DRAYTON SOUTH COAL PROJECT

CONSEQUENTIAL ENVIRONMENTAL IMPACT ASSESSMENT FOR RETRACTED MINE PLAN

for

ANGLO AMERICAN METALLURGICAL COAL PTY LTD

March 2014

Hansen Bailey
ENVIRONMENTAL CONSULTANTS

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Prepared by:

HANSEN BAILEY
6/127-129 John Street
Singleton NSW 2330

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For:

ANGLO AMERICAN METALLURGICAL COAL PTY LTD
201 Charlotte Street
Brisbane QLD 4000

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FOR RETRACTED MINE PLAN

for
Anglo American Metallurgical Coal Pty Ltd

1 INTRODUCTION

This document has been prepared by Hansen Bailey Environmental Consultants (Hansen Bailey) on behalf of Anglo American Metallurgical Coal Pty Ltd (Anglo American) in response to a request from the Department of Planning & Infrastructure (DP&I) to provide additional information as to how the recommendations of the PAC could be further addressed by the Drayton South Coal Project (the Project).

Anglo American maintains that based on the findings of the scientific assessments presented in the Environmental Assessment (EA) dated November 2012 and the Preferred Project Report (PPR) dated August 2013 that the submitted mine plan was approvable. However, Anglo American recognises the position that the PAC has taken and in this submission provides a retracted mine plan which has been developed at the request of DP&I to accommodate many of the recommendations made by the PAC.

This submission presents a retracted mine plan and provides a qualitative assessment of the consequential environmental impacts that would be expected from the further retraction of proposed mining activities in the Houston, Whynot and Redbank mining areas.

2 RETRACTED MINE PLAN DESCRIPTION

This section provides a description of a retracted mine plan for Drayton South based on the recommendations of the PAC.

2.1 PAC RECOMMENDATIONS

The PAC Review Report dated December 2013 recommended that "*if this coal mine is to proceed it will need to be subject to substantial change...*and that *…substantial additional setbacks will be required with associated loss of pits to the mine plan".*

The PAC report presented a proposed setback (see Figure 5 of the PAC Report) which essentially removed the Houston mining area, a portion of the Whynot mining area, a large portion of the Redbank mining area and part of the Blakefield mining area.

The PAC stated that the setback is required to:

- Ensure the physical activities and operations are not visible from the studs' primary areas of operations, i.e. mining can only occur behind natural ridgelines; and
- Having regard to the topography of the area, open cut mining must not be allowed to extend through the second ridge to the north of the Golden Highway (opposite Arrowfield) to buffer against noise, dust, blasting and lighting.

As requested by DP&I Anglo American's consideration of the PAC's recommendations with regard to the requirement for further retractions to the mine plan is provided in the following section.

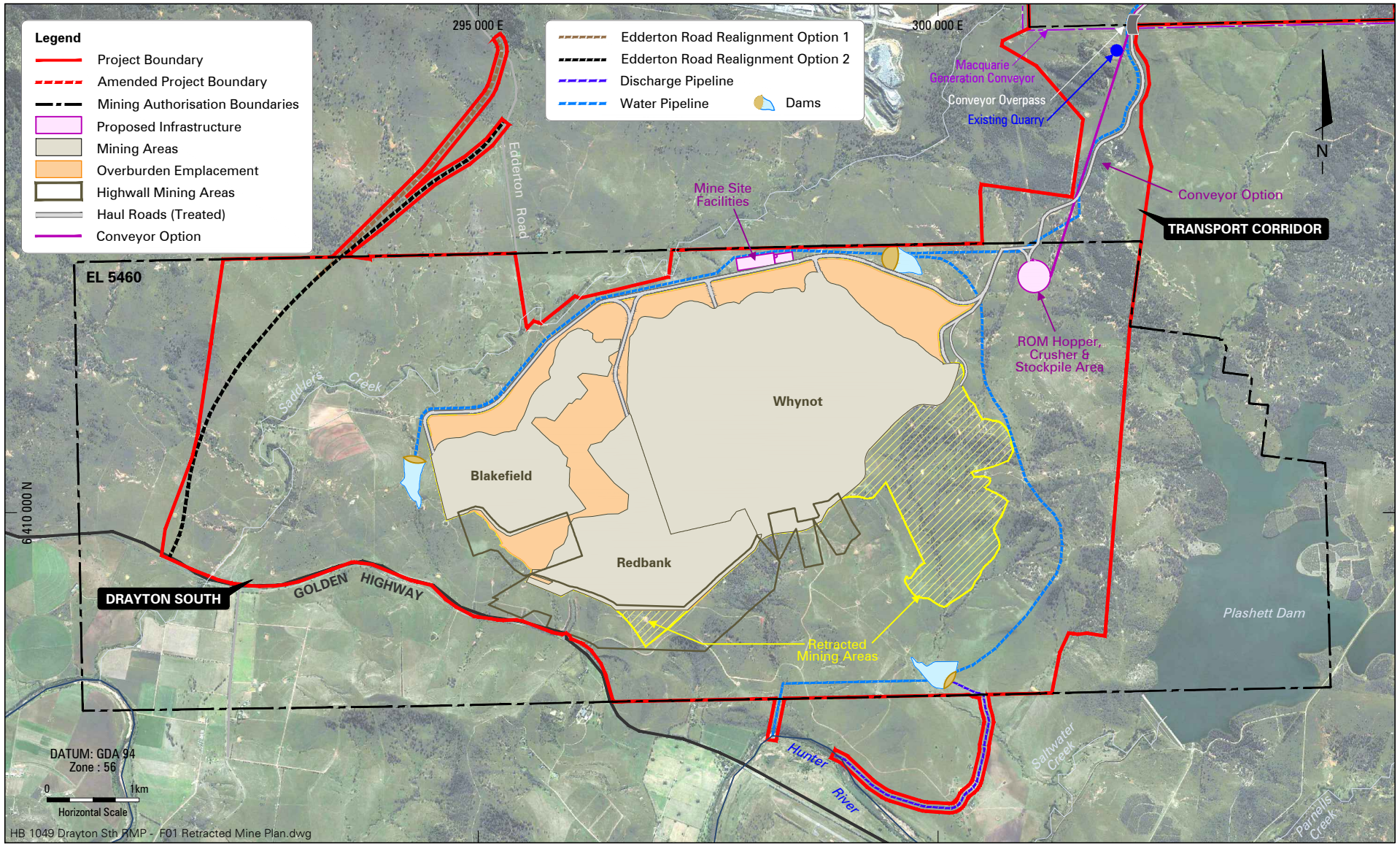
2.2 RETRACTED MINE PLAN

2.2.1 Description of Retractions Made

Following due consideration of the PAC's recommendations and in response to the request from DP&I Anglo American provides as part of this submission two key retractions to the mine plan for the Project. These retractions are shown on **Figure 1** and include the complete removal of the Houston mining area and its associated visual bund along with a significant portion of the Whynot mining area and a substantial area in the southernmost part of the Redbank mining area (pulling operations back a further 400m from the south). These changes reduce the mine life from 27 to 20 years. All other Project elements are assumed to remain as per the Project Description in the EA.

Anglo American reviewed the feasibility of removing a greater portion of the Redbank mining area as recommended by the PAC and found that this would make the Project unviable without realising any material environmental benefits for the horse studs. Further details with regard to the importance of the Redbank mining area to the Projects viability are included in **Section 2.3**.

These retractions to the mine plan would remove all remaining direct visual impacts from the horse studs 'primary areas of operations' as mining is now restricted to remain entirely behind natural ridgelines.



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Retracted Mine Plan

FIGURE 1

Previously modelling completed for the EA and RTS confirmed that the Project was able to meet all relevant criteria with regard to air quality, noise and blasting. As a result of the retractions in this submission further reductions in dust, noise and blasting impacts are expected ensuring that any potential impacts are further reduced. Details of the environmental benefits for the retracted mine plan are provided in **Section 3**.

In addition it is noted that the retracted mine plan provides adequate buffering from the horse studs areas of primary operations. With regard to Coolmore Stud the buffer to their primary areas of operations is now 1.4 km.

With regard to Darley it is noted that the closest part of the mine remains at around 500m to their closest boundary fence, however, this area of their property is on the foot slopes of the Trig Hill ridgeline and is not considered to be a 'primary area of their horse stud operation'. **Plate 1** shows the paddocks in question. Paddocks in this area are very steep with numerous rocky outcrops, do not have the oil stained wooden rail fencing that is associated with a world class horse stud and are utilised by Darley for cattle grazing. The fencing style in this area (as seen in **Plate 1**) is that of barbed wire that is incompatible with housing horses of any sort let alone thoroughbred racing horses. The buffer between the retracted mine plan and Darley's primary areas of operations is greater than 2 km (see **Figure 2**) and satisfies the PACs requirement for maintaining an adequate buffer from the studs primary areas of operations.

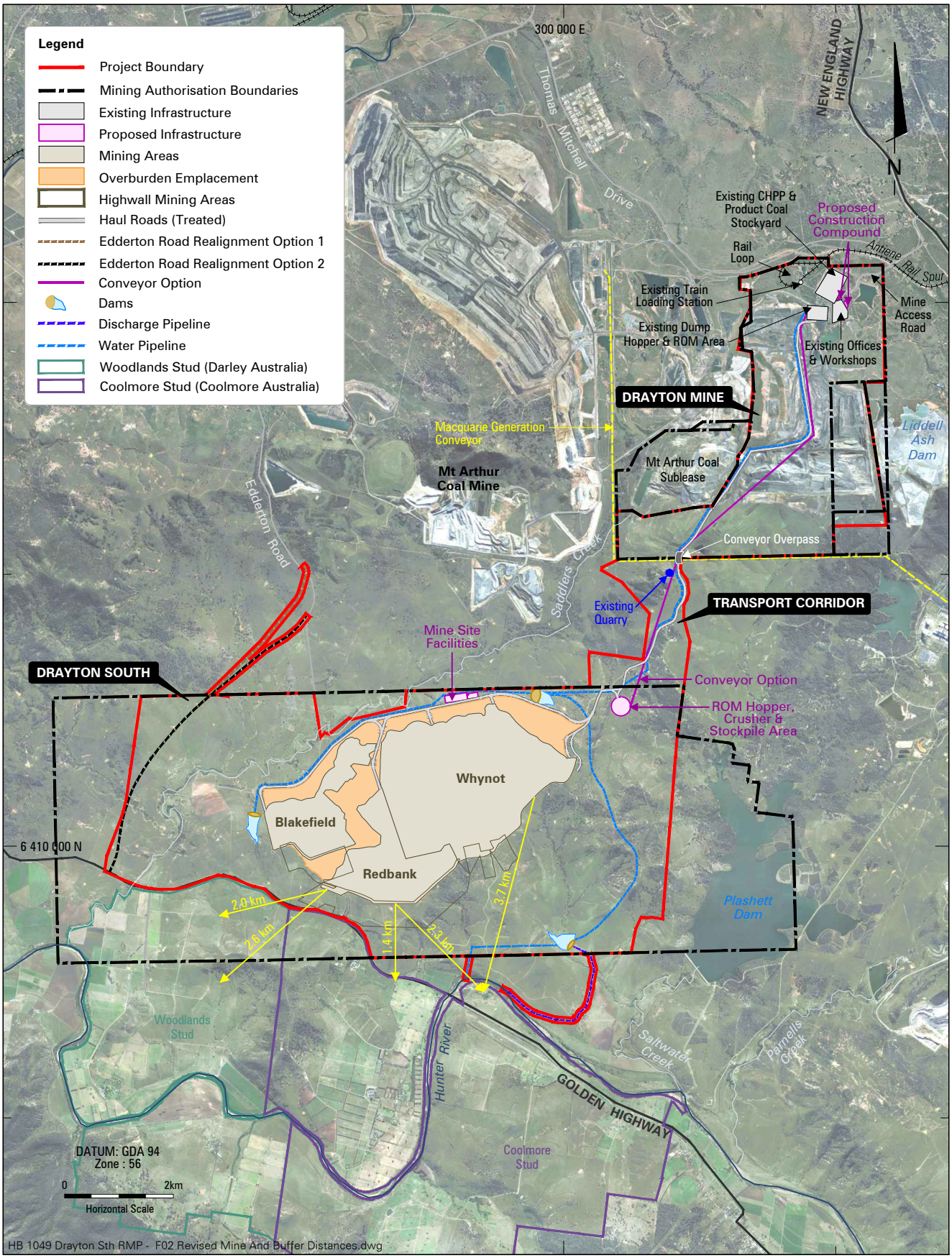
2.2.2 Project Concessions

The retractions to the mine plan would result in a further reduction in Project coal reserves by 22 Mt and hence reduce the mine life by 7 years. The loss of coal and reduction in mine life would subsequently reduce the royalties payable to the NSW state government by approximately $190 Million. This 22 Mt that would be removed is in addition to the concessions that have been made as part of the EA to avoid impacts on the horse studs in which 53 Mt of coal was removed. When the retractions are taken into account the total coal removed in order to reduce impacts on the horse studs would be 75 Mt (or 44% of the total available reserves) which represents an estimated revenue loss of $7.5 Billion (see **Table 1**). The concessions that have been made to the Project mine plan are shown on **Figure 3** (including the PAC's Proposed Setback line for comparative purposes).

Table 1
Project Reserves Comparison

Mine Plan Version	Cumulative Coal Sterilised	Remaining Reserves
Pre-Feasibility Option 2 Mine Plan (Extent of economic open cut reserve)	-	172 Mt
EA	53 Mt	119 Mt
Retracted Mine Plan	**75 Mt**	**97 Mt**

Plate 1
Woodlands Paddock Closest to Drayton South (Trig Hill Paddock)



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Retracted Mine Plan Buffer Distances

FIGURE 2

2.3 REDBANK JUSTIFICATION

This section outlines the major impacts to the Project if the Redbank mining area was not included as planned under the retracted mine plan. The impacts are grouped under revenue impacts, schedule impacts and value impacts.

2.3.1 Revenue Impacts

The Redbank mining area in this plan contains approximately 19 Mt ROM coal, which yields 14.3 Mt product coal. The Redbank area supplies a significant portion of the total tonnage, contributing approximately one third of annual mined tonnes during its life.

2.3.2 Schedule Impacts

The Redbank area is a critical and integral part of the mining schedule. The importance of Redbank to the mining schedule is increased with the removal of the Houston mining area and the south east portion of Whynot. The retracted mine plan has an increased reliance on dragline overburden movement. The Redbank area becomes critical in the absence of the Houston area in providing the dragline with an alternative working area as the strike length in Whynot reduces. Without the Redbank area the scheduling of a continuous dragline operation becomes impossible resulting in costly and uneconomic park-up periods in the schedule.

2.3.3 Project Value

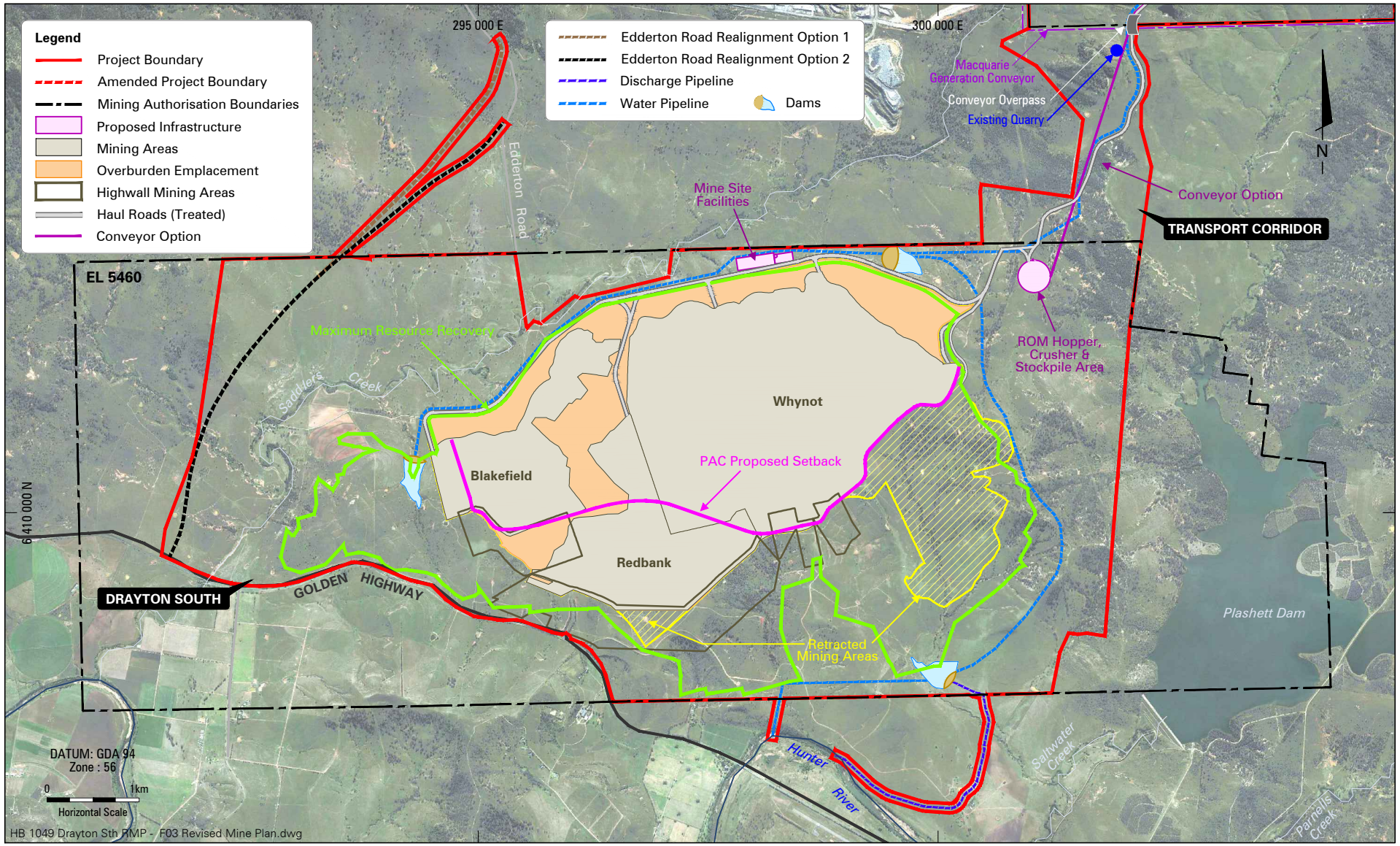
A reduced cash flow of more than $900M and a 25% reduction in NPV would result from the removal of the Redbank mining area. The removal of this low cost resource from the mine plan would render the project unviable.

2.3.4 Conclusion

The Redbank mining area is an integral part of the mine plan for the Project. It makes a significant positive contribution to the value of the Project and permits efficient scheduling of the dragline process. The Redbank operation is completely screened behind the existing ridgeline and it has been confirmed that the removal of this operational area from the mine plan would render the Project unviable.

The Department of Primary Industries also raised this concern following their own review stating that "*the effective removal of two of the four pits also brings into question whether changes to the net present value of the deposit and the flow through effects on mine scheduling, equipment usage and the ability to still produce the required products would render this proposal uneconomic*".

Previous independent mining engineer reviews conducted by Runge Pincock Minarco (for DP&I) and R A Jennings & Associates (for PAC) support this finding.



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Mine Plan Concessions Made

FIGURE 3

2.4 BENEFITS OF THE RETRACTED MINE PLAN

Anglo American maintains that based on the findings of the scientific assessments presented in the EA, RTS and PPR that the submitted mine plan was approvable. However, the key additional benefits of the proposed retracted mine plan would include the following:

- Mining is now not visible at all from the studs primary areas of operation as all mining is restricted to behind existing natural topography;
- There is now a buffer of more than 1.4 km from Coolmore's areas of primary operations and 2 km from Darley's areas of primary operations;
- As described further in **Section 3** the retraction of the mine plan also further reduces air quality, noise and blasting emissions to ensure that all relevant criteria are readily able to be complied with when assessed under worst case operating conditions;
- With the removal of the Houston mining area and the south eastern portion of Whynot there is a significant reduction to the loss of catchment flows to Saltwater Creek and subsequently to the Hunter River;
- Reduced requirement to discharge under the Hunter River Salinity Trading Scheme (HRSTS);
- Reduction of the Project disturbance footprint by approximately 320 hectares (ha) or 17%;
- Significantly reduced ecology and archaeology impacts; and
- The operations at Drayton Mine are able to continue generally as planned to provide continuity for its workforce and deliver economic stimulus and ongoing benefits to the regional and state economies.

3 CONSEQUENTIAL ENVIRONMENTAL IMPACT ASSESSMENT

This section describes the environmental and social impacts of the retracted mine plan and provides a qualitative assessment as to how these compare with the findings of the EA and PPR.

The EA and PPR provided a comprehensive assessment of environmental and socio-economic aspects relevant to the Project. A review of the EA and PPR was undertaken as part of the consequential environmental impact assessment to identify what effect the changes to the mine plan would have on the predicted environmental and social impacts for the Project.

Given the fact that the retracted mine plan represents a reduction in footprint only and there are no new project elements, all remaining environmental and socio-economic aspects are deemed consistent with the impact assessments and associated mitigation and management measures provided in the EA and PPR.

3.1 VISUAL

As part of this consequential environmental impact assessment JVP Planning and Design (JVP) has undertaken a review of the retracted mine plan and provided advice on how the changes made effect the visual impact assessment for the Project. The advice from JVP is provided in **Appendix A**.

In summary, JVP found that the retractions made to the mine plan completely remove mining activity from the more sensitive and visually exposed Saltwater Creek catchment and ensure that all activities remain behind existing natural topography. This protects the visual catchments and views of Coolmore Stud, Jerry's Plains and the Golden Highway. The changes made to the mine plan now places the whole mining operation within the Saddlers Creek catchment and removes any direct visual impact on sensitive southern viewpoints. This includes eliminating any views from the horse studs primary areas of operations. Further as a consequence of the additional setbacks proposed it would also reduce the minor indirect ephemeral visual impacts and any resultant effect this may have on image considerations.

3.2 AIR QUALITY

As part of this consequential environmental impact assessment Pacific Environment Limited (PEL) has undertaken a review of the retracted mine plan and provided advice on how the changes made effect the air quality impact assessment for the Project. The advice from PEL is provided in **Appendix B**.

The revised air quality modelling completed as part of the RTS demonstrated that there were no predicted exceedances of the annual average criteria for TSP, PM_{10} or dust deposition. It also established that with the predictive and proactive mitigation and management measures proposed that 24-hour average PM_{10} is able to be effectively managed in order to prevent any exceedances.

A sensitivity analysis was then undertaken by PEL on the revised modelling following recommendations from the SKM Peer Review which was completed for DP&I. The sensitivity analysis compared site specific data collected from numerous coal mines across NSW (with regard to soil silt and moisture contents) and assessed what would be the likely change in total site emissions if the average silt and moisture contents from these other sites were used. The sensitivity analysis revealed that the use of the average values from other sites across NSW results in a 4.9% increase in total TSP emissions compared with that used in the dispersion modelling. PEL confirmed that 4.9% is not considered to be a significant increase and extensive experience has demonstrated that an increase of less than 10 – 20% in total site emissions results in minimal, if any, change to the predicted impacts. As such the sensitivity analysis demonstrates that the revised modelling that was undertaken as part of the RTS is representative of worst case.

As part of their assessment for the retracted mine plan PEL reviewed the reduced mine plan footprints and production schedules and compared these to the previous mine plans for which modelling has been undertaken. From this review they found that as there is an overall reduction in material movement across the Project for each year, in addition to the removal of the entire Houston mining area and visual bund and the reductions in the Whynot and Redbank mining areas, it would be expected that there would be an overall reduction in the predicted impacts for the Project when compared to the RTS modelling.

Based on the fact that the revised modelling as part of the RTS demonstrated that there will be no exceedances of relevant air quality criteria (and that the sensitivity analysis confirmed that this is representative of worst case) the further retractions to the mine plan along with the commitment to implement leading practice air quality management and mitigation measures would ensure that all relevant air quality criteria as provided in **Table 2** and **Table 3** are able to be complied with when assessed under worst case operating conditions.

Table 4 provides a summary of the proposed air quality management performance measures for the Project.

Table 2
Particulate Matter Assessment Criteria

Pollutant	Averaging Period	Criterion (µg/m3)	Agency
TSP	Annual Mean	90	National Health and Medical Research Council
PM_{10}	24-hour maximum*	50	OEH
	Annual mean	30	OEH

Table 3
Dust Deposition Assessment Criteria

Pollutant	Averaging Period	Maximum Increase in Deposited Dust Levels (g/m^2/month)	Maximum Total Deposited Dust Levels (g/m^2/month)
Deposited Dust	Annual mean	2	4

Table 4
Summary of Air Quality Management Performance Measures

Feature	Performance Measure
Monitoring	• Anglo American will install an air quality monitoring network comprising real-time PM10 and PM2.5 monitors, TSP monitors and dust deposition gauges. This monitoring network will be designed in consultation with EPA and ensure compliance with the relevant criteria as listed in **Table 2** and **Table 3**. • Installation of a real-time meteorological station with predictive software capabilities. The location of this meteorological station will be selected in consultation with EPA. • Monitoring of greenhouse gas emissions and review energy efficiency initiatives to ensure that Scope 1 greenhouse gas emissions are kept to the minimum level practicable.
Mitigation and Management	• Implement leading practice dust mitigation measures to achieve the air quality outcomes described in the EA and RTS. • Permanent haul roads will be treated using a dust suppression agent (e.g. Dust-A-Side or Dust Bloc). • Utilisation of standard operational management and mitigation techniques during the operational phase. • Topsoil clearing restricted to a single strip ahead of mining, where practical and water spraying applied. • Water tankers to be utilised at all times to minimise dust emissions.

3.3 ACOUSTICS

As part of this consequential environmental impact assessment Bridges Acoustics has undertaken a review of the retracted mine plan and provided advice on how the changes made effect the acoustics impact assessment for the Project. The advice from Bridges Acoustics is provided in **Appendix C**.

Bridges Acoustics found that the removal of some of the previously proposed mining areas would result in a slight reduction in noise levels at the closest receivers within the Coolmore and Woodlands Studs. The EA demonstrated that the Project will comply with relevant noise criteria (see **Table 5**) and the retracted mine plan will also comply with relevant noise criteria. Bridges Acoustics also found that the use of a dragline in the Redbank mining area would replace an overburden fleet for part of the time and would subsequently result in lower noise levels at the closest receivers.

With regard to blasting Bridges Acoustics found that the retracted mine plan results in no appreciable change in the minimum distance between the mining area and closest residences. Accordingly the results and conclusions in the EA regarding blasting impacts would therefore remain substantially unchanged (i.e. that with mitigation all blast criteria would be met). The relevant blast criteria for the Project are provided in **Table 6**.

The EA predicted that blast events closest to receivers would most likely require a smaller Maximum Instantaneous Charge (MIC) to meet relevant blasting criteria. As the retracted mine plan includes a smaller percentage of the mining area close to receivers, a reduced MIC would be required for a smaller percentage of blast events.

Anglo American would also like to reiterate that the Project proposes to require blasting on average 5 days per week and not 10 times a week asserted by the horse studs.

A summary of the noise and blasting management performance measures for the Project are provided in **Table 7**.

Table 5
Noise Criteria for Specific Receivers

Receiver Group		Intrusive Criteria LAeq, 15min (LA90+5)		
		Day	Evening	Night
Drayton Mine Receivers				
A	Antiene (west and near the New England Highway)	37	37	37
B	Antiene (east and central)	35	35	35
Drayton South Receivers				
C	Jerrys Plains (M1), Coolmore Stud (M2)	40	38	38
D	Woodlands Stud (M3), Private properties (west and north-west of Drayton South) (M4)	35	35	35

Table 6
Blasting Amenity Criteria

Criteria	Overpressure (dBL)*	Ground Vibration (mm/s)*
Less than 5% of total blasts to exceed	115	5
No blasts to exceed	120	10

** Criteria do not apply where an agreement is in place with land owner.*

Table 7
Summary of Noise and Blasting Management Performance Measures

Feature	Performance Measure
Noise	
Noise Monitoring	• Revision of the current Drayton Mine Noise Management Plan and reviewed every three years. • Implementation of leading practice noise mitigation measures to ensure that the predicted noise levels at private receivers are not exceeded. • Quarterly operator attended noise monitoring at a minimum of four locations during normal mining operations to confirm Project noise levels. • Results from real time noise monitoring and quarterly noise surveys will be reported annually in the Annual Review.
Mitigation and Management During Construction Phase	• Development of noise criteria for each time period (Day, Evening & Night). • Implementation of a Construction Noise Management Program addressing appropriate activities to be undertaken during the evening and night period.
Mitigation and Management During Operational Phase	• Utilisation of low noise idlers to select conveyors at the CHPP to meet noise criteria at receivers. • Fitting mobile plant with leading practice exhaust silencers and sound attenuation devices prior to moving into the Redbank mining area. • Install a real time noise monitoring system, which will be designed in consultation with EPA.
Blasting	
Blasting Monitoring	• A blast monitoring program which is representative of the closest sensitive receivers to ensure compliance with the relevant blast criteria. • Dilapidation surveys will be performed at all identified heritage items listed in Table 43 of the EA.
Blasting Mitigation and Management	• Blasting will not be performed within 500m to any occupied or sensitive buildings or structures unless adequate controls are in place. • Coordination of blasting schedules with adjoining mine. • Notification of Blast events to sensitive receivers upon request and on the Anglo American website prior to the blast and establishment of appropriate signage (if required). • Blast events to be designed to meet the relevant overpressure and ground vibration criteria listed in **Table 6**

3.4 WATER

As part of this consequential environmental impact assessment Australasian Groundwater and Environmental Consultants Pty Ltd (AGE) and WRM Water and Environment (WRM) have undertaken a review of the retracted mine plan and provided advice on how the changes made effect the groundwater and surface water assessments for the Project. The advice from AGE is provided in **Appendix D** while WRM's advice is provided in **Appendix E**.

3.4.1 Groundwater

With regard to the groundwater assessment AGE found that the retracted mine plan footprint and subsequently reduced mine life effectively reduce the impact on the groundwater regime to less than predicted for the EA and PPR. AGE found that by reducing the footprint of the Whynot mining area there would be between a 25 – 50% reduction in the rate of groundwater inflow into the mining area. The removal of the Houston mining area and reduction in Redbank also reduce groundwater inflow to the mine.

AGE found that the reduced mining period from 27 to 20 years allows less time for the zone of depressurisation to radiate out from the mine. Combined with the fact that the mining footprint is also reduced indicates that the revised mine plan would result in a less extensive zone of depressurisation than predicted in the EA. Given the reduced zone of depressurisation from the retracted mine plan, the take from the Hunter River alluvium is expected to be negligible and undetectable.

The groundwater assessments for the EA and PPR found that the overburden will require a long period to fully saturate before a window lake forms in the reshaped void space. During this period the void will behave as a sink for groundwater flow until about 140 years post mining when hydraulic gradients will create a 'flow through' system. The salinity of the void lake will gradually increase reaching an equilibrium level of about 5000 mg/L, 400 to 500 years post mining. Conservative estimates of fluxes from the void concluded the salinity of the Hunter River will not increase above 1%, thus satisfying the Aquifer Interference Policy (AIP) minimum impact considerations.

The revised mine plan will have a final void in a similar location, or further to the north of that presented in the PPR.

3.4.2 Surface Water

WRM have found that the removal of the Houston mining area and a portion of the Whynot mining area (i.e. all mining activities within the Saltwater Creek catchment) will significantly reduce any impacts on the loss of catchment flows to Saltwater Creek and ultimately to the Hunter River. Similarly this will reduce the mine disturbance catchment area and therefore water that is captured by the Project. When this is coupled with the reduced groundwater inflows that are expected as reported in **Section 3.4.1** it is expected that the Project will have a reduced requirement to discharge water from site under the Hunter River Salinity Trading Scheme (HRSTS). There is also an increased likelihood that offsite water supplies may be required later in the mines life during extended dry periods.

No changes are proposed to the surface water management system for the retracted mine plan. However, the removal of the Houston mining area has increased the clean catchment draining to the proposed Houston Dam. As such it is now proposed to construct a diversion bund and drain around the Houston Dam to divert the clean catchment around the dam back to Saltwater Creek.

A summary of the water management performance measures for the Project are provided in **Table 8**.

Table 8
Summary of Water Management Performance Measures

Feature	Performance Measure
Water Management - General	• Revision of the existing Drayton Mine water management system in consultation with the relevant regulators. • Minimise as far as reasonable and feasible the take of water from the Hunter River. • Anglo American will conduct ongoing monitoring of surface water quantity and quality. The monitoring data will be used to update and validate the water balance model. • In the event that offsite water supplies are required, Anglo American will obtain the necessary WAL prior to sourcing water from the Hunter River. • Minimise the use of clean water on site (where practical). • Maximise as far as reasonable and feasible the separation of different quality water within site.
Sediment Dams and linear infrastructure	• Design, construction and implementation of measures to improve the management of surface water runoff, including stormwater, will be conducted in accordance with *Managing Urban Stormwater Guidelines* (Landcom, 2004).
Clean Water Diversion and Storage Infrastructure	• Maximise as far as reasonable and feasible the diversion of clean water around disturbed areas on site. • Treatment of runoff from OEAs using sedimentation dams prior to discharge from the site. • Runoff from all site haul roads within the Drayton Complex, including along the length of the transport corridor, will be captured utilising a series of diversion drains, bunds and sediment dams.
Mine Water Storages	• No uncontrolled discharges to surface waters from mine water storages. . • In the event that out-of-pit-storages reach capacity one of the mining areas at Drayton South will be temporarily used for water storage. • Adequate freeboard within the pit to minimise the risk of discharge to surface waters, and meet DSC requirements (if relevant).
Chemical and petroleum storage	• Chemical and hydrocarbon products to be stored in bunded areas in accordance with relevant Australian Standards.
Aquatic and riparian ecosystems	• Maintain or improve the current condition of Saddlers Creek and Saltwater Creek, in general accordance with the relevant Australian guidelines and consultation with the LLS (or equivalent department).
Groundwater Management	• Ongoing monitoring of groundwater quantity and quality, to ensure groundwater quality is maintained.

3.5 FINAL LANDFORM

The final landform for the Project will be designed and rehabilitated generally in accordance with the commitments made in the PPR. The key difference with the retracted mine plan is that the area requiring rehabilitation will be substantially reduced and restricted entirely to north of existing natural ridgelines.

A summary of the rehabilitation and final land use management performance measures for the Project are provided in **Table 9**.

Table 9
Summary of Rehabilitation and Final Land Use Management Performance Measures

Feature	Performance Measure
Mine Site	• Rehabilitation of mined areas in accordance with commitments made in the Rehabilitation Criteria specified within the EA. • Implementation of leading practice soil management measures to minimise degradation of soils reserved for rehabilitation.
Final Landform	• The final landform will be designed to emulate the natural landscape by incorporating aspects of micro-relief and replicating features such as rolling hills in the rehabilitation. • The final landform will be designed to maximise drainage back to the natural environment where possible.
Final Void	• The final landform will designed to ensure that only one final void will remain at the completion of mining activities. • The size and depth of the final void will be reduced as far as practicable as part of the final landform design. • The final landform design will minimise the drainage catchment of the final void as far as is reasonable and feasible. • The design will ensure negligible high wall instability risk. • Adequate freeboard will remain to ensure the void does not overspill.
Surface Infrastructure	• To be decommissioned and removed, unless the Executive Director Mineral Resources agrees otherwise.
Community	• Ensure public safety. • Minimise the adverse socio-economic effects associated with the mine closure.

3.6 ECOLOGY

As part of this consequential environmental impact assessment Cumberland Ecology (Cumberland) has undertaken a review of the retracted mine plan and provided advice on how the changes made effect the ecology impact assessment for the Project. The advice from Cumberland is provided in **Appendix F**.

The retracted mine plan represents an overall reduction of the Project disturbance footprint by approximately 320 ha or 17%. Significantly, the removal of the Houston mining area and a portion of the Whynot mining area has effectively allowed for the retention of the majority of the on-site occurrence of Upper Hunter White Box-Ironbark Grassy Woodland and its associated Derived Native Grassland. These vegetation units conform to the Critically Endangered Ecological Community (CEEC) Box-Gum Woodland, which is protected under

the EPBC Act. Approximately 122 ha of CEEC has been removed from the disturbance footprint as a result of the retracted mine plan.

The reduction of the mine footprint will also reduce the overall ecological impact of the Project by reducing the direct impacts on identified threatened fauna species that have the potential to utilise habitat in this area.

Given the significant reduction in impacts that would occur to Box-Gum woodland as a result of the retracted mine plan Anglo American would take the opportunity to review and revise the proposed Biodiversity Offset Package to ensure that it is commensurate with the impacts of the Project. This will be re-submitted to DP&I for assessment as soon as it is available.

3.7 ABORIGINAL ARCHAEOLOGY

As part of this consequential environmental impact assessment AECOM has undertaken a review of the retracted mine plan and provided advice on how the changes made effect the aboriginal archaeology impact assessment for the Project. The advice from AECOM is provided in **Appendix G**.

AECOM have confirmed that the retracted mine plan has resulted in an overall reduction in the number of Aboriginal archaeological sites impacted by the Project. Prior to the mine plan modifications, 274 Aboriginal archaeological sites were identified as being impacted by the Project. As a result of the changes the number of impacted Aboriginal archaeological sites has now been reduced to 263.

To manage the impacts of the Project on Aboriginal cultural heritage Anglo American has committed to preparing an Aboriginal cultural heritage management plan for the Drayton complex.

3.8 ECONOMICS

As part of this consequential environmental impact assessment Gillespie Economics have undertaken a review of the retracted mine plan and provided a revised economic assessment for the Project. The revised economic assessment is provided in **Appendix H** and is summarised in the following sections.

3.8.1 Benefit Cost Analysis

The results of the Benefit Cost Analysis (BCA) for the Project are summarised in **Table 10**. The main decision criterion for assessing the economic desirability of a Project to society is its net present value, which is the present value of benefits less the present value of costs. A positive net present value indicates that it would be desirable from an economic perspective for society to allocate resources to the Project, because the community as a whole would obtain net benefits from the Project.

Table 10
Incremental Economic Benefits and Costs of the Retracted Project

Category	Costs	Benefits
Production	Opportunity costs of capital Opportunity cost of land Capital costs of development Operating costs of mine including mitigation measures Rehabilitation and decommissioning costs at end of the Project life	Avoided decommissioning and rehabilitation in 2015 Value of coal production Residual value of capital and land at end of Project life
Potential environmental, social and cultural impacts	Ecology impacts Aboriginal heritage Historic heritage impacts Agricultural production Surface and groundwater impacts Visual amenity impacts Air quality impacts Noise and blasting Greenhouse gas and energy impacts Traffic impacts	Any non-market benefits of employment Value of ecological offsets

The BCA confirms that when production costs (acquisition costs for affected land, opportunity cost of land, operating costs, decommissioning costs, etc.) and production benefits (revenues from production, residual values of land, etc.) are considered, the Project will have net production benefits of $701 M with a minimum of $485 M of these net production benefits accruing to Australia.

This net production benefit is distributed amongst a range of stakeholders including:

- Anglo American and its shareholders in the form of after tax profits;
- The Commonwealth Government in the form of any Company tax payable from the Retracted Mine Plan (estimated at $152M, present value), which is subsequently used to fund provision of government infrastructure and services across Australia and NSW, including the region;
- The NSW Government via royalties (estimated at $333M, present value) which are subsequently used to fund provision of government infrastructure and services across the State, including the region; and
- The local community in the form of financial sponsorship and in-kind support to a variety of local schools, sporting groups, annual events, charity groups and community groups.

Potential environment, cultural and social impacts would largely accrue at the local level although these would be substantially mitigated and internalised in to the operating costs of the Retracted Mine Plan.

3.8.2 Regional Economic Impacts

The revenue, expenditure and employment associated with the construction and operation of the Retracted Mine Plan would stimulate economic activity for the regional economy, as well as for the broader NSW economy.

Construction

In total, the construction phase of the Retracted Mine Plan would contribute in the order of up to:

- $68M in annual direct and indirect output;
- $27M in annual direct and indirect regional value added;
- $21M in annual direct and indirect household income; and
- 234 direct and indirect jobs.

These particular impacts on the regional economy are likely to be felt for a period of in the order of 29 months.

Operations

The annual production, expenditure and employment profile remains similar to that proposed and assessed in the EA. The main difference is that the mine life will be shortened by 7 years. The regional economic impacts of the Retracted Mine Plan will therefore occur for a shorter time.

The Project is estimated to make the following total annual contribution to the regional economy for 15 years with lesser impacts as the mining under the Retracted Mine Plan ramps up and down:

- $588M in annual direct and indirect regional output or business turnover;
- $264M in annual direct and indirect regional value added;
- $86M in annual direct and indirect household income; and
- 785 direct and indirect jobs.

4 CONCLUSION

Following due consideration of the PAC's recommendations Anglo American have made two key retractions to the Project mine plan to eliminate the remaining direct visual impacts from the horse studs primary areas of operations and to further reduce the potential dust, noise and blasting impacts of the Project.

The key benefits of the proposed retracted mine plan are:

- Mining is now not visible at all from the studs primary areas of operation as all mining is restricted to behind existing natural topography;
- There is now a buffer of more than 1.4 km from Coolmore's areas of primary operations and 2 km from Darley's areas of primary operations;
- The retraction of the mine plan also further reduces air quality, noise and blasting emissions to ensure that all relevant criteria are readily able to be complied with;
- With the removal of the Houston mining area and the south eastern portion of Whynot there is a significant reduction to the loss of catchment flows to Saltwater Creek and subsequently to the Hunter River;
- Reduced requirement to discharge under the HRSTS;
- Reduction of the Project disturbance footprint by approximately 320 ha or 17%;
- Reduced ecology and archaeology impacts; and
- The operations at Drayton Mine are able to continue generally as planned to provide continuity for its workforce and deliver economic stimulus and ongoing benefits to the regional and state economies.

As described in the above sections this consequential environmental impact assessment has found that the retracted mine plan further reduces potential impacts on the horses studs, offers a range of environmental benefits and ensures that the retracted project will enable the continuation of operations at Drayton Mine. As a consequence, the socio-economic benefits of the Project will far outweigh its social and environmental costs. Therefore, the Project remains in the public interest.

5 ABBREVIATIONS

Abbreviation	Description
Anglo American	Anglo American Metallurgical Coal Pty Ltd
Coolmore	Coolmore Australia
Darley	Darley Australia
DP&I	NSW Department of Planning and Infrastructure
EA	*Drayton South Coal Project Environmental Assessment* (Hansen Bailey, 2012)
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	NSW Environment Protection Authority
ha	Hectare
Hansen Bailey	Hansen Bailey Environmental Consultants
km	Kilometre
m	Metre
Mt	Million tonne
NSW	New South Wales
PAC	Planning Assessment Commission
PPR	*Drayton South Coal Project Preferred Project Report* (Hansen Bailey, 2013b)
The Project	Drayton South Coal Project
RTS	*Drayton South Coal Project Response to Submissions* (Hansen Bailey, 2013a)
Symbol	**Description**
%	Percent

6 REFERENCES

Hansen Bailey (2012), Drayton South Coal Project Environmental Assessment

Hansen Bailey (May 2013), Drayton South Coal Project Response to Submissions

Hansen Bailey (August 2013), Drayton South Coal Project Preferred Project Report

Landcom (2004) Managing Urban Stormwater Guidelines

NSW Treasury (2007) NSW Government Guidelines for Economic Appraisal, Website: www.treasury.nsw.gov.au, date accessed: 7 February 2013.

Planning Assessment Commission (December 2013), Drayton South Coal Project Review Report

Appendix A

Visual Assessment Advice

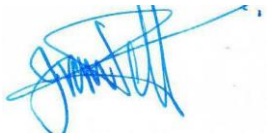
Visual Impact Assessment of the Retracted Mine Plan for Drayton South

This short addendum will form part of JVP Visual Planning and Design's Response, February 2014 to *Visual Impact considerations in: Planning Assessment Commission Drayton South Coal Project Report December 2013*

It specifically addresses the changes to the mine plan made in response to PAC concerns relating to the Houston mining area and visual bund as well as the eastern end of the Whynot mining area. The retracted mine plan for the Drayton South Coal Project (Figure A) illustrates the amendments that have been made to the eastern part of the Project in the vicinity of the Houston and Whynot mining areas in response to the concerns raised by the PAC in their Review Report. By making these changes Anglo American have effectively adopted recommendations 11.1.1 and 11.1.2 of Dr. Richard Lambs report regarding removal of the Houston mining area and visual bund as well as the realignment of the south eastern boundary of the Whynot mining area.

As illustrated in Figure 1, the Houston mining area and visual bund have been removed from the Project. Further the Whynot mining area has been reduced to the north of the existing natural ridge line that separates the visual catchment of Saddlers Creek to the north and Saltwater Creek to the south.

This retraction completely removes mining activity from the more sensitive and visually exposed Saltwater Creek Catchment. This includes the visual catchments and views of Coolmore, Jerry's Plains and the Golden Highway. The changes made to the mine plan now places the whole mining operation within the Saddlers Creek catchment and removes any direct visual impact on sensitive southern view points. Further it reduces the minor indirect ephemeral visual effects and impacts and any resultant effect this may have on image considerations.

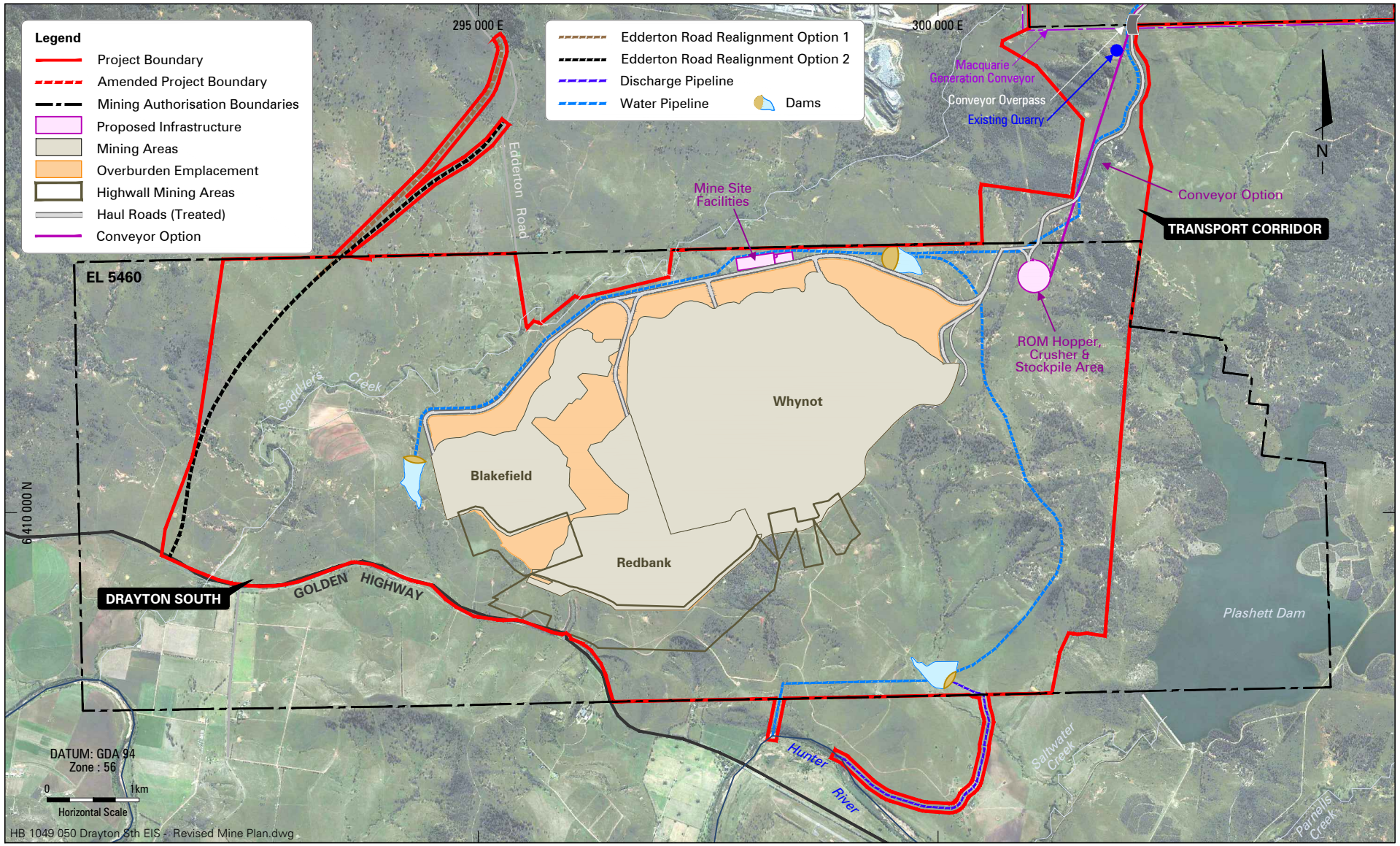


John van Pelt
Managing Principal
JVP Visual Planning & Design

3rd March 2014

Hanirend Pty Ltd
ABN 43 003 801 634
77 fernlea av, scarborough. q. 4020
po box 65. scarborough. q. 4020. e: john@jvpdesign.com

p: 07 3880 0847. f: 07 3880 1659



DRAYTON SOUTH COAL PROJECT

AngloAmerican | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Retracted Mine Plan

FIGURE A

Appendix B

Air Quality Assessment Advice

Pacific Environment Limited

Consulting • Technologies • Monitoring • Toxicology

12 March 2014

Daniel Sullivan
Senior Environmental Scientist
Hansen Bailey

RE: Drayton South Coal Project - Retracted Mine plan footprint changes – Qualitative assessment of air quality impacts

Dear Daniel,

This letter provides a qualitative assessment of the potential air quality impacts from the retracted mine plan for the proposed Drayton South Coal Project mine footprint. These changes to the mine plan have been made in response to the comments made in the Planning Assessment Commission (PAC) Review Report on the Project (**PAC 2013**).

1 OVERVIEW OF CHANGES TO MINE PLAN

The following changes have been incorporated into the retracted mine plan:

- Modifications to the quantity of overburden and ROM removed each year and over the life of the project.
- Removal of the entire Houston mine area.
- Removal of the south east portion of the Whynot mine area.
- Removal of the southern section of the Redbank mine area.

Figure 1 compares the proposed retracted footprint of the Project with the final footprint of mine plans used for the air quality impact assessment (AQIA) completed for the EA (**PAEHolmes 2012**).

It is also understood that with the removal of the Houston mine area that the dragline would now be available to be utilised in the Redbank mine area for part of the time.

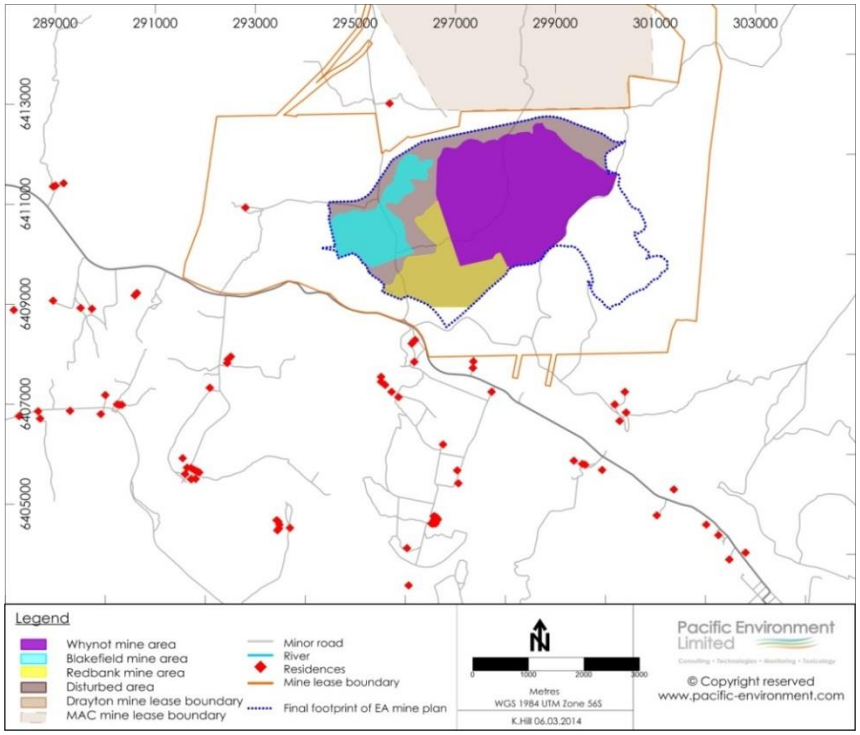


Figure 1: Comparison mine footprint for EA and proposed modification

Pacific Environment Operations Pty Ltd
Suite 1, Level 1, 146 Arthur St
North Sydney, NSW 2060

(ASX: PEH) ABN: 86 127 101 642
www.pacific-environment.com
Ph: +61 2 9870 0900

2 TOTAL MATERIAL MOVED

Figure 2 provides a comparison of the total tonnage of ROM and overburden removed for each year in the EA (as modelled for the AQIA) and the corresponding year in the retracted mine plan. There is a reduction in the total amount of material removed for each year assessed.

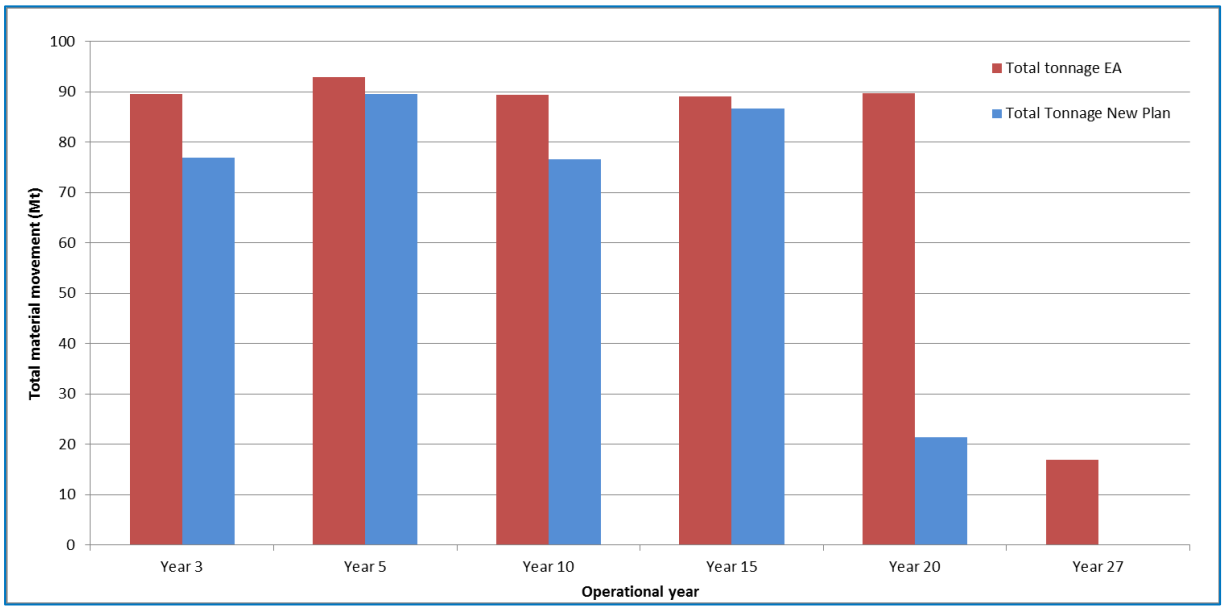


Figure 2: Comparison of total ROM and waste movement from EA modelling and retracted mine plan

3 PREDICTED AIR QUALITY IMPACTS

The modelling completed for the EA AQIA predicted exceedances of the maximum 24-hour average PM_{10} criterion at a number of residences across the life of the mine (see **Table 1**) due to the Project alone and cumulatively. One residence was also predicted to exceed the annual average criteria for TSP and PM_{10}. In Response to Submissions (RTS) received following public exhibition of the EA, further modelling was completed for the two worse case operational years (Y10 and Y15). The same mine plans were used but the emission calculations updated to include site specific input data and revised dust controls (**Pacific Environment 2013**).

As shown in **Table 1**, the updates to the emission calculations resulted in in a reduction in the number of residences predicted to exceed the maximum 24-hour average PM_{10} criteria from the Project alone, with only two residences (226B and 226C) predicted to exceed the criterion for an estimated 3 days in that year. Given that the 24-hour average PM_{10} assessment identifies the activities and meteorological conditions that would potentially lead to these exceedances it is considered that the predictive and proactive mitigation and management options that are proposed would ensure that these exceedances do not eventuate at any private receivers. The revised modelling also demonstrated that there were no predicted exceedances of the annual average criteria for TSP or PM_{10}.

A sensitivity analysis was then undertaken on the revised modelling following recommendations from the SKM Peer Review which was completed for DP&I. The sensitivity analysis compared site specific data collected from numerous coal mines across NSW (with regard to soil silt and moisture contents) and assessed what would be the likely change in total site emissions if the average silt and moisture contents from these other sites were used. The sensitivity analysis revealed that the use of the average values from other sites across NSW results in a 4.9% increase in total TSP emissions compared with that used in the dispersion modelling. This is not considered to be a significant increase and extensive experience has demonstrated that an increase of less than 10 - 20% in total site emissions results in minimal, if any, change to the predicted impacts. As such the sensitivity analysis demonstrates that the revised modelling that was undertaken as part of the RTS is representative of worst case.

Table 1: Number of residences predicted to exceed the relevant criteria for EA and post EA modelling

Operational Year	EA modelling				Post EA (RTS modelling)			
	Maximum 24 hour PM_{10}	Annual PM_{10}	Annual TSP	Annual Dust Deposition	Maximum 24 hour PM_{10}	Annual PM_{10}	Annual TSP	Annual Dust Deposition
	Project Alone	Cumulative			Project Alone	Cumulative		
Year 3	0	0	0	0	-	-	-	-
Year 5	**3**	0	0	0	-	-	-	-
Year 10	**6**	**3**	**2**	0	**2**	0	0	0
Year 15	**5**	**2**	0	0	0	0	0	0
Year 20	0	0	0	0	-	-	-	-
Year 27	0	0	0	0	-	-	-	-

4 CHANGES TO PREDICITED IMPACTS DUE TO THE RETRACTED MINE PLAN

As there is an overall reduction in material movement across the Project each year, in addition to the removal of the entire Houston mine area and the reduction in Whynot and Redbank mine areas, it would be expected that there would be an overall reduction of the predicted impacts for the Project when compared to those presented in the revised modelling for the RTS.

With regard to the potential utilisation of the dragline in the Redbank mine area it is understood that this would replace the truck and excavator fleet. Provided that the dragline is operated in accordance with leading practice requirements as proposed the use of the dragline in Redbank it is unlikely to have any significant impact on the estimated emissions and predicted impacts

The likely further reduction in emissions as a result of the retracted mine plan adds to the conservatism that is already built into the revised modelling that was completed for the RTS.

Anglo American has implemented a best practice predictive and real-time dust management system at their Drayton site, which includes a daily risk forecast tool for planning and managing day-to-day operations and a real-time dust monitoring system to act and respond to short-term elevated dust. Also, as part of the "dust stop' PRP process, Drayton has identified adverse meteorological conditions for managing visible dust from overburden handling, also used for managing day-to-day operations. These systems would be extended to Drayton South to ensure that all air quality criteria are met at private receivers.

Do not hesitate to contact the undersigned should you have any queries on the above.

Sincerely,

Judith Cox
Principal Air Quality Consultant (NSW)
Pacific Environment Limited

Khalia Hill
Atmospheric Scientist
Pacific Environment Limited

5 REFERENCES

PAEHolmes (2012) "Drayton South Air Quality and Greenhouse Gas Impact Assessment", prepared for Hansen Baily on behalf of Anglo American Metallurgical Coal. October 2012

Pacific Environment (2013) "Drayton South modelling with revised assumptions", prepared for Hansen Baily on behalf of Anglo American Metallurgical Coal. April 2013

Planning Assessment Commission (2013) "Drayton South Coal Project Review Report". December 2013. Available from https://majorprojects.affinitylive.com/public/f7a789b462d947ff113477971a9cbb3f/Drayton%20South%20-%20PAC%20Independent%20Review%20Report.pdf

Appendix C

Acoustics Assessment Advice

BRIDGES ACOUSTICS
ABN: 73 254 053 305

78 Woodglen Close
P.O. Box 61
PATERSON NSW 2421

Phone: 02 4938 5866
Mobile: 0407 38 5866
E-mail: bridgesacoustics@bigpond.com

6 March 2014
Ref: J0130-82-L1

Hansen Bailey Pty Ltd
P.O. Box 473
SINGLETON NSW 2330

Attn: Mr Daniel Sullivan

Dear Daniel,

RE: DRAYTON SOUTH PROJECT

RETRACTED MINE PLAN – PRELIMINARY ACOUSTICS ASSESSMENT

Anglo American Metallurgical Coal (AAMC) has proposed a retracted mine plan for the Drayton South Project in response to comments and recommendations from the Planning Assessment Commission (PAC) Review of the Drayton South Project Environmental Assessment (EA). The PAC Review primarily recommended active mining areas be restricted to the northern side of a natural ridgeline. Following due consideration of the PAC's recommendations Anglo American have made substantial retractions to the mine plan for the Project including the complete removal of the Houston mining area and its associated visual bund, a significant portion of the Whynot mining area and a substantial area in the southernmost part of the Redbank mining area.

ENVIRONMENTAL NOISE

Assuming no change to annual ROM coal production levels, removal of some of the previously proposed mining areas would result in a slight reduction in noise levels at closest receivers within the Coolmore and Woodlands Studs. The EA demonstrated the Project can comply with relevant noise criteria and the retracted mine plan can also comply with relevant noise criteria.

With the removal of the Houston mining area from the Project there would now be an opportunity for the Dragline to operate in Redbank. As a dragline is able to move material at a similar rate as an excavator and a fleet of haul trucks, use of a dragline would replace an overburden fleet for part of the time and would result in lower noise levels at closest receivers.

BLASTING

The retracted mine plan results in no appreciable change in the minimum distance between the mining area and closest residences. The results and conclusions in the AIA regarding blasting impacts would therefore remain substantially unchanged (i.e. that with mitigation all blast criteria would be met).

The AIA predicted blast events closest to receivers would most likely require a smaller Maximum Instantaneous Charge (MIC) to meet relevant blasting criteria. As the retracted mine plan includes a smaller percentage of the mining area close to receivers, a reduced MIC would be required for a smaller percentage of blast events. An increase in the weekly blasting frequency due to a smaller MIC would therefore be required for a reduced period of time, compared to the mine plan considered in the EA.

CONCLUSION

This review has indicated the retracted mine plan proposed by AAMC for the Drayton South Project is expected to result in very similar noise levels and blast impacts and continued compliance with relevant noise and blasting criteria at all receivers located generally south and south west of the Project area, including at all residences within the Coolmore and Woodlands Studs.

Please contact the undersigned if any further information is required.

Yours faithfully,

BRIDGES ACOUSTICS

MARK BRIDGES BE (Mech) (Hons) MAAS
Principal Consultant

Appendix D

Groundwater Assessment Advice

Australasian Groundwater
and Environmental Consultants Pty Ltd
Level 2 / 15 Mallon Street
Bowen Hills, QLD 4006 Australia

ABN 64 080 238 642
T. +61 7 3257 2055
F. +61 7 3257 2088
brisbane@ageconsultants.com.au
www.ageconsultants.com.au

JST/ae (G1544I.Drayton South Project)
7 March 2014

Senior Environmental Scientist
Hansen Bailey, Singleton
via email

Attention: Mr Daniel Sullivan

Dear Daniel,

RE: DRAYTON SOUTH PROJECT
QUALITATIVE ASSESSMENT OF RETRACTED MINE PLAN

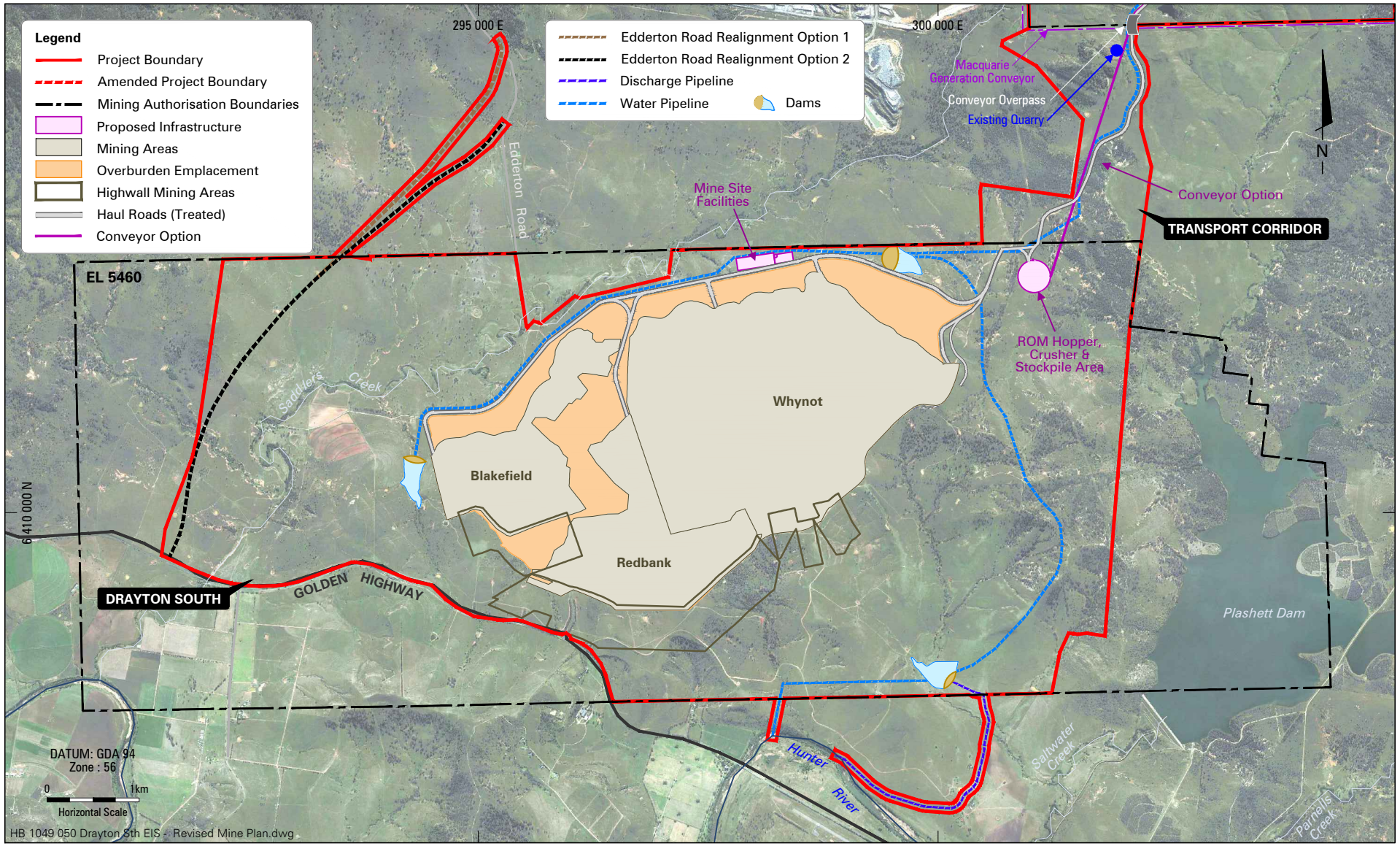
1 Introduction

In 2011, Hansen Bailey Environmental Consultants (Hansen Bailey) engaged Australasian Groundwater and Environmental Consultants Pty Ltd (AGE) on behalf of Anglo American Metallurgical Coal Pty Ltd (Anglo American) to complete a Groundwater Impact Assessment for the Drayton South Coal Project (The Project).

The Project allows for continued mining at Drayton Mine by developing open cut and highwall mining at the Drayton South mining area while continuing to utilise the existing infrastructure, equipment and workforce from Drayton Mine.

It is understood that following due consideration of the Planning Assessment Commission (PAC's) recommendations, Anglo American have made substantial retractions to the mine plan for the Project primarily for visual and air related reasons to alleviate PAC's concerns. The retractions to the mine plan include removing the entire Houston Pit, the south east portion of the Whynot Pit, and a small section of the Redbank Pit. Figure A below shows the proposed revised mining areas.

This letter outlines the expected changes to impact on the groundwater regime associated with the retracted mine plan.



DRAYTON SOUTH COAL PROJECT

AngloAmerican | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Proposed Revised Mining Areas

FIGURE A

2 Impacts on Groundwater Regime

AGE (2012)[1] used a numerical model to assess the impact of the Project on the groundwater regime for the Environmental Assessment (EA). The model provided a range of predictions for groundwater inflow to the mined void, drawdown and post mining impacts. The retracted mine plan reduces the footprint of the proposed mining, and the period of mining. As the mining footprint reduces, the mine life also reduces from 27 years to 20 years. The reduced footprint and mine life effectively reduce the impact on the groundwater regime to less than AGE (2012)[1] predicted for the EA. The sections below describe the impact of the retracted mine plan on the groundwater regime in more detail.

2.1 Inflow to Mined Void

The most significant impact on the groundwater seepage rates occurs by reducing the footprint of the Whynot Pit. AGE (2012)[1] predicted that much of the groundwater inflow would occur from the Whynot Pit, as it was the most extensive and deepest void proposed. The retracted mine plan reduces the extent and depth of the Whynot Pit. The lesser depth reduces the hydraulic gradients and therefore the rate of inflow to the pit. Whilst a numerical model would be required to assess the magnitude of the reduced seepage rate, a qualitative estimate would be that it could be between a half, to a quarter of the volumes previously predicted.

Removing the Houston Pit will impact on total seepage rates of groundwater only slightly, as this pit was proposed in an elevated area, and was only mining shallow seams with limited saturated thickness. The footprint of the Redbank Pit also reduces, but less than the Houston Pit, and the reduced seepage rate to this pit is estimated qualitatively at between 10% and 25% less than previously predicted.

2.2 Groundwater Levels and Users

The reduced mining period from 27 to 20 years allows less time for the zone of depressurisation to radiate out from the mine. The mining footprint is also reduced. These factors combined mean the revised mine plan would result in a less extensive zone of depressurisation than predicted by AGE (2012)[1].

AGE (2012)[1] found that the only two registered bores were present within the zone of depressurisation, and both were on land owned by Anglo American, and would be removed by the proposed mining. In effect, there are no private landholders with bores within the predicted zone of influence, and this will not change with the retracted mine plan.

AGE (2012)[1] predicted the zone of depressurisation extended southwards towards the Hunter River, but not measurably beneath these alluvial lands. Consequently very limited leakage impacts were predicted to affect the alluvial lands associated with the Hunter River, and Anglo American holds sufficient licenses to account for this water take. Given the likely reduced zone of depressurisation from the revised mine, the take from the Hunter River alluvium is expected to be negligible and undetectable.

[1] Australasian Groundwater and Environmental Consultants Pty Ltd, (2012), "*Drayton South Coal Project - Groundwater Impact Assessment",* Prepared for Anglo American Metallurgical Coal Pty Ltd Project No. G1544, October 2012.

2.3 Groundwater Quality and Final Void

AGE (2012)[1] discussed the impacts of the Drayton South final void on the groundwater regime post mining. The Preferred Project Report (PPR) [2013] presented an updated final void with reduced highwall slopes to achieve a more natural landscape. The key issue for final voids is how the void interacts with the surrounding groundwater system, i.e. is it a 'source' or a 'sink' for groundwater flow, and what is the long term water quality.

Work for the EA and PPR found the spoil will require a long period to fully saturate before a window lake forms in the reshaped void space. The void will behave as a sink for groundwater flow until about 140 years post mining when hydraulic gradients will create a 'flow through' system. The salinity of the void lake will gradually increase reaching an equilibrium level of about 5000 mg/L, 400 to 500 years post mining. Conservative estimates of fluxes from the void concluded the salinity of the Hunter River will not increase above 1%, thus satisfying the Aquifer Interference Policy (AIP) minimum impact considerations.

The revised mine plan will have a final void in a similar location, or further to the north of that presented in the PPR. At a high level the conclusions reached for the reshaped void are considered likely to apply to the void that will remain from the retracted mine footprint.

Please contact the undersigned if you have any queries.

Yours faithfully,

JAMES TOMLIN
Principal Hydrogeologist
Australasian Groundwater and Environmental Consultants Pty Ltd

Appendix E

Surface Water Assessment Advice

0770-05-C1
7 March 2014

Daniel Sullivan
Hansen Bailey
6/127-129 John Street
Singleton NSW 2330

Dear Daniel,

**SUBJECT: DRAYTON SOUTH COAL PROJECT
RETRACTED MINE PLAN QUALITATIVE SURFACE WATER ASSESSMENT**

1 INTRODUCTION

Anglo American Metallurgical Coal Pty Ltd (Anglo American) submitted an application for project approval under Part 3A of the *Environmental Planning and Assessment Act 1979* to facilitate the continuation of the existing Drayton Mine by the development of an open cut and highwall coal mining operation and associated infrastructure within the Drayton South area (the project). To support the application, Hansen Bailey (2012), on behalf of Anglo American, requested WRM Water & Environment (WRM) to prepare the Surface Water Impact Assessment (SWIA) for the project. The SWIA was submitted as part of the Environmental Assessment (EA) prepared by Hansen Bailey (2012).

In response to submissions received and concerns raised by the Planning Assessment Commission (PAC) about the project, Anglo American has reduced the extent of the proposed mine to limit the visual impact of the project. All surface mining activities will now be confined to the north-east of the ridge line separating the Saltwater Creek and Saddlers Creek catchments. The revised mine includes removing the Houston mining area, the south east portion of the Whynot mining area, and a small section of Redbank mining area. The period of mining will also reduce from 27 to 20 years. All other mining activities described in the EA will remain the same. Figure 1 shows the proposed revised mining areas.

WRM Water & Environment was requested by Hansen Baily to provide qualitative advice on the potential surface water impacts of the revised project. The advice is to be based on the assessment undertaken by WRM for the SWIA as well as the follow up work that was undertaken for the Drayton South Coal Project - Preferred Project Report (PPR) (Hansen Bailey, 2013), and the response to submissions. This letter is in response to that request.

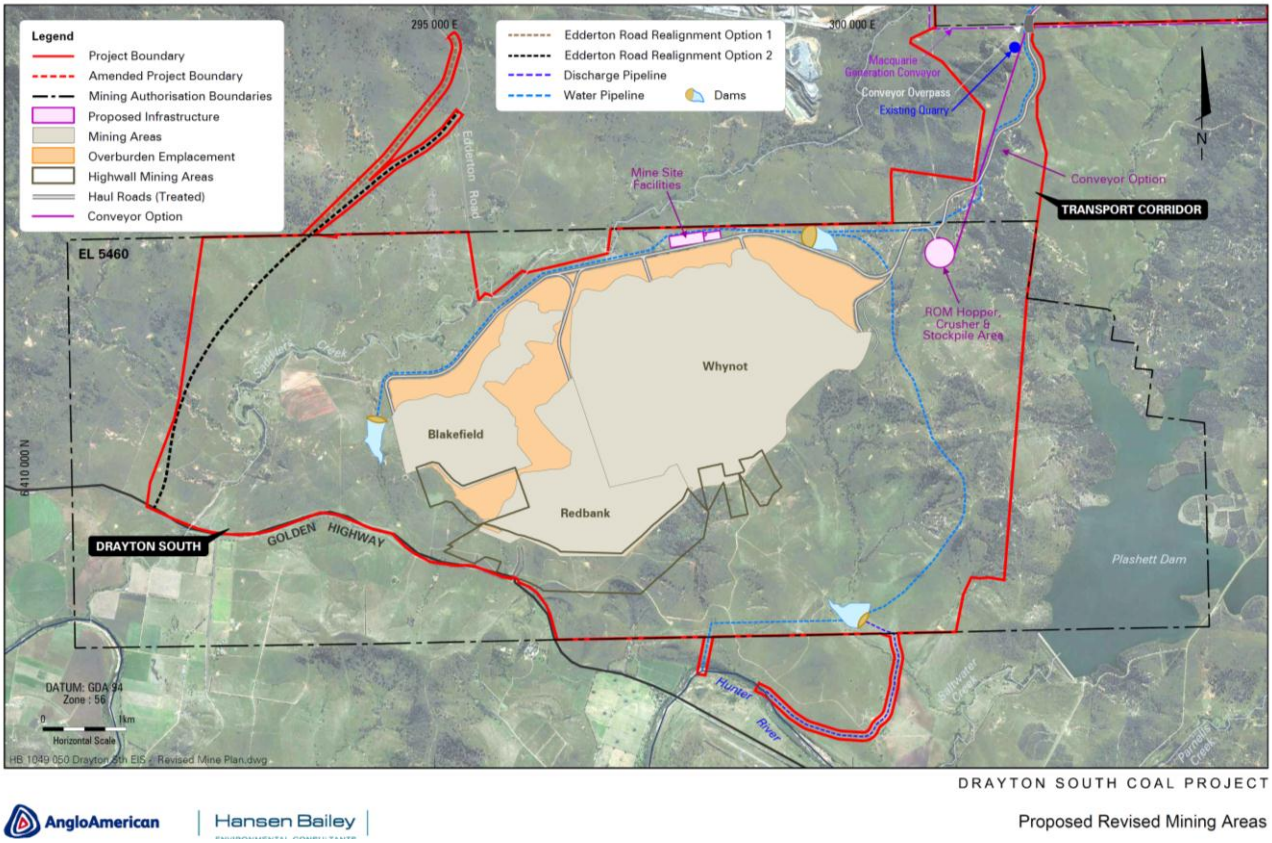


Figure 1 Revised Project Layout

2 PROPOSED SURFACE WATER MANAGEMENT SYSTEM CHANGES

The proposed surface water management system for the project is provided in the SWIA (Appendix M of the EA), (WRM, 2012) and includes:

- A mine water management system to collect and use water that may contain high total dissolved solid (salt) concentrations. Mine water in excess of site water requirements will be released to the Hunter River under the rules governed by the Hunter River Salinity Trading Scheme;
- A tailings water management system to manage the inflows to and outflows from the Coal Handling and Preparation Plant (CHPP) and tailings storage facility;
- A dirty water management system to ensure runoff from disturbed areas is separated from clean area runoff and collected in sediment dams for treatment;
- A clean water management system to divert water undisturbed by mining around the Drayton South disturbance footprint; and
- A contaminated water management system for water that has come in contact with chemicals of various types used in the mining operations.

No changes are proposed to the surface water management system for the revised Drayton South Coal Project. However, the removal of the Houston mining area has increased the clean catchment draining to the proposed Houston Dam. It is proposed to construct a diversion bund and drain around the Houston Dam to divert the clean catchment around the dam back to Saltwater Creek. The Houston Dam would have a revised catchment area of about 40 ha under this scenario.

The progression of the mining for year 3, 5, 10, 15, 20 and 27 given in the EA will change due to the reduced mining footprint. It is expected that minimal changes will occur to the mine plan up to about year

10, other than the removal of the Houston mining area. From year 10 onwards, the smaller Whynot and Redbank mining areas will reduce the period of mining by 7 years as well as the size of the catchments draining to the mine water management system.

3 ASSESSMENT OF IMPACTS

3.1 Catchment Loss

3.1.1 Saltwater Creek

The removal of all mining activities within the Saltwater Creek catchment and the diversion drain and bund to be constructed around the proposed Houston Dam will significantly reduce any impacts on the loss of catchment flows to Saltwater Creek. The proposed Houston Dam will remove some 40 hectares of the 5,321 ha Saltwater Creek catchment or 0.75%.

The impacts on Plashett Dam on the Macquarie Generation site will also reduce by the removal of the Whynot mining area from the catchment. Catchment flows to Plashett Dam would only be reduced by the proposed ROM dam that would collect runoff from the proposed ROM hopper, crusher and stockpile area (see Figure 1). The catchment area of the proposed ROM dam would be 28.9 ha or 0.7% of the Plashett Dam catchment.

3.1.2 Saddlers Creek

The retracted mine plan does not alter the proposed Saddlers Creek catchment impacts described in the EA. The mine plan modifications have effectively confined all surface water impacts to the Saddlers Creek catchment.

3.1.3 Hunter River

The retracted mine plan reduces the impact on surface flows draining to the Hunter River due to the reduced mine footprint from that given in the EA. The impact on Hunter River surface flows due the revised project is expected to be negligible.

3.2 Hunter Unregulated River Water Allocations

The removal of all mining from the Saltwater Creek catchment and the diversion of the Houston Dam catchment has substantially reduced the capture of clean surface water runoff from the project site. As a result, there is unlikely to be a need for a Water Access Licence (WAL) for the take of surface runoff from the Hunter Unregulated and Alluvial Water Source.

3.3 Hunter River and Saddlers Creek Flooding

The project given in the EA and the revised project is located outside of the 100 year Average Recurrence Interval flood extent of both the Hunter River and Saddlers Creek with the exception of the proposed pipeline to discharge water to the Hunter River. No impacts on flooding will occur from the retracted mine plan.

3.4 Minesite Water Balance

WRM developed an OPSim water balance model of the Drayton South mine site water management system for the EA. The model has been configured to simulate the operation of all major components of the water management system including all inflows (direct rainfall, catchment runoff, groundwater inflows and raw water supply) and outflows (evaporation, CHPP demand, dust suppression, vehicle wash down, controlled releases and uncontrolled spills). The model was used to size and assess the performance of the proposed water management infrastructure such as the out of pit storages and pumps over the life of the project. The model was also used to determine the need for discharge credits under the Hunter River Salinity Trading Scheme (HRSTS) and volume of off-site water required to supply mine site demand.

For the project described in the EA, the assessment found that the mine was generally a net producer of water with a net increase in total on-site inventory of some 315 ML/year under median conditions. The excess stored volume was to be stored in the South Void. The model also predicted that average releases under the HRSTS were approximately 740 ML/year under median conditions. An allocation from the Hunter Regulated River to supply mine site demand was not expected to be required.

The retracted mine plan is expected to reduce both the inflows and outflows to be managed within the water management system.

- The reduced mining areas will reduce the mine affected catchment areas by some 22 to 27% throughout the life of the project. The majority of this is associated with the diversion of the Houston Dam catchment and the Houston mining area. Using the long term runoff coefficients given in the EA, average annual surface inflows could reduce by some 200 ML in year 3 to 440 ML in year 20.
- AGE (2014), the groundwater consultant for the project, advised that groundwater inflows to the Whynot mining area may reduce by 25% to 50% post year 10. Smaller reductions are expected from the Redbank mining area. Across the entire project site, including the existing Drayton Mine, it would be expected that groundwater inflows to the mining areas would reduce by between 7% and 10% or 100 ML/year prior to year 10 and up to 600 ML/year after year 10.
- CHPP demand is not expected to alter significantly given coal production rates do not change.
- Dust suppression demands will reduce by some 5% or about 50 ML/year due to the removal of the Houston mining area.
- Overall, the net inflows to the mine water system could reduce by some 300 ML/year in year 3 to 1000 ML/year at the end of mine life, assuming average conditions.

Based on a review of the OPSim model results given in the EA, the revised Drayton South Project is expected to remain a net producer of water early in the project on average, albeit at a much lower rate. Later in the life of the project, the mine is expected to be a net user of water. Given this, it is likely that significantly lower HRSTS credits will be required throughout the life of the project, if at all. The reduced releases under the HRSTS could be stored in the South Void for use later in the life of the project.

Notwithstanding, there is now a higher likelihood that offsite supplies may be required for the project in the later years. This may exceed the existing general security WAL's currently held by Anglo American (WAL1066 and WAL491) during extended dry periods.

3.5 Final Void

It is likely that the final void for the revised project will be located in a similar location and have a similar catchment area to that given in the Preferred Project Report. On this basis, the final void is not expected to overflow at any time in the future.

3.6 Surface Water Quality

The proposed mine site water management system, described in Section 2, will minimise the impact on the water quality in the receiving waters of the project. The impact on downstream receiving waters is not expected to change from that described in the EA.

Notwithstanding, the revised water balance suggests that the frequency and volume of controlled releases required under the HRSTS will be reduced by the project. The likelihood of an uncontrolled spill from Houston Dam will also reduce, due to the diversion of its catchment.

4 CONCLUSION

On the basis of the above qualitative assessment, the surface water impacts of the revised project are expected to be the same as or lower than that described in the EA and the Preferred Project Report.

For and on behalf of
WRM Water & Environment Pty Ltd

Greg Roads
Principal Engineer

5 REFERENCES

AGE, 2014 — *Drayton South Project Qualitative assessment of Revised Mine Plan,* Project No. G1544/F*, Australasian* Groundwater and Environmental Consultants Pty Ltd, March 2014.

Hansen Bailey, 2012 — *Drayton South Coal Project Environmental Assessment,* prepared by Hansen Bailey Environmental Consultants for Anglo American Metallurgical Coal Pty Ltd, 2012.

Hansen Bailey, 2013 — *Drayton South Coal Project Preferred Project Report,* prepared by Hansen Bailey Environmental Consultants for Anglo American Metallurgical Coal Pty Ltd, August 2013.

State of NSW, 2013 — *Drayton South Coal Project Advisory Report,* State of New South Wales through the NSW Mining & Petroleum Gateway Panel , December 2013.

WRM, 2012 — *Surface Water Impact Assessment – Drayton South Coal Project EA*, Report 0770-01-I(rev 5), WRM Water and Environment, October 2012 (Appendix M of the EA).

WRM, 2013 — *Surface Water Impact Assessment Addendum – Drayton South Coal Project Preferred Project Report*, Report 0770-01-AB2, WRM Water and Environment, August 2013 (Appendix E of the PPR).

Appendix F

Ecology Assessment Advice

13 March 2014

Daniel Sullivan
Senior Environmental Scientist
Hansen Bailey
6/127-129 John Street
Singleton NSW 2330

Cumberland Ecology
PO Box 2474
Carlingford Court 2118
NSW Australia
Telephone (02) 9868 1933
Mobile 0425 333 466
Facsimile (02) 9868 1977
Web: www.cumberlandecology.com.au

ECOLOGICAL ASSESSMENT OF THE REVISED DRAYTON SOUTH MINE PLAN

Dear Daniel,

We understand that the Planning Assessment Commission (PAC) carried out an Independent Review of the Drayton South Coal Project (the Project) and released the PAC Independent Review Report in December last year.

As a result of the findings of the PAC Independent Review, the Department of Planning and Infrastructure (DP&I) has instructed that revisions to the Drayton South Mine Plan (as presented in the Preferred Project Report, August 2013) be made to address some of the concerns raised by the PAC.

Hansen Bailey has requested on behalf of Anglo American that Cumberland Ecology review the revised mine plan and provide an assessment of the proposed changes with respect to the impacts predicted in the Preferred Project Report. The purpose of this letter is to present the findings of this assessment.

1. Key Findings

1.1 Mine Plan Revision

The mine plan shown in the figure titled 'Proposed Revised Mining Areas Figure A' and which was provided to Cumberland Ecology on the 28 February 2014 (see **Appendix A**) presents a revised mine footprint in which the following elements have been removed:

- The Houston Pit and associated overburden emplacement area;
- The Houston Visual Bund;
- The south eastern extent of the Whynot Pit and the associated

overburden emplacement area;

- A small section of the treated haul road to the east of the Whynot Pit; and
- The southern extent of the Redbank Pit.

The revised mine plan represents an overall reduction of the mine footprint for the Project by approximately 260 hectares (ha).

1.2 Threatened Ecological Communities

The majority of the woodland and forest vegetation in the Project Boundary are listed as threatened ecological communities protected under either the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or the NSW *Threatened Species Conservation Act 1995* (TSC Act). On a broad level, the reduction of the mine footprint will accordingly reduce the overall ecological impact of the Project by reducing the area of threatened woodland and forest to be removed.

Significantly, the removal of the Houston Pit and Whynot Pit has effectively allowed for the retention of the majority of the on-site occurrence of Upper Hunter White Box-Ironbark Grassy Woodland and its associated Derived Native Grassland. These vegetation units conform to the Critically Endangered Ecological Community (CEEC) Box-Gum Woodland, which is protected under the EPBC Act. Box-Gum Woodland is also protected as an Endangered Ecological Community (EEC) under the TSC Act. These vegetation units represent the largest areas of Box-Gum Woodland on-site.

Details of the predicted change in impacts areas are presented in **Appendix B**.

1.3 Threatened Species

The species listed in **Table 1** below were recorded within the Whynot, Houston and Redbank Pit areas that have been removed from the revised mine footprint.

Table 1 Species Recorded within Mining Areas to be removed from Revised Mine Plan

Common Name	Scientific Name	Listing
Rainbow Bee-eater	*Merops ornatus*	Migratory (EPBC Act)
Eastern Bentwing-bat	*Miniopterus orianae oceanensis*	Vulnerable (TSC Act)
Eastern Freetail-bat	*Mormopterus norfolkensis*	Vulnerable (TSC Act)
Large-footed Myotis	*Myotis macropus*	Vulnerable (TSC Act)
Eastern Cave Bat	*Vespadelus troughtoni*	Vulnerable (TSC Act)
Brown Treecreeper	*Climacteris picumnus*	Vulnerable (TSC Act)
Spotted Harrier	*Circus assimilis*	Vulnerable (TSC Act)

Of the above species, the Brown Treecreeper is likely to be a resident species as it is a sedentary woodland bird. The bat species may also roost as well as forage on site but are more mobile and have a much larger foraging range. The Spotted Harrier and Rainbow Bee-eater are likely to forage on site from time to time.

The reduction of the mine footprint will accordingly reduce the overall ecological impact of the Project by reducing the direct impacts on the above species and their habitat. The revised mine footprint will benefit the Brown Treecreeper in particular as it is a sedentary woodland bird and has a localised foraging range.

1.4 Consistency with the Biodiversity Offset Strategy

The potential impacts of the Project were assessed previously in the Environmental Assessment and Preferred Project Report; these predicted impacts will be mitigated through the implementation of a suite of measures and offset through the Project's Biodiversity Offset Package.

The Biodiversity Offset Package aims to provide a minimum offset ratio of 6:1 of offset to impact area for Box-Gum Woodland vegetation types and a ratio of 3:1 of offset to impact area for other vegetation types. The minimum offsetting that would be required under the proposed revised mine plan are presented in **Table 2**.

Table 2 Minimum Offset Areas Required under the Proposed Revised Mine Plan

Vegetation Community	Area in Disturbance Footprint (ha)	Ratio	Offsets Required (ha)
Central Hunter Bulloak Forest Regeneration	25	3:1	75
Hunter Valley River Oak Forest	2	3:1	6
Central Hunter Box-Ironbark Woodland	176	3:1	528
Hunter Floodplain Red Gum Woodland	11	6:1	66
Narrabeen Footslopes Slaty Gum Woodland	98	3:1	294
Upper Hunter White Box-Ironbark Grassy Woodland	2	6:1	12
Cooba Scrub	9	3:1	27
Planted Vegetation	0	N/A	N/A
Derived Native Grassland - Hunter Floodplain Red Gum Woodland	4	6:1	24
Derived Native Grassland - Upper Hunter White Box-Ironbark Grassy Woodland	3	6:1	18
Other Grassland	1,285	N/A	N/A
TOTAL	**1,615**		**1,050**

When the Biodiversity Offset Package is compared with the minimum offsetting that would be required under the proposed revised mine plan, it is evident that the Biodiversity Offset Package will deliver a greatly improved outcome compared with the outcomes presented in the Environmental Assessment and the Preferred Project Report (see **Appendix C**). Therefore, no additional mitigation measures beyond those proposed in the Environmental Assessment are considered necessary for the proposed revised mine plan.

2. Conclusion

The revised mine plan will result in a greatly reduced mine footprint. Accordingly, the revised mine plan will reduce the overall ecological impact of the Project, particularly impacts on the CEEC and EEC Box-Gum Woodland.

The Biodiversity Offset Package is considered to be appropriate for the proposed revised mine plan and will be improved as a result of the reduced impacts on Box-Gum Woodland and threatened species. Therefore, no additional mitigation measures beyond those proposed in the Environmental Assessment are considered necessary for the proposed revised mine plan.

Given the significant reduction in impacts that would occur to Box-Gum Woodland as a result of the retracted mine plan, a review and revision of the proposed Biodiversity Offset Package is appropriate at this time to ensure that it is commensurate with the impacts of the Project. Any revisions to the Biodiversity Offset Package will be re-submitted to DP&I for assessment.

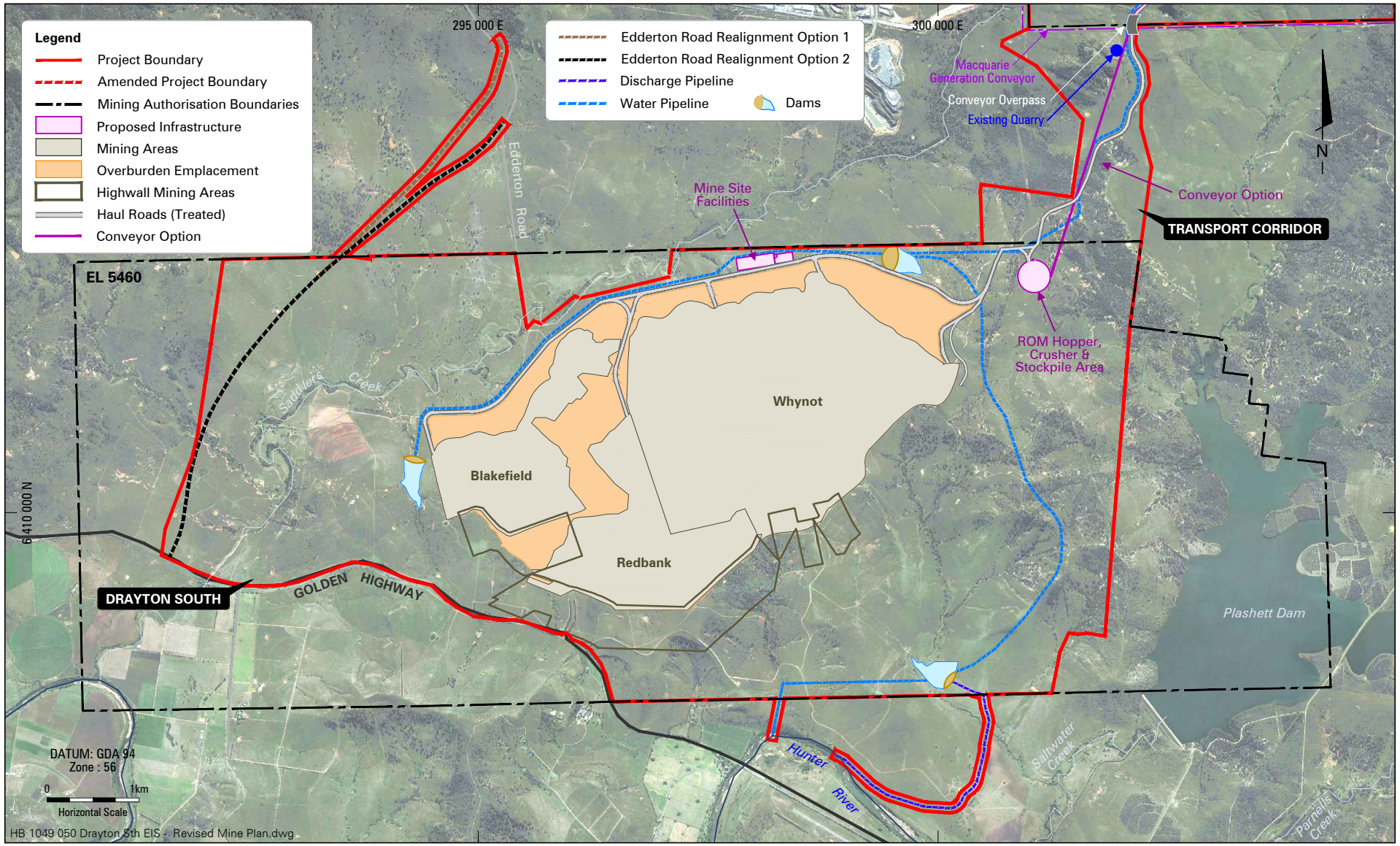
If you would like to discuss any matters raised in this assessment, please do not hesitate to contact either myself or David Robertson on 02 9868 1933.

Yours sincerely,

Cecilia Phu
Senior Project Manager/Ecologist
cecilia.phu@cumberlandecology.com.au

Appendix A

Proposed Revised Mining Areas Figure A



DRAYTON SOUTH COAL PROJECT

AngloAmerican | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Proposed Revised Mining Areas

FIGURE A

Appendix B

Revised Direct Impacts on Vegetation Communities

Table 3 Direct Impact on Vegetation Communities under the Proposed Revised Mine Plan

Vegetation Community*	Status		Preferred Project (ha)			Revised Mine Plan from PAC Review (ha)			Change in Disturbance (ha)	Change in Study Area (ha)
	TSC Act	EPBC Act	Study Area	Disturbance Footprint	Proportion to be Disturbed (%)	Study Area	Disturbance Footprint	Proportion to be Disturbed (%)		
Central Hunter Bulloak Forest Regeneration	-	-	26	25	94%	26	25	94%	0	0
Hunter Valley River Oak Forest	-	-	2	2	100%	2	2	100%	0	0
Central Hunter Box-Ironbark Woodland	EEC	-	479	181	38%	479	176	37%	-5	0
Hunter Floodplain Red Gum Woodland	EEC	CEEC	40	11	28%	40	11	28%	0	0
Narrabeen Footslopes Slaty Box Woodland	VEC	-	100	98	98%	100	98	98%	0	0
Upper Hunter White Box-Ironbark Grassy Woodland	EEC	CEEC	94	44	47%	94	2	2%	-42	0
Cooba Scrub	-	-	65	9	13%	65	9	13%	0	0
Planted Vegetation	-	-	9	0	0%	9	0	0%	0	0
Derived Native Grassland - Hunter Floodplain Red Gum Woodland	EEC	CEEC	10	4	39%	10	4	39%	0	0
Derived Native Grassland - Upper Hunter White Box-Ironbark Grassy Woodland	EEC	CEEC	159	83	52%	159	3	2%	-80	0
Other Grassland	-	-	3,643	1,418	39%	3,643	1,285	35%	-133	0
TOTAL			**4,627**	**1,875**	**41%**	**4,627**	**1,615**	**35%**	**-260**	**0**

Appendix C

Revised Direct Impacts on Vegetation Communities

Table 4 Summary of Areas in the BOP Compared with the Offset Requirements under the Proposed Revised Mine Plan

	IMPACTS				BOP								
					Saddlers Ck Restoration (ha)		Ridgeline (ha)	Onsite Rehabilitation (ha)					
Vegetation Community	**Area of Vegetation within Study Area (ha)**	**[A] Area of Vegetation within Disturbance Footprint (ha)**	**Minimum Ratio**	**[B] Offsets Required (ha)**	**Existing Available Offsets**	**Restoration Offsets**	**Existing Available Offsets**	**Ratio**	**Available Offsets**	**Offsite Offset (ha)**	**[C] Total Offset (ha)**	**Difference (ha) [C]-[B]**	**Offset Ratio [C] : [A]**
Box - gum grassy woodlands, Brigalow Belt South and Nandewar										67	67		
Hunter Floodplain Red Gum Woodland	40	11	6:1	66	20	62					82		
River Oak riparian woodland, eastern NSW*										33	33		
Rough-barked Apple - Blakely's Red Gum riparian grassy woodlands, Brigalow Belt South and Nandewar										25	25		
Silvertop Stringybark grassy open forests, eastern Nandewar and New England Tablelands										253	253		
Upper Hunter White Box-Ironbark Grassy Woodland	94	2	6:1	12									
White Box grassy woodland, Brigalow Belt South and Nandewar										396	396		
Box-Gum Woodland (CEEC, EPBC Act; EEC, TSC Act)	**134**	**13**	**6:1**	**78**	**20**	**62**				**774**	**856**	**778**	**65.8**
Derived grasslands, Brigalow Belt South and Nandewar										343	343		
Derived Native Grassland-Hunter Floodplain Red Gum Woodland	10	4	6:1	24									
Derived Native Grassland-Upper Hunter White Box-Ironbark Grassy Woodland	159	3	6:1	18									
Low Diversity Derived Native Grassland**										555	555		
Box-Gum Woodland Derived Native Grassland (CEEC, EPBC Act; EEC, TSC Act)	**169**	**7**	**6:1**	**42**						**898**	**898**	**856**	**128.3**
Central Hunter Box-Ironbark Woodland (EEC)	479	176	3:1	528	4		50	0.5:1	777		831		
Narrabeen Footslopes Slaty Gum Woodland (VEC)	100	98	3:1	294				0.5:1	626		626		
Other Threatened Woodland and Forest communities	**579**	**274**	**3:1**	**822**	**4**		**50**		**1403**		**1457**	**635**	**5.3**
Central Hunter Bulloak Forest Regeneration	26	25	3:1	75									
Cooba Scrub	65	9	3:1	27			35				35		
Hunter Valley River Oak Forest***	2	2	3:1	6									
Planted Vegetation	9		N/A	N/A	N/A	N/A	N/A		N/A	N/A		N/A	N/A
Silvertop Stringybark - gum open forest on basalts of the Liverpool Range, Brigalow Belt South and Nandewar										71	71		
White Box - stringybark shrubby woodlands, Brigalow Belt South and Nandewar										336	336		

Table 4 Summary of Areas in the BOP Compared with the Offset Requirements under the Proposed Revised Mine Plan

Vegetation Community	IMPACTS				BOP								
					Saddlers Ck Restoration (ha)		Ridgeline (ha)	Onsite Rehabilitation (ha)					
	Area of Vegetation within Study Area (ha)	[A] Area of Vegetation within Disturbance Footprint (ha)	Minimum Ratio	[B] Offsets Required (ha)	Existing Available Offsets	Restoration Offsets	Existing Available Offsets	Ratio	Available Offsets	Offsite Offset (ha)	[C] Total Offset (ha)	Difference (ha) [C]-[B]	Offset Ratio [C] : [A]
Other non-listed Forest and Woodland communities	**102**	**36**	**3:1**	**108**			**35**			**407**	**442**	**334**	**12.3**
Other Grassland	3643	1285	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A		
Other Grassland	**3643**	**1285**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**		**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
TOTAL All Vegetation	**4627**	**1615**		**1050**	**24**	**62**	**85**		**1403**	**2079**	**3653**	**2603**	**2.3**
TOTAL Box-Gum Woodland	**303**	**20**		**120**	**20**	**62**	**0**		**0**	**1672**	**1754**	**1634**	**87.7**

*Co-dominated by *Eucalyptus melliodora* or *Eucalyptus blakelyi* x *Eucalyptus teretecornis*

**Only listed under the TSC Act

***Equivalent vegetation in the offsite offset property is *River Oak riparian woodland, eastern NSW*, which also conforms to Box Gum Woodland

Appendix G

Aboriginal Archaeology Assessment Advice

10 March 2014

Daniel Sullivan
Senior Environmental Scientist
Hansen Bailey
PO Box 473
Singleton NSW 2330

Dear Mr Sullivan,

Reassessment of impacts to Aboriginal heritage for the Drayton South Coal Project retracted mine plan

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) has been commissioned by Hansen Bailey Environmental Consultants (Hansen Bailey) on behalf of Anglo American Metallurgical Coal Pty Ltd (Anglo American) to undertake a reassessment of impacts to Aboriginal archaeological sites as a result of retractions proposed by Anglo American to the Drayton South Coal Project mine plans. AECOM understands that Hansen Bailey require a summary of the consequences, in terms of impacts to Aboriginal archaeological sites, that a retraction in the overall size of the proposed mine footprint will have for the Project.

2.0 Background

The Drayton South Coal Project proposes to extend the life of the existing Drayton Mine. The Project includes the development of additional open cut and highwall mining areas, south of the existing Drayton Mine, which utilise the existing workforce and infrastructure. Since 2012, AECOM has completed a number of Aboriginal heritage assessments for the Project. These have included an Aboriginal Archaeological and Cultural Impact Assessment (AACHIA) (AECOM Australia Pty Ltd 2012) completed for the Environmental Assessment (EA), a Preferred Project Report (PPR) (AECOM Australia Pty Ltd 2013), a due diligence assessment of additional mine disturbance areas (AECOM Australia Pty Ltd 2014a) and an Aboriginal Cultural Heritage Management Plan (ACHMP) (AECOM Australia Pty Ltd 2014b in progress). As a result of these assessments, it was determined that 274 Aboriginal archaeological sites, consisting of 273 open artefact sites and one stone quarry, would be impacted from the Project, and would subsequently require mitigation. A further 117 Aboriginal sites were to be conserved and would not be impacted as a result of the Project

3.0 Modified Mine Plans

In February 2014, following due consideration of the PAC's recommendations, Anglo American have made substantial retractions to the mine plan for the Project. The changes made include the complete removal of the Houston mining area and its associated visual bund, a significant portion of the Whynot mining area and a substantial area in the southernmost part of the Redbank mining area. Modifications to the proposed mine plans have significantly reduced the overall Project disturbance boundary and subsequently a revised assessment of impacts to Aboriginal heritage was required. The revised mine plan is shown on Figure 1 below.

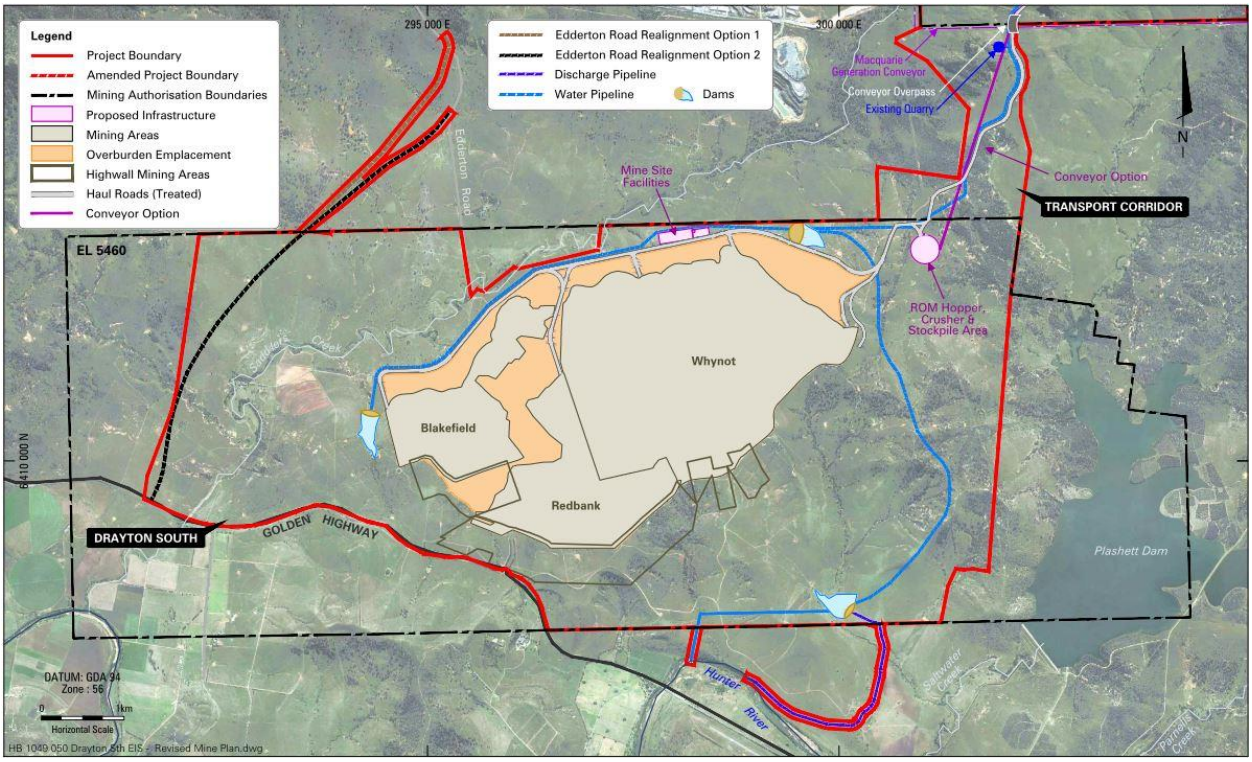


Figure 1: Revised mine plan (Source: Hansen Bailey 2014)

4.0 Results

AECOM has undertaken a reassessment of impacts to Aboriginal heritage sites as a result of the mine plan modifications and have determined that 11 Aboriginal sites, comprising nine artefact scatters and two isolated artefacts, will no longer be impacted as part of the Project due to the retractions made to the mine plan. In addition, areas of subsurface archaeological potential identified in the AACHIA (AECOM Australia Pty Ltd 2012) and associated with tributaries of Saddlers and Saltwater Creeks will also no longer be impacted. Table 1 provides a list of those sites no longer impacted.

Table 1 Aboriginal sites no longer impacted

Site ID	Site Name	Site Type	Easting GDA_94	Northing GDA_94
37-2-0418	MAS 74;Mt Arthur South;	Artefact scatter	299605	6410490
37-2-0419	MAS 75;Mt Arthur South;	Artefact scatter	299605	6410590
37-2-1939	SC-OS-16	Artefact scatter	299871	6411040
37-2-1940	SC-OS-12	Artefact scatter	300081	6410010
37-2-1961	SADDLERS CREEK-OS-1	Artefact scatter	296955	6408800
37-2-2035	SC-OS-4	Artefact scatter	296985	6408820
37-2-4264	DS AS40 11	Artefact scatter	300081	6409350
37-2-4313	DS AS89 11	Artefact scatter	299972	6410700
37-2-4340	DS IF15 11	Isolated artefact	296783	6408570
37-2-4373	DS IF46 11	Isolated artefact	300100	6409730
37-2-4512	DS-AS-9911	Artefact scatter	300244	6410289

5.0 Conclusion

The revised mine plans have resulted in an overall reduction in the number of Aboriginal archaeological sites impacted by the Project. Prior to the mine plan modifications, 274 Aboriginal archaeological sites were identified as being impacted by the Project. As a result of the changes, the number of impacted Aboriginal archaeological sites has now been reduced to 263, comprising 262 open artefact sites and one stone quarry. Furthermore, an additional 11 Aboriginal archaeological sites and areas of subsurface archaeological potential associated with tributaries of Saddlers and Saltwater Creeks will now not be impacted.

As part of the ongoing management of Aboriginal archaeological sites within the Project Boundary, the modified mine plans and subsequent reduction to the number of impacted Aboriginal archaeological sites will be incorporated into the ACHMP currently being prepared for the Project.

6.0 References Cited

AECOM Australia Pty Ltd. 2012. *Drayton South Coal Project: Aboriginal Archaeological and Cultural Heritage Impact Assessment*. Unpublished report for Hansen Bailey.

AECOM Australia Pty Ltd. 2013. *Drayton South Coal Project Preferred Project Report*. Unpublished report for Hansen Bailey.

AECOM Australia Pty Ltd. 2014a. *Aboriginal due diligence assessment of additional mine disturbance areas for the Drayton South Coal Project, Muswellbrook, NSW*. Unpublished report for Hansen Bailey.

AECOM Australia Pty Ltd. 2014b. *Drayton South Coal Project Aboriginal Cultural Heritage Management Plan*. Unpublished report to Hansen Bailey.

Yours faithfully

Geordie Oakes
Archaeologist
geordie.oakes@aecom.com

Direct Dial: +64 2 89340610
Direct Fax: +64 2 89340001

Appendix H

Economics Assessment Advice

Gillespie Economics

Environmental and Resource Economics: Environmental Planning and Assessment

13 Bigland Ave, Denistone NSW 2114
Telephone (02) 98048562
Facsimile (02) 9804 8563
Mobile 0419448238
Email gillecon@bigpond.net.au

6 March 2014

James Bailey
Hanson Bailey Pty Ltd
PO Box 473
Singleton NSW 2330

Dear James

Re: Drayton South Project - Economic Assessment of the Retracted Mine Plan

As requested, attached is an Economic Assessment of Drayton South Project Retracted Mine Plan.

This Economic Assessment includes:

- a Benefit Cost Analysis (threshold value analysis) of the Retracted Mine Project; and
- a regional economic impact assessment of the Retracted Mine Project.

The Benefit Cost Analysis identified the estimated net production benefits of the Retracted Mine Project to Australia at $485 Million. Any environmental, social or cultural impacts of the Retracted Mine Project to Australia, after mitigation, would need to be valued at more than $485 Million for the Modification to undesirable from an economic efficiency perspective.

The regional economic impact analysis, using input-output analysis, found that the Retracted Mine Project would provide additional economic activity, including direct and indirect employment, to the regional economy during both construction and operation. For the peak years of production direct and indirect employment provided to the regional economy is estimated at 785 jobs. Thse impacts would last for 15 years with lessor regional impacts during ramping up and ramping down of production.

Regards

Rob Gillespie

ATTACHMENT 1 – ECONOMIC ASSESSMENT OF THE RETRACTED MINE PLAN

1.0 INTRODUCTION

The Drayton Mine is located approximately 10 km north west of the village of Jerrys Plains and approximately 13 km south of the township of Muswellbrook in the Upper Hunter Valley of NSW. The Mine is managed by Anglo Coal (Drayton Management) Pty Ltd which is owned by Anglo American. Anglo American is seeking Project Approval under Part 3A of the *Environmental Planning and Assessment Act, 1979* to facilitate the extraction of coal by both open cut and highwall mining methods within Exploration Licence (EL) 5460.

An Environmental Assessment (EA) of the Project was considered by the Planning and Assessment Commission (PAC). Following due consideration of the PAC's recommendations Anglo American has made substantial retractions to the mine plan for the Drayton South Project (the Project). The Retracted Mine Plan includes the complete removal of the Houston mining area and its associated visual bund, a significant portion of the Whynot mining area and a substantial area in the southernmost part of the Redbank mining area. All other components of the Retracted Mine Plan remain the same as described previously in the Environmental Assessment (EA) for the Project dated November 2012 and the Preferred Project Report (PPR) dated August 2013.

Gillespie Economics has prepared a brief Economic Assessment of the Retracted Mine Plan. It uses the same methods referred to in the Economic Assessment provided for the EA - Benefit Cost Analysis and Input-Output Analysis, based on financial and technical advice provided by Anglo American. The Economic Assessment provided in the EA should be referred to for technical information on the methods.

2.0 BENEFIT COST ANALYSIS

2.1 Identification of the "With" and "Without" Retracted Project Scenarios

Identification of the "base case" or "without" the Retracted Mine Plan scenario is required in order to facilitate the identification and estimation of the incremental economic benefits and costs of the Retracted Mine Plan.

Under the base case, coal mining at the Drayton Mine would cease in 2015 with associated rehabilitation and site decommissioning following this. In contrast, the Retracted Mine Plan would enable mining of up to 7 million tonnes per annum (Mtpa) of Run-of-Mine (ROM) coal for a period of 20 years, a reduction of 7 years and 22 Mt of ROM coal compared to the Project.

2.3 Incremental Costs and Benefits

The potential categories of incremental economic costs and benefits of the Retracted Mine Plan are as identified in Table 2.1 of the Economic Assessment contained in the EA and reproduced below.

Table 2.1 - Incremental Economic Benefits and Costs of the Retracted Project

Category	Costs	Benefits
Production	Opportunity costs of capital Opportunity cost of land Capital costs of development Operating costs of mine including mitigation measures Rehabilitation and decommissioning costs at end of the Project life	Avoided decommissioning and rehabilitation in 2015 Value of coal production Residual value of capital and land at end of Project life
Potential environmental, social and cultural impacts	Ecology impacts Aboriginal heritage Historic heritage impacts Agricultural production Surface and groundwater impacts Visual amenity impacts Air quality impacts Noise and blasting Greenhouse gas and energy impacts Traffic impacts	Any non-market benefits of employment Value of ecological offsets

The opportunity costs of land and capital equipment, development costs, unit annual operating costs (including mitigation measures but net of royalties), rehabilitation and decommissioning costs and residual value of capital and land at the end of the Retracted Mine Plan, have been assumed to be the same as identified in the Economic Assessment of the Project. The timing of final rehabilitation and decommissioning of the Retracted Mine Plan has been brought forward to coincide with a shorter mine life, as has the timing of the residual value of capital and land. The opportunity cost of land and capital, and avoided decommissioning costs under the base, have also been brought forward in time to 2015 to reflect the timing of cessation of mining under the base case. The coal price in Australian Dollars (AUD) has been varied to reflect current projections of Anglo American for its product coal from the mine i.e. approximately AUD$115, reflecting a United States Dollar (USD) value of $105/tonne and an AUD/USD exchange rate of 0.91. The commencement year of the Economic Assessment has also been adjusted to 2014 from 2012 in the original Economic Assessment in the EA[1].

[1] Any comparisons of the results of this assessment and those in the original Economic Assessment are confounded by the changes in assumptions.

2.4 Consolidation of Value Estimates and Threshold Value Analysis

At the NSW Treasury (2007[2]) recommended central discount rate of 7 percent (%), the Retracted Mine Plan is estimated to have total net production benefits of $701M. Assuming 100% foreign ownership, the net production benefits accruing to Australia are estimated at $485M. This threshold value is the minimum opportunity cost to society of not proceeding with the Retracted Mine Plan. Interpreted another way, any environmental, cultural or social impacts of the Retracted Mine Plan to Australia, after mitigation measures, would need to be valued at greater than $485M (present value) to make the Retracted Mine Plan undesirable from an economic efficiency perspective.

The potential residual environmental impacts are identified and discussed qualitatively in the Environmental Assessment of the Retracted Mine Plan.

2.5 Sensitivity Testing

The estimated threshold value of $485M is most sensitive to assumptions about the economic value of coal. If this estimated value reduced by 20% for the life of the Retracted Mine Plan then the threshold value would reduce to $267M. Nevetheless, whether the Retracted Mine Plan would continue under these circumstances would depend on its financial viability. Alternatively, if the value of coal increased by 20% the threshold value would increase to $826M.

2.6 Distribution of Impacts

While Anglo American would initially bear the production costs and receive the production benefits of the Retracted Mine Plan, the net production benefits would be distributed between a number of stakeholders including:

- Anglo American and its shareholders in the form of after tax profits;
- the Commonwealth Government in the form of any Company tax payable from the Retracted Mine Plan (estimated at $152M, present value), which is subsequently used to fund provision of government infrastructure and services across Australia and NSW, including the region;
- the NSW Government via royalties (estimated at $333M, present value) which are subsequently used to fund provision of government infrastructure and services across the State, including the region; and
- the local community in the form of financial sponsorship and in-kind support to a variety of local schools, sporting groups, annual events, charity groups and community groups.

Potential environment, cultural and social impacts would largely accrue at the local level although these would be substantially mitigated and internalised in to the operating costs of the Retracted Mine Plan.

Some impacts, such as the clearing of vegetation and impacts on Aboriginal heritage may impact the values of people who live outside the region. However, any ecological values lost are proposed to be offset and the costs of offsets are internalised in the operating costs of the Retracted Mine Plan. Anglo American also proposes to develop an Aboriginal Heritage Management Plan to minimise and manage Aboriginal heritage impacts. Impacts from greenhouse gas emissions from the Retracted Mine Plan may have a global dimension. However, the Australian Government has a broad strategic approach to addressing Australia's greenhouse gas emissions.

[2] NSW Treasury (2007) *NSW Government Guidelines for Economic Appraisal*, Website: www.treasury.nsw.gov.au, Date Accessed: 7 February 2013.

3.0 REGIONAL ECONOMIC IMPACTS

The revenue, expenditure and employment associated with the construction and operation of the Retracted Mine Plan would stimulate economic activity for the regional economy, as well as for the broader NSW economy.

3.1 Construction

Construction for the Retracted Mine Plan is assumed to be the same as for the Project. The regional economic impact of the average annual construction expenditure is provided in Table 2.

Table 2 - Regional Economic Impacts of Construction of the Retracted Mine Plan

	Direct	Production induced	Consumption induced	Total Flow on	Total
OUTPUT ($'000)	41,100	18,321	8,410	26,732	67,831
Type 11A Ratio	*1.00*	*0.45*	*0.21*	*0.65*	*1.65*
VALUE ADDED ($'000)	16,082	7,330	3,910	11,240	27,322
Type 11A Ratio	*1.00*	*0.46*	*0.24*	*0.70*	*1.70*
INCOME ($'000)	11,909	5,477	3,235	8,712	20,620
Type 11A Ratio	1.00	0.46	0.27	*0.73*	*1.73*
EMPL. (No.)	126	60	48	108	234
Type 11A Ratio	1.00	0.48	0.38	0.86	*1.86*

*Direct employment of 126 represents average annual construction employment. It is assumed that these people reside in the region. Where they do not, a proportion of the consumption-induced flow-on impacts will leak from the region.

In total, the construction phase of the Retracted Mine Plan would contribute in the order of up to:

- $68M in annual direct and indirect output;
- $27M in annual direct and indirect regional value added;
- $21M in annual direct and indirect household income; and
- 234 direct and indirect jobs.

These particular impacts on the regional economy are likely to be felt for a period of in the order of 29 months.

3.2 Operation

The annual production, expenditure and employment profile remains similar to that proposed and assessed in the Economic Assessment of the Project. The main difference is that the mine life will be shortened by 7 years. The regional economic impacts of the Retracted Mine Plan will therefore occur for a shorter time. The regional economic impacts of the Retracted Mine Plan are provided in Table 3.

Table 3 - Regional Economic Impacts of the Retracted Mine Plan

	Direct Effect	Production Induced	Consump. Induced	Total Flow-on	TOTAL EFFECT
OUTPUT ($'000)	459,324	93,162	35,068	128,230	587,554
Type 11A Ratio	*1.00*	*0.20*	*0.08*	*0.28*	*1.28*
VALUE ADDED ($'000)	209,686	37,600	16,310	53,910	263,597
Type 11A Ratio	*1.00*	*0.18*	*0.08*	*0.26*	*1.26*
INCOME ($'000)	48,175	24,298	13,515	37,813	85,988
Type 11A Ratio	*1.00*	*0.50*	*0.28*	*0.79*	*1.79*
EMPL. (No.)	343	241	201	442	785
Type 11A Ratio	*1.00*	*0.70*	*0.59*	*1.29*	*2.29*

*Direct employment of 346 represents average annual employees residing in the region. Contractors are located in production-induced flow-ons.

The Project is estimated to make the following total annual contribution to the regional economy for 15 years with lesser impacts as the mining under the Retracted Mine Plan ramps up and down:

- $588M in annual direct and indirect regional output or business turnover;
- $264M in annual direct and indirect regional value added;
- $86M in annual direct and indirect household income; and
- 785 direct and indirect jobs.

Businesses that are able to supply the goods and services required by the mining operation, and demanded by employees, would benefit from mining under the Retracted Mine Plan.