WHITEHAVEN COAL

WHITEHAVEN COAL LIMITED

Rocglen Coal Mine Extension Project

Project Application under Part 3A of the EP&A Act 1979

Environmental Assessment

Volume 1 – Main Text

Volume 2 - Appendices (A-L)

Volume 3 - Appendices (M-R)

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GSS ENVIRONMENTAL

Environmental, Land and Project Management Consultants

Rocglen Coal Mine Extension Project

Project Approval 10_0015

Environmental Assessment

Prepared on behalf of:

Whitehaven Coal Limited

By:-

GSS Environmental

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Date: February 2011

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Submission of Environmental Assessment (EA)

Prepared under Part 3A of the *Environmental Planning and Assessment Act 1979*

EA Prepared By:

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Development Application:

Proponent Name:	Whitehaven Coal Limited
Proponent Address:	PO Box 600, Gunnedah NSW 2380
Land to be Developed:	Lot 1 in DP 787417; Lots 1 and 4 in DP 1120601; and Public roads and road reserves. Wean Road, Gunnedah NSW 2380 Parish of Tulcumba County of Nandewar Local Government Area of Gunnedah
Development Description:	Rocglen Coal Mine Extension Project

Declaration:

We hereby certify that we have prepared the contents of this document and to the best of our knowledge:

- It addresses the Director-General's Requirements provided to the Proponent in March 2010 under Section 75F of the *Environmental Planning and Assessment Act 1979;*
- It contains all available information that is relevant to the environmental assessment of the proposed development to which the document relates; and
- It is true in all material particulars and does not, by its presentation or omission of information, materially mislead.

Name:	GSS Environmental Eryn Bath
Signature:	
Date:	February 2011

EXECUTIVE SUMMARY

INTRODUCTION

This Environmental Assessment (EA) has been prepared to support an application by Whitehaven Coal Limited (Whitehaven) for a new Project Approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to expand operations at the company's Rocglen Coal Mine in the Gunnedah Basin of northern New South Wales (NSW).

The Rocglen Coal Mine (formally known as Belmont Coal Project) was originally approved by the Minister on the 15 April 2008 under Project Approval PA 06_0198. It was classified as a Major Project in accordance with the former *State Environmental Planning Policy (Major Projects) 2005* and, subsequently, was determined under Part 3A of the EP&A Act.

Following further drilling and definition of the local geological features, as well as additional reviews of the mine plan, Whitehaven now propose to expand operations at Rocglen in order to maximise resource recovery and allow for improved mine progression. The Project, if approved, would permit up to 5 million tonnes (Mt) of coal, not previously considered in the life of mine plan, to be extracted. This represents an increase in coal recovery from Rocglen by close to 30 percent. At a maximum recovery rate of 1.5 Mt run-of-mine (ROM) coal annually, this will increase the projected life of the operation for coal extraction by up to four years.

APPROVED MINE OPERATION

The Rocglen Coal Mine was originally approved by the Minister on the 15 April 2008 under Project Approval PA 06_0198. It was classified as a Major Project in accordance with the former SEPP (Major Projects) 2005 and, subsequently, was determined under Part 3A of the EP&A Act. The mining lease (ML 1620) was issued for the Rocglen operation in June 2008 and coal production subsequently commenced in late 2008. Approximately 1.5 million tonnes of coal per annum (Mtpa) is mined using truck and excavator method. The coal is transported approximately 30 km by road to the Whitehaven Coal Handling and Preparation Plant (CHPP) for selective washing and subsequent transport by rail to the Port of Newcastle or by road to domestic customers.

On the 27 May 2010, the Minister issued an approval under Section 75W of the EP&A Act to modify PA 06_0198 (06_0198 MOD 1). This modification permitted Whitehaven to undertake unplanned emergency earthworks to stabilise the eastern highwall following slipping adjacent to a fault structure in the north eastern portion of the approved open cut pit. The areas required to be worked to achieve a stable highwall were partially outside of the open cut limit approved under PA 06_0198.

In summary, the activities approved at Rocglen under PA 06_0198 (and subsequent modification, PA 06_0198 MOD 1) are:

- **Coal Mining by Open Cut Mining Methods** – extraction of coal by open cut mining methods within an area of approximately 114 hectares. This involves the extraction of three separate coal seams, being the Upper Glenroc, Lower Glenroc and Belmont Seams, at a production rate of 1.5 Mtpa. The pit extensions approved for stabilisation works under PA 06_0198 MOD 1 have a combined area of approximately 2.05 hectares, giving a total approved open cut area of approximately 116.05 hectares.
- **Auger Mining –** extraction of additional coal reserves that are uneconomical to extract by open cut mining methods using auger mining techniques.

- **On-Site Coal Processing –** transfer of mined coal by haul truck to a coal handling and processing area located immediately south of the limit of open cut pit for crushing, screening and loading into trucks for transport off-site.
- **Transportation –** transportation of crushed and screened coal approximately 30 km to the Whitehaven CHPP, via a purpose built section of road between Rocglen and Hoad Lane, and from Hoad Lane via an established coal haulage route for selective washing, stockpiling and dispatch by both rail and road. A proportion of the coarse and fine reject material from the CHPP is approved to be backloaded to Rocglen for placement in the mined-out areas of the open cut.
- **Relocation of Public Roads –** relocation of sections of Wean Road (not yet undertaken) and Jaeger Lane (completed) to allow for open-cut mining activities and infrastructure within these areas.
- **Rehabilitation –** progressive use of out-of-pit and in-pit overburden emplacements to shape and recreate the landform comparable to that of the pre-mining environment. Approximately 84.4 hectares of the disturbed area is to be restored as rehabilitated native vegetation with the remaining 152.6 hectares to be restored to rehabilitated agricultural land.
- **Biodiversity Offset Strategy –** offsetting the disturbance to remnant native vegetation through the protection and rehabilitation of approximately 195.3 hectares of land, comprising the protection of 44.9 hectares of remnant woodland, enhancement planting and rehabilitation to 90.4 hectares and an additional 60 hectares within the Whitehaven Regional BioBank Site.

Based on the open cut reserves at the time of approval and a maximum production rate of 1.5 Mtpa, the Rocglen Coal Mine was anticipated to have a production life for coal extraction of between seven to ten years.

PROJECT DESCRIPTION

Following further drilling and definition of local geological features, as well as additional reviews of the mine plan, Whitehaven proposes to expand operations at the Rocglen Coal Mine in order to maximise resource recovery and allow for improved mine progression.

The objectives of the Rocglen Coal Mine Extension Project are to:

- Develop the on-going open cut operations with a focus on:
  - maximising resource recovery and maintaining continuity of coal production from the existing Rocglen Coal Mine beyond the currently projected life of mine;
  - maximising the use of existing infrastructure; and
  - securing on-going employment opportunities and socio-economic flow-on benefits;
- Provide additional out-of-pit emplacement area to accommodate overburden material from the existing operations and proposed pit expansion; and
- Continue to conduct mining at Rocglen in an environmentally responsible manner to ensure the potential for adverse impact is minimised.

While Whitehaven undertook preliminary feasibility assessments for several development layout options (both within the Project Site and extending beyond the Project Site), the proposed configuration was selected as the optimal option in light of mining efficiency, operational, environmental, economic and land ownership considerations.

The following table summarises and compares the primary components of the existing Rocglen Coal Mine operation approved under PA 06_0198 (including PA 06_0198 MOD 1) and those of the proposed Rocglen Extension Project to be assessed and determined under Part 3A of the EP&A Act.

Major Components of the Approved Operation and Proposed Project

Aspect	Existing Approved Rocglen Coal Mine Operation	Proposed Rocglen Extension Project
Project Site Area	Approximately 366 hectares.	An additional 94 hectares of land, bringing the total area to approximately 460 hectares.
Production	Extraction and processing of up to 1.5 Mt of ROM coal per year.	No change.
Coal Seams	Upper Glenroc, Lower Glenroc and Belmont.	No change.
Mine Life	Between seven and ten years.	Up to an additional four years over the originally anticipated seven to ten years.
Vegetation Removal	Progressive campaign approach, with the extent of clearing undertaken in each campaign just sufficient for the subsequent year of mine development.	No change.
Soil Stripping and Stockpiling	Topsoil and subsoil stripping is undertaken separately to 15 cm and 35 cm, respectively, using open bowl scrapers and placed directly on mined, backfilled and reshaped areas awaiting rehabilitation or in designated stockpile areas adjacent to the areas of surface disturbance.	Methodology will generally remain the same with different varying depths of topsoil and subsoil suitable for stripping and different designated stockpile areas.
Overburden and Interburden Management	Overburden is blasted and loaded into trucks for transfer and placement in one of the two out-of-pit emplacement areas (Northern and Western Emplacement Areas) or in-pit within completed sections.	Methodology will remain the same with expansion of the Northern Emplacement Area's footprint and height to accommodate a maximum of 12 Mbcm (15 Mlcm) of material from current operations and proposed pit expansion.
Coal Extraction	Open cut mining methods (truck and excavator), with extraction of additional reserves uneconomical to extract by open cut methods using auger mining techniques.	No change.
Open Cut Area	Approximately 114 hectares, plus 2.05 hectares approved for emergency highwall stabilisation works (PA 06_0198 MOD 1).	Expansion of the open cut design limit by approximately 50 hectares to a total area of approximately 164 hectares.
Resource Recovery	Up to approximately 15 Mt of ROM coal.	Up to an additional 5 Mt of ROM coal.
Coal Processing	Transfer of mined coal by haul truck to a coal handling and processing area located immediately south of the limit of the open cut pit for crushing, screening and loading into trucks for transport off-site.	No change.
Coal Storage	Stockpiling of up to 150,000 tonnes of ROM coal on site.	No change.
Infrastructure	Site offices, workers amenities, workshop, fuel farm, coal crushing and handling plant, truck loading bin, weighbridge and surface water management system.	No additional building improvements. The surface water management system will be updated to effectively cater for the expanded operations.

Product Coal Transport	All crushed and screened coal is transported approximately 30 km to the Whitehaven CHPP, via an established coal haulage route, for selective washing, stockpiling and dispatch by rail and road.	No change.
Site Services	Systems in place for potable water, operational water, power, communications, fuel and explosives.	No change.
General Waste	Systems in place to manage general wastes, routine maintenance consumables, waste oils and grease, sewage and hydrocarbon-contaminated water.	No change.
Coal Rejects	A proportion of the coarse and fine coal rejects are approved to be returned from the Whitehaven CHPP to Rocglen for placement in the mined-out areas of the open cut.	No change.
Equipment	Various items of earthmoving and mining equipment throughout the life of the project.	The only change to the current fleet will be the addition of one 1250 excavator in the pit to enable cleaner and more efficient mining of coal (smaller machine).
Hours of Operation	Mining operations are permitted to occur 24 hours a day, Monday to Saturday, with the exception of public holidays.	No change.
Employment	54 full-time jobs, with flow on employment for truck drivers (coal haulage contract) and additional indirect employment.	No change to employment levels, however employment positions would be maintained for the additional 4 years of project life.
Rehabilitation	While the major portion of rehabilitation activities would occur close to the cessation of mining, progressive rehabilitation will be undertaken through the life of the mine. Of the total anticipated disturbance area, approximately 84.4 hectares is to be restored as rehabilitated native vegetation (36 percent), with the remaining 152.6 hectares to be restored to rehabilitated agricultural land (64 percent).	Methodology will essentially remain the same, with the primary differences being the configuration of the final landform and final land use. Of the total anticipated disturbance area, it is proposed to restore approximately 206 hectares as rehabilitated bushland (58 percent), 147 hectares as rehabilitated pasture (41 percent), with the remaining 5 hectares comprising the retained highwall of the final void (1 percent).
Biodiversity Offsetting	A *Biodiversity Offset Strategy* resulting in the protection and rehabilitation of approximately 195.3 hectares, comprising the protection of 44.9 hectares of remnant woodland, enhancement planting and rehabilitation to 90.4 hectares and an additional 60 hectares within the Whitehaven Regional BioBank Site.	Revised *Biodiversity Offset Strategy* to compensate for the Project impacts and the impacts to the previously approved offset areas (i.e. cumulative impacts) on a 'like for like' basis with the equivalent of over 525 hectares of vegetation within the Whitehaven Regional BioBank Site. The *Strategy* will provide an offset to impact ratio of 4.75:1.
Road Relocations	The relocation of sections of Wean Road and Jaeger Lane.	Further relocation of the Jaeger Lane section only.
Environmental Management	A comprehensive set of environmental management plans and monitoring programs.	The current environmental management plans and monitoring programs will be reviewed and updated as required.

The primary components of the Project, over and above the current operations, to be assessed and determined under Part 3A are summarised in the below dot-points. It is intended that the Rocglen Extension Project will be fully integrated with the remaining operational life of the current approved Rocglen mine, which will enable Whitehaven to operate under a single Project Approval over the life of the Project.

- **Expansion of Open Cut Pit –** expansion of the open cut pit design limit in order to access up to an additional 5 Mt of coal not previously considered in the life of mine plan. This will increase coal recovery at Rocglen by close to 30 percent. The footprint of the open cut pit will increase by approximately 50 hectares to a total open cut mined area of approximately 164 hectares. Coal will continue to be extracted from the expanded pit at the approved production rate of 1.5 Mtpa and using the open cut mining methods approved at Rocglen.
- **Extension to Life of Mine –** it is anticipated that coal extraction activities will occur for approximately 11 years following the issue of Project Approval and the subsequent issue of a new or amended mining lease. This represents an increase to the projected life of mine, for coal extraction, of up to four years.
- **Expansion of Northern Emplacement Area -** expansion in the footprint and height of the out-of-pit Northern Emplacement Area in order to accommodate a maximum of 12 million bank cubic meters (Mbcm), or approximately 15 million loose cubic metres (Mlcm) accounting for swell, of overburden from the current operations and proposed pit expansion. The maximum design height of the expanded Northern Emplacement Area will be 50 metres above pre-mining landform, which is the approximate height of the adjacent ridge to the west of the Project Site at 340 metres Australian Height Datum (AHD). Early re-profiling and revegetation of the external batter slopes of the emplacement area will be undertaken to minimise visual impacts and limit erosion and downstream sedimentation.
- **Replacement of Soil Stockpile Areas –** the soil stockpiling areas identified as the Northern and Southern Soil Stockpile Areas will be replaced by the proposed Eastern and Western Soil Stockpile Areas to cater for the expanded open cut pit and Northern Emplacement Area. While all of the topsoil currently in the Northern Stockpile Area will be relocated, the majority of subsoil in this area will remain and will be covered with overburden due to sufficient soil material being available for rehabilitation from the expanded operation. The material to be relocated will be placed in either proposed new designated soil stockpile areas or placed directly onto areas available for rehabilitation.
- **Revised Rehabilitation and Mine Closure** - Whitehaven will continue to adopt a progressive approach to rehabilitation throughout the life of the mine. The rehabilitation and mine closure methodologies will essentially remain as currently approved under PA 06_0198, with the primary differences being the configuration of the final landform and final land use. Of the total anticipated disturbance area of approximately 358 hectares, it is proposed to restore approximately 206 hectares as rehabilitated bushland (58 percent), 147 hectares as rehabilitated pasture (41 percent), with the remaining 5 hectares comprising the retained highwall of the final void (1 percent).
- **Revised Biodiversity Offset Strategy –** a revised *Biodiversity Offset Strategy* has been prepared to compensate for the Project impacts and the impacts to the previously approved offset areas (i.e. cumulative impacts) on a 'like for like' basis with the equivalent of over 525 hectares of vegetation within the Whitehaven Regional BioBank Site. The *Strategy* will provide an offset to impact ratio of 4.75:1. The Whitehaven Regional BioBank Site is in the final stages of registration by the DECCW as a BioBank Site under Part 7A of the *Threatened Species Conservation Act 1995* (TSC Act). It will be actively managed via a BioBanking Management Plan with in-perpetuity management funding, and will have the highest level of conservation status outside of National Parks (via a BioBanking Agreement registered on the land title in-perpetuity).

- **Other Minor Project Related Works:**
  - Altered surface water management to effectively cater for the expanded operations;
  - Relocation of the Mine Water Dam to cater for the expanded open cut pit;
  - Relocation of a section of Jaeger Lane (that has already been relocated under PA 06_0198) to cater for the expanded Northern Emplacement Area;
  - Removal of the building improvements within the "Glenroc" property, which is owned by Whitehaven, to cater for the expanded Northern Emplacement Area;
  - Relocation of the meteorological station and high volume air sampler (HVAS) used to monitor the concentration of particulate matter less then 10 micrometres (PM_{10}) located within the "Glenroc" property to elsewhere within or adjacent to the Project Site to ensure adequate separation from the expanded Northern Emplacement Area and optimal operation; and
  - Realignment of an existing overhead powerline, owned by Country Energy, to ensure adequate separation distances from the expanded Northern Emplacement Area and Eastern Soil Stockpile Area.

The Project does not involve any change to the coal production rate, methods of coal extraction, hours of operation, coal handling and processing techniques, site servicing, general waste management or employment. The only change to the current mine fleet will be the addition of one 1250 excavator in the pit to enable cleaner and more efficient mining of coal (smaller machine).

CONSULTATION AND ISSUE IDENTIFICATION

The key project-related issues warranting detailed investigation and discussion were identified through:

- The environmental context of the Project Site and surrounding locality;
- The legislative framework applicable to the Project;
- A pre-project risk assessment;
- Outcomes of consultation undertaken with various government agencies, including the Director-General's Requirements (DGRs) issued by the NSW Department of Planning (DoP), and other relevant stakeholders; and
- Specialist studies completed as part of the preparation of the EA.

KEY ENVIRONMENTAL ISSUES AND ASSESSMENT

The assessment of the Rocglen Extension Project has been multi-disciplinary and involved consultation with various government agencies, surrounding landholders and community groups. Emphasis has been placed on anticipation and prevention of potential environmental and social impacts, with management strategies, mitigation measures and monitoring activities identified to keep potential impacts to a minimum.

Air Quality

PAEHolmes (2011) undertook an air quality assessment for the Project.

Total dust emissions due to proposed mining operations were estimated by analysing the activities taking place at the site during three mine plan scenarios, these being Years 1, 5 and 10 of the expanded operation. While annual production remains constant throughout the life of the mine, the amount of overburden waste generated varies significantly from year to year, as does the surface area of exposed pit and emplacement areas. As mining progresses from north to south it was also necessary to capture a scenario at each end of this spectrum.

In summary, the air quality modelling predictions for annual average PM_{10}, total suspended particulate matter (TSP) and dust deposition, including non-mining background levels, indicate acceptable air quality impact at all privately-owned residences throughout the life of the mine (as proposed).

The incremental 24-hour average PM_{10} criterion of 50 $\mu g/m^3$ is predicted to be exceeded at "Yarrawonga" and "Belah" by 10 $\mu g/m^3$. Further analysis undertaken by PAEHolmes (2011) on the "Yarrawonga" and "Belah" properties determined that the criterion would be exceeded on 32 occasions and four occasions, respectively. However these properties are already owned by Whitehaven and, as such, the acquisition criterion becomes irrelevant.

PAEHolmes note that it is not possible to accurately predict the cumulative 24-hour PM_{10} concentrations using dispersion modelling due to the variability in ambient levels and spatial and temporal variation in any day to day anthropogenic activity. There are currently no continuous measurements of PM_{10} available in the area that can be considered 'background'.

In terms of making a crude estimate of a background 24-hour average PM_{10} level, PAEHolmes consider it reasonable to use data from the HVAS at "Roseberry". The 70^{th} percentile (22 $\mu g/m^3$) provides a simplistic indication of PM_{10} concentrations in the absence of anomalous data due to extreme events such as bushfires and dust storms. However it does still provide a conservatively high estimation of 24-hour average background PM_{10} concentrations as contributions from the existing Rocglen operation are included. Using it as a background and adding it to modelling results also assumes that this level of 22 $\mu g/m^3$ will occur every day, which is clearly not the case as by definition it will be lower for 70 percent of the time.

The 70^{th} percentile approach leads to predicted exceedances of the 50 $\mu g/m^3$ criterion at "Yarrawonga" "Yarrari", "Belah", "Roseberry" and "Surrey". Of these residences, only "Roseberry" and "Surrey" are not currently owned by Whitehaven. Exceedances at these two properties are only predicted for operations in Year 10. PAEHolmes (2011) carried out further analysis for "Roseberry" and "Surrey" to determine how many times exceedance may occur, when added to a background of 22 $\mu g/m^3$. For the 24-hour average PM_{10} concentration to exceed 50 $\mu g/m^3$ at these residences, a predicted concentration must be 29 $\mu g/m^3$. A time series analysis indicates that there is only one day of the year at each residence when 29 $\mu g/m^3$ is predicted to be exceeded, with the majority of values estimated to be less than 15 $\mu g/m^3$. Using this conservative approach, the mine is predicted to comply with the DoP's acquisition criterion at both "Roseberry" and "Surrey".

Whitehaven will continue to take reasonable and practicable measures to prevent or minimise the generation and dispersal of particulate matter. A range of complementary air pollution management strategies, mitigation measures and monitoring activities are currently employed at Rocglen, and these will continue to be implemented for the Rocglen Extension Project.

Furthermore, as part of the Project, Whitehaven commits to install and operate a real-time PM_{10} monitor (fitted with a weather station). As recommended by PAEHolmes, it is proposed to locate this monitor at the "Roseberry" residence, co-located within one of the existing HVAS. This would enable comparisons between both monitors and also provide real-time information for the majority of privately owned residences, which are to the south of the mine.

Noise

Spectrum Acoustics (2010) undertook an assessment of operational noise levels and off-site road traffic noise levels associated with the Rocglen Extension Project. Noise modelling was conducted for four atmospheric conditions, these being daytime calm (neutral); inversion; prevailing wind (all times) from south; and prevailing wind (all times) from north north-west. Noise models were generated for three operational scenarios, being Years 1, 5 and 10 of the expanded operation, which are considered to be the worst case in terms of noise generation and potential impacts.

Exceedance of the criterion have been predicted at "Costa Vale" during Years 1 and 5, with the primary contributing noise sources being trucks depositing overburden on the expanded Northern Emplacement Area and, to a lesser extent, topsoil spreading activities (daytime only). Noise mitigation to achieve compliance at "Costa Vale" would require all trucks to be retro-fitted with attenuator packages. Whitehaven has advised that while this may be technically feasible, it would be impractical given the large cost involved and the fact that "Costa Vale" is now owned by Whitehaven and is, as such, considered project-related.

In terms of potential sleep disturbance, impacts at "Retreat" were assessed as the most impacted receiver in the Year 1 scenario (apart from "Costa Vale"). Maximum noise levels estimated from individual sources at "Retreat" are more than 10 dB below the 45 dB(A) sleep disturbance 'screening' level and are also no greater than the total LAeq level from the entire mine.

The nearest receiver to the public road section of the coal haul route between Rocglen and the Whitehaven CHPP is "Brooklyn", which is set-back from Blue Vale Road approximately 70 metres. Coal trucks from the Whitehaven's Canyon (now closed), Tarrawonga and Rocglen mines all pass this receiver. The measured traffic noise levels at "Brooklyn" range from 3 to 9 dB below the 60 dB(A) criterion. The Project will not alter the total number of trucks passing "Brooklyn" and therefore off-site traffic noise levels are expected to remain compliant with the applicable criterion.

Whitehaven will continue to take reasonable and practicable measures to prevent or minimise noise generation and propagation. A range of complementary noise management strategies, mitigation measures and monitoring activities are currently employed at Rocglen, and these will continue to be implemented for the Rocglen Extension Project.

Blasting and Vibration

An assessment of ground vibration and airblast overpressure associated with blasting has been undertaken by Spectrum Acoustics (2010). Historical blast monitoring results show no exceedances of either the applicable ground vibration or blast overpressure criteria at the nearest residences surrounding the Project Site. On this basis, Spectrum Acoustics (2010) concludes that no significant blasting impacts are expected as a result of the Rocglen Extension Project.

Since coal production commenced at Rocglen in late 2008, there has only been one occasion when complaints have been received about blasting. On the 24 April 2009, four separate residents contacted Whitehaven to report a significant loud bang and vibration at their residences. Three out of the four residents advised that previous blasting had not resulted in any impact at their property.

Rocglen has two statutory blast monitoring locations, being the "Rosberry" point of interest (POI) and "Costa Vale" POI. On checking with Orica Mining Services (Orica), Whitehaven's blasting contractor, it was discovered that they had failed to properly initiate the blast monitors and therefore did not capture any wave trace data for this particular blast.

As a result of the complaints and Orica's subsequent assessment report, Whitehaven now ensures that meteorological conditions are analysed prior to blasting to avoid times when the potential for impact is heightened, and also endeavours to blast at around midday over the winter period to avoid temperature inversions.

All blasting at Rocglen is designed to satisfy relevant environmental and safety criteria with respect to airblast overpressure and ground vibration, initially using conservative predictive models and subsequently using site laws developed and refined on the basis of operational experience.

Surface Water

GSSE (2010c) has undertaken a surface water assessment for the Rocglen Extension Project, requiring a site wide approach and the re-development of a suitable surface water management system for the expanded operation. GSSE (2010c) concludes that if the surface water management strategies and mitigation measures identified and discussed within the assessment are implemented and maintained, it is anticipated that there would be minimal impact on surface water downstream of the Project Site as a result of the Rocglen Extension Project.

A detailed daily time step water balance indicates that the site has adequate water supply primarily through the rainfall runoff captured in sediment basins, which can be supplemented through the use of bore water when required. Overall the calculations indicate that the site will be relatively well balanced.

The model indicates that use of bore water is highly dependent on the water management practices adopted. Assuming controlled discharge is undertaken to draw down the dirty water dams, the typical bore water usage will be 40 to 50 megalitres per year (ML/year) and will be within the licensed entitlement of 120 ML/year.

The model indicates that the number of overflow discharges is also highly dependent on the water management practices adopted. Assuming controlled discharge is undertaken, likely average annual overflow discharges of one day is expected, which will occur under extreme rainfall events (greater than the license threshold of 38.4 mm in 5 days). In practice the mine pit would provide substantial additional on-site storage (temporarily), which would reduce the potential for overflow discharge to occur.

A new *Site Water Management Plan* will be prepared in accordance with regulatory requirements and conditions of consent. It will be developed in accordance with the *Blue Book (Volume 1 and Volume 2E)* and will address potential impacts, management strategies and mitigation measures. Key changes to be integrated into the existing surface water management system are:

- Additional water management controls to deal with water from the increased disturbance footprint in the northern area of the site;
- Additional water management controls to address total suspended solids (TSS) issues during wet weather discharge;
- Relocation of the Mine Water Dam; and
- More effective diversion of clean water from off-site catchments to the east.

Sections of drainage lines that are or will be impacted upon by the mining operation will be rehabilitated post-mining generally in accordance with Section 5.3.3 of the *Blue Book (Volume 1)* and the *Guidelines for Controlled Activities – In-Stream Works* (DWE 2008, as cited in GSSE 2010c) for watercourse rehabilitation and riparian zone rehabilitation.

Groundwater

Douglas Partners (2010) was commissioned to address hydrogeological (groundwater) issues associated with the Project. Douglas Partners (2010) confirmed and updated the conceptual hydrogeological model derived by RCA Australia for Rocglen in 2002 and 2007, and subsequently constructed and calibrated a revised numerical groundwater flow model in order to assess impact on the surrounding groundwater system and assess the quantum of groundwater seepage that may occur into the pit.

Apart from the groundwater levels recorded for monitoring bore WB-05, which is likely to be anomalous and affected by nearby pumping, it is apparent that the mine has had very little impact on surrounding groundwater levels over the period mid 2008 to present.

Numerical groundwater modelling results indicate high drawdowns in close proximity to the mine site, with relatively low impacts to the east of the faulting. The predicted impacts on the alluvium are also low, however slightly higher in the alluvium immediately south of the pit in the case that a permeable fault was present to the west of the site. The extent of the impacts on groundwater head are expected to be less than previously predicted by RCA Australia (2007) for areas outside of the areas of faulting.

Flow rates into the pit are generally expected to decrease as mining continues in the northern end of the pit, however are expected to increase as the mining progresses to the south due to the increased area of the pit, and because the flow is less restricted by the faulting at the northern end of the pit.

The range of possible inflows to the pit, based on the credible range of parameters, ranges from 1,057 to 3,381 m^3/day. It is unlikely that the annual flow rates into the pit will exceed the existing groundwater interference licence of 700 ML/year (1,918 m^3/day). It is noted however that there is some uncertainty in the site conditions, in particular to the south west of the site, and flows greater than 700 ML/year may be possible if adverse conditions occur. Therefore a robust on-going monitoring program and updating of the predictive model are recommended as mining continues.

It is expected that once mining is complete, recharge of groundwater and rainfall infiltration into the final void will result in the formation of a water table within the backfill. It is likely that this will eventually lead to the formation of surface water in the southern part of the pit with the locally deeper final surface level. The inflow to the pit will be offset by evaporation from the area of surface water and therefore it is unlikely that the groundwater levels within the pit will ever fully recover to pre-development levels. It is estimated that the final equilibrium water levels may take 20 to 50 years to occur and would also be subject to variations according to climatic conditions.

The existing groundwater management strategies, mitigation measures and monitoring activities employed at Rocglen will continue to be implemented for the Rocglen Extension Project. Additional actions recommended by Douglas Partners (2010) to improve monitoring outcomes will also be implemented.

Flora and Fauna

RPS (2010a) was engaged to undertake a flora and fauna assessment of the Rocglen Extension Project. In addition to a review of existing literature and available vegetation mapping, RPS employed a variety of field survey techniques while on site between the 8 and 12 February 2010 to record a representative sample of flora and fauna species across the site.

Ground truthing of the vegetation within the Project Site, and within the adjacent “Yarrawonga” and nearby “Greenwood” properties, identified five vegetation communities.

It is expected that the Project will result in the removal of 5.9 hectares of the White Box Yellow Box Blakely's Red Gum Woodland Endangered Ecological Community (EEC) along Wean Road (note that a large portion of Wean Road occurs within areas covered by the original mine approval) and Jaeger Lane, and 10.9 hectares of derived native grassland of the EEC from the within the Project Site. Habitat critical to the survival of this EEC has not been gazetted within the TSC Act or Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act). Therefore the Project is not likely to impact any habitat critical to this community.

The importance of the patch of White Box Yellow Box Blakely's Red Gum Woodland EEC to be removed is considered to be 'medium'. The Project is not expected to extensively modify abiotic factors such as ground or surface water levels such that it affects other areas of White Box Yellow Box Blakely's Red Gum Woodland EEC. The revised *Biodiversity Offset Strategy* prepared for the Project provides a 'maintain or improve' outcome for the removal of this vegetation community.

A small stand (approximately 0.14 hectares) of Brigalow trees (*Acacia harpophylla*) is present within the proposed mine expansion area. The presence of this species is not definitive but is indicative of the EEC "Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions EEC" listed under the TSC Act. In summary, it is considered that the existing stand of Brigalow is not viable due to its small size, lack of recruitment, depauperate condition, isolation and lack of an adequately sized gene pool for continued survival. Again, the revised *Biodiversity Offset Strategy* prepared for the Project provides a 'maintain or improve' outcome for the removal of this vegetation community.

Suitable habitat for two cryptic threatened flora species, Finger Panic Grass (*Digitaria porrecta*) and Tricolour Diuris (*Diuris sheaffiana*), may occur in the local area. RPS (2010a) undertook the field surveys during the January to February flowering period for Finger Panic Grass (when it is most likely to be detected). Surveys for Tricolour Diuris during the flowering period of September to November were not possible, however the proposed removal of a relatively small area of 'moderate' potential habitat relative to the availability of nearby similar habitat areas would be unlikely to significantly impact the species.

No threatened flora species were observed during previous flora surveys by Geoff Cunningham Natural Resource Consultants (2007b) or by the recent flora surveys by RPS (2010a).

A total of 100 fauna species were recorded by RPS (2010a), comprising nine frogs, nine reptiles, 64 birds and 18 mammals. While no species listed on the EPBC Act were recorded, five threatened fauna species listed on the TSC Act were recorded. Potential habitat exists for a further 13 threatened fauna species listed on the TSC Act. Of the 14 threatened species and 10 migratory species listed on the EPBC Act protected matter database search results, none were identified in the Project Site. However potential habitat exists for two of the threatened species and seven of the migratory species.

No threatened flora species were observed within the Project Site, and it is therefore considered that the Project will not have any significant effect on locally occurring threatened flora species. The Project is also unlikely to significantly affect any threatened, migratory or protected fauna species occurring within the subject site or any locally occurring threatened flora species.

An assessment of the applicability of the EPBC Act to the Rocglen Extension Project was included in the *Flora and Fauna Assessment* (RPS 2010a). RPS (2010a) undertook an on-line search of the EPBC Act Protected Matters Search database (3 January 2010) to generate a list of those matters of National Environmental Significance (NES) within 40 km of the Project Site. This data, combined with other local knowledge and records, was utilised to assess whether the type of activity proposed will have, or is likely to have, a significant impact upon a matter of NES, or on the environment of Commonwealth land.

Following submission of a referral in late May 2010, the Rocglen Extension Project was found to be considered a 'controlled action' under the EPBC Act. In summary, the then Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA), which is now known as the Commonwealth Department of Sustainability, Environment, Water, Population and Community (SEWPaC), advised the following:

> *The proposed action is a controlled action. The project will require assessment and approval under the EPBC Act before it can proceed.*
>
> *The project will be assessed through an accreditation of Part 3A of the New South Wales Environmental Planning and Assessment Act 1979.*

All efforts will be made by Whitehaven to avoid disturbance of the vegetation communities within the Project Site and to maintain and enhance as much of the existing remnant vegetation on-site as possible. Whitehaven already employs a range of complementary flora and fauna management strategies and mitigation measures, and these will continue to be implemented for the Rocglen Extension Project. Furthermore, a revised *Biodiversity Offset Strategy* has been prepared by Eco Logical Australia (2010) to compensate for the Project impacts and the impacts to the previously approved offset areas (i.e. cumulative impacts) on a 'like for like' basis with the equivalent of over 525 hectares of vegetation within the Whitehaven Regional BioBank Site. The *Strategy* will provide an offset to impact ratio of 4.75:1.

Aboriginal Heritage

An assessment of Aboriginal cultural heritage issues associated with the Rocglen Extension Project has been undertaken by RPS (2010b). Consultation with Aboriginal stakeholders was in accordance with the NSW Department of Environment, Climate Change and Water's (DECCW) 2004 *Interim Community Consultation Requirements* (ICCRs).

Field survey identified three stone artefacts sites within the Project Site, comprising one isolated find and two artefact scatters. In addition, two scarred trees identified on the DECCW's Aboriginal Heritage Information Management System (AHIMS) database as NPWS #20-4-0194 and NPWS #20-4-0195, recorded by Appleton (2007), are located on the eastern road reserve of Wean Road.

All efforts will be made by Whitehaven to minimise disturbance within the Project Site. The site already operates under an *Aboriginal and Cultural Heritage Management Plan* (ACHMP) prepared by Whitehaven (2008c) under PA 06_0198 and employs a range of management strategies and mitigation measures, and these will continue to be implemented.

If impact to the three stone artefacts identified within the Project Site is unavoidable, a surface salvage will be undertaken in accordance with Section 3 of the ACHMP (Whitehaven 2008c). Artefacts salvaged will be transferred to relevant Aboriginal groups under a Care and Control Permit under Section 85A of the NP&W Act. Protective measures designed to prevent damage to the scarred trees will be enacted upon as per recommendations in Appleton (2007) and the ACHMP (Whitehaven 2008c). Whitehaven has restricted the proposed mine extension in this area and has committed to ensuring that no disturbance to the scarred trees or immediate surrounds will occur as a result of the Project. Additional management strategies, mitigation measures and consultation activities will be undertaken by Whitehaven as recommended by RPS (2010b).

Visual Amenity

The impact of the Project on the visual amenity of the local area is considered to be relatively low and acceptable. GSSE has undertaken a visual amenity assessment considering the post-mining outlooks from five residences (both privately owned and project-related) in close proximity to the mine.

While the existing topography and remnant vegetation generally contained within road reserves around the Project Site offer natural screening, distant views of the expanded Northern Emplacement Area will be seen from surrounding residences. There is no additional coal handling or significant infrastructure improvements proposed.

Early re-shaping and revegetation of the external batter slopes of the emplacement area will be undertaken in Years 1 and 2 of the expanded operation to, amongst other things, minimise visual impacts. While the expanded Northern Emplacement will extend above the tree line, the post-mining landform is expected to be consistent with the ridgeline contained within the Victory State Forest and, as such, when fully revegetated, it will not present a significant impact on the visual amenity of the area.

A range of management strategies and mitigation measures, including rehabilitation activities and lighting controls, will continue to be implemented to minimise the potential for visual impact.

Greenhouse Gas Emissions

Emissions of carbon dioxide (CO_2) and methane (CH_4) will be the most significant greenhouse gases for the Rocglen Extension Project. These gases are formed and released during the combustion of fuels used on-site and from fugitive emissions occurring during the mining process due to the fracturing of coal seams.

PAEHolmes (2011) undertook a comparison with the baseline 1990 Australian emissions, which are reported under the Kyoto Protocol as 547.7 Mt CO2-e (DCC 2008, as cited in PAEHolmes 2011). Comparing the average annual Scope 1 emissions from Rocglen, against the 1990 baseline, results in a 0.02% increase from 1990 levels. The annual greenhouse emissions for NSW in 2007 were 151.6 Mt (DCC 2009, as cited in PAEHolmes 2011). Average annual Scope 1 emissions from Rocglen represent an approximate increase of 0.06%. PAEHolmes (2011) concludes that there are not likely to be any measurable environmental effects due to the emissions of greenhouse gases from the Rocglen Extension Project.

A *Greenhouse and Energy Efficiency Plan* was prepared by Denis Cooke & Associates in June 2009 for Rocglen in accordance with PA 06_0198, and it will continue to be implemented. This Plan is designed to promote continuous change and sustainable improvement in energy management and efficiency.

Traffic and Transport

All coal mined at Rocglen will continue to be transported approximately 30 km by road to the Whitehaven CHPP, as currently approved under PA 06_0198, for selective washing, stockpiling and dispatch by rail to the Port of Newcastle or by road to domestic customers. A proportion of the coarse and fine reject material from the Whitehaven CHPP is approved to be backloaded to Rocglen for placement in the mined-out areas of the open cut. This is proposed to continue under the Rocglen Extension Project.

The bulk of the truck fleet consists of 40 tonne capacity B-double trucks and the occasional semi-trailer. An average of 120 loads (4,800 tonnes) of coal is dispatched daily at the maximum production rate of 1.5 Mtpa. This equates to between 17 and 24 movements per hour over a typical operational day, with dispatch of coal permitted under PA 06_0198 between 7.00 am and 9.15 pm Monday to Friday and between 7.00 am and 5.15 pm on Saturdays.

The Project does not involve any change to the coal production rate, transport fleet, hours of coal haulage or coal haulage route used between Rocglen and the Whitehaven CHPP. On this basis, the Project does not pose any additional annual impacts upon the local road network or traffic volumes, nor does it pose any additional conflict with other road users.

The Project will result in an extension to the life of the Rocglen operation, which will necessitate on-going coal transport for a number of years beyond what was originally approved under PA 06_0198. The use of the road network for this extended period will be covered under the arrangements of the existing road maintenance agreement with Gunnedah Shire Council to ensure the subject roads continue to be adequately maintained.

Furthermore, a range of complementary traffic management strategies and mitigation measures will continue to be implemented by Whitehaven for the Rocglen Extension Project.

Socio-Economic Considerations

To assess the socio-economic implications of the original Rocglen Coal Mine development, R.W. Corkey & Co. (2007) built on the results of a previous socio-economic study completed by Key Insights and Castlecrest Consulting for a similar scale coal mine development known as East Boggabri Coal Mine in 2005. The key findings and conclusions of R.W. Corkey & Co.'s (2007) assessment have been used in consideration of the Rocglen Extension Project.

While the Rocglen Extension Project does not involve any increase to the coal production rate or employment, it is anticipated that the Project will enable open cut mining for approximately 11 years following the issue of Project Approval and the subsequent issue of a new or amended mining lease. This represents an increase to the projected life of the mine, for coal extraction, of up to four years, which, in turn, will secure on-going employment opportunities and socio-economic flow-on benefits over this time.

Notable positive socio-economic benefits include, but are not limited to, the following:

- Maintenance of direct employment levels (54 full-time jobs) and indirect employment levels for up to an additional 4 years;
- Training opportunities for local people, including young people and indigenous people, in a growth industry (mining);
- Stimulus to local businesses, particularly in Gunnedah, including motel and hotel trade, cafes and restaurants, mining-related servicing and engineering business, and general surplus spending activity such as gyms, cinema, recreational goods and services, beauty salons, and hair dressers;
- Contribution of close to $21 million per year of operation to the local and regional economies through wages, payments to contracting companies and expenditure of other local goods and services;
- Contribution of close to $46 million per year of operation to the NSW, Australian and global economies through income tax, royalties, payroll tax, payments to rail-related contracting companies and expenditure of other goods and services; and
- Community-based and charitable contributions ensuring that the economic benefits of the Rocglen Coal Mine are not restricted to the company, employees and various levels of government.

The Project does not pose any notable social impacts over and above those assessed and approved under PA 06_0198. Potential social issues primarily relate to noise emissions, traffic generation and the temporary cessation of agricultural activities within the Project Site. Each of these issues has been appropriately addressed within the EA, with no significant or limiting factors identified.

CONCLUSION

Whitehaven has shown a commitment to the principles of Ecological Sustainable Development (ESD) and understands that social, economic and environmental objectives are interdependent. Whitehaven also acknowledges that a well designed and effectively managed operation will avoid significant and/or costly environmental impact or degradation. The suite of environmental management plans and monitoring programs employed at Rocglen are designed to demonstrate environmental due diligence and to implement procedures that provide on-going management and monitoring of the mine operation in-line with the objectives of ESD.

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