Centennial Coal

RESPONSE TO SUBMISSIONS

Airly Mine Extension Project

State Significant Development 5581

February 2015

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Centennial Coal
Airly

Airly Mine

Airly Mine Extension Project
Response to Submissions

Prepared on behalf of:

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1. INTRODUCTION

This Response to Submissions report has been prepared by Centennial Coal Company Pty Limited (Centennial Coal) in response to submissions lodged with the NSW Department of Planning and Environment (DPE) during the public exhibition of the *Environmental Impact Statement* (EIS) for the Airly Mine Extension Project (the Project). The EIS was exhibited from 19 September to 31 October 2014.

The EIS has been prepared in support of State Significant Development application (SSD 12_5581) for the Project in accordance with the provisions of Part 4 Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Director General's Requirements (DGRs) issued on 6 November 2012. The Project is a State Significant Development (SSD) in accordance with Clause 8 and Schedule 1 (Item 5) of *State Environmental Planning Policy (State and Regional Development) 2011*.

As the Project had the potential to impact on matters of environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act), an EPBC Act referral was submitted to the Commonwealth Department of the Environment (DoE) in December 2013 (EPBC 2013/7076). The Project was subsequently declared a controlled action on 24 December 2013 and DGRs re-issued on 4 February 2014 with the Department of the Environment's requirements. The Project will be assessed under the bilateral agreement with New South Wales in accordance with the Part 5 of the EPBC Act.

The Response to Submissions (RTS) report has been prepared in accordance with Section 75H(6) of the EP&A Act and addresses issues raised in submissions received on the EIS. The report builds on information presented in the EIS and is to be read in conjunction with the EIS.

The electronic version of the EIS and submissions received on the EIS can be found on DPE's website http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5581

2. BACKGROUND

2.1. Airly Mine

Airly Mine is an existing underground mining operation located in the Western Coalfields approximately 40 kilometres north northwest of Lithgow, New South Wales. The mine site falls within the Lithgow Local Government Area (LGA).

Centennial Airly Pty Limited (Centennial Airly) is the operator of Airly Mine and is a wholly owned subsidiary of Centennial Coal Company Limited (Centennial Coal). The main components of Airly Mine's existing operations are an underground mine and the surface facilities area. The underground part of the mine is accessed via the surface facilities area. Mine access is off Glen Davis Road, approximately 3 kilometres northeast of Capertee.

Airly Mine's current development consent (DA 162/91) was granted on 14 April 1993 pursuant to Section 101 of the EP&A Act. DA 162/91 is supported by the *Airly Coal Project Environmental Impact Assessment* (Novacoal (1991)) and the addendum titled *Supplementary Report to Environmental Impact Statement* (Novacoal (1992)). The development consent authorises the extraction of up to 1.8 million tonnes per annum (Mtpa) of run-of-mine coal within the existing mining lease area, Mining Lease (ML) 1331 for export market. DA 162/91 allowed for a limited scale trial mine for a period of 12 months with transport of 300,000 tonnes of ROM coal by road to the Mount Piper Power Station.

Three subsequent modifications to DA 162/91 were approved and allowed an increased amount of trial mining coal throughput of up to 500,000 tonnes per annum for 2 years to be transported to Mount Piper Station by road (MOD 1), the construction and operation of a 66 kV power line to the pit top (MOD 2) and the extension of life of consent from 12 October 2014 to 31 October 2015 (MOD 3). Development consent is required to ensure Airly Mine is approved for operations beyond this expiry date.

2.2. Overview of Airly Mine Extension Project

The Project description has not changed since the EIS was submitted for exhibition. As noted in Section 1.6 of the EIS the proposed Project will not significantly alter the nature of the existing operations at Airly Mine and will use existing and currently approved operations. Mining methods will vary from those currently approved in order to reduce subsidence impacts to not exceed 125 mm in previously unmined areas, and minimise further potential subsidence in areas where the historical New Hartley Shale Mine has already impacted the environment. The Project will extend the mining operations to the east within ML1331 and into the A232 boundary. The Project will build and operate new supporting infrastructure to complement existing facilities.

The Project will:

- in general, include all currently approved operations, facilities and infrastructure of Airly Mine
- continue to extract up to 1.8 Mtpa of ROM coal from the Lithgow seam underlying the Project Application Area using underground mining techniques
- extend the life of mine by 25 years from the date of consent (including rehabilitation)
- continue to extract coal using partial extraction methods within the ML1331, and extend the mining area to the east of the existing workings into the A232 area
- develop underground access roadways from the current mining area to the east to allow access to the proposed mining areas
- use various partial extraction mining methods that will manage subsidence not to exceed 125 mm in previously unmined areas and minimise further potential subsidence impacts in areas where the historical New Hartley Shale Mine has already impacted the environment
- continue to operate and maintain the existing ancillary surface infrastructure for mine access, underground ventilation, electricity, water, materials supply, and communications at the pit top, and upgrade this infrastructure as required for mining operations
- continue to handle ROM coal through a crushing and screening plant at the pit top for transfer to the existing and proposed stockpiles as required to meet market demands
- complete the construction of the coal handling and preparation plant (CHPP) through construction of a Coal Preparation Plant (CPP) and associated overland conveyors, required for the beneficiation of ROM coal
- use the existing and new overland conveyor systems for the transfer of ROM and product coal from the underground to the CPP and coal stockpiles prior to despatch to offsite locations
- construct a life of mine reject emplacement area (REA) for the co-disposal of reject materials from the CPP
- continue to use the existing water storage dams at the pit top to meet operational water demands
- construct an appropriately sized new water management dam for the proposed life of mine REA
- continue to manage non-production waste in accordance with the Airly Mine's Mining Operations plan 2013-2020
- despatch ROM and product coal off site using the existing rail load out facilities for the export and domestic markets
- continue exploration, predominantly borehole drilling, to further refine the existing geological model
- continue to undertake environmental monitoring
- review and update existing environmental management plans as required
- operate 24 hours per day and seven days per week for 52 weeks per year.

- provide employment to a full time workforce of up to 135 full time employees and 20 contractors
- progressively rehabilitate exploration boreholes and disturbed areas at the pit top no longer required
- undertake life-of-mine rehabilitation at the pit top disturbance areas to create final landforms commensurate with the surrounding areas.

3. ADDITIONAL ASSESSMENTS AND PREPARATION OF DOCUMENT

While there has been no change to the Project from that presented in the EIS additional assessments have however been completed to support responses to issues raised by government agencies, the Commonwealth Independent Expert Scientific Committee (IESC) on Coal Seam Gas and Large Coal Mining Development and other submissions.

The following specialist consultants have provided additional technical advice to assist with the preparation of the RTS or undertaken additional technical assessments described in the RTS.

- Dr Stuart Gray, Senior Hydrogeologist, GHD Pty Ltd
- Dr Martin Doyle, Principal Consultant – Air Quality, SLR Consulting Australia Pty Ltd
- Katie Teyhan, Associate - Acoustics & Vibration, SLR Consulting Australia Pty Ltd
- Arne Bishop, Senior Ecologist, RPS Australia East Pty Ltd
- Roger Lembit, Director, Gingra Ecological Surveys
- Mark Sargent, Director, Aigis Group
- James Marshall, Director, James Marshall and Co.

The RTS document has been prepared by:

- David King, Senior Mining Engineer, Airly Mine, Centennial Airly Pty Limited
- Nagindar Singh, Environmental Projects Co-ordinator – West, Centennial Coal Company Limited.

and reviewed by Mary-Anne Crawford, Group Manager Approvals, Centennial Coal Company Limited.

4. OVERVIEW OF SUBMISSIONS

Of the 174 total submissions received, nine submissions were from Government Agencies, 13 submissions were from Special Interest Groups and Organisations, 152 submissions were from members of the community. Ten Specialist Interest Groups and 36 members of the community object to the Project while three organisations and 116 members of the community are in support of the Project.

Submissions from the members of the community came from Lithgow and Mid-Western LGAs as well as areas outside these LGAs. The positive submissions came from Mid-Western LGA (51%), Lithgow LGA (31%), Blue Mountains LGA (1%), Bathurst LGA, rest of NSW (13%) and Queensland (2%). Submissions that object to the Project came from Mid-Western LGA (47%), Lithgow LGA (42%), rest of NSW (8%) and overseas (3%).

4.1. Independent Expert Scientific Committee Advice and Government Agency Submissions

4.1.1. Independent Expert Scientific Committee Advice

The NSW Department of Planning and Environment (DPE) and the Commonwealth Department of the Environment (DoE), in a letter dated 8 October 2014, jointly referred the development applications for the Project to IESC for its consideration and advice. The advice provided by IESC on the 12 questions supplied to them by DPE and DoE are summarised in **Table 1**.

Table 1 – Summary of Advice from Independent Expert Scientific Committee

Question to IESC	ISEC Response	Where Addressed
Assessment against information guidelines	Relevant data and information: key conclusions While there is generally sufficient baseline surface water quality data available, there is no baseline surface water hydrology data for Airly Creek. Little information is available on the existing workings in the New Hartley Shale Mine Potential Interaction Zone and as a result, the potential subsidence effects and associated impacts on surface water and groundwater resources are uncertain. There is little aquatic ecology data available for downstream environments as sampling for macroinvertebrates and fish was restricted to the proposed project area, except for two sites on Dog Trap Creek.	**Section 5.1**
	Application of appropriate methodologies: key conclusions. Appropriate analytical, empirical and numerical methods have been used to estimate subsidence impacts. While fault zones are identified within the proposed project area, they are not included within the groundwater model and their potential impacts on aquifer connectivity and groundwater flow are not considered, limiting confidence in model predictions. The groundwater model is appropriate for prediction of regional-scale impacts of the proposal but finer resolution is needed to accurately predict potential impacts to the local environment, specifically including surface water–groundwater interactions. The project assessment documentation is lacking in its identification of groundwater dependent ecosystems (GDEs). There is no estimation of the ecological water requirements of identified GDEs and no ecological conceptual model provided. This information is important for informing the appropriate resolution of future groundwater modelling. The proponent recognises that there were limitations with the sampling methodology for stygofauna: methods used varied between bores, there were a limited number of available and suitable bores, and sampling may have been conducted too soon following purging. Conclusions about the lack of likely impacts on the GBMWHA resulting from hydrology and water quality changes in Airly Creek are not supported by appropriate data and analysis. Identification of the relative contribution of waterways within the proposed project area to flows within the GBMWHA, and identification of potential water-dependent assets within the nearby Gardens of Stone National Park, is needed to support such conclusions.	

Question to IESC	ISEC Response	Where Addressed
	Reasonable values and parameters in calculation: key conclusions The groundwater impact assessment is based on the 'average' fracturing scenario for strata above the panel and pillar sections of mining within the Lithgow Seam. The risk assessment and water balance should include a sensitivity analysis.	
Question 1: In respect to the baseline data utilised in the EIS: Has the baseline climate, groundwater and surface water data been collected to a satisfactory standard over an appropriate timeframe?	Climate, surface water quality and groundwater data has largely been collected to a satisfactory standard and over an appropriate timeframe, but surface water hydrology data is lacking for Airly Creek.	**Section 5.1**
Question 2: In respect to the baseline data utilised in the EIS: Are the rainfall records relied upon in the EIS sufficiently representative of the Airly site for water modelling and prediction purposes? Are better rainfall records available?	It is not possible to answer whether there are better rainfall records available based on the information provided.	**Section 5.1**
	To determine the representativeness of rainfall data used in the EIS for modelling and predictive purposes, an event-based comparison of the rainfall-runoff model against the limited rainfall and stream-gauge data from the site should have been undertaken.	
	Rainfall records, if they exist, should be examined to determine whether there are spatial variations in respect to geomorphic differences such as elevation, slope, and aspect. This variability could impact on the surface water model for the site.	
Question 3: In respect to the baseline data utilised in the EIS: Are there significant geological features present that have the potential to act as preferential pathways between the different hydrogeological units and have these been adequately investigated for inclusion/ omission within the groundwater model?	There are significant structural features (faults) present in the proposed project area that have the potential to act as preferential pathways for water flow within and between different hydrological units. These structural features have not been considered in the hydrogeological modelling and groundwater impact assessment.	**Section 5.1**
	A sensitivity analysis of the potential impacts of faults on the groundwater system and mine inflows would improve confidence in the groundwater risk assessment. Further evidence of the hydraulic characteristics of these structural features should be gathered through continued monitoring of groundwater levels and inflows to the underground workings. Resultant risks to groundwater resources should be assessed and the groundwater model adjusted as needed to ensure that the effects of structural features are captured in updated model predictions.	
Question 4: In respect of the EIS's groundwater modelling and its assessment of the impacts of potential water discharges to surface waters: Does the groundwater model use reasonable and suitable characterisations of the groundwater resources for the	The groundwater model is based on a reasonable conceptualisation of groundwater resources. However predictions of mine inflows and baseflow losses are sensitive to hydraulic properties of fracture zones overlying mined areas, which are yet to be verified. A description of the likelihood of each fracturing scenario and an explanation as to why the chosen scenario was adopted for impact assessment and water balance	**Section 5.1**

Question to IESC	ISEC Response	Where Addressed
Project?	modelling would be beneficial. Ongoing assessment and verification of hydraulic properties of fracture zones induced by mining would improve confidence in model predictions.	
	Finer discretisation within the model in areas of potential groundwater-surface water interaction would improve confidence in predictions of baseflow and alluvial groundwater levels.	
Question 5: In respect of the EIS's groundwater modelling and its assessment of the impacts of potential water discharges to surface waters: Are the anticipated quantitative groundwater and surface water impacts accurately and reasonably described?	No. The predictions of baseflow and mine inflows do not quantify potential impacts of structural features present on the site or the full range of potential subsidence impacts, i.e. the 'active' fracturing scenario. Consideration of the full range of likely induced hydraulic properties above mined areas and the potential effects of geological structures would improve assessment of the potential impacts of the proposed project on groundwater and surface water resources.	**Section 5.1**
	Further, potential impacts associated with springs and seepages highlighted in the aquatic ecology and stygofauna assessment are not adequately considered in the groundwater impact assessment.	
Question 6: In respect of the EIS's groundwater modelling and its assessment of the impacts of potential water discharges to surface waters: Are the predictions of loss flows in local streams reasonable? (Tables 10.5 and 10.6 on pages 290 and 291 of the EIS main text)	There is limited confidence in the predictions of baseflow losses from the current groundwater model due to inadequate consideration of structural features, lack of verification of sensitive fracture zone hydraulic properties and the relatively large mesh size within the model in the vicinity of streams. There is also a lack of baseflow measurements to utilise as model calibration targets. As mining progresses, calibration to actual mine inflows and stream baseflows would improve confidence in predictions.	**Section 5.1**
Question 7: In respect of the EIS's groundwater modelling and its assessment of the impacts of potential water discharges to surface waters: Is it reasonable for the EIS to rely on the conclusion that "There is minimal hydraulic connection between the local and regional groundwater sources"? (Page 277 of the EIS main text)	From the information provided it is considered likely that there is minimal hydraulic connection between the local and regional groundwater systems. However structural features (faults) are present on the mine site, which potentially contribute substantial quantities of water to the production well, as indicated by the high conductivity zone intersected during aquifer testing of the bore. The contribution of these structural features to aquifer connectivity has not been determined nor reflected in the groundwater model. There is the potential that these features may intersect both local and regional groundwater systems.	**Section 5.1**
	Monitoring of groundwater levels within the Shoalhaven Group strata in the vicinity of the production well and to the east of the proposed project area, ongoing monitoring and verification of model parameters and associated incorporation of identified structural features in the groundwater model as needed would provide early warning of any potential impacts to regional groundwater resources.	
Question 8: In respect to how the EIS relates to matters of national environmental significance: Do the	No. The assessment does not provide reasonable estimates of the risk, likelihood, extent and significance of impacts to water related assets. Although impacts to	**Section 5.1**

Question to IESC	ISEC Response	Where Addressed
subsidence, groundwater and surface water assessments provide reasonable estimations of the risk, likelihood, extent and significance of impacts to water-related assets?	streams in the vicinity of the project area have been considered, the assessment of impacts to downstream water-related assets arising from proposed discharges to Airly Creek has not been justified and supported by data. Confidence in the prediction of impacts to GDEs is limited as no assessment of the ecological water requirements of GDEs in the proposed project area has been undertaken. Furthermore, potential impacts to some springs across the escarpment are not considered.	
Question 9: In respect to how the EIS relates to matters of national environmental significance: Is the Project likely to cause any impacts to the downstream streams and rivers, and through to the Colo River, and within the Gardens of Stone and Wollemi National Parks and Greater Blue Mountains World Heritage Area? If so, what is the likely nature and extent of these impacts?	Changes to the flow regime and water quality in Airly Creek are likely as a result of the proposed project. In order to determine the nature and extent of potential impacts to downstream watercourses additional baseline hydrological and ecological information is needed, particularly within the Gardens of Stone National Park.	**Section 5.1**
Question 10: In respect to how the EIS relates to matters of national environmental significance: What are the risks of impact to the critically endangered species *Pultenaea* sp. *Genowlan Point* from hydrological and hydro- geological changes resulting from the project? Are these adequately addressed in the EIS?	Hydrological or hydrogeological impacts to the Genowlan Point Pultenaea (*Pultenaea* sp. Genowlan Point) are not anticipated as a result of the proposed project. The EIS would benefit from maps detailing the location of the population relative to the proposed mining zones, and development of an adaptive monitoring and management approach to prevent potential diversion of water as a result of subsidence.	**Section 5.1**
Question 11: In respect to how the EIS relates to matters of national environmental significance: Are the proposed mitigation measures likely to be effective in managing impacts to water-related assets of the project (including downstream assets)? Are additional measures and commitments required to mitigate and manage impacts to water-related assets?	There is limited confidence in the accuracy of predicted impacts to groundwater, surface water and water related assets. As such, the effectiveness of proposed mitigation measures is difficult to assess and additional mitigation may be required following further identification and assessment of impacts to water related assets. Consideration should be given to broadening the mining exclusion zone around Gap Creek and the development of further adaptive management procedures for subsidence.	**Section 5.1**
Question 12: In respect to how the EIS relates to matters of national environmental significance: What are the key features of a monitoring and management framework that would address the key uncertainties and risks of the project identified by the Committee?	Key uncertainties and risks of the proposed project include: the nature and extent of downstream impacts on Airly Creek; identifying potential water related assets within the Gardens of Stone National Park; and groundwater drawdown and subsidence, with associated effects on mine inflows, baseflow reductions to Gap and Genowlan Creeks and potential GDEs within the proposed project area. In order to address these risks and uncertainties a robust groundwater, surface water, aquatic ecology and subsidence monitoring and management framework is needed, as described below.	**Section 5.1**

4.1.2. Government Agency Submissions

Government agency submissions were received from:

- Lithgow City Council (LCC)
- Environment Protection Authority (EPA)
- Office of Environment and Heritage (OEH)
- New South Wales Office of Water (NOW)
- NSW Health – Nepean Blue Mountains Local Health District (NSW Health)
- Office of Agricultural Sustainability & Food Security (OAS&FS), Department of Primary Industries
- Roads and Maritime Services (RMS)
- NSW Division of Resources and Energy (DRE)
- Commonwealth Department of the Environment (DoE).

Summaries of comments and issues raised by the government agencies are provided in **Table 2**. This table also notes sections in the RTS where the issues raised are addressed.

Table 2 – Summary of Comments and Issues in Submissions from Government Agencies

Area of Concern	Comment / Issue	Where Addressed
Mine Design and Subsidence	Council would accept a maximum of 125 mm for potential subsidence for the entire site to prevent surface damage and support the mining method of partial extraction. However, in the area of New Hartley Shale Mine Potential Extraction Zone, Council considers that any further subsidence should be viewed with concern. It is a trending issue through the EIS document that New Hartley Shale Mine Potential Extraction Zone is problematic and may cause impacts in a range of areas if mined including (but not limited to); water quality, visual, surface structures, endangered and threatened species or communities, and water resources. Council considers that this area should not exceed the existing 500 mm vertical subsidence, given existing cracking and potential for increased damage to surface features, water resources, flora and fauna. A detailed Mine Subsidence Plan should focus on no additional subsidence within this area to reduce impact to surface features and potential impact to water resources (ie village spring). There may be a need for an exclusion zone and or restriction to first workings only in areas that do not meet the required subsidence criteria. (**LCC**)	**Section 5.2.1**
	OEH's major concern regarding this development is the potential for impact on the natural features of Mugii Murum-Ban State Conservation Area. OEH accepts that the proposed mining methods and mine design should result in "negligible subsidence impact" over the majority of the mining lease. OEH notes that greater subsidence impacts may occur above the old oil shale workings. (**OEH**)	
	The review of the EIS has led to the identification of two fundamental questions, both of which are considered to be mine feasibility matters for the proposed project. DRE consider that these issues need to be addressed prior to the Extraction Plan stage. These questions are: 1. What should be the appropriate set-off distance from secondary extraction (in other words, what should be the dimension of the "cliff protection zone"), to maintain the integrity of the significant cliff formations within the subject area on a long term basis?	

Area of Concern	Comment / Issue	Where Addressed
	2. Where should the "cliff protection zone" be applied to maintain the integrity of the significant cliff formations within the subject area on a long term basis? Given the significant cliff formations within the subject area DRE recommends that an independent expert panel be established to undertake assessments of all relevant factors and identify the set off distance from secondary extraction and determine the appropriate cliff protection zone. The assessment and determination should be made prior to the proponent submitting an extraction plan. (**DRE**)	
	The EIS stresses the importance of developing a monitoring system that minimises the impact on the environment, an important consideration for OEH. Section 8 of the Subsidence Predictions and Impact Assessment emphasises the value of the installation of stress and deformation monitoring instrumentation in the underground pillars providing data in respect to the stability of these pillars. The use of conventional subsidence monitoring lines over the first series of extraction panels beneath Mount Airly is expected to demonstrate the accuracy of less intrusive remote monitoring, which "would eliminate the reliance upon conventional subsidence survey lines" in more environmentally sensitive areas. OEH recommends that the DPE considers applying a condition of consent to ensure that minimal impact monitoring systems are employed within Mugii Murum-Ban SCA to minimise impact to the environment. (**OEH**)	
Water Resources	Overview of Key Findings page IV in EIS *"Airly Creek is predicted to experience a maximum cumulative increase of 14.5% in flow".* On page 3 in the Executive Summary of the SWIA reference is made to a change in waterway flow of 1% in Airly Creek. The EPA is therefore seeking clarification of the likely increase to flow in Airly Creek due to mine activities related to LDP001. (**EPA**)	**Section 5.2.2**
	Assess the potential impacts of reductions in baseflow due to mining on basic landholder rights for surface water users. (**NOW**)	
	Undertake a further review of the groundwater dependant ecosystems within and around the PAA, with reference to the potential for impacts relating to base flow and surface seepage (springs) reductions. (**NOW**)	
	Clarify the expected volumetric take of water from mine inflows after cessation of mining activities. (**NOW**)	
	Clarify water licensing arrangements for surface water and incidental ingress of groundwater into the mine and obtain additional water entitlement if required. (**NOW**)	
	Clarify the proposed life of the mine. Proposed coal production is due to commence in 2015, and is to extend for 25 years (estimated to cease in 2040) with a recovery of 60 years to 2100. The modelling and subsequent groundwater assessment report detail the production of coal is to last until 2030. (**NOW**)	
	Refer to the NSW Office of water guideline *"Groundwater Modelling and Monitoring Plans - Introduction for prospective mining and petroleum exploration activities",* and liaise with the Office of Water when preparing the Groundwater Monitoring and Modelling Plan (GWMMP) for the project. (**NOW**)	
	Include periodic monitoring of geomorphic conditions of third order streams within the project area as part of a post-approval management plan. (**NOW**)	
	Ensure that any take of clean water runoff is licensed through the Office	

Area of Concern	Comment / Issue	Where Addressed
	of Water. (**NOW**)	
	Investigate and determine the frequency and intensity of rainfall event that may cause larger onsite dams to go into discharge. (**NOW**)	
	The EIS should address the impact on groundwater for agriculture as part of the water management investigations. (**DPI**)	
	<u>Impacts on Water Resources and the Greater Blue Mountains World Heritage Area</u> The Department recommends that the proponent respond to and address comments, issues. knowledge gaps and additional analysis required by the Independent Expert Scientific Committee's (IESC) in its advice on the project, especially as they relate to water resources, the Greater Blue Mountains World Heritage Area and potential impacts to EPBC-listed species . Once the additional information requested by the IESC is collected, the proponent should use the additional information to reassess and revise the impact assessments provided in the EIS documentation to adequately quantify the extent of any impacts on MNES in the RTS. (**DoE**)	
Ecology	OEH also notes that impacts cannot be entirely ruled out and that some rock-fall is predicted. OEH has particular concerns regarding the vulnerability of the Genowlan Pea and unknown vulnerability of the Genowlan Point *Allocasuarina nana* Heathland EEC, and thus the importance of monitoring and associated Trigger Action Response Plans. (**OEH**)	**Section 5.2.3**
	The OEH has previously responded, on 16th May 2014, to an earlier draft of the EIS and raised several concerns including the status of derived native grassland being impacted by the Reject Emplacement Area. These concerns have been addressed in the final version of the EIS. It has been confirmed that Grassy Box Gum Woodland Endangered Ecological Community (EEC) is present within the Reject Emplacement Area but the condition of this, and other derived native grassland types present, do not warrant an offset. (**OEH**)	
	<u>Avoidance of impacts on Matters of National Environmental Significance</u> The Department notes that the project currently proposes to undermine the only known population of the Genowlan Point Pultanea. Due to the highly restricted nature of this critically endangered species, any impact to the species or its habitat will be considered as substantial. The Department requests that the proponent is asked to consider further avoidance of undermining this species, including a sufficient buffer. Further to this, the Department will require that this species must be adequately monitored with contingency measures in place, which should include ceasing mining activities should any impacts (greater than 'negligible') be observed as a result of mining outside of a buffer area. These monitoring and contingency measures should be outlined in the RTS and addressed in greater detail in a management plan. (**DoE**)	
	<u>Impacts on Threatened Species and Communities - Adequacy Comments Not Addressed</u> The Department notes that it appears that the proponent has not addressed the following adequacy comments with sufficient detail. This information is requested to be included in the RTS. 1. Threatened Bat Species	

Area of Concern	Comment / Issue	Where Addressed
	The Department notes that the proponent has stated that old mine workings provide potential habitat for threatened bats. As there will be high levels of subsidence in the Old Hartley Shale Mine, this could impact on habitat for these bats should they reside in the mine. Therefore, additional information, which may require additional surveys , is necessary to determine the Old Hartley Shale Mine provides presence/absence of threatened bats. If the mine is found to provide habitat for listed threatened bat an impact assessment must be provided and avoidance, mitigation safeguards and measures proposed. 2. White Box - Yellow Box - Blakely's Red Gum and Derived Native Grasslands (Box Gum Woodland) The Department notes that the proponent currently concludes that only 3.27 ha of the grassland state of Box Gum Woodland are likely to be impacted by the action. However, additional information is required to confirm the extent of the ecological community and rule out the possibility that modified areas (contained on page 334 of Chapter 10) meet the definition of the community. Further information regarding the Commonwealth definition of the critically endangered community, and the information Centennial need to address, is at Attachment B. (**DoE**)	
Cultural Historic Heritage	Given the significance of the Airly Shale Oil Mining Complex and the inclusion in the Draft Lithgow Local Environmental Plan 2013 the development should have due regard to the Conservation Management Plan produced by the NSW NPWS. (**LCC**)	**Section 5.2.4**
Noise	There is increasing evidence that exposure to noise is associated with health effects. We recommend that noise mitigation strategies listed in the application become part of the conditions of approval to ensure there are minimal impacts on the local community from noise. (**NSW Health**)	**Section 5.2.5**
	The general operation of the mine is predicted to perform within the industrial noise guidelines, however there are concerns with the rail traffic noise. At times it is predicted that noise will exceed the limits at night, however these noise levels are exceeded regardless of Airly Mine's operations. Nonetheless, an appropriate restriction should be imposed to minimise or prohibit train movements at certain times of night to reduce potential impacts on residents within 100 m of the rail lines. (**LCC**)	
	(a) F class inversions and source to receiver winds were modelled independently, but not together, to predict a maximum $L_{Aeq15\ min}$) at receivers of 35 dBA. Appendix D of the *New South Wales Industrial Noise Policy* (INP, EPA 2000) indicates that adding an inversion to a source to receiver wind prediction may increase the predicted level by 2-3 dB (over a distance of 400- 600m), which would result in a predicted $L_{Aeq(15min)}$ up to 38 dB (3 dBA above the Project Specific Noise Level [PSNL]). Predictions should therefore be provided considering both inversion conditions and source to receiver winds in combination. (**EPA**)	
	(b) The EIS stated that the exploration program will be used "for the ongoing refinement of the site's existing geological model which then allows detailed mine planning" (page 86), indicating that it is not an exploration or construction activity but part of the operation of the project. Each drilling campaign was estimated to last less than three weeks in the EIS, which was used as a justification for assessing it under the *Interim Construction Noise Guideline* (ICNG, DECC 2009). The proposed drilling appears to be part of the ongoing operation of the mine, for an extended period (up to the life of the project),	

Area of Concern	Comment / Issue	Where Addressed
	and the ICNG does not apply to mining. The proposed drilling should therefore be assessed under the INP. (**EPA**)	
	(c) The NVIA predicted that the project would increase LAeq(night) rail noise levels, which are already above criteria from the *Rail Infrastructure Noise Guideline* (EPA 2013), by 0.6 dB. While this increase is likely to be imperceptible, existing noise levels above criteria will be exacerbated by the project and the EPA recommends that Department of Planning and Environment (DPE) consider requiring the proponent to use only best practise rolling stock for rail transport resulting from the proposal (including only locomotives which have obtained EPA approval to operate on the NSW rail network under Condition L2 of EPL No. 3142, 12208 or 13421, or in accordance with the former *Noise Control Act 1975)* (**EPA**)	
	(d) Some of the Sound Power Levels (SWL) given in the NVIA appear to be low, for example the Coal Handling and Preparation Plant (CHPP) was given a SWL of 94 dBA internal, and four locomotives (notch two) were given a combined SWL of 111 dBA. No tonal or low frequency modifying factor adjustments were considered applicable, but low frequency modifying factor adjustments are often required for mining projects, especially CHPPs. The NVIA stated that the two SWL were measured at Newstan Colliery, the EPA requests that the modelled SWLs are justified by comparing the measured CHPP and locomotives with the types in use at Airly Mine or proposed for the project. (**EPA**)	
	(e) The statement of commitments in the EIS commits to a Noise Management Plan (NMP) for the project, without specifying what will be addressed in the plan. Any project approval issued should include requirements to be addressed in a NMP for construction, operation and drilling noise. (**EPA**)	
	(f) L_{Amax} levels were used to predict impacts on sleep disturbance. This is acceptable, and care should be taken to specify appropriate sleep disturbance limits in any project approval given (L_{Amax} limits should be provided rather than $L_{A1(1min)}$). (**EPA**)	
	(g) Blast overpressure and vibration was not assessed in the EIS or NVIA. If any blasting is proposed for the project, it should be assessed against ANZECC (1990) guidelines. (**EPA**)	
	(h) Impacts on passive recreation areas in the Capertee National Park and Gardens of Stone National Park do not appear to have been assessed. However, compliance with criteria at these locations is indicated by compliance with residential criteria at nearby receivers, for example receiver R1. Any project approval, if issued, should contain noise limits for passive recreation areas in the National Parks. (**EPA**)	
Air Quality	During the creation of the REA and construction of infrastructure every caution be taken to suppress dust. Additionally, adequate erosion and sedimentation controls should be implemented until soils are suitably stabilised. Internal roadway use and stockpile work should be managed in a manner that will also reduce dust issues. (**LCC**)	**Section 5.2.6**
	The review of the Air Quality Impact Assessment (AQIA) by the EPA has determined that the assessment has been generally undertaken in accordance with the Approved Methods for Modelling and Assessment of Air Pollutants in NSW. EPA recommended conditions of Project Approval: The EPA is satisfied that the air emissions are unlikely to exceed the EPA impact assessment criteria at the identified sensitive receptors,	

Area of Concern	Comment / Issue	Where Addressed
	providing the project activities are undertaken in line with the four distinct scenarios utilised for the dispersion modelling. (**EPA**)	
	The background data source for air quality measurement prediction was Bathurst 2010. The report mentions that the characteristics of the location and activities that could affect the air quality is very different in Bathurst and the adoption of data should be regarded as very conservative. Hence any modelling conducted using this data is likely to underestimate the decline of air quality levels at Airly Mine area. A sensitivity analysis should be used to determine the effect of using higher background levels. (**NSW Health**)	
	It is not explained why background data for 2010 was chosen instead of the most recent data. The maximum PM_{10} 24 hour concentration in year 2010 was 43.3 $\mu g/m^3$ which was 12 $\mu g/m^3$ lower than in year 2012. This would mean that the maximum 24 hour PM_{10} concentration for year 2012 was 55.3 $\mu g/m^3$. However, for the modelling, year 2010 data was used rather than more recent 2012 data which was already higher than the maximum recommended level. Modelling should use the most recent available data. (**NSW Health**)	
	There was no background data for $PM_{2.5}$ (annual average and 24 hours average) available. However modelling was conducted in the absence of background data applying only the increments to predict the 24 hour average and annual average $PM_{2.5}$ concentrations. The conclusions were made that those concentrations are expected to be much lower than the EPA criteria. If background data is unavailable then reasonable estimates derived from known TSP background concentrations should be used in the absence of appropriate background PM2.5 data. (**NSW Health**)	
	Real-time air quality monitoring is mentioned as the best practice, but the proponent has deemed the monitoring unnecessary as the predicted air quality parameters are well below the DGR criteria. However as discussed above due to the problems that we have identified on the methodology of calculation of predicted particulate matter levels, in addition to the absence of any data on PM2.5, it is highly recommended that the proponent considers real time air quality monitoring. (**NSW Health**)	
	Predicted or known impacts from the Excelsior Limestone Quarry located 6.5 km northwest of Airly Mine have not been considered. The applicant has mentioned that due to its distance from the proposed development, the cumulative impact on air quality is unlikely. However it is well known that particulate matter can travel several kilometres, especially $PM_{2.5}$. It is recommended that air quality impacts from this quarry are included in modelling. (**NSW Health**)	
Visual Amenity	Landscaping to be undertaken to minimise visual impacts of the REA is to be completed when the REA has commenced. This landscaping is to be maintained /monitored for the duration of the mining operations and at a standard suitable to act as a visual screen. (**LCC**)	**Section 5.2.7**
	That all lights be directed towards to facility and be situated to not produce light on adjoining properties or impact drivers along Glen Davis Road. (**LCC**)	
	That measures be taken to screen the run-of-mine stockpile from being visual prominent along the Castlereagh Highway or Glen Davis Road. This may include minimising the stockpile size and restricting its height. (**LCC**)	

Area of Concern	Comment / Issue	Where Addressed
General Issues	Centennial will be required to obtain a mining lease for the areas to be mined within Authorisation 232. (**DRE**)	**Section 5.2.8**
	Exploration activities must be notified to and approved by DRE. (**DRE**)	
	It is noted that no clearing of surface vegetation is proposed as part of the project. Exploration activities are proposed with no reference to how many holes are proposed to be drilled or the locations of the drill holes. (**DRE**)	
	It is recommended that the NSW Office of Water undertake a socio-economic assessment of any physical movement of water away from agriculture. (**OAS&FS**)	

4.2. Submissions from Special Interest Groups and Organisations

The following 13 Special Interest Groups and organisations provided submissions; issues raised in their submissions are summarised in **Table 3**. This table also notes sections in the RTS where the issues raised are addressed.

- Alison Hunt Ecology on behalf of EDO NSW and Capertee Valley Environment Group Inc.
- BirdLife Australia Company
- Blue Mountains Conservation Society (BMCS)
- Capertee Valley Alliance Incorporated (CVA)
- Capertee Valley Environment Group Inc. (CVEG)
- Greater Blue Mountains World Heritage Area Advisory Committee (GBMWHAAC)
- Henbury Sport and Recreation Club Limited
- Mark Lilley Plant Hire
- Running Stream Water Users Association (RSWUA)
- The Australia Institute (TAI)
- The Colo Committee
- The Colong Foundation for Wilderness
- Westfund Limited

4.3. Submissions from Members of the Community

Submissions from the members of the community are provided in **Table 4**.

4.4. Positive Submissions from the Members of the Community and Organisations

Submissions from the members of the community are provided in **Table 5**.

Table 3 – Summary of Issues Raised in Submissions from Special Interest Groups and Organisations

Area of Concern	ID of Respondent	Comments	Where Discussed
General Issues	111746	The requirement to apply the precautionary principle to the management of MM SCA (the site of the proposed mining) as set out in the OEH Statement of Intent is not recognised and applied.	**Section 5.3.11**
	111493	In the interests of maximising their profits, mining companies fail to employ the precautionary principle at a level that properly protects high conservation areas such as this SCA. We believe the same process still continues in this EIS. The EIS seeks to hide the fact that too much coal is being extracted to ensure that significant damage does not occur to an area of national and international significance. As the co-author of the only real paper on pagoda geomorphology (Washington and Wray, 2011), I would dispute what is stated on p. 37 of the EIS regarding pagodas in the SCA. There are both smooth and platy pagodas present, with good examples of both types. Mugii Murum-ban SCA is an excellent showcase of pagoda geodiversity. P. 39 states that narrow deeply incised gorges are 'quite common' throughout the Blue Mountains. This is true of gorges but quite untrue of slot canyons such as the Grotto and Valley of the kings. Slot canyons are mainly limited to the north-west edge of Wollemi NP and Gardens of Stone. The extent of slot canyons in this area is arguably of international significance (Washington and Wray 2014). The Grotto is thus not just another boring old gorge, it is a slot canyon, a significant landform on the national and international stage.	
	111640	The EIS is totally inadequate in its evaluation of the cultural and biophysical heritage significance of the mine area. The pagoda rock formations and slot canyon areas are of incalculable value. The site is immediately north of the World Heritage Area. We understand the Greater Blue Mountains World Heritage Advisory Committee has indicated that it would seek at a future time to add the Mugii Murum Ban State Conservation Area to the Greater Blue Mountains World Heritage Area once mining has been completed - assuming its outstanding natural heritage values have not been damaged. This area is of national and international significance. Accordingly, the precautionary principle should be applied to ensure the protection of the area and to minimise possible disturbance to the State Conservation Area.	
	111630	Centennial Airly Pty Ltd has provided insufficient information to allow full understanding and assessment of the implications of the proposed works. Only a few, short, verbal statements have been provided on the existing and proposed extensions to the mining activities and two, small scale general maps which were impossible to interpret accurately or relate to the surface conditions, or any (possibly) affected natural environment. There was no contour information or relevant levels for either the mining works or the overlaying country. As part of the EIS Centennial Airly Pty Ltd should be required to detail all measures that will be taken to ensure the quality of any discharges of water from the mine or the adjacent areas affected by the mining activities or access roads. All surface drainage both natural and formed is to be detailed on the submitted plans. All sewerage installations both existing and proposed are to be fully detailed in the EIS documents. Centennial Airly Pty Ltd should be required to submit all technical information in the form of maps and scale drawings showing the existing and proposed mine tunnels and shafts, their levels to AHD (Australian Height Datum and all new maps) together with overlaying maps (to the same	

Area of Concern	ID of Respondent	Comments	Where Discussed
		scale) of the surface contours and features and the positions and details where strengthening pillars will be left to support the roof of the mined areas. The Advisory Committee maintains its opposition to the extension of the original consent. In summary, the Advisory Committee: • believes that the 1991 development consent for this mine should be revoked and a new development application should be provided for the whole mining operation. • strongly supports the proposed amendment of the conditions of consent regarding the subsidence-conditions 13, 13A, 13B and 13C.	
	111748	It is our understanding that it is against International Best Practice Guidelines to mine within, or adjacent to, a World Heritage Area. This is stipulated by the International Union for Conservation of Nature. CVEG Inc. requests that the same evaluation should apply to this proposal as did the Coalpac Consolidation Project which the Department of Planning determined should be refused because impacts on the area's conservation values would be 'unacceptable'.	
Mine Design and Subsidence	111746	The EIS does not contain any explicit reference to, let alone commitment to, restricting extraction of the resource to 50% as previously made to conservation groups at the time of the dedication of MM SCA. The fact that this commitment is not mentioned in the EIS at all is a major omission by Centennial, a breach of trust and of great concern. Given the importance of this central commitment, Centennial needs to explicitly explain whether and how this commitment is met through the proposed expansion project. The impacts of subsidence are not independently substantiated and do not provide sufficient confidence that impacts to the pagodas, cliffs, deep canyons and gullies will be negligible. Expert review has identified concerns about the predicted level of subsidence and contradictions with the mine plan for the Airly Mod 3 which would warrant review of the EIS. The EIS acknowledges that there will be some damage to cliffs because of the predicted level of subsidence and impacts on groundwater and proposes monitoring and adaptive management of operations rather than avoidance. [EIS, at pp.243 – 250]. It is seeks to minimise the impacts for instance claiming that up to 10% of cliffs might have rockfalls but these would only be “isolated rocks” [EIS at p.245] This is not substantiated and does not rely on independent advice. Relying on the performance of certain standards is inherently risky and once mistakes are made the damage has been done. As well, monitoring is acknowledged as being difficult to implement because of the nature of the terrain. As a result, the proposed operations will not have sufficient oversight to check that performance is meeting the proposed standards and levels of “acceptable” damage. [EIS at p.249] Instead, where there is uncertainty as here, the precautionary principle should be applied. A lot of reliance on TARP - criticised at AP. If there is uncertainty about the efficacy of the mining activity, the precautionary principle would require reducing the impact rather than monitoring it. However, the EIS concludes that when balancing an economic return from the mine with the level of environmental impacts, the economic return justifies not ensuring that there will be negligible	**Section 5.3.1**

Area of Concern	ID of Respondent	Comments	Where Discussed
		impacts on the environment. [EIS at p.250] The Society believes that this is not an appropriate balance to strike in a location which is reserved for its significant conservation values.	
	111493	Colo Committee's key concern remains the percentage of coal to be extracted under highly important pagoda and slot canyon areas and also under very high cliffs and associated very steep talus slopes that act as 'flying buttresses' to support these cliffs. However, given that Centennial in the past verbally assured the Colo Committee and the Colong Foundation for Wilderness that only 50% of coal would be mined under the mesas to ensure their protection, the EIS is woefully deficient in actually owning up to the percentage extraction under this area of great conservation significance. We have had to ourselves determine this percentage from comparing mine layouts for the various extraction zones. We are thus dismayed that extraction rates will be as much as 66% under the majority of the mesas (panel and pillar zone). Such critical information should not have been hidden inside the EIS and breaches clarity and transparency requirements **Panel and pillar area** – most of mesas including pagodas, the Grotto and slot canyons such as Valley of the Kings and heathland Endangered Ecological Community – 61 metre void and 29.5 metre chain pillars so essentially 66% of coal is being extracted Partial Pillar extraction zones – depends on the depth as to how much they take off the pillar, but looks like it will range from 50-60% extraction. From the diagrams in the EIS this is the hardest to estimate percentage extraction. This is set to happen under the steep talus slopes that act as flying buttresses to hold up the cliffs. **Shallow zone** – first workings so around 30% extraction. 66% extraction would not be considered acceptable under a water storage or under a cathedral. These mesas are 'natural cathedrals, so 66% extraction is not acceptable here either. The geodiversity of Mugii Murum-ban needs to be protected for thousands of years, not just the life of this mine. Void widths should be only 40 metres wide with 40 metre pillars. **Cliff line zone**. The EIS notes (e.g. p. 245) that up to 5% of cliff lines could be damaged by subsidence. It seeks to suggest that this would just be 'isolated rock falls', but this is just wishful thinking. 5% damage to these high superb cliffs is unacceptable in a SCA. It is simply not acceptable to mine any coal under cliffs over 50 metres in height. If this occurs under the tip of Genowlan Point (where there is faulting and jointing) then there is a very good chance that the only known population of Pultenaea sp. Genowlan Point, a critically endangered species rarer than the Wollemi Pine will be destroyed as this area collapses **Partial pillar extraction zone.** Under steep talus slopes supporting high cliffs, we feel these areas should be first workings only – with 30% extraction. **New Hartley shale mine zone**. The EIS states there has been prior subsidence (estimated around 300 mm) and argues there will not be further damage (other than additional surface cracking, p. iii) caused by 500 mm subsidence. This is irrational and no proof is provided. The cliffs in this zone are directly upslope of the historic oil shale mining ruins. The EIS points out that there are cracks caused by the earlier subsidence and that a major rock fall occurred in 1911 (from that estimated 300 mm subsidence). With half a metre subsidence planned, this is likely	

Area of Concern	ID of Respondent	Comments	Where Discussed
		to be more severe, with possible further cliff collapse that damages these nationally significant ruins. 66% extraction is clearly inappropriate under this area, which should be limited to first workings (30% coal extraction). The EIS indicates that subsidence could be up to 65 mm, more than twice that at Clarence colliery. Hence why the void widths need to be decreased and the pillar widths widened (where only 50% of coal is mined) to reduce subsidence to a similar level as at Clarence. Reducing the amount of coal extracted by some 10-15% by the changes suggested above, the precautionary principle would be brought into play and the risk of major damage strongly reduced. The suggestion on p. 38 that pagodas will typically crack but that total collapse does not happen is not a rule. In fact pagodas undercut by caves or that are tilted have collapsed from subsidence in other parts of the Western coalfields. As p. 38 notes, pagodas are 'sensitive surface features', for this reason one does not remove two thirds of the coal in voids 61 metres wide underneath them. The claim on p. 38 that 66% coal extraction will have no effect on talus slope vegetation is also questionable as major cliff collapse will have major effects on this community.	
	111640	Extraction techniques and the percentage of coal extracted from beneath different geological formations have been shown to lead to significant subsidence. However, the EIS is not at all specific about this. It is difficult to work out what the percentage extraction will be under the different zones (ie, cliff edges, talus slopes, the mesas that contain the slot canyons and the pagodas). The extraction plan should be made available for public scrutiny. Centennial must be required to uphold its commitment to take only half of the coal under the whole of the State Conservation Area to protect biodiversity and avoid pagoda and cliff collapses, and this percentage must be reduced under the more sensitive areas.	
	111630	The Advisory Committee maintains its opposition to the extension of the original consent. In summary, the Advisory Committee: • strongly opposes the proposed two thirds coal extraction over most of the SCA which will threaten pagodas, slot canyons and internal cliffs. • supports that half the coal resource be left in the ground to protect the biodiversity and geodiversity of Genowlan and Airly mesas • strongly opposes 30% mining extraction even under 120 metre cliffs like Genowlan Point. • strongly opposes the proposed 60% coal extraction under the steep talus slopes that support the cliffs.	
	112923	Pells Consulting Report: • The panel pillar zone subsidence estimations are based on a limited database and numerical model from the USA. The use of Clarence as a base case is not valid as reported subsidence there is 20-30mm. The panel and pillar method should target the same values.	

Area of Concern	ID of Respondent	Comments	Where Discussed
		• The proposed Cliff Zone is much smaller than the Environmental Protection Zones in the current consent. • Flooding of first workings under cliff lines may cause cliff instability due to up to 65mm of subsidence and tilts in the range 0.6 – 1.0mm/m. A cliff of 150m would then be tilted up to 150mm and some instability would be expected. The mine should ensure the workings will not fill with water. • The partial pillar extraction zone subsidence estimations are based on a limited database and numerical model from the USA. The uncertainty of these predictions in a critical area at the base of the cliffs means would be wise to eliminate this zone and conduct only first workings from the shallow zone to the cliff zone. • The level of damage predicted in the shale mine zone should be unacceptable to government authorities and should be limited to first workings only. • Failure to acknowledge that there is a zone 6 where there is no mining under Gap Creek warrants the resubmission of the EIS. • The panel pillar zone subsidence estimations are based on a limited database and numerical model from the USA.	
	111660	The review of this proposal (SSD 12_5581) should ensure all activities regulated under the existing development consent are reviewed, including in particular the recent modification to extend the 1993 development consent for one year. This extension allows mining in shallow areas under streams where apparently no mining is now proposed (in SSD 12_5581) due to potential stream impacts. The Colong Foundation seeks consent conditions for this project that will: • Ensure that the historical New Hartley Oil Shale Mine are defined as sensitive heritage of special significance that must protected from any subsidence movement and impacts; • ensure that high cliffs (including those at Point Hatteras and Genowlan Point),pagodas, the Grotto and the Valley of the Kings are defined as sensitive heritage of special significance and fully protected from any subsidence movement and impacts; • allow the angle of draw of 25 degrees to be retained so that the 'environmental protection zone' (for subsidence) in the existing consent is not reduced in width by about 50% as is currently proposed; • minimise the toxic mine effluent by separating clean runoff from the toxic cocktail of mine water make, bore process water and runoff from the mine site; • require the proposed coal preparation plant to use chemically polluted water stored on site in the restricted release zone until exhausted before using other water sources; • given that this proposed project is an allegedly a dry mine, establish a 'restricted release zone' that ensures there is a neutral or beneficial effect on water chemistry and aquatic life (particularly macroinvertebrates) in	

Area of Concern	ID of Respondent	Comments	Where Discussed
		the waterways of the World Heritage Area and in Capertee National Park; • chemically treat any toxic mine effluent discharged from the mine to a level that will ensure there is no a neutral or beneficial effect on water chemistry and aquatic life in downstream national parks and the World Heritage Area; • revise the EPL for this mine so that the key pollutants in mine discharges that could harm the World Heritage Area downstream are regulated to ensure there is a neutral or beneficial effect on water chemistry and aquatic life; • as the responsible land owner, assess and adequately rehabilitate the exposed mine waste dumps associated with historical oil shale mining in the head catchment of Torbane Creek to reduce pollution runoff to acceptable levels; • ensure all arrangements between the mining company and National Parks and Wildlife in relation to Mugii Murrum-ban State Conservation Area regarding surface operations are subject to public comment and review; • ensure any lands currently owned by Centennial Coal suitable to be transferred to the NPWS are appropriately transferred at a time that is satisfactory to both parties; and • ensure noise levels emitted from the mine at the Airly Gap area and other important areas of quiet recreation is below background noise level to protect natural quiet. The Colong Foundation agrees with the position put forward by the Colo Committee that the cliff falls along 10 per cent of cliffs in the so-called panel and pillar zone and 5 per cent in the cliff line zone are highly inappropriate. There are two problems with the proposed panel and pillar zone. The void width of 61m producing recovery rates of 67% is too great, as the degree of cliff collapse generated indicates and must be reduced to prevent significant cliff damage in that zone. Secondly, this zone also needs to stand further back from the cliffs in the cliff zone to ease tilts and strains on cliff lines in the adjoining zones. This additional stand back consideration is particularly important for the very high cliffs at Point Hatteras and Genowlan Point where mining should be restricted to first workings. The width of cliff protection is far less than in the 1993 consent of 140 metres, at approximately 70 metres wide, or half the width. This is unacceptable. Reducing the angle of draw to 8 degrees will cause avoidable cliff falls resulting in the predicted collapse of 5 per cent of cliffs. The protection generated by the 25 degree angle of draw is necessary for not only internal and external cliffs but also for the Valley of the Kings and the Grotto, as protected by the initial consent. The Colong Foundation finds it hard to comprehend how subsidence design criteria limited to 125mm can have up to 5% cliff damage and for six cliffs up to 10% cliff damage. Surely the proposed flexible design plan can and should ensure no damage to cliff lines in a state conservation area. There is no analogue between Airly and Clarence Mines and no empirical data can be drawn from Clarence to apply to Airly regarding possible impacts. The Airly mine will have much greater cliff and pagoda damage than the Clarence Mine. Seeing that the Airly mine is in a state conservation area, this comparison confirms that the likely	

Area of Concern	ID of Respondent	Comments	Where Discussed
		outcome in cliff and pagoda damage from this proposal will be unacceptable. Due to the anticipated amount of cliff damage it is inappropriate for the panel and pillar mining zone to operate in or close to areas with cliffs, pagodas, caves, overhangs and cultural heritage sites as indicated in the EIS. Golder Associates also recommended (which the proponent apparently ignored) that in the case of Airly, minor impacts would warrant reconsideration of setback distances from cliff lines to the extraction areas associated with panel and pillar mining (page 77). So why did the proponent ignore this advice and choose to half the barrier protection for the cliffs? The proponent is silent on this point. Golder and Associates state that subsidence in the areas of multi-seam mining is unknown and there are no precedents to support the subsidence model. This is a clear warning from the consultant. The reference on page 222 of Volume 1 to 'panel and pillar mining to the edge of the cliffs without impact because of a zero or even a negative angle of draw' is a major concern. It indicates that there is a flaw on angle of draw considerations based on earth subsidence (and upsidence) only, and not stresses and tilts as well. Stresses and tilts are more important factors for generating cliff falls than the vertical movements of subsidence. It is certain that stresses and tilts will not be zero in above instance and the angle of draw method to determine cliff protection in these circumstances is highly misleading. Further, the Colong Foundation does not accept that cliff falls happen at a rate of one every four years. It may be that these cliff falls reflect structural damage arising from past oil shale mining, which probably occurred under Genowlan Mountain, as well as Mount Airly.	
Water Resources	111746	As an SCA, Mugii Murum-ban SCA should protect any adjacent or connected high value conservation areas and not be a means to brings any polluted mine discharges into the adjacent Greater Blue Mountains World Heritage Area. The EIS acknowledges that polluted mine discharge is likely to enter Airly Creek, Gap Creek and Genowlan Creek and that this will lead to impacts on the quality and quantity of water entering Gardens of Stone National Park (via Airly Creek) and the Wollemi National Park (GAP and Genowlan Creeks via Capertee River). It is unacceptable that pollution from mining should be conveyed through a reserved conservation area and into the GBMWHA.	**Section 5.3.2**
	111493	The Grotto always has water in our experience in the pool below the slot canyon. There are also seeps and springs on other parts of the mesas. The absolute fact is that hydrology will not change if they do not mine. It may be true that if they extract only 50% of coal it may not affect hydrology, but if 66% of coal is mined under these areas as proposed, the likelihood of irreversible impact on permanent water sources in the SCA is much increased. It is quite likely that the water flow to the Grotto will be decreased and ceases to be permanent. Other permanent water seeps (e.g. in cave at start of Genowlan Point) and pools in Genowlan Creek may also dry up. This will make it even harder for walkers to source water in the SCA. It is also likely to affect springs used by adjacent landowners. P. 42 states that there is a 'lack of water' on Genowlan Point. Having camped there many times, there is in fact seeps and drips for bushwalkers to use, just as Aboriginal people would have used them in the past (indeed one is near the boomerang art site). We are concerned that water quality into Airly creek will also decline. However, we remain unconvinced as to	

Area of Concern	ID of Respondent	Comments	Where Discussed
		assurances of zero impact, given they have been made for every other mining proposal in the Western Coalfields, yet major changes in water quality and water pollution have resulted. The current water management system is unsatisfactory as it mixes clean surface water with site runoff water and also combines these with mine effluent from the underground workings. This is a most unsatisfactory arrangement and contrary to any standard practice for water management for the last thirty five years. Centennial Coal does not explain its water management in section 3. Why are clean and dirty waters mixed with mine effluent in the largest storage on the site? The water management plan needs to be rethought so that the dirty water is sorted SEPARATELY and used in preference for mine process water. Any overflows from these separate storages should then be diverted to the large storage dam. This would be a far better arrangement to minimise discharge of toxic water from the site, rather than risk maximising it, albeit in diluted form.	
	111640	Water is of major concern. Hydrology expert Dr Philip Pells has stated: "It should be understood that even in areas of first workings, where there is small subsidence and there are small surface strains, there will be impacts on groundwater systems and base flows to streams". Any reduction in flows to the creeks and groundwater will have an impact on all the industries in the valley. The EIS dismisses the impact that mining will have on the permanent water supplies on the mesas. It suggests that all creeks are ephemeral. While this is mostly true, the Grotto is known to always have water in the pool below the slot canyon. There are also seeps and springs on other parts of the mesas. The EIS states on page 42 that there is a `lack of water' on Genowlan Point, but bushwalkers know there are in fact seeps and drips available, just as Aboriginal people would have used them. The proposed washery and the extra 100 megalitre water licence that Centennial was somehow granted (despite the Office of Water cutting back their original application by 100 megalitres) is of great concern as we do not believe the full amount of the licence can be sustainably drawn from groundwater resources. Water pollution is a major environmental issue associated with the current mining activity at Airly and will be of even greater concern with the proposed mine extension. The current operation is already generating waste water that is highly saline and polluted with ecologically hazardous metals and nutrients (eg, sulphur, iron and other heavy metals). Already this year there have been two instances of the sediment dams overflowing, and the EIS documentation indicates that larger volumes of waste water are likely to be discharged to local waterways from three discharge points as part of the extended mine operation.	
	111630	The Advisory Committee remains concerned about the likely deleterious impacts on fauna and biodiversity should highly saline mine effluent be allowed to flow into Airly Creek, and therefore the Gardens of Stone National Park within the Greater Blue Mountains World Heritage Area. It should be a condition of approval that mine effluent and ‘recovered leakage’ be treated to a level where its chemistry is consistent with that of the receiving watercourse.	
	111660	Centennial should provide alternative water resources where these are lost, such as at the Village Spring in the oil shale ruins precinct. A small roofed area with storage tank should be provided at a suitable site at the ruins to provide park visitors with an alternative water source. Without water, the ability to visit the area becomes restricted. The current water management system is unsatisfactory as it mixes clean surface water with site runoff water and	

Area of Concern	ID of Respondent	Comments	Where Discussed
		also combines these with mine effluent from the underground workings. This is a most unsatisfactory arrangement and contrary to any standard practice for water management for the last thirty five years. Centennial Coal does not explain its water management in section 3. Why are clean and dirty waters mixed with mine effluent in the largest storage on the site? The water management plan needs to be rethought so that the dirty water is sorted SEPARATELY and used in preference for mine process water. Any overflows from these separate storages should then be diverted to the large storage dam. This would be a far better arrangement to minimise discharge of toxic water from the site, rather than risk maximising it, albeit in diluted form. If the toxic water were minimised it could then be chemically treated before being introduced into the large storage dam and then the discharge dam. This approach enables a restricted release zone to be created for the mine around the dirty process water and mine water, rather than having an open system as is currently the case. The EPL is defective because it does not contain the pollutants in the mine process water and production bore that can cause serious environmental harm to the World Heritage Area downstream. The EPL must be revised to ensure the downstream environment can be protected from the environmentally harmful water pollutants found the mine. The pollutants contained in the mine's effluent are polluting the downstream environment of Airly Creek. The production bore water is highly saline, and has elevated nickel and zinc levels. It is undeniable that Airly Creek has received mine effluent, and this goes a long way to explain the elevated salinity levels at the sampling point. This is not suitable to be used as a background on which to base SSTV.	
	111748	The continued and expansion of mining risks contamination of water supply. The Greater Blue Mountains is a designated World Heritage Area of Global Significance for the Conservation of Biodiversity. Its ecosystems depend on a reliable supply of surface water and upon groundwater from aquifers. These water resources would be placed in jeopardy should this Mine Expansion be approved.	
	111562	• The groundwater monitoring network does not represent all the areas of interest in the coal mine area. • Mine dewatering and subsidence may alter the hydraulic ability of the local groundwater system to transmit groundwater. • Reduced baseflow recharge to the Quaternary alluvium, and Creeks, may reduce recharge to the underlying shallow aquifers of the Shoalhaven and Devonian Formation. • Centennial Airly have not included a study of cumulative effects of dewatering and subsidence on groundwater levels in the colluvium and alluvium under drought conditions. • Centennial Airly bought an 'Additional Entitlement' WAL 36565 for 120 ML/year from the Sydney North Basin. The source for this 'Additional Entitlement' has not been published. • Once the mine reaches its peak requirements of 199 ML/year and is recycling 80% of this produced water there will be no need to have a 278 ML/year groundwater allocation for the life of the mine. • Centennial Airly have no additional groundwater WAL licences to cover increased groundwater abstractions	

Area of Concern	ID of Respondent	Comments	Where Discussed
		above those modelled.	
	111293	Surface Water Impact Assessment Issues • The water and salt balance assessment used Scenario 2 from the hydrogeological modelling for all the water and salt balance modelling. Scenario 1 case should also be modelled in Goldsim to assess the impact on water and salt balances. • The report should have investigated the rainfall patterns in the region and demonstrated that the data sequences adopted from Ilford adequately represent both the long term rainfall averages and the shorter duration rainfall intensities for the mine site. • The Simulation Model adapts key parameters to local conditions but there is no discussion of the effect of the changes in parameters on the stream flow characteristics so it is not possible to assess if the changes made to the parameters are appropriate. • The statistical information presented in Figure 6-4 does not allow the water balance to be verified for the 10% and 90% exceedance cases. • In assessing changes to the catchment hydrology and hydraulics, the report provides an estimate of changes to baseflow at various locations downstream of the mine site. The studies should attempt to estimate baseflow at these locations so that changes in baseflow can also be presented as percentage change. • The geomorphological assessment should also consider changes in baseflow as these also have the potential to impact on stream morphology. Groundwater Impact Assessment Issues • Unfortunately the report does not give the reduced levels for the collars (tops) of these piezometers …. There does not appear to be a reference to the Packer testing in this report (Section 1.4.2 of Pells report). • The predicted impacts are based entirely on the computer calculations made using the software MODFLOW-2005. It is acknowledged that this is established software, but it is also noted that the software is known, in some cases, to incorrectly compute the impacts of downward seepage.	
Ecology	111740	The Project Application Area falls within the Capertee Valley IBA and has potential to impact upon this area. Surface facilities will permanently remove 39.09 ha of vegetation. This area will not be restored for at least 20 years. This represents a substantial, long-term loss of primary habitat for many endangered bird species. "The scattered trees are not considered to comprise woodland as their distance and lack of contiguous understorey	**Section 5.3.3**

Area of Concern	ID of Respondent	Comments	Where Discussed
		does not provide sufficient habitat to be considered anything more than dispersed paddock trees." This statement is negligent. It is a known fact that isolated paddock trees contribute some of the most important remaining foraging habitat for the Regent Honeyeater and the TSC Act and EPBC Act listed Endangered Swift Parrot (*Lathamus discolor*) as well as the Vulnerable honeyeaters, Painted Honeyeater (*Grantiella picta*) and Black-chinned Honeyeater (*Melithreptus gularis gularis*). This is because of the abundance of mistletoe (*Amyema spp*.) and high nectar flows from flowers in these large trees. Paddock trees also tend to occur in lower elevation areas soil nutrients are higher leading to enhanced nectar supply. The loss of any large native paddock trees will have impact to local populations of these threatened species by further depleting scarce food supplies. BirdLife is not entirely convinced that the mapping of the vegetation in REA2 is correct. The field inspection by Roget Lembit on the 18th June 2014 is inadequate as it occurred during winter when native grasses have died off and seed-head is mostly undetectable (making grass species diversity and accurate species identification questionable). The loss of tree hollows is a listed `Key Threatening Process `under the TSC Act and likely to impact on a larger number of threatened birds including the Vulnerable Brown Treecreeper (*Climacteris picumnus victoriae*). BirdLife maintain that the direct removal of any tree hollows should be avoided, and if unavoidable should be offset irrespective of whether such hollows occur in historically cleared, or woodland environments. The fragmentation or loss of any of this habitat through building of roads, access tracks and other surface facilities will affect habitat and the movement of avifauna species across the landscape. Genowlan Creek is the most important single location for breeding by the Regent Honeyeater in Australia. Regent Honeyeaters in the Capertee Valley primarily nest in Needle-leaf Mistletoe (*Amyema cambagei*) growing in River Oak (*Casuarina cunninghamii*), this habitat is dominant along the lowland areas of Genowlan Creek and is also present along Coco and Airly Creeks. Centennial Coal and RPS have provided no proof or scientific backing to show that that subsidence-related effects (a section of Genowlan Creek is predicted to have a groundwater drawdown of up to 1.1m) on natural drainage will not permanently affect vital Regent Honeyeater streamside breeding habitat which could potentially contribute to the Regent Honeyeater's extinction. The number of cases of environmental spills from inadequate waste water management and poor storm water holding capacity is alarming and enough to suggest that a spill will one day occur as a result of the proposed expansion of Airly Mine. The lack of mention of Needle-leaf Mistletoe (*Amyema cambagei*) in the total flora species list for the entire Project Application Area, or mention of `Needle-leaf Mistletoe in River Oak Forest' as important habitat for the Regent Honeyeater is cause for concern as this is the most crucial habitat for Regent Honeyeater in the Capertee Valley. The omission of this brings BirdLife to question the rigour and validity of background research undertaken for the entire Flora and Fauna Appendix Report (Appendix H). There is no suitable explanation as to how RPS and Centennial Coal determined that MU 20 (Capertee Rough-barked Apple - Redgum - Yellow Box Grassy Woodlands) is the only `Critical Habitat' for the Regent Honeyeater in the Project Application Area. The term `Critical Habitat' is officially only given to habitat which has been declared	

Area of Concern	ID of Respondent	Comments	Where Discussed
		under the OEH `Critical Habitat Register'. Only four species have been allocated `Critical Habitat' under this process to date, the Regent Honeyeater is not one of them. However, this must not detract from the reality that much habitat within the Project Application Area is considered extremely important and critical to the survival of the Critically Endangered Regent Honeyeater. All tracts of MU 54 (Capertee - Wilgan Riparian Rough-barked Apple - River Oak Riparian Forest), MU 42 (Capertee White Box - Tumbledown Red Gum - Ironbark - Callitris Shrubby Woodland), MU 38 (Capertee Grey Gum - Narrow-leaved Stringybark - Scribbly Gum - Callitris -Ironbark Shrubby Open Forest)and MU 21 (21 Capertee - Wolgan Slopes Red Box -Grey Gum - Stringybark Grassy Open Forest) should be included in the RPS `Critical Habitat' map for the Regent Honeyeater across the Project Application Area (see Page lxiv in Appendix H). This means the area of `Critical Habitat' for Regent Honeyeater in the Project Application Area will greatly exceed the initial (unrealistic) calculation of 55.28 ha. Further targeted survey of Regent Honeyeater during the breeding season and non-breeding (foraging) seasons should be carried-out across the Project Application Area. Impacts of subsidence on vegetation and bird habitat (e.g. through dieback caused by the shearing of tree roots, or alteration of tree root access to ground water) is overlooked in this report and not addressed adequately enough to provide any satisfaction that impacts will not be significant. Subsidence will cause the collapse of pagoda formations, cliff lines, overhangs and other outcropping sandstone formations. This may cause direct impact to roosting Sooty Owl (*Tyto tenebricosa*) listed as Vulnerable under the TSC Act, and breeding habitat of the rare Rockwarbler (*Origma solitara*) which is the only species of bird that is endemic to NSW. BirdLife recommends that subsidence risk be audited by environmental agencies that are impartial (e.g. not employed by Centennial Coal). Any potential impacts upon native vegetation should be adequately documented, released to the public and addressed by Centennial Coal. Any consideration of offsets should address all surface area disturbance vegetation losses (including derived native grasslands) and any subsidence or other mine-related vegetation dieback at like for like ratios or more. Offsets must comply with both Commonwealth (EPBC Act) and State (Biobanking or an adequate Conservation Agreement).	
	111493	The flora list in Appendix H misses 13 plants, being: *Astrotricha obovata* (uncommon plant, found on tip of Genowlan Pt) *Billardieara procumbens* (heathland) *Callitris rhomboidea* (Gen Pt) *Cryptandra amara* (heathland) *Dampiera purpurea* *Gonocarpus longifolius* (ROTAP 3RC)	

Area of Concern	ID of Respondent	Comments	Where Discussed
		Grevillea arenaria subsp arenaria (on basalt near Gen Pt) *Isopogon prostratus* (uncommon plant but common in heathland) *Micromyrtus sessilis* (limit of range, heathland) *Persoonia myrtilloides* (heathland) *Pseudanthus divaricatissimus* (ROTAP 3RC heathland and Gen Pt) Pultenaea sp. 'Genowlan Point' (critically endangered!) *Xanthorrhoea johnsonii* (limit of range, heathland) It thus fails to record two ROTAP species found in the SCA – *Pseudanthus divaricatissimus* and *Gonocarpus longifolius*. It does record the presence of the Pagoda Daisy *Leucochrysum graminifolium* but fails to acknowledge that this is ROTAP listed 2R. There are thus three other ROTAP listed rare plants in the SCA that are not acknowledged. Indeed the species list actually fails to list the critically endangered Pultenaea sp. 'Genowlan Point' plus fails to list the presence of *Xanthorrhoea johnsonii* and *Micromyrtus sessilis* (heathland), both at the limit of their range. *Xanthorrhoea johnsonii* was identified for us by David Bedford of the Tasmanian Botanic Gardens (the expert on this genus). The EIS also failed to note the presence of the uncommon *Astrotricha obovata* (IDed by RBG) found on the tip of Genowlan Point. On the road to Genowlan Point on the small basalt section one walks through a grove of Grevillea arenaria subsp. arenaria (identified by Bob Makinson of the RBG for me) yet this obvious large patch of the 2-3 metre shrub is not listed. The failure to find 13 plants, 3 of which are ROTAP listed and two of which are very uncommon raises concern as to the thoroughness of the botanical survey. I was the co-discoverer of Pultenaea sp. 'Genowlan Point' (NSW 417813) and nominated it as endangered under the TSC Act and then as critically endangered under the EPBC Act. Centennial plans to extract 30% of coal under such cliffs, with some associated subsidence. Genowlan point has a fault and extensive jointing. The risk of the very end of the point collapsing is very real. Despite this, on p. 345 and 354 of the EIS it states that the proposal poses no long term risk of a decrease in the population of this EPBC listed species. This is a direct and blatant untruth, as the only known population runs serious risk of being sent extinct via cliff collapse. This deception is both unprofessional and unacceptable. The Colo Committee has seen a breeding pair of the threatened Peregrine Falcon on Genowlan Point but these are not listed in the EIS.	
	111630	The Vertebrate Fauna of Gardens of Stone National Parks (OEH 2012). The report states "Carne and Airly creeks rise outside of the Gardens of Stone National Parks. If these waterways are subject to disturbance or pollution in their upper catchments this can seriously impact on downstream hydrology (DECC 2009a) and alter the value of habitat to vertebrate fauna such as various frog species, the platypus and water rat."	

Area of Concern	ID of Respondent	Comments	Where Discussed
		The Advisory Committee maintains its opposition to the extension of the original consent. In summary, the Advisory Committee: • remains concerned about the likely deleterious impacts on fauna and biodiversity should highly saline mine effluent be allowed to flow into Airly Creek, and therefore the Gardens of Stone National Park within the Greater Blue Mountains World Heritage Area. It should be a condition of approval that mine effluent and 'recovered leakage' be treated to a level where its chemistry is consistent with that of the receiving watercourse.	
	111660	Cardno should thoroughly sample downstream on Airly Creek into the World Heritage Area to ascertain the extent of impact from the existing mining operation, and compared macroinvertebrate levels of more pristine equivalent streams (say Coco Creek) with Airly Creek as a background level. Water quality parameters should also be examined at these sites.	
	111748	The “scientific robustness” could be added to by providing additional assessment especially for stygofauna and hyporheic fauna (part 3.0). Stygofauna sampling did not reveal stygofauna, potentially due to the severely limited sampling effort and location of bores + no attempt made to sample hyporheic fauna. Comments from Dr H Washington's submission. Comparison of mine layouts for the various extraction zones show that extraction rates will be as much as 66% under the majority of the mesas rather than 50% as was verbally announced by the Colo Committee (page 2) • EIS deliberately avoids stating anywhere the percentage coal extraction under the various mining zones because it is too high for the safety of the SCA (see page 3-4 for analysis of zones). (Page 3) • Disputes what is stated on page 37 of the EIS regarding pagodas in the SCA. Says there are both smooth and platy pagodas present, with good examples of both types. Mugii Murum-ban SCA is an excellent showcase of pagoda geodiversity. Pagodas are also regularly greater than 20 metres in height (the EIS states they only reach this height). (Page 8) • Says that the assertion on pages 345 and 354 of the EIS that the proposal poses no long-term risk of a decrease in the EPBC listed Pultenaea sp. Genowlan Point is a direct and blatant untruth as the only known population runs serious risk of being sent extinct via cliff collapse. (Page 9) • Says the EIS failed to identify an aboriginal art site on the creek that runs up to Airly turret from the stone cottage (Page 12) The impacts on fauna species, especially bats, are based on the assumption of minimal surface impacts and the Pells report suggests this may not be the case. Centennial use the Biodiversity Offsets Policy for Major Projects to say they don’t have to do an offset but they don’t seem to have strictly applied the Framework for Biodiversity Assessment that underpins it. This oversight by Centennial should be rectified in order to ascertain if indeed	

Area of Concern	ID of Respondent	Comments	Where Discussed
		Centennial are correct and don't need to do an offset.	
Cultural Historic Heritage	111746	The EIS does not adequately protect the remarkable remains of our industrial heritage in the remains of the Airly shale mining activities .It merits national heritage recognition. It is currently recognised through National Trust listing as an industrial heritage site and through the State heritage system. This observation demonstrates the need for the remains of the mining complex and its technologies, the pagoda landscape and the concentration of biodiversity all to be protected from permanent damage, particularly subsidence.	**Section 5.3.4**
	111493	The maps provided in the EIS are inaccurate but the key historic ruins seem to lie above this zone (possibly the shallow zone). These ruins are of such significance that there should only be first workings (30% extraction) under all the ruins in whatever zone they are located. The oil shale ruins on the side of Mt Airly are not just of state significance (on the State Heritage list) but actually of national significance, though the EIS attempts to downplay their significance and to downplay any likely impact on them. The conclusion of this section that the heritage of the oil shale ruins is only of local significance is a travesty. The EIS makes the claim that subsidence under historic sites will only be between 0 and 10mm, however this does not conform with any of the subsidence figures for the mining zones and is clearly an error. It sounds good but is not supported elsewhere in the document. Extraction should be limited to first workings (30% extraction) only under this important heritage (though 50-60% extraction seems to be proposed on p. 375) We question the thoroughness of the archaeological study, since if failed to identify an art site on the creek that runs up to Airly Turret from the stone cottage. This has charcoal animal drawings, which (while faint) are still visible. See below for charcoal outline of a tortoise there.	
	111640	The EIS inference that the heritage of the oil shale ruins is only of local significance is wrong. These ruins are already on the state heritage list, so clearly the claim that they are of only local significance is nonsense. Furthermore, they were listed by the National Trust in July 2014. It is concerning that this sort of error is made in the EIS. The Airly Village ruins and the Grotto should be fully protected. Lastly, the whole assessment of impacts on Aboriginal and European heritage is premised on the statement that subsidence will be limited to between 0 and 10 millimetres. This statement is given nowhere else in the EIS and appears to be untrue. This calls into question the conclusions in regard to impacts on Aboriginal and European heritage.	
	111630	The Advisory Committee understands that the New Hartley Oil Shale Workings are of national heritage significance, and are an important part of the mining heritage of NSW and welcome Centennial Coal's decision not to mine under those historical workings.	
	111660	The proposed subsidence of 500 mm, which will produce strains of up to 8.3 mm/m and tilts of 16.7 mm/m in the area of old workings is unacceptable because the area adjoins the oil shale ruins. The movements are likely to cause cliff collapses that will fall onto the New Hartley heritage area below it. The proponent discounts the value of	

Area of Concern	ID of Respondent	Comments	Where Discussed
		the mining heritage at New Hartley, which is disappointing as mining heritage should be protected and celebrated and offers important lessons to future generations. There should be no further subsidence impacts in the oil shale heritage area. Mining should be limited to first workings as can be achieved by retaining the existing angle of draw.	
	112923	Pell's Consulting Report • The EIS makes the claim that subsidence under historic sites will only be between 0 and 10 mm, however this does not conform with any of the subsidence figures for the mining zones. • The location for the Airly Village site does not conform with historical mapping done by Carne.	
Air Quality and Greenhouse Gases	111493	This EIS shares (with other coal EISs) a generic blindness in regard to overall greenhouse gases produced by coal mining projects – it ignores the actual burning of the coal itself! Australia's annual emissions of CO2 (from the March Quarterly update for 2014) are 542 million tonnes of CO2. The Airly mine CO2 production is thus 0.73% of total Australian emissions – a considerable addition to global warming and climate change. This is the realistic comparison of the climate impact of the proposed mine, not the 0.002% stated on p. 432, produced by using the smoke and mirrors of the scope 1-3 methodology that ignores the burning of the coal if it is off site.	**Section 5.3.6**
Soils, Land Capability and Agricultural Suitability	111640	The EIS does not give full value to the important agricultural industries in the Capertee Valley. There are several large-scale farms; up to 4450 ha in size and over 6000 head of cattle are produced each year. In addition, there are goats, sheep, alpacas, pigs, bees and poultry. Crops include lucerne hay, olives, saffron, fruit and vegetables, and native plants. All of this agricultural production depends on water, which could be severely compromised by both the mine's extraction of water for the washery, and through even minor subsidence.	**Section 5.3.7**
Social and Economic	111640	The EIS does not recognise that the Capertee Valley already has a significant tourism industry with over 17 tourism operations in the valley, ranging from bed & breakfasts, holiday houses, a wedding and events venue/wellness retreat, to an annual festival with more than 3500 visitors. It is also one of the top bird watching areas in the world. These are industries that are sustainable well into the future (unlike the mine) and have the potential to grow significantly. The Capertee Valley is a unique part of Australia, with outstanding scenic and ecological qualities, right on Sydney's doorstep and thus highly accessible to both national and international tourists.	**Section 5.3.10**
	111748	Quality of life issues should also be prioritised, particularly as they will greatly affect residents of Capertee Valley. Economic impacts, due to loss of World Heritage status, could result if indeed Creeks and Rivers are poisoned as a result of the mine expansion being approved. The flow-on consequences of this and the actual despoliation of an area known Nationally and Internationally for its scenic and pristine beauty would be enormous.	

Area of Concern	ID of Respondent	Comments	Where Discussed
	111648	• The Economic Impact Assessment (EIA) is not based on standard economic assessment techniques and does not comply with NSW Treasury or Federal Government guidelines. • The attempt to make the impact assessment comprehensible to stakeholders is "lay" economics rather than standard approaches supported by government departments. The general public are not the main audience for this report. • The EIA does not follow NSW Government Guidelines for economic assessment of major projects. • There is no discussion of the financial case underlying the economic assessment. • Employment benefits such as wages are not normally assessed as a benefit to the community in economic assessments. Wages are normally assessed as a cost to the project. • Due to the current low unemployment rate (stated at 5.8 per cent for NSW), it is inappropriate to assume that employees cannot find alternative employment. • In relation to the economic viability of the Airly Mine Extension Project, the Aigis Group did not disclose the possibility of the recent suspension of operations at Angus Place as an outcome in its EIA for that project.	
Visual Amenity	111640	The EIS is vague about exactly how such stockpiles will be treated, merely giving three examples of how they could be treated. This is totally inadequate. The stockpiles need to be totally covered to eradicate dust, which would contaminate waterways and the pristine air quality of the valley.	**Section 5.3.9**
	111748	Pearson's Lookout, just off Castlereagh Highway near Capertee, is a recently upgraded, well visited, site for many tourists and the visual impact of the mine, both from the Lookout and from the road into the Capertee Valley, would totally ruin the majestic views which draw people from the four corners of the World.	
Decommissioning and Rehabilitation Strategy	111660	The sizing analysis of the 30 metre high reject emplacement area is hard to follow, although the volumes are provided. No clear representation of the impacts of the proposed emplacement area on views from Glen Davis Road is provided or in Appendix P. Figure 4.5 and 4.6 on pages 133 and 134 respectively do not give any impression of how intrusive this REA location is when viewed from the Glen Davis Road.	**Section 5.3.8**

Area of Concern	ID of Respondent	Comments	Where Discussed
Noise	111660	There seems to be no sensible noise criteria for quiet recreation in a reserve established under the National Parks and Wildlife Act. A standard for noise in these areas should be 'background' at key visitor recreation sites, such as picnic grounds or camping grounds.	**Section 5.3.5**
	111748	Comments from J Bassett noise report. Report states that compliance measurements have been conducted on an annual basis however there is no data presented from these measurements. Therefore claims that the noise environment is the same as five years ago is contestable. • Quiet recreation sites at Airly Gap camp ground and Nissen Hut on Glenowlan Mountain are not indicated in any of the modelling • Assessment criteria for sites for "contemplative activities that generate little noise and where benefits are comprised by external noise intrusion, for example reading, meditation" is set at a higher standard than a school classroom (35dB(A)) or a place of worship (40dB(A)) (NSW INP, Table 2.1) SoundPlan 3D is the software that has been used – it was released in 2011 and is an old version • Noise indicators show that residence 2 will experience levels of 35-40dBA with REA1 2 • No noise contour maps presented for temperature inversions although they are recognised in NSW Industrial Noise Policy as a significant factor in noise propagation • Recommend: current assessment of existing noise environment be conducted, modelling be conducted for all receiver sites, including recreational sites and modelling include meteorological conditions • No indication of modelling procedure or proof that analysis complies with NSW Industrial Noise Policy • Recommend: modelling must include an indication of potential sleep disturbance and effects of construction noise at all receiver sites.	

Table 4 – Summary of Issues Raised by the Members of the Community

Area of Concern	ID of Respondent	Comments	Where Discussed
General Issues	111162	Area should be listed as World Heritage Area	**Section 5.4.12**
	110979	The community's voice is low on the Government's list of value	
	111130	Concerned about transparency of mining companies to people	
	111171	Area should be conserved for future generations	
	111056	The Capertee Valley should be protected from any kind of mining and be WH listed.	
	111232	There must be a guarantee of no Eastern Portal There must be free sharing of information about the mine with the community	
	110981	Project should not go ahead under the EPBC Act as project does not protect biodiversity	
	110369	No Eastern Portal	
	111560	The mine should not be a deterrent for land owners.	
	111580	Centennial has had 1 year to formulate their report. The community had 4 weeks. There is no data on the amount of coal actually being mined (we know the limit, but who is checking on a regular basis how much is being railed out on a daily basis). Residents of Capertee village report that an average of 3 coal trains /day with up to 52 uncovered trucks, moving past houses along its route. The eastern portal which was approved must never be allowed to be developed, as this would have an extremely damaging impact on the valley, which extra infrastructure being necessary, including roads.	
	Form Letter from RSWUG used by 111578, 111642, 111644	This area is of national and international significance. Accordingly, the precautionary principle should be applied to ensure the protection of the area and to minimise possible disturbance to the State Conservation Area.	
	111669	Farm tours business and wants to conduct these tours in an environment which boasts clean air, clean water and which is free from visual blight and industrial noise.	
	111667	As I understand it, the mine was given initial EIS permission to open on the basis that it would not include a coal washery. Subsequently it did open and closed again on the basis that the coal was not of sufficient quality to be profitable without a washery. Part of the reason, I believe, for the current application is to request permission to open a washery. I am firmly opposed to that - they opened on a promise not to do something that I considered very harmful for the valley	

Area of Concern	ID of Respondent	Comments	Where Discussed
		environment and I do not believe they should be rewarded for their bad commercial decision.	
	111683	I object to this Extension project because it is undermining the area of Airly Genowlan which should be declared World Heritage due to its unique biodiversity and pagoda landscapes. Also the original mine proposal was never to go under Mount Genowlan. Centennial has hardly begun to mine under Airly Mountain and now they are greedily trying to get approval for this massive extension.	
	111612	The only proper protection for an area is to guarantee “no damage”. “Minimal” or “Minor” damage is not acceptable to me, especially in a State Conservation Area which includes areas of nationally significant geodiversity and Endangered Ecological Communities. As the only true way to protect an area is not to mine under it, I would not like to see the Airly mining area extended easterly beyond its current lease boundary into the rest of the A232 authorisation area. Limiting their mining area to the current mining lease would still allow a very large area for mining, much larger than they have managed to mine so far	
	111754	It is unclear from this diagram whether underground works are proposed to extend beyond the coloured area to the red border (of the PAA) shown.	
	No ID allocated	I have grave fears for what the proposed expansion means for tourism, water supply, residents and farmers livelihoods. Anywhere else in the world a natural asset in the calibre of the Capertee Valley would be would be declared a national treasure and safe from the impacts of mining, here it is open slather for the impacts of mining. It is a disgrace.	
	No ID allocated	I do not wish to see the whole area disturbed and damaged.	
	No number allocated	Objections of residents and farmers should count in this debate. The mining company should provide a compelling case	
	111744	No grandfathering of conditions from the 1993 consent should be allowed as it is outdated from 1993 The issue of the Eastern Portal must be spelt out clearly. By the number of coal train movements through Capertee there is reason to believe that Airly Mine is exceeding their existing yearly quota of 1.8 million tons. Is the mining quota being monitored? Who monitors underground extraction methods? While there are government inspectors, what frequency and how thoroughly do they inspect?	
Water Resources	111162	Water supply could be diminished or contaminated	**Section 5.4.2**
	110979	Underground water will be reduced if this project goes ahead	
	111130	Water resources must be shared Water pollution must be handled in the right manner	

Area of Concern	ID of Respondent	Comments	Where Discussed
	111101	Concerned about effects on water resources in terms of quantity and quality Even small amounts of subsidence and strains will have impacts on ground water systems and base flows to creeks Water monitoring should be done by an independent company appointed by NOW and paid for by Centennial.	
	111160	Mining disturbs underground water tables which can threaten water supply	
	111171	Coco Creek and any other creeks are not to be compromised by a coal that may pollute or limit flows in any way. Airly Village spring may cease - unacceptable as the spring is integral part of the habitat for the superb lyre bird. Airly Village Spring is delightful part of tramway track accessed by the majority of the visitors to the SCA Increases in water flow in Airly creek and 5% decreases in Genowlan/ Gap creek is unacceptable - do not poison or modify the waterways they are precious in a drought prone valley and used by several thousand local residents for farming and domestic purposes.	
	111073	If ground and/ or surface water is depleted or contaminated, there is no plan B and it is too late by then the damage is done. The water needs to be monitored by an independent company, regularly starting no and results made public in a timely manner. Any discharge must be processed cleaned and filtered in a sustainable way before being returned to the environment.	
	111056	The viability of our enterprise depends on water from Genowlan Creek, Emu Creek and 2 bores. Ours is the first working property downstream from the mine. We have paid to rightfully gain access to the water required to continue operation. Any interference would make the property worthless. Dams don't hold water well, so water pumped from creeks and bores is essential. I could not continue with even a 3% drop in water quantity. Springs from Genowlan and Airly Mountain feed Genowlan and Gap creeks on which I rely. The original bore testing results from Airly showed high levels of metals and poisons and should not be pumped from the mine. • need a 100% guarantee from the mine for all our water supplies • The Grotto including its springs will be fully protected • No pollution from overflow of mine site dams should be tolerated All water monitoring should be carried out independently	
	110981	Underground water will be reduced if this project goes ahead	
	110369	The mine is in denial that water extraction will have no impact on the flow of Genowlan and Emu creek. How can the mine be allowed to interfere with the natural springs and aquifers that have been there for thousands of	

Area of Concern	ID of Respondent	Comments	Where Discussed
		years? Keeping the creeks flowing is vital.	
	111584	• The EIS is quite dismissive of the impact mining will have on permanent water supplies on the mesas • With the additional 100 megalitres granted we do not believe that the full amount of water can be drawn sustainably from the ground water resource. • Why would we consider polluting our existing water supplies?	
	111560	• How will the project effect current water supply to the Capertee Valley. • the bore is very deep and will water supply for farmers, hobby farmers and home owners as their bores are nowhere near the depth of the proposed mine bore. • Expected pollution of creeks and gullies is unacceptable	
	111546	Where are the base readings and guidelines for groundwater quality and quantity from before the first approval was given? How do we determine what deterioration has already occurred and will continue if approval is given to this extension? I have grave concern for the interconnectivity between aquifers that may occur with all the drilling and mining and the fracturing of rock leading to subsidence in what is a fragile environment. We need a complete mapping of the aquifers in the Capertee Valley and this should be referred to NSW Office of Water. The onus of proof shouldn't be on land owners to prove the company is at fault. I fear we may lose our supply of potable water for ourselves, our animals, vegetable garden and orchards. The EIS refers to 80% of water being recycled so do they really need such large volumes of water as those allocated? I want compensation to landholders for any and all loss of water and water quality, and lose of pasture quality. This to be monitored by independent entities decided by Dept. of Planning not the coal mining company, not self-regulated and reported.	
	111580	There appears to be a considerable discrepancy in the water usage/ balance with the EIS stating it is a “dry” mine (so far maybe…but not over Genowlan), where it is expected that a rate of up to 180ML will be available. There is no reasonable explanation, why after firstly receiving 158ML approval for water from their operational bore, then granted a further 120 ML (process by which this was obtained still uncertain) & recently applied for another water sharing plan. Why the need for all this water? Extension of the mine into the eastern section will impact on streams other than Airly Creek. Genowlan, Gap and Emu Swamp Creeks which all flow into the Capertee River and then Colo River, and Mining on Airly, in the Illawarra Coal Measures which are also high in salt, will only add to these salt levels. Centennial Coal Mine needs to prove that the salt and metal levels in Airly Creek are natural & not a result of discharge from mine water. So that means comprehensive chemistry, isotope and geophysical electromagnetic surveys across and along the creek bed to determine where the surface water and groundwater systems are connected. Centennial need to prove they are not causing the salinity. Drought conditions have not been modelled.	

Area of Concern	ID of Respondent	Comments	Where Discussed
		Centennial has not provided sufficient evidence in addressing cumulative impacts on ground water and surface water. There are not enough baseline studies/data to this point re surface and groundwater and consequently there is no certainty that this project will not impact on the fragile & fractured environment in which it exists. Centennial rain data has been extrapolated from Ilford and Charbon districts, neither of which is relevant to Airly/Genowlan River. It is stated that Centennial will have to compensate land owners if their flow of water is affected. But realistically, after the event it is too late and how does one prosecute an overseas owned Company, once the mine closes and the damage is done?	
	111669	Availability of a reliable and clean water supply is crucial to the running of my farming operation as it is for the multitude of agricultural enterprises which operate in the valley. The Project Has the potential to critically compromise the continued availability of clean, safe groundwater for agricultural enterprises. The Project may result in downstream impacts of mine effluent including leakage from waste dumps in the adjacent Wollemi World Heritage Area.	
	111677	I am very nervous about any activities whatsoever that put at risk the already very delicate water environment of our valley. Changes in the water regimen would have obvious consequences for habitat for the Regeant Honey Eater that would very probably be harmful.	
	111616	We are reliant on underground water to feed our stock, so reliable clean water is a necessity for us. Our concerns are the mines contaminating our water supply making it unusable.	
	111612	Increased size of mining areas also leads to issues with surface water runoff and mine water make, and damage to aquifers. Cracking and subsidence ground effects can have the opposite result of reducing the water available in the ecosystem, leading to dieback of vegetation, and subsequent erosion in sensitive soil profile areas. The plan to mine under the existing (largely unknown) New Hartley workings and the unique heritage areas of Airly village (including “Cave Houses”) is not a good idea, as the area is already quite damaged by the historical mining, and mining the vertically close by Lithgow Seam could have unforseen results. This mine design, in any approved extension area, should be made even more conservative (e.g. panel and pillar widths) to minimise the subsidence effects on surface features and aquifers.	
	111734	The extended Airly Mine operation is likely to result in an increase in environmentally damaging mine waste water including increased salinity, phosphorous, nitrogen, nickel and zinc. This will affect local creeks and may have a negative impact on wildlife. In addition, access to clean water is critical for livestock: contaminated water could have a serious impact on the local livestock industry.	

Area of Concern	ID of Respondent	Comments	Where Discussed
		Ground water data is weak and not independently reviewed. GDH have used average rainfall data from the Bureau of Meteorology weather station at Ilford, some 29 kilometres north-west of the Airly Mine, as input into the groundwater numerical model. Ilford receives substantially more rain than Mt Airly and Genowlan Mountain so cannot be considered to have a similar rainfall pattern. Using Ilford rainfall data will lead to an overestimation of the aquifer recharge and an underestimation of the salt load. Discharged pollutants should be independently monitored. Independent monitoring of water quality and monitoring of compliance with licence conditions to ensure the regulation of all discharged pollutants should be a condition of approval. Pollutants should be limited, based on sound scientific assessment, to avoid any negative impacts further downstream. This monitoring should be independently and adequately funded and licence conditions should be strongly enforced.	
	111754	Foreseeably, if the project were to go ahead, there would be degradation in the quality and flow of both surface and groundwater in the Capertee Valley and on our property. The events leading to this degradation would occur possibly intermittently but the overall effect would be to deprive the Capertee Valley of good quality water for a generation and beyond. This would be compounded by drought. We request that any loss of flows or quality be assessed independently and publicly and that any loss of production consequent on loss of flows or quality be compensated financially by Centennial Coal directly to the landowners so as to maintain the viability of their enterprises and to keep them on their land. Consider enforcing a condition on the proposed extended Airly Mine that the mine be put into a “care and maintenance” phase in a timely fashion during periods of drought and El Niño events and during the recovery period that follows.	
	No ID allocated	I have a licence to use water from Coco Creek to irrigate olives and lucerne. I am concerned about the potential negative impact to Coco creek waterway by sediment and heavy metal pollution from the mining process. My property will be unviable without access to sufficient good quality water.	
	111744	No plan to guarantee continuance of surface water and groundwater to farmers. There is a lot to be lost if the water supply is reduced or stopped. The growing eco tourist industry in the valley would also be greatly damaged by lack of water. Capertee Valley is not blessed with a huge amount of water and any reduction in water would be catastrophic for the farmers and the ecology. As there is no mention of water treatment before overflowing from the dams into Airly Creek, I question the quality of water discharged during emergencies which would affect downstream farmers and water quality entering the Capertee and Colo Rivers in other words the Wollemi wilderness. The EIS states that only emergency discharges will occur but based on past performance there has been two recorded discharges last year in one month due to overflow from toxic dams. Rough calculations suggest that even with their current water entitlement there is insufficient water available to sustain extraction of 1.8 million tonnes per year. Airly acknowledges that creeks flow briefly and low yield of underground water suggests that farmers will be affected.	

Area of Concern	ID of Respondent	Comments	Where Discussed
		Alarm bells ring when Dr Ian A Wright raises the question of a currently polluted Airly Creek being further polluted by this mining extension. The source of the current toxic levels of the Airly Creek should be determined so that it can be fixed before more toxins are added. Logic says that as the creek rises in the Airly Mine area, the source of the toxins are due to existing mine activities.	
	111558	The current coal mining operation is generating waste water that is highly saline and is also enriched with ecologically hazardous concentrations of metals and nutrients. The waterway currently receiving mine waste water (Airly Creek) from the current mine operation is a highly polluted waterway with degraded ecosystem health. The cause of this pollution is unclear, but is at least partly due to the current and previous mining activities. The ANZECC (2000) methodology for calculating local trigger values (see Chapter 3 of the ANZECC guidelines – section 3.1.4 'Defining a reference condition') relies on the use on non-impacted local waterways. I strongly disagree that the approach used in this documentation is consistent with ANZECC (2000) methodology. In my opinion this is unacceptable and generates misleading information that will downplay the environmental hazards posed by coal mine wastewater to the local and regional environment. I do not believe that water quality results from Airly Creek can be reasonably used to represent 'reference condition' as this is defined in ANZECC (2000), section 3.1.4. It is my professional experience that Airly Creek ranks as one of the most polluted waterways that I am aware of (from my 25 years of experience as a water scientist in the Hawkesbury-Nepean catchment). It is consistent with a waterway that is highly degraded from coalmine wastes. Calculation of 'site specific trigger values' should be based on water quality at 'reference' creeks in the local waterways, away from any coal mining operation. I expect the water quality in Airly Creek is strongly reflective of the current coal mining activities in the area, and thus it appears illogical to me to use highly contaminated water quality to be used as a basis of comparison, to protect local water quality from coal mine water pollution. The EIS documents propose the use of 'site specific trigger values' that in my opinion are inappropriate and seek to legitimise ongoing water pollution from the current mining operation to the expanded mine operation. The existing EPA licence held by the mine for discharge of contaminated mine water currently applies no effective limits for pollutants identified in the surface water assessment. There are no discharge limits on these pollutants (e.g. salinity, nitrogen, phosphorous, ammonia, turbidity, zinc, nickel) in the EPA waste discharge licence (EPL #12374). In my opinion, the expanded mine operation appears likely to continue to generate environmentally damaging waste water that will be unregulated with an ineffective EPA environmental protection licence. The disconnection between the pollutants and the EPA licence is obvious and of great concern. This is a major issue that needs to be addressed as part of this proposed development. I regard the three pollutant discharge limits, currently in EPL 12374, as being inappropriate and ineffective if the true purpose of the EPL is actually to protect the water quality of Airly Creek, and other waterways downstream of the waste discharge. In my opinion EPL 12374 needs to specify pollutants in contaminated waste water from the coal mine, with discharge limits that conform to the ANZECC (2000) water quality guidelines and protection of downstream water uses and ecosystems. Given the high conservation value of waterways in the downstream Greater Blue	

Area of Concern	ID of Respondent	Comments	Where Discussed
		Mountains World Heritage Area this should be based on protection of 99% of species. The production bore was reported in the Appendix C to have highly elevated salinity (median of 4735 µS/cm); and ecologically hazardous levels of two metals (results for other metals was not available) Nickel (median of 0.29 mg/L) and Zinc (median of 0.251).This information highlights how the expanded mine operation is likely to generate larger volumes of highly polluted waste water that is likely to worsen the already degraded water quality and ecological health of Airly Creek, and extend the negative impact further downstream. In my professional opinion, the EPL 12374 for this current mine operation needs to be modified to include at least six additional pollutants (salinity, nitrogen, phosphorus, turbidity, ammonia, zinc and nickel) and impose meaningful limits that actually protect downstream waterways from pollution. Inadequate information is also presented on the likely adverse impacts on such water pollution to downstream waterways in the Hawkesbury-Nepean catchment and local and regional water users (agriculture, human recreation, conservation and biodiversity). Potential adverse impacts on Greater Blue Mountains World Heritage area streams and rivers from the current, or future extended, mine operation is a serious omission from this EIS documentation.	
	111562	Refer Table 3 for issues raised by this respondent.	
	Form Letter from Running Stream Water Users Group used by 111586, 111578, 111642, 111658, 111644,	Water is of major concern. Hydrology expert Dr Philip Pells has stated: "It should be understood that even in areas of first workings, where there is small subsidence and there are small surface strains, there will be impacts on groundwater systems and base flows to streams". Any reduction in flows to the creeks and groundwater will have an impact on all the industries in the valley. The EIS dismisses the impact that mining will have on the permanent water supplies on the mesas. It suggests that all creeks are ephemeral. While this is mostly true, the Grotto is known to always have water in the pool below the slot canyon. There are also seeps and springs on other parts of the mesas. The EIS states on page 42 that there is a `lack of water' on Genowlan Point, but bushwalkers know there are in fact seeps and drips available, just as Aboriginal people would have used them. The proposed washery and the extra 100 megalitre water licence that Centennial was somehow granted (despite the Office of Water cutting back their original application by 100 megalitres) is of great concern as we do not believe the full amount of the licence can be sustainably drawn from groundwater resources. Water pollution is a major environmental issue associated with the current mining activity at Airly and will be of even greater concern with the proposed mine extension. The current operation is already generating waste water that is highly saline and polluted with ecologically hazardous metals and nutrients (e.g., sulphur, iron and other heavy metals). Already this year there have been two instances of the sediment dams overflowing, and the EIS documentation indicates that larger volumes of waste water are likely to be discharged to local waterways from three discharge points as part of the extended mine operation.	
Mine Design and	110979	Fear that subsidence impacts elsewhere in NSW could happen to the cliffs in the Capertee Valley	**Section 5.4.1**

Area of Concern	ID of Respondent	Comments	Where Discussed
Subsidence	111160	Centennial should honour its commitment to only take 50% of the coal in the entire licence area.	
	111171	500mm of subsidence in the area adjoining the Airly Village is unacceptable - risk of rock falls endangering people visiting Airly Village and Tramway track. 5% cliff failure with isolated rack falls - unacceptable due to compromising the surface environment and safety of walkers.	
	111056	To protect biodiversity and prevent cliff collapse, extraction should be limited to 50% and subsidence limited to a maximum 125mm, strain to 2mm/m and tilt to 2.5mm/m.	
	110981	Fear that subsidence impacts elsewhere in NSW could happen to the cliffs in the Capertee Valley	
	111580	A maximum vertical subsidence limit of 125mm; maximum strains of 2.0mm/m; and maximum til of 2.5mm/m for Application No SSD 5581. This is now a condition of consent. This condition should be enforced over the total licence area, and not the 1.8m previously approved, as this would have disastrous effects on the landscape, ecology, biodiversity and water. Centennials' extraction plan is not available for assessment in this EIS & one can interpret from facts gathered that the maximum extraction rate will not be capped at 50%. Anything over this threatens the areas under and over which it is mined, as more would result in subsidence with again unacceptable impacts. Surely this plan should have been incorporated into the EIS for assessment now and not subsequently. It is key to the project and the potential impacts.	
	111669	The Project has the potential to seriously damage the State Conservation Area. The cliff collapses at Baal Bone Colliery is tangible evidence of the devastating impact of mining in this landscape.	
	111612	In areas of cliffs and pagodas they plan to use first workings mining (but only 30m either side of the cliff), but even that will result in 5% of mining related impacts to the majority of cliffs, and in some cases 10%. As such, I think there should be no mining under cliffs/pagodas or other significant surface features such as The Grotto, which are of national geodiversity significance. Subsidence will have a detrimental effect on the hydrology (including near surface and deeper aquifers), which in term can affect the associated ecosystem. There is an EEC near Genowlan Point, and this should not be mined under unless they can guarantee no adverse impacts.	
	No ID allocated	Limit the extraction of coal to 50% to hopefully avoid subsidence.	
	111744	Issues of up to 70% extraction and in some case full extraction. Mine plans are not fully developed therefore there can be no scrutiny of what is happening underground to ensure minimum subsidence. The plans should be developed NOW not after the EIS was published for comment. Airly has abandoned the commitment to 50% extraction of the coal to avoid subsidence. Reduce extraction to 50% as agreed and there will be no environmental damage at Airly. Engineering figures are based on Clarence	

Area of Concern	ID of Respondent	Comments	Where Discussed
		that is 50km away and where subsidence is 20-30mm. Maximum subsidence has jumped from 100mm=/-25mm to 125mm. this is a sneaky way to get an extra 25mm. This happens to coincide with data charts allowing greater extraction and therefore possible increased damage to surface features. The term Splitting And Quartering is used which means that after first workings (50%) they will come back and take more probably to 70% and in some cases full extraction. Again a risk of serious subsidence. Airly has stated that they are aware of sensitive surface features but in the EIS state that under the heritage shale oil workings, further subsidence of half a metre can be expected. There will be underground instrumentation, what for and what type?	
	Form Letter from RSWUG used by 111578, 111642, 111644,	Extraction techniques and the percentage of coal extracted from beneath different geological formations have been shown to lead to significant subsidence. However, the EIS is not at all specific about this. It is difficult to work out what the percentage extraction will be under the different zones (i.e., cliff edges, talus slopes, the mesas that contain the slot canyons and the pagodas). The extraction plan should be made available for public scrutiny. Centennial must be required to uphold its commitment to take only half of the coal under the whole of the State Conservation Area to protect biodiversity and avoid pagoda and cliff collapses, and this percentage must be reduced under the more sensitive areas.	
Ecology	110979	Project should not go ahead under the EPBC Act as project does not protect biodiversity	**Section 5.3.3**
	110369	Flora and fauna and bird life may suffer or even perish at the Grotto and other special places. Centennial must be held accountable for anything that is destroyed at all cost. The Grotto and Genowlan Mountain is a magnificent natural environment not found elsewhere.	
	111580	Despite a wealth of aesthetic, conservation and recreational values, this area is still unprotected. It should be protected.	
	111616	This area is a tourist destination for many "birders" who come in from all over the world to find and watch our magnificent array of birds. If the birds leave so do the tourists who come here.	
	No ID allocated	Because mining is inherently hazardous to the environment, I am concerned that the pristine state of flora and fauna of the Capertee Valley could be jeopardised if the extension project proceeds.	
	111744	The term ‘Offsets’ has appeared in the EIS without specifically stating what the intention is. The offsets should be spelt out before the EIS is approved.	
Cultural Historic Heritage	111160	Strong connection to the land as an indigenous person	**Section 5.4.4**
	111232	Airly Village ruins should be fully protected	

Area of Concern	ID of Respondent	Comments	Where Discussed
	111546	It should be designated a no-go area as far as mining is concerned before we lose more of our heritage.	
	111580	Airly Shale Mines and Torbane Refinery Remains have now been place on the Industrial Heritage Register (July 2014). The mere fact that extraction rates are indicated to be above 50% in some areas & the lack of credible baseline & scientific studies for the aquifers, the subsidence rate not fixed at .125 mm (MOD 3 DA162/9) over the entire application, all indicates the lack of intent.	
	Form Letter from RSWUG used by 111586, 111578, 111642, 111644	The EIS is totally inadequate in its evaluation of the heritage significance of the mine area regarding both the cultural and biophysical heritage. The pagoda rock formations and slot canyon areas are of great value. The EIS inference that the heritage of the oil shale ruins is only of local significance is wrong. These ruins are already on the state heritage list, so clearly the claim that they are of only local significance is nonsense. Furthermore, they were listed by the National Trust in July 2014. It is concerning that this sort of error is made in the EIS. The Airly Village ruins and the Grotto should be fully protected. The whole assessment of impacts on Aboriginal and European heritage is premised on the statement that subsidence will be limited to between 0 and 10 millimetres. This statement is given nowhere else in the EIS and appears to be untrue. This calls into question the conclusions in regard to impacts on Aboriginal and European heritage.	
Social and Economic	111162	Why destroy the value of the valley for profits that last 10-20years	**Section 5.4.11**
	110979	There will never be 135 people working at the mine at any one time	
	111130	The mine should contribute to local roads, children's playgrounds, picnic areas, tree planting and the Bushfire Brigade	
	111073	Most of the community don't want the mine at all. No benefit or employment to the community of the valley. Benefits are short term. Tourism is evolving into an important industry that relies the values of a pristine environment. Why threaten this with a coal mine that has closed before.	
	111232	My property should not be devalued because a mine opens next door	
	110981	There will never be 135 people working at the mine at any one time	
	110369	Property values are already being affected. There needs to be some sort of buffer zone where properties are purchased as a buffer.	
	111584	The EIS does not properly address the agriculture and tourism industries	
	111546	I feel there is a very real possibility that I may lose what I have invested and end up with little or no	

Area of Concern	ID of Respondent	Comments	Where Discussed
		superannuation if the value of my enterprise is compromised in any way by a loss of high quality water, significant drop in land or property value.	
	111580	All of this put at risk for a mine that is unviable Coal has been promised to the Chinese owned Company - Energy Australia who own Mt Piper. Capertee Valley has suffered a significant oversight in statistical information, as a result of being on the fringe of 2 Council boundaries. Therefore it has not been evident the growing population in the valley, the primary industries conducted, tourism figures and agricultural statistics. Centennial has taken advantage of this situation and ignored the impacts on, in particular, agriculture and tourism. We have many a visitor stating, that if the mine is extended it will definitely impact on their impressions of the valley and they would be less likely to return.	
	111669	It is my view that an expansion of coal mining will impact negatively on the expanding tourism industry as well as on the long standing and newly emerging agricultural enterprises in the Capertee Valley. Analysis would reveal that the 'benefits' of a short term and financially marginal mining operation would not outweigh the negative impacts on water, air, ecology and the flow on effect these will have on agriculture and tourism?	
	No ID allocated	The mine is of no advantage to the town and will do great harm.	
	111744	The EIS lacks detail of the economics of the project.	
	Form letter from RSWUG used by 111578, 111642, 111644	The EIS does not recognise that the Capertee Valley already has a significant tourism industry with over 17 tourism operations in the valley, ranging from bed & breakfasts, holiday houses, a wedding and events venue/wellness retreat, to an annual festival with more than 3500 visitors. It is also one of the top bird watching areas in the world. These are industries that are sustainable well into the future (unlike the mine) and have the potential to grow significantly. The Capertee Valley is a unique part of Australia, with outstanding scenic and ecological qualities, right on Sydney's doorstep and thus highly accessible to both national and international tourists.	
Soils, Land Capability, Agricultural Suitability	111171	I doubt there will be no impact to the recreational use of the SCA due to rock falls, springs near the camping area being drained and exploration drilling.	**Section 5.4.8**
	111232	The mountain should be fully protected and be left in a pristine condition. Land uses must be protected.	
	111546	Where is the Agricultural Impact report in the EIS as pertains to ground water?	
	111754	Foreseeably, this will result in loss of productivity and potentially a loss of viability of all the farming and grazing enterprises downstream and within the groundwater sources of the mine.	

Area of Concern	ID of Respondent	Comments	Where Discussed
	Form letter from RSWUG used by 111578, 111642, 111644	The EIS does not give full value to the important agricultural industries in the Capertee Valley. There are several large-scale farms; up to 4450 ha in size and over 6000 head of cattle are produced each year. In addition, there are goats, sheep, alpacas, pigs, bees and poultry. Crops include lucerne hay, olives, saffron, fruit and vegetables, and native plants. All of this agricultural production depends on water, which could be severely compromised by both the mine's extraction of water for the washery, and through even minor subsidence.	
Noise	111232	There must be no increase in noise.	**Section 5.4.6**
	110369	There must be minimal or no noise. We want to hear birds not the rumble of machinery.	
	111546	There needs to be dust and noise level monitoring in the entire valley	
	No ID allocated	My home is metres from the rail line at Capertee. Increased noise is not welcome.	
Air Quality	111160	Minerals are likely to become toxic when exposed to air and be a health hazard	**Section 5.4.7**
	111546	Why are there no dust monitors to the east and south east of the mine? I propose the monitoring should cover at least all of the Capertee Valley. All railway coal trucks to be covered, both full and empty	
	No ID allocated	Coal dust from wagons is a concern	
	No ID allocated	Cover coal rail trucks to minimise dust pollution	
Visual Amenity	111232	The coal stockpiles should be fully screened from the Glen Davis Road	**Section 5.4.10**
	110369	The mine must guarantee not to expose coal so that it is visible from any road.	
	111546	The coal stockpile is already an eyesore when you enter the valley, how much worse will it be with approval of this extension?	
	111744	An issue which has received little attention is light pollution at night. Airly would create similar light pollution to that of Charbon for its neighbours. The current stated undertaking that outdoor lights would only be used when a train is being loaded is never adhered to.	
	Form letter from RSWUG used by 111578, 111642, 111644	The EIS is vague about exactly how such stockpiles will be treated, merely giving three examples of how they could be treated. This is totally inadequate. The stockpiles need to be totally covered to eradicate dust, which would contaminate waterways and the pristine air quality of the valley.	

Area of Concern	ID of Respondent	Comments	Where Discussed
Traffic and Transport	111162	Increased traffic will lead to increased animal deaths	**Section 5.4.5**
	111232	We don't want increased traffic and the mine should pay for any upgrade of the road if an increase happens.	
Decommissioning and Rehabilitation	111546	I think these conditions should also extend and specify how the land has to be remediated and rehabilitated after mining is finished and ongoing, including soil testing and aquifer monitoring and the success of revegetation for at least 10 years with high monetary penalties for non-compliance.	**Section 5.4.9**
	111744	Rejects Replacement Area. There is deep concern that the rejects replacement area will be an ugly scar on the landscape and secondly feed toxic wastes from rainwater into dams which will overflow into Airly Creek.	

Table 5 – Summary of Comments from Positive Submissions

ID of Respondent	Location	Key Theme for Project Support	Comments
111132	NSW	Environment Employment Local business benefit	I am a regular visitor to the beautiful Capertee Valley and mining has been going on in the area for many years. In my opinion there has been no impact on the environment as a result of mining. Families depend on the mine for jobs and the local businesses do also. I believe if the extreme Greens had their way we all be living back in the stone age instead of being the young vibrant progressive country we are. I support the existence of Airly Mine 100 percent.
110740	Wallerawang,	Environment Employment Sustainable and conservative mine design	I have been an employee with Centennial Coal since 1998 in the capacity of Senior Mining Engineer and have overseen the development of the Airly Mine Extension Project EIS. I have worked in the Western Coalfields since 1994 and have experienced a wide variety of operations during that time. During that time I also was able to gain experience in the United States of America in the underground coal industry. One of the key experiences I have had during my career was the 11 years I spent at Clarence Colliery during which time I was instrumental in the development and implementation of the partial extraction mining that has successfully been used there from 1999 to date. Having grown up in the in the Blue Mountains and lived in the stunningly beautiful Wolgan Valley for the past 15 years, I have a deep appreciation of this landscape and very much want to see it available for future generations. Equally there needs to be industry to support communities and mining has been vital to the success of this district for over 150 years. I strongly believe there is a balance to be struck between our need to build and maintain strong communities, our need to be rejuvenated by the beauty of the natural world and the need to maintain thriving natural landscapes for the good of the entire world. So it is with that philosophy that I approached the design of mining at Clarence in 1999 and was able to develop mining methods that prevented fracturing of the overlying rock structures, minimised impacts on surface and ground water systems and yet were safe and productive. Clarence Colliery was and is one of the most, if not the most, successful continuous miner operation in Australia. And all that under the spectacular and fragile landscape of the Bungleboori Creek gorge. Centennial Coal could have insisted on higher extraction ratios and greater levels of impact at Clarence given the high value resources that is there, but instead the company has been fully supportive of the partial extraction techniques used and the minimal impact philosophy I came to Airly in mid-2009 and after one inspection around the mountain realised that this was a landscape that bore remarkable similarities to that above Clarence Colliery. It was fragile and much loved by a broad cross section of the community. Added to this was a vibrant community in the Capertee Valley that made use of the natural and water resources of the area. Clearly a similar approach to that used at Clarence was applicable. Again, Centennial has been fully supportive of moving away from the high levels of impact previously proposed for Airly and moving to a

ID of Respondent	Location	Key Theme for Project Support	Comments
			far more sustainable yet productive mining method that minimises impacts to surface features and water systems. As the person responsible for the development of the Airly EIS I can say that every effort has gone into finding the right balance between safe and productive mining, preserving the local environment and making sure that downstream water users are not unduly impacted. I don't just work here. I am not just a blow in, here to make a quick buck and move on. These mountains are my home - they have been all my life and I hope they will be for my children and theirs after them. I could not in all conscience be a part of something I knew to be destructive on this community and this place. I am proud to support Airly and what we are trying to achieve. I would encourage others to support this project as an example of the way forward in underground coal mining in Australia.
110913	Lithgow	Economic benefit Environment No adverse impacts	The Airly Mine has been an important economical benefit to a large area from Lithgow to Kandos and Bathurst. Granting an extension to this environmentally responsible company would go a long way to helping the people of these areas. The managing company have proved in the past to respect any environmental conditions imposed and are expected to do so in the future. There would be no negative impacts on the surrounding area that could or would not be rectified at the end of the term.
110876	Capertee	Employment (contractor) Support livelihood and way of life Impact on other businesses if closed.	I am a permanent resident of Capertee, I currently work for Strike Force, a cleaning company that contracts to Airly mine. I have worked there for over 3y now even when it was on care n maintenance. I also own a property at the nearby town of Cullen Bullen, which is currently rented to a Airly mine worker, my son also works at the mine. So as you can see my life would be changed dramatically if the mine were to close. Not only would I lose my home and workplace that I love. My son would lose his too. Please don't close our mine it is part of our community without it our little school and our only shop would close.
110902	Kandos	Employment Pay packet effect Lifestyle	I support the submission as it gives me a annual income, so i can support my Family and also spend our income in our local towns of Kandos/Rylstone. and also into the local schools ,and I wish to do this for many years to come , as Kandos has been my Family's home town for 4 generations so far.
111125	Mudgee	Employment Pay packet effect Sponsorship Support local community	I am employed by Centennial Coal and have been for 6yrs. They gave me an opportunity as a mature aged person to start a apprenticeship and support me through that time. My income that I earn supports my local community. I donate to local charities, support local growers at our local markets and participate in local events like relay for life. These traits I learnt from seeing what companies like Centennial do, supporting the local community
110904	Kandos	Employment	I support the submission ,as My husband works at Airly and we have 2 teenage kids to support our kids enjoy sports and we travel to places all over NSW , it will be a bit hard to do this without an income. our

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		Flow on effects Impact on community	community also benefits from his income ie schools shops , we know a lot of people from the local towns that also work there, and if there are no jobs around there may not be any towns.
111142	Rylstone	Employment Long History of employment Low environmental impact Impact on community / relocate	I am a current employee at Airly underground colliery. I have worked in the underground coal industry for 29 years at various mines and have seen many changes in this time. Airly colliery mining methods have the lowest impact on surface, water, flora and fauna that I have worked with. centennial coal, (Airly), are also a great community minded company, helping with local schools, volunteer and sporting organizations .without Airly the Rylstone Kandos area would lose more families to the bigger regional towns and cities, causing the loss of teachers, nurses and hairdressers in our already struggling towns.so with this submission I urge the Airly mine extension be granted.
110911	Clandulla	Employment Environment Pay packet effect	I have worked in the mining industry for the past 8 years, with Airly for 3 months it would be the most safest enviro friendly mine I have worked at. I have 4 children we live in Clandulla NSW which is located near Kandos in recent years it has been hit hard by the cement works and Charbon mine closing there are over 40 people that work at Airly witch live in and spend a lot of money in this community I believe with this extension it would help a small town not only survive but thrive in years to come.
111127	Mudgee	Employment Environment Impact on community/relocate	My dad is employed at Airly Coal. His wage each week pays for my day care, sports and play groups. He works hard so I can enjoy the parks, fishing, bushwalking in the Capertee valley and all other fun things to do locally. If this submission was to fail, we would have to move and I would miss my friends
110727	Bowenfels	Environment	There is no evidence of subsidence throughout the reserve caused by the underground 100 year old pillar and post oil shale mine. Therefore there should be no evidence of subsidence from the pillar and post Airly coal mine project. They are; A supply of water for drought relief. Philanthropy – RFS and P&C Increase trade to pub and service station/café
111334	Lithgow	Employment Loss of jobs in the sector Mining history Pay packet effect	Airly Mine needs this approval for the neighbouring communities well-being and economy. After blows to Coalpac and angus place and over 500 out of work, these families need some security, which can be provided by this approval... These towns are steeped in mining history and require these mines to help support local economy, without these jobs and mines these communities will crumble without a significant boost from alternative industry to take up the slack of mass unemployment and the effect of no one supporting the local economy.
111318	Capertee	Low impact Protect the environment	I am a long time resident of Capertee and have lived in the area most of my life. The area that Centennial Coal is proposing to mine in this application is directly under the mountain and land that our family have called home for longer than I have been alive. My brother, sisters and I all grew

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		Participate in local business Corporate citizen Sponsorship Robust EIS Community benefit	up in the area and spent every weekend on and around Genowlan and Airly Mountain, now called Mugii Murum-Ban State Conservation Area and now a majority of it like the back of our hands so to speak. After reading the EIS and seeing firsthand the work that is being conducted by Airly Coal, I do have some reservations, but trust the planned methods for the low impact mining that is proposed in this location, to protect our beautiful backyard. My entire primary school education was at Capertee Public School and I also had my son who is now 18 attend for his entire primary education. I have one daughter currently attending the school, and will have another entering kindergarten in 2015. My husband is employed by Centennial Coal at the Airly site as an electrician, and we have been through the roller coaster of Airly closing, being redeployed to Charbon Colliery and then being redeployed once again when Charbon closed back to Airly. Centennial Coal have been very open and understanding with the Capertee community with regular meetings, ongoing updates as well as being available to answer any questions, no matter how stupid. My children have directly benefited from the coal mine, participating in a music program at the Capertee Public School funded by Airly Coal. They have also provided an information sign for the school as well as new technology. They have provided various types of support and help to our community organisations, such as cash donations for our Community Christmas Party, physical and practical support with electrical wiring, concrete and termite protection on our community hall. This type of support is invaluable to our school and community which have very few options of support and very little money due to the small size of our community. I remember reading the original EIS in 1994 and have since had the opportunity to learn a bit more about coal mining. I have also read this EIS and am impressed with quality of work and research that has been put in by Centennial Coal. I have seen firsthand the Centennial Coal drilling sites and was impressed with their level of rehabilitation. The employment provided with this extension will help sustain not only Capertee, but other locations such as Kandos, Rylstone and Lithgow. I fully support the Centennial Coal Airly Mine Extension and have experienced no issues with the current operations and can see nothing but benefits from continued operations. The Lithgow district and the Capertee community needs this extension to be approved
111344	Portland, NSW	Integral part of the community economy	I support the extension of Airly Mine as I believe it is in the interests of the whole community to support the coal mines that have been an integral part of this community and an important contributor to our economy. I believe an overwhelming majority of people who reside in this area are in support of this important project. It seems that the loudest voices in protest at such projects are those who do not even live here and are therefore not immediately affected by what happens. Local residents' submissions should be the ones to be considered.

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111330	Wallerawang, NSW	Employment	The Airly Mine extension approval will be pivotal to the sustainability of the local area. The community supports mining and in turn the approval for extension will support the community by potentially creating jobs, or at least long term employment for the current employees
111350	Mudgee, NSW	Employment Regional benefit	I believe the Airly upgrade will be beneficial to the surrounding areas and also benefit many employees and future employment
111316	Capertee	Focus on minimising adverse social and environmental consequences Employment Community benefit Sponsorship Minimal impact to environment Positive community benefit	I have lived and worked in this area for the past 10 years, of those ten years I have worked for Centennial Coal (originally at Airly, then Charbon and now Airly again) for 3 years. In this time I have been exposed to some very broad views on Coal mining in the district. What leads me to make a submission is that such a thing can be so polarizing to the point of level headed discussion goes out the window. I have seen those opposed to the extension turn blindly to any factual information and encourage hearsay and scaremongering on both sides of the argument. As it stands now with my involvement in the mine I can say I have never worked for an organization that has been so focused on social and environmental consequences, this gives me faith as a local resident of Capertee that Centennial are aware of the factors that will limit their mining operations. So far without Centennial in the Capertee valley, extensive environmental and native history research would not have been undertaken, as they are obliged to undertake these studies. Local communities that sustain the rural industries would struggle, as the towns of Kandos/Rylstone have already hit by the closure of Kandos Cement Works and Charbon Colliery, would not have the employment opportunity offered by Airly. Before I started at Airly, I was working in Kandos for another company so to me these towns I consider to be local. Airly Coal has proven that it wants to be a good for the area they have directly supported Capertee Public School, where my daughters attend. They are active with Capertee Progress Association and I have seen them first hand try to engage in those opposed to mine to allay concerns. But as history shows you can't teach those that don't want to learn. If I was to have any concerns as a local it would be that I don't know enough, I don't have experience in mining to understand the environmental effects. I have read the proposal and understand they aim to not impact the surface or the cliff faces. And ultimately this is where I have to have faith in the professionals that look at this. Not greenies opposing for opposing sake. There must come a time when the planning department seek a win-win solution, one that placates the environmentalists and allows industry to employ and profit. Airly as I know it have been positive to the local community being employed there has given me more family time and career opportunities.
111328	Lithgow	Economic benefit Employment	The future of Airly Mine is critical to the local community not only on an economic level but from a cultural and community stand point. With the recent decision to suspend mining at Angus Place Colliery and the global downturn in the mining sector it is imperative that the community receive 'Good news' stories. The

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		Secure future Devastating impact of job losses in surrounding area Sponsorship	re-opening of Airly Mine allowing the continued employment of the Charbon Mine workforce has re-invigorated the communities of Kandos, Rylstone and Lithgow. Moreover the secured future of Airly Mine provides Lithgow residents with some hope for the future, needless to say at some stage the mine will require more employees and can quite easily accommodate expanded production should the extension be granted and the economic climate improve. The creation of jobs in the local government area must be a major priority at this time or the impact upon the Lithgow community could be devastating sending Lithgow spiralling into an economic downturn that I fear could destroy a town built for decades on heavy industry and steeped in tradition and history. In recent times the local government has been very proactive in promoting local business and it is very encouraging to see the transformation of the main street in Lithgow with once empty shops now opened again and trading successfully. We simply must keep this trend and allow local children the opportunity to stay in Lithgow and gain employment, the alternative spells the end. Airly Mine's current and indeed future mining methods are designed to have very low impact on the environment and no discernible impact has been recorded from operations to date. This fits in well with the conservation values of the Mugii Murum-Ban State Conservation Area that the mine currently operates in. Airly Mine is a very strong supporter of the local community and supports groups such as Capertee Public School, Capertee Rural Fire Service and the Capertee and District Progress Association. My involvement in the local community encompasses almost 30 years supporting local sporting associations both cricket and hockey, having coached literally thousands of young and mature athletes. I am now a High Performance Coach with Hockey NSW a job which allows me to travel the country coaching children and young adults, with the blessing and support of my current employer Centennial Coal, a role that I would be forced to relinquish should my employment cease.
111294	Rylstone	Employment Economically viable Regional benefit in response to downturn of industry	I am currently employed as the Commercial Manager at Airly Coal. I express my support for the Airly Mine Extension Project. I have resided within the district (Rylstone) for the past 30 years and have been employed within the mining industry for the past 8 years. In March 2014 I was transferred from Charbon to Airly when mining recommenced. Although the my exposure to Airly Mine has been relative short (8 Months), it has been rewarding to be part of team that has achieved a safe, productive and low cost operation in very difficult times within the industry. If approved, the project will give continuity of employment for many families within the district when employment prospects are scarce due to the recent closure of the Charbon Underground Mine and the Kandos Cement Works.
111332	Lithgow	Employment	This would be beneficial as the loss of 268 jobs at our local Angus Place Colliery will affect Lithgow and surrounding areas greatly, we don't want any more country area's to turn into ghost towns.

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		Impact on towns	
111312	Kandos	Economic benefit to community Important outcome for the local community due to other industry closures Employment Improvements to environmental management / performance Important part of the community	I fully support the Airly mine extension project and EIS, I have lived in the local area all my life and have witness the strong support that the mining industry has injected to our local communities and economy. I have also seen first hand how both industrial and farming can effectively work together in our local area in excess of 80 years. The extension of Airly mine is extremely important to the true local community that has been hit very hard by the closures of the Cement works, Kandos Mine, and the huge reduction of workforce at Charbon Mine that is also set to close completely in late 2015. The community and local businesses strongly rely on the Airly Mine extension approval to provide employment and sustainability in the local surrounding areas. Having worked in the Mining industry for almost 20 years I have seen massive improvements in the mining process in regards to environmentally impact, Centennial Coal and their employees are extremely well educated in the proposed mining methods to minimise any potential environmental impact. At the end of the day we are not just miners, we are a very important part of the community that are strong supporters of local services and associations and truly do care about any environmental harm.
111326	Wallerawang	Employment Pay packet effect positive to local businesses Important part of local economy Impact of downturn of the industry Approval means confidence in the community Environmental performance Adverse impact to local community of not approved.	I am in support of the Airly Mine Extension Project for a number of reasons. Firstly I am currently an employee of this mine and have been for the past 8 months and prior to that was an employee of Centennial Coal for two and a half years, this mine currently provides employment to 60 local workers, and because the local community relies heavily on the mine workers of the district to keep small businesses and schools financial. Centennial Coal is one of the area's biggest employers. Generations of people have raised their families here and have helped to build the local economy to the point it is today. It has come as a huge shock to learn that Angus Place, the biggest mine in the district, has just been put under care and maintenance resulting in a job loss of over 260 men and women, right after the announcement of the Cullen Valley and Coal-Pac extension rejections. With the approval of this extension at Airly Mine, more local jobs are created, families remain in the local area, and the local community continues to thrive like it has done in recent years. As an employee of Airly I know first hand that the mining methods used at Airly cause no surface subsidence, it is the cleanest and driest underground mine in the area and as a result of the location it does not disturb any water tables in the Airly and Genowlan Mountains. It poses no threat to the natural environment or the Pagoda rock formations. The pit top infrastructure has already been established, there are brand new bath house amenities and offices to cater up to 170 underground employees, and approval of this extension will help to see a lot of the recent local job losses absorbed back into the mining industry. No mines = no Lithgow

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			No jobs = no community The community has suffered enough recently due to mine closures and approval rejections, we dont need any more. Approve this project and save a district
111354	Glenmore Park	Must rely on mining Employment Community sustainability	Until safe, viable alternatives are found we must rely on coal mining to supply coal for power generation. In my view those who oppose the extension to the mine are standing in the way of progress and potentially causing a rise in the cost of power to families already struggling. There is also the issue of job losses for those who work for the mine and those who depend on them. These are jobs that allow families to live and grow in regional areas that may well otherwise be dependent on tourism and farming, neither of which is a reliable source of income. Coal mining has been taking place all over the world for many years. The environmental impact of a coal mine is relatively insignificant compared to a nuclear "accident". I believe we must continue to mine coal.
111346	Mudgee	Community sustainability	If closed this would have a devastating effect on a rural community where work doesn't come easy.
111348	Blue Haven	Community sustainability	I fully support the Airly Mine Extension. Putting the mine into care & maintenance will be detrimental to the community, and to the lives of those apart of the community.
111342	Lithgow	Employment Downturn of the industry	In recent light of another major mining site being taken into care and maintenance i would like to support the expansion of this mine and the opportunity for more jobs in the local area
111336	NSW	Comment support	I support that Airly mine re-opens. For the local community
111340	Wallerawang	Comment support	I fully support this expansion
111338	Wallerawang	Comment support	I fully support this expansion
111320	Rylstone	Employment Pay packet effect Possible need for families to relocate Down turn of industry in region Adverse impact on community if not approved environment	I am in support of the mine, I am a 2nd generation miner, but have had family working in the area as miners for a total of 70 odd years. I have a wife and 2 kids that rely on my wage to live. We love the area and without my income we would have to move elsewhere, something we don't want to do. We have lived in this area our whole lives and wish to bring our family up in the area, but if it's not approved, this unfortunately will not happen. We put a lot of my wage into the local area along with most of the other employees I work with. We have had a lot of businesses close in recent years and without this job, there is pretty much nothing around, just a lot of empty shops in both towns (Kandos and Rylstone). There would be some 60 or so families in the area that would have to look elsewhere for work, something that could cripple the whole area as smaller businesses rely on the wages that we all get. The Kandos Cement Works closed only a few years ago and that was bad enough. As for me and my family, I don't know what we would do, there are no permanent jobs around, and with other mines scaling back their work force as a result of coal prices, any job that does come up is extremely competitive. Without this job i risk losing my house, something that we have been doing renovations on for that last year or so, and just

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			don't know who would buy it with no employment in the area. I have an interest in environment issues and have family in the local environment group, Airly is extremely good at having very little if any negative impact on the area, it's like a wildlife sanctuary driving home from there at night, it also has an incredible variety of native birds to see around the mine, something I like to see when I get there, it seems the birds and animals don't mind us being there either. I certainly hope it gets approved as it's a lovely area to work in and me and my family depends on it.
111401	Rystone	Comment support	This mine needs to go ahead a lot of locals need this.
111399	Portland	Community benefit	It is essential this this goes ahead for the sake of our towns and families. With the massive job losses of recent the towns will be ghost towns before long.
111377	Kandos	Employment Concern re down turn on industry in the area Impact on towns if mine closes Pay packet effect	Am in support of Airly. as a wife, daughter and granddaughter of miner's If it wasn't for Airly my family would have to move looking for work else were. Due to the closer of the cement work's there is not much job opportunities in the area. Having to boys at the age of 13 & 16 knowing that there is no work for them when the leave school is hard. But not having work for my husband at Airly will be harder. Knowing that our lovely little town of Kandos will DIE!!!! with a lot of family's like mine having to move elsewhere. Airly may employ over 50 worker's but what about the ones in our town that have employment form the workers of Airly. I work at the local R.S.L and have been there over 5 years and if it wasn't for these men coming in and supporting my place of employment I be without a JOB. And what about the local business that all so employ people I no they would have to let people go if Airly closed. No Airly, No local Jobs, No families, No towns :-(I SUPPORT AIRLY 110%
111373	Rylstone	Low environmental impact Benefit to surrounding community / region Employment benefit	I have been in the mining industry for 5 years, 9 months of that has been at Airly Mine. Those 5 years of experience I've never seen a mine operate with such a low environmental impact and a work force with a positive attitude towards safety, cleanliness the environment and the community. Airly is not just economically important to its location (Capertee) but to other surrounding towns and cities such as Kandos, Rylstone, Lithgow, Wallerawang and Bathurst Each employee a treasure to his/her local community and surrounding. With Airly Expanding this would provide 135 much needed jobs over the next 25 years and prevent families and communities suffering from unemployment. Airly's Extension is Vital and with a workforce trained for a environmental individual commitment to a group effort that is what makes a team work, a company work, a society work, a civilisation work. I hope my submission helps towards Airly's extension and the next 25 years of employment and

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			economic success.
111397	Mudgee	Employment benefit Lose lifestyle and home May be forced to leave the area	I support the extension project. It is very beneficial to our town and the people in it especially my family as my husband works for the mines and would lose his job. We would lose his income and potentially our home and life style. We may have to move away which would be terrible for our 3 children and the community which we support. I also work as a school teacher and this would be very disruptive to my school if we had to leave or if my husband had to move away from us to find a new job. This is the same story for hundreds of families that rely on the mine and this extension to go ahead.
111379	Lithgow	Employment Industrial town with mining history Sustainability of industry is important to families and the economy Positive benefit of pay packet effect May need to relocate of not approved with devastating impact on the area	I 100% support this submission and cannot fathom the impact of this not going ahead not only on the local community but on mining in Australia in general. Lithgow community has effectively declined due to opposition due to environmental factors. Lithgow has been a strong industrial town dating back whether that be the small arms factory, the steel works, the power stations the mines etc. These have been the pivotal components that have led to the expansion of this country town. Take a look around, the mining is sustaining a town currently stunted by growth due to the increasing number of people out of work. More and more people are moving away, small business are shutting and real estate will start to decline with new houses and prices. In 2011 Lithgow took some big hits with The private hospital closing, Airly coal mine and Coalpac stopping production. This left the community reeling. So many jobs gone and some just prior to Christmas. Many of these guys had to move away from their homes and love ones just to afford their mortgages. These men and women could not find local employment and had to apply for temp work or fly in fly out. Have you been in a situation where your next pay check will be coming from? Or how you can support your family? How you will give your children the Christmas you know they deserve? The fear of not paying rent or mortgage repayments. Have you ever spoken to the men and women who are depressed having to apply for benefits at Centrelink when their fathers and their fathers worked in mining. Have you ever come to Lithgow and discussed the impact on the real people of the town? Not just the environmentalist?! Let's fast forward to 2014. Wallerawang power station ceased operation and is mothballed. Leaving the future of hundreds of workers and contractors up in the air. This alone has forced contracting companies to lay off staff, more family relocated and that horrible feeling of "what the hell will we do". It's left workers too scared to take holidays or sick leave because of the fear that this will be the reasoning of their family not eating. Worried that they won't be offered a role at the sister power station as they're at capacity for staff as it is. Then the devastating news that Coalpac won't be continuing or expanding meaning the men working away from their families have to remain there. This was rejected on environmental grounds. And honestly it's been an industrial town for how many years. I bet these people use computers and phones. All of which I'm sure is powered by our power stations which are powered by our coal mines. The rock formations are pretty but no one knew they existed before now and for every tourist they MIGHT bring, they're losing so much for the miners that could be here. A miner who earns $100,000 a year help the local economy by supporting them whether it be the local builder, the clothing shops, the butchers and

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			fruit shop, the painters, the grocers, the hairdressers, the restaurant. Lithgow isn't a hot tourist destination. We're not kidding ourselves. A few tourists to see a rock formation will not even meet the Impact of one miner and his family gone. Keep moving forward to now. To yesterday in fact. Angus place colliery is closing. Just shy of 300 workers there. Can they just be transferred. NO. Families yet again worried about their future, their children, their commitments. It's putting strains on marriages, relationships and friendships. When the govt sold the power stations, the staff was guaranteed 4yrs of employment. Due to the Coalpac expansion not going ahead the future of mt piper is in doubt. Let's look at the impact of this and potential closes. Hyperthetically let's pretend the power stations gone, coalpac and angus place gone. Let's also imagine Airly gone. This is at least 1000-2000 jobs. Let's assume 1000 just for numbers. These workers come from a family of 3. So 3000 less people in the area. Now the flow on effect will mean the people who service these places the laundromat, the engineering companies, the cleaners, the car dealerships will all face ultimate losses and staff reductions or closures. This then means these families will tighten down and it's the small local business of the town who will suffer. The florist, the builders, the fish and chip shops, the clothing stores, beauticians. It honestly will have horrible consequences for this already struggling town. This town needs Airly to continue. It needs the security and our workers deserve that. Our families deserve this. And our town needs to survive. The greenies will screw over this town before moving on. Mining has a major economical effect on our country. If the greenies get there way Australia will suffer. In an economy already struggling to recover. Airly coal mine needs to go ahead. Come to Lithgow. Walk the streets. Talk to the real people. Secure our future and that of our children.
111367	Mudgee	Employment Pay packet effect is important Participate in local economy Social ties are established and important to way of life Strong connection to the area which may be lost of need to relocate	I wish to make a submission in support of the Airly Mine extension. I have lived in the mudgee region for 12 years now and even though I came to mudgee within the banking industry, I was able to get employment in the mining industry 5 years ago. For the last 5 years I have been employed by centennial coal and am proud of the image and reputation they have built up in the western districts during this time. I am currently employed at the Airly mine and to not have the current expansion go through would effect myself and my family immensely. Although I currently reside in Mudgee I travel each day to Capertee for work and am a regular visitor to the Lithgow region for Mines rescue training at the Lithgow Coal Services compound as well as our whole family attending regularly to the Westfund offices for all our Dental and Optical needs. All three of our children were born at Mudgee hospital and have all their friends and peer support here where they have grown up.

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			My wife is a permanent school teacher and if I were to lose my job we would have to uproot our children to move somewhere that I was able to find employment. This would be a major disruption to them as well as my wife's career which she would have to resign and hopefully pick up wherever we end up. My wife, children and I all have a strong connection with this area as it is where we have decided to make our home and the Capertee valley is a valuable part of our family time together, whether it be camping at Turon gates or just bushwalking within the Capertee valley which we are so proud to know is able to co-exist with the local mine that provides the main income for our family.
111359	Eimeo (QLD)	Comment supporting	Supporting
111375	Yetholme (NSW)	Benefit to suffering economy	This extension would be great for the already suffering local economy. With the closure of mines in the area families and local businesses are suffering, so this extension would give some hope in these tough times. Centennial coal does a great job with supporting local sports teams and community events
111385	Manilla	Employment and economy	It's great for the community the state and the country. We need mining we need jobs. It needs to be approved
111387	Manilla	Employment Environment	Good to see another mine the community needs the jobs. And mines are a good wildlife refuge all the wildlife on the mine's properties are amazing.
111389	Manilla	Employment Environment	Good to see another mine the community needs the jobs. And mines are a good wildlife refuge all the wildlife on the mine's properties are amazing
111393	Manilla	Employment	We need mining we need jobs
111382	Mudgee	EIS robust and impacts considered Pay packet effect is important Positive lifestyle	As an employee of the mining industry I am aware of the detail which goes into such assessments. Organisationally I believe that every endeavour is made to truly consider the impacts of the work we do, on the environment we affect and to the community at large. As sole provider for my family, my earnings are feed back into the local economy and community. I love being able to live in Mudgee while maintaining meaningful employment and career development. The quality of life enjoyed by our whole family is vastly superior to what it would be if I was working in the city as an engineer. We can only continue this existence while employment opportunities are available.
111371	NSW	Comment support	I support this expansion. As I have family and friends that are currently working at Airly.
111365	Wallerawang	Comment support	I fully support this expansion

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111357	Rylstone	Comment support	I am for the mine going ahead as I have many family and friends whose livelihood depends on it
111363)	Wallerawang	Comment support	I fully support this expansion
111361)	Kelso	Employment Positive benefit to community Flow on effects to other businesses is important Support jobs	I know many families of people who work at Airly mine. They put in extensive effort and take great pride in being world class miners. A well paid job in the mining industry has provided me also with the opportunity to stay in the local area and to contribute to the local community in many meaningful ways. I live and work here, when most of the young people need to move to the cities to find work, which I see to be unsustainable. We support many engineering business from the surrounding areas. Since the cement works and Wallerawang power stations have closed it has taken a huge toll on businesses in the local area and there are only just enough work for many businesses to be a sufficient size to remain in business. I am building a house, which helps employ lots of local people. I help out on family farms in the area because farmers need support too. I often ask people if they know about mining and the usual response I get is "no i don't but someone has shown me a photo of a bad experience from overseas somewhere". The fact is that every mine is completely different in Geology, Hydrology and community aspects and each needs to be assessed on a case by case basis. This mine application should definitely be approved because it is a no brainer for those who understand what actually goes on. Every job counts for a community outcome that is either on the incline or decline, thus affecting our economy and our future - Theory of compounding. Please support jobs that make good sense.
111441	Kandos	Positive benefit to community and businesses Sponsorship Communities reliant on mining	I believe that the Airly mine has a huge beneficial impact on the local communities. If the mine was to close, the communities would experience major detrimental effects. Including; population decrease, economic loss and loss of professionals just to name a few. Being a student myself, I can see the impact that the Centennial Coal company has on the communities and the various small businesses and organisations within them. I know that Centennial sponsor/donate to the local schools. Without this sponsorship the schools would have to withdraw from certain events and the students would experience the effects from the lack of funds. Centennial also are a major sponsor of the local football team. Without this sponsorship, the team would have to seek extra funding from other sources in order for them to be successful. The mining industry has a major positive impact on the local communities and without this, the communities wouldn't be the way they are. The mining industry provides resources, jobs, economical

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			boosts, support and finding to the community.
111411	Gulgong	Employment Positive pay packet effect on other businesses	The mining industry employs a lot of people within the area which in turn brings money to the town and keeps other businesses associated in the town open therefore I am all for the expansion of Airly mine
111419	Rylstone	Employment benefits Pay packet effect Possibly required to relocate if no jobs	I have worked at Airly for 7 months as a deputy. My family live in the area and we shop in the area. If the mine approvals do not go through. Myself and my family will be forced to leave the area to source work elsewhere. And saying that there isn't to many other jobs around in this current climate. The mine itself has very minimal impact on the environment and the ascetic of the surroundings. This approval if not passed will have a detrimental impact on the surrounding townships.
111421	Wallerawang	Employment Possibly need to relocate if not approved Positive impact of pay packet effect	I am a current resident of Lithgow, I have grown up and lived here my whole life and I have been employed in the local coal mines for 8 years. I was at Airly before when we got laid off and then went to Charbon colliery and got transferred back to Airly mine. If Airly was not to get approval it would be devastating for myself and my family. I would have to relocate and to be honest Lithgow is looking pretty grim at the moment which is heartbreaking. If I was to leave the area I would have to leave behind my family and friends. I shop locally, I support local businesses, please approve this mine so I can continue living in my town that I love so much.
111429	Kandos	Live in the area and jobs for the next 25 years is positive	My name is xxx and I'm a coal miner at the Airly mine. I have lived in the local area all my life and have a young family and have no desire to leave the area but fear I will have to do so if this submission is not granted as there is next to no work around. This project will provide up to 135 jobs to local people for 25 years which has to be good for the local economy..
111435	Kandos	Possible need to relocate f not approved	My name is xxx and I fully support the project as my son in law works at the Airly mine and if it does not get the extension I fear they will have to move away for work and that will mean my grandkids relocating and this would not please me.
111445	Rylstone	Provide employment and job security	The extension to the mine sounds fantastic. It will increase job opportunities and bring more people to the region. It will help provide a positive future for our children.
111437	Kandos	Sponsorship	hi my name is xxx and I would like to support the project because of all the support the mine provides to local groups such as the Capertee public school, The Capertee rural fire service and the Capertee and district progress association
111405	Rylstone	Environmental performance Adverse impact on surrounding communities Long history of mining	I currently work at the Airly mine project and for this mine not to gain it's approvals because of a few small minded and very uneducated people is a terrible thought. These people really do not know what they are talking about when it comes to the topic of coal mining. Most of them have never stepped foot in a working coal mine to see actually how non detrimental to the environment we actually are and further more are not even from the affected area. For this approval not to go through would have such wide spread ramifications. Not just on Capertee itself

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			but all of the other little surrounding townships. That mine is the backbone and life blood of a lot of those little townships and for it not to get approved, these townships could quite possibly no longer thrive or exist. Families will have to pack up and leave to find employment. I love this community. I've lived here for over 26 years and I don't want to leave and have to find work. So for the small uneducated minority who would love to see this knocked back. Stop and have a think about the lives you're trying to ruin and everyone you're affecting here.
111425	Mudgee	Employment Concern re down turn of the industry Economic benefit	I support the extension of Airly Coal Mine as it provides a large number of jobs within the local region. Recent times have seen job losses in Mining and manufacturing in the area. My husband works at the mine, and he supports his family with earnings. Many of my local friends also work at this mine. Further economic stimulus for the region will be provided if the extension is granted.
111447	Lithgow	Loss of jobs in area	I am for the mine expansion how many jobs have gone from LITHGOW this year we have to give the poor town something
111423	Kandos	Employment vital in rural communities	My husband already lost his job with closure of Charbonneau this employment is vital to sustaining rural communities
111409	Kandos	Employment vital in rural communities	It is vital that Airly Mine continues to extend as it gives many locals employment, Allowing people to be able to live in our area.
111427	Crestwood	Economic benefit	It will bring money to the surrounding areas, boosting the communities
111407	Rylstone	Employment Adverse impact on families Widespread impacts across the community and people Possible need to relocate	The Kandos and Rylstone area has had the misfortune of several industries closing resulting in job losses from Cement Australia and more recently Charbon Underground. We were fortunate you might say that many (not all) of the Charbon employees were assisted with jobs at Airly Underground. Both my husband and son are employed at Airly, as are many other locals with families to support. If the extension for Airly is not granted, there will be major impacts on families such as ours. The impacts will be significant and include: major unemployment, families faced with financial hardship, forced house sales - lowering real estate values, increasing vacancy rates among rentals potential for increased mental health illnesses such as stress, depression, anxiety and suicidal ideation & loss of valuable community support (Centennial sponsors numerous sporting teams and events within the local community) As a result of such impacts, many families will be forced to relocate in search of employment, resulting in:

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			a genuine economic downturn for the Rylstone and Kandos communities & business houses & loss of already scarce professionals who are married to coal miners such as teachers, and nurses. Please give strong consideration to approving the extension of Airly. The employees and the company are committed to being as efficient, low impact, safe and environmentally aware during all aspects of operations. This is the livelihood of many people and families. Keep Airly open! If you close Airly you close our towns and communities.
111431	Kandos	Adverse impact on area if not approved	My name is xxx and my partner is currently employed at the Airly coal mine at Capertee. We are currently in the process of buying our own home and love the area we live in. If this project does not get the go ahead I know that it will have a massive impact on the whole area..
111449	Rylstone	Employment	It should be given the approval because it is a good Job opportunity for the area considering the whole area in the last few years a lot of people have lost their jobs and it has affected the area in a big way
111439	Marrangaroo	Employment	Supports jobs And the community
111433	Macksville	Employment Vital to economy Decline of the area	The expansion of Airly Underground Coal Mine is vitally important to the work force and to the community as there has been an exceptional amount of jobs lost in the Western Coal Fields in recent times, most or all of these miners are travelling some distance to work at the present time and if this proposal is not accepted it will only add to more of their employment difficulties in the Western Coal Fields which is on the decline and has been for some years now with closures of many mines in the area.
111443	Kandos	Employment Need to relocate All businesses affected	I am directly affected by the Mining Industry and Airly in particular as my husband works there. Our lively hood and those of the whole town rely on the mine. Without Airly we would be forced to leave and the businesses and real estate would be greatly affected.
111463	Portland	Decline of industry in area has devastating impact on communities and business	We need this industry in our area. There are hundreds of men out of work now due to CoalPac & Centennial Angus Place closing. There are no jobs for them to ho to here. They have families to feed & mortgages to pay. Without mining in our district, we simply will not survive & become a ghost town. Please think seriously about the devastating effects on these small towns & its people.
111499	Kandos	Employment Pay packet effect Sponsorship Workforce live locally	I support the Airly Mine Extension Proposal SSD 12_5581 I live in the Mid Western LGA at Kandos. I have a young family, my son is a student at Kandos High School, who in the near future will be seeking employment , a partner who is a nurse that works at the local hospital, we support all the local business areas from GP's to grocery stores, service stations. As I work at this mine and have had 28 years' experience in the coal mining industry I can see the mining methods proposed will have very minimal impact on the surrounding areas of Mt Airly.

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			Airly Mine is also in very strong support of the local Capertee community groups such as Public School, Rural Fire Brigade and the Capertee District Progress Association. About 75% of the work force live in the Kandos/Rylstone area and their incomes hugely support the business of this area.
111503	Lithgow	Financial benefit to family and community Pay packet effect positive to Lithgow community. Long mining history Possible need for families to relocate	As the wife of a current employee of the Airly Mine I cannot begin to express how passionate I am about the approval of the mines extension , not only for the financial security of our own family , but those of all the other employee's that will be devastatingly affected if the approval was not be granted. We live locally and have for 30 years, we shop locally and believe strongly in supporting the local economy to keep our already fragile community alive. I am well aware that a Miners job security is never guaranteed, we have already felt the devastating blow of my husband being retrenched from a previous mine closure, then a relocation from another. The after effects of these kind of situations are something that those who have been fortunate to avoid - would never be able to comprehend! For generations local family members have been able to rely on the Mining industry for employment, with the comfort of being able to raise their family's local & knowing that there is the opportunity for apprenticeships for the younger generations to further concrete the stability of future. If the mine was to shut, we would have to leave the area that we have grown up in and that has given us the opportunity to purchase our first house, send our children to school, shop locally and more importantly compromise our plans to retire here. The ricochet effect would be enormous, more people would be forced to leave the area forcing the drop in local spending and the possible closure of small local businesses. Not to mention the personal trauma that families will face with money struggles - Why anyone with a conscious would be pushing to ruin people's lives and tearing communities apart is beyond me! We love our community, and the unspoken bond that we all have when it comes to supporting each other! At the end of the day - We Live Here & We Will Continue To Fight For What Is Right! I urge that you take the time to read every letter from the opposition, in depth - checking that it's not just a recycled to template to try and outnumber those of us who are literally pleading our cases! It is our lives that will ultimately be affected, and I truly hope that our future is safe!
111459	Kandos	Employment Surety of employment important Good environmental performance	Airly mine is a important part of the comunity it provides great job opertunities in a community with little job oppertunity. I am employed at the mine and reside in nearby Kandos with my wife and 2 children who go to school here. Kandos has already suffered job losses with cement Australia closing its doors putting over 100 out of work and the local open cut coal mine due to close mid 2015 which would put a further 70 people out of work. No need what this has done to a community of approximately 2000 people.

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			I have seen firsthand how environmentally committed the mine is employing a team of environmentalists and regular training of staff on environmental issues. I hope for the sake of the community and for mine and many families that this proposal goes ahead and provides opportunities for employment for a community that is suffering for no reason.
111453	Lithgow	Positive for businesses and livelihood of families	Our town needs this extension, not only for the sake of the ongoing business in our town, but for the livelihood of so many families. We have seen enough devastation from proposals being knocked back. Please think of the long term effects of your decisions.
111451	Rylstone	Surety of employment is important Risk of people moving away Flow on effects broad of mine not approved	Should be given the go ahead. Our local towns have lost so much employment in the last couple of years, if we lose this it will be detrimental to family homes/ our lifestyles. people would be moving to find more work, houses would be on the market, local businesses will lose out. Please think about how many families will be affected how many people have mortgages and children if this doesn't go ahead a lot of people & business will be affected. Please give consideration to the families that will be affected if this doesn't go ahead there is far too many of us not to matter.
111465	Capertee	Comment	I have no objection to the proposal
111511	Bathurst	Positive effect on economy Adverse impact on families and communities if more job losses Pay packet effect is positive Families relocate Approval will be positive for the economy and area	As a long- time friend of current employees & the FAMILIES of the Airly Mine, we cannot begin to express how passionate we are about the approval of the extension of the mine. Not only for the continued stimulation of the local economy, but the for the financial stability of the familes & people, the faces that I know in my community. How can you expect a local, already frail (nevertheless trying) economy to keep afloat if you eliminate 100+ jobs, positions, careers, and livelihoods? Each day we are encouraged to live, shop, sell & support local businesses & the people who built the foundations. How can we if they don't exist? How can we if these jobs are retrenched & the entire families have to move? Familes having to leave the area means smaller businesses closing. More families leaving. An already tenuous econonomy disintegrating. Bankruptcy. Increased stress levels. Families & relationships within the community deteriorating. Why would you want this for us? It's not just one person, one name, one number or one position that is affected here. There is a ripple effect. Think of the HUMAN in that job position. Think of that HUMAN's wife, daughter, mother, sister, husband, son, family pet.. Think of their neighbours. Think of their Families who will be affected. My friend, who works at Airly, who has lived locally for OVER 30 years, is marrying my best friend. Also

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			my work colleague. IF, god forbid, he loses his job to this absurd proposed closure, he'll have to move. Countless closures, retrenchments, relocations & so many more grievances have impacted this family that is only just starting out. He'll have to move. She'll have to move. ANOTHER local business loses out. Give them a fighting chance. They do the right thing, they support the community. They live, love, grow & THRIVE Locally. A closure like this will only set them back. It will be like ripping the carpet out from underneath them. Will you support 100+ families to get back on their feet when they can't find a job at another mine? Will you pack up their houses? Will you find them another house? Will you support these families? Are you prepared to face the consequences of a closure like this? This blasphemy that will no doubt TEAR families apart? Do you actually think about these things? Or do you simply see the numbers? Look at the names. Look at them & tell me that you can't see them as part of a community & you can go to sleep at night knowing that you closed a mine from a fantasy notion presented by a Government body & uprooted, if not potentially ruined 100s to 1000's of lives. There's a ripple effect here. Can you live with that? Or have those extra zeros at the end of your pay checks blinded you? Have you even considered what this might do to people, communities & their families?? It's wildly inappropriate, irresponsible & hypocritical of you to encourage local living & local communities when you're willing to do something so completely the opposite. Something incredibly un-Australian. You're compromising the present & you are most certainly compromising the future.. But not yours, right? You're safe & secure. Your offices won't close. Just the mines that produce the energy to power your computers & lights. No worries though, you can just export to China & remain under the thumb. It seems that the poor excuses for Australian Government have lost their heart, one of the traits I was SO proud of when growing up. I was PROUD to be an Australian. Now, I look with shame, disgust & anger. I know I couldn't live with myself if I did this to MY countries people.

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			But that's okay. Your families won't be forced to move. You're safe. You can sleep easy knowing that your life isn't going to be flipped upside down because a government body has their notions that they pulled from Narnia. I'd love to know what they're actually doing to HELP Australia. Isn't that their/your job? Not destroying it piece by piece.
111461	Rylstone	Minor environmental impact Sponsorship Positive pay packet effect	I strongly support the Airly Mine project & commend its financial owners, management, workers & environment team for operating this coal mine efficiently with methods designed to have minor impact on the area, demonstrating all care & respect for the local environment. This operations financial contribution to the Capertee Rural fire Service, Capertee Public School, Capertee Progress Association & locally independently owned businesses is vital for their survival. Employing 135 jobs in an area already with high unemployment. These workers are contributing to society, the community & economy. The Airly Mine Project has a positive emotional & psychological effect on so many people within a wide distance of its location.
111483	Clandulla	Spectacular area and mine design will protect the environment Positive in light of the down turn of the industry	I support the project for the Airly Mine Extension Project to continue underground coal mining in their current mining lease ML 1331 and carry out future mining in their current exploration area A232. The Mugii Murum-ban State Conservation Area is ecologically and visually a spectacular region. The mining method developed is a superb example of how underground coal mining and environmental protection can co-exist and that mining can be carried out with the end purpose of protecting significant surface features. The mining method has been developed with both avoidance and minimisation of environmental impacts in mind. The partial extraction mining method has been tried and tested for numerous years at Centennial Coal's Clarence Colliery, with negligible impacts occurring to the surface features of the Wollangambe wilderness' cliff lines, pagoda formations and groundwater and surface water systems. The identification of potential environmental impacts and the environmental assessment developed has been both proficient and thorough and the partial extraction mine design has been expertly developed to allow coal extraction whilst still minimising these potential impacts. With further mine closures in the western coal fields due to the down turn in coal and electricity markets and the rejection of project applications based on impacts to the community and environment, the Airly Mine Extension Project, if approved, will be a astonishing example that underground coal mining can not only be productive and safe but at the same time avoid and minimise impacts to the environment and the

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			community. The approval of this project will be a win-win all round with Centennial Coal's partial extraction methods that have a proven history in previously mined areas in the western coal fields. I am in full support of all facets of the Airly Coal Mine Project and hope after careful consideration of the project that continued mining at Airly Mine is approved.
111485	Clandulla	Spectacular area and mine design will protect the environment Positive in light of the down turn of the industry	I support the project for the Airly Mine Extension Project to continue underground coal mining in their current mining lease ML 1331 and carry out future mining in their current exploration area A232. The Mugii Murum-ban State Conservation Area is ecologically and visually a spectacular region. The mining method developed is a superb example of how underground coal mining and environmental protection can co-exist and that mining can be carried out with the end purpose of protecting significant surface features. The mining method has been developed with both avoidance and minimisation of environmental impacts in mind. The partial extraction mining method has been tried and tested for numerous years at Centennial Coal's Clarence Colliery, with negligible impacts occurring to the surface features of the Wollangambe wilderness' cliff lines, pagoda formations and groundwater and surface water systems. The identification of potential environmental impacts and the environmental assessment developed has been both proficient and thorough and the partial extraction mine design has been expertly developed to allow coal extraction whilst still minimising these potential impacts. With further mine closures in the western coal fields due to the down turn in coal and electricity markets and the rejection of project applications based on impacts to the community and environment, the Airly Mine Extension Project, if approved, will be a astonishing example that underground coal mining can not only be productive and safe but at the same time avoid and minimise impacts to the environment and the community. The approval of this project will be a win-win all round with Centennial Coal's partial extraction methods that have a proven history in previously mined areas in the western coal fields. I am in full support of all facets of the Airly Coal Mine Project and hope after careful consideration of the project that continued mining at Airly Mine is approved.
111473	Capertee	Employment Flow on effects to other services such as schools Sponsorship	I would very much like add my support to the Airly Mine Extension Project. As a resident within the Capertee Community, it is my belief that Airly Mine is a vital part of the town, it provides much needed jobs, these jobs keep people in the area that would not otherwise be able to stay, it also boosts the schools enrolments. As a parent with 3 children at Capertee Public School, and another due to start in 2016 I feel it's important to keep the mine open and prevent enrolment numbers from falling, as being such a small school this is a very important issue. I also feel that Centennial Coal has been generous with their support of the Capertee School over the years. I believe the Capertee Community will benefit if the Extension project goes ahead.

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111507	Kandos	Employment Employees live locally Income supports other local businesses	I live at Kandos. I have a young family, my son is a student at Kandos High School, who in the near future will be seeking employment, and a husband who works at Airly Mine. Approximately 75% of the employees that work at the Airly Mine live in the Kandos/Rylstone district and their income supports the business of this area, some of which include Doctors, Rylstone Hospital, 4 Schools, Grocery stores, Service Stations, Banks, Sporting Groups and various other small businesses. I SUPPORT THE AIRLY MINE EXTENSION PROJECT
111509	Kandos	Large employer Adverse impact on towns if not approved	I am writing in support of the Airly mine Extension project. I have lived in the Kandos area for the majority of my life and have strong links to the area through family and friends and hope to maintain this association. Airly Mine is currently one of the largest employers in the towns of Kandos and Rylstone and if the extension is not granted the impact on the two towns may be devastating. Employment opportunities in the area have suffered in recent years with the closure of the cement factory and Charbon colliery. Without the extension being granted local schools, the hospital and other services will be affected. Kandos has recently had its 100 year celebration and I think if the Airly mine extension is granted it will the help the town to remain to be a viable place to live and set the community on the path towards their 200 year celebration.
111475	Lithgow	Environmental performance Employment	I wish to support the Airlie mine extension. Centennial has shown it supports environmental policies. At the same time as producing a much needed source it will enable employment in an area in which has seen little support from companies and the government for its workers. As long as requirements are met I can see no reason in why this project cannot proceed. Unless it's another government ploy for The Green vote.
111517	Lidsdale	Comment support	I fully support this expansion
111515	Wallerawang	Employment Approval will help sustain the local economy No adverse impact on environment	Coal mining is a vital industry in the Lithgow region & Airly mine is one of the few remaining mines in the area providing employment and income in the area. Unemployment is high and we need this industry to help sustain the local economy. In my opinion as a surveyor with experience in mine subsidence the methods which will be employed by Airly to extract the coal will not result in any visible or harmful effects on the surface. Thus there will be nil effect on the existing environment of Mount Airly or Mount Genowlan.
111491	Rylstone	Positive impact on community	I believe it will be beneficial for the community. It will provide further job availabilities, assisting the communities' growth.
111477	Glenmore Park (NSW)	Employment	The loss of jobs would have a huge effect on the workers and their families. Coal has been mined in the area for many years with no effect on the environment.

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			Keep the mine open!!!!!
111457	Clandulla	No comment	**Nil**
111564	Capertee	Local connection to the area Value the environment Sustainability of the area is important and environment can be protected while mining undertaken	Being a 50 year resident and close personal neighbour of the mine, and now a tenant of Centennial Coal with close relations employed by Airly Coal, I offer my support for approval for the extension application. Having had a mining lease and a pastoral lease over much of the Genowlan Mountain area since 1961, I have a long established relationship and knowledge of this area. I have raised my four children in the Capertee area and they have attended the local school, I am lucky enough to have two of my children still living within the township and have some of my grandchildren now attend the school. Being a conservationist and having an interest in preserving the local area including Airly Village, through consultation with Lithgow City Council's Heritage Group it was planned for myself to overseer the partial restoration of suitable old structures utilising free labour of weekend detainees from Bathurst Gaol, a plan that was unfortunately voided by the National Parks and Wildlife Service with declaration of the Mugii Murum-Ban State Conservation Area. Since the first road/track construction in 1967 we have been aware of the possible removal of the beautiful trees and bushrock in this area, we were advised by Lands Department in Orange to leave the incredibly tight switchbacks near Pappys Pass to deter any logging in the future. In 2003 in conjunction with the Lands Department and myself, a fence and gate were constructed across Genowlan Mountain to protect the endangered plant the Genowlan pultenea. I have also a vested interest in Local Aboriginal history and have spent a lot of time researching and have located an extremely rare Aboriginal quarry and ochre pits. This attitude of conservation is echoed by the hundreds of visitors to this area including the Local Wiradjuri people, Scouts, Army cadets, Orienteering groups, Geological students, Geocaching groups, Bird watchers, Hang gliders, School excursion groups, four wheel drive users as well as many other groups that have enjoyed this location and who share this vision of protecting this beautiful place while still being available for all, including the elderly and the disabled, to access and enjoy the pristine scenery. With the continued upgrade, maintenance and extensions to the road/ track network courtesy of Airly Coal through this magnificent scenic country we have anywhere from 800 to 1000 four wheel drives visiting yearly. Having discussed this coal mine with many of these people very few have objected, all agree to the simple proviso that it must be looked after. Many of these are repeat visitors over 20 years and their opinion must be very valid as they have feet on ground experience for many years unlike most of the un-informed "duplicated letter opponents" that are used as pawns for self-serving protest greenie groups. In the early 1970s declaration of a National Park had a devastating effect on local towns; Ilford, a town previously with two cafes/service stations now has none, Glen Davis- formally a town with a service station as well as a general store, Capertee had two garages and two general stores and a thriving timber industry. K.Ford the timber man had to close with a total 69 timber related jobs lost, this also had a roll on negative effect of the communities of Kandos and Rylstone. In the late 1970s and early 1980s, coal exploration was carried out employing approximately 10 locals including myself, this money was spent locally, work included drilling off-siding and extensive road building. In 1987 there was the opening of a trial mine, followed by a Boxcut in 2000. With the

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			commissioning in 2009 of the current mine, a great surge of optimism returned to the community with employment opportunities and the natural follow on with ancillary services, such as contractors, cleaners, earth moving contractors and local businesses including the local hotel and garage. During this time Airly Coal and its contractors supported the Capertee Public School, The Capertee Fire Brigade, Capertee and District Progress Association as well as businesses in the town both financially and practically. Kandos, Rylstone and Lithgow also all benefited from this activity, with raised employment opportunities and increased money in the local economy, unfortunately economic factors caused a shut down and the moth balling of the mine. Since the reopening of Airly Mine in March 2014 the community, especially the Kandos and Rylstone areas (who have suffered greatly in recent times with the closure of the Cement Works and Charbon Colliery) have a great relief. To date expenditure on the Airly Mine has been over $150 million dollars. I have had personal dealings with various community groups over many years and one in particular that I have been a member of for approximately for about 5 years is the Capertee Valley Alliance (CVA). This group was set up for the betterment of the valley to lobby for safer and better roads, better community facilities and with such things as the recent excellent upgrading of Pearsons Lookout. It was not set up as a voice for commercial environmental groups such as the Colong Foundation and Blue Mountains Conservation Group, with their flock of duplicated "sign here and post" your long held convictions, to protest for the mostly retired non-permanent residents whom seem in discussions to have little comprehension of the industry. My outspoken criticism of the "economic greenie" lack of interest in the truth can be verified by apologises to me still on the internet. I consider the only harmful effect of this mine was the taking the grazing ground of three hungry horses. I fully support the Centennial Coal's Airly Mine Extension plan, as I believe that our district and country needs this.
111523	Bathurst	Mining industry is important to the region Flow on effects through the economy Need coal to supply power stations Closure would cripple the economy	I would just like to write a few words to support the extension of the Airly Mine. I am just a regular guy, with very little interest and certainly no financial stake hold in mining of any sort. What is see is by no means ground breaking but i feel in needs to be said. What I see is a region stretching far wider than just Lithgow that is affected by a decision like this. The stability of our whole region's economy is tied up in mining, it might not seem like it, but it is. not just the miners and the power stations. So many businesses rely on the money that is generated through the mines. and the cash that flows from this into our communities. to deny this proposal would be almost certainly create a domino effect that would in quick time force the closure of the Mt piper power station. Some say this is inevitable anyway, however while we have coal, we at least have a fair argument to keep it running also. cut the coal supply and this argument is invalid. The closure of mines to the Lithgow area would not just cripple the community it would destroy it. This decision has far reaching consequences. if we lose the Lithgow mines and power station our regions power costs would certainly rise, and the flow on effects of the job losses and business and industry losses would cripple the region. yep i am probably looking at some worst case scenarios here, but really, if there is even a chance that these consequences could be the rest of a decision like this, who would

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			want to have that decision on their head. If you want to hurt us, I just ask that you have the guts to do it publicly. Whoever votes for this, we want to see your faces in the papers. if you can honestly stand by your decision, without any shame, then have the integrity to show your face to the people whose futures you have in the palm of your hand. Hope this helps make the right decision.
111531	Kandos	Employment	As a wife of an Airly Coal mine employee I am writing in support of the Airly Coal mine Extension Project. We live in Kandos and have done so for most of our lives. Kandos had a Cement works which closed a couple of years ago which left a lot of people without employment. Kandos is situated a little off the beaten track and has struggled over the years to keep the workforce in the town which in turn keeps families here. When Charbon Colliery closed many men made the decision to stay living in Kandos and travel to Airly mine each day for work. This in turn keeps our little country town operational. To lose any further workforce if the Airly Extension project is not approved would be the death of our small little corner of the world. Centennial coal have always been most generous in their contributions to our community, having served on a number of committees and asking for donations they have always helped with funding. I hope that this extension project is approved to allow our little community to survive.
111572	Kandos	Region suffering due to down turn in economy Flow on effects important Broad benefits with approval	I work at Airly colliery. I have worked and lived in the Kandos area for the past eight years. In my time I have seen the demise of the cement works and the underground at Charbon colliery which has caused the loss of hundreds jobs in the community. This obviously had a flow on effect for businesses and schools. Airly colliery has been great as it has allowed many of us to stay in the community and have a workplace close enough to promote a good work life balance. At Airly I have been part of a workforce committed to mining in a sustainable way causing minimal impact to the surface. The Airly mine extension should be approved as I believe the benefits to the surrounding communities are undeniable and the environmental impacts are minimal.
111582	Rylstone	Employment Limited jobs in the region Low environmental impact Area will struggle without jobs and job surety	Airly mine is very important, not only for myself and my family but also for many other families within the area. I am very fortunate to be employed at Airly mine and hope to be for as many years as possible. Without Airly mine I am certain that my family and I would have to sell up and relocate as there is very limited jobs available within our area, with the closing of many local businesses like Kandos Cement Works, Charbon Coal mine and Ironwood saw mill. As an employee of Airly mine I know that the proposed mining methods are designed to have a very low impact, as this method of mining is in practice at the moment. I have also been involved in sporting teams sponsored by Centennial Coal and without their support it

ID of Respondent	Location	Key Theme for Project Support	Comments
			would not have got off the ground. The local community values the support they are given. I feel that without Airly mine our towns and communities would struggle meaning the possibility of increased mental health issues. Many professionals such as teachers and nurses are married to Airly coal miners, I know this first hand as my wife is an SLSO at Kandos Public School, and if they have to relocate then our community will lose said skill base as well. Airly mine has a major impact on my family's future, it is a very important part of our lives and hope that it stays that way.
111529	Kandos	Long history working in mining Minimise and monitor environmental impacts Sponsorship Flow on effect of employment via pay packet effect ad participation in social / community activities.	This letter is in support for the Airly Mine Extension Program. I have been employed in the local underground coal mining industry for all of my working life for the past 37 years around the Lithgow and Charbon areas, having worked for the Centennial Coal Company since they were formed at Ivanhoe, Charbon, Clarence and Airly Collieries. I have found Centennial Coal to be a company that genuinely cares about their employees and are very conscious about environmental impacts and community affairs and provide support for local community groups such as Rylstone Kandos ADA Cottage, Rylstone District Hospital, Capertee Public School, Capertee Rural Fire Service, Capertee & District Progress Association to name a few as well as Centennial Coal supporting and sponsoring the local Centennial Coal Cup Rugby League competition. The re-opening of Airly Mine has provided a lifeline for myself and many other families. With the closure of the Charbon underground mine due to the depletion of coal resources the majority of the workforce that resides around the Kandos/Rylstone and outlying area were given employment at Airly mine. Our local area is still coming to terms with the closure of the Kandos Cement works and being a small close knit community any loss of employment deals our community a cruel blow as these people all support local businesses, sporting clubs, education. We all have a very strong community spirit and pride with many of these employees being second and third generation families in our area with very strong ties to the region. Underground coal mining provides a major employment opportunity in this are and surrounding district. An end to this source of employment would have devastating effects and flow on effects to families, businesses and community groups within our region. Having worked for Centennial for so many years I have witnessed their commitment to environment, community and employee welfare and am proud to work for them and hope to be able to continue to work for them with the Airly Mine Extension Project.
111535	Rystone	Need to relocate if not approved	Without Airly mine our family and many other families would have to relocate, making life very stressful. The support that Airly mine gives to the community is priceless. We hope that Airly mine is a part of our life and community for a very long time!

ID of Respondent	Location	Key Theme for Project Support	Comments
111537	Wallerawang	Local jobs needed	Due to the local coal industry lay off the extension on Airly would help the local economy and local jobs and me myself am one of those people that would possibly benefit from this as I was previously an Airly employee and am still unable to find permanent work in the area
111525	Bathurst	Positive effect on the economy Possible need to relocate	This application has been brought to my attention by a close friend, and frankly i don't see why there's even a debate. Approving this application will help our local economy grow and move forward, rather than the slow recession it has been enduring. Without this 170+ jobs are lost. I know whole families that are supported by these jobs, close personal friends that rely on the work to survive. What kind of system would even consider cutting the foundation of a community out like that? No, if we want our economy to move forward we must approve. People are probably worried about the environmental damage, which is a fair concern. But it does very clearly state the rehabilitation will commence at the completion of the project. The way I hear it, this is only opposed because there are some very old rocks in the area, which are very pretty to look at. What use is a few pretty and aged rocks if the economy crashes and the people are gone? Maybe that rabbits can sunbake on them. Now I know that it would be more serious than that. We do need to preserve what does not need to be senselessly destroyed. But this is not senseless. Allowing this is a massive boost for the local community. We will grow and progress, instead of slowly fail and crumble. So what possible reason is there to disallow this?
111521	Lithgow	Long history of mining Important to the economy	Coal has been mined from the Western Coalfield area for 145 years and it still contains Coal Reserves estimated at 4500 million tonnes. These reserves and the coal mine they support are vital to the economy of the Greater Lithgow Council area and the coal produced is of significant importance to the NSW electricity supply and its production costs. The Greater Blue Mountains World Heritage Area was created to protect the natural environment of the Blue Mountains Plateau, not to prevent coal mining activities in the Western Coalfield.
111519	Lidsdale	Comment support	Fully support the expansion
111576	Kandos	Positive community and economic benefits	My husband is currently employed at Airly Colliery, previously employed at Centennial's Charbon Colliery in Kandos. Our family resides in Kandos.

ID of Respondent	Location	Key Theme for Project Support	Comments
		Down turn of industry has negative impact on the local economy Environment will be maintained Need coal power as no alternative	I strongly support the Airly Colliery extension project as I believe that the community and economic benefits of the project outweigh any potential environmental harm. Since relocating to the local area a few years ago, I have seen Kandos Cement, Charbon Colliery, Wallerawang Power Station and, most recently, Angus Place Colliery close. These significant cuts in local job numbers have forced many families to relocate, or take up fly-in-fly-out jobs in other states. This has negatively affected local businesses, schools and the housing market - not to mention causing considerable stress for local families and individuals. As such, the jobs retained and new jobs created by the Airly Extension Project are sorely needed in this area. Underground mining, particularly partial extraction, and panel and pillar methods (as proposed by Centennial) are designed to minimise any impacts on the surface. Furthermore I understand that Centennial has committed to limiting subsidence to 125mm. As such, the beautiful cliffs and pagodas of the Mugii Murum-Ban SCA will be retained - whilst an important and valuable resource is extracted. Unfortunately technological advances have not yet provided a large scale reliable, efficient and cost effective alternative to coal fired power stations. Until an effective alternative is found, we require coal for domestic power stations and for export. Unless, of course, you are one of the lucky few that live off-the-grid in an entirely mud brick or timber house!
111592	NSW	Good environmental performance Employment sponsorship	I have work in the coal industry for the last 15 years & started at Airly in March 2014. Since being at Airly I have not seen a coal mine that is not more aware of its impact on the local environment & its commitment to have as minor impact as possible. Airly coal not only employs around 60 people (which is very valuable for the community) it is also a strong supporter of local events.
111638	Lithgow	Need industry for areas economy	I'm afraid Lithgow will not survive without out it... I love this town but we need industry to survive.
111701	Rylstone	Good company Need to relocate if no employment Low impact mining	Being a former employee I know they are a great company that support the community. I have family that work for Airly mine and without the mine they would have to relocate, making life harder. The community values Airly mine and its low impact mining.
111608	Wallerawang	Employment	This area needs more jobs, very important this gets the go ahead.
111713	Mudgee	Planned with ESD	I am a rate payer in the Mid-Western local government area and have a family that supports schools and sporting groups in the area. I would like to make a submission in support of the Airly Mine Extension Project. The Airly Mine Extension Project has been planned and designed in accordance with the objectives of Ecological Sustainable Development (ESD) which are to use, conserve and enhance natural resources. This has been demonstrated in the environmental assessment of the Airly Mine Extension Project by Centennial Coal remaining committed to the principles of ESD and understanding that social,

ID of Respondent	Location	Key Theme for Project Support	Comments
			economic and environmental objectives are dependent on each other.
111606	Rylstone	Employment surety Need to relocate if not approved	I would like to see the Airly Extension Project be approved as it will help ensure my employment and many other people from the local communities as well as enabling more opportunities for employment within the company. If the Project was not approved and I was made to find other employment I would be forced to leave with my family the district to locate employment as at the moment work is very limited in the area.
111610	Salisbury (QLD)	Adverse social and economic impacts if not approved Supports local industries and suppliers Low impact to environment	I write this submission in support of the project. I have worked at the site and in the district in the past, in environmental management roles. The statistics presented in the EIS and management planning regime support the following comments. The economic and social impacts of NOT approving this project would be significant locally and regionally. This project is vital to the viability of the Mine as a business employing local people and supporting local contractors and suppliers. Environmental impact will be minimal. Current infrastructure is utilised. Subsidence management mitigation will minimise surface impacts - they will be difficult to measure. Groundwater management is well covered. Rehabilitation of a degraded grazing landscape is ongoing and will leave the site in far better condition once mining is completed. Cumulative impact is minimal, with no further coal mining in the Valley expected. Limestone quarrying is hydrogeologically unrelated Thank you for considering this submission.
111663	Rystone	No detrimental issues identified Benefits to surrounding communities	Having reviewed the Airly Extension Project's EIS, I cannot see a valid reason as to why this project should be rejected. There appear to be no associated issues with this project that can't be adequately mitigated. The Airly Extension Project is critical in supporting the local communities of Capertee, Kandos and Rylstone. I fully support this project.
111622	Lue	Approval is important given current job losses	The mining and coal industry in the local area are paramount to its existence. I have been working in heavy industry and mining for my entire working life during this time I have been well provided and have never been directly affected by such industry that I have deemed detrimental to myself my family or my surroundings. With current loss of jobs in our local area in the mining sector I applaud any expansion to the Airly project and look forward to what it can bring to the local communities.

ID of Respondent	Location	Key Theme for Project Support	Comments
111667	Capertee	Approval is important given current job losses	Due to the recent downsizing of Angus Place Colliery to care and maintenance, in conjunction with previous numerous job losses in the mining industry, and rejection by the State Government of other mining ventures in the region, I felt compelled to forward a submission supporting the Airly Mine Extension Project. It is of my personal opinion that continuous job losses in the mining industry in our region will have a devastating long-term flow-on effect to the local economy and to the already struggling small businesses and broader communities, (mining and non-mining related) that rely on revenue that is generated from employment in the mining industry. Therefore, employment preservation for the future sustainability and growth of our region is therefore paramount. For the above reasons, I fully support this project going ahead.
111671	Rylstone	Employment Flow on effects positive	The Airly Project Extension will be fundamental in supporting jobs and families within the broader community.
111673	Rylstone	Communities dependent on employment	I support the Airly Project Extension as a large percentage of the Rylstone and Kandos community is dependent on employment there. Without the Airly mine the broader community will suffer.
111736	Mittagong	Resource recovery and environmental management can be achieved Mine design results in minimal subsidence Ongoing employment of Charbon workforce positive Will meet the expectations of the local community	I fully support the Airly Mine Extension Project based upon the following: As the Manager of Airly Coal Mine I recognise and appreciate the unique opportunity provided by the Airly Project to demonstrate to all stakeholders that an optimal balance between resource recovery and responsible environmental management can be achieved. Core values shared by employees at Airly include safe, efficient mining practices, ensuring minimal environmental impact, co existing with neighbours and partnering with the community whilst maximising economic opportunity. The range of extensive technical studies and generated reports covering recognised potential social and environmental impacts include surface subsidence, terrestial ecology, surface and groundwater, heritage, air quality, visual amenity, noise, traffic , bushfire and landuse clearly define the sensitivity of the Airly and Genowlan Mountain complex. Armed with this knowledge Centennial Coal and in particular Airly employees are committed to operating in accordance with a geotechnically engineered mine design specifying an appropriate pillar system factor of safety calculation for both minimal subsidence impact and long term stability. Airly has gained significant benefit from employing from our Charbon Mine, experienced and skilled employees familiar with this mining system and processes and who poses an awareness of the importance of maintaining high standards of operational compliance and thereby meeting the expectations of the local community in terms of environmental performance.
111770	Mudgee	Sustainable employment important	I have been part of the Kandos/Rylstone community for about 30 years, the district has a lot of natural beauty but is desperate for industries which provide substantial employment such as Airly Mine. I was

ID of Respondent	Location	Key Theme for Project Support	Comments
		Improved mining practices	very pleased to read in the submission that the mine has improved its mining practices to help protect the environment. I know that coal is being targeted by political activitist, but I agree with Tony Abbot that coal is good for Australia, at this time. As renewable technologies become more reliable and cost effective then it makes sense to lessen our carbon footrpint. At this present time coal is still the cheapest, most efficient form of energy. I fully support the operations of Airly Mine.
111726	Rylstone	Local employment Pay packet effect positive Jobs at risk if not approved	I support the Airly Mine Extension Project as it will help to secure local jobs. I don't work directly in the mining industry but my brother does and my parents own a business in the township of Rylstone where many of the Airly Mine workforce reside. This mine indirectly supports many of the small surrounding towns. Without this extension hundreds of jobs will be at risk including those who work in small businesses in the surrounding towns.
111766	Mudgee	Mining methods will protect the environment Employment positive to the district Down turn of the industry has had an adverse impact	I am in favour of the Airly Coal Mine extension. I have been involved in coal mining in this district for the last 28 years. I began at Charbon Colliery in 1986, I went to Ulan Coal in 1996 for7 years, then returned to Charbon in 2003 and remained there until its closure in 2014, I commenced at Airly in March 2014. I know firsthand how hard the management and workforce work to protect the environment and to have as small an impact as possible. The mining methods at Airly are strictly adhered to and strata management is always maintained. As a local resident, and currently Pastoring a church in Kandos I know how important the employment Airly mine provides to the district. In recent years the Kandos/Rylstone district has been adversely affected by the closure of major industries like the Cement Works and Charbon Colliery and the reopening of Airly Mine has given the district fresh hope. Many families and businesses, directly and indirectly rely on the success of Airly Mine.
Henbury Sport and Recreation Club	Kandos	Employment	Members are employees are miners Need approval in light of recent down turn in industry and closures Adverse impact on local businesses
Mark Liley Plant Hire	Capertee	Employment Socio-economic benefits	Families in the area rely on the mines ongoing employment Flow on effects positive
Westfund	Lithgow	Employment	Adverse impact of industry down turn Mine related employment has made a significant contribution to the economy Airly extension would provide surety of employment Employment needs to be supported in the current climate

5. RESPONSE TO SUBMISSIONS

5.1. Response to Advice from Independent Expert Scientific Committee

ISEC: Assessment against information guidelines

Relevant data and information: key conclusions

Refer to Section 2.1.1 of GHD (2015a) in **Appendix A**.

Application of appropriate methodologies: key conclusions.

Refer to Section 2.1.2 and Section 2.1.3 of GHD (2015a) in **Appendix A**.

Reasonable values and parameters in calculation: key conclusions

Refer to Section 2.1.4 of GHD (2015a) in **Appendix A**.

ISEC Question 1

In respect to the baseline data utilised in the EIS: Has the baseline climate, groundwater and surface water data been collected to a satisfactory standard over an appropriate timeframe?

Response

Refer Section 2.2.1 of GHD (2015a) in **Appendix A**.

ISEC Question 2

In respect to the baseline data utilised in the EIS: Are the rainfall records relied upon in the EIS sufficiently representative of the Airly site for water modelling and prediction purposes? Are better rainfall records available?

Response

Refer Section 2.2.2 of GHD (2015a) in **Appendix A**.

IESC Question 3

In respect to the baseline data utilised in the EIS: Are there significant geological features present that have the potential to act as preferential pathways between the different hydrogeological units and have these been adequately investigated for inclusion/ omission within the groundwater model?

Response

Refer Section 2.2.3 of GHD (2015a) in **Appendix A**.

IESC Question 4

In respect of the EIS's groundwater modelling and its assessment of the impacts of potential water discharges to surface waters: Does the groundwater model use reasonable and suitable characterisations of the groundwater resources for the Project?

Response

Refer Section 2.2.4 of GHD (2015a) in **Appendix A**.

IESC Question 5

In respect of the EIS's groundwater modelling and its assessment of the impacts of potential water discharges to surface waters: Are the anticipated quantitative groundwater and surface water impacts accurately and reasonably described?

Response

Refer Section 2.2.5 of GHD (2015a) in **Appendix A**.

IESC Question 6

In respect of the EIS's groundwater modelling and its assessment of the impacts of potential water discharges to surface waters: Are the predictions of loss flows in local streams reasonable? (Tables 10.5 and 10.6 on pages 290 and 291 of the EIS main text)

Response

Refer Section 2.2.6 of GHD (2015a) in **Appendix A**.

IESC Question 7

In respect of the EIS's groundwater modelling and its assessment of the impacts of potential water discharges to surface waters: Is it reasonable for the EIS to rely on the conclusion that "There is minimal hydraulic connection between the local and regional groundwater sources"? (Page 277 of the EIS main text).

Response

Refer Section 2.2.7 of GHD (2015a) in **Appendix A**.

IESC Question 8: In respect to how the EIS relates to matters of national environmental significance: Do the subsidence, groundwater and surface water assessments provide reasonable estimations of the risk, likelihood, extent and significance of impacts to water-related assets?

Response

Refer Section 2.2.8 of GHD (2015a) in **Appendix A**.

IESC Question 9

In respect to how the EIS relates to matters of national environmental significance: Is the Project likely to cause any impacts to the downstream streams and rivers, and through to the Colo River, and within the Gardens of Stone and Wollemi National Parks and Greater Blue Mountains World Heritage Area? If so, what is the likely nature and extent of these impacts?

Response

Refer Section 2.2.9 of GHD (2015a) in **Appendix A**.

In addition to the hydrological and hydrogeological assessments undertaken to assess the potential impact of the Project on the downstream streams and rivers, the EIS also assessed the riparian zones downstream of Airly Creek and within the Gardens of Stone National Park. Targeted surveys within the riparian zones were undertaken as described in Chapter 4 of RPS (2014a). Potential impacts assessed for the riparian corridor are described in Chapter 7 of RPS (2014a) and summarised as follows.

- A potential for impacts to riparian habitats is provided in Section 7.2.2 of RPS (2014a).
- A potential for impacts to GDEs is provided in Section 7.2.5 of RPS (2014a).
- A potential for impacts associated with mine water discharge is provided in Section 7.3 of RPS (2014a).

Macroinvertebrate monitoring in Airly Creek (upstream and downstream sites) will continue. A program for the monitoring of impacts of proposed mine water discharge will be developed in consultation with the relevant government agencies. The Revised Statement of Commitments (Chapter 6) has been updated with this commitment.

An eco-toxicological assessment is currently being undertaken by GHD Pty Ltd (refer Section 2.1.3 of **Appendix A**) comprising toxicity testing on samples of water collected from all Airly Mine licensed discharge points (LDP001 – LDP003), the production bore and three upstream and downstream locations on Airly Creek. Toxicity testing was conducted using the methodology outlined by ANZECC and ARMCANZ (2000). The aim of the eco-toxicological assessment is to determine the potential toxicity of proposed mine water discharges via the licensed discharge points into Airly Creek.

IESC Question 10

In respect to how the EIS relates to matters of national environmental significance: What are the risks of impact to the critically endangered species *Pultenaea* sp. *Genowlan Point* from hydrological and hydrogeological changes resulting from the project? Are these adequately addressed in the EIS?

Response

Refer Section 2.2.10 of GHD (2015a) in **Appendix A**.

In addition, the terrestrial ecology impact assessment for the Project (RPS, 2014a) discusses in detail the potential ecological impact of the predicted subsidence effects on the recorded population of *Pultenaea sp. Genowlan Point.* The assessment outcomes and conclusions discussed in RPS (2014a), provided as Appendix H and summarised Sections 10.2.4.1 and 10.2.5.1 of the EIS, have been informed by a number of other technical assessments, namely, Subsidence Impact Assessment (Appendix D), Groundwater Impact Assessment (Appendix E) and Surface Water Impact Assessment (Appendix F).

RPS (2014a) undertook the 7-Part Test / Assessment of Significance (*Threatened Species and Conservation Act 2005* (TSC Act)) and the Assessment of Significance (*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the *Pultenaea sp. Genowlan Point* species. The results of these assessments are discussed in detail in Appendices 1 and 2, respectively, of RPS (2014a). Briefly, the 7-Part Test (TSC Act) revealed the low levels of subsidence effects are not considered substantial enough to impact upon the presence of the species, and that the Project is unlikely to affect the lifecycle of *Pultenaea sp. Genowlan Point* such that a viable local population of the species is likely to be placed at risk of extinction. Similarly, the EPBC Act Assessment of Significance revealed the low level of predicted subsidence is not expected to impact upon the heath areas that provide habitat for *Pultenaea sp. Genowlan Point* such that these habitats would become unsuitable and result in the long-term decrease in the size of the local population of the species.

IESC Question 11

In respect to how the EIS relates to matters of national environmental significance: Are the proposed mitigation measures likely to be effective in managing impacts to water-related assets of the project (including downstream assets)? Are additional measures and commitments required to mitigate and manage impacts to water-related assets?

Response

Refer Section 2.2.11 of GHD (2015a) in **Appendix A**.

IESC Question 12

In respect to how the EIS relates to matters of national environmental significance: What are the key features of a monitoring and management framework that would address the key uncertainties and risks of the project identified by the Committee?

Response

Refer Section 2.2.12 of GHD (2015a) in **Appendix A**.

5.2. Response to Government Agency Submissions

5.2.1. Mine Design and Subsidence

Issue – LCC

Council would accept a maximum of 125 mm for potential subsidence for the entire site to prevent surface damage and support the mining method of partial extraction. However, in the area of New Hartley Shale Mine Potential Extraction Zone, Council considers that any further subsidence should be viewed with concern. It is a trending issue through the EIS document that New Hartley Shale Mine Potential Extraction Zone is problematic and may cause impacts in a range of areas if mined including (but not limited to); water quality, visual, surface structures, endangered and threatened species or communities, and water resources. Council considers that this area should not exceed the existing 500 mm vertical subsidence, given existing cracking and potential for increased damage to surface features, water resources, flora and fauna. A detailed Mine Subsidence Plan should focus on no additional subsidence within this area to reduce impact to surface features and potential impact to water resources (ie village spring). There may be a need for an exclusion zone and or restriction to first workings only in areas that do not meet the required subsidence criteria.

Issue – LCC

OEH's major concern regarding this development is the potential for impact on the natural features of Mugii Murum-Ban State Conservation Area. OEH accepts that the proposed mining methods and mine design should result in "negligible subsidence impact" over the majority of the mining lease. OEH notes that greater subsidence impacts may occur above the old oil shale workings. (**OEH**)

Response

Not mining within the New Hartley Shale Mine Potential Interaction Zone will reduce Airly Mine's mining life by one year and result in the sterilisation of approximately 1 Mt of run-of-mine coal from within the Project Application Area. This loss of coal and reduction in mine life represents a loss of income for Centennial Airly. Flow-on socio-economic effects, discussed in Section 6.2 of the EIS, to the local government area, the State and Federal governments would not materialise to the extent noted and the loss will be significant.

The New Hartley Shale Mine Potential Interaction Zone is proposing panel and pillar mining. This type of mining in previously unmined areas within the Project Application will only result in subsidence ranging from 40 to 106 mm and which will not cause surface cracking (refer Section 8.3.7.2 of the EIS). Given the presence of the existing workings from the abandoned New Hartley Oil Shale underlying the coal deposit, panel and pillar extraction within the New Hartley Shale Mine Potential Interaction Zone will lead to greater subsidence than the up to 106 mm noted above, due to cumulative impacts of the proposed coal extraction and the existing oil shale workings. The new subsidence predictions in the New Hartley Shale Mine Potential Interaction Zone range from 500 mm, in areas where the old oil shale workings had sub-critical void widths, to as low as 200 mm in areas where the old workings had super-critical void widths. New surface cracking is predicted in the zone. Given the pre-existing levels of damage in the zone the Project is unlikely to cause a significant amount of additional damage.

Centennial Airly has already mitigated the potential impacts within the New Hartley Shale Mine Potential Interaction Zone on the geodiversity, water resources and biodiversity through the adopted mine design. To prevent damage to the cliffs adjacent to the area, the set-back distance from the cliffs has been increased to half the mining depth (which equates to an angle of draw of 26.5^{o}) and first workings is only proposed under the cliffs. No third order streams exist in the area. Minimal loss of surface water flows in the drainage lines with the zone is predicted due to surface cracking. GHD (2014a) (refer Section 6.4.1) have predicted a catchment run-off loss of only 2% to the Genowlan Creek system. The water that may be lost in surface cracks will appear further downstream in the

catchment, that is, the overall catchment loss due to mining within this zone is not considered to be measureable.

Groundwater systems in the zone have already been impacted due to the overburden fracturing caused by the previous shale mine activities. This fracturing has manifested itself in the form of a water spring (Village Spring) in Airly Village. Due to the depressurisation of the Permian Strata within the zone, there is potential for the flow at Village Spring to reduce or cease. GHD (2014b) have predicted the groundwater currently reporting to the shale mine workings will find its way into the coal seam workings. While it is acknowledged that there is a potential for the Village Spring to reduce or cease it is emphasized the spring is a man-made feature formed from mining activities in the area in the first place.

Section 10.2.4.1 of the EIS summarises the potential impacts of the mine-induced subsidence on flora and fauna, through surface cracking, accelerated soil erosion, changes to groundwater and surface water, ponding and cliff failure, assessed in RPS (2014a). The area of greatest potential subsidence is within the New Hartley Shale Mine Potential Interaction Zone. The conclusion reached in the assessment was that while *Prostranthera stricta* (listed as Vulnerable under both EPBC Act and TSC Act) and *Eucalyptus cannonii* (listed as vulnerable under the TSC Act) individuals with the zone may potentially be impacted upon, they are likely to readily recover from disturbance given their natural occurrence within unstable areas such as steep rocky slopes and cliff edges. Notwithstanding the above, any loss of threatened flora would be highly isolated and would be restricted to localised root zone disturbance, and impacts would not be extensive such that any area would become unviable to support threatened flora species. Therefore, it is unlikely that subsidence related ground movements would affect woodland or forest habitats such that they would become unsuitable for any of the potentially occurring threatened flora and fauna.

Visual impacts of the Project due to subsidence have been assessed to be negligible (refer Sections 10.10.4.3 and 10.10.5 of the EIS which has summarised the visual impacts assessment (GBD, 2014)) and this has been achieved through the proposed mine design which minimises subsidence. In the New Hartley Shale Mine Potential Interaction Zone, there is cracking visible above the old workings, albeit most likely only noticeable to trained people. The Project has the potential to cause the reopening of these cracks which may be visible at close distances by, for example off-track bushwalkers. Given the thickly vegetated nature of the zone, the limited visibility of predicted cracking will generate low visual consequences.

It is recognised that the predicted subsidence within the New Hartley Shale Mine Potential Interaction Zone is higher than the up to the 125 mm predicted in the other mining zones within the Project Application Area. The EIS has rigorously assessed the subsidence impacts and consequences for this zone through a wide range of technical assessments in the EIS as discussed above. While there are potential impacts predicted within the zone these impacts range from minimal to negligible.

As with other bord and pillar / partial extraction Centennial Coal operations (for example, Clarence Colliery, Myuna Colliery, Awaba Colliery), Airly Mine proposes to undertake geotechnical review of first workings development prior to the commencement of any extraction that may result in surface subsidence. This geotechnical assessment will assess the behaviour of the roof, rib and floor to ensure their respective competencies lie within the system factors of safety established for the mine. This type of assessment has been successfully applied at for example at Myuna Colliery (which mines under Lake Macquarie) for over 30 years. The Revised Statement of Commitments (refer Section 6.0) has been updated to include the geotechnical reviews noted above.

It should also be noted the mining methods proposed for the Project are intended to be flexible to allow the mine to adaptively manage impacts to surface features and water systems. The design has been made conservative enough in terms of subsidence, that changes can be made to the underground operations should impacts be outside the predicted levels before any significantly adverse impact actually occurs. Actions, if required, could be used in isolation or in various combinations to adapt the mine workings to avoid adverse impacts outside the predictions discussed in the EIS and supporting technical assessments. These actions are:

- increasing the size of cliff protection zones by commencing or stopping extraction further away from cliffs than planned

- moving around sensitive features and not conducting extraction activities
- leaving additional pillars unmined
- changing the dimension of pillars or void widths
- reducing the size and extent of roadways.

Each of these actions has the potential to have a significant impact on the feasibility of the operation, and would only be undertaken as a considered response to impacts outside predicted values.

Issue – DRE

The review of the EIS has led to the identification of two fundamental questions, both of which are considered to be mine feasibility matters for the proposed project. DRE consider that these issues need to be addressed prior to the Extraction Plan stage. These questions are:

1. What should be the appropriate set-off distance from secondary extraction (in other words, what should be the dimension of the "cliff protection zone"), to maintain the integrity of the significant cliff formations within the subject area on a long term basis?
2. Where should the "cliff protection zone" be applied to maintain the integrity of the significant cliff formations within the subject area on a long term basis?

Given the significant cliff formations within the subject area DRE recommends that an independent expert panel be established to undertake assessments of all relevant factors and identify the set off distance from secondary extraction and determine the appropriate cliff protection zone. The assessment and determination should be made prior to the proponent submitting an extraction plan.

Response

Subsequent to DRE's submission dated 18 December 2014, DPE advised on 19 December 2014 via a telephone call that assessments recommended above by DRE must be completed as part of the RTS process. Centennial Airly can confirm an independent review for recommendations on the mine design criteria proposed in the EIS will be undertaken. The responses to the two above noted questions will be provided in the review report. The review report will be provided to DRE and DPE as supplementary information to the RTS.

Comment – OEH

The EIS stresses the importance of developing a monitoring system that minimises the impact on the environment, an important consideration for OEH. Section 8 of the Subsidence Predictions and Impact Assessment emphasises the value of the installation of stress and deformation monitoring instrumentation in the underground pillars providing data in respect to the stability of these pillars. The use of conventional subsidence monitoring lines over the first series of extraction panels beneath Mount Airly is expected to demonstrate the accuracy of less intrusive remote monitoring, which "would eliminate the reliance upon conventional subsidence survey lines" in more environmentally sensitive areas. OEH recommends that the DPE considers applying a condition of consent to ensure that minimal impact monitoring systems are employed within Mugii Murum-Ban SCA to minimise impact to the environment.

Response

Centennial Airly can confirm that:

- underground stress and deformation monitoring instrumentation will be installed in the pillars, where required, to provide data in respect to the stability of these pillars
- less intrusive remote monitoring systems in place of conventional subsidence survey lines are currently being investigated and will be implemented as much possible

to ensure that both the proposed techniques in combination will minimise impact to the environment while allowing valuable information required for subsidence monitoring to be obtained. These minimal

impact monitoring systems will be discussed and agreed with OEH and DRE prior to their implementation.

5.2.2. Water Resources

Issue – EPA

Overview of Key Findings page IV in EIS *"Airly Creek is predicted to experience a maximum cumulative increase of 14.5% in flow".* On page 3 in the Executive Summary of the SWIA reference is made to a change in waterway flow of 1% in Airly Creek. The EPA is therefore seeking clarification of the likely increase to flow in Airly Creek due to mine activities related to LDP001.

Response

The statement in the Executive Summary, Table of Summary of Environmental Impacts, page vi of the EIS ie *"Airly Creek is predicted to experience a maximum cumulative increase of 14.5% in flow"* is correct. The reference on page 3 in the Executive Summary of the Surface Water Impact Assessment (GHD, 2014a) that "… *a change in waterway flow of 1% in Airly Creek* …" is incorrect. Section 6.4.1 of GHD (2014a) and Section 10.1.3.2 of the EIS provide a value of 14.5% as the estimated reduction of total annual flow in Airly Creek for the proposed conditions under Scenario 2. The assumptions made for Scenario 2 is provided in Section 6.1.1 of the hydrogeological model report (GHD, 2014c) and Section 2.1.2 of GHD (2015a). Briefly, this scenario assumes increases in vertical and horizontal hydraulic conductivity up to a height of 75 m above the panel and pillar mining zone, which is the maximum height of the fracturing predicted in the Subsidence Impact Assessment (Golder Associates, 2014).

Table 10.5 in the EIS and Table 6-5 of GHD (2014a) note two values of the total predicted change to flow in Airly Creek, namely 0.2% and 14.5%, the first of which represents the impact on waterway flow when the predicted LDP001 discharges are minimal whilst the second value of 14.5% represents the impact when the predicted LDP001 discharges are maximised and vary the most from the existing conditions. It is noted the proportional increases to water flow along Airly Creek are expected to reduce downstream in the vicinity of the Gardens of Stone National Park as the natural creek flow becomes more continuous.

Issue – NOW

Assess the potential impacts of reductions in baseflow due to mining on basic landholder rights for surface water users.

Response

Refer to Section 3.1 of GHD (2014) in **Appendix A**.

Issue – NOW

Undertake a further review of the groundwater dependent ecosystems within and around the Project Application Area, with reference to the potential for impacts relating to baseflow and surface seepage (springs) reductions.

Response

Section 10.2.3.1 of the EIS and Section 4.5 of RPS (2014a) discuss the vegetation communities which occur within the shallow alluvial aquifers (facultative groundwater dependent ecosystems GDE) and which have the potential to be impacted by the predicted groundwater drawdowns. Section 7.2.5 of RPS (2014a) and Section 10.2.4.4 of the EIS note that although there is potential for some minimal impacts upon the structure and composition of the facultative GDEs at the local scale, larger areas of these communities will not be impacted by the Project. Given the known high tolerance of the tree species to persist in the absence of groundwater, it has been concluded that the identified GDEs are unlikely to result in significant modifications to species composition, and therefore it is unlikely the local extent of the GDEs would be significantly reduced as a result of the Project.

Section 5 of the Aquatic Ecology and Stygogauna Assessment (Cardno, 2014) and Section 10.2.3.3 of the EIS note that, despite sampling eight bores over three sampling campaigns, no stygofauna was found within the Project Application Area.

The baseflow reductions in proposed subsidence zones are discussed in Section 6.4.1 of the Surface Water Assessment (GHD, 2014b)) and Section 10.1.3.2 of the EIS. Of the 11 sites assessed it was found the largest baseflow reduction occurred at the confluence of Gap Creek and Genowlan Creek (170.9 ML/year), which is predicted to reduce total annual flows at the confluence by 3.3% for average rainfall conditions. Downstream of this location the impact on total annual flows will reduce further.

In terms of the assessments of surface seepage reductions in the Project, further work has been carried out by GHD (GHD (2015a), **Appendix A**) in response to Question 7 in IESC (2014a) on the existing hydraulic connectivity between the local and regional groundwater sources (refer Section 2.2.7 of **Appendix A**). This further assessment has specifically assessed the potential impacts of geological faults on vertical interconnectivity of aquifer systems and groundwater flow. The assessment includes discussions on the loss of groundwater through seepage, discussed below.

GHD (2015a) has demonstrated that fault zones have limited influence on local and regional hydrogeology at Airly Mine. However, the high degree of fracturing in the Triassic and Permian strata direct groundwater to seepage areas and account for the relatively low piezometric head throughout Mount Airly and Genowlan Mountain, that is, there is little opportunity for water to migrate downwards into the lower aquifer systems. Losses in groundwater through seepage will be localised to the Project Application Area. Any loss of groundwater due to the Project will only express itself as a reduction in baseflows in waterways, with the estimated reduction of total flow due to baseflow reduction ranging from 0.2% to 3.3%.

Issue – NOW

Clarify the expected volumetric take of water from mine inflows after cessation of mining activities.

Response

Refer to Section 3.2 of GHD (2015a) in **Appendix A**.

Issue – NOW

Clarify water licensing arrangements for surface water and incidental ingress of groundwater into the mine and obtain additional water entitlement if required.

Response

Refer to Section 3.3 of GHD (2015a) in **Appendix A**.

Issue – NOW

Clarify the proposed life of the mine. Proposed coal production is due to commence in 2015, and is to extend for 25 years (estimated to cease in 2040) with a recovery of 60 years to 2100. The modelling and subsequent groundwater assessment report detail the production of coal is to last until 2030.

Response

Refer to Section 3.4 of GHD (2015a) in **Appendix A**.

Issue – NOW

Refer to the NSW Office of water guideline *"Groundwater Modelling and Monitoring Plans - Introduction for prospective mining and petroleum exploration activities",* and liaise with the Office of Water when preparing the Groundwater Monitoring and Modelling Plan (GWMMP) for the project.

Response

A commitment has been made in the in the EIS (refer Table 11.3) to revise the existing Water Management Plan following development consent, and this revision will include the preparation of a Groundwater Monitoring and Management Plan (GMMP). The GMMP will incorporate clearly defined triggers and actions based on monthly and annual reviews of monitoring data. Centennial Airly will liaise with NOW for the development of the GMMP. The preparation of the GMMP will also take into consideration the recommendations provided in IESC (2014a), specifically Responses 51 to 57.

Issue – NOW

Include periodic monitoring of geomorphic conditions of third order streams within the project area as part of a post-approval management plan.

Response

The updated Water Management Plan will include periodic monitoring (approximately every two years) of geomorphic conditions of third order streams within the Project Application Area (refer Revised Statement of Commitments in Chapter 6).

Issue – NOW

Ensure that any take of clean water runoff is licensed through the Office of Water.

Response

Refer to Section 3.5 of GHD (2015a) in **Appendix A**.

Issue – NOW

Investigate and determine the frequency and intensity of rainfall event that may cause larger onsite dams to go into discharge.

Response

Refer to Section 3.6 of GHD (2015a) in **Appendix A**.

Issue – DPI

The EIS should address the impact on groundwater for agriculture as part of the water management investigations.

Response

Section 10.1.2.2 of the EIS and Section 3.5 of the GHD (2014b) conclude there is limited interconnectivity between the Triassic and upper Permian aquifer systems on the Airly / Genowlan Mountain complex and the lower regional aquifer systems located in the lower Shoalhaven and Devonian strata utilised by water users in the Capertee Valley. Further work has been carried out by GHD (GHD (2015a), **Appendix A**) in response to Question 7 in IESC (2014a) on the existing hydraulic connectivity between the local and regional groundwater sources (refer Section 2.2.7 of **Appendix A**) and the potential impacts of geological faults on vertical interconnectivity of aquifer systems and groundwater flow. This further assessment has demonstrated that fault zones have limited influence on local and regional hydrogeology at Airly Mine, however, the high degree of fracturing in the Triassic and Permian strata direct groundwater to seepage areas and account for the relatively low piezometric head throughout Mount Airly and Genowlan Mountain, that is, there is little opportunity for water to migrate downwards into the lower aquifer systems. Losses in groundwater through seepage will be localised to the Project Application Area and not have any influence on the downstream groundwater users. Any loss of groundwater due to the Project will only express itself as a reduction in baseflow in Gap and Genowlan Creeks as discussed in detail in Section 6.4 of the Surface Water Impact Assessment (GHD, 2014a) and summarised in Section 10.1.3.2 of the EIS.

The Agricultural and Land Use Impact Assessment (SLR, 2014) undertaken for the Project, appended as Appendix Q to the EIS, has assessed the Project's groundwater impacts on agriculture (refer Section 4.4.2 of SLR (2014)). The conclusion reached was that, given the potential groundwater impacts for all groundwater sources are less than the Level 1 impact considerations under the Aquifer Interference Policy (NOW, 2012), the Project is not anticipated to have any short or long term detrimental effects on groundwater which is relied upon by agriculture. It should be emphasized that the Project Application Area does not contain Biophysical Strategic Agricultural Land (BSAL) (refer Sections 2.8 and 4.1.2 of SLR (2014)) and as such the Project will not impact on BSAL.

Issue – DoE

Impacts on Water Resources and the Greater Blue Mountains World Heritage Area

The Department recommends that the proponent respond to and address comments, issues. knowledge gaps and additional analysis required by the Independent Expert Scientific Committee's (IESC) in its advice on the project, especially as they relate to water resources, the Greater Blue Mountains World Heritage Area and potential impacts to EPBC-listed species .

Once the additional information requested by the IESC is collected, the proponent should use the additional information to reassess and revise the impact assessments provided in the EIS documentation to adequately quantify the extent of any impacts on MNES in the RTS.

Response

Responses to the IESC advice have been provided in Section 5.1. Additional assessments have been undertaken as part of preparation of responses to IESC (2014a) advice and responses to the 12 questions provided to the Committee by DPE and DoE. Detailed discussions of impacts on water resources are contained in **Appendix A**. The potential impacts on the Greater Blue Mountains World Heritage Area are specifically addressed in Section 2.2.9 of GHD (2015a).

An eco-toxicological assessment is currently being undertaken by GHD Pty Ltd (refer Section 2.1.3 of **Appendix A**) comprising toxicity testing on samples of water collected from all Airly Mine licensed discharge points (LDP001 – LDP003), the production bore and three upstream and downstream locations on Airly Creek. Toxicity testing was conducted using the methodology outlined by ANZECC and ARMCANZ (2000). The aim of the eco-toxicological assessment is to determine the potential toxicity of proposed mine water discharges via the licensed discharge points into Airly Creek.

5.2.3. Ecology

Issue – OEH

OEH also notes that impacts cannot be entirely ruled out and that some rock-fall is predicted. OEH has particular concerns regarding the vulnerability of the Genowlan Pea and unknown vulnerability of the Genowlan Point *Allocasuarina nana* Heathland EEC, and thus the importance of monitoring and associated Trigger Action Response Plans.

Issue – DoE

Avoidance of impacts on Matters of National Environmental Significance

The Department notes that the project currently proposes to undermine the only known population of the Genowlan Point Pultanea. Due to the highly restricted nature of this critically endangered species, any impact to the species or its habitat will be considered as substantial. The Department requests that the proponent is asked to consider further avoidance of undermining this species, including a sufficient buffer.

Further to this, the Department will require that this species must be adequately monitored with contingency measures in place, which should include ceasing mining activities should any impacts (greater than 'negligible') be observed as a result of mining outside of a buffer area. These monitoring and contingency measures should be outlined in the RTS and addressed in greater detail in a management plan.

Response

The Fauna and Flora Impact Assessment for the Project (RPS, 2014a), appended as Appendix H to the EIS, discusses in detail the potential ecological impact of the predicted subsidence effects on the recorded population of *Pultenaea sp. Genowlan Point* species (Genowlan Pea) and Genowlan Point *Allocasuarina nana* Heathland EEC. The single population *Pultenaea sp. Genowlan Point* species occurs within the proposed Cliff Line Zone and Zone of First Workings while the entire occurrence of *Allocasuarina nana* Heathland is located within the proposed Panel and Pillar mining zone (refer revised EIS Figure 8.2 (included in **Appendix G** of this RTS) and Figure 10.6 in the EIS). The subsidence impact assessment (Golder Associates, 2014) has predicted vertical subsidence of 10 – 65 mm and 40 – 106 mm, respectively for these zones. For both zones no surface cracking is predicted and no hydrological impacts due to the proposed surface disturbance are expected.

OEH's comment "*that impacts cannot be entirely ruled out and that some rock-fall is predicted*" is reasonable. While Rockfalls from cliff lines resulting in cliff damage is a natural phenomenon, it is known to be exacerbated by subsidence effects. For this reason, the Project is proposing, within the Cliff Line Zone and Zone of First Workings (the location of the *Pultenaea sp. Genowlan Point* population), first working only with pillars designed to be long term stable. An analysis of past cliff failures in the NSW coalfields (ACARP, 2002) has shown that cliff damage increases in proportion to the extent of mining and associated subsidence. This analysis also shows that where mining voids are highly sub-critical, as they are proposed to be in this zone, that cliff damage was negligible. Figure 8.7 of the EIS plots the distribution of past cliff damage against mining void ratios. The upper bound curve shows that for the void to width ratio of <0.38 that is proposed in this zone, no cliff damage is predicted. The restriction of mining to first workings only under the cliffs reduces the expected risk of damage to less than 5% of the cliff face area. This level of damage is expected to manifest itself, at worst, as isolated, individual rockfalls, which in accordance with ACARP (2012), is defined as insignificant.

The potential ecological impacts of the Project on *Pultenaea sp. Genowlan Point* species and *Allocasuarina nana* Heathland are summarised in Section 10.2.4.1 of the EIS and the environmental consequences in Section 10.2.5.1 of the EIS. These assessments have been informed by a number of other relevant technical assessments, namely, Subsidence Impact Assessment (Appendix D of the EIS), Groundwater Impact Assessment (Appendix E of the EIS) and Surface Water Impact Assessment (Appendix F of the EIS).

RPS (2014a) undertook the 7-Part Test / Assessment of Significance (TSC Act) for *Pultenaea sp. Genowlan Point* species and Allocasuarina nana Heathland and the Assessment of Significance (EPBC Act) *for Pultenaea sp. Genowlan Point* species. The results of these assessments are discussed in detail in Appendices 1 and 2, respectively, of RPS (2014a). For the *Pultenaea sp. Genowlan Point* species:

- the 7-Part Test (TSC Act) revealed the low levels of subsidence effects are not considered substantial enough to impact upon the presence of the species, and that the Project is unlikely to affect the lifecycle of *Pultenaea sp. Genowlan Point* such that a viable local population of the species is likely to be placed at risk of extinction.
- the EPBC Act Assessment of Significance revealed the low level of predicted subsidence is not expected to impact upon the heath areas that provide habitat for *Pultenaea sp. Genowlan Point* such that these habitats would become unsuitable and result in the long-term decrease in the size of the local population of the species.

The TSC Act 7-Part Test for *Allocasuarina nana* Heathland EEC concluded the low levels of predicted subsidence are unlikely to cause impacts to the EEC. Given the proposed clearing in the Project will not include this EEC it was also concluded the Project is likely to have an adverse effect on the extent, or modify the composition of the ecological community, such that it would be placed at risk of local extinction.

Any potential impacts to the *Pultenaea sp. Genowlan Point* population has already been mitigated through the selected mining technique of first workings and long term stable pillars (Cliff Line Zone and Zone of First Workings) for the underlying area. Given the Project will not impact on the species no further mitigation measures, including avoidance or the inclusion of buffer zones, is necessary.

As noted in Section 10.2.8 of the EIS no State Recovery Plan exists for the species, however, a National Plan with defined objectives and 18 Priority Actions for the recovery of the species exists. A monitoring program for the *Pultenaea sp. Genowlan Point* population is proposed to be prepared and implemented in consultation with OEH (National Parks and Wildlife Service). The monitoring program will take into account the National Plan and the Priority Actions.

A Flora and Fauna Monitoring and Management Plan for the Project will be prepared in consultation with OEH. This plan will be consistent with the Mugii Murrum Ban State Conservation Area Plan of Management and will include the Trigger Action Response Plans for all EECs and threatened species with the potential to be impacted, including *Pultenaea sp. Genowlan Point* species and *Allocasuarina nana* Heathland. It is noted that Centennial Airly will prepare the Flora and Fauna Management Plan, however, the implementation of the plan will be undertaken by OEH as managers of the Mugii Murrum Ban State Conservation Area (in accordance with their request). Centennial Airly will continue to work with OEH on the monitoring programs proposed within the Mugii Murrum Ban State Conservation Area. The Revised Statement of Commitments (Chapter 6) has been updated to include the preparation of a Flora and Fauna Monitoring and Management Plan.

Issue – OEH

The OEH has previously responded, on 16 May 2014, to an earlier draft of the EIS and raised several concerns including the status of derived native grassland being impacted by the Reject Emplacement Area. These concerns have been addressed in the final version of the EIS. It has been confirmed that Grassy Box Gum Woodland Endangered Ecological Community (EEC) is present within the Reject Emplacement Area but the condition of this, and other derived native grassland types present, do not warrant an offset.

Response

While the Box-Gum Woodland EEC derived native grassland is present within the proposed reject emplacement area (REA), and 3.27 ha of it is proposed to be cleared in the Project, the REA does not contain any Grassy Box Gum Woodland EEC and no clearing of this EEC is proposed. Given the Box-Gum Woodland EEC derived native grassland within the REA is low quality (refer Appendix 1, page xxvi of RPS (2014a) and Section 10.2.4.1 of the EIS) and the conservation value was assessed as low, no offset area to account for the loss of 3.27 ha of the grassland was proposed in the EIS. OEH is in agreement with this proposal, as noted above.

Issue – DoE

<u>Impacts on Threatened Species and Communities - Adequacy Comments Not Addressed</u>

The Department notes that it appears that the proponent has not addressed the following adequacy comments with sufficient detail. This information is requested to be included in the RTS.

1. **Threatened Bat Species**

The Department notes that the proponent has stated that old mine workings provide potential habitat for threatened bats. As there will be high levels of subsidence in the Old Hartley Shale Mine, this could impact on habitat for these bats should they reside in the mine. Therefore, additional information, which may require additional surveys, is necessary to determine the Old Hartley Shale Mine provides presence/absence of threatened bats. If the mine is found to provide habitat for listed threatened bat an impact assessment must be provided and avoidance, mitigation safeguards and measures proposed.

2. **White Box - Yellow Box - Blakely's Red Gum and Derived Native Grasslands (Box Gum Woodland)**

The Department notes that the proponent currently concludes that only 3.27 ha of the grassland state of Box Gum Woodland are likely to be impacted by the action. However, additional information is required to confirm the extent of the ecological community and rule out the possibility that modified areas (contained on page 334 of Chapter 10) meet the definition of the community.

Further information regarding the Commonwealth definition of the critically endangered community, and the information Centennial need to address, is at Attachment B.

Response

1. Threatened Bat Species

The Flora and Fauna Assessment (RPS, 2014a) have commented that there is potential for threatened cave dwelling bat species to use structures such as caves and old mine workings. However, Section 7.2.3 of RPS (2014a) notes that RPS conducted targeted searches within the New Hartley Shale Mine Potential Interaction Zone in order to identify any cave structures with potential to be impacted upon. No cave structures were detected during targeted surveys. Therefore, as this impact area does not contain any potential habitat for threatened cave dwelling bats, it is unlikely that any caves or cave dwelling bat species will be impacted upon within the area.

2. White Box - Yellow Box - Blakely's Red Gum and Derived Native Grasslands (Box Gum Woodland)

Gingra Ecological Surveys were contracted to provide specific advice relating to the characterisation of grassland vegetation within the proposed REA, whether any areas of grassland comprised derived native grassland and, in turn, whether such grassland areas comprised Box-Gum Woodland derived native grassland. The peer review and analysis of grassland vegetation undertaken by Gingra Ecological Surveys had a very close and thorough regard to the *Commonwealth Listing Advice White Box - Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (Listing Advice) and the *White Box- Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grasslands EPBC Act Policy Statement* (EPBC Act Policy Statement). It is noted the peer review report from Gingra Ecological Surveys has now been appended to the revised Airly Mine Extension Project Flora and Fauna Impact Assessment report (RPS Australia East Pty Ltd) and this revised report will be supplied to DoE and OEH under separate cover.

The characterisation of grassland in the context of pasture land which has had a long disturbance history (since 1860s and is ongoing through grazing), involving clearing, grazing and possibly pasture improvement, is informed by the presence and relative proportions of native and exotic plant species, the soil characteristics including soil fertility and the degree and nature of soil disturbance. The native grasses which are diagnostic are perennial species. Such species can be detected at most times of year by an experienced botanist or pasture specialist.

Surveys by Gingra Ecological Surveys were undertaken in June 2014. Whilst a survey in spring or early summer may detect additional native species, there is also likelihood that a survey during that time of year may detect additional exotic annual species, thereby reducing the potential extent of derived native grassland.

Benson (1996) provides for surveys to be conducted outside of the optimum time for identifying the full range of species. In such circumstances, Benson (1996) effectively states that presence of native grassland should be assumed if it is likely that soil conditions are such that the soil stored seedbank may be viable. Benson (1996) does not provide a mechanism to determine what type of derived native grassland may be present.

It is considered that the methodology applied in the case of the proposed REA is appropriate and has allowed a high degree of certainty relating to the relative distribution of grassland types present in and adjacent to the area.

Section 4.4.3 of the Flora and Fauna Assessment (RPS, 2014a) notes the detailed assessments of the derived native grassland component of the Box Gum Woodland community were restricted to the surface facilities / infrastructure areas that would require vegetation clearing. The assessment outcomes are provided in Sections 4.4.3.1 and 4.4.3.2 of RPS (2014a). The REA Option 1 (alternative REA) was surveyed and impacts assessed (Section 4.1.3.1) but will not be constructed. The proposed REA Option 2 will be constructed and Section 10.2.4.1 of the EIS and Section 7.1.1 of (RPS, 2014a) note the area contains 3.27 ha of Box-Gum Woodland Derived Native Grassland (EEC). The Train Refuelling Station and the proposed Stockpile Site were assessed to be mostly devoid of native vegetation and these sites were determined not to be derived native grassland. The proposed Site Security area was deliberately positioned at a location that was dominated by non-native grass

species *P. Dilatatum* and the chosen location was not within an area containing derived native grasslands.

Section 4.4.2.2 of (RPS (2014a) discusses the criteria that have been considered in delineating the derived native grassland community within the proposed infrastructure areas. The EPBC Act Policy Statement 3.5 (DEH, 2006) is the primary identification guideline for *White box - yellow box - Blakely's Red Gum Grassy Woodlands and derived native grasslands*. For this reason, RPS (2014a) has used this document to inform the delineation of the community within the proposed infrastructure areas where disturbance will occur. DEH (2006) clearly conveys the determination of the community for identification purposes including the definitions provided in Appendix B of the Department of the Environment's submission.

In accordance with DEH (2006), the following criteria have been considered in assessing the potential for the proposed infrastructure areas to contain derived native grasslands.

- Is or was previously, at least one of the most common over-storey species White Box, Yellow Box or Blakely's Red Gum (or Western Grey Box or Coastal Grey Box in the Nandewar Bioregion)?
- Does the 'patch' have a predominately native understorey?
- Is the patch 0.1 ha or greater in size?
- Are there 12 or more native understorey species present (excluding grasses)?
- Does the study area contain at least one important species?
- Is shrub cover less than 30% across the entire remnant?

Section 4.4.2 of RPS (2014a) discusses how the criteria were applied for the delineation of the derived native grassland community within the proposed REA location.

5.2.4. Cultural Historic Heritage

Issue – LCC

Given the significance of the Airly Shale Oil Mining Complex and the inclusion in the Draft *Lithgow Local Environmental Plan 2013* the development should have due regard to the Conservation Management Plan produced by the NSW NPWS.

Response

Section 10.3.3.3 of the EIS notes Centennial Airly will abide by the Mugii Murrum-ban State Conservation Area Plan of Management (NSW National Parks and Wildlife Service) in relation to the Airly shale mining complex.

Additionally, Section 10.3.3.3 notes that if, during the course of development works, suspected historic cultural heritage material is uncovered, work will cease in that area immediately. The Heritage Branch, Office of Environment & Heritage will be notified and works will only recommence when an approved management strategy has been developed.

5.2.5. Noise

Issue – NSW Health

There is increasing evidence that exposure to noise is associated with health effects. We recommend that noise mitigation strategies listed in the application become part of the conditions of approval to ensure there are minimal impacts on the local community from noise.

Response

Noted.

Issue – LCC

The general operation of the mine is predicted to perform within the industrial noise guidelines, however there are concerns with the rail traffic noise. At times it is predicted that noise will exceed the limits at night, however these noise levels are exceeded regardless of Airly Mine's operations. Nonetheless, an appropriate restriction should be imposed to minimise or prohibit train movements at certain times of night to reduce potential impacts on residents within 100 m of the rail lines.

Issue – EPA

The NVIA predicted that the project would increase LAeq(night) rail noise levels, which are already above criteria from the *Rail Infrastructure Noise Guideline* (EPA, 2013), by 0.6 dB. While this increase is likely to be imperceptible, existing noise levels above criteria will be exacerbated by the project and the EPA recommends that Department of Planning and Environment (DPE) consider requiring the proponent to use only best practise rolling stock for rail transport resulting from the proposal (including only locomotives which have obtained EPA approval to operate on the NSW rail network under Condition L2 of EPL No. 3142, 12208 or 13421, or in accordance with the former *Noise Control Act 1975)*

Response

Section 13 of the Noise Impact Assessment (SLR, 2014b) and Section 10.5.4.4 of the EIS discusses the rail traffic noise potential impacts from the Project. The day-time $L_{Aeq(15hour)}$, Night-time $L_{Aeq(9hour)}$ and maximum (L_{Amax}) noise levels for the assumed train movements are presented in Table 10.38 and Table 10.39 in the EIS for various set back distances from the Main Western Rail and Wallerawang-Gwabegar Rail lines. As indicated in these tables predicted existing rail traffic noise levels with and without Airly Mine trains comply with the $L_{Aeq(15\ hour)}$ trigger levels for residences more than 25 m from the Main Western and Wallerawang-Gwabegar Rail Lines.

Rail traffic noise levels without Airly Mine-related trains are predicted to exceed the night-time $L_{Aeq(9\ hour)}$ trigger levels for residents at or within 50 m of the Main Western Rail Line. Furthermore, the existing maximum rail pass-by noise level is predicted to exceed the relevant trigger levels at residences within 100 m of each line.

Airly Mine rail traffic increases rail noise by 0.5 and 0.6 dBA during the day and night respectively. According to SLR (2014b) this negligible noise level increase would not be audible. Furthermore, the rail noise passby noise levels will not increase as a result of the Project.

It should also be noted that rail traffic volumes will not change as a result of the proposed Project and rail noise currently experienced by residences will not increase as a result of the Project.

Centennial Airly does not have management control over the arrival and departure times of trains. Train path availability is priority driven where commuter trains take first priority, followed by general freight. The system is take or pay, which means that it is difficult to predict in advance which paths will be utilised for the Project.

For train movements Centennial Airly, to a large part, has limited opportunity to apply engineering controls to mitigate the noise contribution from trains not under its management control. The rail loop at the pit top is constructed on level terrain therefore train run in-run out noise will be minimised as this will reduce the power load that the train will require to move through and exit the site. The loading facility is also designed to current rail operations criteria and is capable of loading the current train size of 42 wagons in 1.5 hours or less. This minimises noise as far as possible at the mine site.

Through the procurement of its own limited locomotives and rolling stock, Centennial Coal requires fewer locomotives from alternative rail providers to service the Airly Mine. This is because the Centennial Coal purchased locomotives have greater power than those provided by alternative rail providers. However, the Centennial Coal owned locomotives are limited in stock and service both Centennial Coal's western and northern operations and, like alternative rail providers, will be subject to available rail paths.

Management of train noise once the coal leaves site is the responsibility of the rail transport provider and are dealt with in the licence to operate for these providers. Airly has no management control over the types of locomotives or rolling stock purchased and operated by external providers.

Issue – EPA

F class inversions and source to receiver winds were modelled independently, but not together, to predict a maximum $L_{Aeq15\ min}$) at receivers of 35 dBA. Appendix D of the *New South Wales Industrial Noise Policy* (INP, EPA 2000) indicates that adding an inversion to a source to receiver wind prediction may increase the predicted level by 2-3 dB (over a distance of 400- 600m), which would result in a predicted $L_{Aeq(15min)}$ up to 38 dB (3 dBA above the Project Specific Noise Level [PSNL]). Predictions should therefore be provided considering both inversion conditions and source to receiver winds in combination.

Response

Refer to Section 3(a) of SLR (2015) in **Appendix B**.

Issue – EPA

The EIS stated that the exploration program will be used "for the ongoing refinement of the site's existing geological model which then allows detailed mine planning" (page 86), indicating that it is not an exploration or construction activity but part of the operation of the project. Each drilling campaign was estimated to last less than three weeks in the EIS, which was used as a justification for assessing it under the *Interim Construction Noise Guideline* (ICNG, DECC 2009). The proposed drilling appears to be part of the ongoing operation of the mine, for an extended period (up to the life of the project), and the ICNG does not apply to mining. The proposed drilling should therefore be assessed under the INP.

Response

Refer to Section 3(b) of SLR (2015) in **Appendix B**.

Issue – EPA

Some of the Sound Power Levels (SWL) given in the NVIA appear to be low, for example the Coal Handling and Preparation Plant (CHPP) was given a SWL of 94 dBA internal, and four locomotives (notch two) were given a combined SWL of 111 dBA. No tonal or low frequency modifying factor adjustments were considered applicable, but low frequency modifying factor adjustments are often required for mining projects, especially CHPPs. The NVIA stated that the two SWL were measured at Newstan Colliery, the EPA requests that the modelled SWLs are justified by comparing the measured CHPP and locomotives with the types in use at Airly Mine or proposed for the project.

Response

Refer to Section 3(d) of SLR (2015) in **Appendix B**.

Issue – EPA

The Statement of Commitments in the EIS commits to a Noise Management Plan (NMP) for the project, without specifying what will be addressed in the plan. Any project approval issued should include requirements to be addressed in a NMP for construction, operation and drilling noise.

Response

The Noise Management Plan will include the management of construction, operation and drilling noise, and will be prepared in consultation with the EPA as relevant.

Issue – EPA

L_{Amax} levels were used to predict impacts on sleep disturbance. This is acceptable, and care should be taken to specify appropriate sleep disturbance limits in any project approval given (L_{Amax} limits should be provided rather than $L_{A1(1mln)}$).

Response

Refer to Section 3(f) of SLR (2015) in **Appendix B**.

Issue – EPA

Blast overpressure and vibration was not assessed in the EIS or NVIA. If any blasting is proposed for the project, it should be assessed against ANZECC (1990) guidelines.

Response

Blasting is not proposed in the Project, and as such no blast overpressure and vibration was assessed Noise Impact Assessment for the Project (SLR, 2014b).

Issue – EPA

Impacts on passive recreation areas in the Capertee National Park and Gardens of Stone National Park do not appear to have been assessed. However, compliance with criteria at these locations is indicated by compliance with residential criteria at nearby receivers, for example receiver R1. Any project approval, if issued, should contain noise limits for passive recreation areas in the National Parks.

Response

Refer to Section 3(h) of SLR (2015) in **Appendix B**.

5.2.6. Air Quality

Issue – LCC

During the creation of the REA and construction of infrastructure every caution be taken to suppress dust. Additionally, adequate erosion and sedimentation controls should be implemented until soils are suitably stabilised. Internal roadway use and stockpile work should be managed in a manner that will also reduce dust issues.

Response

As noted in Chapter 11.0 of the EIS (Statement of Commitments), specifically Table 11.2 (which has been reproduced as Table 14 in this RTS) sediment control measures will be implemented in accordance with the guidelines *Managing Urban Stormwater – Soils and Construction, Volume 2E: Mines and Quarries* (DECC, 2008). The management controls will be included within a Construction Environmental Management Plan that will be prepared prior to the construction activities.

Issue – EPA

The review of the Air Quality Impact Assessment (AQIA) by the EPA has determined that the assessment has been generally undertaken in accordance with the Approved Methods for Modelling and Assessment of Air Pollutants in NSW.

EPA recommended conditions of Project Approval:

The EPA is satisfied that the air emissions are unlikely to exceed the EPA impact assessment criteria at the identified sensitive receptors, providing the project activities are undertaken in line with the four distinct scenarios utilised for the dispersion modelling.

Response

Noted.

Issue – NSW Health

The background data source for air quality measurement prediction was Bathurst 2010. The report mentions that the characteristics of the location and activities that could affect the air quality is very different in Bathurst and the adoption of data should be regarded as very conservative. Hence any modelling conducted using this data is likely to underestimate the decline of air quality levels at Airly Mine area. A sensitivity analysis should be used to determine the effect of using higher background levels.

Response

Refer to Section 2.1.1 of SLR (2014e) in **Appendix C**.

Issue – NSW Health

It is not explained why background data for 2010 was chosen instead of the most recent data. The maximum PM_{10} 24 hour concentration in year 2010 was 43.3 $\mu g/m^3$ which was 12 $\mu g/m^3$ lower than in year 2012. This would mean that the maximum 24 hour PM_{10} concentration for year 2012 was 55.3 $\mu g/m^3$. However, for the modelling, year 2010 data was used rather than more recent 2012 data which was already higher than the maximum recommended level. Modelling should use the most recent available data.

Response

Refer to Section 2.1.2 of SLR (2014e) in **Appendix C**.

Issue – NSW Health

There was no background data for $PM_{2.5}$ (annual average and 24 hours average) available. However, modelling was conducted in the absence of background data applying only the increments to predict the 24 hour average and annual average $PM_{2.5}$ concentrations. The conclusions were made that those concentrations are expected to be much lower than the EPA criteria. If background data is unavailable then reasonable estimates derived from known TSP background concentrations should be used in the absence of appropriate background $PM_{2.5}$ data.

Response

Refer to Section 2.1.3 of SLR (2014e) in **Appendix C**.

Issue – NSW Health

Real-time air quality monitoring is mentioned as the best practice, but the proponent has deemed the monitoring unnecessary as the predicted air quality parameters are well below the DGR criteria. However as discussed above due to the problems that we have identified on the methodology of calculation of predicted particulate matter levels, in addition to the absence of any data on $PM_{2.5}$, it is highly recommended that the proponent considers real time air quality monitoring.

Response

Refer to Section 2.2 of SLR (2014e) in **Appendix C**.

Issue – NSW Health

Predicted or known impacts from the Excelsior Limestone Quarry located 6.5 km northwest of Airly Mine have not been considered. The applicant has mentioned that due to its distance from the proposed development, the cumulative impact on air quality is unlikely. However it is well known that particulate matter can travel several kilometres, especially $PM_{2.5}$. It is recommended that air quality impacts from this quarry are included in modelling.

Response

Refer to Section 2.3 of SLR (2014e) in **Appendix C**.

5.2.7. Visual Amenity

Issues – LCC

Landscaping to be undertaken to minimise visual impacts of the REA is to be completed when the REA has commenced. This landscaping is to be maintained / monitored for the duration of the mining operations and at a standard suitable to act as a visual screen.

That all lights be directed towards to facility and be situated to not produce light on adjoining properties or impact drivers along Glen Davis Road.

That measures be taken to screen the run-of-mine stockpile from being visual prominent along the Castlereagh Highway or Glen Davis Road. This may include minimising the stockpile size and restricting its height. (**LCC**)

Response

A Visual Impact Assessment (GBD, 2014) undertaken for the Project (refer Section 10.10 of the EIS) noted that the views and landscape features, comprising the surface features of Mount Airly and Mount Genowlan including cliff lines and rock formations (eg. pagodas), are available to recreational users through the Mugii Murrum-ban State Conservation Area and surrounding National Parks. The Airly Mine pit top and the surrounding areas contain moderate to dense tree cover, which in combination with surrounding mountains and ridgelines provide an enclosed visual character. Given the extent and combination of existing tree cover and undulating landform within and surrounding the Airly Mine, the visual absorption capability is likely to be high which then reduces the potential magnitude of visual significance.

Notwithstanding the above, Section 10.10.6 of the EIS includes the following measures that will be implemented in relation to the proposed REA and light spill to reduce the visual impacts of the Project during the construction and operation phases.

- Minimising light spill outside of areas required to be lit.
- Where possible, establishment of tree, shrub and ground cover consistent with native woodland and grasslands. Tree planting at the basal area of the REA will be undertaken.
- Progressive and ongoing restoration and rehabilitation of the REA will minimise visual contrast between the emplaced reject materials and surrounding landcover.

The Statement of Commitments have been updated (refer Section 6.0) to include the above noted mitigation measures.

With regards to the recommendation that measures be undertaken to screen the run-of-mine stockpile this is being currently addressed as part of the DA162/91 MOD 3 consent conditions. In 2013 an independent review of the existing tree screening activities being undertaken at Airly Mine was undertaken against the requirements of Condition 26(a)-(c) of the existing consent DA 162/91. The review recommended a Visual Impact Assessment be carried out as part of the Airly Mine Extension Project EIS which should include an assessment of the adequacy of the current staged program of works. The Visual Impact Assessment undertaken (GBD, 2014), appended as Appendix O of the EIS, proposed the establishment of tree, shrub and ground cover consistent with native woodland and grassland, as appropriate. Centennial Airly has committed to the tree plantings to provide visual screening of the existing coal stockpile area during MOD 3 period and the commitment was included in the Revised Statement of Commitments (refer Appendix 1) of DA162/91 MOD 3 consent conditions.

5.2.8. General Issues

Issues – DRE

- Centennial will be required to obtain a mining lease for the areas to be mined within Authorisation 232.

- Exploration activities must be notified to and approved by DRE.

Response

Noted.

Issue – DRE

It is noted that no clearing of surface vegetation is proposed as part of the project. Exploration activities are proposed with no reference to how many holes are proposed to be drilled or the locations of the drill holes.

Response

Clearing of vegetation is proposed in the Project. Section 4.6 of the EIS notes 39.09 ha of vegetation will be disturbed for the establishment of the proposed REA, construction of a Coal Preparation Plant, establishment of a ROM Stockpile, and the construction of a Site Security Gate.

Section 10.2.4.1 of the EIS and Section 7.1.1 of the Flora and Fauna Impact Assessment (RPS, 2014a) note the area required for the proposed REA contains 9.15 ha of disturbed/improved land, 25.49 ha of derived native grassland, most likely derived from MU38 Capertee Grey Gum - Narrow-leaved Stringybark - Scribbly Gum - Callitris - Ironbark Shrubby Open Forest, and 3.27 ha of Box-Gum Woodland Derived Native Grassland (EEC). All remaining areas for surface infrastructure cover approximately 1.18 ha of disturbed/improved land. These areas provide marginal habitat for most threatened fauna and flora species.

Section 4.3 of the EIS notes the number of holes and their locations are not known currently. This section outlines the procedures that will be adopted for exploration activities that will be undertaken in the Project, including the drill site selection process, due diligence assessment, avoidance or minimisation of significant environmental impacts and rehabilitation of drill sites.

Issue – OAS&FS

It is recommended that the NSW Office of Water undertake a socio-economic assessment of any physical movement of water away from agriculture.

Response

Noted.

5.3. Response to Submissions from Special Interest Groups and Organisations

5.3.1. Mine Design and Subsidence

Key Issues

- Centennial must keep to its commitment to only remove 50% of the coal in the lease area.
- The impacts of subsidence are not independently substantiated and do not provide sufficient confidence that impacts to the pagodas, cliffs, deep canyons and gullies will be negligible.
- The panel pillar zone subsidence estimations are based on a limited database and numerical model from the USA.
- Clarence is not a suitable case to base the Airly design on due to much lower levels of subsidence created at Clarence Colliery.
- The partial pillar extraction zone subsidence estimations are based on a limited database and numerical model from the USA. The uncertainty of these predictions in a critical area at the base of the cliffs means would be wise to eliminate this zone and conduct only first workings from the shallow zone to the cliff zone.

- As the co-author of the only real paper on pagoda geomorphology (Washington and Wray, 2011), I would dispute what is stated on p. 37 of the EIS regarding pagodas in the SCA. There are both smooth and platy pagodas present.
- Colo Committee's key concern remains the percentage of coal to be extracted under highly important pagoda and slot canyon areas and also under very high cliffs and associated very steep talus slopes that act as 'flying buttresses' to support these cliffs.
- Flooding of first workings under cliff lines may cause 5% cliff damage and this is unacceptable in the SCA. The mine should ensure the workings will not fill with water.
- The cliffs in this zone are directly upslope of the historic oil shale mining ruins. The EIS points out that there are cracks caused by the earlier subsidence and that a major rock fall occurred in 1911 (from that estimated 300 mm subsidence). With half a metre subsidence planned, this is likely to be more severe, with possible further cliff collapse that damages these nationally significant ruins.
- The suggestion on p. 38 of the EIS that pagodas will typically crack but that total collapse does not happen is not a rule. In fact pagodas undercut by caves or that are tilted have collapsed from subsidence in other parts of the Western coalfields. The Colong Foundation seeks consent conditions for this project that will:
    - ensure that the historical New Hartley Oil Shale Mine are defined as sensitive heritage of special significance that must protected from any subsidence movement and impacts
    - ensure that high cliffs (including those at Point Hatteras and Genowlan Point), pagodas, the Grotto and the Valley of the Kings are defined as sensitive heritage of special significance and fully protected from any subsidence movement and impacts
    - allow the angle of draw of 25 degrees to be retained so that the 'environmental protection zone' (for subsidence) in the existing consent is not reduced in width by about 50% as is currently proposed.
- Further, the Colong Foundation does not accept that cliff falls happen at a rate of one every four years.
- High cliffs, pagodas, the Grotto, and the Valley of the Kings should be defined as sensitive heritage of special significance that must be protected from any subsidence movement impacts.
- The level of damage predicted in the shale mine zone should be unacceptable to government authorities and should be limited to first workings only.
- Failure to acknowledge that there is a zone 6 where there is no mining under Gap Creek warrants the resubmission of the EIS.

Response

Applicability of Clarence Colliery Mine Design to Airly Mine

Airly Mine has recognised that impacts due to mining that were acceptable in the past are now no longer acceptable to society as a whole. The proposed mine design is specifically intended to avoid significant damage to cliffs and rock features as discussed in Chapter 8.0 of the EIS.

The Clarence Colliery design subsidence criteria of (100±25) mm (hence up to 125 mm subsidence for the Airly Mine Extension Project) was used as the basis for the subsidence limits for the mine design as these have proven successful in similar topography for over 15 years. Subsidence levels recorded at Clarence Colliery using partial extraction have ranged up to 103 mm in some areas around significant cliffs, yet without impact. Clarence Colliery has proven, over the monitoring period, that controlling and minimising vertical subsidence to approximately (100±25) mm has resulted in no impact on surface features such as cliff lines and/or pagodas, as evidenced by their ongoing monitoring (EPBC 2012/6446 Referral) including surface subsidence, groundwater monitoring and underground pillar monitoring. So the decision to adopt the proposed mine design at Airly Mine has

been informed by the objectively verifiable success of similar partial extraction methods and subsidence limits employed at Clarence Colliery with minimal impact on the environment.

Subsidence modelling was based on the recognised industry database. There are few cases of partial extraction style voids in the database as the vast majority of underground workings in both Australia and internationally involve full extraction with much greater impacts than proposed for the Project. Airly is proposing workings that are at the extreme conservative end of the database experience where impacts are least.

Coal Extraction Rates

Centennial Airly is not back-tracking on its previous agreement with the Special Interest Groups and the members of the community, albeit this agreement was through verbal communication, that it will not extract more than approximately 50% of coal from within its lease area. Extraction ratios for the various mining methods are noted in Section 8.3.7 of the EIS. The approximate extraction rates of proposed mining zones and the respective areas of each mining zone are provided below.

- Panel and Pillar Mining Zone: Up to 67% (less if main headings are included) extraction rate within an area of 789 ha (includes the New Hartley Shale Mine Interaction Zone)
- Partial Pillar Extraction Zone: Approximately 51% extraction rate within an area of 258 ha
- Shallow Zone comprising First Workings with Pillar Splitting and Quartering: Approximately 51% extraction rate within an area of 258 ha
- Cliff Line Zone and Zone of First Workings: Approximately 31% extraction rate within an area of 528 ha.

The above extraction rates take no account of main headings pillars (which have a lower extraction ratio), areas left unmined at the ends of production panels, and areas not feasible to recover. The actual resource recovery will be below the values quoted above for each mining zone. Using the extraction rates and the total mining area of 2176 ha the average extraction ratio across the mining area is approximately 52%. It is emphasized this figure is conservative given the above-mentioned unrealistically high extraction ratios applied for each mining zone.

Pagoda Geomorphology

Section 2.3.3.2 of the EIS recognises that both smooth and platy pagodas exist within the Project Application Area, and discusses the distribution of pagodas in the Project Application Area.

Subsidence Impacts on Pagodas, Cliffs, The Grotto and The Oasis

Cliffs and associated pagodas as well as the more significant canyons on the Mount Airly / Genowlan Mountain complex are located within the Cliff Line Zone and Zone of First Workings where extraction will be limited to first workings only with large long term stable pillars. Extraction ratio in this zone is approximately 31%. The Cliff Line Zone and Zone of First Workings extends at least 30 m on both the upslope and downslope sides of identified cliffs and large pagoda features to provide a buttress style foundation for these features.

An angle of draw of 26.5 degrees is not required in most areas of the Project Application Area as that value is used where full extraction (for example, a longwall mine) is taking place. Only partial extraction or first workings is being proposed for the Project. Golder Associates (2014) in the Subsidence Impact Assessment noted that the type of workings being proposed would not require any angle of draw due to the very low levels of subsidence, tilt and strain. But in the interests of precaution a zone of at least 30 m is being proposed. Increasing the size of the Cliff Line Zone and Zone of First Workings to a 26.5 degree angle of draw will result in a significant loss of mineable reserve from the more productive mining areas and impact the Project feasibility significantly, but note without actually reducing any potential impacts in the zone significantly.

The Cliff Line Zone and Zone of First Workings in area adjacent to the New Hartley Shale Mine Interaction Zone has been increased in horizontal size to an effective angle of draw of 26.5° against the panel and pillar workings. This is an industry accepted value where full extraction is taking place. The interaction between the proposed Airly Mine workings and the existing New Hartley Shale Mine create the same impact as full extraction, hence the increase in the size of the cliff protection zone in

this area. This will prevent further damage to the cliffs above the Airly Village site and thus provide protection of the site and manage risk to the public.

Section 8.3.7.1 of the EIS states that the first workings proposed will limit subsidence damage to cliffs around the mountain complex to negligible levels. The ACARP (2002) methodology used to assess impacts to the cliffs is the only industry accepted method available at this time. Using this method determined that any impact would be limited, at worst, to isolated rock falls on very limited areas of the cliffs. These would not be noticeable above the natural frequency of such falls. In most cases no impact would be noted. This represents the lowest possible rating on the ACARP (2002) methodology above the "no mining" case.

Where impacts were predicted on the cliffs identified in the Panel and Pillar Zone, again the impact is limited to isolated falls of rock on limited areas of the cliffs in question.

The cases cited of collapsed pagodas where overhangs are present are in areas of the Western District where full extraction has taken place. No full extraction in the Lithgow seam is proposed in any mining zones at Airly Mine. The significant pagoda features are usually in association with cliffs and these are further protected by first workings only in the Cliff Line Zone and Zone of First Workings. Interaction of the proposed partial extraction panel and pillar workings within the New Hartley Shale Mine Interaction Zone will effectively be similar to full extraction in terms of subsidence, but identified pagodas in this zone are already significantly fractured but have not collapsed.

The EIS has recognised the presence of The Grotto and The Oasis within the Project Application Area and has proposed mining methods that provide for very low levels of subsidence, tilts and strains in order to prevent fracturing or damage to these features, and hence provide a very high level of protection to these features and landforms around it. As discussed in Section 8.3.7.1 of the EIS The Grotto (along with The Oasis) is located in the proposed Cliff Line Zone and Zone of First Workings (refer revised EIS Figure 8.2 (included in **Appendix G** of this RTS)) within the mining area where only first workings with large pillars will be carried out. This proposed mining method in the area has been designed to protect The Grotto (and The Oasis). This zone is predicted to have low levels of subsidence and will prevent surface impacts to the landform. Section 10.1.3.3 of the EIS notes that no groundwater drawdown is predicted under The Grotto or The Oasis. No surface cracking is predicted due to the low levels of subsidence predicted. As such no impacts on The Grotto and The Oasis are predicted.

Airly has committed to an independent review of the geotechnical and subsidence aspects of the EIS (refer Revised Statement of Commitments in Chapter 6). This is in addition to the ongoing geotechnical review of first workings development prior to the commencement of any extraction that may result in surface subsidence.

Rate of Cliff Falls

Cliff falls are a naturally occurring phenomenon. The website http://world.time.com/timelapse2/ has a time-lapse set of satellite images of the entire earth from 1984 to 2012. When the locality of Capertee, NSW is inputted into the search box, a series of images will play on screen. The photographs provided in **Appendix D** show the years the falls of cliffs occurred that are visible from the satellite imagery. Falls of rock large enough to cause damage to the tree cover below occurred in 1984, 1989, 2004 (2 separate falls), 2006, 2008 and 2009. Since that time another fall occurred in November 2013 for which there is a separate photograph taken by local resident B. Upton. The locality of that fall is shown on the 2012 image for completeness. This is a total of eight individual falls of cliffs that were visible from satellite images in the past 31 years or an average of 1 fall in less than 4 years. This observation is inconsistent with the statement that " … *does not accept that cliff falls happen at a rate of one every four years*".

Existence of Mining Zone 6 Under Gap Creek

The areas of Gap Creek where no mining will take place are not another mining zone because there is no mining proposed.

5.3.2. Water Resources

- Surface water flows may be reduced due to the Project to the extent that downstream users suffer a loss significant enough to impact on all the industries in the valley;
- The Gardens of Stone National Park and Greater Blue Mountains World Heritage Area may be impacted by adverse changes in water quality and quantity in Airly Creek;
- The current water management system is unsatisfactory as it mixes clean surface water with site runoff water and also combines these with mine effluent from the underground workings;
- The EIS dismisses the impact that mining will have on the permanent water supplies on the mesas.
- The groundwater monitoring network does not represent all the areas of interest in the coal mine area.
- Mine dewatering and subsidence may alter the hydraulic ability of the local groundwater system to transmit groundwater.
- Reduced baseflow recharge to the Quaternary alluvium, and Creeks, may reduce recharge to the underlying shallow aquifers of the Shoalhaven and Devonian Formation.
- Centennial Airly have not included a study of cumulative effects of dewatering and subsidence on groundwater levels in the colluvium and alluvium under drought conditions.
- Centennial Airly bought an 'Additional Entitlement' WAL 36565 for 120 ML/year from the Sydney North Basin. The source for this 'Additional Entitlement' has not been published.
- Once the mine reaches its peak requirements of 199 ML/year and is recycling 80% of this produced water there will be no need to have a 278 ML/year groundwater allocation for the life of the mine.
- Centennial Airly have no additional groundwater WAL licences to cover increased groundwater abstractions above those modelled.
- The water and salt balance assessment used Scenario 2 from the hydrogeological modelling for all the water and salt balance modelling. Scenario 1 case should also be modelled in Goldsim to assess the impact on water and salt balances.
- The report should have investigated the rainfall patterns in the region and demonstrated that the data sequences adopted from Ilford adequately represent both the long term rainfall averages and the shorter duration rainfall intensities for the mine site.
- The Simulation Model adapts key parameters to local conditions but there is no discussion of the effect of the changes in parameters on the stream flow characteristics so it is not possible to assess if the changes made to the parameters are appropriate.
- The statistical information presented in Figure 6-4 does not allow the water balance to be verified for the 10% and 90% exceedance cases.
- In assessing changes to the catchment hydrology and hydraulics, the report provides an estimate of changes to baseflow at various locations downstream of the mine site. The studies should attempt to estimate baseflow at these locations so that changes in baseflow can also be presented as percentage change.
- The geomorphological assessment should also consider changes in baseflow as these also have the potential to impact on stream morphology.
- Unfortunately the report does not give the reduced levels for the collars (tops) of these piezometers. There does not appear to be a reference to the Packer testing in this report (Section 1.4.2 of Pells report).
- The predicted impacts are based entirely on the computer calculations made using the software MODFLOW-2005. It is acknowledged that this is established software, but it is also

noted that the software is known, in some cases, to incorrectly compute the impacts of downward seepage.

Response

Surface Water Flows and Water Quality Impacts on Greater Blue Mountains World Heritage Area

Impacts on surface water flows are assessed in Section 10.1.3.2 of the EIS and Section 6.4 of the Surface Water Impact Assessment (GHD, 2014a). This assessment concludes that there is a maximum loss of flow due to the Project at the confluence of Gap and Genowlan Creek of 5%. This creek system is ephemeral at this location and so such a loss is considered minimal. All losses downstream of this point are less due to the influence of other watercourses joining the Genowlan Creek waterway and are therefore not significant to downstream water users. All other creek systems in the Project Application Area are not predicted to have any negative flow impact.

Section 10.1.3.2 of the EIS and Section 6 of GHD (2014a) conclude that surface water quality in Airly Creek will not be adversely impacted by discharges from the Airly Mine. Background levels of salts and other metals that naturally occur in Airly Creek are greater than those predicted to be discharged from the mine site. Further recent monitoring work undertaken by GHD and presented in GHD (2015a) has demonstrated that the areas of Airly Creek that are upstream of the mine site are consistent in water quality with those monitored as part of the EIS preparation.

Discharge is only predicted during times of high rainfall where any water discharged would be diluted by the run-off in the Airly Creek catchment. No significant adverse impact on downstream water quality in Airly Creek is predicted.

Due to the very low levels of subsidence resulting from the partial extraction being proposed and minimal reduction water flows in the creek system within the Project Application Area, there is no impact on surface water quality predicted in creeks other than Airly Creek.

Section 10.1.6 of the EIS summarises the impacts of the Project on the Greater Blue Mountains World Heritage Area (GBMWHA) based on assessments undertaken in Section 6.4 of the Surface Water Impact Assessment (GHD, 2014a). GHD (2015a) (refer Sections 2.1.3 and Section 2.2.9) more recently have carried out specific assessments of the potential impacts of the Project on the GBMWHA to address advice and responses provided in IESC (2014a). GHD (2015a) has concluded that “Given the relatively small increase in the volume and frequency of flows within Airly Creek due to the Project, it is not expected that there will be any adverse impacts to the receiving environment within the GBMWHA downstream of Airly Mine”. Any impacts further downstream will be further reduced due to the influence of other water courses entering the Airly Creek system.

Section 10.1.2.2 of the EIS and Sections 3, 5 and 6 of the groundwater impact assessment (GHD, 2014b) conclude there is very little interconnectivity between the Triassic and upper Permian aquifer systems on the Airly / Genowlan Mountain complex and the lower aquifer systems located in the lower Shoalhaven and Devonian strata utilised by water users in the Capertee Valley. Further work carried out by GHD in response to question 9 in IESC (2014a) regarding the influence of fault zones on vertical interconnectivity of aquifer systems demonstrated that the high degree of fracturing in the Triassic and Permian strata caused groundwater on the mountain complex to find its way to the outside of the mountain and internal gullies within the mountain. Thus there was little opportunity for water to migrate downwards into the lower aquifer systems. Thus any losses in groundwater due to the Project will be localised to the Project Application Area and not have any influence on the groundwater users outside the Project Application Area. Any loss of groundwater due to the Project will express itself as a reduction in base flow in Gap and Genowlan Creek.

Section 10.1.3.3 of the EIS and Section 6.1.1 of GHD (2014b) discuss the potential impacts of the Project on groundwater quality. The conclusion from this assessment was that there is no expected impact on groundwater quality. Section 2.2.7 of GHD (2015a) has concluded the Project is unlikely to result in impacts to regional groundwater resources and the downstream groundwater users.

Water Management System at Airly Mine

The surface water management at the Airly Mine pit top is described in detail in Section 3.11 of the EIS. The water management system at Airly Mine serves two functions. The first is to prevent

unsettled or dirty water from the mine site entering Airly Creek and the second is to harvest water for use at the mine as process water. The need to harvest water for process use requires that all mine site run off and diverted clean water is captured and diverted to a dedicated dirty water dam. Airly Mine has a right to harvest water from the land owned by the mine and use it for industrial purposes. Water in the dirty water dam is settled before it flows into the discharge dam where it is further settled and used either for process water or discharges to Airly Creek during high rainfall events. No dirty water is discharged into Airly Creek.

The water management system is designed for maximum recycling of site water. Rigorous water management occurs at the Airly Mine top to ensure surface run-off is captured and reused for operations.

While the water management system does allow mixing of clean surface water from site runoff water with dirty water (and in the future mine inflows) water treatment through settling occurs as described above to produce clean water for operations and for discharges off site.

Groundwater Monitoring Network

Refer to Point 1 in GHD (2015b) in **Appendix E**.

Impact of Mine Dewatering and Subsidence on Groundwater System

Refer to Point 2 in GHD (2015b) in **Appendix E**.

Impact of Reduced Baseflow Recharge to the Quaternary Alluvium and Creeks

Refer to Point 3 in GHD (2015b) in **Appendix E**.

Cumulative Effects of Dewatering and Subsidence on Groundwater Levels

Refer to Point 4 in GHD (2015b) in **Appendix E**.

'Additional Entitlement' WAL 36565 for 120 ML/year from the Sydney North Basin

Refer to Point 5 in GHD (2015b) in **Appendix E**.

No need for a 278 ML/year Groundwater Allocation for the Life of the Mine

Refer to Point 6 in GHD (2015b) in **Appendix E**.

Insufficient Groundwater WAL Licences

Refer to Point 7 in GHD (2015b) in **Appendix E**.

Water and Salt Balance Assessment for Proposed Scenarios 1 and 2

This has now been undertaken and is reported in Section 3 of *Airly Mine Extension Project – Response to Submissions: Hydrology Assessment* which is appended as Attachment 1 of GHD (2015a) in **Appendix A**.

Rainfall Patterns in the Region and Suitability of Ilford Station Data

This has now been undertaken and is reported in Section 2 of *Airly Mine Extension Project – Response to Submissions: Hydrology Assessment* which is appended as Attachment 1 of GHD (2015a) in **Appendix A**.

Effect of the Changes in Parameters on the Stream Flow Characteristics

Since the Airly Creek catchment is ungauged, the AWBM catchment parameters from Boughton and Chiew (2003) were adopted for the Water and Salt Balance Assessment for the Project (GHD, 2014c). Boughton and Chiew (2003) recommend a calibration method for parameters for the AWBM for use on ungauged catchments for bushland/vegetation land types. The closest gauged catchment to the Airly Mine that Boughton and Chiew (2003) provided data for was the Capertee River, which was used in the model. Although this gauge is 25 km away from the mine, it was the only appropriate location available. Flow gauging of Airly Creek in the future could be used to calibrate the AWBM with site-specific parameters.

With regards to the AWBM sensitivity analysis (Appendix B of the Water and Salt Balance Assessment (GHD (2014a)), it is recognised that the Turon River and Capertee River catchments are different,

particularly in size, and that the model underestimated the runoff which was expected. However, the focus of this assessment was more on what effect changing the value of the surface storage capacity parameter would have on catchment runoff – which was less than 1% change in runoff volume with a 10% change in parameter value. This shows that the selection of that particular parameter (generally the only parameter in the AWBM that is adjusted) is robust, with little change in runoff predicted compared to the variation in the parameter value.

The statistical information presented in Figure 6-4 does not allow the water balance to be verified for the 10% and 90% exceedance cases.

The maximum discharge from LDP001 is predicted to occur in year 2030. Therefore it is appropriate to show the 10th and 90th percentile for this year. The maximum predicted discharge for this year has also been reported in the Water and Salt Balance Assessment (GHD, 2014c). The 10th and 90th percentile discharges for other years are not greater than year 2030 and therefore have not been reported.

It is possible to show more results in the Water and Salt Balance Assessment (GHD, 2014a) however, the report would have become overly complex and lengthy, and would have most probably compromised the overall readability of the report. A conscious decision was made to keep the report readable and of a manageable size.

Catchment Hydrology and Hydraulics and Estimates of Changes to Baseflow at Various Locations Downstream of the Mine Site

Baseflow changes have been predicted as part of the hydrogeological model and percentage changes in stream flow (incorporating both runoff and baseflow) have been presented in Table 6-4 of the Surface Water Impact Assessment (GHD, 2014a) and summarised in Section 10.1.3.2 of the EIS.

Consideration of changes in baseflow to assess impact on stream morphology.

Conservative predicted reductions in total annual flow at nominated locations (expressed as a percentage) are shown in Table 6-4 of the Surface Water Impact Assessment ((GHD, 2014a). These reductions in flow include predicted changes to baseflow. Overall, the predicted reductions are relatively small and not expected to impact stream morphology.

Reduced Levels for the Collars of Piezometers and Packer Testing Results

All piezometer and packer testing details have been provided in the 2012 and 2013 AEMR Water Monitoring Reports, provided at the Airly Mine website: (http://www.centennialcoal.com.au/Environment/Airly.aspx).

Suitability of using the Software MODFLOW-2005 for Predicted Impacts

Numerical modelling was undertaken using the MODFLOW-NWT solver with the Upstream Weighting flow package. MODFLOW-NWT is a version of MODFLOW 2005 that provides a different formulation of the groundwater flow equation (Newton formulation) designed to solve models that are non-linear due to unconfined cells or non-linear boundary conditions. In particular, the model overcomes cell drying and rewetting issues encountered with MODFLOW 2005.

There is a low piezometric pressure within the Narrabeen Sandstone, which is attributable to the extensive jointing and extensive seepage areas across the slopes of Mount Airly and Genowlan Mountain. Note that some depressurisation is predicted at the interface between the sandstone and the underlying Permian formations. As described in *Airly Mine Extension Project – Response to Submissions: Fault Zone Hydrogeology Assessment* (GHD (2015a), **Appendix A**), the movement of groundwater to seepage areas via the extensive network of joints within the Narrabeen Sandstone has a larger influence on groundwater flow than vertical flow to underlying strata.

5.3.3. Ecology

Key Issues

- Surface facilities will permanently remove 39.09 ha of vegetation. This area will not be restored for at least 20 years. This represents a substantial, long-term loss of primary habitat for many endangered bird species.

- Impacts of subsidence on vegetation and bird habitat is overlooked in this report and is not addressed adequately enough to provide any confidence that impacts will not be significant.
- There is a serious risk that the population of Pultenea sp. Genowlan Point will become extinct due to cliff collapse.
- Potential for impacts to the Capertee Valley which is an Important Bird Area (IBA no. 24546)
- The actual area of impact upon the Regent Honeyeater is considered likely to exceed the 55.28 hectares of critical habitat.
- Explanation of what has been defined as 'critical habitat' for the Regent Honeyeater by RPS.
- Birdlife Australia dispute the statement in Section 7.1.1 (RPS 2014a) '*The scattered trees are not considered to comprise woodland as their distance and lack of contiguous understorey does not provide sufficient habitat to be considered anything more than dispersed paddock trees*'.
- The loss of hollow bearing trees should be avoided and if unavoidable should be offset.
- Consideration of offsets for loss of habitats.
- Habitat connectivity and fragmentation for threatened bird species.
- Regent Honeyeaters in the Capertee Valley primarily nest in Needle-leaf Mistletoe (*Amyema cambagei*) growing in River Oak (*Casuarina cunninghamii*). This habitat may be impacted upon as a result of the Project.
- The flora list in Appendix H of the EIS misses 13 plants, including *Pultenaea* sp. Genowlan Point, and fails to identify that the Pagoda Daisy *Leucochrysum graminifolium* is ROTAP listed 2R

Response

Proposed Vegetation Clearing

The proposed surface facilities will remove 39.09 ha of vegetation for the establishment of the proposed REA, construction of a Coal Preparation Plant, establishment of a ROM Stockpile, and the construction of a Site Security Gate. The REA will require disturbance of the majority of this area at 37.94 ha. Section 10.2.4.1 of the EIS and Section 7.1.1 of the Flora and Fauna Impact Assessment (RPS, 2014a) note the area required for the proposed REA contains 9.15 ha of disturbed/improved land, 25.49 ha of derived native grassland, most likely derived from MU38 Capertee Grey Gum - Narrow-leaved Stringybark - Scribbly Gum - Callitris - Ironbark Shrubby Open Forest, and 3.27 ha of Box-Gum Woodland Derived Native Grassland (EEC). The Box-Gum Woodland EEC derived native grassland within the REA is low quality (refer Appendix 1, page xxvi of RPS (2014a) and Section 10.2.4.1 of the EIS) and the conservation value was assessed as low, and OEH is in agreement with this assessment (refer Section 5.2.3). No threatened flora species have been recorded within the REA location.

All remaining areas for surface infrastructure cover approximately 1.18 ha of disturbed/improved land. These areas provide marginal habitat for most threatened fauna and flora species.

The proposed area for the REA has been subjected to clearing and the grazing of livestock in the past (since the 1860s and ongoing) which has resulted in overall low groundcover species diversity with few remaining canopy species. Section 7.1.1 of RPS (2014a) states that the scattered trees are not considered to comprise woodland as their distance and lack of contiguous understorey does not provide sufficient habitat to be considered anything more than dispersed paddock trees. The small loss of already fragmented and disturbed grassland vegetation with scattered trees is unlikely to significantly contribute to habitat fragmentation for highly mobile threatened bird species.

While it is recognised that there will be a loss of potential habitat for birds the loss will be temporary. All areas of disturbance will be progressively rehabilitated (as in the case of the REA) or rehabilitated at the end of mine life. A Decommissioning and Rehabilitation Strategy (SLR 2014e) has been prepared for the proposed rehabilitation. All rehabilitation activities have been summarised in Section 10.9.5.2 of the EIS. The REA will be rehabilitated back to pasture land (restricted grazing) and will be

appropriately revegetated with both native and exotic pasture species. The areas for the Coal Preparation Plant and the ROM Stockpile (along with the remainder of the pit top areas will be rehabilitated to open forest commensurate with the vegetation located to the north and the northeast (refer Figure 10.44 of the EIS). Open forest seed mix will include groundcover, mid-storey and over-storey species representative of the target vegetation community.

Impacts of Subsidence on Vegetation and Bird Habitat

Section 7.2.4 of the Flora and Fauna Assessment (RPS, 2014a) has assessed the impact of subsidence on wooded habitats within the proposed mining zones. Their assessment has taken into consideration the outcomes of Subsidence Impact Assessment (Golder Associates, 2014) appended as Appendix D to the EIS), Groundwater Impact Assessment (GHD, 2014b) appended as Appendix E to the EIS, and Surface Water Impact Assessment (GHD, 2014a) appended as Appendix F to the EIS. Given that subsidence is predicted to be negligible to low levels within the majority of the mining area (with the exception of the New Hartley Shale Mine Interaction Zone) the conclusion of RPS (2014a) was that across the majority of the Project Application Area (with the exception of the New Hartley Shale Mine Potential Interaction Zone), no impacts are expected that may alter the composition or extent of any woodlands forests or heaths.

RPS (2014a) has recorded *Prostranthera stricta* (listed as Vulnerable under both EPBC Act and TSC Act) and *Eucalyptus cannonii* (listed as vulnerable under the TSC Act) within the woodland areas of the New Hartley Shale Mine Potential Interaction Zone. Tension cracks and soil destabilisation may cause localised disturbance of the root zone for some plants in this area. Although *Prostranthera stricta* and *Eucalyptus cannonii* individuals may potentially be impacted upon, they are likely to readily recover from disturbance given their natural occurrence within unstable areas such as steep rocky slopes and cliff edges. Notwithstanding, any loss of threatened flora would be highly isolated and would be restricted to localised root zone disturbance, and impacts would not be extensive such that any area would become unviable to support threatened flora species. Therefore, it is unlikely that subsidence related ground movements would affect woodland or forest habitats such that they would become unsuitable for any of the potentially occurring threatened flora and fauna.

Bird habitat impact assessments within the Project Application Area have been assessed in RPS (2014a). The surveys undertaken to detect the avifauna are described in Section 4.7.4 of the RPS (2014a) while the fauna (including birds) habitat surveys are described in Section 4.8. Section 4.7.9 of RPS (2014a) discusses the threatened fauna and migratory species recorded within the Project Application Area while Appendix 2 has included assessments of those EPBC listed migratory species with the potential to be impacted by the Project. The conclusion from these assessments was that due to the high mobility of these migratory species and the low level impacts predicted to potential habitats, the impact upon these migratory species are unlikely to be significant.

Impact of Pultenaea sp. Genowlan Point

The assessment outcomes and conclusions of potential impacts of the Project on *Pultenaea sp. Genowlan Point* species are assessed in the Flora and Fauna Impact Assessment (RPS, 2014a), provided as Appendix H to the EIS. The single population *Pultenaea sp. Genowlan Point* species occurs within the proposed Cliff Line Zone and Zone of First (refer revised EIS Figure 8.2 (included in **Appendix G** of this RTS) and Figure 10.6 in the EIS). The Subsidence Impact Assessment (Golder Associates, 2014) has predicted vertical subsidence of 10 – 65 mm for this zone and no surface cracking is predicted and no hydrological impacts due to the proposed surface disturbance are expected.

Rockfalls from cliff lines resulting in cliff damage is a natural phenomenon, however, it is known to be exacerbated by subsidence effects. For this reason, the Project is proposing, within the Cliff Line Zone and Zone of First Workings (the location of the *Pultenaea sp. Genowlan Point* population), first working only with pillars designed to be long term stable. An analysis of past cliff failures in the NSW coalfields (ACARP, 2002) has shown that cliff damage increases in proportion to the extent of mining and associated subsidence. This analysis also shows that where mining voids are highly sub-critical, as they are proposed to be in this zone, that cliff damage was negligible. Figure 8.7 of the EIS plots the distribution of past cliff damage against mining void ratios. The upper bound curve shows that for the void to width ratio of <0.38 that is proposed in this zone, no cliff damage is predicted. The restriction of mining to first workings only under the cliffs reduces the expected risk of damage to less

than 5% of the cliff face area. This level of damage is expected to manifest itself, at worst, as isolated, individual rockfalls, which in accordance with ACARP (2012), is defined as insignificant. Impacts to *Pultenaea sp. Genowlan Point* species due to rock falls is unlikely.

RPS (2014a) undertook the 7-Part Test / Assessment of Significance (TSC Act) and the Assessment of Significance (EPBC Act) *for Pultenaea sp. Genowlan Point* species. The results of these assessments are discussed in detail in Appendices 1 and 2, respectively, of RPS (2014a). The results of the assessments are as follows:

- the 7-Part Test (TSC Act) revealed the low levels of subsidence effects are not considered substantial enough to impact upon the presence of the species, and that the Project is unlikely to affect the lifecycle of *Pultenaea sp. Genowlan Point* such that a viable local population of the species is likely to be placed at risk of extinction.
- the EPBC Act Assessment of Significance revealed the low level of predicted subsidence is not expected to impact upon the heath areas that provide habitat for *Pultenaea sp. Genowlan Point* such that these habitats would become unsuitable and result in the long-term decrease in the size of the local population of the species.

Any potential impacts to the *Pultenaea sp. Genowlan Point* population has already been mitigated through the selected mining technique of first workings and long term stable pillars (Cliff Line Zone and Zone of First Workings) for the underlying area. Given the Project will not impact on the species no further mitigation measures are necessary.

As noted in Section 10.2.8 of the EIS no State Recovery Plan exists for the species, however, a National Plan with defined objectives and 18 Priority Actions for the recovery of the species exists. A monitoring program for the *Pultenaea sp. Genowlan Point* population is proposed to be prepared and implemented in consultation with OEH (National Parks and Wildlife Service). The monitoring program will take into account the National Plan and the Priority Actions. A Flora and Fauna Monitoring and Management Plan proposed to be prepared for the Project will be consistent with the Mugii Murrum Ban State Conservation Area Plan of Management and will include the Trigger Action Response Plans for all EECs and threatened species with the potential to be impacted, including *Pultenaea sp. Genowlan Point* species.

Potential for Impacts to the Capertee Valley, an Important Bird Area (IBA no. 24546)

The Project is proposing to remove 39.09 ha of vegetation. The impact of removing this area of vegetation removal is considered to be minimal especially in the context of the entire Capertee Valley which is the second largest valley in the world.

As stated in Section 7.1.1 of RPS (2014a) and above, the Project involves the modification of approximately 39.09 ha of land, which comprises 9.15 ha of disturbed/improved land, 25.49 ha of derived native grassland, most likely derived from MU38 Capertee Grey Gum - Narrow-leaved Stringybark - Scribbly Gum - Callitris - Ironbark Shrubby Open Forest and 3.27 ha of Box-Gum Woodland Derived Native Grassland (EEC). All remaining areas for surface facilities cover approximately 1.18 ha of disturbed/improved land.

These areas provide marginal habitat for most threatened fauna and flora species. Furthermore, as stated in Section 7.1.3 of RPS (2014a), within these areas only four hollow-bearing trees are being removed.

Potential for Impacts to The Regent Honeyeater and 'Critical Habitat' for The Regent Honeyeater

This species has been assessed by RPS (2014) as having potential to occur within all remnant woodland and forest. Appendix 2 of (RPS 2014a) states that all remnant eucalypt woodland and forest communities located within the Project Application Area are considered to provide potential foraging and breeding habitat for this species. The potentially more fertile MU 20 woodlands, which contain both winter flowering and summer flowering eucalypts has been identified as critical habitat for this species in RPS (2014a).

Avoidance of Threatened Species Habitat

The statement from Section 7.1.1 (RPS 2014a):

'The scattered trees are not considered to comprise woodland as their distance and lack of contiguous understorey does not provide sufficient habitat to be considered anything more than dispersed paddock trees.'

is taken from the context of the area of habitat to be removed and the habitat which it provides for threatened species. BirdLife Australia is specifically referring to three threatened bird species which may utilise these habitats. However, the point being made by RPS is in the context of habitats for most threatened species. The sentence prior to this states; *'These areas provide marginal habitat for most threatened fauna and flora species'* (RPS 2014). Furthermore, the potential impacts to the three threatened bird species have been assessed (Appendix 1 and Appendix 2 of (RPS 2014a)) and no significant impacts are expected.

Loss of Hollow Bearing Trees and Consideration of Offsets for Loss of Habitats

Section 7.4 of RPS (2014a) discusses the Key Threatening Processes (KTP) under Schedule 3 of the TSC Act. 'Loss of hollow-bearing trees' was identified as one of the five KTPs that has the potential to be relevant to the Project, and under this KTP it is stated:

"REA 2 contains four hollow-bearing trees consisting of seven small (2-10cm) hollows, one medium (11 – 20 cm) hollow and two large (<20 cm) hollows, that may be removed, ultimately contributing to this KTP. The loss of tree hollows will trigger this KTP for several species that have been recorded or have potential to occur within the Project Application Area."

The loss of four hollow bearing trees has been assessed and combined with the other predicted impacts has resulted in a conclusion that the Project is unlikely to have a significant impact to threatened species, EECs or other MNES.

No Biodiversity Offset Strategy has been proposed for the Project based on the impact outcome assessments undertaken in RPS (2014a). OEH is in agreement with this proposal. The reasons for not proposing a Biodiversity Offset Strategy for the Project is discussed in 10.2.7 of the EIS.

Habitat Connectivity and Fragmentation for Threatened Bird Species

The small loss of already fragmented and disturbed grassland vegetation with scattered trees is unlikely to significantly contribute to habitat fragmentation for highly mobile threatened bird species.

Potential Impacts to Primary Nesting Habitat for Regent Honeyeaters

As noted in Section 7.2.5 of RPS (2014a) the areas which are proposed to be subjected to subsidence related impacts such as drawdown are mapped as MU3, MU13, MU21 and MU40. However, the only vegetation type within the Project Application Area which contains *Casuarina cunninghamii* is mapped as MU54. Therefore, the Project is unlikely to impact upon primary nesting habitat for Regent Honeyeaters.

Adequacy of Flora Surveys

Pultenaea sp. Genowlan Point was identified in the report as occurring within the Project Application Area and was subsequently assessed (refer Section 4.6, RPS (2014a)), but it was omitted to be included in the flora species list (Appendix 4 of RPS (2014a)). Similarly, the ROTAP listing for the Pagoda Daisy was an oversight which has been rectified.

The remaining 12 species noted in the Colo Committee submission were not included in RPS (2014a) because they were not encountered in the 79 flora quadrats undertaken within the surveyed area. For this reason the 12 species were not included in the flora list (Appendix 4). It should be noted that the Project Application Area does not include the entire Mugii Murrum-ban SCA, and the surveyed area covers approximately 3,982 ha, with 394 flora species identified. Of these, 130 species had not been recorded in regional mapping and 152 species were not recorded by University of Queensland personnel who undertake monitoring within the Project Application Area as part of the current development consent conditions. To have only 'missed' 12 known species across this vast area, some of which have required positive identification at the Royal Botanic Gardens to differentiate from similar species (e.g *Grevillea arenaria* subsp. *arenaria*), and others that are admittedly rare (ROTAP) or uncommon, is considered to be an entirely acceptable result for a survey of this type and duration.

RPS (2014a) has been revised to include *Pultenaea sp*. Genowlan Point in the flora list in Appendix 4. The revised report will be provided to DoE and OEH under separate cover.

5.3.4. Cultural Historic and Aboriginal Heritage

Key Issues

- The EIS does not adequately protect the significant remains of our industrial heritage in the remains of the Airly shale mining activities.
- The EIS makes the claim that subsidence under historic sites will only be between 0 and 10 mm, however this does not conform with any of the subsidence figures for the mining zones and is clearly an error.
- The EIS inference that the heritage of the oil shale ruins is only of local significance is incorrect as the ruins are already on the state heritage list.
- The location for the Airly Village site does not conform with historical mapping done by Carne.
- We question the thoroughness of the archaeological study, since if failed to identify an art site on the creek that runs up to Airly Turret from the stone cottage. This has charcoal animal drawings, which (while faint) are still visible. See below for charcoal outline of a tortoise there.

Response

Protection of the Airly Shale Oil Mining Complex and Predicted Subsidence Under the Complex

A comprehensive Cultural Heritage Impact Assessment, appended as Appendix J (RPS, 2014b) to the EIS, covered assessments of both the Aboriginal Cultural Heritage and the Historical Cultural Heritage values within the Project Application Area. The latter assessment component included the oil shale mining or Airly Village ruins and involved the identification of the remaining ruins, recording of their locations and condition, and an assessment of the sensitivity of the recorded items to subsidence impacts. The 34 out of the 37 historic heritage sites identified in the Project are located within the proposed Shallow Zone within the Airly Village Site. The remaining three sites are located within Torbane processing site, located near the pit top in a location called Carinya. No sites were identified within the proposed disturbance areas.

No mining method other than first workings is proposed under or adjacent to the Airly Village heritage site within the Shallow Zone. Subsidence values are predicted to be <25.5 mm in this zone with very low tilt and strain values (refer Table 10.26 in the EIS). Section 8.3.7.4 of the EIS explains that some sites where depth of cover is <30 m have mining exclusion zones proposed under them. The Cliff Line Zone and the Zone of First Workings in the vicinity of this area and the New Hartley Shale Mine Interaction Zone has been increased in horizontal size to an effective angle of draw of 26.5° against the panel and pillar workings. This is an industry accepted value where full extraction is taking place. The interaction between the Airly Mine workings and the New Hartley Shale Mine create the same impact as full extraction, hence the increase in the size of the cliff protection zone in this area. This will prevent further damage to the cliffs above the Airly Village ruin site and thus provide protection of the heritage items at site and manage risk to the public. As noted in Section 10.3.3.3 of the EIS RPS (2014b) concluded that the consequences of the Project on cultural historic heritage are negligible.

The Statement of Commitments provided in Chapter 8.0 of the EIS and reproduced in Section 6 of this document commit to ensuring the minimisation of the recorded historic heritage sites. This will occur through the development and implementation of a Cultural Heritage Management Plan that will include appropriate management controls to provide adequate protection to the cultural heritage values, of both the historic sites and the Aboriginal sites. The Cultural Heritage Management Plan will be consistent with the Mugii Murum-ban State Conservation Area Plan of Management relating to these ruins.

Section 10.3.3 of the EIS notes that if, during the course of development works, suspected historic cultural heritage material is uncovered, work will cease in that area immediately. The Heritage Branch, Office of Environment & Heritage will be notified and works only recommence when an approved management strategy has been developed.

Local Significance of Airly Shale Mining Complex

The heritage list referred to in the submissions received for the Project is the National Trust Register which does not provide statutory protection for listed sites on this register. The heritage registers that

do provide statutory protection are referenced in RPS (2014b). Section 10.0 of RPS (2014b) provides a list of the historic heritage registers searched. Section 12.1 of RPS (2014b) provides assessment against the NSW State heritage significance criteria which encompass the four values in the Australia *ICOMOS Burra Charter*. Section 12.4 of RPS (2014b) provides a summary of the assessment against the NSW State heritage significance criteria as follows. The Airly shale mining complex meets a number of the NSW heritage significance criteria. The site is considered to embody historic, aesthetic/technical, social and rarity values as well as being a good example of type with high research/archaeological potential. The level of heritage significance is considered to be local based on current research and investigations. The assessment was undertaken by appropriately qualified and independent archaeologists from RPS with many years of experience in the areas of Aboriginal and historic heritage assessments.

Airly Village Site and Carne's Historical Mapping

The location of Airly Village from Carne's map coincides with the officially surveyed location of the village. As noted in Section 11.2.1 of the Cultural Heritage Impact Assessment (RPS, 2014b) relatively few buildings were constructed within the planned village area but rather, dwellings were constructed on levelled terrace areas and most commonly, in close proximity to the working areas. As a result, only four sites were identified within the bounds of the officially surveyed Airly Village. Most remains of building were identified close to the working areas of the mines outside the surveyed Airly Village boundary.

Charcoal Animal Drawings

The charcoal drawings referred to are not listed as an Aboriginal site as they were not considered by the five Aboriginal Registered Parties, who took part in the filed surveys to assess Aboriginal sites, to be of indigenous origin.

5.3.5. Noise

Key Issues

- Recreation sites at Airly Gap camp ground and the Nissen Hut on Genowlan Mountain are not indicated in any of the modelling;
- There are no noise contour maps presented for temperature inversions;
- Noise indicators show that residence 2 will experience levels of 35 – 40 dBA with REA 1.

Response

Recreation Sites at Airly Gap Campground

Recreation sites within the Project Application Area have been included in the Noise and Vibration Noise and Assessment (SLR, 2014c). The Airly Campground is identified as Receptor 17 while the Nissen Hut identified as Receptor 18 (refer Figure 2.6 and Table 2.4 in the EIS) have been assessed as passive recreation areas in accordance with the Industrial Noise Policy (2000). All noise contours presented in the EIS (Figures 10.11 to Figure 10.13) and Figures 6 to 8 in SLR (2014c) include these receptors. Table 10.35 of the EIS shows that the predicted noise levels for the modelled operations at these recreational receptors are <35 dBA, and within the adopted project specific noise criterion of 50 dB. Similarly, Table 10.36 of the EIS shows that the predicted sleep disturbance noise levels at these receptors are below the sleep disturbance noise goal $L_{A1(1\ minute)}$ of 45 dB.

Noise Contour Maps Under Temperature Inversion Conditions

The noise contour maps presented in Figures 10.11 to 10.13 in the EIS and Figures 6 to 8 in SLR (2014c) show contours that represent the worst case scenario of all mine plant operating under prevailing winds and night time temperature inversion conditions. The predicted noise levels for all receptors assessed are presented in Table 10.35 of the EIS. Results preseted in Table 10.35 (and the associated noise contours) show that that noise levels from the modelled operational scenarios are predicted to be below the project specific noise criteria at all privately owned residential assessment locations under all considered meteorological conditions.

Noise Impacts at Receptor R2

The nearest receptor R2 is predicted to be on the limit of the 35 dBA contour for the Project (refer Figure 10.13 of the EIS). However, the more accurate quantification of the predicted noise level at receptor R2 is presented in Table 10.35 of the EIS; the table shows the predicted noise level at R2 will be <35 dB under calm conditions and 35 dB under temperature inversion / prevailing wind conditions. Given that the modelled case represents an unlikely scenario of all plant running at the same time, it is unlikely that the noise levels will exceed the Project Specific Noise Criterion of 35 dB at any residential receptor. Centennial Airly has committed to the preparation of a Noise Management Plan (refer Section 11.0 Statement of Commitments of the EIS, reproduced as Revised Statement of Commitments in Section 6.0 of this document) that includes a monitoring program and the maintenance of noise levels at the nearest sensitive receptors of <35 dBA.

5.3.6. Air Quality and Greenhouse Gases

Key Issues

- Airly Mine will make a considerable addition to global warming and climate change.
- The coal stockpiles at Airly Mine need to be totally covered to eradicate dust which would contaminate the air and waterways;

Response

Airly Mine's Contribution to Global Warming and Climate Change

Section 10.7.4 of the EIS notes the Project's contribution to Australian greenhouse gas (GHG) emissions would be relatively small, being 10,629.2 tonnes CO_2-e/annum. Estimated annual Scope 1 emissions will represent approximately 0.007% of NSW GHG emissions and 0.002% of Australia's total GHG emissions.

It is widely accepted that increased GHG emissions exert a warming influence on climate. Atmospheric temperature increases can result in: changes in ocean levels (due to melting of glaciers and polar ice caps) and water temperatures; greater humidity; and changes in weather patterns which lead to effects such as more droughts in some areas and more flooding in others. The Project will directly and indirectly generate GHG emissions, which will contribute to these associated global environmental effects. However, the increase in GHG emissions resulting from the Project will not substantially increase the total Australian emissions. In addition, due to the uncertainties and complexities of the climate system, quantification of the likely environmental effects associated with Project incremental greenhouse gases cannot be made.

Covering Coal Stockpiles

It is not practical for coal stockpiles to be covered and covering of coal stockpiles is not standard practice. Water sprays are used to keep coal moist and reduce dust emissions from the stockpiles at the site. The Air Quality Impact Assessment (SLR, 2014d) has assessed the product stockpile as a dust emission source (materials handling and wind erosion, refer Table 9 of (SLR 2014d)) as part of the Air Quality Impact Assessment of the Project for Total Suspended Particulate, PM_{10} and $PM_{2.5}$ concentrations. Tables 10.47 to 10.53 in the EIS, providing PM_{10} and $PM_{2.5}$ concentrations, show that the Project is predicted to comply with all the relevant air quality criteria (refer Table 10.42 of the EIS) at all receptors assessed and with regard to potential cumulative impacts.

5.3.7. Soils, Land Capability and Agricultural Suitability

Key Issues

- The EIS does not consider the significance of the agriculture industries in the Capertee Valley.
- The use of the production bore to extract groundwater at Airly Mine will significantly impact on the water resources relied upon for agricultural production in the Capertee Valley.

Response

Significance of the Agriculture Industries in the Capertee Valley

The vast majority of the Project Application Area is Class 8 Rural Land Capability, covering a total 2,805 ha or (70.5 %) of the Project Application Area. Note that 78% or 3090 ha of the Project Application Area is within the Mugii Murrum-ban State Conservation Area. Class 8 Rural Land Capability land is unsuitable for agricultural production. There are some areas of land suitable for grazing (Rural Land Capability classes 4 and 5) covering a combined total of 532 ha or 13.3% of the Project Application Area. There are approximately 480 ha of the Project Application Area, primarily owned by Centennial Airly, currently available for cattle grazing.

The predominant soils within the Project Application Area have extremely low agricultural capability and the Project will have negligible to minimal impacts on soil, land and agricultural resources.

The Groundwater Impact Assessment (GHD, 2014b) (refer Section 6.1.1) found that there will be less than Level 1 impact as defined by the Aquifer Interference Policy (NOW, 2012). The Agricultural and Land Use Impact Assessment undertaken for the Project (SLR, 2014) appended as Appendix Q to the EIS, has assessed the Project's groundwater impacts on agriculture (refer Section 4.4.2 of SLR (2014)). The conclusion reached was that, given the potential groundwater impacts for all groundwater sources are less than the Level 1 impact considerations, the Project is not anticipated to have any short or long term detrimental effects on groundwater which is relied upon by agriculture. It should be emphasized that the Project Application Area does not contain Biophysical Strategic Agricultural Land (BSAL) (refer Sections 2.8 and 4.1.2 of SLR (2014)). As such the Project will not impact on BSAL.

No agricultural land in the Capertee Valley will be permanently removed from use for agriculture, either due to mining or ancillary infrastructure. Therefore there will be no loss of agricultural land available for production. Water resources are not being significantly impacted so the productivity of agricultural land is not predicted to fall.

Impact of Drawing Water from the Production Bore

The production bore at Airly Mine is in excess of three kilometres from the nearest registered bore. Bores downdip of the Airly Mine production bore are in excess six kilometres away. As discussed in Section 6.1.2 of GHD (2014b), drawdown is not likely at such distances given the limited amount of water predicted to be taken from the bore. The production bore is located in the Shoalhaven strata, which is naturally high in salt. The preference for water usage will be to source surface run-off captured within dams or mine water inflows. Use of the production bore would only be as a last preference during dry periods and entirely used in the mining and transport process. Therefore water from the production bore will not be discharged undiluted as its use would be at times when discharge would not occur.

Section 2.2.7 of GHD (2015a) has concluded the Project is unlikely to result in impacts to regional groundwater resources and the downstream groundwater users.

5.3.8. Decommissioning and Rehabilitation

Key Issue

- The sizing analysis of the 30 metre high reject emplacement area is hard to follow, although the volumes are provided. No clear representation of the impacts of the proposed emplacement area on views from Glen Davis Road is provided or in Appendix P. Figure 4.5 and 4.6 on pages 133 and 134 respectively do not give any impression of how intrusive this REA location is when viewed from the Glen Davis Road.

Response

Figures 4.5 and 4.6 in the EIS provide true 3D images of the proposed REA on completion. If the images do not provide any impression of how intrusive the REA will be when viewed from Glen David Road then this is because the REA is not meant to an intrusive feature on the landscape. As noted in Section 4.8.3 of the EIS the REA on the western side has been designed to conform to the natural topography of the area and hence will be commensurate with the existing landscape.

The Visual Impact Assessment (GBD, 2014) notes the mine site is visible for eight seconds whilst driving into the Capertee Valley on the Glen Davis Road. It is otherwise not clearly visible from the Glen Davis Road. Section 10.10.6 of the EIS includes the following measures that will be implemented in relation to the proposed REA.

- Where possible, establishment of tree, shrub and ground cover consistent with native woodland and grasslands. Tree planting at the basal area of the REA will be undertaken.
- Progressive and ongoing restoration and rehabilitation of the REA will minimise visual contrast between the emplaced reject materials and surrounding landcover.

The Statement of Commitments have been updated (refer Section 6.0) to include the above noted mitigation measures.

5.3.9. Visual Amenity

Key Issues

- The impact of Airly Mine ruins the view of the Capertee Valley from Pearson's Lookout and the Glen Davis Road.
- The visual impact of the proposed reject emplacement area when viewed from the Glen Davis Road will be intrusive.

Response

Centennial Airly can confirm that the surface facilities at the Airly Mine pit top are not visible from the tourist location known as Pearsons Look-out. The Visual Impact Assessment (GBD, 2014) undertaken for the Project noted that the views and landscape features, comprising the surface features of Mount Airly and Mount Genowlan including cliff lines and rock formations (eg. pagodas), are available to recreational users through the Mugii Murrum-ban State Conservation Area and surrounding National Parks. The Airly Mine pit top and the surrounding areas contain moderate to dense tree cover, which in combination with surrounding mountains and ridgelines provide an enclosed visual character. Given the extent and combination of existing tree cover and undulating landform within and surrounding the Airly Mine, the visual absorption capability is likely to be high which then reduces the potential magnitude of visual significance.

GBD (2014) also notes the mine site is visible for eight seconds whilst driving into the Capertee Valley on the Glen Davis Road. It is otherwise not clearly visible from the Glen Davis Road.

Airly has already committed to tree screening of the product stockpile as part of current Development Consent (DA 162/91) MOD 3 conditions.

Progressive rehabilitation of disturbed areas is undertaken within a reasonable timeframe at the pit top when infrastructure no longer required is decommissioned. The Decommissioning and Rehabilitation Strategy for the Project (SLR, 2014c), discussed in Section 10.9 of the EIS provides:

- rehabilitation objectives, methodology, monitoring programs, performance standards and proposed completion criteria
- nominated final land use and a conceptual final landform design.

The various landscape secondary domains proposed across the Project Application Area have been developed in consideration of the proposed land zonings in the Draft Lithgow Local Environment Plan 2013.

Staged and final rehabilitation will ensure that there will be little change to the landform of the Project Application Area during and after mining compared to current conditions. Existing and proposed components of the Project will be decommissioned and rehabilitated once they have performed their functions, to ensure minimal disturbance areas within the Project Application Area. This will be particularly important in the case of the REA which will undergo progressive rehabilitation. Rehabilitation of the pit top area will mitigate the largest area of surface disturbance.

5.3.10. Social and Economic

Key Issues

- The EIS does not recognise the significant tourism industry in the Capertee Valley;
- The mine will have a negative impact on the quality of life of residents of the Capertee Valley.
- The Economic Impact Assessment (EIA) is not based on standard economic assessment techniques and does not comply with NSW Treasury or Federal Government guidelines.
- The attempt to make the impact assessment comprehensible to stakeholders is "lay" economics rather than standard approaches supported by government departments. The general public are not the main audience for this report.
- The EIA does not follow NSW Government Guidelines for economic assessment of major projects.
- There is no discussion of the financial case underlying the economic assessment.
- Employment benefits such as wages are not normally assessed as a benefit to the community in economic assessments. Wages are normally assessed as a cost to the project.
- Due to the current low unemployment rate (stated at 5.8 percent for NSW), it is inappropriate to assume that employees cannot find alternative employment.
- In relation to the economic viability of the Airly Mine Extension Project, the Aigis Group did not disclose the possibility of the recent suspension of operations at Angus Place as an outcome in its EIA for that project.

Response

Tourism Industry in the Capertee Valley

The tourism industry will not be impacted because no areas outside the Project Application Area currently used for that purpose will be removed from use. Restrictions of access to the Mugii Murrum-ban SCA are managed by National Parks and Wildlife Service (OEH). Proposed Airly mining operations within the Mugii Murrum-ban SCA SCA are designed so that no areas need be restricted for public access while mining takes place. The mining activities undertaken to date have been alongside the growing tourist industry within the area that has been quoted by the respondents. This tourism industry draws in part on the historic ties to coal mining and historical oil shale mining at Airly Mine and other locations in the Capertee Valley as an attraction to visitors. Tourism also draws on biodiversity and geodiversity, bird watching, photography, bushwalking, four wheel driving etc. within the Mugii Murrum-ban State Conservation Area.

It is noted Centennial Coal has been an active supporter of Lithgow City Council's *Economic Development Strategy* 2010 – 2014, which highlights the importance of tourism to the Lithgow Government Area. A representative from Centennial Coal (GM Western Operations) is an active member of the Lithgow Economic Development Committee, confirming Centennial Coal's commitment to co-exist with its regional community as well as underpin the economic opportunity the mine represents.

Negative Impact on The Quality of Life of Residents of the Capertee Valley

A review of the wide range of technical assessments undertaken in the preparation of the EIS it was found (James Marshall & Co, 2014) that Airly Mine's operation does not change the land use within the Project Application Area nor does it adversely impact on the social amenity to the surrounding community and other land uses or activities (ie tourism or agriculture).

The majority of the Project Application Area is Crown Land and classified as State Conservation Area. This land is managed by National Parks and Wildlife Service. Centennial Airly owns a substantial buffer zone (approximately 2,000 hectares) around the pit top in order to provide a substantial buffer to private landholders and the surrounding community from the mine's operations. Centennial Airly also own a parcel of land on the southern boundary which allows access to Mount Airly and Genowlan Mountain. There are private land holdings bordering the Project Application Area along with the

Capertee National Park and Garden of Stones National Park boundaries however these landholding are located away from the pit top facilities.

The Social Impact Assessment (James Marshall & Co, 2014) found from its review of all specialist consultants reports that the operational impacts of the mine remain largely within the Project Application Area. As there is no change to the existing land use or social amenity land values and quality of life of people in the area should not be affected by the continued operation of the mine.

The Economic Impact Assessment (EIA) is not based on standard economic assessment techniques and does not comply with NSW Treasury or Federal Government guidelines.

The attempt to make the impact assessment comprehensible to stakeholders is "lay" economics rather than standard approaches supported by government departments. The general public are not the main audience for this report.

The EIA does not follow NSW Government Guidelines for economic assessment of major projects.

There is no discussion of the financial case underlying the economic assessment.

Employment benefits such as wages are not normally assessed as a benefit to the community in economic assessments. Wages are normally assessed as a cost to the project.

Due to the current low unemployment rate (stated at 5.8 percent for NSW), it is inappropriate to assume that employees cannot find alternative employment.

In relation to the economic viability of the Airly Mine Extension Project, the Aigis Group did not disclose the possibility of the recent suspension of operations at Angus Place as an outcome in its EIA for that project.

Refer to Aigis (2014) appended as **Appendix F** of this RTS.

5.3.11. General Issues

Key Issues

- The precautionary principle should be applied to ensure the protection of the area and to minimise possible disturbance to the Mugii Murum-ban State Conservation Area;
- The Grotto is not just another gorge, it is a slot canyon, a significant landform on the national and international stage.
- Supply of technical information in the form of maps and scale drawings showing the existing and proposed mine tunnels and shafts.
- Centennial Airly Pty Ltd has provided insufficient information to allow full understanding and assessment of the implications of the proposed works.
- It is against International Best Practice Guidelines to mine within, or adjacent to, a World Heritage Area.

Response

The Precautionary Principle

Centennial Airly is committed to the principles of Environmentally Sustainable Development, and understands that social, economic and environmental objectives are interdependent. The precautionary principle reinforces the need to take risk and uncertainty into account, particularly in relation to threats of irreversible environmental damage. In the application of the precautionary principle at Airly Mine, decisions have been guided by careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and by an assessment of the risk-weighted consequences of various mine design options.

The main method by which irreversible damage to the environment, including the Mugii Murrum-ban State Conservation Area, will be achieved is through conservative mine design based on well-established geotechnical principles. The mine design is also flexible to allow mining layouts and

design to be adapted to changing surface topography, geological structure or respond if outcomes vary adversely from predicted values.

The Grotto as a Significant Landform

Whilst the significance and occurrence of slot canyons may be debated, the EIS has recognised the presence of these landforms in the Project Application Area and has proposed mining methods that provide for very low levels of subsidence, tilts and strains in order to prevent fracturing or damage to these features. The Grotto in particular is within an area designated as Cliff Line Zone and Zone of First Workings where only first workings with large pillars would be formed, providing a very high level of protection to this feature and landforms around it.

Supply of Technical Information in the Form of Maps Showing Existing and Proposed Workings

The existing Airly Mine workings, the Torbane Colliery Lithgow Seam old workings and the New Hartley Shale Mine old workings are shown in Figure 8.1 of the EIS. The proposed workings or a mine plan for the Project will not be available. Approval is being sought for the mine design criteria with geotechnically-engineered vertical subsidence, tilt and strain limits for the five mining zones proposed (refer revised EIS Figure 8.2 (included in **Appendix G** of this RTS), discussed in Section 8.3.7 of the EIS and in the Subsidence Impact Assessment (Golder Associated, 2014).

Insufficient Information in the Technical Assessments and the EIS

The EIS document is a summary of the specialist studies undertaken to assess the impacts of the Project. A wide range of technical assessments have been undertaken in accordance with the Director General's Requirements and government agency environmental requirements (NSW State requirements), the Commonwealth Department of the Environment requirements, and the requirements of the Independent Expert Scientific Committee (IESC, 2014b).

Table 1.3 of the EIS provides the Director General's Requirements and notes where each requirement has been addressed in the EIS. Table 1.4 of the EIS provides the Department of the Environment's requirements and section references where each requirement has been addressed. Table 1.5 of the EIS provides the IESC checklist as relevant to the Project. Similarly, technical assessment reports provide tables of the Director General's Requirements, and Department of the Environment's requirements (if relevant) and IESC checklist (if relevant), and the tables provide references of sections where the requirements have been addressed in the report.

Mining Within or Adjacent to the World Heritage Area

Mining is not proposed to be immediately adjacent to the GBMWHA as the mining is limited to a minimum depth of 20 m and this point is reached over 200 m from the boundary with the GBMWHA. No subsidence or water related impacts are predicted for the GBMWHA. No mining is proposed within the GBMWHA.

5.4. Response to Submissions from Members of the Community

5.4.1. Mine Design and Subsidence

Key Issues

- Subsidence impacts seen elsewhere will be repeated in the Capertee Valley
- 70% and up to full extraction of the coal is planned to be extracted. The amount of extraction in each area is not clear.
- Centennial must keep to its commitment to only remove 50% of the coal in the lease area.
- Clarence is not a suitable case to base the Airly design on due to much lower levels of subsidence there.
- Subsidence should be limited to 125 mm over the entire project area.
- 500 mm on subsidence in the area of the Airly Village will damage the heritage of the area.

- There is no extraction plan available as part of the EIS.
- 5% damage to the majority of cliffs and 10% to some cliffs is unacceptable.
- There is no scrutiny of what is happening underground.

Response

Applicability of Clarence Colliery Mine Design to Airly Mine

Airly Mine has recognised that impacts due to mining that were acceptable in the past are now no longer acceptable to society as a whole. The proposed mine design is specifically intended to avoid significant damage to cliffs and rock features as discussed in Section 8 of the EIS.

Clarence Colliery was used as the basis for the subsidence limits for the mine design as these have proven successful in similar topography for over 15 years. Subsidence levels recorded at Clarence Colliery using partial extraction have ranged up to 103 mm in some areas around significant cliffs, yet without impact. Clarence Colliery has proven, over a 13 year period, that controlling and minimising vertical subsidence to approximately 100 mm has resulted in no impact on surface features such as cliff lines and/or pagodas, as evidenced by their ongoing monitoring (EPBC 2012/6446 Referral) including surface subsidence, groundwater monitoring and underground pillar monitoring. So the decision to adopt the proposed mine design at Airly Mine has been informed by the objectively verifiable success of similar partial extraction methods and subsidence limits employed at Clarence Colliery with minimal impact on the environment.

Coal Extraction Rates

Centennial Airly is not back-tracking on its previous agreement with the Special Interest Groups and the members of the community, albeit this agreement was through verbal communication, that it will not extract more than approximately 50% of coal from within its lease area. Extraction ratios for the various mining methods are noted in Section 8.3.7 of the EIS. The approximate extraction rates of proposed mining zones and their respective areas of each mining zone are provided below.

- Panel and Pillar Mining Zone: Up to 67% (less if main headings are included) extraction rate within an area of 789 ha (includes the New Hartley Shale Mine Interaction Zone)
- Partial Pillar Extraction Zone: Approximately 51% extraction rate within an area of 258 ha
- Shallow Zone comprising First Workings with Pillar Splitting and Quartering: Approximately 51% extraction rate within an area of 258 ha
- Cliff Line Zone and Zone of First Workings: Approximately 31% extraction rate within an area of 528 ha.

The above extraction rates take no account of main headings pillars which have a lower extraction ratio, areas left unmined at the ends of production panels, areas not feasible to recover. The actual resource recovery will be below these values. Using the extraction rates and the total mining area of 2176 ha the average extraction ratio across the mining area is approximately 52%. It is emphasized this figure is conservative given the above-mentioned unrealistically high extraction ratios applied for each mining zone.

Subsidence Limits

Subsidence will be limited to 125 mm over the entire Project Application Area with the exception of the New Hartley Shale Mine Interaction Zone, as explained in Section 8.3.7.5 of the EIS. This area is already significantly impacted from previous mining and whilst some additional fracturing is likely, impacts will not be more significant than already present. None of the flora and fauna species identified in the zone are likely to be impacted and no Endangered Ecological Communities exist within the area.

No mining other than first workings is proposed under or adjacent to the Airly Village heritage site. Subsidence values are predicted to be <25.5 mm with very low tilt and strain predictions. Section 8.3.7.4 of the EIS explains that sites where depth of cover is <30 m will have mining exclusion zones proposed under them. The Cliff Line Zone and Zone of First Workings has been increased in horizontal size to an effective angle of draw of 26.5° against the panel and pillar workings. This is an

industry accepted value where full extraction is taking place. The interaction between the Airly Mine workings and the New Hartley Shale Mine create the same impact as full extraction, hence the increase in the size of the cliff protection zone in the vicinity of the New Hartley Shale Mine Interaction Zone (refer revised EIS Figure 8.9 (included in Appendix G of this RTS)). This will prevent further damage to the cliffs above the Airly Village site and thus provide protection of the site and manage risk to the public.

Section 8.3.7.1 of the EIS states that the first workings proposed will limit subsidence damage to cliffs around the mountain complex to negligible levels. The ACARP (2002) methodology used to assess impacts to the cliffs determined that any impact would be limited, at worst, to isolated rock falls on very limited areas of the cliffs. These would not be noticeable above the natural frequency of such falls. In most cases no impact would be noted. This represents the lowest possible rating on the ACARP (2002) above the “no mining” case.

Where impacts were predicted on the cliffs identified in the Panel and Pillar Zone, again the impact is limited to isolated falls of rock on limited areas of the cliffs in question.

Absence of an Extraction Plan in the EIS

The mine operations are managed through the implementation of an Extraction Plan once consent is granted. The Extraction Plan sets out the detail of mining activities to be undertaken. Operations are then monitored by DRE for compliance with Mine Safety and Environmental legislation and by DPE for compliance with consent conditions. This involves site inspections and audits by Government Inspectors and Officials and regular reporting of operational activities by Airly Mine to the Government. Results of operational reporting are made available to the public through the various statutory authorities’ websites, the Centennial Coal website and the Airly Mine’s Community Consultative Community.

Airly has committed to an independent review of the geotechnical and subsidence aspects of the EIS. This review will be undertaken prior to the grant of development consent for the Project and the subsequent preparation of the Extraction Plan and t

5.4.2. Water Resources

Key Issues

- Surface water flows may be reduced due to the Project to the extent that downstream users suffer loss significant enough to impact business or domestic requirements.
- Surface water quality may be negatively impacted due to the Project to the extent that downstream users suffer loss significant enough to impact business or domestic requirements.
- The Gardens of Stone National Park and Greater Blue Mountains World Heritage Area may be impacted by adverse changes in water quality and quantity in Airly Creek.
- Groundwater flows may be reduced due to the Project to the extent that downstream users suffer a loss significant enough to impact business or domestic requirements.
- Ground water quality may be negatively impacted due to the Project to the extent that downstream users suffer a loss significant enough to impact business or domestic requirements.
- Water resources are not being equitably shared and allocations to the mine are not sustainable or not required.
- Any water monitoring should be done by an independent body appointed by NOW.
- The village spring is a significant habitat and water source that should not be lost.
- The Grotto and other springs on the mountain should be protected.
- There is no clear plan for water resources if mining does cause significant impacts and no compensation for losses.

- Drawing water from the mine bore will impact other water users in terms of loss of ground water and poor quality discharges from the site.
- No water treatment is proposed for discharges into Airly Creek.
- Baseline studies are not adequate for the following reasons:
    - Drought has not been considered, only average conditions have been considered
    - Lack of data or time
    - Lack of understanding of aquifers
    - Rainfall data uses Ilford station and not local data
    - Airly Creek is currently polluted by the mine and non-polluted waters have not been used as background for SSTV determination
    - Inadequate assessment of impacts to the Greater Blue Mountains World Heritage Area.
- EPL limits should comply with ANZECC guidelines.

Response

Surface Water Flows and Water Quality Impacts

Impacts on surface water flows are assessed in Section 10.1.3.2 of the EIS and Section 6.4 of the surface water impact assessment (GHD, 2014a). The assessment concludes that there is a maximum loss of flow due to the Project at the confluence of Gap and Genowlan Creek of 5%. This creek system is ephemeral at this location and so such a loss is considered minimal. All losses downstream of this point are less due to the influence of other watercourses joining the Genowlan Creek waterway and are therefore not significant to downstream water users. All other creek systems in the Project Application Area are not predicted to have any negative flow impact.

Section 10.1.3.2 of the EIS and Section 6 of GHD (2014a) conclude that surface water quality in Airly Creek will not be adversely impacted by discharges from the Airly Mine. Background levels of salts and other metals that naturally occur in Airly Creek are greater than those predicted to be discharged from the mine site. Further recent monitoring work undertaken by GHD and presented in GHD (2015a) has demonstrated that the areas of Airly Creek that are upstream of the mine site are consistent in water quality with those monitored as part of the EIS preparation.

Discharge is only predicted during times of high rainfall where any water discharged would be diluted by the run off in the Airly Creek catchment. No significant adverse impact on downstream water quality in Airly Creek is predicted.

Due to the very low levels of subsidence resulting from the partial extraction being proposed and minimal reduction water flows in the creek system within the Project Application Area, there is no impact on surface water quality predicted in creeks other than Airly Creek.

Section 10.1.6 of the EIS summarises the impacts of the Project on the Greater Blue Mountains World Heritage Area (GBMWHA) based on assessments undertaken in Section 6.4 of the Surface Water Impact Assessment (GHD, 2014a). GHD (2015a) (refer Sections 2.1.3 and Section 2.2.9) more recently have carried out specific assessments of the potential impacts of the Project on the GBMWHA to address advice and responses provided in IESC (2014a). GHD (2015a) has concluded that “Given the relatively small increase in the volume and frequency of flows within Airly Creek due to the Project, it is not expected that there will be any adverse impacts to the receiving environment within the GBMWHA downstream of Airly Mine”. Any impacts further downstream will be further reduced due to the influence of other water courses entering the Airly Creek system.

Section 10.1.2.2 of the EIS and Sections 3, 5 and 6 of the groundwater impact assessment (GHD, 2014b) conclude there is very little interconnectivity between the Triassic and upper Permian aquifer systems on the Airly / Genowlan Mountain complex and the lower aquifer systems located in the lower Shoalhaven and Devonian strata utilised by water users in the Capertee Valley. Further work carried out by GHD in response to question 9 in IESC (2014a) regarding the influence of fault zones on vertical interconnectivity of aquifer systems demonstrated that the high degree of fracturing in the Triassic and Permian strata caused groundwater on the mountain complex to find its way to the

outside of the mountain and internal gullies within the mountain. Thus there was little opportunity for water to migrate downwards into the lower aquifer systems. Thus any losses in groundwater due to the Project will be localised to the Project Application Area and not have any influence on the groundwater users outside the Project Application Area. Any loss of ground water due to the Project will express itself as a reduction in base flow in Gap and Genowlan Creek.

Section 10.1.3.3 of the EIS and Section 6.1.1 of GHD (2014b) discuss the potential impacts of the Project on groundwater quality. The conclusion from this assessment was that there is no expected impact on groundwater quality.

Water Licensing Requirements

The Water Licensing requirements of the Project are discussed in Section 10.4.1.5 of the Project. Water resource sharing and allocation is determined by the NSW Office of Water in accordance with the *Water Management Act 2000*. Airly Mine holds two Water Access Licences to extract groundwater from the Sydney Basin North up 278 ML/year. The second of the two licences was granted to Airly Mine through a public tender process.

Centennial Airly has committed in Section 11.0 of the EIS (Statement of Commitments), and reproduced in Section 6.0 of the RTS, to monitoring of adjacent water bores on private properties. This would be done only with agreement of land owners and would be conducted by an independent testing organisation.

Impacts on Airly Village Spring and The Grotto

As discussed in Section 8.3.7.5 of the EIS, the Village Spring is a man-made feature resulting from ingress of water to the New Hartley Shale Mine workings from subsidence related fractures in the overburden. As a result of depressurisation of the Permian strata within the New Hartley Shale Mine Potential Interaction Zone, there is potential for the flow at Village Spring to reduce or cease (GHD 2014b). Impacts on flow from the Village Spring are harder to predict and therefore a worst case scenario that the spring may cease is adopted. It should be noted that the Village Spring is a mining related landscape feature and not a natural spring. According to Section 7.2.2 of RPS (2014a) the loss of water to the Airly Village Spring would constitute a negligible loss of water resources for local fauna.

As discussed in Section 8.3.7.1 of the EIS The Grotto (along with The Oasis) is located in the proposed Cliff Line Zone and Zone of First Workings within the mining area where only first workings with large pillars will be carried out. This proposed mining method in the area has been designed to protect The Grotto (and The Oasis). This zone is predicted to have low levels of subsidence and will prevent surface impacts to the landform. Section 10.1.3.3 of the EIS notes that no groundwater drawdown is predicted under The Grotto. No surface cracking is predicted due to the low levels of subsidence predicted. As such no impacts are predicted.

Groundwater Monitoring Framework

As stated in Section 4.1 of GHD (2014b), it is considered that the spatial coverage of groundwater monitoring bores is adequate for the purpose of predicting and monitoring groundwater impacts associated with the Project. However, Airly Mine has committed to an extensive groundwater monitoring array on both Mount Airly and Genowlan Mountain. This array was commenced in 2010 and will be completed in 2015. Airly Mine has also committed to monitoring of adjacent bores on private lands with the agreement of the land owners. Mining methods are flexible and can be adapted to prevent further impact should any be detected outside predicted values before those impacts become significant enough to impact users outside the Project Application Area.

Impacts of Drawing Water from the Production Bore

The production bore at Airly Mine is in excess of three kilometres from the nearest registered bore. Bores downdip of the Airly Mine production bore are in excess six kilometres away. As discussed in Section 6.1.2 of GHD (2014b), drawdown is not likely at such distances given the limited amount of water predicted to be taken from the bore. The production bore is located in the Shoalhaven strata, which is naturally high in salt. The preference for water usage will be to source surface run-off captured within dams or mine water inflows. Use of the production bore would only be as a last preference during dry periods and entirely used in the mining and transport process. Therefore water

from the production bore will not be discharged undiluted as its use would be at times when discharge would not occur.

Section 2.2.7 of GHD (2015a) has concluded the Project is unlikely to result in impacts to regional groundwater resources and the downstream groundwater users.

Treatment of Mine Discharge Water

Airly Creek is naturally high in salt concentration and dissolved metal concentrations due to it rising in lands where the Shoalhaven strata sequence outcrops. This sequence is marine based and therefore naturally confers a high level of salts to the waters of this ephemeral system. GHD (2014a) recommends a site specific trigger value for salts of 2998 µS/cm. This high level recognises the naturally high salt levels in Airly Creek.

Any discharges of water from the Airly pit top would be the surface run-off (with much lower salinity than currently in Airly Creek) and this will have the impact of diluting the salinity in Airly Creek and not polluting it. No mine water is currently pumped from the underground to the surface. While Airly Mine's Environment Protection Licence (EPL 12374) allows discharge of water from the site from three licensed discharge points no regular discharges from the mine site occur due to operations. Airly Mine has had one discharge event in 2013 and two in 2014 resulting in an exceedance of the total suspended solids concentration limit specified on EPL 12374. All discharges have been from the Licenced Discharge Point 3 associated with the drainage around the train loader area. All events have been associated with high intensity rainfall events that have exceeded the design capacity of the Train Loader Dam despite the design complying with the mandated Type D Sediment Basin as defined DECC (2008). This was recognised by the EPA and resulted in a variation to EPL 12374 to accommodate high rainfall events leading to exceedance of total suspended solids concentration. All other licence conditions were met during discharge events.

Rigorous water management occurs at the Airly Mine top to ensure surface run-off is captured and reused for operations. The Airly Mine water management system consists of a number of internal dams that capture both clean and dirty water from the site and recycle it to the existing 109 ML Dirty Water Dam used for the storage of process water. The system is designed for maximum recycling of site water.

Given the water discharges only occur at high rainfall events there is no requirement for water treatment as the salinity of water being discharged is significantly less than the existing Airly Creek salinity.

Adequacy of Baseline Data

The adequacy of baseline water studies have been independently peer reviewed by Dr Noel Merrick and found to be adequate for the purposes of predictive modelling. Further explanation of baseline study and input data are found in Section 2.2.1 of GHD (2015a) appended as **Appendix A** to this RTS.

Rainfall Data

An assessment of the rainfall data available for use in assessments has been provided in Section 2.2.2 of GHD (2015a) **Appendix A**. A total of 29 Bureau of Meteorology (BOM) stations within a 30 km radius of the surface facilities area at Airly Mine were considered. The Ilford (Warrangunyah) Station was determined to be the most appropriate station to obtain data due to a number of factors, including its location relative to the site, similar elevation to the surface facilities area and relatively long record.

Suitability of ANZECC/ARMCANZ (2000) Guidelines for Determination of Site Specific Trigger Values

The suitability of the ANZECC/ARMCANZ (2000) Guideline limits for mine water discharge into Airly Creek is described in Section 4.6 of the Surface Water Impact Assessment (GHD, 2014a). As Airly Creek is naturally high in salt and metal concentration, Site Specific Trigger Values (SSTV) have been derived for the Airly Creek catchment based on a review of default trigger values, hardness correction factors and the 80th percentile of water quality data for a reference site referred to in the report as 'Airly Creek'. The SSTVs have been proposed that better reflect the receiving waters than the ANZECC/ARMCANZ (2000) Guideline limits.

5.4.3. Ecology

Key Issues

- The project does not protect biodiversity in accordance with the EPBC Act.
- The intention of the term “offsets” is not clear and needs to be spelt out.
- Flora and fauna at the Grotto, Genowlan Point and other sensitive locations may be destroyed by subsidence.

Response

Protection of Biodiversity in Accordance with the Environment Protection and Biodiversity Conservation Act 1999

Section 1.1 of the EIS notes that as the Project had the potential to impact on matters of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), an EPBC Act referral was submitted to the Commonwealth Department of the Environment in December 2013 (EPBC Act referral 2013/7076). The Project was subsequently declared a controlled action on 24 December 2013 and DGRs re-issued on 4 February 2014 with Department of the Environment’s requirements. The Project will be assessed under the bilateral agreement with New South Wales in accordance with Part 5 of the EPBC Act. The Project EIS has been prepared to address the Department of the Environment requirements, listed in Table 1.4 of the EIS. This table also provides references of sections in the EIS where the requirements have been addressed. An assessment of those matters of environmental significance relevant to biodiversity (RPS, 2014a) has been prepared in accordance with EPBC Act policy document *Matters of National Environmental Significance Statement 1.1 Significant Impact Guidelines* (DoE, 2013a) and those relevant to water resources in accordance with *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments—impacts on water resources* (DoE, 2013b).

Issues covered by the EPBC Act must be adequately addressed to the satisfaction of the Department of the Environment before approval can be granted.

Section 10.2.4 of the EIS notes that no EPBC Act listed endangered ecological community (Box Gum Woodland (also TSC Act listed) and Derived Native Grassland EEC) or threatened flora species recorded within the Project Application Area will be impacted by subsidence either due to their absence from the proposed mining areas (Box Gum Woodland) or due to the levels of subsidence predicted in the mining zone in which the species is located (eg *Pultanaea* sp Genowlan Point within the Cliff Line Zone and Zone of First Workings).

While the Box-Gum Woodland Derived Native Grassland is present within the proposed REA, and 3.27 ha of it is proposed to be cleared in the Project, the REA does not contain any Grassy Box Gum Woodland EEC and no clearing of this EEC is proposed. Given the Box-Gum Woodland Derived Native Grassland within the REA is low quality (refer Section 7.1.2 of RPS (2014a) and Section 10.2.4.1 of the EIS) and the conservation value was assessed as low, no offset area to account for the loss of 3.27 ha of the grassland was proposed in the EIS. OEH is in agreement with this proposal (refer Section 5.2.3).

Definitions of Offsets

Offsets in accordance with *NSW Biodiversity Offsets Policy for Major Projects* are defined in OEH (2014) and in accordance with *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* in SEWPaC (2012).

Section 10.2.7.2 of the EIS discusses the justification for why an offset area in accordance with OEH (2014) is not required for the Project while Section 10.2.7.3 of the EIS discusses the justification for no offset area in accordance with SEWPaC (2012).

Impact of Subsidence on The Grotto

As discussed in Section 8.3.7.1 of the EIS The Grotto is located in the proposed Cliff Line Zone and Zone of First Workings within the mining area where only first workings with large pillars will be carried out. This proposed mining method in the area has been designed to protect The Grotto. This zone is predicted to have low levels of subsidence and will prevent surface impacts to the landform. Section

10.1.3.3 of the EIS notes that no groundwater drawdown is predicted under The Grotto. No surface cracking is predicted due to the low levels of subsidence predicted for the zone. As such no impacts to water resources, flora and fauna habitat are predicted at the Grotto.

5.4.4. Cultural Historic Heritage

Key Issues

- The Airly Village ruins need to be protected from damage due to subsidence.
- The Airly Village ruins are listed on the Industrial Heritage Register (or State Heritage Register or National Trust) and claims of local significance are wrong.

Response

Subsidence Impacts on Items within the Airly Shale Mining Complex

A comprehensive Cultural Heritage Impact Assessment, appended as Appendix J (RPS, 2014b) to the EIS, covered assessments of both the Aboriginal Cultural Heritage and the Historical Cultural Heritage values within the Project Application Area. The latter assessment component included the oil shale mining or Airly Village ruins and involved the identification of the remaining ruins, recording of their locations and condition, and an assessment of the sensitivity of the recorded items to subsidence impacts. The 34 out of the 37 historic heritage sites identified in the Project are located within the proposed Shallow Zone within the Airly Village Site. The remaining three sites are located within Torbane processing site, located near the pit top in a location called Carinya. No sites were identified within the proposed disturbance areas.

No mining method other than first workings is proposed under or adjacent to the Airly Village heritage site within the Shallow Zone. Subsidence values are predicted to be <25.5 mm in this zone with very low tilt and strain values (refer Table 10.26 in the EIS). Section 8.3.7.4 of the EIS explains that some sites where depth of cover is <30 m have mining exclusion zones proposed under them. The Cliff Line Zone and the Zone of First Workings in the vicinity of this area and the New Hartley Shale Mine Interaction Zone have been increased in horizontal size to an effective angle of draw of 26.5° against the panel and pillar workings. This is an industry accepted value where full extraction is taking place. The interaction between the Airly Mine workings and the New Hartley Shale Mine create the same impact as full extraction, hence the increase in the size of the cliff protection zone in this area. This will prevent further damage to the cliffs above the Airly Village site and thus provide protection of the site and manage risk to the public. As noted in Section 10.3.3.3 of the EIS RPS (2014b) concluded that the consequences of the Project on cultural historic heritage are negligible.

The Statement of Commitments provided in Chapter 8.0 of the EIS and reproduced in Section 6 of this document commit to ensuring the minimisation of the recorded historic heritage sites. This will occur through the development and implementation a Cultural Heritage Management Plan that will include appropriate management controls to provide adequate protection to the cultural heritage values, of both the historic sites and the Aboriginal sites. The Cultural Heritage Management Plan will be consistent with the Mugii Murum-ban State Conservation Area Plan of Management relating to these ruins.

Section 10.3.3 of the EIS notes that If, during the course of development works, suspected historic cultural heritage material is uncovered, work will cease in that area immediately. The Heritage Branch, Office of Environment & Heritage will be notified and works only recommence when an approved management strategy has been developed.

Local Significance of Airly Shale Mining Complex

The heritage list referred to in the submissions received for the Project is the National Trust Register which does not provide statutory protection for listed sites on this register. The heritage registers that do provide statutory protection are referenced in RPS (2014b). Section 10.0 of RPS (2014b) provides a list of the historic heritage registers searched. Section 12.1 of RPS (2014b) provides assessment against the NSW State heritage significance criteria which encompass the four values in the Australia *ICOMOS Burra Charter*. Section 12.4 of RPS (2014b) provides a summary of the assessment against the NSW State heritage significance criteria as follows. The Airly shale mining complex meets a

number of the NSW heritage significance criteria. The site is considered to embody historic, aesthetic/technical, social and rarity values as well as being a good example of type with high research/archaeological potential. The level of heritage significance is considered to be local based on current research and investigations. The assessment was undertaken by appropriately qualified and independent archaeologists from RPS with many years of experience in the areas of Aboriginal and historic heritage assessments

5.4.5. Traffic and Transport

Key Issue

- The mine should pay for an upgrade of the road if there is an increase in traffic.

Response

Section 10.4 of the EIS discusses the capacity of the Glen Davis road, its intersection with Castlereagh Highway and the intersection with the Mine Access Road. The traffic impact assessment found that the current arrangements are adequate for the number of vehicle movements expected with the mine at proposed production levels and staffing. No further upgrades are required.

5.4.6. Noise

Key Issue

- There should be no increase in noise from the project.

Response

Project noise levels have been modelled on the assumption that all plant is operating at once in a given 15 minute period. Modelling was also carried out under adverse conditions at night. Table 10.35 of the EIS, which provides the predicted noise levels for the Project, indicate that noise levels from the modelled operational scenarios are predicted to be below the project specific noise criteria (35 dB) at all privately owned residential assessment locations under all considered meteorological conditions. It is noted the project specific noise criteria for the Project have been established with reference to *Industrial Noise Policy 2000*. The background noise levels adopted (30 dB) are the minimum background noise levels recommended by the Industrial Noise Policy 2000. Predicted noise levels, with regards to sleep disturbance analysis are provided in Table 10.36 of the EIS, and show the predicted L_{Amax} noise levels are below the project specific sleep disturbance noise goal surrounding the Project Application Area under prevailing weather conditions (worst case scenario) for privately owned residential receptors.

The modelled scenario is highly unlikely to be the case and normal noise levels for the operation will be even less than those predicted.

Notwithstanding the above assessment outcomes Centennial Airly has committed to the preparation of a Noise Management Plan (refer Section 11.0 Statement of Commitments of the EIS, reproduced as Revised Statement of Commitments in Section 6.0 of this document) that includes a monitoring program and the maintenance of noise levels at the nearest sensitive receptors of less than 35 dBA.

5.4.7. Air Quality

Key Issues

- Minerals are likely to become toxic with exposure to air and be a health hazard.
- The dust monitoring regime does not cover the east and south east of the mine. There should be monitoring of the whole valley.
- Coal dust from wagons needs to be managed.

Response

Exposure of Coal to Air and Health Hazards

Strip sample testing of coal extracted from the Lithgow Seam at Airly Mine indicates that total sulfur is in the order of less than 0.5%. Acid-base analysis used to assess the potential for coal mine waste materials to generate acid when exposed to an oxidised leaching environment has found that generally materials with total sulfur values of 0.5% or less are non-acid forming (Miller and Murray, 1988). Overall, these results suggest that the future operation of coal handling within the Product Coal Stockpile, the Coal Preparation Plant and REA at Airly Mine is unlikely to result in material formation that would be a health hazard or result deterioration in downstream water quality.

Nevertheless the Project proposes co-disposal of fines and coarse material to prevent water ingress as far as practicable. This is discussed in Section 4.8.3 of the EIS.

Dust Monitoring

Dust monitoring is already carried out at the nearest private residence to the south east of the mine site. Air quality modelling results presented in Section 10.6.4 and the subsequent discussions of the consequences of the air quality impacts confirm the Project is predicted to comply with all relevant air quality criteria at representative receptors during all scenarios and with regard to potential cumulative impacts.

Management of Coal Dust from Wagons

Section 8.5 of the Air Quality Impact Assessment for the Project (SLR, 2014d) has assessed the impact of dust lift-off from coal wagons as part of the DGRs. SLR (2014d) note that it is difficult to quantify the particulate emissions from a rail journey on sensitive receptors along a rail line due to the varying nature of shape and configuration of the coal wagons and the wind conditions responsible for the wind erosion from the top of coal wagons. Particulate emission sources from trains have been identified (Connell Hatch, 2008) as:

- the coal surface of loaded wagons
- leakage of coal from doors of loaded wagons
- wind erosion of spilled coal in the corridor
- leakage of residual coal from doors of unloaded wagons.

To assess the impact of the dust lift-off from trains from Airly site, SLR (2014d) have undertaken an assessment of the total suspended particulate (TSP) and PM_{10} concentrations based on a study on dust emissions from rail transport for the Duralie Coal Project (DCPL, 2009), undertaken by Katestone Environmental Pty Ltd (Katestone, 2012).

The assessment for the Airly Project showed the predicted maximum 24-hour PM_{10} concentration associated with the transport of coal by rail is anticipated to be:

- 9.2 $\mu g/m^3$ close to release point
- 5.3 $\mu g/m^3$ at 20 m from the rail centre line
- 1.1 $\mu g/m^3$ at 100 m from the rail centre line

These concentrations are significantly lower than the 24-hour average PM_{10} criterion 50 $\mu g/m^3$ (NSW EPA Approved Methods). It should be noted that calculation of emissions from rail wagons was identified by Katestone (2012) as being very conservative. Therefore the PM_{10} concentration calculated for the Airly Project at the rail trackside are likely to be significantly lower than the values noted above in reality.

There is no proposal to increase train movements in the Project over that undertaken in existing current operations. The average train movements will continue at two movements per day with a maximum 4 to 5 train movements per day. Airly Mine implements controls to minimise or prevent coal spills and dust emissions from the top of wagons during transport by maintaining the moisture content of the coal to at least ROM coal moisture levels (approximately 9% at Airly Mine using water sprays.

Training on the correct train loading procedures are provided to all staff involved in the train loading operations through regular tool box talks.

Notwithstanding the above, dust from coal trains wagons is a contentious issue in the community. Ongoing research and monitoring, by both industry and government agencies has been undertaken and is providing a better understanding of air quality along the coal transport corridor, particularly in the Hunter region of NSW. Scientific studies to date have generally found that fugitive dust from coal trains is a relatively small source of ambient particulate matter (Connell Hatch (2008); PEL (2014); Katestone (2013)). While many of the technical studies to date have found that fugitive dust from coal trains is not a significant source of ambient particulate matter (and this is consistent with assessment outcomes for the Airly and Duralie Coal Projects), ongoing work in regards to this issue is continuing to provide a better understanding of the composition and source of particulate matter. Nevertheless, fugitive dust from coal trains remains a significant community concern and the industry is committed to identifying areas of improvement in management practices.

5.4.8. Soils, Land Capability and Agricultural Suitability

Key Issues

- Current land use must be protected.
- Where is the agricultural impact assessment for groundwater?
- The project will cause a loss of viability of agriculture in the Capertee Valley.
- The EIS does not give full value to the agricultural industry in the Capertee Valley.

Response

The Groundwater Impact Assessment (GHD, 2014b) (refer Section 6.1.1) found that there will be less than Level 1 impact as defined by the Aquifer Interference Policy (NOW, 2012). The Agricultural and Land Use Impact Assessment undertaken for the Project (SLR, 2014) appended as Appendix Q to the EIS, has assessed the Project's groundwater impacts on agriculture (refer Section 4.4.2 of SLR (2014)). The conclusion reached was that, given the potential groundwater impacts for all groundwater sources are less than the Level 1 impact considerations, the Project is not anticipated to have any short or long term detrimental effects on groundwater which is relied upon by agriculture. It should be emphasized that the Project Application Area does not contain Biophysical Strategic Agricultural Land (BSAL) (refer Sections 2.8 and 4.1.2 of SLR (2014)). As such the Project will not impact on BSAL.

No agricultural land in the Capertee Valley will be permanently removed from use for agriculture, either due to mining or ancillary infrastructure. Therefore there will be no loss of agricultural land available for production. Water resources are not being significantly impacted so the productivity of agricultural land is not predicted to fall.

The vast majority of the Project Application Area is Class 8 Rural Land Capability, covering a total 2,805 ha or (70.5 % of the Project Application Area). This land is unsuitable for agricultural production. There are some areas of land suitable for grazing (Rural Land Capability classes 4 and 5) covering a combined total of 532 ha or 13.3% of the Project Application Area. There are approximately 480 ha of the Project Application Area, primarily owned by Centennial Airly, currently available for cattle grazing.

The predominant soils within the Project Application Area have extremely low agricultural capability and the Project will have negligible to minimal impacts on soil, land and agricultural resources.

5.4.9. Decommissioning and Rehabilitation

Key Issues

- Consent conditions should specify how the land has to be remediated and rehabilitated after mining is finished and ongoing, including soil testing and aquifer monitoring and the success of revegetation for at least 10 years with high monetary penalties for non-compliance.
- The proposed REA will feed toxic waste into Airly Creek.

Response

Rehabilitation of the Project Application Area

A Decommissioning and Rehabilitation Strategy (SLR, 2014c) has been prepared for the Project, as required by the DGRs. The Strategy is discussed in Section 10.9 of the EIS and provides:

- rehabilitation objectives, methodology, monitoring programs, performance standards and proposed completion criteria
- nominated final land use and a conceptual final landform design.

The various landscape secondary domains proposed across the Project Application Area have been developed in consideration of the proposed land zonings in the Draft Lithgow Local Environment Plan 2013.

Staged and final rehabilitation will ensure that there will be little change to the landform of the Project Application Area during and after mining compared to current conditions. Existing and proposed components of the Project will be decommissioned and rehabilitated once they have performed their functions, to ensure minimal disturbance areas within the Project Application Area. Rehabilitation of the pit top area will mitigate the largest area of surface disturbance. Section 10.9.6 of the EIS discusses the conceptual rehabilitation success criteria developed for the mine site in SLR (2014c). These completion criteria will be further developed following detailed design of the final landform and stakeholder consultation regarding final land use during the detailed mine closure planning process and documented in successive Mining Operations Plans. Detailed mine closure planning for the Project will be completed no later than five years prior to closure.

Airly Mine will be required as a condition of the mining lease granted under the *Mining Act 1992* to develop a Mine Rehabilitation and Closure Plan for the Project. This Plan will detail the final land use, final land form as well as details of the construction, operation and rehabilitation of disturbed areas. DRE issue guidelines for the rehabilitation of mine sites and regulate the ongoing and final rehabilitation of the mine site in accordance with these guidelines.

A bond is lodged with the Department based upon the agreed final land form and this is retained by the Department until such time as rehabilitation works are complete. Should the company cease to operate, the bond is used to carry out the rehabilitation works. The bond is reviewed yearly and increased as required if there is a change to the rehabilitation plan and to account for inflation. The mining lease and all its responsibilities cannot be relinquished until all obligations for rehabilitation are met to the satisfaction of the regulator. This includes a stable and self-sustaining final land form.

Potential Impact of REA Leachate Discharging into Airly Creek

The guidelines detail the accepted methodologies for the establishment, operation and rehabilitation of reject emplacement areas. This includes the proper sealing of the base of the REA, correct type and thicknesses of capping materials and drainage. The proposed Airly REA will be constructed and operated in accordance with the relevant standards so as to prevent contaminated drainage from entering Airly Creek. As discussed in Section 4.8.3 of the EIS, the mine is proposing co-disposal to provide a high level of compaction and minimise water ingress. Soils studies have shown the local material is suitable for use in both the base and capping of the REA. Section 4.8.3 and Section 4.11.1 of the EIS also details the drainage and run off water storage and recycling system to be constructed. These structures are designed in accordance with the current industry standards for 72 hour, 1 in 100 year rainfall events.

Strip sample testing of coal extracted from the Lithgow Seam at Airly Mine indicates that total sulfur is in the order of less than 0.5%. Acid-base analysis used to assess the potential for coal mine waste materials to generate acid when exposed to an oxidised leaching environment has found that generally materials with total sulfur values of 0.5% or less are non-acid forming (Miller and Murray, 1988). Overall, these results suggest that the future operation the REA at Airly Mine is unlikely to result in leachate formation that could result in deterioration of downstream water quality, including in Airly Creek.

5.4.10. Visual Amenity

Key Issues

- The coal stockpile visible from the Glen Davis Road needs to be fully screened.
- Airly would create similar light pollution to Charbon for its neighbours.
- The undertaking that lights would only be used when a train is being loaded is never adhered to.

Response

Airly Mine has already committed to establishing tree screening of the product coal stockpile that is visible from the Glen Davis Road as part of Modification 3 of the existing consent DA162/91 (refer Section 5.2.7).

Proposed operations at Airly Mine will differ considerably from those at Charbon Colliery. The key differences are:

- Charbon is an open cut operation, Airly will continue to be an underground mine.
- Charbon is located immediately adjacent to Charbon Village and other rural neighbours. Airly Mine is separated from the nearest light receptors by over two kilometres.
- Airly has been constructed with lower impact lighting structures. Section 10.10 of the EIS discusses the continuation of the use of low impact lighting arrangements for any further construction.

Airly Mine does use lighting of the surface infrastructure around key areas such as the office complex, workshop and Coal Handling Plant (CHP) operator's office. Operating practice is to only turn lights on at the CHP if maintenance work is being carried out or if train loading is taking place. Airly Mine has no management control over train scheduling (refer Section 5.2.5) and trains are loaded at night as required.

Airly Mine has been operating since 2009 and majority of infrastructure required for the mining operations has been constructed. While an REA and a Coal Preparation Plant has been proposed in the Project Section 10.10.5 of the EIS notes minimal visual impacts will be experienced at the sensitive receptors during the construction and operational phases. The Airly Mine pit top and the surrounding areas contain moderate to dense tree cover, which in combination with surrounding mountains and ridgelines provide an enclosed visual character. Given the extent and combination of existing tree cover and undulating landform within and surrounding the Airly Mine, the visual absorption capability is likely to be high which then reduces the potential magnitude of visual significance.

5.4.11. Social and Economic

Key Issues

- The mine has and will cause a devaluation of land in the Capertee Valley, especially neighbouring lands. Buffer zones should be purchased.
- Rock falls and draining of springs will impact recreational use of the SCA.
- There is limited benefit to the community as few locals work at the mine.
- There will never be 135 people working at the mine.
- The mine is marginal and any benefits will only be for 10-20 years and leave a detrimental impact lasts much longer.
- The mine should contribute to local roads and community efforts.
- The EIS does not properly address the tourism and agriculture industries.

- The statistical information is wrong due to the mine being on the boundary of the Lithgow LGA and Mid-Western Regional LGA.
- The EIS lacks details on the economics of the project.

Response

Devaluation of Land in Capertee Valley

The majority of the Project Application Area is Crown Land and classified as State Conservation Area. This land is managed by National Parks and Wildlife Service. Centennial Airly owns a substantial buffer zone (approximately 2,000 hectares) around the pit top in order to provide a substantial buffer to private landholders and the surrounding community from the mine's operations. Centennial Airly also own a parcel of land on the southern boundary which allows access to Mount Airly and Genowlan Mountain. There are private land holdings bordering the Project Application Area along with the Capertee National Park and Garden of Stones National Park boundaries however these landholding are located away from the pit top facilities.

The Social Impact Assessment (James Marshall & Co, 2014) found from its review of all specialist consultants reports that the operational impacts of the mine remain largely within the Project Application Area and as such no additional land acquisition is required. As there is no change to the existing land use or social amenity land values should not be affected by the continued operation of the mine.

Rock Falls and Draining of Springs

As detailed in Section 8.0 of the EIS, the proposed mine design includes specific zones around cliffs, pagodas and canyon features on Mount Airly and Genowlan Mountain. Only first workings with large long term stable pillars are proposed in these areas in order to prevent cliff falls.

No mining other than first workings is proposed under or adjacent to the Airly Village heritage site. Subsidence values are predicted to be <25.5 mm with very low tilt and strain. Section 8.3.7.4 of the EIS explains that some sites where depth of cover is <30 m have mining exclusion zones proposed under them. The Cliff Line Zone and Zone of First Workings proposed in this area has been increased in horizontal size to an effective angle of draw of 26.5° against the panel and pillar workings. This is an industry accepted value where full extraction is taking place. The interaction between the Airly Mine workings and the New Hartley Shale Mine create the same impact as full extraction, hence the increase in the size of the cliff protection zone in this area. This will prevent further damage to the cliffs above the Airly Village site and thus provide protection of the site and manage risk to the public.

As detailed in Section 10.1.3.3 of the EIS, the impact of the proposed mining will not extend to the upper Triassic sandstones and the associated aquifers in these strata. The springs and seeps in this stratum are not predicted to be impacted. Section 10.1.3.2 of the EIS does note there will be a loss of baseflow in some limited lengths of Gap and Genowlan Creeks associated with the Permian strata, but this will not cause these streams to cease to flow.

Impacts on flow from the Village Spring are harder to predict and therefore a worst case scenario that the spring may cease is adopted. It should be noted that the Village Spring is a mining related landscape feature and not a natural spring.

From the above discussion there will be no loss of public access to Mugii Murrum-ban SCA or prevention of any recreational activities from occurring due to mining activities.

Proposed Employment of 135 Personnel

The proposed employment figure of 135 people is a maximum value and is a realistic number. Modelling of mining methods that could produce up to the proposed 1.8 Mtpa indicate that a workforce of up to 135 people would be necessary for efficient operations.

Airly Mine's Contributions to Local Roads and Community Efforts

Airly Mine currently contributes to the local community in support of local business wherever possible, assistance to the Capertee Public School, Capertee RFS and Capertee and District Progress Association.

Local roads, such as Glen David Road, and any upgrades required are the responsibility of the Lithgow City Council. The mine has financed the upgrade of Glen Davis Road at the its intersection with the Mine Access Road and also the Mine Access Road to the pit top facility. The traffic flow incurred by the mine's operations is well within the capability of the road network and no further upgrades of roads are required.

Centennial has made a significant contribution to community efforts via financial and in-kind support. For its Western Region operations a total of $114,814 was allocated over the 2013 / 2014 financial year to 56 organisations.

Impact on Agricultural Lands and Tourism

As there is no significant impact on either surface or groundwater resources or downstream users and no agricultural land is to be permanently removed from use, the Project has no impact on the agricultural capacity of the Capertee Valley region. Refer to Section 5.4.8 for further details on assessments undertaken to understand potential impacts of the Project on agricultural land.

The tourism industry will not be impacted because no areas outside the Project Application Area currently used for that purpose will be removed from use. Restrictions of access to the Mugii Murrum-ban SCA are managed by National Parks and Wildlife Service (OEH). Proposed Airly mining operations within the Mugii Murrum-ban SCA SCA are designed so that no areas need be restricted for public access while mining takes place. The mining activities undertaken to date have been alongside the growing tourist industry within the area that has been quoted by the respondents. This tourism industry draws in part on the historic ties to coal mining and historical oil shale mining at Airly Mine and other locations in the Capertee Valley as an attraction to visitors. Tourism also draws on biodiversity and geodiversity, bird watching, photography, bushwalking, four wheel driving etc. within the Mugii Murrum-ban State Conservation Area.

It is noted Centennial Coal has been an active supporter of Lithgow City Council's *Economic Development Strategy* 2010 – 2014, which highlights the importance of tourism to the Lithgow Government Area. A representative from Centennial Coal (GM Western Operations) is an active member of the Lithgow Economic Development Committee, confirming Centennial Coal's commitment to co-exist with its regional community as well as underpin the economic opportunity the mine represents.

Additionally, the potential for tourism and agricultural sector impacts have been assessed along with a range of concerns identified through the consultation process as discussed below.

- Near neighbours can be affected by noise, dust, visual, light, traffic impacts and any other factor of the mine's operation which adversely impacts on residential social amenity.
- Environmental impacts of the mine (ie surface and groundwater) may extend beyond the Project Application Area and adversely affect the economic viability of agricultural land uses.
- Residents living on major transport routes may be impacted upon by employee traffic at various times (aligning with shifts).
- Any requirement to purchase property may cause existing residents to relocate. Therefore social networks and social fabric of the area may be adversely affected.
- The impacts of the mine may extend to other users of the area. For example this area has high tourist value which may be adversely impacted upon.

The mine design along with limited coal production and small surface facilities area mean that there is:

- No requirement to purchase property as a means of managing impact on social amenity.
- No impact on surrounding land use or viability of agricultural production.
- No significant change to the economic profile of the community except for the potential for incidental economic benefit via localised spending.
- No change to the social fabric of the area.
- No change to how residents or visitors utilise the area.

The potential impacts that exceed the Project Application Area are limited to:

- Very minor and localised reductions in total average flow in Gap and Genowlan Creeks (<3%) are expected resulting in negligible impact to surface water supplies on neighbouring properties.
- Limited visual impact on surface infrastructure and the REA primarily from Camerons Road and when travelling along Glen Davis Road.
- Water discharge to Airly Creek.
- Noise and air quality impact that exceeds the PAA however is within compliance.

In consultation large number and wide range of technical assessments undertaken in the preparation of the EIS it was found that Airly Mine's operation does not change the land use within the Project Application Area nor does it adversely impact on the social amenity to the surrounding community and other land uses or activities (ie tourism or agriculture).

Economic Viability of Airly Mine and Economic Assessment

Centennial Coal does not provide commercially sensitive details of the financial arrangements of its operations to the public. The economic viability of the mine is not a planning consent issue. The social and economic benefits of the Project are discussed in the Social Impact Assessment (James Marshall & Co, 2014) and the Economic Assessment (Aigis, 2014), respectively, provided with the EIS. These assessments have been summarised in Chapter 6.0 of the EIS and include discussions of the benefits of the mine and employment in the local area.

Statistical Information

The population and demographic characteristics take into account the State Suburbs of Capertee and Glen Davis. These State Suburbs adequately cover the populations that neighbour the Project Application Area and surrounding communities of Capertee, Glen Davis, Glen Alice, Bogee etc.

Comparison to the Lithgow LGA is made due to that being the LGA where the mine is based. Reference to the Mid-Western LGA demographic / population profile would not provide value.

5.4.12. General Issues

Key Issues

- The area should be preserved for future generations using the precautionary principle and become part of the Greater Blue Mountains Heritage Area.
- The inclusion or exclusion of the Eastern Portal needs to be clarified.
- Free sharing of information with the community is important for the community to have a voice.
- What monitoring is in place of the amount of coal being mined and transported?

Response

Precautionary Principle

Centennial Airly is committed to the principles of Environmentally Sustainable Development, and understands that social, economic and environmental objectives are interdependent. The precautionary principle reinforces the need to take risk and uncertainty into account, particularly in relation to threats of irreversible environmental damage. In the application of the precautionary principle at Airly Mine, decisions have been guided by careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and by an assessment of the risk-weighted consequences of various mine design options.

The main method by which irreversible damage to the environment, including the Mugii Murrum-ban State Conservation Area, will be achieved is through conservative mine design based on well-established geotechnical principles. The mine design is also flexible to allow mining layouts and design to be adapted to changing surface topography, geological structure or respond if outcomes vary adversely from predicted values.

Eastern Portal

The Eastern Portal is not part of the Project as all the required access and ventilation requirements of the Project can be serviced from the current pit top arrangement. The Eastern Portal currently approved will not be constructed in the future. This is noted in Table 4.1 of the EIS.

Free Sharing of Information with the Community

As detailed in Section 7.3.3 and Section 7.3.4 of the EIS Airly Mine carried out an extensive community consultation process for the Project, above and beyond that required by the Director General's Requirements for the EIS. Centennial Airly has provided feedback to the community as to how their concerns have been dealt with during the fourth and final Technical Information Session held on 16 February 2014 at Airly Mine. The session was advertised well in advance of the meeting by letter drop-offs.

Airly Mine will continue to have communication with and input from the community on the Project through the following mechanisms:

- the community newsletter that is circulated approximately 6 monthly
- the Community Consultative Committee (currently being established as part of MOD 3 of Consent DA162/91 conditions)
- Membership of the Capertee and District Progress Associations.

Airly Mine provides updates on its activities, including the progress of the Project's approval, via articles in the local newspapers and through newsletters.

Monitoring and Reporting of ROM Coal Production at Airly Mine

Monitoring and reporting of the amount of coal produced is via Annual Environmental Management Reports / Annual Reviews to DRE and DPE. The reports are available on the Centennial Airly website (http://www.centennialcoal.com.au/Environment/Airly.aspx).

5.5. Analysis of Positive Submissions from the Members of the Community and Organisations

5.5.1. Summary

The Project has received a substantial number of positive submissions on the exhibited EIS (refer **Table 5**). Through the analysis of these positive submissions it is demonstrated that mining brings about a direct and significant financial and social benefit to local communities. The submission review has found that:

- the majority of support submissions are from the local community, the Lithgow or Mid-Western LGAs.
- the submissions outline the risks to the local community if the projects are not approved.

The risks outlined include:

- The importance of employment.
- Flow-on effects to other business.
- The need to relocate should employment cease and decline within the sector.
- The contribution to local community events, charities and projects through financial and in-kind sponsorship.
- The long history of mining in the LGA and also the multi-generational employment history amongst families.
- The environmental performance of the projects and also that local people access and enjoy the areas where mining is undertaken for leisure and recreation.

- The importance of training for new employees and those wishing to pursue a career in the industry.

Direct mine industry sector employment sits at 15% of Lithgow's workforce compared to 1.0% of the NSW workforce. The Lithgow Economic Development Strategy (Version 2) highlights the clear link between population growth and economic sustainability. If population growth does not occur, there is a rapid increase in ageing. Lithgow's current population is 20,161 (2011 Census data, Australian Bureau of Statistics) and the projected population is forecast to be 20,650 people in 2036.

A large proportion of Airly's workforce resides in the region. Many are long term residents and have been employed in the mining sector for many years. The workforce is more likely to own their own home and directly contribute to the social and financial economy if their community.

5.5.2. Overview of Submissions

A total of 116 submissions from the members of the community and three submissions from organisations registering support for the Project. The submissions were from a number of areas as follows in Australia as follows:

Lithgow LGA:	31%
Mid-Western LGA	51%
Bathurst LGA	2%
Blue Mountains LGA	1%
Central Coast area	1%
NSW (elsewhere)	12%
Queensland	2%

An analysis of all positive submissions found key themes listed in **Table 5** and **Table 6**.

Table 6 – Key Themes from Positive Submissions

Theme	Comments
Positive Employment Impact	Strong messages that jobs and job security is required in the area. The project life of 25 years is considered vital to the future of the area. Concern about the decline in the minerals / energy sector and reduced opportunities for jobs in the region. This means that people may need to relocate and lose established social ties. Centennial Coal is a large employer both directly and indirectly and ongoing employment and job security is important for families. Approval of the Project shows confidence in the sector and will support other Centennial projects therefore increasing employment opportunities.
Support to Local Business	Flow-on effects to other business including the following. • Spending of wages and participation in events is vital to the wellbeing of the community. • The benefit of spending of wages in the local community is acknowledged and recognised as being interdependent. • Concern that all businesses are suffering with the economic downturn of the industry and closure of major industry (for example the Kandos Cement Works).
Benefit of Local Spending	The benefit of secure employment for families who invest in the financial and social economy of the place where they live. This includes investment in housing, education, supporting their local community through local spending, participation in community

Theme	Comments
	events and activities. People are connected to their community through these activities and employment is identified as a key driver for these benefits. All local businesses benefit through spending of wages.
Sponsorship	Centennial Coal is recognised as being a major sponsor (both financially and in-kind) of local community events, charities and projects. Centennial Coal provided over $114,814.00 to 56 community organisations in the 2013 – 2014 financial year throughout the western region (Lithgow, Mid-Western, Bathurst and Blue Mountains LGAs).
Environmental Performance	The environmental performance of the project was recognised and environmental performance is important to local residents who enjoy the key features such as Capertee Valley, Mount Airly etc. Recognised that the mine design is conservative and subsidence impacts are minimal and that the conservative mine design means a large amount of coal resource is sterilised.
Family	A risk to secure employment together with a downturn to the industry across the region has signalled that families may need to consider relocation in order to seek employment. The contribution that families make to the social and financial economy would therefore be lost.
Long History of Mining	The long history of mining in the Lithgow LGA and also the multi-generational employment history amongst families. People identify the area as a mining region and many towns exist because of the mines. There seems to be opposition to those who oppose mining given the connection to mining in the area.
Contractors	Contractors recognise the importance of secure employment and the have confidence when companies such as Centennial Coal invest in their operations.

5.5.3. Overview of Mining Industry Sector

An analysis of the jobs held by the workforce in Lithgow City in 2011 Census (Australian Bureau of Statistics) shows the three most popular industry sectors were:

- Mining (1,120 people or 15.0%)
- Health Care and Social Assistance (804 people or 10.7%)
- Public Administration and Safety (715 people or 9.6%).

In combination, these three industries employed 2,639 people in total or 35.3% of the total workforce. In comparison, New South Wales employed 1.0% in Mining; 11.8% in Health Care and Social Assistance; and 6.0% in Public Administration and Safety.

The major differences between the jobs held by the workforce of Lithgow City and New South Wales were:

- A *larger* percentage of people employed in Mining (15.0% compared to 1.0%)
- A *larger* percentage of people employed in Electricity, Gas, Water and Waste Services (5.0% compared to 1.1% in NSW)
- A *larger* percentage of people employed in Public Administration and Safety (9.6% compared to 6.0% in NSW)

- A *smaller* percentage of people employed in Professional, Scientific and Technical Services (2.8% compared to 8.0% in NSW).

Figure 1 shows the Employment by Industry Sector for the Lithgow LGA (2011 Census). The mining industry sector comprises a range of related industries. **Table 7** outlines the industry types that form the Mine Industry Sector classification by the Australian Bureau of Statistics.

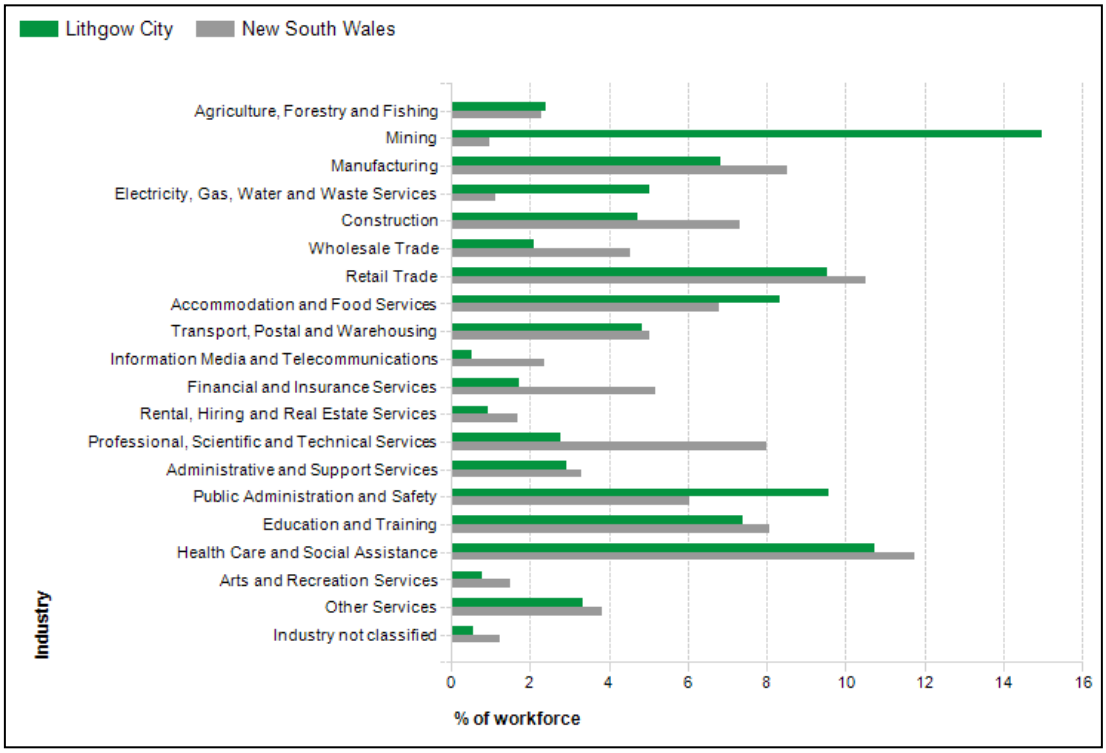

Figure 1 – Employment by Industry Sector for the Lithgow Local Government Area (2011 Census)

Table 7 – Employment by Mining Industry Sector for the Lithgow Local Government Area (2011 Census)

Industries that form the Mining Sector	2011 Census			2006 Census			Change between 2006 and 2011 data
	Number	%	NSW %	Number	%	NSW %	
Coal Mining	1,048	14.0	0.6	769	11.2	0.4	+279
Oil and Gas Extraction	0	0.0	0.0	0	0.0	0.0	0
Metal Ore Mining	3	0.0	0.1	5	0.1	0.1	-2
Non-Metallic Mineral Mining and Quarrying (nfd)	3	0.0	0.0	0	0.0	0.0	+3
Construction Material Mining	25	0.3	0.1	20	0.3	0.0	+5
Other Non-Metallic Mineral Mining and Quarrying	3	0.0	0.0	0	0.0	0.0	+3
Exploration and Other Mining Support Services	0	0.0	0.0	0	0.0	0.0	0

Industries that form the Mining Sector	2011 Census			2006 Census			Change between 2006 and 2011 data
	Number	%	NSW %	Number	%	NSW %	
(nfd)							
Exploration	11	0.1	0.1	9	0.1	0.0	+2
Other Mining Support Services	9	0.1	0.0	16	0.2	0.0	-7
Mining (nfd)	18	0.2	0.1	23	0.3	0.1	-5
Total	**1,120**	**15.0**	**1.0**	**842**	**12.3**	**0.7**	**+278**

5.5.4. Emerging Groups

The largest changes in the jobs held by the workforce between 2006 and 2011 in Lithgow City were for those employed in (refer **Figure 2**):

- Mining (+278 people)
- Health Care and Social Assistance (+123 people)
- Public Administration and Safety (+85 people).

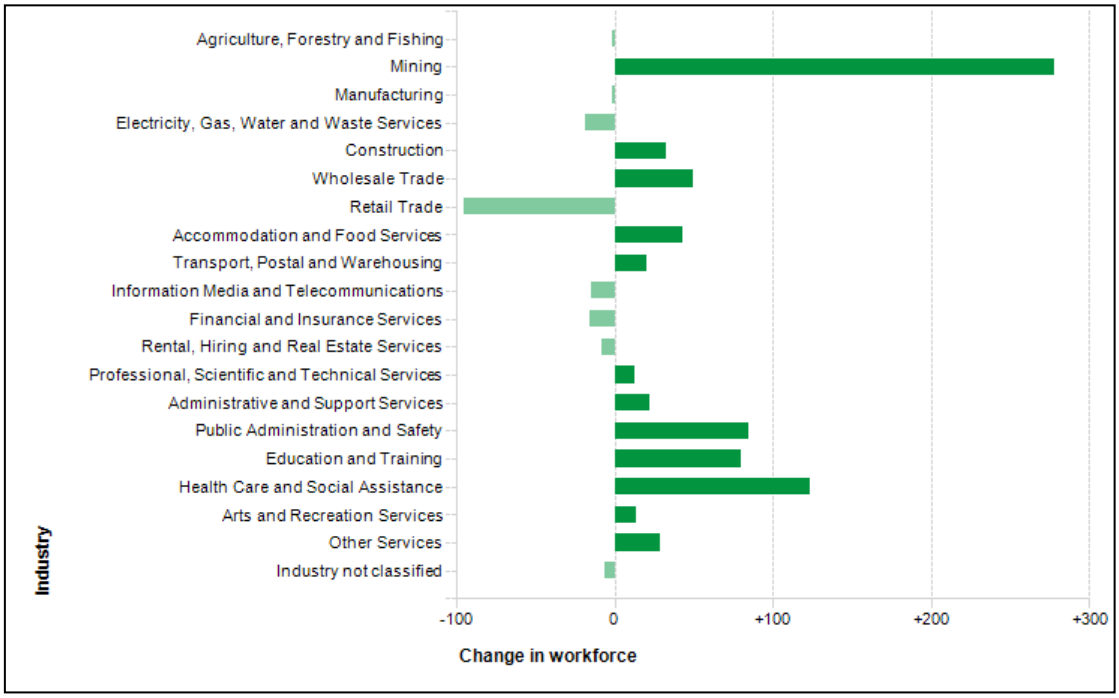

Figure 2 – Change in Employment by Industry Sector between 2006 and 2011 for the Lithgow Local Government Area (2011 Census)

5.5.5. Summary of the Social Benefits of Staying in the Community

1. Overview

There are many social benefits of long term business and industry investment in any community, in particular Lithgow. Long term secure employment means that residents are more likely to purchase their home and participate in the social and financial economy of the area where they live, i.e. residents are less likely to be transient. If however, there are no jobs in the industry sector where they work people will potentially relocate and the social and economic contribution will be lost. Population stability and growth require secure employment and adequate hard infrastructure (roads, water supply

etc.) and soft infrastructure (social activities, health care, schooling etc.). Investment in both hard and soft infrastructure requires population growth and critical mass (numbers).

The social benefits of staying in the community mean:

- investment in housing etc.
- long term planning for the future via education, family planning etc.
- participation in social activities and maintenance of social ties
- long term planning by other businesses that rely on the sector (directly or indirectly)
- investment and confidence
- growth, rather than changing needs (i.e. an ageing community).

2. The Lithgow Economic Development Strategy 2010 – 2014

The Lithgow Economic Development Strategy 2010-14, states that growth in population is a critically important component in economic development. Such growth or decline in population figures has a direct impact on levels of total private and public expenditure in a community. Population growth in fact provides the underlying basis for growth in labour resources, improvements in skill levels, and development of investment and capital within an area.

The Strategy goes on to say, *population growth generates opportunities for business development and public investment, brings into the community new knowledge and expertise, and creates opportunities for innovation and business development*. By contrast, if there is no significant increase in population numbers over time, then the population can become an 'ageing' one. The population will begin to stagnate and consequently varying economic demand levels eventually decline, new skills are slow to develop, innovation and enterprise have limited prospects, fewer people are attracted to in-migrate, and the rate of household and community dependency increases as fewer workers have to support an increasing number of non-workers. This is exacerbated by the out-migration of younger people seeking higher education and employment elsewhere.

3. Workforce Contribution

As previously stated the socio-economic contribution of mine related employment is significant. A recent survey of the Airly Mine workforce (44 participants) found that nearly 90% of the employees live in the Mid-Western and Lithgow LGAs. The majority of employees are married with children and have lived in the area most of their life. Living in the local area also means that there is a positive contribution into the local economy. Home ownership is higher (in this case approximately 86%) and employees shop locally meaning there is a significant flow on effect to other businesses.

Social networks and ties are also a positive benefit to the local area. Employees and their families participate in local sporting and recreational activities, participate in community activities such as volunteering their time to coach junior sports, membership in service organisations such as the rural fire service, help in our school canteen and participate in P & C meetings, attend local gyms, participate in athletics, swimming and water skiing. Employee's children attend local kindergartens and schools and also develop their own local ties and networks as they grow older.

A summary of the survey results from the 44 participants are presented in **Tables 8** to **12.**

Table 8 – Age Groups of Survey Participants and Percentage of Total Participants

Age Groups of Survey Participants	
18 – 24 years	4%
25 – 34 years	29%
35 – 44 years	31%
45 – 54 years	29%
55 – 64 years	7%

Table 9 – Time Employed in Mining Industry by Survey Participants and Percentage of Total Participants

Time Employed in Mining Industry	
1 – 2 years	2%
2 – 5 years	13%
5 – 10 years	39%
10 – 20 years	16%
> 20 years	30%

Table 10 – Generations Family Employed in Mining Industry by Survey Participants and Percentage of Total Participants

How many generations of your family have been employed in this industry?	
1st generation	44%
2nd generation	41%
3rd generation	12%
4th generation	3%

Table 11 – Residential Location of Survey Participants and Percentage of Total Participants Living in the Area

Where do you live?	
Kandos (29.55%)	Of those respondents who live in Kandos, 15% have lived there for between 10 and 20 years and 61% for over 20 years.
Rylstone (1.8%)	Of those respondents who live in Rylstone, 14% have lived there for between 10 and 20 years and 71% for over 20 years.
Other areas within the	Of those who live in another area of the Mid-

Where do you live?	
Mid-Western LGA (13.6%)	western LGA, 50% have lived there for between 10 and 20 years and 16% for over 20 years.
Lithgow LGA (13.6%)	Of those who live in Lithgow LGA, 16% have lived there between 10 and 20 years and 83% for over 20 years.
Other LGA (9%)	9% live in LGAs other than Lithgow or Mid-Western LGAs

Table 12 – Other Characteristics of Survey Participants

Other Characteristics	
Mortgage	86% either own their home outright or are paying a mortgage.
Family Status	86% are in a relationship and 72% have children.
Social Participation	Participation in local social activities and sporting activities is high. Leisure activities are spread across the Kandos, Rylstone and Mudgee areas however for employees who live in the Kandos and Rylstone areas most of the sporting activities (golf, swimming etc.) are undertaken at Kandos.
Estimated percentage of weekly expenditure is spent in the town where you live	73% of respondents state they spend 50% or greater of their weekly income in the local area where they live (note for Rylstone this includes Kandos).

6. REVISED STATEMENT OF COMMITMENTS

A revised Statement of Commitments for the modification has been provided below. The new commitments that have been included are shown in red.

Table 13 – Existing Management Plans

Management Plan or System	Purpose	Update Required Following Development Consent
Mining Operations Plan	Covers activities at Airly Mine during operations. The document has been prepared in accordance with the *Guidelines to the Mining, Rehabilitation and Environmental Management Process prepared by the NSW Department of Mineral Resources, Updated April 2012.*	The Mining Operations Plan will be revised in accordance with the Department Guidelines.
Landscape and Rehabilitation Management Plan	To minimise and manage potential landscape and rehabilitation issues and to return the land to a pre-operation state or better, in line with the relevant consent conditions and in consultation with the key stakeholders.	The plan will be superseded by a new Rehabilitation Management Plan and will be prepared in accordance with the conditions of the new development consent.
Environmental Monitoring Plan	Provides details of monitoring and reporting of the various management plans.	The Plan will be updated in accordance with the conditions of the new development consent.
Stakeholder Engagement Plan	The objectives are to: • effectively communicate with relevant stakeholders • define responsible parties within Centennial in respect of the communication paths and forums • monitor and manage issues from relevant stakeholders • maintain a complaints protocol.	The Plan will be updated in accordance with the conditions of the new development consent.
Borehole Construction Environmental Management Plan	Project specific plan developed to ensure appropriate environmental management practices are followed during borehole construction.	No
Pollution Incident Response Management Plan	Covers the key actions to minimise the occurrence of a pollution incident and to manage a pollution incident if one occurs (during and after a pollution incident). The plan has been prepared for managing the impact to human health (employees and nearby neighbours) and the environment (onsite and offsite).	No
Air Quality Management Plan	Provides for the monitoring and management of air quality.	The Plan will be updated in accordance with the conditions of the new development consent.
Noise Management Plan	Sets out procedures for monitoring, assessing and responding to noise impacts.	The Plan will be updated in accordance with the conditions of the new development consent.

Management Plan or System	Purpose	Update Required Following Development Consent
Water Management Plan	Coordinates the management of water within the Airly Mine lease area in an efficient and sustainable manner.	The Plan will be updated in accordance with the conditions of the new development consent.
Waste Minimisation and Management Plan	To achieve waste minimisation through maximising re-use and recycling, to ensure environmentally responsible disposal of waste materials not suitable for re-use or recycling and to ensure environmental protection throughout all stages of waste handling, storage, collection and disposal.	The Plan will be superseded by a Waste Management Plan and will be prepared in accordance with the conditions of the new development consent.
Contractor Management Plan	This plan aims to ensure that all activities carried out on behalf of Airly by external contracted parties comply with legislative requirements, internal and external practices and guidelines.	No
Fire Management Plan	Sets out the procedures for reporting fire and for the inspection and maintenance of firebreaks and asset protection zones at the pit top.	The Plan will be updated in accordance with the conditions of the new development consent.
Strata Failure Management Plan	In accordance with Clause 28b (ii) of the *Coal Mine Health and Safety Regulation 2006* the objectives of this management system are to ensure as far as reasonably practicable the safety of all persons present at the coal operation with regard to underground strata.	This plan will be reviewed in consultation relevant geotechnical expertise to address any changes in mining methodology approved in the new consent. This review will include provisions for monitoring and management actions defined in Section 8.6.
Ventilation Arrangements	In accordance with Clause 21 of the *Coal Mine Health and Safety Regulation 2006,* Airly Mine has implemented Ventilation Arrangements to ensure as far as reasonably practicable the safety of all persons present at the coal operation with regard to mine ventilation.	No

Table 14 – Project Construction Phase - Statement of Commitments

Desired Outcome	Action
All construction is minimizes potential impacts to the environment.	Erosion and sediment control measures will be implemented in accordance with the guidelines 'Managing Urban Stormwater – Soils and Construction, Volume 2E: Mines and Quarries' (DECC2008). Prior to construction a Construction Environmental Management Plan will be prepared and will include a: • Noise Management Plan • Air Quality Management Plan • Site Water Management Plan It is also proposed to develop the following plans: • A management plan for the undermining of the tower complex in

Desired Outcome	Action
	consultation with the owner of the infrastructure • Weed Management Plan • Construction Traffic Management Plan.

Table 15 – Project Operational Phase - Statement of Commitments

Desired Outcome	Action
General	
All operations are undertaken in a manner that will minimise the environmental impacts associated with the Project.	Operations will be undertaken in accordance with the description provided in this EIS.
Hours of Operation	
All operations are undertaken within the approved operating hours.	Operations will be undertaken 24 hours a day 7 days a week.
Subsidence	

Desired Outcome	Action
All subsidence impacts to surface sensitive features are minimised.	Mining operations will be conducted in accordance with the design parameters and those parameters will be implemented in the areas defined in this EIS. Geotechnical reviews of first workings development prior to the commencement of any extraction that may result in surface subsidence will be undertaken on an ongoing basis. A new Extraction Plan will be developed as required by the new consent and in accordance with any requirements of *Mining Act 1992*. An independent review of the geotechnical and subsidence aspects of the EIS will be undertaken prior to the development of the Extraction Plan and as part of the Response to Submissions Process. The Extraction Plan will provide detail around the management of subsidence impacts on the natural and built environment. The Plan is supported by a Subsidence Monitoring and Reporting Program and Community Consultation Process. The new Plan will incorporate requirements for mine design criteria, implementation, monitoring, management of mining systems and response plans to manage impacts to landscape, surface water, groundwater, and ecology impacts identified in as identified in Chapter 8.0 and in Sections 10.1, 10.2 and 10.3 of this EIS. The Plan will be developed in consultation with DITRIS (DRE) and OEH (land owner). The Plan will include subsidence management elements as follows. • Visual inspection of all mining areas prior, during and after mining activities will be undertaken. • Subsidence monitoring of initial panel and pillar mining on Mount Airly to confirm mining system performance and establish correlation between surface subsidence and underground geotechnical monitoring. • Ongoing underground geotechnical monitoring to demonstrate mining system performance will be undertaken. • Implement where practical remote subsidence monitoring techniques.
Surface Water, Groundwater, Geomorphology and Aquatic Ecology	
All surface water groundwater and aquatic ecology impacts are minimised to the greatest extent possible.	The existing Water Management Plan for Airly Mine will be revised, including the preparation of a Groundwater Monitoring and Management Plan (GMMP). The GMMP will include the continuation of the existing groundwater monitoring program as outlined in Section 3.14.4, as well as the following: • Additional groundwater monitoring bores will be installed during the pre-mining phase within Gap Creek and Genowlan Creek alluvium in the areas of predicted groundwater drawdown and monitored for groundwater levels and quality (where accessible). An additional four monitoring bores (including loggers) are planned to be installed in early 2015. • Daily groundwater volumes transferred to the surface facilities area will be monitored. • The GMMP will establish critical threshold levels for groundwater levels and groundwater quality to trigger additional assessment and management, and will define the mechanism for identifying and reporting exceedances. Action will be taken if the Level 1 minimal impact considerations (or other critical threshold levels) are found to be exceeded. • Groundwater monitoring data will be audited on an annual basis and compared to hydrogeological modelling predictions. The GMMP will define the mechanism for identifying and reporting variations from

Desired Outcome	Action
	predictions. • Should more than 278 ML/year of groundwater flow into the underground mine workings (i.e. more than the existing WALs) due to greater than predicted storage within the Permian strata (particularly within the old shale workings), it will be necessary for Centennial Airly to purchase an additional groundwater WAL to cover the excess groundwater volume. • Monitor current surface and groundwater monitoring points. The surface water monitoring will include the proposed REA Dam and the associated licensed discharge point. Additional groundwater monitoring points to be installed during the pre-mining phase within Gap Creek and Genowlan Creek alluvium in the areas of predicted groundwater drawdown. The surface and groundwater monitoring points will monitor the following parameters: o Piezometric height o Groundwater quality o Groundwater flow o Surface water quality and flow o geomorphic conditions of third order streams. The monitoring of the above noted parameters will be undertaken on a quarterly basis except for the monitoring of the geomorphic conditions of third order streams which will be undertaken approximately every two years. • Monitor groundwater bores on adjacent private properties to provide understanding of regional groundwater systems. Parameters to be monitored will be: o Piezometric height o Groundwater quality. • Monitor macroinvertebrate ecology in Airly Creek at appropriate upstream and downstream locations biannually (Spring and Autumn).
Terrestrial Ecology	
Ensure that potential impacts on threatened species and endangered ecological communities are monitored and managed appropriately.	A new Flora and Fauna Monitoring and Management Plan, consistent with the Mugii Murrum-ban State Conservation Area Plan of Management will be prepared in consultation with OEH.
Aboriginal and Historical Heritage Management	

Desired Outcome	Action
Ensure that identified and unidentified Aboriginal and Historic Sites are appropriately managed.	The sites identified in Chapter 8.0 and Section 10.3 will be subject to a monitoring programme within the Cultural Heritage Management Plan that will: • monitor for impacts caused by subsidence on identified archaeological sites prior to, during and post mining activities. The condition of the site will be compared with baseline. If the site is found to be damaged Centennial Airly will notify OEH and work in consultation to mitigate further impacts. Monitoring will cease once mining is complete under a particular site and inspection with NPWS demonstrate no further impact has occurred • follow the measures contained in the Mugii Murrum-ban SCA Plan of Management in relation to the Airly shale mining complex • if unrecorded Aboriginal object/s or historical cultural heritage material are identified in the Project Area during works, then all works in the immediate area must cease and the area should be cordoned off. NPWS and OEH will be notified so that the site can be adequately assessed and a Plan of Management developed. • In the unlikely event that skeletal remains are found, work will cease immediately in the vicinity of the remains and the area will be cordoned off. The local police will be contacted to make an initial assessment to ascertain whether the remains are part of a crime scene or possible Aboriginal remains. If this is the case, the local police will contact OEH so that they can determine if the remains are Aboriginal.
Traffic and Transport	
Project-related impacts on the road network are limited.	Airly Mine will implement a construction traffic management plan during construction of the CPP. This will include: • consideration of shift start and finish times to avoid excessive usage of intersections by both Airly and contraction workers • consideration of delivery times for large items of plant during construction.
Noise	
All noise impacts are minimised to the greatest extent possible.	The following noise mitigation and management measures will be implemented to reduce the noise impact of the Project: • preparation of a Noise Management Plan including noise monitoring program • noise levels are to be maintained at 35 dBA or less at all identified receptors.
Air Quality	
All air quality impacts are minimised to the greatest extent possible.	Existing monitoring measures will continue for Airly Mine, consisting of the four static dust deposition gauges.
Decommissioning and Rehabilitation Strategy	

Desired Outcome	Action
Rehabilitation to be conducted in accordance with Industry Standards.	The Proposed REA will be rehabilitated in stages and limited progressive vegetation of batters will occur with each lift of the REA. Native species tree planting at the base of the REA will be undertaken prior to the commencement of the REA establishment to provide visual screening. On the completion of mining and associated activities, all disturbed areas will be rehabilitated, through the following stages: • Decommissioning: demolition of infrastructure • Landform Establishment: shaping, bulk earthworks and construction of drainage works • Growth Media Development: topsoiling and application of soil ameliorants; • Ecosystem Establishment: revegetation • Ecosystem Sustainability: monitoring and maintenance.
Visual Amenity	
Ensure visual impacts are minimised.	The visual impacts of the Project, including from the proposed establishment of the reject emplacement area (REA), will be managed through the following mitigation measures. • Minimising light spill outside of areas required to be lit. • Where possible, establishment of tree, shrub and ground cover consistent with native woodland and grasslands. Tree planting at the basal area of the REA will be undertaken. • Progressive and ongoing restoration and rehabilitation of the REA will minimise visual contrast between the emplaced reject materials and surrounding landcover.
Waste	
All waste impacts are minimised to the greatest extent possible.	Dirty water management structures will be constructed in association with the work shop and refuelling facilities. This will include: • drainage to a collection point • collection of dirty water and separation of oil and grease from the waste water • disposal of waste oil and grease • direction of remaining dirty water to the dirty water management system.
Hazards	

Desired Outcome	Action
All hazard impacts are minimised to the greatest extent possible.	• dangerous goods will be stored in accordance with normal dangerous goods storage procedures. • spill containment will be managed in accordance with relevant Australian Standards • safety hazards will be managed through occupational health and safety procedures • environmental hazards will be managed through the EMP • fire protection infrastructure and plant (including fire extinguishers, mains hydrants and hoses) will be provided and maintained in accordance with relevant Australian Standards • site emergency response plans including emergency contact numbers are provided within management system for the site • maintenance of asset protection zones around existing and proposed infrastructure.

7. ADDITIONAL INFORMATION

A review of the EIS has revealed that there is an inconsistency between the proposed mining zones presented in the EIS Figures 4.1, 8.2 and 8.9 with those presented in the Subsidence Impact Assessment (Golder Associates, 2014) and technical assessments The mining zones presented (and assessed) in Golder Associates (2014) are correct. Similarly, the mining zones presented in majority of the technical assessments (except the Aquatic Ecology and Stygofauna Impact Assessment (Cardno, 2014)) are correct. Figure 6.1 in Cardno (2014) shows the incorrect mining zones. Section 6.2.2.2 of Cardno (2014) has referred to this Figure 6.1, however, the mitigation measures proposed in the section has relied on the impact assessment discussions in the Subsidence Impact Assessment. Centennial Airly can confirm that impact assessments have been undertaken for the correct mining zone boundaries in all relevant technical assessments and no further impact assessments are required.

The EIS Figures 4.1, 8.2 and 8.9 and Figure 6.1 in Cardno (2014) have been updated and are included in **Appendix G** of the RTS.

Figures 4.1, 8.2 and 8.9 presented in the EIS and Figure 6.1 in Cardno (2014) represent the initial mining zones proposed in the early stages of the EIS preparation. Following an assessment of the impact of post mining flooding (GHD (2014a) on the associated extracted workings required a reduction in the area of the deposit suitable for partial pillar extraction, as shown in the revised figures included in **Appendix G**. The reduction in the Partial Pillar Extraction Zone (and the resulting increase in the Shallow Zone) was necessary as the post-mining flooding study was showing subsidence results to be outside the proposed design limits. The expansion of the Shallow Zone with proposed first workings with splitting and quartering has the same extraction rate of 52% (refer Section 5.3.1)) and has a lower level of subsidence than that proposed for the partial pillar extraction.

8. ADDITIONAL CONSULTATION

Consultation was conducted with DRE as part of the RTS process. Centennial Airly hosted a site visit by the DRE Principal Subsidence Engineer held on 18 November 2014. The surface areas of the Project Application Area were inspected during the visit. Discussions focussed on:

- pillar splitting and quartering practices
- sinkhole formation at shallow depth
- sizing of cliff protection zones
- subsidence due to interactions between the proposed panel and pillar workings and the New Hartley Shale Mine (within the proposed New Hartley Shale Mine Interaction Zone)
- the practicalities and difficulties of traditional subsidence monitoring within the Mugii Murrum-ban SCA
- the practicalities and difficulties of underground subsidence monitoring.

A second site inspection was conducted on the 28 November 2014 with the DRE Subsidence Officer. Underground areas where pillar splitting and quartering had previously been undertaken over two years previously were inspected. Discussions focussed on:

- long term stability of workings after splitting and quartering
- the influence of local roof conditions on pillar stability
- underground subsidence monitoring.

A meeting was held at the DRE offices in Maitland on the 18 December 2014 with representatives of DPE, DRE and Centennial Airly to discuss DRE's concerns relating to the Modification 3 of consent DA162/91. The Project was also discussed. It was agreed that a further independent geotechnical review of the proposed Project's geotechnical and subsidence aspects would be carried out as part of the RTS process.

9. REFERENCES

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Appendix A

Response to Advice from Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development

and

Response to Submissions from NSW Office of Water

GHD Pty Ltd
January 2015

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16 January 2015

David King
Senior Mining Engineer
Centennial Airly Pty Ltd
Glen Davis Rd
CAPERTEE NSW 2846

Our ref: 22/16787
108310

Your ref:

Dear David,

Airly Mine Extension Project
Response to Submissions from Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development and NSW Office of Water

1 Introduction

GHD Pty Ltd (GHD) was commissioned by Centennial Airly Pty Limited (Centennial Airly) to prepare a Surface Water Impact Assessment (SWIA) and a Groundwater Impact Assessment (GWIA) for the proposed Airly Mine Extension Project (the Project). The assessments formed part of an Environmental Impact Statement (EIS) to support an application under Part 4 of the *Environmental Planning and Assessment Act 1979* seeking development consent for the Project. The EIS was on public exhibition from 19 September to 31 October 2014 and a number of submissions were received from the public and government agencies.

This letter has been prepared in response to advice provided by the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) and the NSW Office of Water (NOW). The IESC was requested to provide advice on the Project by the Australian Government Department of the Environment and the NSW Department of Planning and Environment. The advice received from the IESC and comments from the NOW are presented in Section 2 and Section 3 respectively, with a response from GHD following each comment.

2 IESC advice and responses

The IESC advice is divided into two sections:

- Assessment against its information guidelines (IESC, 2014).
- Advice in response to specific questions nominated by the requesting agencies.

2.1 Assessment against information guidelines

2.1.1 There is no baseline surface water hydrology data in Airly Creek

Flow monitoring is not currently available for Airly Creek. To provide an estimate of the flows within the creek, GHD have completed an assessment of catchment runoff contributing to Airly Creek using the GoldSim water balance model. The model represents catchments contributing to Airly Creek and the flows within the creek were determined at three points downstream of the surface facilities area at Airly Mine to the confluence of the creek with Reedy Creek.

At the confluence of Airly Creek and Reedy Creek within the Gardens of Stone National Park, no flow was predicted within Airly Creek for approximately 89% of the year. Average flows were modelled to vary between 0.4 ML/day and 24.8 ML/day. The maximum daily flow rate estimated by the water balance model was approximately 2,441 ML/day at this point on Airly Creek.

Further information is provided within Section 4 of Attachment 1 *Airly Mine Extension Project – Response to Submissions: Hydrology Assessment*, which is appended to this letter.

2.1.2 While fault zones are identified within the proposed project area, they are not included within the groundwater model and their potential impacts on aquifer connectivity and groundwater flow are not considered, limiting confidence in model predictions. The groundwater model is appropriate for prediction of regional-scale impacts of the proposal but finer resolution is needed to accurately predict potential impacts to the local environment, specifically including surface water-groundwater interactions.

Consideration of fault zones and their likely influence on local and regional hydrogeology is detailed in Attachment 2 *Airly Mine Extension Project – Response to Submissions: Fault Zone Hydrogeology Assessment*. Based on an assessment of available hydrogeological data, high resolution aeromagnetic (HRAM) and radiometric data (SRK, 2012) and a refinement of the conceptual hydrogeological model, it was concluded that fault zones have limited influence on local and regional hydrogeology at Airly Mine and do not need to be incorporated into the numerical hydrogeological model.

The numerical hydrogeological model has a regular grid size of 50 m by 50 m as reported in Section 5.2 of GHD (2014b). To assess model sensitivity to grid size as requested by the IESC, the model was re-run using a smaller grid size of 25 m by 25 m in the vicinity of Gap Creek. The model was run under Scenario 1 conditions, which assumes that there will be no change in hydraulic conductivity in the caving and fracturing zones above the panel and pillar mining zone (refer Section 6.1.1 of GHD (2014b)).

A comparison between the predicted maximum groundwater drawdown due to mining for the 50 m by 50 m model and the 25 m by 25 m model is shown in Table 1. The hydrogeological properties of the strata/model layers noted in the table have previously been described in Section 4.3 of GHD (2014b) while the assumptions made in the proposed conditions modelled (Scenario 1 and Scenario 2) have been described in Section 6.1.1 of GHD (2014b) and briefly described in Section 3.2.2 of Attachment 1.

Table 1 Sensitivity of predicted groundwater drawdown to model grid size

Strata / Model Layer	Maximum drawdown (m) 50 x 50 m grid size	Maximum drawdown (m) 25 x 25 m grid size
Shallow (Gap Creek) / Layer 1	2.7	2.6
Triassic / Layer 2	NA	NA
Permian overburden / Layer 5	4.6	2.8
Marrangaroo / Layer 9	6.1	3.6
Shoalhaven Group / Layer 10	0.1	0.1

As shown in Table 1, a reduction in grid size reduced the maximum predicted groundwater drawdown due to mining in all model layers. This suggests that the choice of grid size for the hydrogeological model has not underestimated groundwater drawdown or groundwater inflow predictions. Further, groundwater drawdown in Layer 1 can also be considered conservative due to the relatively low hydraulic conductivity adopted in the model for the shallow zone and alluvium (0.05 m/day). As stated in Section 6.3.1 of GHD (2014b), with a higher hydraulic conductivity for Gap Creek alluvium (K_h 2.5 m/day derived from transient calibration), the depressurisation within the alluvium would generally be less than 0.1 m.

2.1.3 Conclusions about the lack of likely impacts on the GBMWHA resulting from hydrology and water quality changes in Airly Creek are not supported by appropriate data and analysis. Identification of the relative contribution of waterways within the proposed project area to flows within the GBMWHA, and identification of potential water-dependent assets within the nearby Gardens of Stone National Park, is needed to support such conclusions.

Consideration of the impact of the Project on flows within Airly Creek up to its confluence with Reedy Creek within the Gardens of Stone National Park (within the Greater Blue Mountains World Heritage Area (GBMWHA)) is provided in Section 4 of Attachment 1. Modifications to the water management system as part of the Project are likely to alter the frequency and volume of discharges from the surface facilities area at Airly Mine via licensed discharge points (LDPs) into Airly Creek. In addition, the construction of the REA will reduce the catchment area contributing to the creek. Water balance modelling was undertaken to represent catchment runoff contributing to Airly Creek along with discharges predicted from the Project under proposed conditions in 2030. This year was chosen as it is when groundwater inflows into the underground workings are predicted to peak and the water management system is expected to be the most different compared to existing conditions.

Discharges from the LDPs at the surface facilities area into Airly Creek under proposed conditions were found to decrease the time of no flow within the creek from 89% of the year to 87% of the year. This represents a decrease in the time of no flow predicted for the creek under proposed conditions compared to catchment runoff alone and under existing conditions.

An increase the average flow within the creek by up to 1.1 ML/day was modelled when compared to catchment runoff to the creek alone (i.e. under existing conditions without LDP discharges). Average

flows at the confluence of Airly Creek with Reedy Creek were estimated to vary between 0.4 L/day and 25.9 ML/day. The maximum daily flow rate estimated by the water balance model was approximately 2,525 ML/day at this point on Airly Creek.

Considering annual volumes, discharge from the surface facilities area at Airly Mine via LDPs represents approximately 6.0% of the flow at Point C on Airly Creek on average under proposed conditions, with a 90th percentile value of 7.3% of flows. Note that 10th percentile discharges from the mine under proposed conditions were found to be 0 ML/year.

Further information is provided within Attachment 1 *Airly Mine Extension Project – Response to Submissions: Hydrology Assessment*, which is appended to this letter.

The results of the Airly Creek hydrology assessment indicate that the impacts of the Project on Airly Creek are limited to a decrease in the time of no flow within the creek and an increase in flow rate of approximately 1.1 ML/day on average, which represents 6.0% of flows at the downstream point at the confluence of the creek with Reedy Creek. Given the relatively small increase in the volume and frequency of flows within Airly Creek due to the Project, it is not expected that there will be any adverse impacts to the receiving environment within the GBMWHA downstream of Airly Mine.

GHD has undertaken an ecotoxicology assessment of mine water discharge from Airly Mine. This report will be submitted as supplementary information to the Response to Submissions. The aim of the assessment is to determine the potential toxicity of proposed mine water discharges via LDPs into Airly Creek. Toxicity testing was conducted on samples of water collected from the following locations:

- LDP001 – Collected from the 35 ML Discharge Dam.
- LDP002 – Collected from the 7 ML Dam.
- LDP003 – Collected from the Train Loader Dam.
- Production bore – Bore used to extract groundwater that is used to supplement water harvested by the surface water system for use in mining activities. Minor groundwater extraction has occurred from the production bore to date.
- Airly Creek Upstream – Airly Creek upstream of tributary from the Airly Mine Surface Facilities Area.
- Airly Creek – Airly Creek downstream of tributary from the Airly Mine Surface Facilities Area.
- Airly Creek Downstream – Airly Creek within the Gardens of Stone National Park.

Toxicity testing was conducted using the methodology outlined by ANZECC and ARMCANZ (2000). Samples were also collected for water quality analysis, with results compared to site-specific trigger values (SSTVs) and Environmental Protection Licence (EPL) limits specified for LDPs. A technical report is currently being prepared by GHD to provide the results of the ecotoxicology assessment, including results of water quality testing. The results are compared with modelled catchment runoff within the catchment, estimated from water balance modelling, to determine the dilution of mine water discharge downstream of Airly Mine.

2.1.4 *The groundwater impact assessment is based on the 'average' fracturing scenario for strata above the panel and pillar sections of mining within the Lithgow Seam. The risk assessment and water balance should include a sensitivity analysis.*

As detailed in Section 6.1.1 of the Hydrogeological Model Report (GHD, 2014b), the bulk horizontal and vertical hydraulic conductivities within the fracture zone above the proposed panel and pillar workings (i.e. Layers 3–7 of the hydrogeological model) have been established with reference to an empirical relationship derived by CSIRO based on long term monitoring data from Springvale Colliery (CSIRO, 2013). This empirical relationship allows for the calculation of hydraulic conductivity values for 'active' and 'goaf' fracturing, which refer to the initial (up to two months) and long term phases of fracturing respectively.

Since the 'goaf' fracturing phase is representative of hydraulic conductivities throughout the fracture zone throughout the majority of mine life, it is considered appropriate to apply these conditions within the hydrogeological model. However, to make the predictions more conservative an 'average' fracturing scenario was adopted based on the average hydraulic conductivity values of the 'active' and 'goaf' phases.

Hydrogeological model predictions of groundwater inflows into the mine workings under various hydraulic conductivity and storage conditions are shown in Figure 6-1 of the Hydrogeological Model Report (GHD, 2014b) and have been reproduced in Figure 1 below.

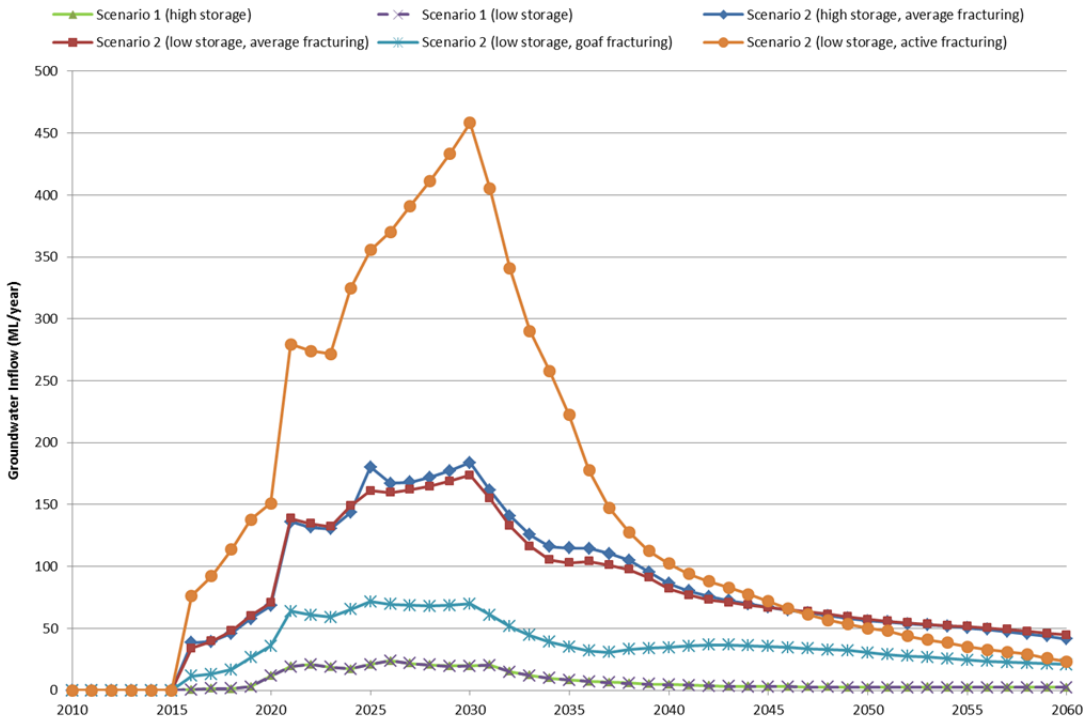

Figure 1 Modelled groundwater inflows into the mine workings under proposed conditions

The highest predicted groundwater inflows occur when hydraulic conductivity values for the 'active' fracturing phase are adopted throughout the entire life of mine. However, these inflows are considered to

be unrealistic since this phase occurs for less than two months following panel extraction and therefore was not considered further in the groundwater impact assessment or water balance assessment. The next highest groundwater inflows occur when 'average' fracturing parameters are adopted. These inflows exceed those predicted when hydraulic conductivity values for the 'goaf' fracturing phase are adopted throughout the entire life of mine (as shown in Figure 1) and were therefore considered to be conservative (but not unrealistic) and were assessed in the groundwater impact assessment (GHD, 2014d) and water balance assessment (GHD, 2014a).

The Water and Salt Balance Assessment (GHD, 2014a) adopts groundwater inflows from the 'average' fracturing scenario. In order to assess the sensitivity of the water and salt balance to other groundwater inflow conditions, the Scenario 1 inflows have also been incorporated into the model and results are given in Attachment 1. These inflows represent a lower bound since Scenario 1 does not include any hydraulic conductivity changes within the fracture zone above panel and pillar mining areas.

The primary impacts of the increased groundwater input into the mine water management system under Scenario 2 compared to Scenario 1 were found by water and salt balance modelling to be:

- A decrease in extractions from the production bore to supplement water supply for mining associated activities.
- An increase in average volume and frequency of discharges via LDP001 into Airly Creek. Note the maximum daily discharge was not found to change between scenarios modelled.
- A decrease in the salinity of the water management system associated with reduced extractions from the production bore.

Further information is provided within Attachment 1 *Airly Mine Extension Project – Response to Submissions: Hydrology Assessment*, which is appended to this letter.

2.2 Response to specific questions nominated by the requesting agencies

2.2.1 Question 1: In respect to the baseline data utilised in the EIS: Has the baseline climate, groundwater and surface water data been collected to a satisfactory standard over an appropriate timeframe?

Given the relatively small increase in the volume and frequency of flows within Airly Creek due to the Project, it is not expected that there will be any adverse impacts to the receiving environment within the GBMWHA downstream of Airly Mine. The flows within the creek have been estimated using water balance modelling to predict catchment runoff. In the absence of metered data for the flows within Airly Creek, this represents an estimate of the baseline hydrology of the creek.

Further information is provided within Section 4 of Attachment 1 *Airly Mine Extension Project – Response to Submissions: Hydrology Assessment*, which is appended to this letter.

2.2.2 Question 2: In respect to the baseline data utilised in the EIS: Are the rainfall records relied upon in the EIS sufficiently representative of the Airly site for water modelling and prediction purposes? Are better rainfall records available?

An assessment of the rainfall data available for use within the SWIA has been provided in Section 2 of Attachment 1 *Airly Mine Extension Project – Response to Submissions: Hydrology Assessment.* A total

of 29 Bureau of Meteorology (BOM) stations within a 30 km radius of the surface facilities area at Airly Mine were considered. The Ilford (Warrangunyah) Station was determined to be the most appropriate station to obtain data due to a number of factors, including its location relative to the site, similar elevation to the surface facilities area and relatively long record.

Further information is provided within Section 2 of Attachment 1 *Airly Mine Extension Project – Response to Submissions: Hydrology Assessment*, which is appended to this letter.

2.2.3 Question 3: In respect to the baseline data utilised in the EIS: Are there significant geological features present that have the potential to act as preferential pathways between the different hydrogeological units and have these been adequately investigated for inclusion/omission within the groundwater model?

A fault zone hydrogeology assessment has been undertaken as part of the Response to Submissions process. This assessment is appended to this letter report as Attachment 2. The assessment has been conducted by further review of available hydrogeological data and by conceptualisation of groundwater flow due to structural features (Attachment 2). The assessment concludes that fault zones have limited influence on local and regional groundwater flow at Airly Mine and it is not considered necessary to incorporate fault zones into the numerical hydrogeological model.

The extensive network of fractures and joints within the Triassic and Permian strata is considered to have a greater influence on groundwater flow than fault zones. These fractures direct groundwater to seepage areas and account for the relatively low piezometric head throughout Mount Airly and Genowlan Mountain, the water loss during drilling and packer testing and the unsaturated conditions in the Lithgow Seam.

2.2.4 Question 4: In respect of the EIS's groundwater modelling and its assessment of the impacts of potential water discharges to surface waters: Does the groundwater model use reasonable and suitable characterisations of the groundwater resources for the Project?

Further explanation of the various fracturing scenarios is given in Section 2.1.4. As discussed, the groundwater inflows predicted under the 'active' fracturing scenario are considered to be unrealistic since this phase occurs for less than two months following panel extraction and therefore was not considered further in the groundwater impact assessment (GHD, 2014d) or water balance assessment (GHD, 2014a) undertaken in support of the EIS. Hydrogeological and subsidence monitoring data will be collected and assessed throughout mining operations and hydraulic properties adopted in the hydrogeological model will be modified if necessary.

Further assessment of the sensitivity of the hydrogeological model to grid size is given in Section 2.1.2.

2.2.5 Question 5: In respect of the EIS's groundwater modelling and its assessment of the impacts of potential water discharges to surface waters: Are the anticipated quantitative groundwater and surface water impacts accurately and reasonably described?

As noted above, a fault zone hydrogeology assessment has been undertaken by further review of available hydrogeological data and by conceptualisation of groundwater flow due to structural features (Attachment 2). The assessment concludes that fault zones have limited influence on local and regional

groundwater flow at Airly Mine and it is not considered necessary to incorporate fault zones into the numerical hydrogeological model.

Again, further explanation of the various fracturing scenarios is given in Section 2.1.4.

The extensive network of fractures and joints within the Triassic and Permian strata is considered to have a greater influence on groundwater flow than fault zones and, as discussed previously, direct groundwater flow to seepage areas across the slopes of Mount Airly and Genowlan Mountain. The numerical hydrogeological model does not predict any groundwater drawdown greater than 0.1 m in the vicinity of these seepage areas for any of the fracturing scenarios. For this reason, it is not expected that there would be a reduction in groundwater supply to Groundwater Dependent Ecosystems (GDEs) in these seepage areas.

2.2.6 Question 6: In respect of the EIS's groundwater modelling and its assessment of the impacts of potential water discharges to surface waters: Are the predictions of loss flows in local streams reasonable? (Tables 10.5 and 10.6 on pages 290 and 291 of the EIS main text).

Existing baseflows along Gap Creek and Genowlan Creek are relatively small within the Project Application Area and have not been detected by the existing flow monitoring devices as shown in Section 5.3 of GHD (2014c). An additional flow gauge is planned to be installed within Genowlan Creek in 2015.

The hydrogeological model was used to predict potential changes to baseflow at 11 locations within and outside the Project Application Area (refer Figure 5-8 in GHD (2014b)). The results are provided in Section 6.4.1 of GHD (2014b) and the potential impacts from these changes on surface water receptors are discussed in detail in Section 6.4 of the surface water assessment (GHD (2014c)) and summarised in Section 10.1.3.2 of the EIS. Cumulative impacts due to several Project components have been assessed to estimate the maximum predicted impact on waterway flow, the results of which are presented in Table 10.5 of the EIS.

The total predicted change to waterway flow at all locations assessed is conservative, i.e. the impacts are likely to be less than indicated. This is because a conservative model, which assumed that the catchment runoff was equal to 5% of the mean annual rainfall, was used to evaluate the impact of change in baseflow on total annual flow. The annual runoff is more likely higher than 5% of annual runoff due to the rocky nature and steep topography of the catchment. It should also be noted that the estimated losses due to surface cracking are conservative and the maximum predicted impact is unlikely.

The concerns raised by IESC regarding consideration of structural features (faults), fracture zone hydraulic properties and model grid size have previously been addressed in this letter, in Sections 2.1.2 and 2.1.4. Given the outcomes of the assessments contained in these sections it can be stated that a high level of confidence is present in the predictions of baseflow losses from the current groundwater model. When additional baseflow measurements become available as mining progresses, the measurements will be utilised as model calibration targets to further validate the existing hydrogeological model to improve confidence in predictions.

2.2.7 *Question 7: In respect of the EIS's groundwater modelling and its assessment of the impacts of potential water discharges to surface waters: Is it reasonable for the EIS to rely on the conclusion that "There is minimal hydraulic connection between the local and regional groundwater sources"? (Page 277 of the EIS main text)*

A fault zone hydrogeology assessment has been undertaken by further review of available hydrogeological data and by conceptualisation of groundwater flow due to structural features (Attachment 2). The assessment concludes that fault zones have limited influence on local and regional groundwater flow at Airly Mine and it is not considered necessary to incorporate fault zones into the numerical hydrogeological model. This conclusion is consistent with the description of the groundwater system provided in Mackie Martin & Associates (1992), which describes the hydrogeology as '*a multilayered aquifer system with limited or negligible hydraulic connectivity between layers*'.

The production bore extracts groundwater from a higher yielding zone within the Shoalhaven Group. Based on fault zone mapping and the assessment undertaken in Attachment 2, it is unlikely that a fault zone connects the local and regional groundwater sources at this point. Based on the geological log provided in Larry Cook & Associates (2009), the higher yielding zone is described as a sandstone and shale unit with quartz bands which suggests that it is a porous groundwater source and may contain localised fracturing.

The groundwater from the Shoalhaven Group is highly brackish to saline and magnesium sulfate type water. This is considerably different to the local groundwater sources within Mount Airly and Genowlan Mountain, which are sodium chloride/bicarbonate (ARP05), calcium bicarbonate (ARP09) and calcium/magnesium bicarbonate (Village Spring) type.

The registered domestic and stock bores that were identified within a 5 km distance of the Project Application Area primarily extract groundwater from the lower Devonian regional groundwater source (refer Section 2.6.2 of the EIS, Sections 3.5 and 3.6 of GHD (2014c)). It is considered that there would be minimal inter-aquifer hydraulic connection between this lower regional groundwater source and the upper Shoalhaven Group, based on differences in groundwater chemistry. The Devonian groundwater source is more of a calcium/bicarbonate type water whereas the Shoalhaven Group, as noted above is magnesium sulphate type water. The Project is unlikely to result in impacts to regional groundwater resources and the downstream groundwater users.

2.2.8 *Question 8: In respect to how the EIS relates to matters of national environmental significance: Do the subsidence, groundwater and surface water assessments provide reasonable estimations of the risk, likelihood, extent and significance of impacts to water-related assets?*

As discussed in Section 2.1.3, consideration of the impact of the Project on flows within Airly Creek up to the confluence of the creek with Reedy Creek within the Gardens of Stone National Part is provided in Attachment 1. The results of the assessment indicate that the impacts of the Project on Airly Creek are limited to a decrease in the time of no flow within the creek and an increase in flow rate of approximately 1.1 ML/day on average, which represents 6.0% of flows at the downstream point at the confluence of the creek with Reedy Creek. Given the relatively small increase in the volume and frequency of flows within Airly Creek due to the Project, it is not expected that there will be any adverse impacts to the receiving environment within the GBMWHA downstream of Airly Mine.

Further information is provided within Section 4 of Attachment 1 *Airly Mine Extension Project – Response to Submissions: Hydrology Assessment*, which is appended to this letter.

Based on the conceptual hydrogeological model, which assumes that local groundwater flow is influenced by the extensive network of fractures and joints within the Triassic and Permian strata, it follows that the minor water loss that may occur due to subsidence cracking within the New Hartley Shale Mine Potential Interaction Zone will follow the existing network of fractures and joints and reappear as seepage to the east – northeast of Mount Airly (upstream of the confluence between Gap and Genowlan Creeks).

2.2.9 Question 9: In respect to how the EIS relates to matters of national environmental significance: Is the Project likely to cause any impacts to the downstream streams and rivers, and through to the Colo River, and within the Gardens of Stone and Wollemi National Parks and Greater Blue Mountains World Heritage Area? If so, what is the likely nature and extent of these impacts?

As discussed in Section 2.1.3, consideration of the impact of the Project on flows within Airly Creek up to the confluence of the creek with Reedy Creek within the Gardens of Stone National Part is provided in Attachment 1. The results of the assessment indicate that the impacts of the Project on Airly Creek are limited to a decrease in the time of no flow within the creek and an increase in flow rate of approximately 1.1 ML/day on average, which represents 6.0% of flows at the downstream point at the confluence of the creek with Reedy Creek. Given the relatively small increase in the volume and frequency of flows within Airly Creek due to the Project, it is not expected that there will be any adverse impacts to the receiving environment within the GBMWHA downstream of Airly Mine.

Further information is provided within Attachment 1 *Airly Mine Extension Project – Response to Submissions: Hydrology Assessment*, which is appended to this letter.

As discussed in Attachment 3, although Site Specific Trigger Values (SSTVs) have been derived using water quality data from Airly Creek downstream of Airly Mine Licensed Discharge Points (LDPs), mine water discharge has been infrequent over the monitoring period (discharge from LDP001 occurred in December 2010, January 2011, February 2012 and March 2012, while discharge from LDP003 occurred in January 2013, March 2014 and April 2014). No correlation between mine water discharge and water quality at Airly Creek is evident from the time series plots presented in Attachment 3.

Recent monitoring data from site 'Airly Creek Upstream', located on Airly Creek upstream of any mine water discharge, has been compared to data from site 'Airly Creek'. Similar water quality has been reported for both sites over the period they have both been monitored.

2.2.10 Question 10: In respect to how the EIS relates to matters of national environmental significance: What are the risks of impact to the critically endangered species Pultenaea sp. Genowlan Point from hydrological and hydrogeological changes resulting from the project? Are these adequately addressed in the EIS?

The single population of the critically endangered species *Pultenaea sp. Genowlan Point* is located on the northwest facing tip of the Genowlan Mountain within the Project Application Area. This location falls within the proposed mining area, specifically within the Cliff Line Zone and Zone of First Workings (refer Figure 8.2 and Figure 10.6 in the EIS) where the subsidence impact assessment (Golder Associates, 2014) has predicted vertical subsidence of 10 – 65 mm, tilt 0.6 – 1.1 mm/m and tensile strain 0.2 -

0.3 mm/m for this zone (refer Section 7.1 of Golder Associates, (2014)). The fractured zone height is predicted to be is less than 10 m above the coal seam and no surface cracking is predicted. The hydrogeological model (GHD, 2014b) does not predict that groundwater impact occurs within this shallow zone (down to 10 m bgl) supporting the *Pultenaea sp. Genowlan Point* plants. No surface disturbance is proposed in the vicinity of the plants. No surface cracking is predicted for this zone and hence no hydrological impacts are predicted to occur on the *Pultenaea sp. Genowlan Point* local population.

The terrestrial ecology impact assessment for the Project (RPS, 2014) discusses in detail the potential ecological impact of the predicted subsidence effects on the recorded population of *Pultenaea sp. Genowlan Point.* That assessment also undertook the 7-Part Test / Assessment of Significance (*Threatened Species and Conservation Act 2005* (TSC Act)) and the Assessment of Significance (*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)) for this species; the results of these assessments are discussed elsewhere in the Response to Submissions. Briefly, the 7-Part Test (TSC Act) revealed the low levels of subsidence effects are not considered substantial enough to impact upon the presence of the species, and that the Project is unlikely to affect the lifecycle of *Pultenaea sp. Genowlan Point* such that a viable local population of the species is likely to be placed at risk of extinction. Similarly the EPBC Act Assessment of Significance revealed the low level of predicted subsidence is not expected to impact upon the heath areas that provide habitat for *Pultenaea sp. Genowlan Point* such that these habitats would become unsuitable and result in the long-term decrease in the size of the local population of the species.

2.2.11 Question 11: In respect to how the EIS relates to matters of national environmental significance: Are the proposed mitigation measures likely to be effective in managing impacts to water-related assets of the project (including downstream assets)? Are additional measures and commitments required to mitigate and manage impacts to water-related assets?

The predictions and assessments made in the surface water and groundwater impact assessments are based on extensive assessment of available geological, hydrological and hydrogeological data. In most cases, conservative assessments have been undertaken.

Ongoing subsidence, surface water and groundwater monitoring will be undertaken throughout mining operations and monitoring data will be compared to predictions. An adaptive management approach will be adopted whereby management strategies will be modified if necessary based on monitoring data collected. In particular, there will be several years of mining within the western portion of the Project Application Area before approaching more sensitive groundwater and surface water receptors in the vicinity of Gap and Genowlan Creeks. Monitoring data collected during early years of mining will inform management strategies for mining near Gap and Genowlan Creeks.

The mining systems proposed in the EIS are designed to be flexible. Should results from either surface water or ground water monitoring indicate that predicted conditions are not being met and water systems are being adversely impacted due to mining activities, a number of adaptive actions can be taken to bring impacts in line with expected outcomes. These could include the following actions, or a combination of them:

- Changing the size of pillars that remain after completion of extraction to improve stability.
- Changing mining layouts.

- Decreasing void widths.
- Increasing the size of set off distances or exclusion zones around key features.
- Not carrying out second workings under key features.

2.2.12 Question 12: In respect to how the EIS relates to matters of national environmental significance: What are the key features of a monitoring and management framework that would address the key uncertainties and risks of the project identified by the Committee?

To address the uncertainties raised by the IESC, additional information regarding the nature and extent of downstream impacts on Airly Creek (refer Attachment 1) and the influence of structural features (faults) on predicted groundwater drawdown and groundwater inflows (refer Attachment 2) have been provided in this letter report.

A commitment has been made in the EIS (refer Table 11.3) to revise the existing Water Management Plan following development consent, and this revision will include the preparation of a Groundwater Monitoring and Management Plan (GMMP). The GMMP will incorporate clearly defined triggers and actions based on monthly and annual reviews of monitoring data. The GMMP will be prepared in consultation with the relevant government agencies. The preparation of the GMMP will take into consideration the recommendations provided in IESC (2014) Responses 51 to 57.

Additional alluvial monitoring bores will be installed in 2015 in areas of predicted groundwater drawdown and additional VWPs will be installed further to the east of the Project Application Area.

The aquatic ecology monitoring (macroinvertebrates and stygofauna) will continue. The monitoring and management program to be developed will take into consideration the recommendation in IESC (2014) Responses 58 to 59 and will ensure that at least two years monitoring is undertaken prior to commencement of mining.

3 NOW comments and responses

The comments from NOW and responses where required are detailed in this section.

3.1 Assess the potential impacts of reductions in baseflow due to mining on basic landholder rights for surface water users.

As discussed in Section 2.1.4 of the SWIA (GHD, 2014c), the Project Application Area is located within the Hawkesbury and Lower Nepean Rivers Water Source regulated by the Greater Metropolitan Region Unregulated River Water Sources Water Sharing Plan. The requirement of domestic and stock rights allocated within this water source is 25.4 ML/day.

Section 6.4.1 of the SWIA presents the predicted cumulative impact of the Project on hydrology. Several impacts to waterways were considered, including the following:

- Changes in baseflow due to mining.
- Changes to catchment runoff due to surface cracking.
- Changes to catchment runoff due to construction of the REA.

- Changes to the frequency and volume of discharges via LDPs due to water management at the surface facilities area.

A point located on Gap Creek at the Project Application Area boundary (identified as Location 2 in Table 6-5 and Figure 6-9 in GHD (2014c)) was found to have the largest potential reduction in waterway flow of 11.3 ML/year or 9% as a result of reduction in baseflow and surface cracking. This is equivalent to 0.03 ML/day, which is 0.12% of the volume allocated to domestic and stock rights for the Hawkesbury and Lower Nepean Rivers Water Source. It should be noted that the estimated losses caused by surface cracking are very conservative.

The localised impact to Gap Creek at the Project Application Area boundary is expected to dissipate further downstream. At the confluence of Gap Creek and Genowlan Creek, the predicted reduction in total flow is estimated be 40.5 ML/year, representing a reduction in the change to waterway flow to 5%. This is equivalent to 0.11 ML/day, which is 0.44% of the volume allocated to domestic and stock rights for the Hawkesbury and Lower Nepean Rivers Water Source. Again, the 5% reduction in total flow is a maximum predicted impact which is unlikely to occur.

The impacts to basic landholder rights predicted by the potential reduction of waterway flow is expected to be less than 0.5% of the volume allocated to domestic and stock rights for the Hawkesbury and Lower Nepean Rivers Water Source. This loss is likely to be within the bounds of natural variation due to Genowlan Creek's pre-existing ephemeral nature. Impacts to downstream water users are therefore not expected to be observable.

3.2 Clarify the expected volumetric take of water from mine inflows after cessation of mining activities.

Following completion of coal production, groundwater inflows into the mine are predicted to reduce from approximately 20 ML/year in 2030 to less than 3 ML/year in 2046 under Scenario 1, and from approximately 184 ML/year in 2030 to less than 3 ML/year by 2090 under Scenario 2 ('average' fracturing). The assumptions made in the proposed conditions modelled (Scenario 1 and Scenario 2) have been described in Section 6.1.1 of GHD (2014b) and briefly described in Section 3.2.2 of Attachment 1.

As noted in Section 2.1.4, the 'average' fracturing scenario adopts the average horizontal and vertical hydraulic conductivities of the 'active' and 'goaf' fracturing phases within the fracture zone above the proposed panel and pillar mining areas.

3.3 Clarify water licensing arrangements for surface water and incidental ingress of groundwater into the mine and obtain additional water entitlement if required.

Airly Mine does not currently hold any surface water extraction licences under the *Water Management Act 2000*.

Surface water licensing requirements under the *Water Management Act 2000* were assessed for existing and proposed conditions in Section 5.8.1 and Section 6.9.1 of the Surface Water Impact Assessment (GHD, 2014c) respectively.

The total predicted maximum surface water licensing requirement was found to be 211 ML/year under existing conditions and 253 ML/year under proposed conditions as a result of water used in mining activities, based on the 90th percentile results of the water balance. It should be noted that due to the circulation of groundwater from the production bore and inflows into the underground workings within the water management system, the volumetric limits specified by surface water licences for water used at Airly Mine may be considerably less than these volumes.

Capture of coal- and sediment-laden runoff was determined to be exempt from requiring licensing under both existing and proposed conditions. The capture of clean runoff by the water management system was also determined to not require licensing as it is within the harvestable rights for the Airly Mine site.

Further information is provided in GHD (2014c).

As outlined in Section 6.3 of the Groundwater Impact Assessment (GHD, 2014d), groundwater extraction and interception from the Sydney Basin North groundwater source over the life of the Project (based on Scenario 2, 'average' fracturing) is as follows:

- Groundwater inflows into the underground mine workings, which are predicted to peak at up to 184 ML/year in year 2030.
- Groundwater extraction from the Shoalhaven Group via the existing production bore, which was predicted to peak at 192 ML/year (under dry conditions) in year 2015. This is a conservative estimate since it assumes that a Coal Handling and Preparation Plant (CHPP) and Reject Emplacement Area (REA) are operating in 2015; this is unlikely to occur.
- Coal moisture, which is removed with the Run of Mine (ROM) coal, which is predicted to be 46 ML/year (GHD, 2014a) during mining operations.

The water balance model (GHD, 2014a) has been used to predict total extraction and interception from the Sydney Basin North groundwater source over the life of the Project. Model output is shown as Figure 6-9 in GHD (2014b) and reproduced as Figure 2 in this report. Total groundwater extraction and interception is predicted to peak at 180 ML/year (50^{th} percentile) or 199 ML/year (90^{th} percentile). These volumes are well below Centennial Airly's existing total Water Access Licences for the Sydney Basin Groundwater Source of 278 ML/year, even when the coal moisture of 46 ML/year is considered. Therefore, no additional groundwater entitlement is required by Centennial Airly.

Figure 2 Modelled groundwater extraction and interception

3.4 Clarify the proposed life of the mine. Proposed coal production is due to commence in 2015, and is to extend for 25 years (estimated to cease in 2040) with a recovery of 60 years to 2100. The modelling and subsequent groundwater assessment report detail the production of coal is to last until 2030.

The assessed mine plan is based on coal production between 2015 and 2030, although overall development consent for the Project is sought for a period of 25 years (inclusive of the rehabilitation phase). Once coal production is complete in 2030, groundwater will continue to flow into the mine over a period of approximately 60 years (based on the Scenario 2 'average' fracturing model).

3.5 Ensure that any take of clean water runoff is licensed through the Office of Water.

The capture of clean water runoff was assessed as part of the surface water licensing requirements discussed in Section 5.8.1 and Section 6.9.1 of the Surface Water Impact Assessment (GHD, 2014c) for existing and proposed conditions respectively. Following an assessment of Centennial Airly's landholdings and existing dams, it was determined that the predicted volume of clean catchment runoff captured by the mine water management system under both existing and proposed conditions is within the maximum harvestable rights for the site. Therefore, no licensing for the capture of clean water runoff is expected to be required by Centennial Airly under the *Water Management Act 2000*.

Further information is provided in GHD (2014c).

3.6 Investigate and determine the frequency and intensity of rainfall event that may cause larger onsite dams to go into discharge.

The current surface water management system at Airly Mine has been designed to allow for the harvesting of water from the site. Provision for dirty water storage has been made to contain the 100 year, 72 hour rainfall event (Centennial Airly, 2011). As noted in the Surface Water Impact Assessment (GHD, 2014c), the REA water storages proposed as part of the Project will also be sized to capture the 100 year, 72 hour rainfall event.

Uncontrolled discharges from the Airly Mine site into the surrounding environment are not expected to occur under existing conditions or proposed conditions during the Project. The 7 ML Dam and the Train Loader Dam (refer Figure 3.2 in the EIS) are maintained at a low level by transferring water to 109 ML Dirty Water Dam. The same water management strategy is expected to be employed at the proposed REA Dam. Overflows from the Settling Pond are also directed to the 109 ML Dirty Water Dam. Water from the 109 ML Dirty Water Dam is transferred to the 35 ML Discharge Dam via a gravity-fed pipe, as well as an overland drain designed to cater for overflows. Discharges from the site are expected to only occur via LDPs into Airly Creek from the 35 ML Discharge Dam, 7 ML Dam, Train Loader Dam and REA water storages (proposed LDP).

4 References

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Yours Sincerely

Stuart Gray
Senior Hydrogeologist
(02) 4979 9999

Attachment 1 Airly Mine Extension Project – Response to Submissions: Hydrology Assessment
Attachment 2 Airly Mine Extension Project – Response to Submissions: Fault Zone Hydrogeology Assessment
Attachment 3 Airly Mine Extension Project – Response to Submissions: Airly Creek Water Quality

16 January 2015

David King
Senior Mining Engineer
Centennial Airly Pty Ltd
Glen Davis Rd
CAPERTEE NSW 2846

Our ref: 22/16787
108314

Your ref:

Dear David

Airly Mine Extension Project - Response to Submissions
Hydrology Assessment

1 Introduction

GHD Pty Ltd (GHD) was commissioned by Centennial Airly Pty Limited (Centennial Airly) to prepare a Surface Water Impact Assessment (SWIA) (GHD, 2014a) for the proposed Airly Mine Extension Project (the Project). A Water and Salt Balance Assessment (GHD, 2014b) was prepared as part of the SWIA which involved modelling of existing and proposed conditions at Airly Mine to assess potential changes in the local water cycle and quantify potential impacts of the Project. A review of the Environmental Impact Statement (EIS) by the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) recommended additional assessment on several aspects relating to the Water and Salt Balance Assessment (GHD, 2014b) in the advice they provided to Department of Planning and Environment on 13 November 2014 (IESC, 2014). This report outlines further assessment of hydrology undertaken by GHD.

Information presented in this letter report is in response to Questions 1 and 2 provided to ISEC by the requesting agencies (NSW Department of Planning and Environment, Commonwealth Department of the Environment) and the associated responses contained within the IESC advice (IESC, 2014).

2 Rainfall data assessment

2.1.1 Background

Site-specific rainfall data was supplied by Centennial Airly for the period from April 2010 onwards. This data was used within the SWIA (GHD, 2014a) to assess recorded flows in the upstream mountainous areas of Village Spring, Gap Creek and Genowlan Creek. These locations are shown in Figure 5.5 of GHD (2014a).

As noted in Section 3.6.1 of GHD (2014a) a more complete record was required to adequately consider the long-term wet and dry conditions of the Project site for the Water and Salt Balance Assessment (GHD, 2014b). Daily rainfall data was obtained as SILO Patched Point Data from the Queensland Climate Change Centre of Excellence. SILO Patched Point Data is based on historical data from a particular Bureau of Meteorology (BOM) station with missing data 'patched in' by interpolating with data from nearby stations. SILO data was obtained for BOM Ilford (Warrangunyah) Station, which is located

approximately 29 km north-west of the surface facilities area at Airly Mine. This station was chosen based on the length and quality of the data record and proximity to the site. Annual rainfall for BOM Ilford (Warrangunyah) Station for the period January 1901 to December 2012 was presented in Figure 3-4 of GHD (2014a).

2.1.2 Station selection process

A large number of BOM stations were considered in the process of selecting a rainfall record for use within the water and salt balance model and SWIA for the Project. A total of 29 BOM stations were identified within a 30 km radius of the surface facilities area at Airly Mine. Table 2-1 presents a summary of the stations identified, as well as other factors considered including distance from the Project, elevation of the station and the length and completeness of record.

Figure 2-1 presents the spatial distribution of average seasonal rainfall over the period 1961 to 1990 derived by BOM (2014) for the Project Application Area and surrounding region. The rainfall totals are derived using data recorded at the network of meteorological stations operated by BOM. The stations identified within 30 km of the surface facilities area are also presented in Figure 2-1. As noted by the IESC, the Ilford (Warrangunyah) Station lies within a separate rainfall district to the Airly Mine site, however as seen in Figure 2-1, the average rainfall totals are similar at the two sites.

The majority of the meteorological stations considered were determined to be inappropriate due to the short length of record, which would not be able to represent the long-term wet and dry conditions of the Project site. Other sites were eliminated from consideration due to significantly varying elevations compared with the surface facilities area at the mine. For example, the Running Stream (Brooklyn) site was not considered due to its elevation of 1,070 m Australian Height Datum (AHD), which is substantially higher than the elevation of the surface facilities area at the mine, which is approximately 750 m AHD. Other sites were determined to be unsuitable due to the completeness of the recorded rainfall. For example, although the Portland (Jamieson St) Station had a relatively long record at 100 years, the completeness of this record was found to be approximately 65.1%.

After careful consideration of the data presented in Table 2-1 and Figure 2-1, the Ilford (Warrangunyah) Station was determined to be the most appropriate station to obtain data for the Water and Salt Balance Assessment (GHD, 2014b). This choice is justified due to a number of factors, including its location relatively close to the Project site (within 30 km of the surface facilities area), similar elevation to the surface facilities area at Airly Mine (750 m AHD) and a relatively long data record (114 years).

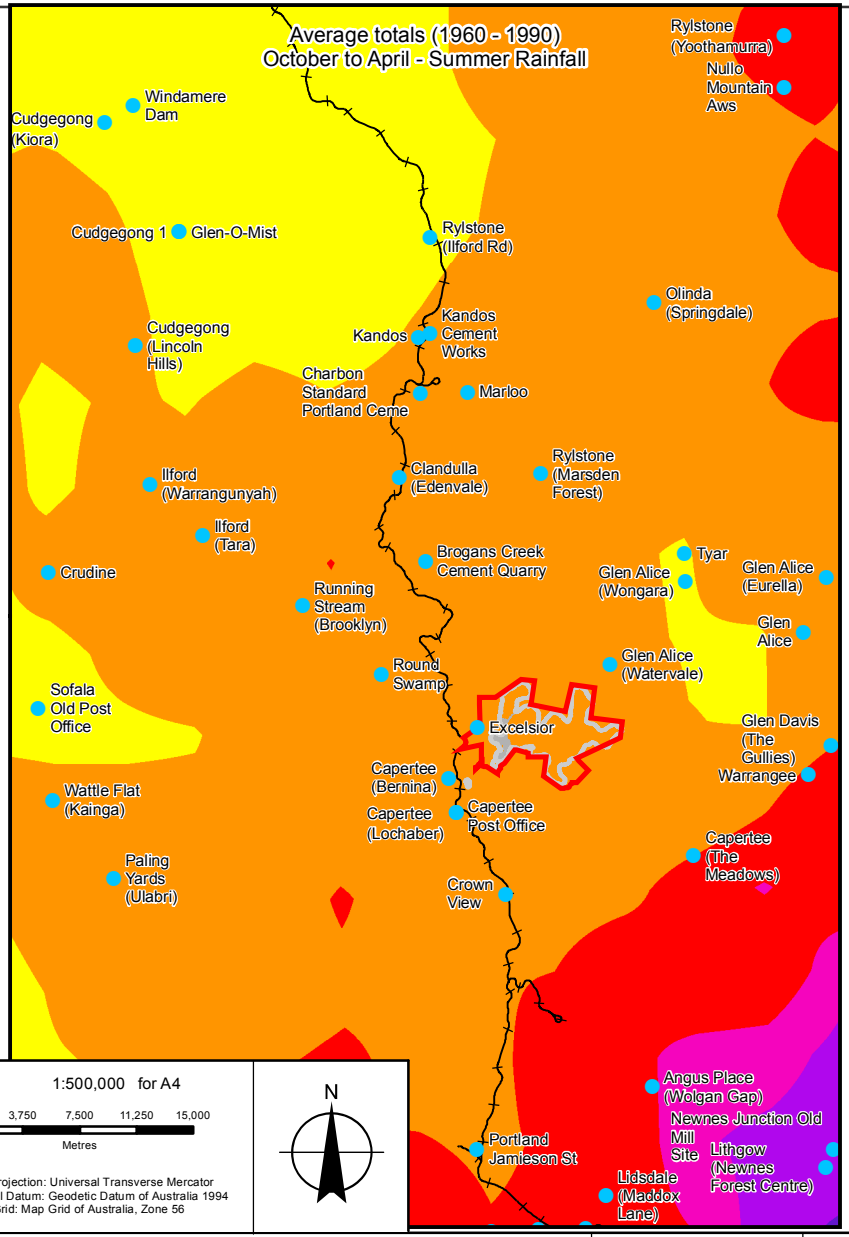
2.1.3 Comparison of SILO and site-specific rainfall data

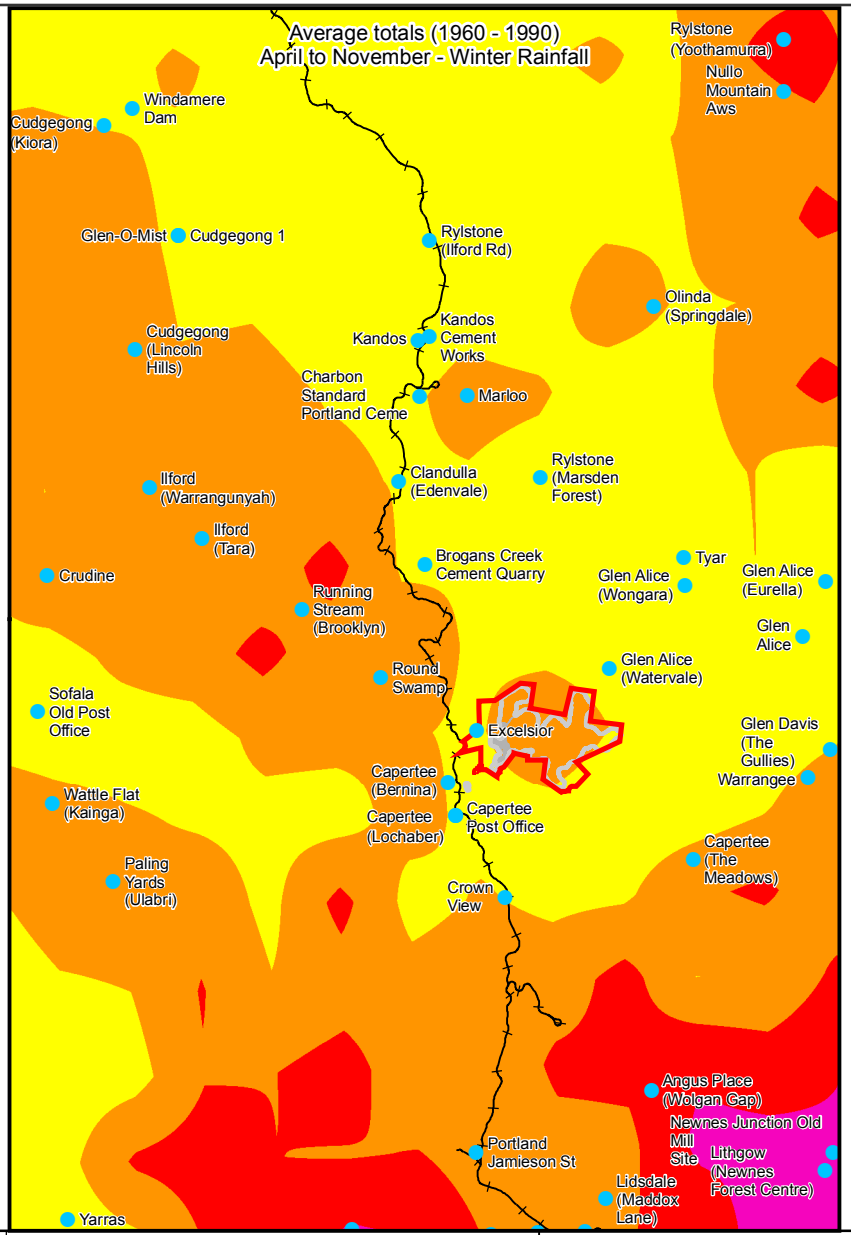
A comparison of the SILO patched point data obtained for the Ilford (Warrangunyah) Station and site-specific rainfall recorded at Airly Mine is provided in Figure 2-2 from April 2010 to November 2014. Daily rainfall is generally found to be similar, although larger rainfall events are underestimated by the SILO data, most notably in March 2014. However, the cumulative total over this period is similar between the two sources of rainfall data.

Table 2-1 Rainfall station summary

Station name	Station number	Distance from surface facilities area (km)	Elevation (m AHD)	Length of record (years)	Completeness of record
Excelsior	63192	1.5	Unknown	9	100%
Capertee (Bernina)	63241	3.5	780	29	95.2%
Capertee (Lochaber)	63168	4.9	810	19	96.9%
Capertee Post Office	63191	4.9	732	28	97.3%
Round Swamp	63195	8.5	760	9	100%
Glen Alice (Watervale)	63180	9.5	420	69	84.3%
Crown View	63178	9.9	899	6	86.0%
Brogans Creek Cement Quarry	62001	12.9	518	28	84.8%
Capertee (The Meadows)	63179	15.2	485	39	95.9%
Running Stream (Brooklyn)	63012	15.3	1,070	115	97.6%
Glen Alice (Wongara)	63235	16.7	354	4	89.5%
Tyar	63110	17.9	Unknown	29	43.9%
Rylstone (Marsden Forest)	62055	18.2	579	36	81.2%
Clandulla (Edenvale)	62090	18.6	701	4	94.4%
Warrangee	63205	20.9	Unknown	12	93.7%

Station name	Station number	Distance from surface facilities area (km)	Elevation (m AHD)	Length of record (years)	Completeness of record
Glen Alice	61334	21.8	320	44	93.9%
Glen Davis (The Gullies)	63031	22.3	282	29	95.2%
Marloo	62019	23.3	Unknown	47	82.4%
Ilford (Tara)	62029	23.4	780	85	98.9%
Charbon Standard Portland Ceme	62006	23.6	762	49	93.9%
Glen Alice (Eurella)	61149	24.7	320	55	96.2%
Angus Place (Wolgan Gap)	63131	24.9	945	23	96.3%
Paling Yards (Ulabri)	63085	26.0	960	93	90.3%
Portland (Jamieson St)	63071	26.7	925	110	65.1%
Kandos	62016	27.3	762	29	97.9%
Kandos Cement Works	62017	27.4	660	60	99.1%
Ilford (Warrangunyah)	62031	28.2	750	114	87.2%
Wattle Flat (Karinga)	63089	29.4	902	118	78.4%
Sofala Old Post Office	63076	29.7	579	122	99.9%





Average daily rainfall

- 0 - 302
- 302 - 373
- 373 - 452
- 452 - 529
- 529 - 602
- 602 - 664
- 664 - 720
- 720 - 778
- 778 - 837

1:500,000 for A4

0 3,750 7,500 11,250 15,000

Metres

N

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geodetic Datum of Australia 1994
Grid: Map Grid of Australia, Zone 56

- Assessed BOM daily rainfall stations
- Project Application Area
- Lithgow Seam Outcrop
- Existing Workings
- Railway

LOCATION	Airly
SEAM	Lithgow
DRAWN	T.M
CHECKED	L.H
APPROVED	S.G
SCALE	refer to scalebar

Airly Mine Extension Project
Response to Submissions
Assessment of Rainfall Variance across Rainfall Stations

Centennial Airly

DATE 16/01/2015

Figure 2-1

GIS Filename: C:\Users\ljhammersley\Desktop\2216787_SWIA_010_RainfallAssess_A.mxd

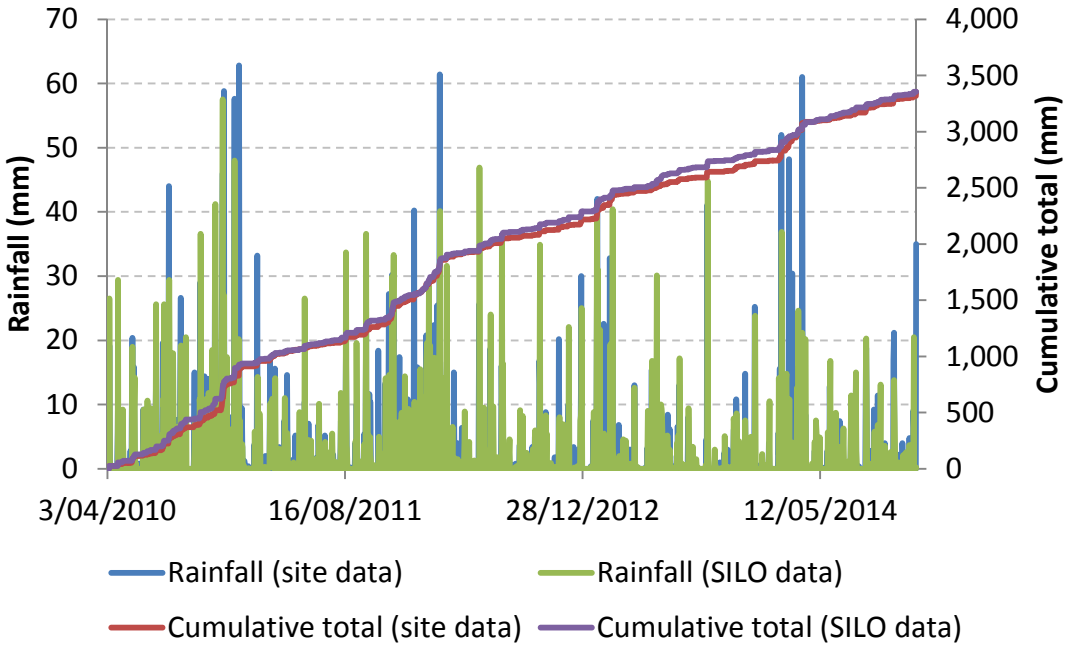


Figure 2-2 Comparison of SILO (BOM Ilford (Warrangunyah) Station) and Airly Mine site-specific rainfall records

3 Groundwater inflow scenarios

3.1 Modelling methodology

The water balance model representing Airly Mine was used to undertake continuous modelling of the water management system for the full duration of the Project. The model used to represent the Project was GoldSim (Version 10.50). The model was produced by representing the water cycle at the mine as a series of elements, each containing pre-set rules and data, that were linked together to simulate the interaction of these elements within the water cycle. The water cycle was simulated over time in GoldSim and selected outputs from the modelled system were statistically summarised.

As discussed in Section 4.1.2 of GHD (2014a) to assess the impact of rainfall on the site, modelling was completed by applying 112 different rainfall patterns over the simulation timeline. To complete this, the simulation timeline was modelled for 112 'realisations', where each realisation represented a single model run. The 112 realisations were applied as the historical rainfall record extended from January 1901 to December 2012, which represents 112 years of complete rainfall data available. The only variation between realisations was that each realisation modelled a different continuous historical rainfall pattern.

A salt balance was developed as an extension of the water balance model, with expected concentrations of salt applied to water inflows into the system. Transfers of resulting salt loads were modelled throughout the site in parallel with the water balance model.

Further detail on the modelling methodology, assumptions and limitations is discussed in the Water and Salt Balance Assessment (GHD, 2014b).

3.2 Modelling representation

3.2.1 Existing conditions

The water cycle for existing operations at Airly Mine was modelled in GoldSim based on site conditions in the year 2014. The model assumed an extraction rate of 1.8 million tonnes per annum (Mtpa) of run of mine (ROM) coal. Hydrogeological modelling undertaken as part of the Airly Mine Extension of Time Project (GHD, 2014c) predicted groundwater inflows into the underground mine workings of up to 1.3 ML/year under existing conditions in 2014.

3.2.2 Proposed conditions

The water balance model developed for existing conditions was modified to represent the proposed conditions for the water cycle as a result of the Project. The Project was assumed to commence in the year 2015 and active mining was assumed to continue for 17 years at an extraction rate of 1.8 Mtpa of ROM coal. The primary changes to the model for future conditions were the addition of a coal preparation plant (CPP) to undertake coal processing and a reject emplacement area (REA) for disposal of reject material and associated surface water storages.

Groundwater inflows into the underground workings under proposed conditions were estimated as part of the Hydrogeological Model Report (GHD, 2014d) (refer Section 6.1.1) under the following two scenarios:

- Scenario 1 assumed no changes in hydraulic connectivity in the caving and fracturing zones above the panel and pillar mining zone. This scenario was modelled to provide a lower bound estimate for groundwater inflows and drawdown.
- Scenario 2 assumed that the vertical and horizontal hydraulic conductivity will increase to a height of 75 m above the panel and pillar mining zones, which is the maximum height of the fracture zone predicted in the subsidence assessment for the Project (Golder, 2014). Scenario 2 considered initial ‘active’ fracturing, long term ‘goaf’ fracturing and ‘average’ fracturing scenarios.

The predicted groundwater inflows under both scenarios are presented in Figure 3-1 in this document, Figure 6-1 in GHD (2014d) and as Figure 10.3 in the EIS. Inflows are predicted to peak at approximately 0.8 L/s (24 ML/year) in 2026 for Scenario 1. For Scenario 2, inflows into underground workings are predicted to peak at approximately 5.8 L/s (184 ML/year) in 2030.

The groundwater inflows predicted under Scenario 2 were considered to be the most conservative based on the current mine design. The two scenarios were incorporated separately into the water and salt balance model to provide a sensitivity analysis on the outcomes of the modelling in response to ISEC (2014).

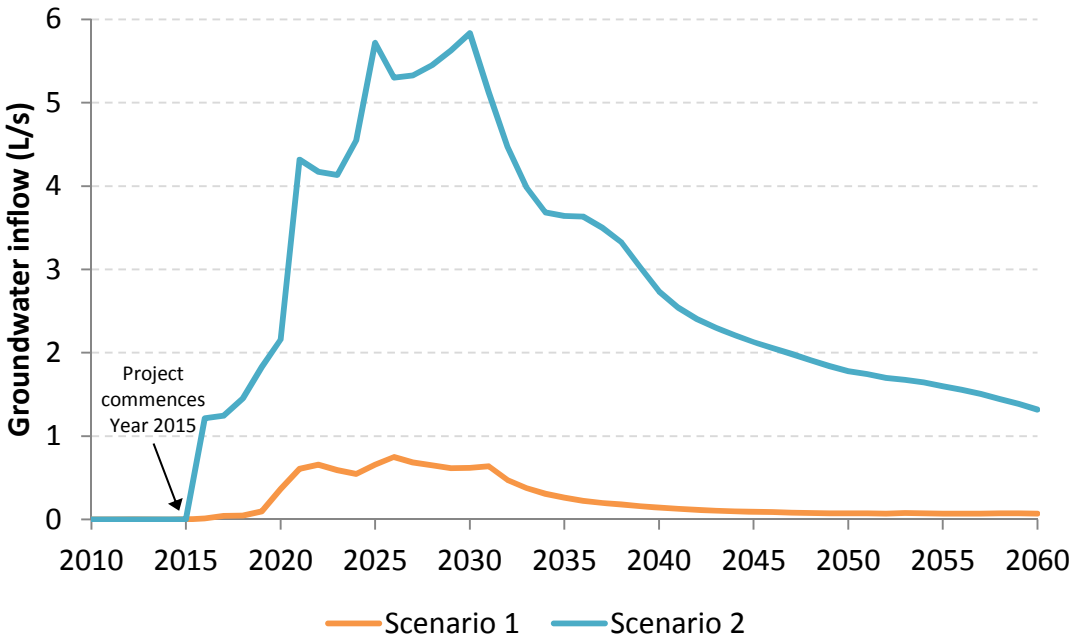


Figure 3-1 Predicted groundwater inflows into underground workings under proposed conditions (GHD, 2014d)

3.3 Results

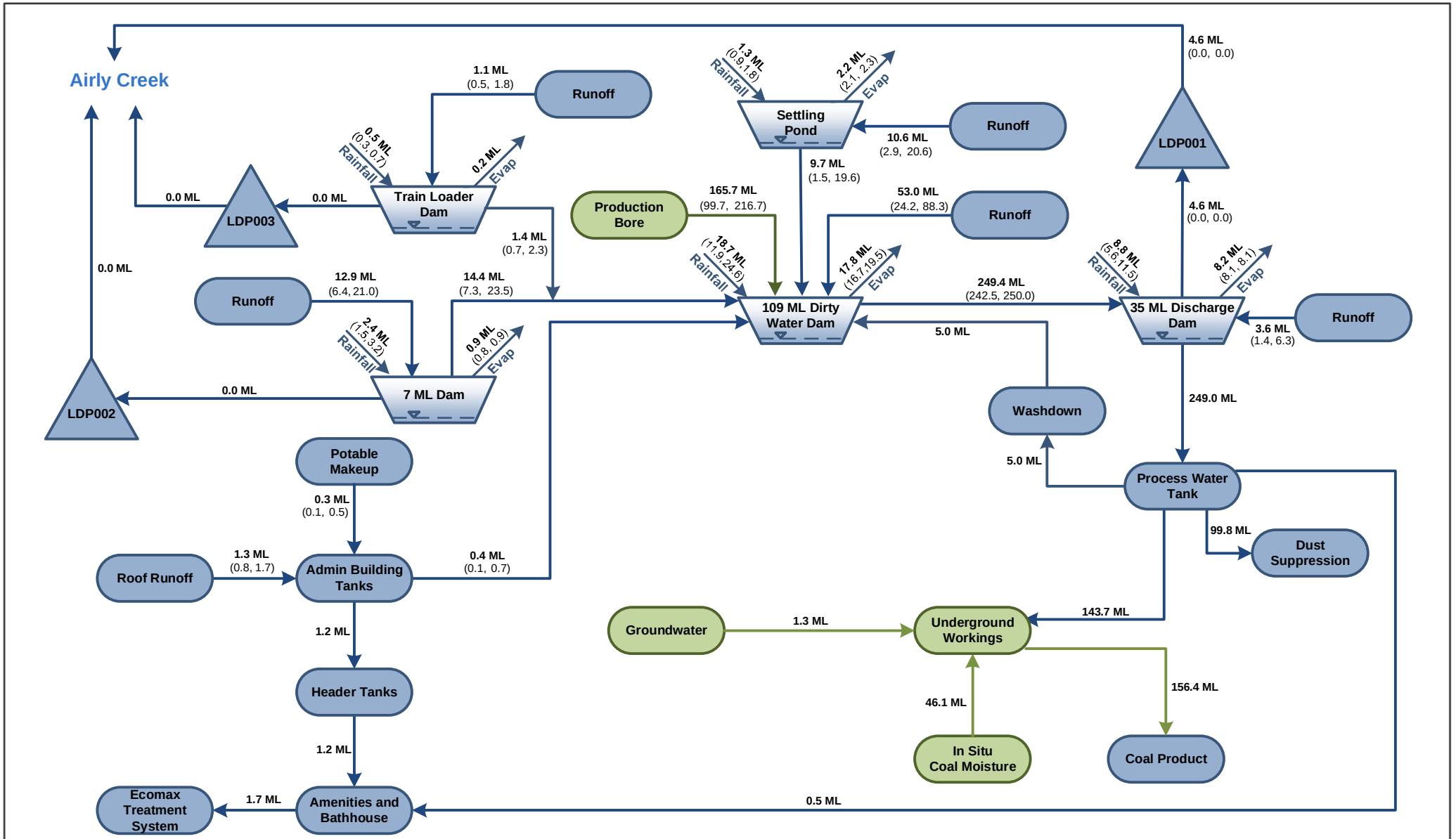
3.3.1 Water balance

Water balance modelling estimated the annual volumetric transfers between water management features of the Airly Mine site for the Project, as shown in Figure 3-2 for existing conditions and in Figure 3-3 and Figure 3-4 for proposed conditions under Scenario 1 and Scenario 2 respectively. A summary of the average inputs and outputs for the water management system for the existing and proposed conditions is presented in Table 3-1.

Existing conditions were based on the site conditions in 2014. Results for proposed conditions are presented based on the predicted site conditions in 2026 for Scenario 1 and in 2030 for Scenario 2. These years were chosen as it is when groundwater inflows into the underground workings are predicted to peak and the water management system will be the most different compared to the existing conditions.

The results present the average annual transfers between water management elements as well as the 10th percentile and 90th percentile values. The purpose of displaying the three results for each water transfer is to show the average transfer volume and an indication of the range of volumes expected due to possible variations in rainfall.

The 10th percentile represents the value at which 10% of the modelled outputs were less than this value. Similarly, the 90th percentile represents the value at which 90% of the modelled outputs were less than this value. The 10th and 90th percentile values have been used (rather than minimum and maximum values) to remove the impact of skewing by infrequent to extreme wet and dry conditions.



LEGEND

- Surface water transfer
- Underground water transfer
- Storage
- XX ML (XX, XX) Mean ML/year 10th, 90th percentile

LOCATION	Airly
SEAM	Lithgow
DRAWN	SM
CHECKED	TD
APPROVED	SG
SCALE	NTS

Airly Mine Extension Project
Response to Submissions

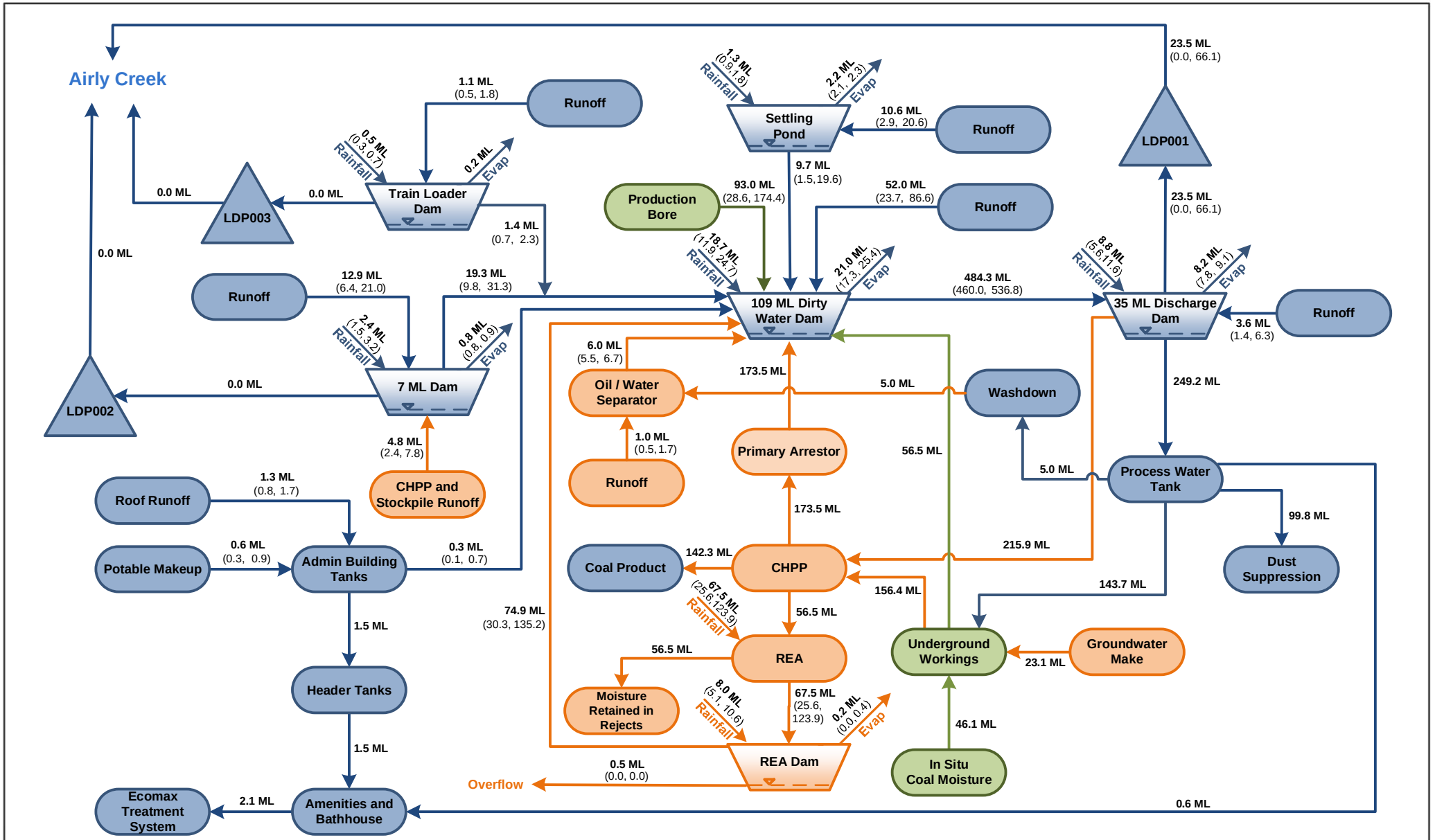
Annual Water Transfers
Existing Conditions 2014

Centennial Airly

DATE 19/12/2014

Figure 3-2

G:\22\16787\Visio\Response to Submissions\Figure 1_Existing Water Transfers_2014.vsd



LEGEND

- Surface water transfer
- Underground water transfer
- Proposed water transfer
- Storage
- XXML (XX, XX) Mean ML/year 10th, 90th percentile

LOCATION	Airly
SEAM	Lithgow
DRAWN	SM
CHECKED	TD
APPROVED	SG
SCALE	NTS

Airly Mine Extension Project
Response to Submissions

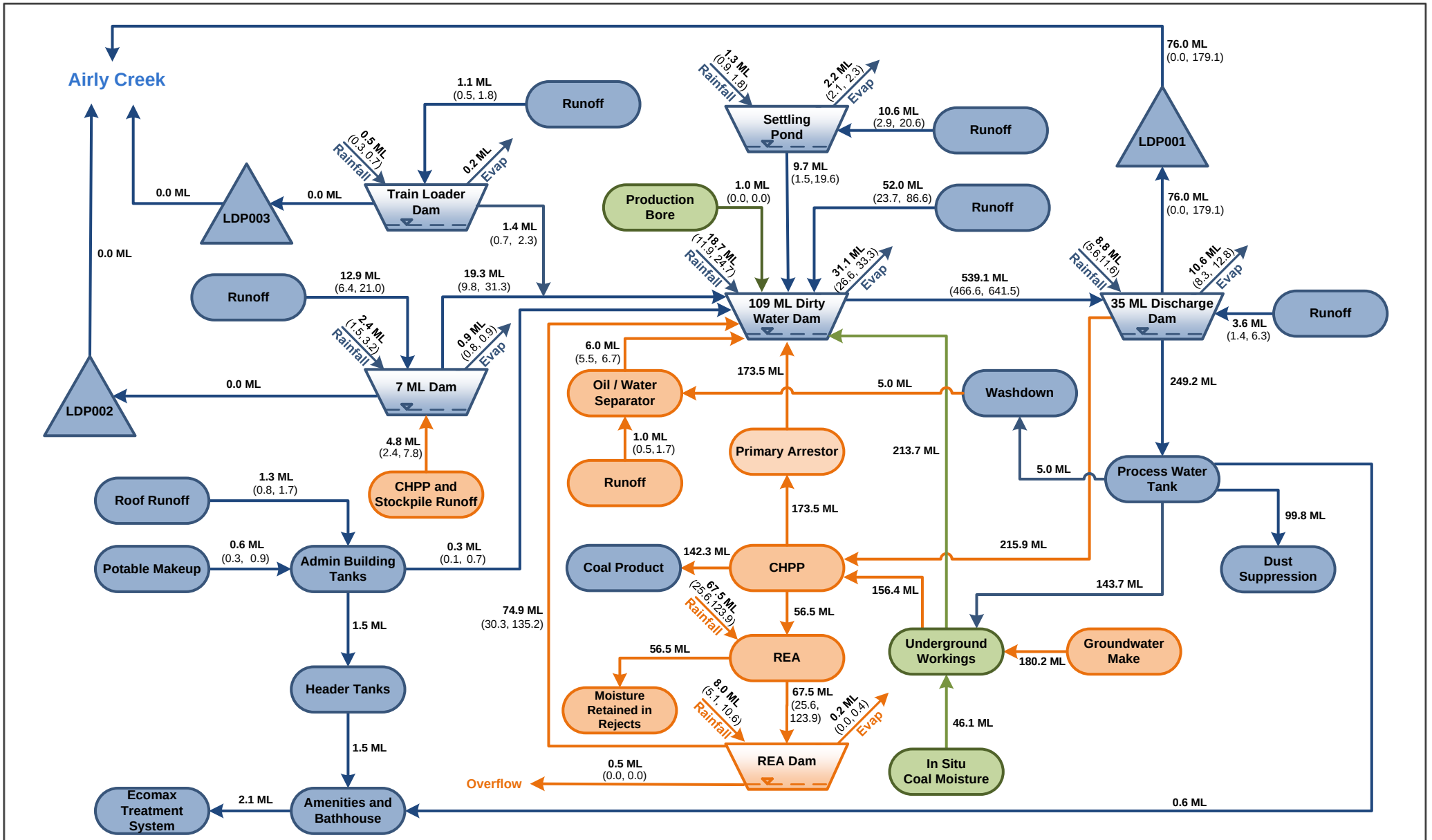
Annual Water Transfers
Proposed Conditions Scenario 1 (2026)

Centennial Airly

DATE 18/12/2014

Figure 3-3

G:\22\16787\Visio\Response to Submissions\Figure 2_Proposed_WaterCycle_Schematic_Scenario_1.vsd



LEGEND

- Surface water transfer
- Underground water transfer
- Proposed water transfer
- Storage
- XXML (XX, XX) Mean ML/year 10th, 90th percentile

LOCATION	Airly
SEAM	Lithgow
DRAWN	SM
CHECKED	TD
APPROVED	SG
SCALE	NTS

Airly Mine Extension Project
Response to Submissions

Annual Water Transfers
Proposed Conditions Scenario 2 (2030)

Centennial Airly

DATE 16/01/2015

Figure 3-4

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Table 3-1 Summary of average predicted water inputs and outputs for existing and proposed conditions

Element	Existing conditions (ML/year)	Proposed conditions (ML/year)	
	2014	Scenario 1 2026	Scenario 2 2030
INPUTS			
Direct rainfall onto storages and catchment runoff	114.2	194.5	194.5
External water supply	0.3	0.6	0.6
Groundwater inflows into underground workings	1.3	23.1	180.2
Extraction from production bore	165.7	93.0	1.0
In situ coal moisture	46.1	46.1	46.1
TOTAL INPUTS (rounded)	**328**	**357**	**422**
OUTPUTS			
Evaporation	29.3	32.6	45.2
Dust suppression	99.8	99.8	99.8
Sewage to Ecomax effluent treatment system	1.7	2.1	2.1
Discharge through LDP001	4.6	23.5	76.0
Discharge through LDP002	0.0	0.0	0.0
Discharge through LDP003	0.0	0.0	0.0
Discharge through proposed LDP	N/A	0.5	0.5
Coal product moisture	156.4	142.3	142.3
Moisture retained in reject material	N/A	56.5	56.5
TOTAL OUTPUTS (rounded)	**292**	**357**	**422**

Element	Existing conditions (ML/year)	Proposed conditions (ML/year)	
	2014	Scenario 1 2026	Scenario 2 2030
CHANGE IN STORAGE			
Surface water storages	1.1	0.0	0.0
Underground workings	34.7	0.0	0.0
TOTAL CHANGE IN STORAGE (rounded)	**36**	**0**	**0**
BALANCE			
Inputs – Outputs – Change in Storage	**0**	**0**	**0**

As seen in Table 3-1, the largest source of water into the water management system at Airly Mine under existing conditions is expected to be extractions from the production bore. Shortfalls in water supply occurring when the demand for water use in mining activities was modelled to exceed the supply from surface water storages was assumed to be provided by the production bore. The total average annual volume extracted from the production bore was estimated to be approximately 166 ML/year for 2014. This value was modelled to vary between approximately 100 ML/year (10th percentile) and 217 ML/year (90th percentile). Note that actual operating conditions at Airly Mine in 2014 involved mining at an extraction rate lower than 1.8 Mtpa and therefore it was not necessary to extract groundwater from the production bore. Also, there have been no mine water discharges from LDP001 in 2014.

Under proposed conditions, the modelled supply from the production bore decreases, as groundwater inflows into the underground workings and water stored in surface water storages are predicted to be used to meet the water demand for mining activities. Groundwater inflows modelled under Scenario 1 were predicted to peak at approximately 23 ML/year in 2026. In this year, extractions from the production bore were estimated to be approximately 93 ML/year on average, varying between approximately 29 ML/year (10th percentile) and 174 ML/year (90th percentile). Under Scenario 2, groundwater inflows were predicted to be significantly greater, peaking at approximately 180 ML/year. As a result of the increase in groundwater inflows recirculated within the mine water management system for reuse, extractions from the production bore under Scenario 2 were modelled to decrease to approximately 1 ML/year on average. The 10th and 90th percentile values were estimated to be 0 ML/year, indicating that the site is expected to have a low dependence on extractions from the production bore under these conditions.

Figure 3-5 presents the range of daily flow percentiles predicted to occur through LDP001 under existing and proposed conditions. For clarity, the results are shown on a single graph with a logarithmic y-axis. The volumetric limit for LDP001 specified by Environment Protection Licence (EPL) 12374 of 100 ML/day is also shown.

The average annual discharge through LDP001 under existing conditions was predicted to be approximately 4.6 ML/year. The 10th percentile and 90th percentile values for LDP001 discharge were found to be 0 ML/year, indicating the average value is significantly skewed by high rainfall events and prolonged wet periods. Discharges are predicted to occur under existing conditions on less than 0.3% of days, or approximately one day a year. The maximum discharge modelled under existing conditions was approximately 79 ML/day, with a frequency of less than 0.01% of days modelled. Therefore, the EPL limit of 100 ML/day is not expected to be exceeded under existing conditions.

Increased LDP001 discharges modelled under proposed conditions were a result of increased groundwater inflows being transferred to the surface water system compared with existing conditions. The average annual discharge through LDP001 under Scenario 1 of proposed conditions in 2026 was predicted to be approximately 23.5 ML/year. This value was found to range between 0 ML/year (10th percentile) and 66.1 ML/year (90th percentile). As shown in Figure 3-5, discharges under proposed conditions for Scenario 1 were modelled to occur for less than 2% of days, or approximately seven days in a year. The maximum discharge estimated was approximately 84 ML/day, with a frequency of less than 0.01% of days modelled.

Under Scenario 2 of proposed conditions in 2030, the average annual discharge through LDP001 was found to increase to approximately 76.0 ML/year, ranging between 0 ML/year (10th percentile) and 179 ML/year (90th percentile). The frequency of discharges was also predicted to increase, with discharges predicted to occur for approximately 9% of days, or approximately 31 days a year. The maximum discharge was estimated to be approximately 84 ML/day, with a frequency of less than 0.01% of days modelled.

3.3.2 Salt balance

The predicted values for each of the salt transfers for Airly Mine are provided in Figure 3-6 for existing conditions and in Figure 3-7 and Figure 3-8 for proposed conditions under Scenario 1 and Scenario 2 respectively. As discussed in Section 3.3.1, the results present the average annual transfers between water management elements of the site as well as an indication of the range of values expected due to possible variations in rainfall. In addition, the predicted average salinity is also provided.

A summary of the average salt inputs and outputs of the Airly Mine water management system for the existing and proposed conditions is presented in Table 3-2.

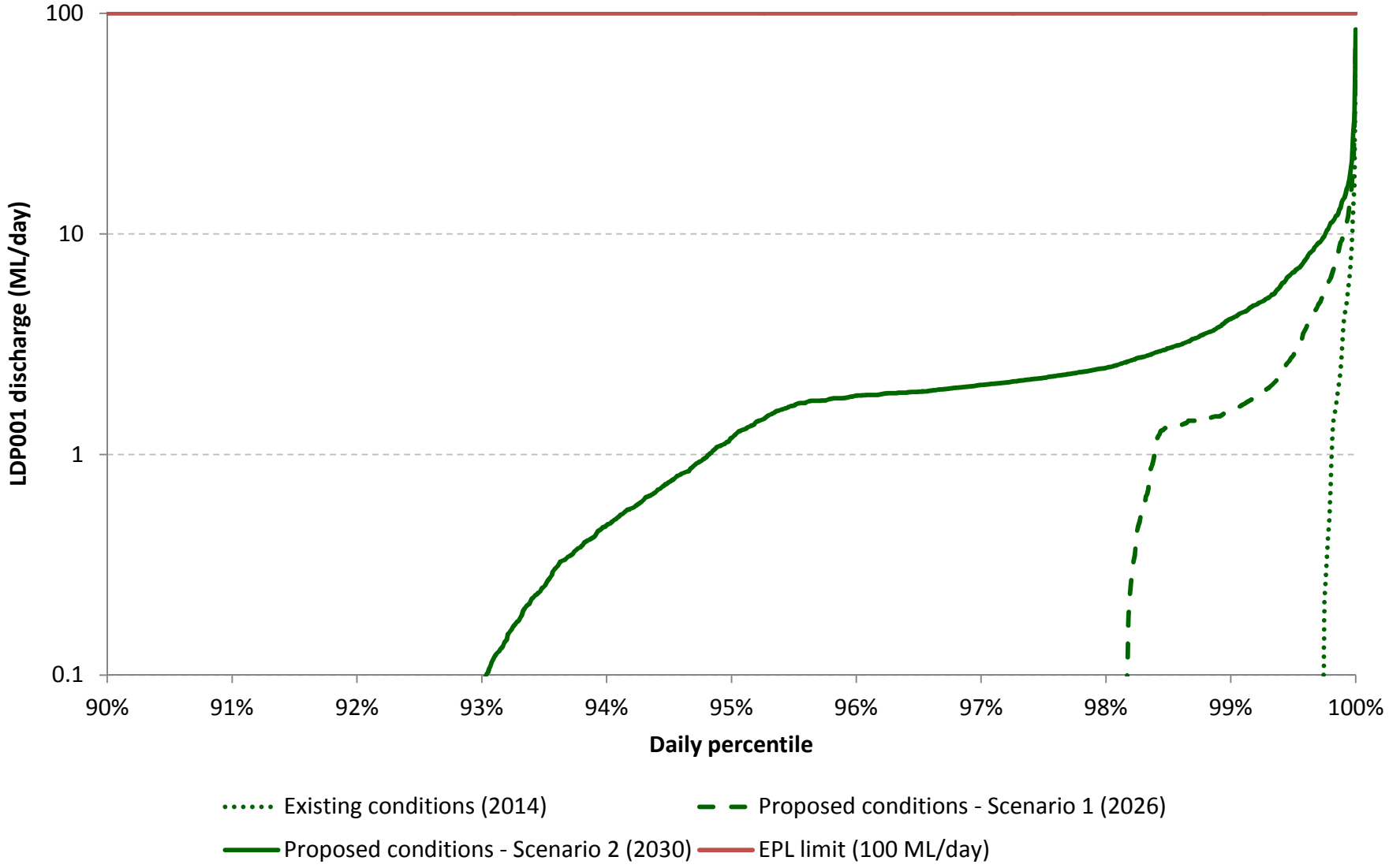
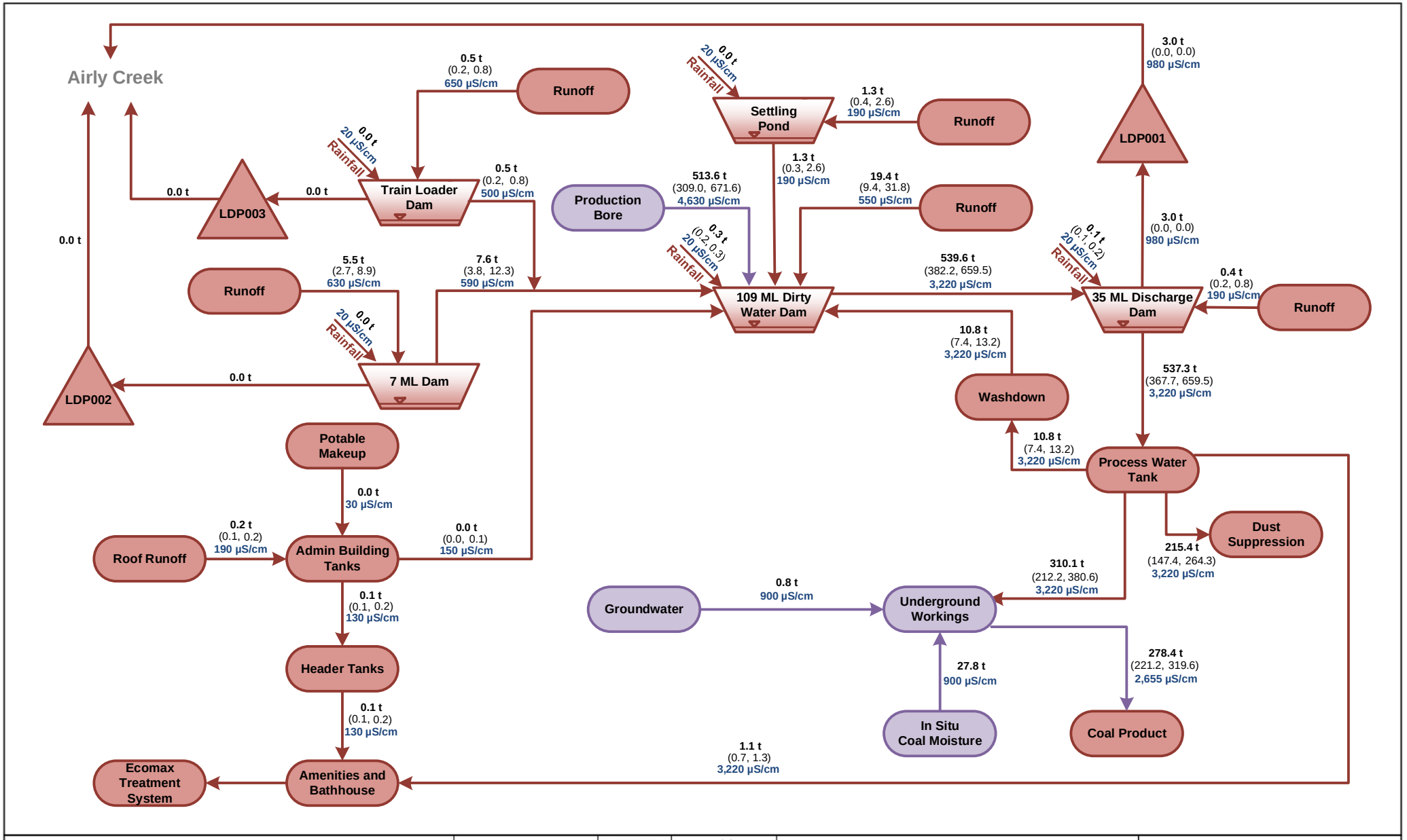


Figure 3-5 **Predicted LDP001 daily flow percentiles**



LEGEND

- Surface salt transfer
- Underground salt transfer
- Storage
- XX t (XX, XX) — Mean t/year, 10th, 90th percentile
- XX µS/cm — Mean salinity

LOCATION	Airly
SEAM	Lithgow
DRAWN	SM
CHECKED	TD
APPROVED	SG
SCALE	NTS

Airly Mine Extension Project
Response to Submissions

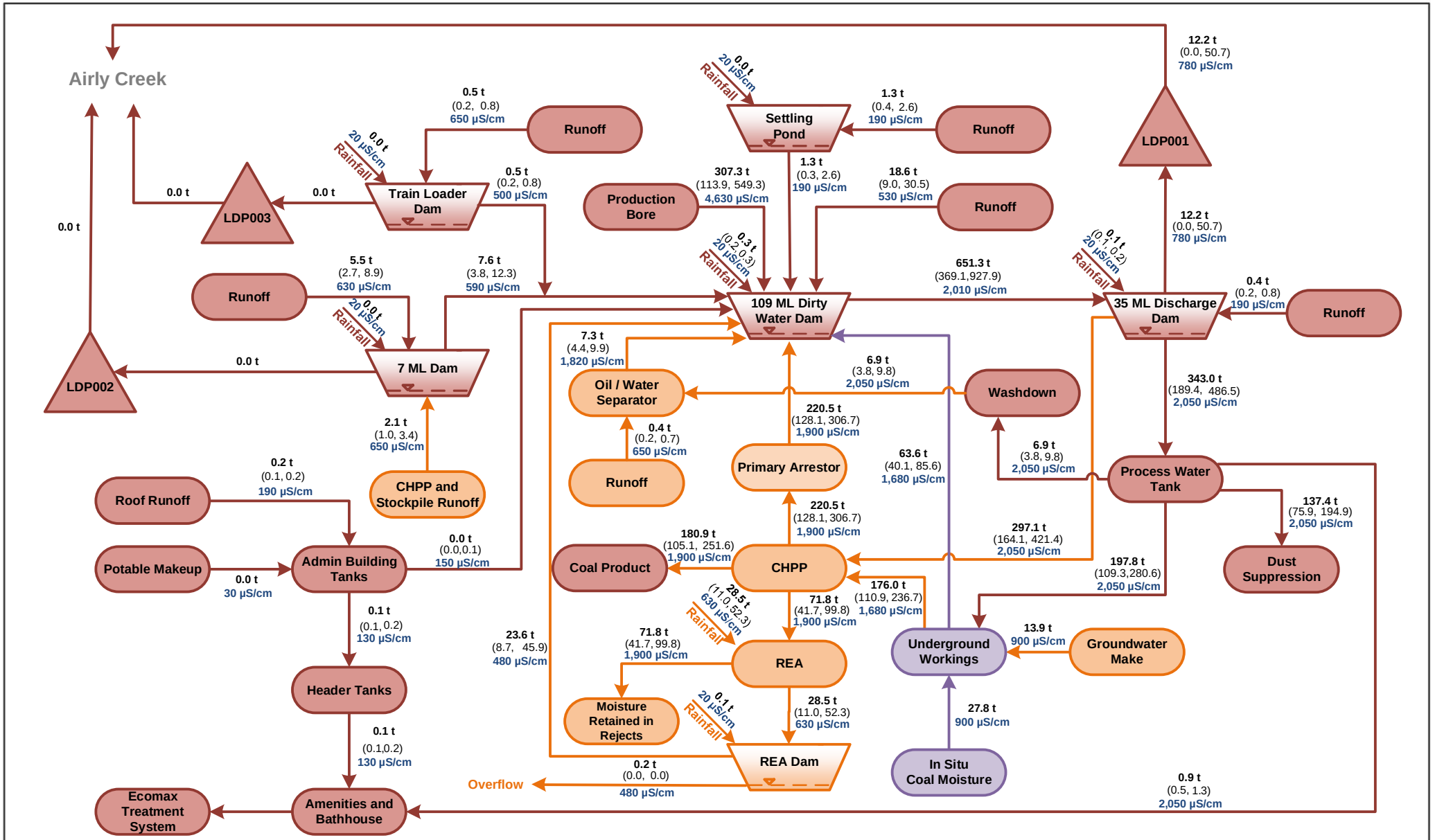
Annual Salt Transfers
Existing Conditions 2014

Centennial Airly

DATE 23/12/2014

Figure 3-6

G:\22\16787\Visio\Response to Submissions\Figure 4_Existing_Salt_Cycle_Schematic_Numbered.vsd



LEGEND

- Surface water transfer
- Underground water transfer
- Proposed water transfer

Storage

XX t (XX, XX) XX µS/cm — Mean t/year, 10th, 90th percentile, Mean salinity

LOCATION	Airly
SEAM	Lithgow
DRAWN	SM
CHECKED	TD
APPROVED	SG
SCALE	NTS

Airly Mine Extension Project
Response to Submissions

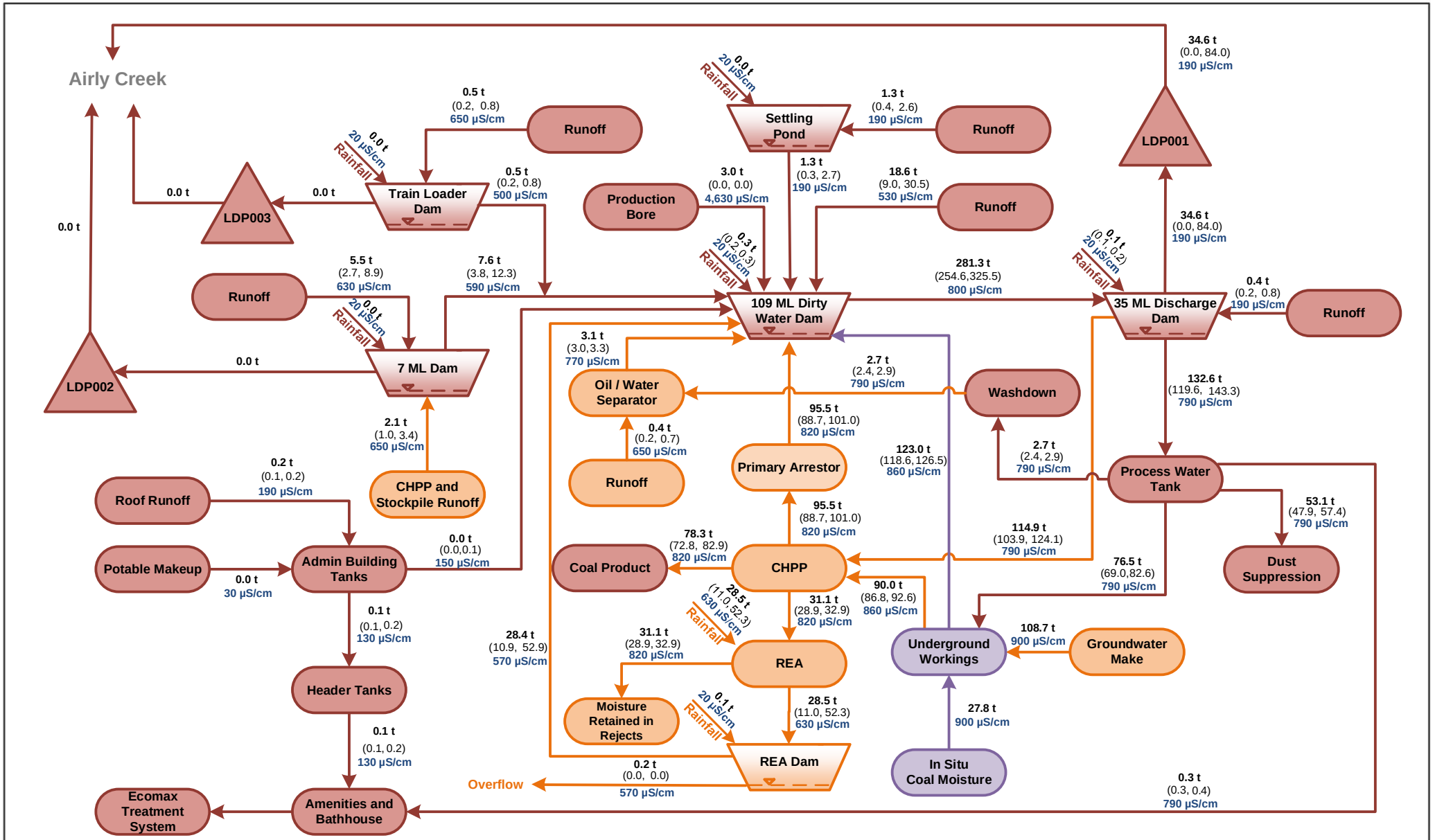
Annual Salt Transfers
Proposed Conditions Scenario 1 2026

Centennial Airly

DATE 23/12/2014

Figure 3-7

G:\22\16787\Visio\Response to Submissions\Figure 5_Proposed_Salt Cycle_Schematic_Scenario_1.vsd



LOCATION	Airly
SEAM	Lithgow
DRAWN	SM
CHECKED	TD
APPROVED	SG
SCALE	NTS

Airly Mine Extension Project
Response to Submissions

Annual Salt Transfers
Proposed Conditions Scenario 2 2030

Centennial Airly

DATE 23/12/2014

Figure 3-8

G:\22\16787\Visio\Response to Submissions\Figure 6_Proposed_Salt Cycle_Schematic_Scenario_2.vsd

Table 3-2 Summary of average predicted salt inputs and outputs for existing and proposed conditions

Element	Existing conditions (t/year)	Proposed conditions (t/year)	
	2014	Scenario 1 2026	Scenario 2 2030
INPUTS			
Direct rainfall onto storages and catchment runoff	27.7	58.0	58.0
External water supply	0.0	0.0	0.6
Groundwater inflows into underground workings	0.8	13.9	108.7
Extraction from production bore	513.6	307.3	3.0
In situ coal moisture	27.8	27.8	27.8
TOTAL INPUTS (rounded)	**570**	**407**	**198**
OUTPUTS			
Dust suppression	215.4	137.4	53.1
Sewage to Ecomax effluent treatment system	1.2	1.0	0.4
Discharge through LDP001	3.0	12.2	34.6
Discharge through LDP002	0.0	0.0	0.0
Discharge through LDP003	0.0	0.0	0.0
Discharge through proposed LDP	N/A	0.2	0.2
Coal product moisture	278.4	180.9	78.3
Moisture retained in reject material	N/A	71.8	31.1
TOTAL OUTPUTS (rounded)	**498**	**404**	**198**
CHANGE IN STORAGE			

Element	Existing conditions (t/year)	Proposed conditions (t/year)	
	2014	Scenario 1 2026	Scenario 2 2030
Surface water storages	11.6	3.5	-0.3
Underground workings	60.3	-0.1	0.0
TOTAL CHANGE IN STORAGE (rounded)	**72**	**3**	**0**
BALANCE			
Inputs – Outputs – Change in Storage	**0**	**0**	**0**

As shown in Table 3-2, the sources and sinks for the salt balance are broadly similar to the water balance. The largest source of salt into the water management system under existing conditions is expected to be associated with extractions from the production bore, which accounts for approximately 514 tonnes annually, with an average conductivity of 4,626 µS/cm. The actual salt input into the water management system in 2014 was much less than predicted due to the reduced mining rate and no extractions from the production bore.

Under proposed conditions, extractions from the production bore were modelled to decrease as groundwater inflows into the underground workings increased. For Scenario 1, approximately 307 tonnes of salt on average was estimated to be associated with extractions from the production bore annually. Groundwater inflows under Scenario 1 are expected to account for approximately 14 tonnes on average annually, with an average conductivity of 900 µS/cm. Under Scenario 2, groundwater inflows were predicted to input 109 tonnes of salt annually into the water management system on average. Extractions from the production bore were modelled to decrease significantly, with associated salt decreasing to 3 tonnes on average for the year.

Outputs of salt from Airly Mine are predicted to be associated primarily with coal product and dust suppression. Salt associated with discharges through LDP001 into Airly Creek was predicted to be approximately 3 tonnes on average under existing conditions annually, with a conductivity of approximately 980 µS/cm. The salt output was modelled to increase to approximately 12.2 tonnes on average under proposed conditions for Scenario 1 in 2026, with a decreased conductivity of approximately 780 µS/cm. For Scenario 2 of proposed conditions, discharges are expected to account for approximately 34.6 tonnes on average annually, with a conductivity of approximately 190 µS/cm.

From these results, it can be seen that the salinity of the water management system was modelled to decrease from existing conditions to proposed conditions under both Scenario 1 and Scenario 2. This is due to the large input of groundwater into the water management system from the production bore under existing conditions, which has a relatively high conductivity of 4,626 µS/cm on average. Extraction from the production bore decreases under proposed conditions, as a greater proportion of water for mining associated activities is expected to be supplied by water harvested from the surface water system, including groundwater inflows into the underground workings.

3.3.3 Discussion

Groundwater inflows into the underground workings under proposed conditions were predicted for two scenarios, which have been incorporated into the water and salt balance model and compared to provide a sensitivity analysis on the outcomes of the modelling. The primary impacts of the increased groundwater input into the mine water management system under Scenario 2 compared to Scenario 1 were found to be:

- A decrease in extractions from the production bore to supplement water supply for mining associated activities.
- An increase in average volume and frequency of discharges via LDP001 into Airly Creek. Note the maximum daily discharge was not found to change between scenarios modelled.
- A decrease in the salinity of the water management system associated with reduced extractions from the production bore.

4 Airly Creek hydrology

4.1 Catchment runoff

Flow monitoring is not currently available for Airly Creek. To provide an estimate of the flows within the creek, an estimate of the catchment runoff contributing to Airly Creek was made. To estimate runoff volumes, the Australian Water Balance Model (AWBM) was incorporated into a water balance model developed using the GoldSim (Version 11.1) software modelling package. The AWBM is a catchment water balance model that calculates runoff from rainfall after allowing for relevant losses and storage.

The AWBM was adopted as the most suitable model as it is widely used throughout Australia, has been verified through comparison with large amounts of recorded streamflow data and literature is available to assist in estimating input parameters based on recorded streamflow data (Boughton and Chiew, 2003).

Daily rainfall data was incorporated into the model from the SILO patched point data from the Ilford (Warrangunyah) Station, as described in Section 2 and the Water and Salt Balance Assessment (GHD, 2014b). The water balance was modelled using the historical time series of rainfall data extending over 112 years. A total of 112 simulations were applied, with each simulation modelling a different rainfall pattern. Further detail on the modelling methodology, assumptions and limitations is discussed in the Water and Salt Balance Assessment (GHD, 2014b).

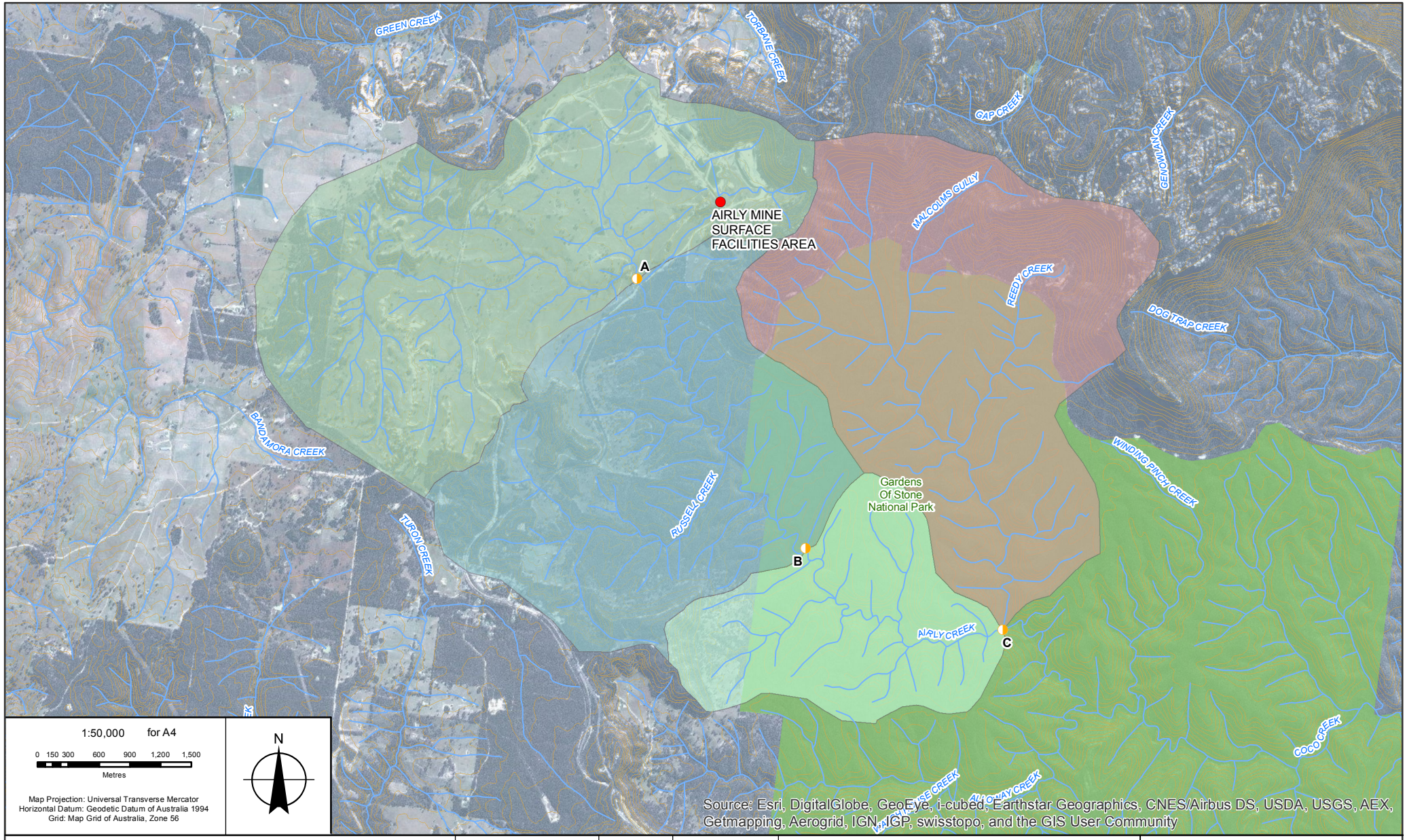
Relevant catchments contributing to Airly Creek were determined based on topographic information, as shown in Figure 4-1. The catchments were modelled using AWBM parameters for bushland/vegetation areas, as described in the Water and Salt Balance Assessment (GHD, 2014b).

The daily catchment runoff volumes were determined for three locations extending downstream of Airly Mine along Airly Creek to the confluence of the creek with Reedy Creek within the Gardens of Stone National Park, as shown in Figure 4-1. Flows within Airly Creek were estimated without the predicted contribution of discharges via LDPs from the mine.

The predicted flow within Airly Creek at Points A, B and C based on modelled catchment runoff are presented in Figure 4-2, Figure 4-3 and Figure 4-4 respectively. The time series graphs show average values along with 10th percentile and 90th percentile values to provide an indication of the possible range of flow due to variation in rainfall.

A clear seasonal pattern can be seen in the time series graphs, with larger flows predicted during winter months. Average flows were found to vary between 0.1 ML/day and 7.0 ML/day at Point A, which is approximately 2 km downstream of the surface facilities area at Airly Mine. At Point B, located within the Gardens of Stone National Park approximately 4 km downstream of Point A, average flows were modelled between 0.2 ML/day and 13.7 ML/day. Point C is located approximately 3 km downstream of Point B at the confluence of Airly Creek and Reedy Creek. Average flows at this point were estimated to range from 0.4 ML/day to 24.8 ML/day.

Figure 4-5 presents the daily percentiles of the range of flows modelled for Airly Creek predicted by the water balance model over the period of one year. As seen in Figure 4-5, no flow within the upper reaches of Airly Creek were modelled for approximately 89% of the year. Note flow of 0 ML/day is not shown in Figure 4-5 due to the logarithmic conversion of data. This indicates that Airly Creek is an ephemeral creek with flows fluctuating in response to rainfall patterns and the creek flowing intermittently following significant rainfall events. The maximum daily flow rate predicted by the water balance model was approximately 693 ML/day at Point A, 1,354 ML/day at Point B and 2,441 ML/day at Point C.



LEGEND

- Waterway
- 50m Contour
- Nature Conservation
- Airly Creek Monitoring Locations

LOCATION	Airly
SEAM	Lithgow
DRAWN	I.G.
CHECKED	S.G.
APPROVED	S.G.
SCALE	refer to scalebar

Airly Mine Extension Project
Response to Submissions

Catchment Areas and Watercourses

Centennial Airly

DATE 16/01/2015

Figure 4-1

GIS Filename: G:\22\0105001\GIS\Maps\Deliverables\Western\Airly\2216787\Response to Submissions\2216787_SWIA005_Catchments_MonitoringLocations_A.mxd

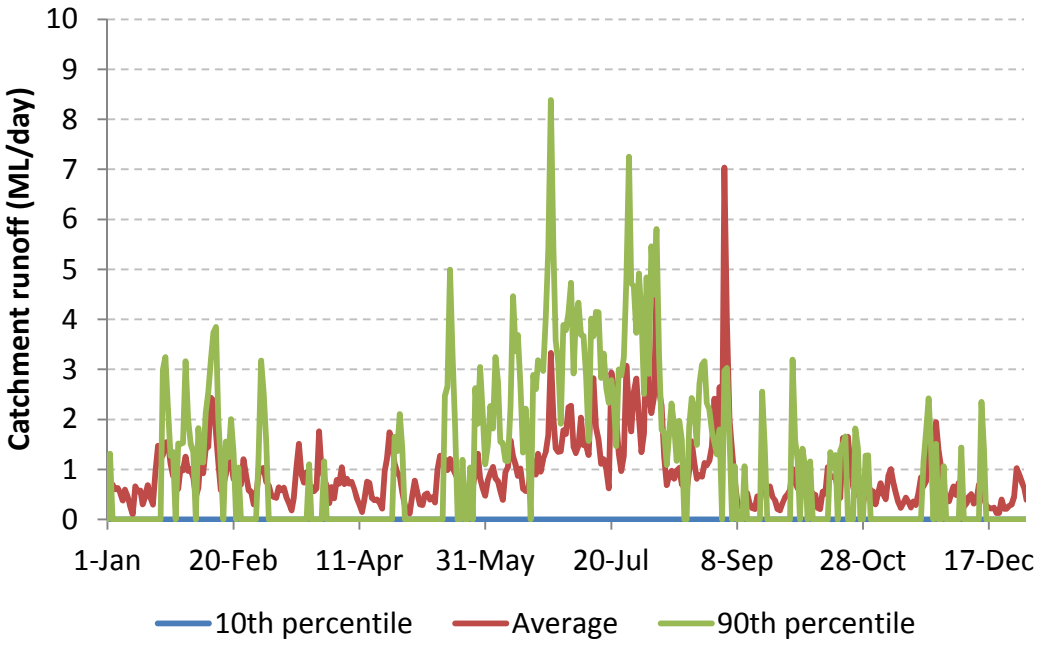


Figure 4-2 Predicted catchment runoff to Airly Creek at Point A

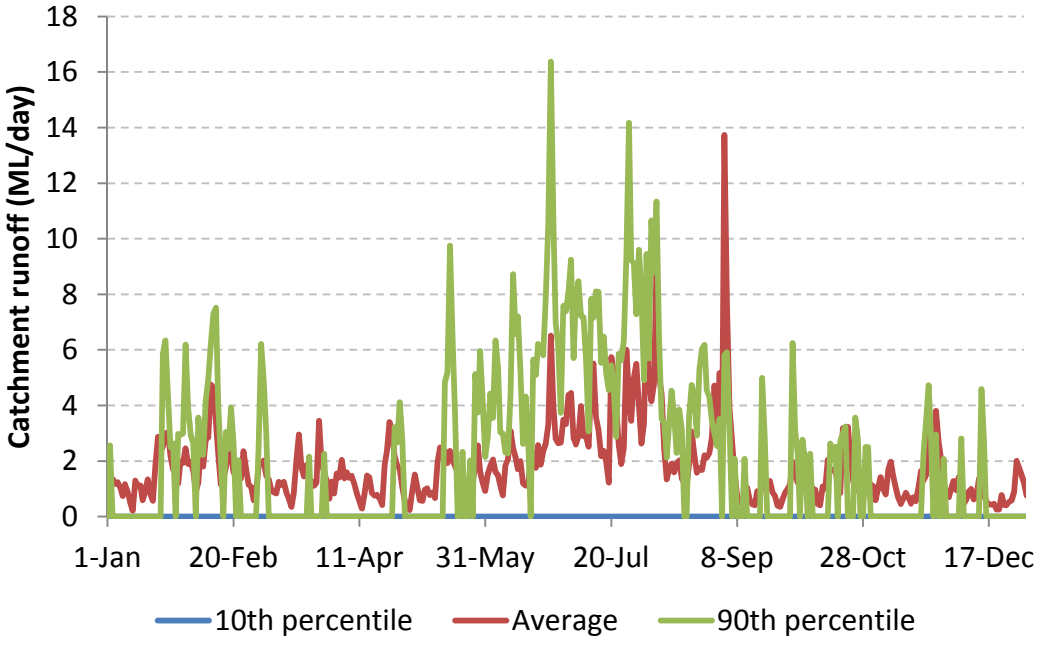


Figure 4-3 Predicted catchment runoff to Airly Creek at Point B

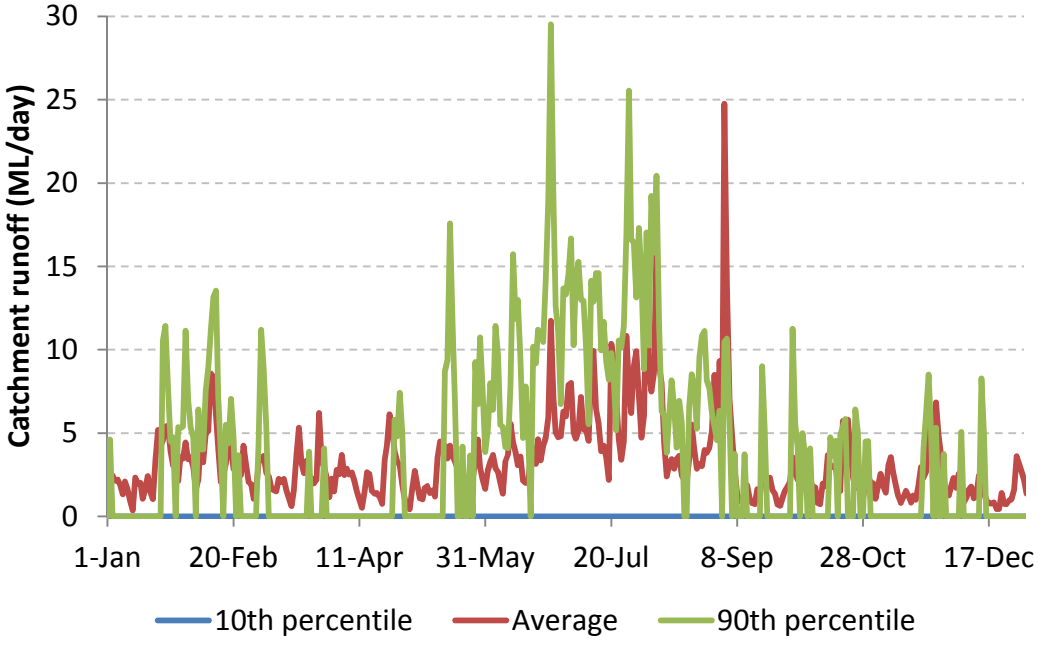


Figure 4-4 Predicted catchment runoff to Airly Creek at Point C

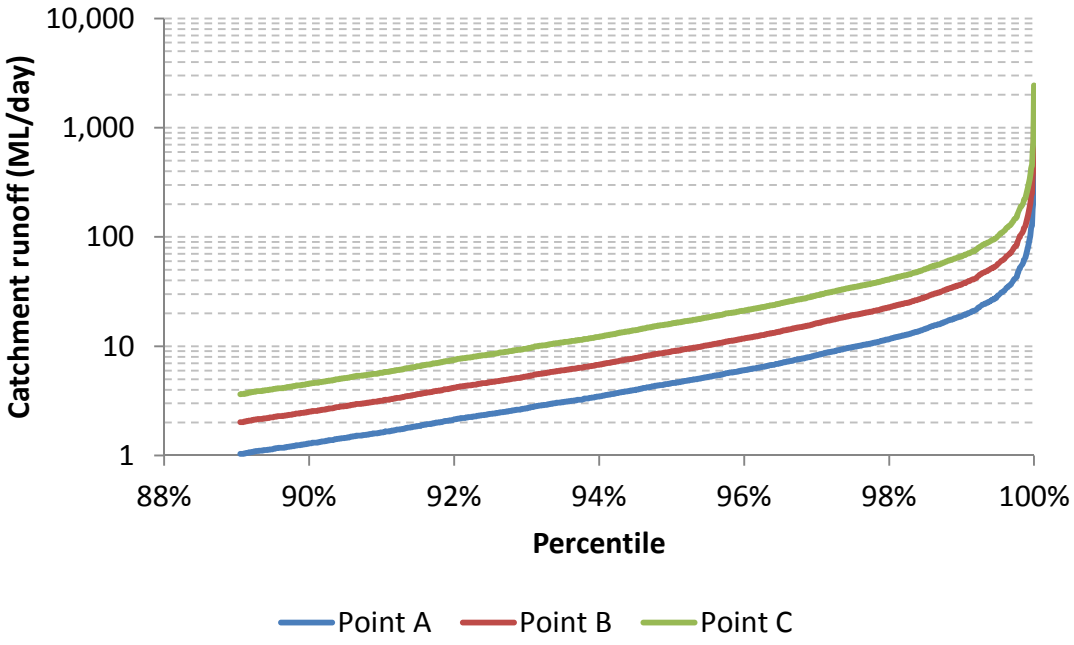


Figure 4-5 Predicted daily percentiles of catchment runoff to Airly Creek

4.2 Impact of Airly Mine on Airly Creek flows

To determine the impact of Airly Mine under existing conditions and the Project under proposed conditions on flows within Airly Creek, catchment runoff to the creek was incorporated into the water and salt balance model used to represent the mine, as described in Section 3.1. Modifications to the water management system as part of the Project are likely to alter the frequency and volume of discharges from the surface facilities area at Airly Mine via LDPs into Airly Creek. In addition, the construction of the REA will reduce the catchment area contributing to the creek.

The water balance was modelled using the historical time series of rainfall data extending over 112 years. A total of 112 simulations were applied, with each simulation modelling a different rainfall pattern. Proposed conditions were modelled using the groundwater inflows predicted under Scenario 2 (refer Section 3.2.2), as this was considered to be the most conservative scenario based on the current mine design. Further detail on the modelling methodology, assumptions and limitations is discussed in the Water and Salt Balance Assessment (GHD, 2014b).

4.2.1 Existing conditions

The predicted flow within Airly Creek at Points A, B and C based on modelled catchment runoff plus discharges from Airly Mine via LDPs under existing conditions in 2014 are presented in Figure 4-6, Figure 4-7 and Figure 4-8 respectively. The time series graphs show average values along with 10th percentile and 90th percentile values to provide an indication of the possible range of flow due to variation in rainfall.

Discharges from Airly Mine under existing conditions were found to increase the average flow within Airly Creek by up to 0.7 ML/day, compared with catchment runoff to the creek alone. Average flow rates were modelled to vary from 0.1 ML/day to 7.7 ML/day at Point A, from 0.2 ML/day to 14.5 ML/day at Point B and from 0.4 ML/day to 25.5 at Point C.

Considering annual volumes, discharge from the surface facilities area at Airly Mine via LDPs represents approximately 0.4% of the flow at Point C on Airly Creek on average under existing conditions. Note that 10th percentile and 90th percentile discharges from the mine were found to be 0 ML/year, as discussed in Section 3.3.1.

Figure 4-9 presents the daily percentiles of the range of flows modelled for Airly Creek predicted by the water balance model under existing conditions for 2014. As seen in Figure 4-9, no flow is predicted within the upper modelled reaches of Airly Creek for approximately 89% of the year, indicating no change to the frequency of flow within the creek with the addition of discharges from Airly Mine under existing conditions. The maximum daily flow rate predicted by the water balance model increased by approximately 79 ML/day due to discharges under existing conditions, as discussed in Section 3.3.1. The maximum flow estimated within the creek under existing conditions was approximately 772 ML/day at Point A, 1,433 ML/day at Point B and 2,520 ML/day at Point C.

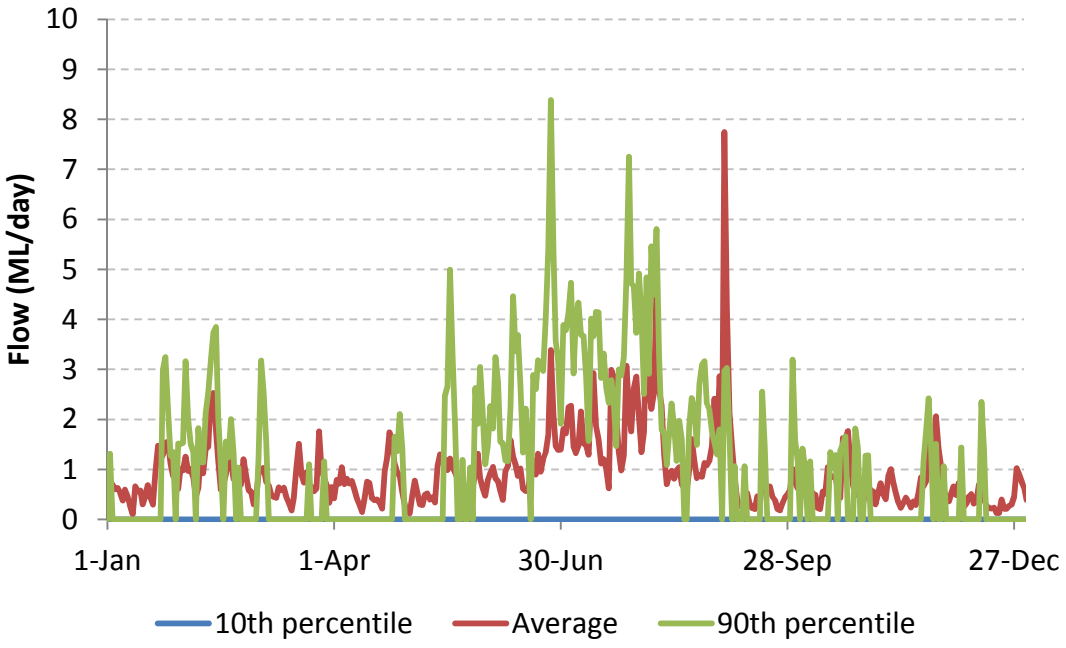


Figure 4-6 Predicted flow in Airly Creek at Point A under existing conditions

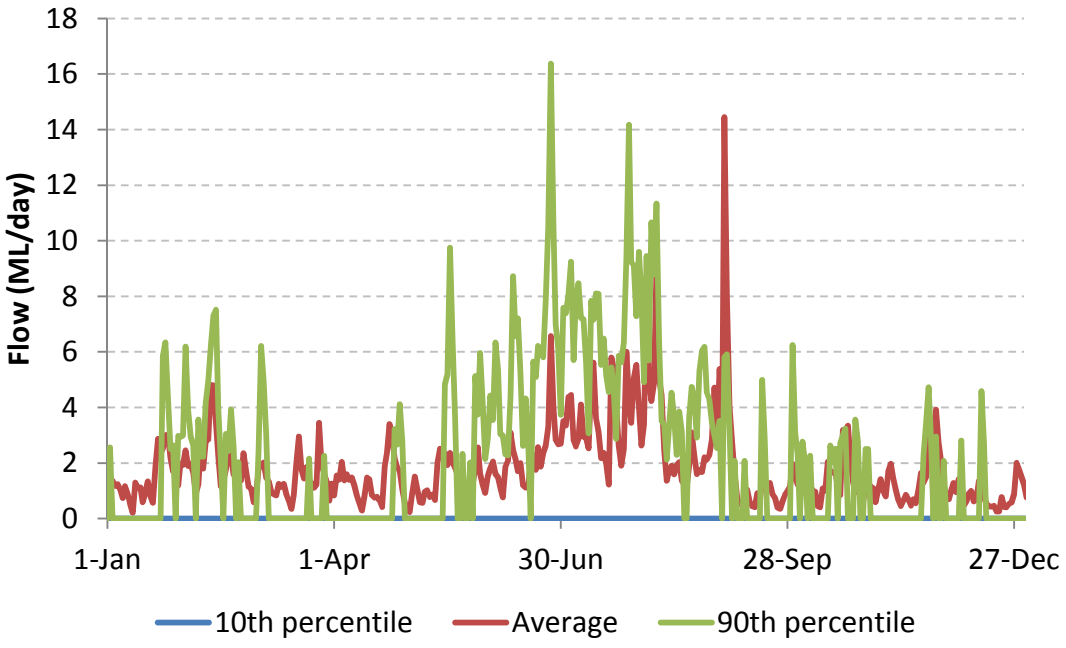


Figure 4-7 Predicted flow in Airly Creek at Point B under existing conditions

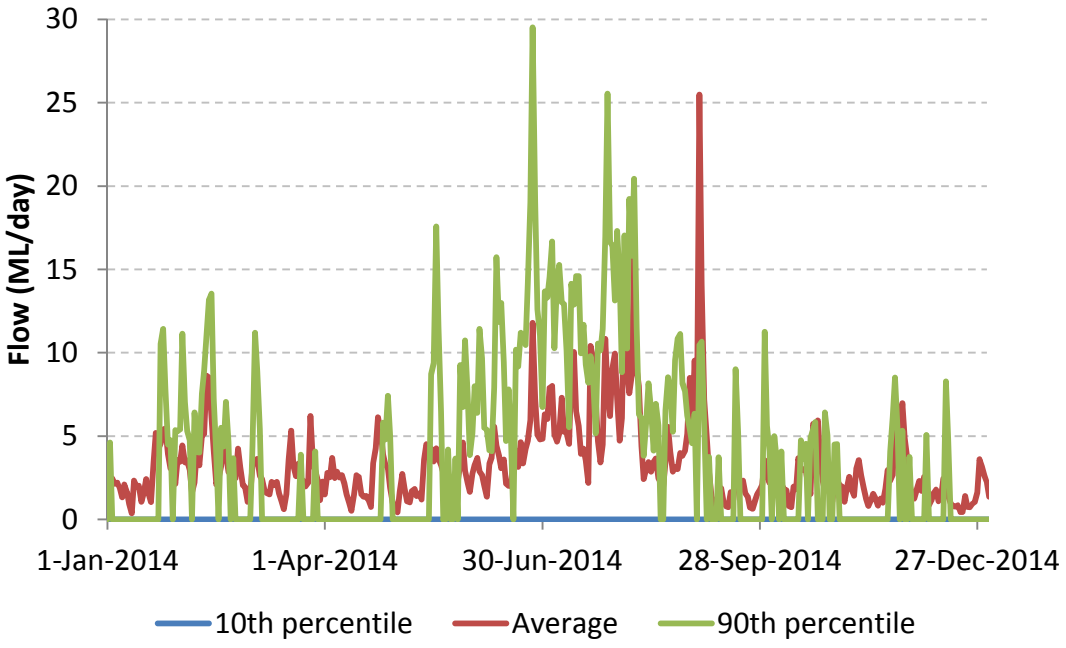


Figure 4-8 Predicted flow in Airly Creek at Point C under existing conditions

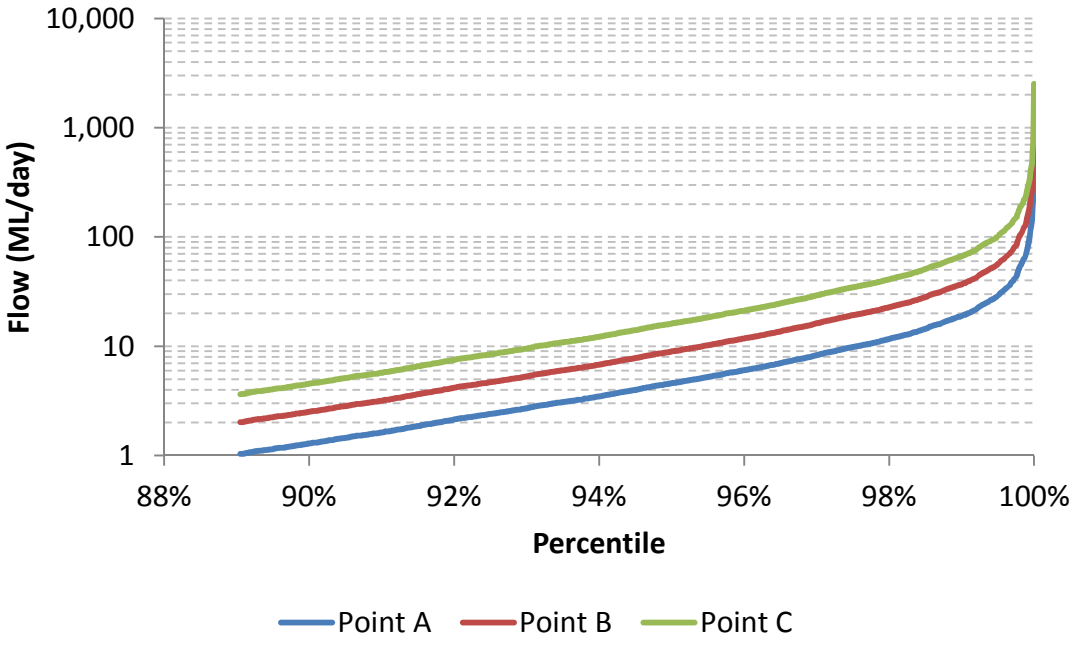


Figure 4-9 Predicted daily percentiles of flow in Airly Creek under existing conditions

4.2.2 Proposed conditions

The predicted flow within Airly Creek at Points A, B and C based on modelled catchment runoff plus discharges from Airly Mine via LDPs under proposed conditions in 2030 are presented in Figure 4-10, Figure 4-11 and Figure 4-12 respectively. The time series graphs show average values along with 10th percentile and 90th percentile values to provide an indication of the possible range of flow due to variation in rainfall.

Discharges from Airly Mine under proposed conditions were found to increase the average flow within Airly Creek by up to 1.1 ML/day, compared with catchment runoff to the creek alone. Average flow rates were modelled to vary from 0.1 ML/day to 8.1 ML/day at Point A, from 0.2 ML/day to 14.8 ML/day at Point B and from 0.4 ML/day to 25.9 ML/day at Point C.

Considering annual volumes, discharge from the surface facilities area at Airly Mine via LDPs represents approximately 6.0% of the flow at Point C on Airly Creek on average under proposed conditions, with a 90th percentile value of 7.3% of flows. Note that 10th percentile discharges from the mine under proposed conditions were found to be 0 ML/year, as discussed in Section 3.3.1.

Figure 4-13 presents the daily percentiles of the range of flows modelled for Airly Creek predicted by the water balance model under proposed conditions for 2030. As seen in Figure 4-13, no flow is predicted within the upper modelled reaches of Airly Creek for approximately 87% of the year. This represents a minor decrease in the time of no flow predicted for the creek under proposed conditions compared to catchment runoff alone and under existing conditions. This can be attributed to the increase in the frequency and volume of discharges from Airly Mine that do not occur in response to rainfall patterns, due to increased groundwater inflows into the underground workings that are discharged via LDP001.

The maximum daily flow rate predicted by the water balance model was predicted to increase under proposed conditions by approximately 84 ML/day due to discharges, as discussed in Section 3.3.1. The maximum flow estimated within the creek under existing conditions was approximately 777 ML/day at Point A, 1,438 ML/day at Point B and 2,525 ML/day at Point C.

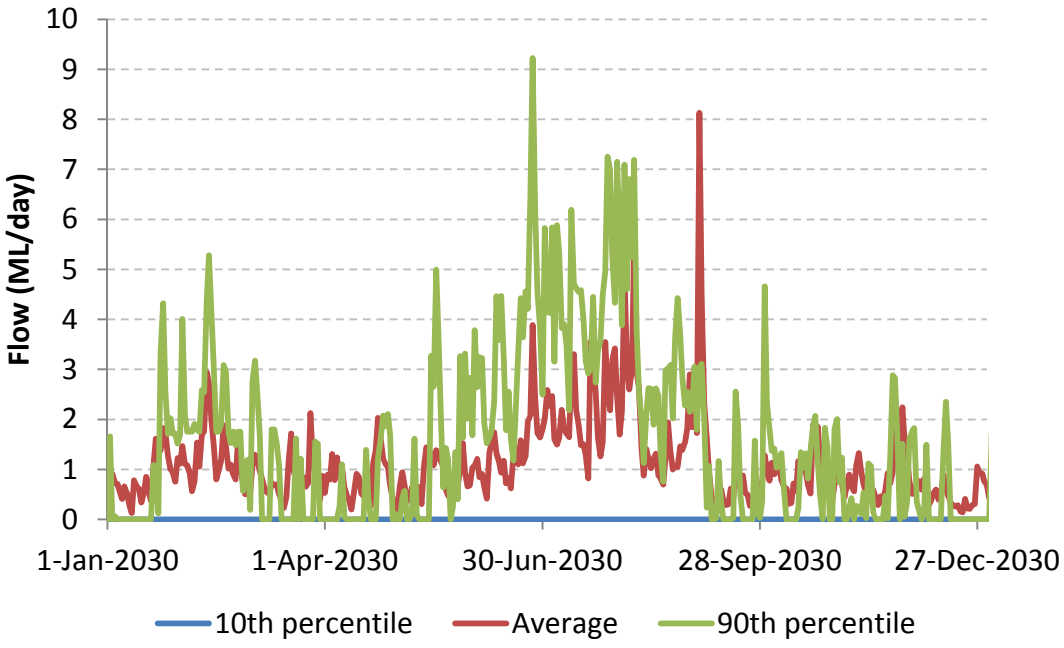


Figure 4-10 Predicted flow in Airly Creek at Point A under proposed conditions

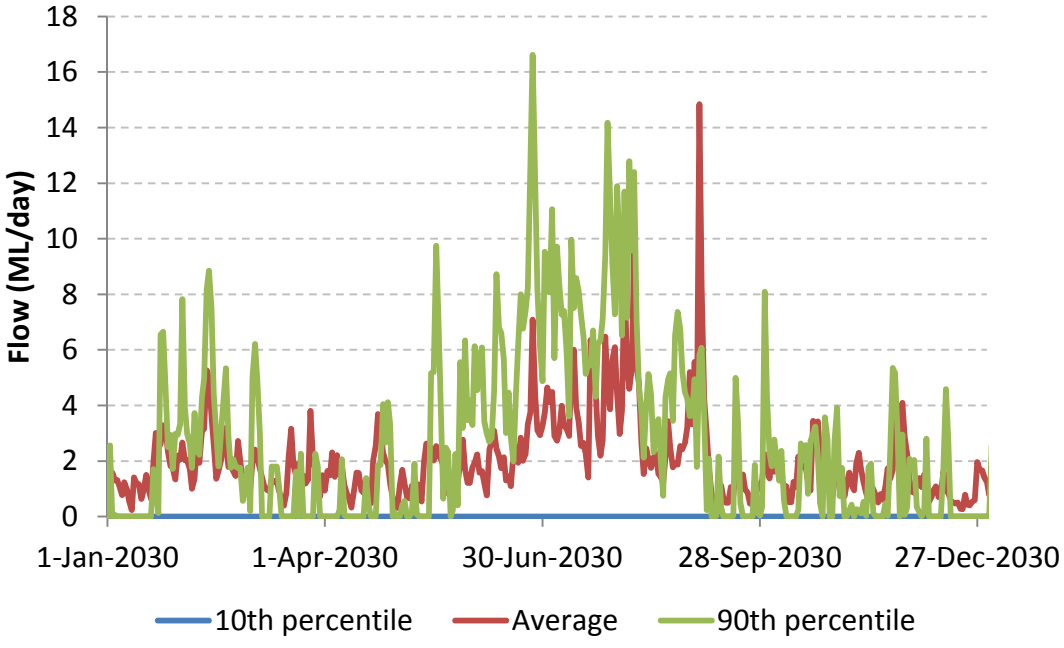


Figure 4-11 Predicted flow in Airly Creek at Point B under proposed conditions

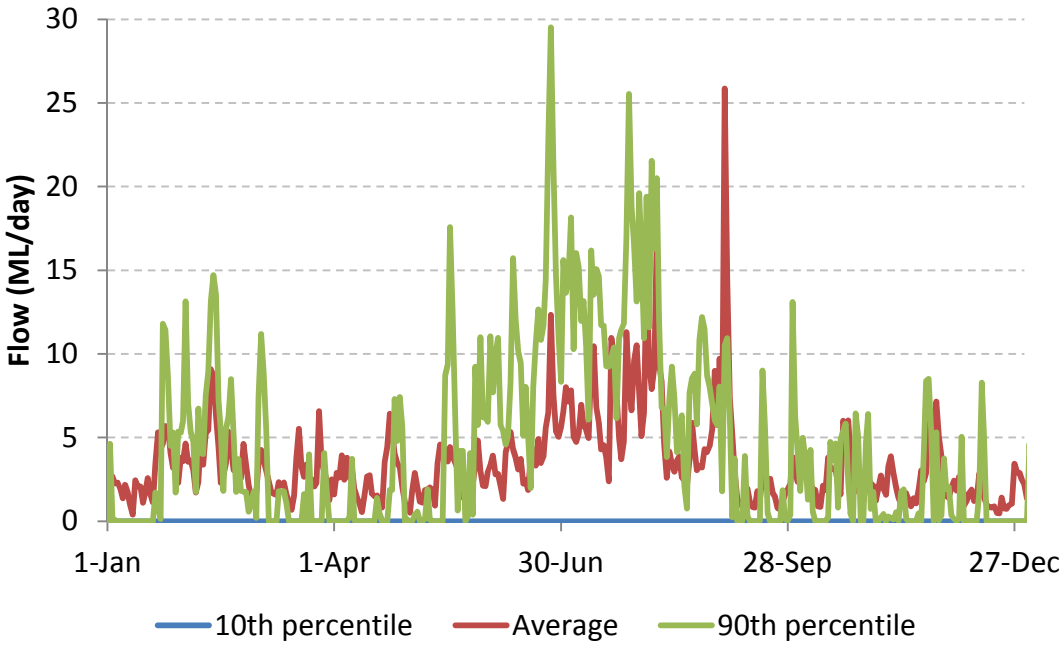


Figure 4-12 Predicted flow in Airly Creek at Point C under proposed conditions

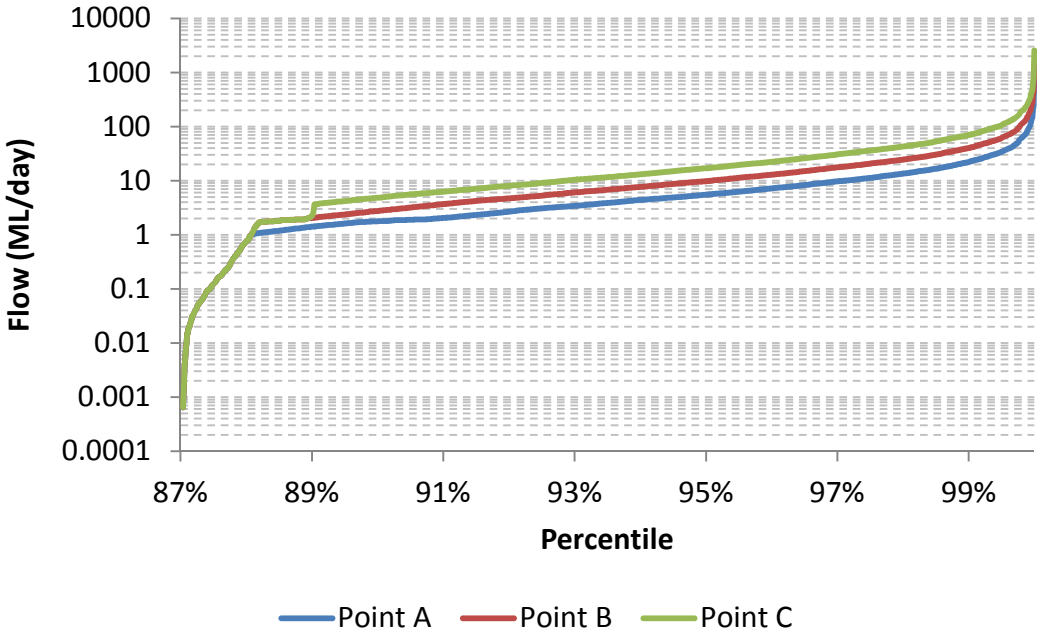


Figure 4-13 Predicted daily percentiles of flow in Airly Creek under proposed conditions at Points A, B and C

5 References

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Regards

Stuart Gray
Senior Hydrogeologist
(02) 4979 9999

16 January 2015

David King
Senior Mining Engineer
Centennial Airly Pty Ltd
Glen Davis Rd
CAPERTEE NSW 2846

Our ref: 22/16787
108405

Your ref:

Dear David

Airly Mine Extension Project - Response to Submissions
Fault Zone Hydrogeology Assessment

The review of the Airly Mine Extension Project Environmental Impact Statement (EIS) by the Independent Expert Scientific Committee (IESC) recommended that additional assessment of fault zones and their potential impacts on aquifer connectivity and groundwater flow is undertaken.

This report outlines a fault zone hydrogeology assessment undertaken by GHD Pty Ltd (GHD) to assess how mapped faults at Airly Mine affect local and regional hydrogeology and predict the impact of fault zones on the predictions of groundwater drawdown and groundwater inflow from the Groundwater Impact Assessment (GHD, 2014a).

1 Methodology

A fault zone hydrogeology assessment has been undertaken by further review of available hydrogeological data from Airly Mine and by conceptualisation of groundwater flow due to structural features.

1.1 Data Assessment

The existing groundwater monitoring program at Airly Mine includes vibrating wire piezometers (VWPs), sampling of groundwater bores and flow monitoring of groundwater seepage. All VWPs and standpipe monitoring bores are continuously logged for piezometric head and groundwater levels.

Piezometric head is currently monitored by 23 VWPs, installed across seven locations (ARP01, ARP02A, ARP03A, ARP04, ARP06, ARP07 and ARP08). These groundwater monitoring locations are shown in Figure 1 in this report, Figure 4-1 of GHD (2014a) and Figure 3.5 of the EIS. VWP data have been reviewed to identify evidence for the influence of fractures and/or fault zones on piezometric head.

To date, Centennial Airly has also undertaken 23 packer tests across the seven locations (ARP01, ARP02A, ARP03A, ARP04, ARP06, ARP07 and ARP08). Packer test data have also been reviewed to identify evidence for fractures and/or fault zones at these locations.

1.2 Conceptual Hydrogeological Model Assessment

The existing conceptual hydrogeological model has been updated with more information on the mechanisms for how fractures and faults influence local and regional hydrogeology at Airly Mine. This is discussed in Section 4 of this report.

2 Structural Features at Airly Mine

Based on high resolution aeromagnetic (HRAM) and radiometric data (SRK, 2012), the basement (or pre-Permian) and shallow geology at Airly Mine is characterised by the number of NW, NE and NS trending vertical fault zones. The approximate locations of these fault zones are shown in Figure 1 in this report and Figure 8.1 of the EIS.

Vertical fault zones are considered to be potential barriers to horizontal groundwater flow normal to the fault and conduits of horizontal flow tangential to the fault (Anderson and Bakker, 2008). Horizontal groundwater flow may be affected by high hydraulic gradients across the fault zones (Bense et al, 2013).

Faults zones are also considered to be areas of increased vertical hydraulic conductivity. Within a fault zone of increased vertical hydraulic conductivity (at least two orders of magnitude greater than horizontal hydraulic conductivity), Anderson and Bakker (2008) found that there would be equilibration of piezometric heads between different aquifers i.e. hydrostatic conditions within the fault zone.

In addition to fault zones, the Triassic and Permian strata of Mount Airly and Genowlan Mountain are characterised by a regular pattern of joints and fractures, based on analysis of aerial imagery as well as evidence from the exploration drilling program. Mackie Martin & Associates (1992) also describes this pronounced jointing, noting that it is predominantly northerly and north easterly trending.

3 Review of Hydrogeological Data

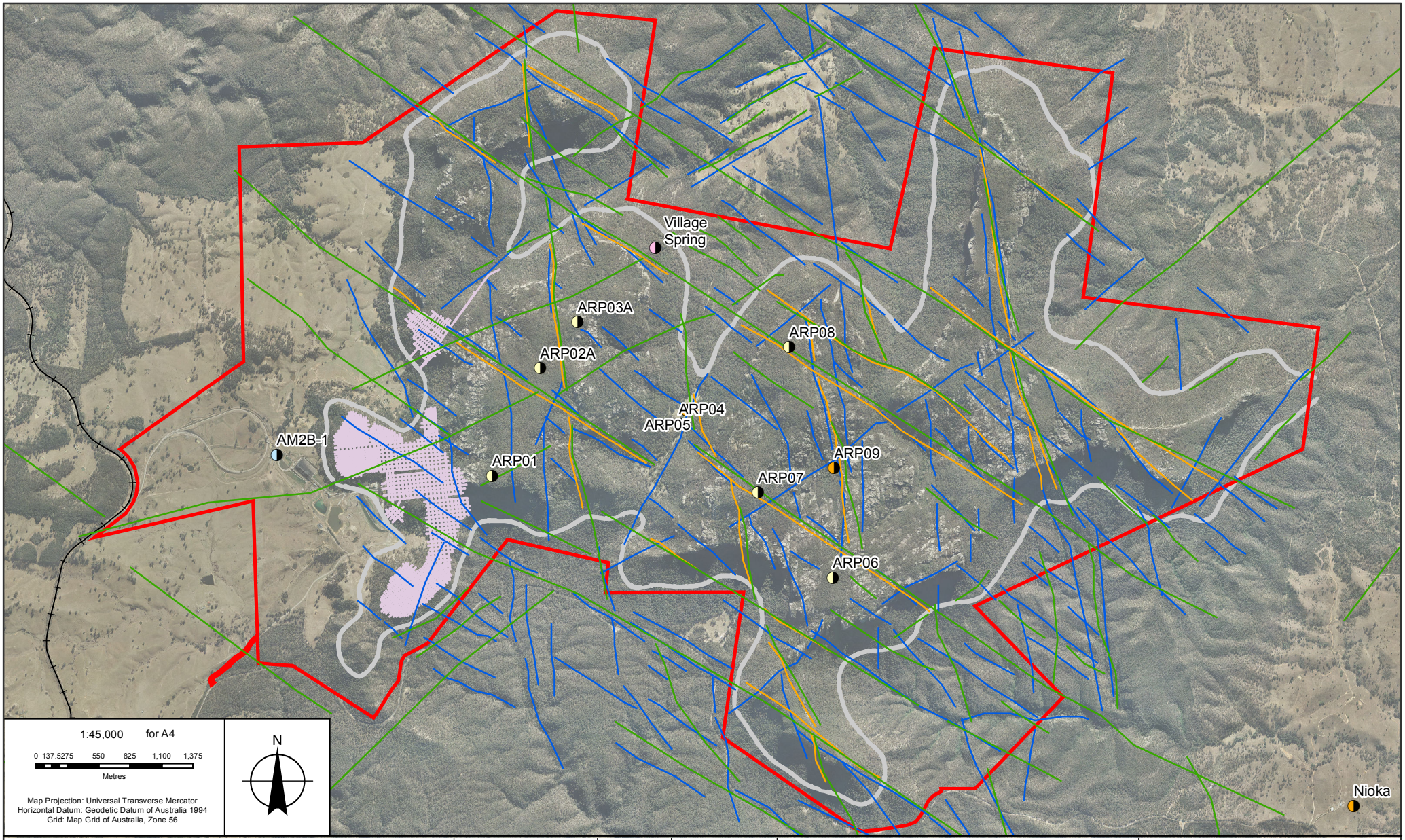
As shown in Figure 1, the groundwater monitoring (VWP) locations within mapped fault zones are ARP01, ARP04, ARP07 and ARP08. Therefore, the hydrogeological data from these locations would be expected to be more influenced by fault zones than other locations. The production bore AM2B-1 is not located within a mapped fault zone area.

Mining to date within the Lithgow Seam has coincided with mapped surface and basement faults.

3.1 Piezometric Head

There is a consistent downward vertical hydraulic gradient at each groundwater monitoring (VWP) location, which is not consistent with the equilibration of piezometric head throughout a fault zone discussed by Anderson and Bakker (2008). VWP monitoring data are shown in Appendix C of GHD (2014a). This vertical hydraulic gradient suggests that fault zones do not influence piezometric head at these locations and/or the VWPs are not measuring piezometric head throughout the entire vertical profile of the fault.

It is noted that piezometric pressure is zero or negative at a number of locations. The locations and monitored strata with consistent negative piezometric pressure are shown in Table 1. Negative piezometric pressure is generally indicative of unsaturated conditions. As shown in Table 1, the Lithgow



GHD

- Groundwater Seepage
- Production Bore
- Standpipe Monitoring Bore
- Vibrating Wire Piezometers
- Project Application Area
- Existing Workings
- Airly Basement Faults
- Airly Seam Faults
- Airly Surface Faults
- Lithgow Seam Outcrop
- Railway

LOCATION	Airly
SEAM	Lithgow
DRAWN	I.G.
CHECKED	S.G.
APPROVED	S.G.
SCALE	refer to scalebar

Airly Mine Extension Project
Response to Submissions
Groundwater Monitoring Locations and Fault Zones

Centennial Airly

DATE 16/01/2015

Figure 1

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Seam is unsaturated at most locations, indicating that surface to seam groundwater connectivity is unlikely. Where piezometric pressure is positive, it is generally low (less than 10 m), which reflects the extensive groundwater seepage areas across the slopes of Mount Airly and Genowlan Mountain.

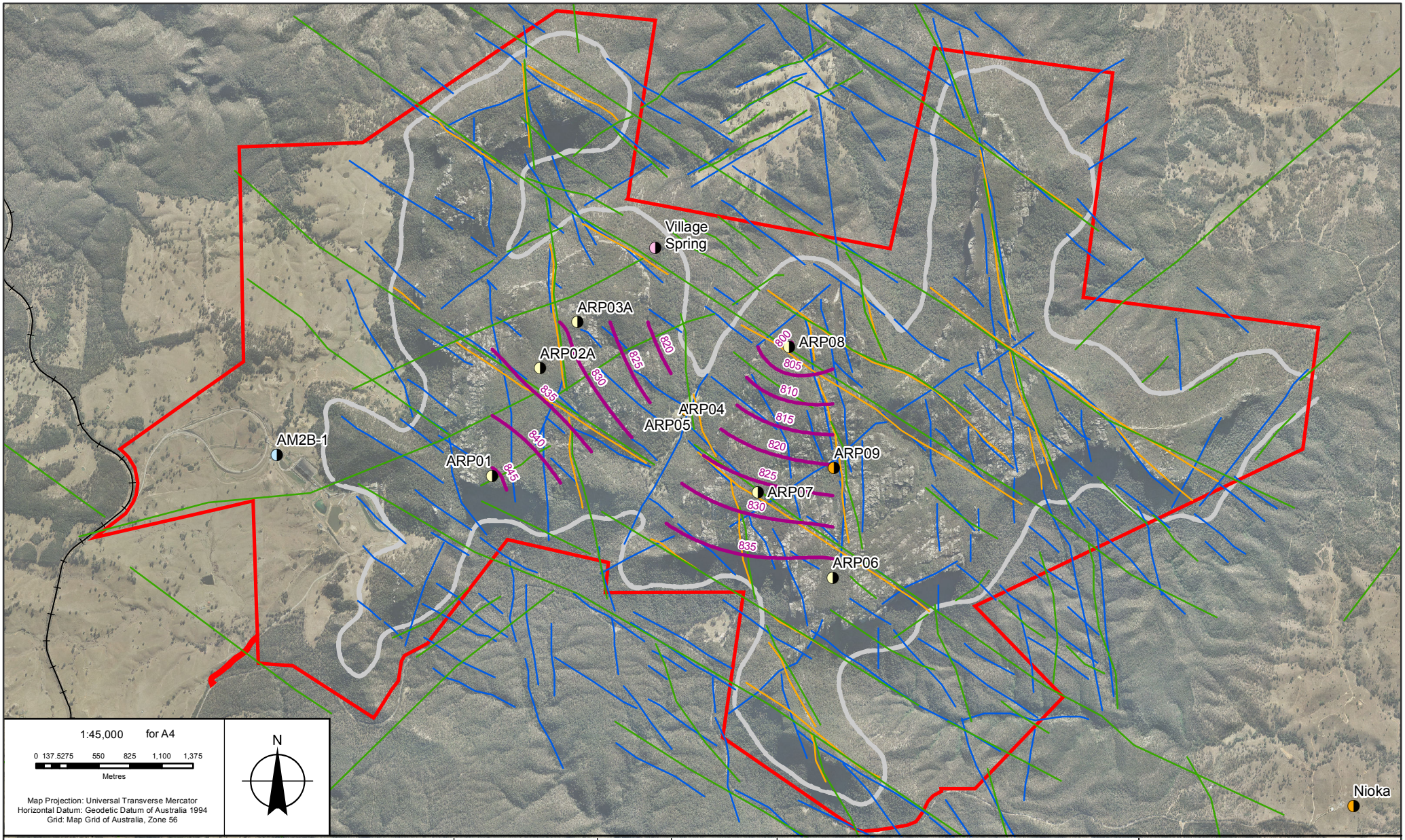
Groundwater flow contours for the Narrabeen Sandstone, Lithgow Seam and Marrangaroo Formation were generated from piezometric head data and are shown in Figures 3-3, 3-4 and 3-5, respectively, of the Hydrogeological Model Report (GHD, 2014b). Groundwater flow in each case is generally to the east – northeast, perpendicular to the main NW and NS trending fault zones. No high hydraulic gradients are noticeable across the fault zones, as shown in Figure 2, Figure 3 and Figure 4 of this report, indicating that fault zones are not influencing horizontal groundwater flow.

Table 1 VWP locations with negative piezometric pressure

Location name	Period of data	Lithology and depth of installation
ARP01	June 2012 - present	Narrabeen Sandstone (74 m bgl)
		Lithgow Seam (260 m bgl)
ARP02A	May 2012 - present	Narrabeen Sandstone (65 m bgl)
		Irondale Seam (243 m bgl)
		Lithgow Seam (266 m bgl)
ARP03A	July 2012 - present	Lithgow Seam (252 m bgl)
ARP06	June 2013 - present	Irondale Seam (252 m bgl)
		Lithgow Seam (288 m bgl)
ARP07	July 2013 - present	Middle River Seam (168 m bgl)
		Lithgow Seam (252 m bgl)

3.2 Packer Tests

Packer tests have been conducted within each exploration hole drilled at Airly Mine since 2012. Considerable water loss has been reported during drilling and packer testing at a number of locations. The locations of excessive water loss and where packer testing has failed due to water pressure not being maintained are listed in Table 2.



LEGEND

- Project Application Area
- Measured Piezometric Contour
- Airly Basement Faults
- Airly Seam Faults
- Airly Surface Faults
- Lithgow Seam Outcrop
- Railway

LOCATION	Airly
SEAM	Lithgow
DRAWN	I.G.
CHECKED	S.G.
APPROVED	S.G.
SCALE	refer to scalebar

Airly Mine Extension Project
Response to Submissions

Measured Piezometric Contours Narrabeen and Fault Zones

Centennial Airly

DATE 16/01/2015

Figure 2

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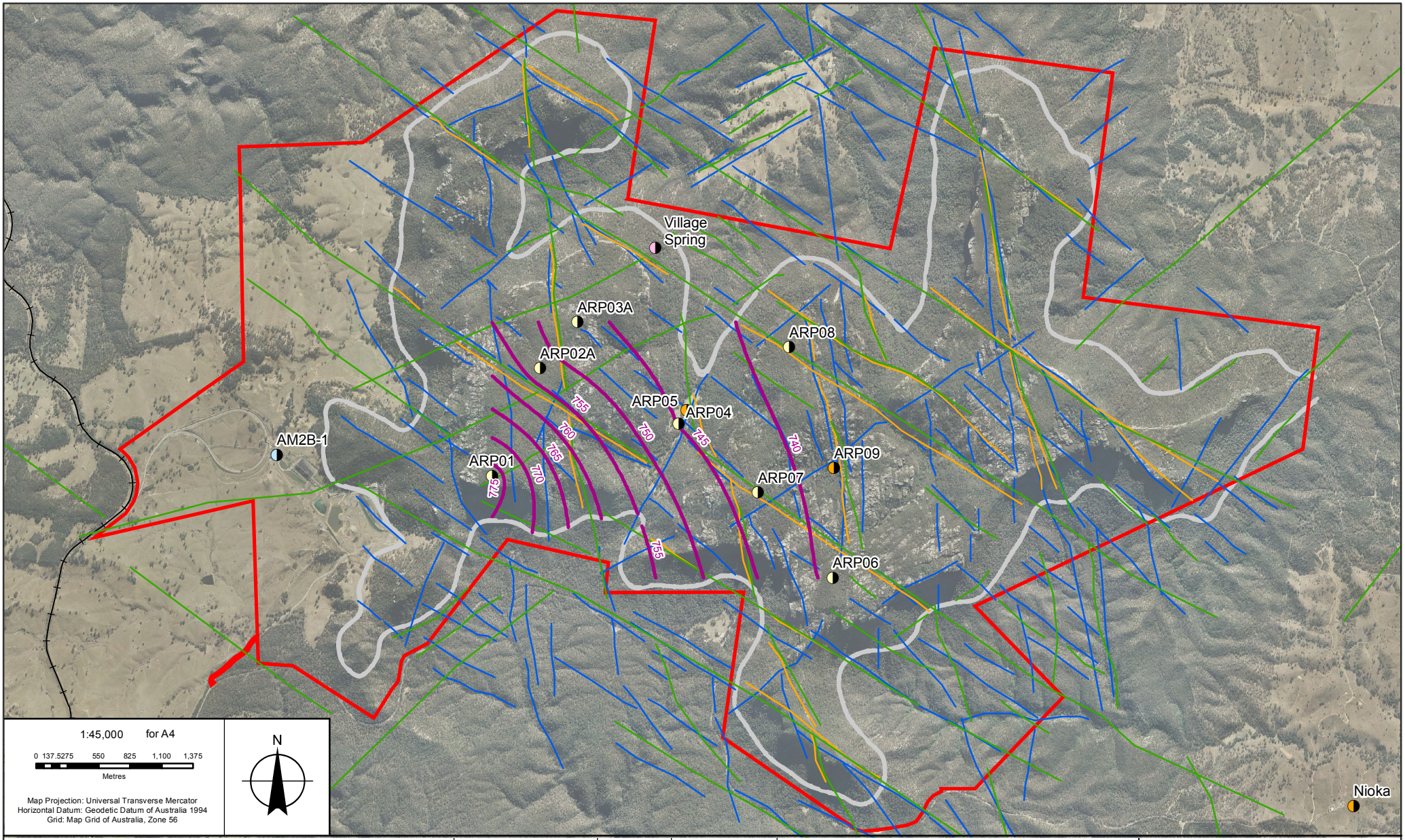

LEGEND

- Project Application Area
- Measured Piezometric Contours
- Airly Basement Faults
- Airly Seam Faults
- Airly Surface Faults
- Lithgow Seam Outcrop
- Railway

LOCATION	Airly
SEAM	Lithgow
DRAWN	I.G.
CHECKED	S.G.
APPROVED	S.G.
SCALE	refer to scalebar

Airly Mine Extension Project
Response to Submissions

Measured Piezometric Contours Lithgow Seam and Fault Zones

Centennial Airly

DATE 16/01/2015

Figure 3

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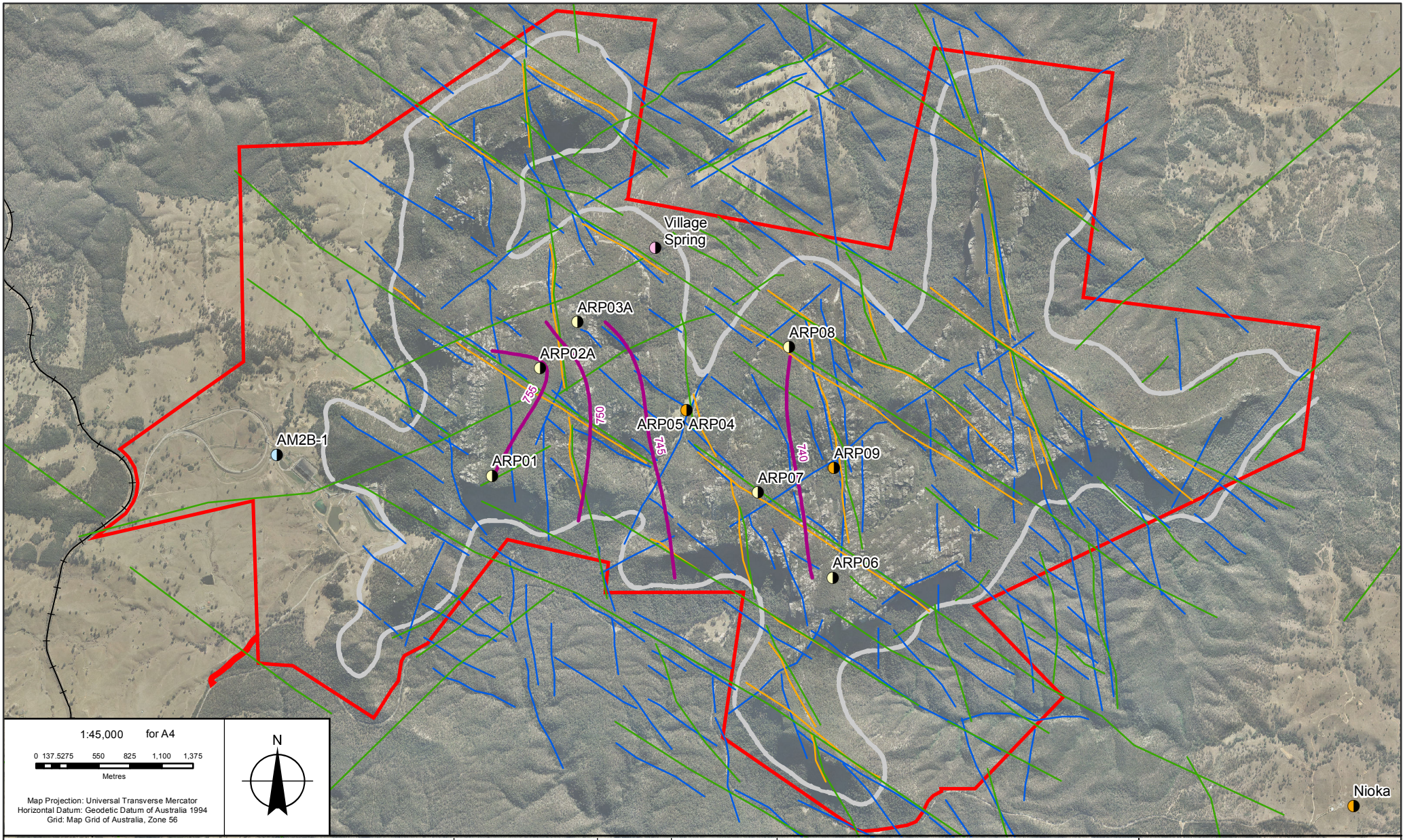

LEGEND

- Project Application Area
- Measured Piezometric Contours
- Airly Basement Faults
- Airly Seam Faults
- Airly Surface Faults
- Lithgow Seam Outcrop
- Railway

LOCATION	Airly
SEAM	Lithgow
DRAWN	I.G.
CHECKED	S.G.
APPROVED	S.G.
SCALE	refer to scalebar

Airly Mine Extension Project
Response to Submissions

Measured Piezometric Contours Marrangaroo and Fault Zones

Centennial Airly

DATE 16/01/2015

Figure 4

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Table 2 Packer test locations with water loss

Location name	Depth (m bgl)	Strata
ARP01	237-240	Lower Irondale Seam
ARP06	181-184	Narrabeen Sandstone
ARP07	163-166	Middle River Seam
	250-253	Lithgow Seam
ARP08	281.5-284.5	Narrabeen Sandstone
	291-294	Siltstone
	298-301	Sandstone
	305.3-308.3	Lithgow Seam

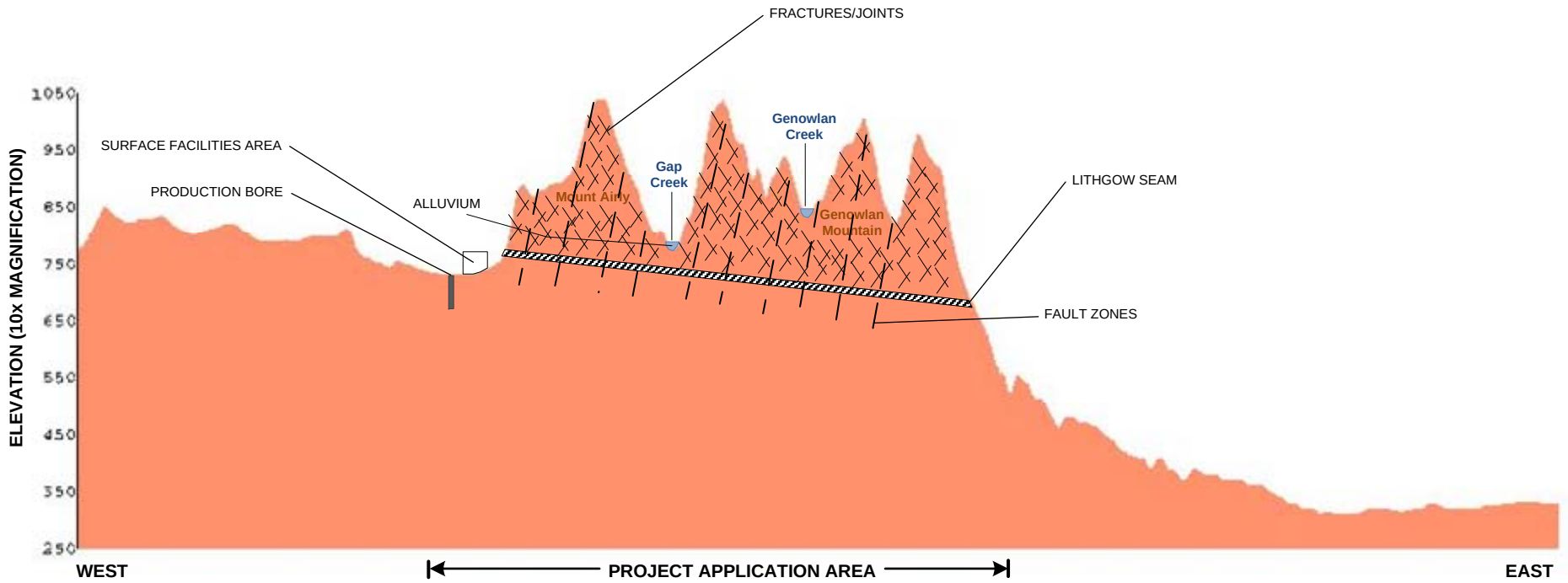
It is most likely that water was lost at ARP01 and ARP06 due to fractures and joints in the strata rather than faults due to the absence of surface and seam faults in these areas. It is possible that water loss occurred at ARP07 and ARP08 due to faults, since seam and basement faults are present at these locations, however it is more likely that the water loss occurred due to fractures as discussed in Section 4.

4 Conceptual Hydrogeological Model

The local and regional hydrogeology at Airly Mine is shown conceptually in Figure 4-2 of the Hydrogeological Model Report (GHD, 2014b). As outlined in GHD (2014b), the local groundwater sources are recharged by rainfall and discharge along the side of the mountains or directly into watercourses.

This conceptual hydrogeological model has been updated to provide more analysis of the potential influence of fractures/joints and fault zones on local and regional groundwater flow. An updated conceptual cross section is shown in Figure 5. Aerial imagery of Airly Mine shows a regular network of fractures/joints at 10-20 m spacing across the surface of Mount Airly and Genowlan Mountain. These have been represented in Figure 5, along with the vertical fault zones shown in Figure 1.

The extensive network of fractures and joints within the Triassic and Permian strata across the surface of Mount Airly and Genowlan Mountain is the dominant geological feature across Airly Mine. They are therefore more likely to influence local groundwater flow than fault zones. These fractures provide a pathway for groundwater movement and, due to their orientation and surface expression, they are more likely to direct groundwater towards seepage areas across the slopes of Mount Airly and Genowlan Mountain than downward to the Lithgow Seam and regional groundwater sources. This is demonstrated by the unsaturated conditions in the Lithgow Seam, discussed in Section 3.1 of this report, as well as the fact that no continuous groundwater inflows have been reported into the existing Lithgow Seam workings to date.



GROUNDWATER FLOW

LOCATION	Airly
SEAM	NA
DRAWN	SM
CHECKED	SG
APPROVED	SG
SCALE	NTS

Airly Mine Extension
Project Response to Submissions

Cross section showing
faults and joints at Airly Mine

Centennial Airly

DATE Jan 2015

Figure 5

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5 Conclusions

Based on the lines of evidence presented in this report, fault zones have limited influence on local and regional groundwater flow at Airly Mine. The analysis undertaken has shown that:

- There is a downward vertical hydraulic gradient at all groundwater monitoring locations, including those located within mapped fault zone areas. Vertical equilibration of piezometric head would be expected within a fault zone.
- Horizontal groundwater flow gradients do not appear to be affected across mapped fault zones.
- The extensive network of fractures and joints within the Triassic and Permian strata is considered to have a greater influence on groundwater flow than fault zones. These fractures direct groundwater to seepage areas and account for the relatively low piezometric head throughout Mount Airly and Genowlan Mountain, the water loss during drilling and packer testing and the unsaturated conditions in the Lithgow Seam.
- The production bore is not located within a mapped fault zone area.

It is not considered necessary to incorporate fault zones into the numerical hydrogeological model. Fractures and joints are currently accounted within the bulk hydraulic conductivity values for each model layer, which have been calibrated using piezometric head data affected by these fractures and joints.

6 References

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Regards,

Stuart Gray
Senior Hydrogeologist
(02) 4979 9999

16 January 2015

David King
Senior Mining Engineer
Centennial Airly Pty Ltd
Glen Davis Rd
CAPERTEE NSW 2846

Our ref: 22/16787
Your ref: 108456

Dear David

Airly Mine Extension Project - Response to Submissions
Airly Creek Water Quality

1 Introduction

The review of the Airly Mine Extension Project Environmental Impact Statement (EIS) by the Independent Expert Scientific Committee (IESC) noted that Site Specific Trigger Values (SSTVs) have been derived using water quality data from Airly Creek downstream of Airly Mine Licenced Discharge Points (LDPs) and these SSTVs need to be validated using data from an appropriate reference site not affected by mine water discharges. The monitoring location used to derive SSTVs is referred to as 'Airly Creek' and is shown in Figure 1. This monitoring data has been validated using water quality data from 'Airly Creek Upstream', located upstream of mine water discharge and shown in Figure 1.

Water quality sampling has been undertaken on a monthly basis at monitoring point Airly Creek from January 2010 to November 2014 and at Airly Creek Upstream from April 2014 to November 2014. Monitoring at both sites is ongoing. Time series plots of water quality at both sites are shown in Appendix A.

2 Assessment of Water Quality Data

Visual comparison of the time series plots of water quality at sites Airly Creek and Airly Creek Upstream, shown in Appendix A, indicates that the water quality at Airly Creek Upstream is very similar to that of monitoring point Airly Creek. Airly Creek Upstream is located upstream of monitoring point Airly Creek and is not affected by mine water discharges. The water quality results for Airly Creek Upstream fall within the historical minimum and maximum results for monitoring point Airly Creek for all reported parameters.

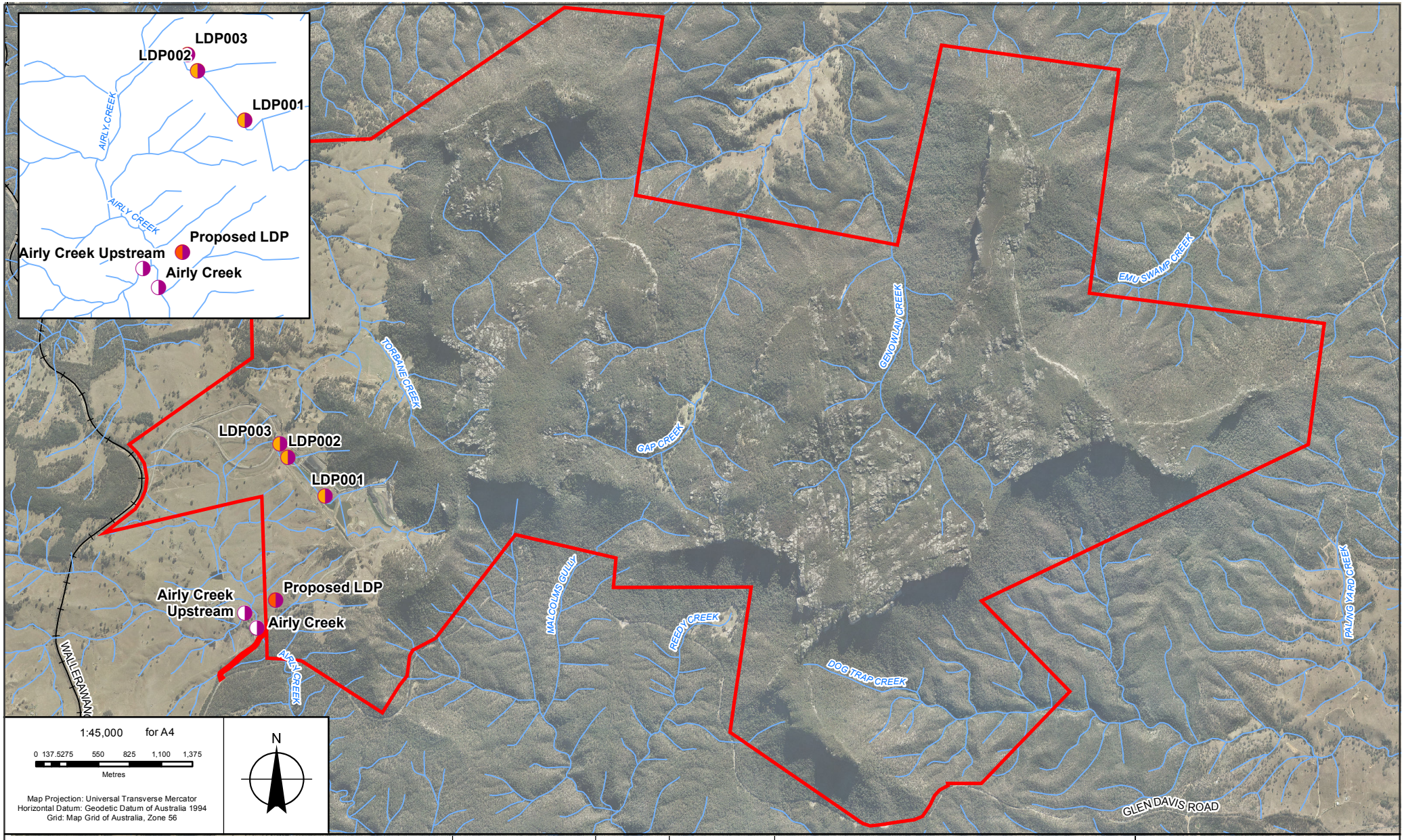
In particular, similar water quality has been reported at both sites for the period from April 2014 to November 2014 during which time monitoring was undertaken at both locations.

Mine water discharge from LDP001 has occurred in December 2010, January 2011, February 2012 and March 2012, while discharge from LDP003 has occurred in January 2013, March 2014 and April 2014. All discharges generally occurred during wet weather periods. No correlation between mine water discharge period and water quality at Airly Creek is evident from the time series plots.

Overall it is considered that water quality at site ‘Airly Creek’ is appropriate for deriving SSTVs. Statistical analysis of data for Airly Creek Upstream has not been undertaken at this stage as the number of data points available is less than two years of monthly data required by ANZECC guidelines, however it is recommended that SSTVs be recalculated using data from Airly Creek Upstream once two years of monthly data are available. Due to the similarity in water quality between monitoring points Airly Creek and Airly Creek Upstream it is anticipated that the revised SSTVs will not change significantly.

Sincerely

Stuart Gray
Senior Hydrogeologist
(02) 4979 9999



LEGEND

- Project Application
- Waterway
- Railway
- Flow and Water Quality Monitoring
- Water Quality Monitoring
- Proposed LDP

LOCATION	Airly
SEAM	Lithgow
DRAWN	F.M.
CHECKED	S.G.
APPROVED	S.G.
SCALE	refer to scalebar

Airly Mine Extension Project
Response to Submissions

Airly Creek
Surface Water Monitoring Locations

Centennial Airly

DATE 16/01/2015

Figure 1

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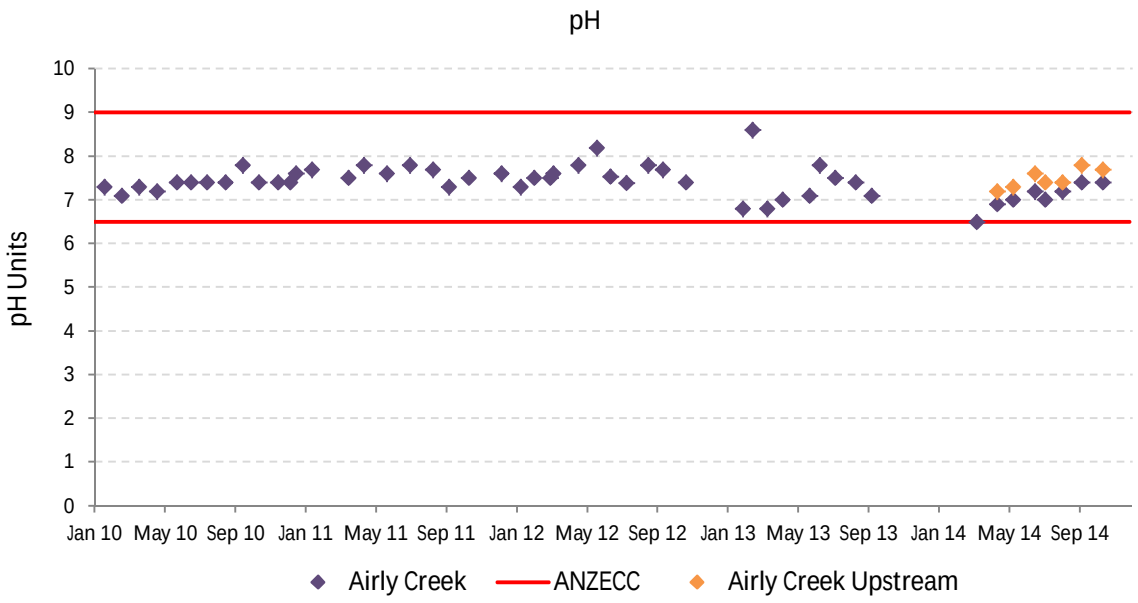
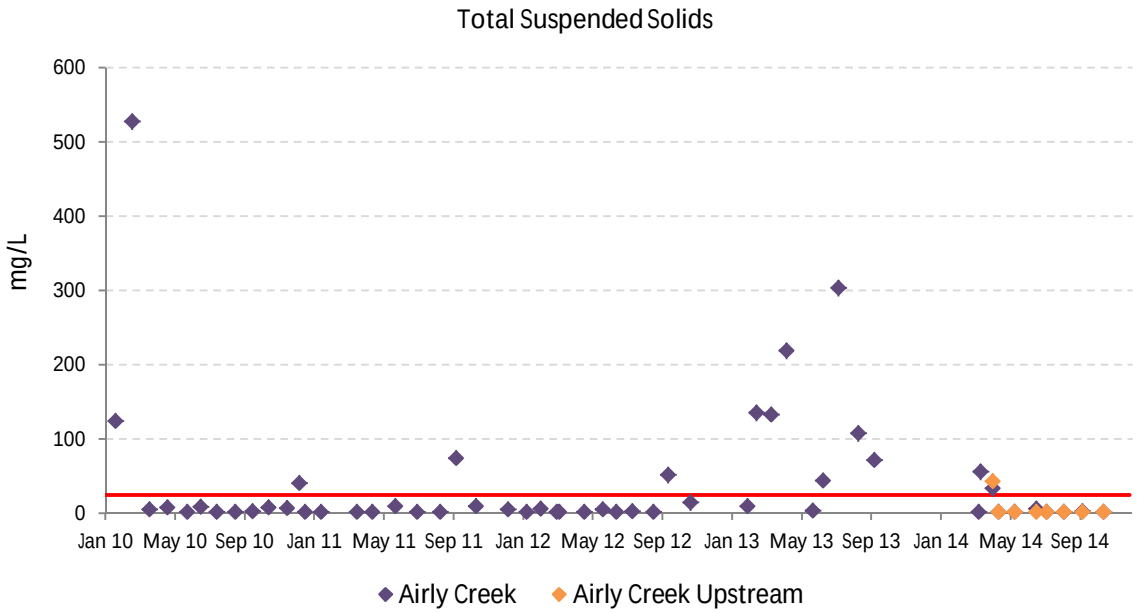
Appendix A

Water Quality Results


pH
pH Units
10
9
8
7
6
5
4
3
2
1
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
ANZECC
Airly Creek Upstream


Total Suspended Solids
mg/L
600
500
400
300
200
100
0
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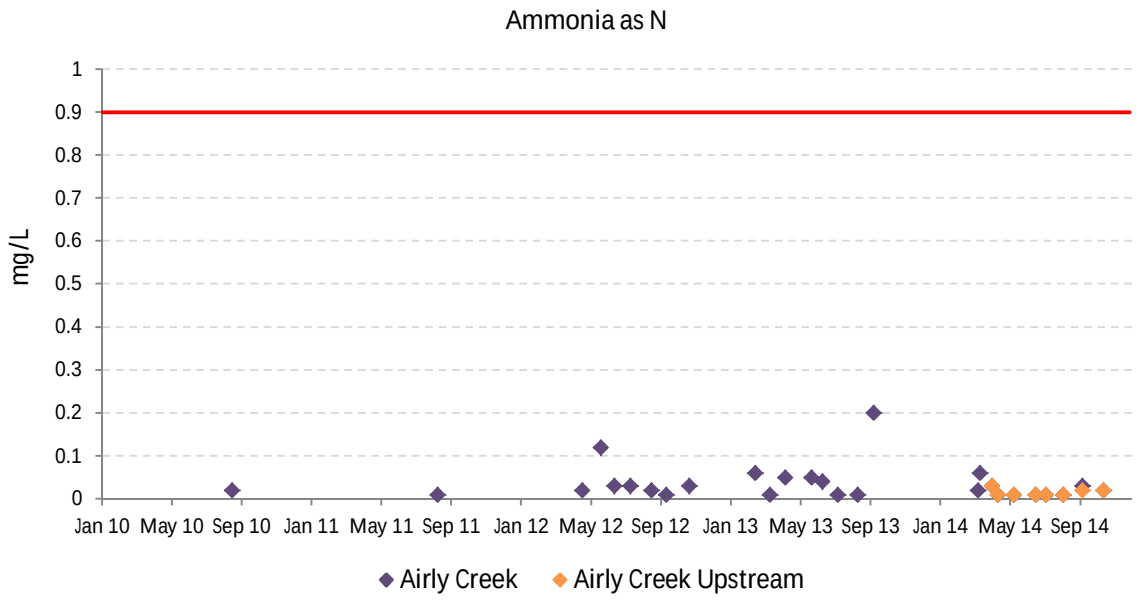
Airly Creek
Airly Creek Upstream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mg/L
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0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
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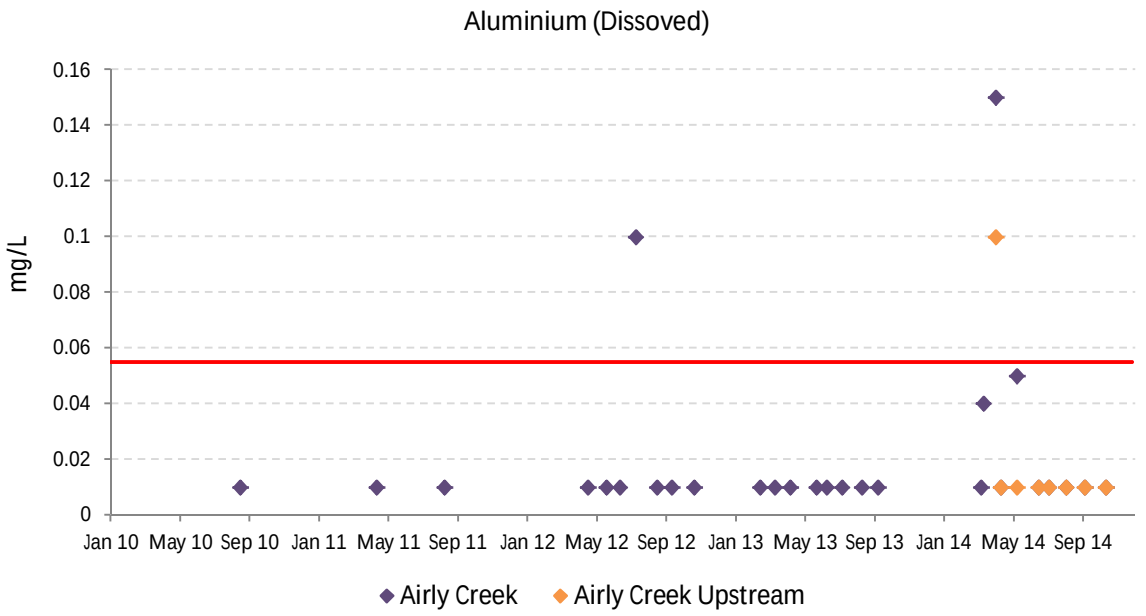
Airly Creek
Airly Creek Upstream


Aluminium (Dissoved)
mg/L
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0.12
0.1
0.08
0.06
0.04
0.02
0
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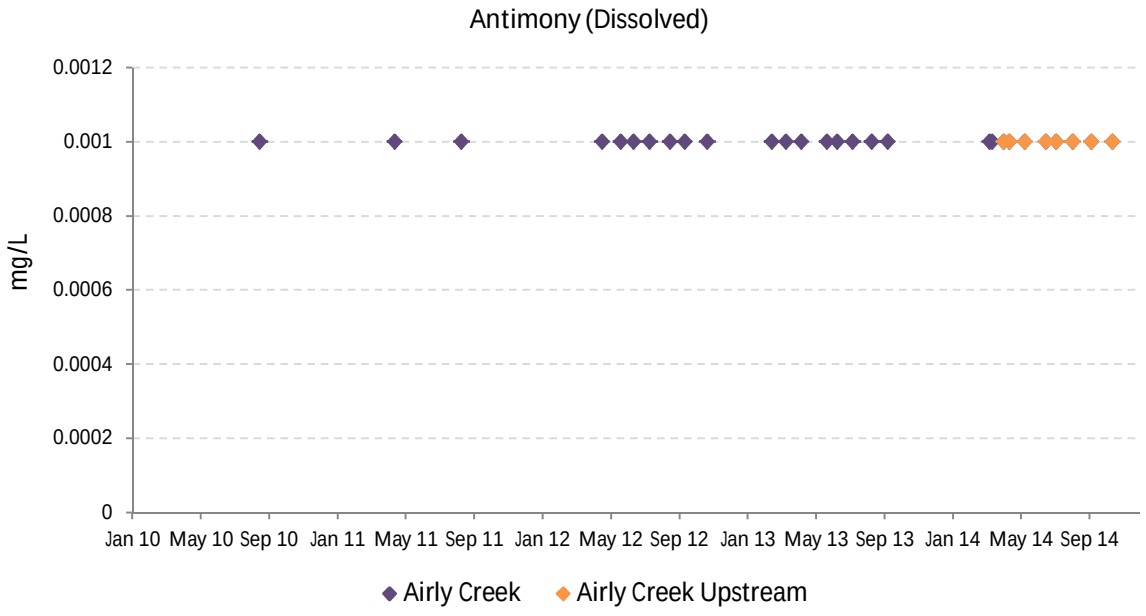
Airly Creek
Airly Creek Upstream


Antimony (Dissolved)
mg/L
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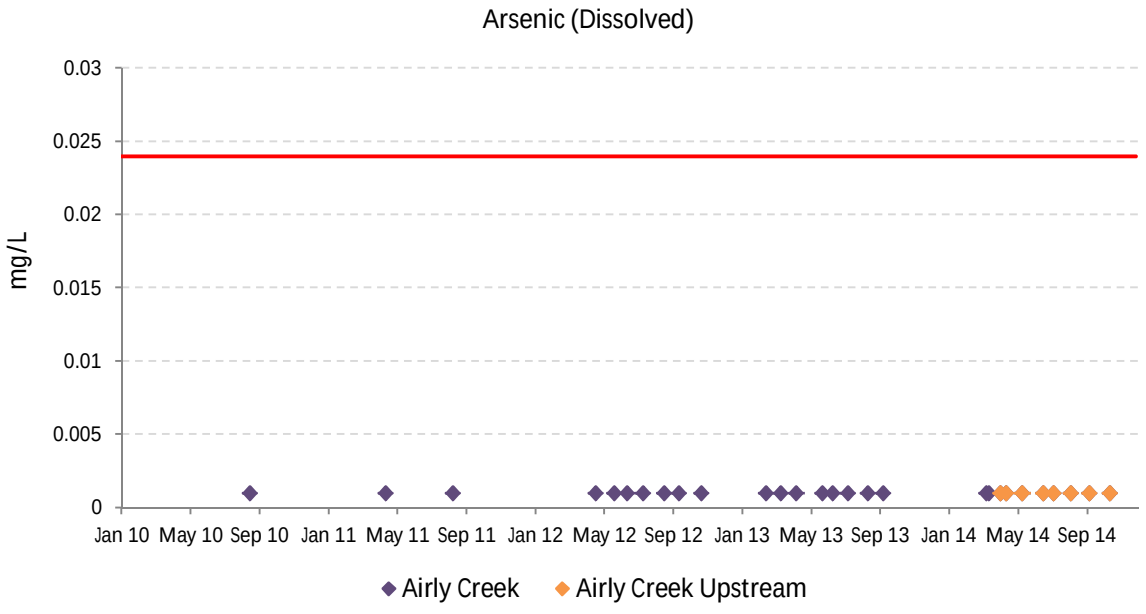
0.001
0.0008
0.0006
0.0004
0.0002
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream


Arsenic (Dissolved)
mg/L
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0.025
0.02
0.015
0.01
0.005
0
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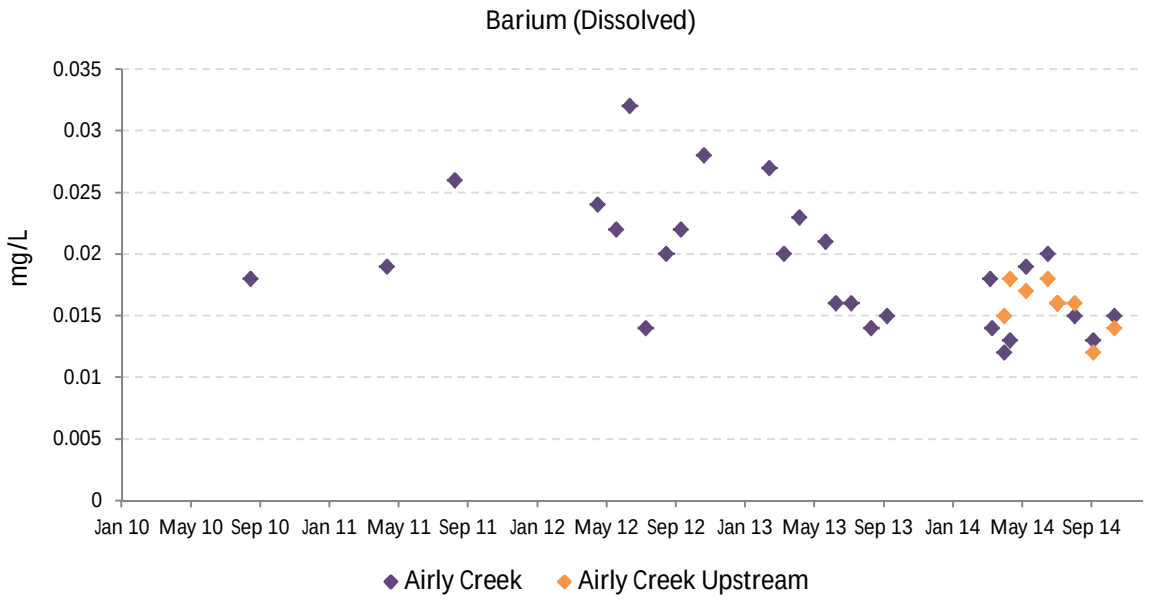
Airly Creek
Airly Creek Upstream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mg/L
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0.025
0.02
0.015
0.01
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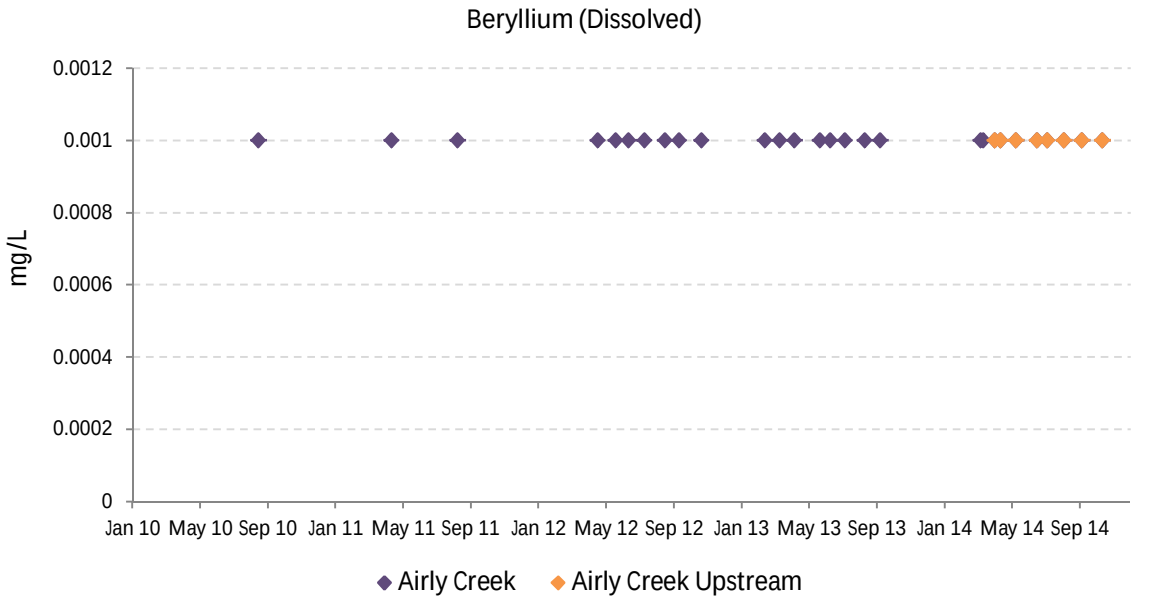
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream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mg/L
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0.0008
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0.0004
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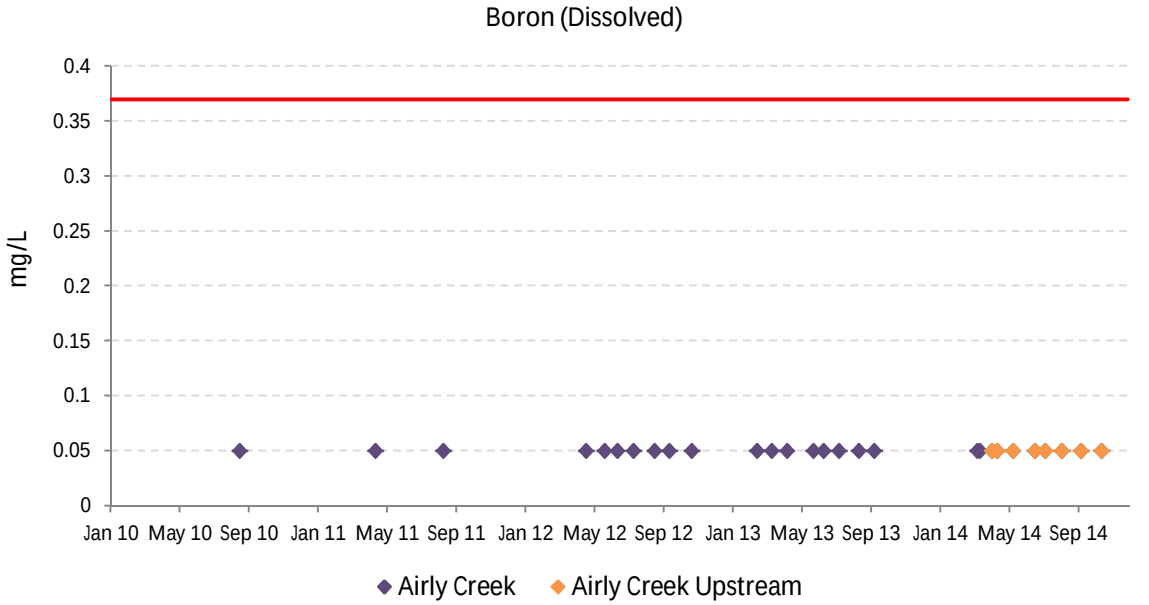
Airly Creek
Airly Creek Upstream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mg/L
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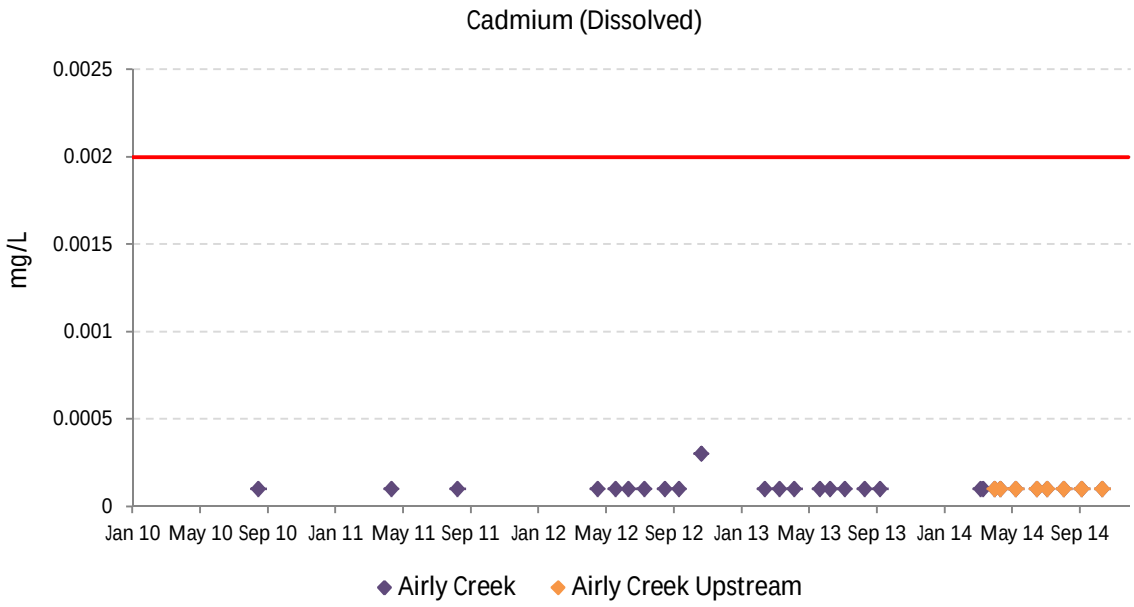
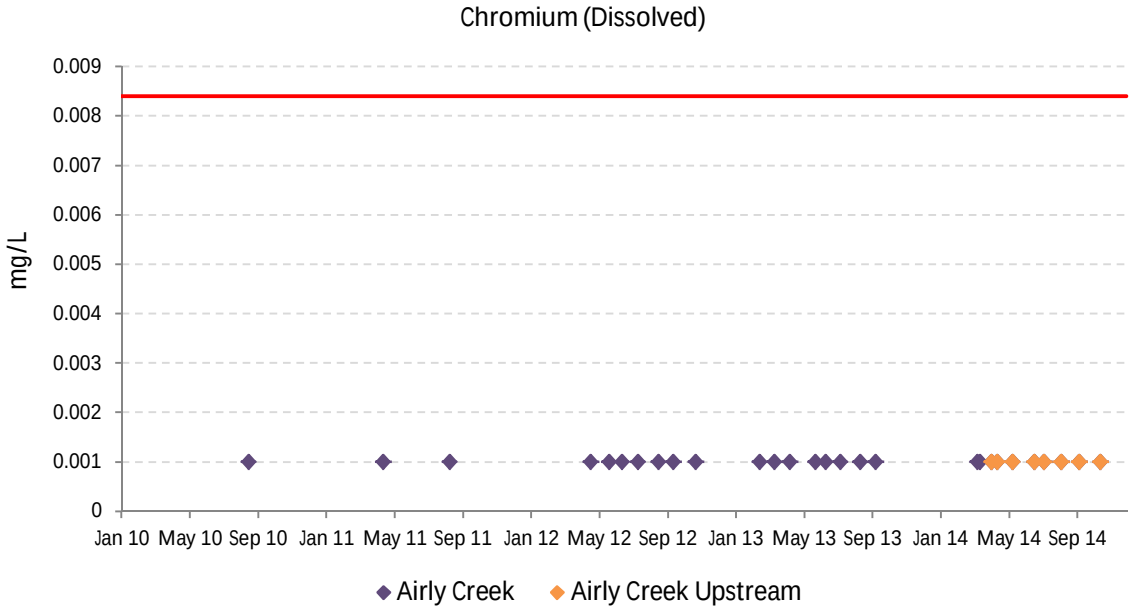
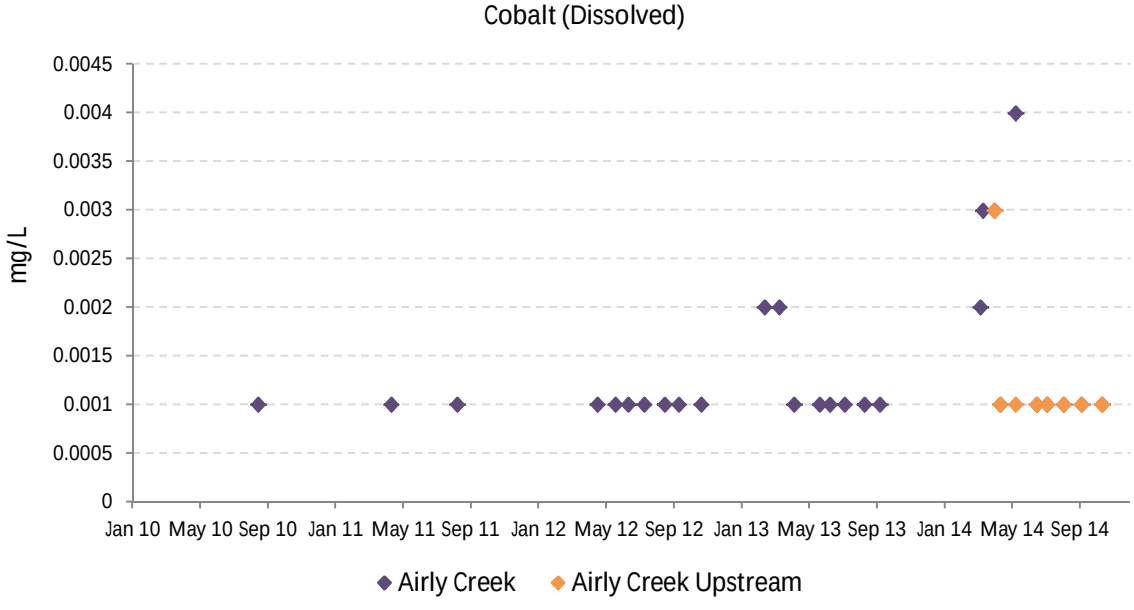
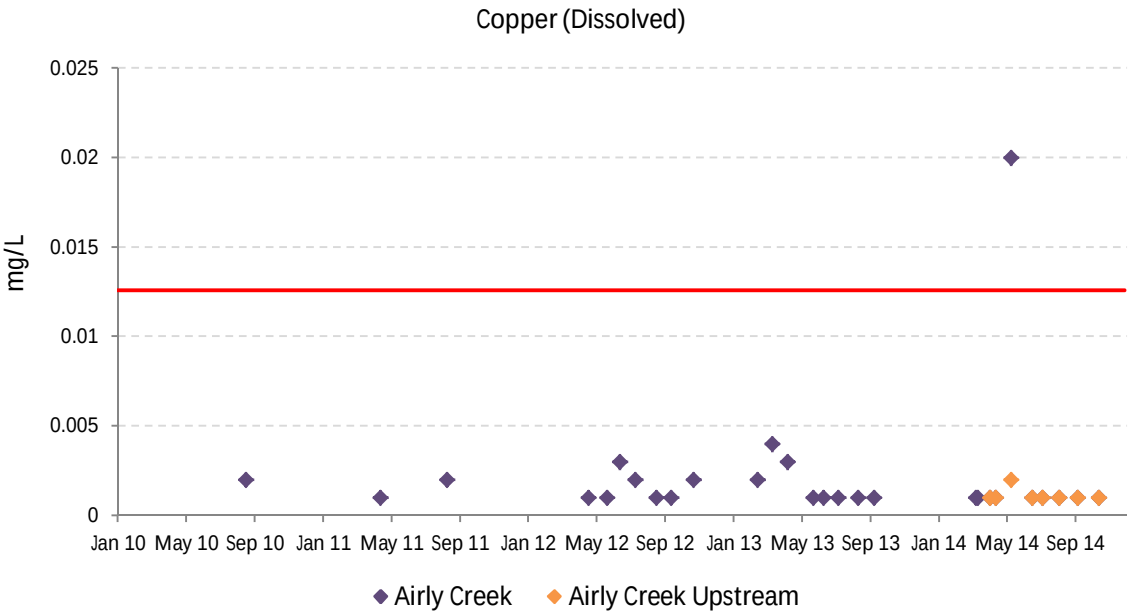
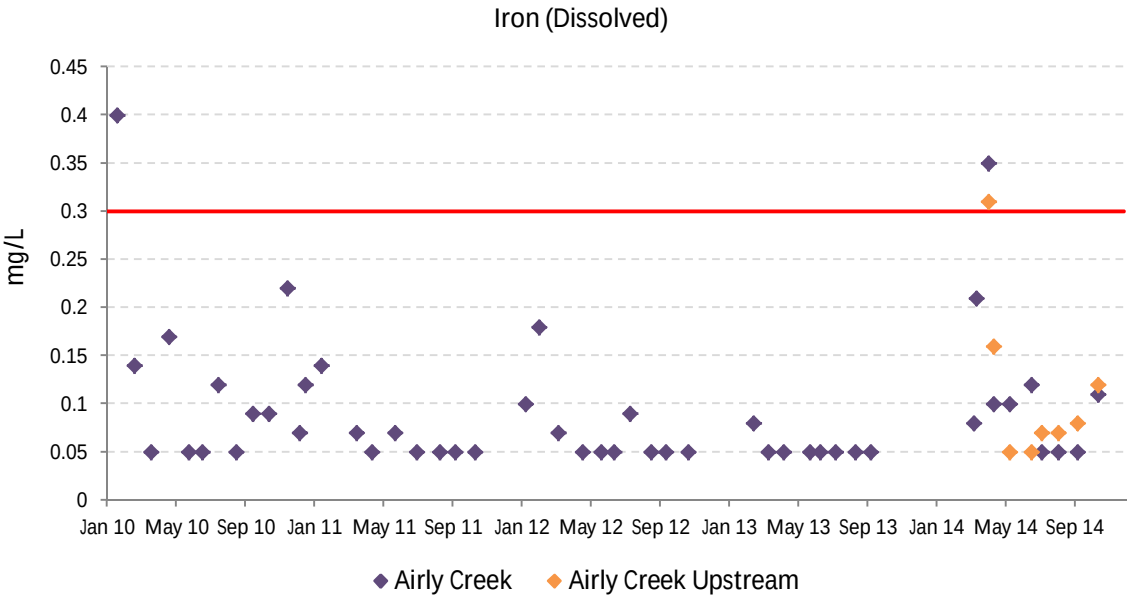
0.3
0.25
0.2
0.15
0.1
0.05
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

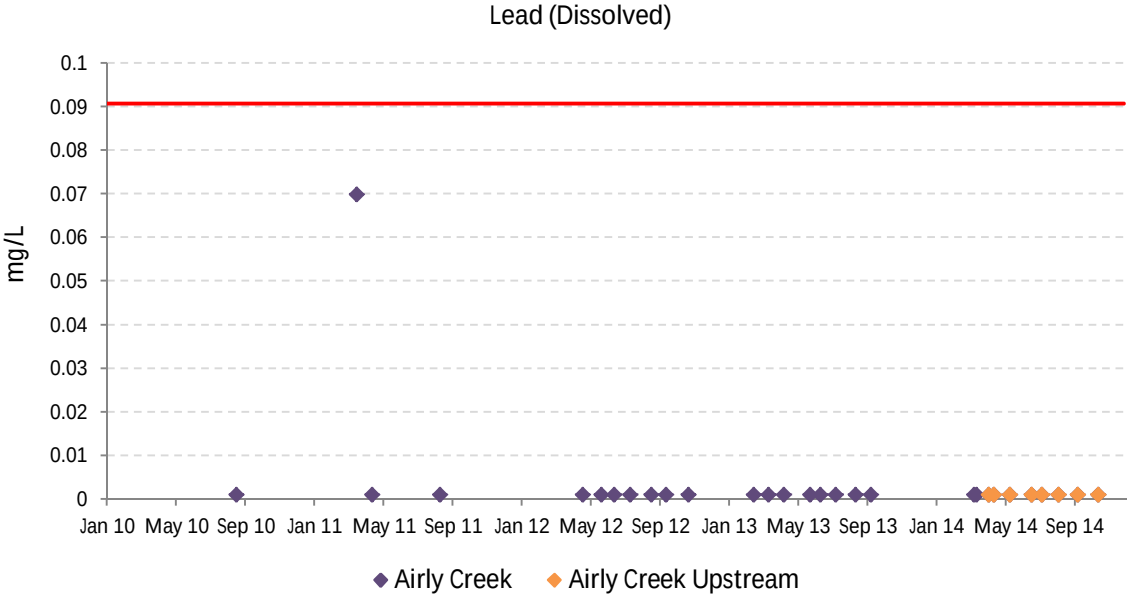

Cadmium (Dissolved)
mg/L
0.0025
0.002
0.0015
0.001
0.0005
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

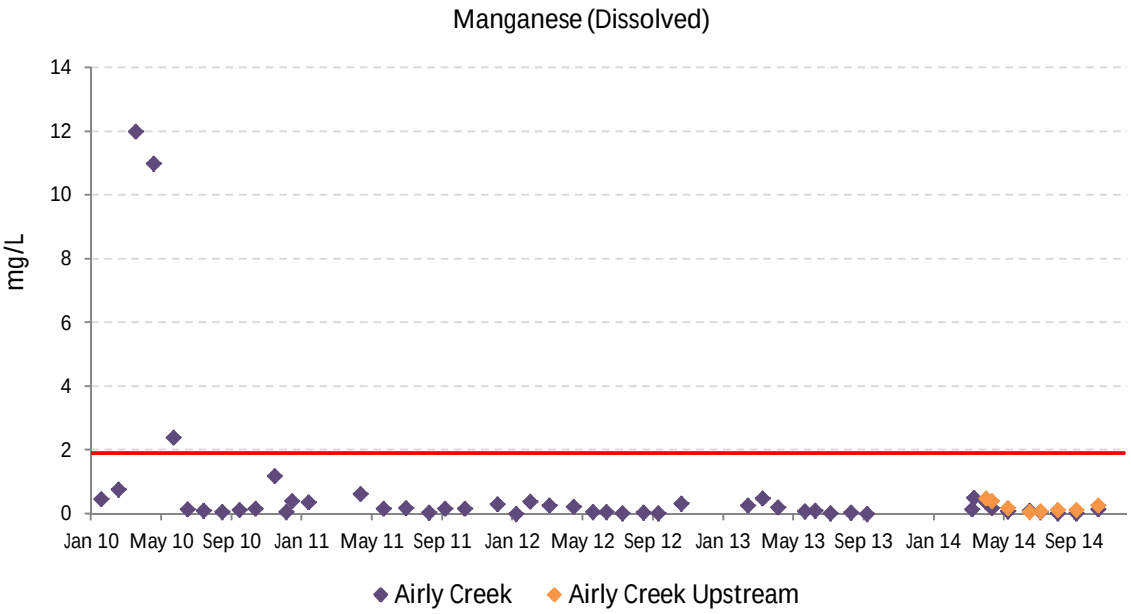

Chromium (Dissolved)
mg/L
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

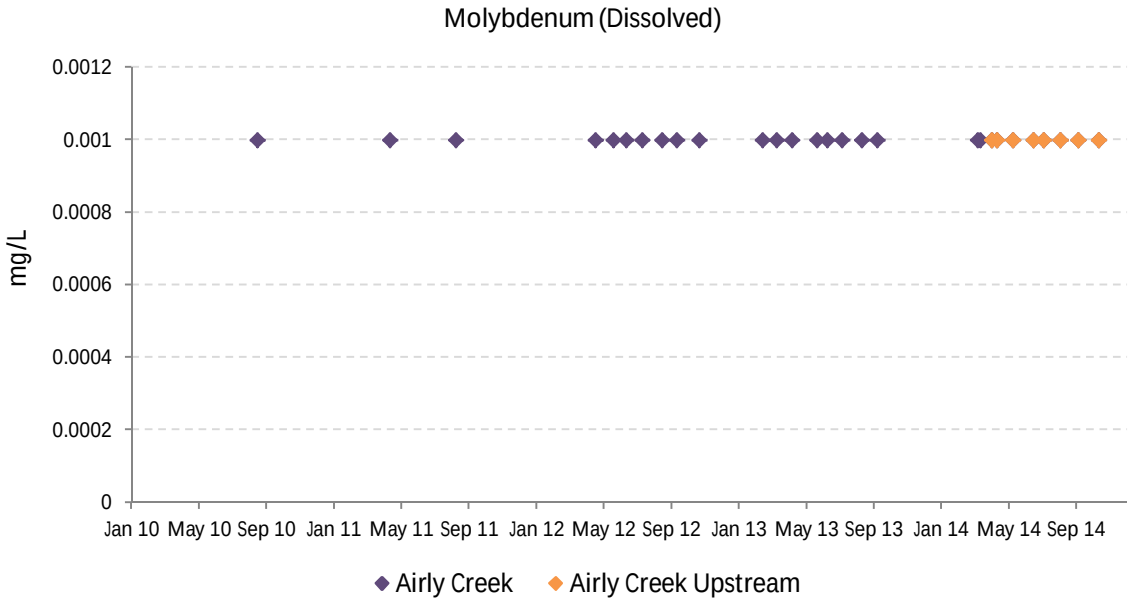

Cobalt (Dissolved)
mg/L
0.0045
0.004
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

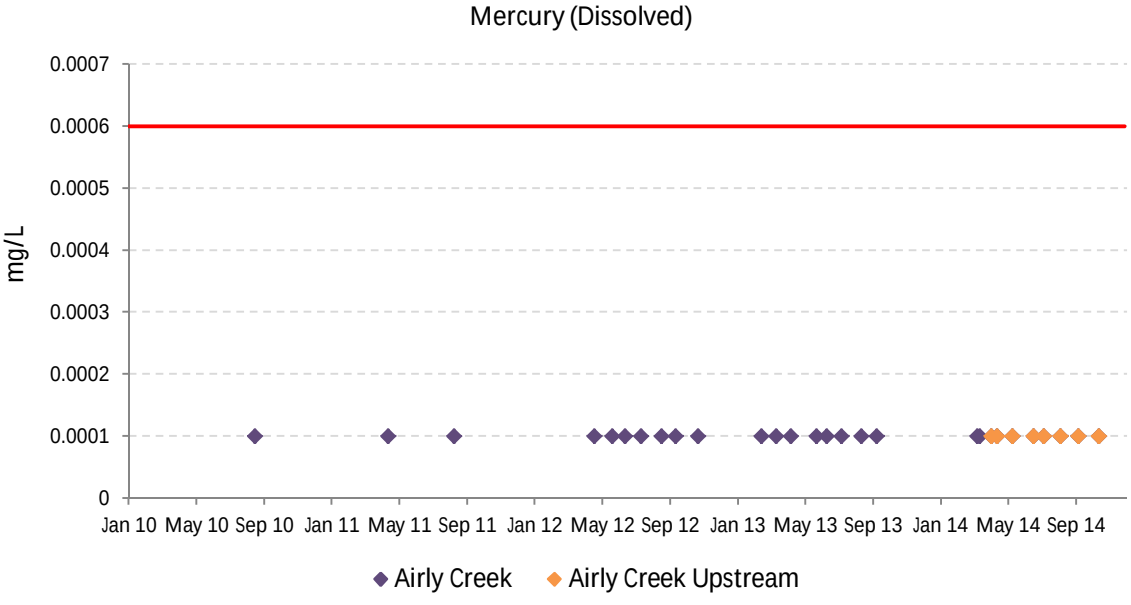

Copper (Dissolved)
mg/L
0.025
0.02
0.015
0.01
0.005
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

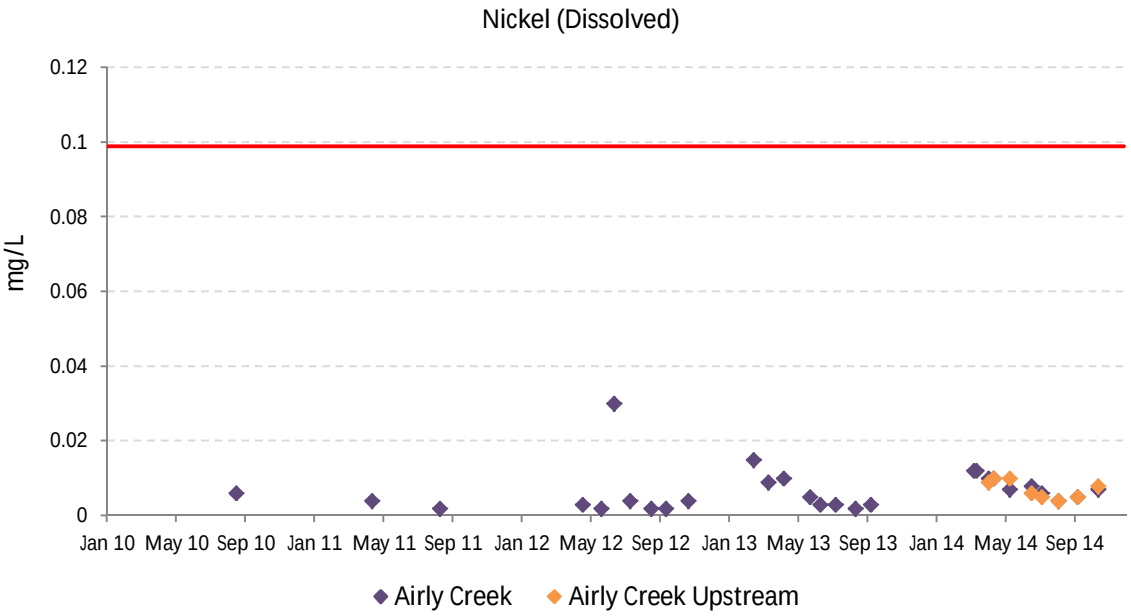

Iron (Dissolved)
mg/L
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

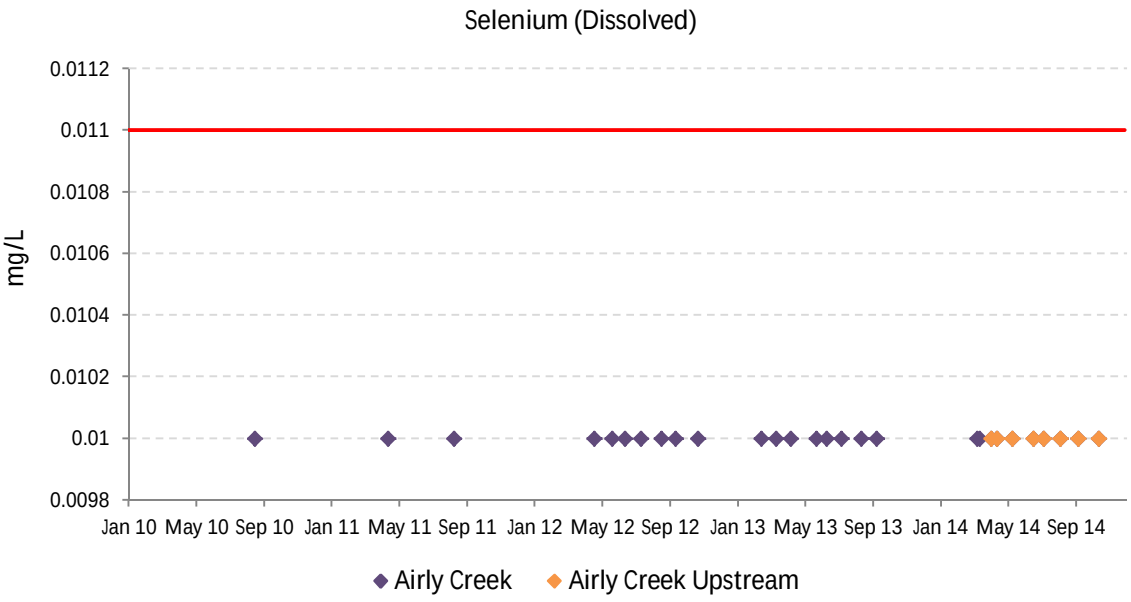

Lead (Dissolved)
mg/L
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

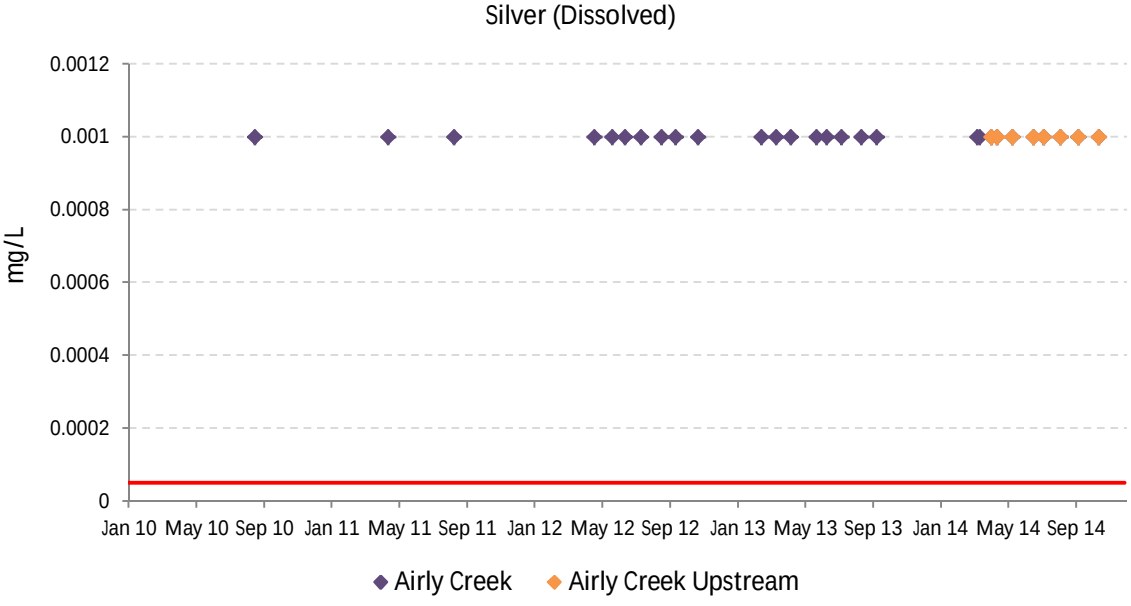

Manganese (Dissolved)
mg/L
14
12
10
8
6
4
2
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

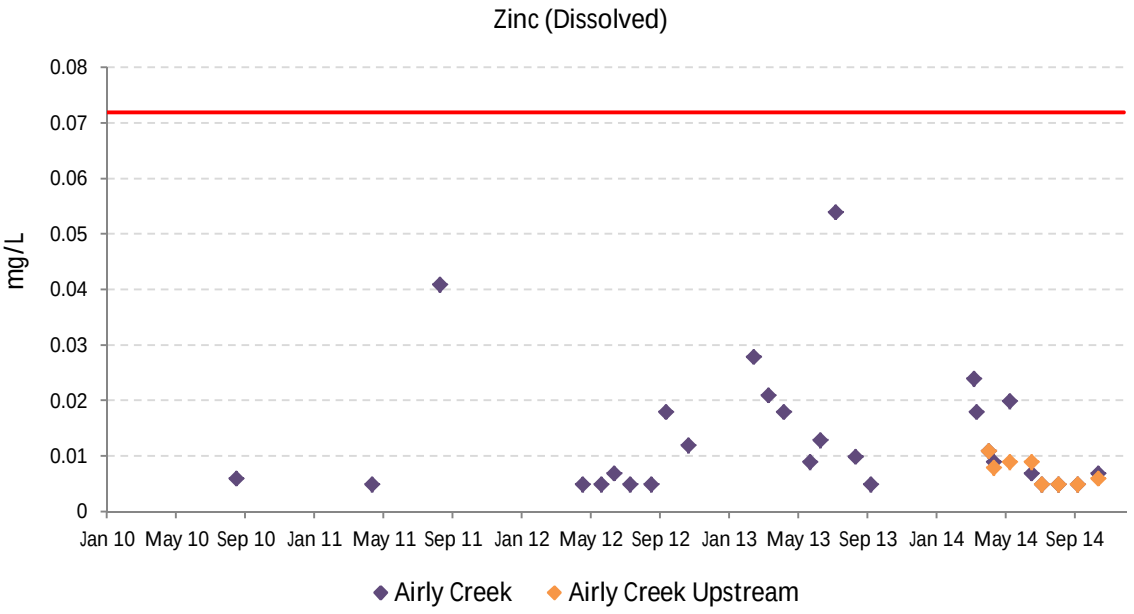

Molybdenum (Dissolved)
mg/L
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

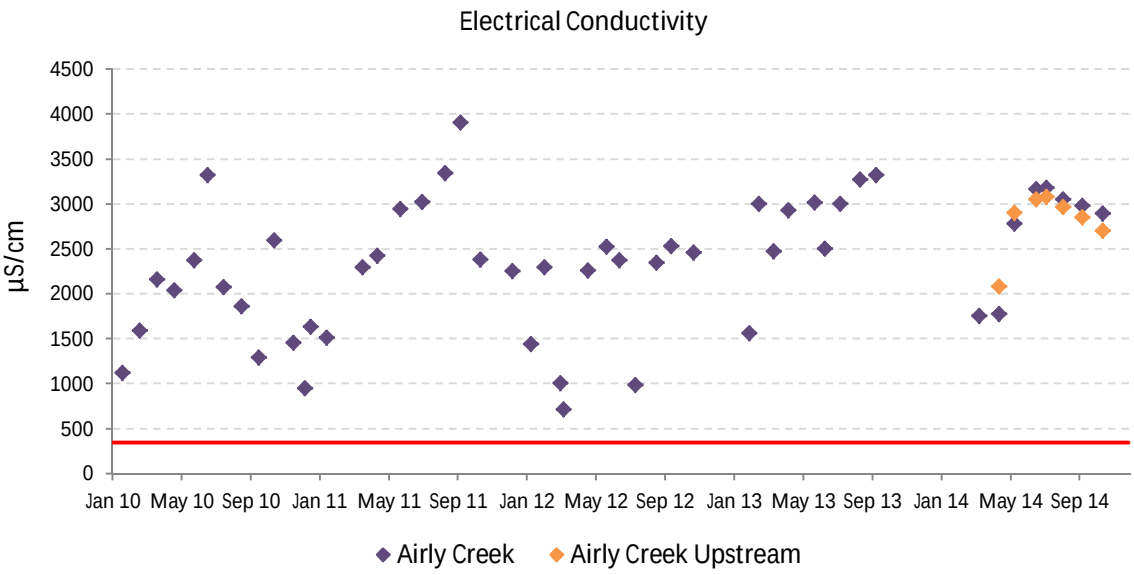

Mercury (Dissolved)
mg/L
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

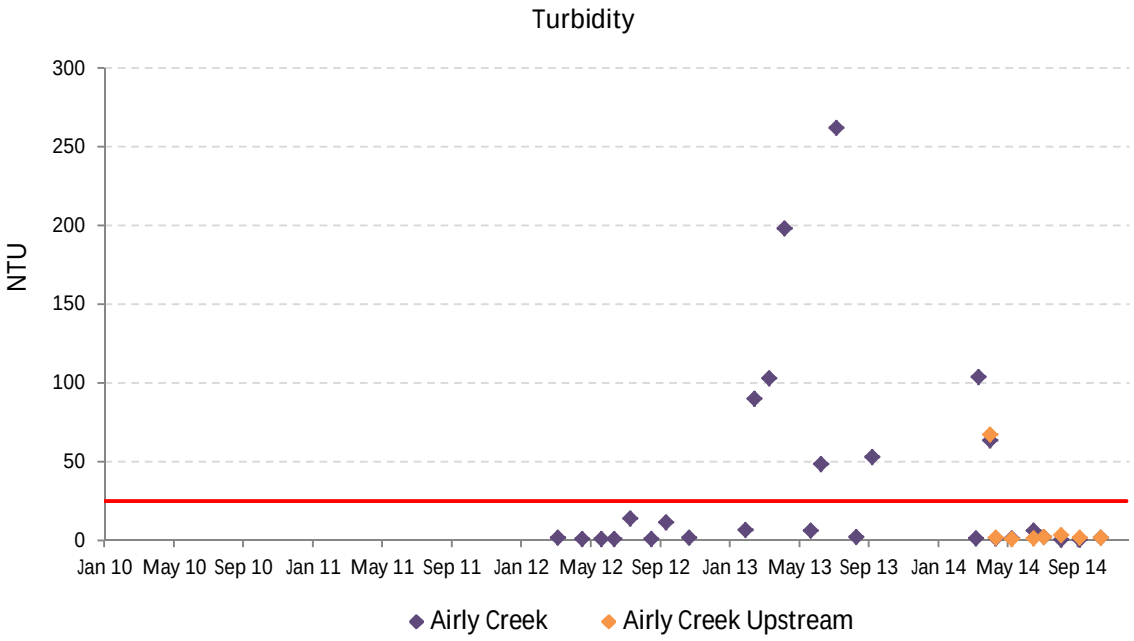

Nickel (Dissolved)
0.12
0.1
0.08
0.06
0.04
0.02
0
mg/L
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

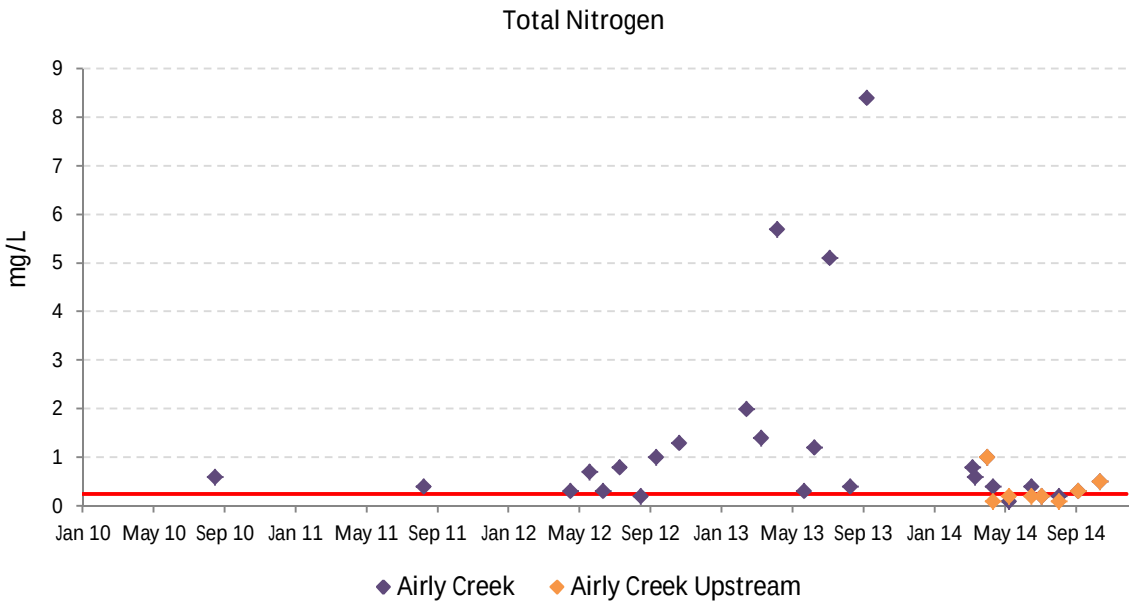

Selenium (Dissolved)
0.0112
0.011
0.0108
0.0106
0.0104
0.0102
0.01
0.0098
mg/L
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

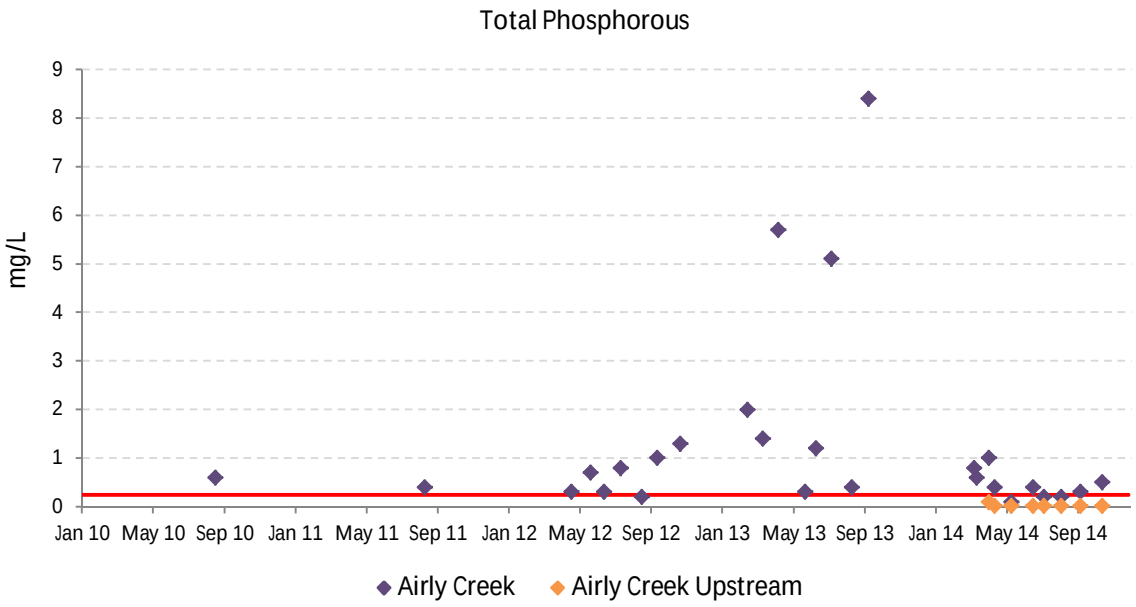

Silver (Dissolved)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
mg/L
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

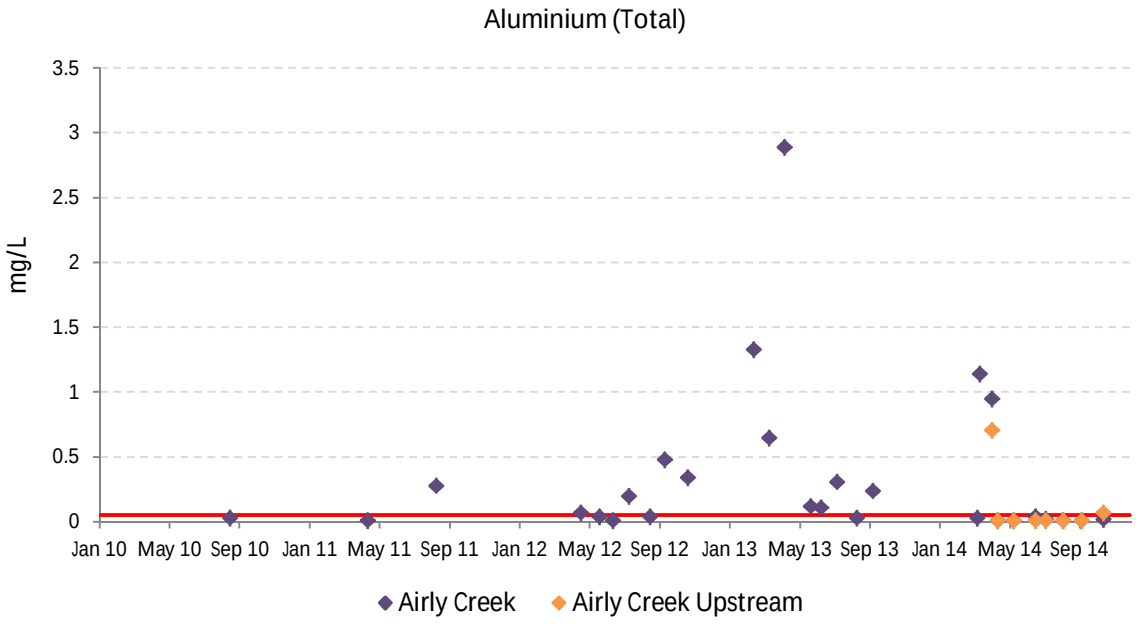

Zinc (Dissolved)
mg/L
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

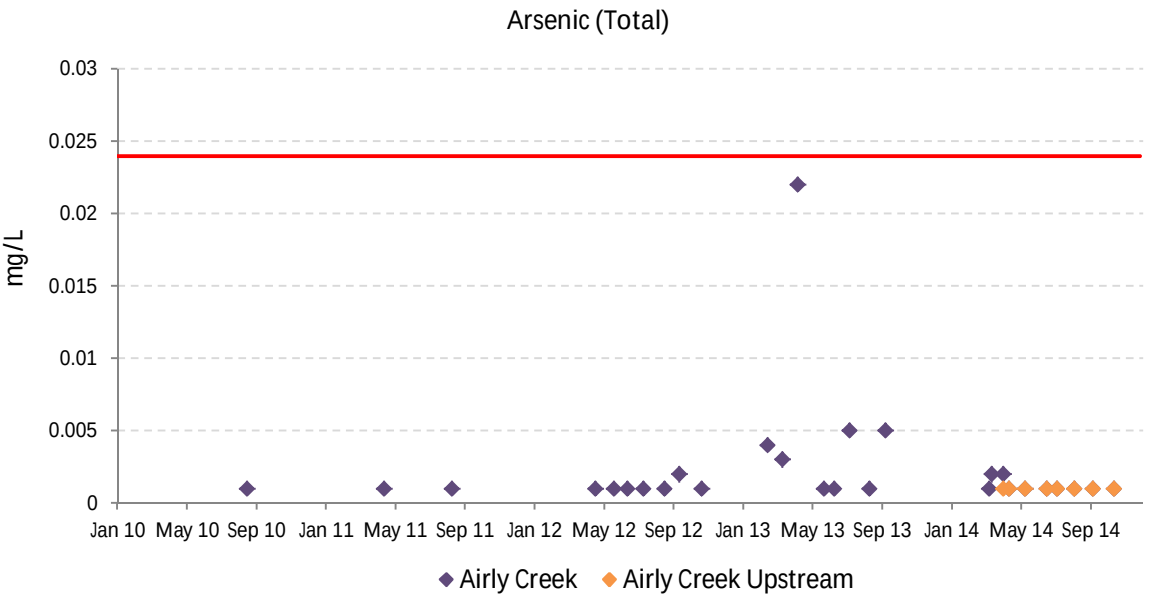

Electrical Conductivity
µS/cm
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

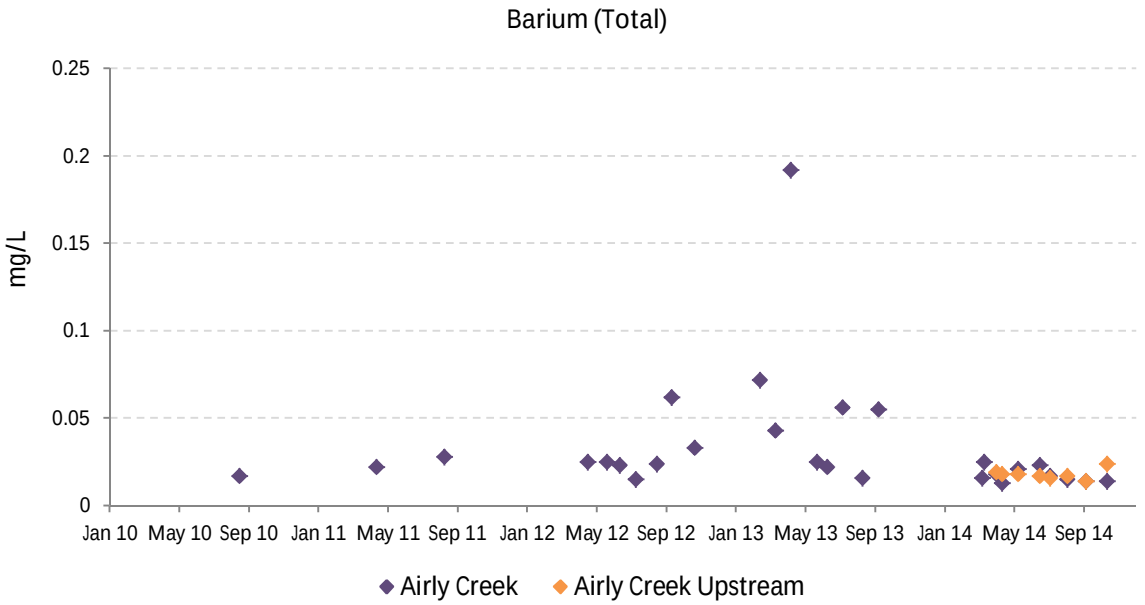

Turbidity
NTU
300
250
200
150
100
50
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

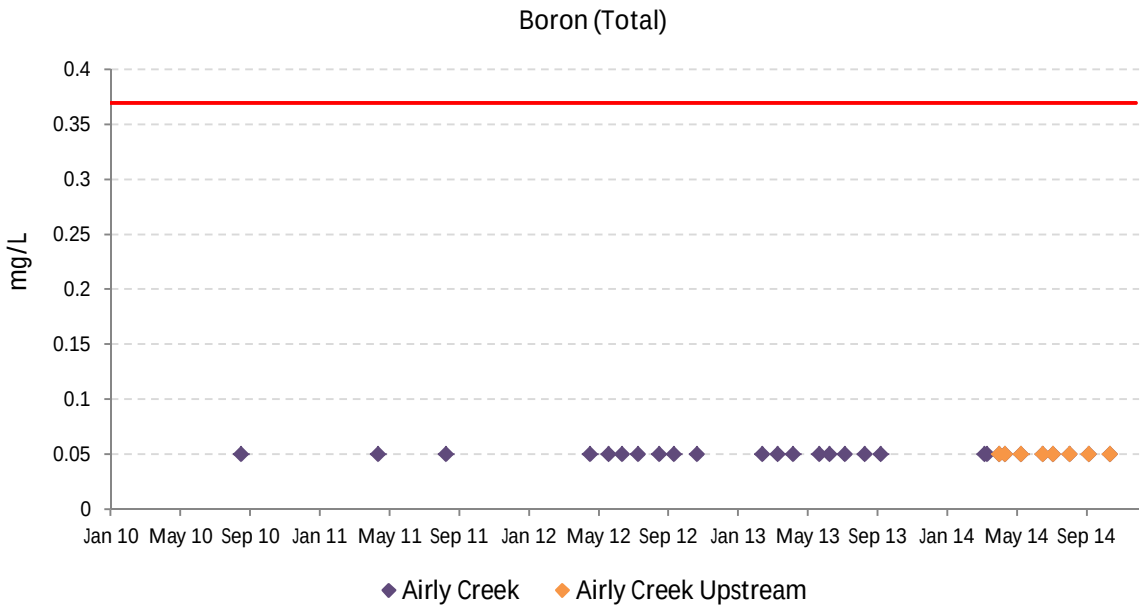

Total Nitrogen
mg/L
9
8
7
6
5
4
3
2
1
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

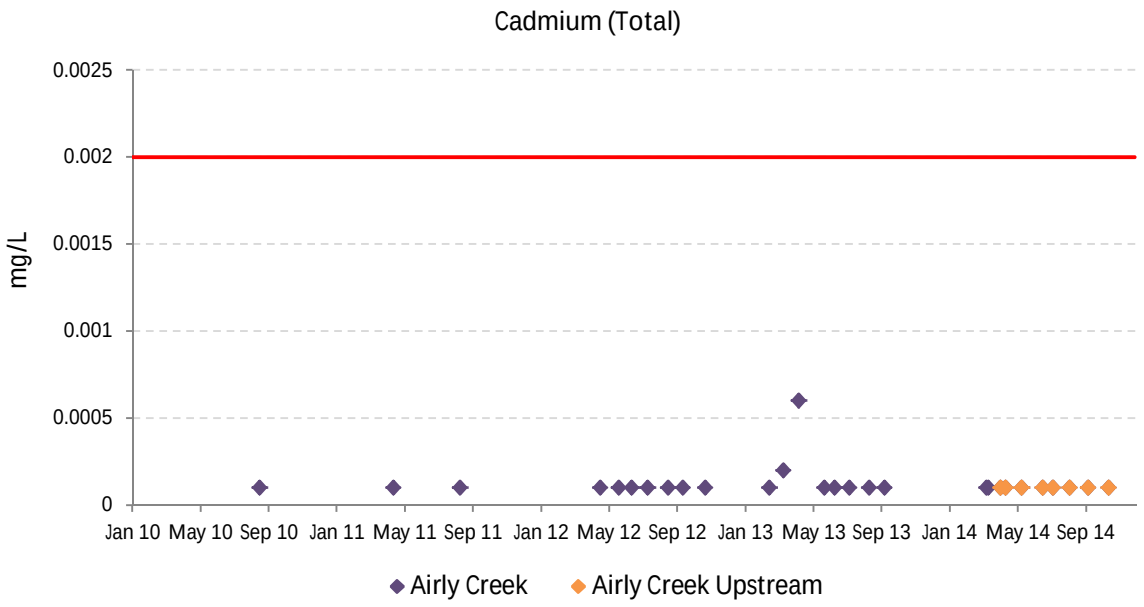

Total Phosphorous
mg/L
9
8
7
6
5
4
3
2
1
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

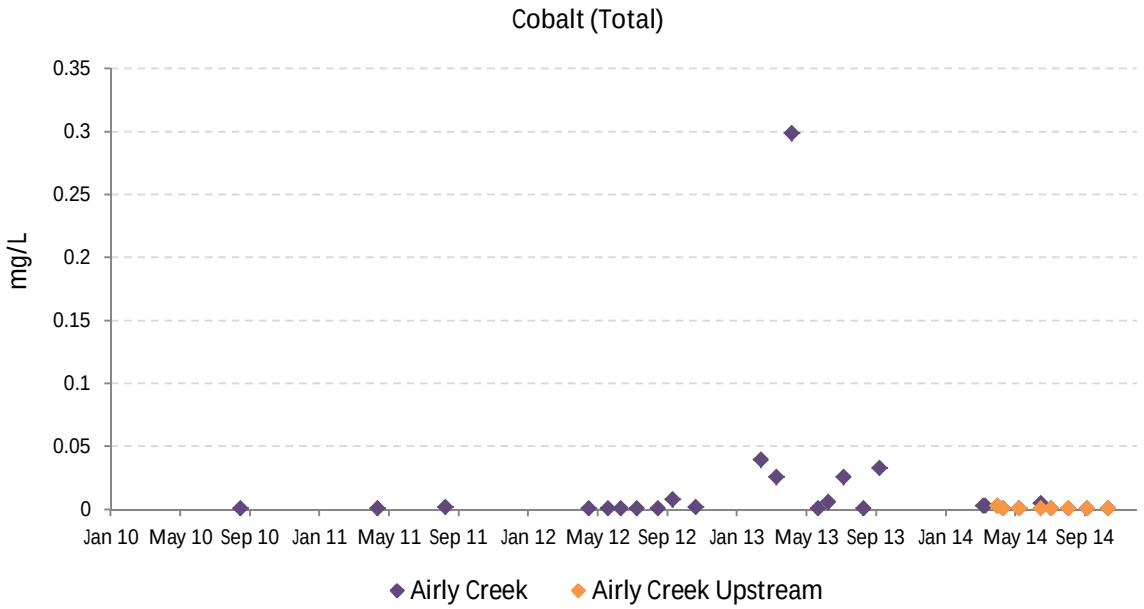

Aluminium (Total)
mg/L
3.5
3
2.5
2
1.5
1
0.5
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

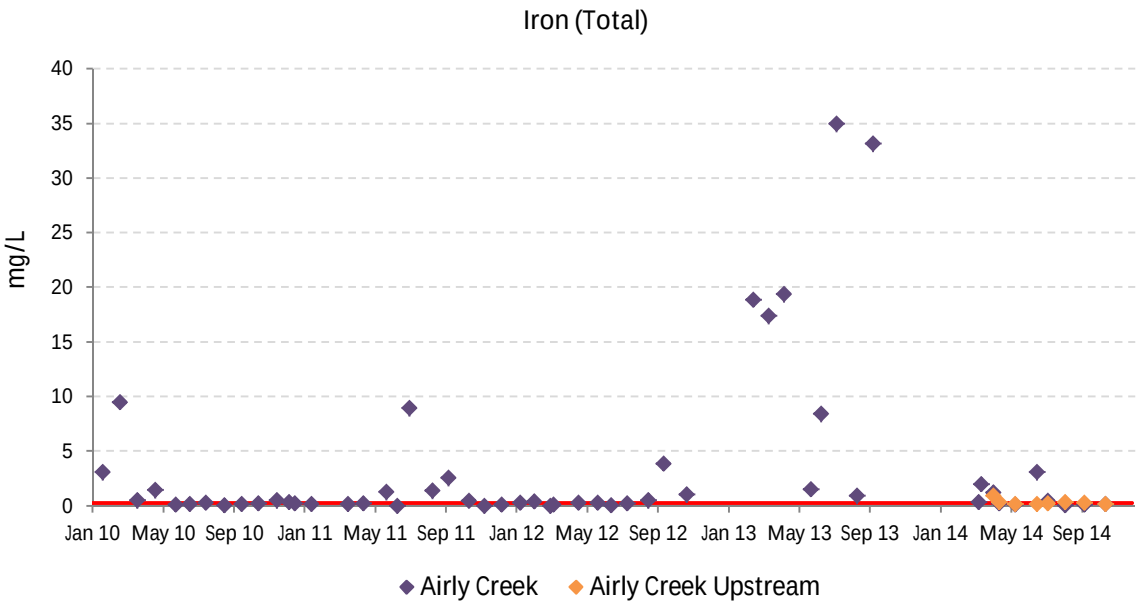

Arsenic (Total)
mg/L
0.03
0.025
0.02
0.015
0.01
0.005
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

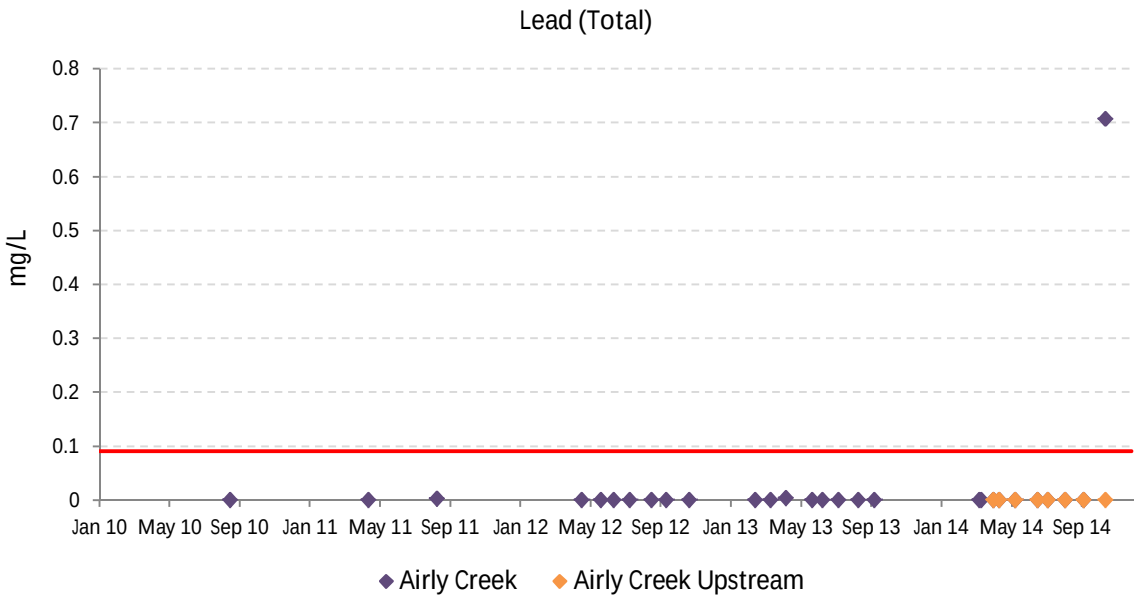

Barium (Total)
mg/L
0.25
0.2
0.15
0.1
0.05
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

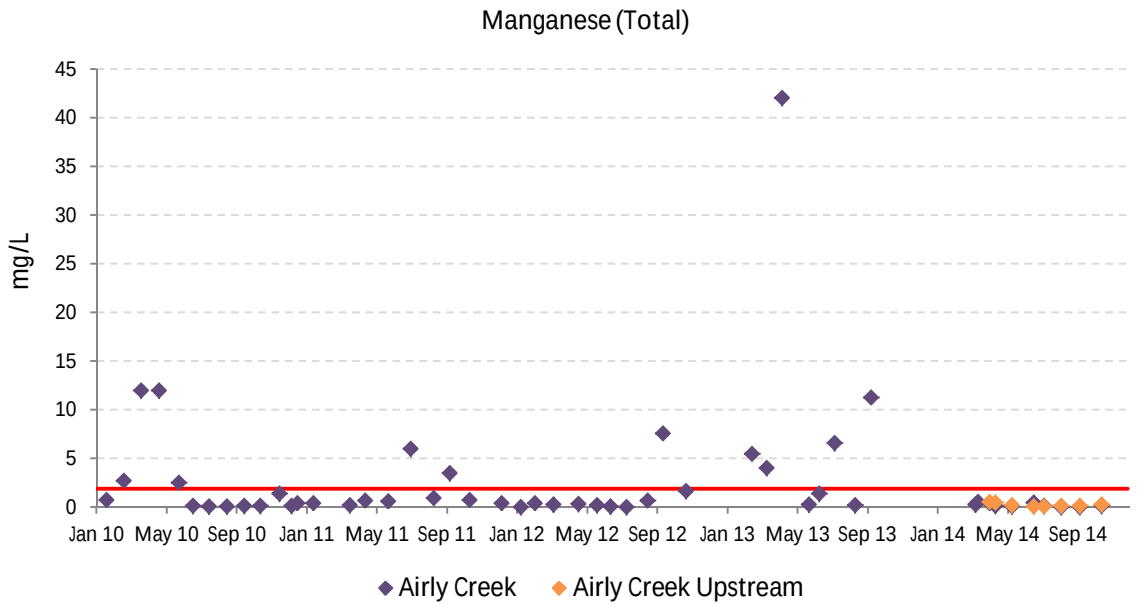

Boron (Total)
mg/L
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

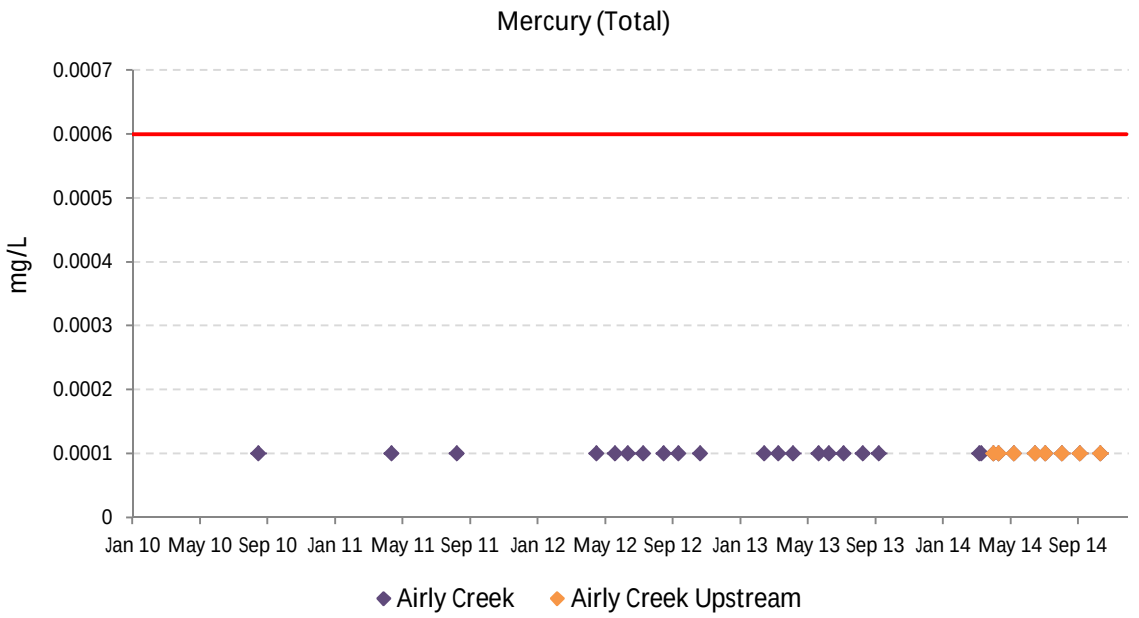

Cadmium (Total)
mg/L
0.0025
0.002
0.0015
0.001
0.0005
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

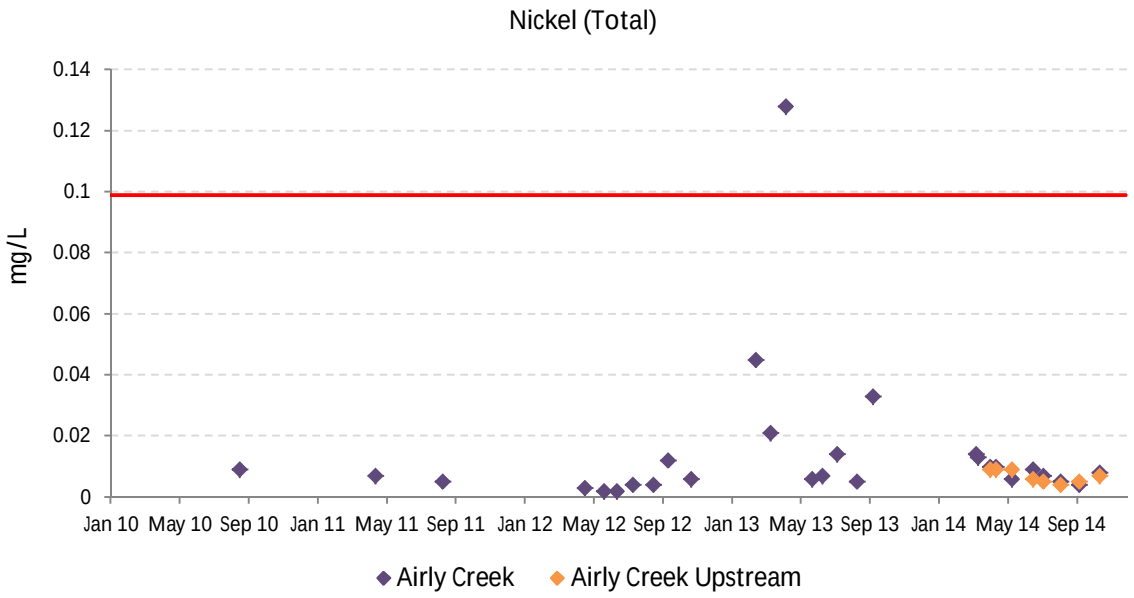

Cobalt (Total)
mg/L
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

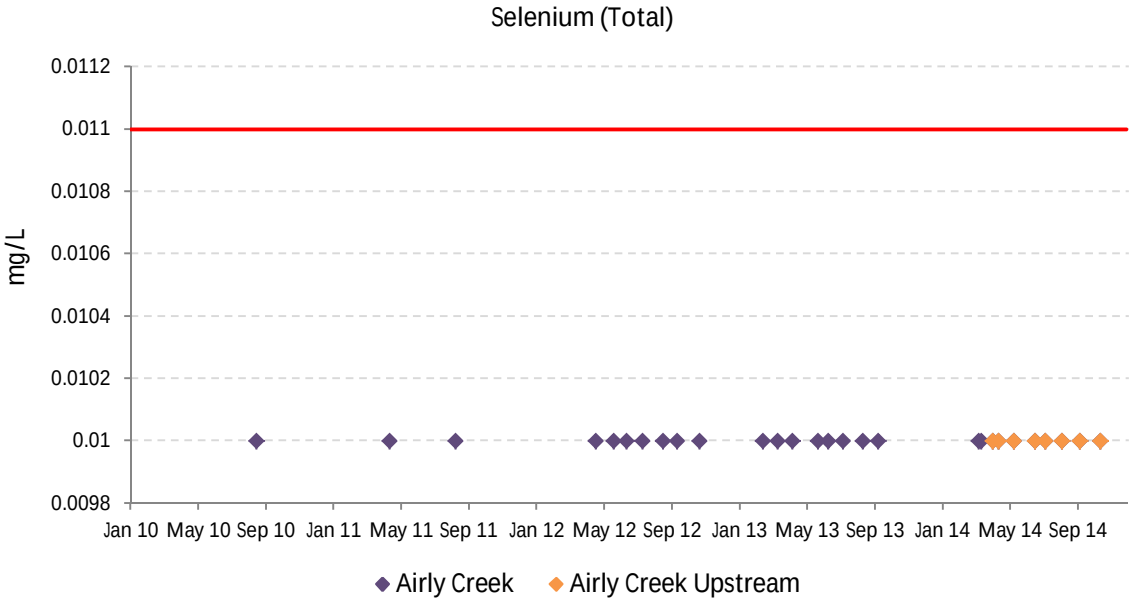

Iron (Total)
mg/L
40
35
30
25
20
15
10
5
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

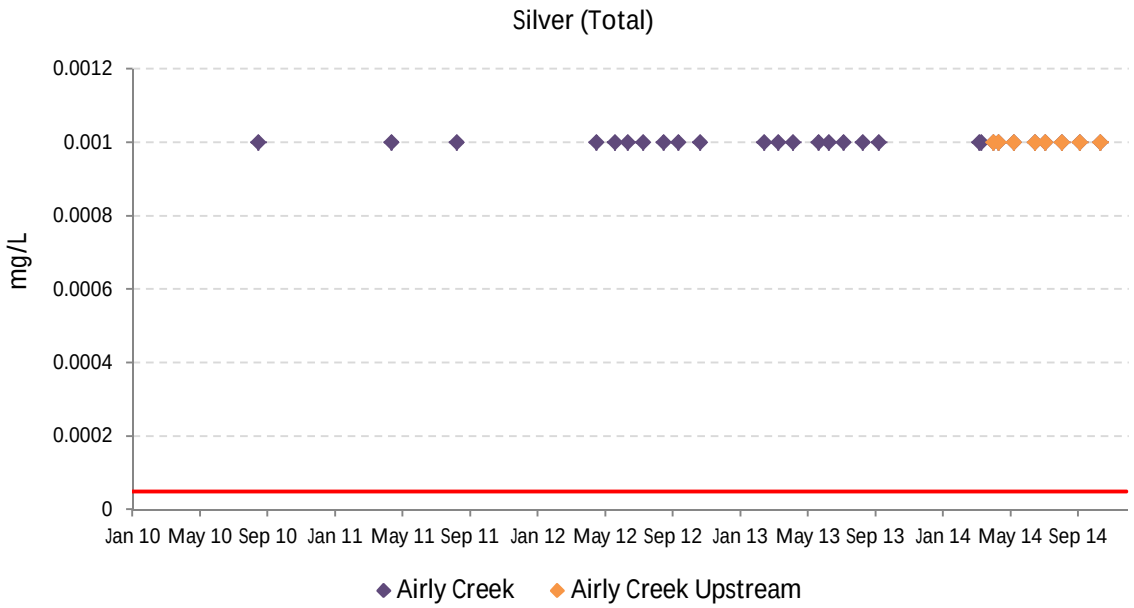

Lead (Total)
mg/L
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream

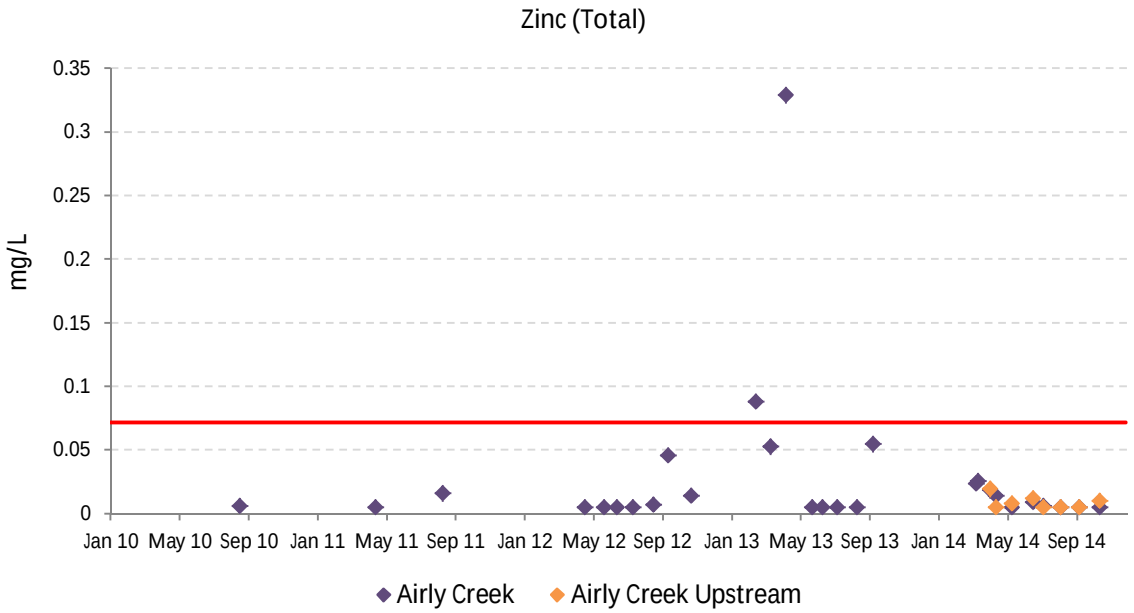

Manganese (Total)
mg/L
45
40
35
30
25
20
15
10
5
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream


Mercury (Total)
mg/L
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream


Nickel (Total)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
mg/L
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream


Selenium (Total)
0.0112
0.011
0.0108
0.0106
0.0104
0.0102
0.01
0.0098
mg/L
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream


Silver (Total)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
mg/L
Jan 10 May 10 Sep 10 Jan 11 May 11 Sep 11 Jan 12 May 12 Sep 12 Jan 13 May 13 Sep 13 Jan 14 May 14 Sep 14
Airly Creek
Airly Creek Upstream


Zinc (Total)
mg/L
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Jan 10
May 10
Sep 10
Jan 11
May 11
Sep 11
Jan 12
May 12
Sep 12
Jan 13
May 13
Sep 13
Jan 14
May 14
Sep 14
Airly Creek
Airly Creek Upstream

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Appendix B

Response to Submissions on Noise Issues by Government Agencies

SLR Consulting Australia Pty Ltd
January 2015

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21 January 2015

630.10123.03011 LR Response to Submissions Noise 20150119

Centennial Airly Pty Ltd
Glen Davis Road
Capertee NSW 2846

Attention: Gregory Brown

Dear Greg

Airly Mine Extension Project
Response to Submissions
Noise and Vibration Impact Assessment

Thank you for providing the relevant comments relating to the Noise and Vibration Impact Assessment received during the Public Exhibition period for the Airly Mine Extension Project.

SLR Consulting Australia Pty Ltd (SLR) has reviewed these comments and provided a response as necessary.

I trust that the attached information is suitable, please do not hesitate to contact me if we can be of further assistance.

Yours sincerely

KATIE TEYHAN
Associate - Acoustics & Vibration

1 Introduction

Following the Public Exhibition period for the Airly Mine Extension Project (SSD 5581) responses regarding the Noise and Vibration Impact Assessment (NVIA) were received from

1. Lithgow City Council; and,

2. the NSW Environment Protection Authority (EPA).

Further comments were also provided by NSW Government Health Nepean Blue Mountains Local Health District although these were related to the noise mitigation measures to be implemented during operation of the Project rather than issues related to the NVIA. No response is considered to be required to the NSW Government Health comments.

The relevant comments received are reproduced below followed by SLR's response.

2 Lithgow City Council

> ***Noise:*** *The general operation of the mine is predicted to perform within the industrial noise guidelines, however there are concerns with the rail traffic noise. At times it is predicted that noise will exceed the limits at night, however these noise levels are exceeded regardless of Airly Mines operations. Nonetheless, an appropriate restriction should be imposed to minimise or prohibit train movements at certain times of night to reduce potential impacts on residents within 100m of the rail lines.*

It is noted that Centennial does not have control over the arrival time of trains. Train path availability is priority driven where commuter trains take first priority, followed by general freight. The system is take or pay, which means that it is difficult to predict in advance which paths will be utilised for the Project.

3 NSW EPA

> ***a) Predictions should therefore be provided considering both inversion conditions and source to receiver winds in combination;***

Section 5.2 of the INP provides that drainage-flow winds should be considered in conjunction with a temperature inversion "*where a development is at a higher altitude than a residential receiver, with no intervening higher ground (for example, hills)*". All residential receivers considered as part of the noise assessment are at a similar or higher altitude than the project site (refer **Attachment A**) with some significant intervening higher ground. In accordance with the INP, it is not considered necessary to consider drainage flow winds and inversion conditions in conjunction.

b) The proposed drilling appears to be part of the ongoing operation of the mine, for an extended period (up to the life of the project), and the ICNG does not apply to mining. The proposed drilling should therefore be assessed under the INP;

SLR maintains that assessment under the ICNG would be applicable to drilling activities for the following reasons (also refer to Section 12.2.2. of the NVIA):

- Drilling activities will be conducted at varying locations for relatively short durations.
- Noise from drilling activities will typically be remote from other mining infrastructure.

Recommended noise mitigation and management measures relevant to exploration are provided in Section 15.2.1 of the NVIA. In addition, where required, Centennial will implement the following measures to minimise the impact of noise from drilling activity:

- Drilling will only occur during day-light hours.
- Wherever possible, attenuated drill rigs will be used.
- Rotary mud drilling will be utilised to eliminate noise from compressors.
- Construction of temporary noise barriers will be considered where drilling is proposed to occur in close proximity (ie within 665 m based on a drill rig sound power level of 104 dBA) to sensitive receptors or where cumulative noise from drilling and mining operations is identified as an issue.

c) existing noise levels above criteria will be exacerbated by the project and the EPA recommends that Department of Planning and Environment (DPE) consider requiring the proponent to use only best practise rolling stock for rail transport resulting from the proposal (including only locomotives which have obtained EPA approval to operate on the NSW rail network under Condition L2 of EPL No. 3142, 12208 or 13421, or in accordance with the former Noise Control Act 1975);

It is noted that Centennial are not proposing to increase currently approved rail movements (refer Section 13 of the NVIA).

d) the EPA requests that the modelled SWLs are justified by comparing the measured CHPP and locomotives with the types in use at Airly Mine or proposed for the project;

The CHPP and locomotive noise levels used for the NVIA are based on measured values at Newstan which are similar to those proposed for and currently in use at Airly (refer to Section 9 of the NVIA).

e) Any project approval issued should include requirements to be addressed in a NMP for construction, operation and drilling noise;

Agreed.

f) care should be taken to specify appropriate sleep disturbance limits in any project approval given (LAmax limits should be provided rather than LA1(1min);

Specifying conditions of consent in terms of $L_{A1(1minute)}$ would be consistent with the current EPA Application Notes to the INP. While the EPA notes that the $L_{A1(1minute)}$ criteria is not ideal there is insufficient evidence to determine what should replace it and is continued to be used as a guide to identify the likelihood of sleep disturbance.

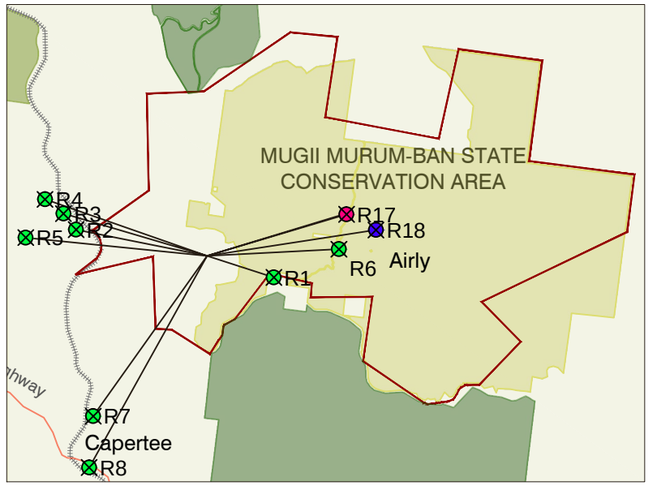
The use of L_{Amax} in predicting potential sleep disturbance in the NVIA was used to provide a conservative assessment approach (refer Section 10.4 of the NVIA).

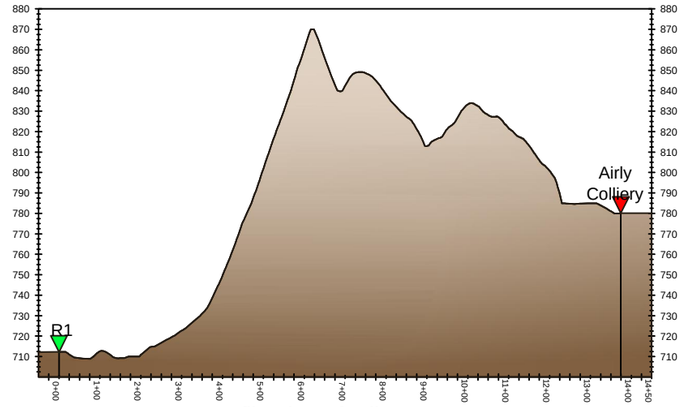
g) If any blasting is proposed for the project, it should be assessed against ANZEC (1990) guidelines;

Blasting is not proposed for the Project.

h) Any project approval, if issued, should contain noise limits for passive recreation areas in the National Parks.

Agreed. The Acceptable Amenity noise limit for "*Area specifically reserved for passive recreation (eg National Park)*" provided in the NSW INP is $L_{Aeq(Period)}$ 50 dBA for all periods when in use.





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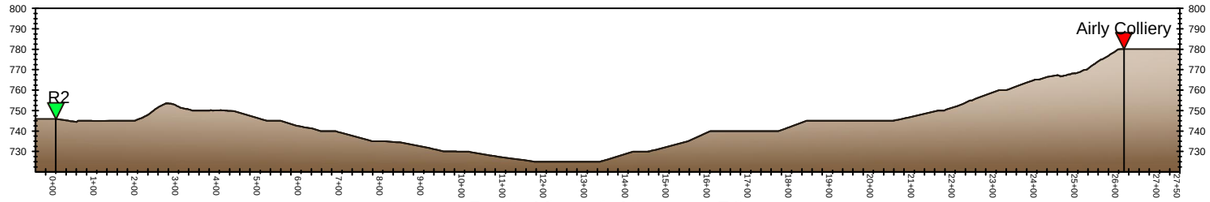

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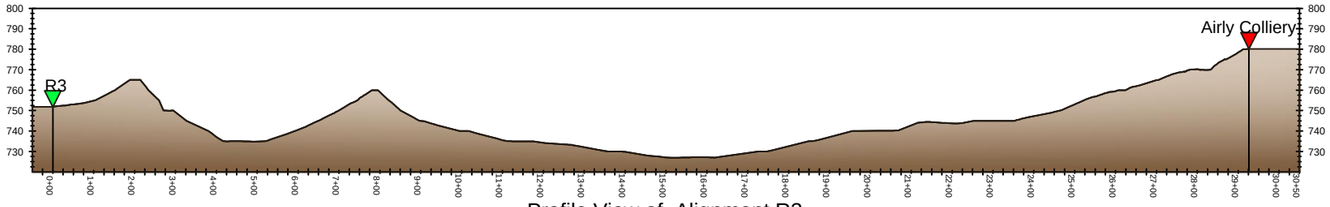

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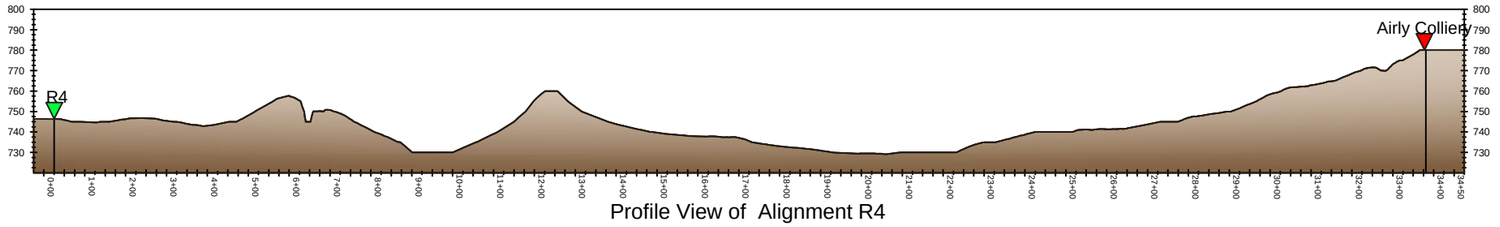

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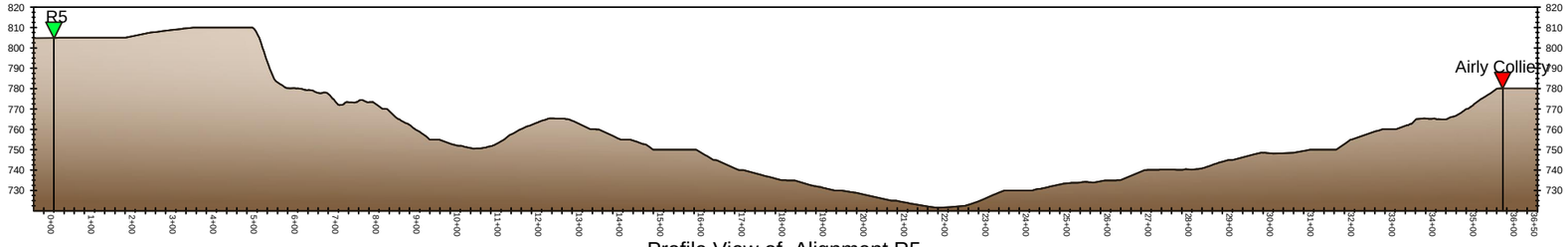

Profile View of Alignment R5

SLR630_10123_03010_ReceptorCrossSections_DataShortcuts.dwg

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Project No:	630.10123.03010
Date:	21.01.2015
Drawn by:	LH
Scale:	
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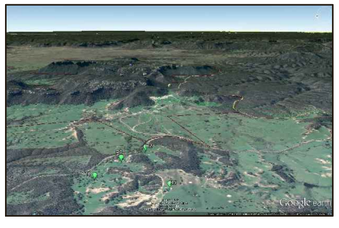
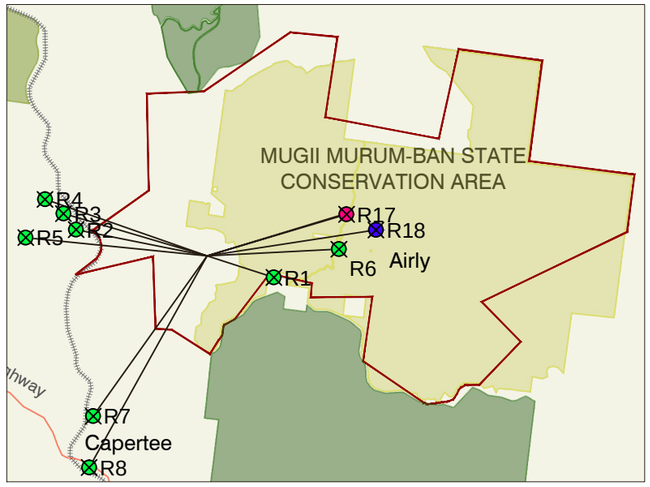
Projection:	(GDA94) MGA Zone

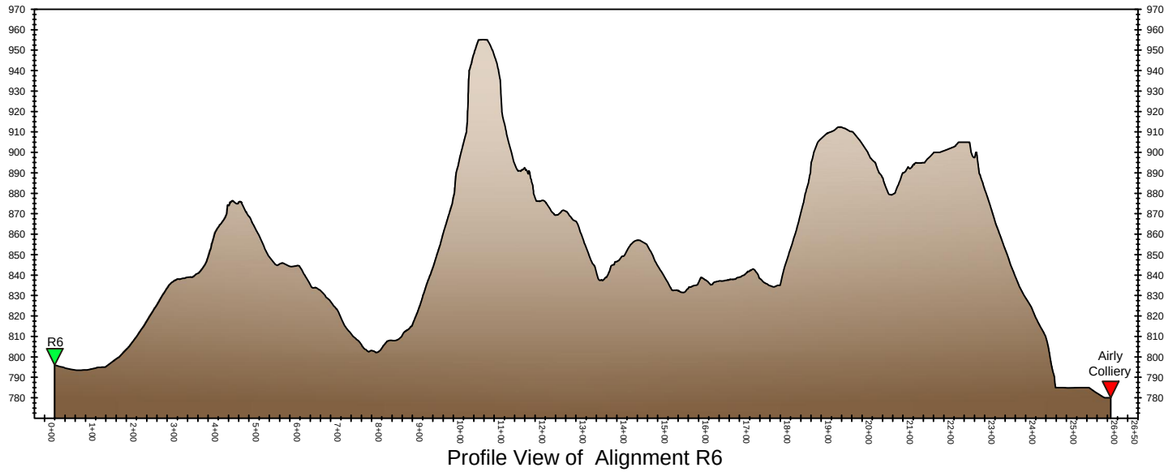


AIRLY

Receiver Location to Airly Colliery Cross Sections

ATTACHMENT A-1





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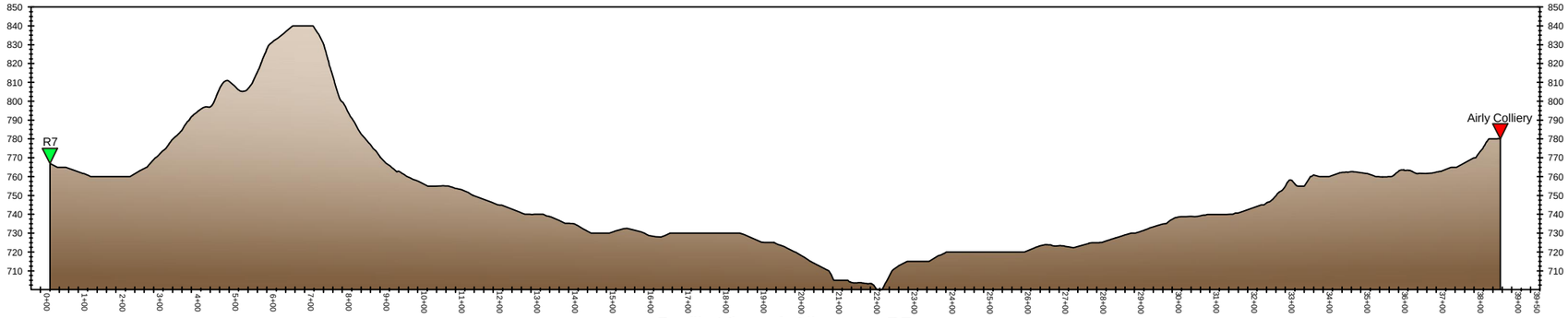

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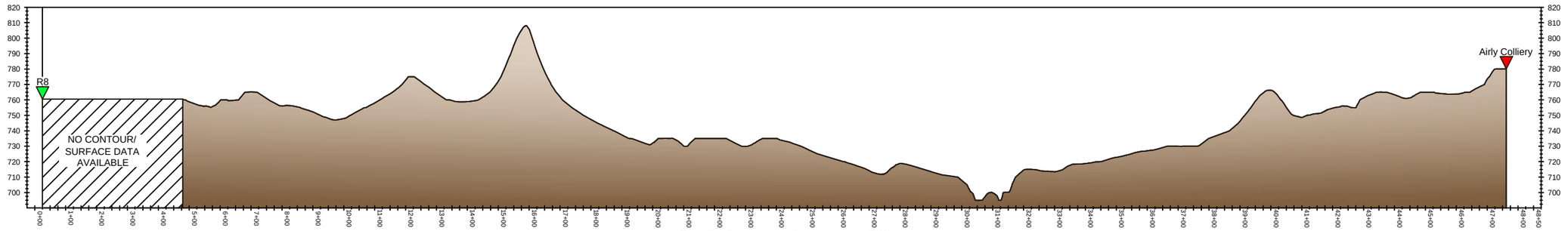

Profile View of Alignment R8

SLR630_10123_03010_ReceptorCrossSections_DataShortcuts.dwg

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Date:	21.01.2015
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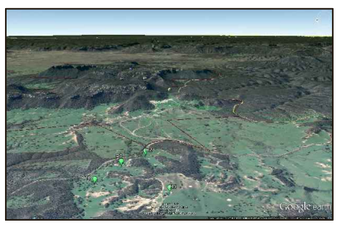
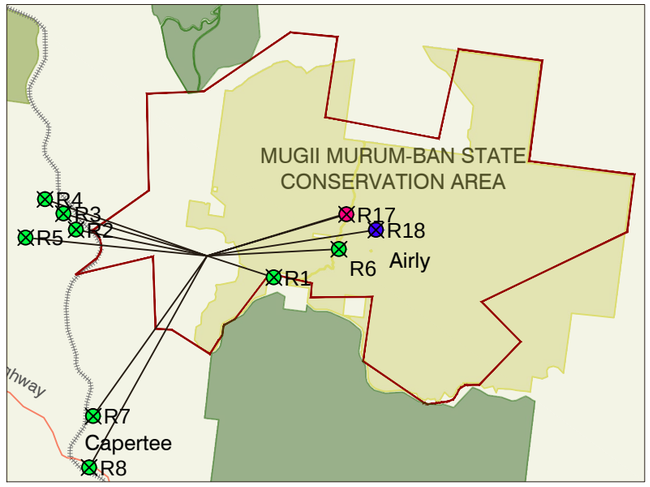
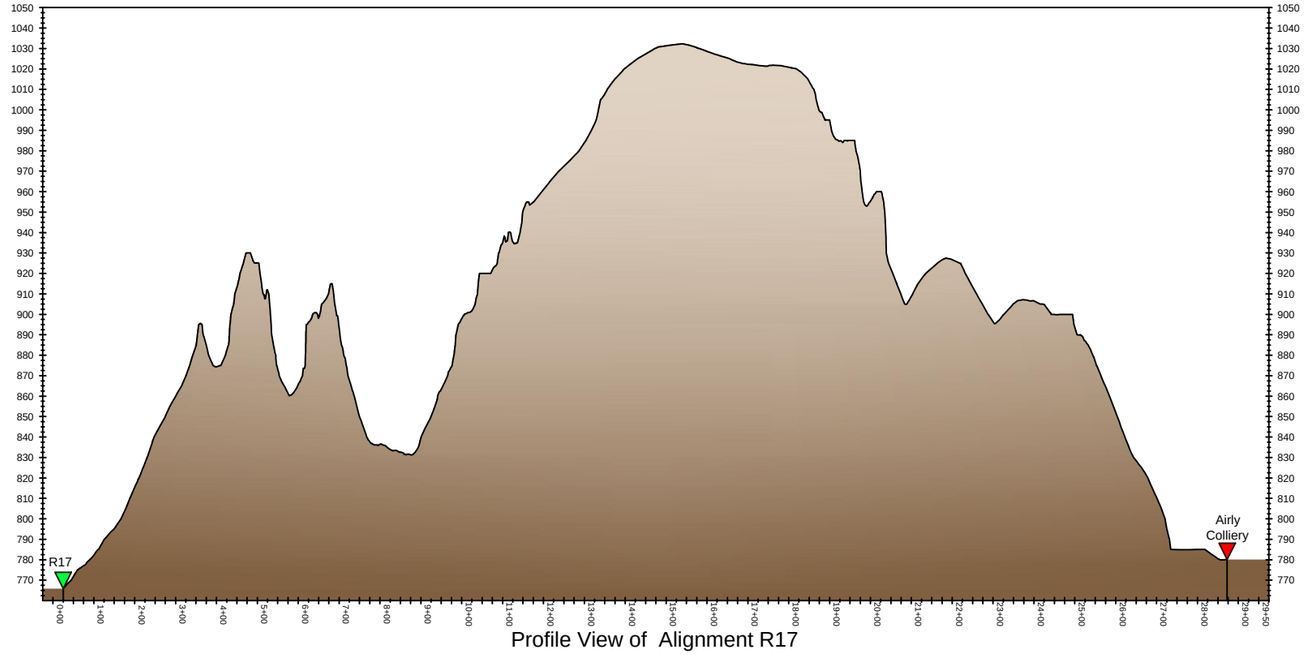


AIRLY

Receiver Location to Airly Colliery Cross Sections

ATTACHMENT A-2





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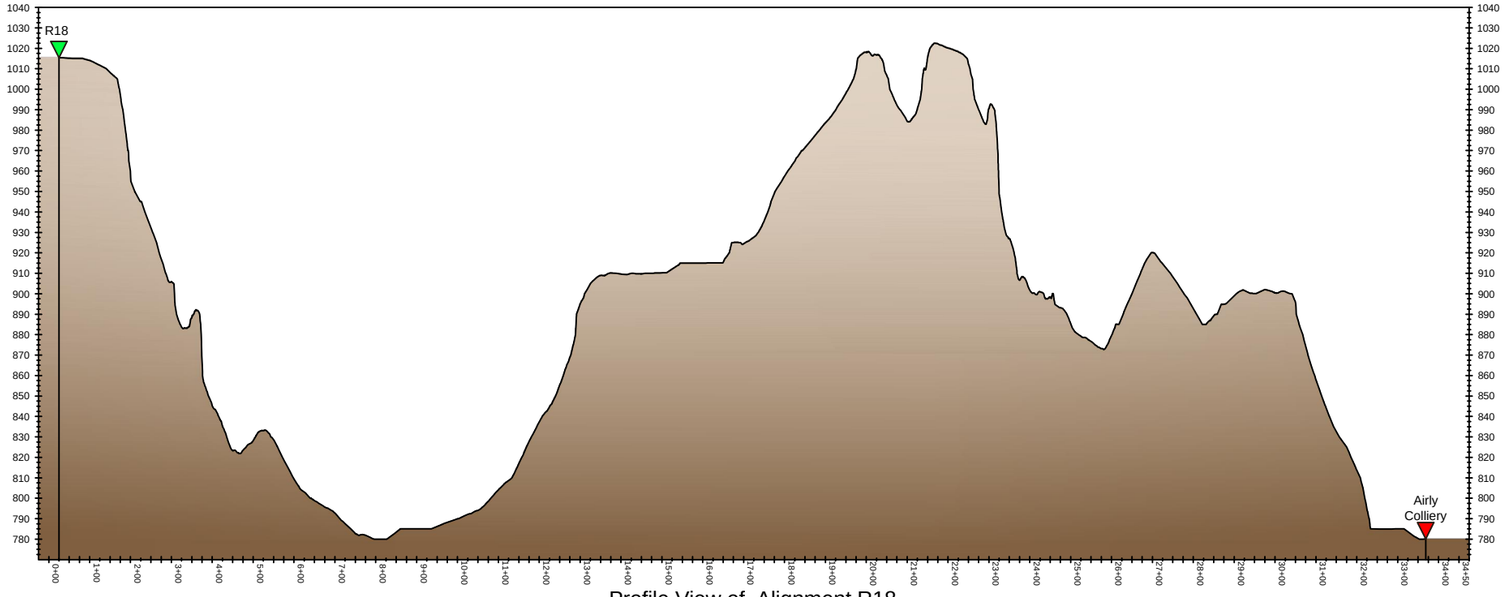

Profile View of Alignment R18

SLR630_10123_03010_ReceptorCrossSections_DataShortcuts.dwg

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Project No:	630.10123.03010
Date:	21.01.2015
Drawn by:	LH
Scale:	
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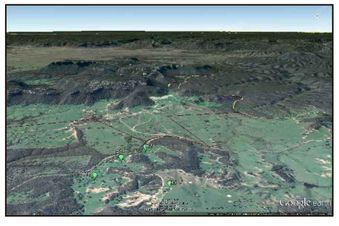

AIRLY

Receiver Location to Airly Colliery Cross Sections

ATTACHMENT A-3

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Appendix C

Response to Submissions on Air Quality Issues by Government Agencies

SLR Consulting Australia Pty Ltd
December 2014

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16 December 2014

630.10123.03021 Response to Comments 20141216.docx

Centennial Airly Pty Ltd
Glen Davis Road
Capertee NSW 2846

Attention: Gregory Brown

Dear Greg

Airly Mine Extension Project
Response to Comments
Air Quality Impact Assessment

Thank you for providing the relevant comments relating to the Air Quality Impact Assessment received during the Public Exhibition period for the Airly Mine Extension Project.

SLR Consulting Australia Pty Ltd (SLR) has reviewed these comments and provided a response as necessary.

I trust that the information overleaf is suitable, but please do not hesitate to contact me if we can be of further assistance.

Yours sincerely

MARTIN DOYLE
Principal Air Quality Consultant

SLR Consulting Australia Pty Ltd 2 Lincoln Street Lane Cove NSW 2066 Australia
(PO Box 176 Lane Cove NSW 1595 Australia)
T: 61 2 9428 8100 F: 61 2 9427 8200 E: sydney@slrconsulting.com www.slrconsulting.com
ABN 29 001 584 612

1 COMMENTS RECEIVED

Following the Public Exhibition period for the Airly Mine Extension Project (SSD 5581) responses regarding the Air Quality Impact Assessment (AQIA) were received from

1. the NSW Environment Protection Authority (EPA); and
2. NSW Government Health Nepean Blue Mountains Local Health District.

Further comments were also provided by Lithgow City Council although these were related to the measures to be implemented to suppress dust during the operation of the Project rather than issues related to the AQIA. No response is considered to be required to the Lithgow City Council comments.

The relevant comments received are reproduced below.

1.1 NSW Environment Protection Authority

NSW EPA has provided the following comment on the AQIA:

> *The review of the Air Quality Impact Assessment (AQIA) by the EPA has determined that the assessment has been generally undertaken in accordance with the Approved Methods for Modelling and Assessment of Air Pollutants in NSW.*
>
> ***EPA recommended conditions of Project Approval:***
>
> *The EPA is satisfied that the air emissions are unlikely to exceed the EPA impact assessment criteria at the identified sensitive receptors, providing the project activities are undertaken in line with the four distinct scenarios utilised for the dispersion modelling.*

1.2 NSW Health – Nepean Blue Mountains Local Health District

NSW Health, Nepean Blue Mountains Local Health District (NSW Health) has provided the following comments on the AQIA:

> 1. *The background data source for air quality measurement prediction was Bathurst 2010. The report mentions that the characteristics of the location and activities that could affect the air quality is very different in Bathurst and the adoption of data should be regarded as conservative. Hence any modelling conducted using this data is likely to underestimate the decline of air quality levels at Airly Mine area. A sensitivity analysis should be used to determine the effect of using higher background levels.*
>
> 2. *It is not explained why background data for 2010 was chosen instead of the most recent data. The maximum PM10 24 hour concentration in year 2010 was 43.3 µg/m3 which was 12 µg/m3 lower than in year 2012. This would mean that the maximum 24 hour PM10 concentration for year 2012 was 53.3 µg/m3. However for the modelling, year 2010 data was used rather than more recent 2012 data which was already higher than the maximum recommended level. Modelling should use the most recent available data.*
>
> 3. *There was no background data for PM2.5 (annual average and 24 hours average) available. However modelling was conducted in the absence of background data applying only the increments to predict the 24 hour average and annual average PM2.5 concentrations. The conclusions were made that those concentrations are expected to be much lower than the EPA criteria. If background data is unavailable then reasonable estimates derived from known TSP background concentrations should be used in the absence of appropriate background PM2.5 data.*

4. *Real-time air quality monitoring is mentioned as the best practice, but the proponent has deemed the monitoring unnecessary as the predicted air quality parameters are well below the DGR criteria. However as discussed above due to the problems that we have identified on the methodology of calculation of predicted particulate matter levels, in addition to the absence of any data on PM2.5, it is highly recommended that the proponent considers real time air quality monitoring.*

5. *Predicted or known impacts from the Excelsior Limestone Quarry located 6.5km northwest of Airly Mine have not been considered. The applicant has mentioned that due to its distance from the proposed development, the cumulative impact on air quality is unlikely. However it is well known that particulate matter can travel several kilometres, especially PM2.5. It is recommended that air quality impacts from this quarry are included in modelling.*

2 RESPONSE TO COMMENTS

No response is required to the comment provided by NSW EPA.

Reponses to each of the comments provided by NSW Health are provided below.

2.1 Background Air Quality Data

2.1.1 Background Data Source

As noted in the AQIA and in the review comment (reviewer comment 1), PM_{10} data for the year 2010 as measured at the Bathurst OEH Air Quality Monitoring Station (AQMS) was selected for use within the assessment. Given that background air quality data is used to characterise the environment surrounding a project without the impacts of the project (which are then included through the dispersion modelling exercise), it is considered that the use of data from the Bathurst AQMS (located in an urban area) does represent a conservative assessment of the background air quality surrounding the Airly Mine. The reviewer states that the use of this data is "*..likely to underestimate the decline of air quality levels at Airly Mine area*". SLR considers that the opposite is in fact the case, that the use of the Bathurst AQMS data would overestimate the air quality concentrations surrounding the Airly Mine (if the Airly Mine were not present) and the results of the AQIA can be seen as representative of worst-case.

2.1.2 Background Data Year

The reviewer has commented (reviewer comment 2), that it is not explained why background data for year 2010 was selected for use within the AQIA. As noted on page 49 of the AQIA "*as required by the Approved Methods, this background dataset is required to be contemporaneous with the meteorological data used within the assessment*". The most recent available and appropriate meteorological data for use in the assessment was for the year 2010, hence the use of 2010 background data in the AQIA.

The reviewer states that should the year 2012 be selected for assessment of background air quality, the maximum 24 hour PM_{10} concentration would be 53.3 µg/m^3. The maximum 24 hour average PM_{10} concentration recorded at Bathurst in 2012 was actually 55.5 µg/m^3 on 8 December 2012. A further exceedance of the 50 µg/m^3 criterion was experienced on 7 April 2012 (50.7 µg/m^3). Review of the *National Environment Protection (Ambient Air Quality) Measure New South Wales Annual Compliance Report 2012* (NSW OEH, 2013) indicates (on page 26) that the exceedance in April was due to a regional dust event and the exceedance in December was due to dust haze. The Approved Methods states that:

> *In some locations, existing ambient air pollutant concentrations may exceed the impact assessment criteria from time to time. In such circumstances, a licensee must demonstrate that no additional exceedances of the impact assessment criteria will occur as a result of the proposed activity and that best management practices will be implemented to minimise emissions of air pollutants as far as is practical.*

Further review of the Bathurst PM_{10} monitoring data for 2012 indicates that the third highest PM_{10} concentration recorded (i.e. excluding the regional dust events) was 37.3 µg/m^3, which is noted to be 6 µg/m^3 *lower* than the maximum PM_{10} concentration adopted within the AQIA. If the limitations imposed through the availability of meteorological data had allowed the AQIA to adopt the Bathurst 2012 PM_{10} data as background, both exceedances of the 50 µg/m^3 criterion would have been discounted from the analysis as they represent regional dust events (and not 'usual' background air quality), and it could also be demonstrated that no additional exceedances of the criterion would be experienced as a result of the Project.

The adoption of 2010 data is therefore more conservative than the reviewers proposed adoption of the 2012 data.

2.1.3 $PM_{2.5}$ Background Data

The absence of $PM_{2.5}$ background data (reviewer comment 3) has been identified as a potential weakness in the AQIA by NSW Health. The presentation of a cumulative (background + project) impact is desirable but in this particular case, the maximum incremental 24 hour $PM_{2.5}$ impacts predicted in any of the four scenarios modelled, at any receptor location is 1.4 µg/m^3 representing less than 6% of the relevant criterion.

It is not considered that the derivation of a non-site specific TSP/$PM_{2.5}$ or PM_{10}/$PM_{2.5}$ ratio, based on a number of assumptions regarding the particulate environment of the area would provide any additional assurances that the $PM_{2.5}$ criterion would be achieved.

2.2 Real-Time Air Quality Monitoring

Reviewer comment 4 relates to the identified weaknesses in the AQIA regarding the adoption of background particulate concentrations and the assertion that due to these weaknesses, a real-time air quality monitoring program should be adopted at the Airly Mine.

Given the discussion above, it is considered that these issues have been adequately addressed and that the adoption of the air quality monitoring program as outlined in Section 8.6.3 of the AQIA is retained.

2.3 Excelsior Limestone Quarry

The reviewer has identified that the impacts on air quality from the Excelsior Limestone Quarry, located 6.5 km to the northwest of the Airly Mine be included in the dispersion modelling assessment (comment 5).

Excelsior Quarry Pty Ltd (Excelsior) hold Environment Protection Licence (EPL) number 953 for operations performed at Excelsior Quarry, Capertee. The EPL allows Excelsior to mine up to 500,000 tonnes and crush, grind or separate up to 500,000 tonnes of material per annum.

SLR has previously performed an AQIA for a limestone quarry and processing operation, extracting and processing up to 380,000 tonnes of material per annum (SLR, 2010). Predicted maximum 24 hour PM_{10} concentrations predicted at 500 m from the site boundary were approximately 15 µg/m^3. Given the 6.5 km separation distance between the Excelsior Quarry and the Airly Mine, and even accounting for the disparity in extraction and production rates between the Excelsior Quarry and the provided example, it is not considered that particulate matter concentrations experienced at receptors surrounding the Airly Mine will experience impacts from the Excelsior Quarry, and should any impacts be experienced, the impacts would be negligible.

Appendix D

Satellite Imagery and Photographic Records of Cliff Falls within Airly Mine Project Application Area: 1984 to 2013

Source: http://world.time.com and B Upton

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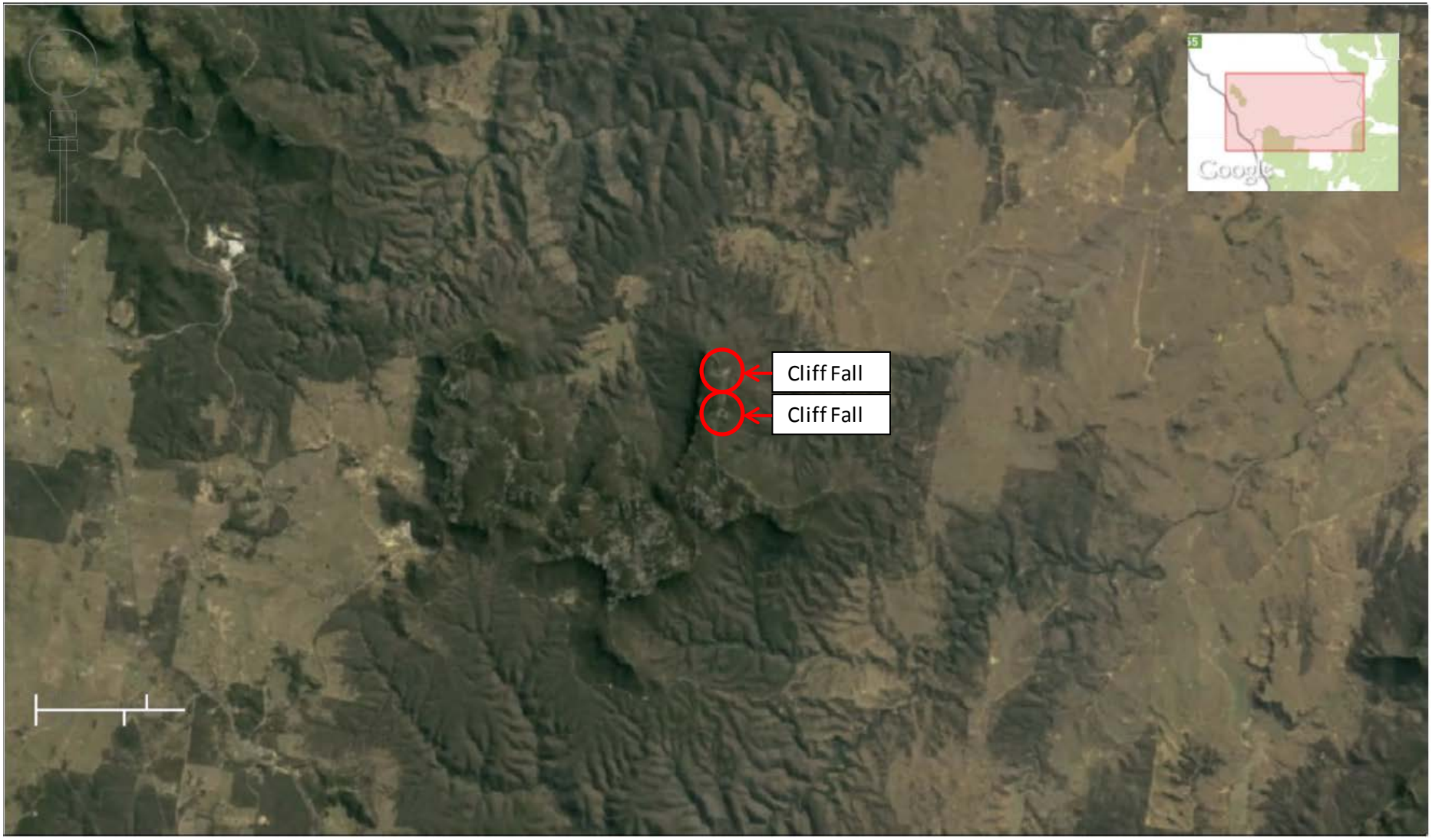
Satellite Image of Airly/ Genowlan Mountain Complex Taken 1984. Courtesy http://world.time.com

Satellite Image of Airly/ Genowlan Mountain Complex Taken 1989. Courtesy http://world.time.com



Satellite Image of Airly/ Genowlan Mountain Complex Taken 2004. Courtesy http://world.time.com

Satellite Image of Airly/ Genowlan Mountain Complex Taken 2006. Courtesy http://world.time.com

Satellite Image of Airly/ Genowlan Mountain Complex Taken 2008. Courtesy http://world.time.com

Satellite Image of Airly/ Genowlan Mountain Complex Taken 2009. Courtesy http://world.time.com

Satellite Image of Airly/ Genowlan Mountain Complex Taken 2012 – Highlighting Area of Cliff Fall in November 2013. Courtesy http://world.time.com

Cliff Fall on Genowlan Mountain November 2013 taken From Glen Davis Road. Photo Courtesy of B Upton.

Appendix E

Response to Submission from Groundwater Solutions International

GHD Pty Ltd
January 2015

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16 January 2015

David King
Senior Mining Engineer
Centennial Airly Pty Ltd
Glen Davis Rd
CAPERTEE NSW 2846

Our ref: 22/16787
108474

Your ref:

Dear David

Airly Mine Extension Project - Response to Submissions
Response to Submission from Groundwater Solutions International

This report responds to comments on the Airly Mine Extension Project Environmental Impact Statement (EIS) by Groundwater Solutions International (GSI).

1 The groundwater monitoring network does not represent all the areas of interest in the coal mine area

The existing groundwater monitoring program at Airly Mine includes 23 vibrating wire piezometers (VWPs) and five standpipe monitoring bores (including the production bore). There is currently over two years of monitoring data for 15 VWPs and two monitoring bores. The information is presented in Section 10.1.2.3 of the EIS and Section 4 of the Groundwater Impact Assessment (GHD, 2014).

The review of the EIS by the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC), and advice provided by them to the NSW Department of Planning and Environment on 13 November 2014, states that '… *groundwater data has largely been collected to a satisfactory standard and over an appropriate timeframe*'. Further, the NSW Office of Water (NOW), in their submission on the EIS (dated 7 November 2014), has not raised concerns regarding the groundwater monitoring network and existing data.

As stated in Section 4.1 of GHD (2014), it is considered that the spatial coverage of groundwater monitoring bores is adequate for the purpose of predicting and monitoring groundwater impacts associated with the Project. The local groundwater sources are limited in extent by outcrop boundaries creating a 'closed' hydrogeological system of rainfall recharge and seepage within the Project Application Area. This limits the required spatial coverage of groundwater monitoring bores to gain an understanding of the hydrogeological system (since the system is entirely bound by local seepage areas). Piezometric head at many monitoring locations is low or negative and there is limited response to rainfall (with the exception of shallow alluvium). The extensive network of fractures and joints within the Triassic strata provide a pathway for groundwater movement toward seepage areas rather than downward to the Lithgow Seam and regional groundwater sources.

The available monitoring data have been sufficient to achieve steady state calibration of the hydrogeological model. The predicted zones of groundwater depressurisation are generally within the spatial coverage of the monitoring network.

An additional five standpipe monitoring bores and four VWPs are planned to be installed in early 2015. These will target areas of alluvium where groundwater drawdown is predicted as well as porous and fractured rock groundwater within the eastern portion of the Project Application Area.

2 Mine dewatering and subsidence may alter the hydraulic ability of the local groundwater system to transmit groundwater

Due to the extensive network of fractures and joints throughout the Triassic strata, as reported by Mackie Martin & Associates (1992), it is considered unlikely that fracturing and deformation of strata overlaying the mine workings will be altered to such an extent that natural groundwater flow to seepage areas and waterways will reduce. The subsidence assessment for the Project (Golder, 2014), provided as Appendix D to the EIS, does not predict any impacts to the Triassic strata.

3 Reduced baseflow recharge to the Quaternary alluvium, and Creeks, may reduce recharge to the underlying shallow aquifers of the Shoalhaven and Devonian Formation

This has been considered in the numerical hydrogeological model (refer Appendix B of GHD (2014)). As discussed in Section 6.1 of GHD (2014) maximum drawdown of the Shoalhaven Group aquifer is 0.1 m and occurs within the Project Application Area. No drawdown of regional groundwater is predicted outside the Project Application Area.

4 Centennial Airly have not included a study of cumulative effects of dewatering and subsidence on groundwater levels in the colluvium and alluvium under drought conditions

The purpose of the hydrogeological model is to predict non-rainfall effects (i.e. from mining) on local and regional groundwater. A conservative approach has been adopted, as noted by GSI, by using a relatively low hydraulic conductivity for the shallow zone and alluvium (0.05 m/day). With a higher hydraulic conductivity for Gap Creek alluvium (K_h 2.5 m/day derived from transient calibration), the depressurisation within the alluvium would generally be less than 0.1 m.

5 Centennial Airly bought an 'Additional Entitlement' WAL 36565 for 120 ML/year from the Sydney North Basin. The source for this 'Additional Entitlement' has not been published

As stated in GHD (2014), an additional entitlement of 920 ML/year from the Sydney Basin North groundwater source was made available by the NSW Government under a Controlled Allocation Order. Details regarding the Controlled Allocation have been published by NOW (2014). The Controlled Allocation was made on 31 May 2013 under Section 65 of the Water Management Act (WM Act) and was made to provide a limited number of aquifer access licences to groundwater sources that previously had unassigned water. The additional entitlement was obtained by Centennial Airly through a tender process.

6 Once the mine reaches its peak requirements of 199 ML/year and is recycling 80% of this produced water there will be no need to have a 278 ML/year groundwater allocation for the life of the mine

The NSW Aquifer Interference Policy (AIP) outlines the water licensing requirements under the *Water Act 1912* and WM Act. A water licence is required whether water is taken for consumptive use or whether it is taken incidentally by the aquifer interference activity (such as groundwater filling a void) even where that water is not being used consumptively as part of the activity's operation. Under the WM Act, a water licence gives its holder a share of the total entitlement available for extraction from the groundwater source. The water access licence must hold sufficient share component and water allocation to account for the take of water from the relevant water source at all times. Sufficient access licences must be held to account for all water taken from a groundwater or surface water source as a result of an aquifer interference activity, both for the life of the activity and after the activity has ceased. Therefore, Centennial Airly will need to retain this licence for the life of the mine to account for groundwater interference, regardless of whether the water is being used.

7 Centennial Airly have no additional groundwater WAL licences to cover increased groundwater abstractions above those modelled

As outlined in the Groundwater Impact Assessment (GHD, 2014), groundwater extraction and interception from the Sydney Basin North groundwater source over the life of the Project (based on Scenario 2, 'average' fracturing, discussed in Section 10.1.3.3 of the EIS and Section 6 of the Hydrogeological Model report (refer Appendix B of GHD (2014)) is as follows:

- A conservative assessment of groundwater inflows into the underground mine workings, which are predicted to peak at up to 184 ML/year in year 2030.
- Groundwater extraction from the Shoalhaven Group via the existing production bore, which was predicted to peak at 192 ML/year (under dry conditions) in year 2015. This is a conservative estimate since it assumes that a Coal Handling and Preparation Plant (CHPP) and Reject Emplacement Area (REA) are operating in 2015.
- Coal moisture, which is removed with the Run of Mine (ROM) coal, which is predicted to be 46 ML/year (GHD, 2014) during mining operations.

The water balance model has been used to predict total extraction and interception from the Sydney Basin North groundwater source over the life of the Project. Model output is provided as Figure 6-9 in GHD (2014) and reproduced in Figure 1 in this report. Total groundwater extraction and interception is predicted to peak at 180 ML/year (50^{th} percentile) or 199 ML/year (90^{th} percentile). These volumes are well below Centennial Airly's existing total Water Access Licences (WALs) for the Sydney Basin Groundwater Source of 278 ML/year, even when the coal moisture of 46 ML/year is considered. Therefore, no additional groundwater entitlement is required by Centennial Airly.

Figure 1 Modelled groundwater extraction and interception

8 References

GHD (2014). *Airly Mine Extension Project Groundwater Impact Assessment*, GHD Pty Ltd, July 2014

Golder (2014). *Subsidence Predictions and Impact Assessment for Airly Mine*, Golder Associates, July 2014

Mackie Martin & Associates (1992). Notes in Support of Reply to Commissioner Simpson. Letter report.

NOW (2014). *Controlled Allocations,* NSW Office of Water, retrieved from: http://www.water.nsw.gov.au/Water-management/Water-availability/Controlled-allocations/Controlled-allocations

Regards,

Stuart Gray
Senior Hydrogeologist
(02) 4979 9999

Appendix F

Airly Mine Extension Project: Response to Submission by The Australia Institute

Aigis Group - Mark Sargent Enterprises
December 2014

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AIRLY MINE EXTENSION PROJECT

CENTENNIAL AIRLY PTY LTD

RESPONSE TO SUBMISSION BY THE AUSTRALIA INSTITUTE

Prepared by

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1. TAI observes that the Economic Impact Assessment (EIA) 'is not based on standard economic assessment techniques and does not comply with NSW Treasury or Federal Government guidelines' (TAI, p.1). TAI further quotes material excerpted from the EIA to support its conclusion. The cited material acknowledges that the EIA represents an effort to present the monetised economic, environmental and social costs of the project in a form that is
    - Relevant to the most-affected communities; and
    - Comprehensible to members of the community who wish to view and understand the benefits, costs and net impacts of the project.
2. TAI goes onto describe the attempt to make the impact assessment comprehensible to 'lay' stakeholders as "'lay' economics[1] rather than standard approaches supported by government departments". At best this semantic shift appears to be a misinterpretation. Describing the outcomes of the economic assessment to non-professionals is significantly different to presenting an analysis that is not supported by accepted analytical techniques. There is no material in the EIA to suggest that the latter is the case, therefore TAI's conclusion can only be considered as surmise.
3. With respect to the repeated references to government guidelines, current guidelines generally relate to publicly-funded (i.e. government) projects, which have different metrics and expectations associated with the acquittal of public funds, but which have been transposed onto this process. The fact that the Department of Planning and Environment is now developing guidelines specific to mining and CSG proposals demonstrates that different approaches are relevant for state-significant, privately funded projects that may impose impacts on the community and in some instances, costs on governments, than for the publicly-funded projects contemplated by existing guidelines. Of particular relevance is the following statement from the draft guidelines; *'Mining and CSG projects are generally private sector investments and, as such, the applicant will generate information for their own financial appraisal which may be confidential and commercially sensitive. The CBA and LEA do not need to show details of capital spend or operating costs in the appraisal reports, but the calculation of some costs, benefits and impacts may be derived from confidential information on capital and operating costs'.*[2]The approach taken in the EIA is consistent with this interpretation, while simultaneously providing for information to be provided to authorities *in camera*.
4. It is salient that the draft guidelines referred to above provide for a 'Local Effects Analysis' (LEA). Given the regional nature of this project and the localised nature of most of its external impacts, the EIA presented pre-empts the LEA in many respects. The new guidelines provide for a separate, overarching CBA at state-level. These impacts (e.g. royalties, taxes etc.) are also covered in the EIA, although not in a separate analysis.

[1] A term also used at page 3 of TAI's submission.
[2] Department of Planning & Environment (2014). *Guidelines for the economic assessment of mining and coal seam gas proposals.* Draft for review. Sydney, State of NSW p.5.

5. TAI's assertion that the general public is not the main audience for technical appendices may or may not be correct. As each EIS goes on public exhibition in full, the material is available to the public and to decision makers. In both instances, the underlying methods are appropriate and the material is conveyed in terms that are appropriate for both audiences.
6. TAI observes that there is no discussion of the financial case underlying the economic assessment. Centennial management has determined that the company will no longer place material that might be considered commercially sensitive in the public domain, in the context of submitting consent approvals. As would be appreciated by the relevant decision makers, the investment in an employment-generating, state-significant development would not be proposed were the project not commercially viable. The discussion of alternative project approaches and mining plans in the EIA further substantiates the significant analytical process that has produced the proposal. The economic assessment is explicit in stating that Centennial will provide commercially confidential financial material to the appropriate decision-making bodies as required for determination of the application. The draft guidelines previously referred to acknowledge the issue of publication of commercially confidential information. The proposed economic assessment process detailed in the draft guidelines will involve the Department providing mandatory pricing and discount rate assumptions (the latter is existing practice). This change in approach appears to represent an effort to allow the level of detail required by TAI in a manner that standardises assumptions and does not require proponents to divulge specific, confidential information.

7. TAI provides some valid theoretical commentary on employment impacts. However, there is some contextual material included in the economic assessment that suggests that TAI's argument for reducing the value or contribution of employee incomes to the regional and state economies to zero cannot reasonably be sustained. In the regional context, TAI's analysis disregards Lithgow City Council's and Mid-Western Regional Council's (MWRC) recognition of the contribution of mining incomes to the region. This is discussed in the economic assessment (pp. 30 – 34). On the strength of this material alone, TAI's argument should be considered as unsustainable.

8. TAI states that due to the current low unemployment rate (stated at 5.8 per cent for NSW), it is inappropriate to assume that employees cannot find alternative employment. TAI assumes that mining employees' skills are directly transferrable to 'other mining, construction and engineering projects' (p.2). In terms of equating this opportunity cost to zero in the context of the Lithgow and MWRC LGAs' regional economies, this assumption must necessarily be based on an accompanying assumption that such other projects would either be situated within, or in relatively close proximity to the Lithgow/MWRC region, or relate to workers commuting to other areas where such jobs are available. The very significant majority of

employees formerly engaged at Airly, and those who may be relocated from Charbon Mine, lived in the immediate region. These workers have residential and community ties to the region and as a consequence, being required to leave the area to obtain alternative employment may not be the simply an economic-driven decision that may be implied from TAI's approach, but rather may have significant social aspects as well. The prevailing low unemployment rate cited by TAI would suggest that opportunities for comparable alternative employment would in fact be likely to be scarce. This is particularly likely to be the case in the mining sector. The Productivity Commission (1998, p.67) provided one measure of the relative constraints on finding alternative employment within the black coal mining industry, finding that voluntary labour turnover rates were less than half the average for all industries. This structural feature of the labour market in the mining sector is particularly relevant in the current market environment and would be likely to constrain the availability of alternative employment in the mining industry. Although there are likely to be potential employees available from other areas, Centennial's intention is to relocate current employees, so these jobs would be expected to be filled by local residents.

9. As has been acknowledged in previous responses to TAI submissions, the contention that some proportion of wage and salary benefit should be excluded from the analysis is accepted. Internal research at Centennial's other operations in the region has consistently found that that on average, employees spend around 33 per cent of their incomes with local businesses. Application of this proportion to the total wages benefit objected to by TAI, would result in an adjusted wage and salary assumption of approximately **$34 million,** with the estimated economic benefits of the project decreasing to **$276 million** and **net benefit to $191 million**. It is submitted that these estimates would be conservative, as it would no longer provide for benefit associated with economic activity by these households in other parts of NSW.
10. TAI cites a number of other coal producers that present material in EIAs which includes information that Centennial, in its view, believes to be commercially confidential. While that approach remains the prerogative of those companies, Centennial has arrived at an internal policy that excludes publication of sensitive information. As stated in the EIA, in keeping with the 2002 guidelines, Centennial's approach does not preclude provision of such information to the relevant decision-making authorities. As has been previously observed, the proposed changes by the Department to the EIA guidelines appear to provide some support for a position that protects commercially confidential information.
11. TAI's further discussion of the viability of the Airly project ranges to a discussion of the recent suspension of operations at Angus Place, and makes a point that Aigis Group did not disclose the possibility of such an outcome in its EIA for that project. Despite any insinuations, the reason for this is simply that relatively imminent suspension was not disclosed to Aigis Group. On the material issue of Airly Mine,

current and future suspension of operations is a possibility, although the timing of such actions remains the commercial prerogative of Centennial. Although this would have immediate-term impacts on certain benefits (and costs), the preservation of the resource until mining is more financially efficient should be considered as an overall benefit, particularly from the state perspective. Clearly, mining of the resource at a period of higher pricing will increase the revenues accruing to the state in respect of the resource.

12. It is Centennial's decision to reserve commercially confidential information. The qualitative information presented by TAI (p.4) on the operation of Airly and Mannering mines patently provides no information that could be construed to be commercially confidential. There is no apparent inconsistency between the disclosure of this information and Centennial's present position.
13. TAI has made similar submissions in respect to the use of benefits transfer in relation to other Centennial applications prepared by Aigis Group. TAI's observation that the method is acceptable is correct. This is acknowledged by the NSW Office of Environment and Heritage (OEH) Environmental Valuation Reference Inventory (EVRI) webpage specifically identifies benefits transfer as a method that '*can provide estimations for cost-benefit analyses and impact assessments, encouraging the internalisation of pollution costs and appreciation of natural capital tradeoffs*'[3]. Furthermore, Section 3.5 of the draft guidelines (Department of Planning and Environment) proposes the use of a benefits transfer approach to be applied in EIAs, noting in part that in relation to the proposed method the guidelines will provide appropriate estimation parameters. The guidelines state that; *'These values are derived from other appraisal studies, and from academic and other research, including research in Europe and North America'* (2014 p.13). This is the approach taken in the economic assessment, with the costs being estimated, and appropriate prevention and strategies put in place to address these. Table 10 in the EIA contextualises impacts and proposed avoidance/minimisation/mitigation strategies for each category of impact, which are 'netted off' against each other in aggregate in the calculation of the project NPV. The endorsement of this approach from two relevant NSW government departments would suggest that the method is entirely appropriate for this purpose.
14. Considered in view of this information, there is no clear basis for TAI's conclusion that 'little weight' be placed on the impact analysis, other than TAI's disagreement with the choice of studies from which values are drawn.
15. In general, TAI makes a valid observation in relation to employment effects of the proposed project. This is acknowledged and addressed in this response. The remainder of TAI's submission largely misconstrues statements from the EIA in order to call into question the methods used in developing the EIA.

[3] http://www.environment.nsw.gov.au/publications/evri.htm

References:

Aigis Group 2014. *Airly Mine Extension Project; Economic Impact Assessment*.

Campbell R. 2014. *Airly Mine Extension Proposal; Submission.* Canberra. The Australia Institute.

Department of Planning & Environment (2014). *Guidelines for the economic assessment of mining and coal seam gas proposals.* Draft for review. Sydney. State of NSW

NSW Government Office of Environment & Heritage: *EVRI – Environmental value reference inventory.* http://www.environment.nsw.gov.au/publications/evri.htm

Planning NSW. 2002. *Guideline for economic effects and evaluation in EIA.* Sydney. NSW Government

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Appendix G

Revised Figures:

(i) EIS Figures 4.1, 8.2 and 8.9
(ii) Figure 6.1 from Aquatic Ecology and Impact Assessment (Cardno, 2014)

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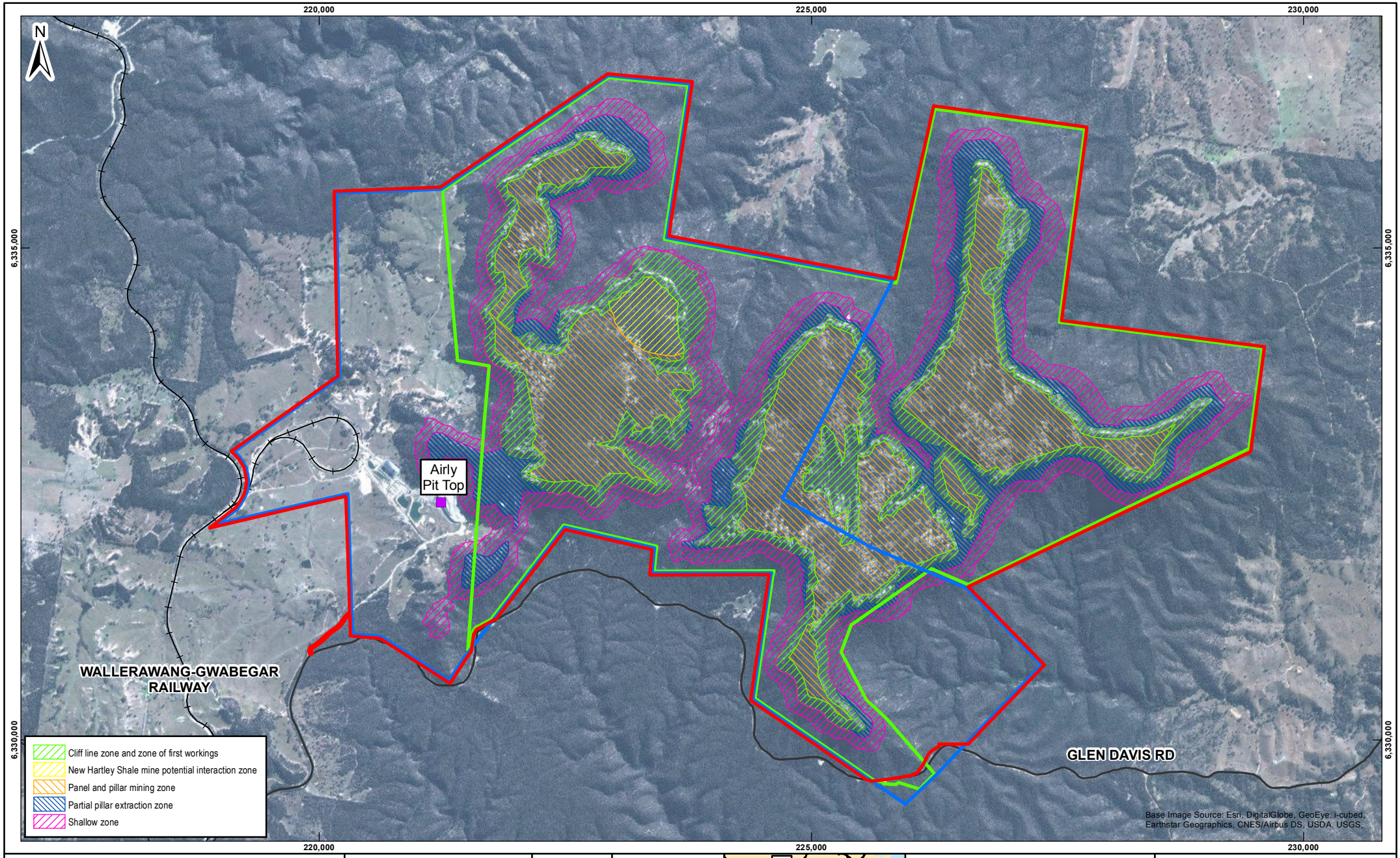


LEGEND

- Project Application Area
- ML1331 Current Lease Boundary (Offset for Clarity)
- A232 Authorisation Boundary (Offset for Clarity)
- Rail
- Main Road

Coordinate System: GDA 1994 MGA Zone 56

DATE	30/01/2015
SEAM	LITHGOW
REFERENCE	137623024-R Rev 0
SCALE	1:50,000

Figure 4.1: Proposed Mining Zones

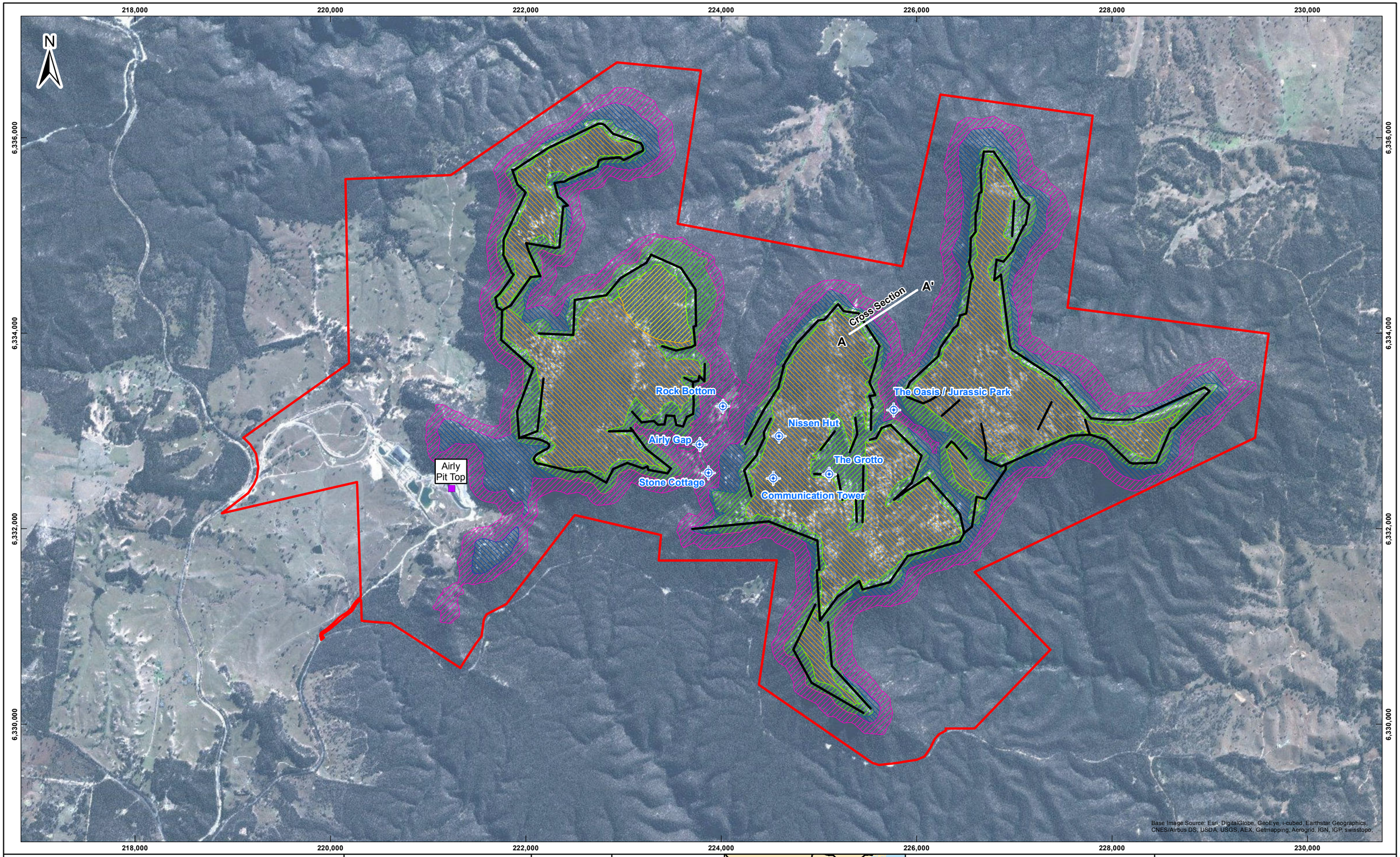
0 500 1,000 1,500 2,000 Metres

PLOTFILE No.

Centennial Coal
Airly

DRG No. 4-4.1

A4



LEGEND

- Project Application Area
- Sensitive Feature
- Cliff Line
- Cliff line zone and zone of first workings
- New Hartley Shale mine potential interaction zone
- Panel and pillar mining zone
- Partial pillar extraction zone
- Shallow zone

See Figure 8.5 for Mining Zone Cross Section Profile A-A'
Coordinate System: GDA 1994 MGA Zone 56

DATE	30/01/2015
SEAM	LITHGOW
REFERENCE	137623024-R Rev 0
SCALE	1:35,000

Figure 8.2: Sensitive Features and Mining Zones

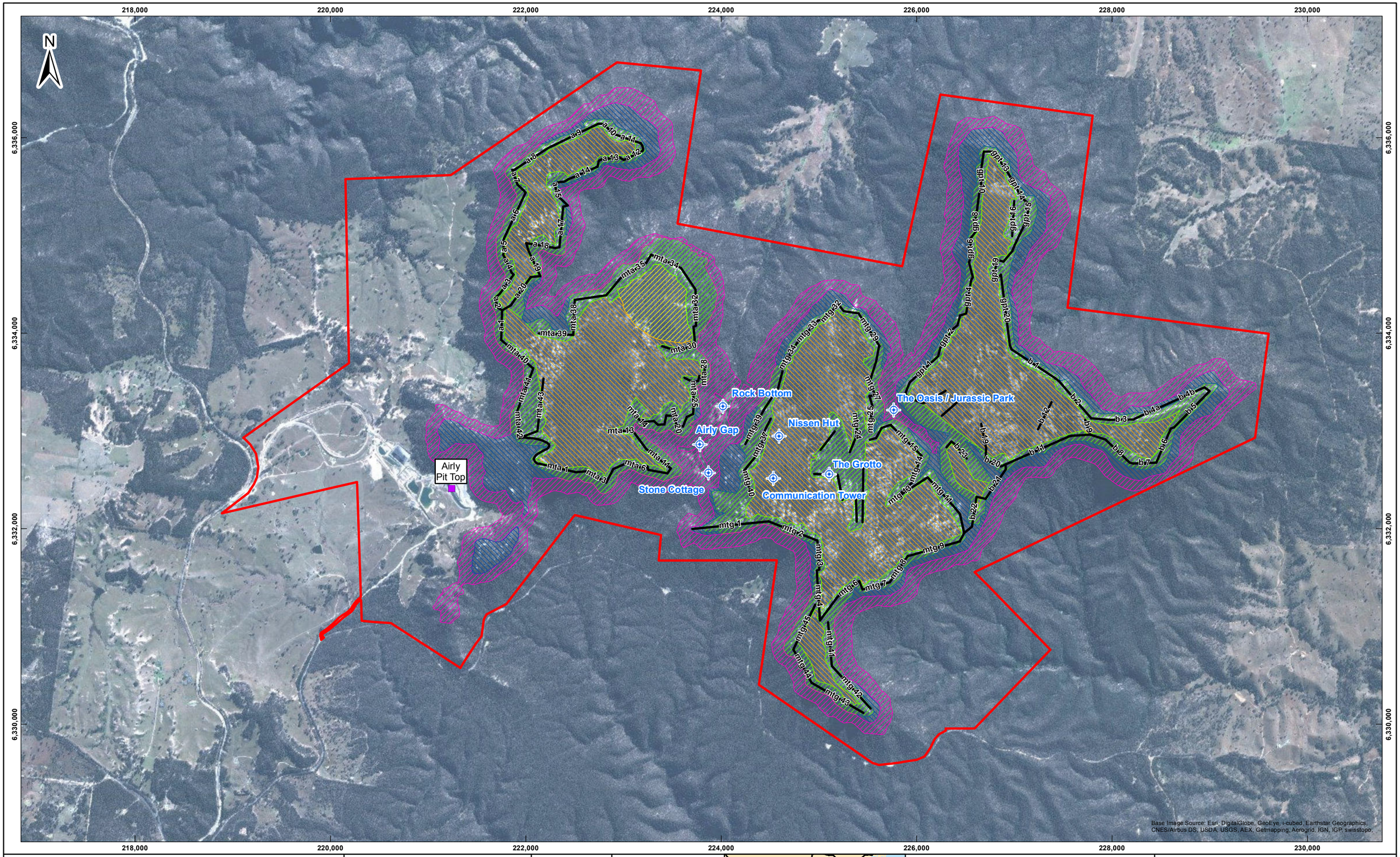
0 500 1,000 1,500 2,000 Metres

PLOTFILE No.

Centennial Coal
Airly

DRG No. 8-8.2

A3



LEGEND

- Project Application Area
- Sensitive Feature
- Cliff Line
- Cliff line zone and zone of first workings
- New Hartley Shale mine potential interaction zone
- Panel and pillar mining zone
- Partial pillar extraction zone
- Shallow zone

Abbreviations:
mta - Mount Airly
mtg - Mount Genowlan
gpt - Genowlan Point
a - Area A
b - Area B

Coordinate System: GDA 1994 MGA Zone 56

DATE	30/01/2015
SEAM	LITHGOW
REFERENCE	137623024-R Rev 0
SCALE	1:35,000

Figure 8.9: Cliff Line Zone and Zone of First Workings

0 500 1,000 1,500 2,000 Metres

PLOTFILE No.

Centennial Coal
Airly

DRG No. 8-8.9

A3

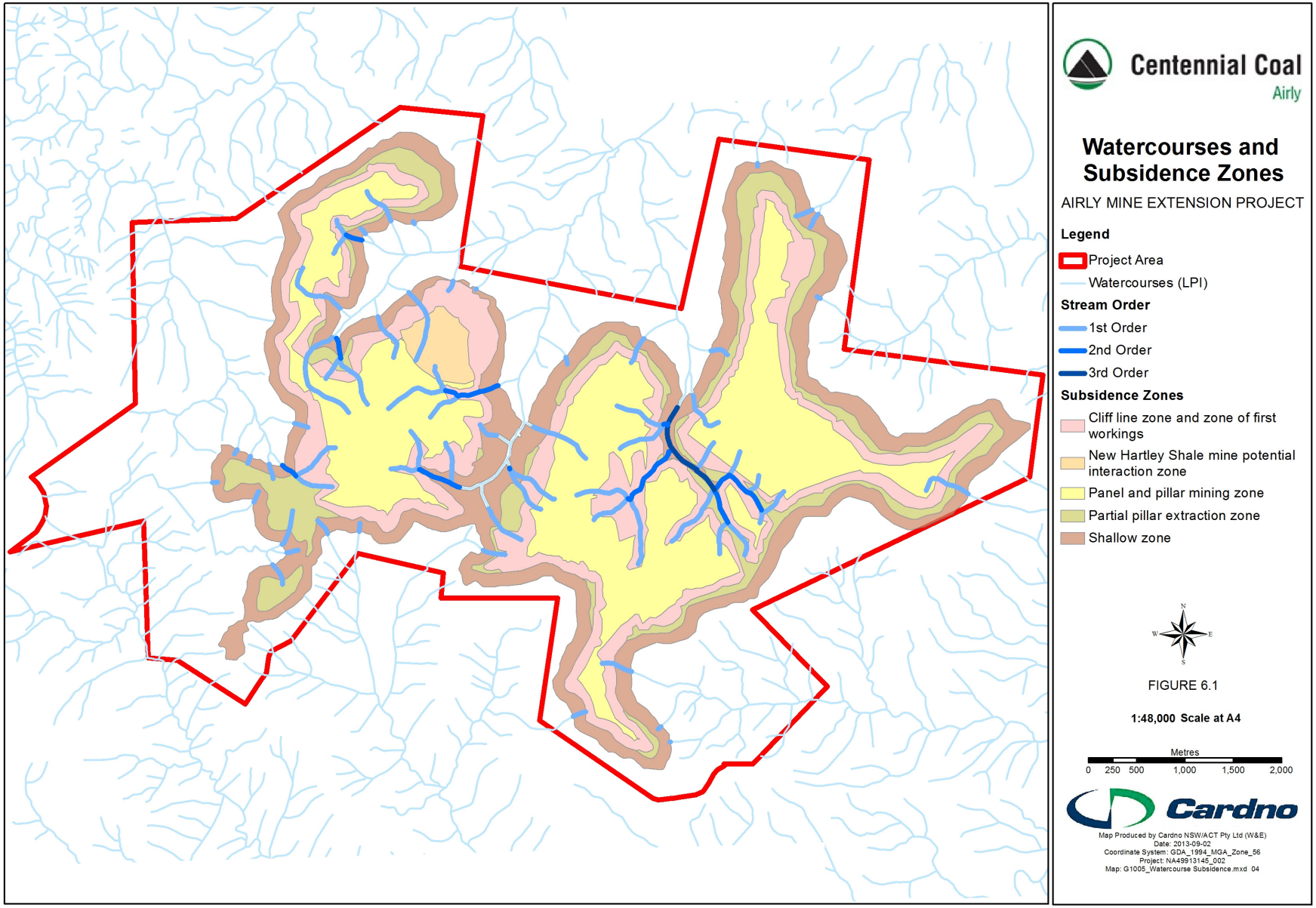


Figure 6-1 Subsidence prediction zones overlayed with surface water features

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