



**Centennial Coal**



**ANGUS PLACE COLLIERY  
EXTENSION PROJECT  
ECONOMIC IMPACT ASSESSMENT**

**March 2014**





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## EXECUTIVE SUMMARY

- Centennial Angus Place Pty Ltd (the Applicant) proposes to extend its mining operations, using longwall mining techniques, to the east of its existing operations at the Angus Place Colliery (Angus Place), located 15 kilometres northwest of the city of Lithgow. Angus Place's development consent will lapse on 18 August 2024. Planned longwall mining at Angus Place in accordance with the current mine plan will end in March 2016. Accordingly, the proposed Project is seeking approval for the continuation of longwall mining at Angus Place to the east of the current workings within its Mining Lease (ML) 1424 lease boundary beyond March 2016 (the Project).
- The Project is classified as state significant development pursuant to *State Environmental Planning Policy (State and Regional Development) 2011*. As such, development consent is sought pursuant to Part 4, Division 4.1 of the *NSW Environmental Planning & Assessment Act 1979* (EP&A Act).
- This Economic Impact Assessment has been prepared as part of the Environmental Impact Statement (EIS) in relation to the application. The assessments contained herein are based on the findings included in specialist reports on the impacts required to be identified under the Director General's Requirements for this Project. The report seeks to address the social, economic and environmental effects surrounding the project from the perspective of a 'triple bottom line' reporting approach.
- On approval, the consent will allow Angus Place to sustain employment for the mine's 225 permanent employees, and up to 75 contract positions per year. The mining industry is a crucial component of the regional economy. The salaries paid to these employees and contractors provide significant economic stimulus and activity in the local and regional economies. In addition to these positions, 100 construction-related contractors will be employed periodically over the life of the mine on construction of infrastructure required to facilitate operations.
- Continued mining at Angus Place will also provide ongoing revenue streams to Federal (e.g. corporate income taxes), State (e.g. royalties, payroll tax) and Local (e.g. rates) governments over the period of operation.
- The proposed mine plan has been developed to maximise resource recovery while minimising the potential for impacts on land in the area, with particular



regard to subsidence impacts. The approach taken to mining has been specifically adopted to permit an adaptive management approach with respect to reducing the likelihood of subsidence impacts. This approach is most specifically targeted at mining in the vicinity of the Gardens of Stone National Park. Surface impacts are predicted to be similar to those currently being experienced by the community and the environment as a result of the existing Angus Place workings.

- The net economic benefit of the Project for the State and regional communities is positive, at a net present value (NPV) of \$699 million over the Project forecast period to 2041. The benefit-cost ratio (BCR) for the Project is also positive (10.8). Under different sensitivity testing assumptions, the economics of the Project remain robust.
- In addition to subsidence, there are a range of other external costs and benefits that may be associated with both the construction and operations phases of the Project. The proposed Project proposal includes a range of prospective controls and mitigation measures that either allow avoidance of certain impacts or mitigation in the context of the proposed management strategies indicates that the positive aspects of the Project are greater than are the quantified assessments of the potential negative externalities. This report recognises that there is also an 'intrinsic value' component to individuals' perceptions of impacts, which is subjective and may not be accurately quantified.
- There may also be some cumulative impacts resulting from the Project in the regional context, however the proposed mining extension is consistent with other similar industrial activity in the area surrounding Angus Place Colliery, including other mines and power generation facilities.
- With respect to the external impacts, Angus Place Colliery and its advisers are engaged in a continuous process of stakeholder consultation and development of management and mitigation programs that will ameliorate impacts to the satisfaction of affected communities, to the greatest practical extent.



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## ABBREVIATIONS

ABS:	Australian Bureau of Statistics
APMEP:	Angus Place Mine Extension Project
BAU:	Business as Usual
BCA:	Benefit-Cost Analysis
BCR:	Benefit-Cost Ratio
APC:	Centennial Angus Place
CO <sub>2</sub> -e:	Carbon dioxide equivalent
DA:	Development Application
DGRs:	Director General's Requirements
DTIRIS:	Department Trade, Investment, Regional Infrastructure & Services
EIS:	Environmental Impact Statement
EMS:	Environmental Management System
EPA:	Environment Protection Authority
EVRI:	Environmental Valuation Reference Inventory
FCNSW:	Forestry Commission of NSW
GDE:	Groundwater Dependent Ecosystem
GHG:	Greenhouse Gas/es
GVA:	Gross Value Added
I/O:	Input/Output
LCC:	Lithgow City Council
LGA:	Local Government Area
LOM:	Life of Mine
Mtpa:	Million tonnes per annum
NPV:	Net Present Value
NSF:	Newnes State Forest
PA:	Project Area
ROM:	Run of Mine ('raw' coal)
SLA:	Statistical Local Area
SSD:	State Significant Development
SSR:	Safe, serviceable and repairable
THPSS:	Temperate Highland Peat Swamps on Sandstone
tpa:	Tonnes per Annum



## 1. ECONOMIC ANALYSIS AND IMPACT ASSESSMENT: PURPOSE AND APPROACH

Centennial Angus Place Pty Ltd (the Applicant) proposes to extend its mining operations, using longwall mining techniques, to the east of its existing operations at the Angus Place Colliery (Angus Place), located 15 kilometres northwest of the city of Lithgow.

Angus Place's development consent will lapse on 18 August 2024. The proposed Project is seeking approval for the continuation of longwall mining at Angus Place to the east of the current workings within its Mining Lease (ML) 1424 lease boundary beyond March 2016 (the Project), at which point the current approved mine plan is due to expire.

Angus Place is seeking approval for its Mine Extension Project based on resource modeling within the Angus Place Colliery Holding Boundary. This involves an extension to current mining practices through longwall extraction methods which would extend the mine life by up to 25 years. The Project will continue to use existing surface and underground facilities at Angus Place. New facilities and modifications to existing facilities are also required to support the Project. The proposed new facilities will assist with ensuring adequate underground mine ventilation in accordance with Clause 13(h) of the *Coal Mine Health and Safety Regulation 2006* as well as mine dewatering and ancillary support such as power.

The Project is a State Significant Development in accordance with Clause 8 and Schedule 1 (Item 5) of *State Environmental Planning Policy (State and Regional Development) 2011*. As such the Applicant will be seeking approval under Part 4 Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

In relation to the development application, presentation of an economic assessment is a provision under Schedule 2 (7) of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), associated with the EP&A Act, which requires, in particular:





*(1)(c) an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure.*

*(1)(f) the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development set out in subclause (4).*

On 6 November 2012, the Director General for the Department of Planning and Infrastructure issued Environmental Assessment Requirements (DGRs) for the Project. These stipulate the provision of an economic assessment of the Project’s impacts. Table 1 below details those requirements relevant to this assessment and where they have been addressed in this document.

**Table 1 – Angus Place Colliery Mine Extension Project – Director- General’s Requirements**

<b>Requirements</b>	<b>Addressed in this Report</b>
Potential direct and indirect economic benefits of the Project for local and regional communities and the State.	Section 3/4
A detailed description of the measures that would be implemented to minimise the adverse social and economic impacts of the Project including any infrastructure improvements or contributions and/or voluntary planning agreement or similar mechanism.	Section 4/Table 10 Appendix 1 Appendix 2
A detailed assessment of the costs and benefits of the development as a whole, and whether it would result in a net benefit for the NSW and regional communities.	Sections 3-5

In addition to these requirements, on 30 August 2013, the Department issued Supplementary Director General’s Requirements in respect of the application. The Requirements related a number of environmental and social impacts relating to the proposal. With regard to this report, the following matters raised in the Supplementary Requirements are to be addressed:

- The cost of mitigation measures;



- A compensatory offset package and its impact on, inter alia, economic matters;
- Analysis of cost, both financial and other, related to offsets; and
- A description of the short-term and long-term social and economic implications and/or impacts of the project.

This assessment addresses relevant economic impacts of the Project as provided for in these various requirements. The approach to this assessment is to estimate the direct economic benefits and costs of the Project, as they related to the State, regional and local communities. The extended regional economic benefits and costs of the Project are also considered.

In addition to the assessment of economic outcomes, the benefit or cost to the community of other aspects of the Project, such as social and environmental outcomes, are quantified where practicable. This element of the approach is consistent with the requirements of subclause 7(4) (d), Schedule 2 of the EP&A Regulation, which require consideration of the principles of ecologically sustainable development. This report seeks to address these requirements by providing a 'triple bottom line' reporting focus on the social, economic and environmental outcomes of the Project.

## **2. PROJECT BACKGROUND AND JUSTIFICATION**

### **2.1 Applicant**

Centennial Angus Place Pty Ltd (APC) is the Applicant for this Project.

Angus Place Colliery is managed by Centennial Angus Place Pty Ltd under a joint venture arrangement between Centennial Springvale Pty Ltd and Springvale SK Kores Pty Ltd. Centennial Angus Place Pty Ltd is 100% owned by Centennial Coal Company Pty Ltd. Centennial Coal Company Pty Ltd is a wholly owned subsidiary of Banpu Public Company Ltd, listed on the Thailand Stock Exchange. Centennial Coal supplies thermal and semi-soft coking coal to domestic and export markets, providing NSW with coal for approximately 40% of the State's coal fired electricity.

### **2.2 Mine consent, operation and production information**

Angus Place Colliery commenced production in 1979, after being developed as an extension of the Newcom Mine at Kerosene Vale. Coal is extracted from the Lithgow



seam using longwall mining techniques. The main components of the development are an underground longwall mine and development panels, supporting surface infrastructure (within the Angus Place pit top area and in the Newnes State Forest), a coal stockpile area (Kerosene Vale) and dedicated haul roads to EnergyAustralia's Wallerawang and Mount Piper power stations.

Project Approval PA06\_0021 is applicable to Angus Place. This was approved by the Department of Planning (DP&I) pursuant to Part 3A of the EP&A Act. Project Approval PA06\_0021 was granted on 13 September 2006 to expand the mining area and increase the production limit to 3.5 million tonnes per annum. PA 06\_0021 is currently due to lapse on 18 August 2024. However, the planned longwall mining at Angus Place in accordance with the current mine plan will end in March 2016. Accordingly, the proposed Project is seeking approval for the continuation of longwall mining at Angus Place to the east of the current workings within its Mining Lease (ML) 1424 lease boundary beyond March 2016 (the Project).

During 2010, Angus Place submitted an application to the Department of Planning (DP&I) requesting to modify Project Approval 06\_0021 pursuant to Section 75W of the EP&A Act. This Project proposed an extension to Angus Place's operations through the development and extraction of two additional longwall panels (910 and 900W), as well as development of supporting surface infrastructure. The Project additionally provisioned to increase the annual production limit from 3.5 Mtpa to 4 Mtpa. Project Approval 06\_0021 Modification 1 was approved on 29 August 2011.

On 22 December 2011, Angus Place lodged a request to modify its existing Project Approval with the DP&I regarding the construction and operation of a ventilation facility and supporting infrastructure in accordance with section 75W of the EP&A Act. The Director-General Requirements for the modification project were received on 18 January 2012. An Environmental Assessment in support of the modification was submitted to DP&I in September 2012. The ventilation facility (APC-VS3) was approved on 14 April 2013.



It is proposed to amalgamate Angus Place's coal processing and distribution network with the existing Springvale Coal Services Facility. The Springvale Coal Services Facility is in the process of submitting an application for the upgrade of their facilities, and as part of this proposed upgrade, the coal processing and distribution logistics of Angus Place will be transferred into Springvale Coal Services operations. This is an administrative transfer of the management of the existing infrastructure between three of Centennial's business units.

## 2.3 Description of proposed Project

The objectives of the Project include:

The overall objective of this Project is to obtain approval for the continuation of mining at the Angus Place Angus Place Colliery. The objectives of the Project are as follows.

- Design of the extension project in accordance with ecological sustainable principles;
- Coal production of a total of up to 4 million tonnes per annum (Mtpa) of coal from the Lithgow coal seam;
- Extraction of coal using longwall mining techniques from an area identified as Angus Place East within the Project Application Area as defined in the Environmental Impact Statement
- Construction and operation of the following facilities to support the extension Project:
  - A ventilation facility (APC-VS3) consisting of a single downcast (intake) shaft for which development consent was approved on 14 April 2013;
  - Dewatering borehole sites to deliver water into the existing Springvale-EnergyAustralia Water Transfer Scheme;
  - Water management structures;
  - Shaft spoil emplacement area;
- Upgrade of access track from Sunnyside Ridge Road to the approved ventilation facility (APC-VS3) and dewatering borehole sites; and



- Continue to provide employment of a full time workforce of 225 persons and up to 75 mining contractors, and periodically, 100 construction-related contractors.

### **3. PROJECT ECONOMIC ANALYSIS**

#### **3.1 Focus of analysis**

The critical focus of these analyses is on the economic impacts of the project for the State and the Lithgow City Council (LCC) Local Government Area (LGA) communities. As may be expected, APC has carried out a comprehensive internal financial appraisal of the Project. The financial appraisal process and its outputs are highly commercially sensitive. As such this material is unsuitable for presentation in a document which is intended for public exhibition and is excluded from this Economic Assessment on that basis. The economic aspects assessed in this report are those that allow the community to consider the project in the context of social, economic and biophysical factors that are relevant to them, as required under the EP&A Act.

Initially, there will be effects resulting from direct and derived economic activity associated with the development of supporting facilities for the Angus Place Colliery Mine Extension, such as the construction of the APC-VS3 ventilation infrastructure. This program of works is planned to extend over the period 2016 to 2018, with some additional works programmed thereafter. The principal economic impact of this element of the Project relates to providing employment of relevant contractors.

There will also be ongoing direct economic effects associated with continued operations at Angus Place. Prominent among these effects is the impact of additional consumption activity induced by the incomes of retained employees, and commercial transactions between the mine and suppliers and other businesses. The economic stimulus provided by these activities also results in the flow of further activity in the regional, state and national economies, as the goods and services required to support mining activity are produced and supplied. A further major economic outcome is the flow of royalties and various taxes into relevant government incomes, and their subsequent application to provision of public goods and services.

APC has conducted internal analyses in order to determine the financial and economic feasibility of several project options, particularly different mine plan options. The proposed Project represents the best of the alternatives considered from the



perspective of economic efficiency and socially and environmentally sustainable operations.

The economic analysis presented in this assessment provides an overview of the conclusions of the comparative approach adopted by APC in respect of the most feasible Project options. The analysis requires certain assumptions to be made in relation to the expected outcomes of the Project, which are detailed in the appropriate sections of this report.

It should be noted that in developing the economic assessment of the Project, certain information has been used which APC considers to be commercially sensitive. APC is in a position to provide this information on a confidential basis, as is provided for in the Planning NSW draft guidelines (2002) should this be required. Accordingly, this Economic Assessment presents the costs and benefits to the State and regional communities, with corporate financial outcomes excluded.

### **3.2 Discussion of project alternatives and determination of preferred APMEP proposal**

In developing the preferred approach to the Project, APC initially considered a broad range of project options. These alternatives were assessed from the perspective of ecologically sustainable development stipulated in the legislation governing this Project (refer to Section 1). The alternative project approaches principally differed on the basis of the planned mine layout and mining approach for each option. Through an internal project assessment process conducted by management, APC excluded various alternatives on the bases of:

- Economic feasibility;
- Ecological impacts management;
- Social and community impacts; and
- In some instances, combinations of these factors.

Ultimately, three project alternatives were identified that met these feasibility requirements to varying degrees, with the final APMEP proposal being assessed as the best of these.

The alternative proposals are examined in greater detail in Section 3.4 and Appendix 1. This comparative assessment also includes consideration of the 'do nothing' or



'business as usual' (BAU) case. In this instance BAU fundamentally involves expiry of the existing mining consent in 2016, effectively ending mining at Angus Place.

### **3.3 Project-related economic evaluation – Angus Place Mine Extension Project (as proposed)**

The benefit – cost analysis (BCA) data presented in this section are net present values (NPV), at an assumed discount rate of 7 per cent, except as otherwise noted<sup>1</sup>. The assumed Project timeframe is 2016 to 2041, although present values based on the current (2013) year are used in these analyses.

#### *3.3.1 Estimation of economic benefit*

The key economic benefits that accrue to the local and State communities, as distinct from the proponent corporation, are:

- Salaries and wages paid to contract workers in the construction phase of the Project. These incomes then support additional activity in other sectors of the economy;
- Salaries and wages paid to full time employees at Angus Place Colliery, with similar flow-on effects to those noted above;
- Royalties on product coal which are remitted to the State. These are then redistributed across the State community in the form of publicly-provided goods and services;
- A range of federally-levied taxes, a proportion of which is similarly redistributed across the State community. This does not include provision for the carbon tax, or the Mineral Resources Rent Tax (MRRT) due to uncertainty as to their continuity;
- Various State (e.g. payroll tax) and Local Government (e.g. council rates) taxes, rates and charges. These contribute to provision of further public goods, services and facilities.

The construction of the surface infrastructure will support an average of 97 contract employees over the Project program. As may be expected there will be a concentrated program of works in the early years in order to establish supporting infrastructure. Subsequent periodic campaigns will relate to repairs, maintenance and replacement activity in relation to the surface infrastructure.

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<sup>1</sup> The economic appraisal principles employed herein are consistent with relevant parts of NSW Treasury/Planning NSW Cost Benefit Analysis for mining and coal seam gas proposals (2012) and NSW Treasury TPP07-6 Economic Appraisal Principles and Procedures Simplified.



Extended mining operations resulting from the Project ensure the continued employment of the current 225 persons employed at the mine, along with up to an additional 75 contractor positions. 100 additional construction contractor positions will be required on a periodic basis for construction of dewatering bores and ventilation infrastructure. This ongoing employment is the source of significant direct and derived economic benefits and also has positive social and welfare benefits for the local communities in which these employees reside and spend a proportion of their incomes.

In addition to these household income-related benefits, the royalties and taxes generated are also a source of benefit. Table 1 shows the valuation of these benefits, and the bases of the valuation for each.

**Table 2: Estimate of economic benefit – Angus Place Colliery Mine Extension Project**

<b>Economic Benefit</b>	<b>Estimation assumptions</b>	<b>Estimate</b>
Mine operation-stage additional/sustained employment	Direct operations employment sustained: 225 FTE positions. Contractors employment sustained: 75 FTE positions. Construction positions: 100 (periodic engagements)	Assessed NPV ≈\$418 million.  Assessed NPV ≈\$37 million. Assessed PV ≈ \$18 million.
Coal royalties (State Government)	Based on assessed output over mine life extension period 2016-2041, and royalty rate of 7.2% <sup>2</sup>	Assessed NPV ≈ \$203 million
Other State taxes/Local Government rates & charges	e.g. Payroll tax; council rates	Assessed NPV ≈ \$16 million
Federal taxes (e.g. Corporate income taxes)	Based on assessed corporate income & corporate tax rates	Return to NSW at 30.1%, assessed NPV ≈\$39 million <sup>345</sup>
Biodiversity offset provision	Refer to Appendix 2	NPV ≈ \$778K
Project impact controls and mitigation provisions <sup>6</sup>	Particulars included in Table 10, rehabilitation section.	NPV ≈ \$38 million
<b>Total economic benefit</b>		<b>≈ \$770 million</b>

<sup>2</sup> Deep underground coal (+400m) 6.2 per cent; **other underground coal 7.2 per cent**, open cut coal 8.2 per cent.

<sup>3</sup> Commonwealth of Australia (2012): Budget 2012-13 Budget Paper No 3, Part 3, General Revenue Assistance. Table 3.2 General revenue assistance by State.  
[http://www.budget.gov.au/2012-13/content/bp3/html/bp3\\_04\\_part\\_3.htm](http://www.budget.gov.au/2012-13/content/bp3/html/bp3_04_part_3.htm) >

<sup>4</sup> Includes provision for tax treaty impacts associated with foreign ownership.

<sup>5</sup> No provision is allowed for the former Mineral Resources Rent Tax and the Carbon Tax, due to uncertainty as to their retention as Government policy.

<sup>6</sup> The benefit of the conservative mine plan proposed (NPV \$3 million) assumed as an environmental benefit to the community, is offset by the cost to the community of \$3 million in government revenues (royalties) foregone.





### 3.3.2 Estimation of economic costs

The Director General's Requirements (DGRs) issued by the DP&I for the Project identify key issues that the EIS prepared for the Project must address. These relate to:

- Subsidence;
- Land resources;
- Water resources;
- Biodiversity;
- Heritage;
- Air quality;
- Greenhouse gases (GHG);
- Noise;
- Traffic and transport;
- Visual;
- Social and economic; and
- Rehabilitation.

Each of these matters is addressed within the EIS prepared for the Project, and the majority are the subject of specialist assessment reports appended to the EIS. A qualitative and quantitative analysis of these aspects of the Project is included in Table 10. The table also details prospective controls and mitigation measures proposed by APC for addressing these impacts.

In order to estimate the net cost or benefit of the project, it is necessary to provide a monetised estimate of these impacts, based on specialist assessments of their magnitude, and relevant valuation methodologies, which are displayed in Table 3.

In relation to these valuations, three key points must be observed:

- Where possible, valuation methodologies are derived from studies accessed through relevant government bodies. This may be considered as placing some greater level of reliability on these studies;
- The identified valuation methodologies have been selected to provide approaches which were the most appropriate for application to this Project as was achievable. In evaluating these social and environmental factors, it is



observed that a number of these effectively relate to continuation of activities similar to current activity at Angus Place, and in the case of Angus Place, using much of the existing infrastructure. This continuing co-existence in proximity to other similar land uses may be considered as a mitigating factor in relation to impacts associated with the Project, as no change in land use is proposed.<sup>7</sup>

- There remains an unquantified element of social impact. This may be described as the 'intrinsic value'<sup>8</sup> of certain impacts or effects, as attributed by individual stakeholders. This aspect can be highly individualised and subjective and consequently may not be accurately quantified, as the estimation techniques applied, although based on valid methodologies, may not align with individual stakeholders' values.

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<sup>7</sup> In discussing regional and cumulative impacts, the Department of Planning and Infrastructure's *Guideline for the use of Cost Benefit Analysis in mining and coal seam gas proposals* (2012), focuses on land use changes in relation to strategic agricultural land. As the current Project does not change land use in the area in this context, it may be argued that cumulative impacts that might be associated with such a change are avoided or mitigated to some extent.

<sup>8</sup> James Marshall 7 Co. (2013)



**Table 3: Valuation methods – socioeconomic and biophysical impacts**

Description	Methodology/Source of Valuation mechanism	Valuation measure/unit <sup>9</sup>	Comment on application
Noise	Day B, Bateman I & Lake I (2010): “Estimating the Demand for Peace and Quiet Using Property Market Data” - Hedonic pricing (impact on dwelling values) EVRI reference number: 06153-105312	\$77 - \$202/dBA per annum (upper bound assumed for estimation)	Based on perceived changes in property valuations. Application based on number of affected receptors (3 residential receptors, 2.3 persons per household [Lithgow LGA, Census 2011]), no exceedances anticipated, however increased noise level assumed as 20dBA. Upper bound applied in valuation.
Subsidence, soil and water	Streever WJ, Callaghan-Perry M, Searles A, Stevens T & Svoboda P (1998): “Public Attitudes and Values for Wetland Conservation in New South Wales, Australia” – simulated market price/WTP EVRI reference number 02309-0732	\$154/household per annum	Census 2011 data enumerates the number of households in Lithgow LGA as 7,787. Assumed from commencement of Angus Place Mining Extension, 2016.
Traffic and transport	Evaluation included under other impact assessments	Not applicable	Air quality, noise and GHG emissions considered in relevant evaluations.
Air	DEC NSW (2005): “Health Costs of Air Pollution in the Greater Sydney Metropolitan Region” - cost of injury/replacement; WTP EVRI reference number: 07200-41439	\$243 - \$1,131 per capita per annum (upper bound assumed for estimation)	Valuation relates to all air pollution in Sydney GMR. Application herein relates 7 identified residential receptors, 2.3 persons per household (Lithgow LGA, 2011 Census), total ≈ 17 residents <sup>10</sup> .
Greenhouse gas (GHG)	Australian Government, Clean Energy Future <a href="http://www.cleanenergyfuture.gov.au/clean-energy-future/carbon-price/">http://www.cleanenergyfuture.gov.au/clean-energy-future/carbon-price/</a>	\$23 per tonne/CO <sub>2</sub> -e	Assumes incremental Scope 1 costs as assessed (42,647t CO <sub>2</sub> -e in any one year). Fixed cost assumed over assessment period as a consequence of uncertainty regarding future pricing mechanism/s.

<sup>9</sup> All values adjusted by three percent per annum to allow for inflation.

<sup>10</sup> The air quality report also identified nine (9) sensitive receptor locations on the Newnes Plateau, which relate to recreational users. These are not included in the analysis as (a) the numbers of such users are unknown, and (b) use of the area is assumed to be largely transient, thus limiting impacts.



Description	Methodology/Source of Valuation mechanism	Valuation measure/unit <sup>11</sup>	Comment on application
Heritage	1. Allen Consulting Group (2005): “Valuing the Priceless: The Value of Heritage Protection in Australia” – choice modelling/WTP 2. Streever WJ, Callaghan-Perry M, Searles A, Stevens T & Svoboda P (1998): “Public Attitudes and Values for Wetland Conservation in New South Wales, Australia” – simulated market price/WTP EVRI reference number 02309-0732	\$7.00 per capita p.a. for each 1,000 places protected	1. Assumes Census 2011 population count (Lithgow LGA) of 20,160, and 49 Aboriginal heritage sites. Implied cost of \$0.34 per capita. 2. Assumes conservation value of surface features (cliffs and pagodas) and associated ecological communities and features. Calculated as for subsidence, soil and water.
Biodiversity	Land & Water Australia (2005): <i>Making Economic Valuation Work for Diversity Conservation</i> : Australian Government Department of Environment & Heritage: - simulated market price/ WTP	\$149/household per annum (preservation of 700 species –flora & fauna - VIC)	Implied cost of \$0.21 per species. Applied to 2 EECs, 2 threatened flora and 23 threatened fauna identified on or likely to occur in relevant areas of APMEP Project Area which may be affected, total \$5.75 per household p.a. 7,787 households (Lithgow LGA).
Visual	Curtis I.A. (2004): “Valuing Ecosystem Goods and Services: A New Approach Using a Surrogate Market and the Combination of Multiple Criteria Analysis and a Delphi Panel to Assign Weights to Attributes – actual market pricing. EVRI reference number: 0663 - 1365	\$1,044 - \$1,331/Ha per annum (upper bound assumed for estimation)	23.25Ha of vegetation removed (surface facilities) Upper bound applied in valuation.

<sup>11</sup> All values adjusted by three percent per annum to allow for inflation.



### *3.3.3 Physical area applied for estimation of impacts*

As is required by the DGRs for this project certain impacts are necessarily considered in the context of NSW. However, in relation to the majority of the estimated environmental effects are considered as being relevant to the Lithgow LGA, or for impacts such as noise and air quality, to specific receptors such as certain residences in close proximity to operational sites, as detailed in Table 3. The estimates are detailed in Table 4. These assume commencement of preliminary works in 2014.

A number of the estimates calculated may not be considered as meeting conventional assumptions of materiality. In the context that these estimates involve impacts on the various communities to which they are relevant, they may be sources of intrinsic value as defined in the accompanying social impact assessment. In this respect they should be considered as material to those communities, and thus warrant inclusion in the assessment process. Those costs that are directly related with mining activity in the proposed extension area (e.g. subsidence) are estimated from 2016 (commencement of mining). Impacts which may have effect in relation to surface infrastructure construction and for other preparatory activity may have more immediate effect and are estimated from 2014 onwards.



**Table 4: Economic valuation of social and environmental costs of Angus Place Mine Extension Project**

Social/environmental cost	Estimation assumptions	Estimate of cost
Noise	Cost to community \$29,128 (2014 cost estimate)	Assessed NPV ≈ \$386K
Subsidence	Cost to community \$1,310,396 (2016 cost estimate)	Assessed NPV ≈ \$14.3M
Soil and land capability	Cost to community \$1,235,174 (2014 cost estimate)	Assessed NPV ≈ \$16.4M
Surface water & groundwater	Cost to community \$1,310,396 (2016 cost estimate)	Assessed NPV ≈ \$14.3M
Air	Cost to community \$19,804 (2014 cost estimate)	Assessed NPV ≈ \$263K
GHG emissions	Cost to community \$980,881 (2014 cost estimate)	Assessed NPV ≈ \$10.1M
Heritage	1. Archaeological heritage: Cost to community \$7,060 (2014 cost estimate) 2. Natural heritage: Cost to community \$1,310,396 (2016) cost estimate)	Assessed NPV ≈ \$94K  Assessed NPV ≈ \$14.3M
Biodiversity <sup>12</sup>	Cost to community \$46,119 (2014 cost estimate)	Assessed NPV ≈ \$612K
Visual amenity	Cost to community \$31,874 (2014 cost estimate)	Assessed NPV ≈ \$423K
<b>Economic valuation of social and environmental cost</b>		<b>≈ \$71 million</b>

*3.3.4 Estimation of net economic benefit/cost*

Table 5 displays the overall measures of net economic benefit of the Project for the State and regional communities, based on the benefit and cost assessments detailed in Tables 2 and 4.

Economic benefit (PV)	<b>\$770 million</b>
Economic cost (PV)	<b>\$ 71 million</b>
Net Present Value (NPV)	<b>\$699 million</b>
Benefit-Cost Ratio (BCR)	<b>10.8</b>

<sup>12</sup> The valuation for subsidence and natural heritage also entail recognition of the value of possible biodiversity effects on significant surface features such as cliffs, pagodas and the ecological communities associated with these. This assumption is stated in Table 10.



The anticipated outcome of the project in terms of its net economic impacts on the State and regional communities is a positive quantified social and economic outcome of approximately \$699 million dollars

The benefits defined in the report exclude those to the corporate entities owning the mine. They are benefits and/or contributions to specific groups among the communities, such as employees, and to the community more broadly, in the form of addressing any impacts that may arise from the proposed mining activity. From this perspective, the benefits associated with managed continuation of an activity that is already ongoing in the region, are significantly greater than the possible costs. This differential is emphasised by the adoption of effective 'worst case' estimates for the impacts involved. This implies that there is some prospect that the impacts may be of lesser magnitude.

### 3.4 Sensitivity analyses – alternative Project options

Discussion of the process undertaken by Centennial Coal and Springvale Colliery to determine the preferred Project option is included in Section 3.2. Briefly, the process entailed a rigorous comparison of a variety of options in the context of the combination of economic, social and environmental factors associated with each option.

As a consequence of this process three feasible alternatives were determined. These were:

- **Option 1** – east west orientation of longwall blocks. Extraction from south to north before the last three blocks in the south;
- **Option 2** - ENE-WSW similar to Option 1 with more favourable stress orientation. This option was previously extended further to the east to maximise coal reserve. However, it was found that the coal quality at the eastern end of the extended blocks is poor (>35% ash) and not economically viable; and
- **Option 3** – NW-SE orientation of longwall blocks. This option was assessed to optimise extraction in areas with thicker seams.

The preferred project (Option 2) is the most viable and preferred option, and is thus the proposed Project. The key factors for preferring this option over the second



option were geology (seam split and ash content), geotechnics (structural zones), the environment (swamps, pagodas, cliffs and archaeological features), and economics.

In order to fully assess all possible outcomes in relation to Angus Place Colliery, it is necessary to also consider a further possible outcome, which may be described as the business-as-usual (BAU) case. Under this scenario, exhaustion of approved resources would occur in 2016, and effective expiration of the present development consent and mining leases would result in cessation of mining and closure Angus Place Colliery. Consequently, all economic and associated social benefits would cease to be realised beyond this time, with the exception of that associated with a relatively brief period of decommissioning and rehabilitation activity, and subsequent periodic monitoring obligations.

Table 6 provides a comparison of the three options. The BAU assessment relates to the period prior to exhaustion of resources within the current mining lease area.

**Table 6: Sensitivity analysis – Project options - adjusted discount rates (NPV)**

<b>Project option component</b>	<b>Discount Rate 4% \$M</b>	<b>Discount Rate 7% \$M</b>	<b>Discount Rate 10% \$M</b>
Option 1 total social and environmental cost	101	71	52
Option 1 total State and community benefit	961	769	629
Option 1 NPV	860	698	577
<b>Option 2 (APMEP)</b>			
Option 2 (APMEP) total social and environmental cost	101	<b>71</b>	52
Option 2 (APMEP) total State and community benefit	962	<b>770</b>	630
Option 2 (APMEP) NPV	861	<b>699</b>	578
<b>Option 3</b>			
Option 3 total social and environmental cost	108	78	59
Option 3 total State and community benefit	996	800	708
Option 3 NPV	866	722	649
<b>Option 4 (BAU)</b>			
Option 4 (BAU) total social and environmental cost	17	16	15
Option 4 (BAU) total State and community benefit	164	150	138
Option 4 (BAU) NPV	147	134	123





As the change in discount rates is proportional for each alternative case, the NPV of the proposed Project and that for the alternatives are superior to the BAU case in each instance. There may be any number of possible scenarios that vary from the forecast relativities between revenues and costs. The manipulation of the discount rate, based on NSW Treasury financial appraisal guidelines, provides some indication of the range covered by such possible variances and the associated project risk.

A further means of testing the strength of the economic case for the proposal is to adjust certain economic performance assumptions. In framing these test criteria, it is considered that capital and operating cost assumptions will behave in a relatively predictable manner, in the context of assumptions for inflation over time, which have been factored into the analysis. The most likely source of variation relates to coal prices, which may be comparatively volatile. Table 6 displays the output of this analysis, based on price assumptions derived from market data and price adjustments at ten and twenty per cent higher and lower. As is the case with the proceeding analysis, changes in revenue associated with price variances are reflected as changes in tax and royalty benefit to NSW.

**Table 7: Sensitivity analysis - project options- adjusted price assumptions - (NPV)<sup>13</sup>**

<b>Evaluation Element</b>	<b>Option 1 \$M</b>	<b>Option 2 (APMEP) \$M</b>	<b>Option 3 \$M</b>	<b>Option 4 (BAU) \$M</b>
<b>Base case<sup>14</sup></b>	698	<b>699</b>	722	134
<b>Revenue Δ 10%</b>	718	<b>719</b>	745	137
<b>Revenue Δ 20%</b>	756	<b>757</b>	786	140
<b>Revenue -10%</b>	678	<b>679</b>	699	131
<b>Revenue -20%</b>	658	<b>659</b>	676	128

These separate analyses, based on adjustments to discount rates and also operating outcomes assumptions, demonstrate the positive economic outcomes for the Project

<sup>13</sup> At 7% discount rate.

<sup>14</sup> Refer to Table 5.



under a variety of scenarios. Although Table 7 assess only a limited range of variations, the Project outcomes are significantly greater than for the BAU case, and are likely to be positive in most foreseeable eventualities.

### **3.5 Direct employment impacts of Angus Place Colliery Mine Extension Project**

With respect to the employment impacts of the Project, the total number of employees and contractors employed at Angus Place will be maintained at 300 personnel, 225 of whom are full time employees. The significant majority of these employees reside in areas close to the mine (refer to Section 4.4.1).

As is the case with the assessment of project economics undertaken in previous sections, the underlying alternative outcome in respect of the Project is the loss of all existing positions, as mine closure would become inevitable on exhaustion of the currently approved resource and subsequent expiration of the current mine lease.

## **4. EXTENDED ECONOMIC IMPACT ANALYSIS**

### **4.1 Approach**

This analysis firstly identifies and where appropriate, quantifies the broader impacts of the Angus Place Colliery Mine Extension Project. The effects of the stimulus provided to regional and broader economies by direct construction and operating activity and the associated impacts are then considered. A discussion of the application of multipliers to quantify the extended benefit/cost relativities of the proposal is then undertaken.

### **4.2 Regional context**

Centennial's operations in the Lithgow and adjacent Mid-Western Regional Council LGAs are significant contributors to these regional economies. As Angus Place Colliery is situated in the Lithgow LGA, it is appropriate to focus on the recognised contribution of the mining industry to that particular regional economy.

#### **4.2.1 Lithgow City Council Economic Development Strategy**



The importance of the coal mining industry to the regional economy is explicit in Lithgow City Council's Economic Development Strategy (EDS) 2010-2014. This is substantiated by the following material included in the EDS;

- *"In 2006, the mining sector employed 10% of the total Lithgow resident workforce second only to the Retail sector at 11.2%" [emphasis added].*
- *"The largest employer in Lithgow Local Government Area is mining".*
- *"Only the mining sector had a greater percentage contribution to gross regional product (27%) than its share of employment (12%)<sup>15</sup>.*

Clearly the sector is of significant importance in the context of such a relatively small regional economy. The comparison of employment to output identified in the second point is indicative of a number of factors. Firstly, mining is relatively capital intensive, so the labour input may be comparatively lower. The EDS notes however that as much of the mining in the area is underground mining, this is relatively more labour intensive than open cut mining. Secondly, in terms of regional output, the sector stands out from the remainder of the local economy on the basis of its productivity and income effects relative to labour inputs.

The EDS also notes that there is scope for expansion in the coal industry, however "there is still pressure for coal industry downsizing from efficiency rationalisation and this may ameliorate [*sic*] the benefits of increased exports" (p. 87). The proposal to extend the Angus Place Colliery mining lease represents a commitment to maintaining operations and the associated employment in the Lithgow area.

These sustained operational and additional construction-related positions are of regional significance. The EDS emphasises the potential for severe impacts on the local economy that are likely to result from any premature curtailment of mining activity, as is exemplified in the following statements from the EDS:

- *"The major concern here is that many of these mining jobs are concentrated into a handful of businesses hence, as has been experienced in the past, any job losses tend to be on a large scale and hence may have an immediate impact upon the community"*

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<sup>15</sup> Note that this figure refers to total employment in the mining sector in Lithgow. The former figure of ten percent relates to the resident workforce of the LGA.



- *“This may have an impact upon the level of disposable income available to the Lithgow Resident Workforce in the future should the number of people in the mining industry decline further”.*
- *“This industry sector [mining] has also been shown as having a propensity to fluctuate mainly due to its sensitivity to international market forces. A critical impact of this is local business being heavily reliant upon a relatively small proportion of the community which has disposable income but one which can also be severely affected by changes to employment status. These families can also be considered as transient due to the specialised nature of their skills base. In other words a workforce with niche skills such as those in the mining industry are [sic] more likely to move from one region to another for work taking their disposable income with them”.*

The sustainability of the mining sector and its related employment is clearly vital to the broader economic wellbeing of the area. As is established throughout this economic assessment, the proposed project will have a direct and positive impact on economic sustainability over the period in which coal resources can be economically extracted, both directly for employees and their households and indirectly for the broader regional economy. The content of the EDS indicates that LCC is cognisant of the finite nature of mining in the area and its conclusions are evidently that the regional economy will continue to remain reliant on the role of the mining industry for some time.

The LCC EDS supports a conclusion that employment provided by Angus Place is a critical component of the regional economy. As is disclosed in Table 2, Angus Place Colliery employees' salaries are estimated at around \$418 million over the proposed extended mining period. Contractor salaries are additional to this estimate. The 'pay packet effect' of these incomes on the local economy is very significant, as is substantiated by LCC's assessment of the local economy and its reliance on these households' disposable incomes.

The extent of the 'pay packet effect' in relation to Angus Place Colliery is clear from the output of an employee survey conducted by the mine, which produced the following relevant findings:



- Over 81% of Angus Place Colliery employees live in the Lithgow Local Government Area and 62% of these employees live in the major townships of Lithgow, Wallerawang and Portland.
- On average, each employee surveyed spends 33.5% of their weekly income in their local residential community.

These data indicate the importance of the mine to the economy and the social fabric of the region. APMEP will ensure the continued operation of Angus Place and as such has an integral role in ensuring that these employment levels are maintained over the extended life of the mine.

#### **4.2.2 Community consultation**

Centennial Coal undertook community consultations in 2012 in relation to a range of projects (Coal Services Upgrade, Springvale Mine and Angus Place Colliery developments). Issues raised by the community in relation to the wider regional developments include:

- general visual impacts, particularly from open cut mining;
- intensification of mining activities; and
- the recognition of impacts from sources other than Centennial such as other mining operations and the two power stations.

Community information sessions to update on progress for the Angus Place and Springvale Mine Extension Projects and Lidsdale Siding Upgrade were undertaken in March 2013. In relation to mining activities on the Newnes Plateau the following points were raised:

- Sensitive ecology.
- Structural geology of the Newnes Plateau.
- Maintaining the 'environmental architecture'.

These matters are addressed in the relevant specialist reports comprising parts of the EIS. They are also quantified in the relevant sections of this report.

The consultation process also resulted in the following observations:



- There is a strong connection to mining in areas such as Lithgow, Wallerawang and Portland however this connection is not shared across the entire LGA. There has been an increasing population in rural areas and the connection that many of these landholders have to the LGA are its natural assets.
- Despite the connection to power and mining, residents do not want to be adversely impacted upon by industry when they are not at work.
- Identified benefits arising from mining such as construction of additional infrastructure, maintenance of existing, and creation of additional jobs etc. does not always outweigh the impact on community amenity even if the industry (e.g. mine) operates within approved limits.

These findings raise an important issue. Notwithstanding attempts to quantify environmental and economic effects from the perspective of their impact on the relevant communities, there remains an 'intrinsic value' component<sup>16</sup>. This element of social value relates to individual value judgements on impacts. It is subjective and cannot be accurately quantified, but must be recognised as an aspect of social impact.

### 4.3 Extended economic impacts

An estimate of the extended economic impacts associated with the construction works on the Angus Place Colliery Mine Extension Project, and the ongoing operation of the mine, can be derived using input-output (I/O) multipliers. The methodology is a commonly-used approach to providing an approximation of the economic effects of one industry's activities across the rest of the economy<sup>17</sup>. There are certain limitations to the application of I/O multipliers. These are also acknowledged by ABS<sup>18</sup>. The practical effect of these limitations is that the output of multiplier analysis can only be considered as *indicative* of outcomes that may result from economic stimuli.

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<sup>16</sup> James Marshall & Co. (2013)

<sup>17</sup> A detailed discussion on interpretation and limitations of multiplier analysis is included in ABS Cat No 5246.0; *Information Paper Australian National Accounts Introduction to Input-Output Multipliers*;

<sup>18</sup> For example ABS Cat No 1301.0, *Year Book Australia, 2002*



The NSW Department of Trade, Investment, Regional Infrastructure and Services (Division of Resources and Energy)<sup>19</sup> identified output and employment multipliers for mining and related services. While acknowledging the aforementioned limitations on multiplier analysis, the application of the relevant NSW Government Department’s declared multipliers adds validity to the analysis. The relevant multipliers are displayed in Table 8.

**Table 8: Type 2A Multipliers – mining and services**

Description	Multiplier value
Output Multiplier – mining & services	2.136
Gross Value Added Multiplier – mining & services	4.099
Income Multiplier – mining & services	2.839
Employment Multiplier – mining & services	3.977

The relatively large GVA multiplier in this instance demonstrates the importance of incomes generated by the relevant project. It should be noted that GVA comprises all components of income to labour, plus the gross operating surplus of the corporate entity. Due to the foreign ownership of Centennial, the latter will accrue beyond NSW; however, the former would be concentrated in the State and the immediate region. In addition to these mining multipliers, similar multipliers for construction activity were also identified<sup>20</sup>. These are relevant for assessment of the impacts of the initial stimulus associated with the construction works required for the Project, which are projected to involve around 50 contract employees.

**Table 9: Type 2A Multipliers – construction**

Description	Multiplier value
Output Multiplier – construction	2.694
Gross Value Added Multiplier - construction	4.369
Income Multiplier - construction	2.899
Employment Multiplier – construction	2.727

In this instance the GVA multiplier would have wider geographic impacts in terms of economic activity, as suppliers and contractors may be more likely to originate beyond the immediate region, given the specialised nature of the infrastructure being constructed. Nevertheless, Centennial Coal practice is to invite all locally-based

<sup>19</sup> *The Contribution of Primary Industries to the NSW Economy, Key Data 2012:*  
<[http://www.dpi.nsw.gov.au/\\_data/assets/pdf\\_file/0010/427645/Contribution-of-primary-industries-key-data-2012.pdf](http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0010/427645/Contribution-of-primary-industries-key-data-2012.pdf)>

<sup>20</sup> The original source of the DTIRIS multipliers is ABS Cat. No. 5246.0 (as above). GVA multiplier derived from ABS Cat No, 5246.0 & Multipliers for Culture-Related Industries, CMC SWG, Canberra.



tenderers for relevant works to identify themselves as such, with a view to ensure that opportunities to retain work locally are offered.

As the stimulus to the economy is equivalent to the additional activity and output associated with both construction and operational phases of the project, the net benefit of the Project may result in extended economic effects of approximately 2.1 to 4.4 times the initial stimulus, dependent on the economic measure being considered. Employment of the magnitude of approximately 2.7 to 4 times the economic stimulus would result. These indirect positions represent employment supported in the broader economy as a result of the demand for additional goods and services generated by the Project.

#### **4.4 Ecologically sustainable development reporting: quantitative and qualitative assessment of social, economic and environmental impacts**

The legislation governing this Project requires consideration of the principles of ecologically sustainable development in the design and implementation of such a project (refer to Section 1). These principles are reiterated in the Project DGRs. This report adopts a 'triple bottom line' approach to assessing and reporting these impacts. The approach is intended to provide an integrated assessment of the social, economic and environmental impacts of the Project, with the interdependencies between each of these aspects taken into consideration. The output of this approach is included in Table 10.

Tables 2 and 3 respectively identified the bases for quantifying the environmental impacts contained in the DGRs, and the relevant estimates for the Project. Table 10 compares the benefit and cost impacts in the context of those quantified assessments and also key qualitative aspects of each impact, with particular emphasis on the matters identified through the community consultation process and local government economic profile documents. In addition, the table also identifies the policies and specific actions employed by Centennial in managing and mitigating the externality impacts of the Project.





**Table 10: Economic Impact Assessment – Summary Table**

Impact	Environmental Assessment Commentary	Social and Economic Benefits	Social & Economic Costs/impacts	Description of Environmental Controls & Mitigation Measures
<p><b>Angus Place Colliery extended operations</b></p> <p><b>Consultant: Aigis Group</b></p>	<p>The project will result in an overall positive economic contribution at a State, regional and also to the local community level.</p>	<p>1. Direct existing positions maintained beyond current mine approval: 225. Assessed PV (all positions): ≈ \$418 million</p> <p>Mining contractors 75 FTE positions maintained. Assessed NPV ≈\$37 million.</p> <p>Construction contractors (periodically over LOM). Assessed PV ≈ 18 million.</p> <p>NSW Government royalty income from extended mining: PV ≈ \$203 million</p> <p>Additional state/local government taxes, rates &amp; charges: PV ≈ \$16 million</p> <p>Corporate taxes (federal); return to NSW: PV ≈ \$39 million</p> <p>Economic importance of mining in local economy recognised by LCC.</p>	<p>Nil</p> <p>Some specialised works may require contracting with providers from outside the local region, in which case the regional economy will experience lesser beneficial stimulus.</p>	<p>Nil required</p> <p>Local contractors tendering will have the opportunity to identify themselves as being locally based, with a view to ensure that opportunities to retain work locally are offered.</p>



Impact	Environmental Assessment Commentary	Social and Economic Benefits	Social & Economic Costs/impacts	Description of Environmental Controls & Mitigation Measures
<p><b>Subsidence</b></p> <p><b>Consultant: MSEC</b></p>	<p>Assessments indicate that the levels of impact on the natural and built features can be managed by the preparation and implementation of the appropriate management strategies.</p>	<p>1. Mining layout designed to exclude majority of cliffs and pagoda complexes from angle of draw from longwalls.            2. Longwalls to be extracted towards the National Park, allowing for an adaptive management approach. Possible implementation of Trigger Action Response Plan (TARP).</p> <p>Socioeconomic benefit of avoided or reduced impacts relating to implementation of prospective controls:</p> <p>PV ≈ \$3 million (implied avoidance of impacts equated with the value of royalties on foregone production of less conservative mine plan)</p> <p>Socioeconomic benefit of reparations relating to mitigation commitments:</p> <p>2013 price \$750K (remediation) - \$1 million (restoration) per swamp. 3 shrub swamps (Tri-Star, Twin Gully &amp; Trail 6). Up to \$3 million + 14 hanging swamps in Extension Area. <b>(PV not calculated as estimate is contingent and timing (if required) uncertain)</b></p>	<p>1. Notional cost to community: \$1,310,396 per annum (2016 price)            PV: ≈ \$14.3 million            2. Some minor and isolated fracturing could occur on the bed of the Wolgan River.            3. Impacts on certain minor cliffs, pagodas and rock formations would represent less than 1% to 3% of total exposed rock face areas of features located directly above proposed longwalls            4. Some cracking could occur in the swamps resulting from extraction of the proposed longwalls previous experience of mining in the area indicate that the likelihood and extents of these impacts are low.            5. \$3 million (PV) in public revenue (royalty) foregone due to conservative mine plan.</p>	<p><b>Prospective Controls:</b></p> <p>1. Mine plan designed to reduce likelihood of impacts.            2. Mine plan designed to permit adaptive management strategy relating to any observed impacts on surface features (cliffs, pagodas) and associated ecological communities.</p> <p><b>Mitigation Measures:</b></p> <p>Possible remediation activities:</p> <p>1. Infilling of surface cracks with soil or other suitable materials.            2. Locally regrading and recompacting the surface.            3. Erosion protection, such as planting of additional vegetation.            4. Remediation or restoration of any impacted swamps <b>as required.</b></p>



Impact	Environmental Assessment Commentary	Social and Economic Benefits	Social & Economic Costs/impacts	Description of Environmental Controls & Mitigation Measures
<p><b>Land use, soil &amp; agriculture</b></p> <p><b>Consultant: SLR Consulting Australia</b></p>	<p>An assessment of the Project Application Area against the biophysical strategic agricultural land verification criteria has been undertaken. The assessment found that there is no potential biophysical strategic agricultural land in the Project Application Area.</p> <p>The post-disturbance impact assessment determined that the Project may cause some minor ponding in drainage lines where natural gradients are naturally low upstream of longwall chain pillars, as well as tension cracks at the top and side of steep slopes. These impacts are not anticipated to have any effect on post-disturbance Land and Soil Capability classes across the Project Application Area.</p> <p>The only likely impact is associated with surface disturbance; however, as the proposed area to be disturbed is small (23.25 hectares), there will be negligible impact on Land and Soil Capability classes.</p>	<p>Rehabilitation of affected lands (progressive and mine closure)          Preservation of removed soils for redistribution to maintain local soil profile.</p> <p><b>Included in annual environmental compliance &amp; works provision (refer to Rehabilitation section).</b></p>	<p>Notional cost to the community: \$1,235,174 per annum (2014 price).          PV: ≈ \$16.4 million</p>	<p><b>Prospective Controls:</b>          Mine and infrastructure designed to minimise land and soil disturbance.</p> <p><b>Mitigation Measures:</b></p> <ol style="list-style-type: none"> <li>1. Refer to Sections 5.1.3 and 5.1.4 of APMEP Soil and Land Capability Assessment.</li> <li>2. Progressive rehabilitation of relevant sites.</li> </ol>



Impact	Environmental Assessment Commentary	Social and Economic Benefits	Social & Economic Costs/impacts	Description of Environmental Controls & Mitigation Measures
<p><b>Water Resources</b></p> <p><b>Consultant: RPS</b></p>	<p>1. Groundwater flow:            Level 1 Minimum Harm Criteria are met and consequently there are minimal consequences of the extension of Angus Place Mine with respect to groundwater flow.            Analysis also indicates that there is limited to negligible impact on THPSS ecosystems on the Newnes Plateau due to depressurisation of the Illawarra Coal Measures.</p> <p>2. Surface water flow:            The consequence of increased discharge to the Coxs River is negligible since there is excess demand for this water resource.</p> <p>3. Groundwater quality:            The proposed extension of Angus Place Mine does not lead to a change in the beneficial use of groundwater as drinking water supply.</p> <p>4. Surface water quality:            Neutral effect on water quality.</p>	<p>Mine water discharged into DWTS and/or Cox's River is utilised by EnergyAustralia for power generation. Water would otherwise need to be obtained from alternative sources, thus potentially impacting on other uses/users. In this respect the current mine water management approach has little local impact and is beneficial to the State.</p> <p>Socioeconomic benefit of reparations relating to mitigation commitments:</p> <p>2013 price \$750K (remediation) - \$1 million (restoration) per swamp. 3 swamps (Tri-Star, Twin Gully &amp; Trail 6). Up to \$3 million. <b>(PV not calculated as estimate is contingent and timing (if required) uncertain)</b><sup>21</sup></p>	<p>1. Overall a net decline in base flow of 0.74ML/day or 9.7% is predicted due to Angus Place.</p> <p>2. Notional cost to the community: \$1,235,175 per annum (2014 price)            PV: ≈ \$16.4 million</p>	<p><b>Prospective Controls</b>  <b>Groundwater:</b> Refer to SECTION 9.1, ANGUS PLACE MINE EXTENSION PROJECT GROUNDWATER IMPACT ASSESSMENT</p> <p><b>Surface water:</b> Refer to TABLE 9.1 ANGUS PLACE COLLIERY - SURFACE WATER IMPACT ASSESSMENT</p> <p><b>Mitigation Measures</b>  <b>Groundwater:</b> Refer to SECTION 9.1, ANGUS PLACE MINE EXTENSION PROJECT GROUNDWATER IMPACT ASSESSMENT</p> <p><b>Surface water:</b> Refer to TABLE 9.1 ANGUS PLACE COLLIERY - SURFACE WATER IMPACT ASSESSMENT</p>

<sup>21</sup> Not included in aggregate benefit/cost calculations due to the contingent nature of the provision.



Impact	Environmental Assessment Commentary	Social and Economic Benefits	Social & Economic Costs/impacts	Description of Environmental Controls & Mitigation Measures
<p><b>Biodiversity</b></p> <p><b>Consultant: RPS</b></p>	<p>Section 5A Assessments and EPBC Assessments were undertaken for all threatened subject flora and fauna species, populations and EECs. The Assessments concluded that, based on the relatively minor amount of vegetation to be cleared, the availability of extensive tracts of reserved bushland in the western Blue Mountains and the unlikely changes to local hydrology regimes, the Project is unlikely to have a significant impact.</p> <p>The location of the proposed clearing footprint incorporated significant avoidance measures, including the use of existing tracks and design modification to avoid threatened flora species and EECs. Consequently, no EECs or threatened flora species will be disturbed as a result of the proposed clearing</p>	<p>PV ≈ \$3 million (implied avoidance of impacts equated with the value of royalties on foregone production of less conservative mine plan)</p> <p>Socioeconomic benefit of reparations relating to mitigation commitments: 2013 price \$750K (remediation) - \$1 million (restoration) per swamp. 3 shrub swamps (Tri-Star, Twin Gully &amp; Trail 6) + 14 hanging swamps in Extension Area. <b>(PV not calculated as estimate is contingent and timing (if required) uncertain)</b></p> <p>Offset strategy (refer Appendix 2). Land value &amp; land management costs. PV ≈ \$778K</p>	<p>Land clearing for works and infrastructure limited to 23.25Ha, representing approximately 0.2% of the total project area.</p> <p>Notional cost of loss of biodiversity (upper bound) 2014: \$46,119. PV: ≈ \$612K</p> <p>2 EECs are within the predicted subsidence extents.</p> <p>13 threatened flora species have the potential to occur within the Project Area (PA).</p> <p>Of these 13 species, 2 were recorded in studies of the PA</p> <p>44 threatened fauna species have the potential to occur within the PA</p> <p>9 recorded in the PA; an additional 14 have previously been recorded in the PA</p> <p>PV ≈ \$3 million (implied avoidance of impacts equated with the value of royalties on foregone production of less conservative mine plan)</p>	<p><b>Prospective controls:</b></p> <ol style="list-style-type: none"> <li>1. Project design modification to avoid threatened flora species and EECs</li> <li>2. Land clearing for works and infrastructure limited to 23.25Ha, representing approximately 0.2% of the total project area<sup>22</sup>.</li> </ol> <p><b>Mitigation Measures:</b></p> <ol style="list-style-type: none"> <li>1. Progressive rehabilitation of infrastructure (underground services) corridors and other sites.</li> <li>2. Comprehensive post-mining rehabilitation program</li> </ol>

<sup>22</sup> 10,460 Ha



Impact	Environmental Assessment Commentary	Social and Economic Benefits	Social & Economic Costs/impacts	Description of Environmental Controls & Mitigation Measures
<p><b>Heritage</b></p> <p><b>Consultant: RPS</b></p>	<p>ARCHAEOLOGICAL</p> <p>1. A search of the Aboriginal Information Management Systems (AHIMS) database identified a total of 49 registered sites within the boundary of the Project Application Area, of which 14 were within the four study areas which encompassed proposed disturbance by both surface works and mining subsidence.</p> <p>2. Of the 14 sites within the PA boundary, it was considered that three were at potential risk of harm from mine subsidence and no sites will be affected by proposed surface works</p> <p>3. Likelihood of significant impacts on site #45-1-0084 and site 45-1-2756 (duplicate 45-1-2757) is relatively low (MSEC 2013: 93-94). It is considered that site #45-1-0137 is predicted to experience very low level subsidence, which is highly unlikely to result in any harm to the shelter.</p> <p>NATURAL<sup>23</sup></p> <p>1. Whilst the cliffs and pagoda complexes could experience low levels of subsidence, they are not expected to experience any significant conventional tilts, curvatures or strains.</p> <p>2. It is unlikely, therefore, that the cliffs and pagoda complexes would experience any adverse impacts resulting from the extraction of the proposed longwalls.</p>	<p>PV ≈ \$3 million (implied avoidance of impacts equated with the value of royalties on foregone production of less conservative mine plan)</p>	<p>1. ARCHAEOLOGICAL:          Notional cost to community (Lithgow LGA), 2014: \$7,060 per annum.          PV: ≈ \$94K</p> <p>2. NATURAL:          Notional cost to the community: \$1,235,174 per annum (2014 price)          PV: ≈ \$16.4 million</p>	<p><b>Prospective Controls:</b>          Refer to Section 9.3, Cultural Heritage Impact Assessment Lithgow Local Government Area</p> <p><b>Mitigation Measures:</b>          Refer to Section 9.3, Cultural Heritage Impact Assessment Lithgow Local Government Area</p>

<sup>23</sup> Based on subsidence report prepared by MSEC (2013)



Impact	Environmental Assessment Commentary	Social and Economic Benefits	Social & Economic Costs/impacts	Description of Environmental Controls & Mitigation Measures
<b>Air</b>  <b>Consultant:</b> <b>SLR Consulting Australia</b>	<p>The predicted results showed that the proposed APMEP is unlikely to cause any exceedances of the relevant ambient air quality criteria for TSP, PM10 and PM2.5 concentrations or dust deposition at any identified surrounding sensitive receptors when considering Project construction, operation and site rehabilitation.</p>	<p>Socioeconomic benefit of avoided or reduced impacts relating to implementation of prospective controls:</p> <p>Socioeconomic benefit of reparations relating to mitigation commitments:</p> <p><b>Included in annual environmental compliance &amp; works provision (refer to Rehabilitation section).</b></p>	<p>3 identified residential/receptor properties, assumed population of 7 individual residents<sup>24</sup>/receptors.</p> <p>Notional cost to community (2014): \$19,804 per annum.            PV: ≈ \$263K</p>	<p><b>Prospective Controls:</b>            Minimisation of exposed areas.            Dust containment fixtures fitted to all fixed plant and equipment</p> <p><b>Mitigation Measures:</b>            1. Water spraying            2. Ceasing work during adverse weather conditions</p>
<b>GHG</b>  <b>Consultant:</b> <b>SLR Consulting Australia</b>	<p>Comparison of Project emissions totals indicates that the APMEP is likely to represent approximately 0.03% of NSW GHG emissions when compared to the latest available emissions data (2010) Scope 1) and 0.01% of Australian GHG emissions (Scope 1).</p>	<p>Socioeconomic benefit of avoided or reduced impacts relating to implementation of prospective controls:</p> <p>Socioeconomic benefit of reparations relating to mitigation commitments:</p> <p><b>Included in annual environmental compliance &amp; works provision (refer to Rehabilitation section).</b></p>	<p>Assumed cost of \$23/tonne CO<sub>2</sub>-e.            Notional cost per annum of Scope 1 emissions (2014): \$980,881</p> <p>PV: ≈ \$10.1 million</p>	<p><b>Prospective Controls:</b>            1. Cost effective measures to improve energy efficiency            2. Regular maintenance of plant and equipment to minimise fuel consumption            3. Consideration of energy efficiency in plant and equipment selection phase</p> <p><b>Mitigation Measures:</b></p>

<sup>24</sup> ABS 2011 Census data: Persons per household for Lithgow LGA: 2.3 persons/household.



Impact	Environmental Assessment Commentary	Social and Economic Benefits	Social & Economic Costs/impacts	Description of Environmental Controls & Mitigation Measures
<p><b>Noise</b></p> <p><b>Consultant: SLR Consulting Australia</b></p>	<p>1. Operational Noise: Any increase in the existing Angus Place noise levels is predicted to be negligible and there will be no change to existing noise levels at the nearest residential receivers.</p> <p>2. Construction Noise: The predicted construction noise levels are significantly below the respective construction noise goals at the nearest receivers and any potential construction noise impacts are negligible.</p> <p>3. Off-site Transport Noise: Noise from traffic servicing surface infrastructure sites will be significantly below the relevant Industrial Noise Policy criteria and therefore no significant consequences are predicted.</p> <p>4. The consequences of potential noise impacts as a result of the Project are predicted to be negligible.</p>	<p>Socioeconomic benefit of avoided or reduced impacts relating to implementation of prospective controls:</p> <p>Socioeconomic benefit of reparations relating to mitigation commitments:</p> <p><b>Included in annual environmental compliance &amp; works provision (refer to Rehabilitation section).</b></p>	<p>Notional cost to residential receptors based on increase in background noise (20dBA), with no predicted exceedances (2014): \$29,128.          PV: ≈ \$386K</p>	<p><b>Prospective Controls:</b>          Noise containment fixtures fitted to all fixed plant and equipment</p> <p>Train workers to use equipment in ways to minimise noise;</p> <ul style="list-style-type: none"> <li>▪ operate the mobile plant in a quiet, efficient manner;</li> <li>▪ switch off vehicles and plant equipment when not in use;</li> <li>▪ keep plant and equipment well maintained including regular inspections and maintenance of equipment to ensure it is in good working order, and equipment not to be operated until it is maintained or repaired; and</li> <li>▪ for equipment with enclosures, ensure door and seals are well maintained and kept closed.</li> </ul>





Impact	Environmental Assessment Commentary	Social and Economic Benefits	Social & Economic Costs/impacts	Description of Environmental Controls & Mitigation Measures
<p><b>Traffic and transport</b></p> <p><b>Consultant: ARC Traffic + Transport</b></p>	<p>With the application of consultant's recommendations, the Project is supportable from an access and traffic perspective.</p> <p>The project will not alter the characteristics of the existing Pit Top Traffic generation.</p> <p>The traffic generated by the construction and operation of the Newnes State Forest (NSF) Project Sites would not significantly impact the operation of the NSF road network or the NSF access intersections at Clarence and north Lithgow.</p>	<p>Socioeconomic benefit of avoided or reduced impacts relating to implementation of prospective controls:</p> <p>Socioeconomic benefit of reparations relating to mitigation commitments:</p> <p><b>Included in annual environmental compliance &amp; works provision (refer to Rehabilitation section).</b></p>	<p>Notional and actual costs to community captured in noise, air, and GHG emissions estimates.</p>	<p><b>Prospective Controls:</b></p> <ol style="list-style-type: none"> <li>1. Preparation and implementation of Construction and Operational Traffic Management Plans with FCNSW and LCC.</li> <li>2. All heavy vehicle trips to/from NSF Project Sites be undertaken in daylight hours (6am to 6pm).</li> <li>3. Regular maintenance of overland conveyor system such that the potential for contingency coal road transport to be required is minimal.</li> <li>4. Agreement with FCNSW to limit new access tracks and adjacent infrastructure corridors to 5m + 5m</li> </ol> <p><b>Mitigation Measures:</b></p> <ol style="list-style-type: none"> <li>1. Each infrastructure corridor to be remediated after installation (all supporting infrastructure installed underground).</li> </ol>



Impact	Environmental Assessment Commentary	Social and Economic Benefits	Social & Economic Costs/impacts	Description of Environmental Controls & Mitigation Measures
<p><b>Visual</b></p> <p><b>Consultant: Golder Associates</b></p>	<p><b>Pit Top:</b>            As the Project involves no changes at the pit top, the views from identified receptors and any other fixed or transient viewpoints will remain unchanged. Residents will continue to see parts of the pit top during day and night. However, there will be no additional visual impact to the existing operations.</p> <p><b>Newnes Plateau:</b>            (Seven new dewatering boreholes) are at the end of minor, terminating 4wd tracks and will be decommissioned on completion of mining, with the facilities dismantled and sites rehabilitated to native woodland. The long term visual effect following successful rehabilitation is negligible.</p> <p>Construction of AP VS3 will cause minor to moderate visual impacts on recreational road users. In the long term VS3 will be dismantled and the site revegetated with endemic species to blend with adjacent undisturbed vegetation, thereby minimising the long-term visual impact.</p>	<p>Socioeconomic benefit of avoided or reduced impacts relating to implementation of prospective controls:</p> <p>Socioeconomic benefit of reparations relating to mitigation commitments:</p> <p><b>Included in annual environmental compliance &amp; works provision (refer to Rehabilitation section).</b></p>	<p>Notional cost to community of continued presence of existing and new infrastructure (2014): \$31,874 per annum.            PV: ≈ \$423K</p>	<p><b>Prospective Controls:</b>            Project design:</p> <ol style="list-style-type: none"> <li>1. Elevated conveyors at the pit top have been clad in neutral coloured steel sheeting.</li> <li>2. Lights at the pit top have been designed and installed to minimise light spill and direct shining towards receptors.</li> <li>3. Newnes Plateau pipelines and power lines will be buried and the clearing corridor promptly revegetated</li> </ol> <p><b>Mitigation Measures:</b></p> <ol style="list-style-type: none"> <li>1. Pit top rehabilitation plan provides for revegetation with native woodland and grasslands.</li> <li>2. Newnes Plateau infrastructure will be progressively dismantled and rehabilitated to an appropriate land use as identified with the rehabilitation technical report.</li> </ol>



Impact	Environmental Assessment Commentary	Social and Economic Benefits	Social & Economic Costs/impacts	Description of Environmental Controls & Mitigation Measures
<p><b>Rehabilitation</b></p> <p><b>Consultant; SLR Consulting Australia</b></p>	<p>Rehabilitation activities will be undertaken both progressively and at the end of the mine life (LOM). Partial rehabilitation of the disturbed areas following construction of the proposed infrastructure on Newnes Plateau. LOM rehabilitation to include rehabilitation of all infrastructure areas and the pit top and on Newnes Plateau.</p>	<p>Socioeconomic benefit of avoided or reduced impacts relating to implementation of prospective controls:</p> <p>PV ≈ \$3 million (implied avoidance of impacts equated with the value of royalties on foregone production of less conservative mine plan)</p> <p>Socioeconomic benefit of reparations relating to mitigation commitments:</p> <p><b>Annual environmental compliance and works provision: \$2.9 million (2014 price).</b>  <b>PV ≈ \$38 million</b></p> <p>2013 price \$750K (remediation) - \$1 million (restoration) per swamp. 3 swamps (Tri-Star, Twin Gully &amp; Trail 6). Up to \$3 million. <b>(PV not calculated as estimate is contingent and timing (if required) uncertain)</b></p>	<p>No additional social or economic costs are anticipated in respect of rehabilitation. Some short term activity will be required to carry out progressive and LOM rehabilitation activities, but overall outcomes (return of sites to remediated conditions) are positive.</p>	<p><b>Prospective Controls:</b>          Mining closure plan to be established and implemented - 5 years to + 10 years of mine closure</p> <p><b>Mitigation Measures:</b>          All rehabilitation activities are considered as part of mitigation commitments.</p>



## 4.5 Summary

There are several sources of benefit associated with the proposed Angus Place Colliery Mine Extension Project. From Centennial's perspective, there are benefits in terms of continued operation of Angus Place and the associated commercial benefit. Similarly, the workforce that will be sustained by the Project will also benefit employees' households. Also, the incomes which they derive will result in further induced benefit across the regional community, as a result of the 'pay packet effect' of the consumption activity of these employees in local and regional economies.

The negative external impacts reported in Table 10 must also be considered in the context of the existing use of Angus Place and other similar industrial usage in the area. Largely as a result of the detailed preliminary planning process and development of mitigation strategies, the negative impacts associated with the Project proposal are of significantly lesser magnitude than the benefits that will be generated by the Project, particularly in the regional context described in the LCC EDS.

## 5. ADDITIONAL REQUIREMENTS

### 5.1 Cumulative impacts

As part of the assessment of such a project, the DGRs require that impacts of the existing regional situation, and in particular any other concurrent expansion or application that may cumulatively increase impacts in the area be considered. In assessing cumulative impacts, it is important to recognise that these principally affect resident persons, households or others accessing the region under observation.

#### 5.1.2 Relationship Between the Proposed Springvale Coal Services Upgrade Project and the Angus Place Mine Extension Project

In addition to the extension of mining at Angus Place, the Project application also seeks to consolidate operational management of coal processing and distribution infrastructure with Springvale Coal Services. This approach is also relevant to Springvale Colliery and other potential Centennial Coal projects in the area. This initiative would allow managerial and locational centralization of logistics functions, thus avoiding unnecessary duplication and impacts across multiple sites.



## 5.1.2 Other relevant projects

Other relevant existing and pending applications in respect of the Lithgow LGA at present are as follows:

- Existing Wallerawang power station including approval for a Development Application (024/11DA) in July 2011 for new storage silos;
- Existing Mount Piper power station including the following applications:
  - Application for a Western Rail Coal Unloader (06\_0271) approved in June 2009;
  - Application for a new Base Load Power Station (MP 09\_0119) approved in January 2010; and
  - Application for the Ash Emplacement project under part 3A (MP 09\_0186) not yet determined.
- Activities such as those related to forestry operations and recreational activities (such as motorised vehicles on the Newnes State Forest);
- Existing Springvale Mine including:
  - longwalls 415 to 417 beneath Sunnyside Ridge Road;
  - an application to be made for one new dewatering bore 8;
  - the existing ventilation facility and its approved upgrade; and
  - pending application for extension of current mining consent.
- Existing Pine Dale Mine including:
  - Part 3A approval in 2011 for the Yarraboldy extension of an open cut mine; and
  - A request for DGRs was lodged in December 2011 for an additional and larger extension to the open cut mine.
- The Lidsdale Siding Upgrade Project is a Centennial project to improve rail loading facilities including a reclaim tunnel and train track extension, near Wallerawang. DGRs issued in January 2012;
- Expansion of Invincible Mine is part of the Coalpac Consolidation project 10\_0178 and includes an extension to the north by open cut and high wall mining.

Clearly, the APMEP has the potential to contribute to these cumulative impacts. However, findings of the specialist reports on impacts of Angus Place's extended operation indicate that these will be similar in nature to current operations at the mine. As a consequence, it may be concluded that there will be no incremental change in contributions to these impacts in the context of the current baseline impact levels.



## 5.2 Intra-generational and intergenerational equity

The Project has direct implications for both intra-generational and intergenerational equity. With respect to the intra-generational benefits, those individuals and households benefitting from direct and indirect effects of Angus Place Colliery's operations will continue to do so due to the extension of the mine's life. The broader derived benefits are discussed in preceding sections.

These socio-economic considerations are also relevant to the issue of intergenerational equity. Clearly, an extension of mine life by up to 25 years will provide future as well as immediate employment opportunities and the incomes and economic stimulus that these provide. There are also wealth impacts to be considered, to the extent that these can affect the long-term economic stability of employees' households, and have a reductive effect on future reliance on publicly financed welfare structures.

The intra- and intergenerational impacts of the proposal in terms of environmental risks will be actively managed and/or mitigated by APC to the greatest practicable extent. As is identified in the assessment of these non-financial impacts, Centennial continues to work on ongoing improvement of policies and procedures in order to ensure that management of impacts takes into account the most current, effective technologies and practices.

## 6. SUMMARY

As was discussed in Section 1, this report has sought to assess social, economic and environmental aspects of the project, from a 'triple bottom line' perspective. The results of financially quantifying these three interdependent groups of impacts indicate that the overall social and economic impact of the Angus Place Colliery Mine Extension Project is positive. Specialist reports indicate that with appropriate management, environmental impacts will not escalate as a consequence of the extension of mining. A detailed suite of prospective control mechanisms is proposed by Angus Place Colliery to reduce avoidable impacts. Unavoidable impacts are addressed to the greatest practicable extent by a range of adaptive management practices and specific mitigation measures. When this approach to minimising environmental impacts is considered in combination with the beneficial economic and social contributions Angus Place produces in the local community, it is concluded



that the net social, economic and environmental impacts of the project to the local, regional and NSW communities, and to the national economy, will also be positive.



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**Appendix 1: Comparative economic analysis of project alternatives APMEP proposal 2014-2034<sup>25</sup>.**

Assessment component	Option 1 (NPV) \$'000	Option 2: Preferred APMEP proposal (NPV) \$'000	Option 3 (NPV) \$'000	Option 4: 'Do nothing'/BAU (NPV) \$'000
Mine operation-stage additional/sustained employment (full time and contract) and contract construction employment	473,100	473,100	473,100	110,700
Coal royalties (State Government)	203,100	203,400	231,000	30,600
Other State taxes/Local Government rates & charges	15,800	15,900	16,500	3,800
Federal taxes (e.g. Corporate income taxes, return to NSW)	38,500	38,600	40,600	100
Biodiversity offset provision	780	780	780	0
Project impact controls and mitigation commitments	38,000	38,000	38,000	5,000
<b>Total assessed Social, Economic and Environmental benefit</b>	<b>≈769,000</b>	<b>≈770,000</b>	<b>≈800,000</b>	<b>≈ 150,000</b>
Noise	400	400	400	100
Subsidence	14,300	14,300	17,500	3,300
Soil & land capability	16,400	16,400	16,400	3,300
Surface water & groundwater	14,300	14,300	16,400	3,300
Air	300	300	300	100
GHG emissions	10,100	10,100	10,100	2,400
Heritage (Archaeological & Natural)	14,400	14,400	16,500	3,300
Biodiversity	600	600	600	100
Visual amenity	400	400	400	100
<b>Total assessed Social, Economic and Environmental cost</b>	<b>≈71,000</b>	<b>≈71,000</b>	<b>≈78,000</b>	<b>≈16,000</b>
<b>NET ASSESSED SOCIAL, ECONOMIC AND ENVIRONMENTAL COST</b>	<b>≈ 698,000</b>	<b>≈ 699,000</b>	<b>≈ 722,000</b>	<b>≈ 134,000</b>

<sup>25</sup> At discount rate of 7 per cent.



## Appendix 2: Description of Centennial Coal Biodiversity Offset Strategy Springvale Colliery & Angus Place Colliery Mine Extension Projects

### *Angus Place and Springvale Proposed Biodiversity Strategy*

Through the adoption of avoidance measures, including where possible, placing surface infrastructure outside habitat for threatened species, shortening longwall blocks and narrowing longwall widths; Centennial has minimised the potential impacts to threatened species and endangered ecological communities.

Despite this, there is the potential for activities undertaken as part of these Projects to directly impact the habitat for threatened species and indirectly impact the endangered ecological communities that comprise Temperate Highland Peat Swamps on Sandstone (Newnes Plateau Shrub Swamps and Newnes Plateau Hanging Swamps). Centennial has developed a Biodiversity Strategy that considers both these direct and indirect impacts.

#### **Direct Offset Package:**

The Angus Place Extension Project will clear 23.25 hectares of native vegetation. The Springvale Extension Project will clear 11.8 hectares of native vegetation. No endangered ecological communities will be cleared.

Whilst Centennial has established that the impacts on swamp communities on the Newnes Plateau are negligible (that is, within pre-mining or natural variations), Centennial acknowledges that the potential for indirect impacts presents a level of uncertainty that to some stakeholders may be unacceptable.

The Springvale Extension Project proposes to mine under 76.57 hectares of THPSS.

The Angus Place Extension Project proposed to mine under 20.04 hectares of THPSS.

The total area of THPSS to be mined under is 96.61 hectares.

To compensate for the residual impacts to THPSS, it is intended to provide an offset of up to 105 hectares of land owned by Centennial Airlly Pty Limited This land is located adjacent to the Capertee National Park and within proximity of the Mugii Murum-Ban State Conservation Area. This land includes the critically endangered ecological community Capertee Rough-barked Apple-Redgum-Yellow Box Grassy



Woodlands and habitat for the threatened Gang Gang Cockatoo, Swift Parrot and Regent Honeyeater.

This land will be placed under a restrictive covenant (or similar) to provide for in perpetuity conservation. The restrictive covenant will place restrictions on future land use commensurate with conservation outcomes.

The covenant will be supported by a Land Management Plan that may include commitments to:

- Manage weeds and feral animals, establish and maintain fencing to exclude stock (incorporated into a regional pest management strategy).
- Establish the completion criteria required to achieve an improved biodiversity outcome on the land such that once criteria are met, Centennial's conservation obligation will have been realised.
- Working with the Hawkesbury-Nepean Catchment Management Authority and National Parks and Wildlife to establish habitat suitable for the Gang Gang Cockatoo, Swift Parrot and Regent Honeyeater on this land.

Centennial will continue to consult with Office of Environment and Heritage and the Federal Department of the Environment to continue to refine this package.

### **Supplementary Measures to Support Conservation Outcomes**

Centennial intends to continue consultation with the Office of Environment and Heritage and the Federal Department of the Environment regarding the following potential research activities:

- Contributing research funding towards furthering recovery plans for threatened species that are endemic to shrub swamp communities. This research may include mapping the extent of species distribution in a regional context, include trials for the establishment of species habitat, studies of the nature, form and function of species within the landscape, methods to communicate research findings, and short and long term goals to measure the effectiveness of the research.
- Working with community groups to provide remediation advice and in kind support, for the active rehabilitation of shrub swamp communities impacted by other anthropogenic activities (for example, four wheel drive tracks) on the Newnes Plateau.



- Developing a research program in consultation with Forests NSW, the Office of Environment and Heritage and the Office of Water Science into the hydrology of shrub swamp communities.

Centennial acknowledges that the existing approval condition requiring both the Angus Place and Springvale operations to develop and implement a *Persoonia hindii* Research and Management Plan is ongoing; the outcomes of this research and monitoring program will provide information to inform future management decisions regarding potential impacts to *Persoonia hindii*. To mitigate the unlikely event that this research program does not achieve the expected outcomes, the biodiversity package within this EIS includes consideration of *Persoonia hindii* and satisfy the requirement to provide additional offsets.

### **Monitoring Program**

Centennial has invested considerable research and monitoring effort on the Newnes Plateau over the last 15 years of mining operations. In particular, Centennial's investment has focussed on monitoring the THPSS. The biodiversity strategy described above will enable Centennial to redirect this monitoring investment towards improving those conservation outcomes.

Centennial will continue to support research into rapid mapping techniques, defining vegetation community boundaries and understanding hydrological needs of swamp communities.

Centennial's existing and future monitoring programs will be redefined to focus on establishing these conservation outcomes.

### **Summary of Biodiversity Strategy**

Centennial will continue to consult with Office of Environment and Heritage and the Federal Department of the Environment to continue to refine the Biodiversity Strategy. This Strategy, combined with the current measures taken to avoid and minimise impacts, will compensate for the residual impacts, enhance biodiversity outcomes, conserve high conservation species and communities and will enable focussed effort on improving understanding of the biodiversity values on the Newnes Plateau.



**Approach to valuation of related costs and benefits in economic assessments**

The approach to valuing the risk of indirect impacts to THPSSs is to attribute the relevant proportion of the full value of the package (land value and land management costs as described) to each of the mines. This attribution is on the basis of the relative area of THPSS undermined for each project. The key data are:

<b>Project site</b>	<b>THPSS area undermined (Ha)</b>	<b>Proportion of total %</b>
Total	96.61	100
Springvale Colliery	76.57	79
Angus Place Colliery	20.04	21

In terms of the land management provision, the commencement of the program is assumed to commence in 2016. As a result, estimates included in the report are present values based on that assumption. The present land valuation and estimate of land management costs are:

- Land value: \$3,125,955
- Land management costs: \$1,706,250 (five years).