

Appendix O

Economic impact assessment

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COWAL GOLD OPERATIONS UNDERGROUND DEVELOPMENT

EVOLUTION MINING (COWAL) PTY LTD
SEPTEMBER 2020

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Job ID:	J001331
Job Name:	Cowal Gold Operations Underground Development
Client:	Evolution Mining (Cowal) Pty Ltd (Project Managed by EMM Consulting)
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Document Name:	CGO Underground - Economics Final
Last Saved:	18/9/2020 3:40 PM

Version	Date	Reviewed	Approved
Draft v1.0	21/08/2020	KL	KL
Draft v2.0	11/09/2020	KL	KL
Draft v3.0	15/09/2020	KL	KL
Final	18/09/2020	KL	KL

EXECUTIVE SUMMARY

BACKGROUND

Evolution Mining (Cowal) Pty Ltd is proposing to develop an underground mining operation (the Cowal Gold Operations Underground Development), which includes:

- Developing an underground gold mining operation beneath and adjacent to existing open cut operations at the Cowal Gold Mine.
- Developing ancillary surface infrastructure including modifications to existing processing plant and a pastefill plant for stope void backfill.
- Extracting and processing up to 27 million tonnes of ore over the life of the underground mine.

An Environmental Impact Statement (EIS) is being prepared for the proposed development, complying with the requirements in Clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.

This economic impact assessment report has been prepared to examine the likely impacts of the Project on the regional (in which the mine is proposed to be located) and NSW economies. This report has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) and *Guidelines for Economic Assessment of Mining and Coal Seam Gas Proposals (December 2015)*.

The most relevant economy against which to examine the regional impacts associated with the proposed project is the regional economy comprised of Bland, Lachlan and Forbes local government areas (LGAs). This area is referred to as the Catchment.

EXISTING ECONOMIC ENVIRONMENT

The Catchment recorded an estimated resident population of just under 22,000 people in 2019. Similar to many communities in regional NSW, the Catchment's population has been in decline over the past two decades. Various mining and exploration projects have assisted in slowing population decline since 2006 (including the commencement of production at the current Cowal Gold mine in 2006). The Catchment's population is anticipated to decline by 0.2% per annum on average to just over 21,000 residents by 2041.

The Catchment recorded Gross Regional Product (GRP) of approximately $1.5 billion in 2018-19. The economy heavily influenced by fluctuations in mining and agricultural activity, with these industries contributing 18.8% and 16.8% of total sector Gross Value Added (GVA) activity, respectively. Agriculture was also the largest employing industry in the Catchment in 2018-19 (representing 22.1% of total employment).

As of December 2019, the unemployment rate in the Catchment was recorded at 3.3% (lower than the 4.5% recorded for NSW). The unemployment rate in the Catchment was higher than the State between mid-2012 and 2016 but averaged just below that of the State over the past three years to 2019 (at 4.4% compared to 4.7% respectively).

Within the Catchment, housing and rental market activity is primarily centred in Forbes LGA. Since June 2017, residential house sales activity in Forbes LGA has averaged around 40 sales per quarter, whilst Bland and Lachlan LGAs recorded fewer than 30 sales per quarter on average. Rental activity demonstrated similar trends to sales. Median house prices and rents were both consistently well below the State average.

Indicative estimates of the impact from COVID-19 suggest as at 30 May 2020 there was a reduction of approximately 650 employees in the Catchment compared to 2018-19 estimates (or 7.0%). The impact on GVA has been slightly less pronounced, with the Catchment recording a decline of approximately $67.6 million due to the pandemic, a decline of 5.1%. Longer term it is anticipated the Catchment economy will continue to be impacted by lower international demand for Australian agriculture produce until trade activity returns. As with most of regional Australia, lower population growth is expected over the next few years, due reduced migration resulting from the international travel ban implemented in March 2020. As a result, property market activity prospects remain subdued.

LOCAL EFFECTS ANALYSIS

Potential Beneficial Impacts

Key beneficial impacts arising from the Cowal Gold Operations Underground Development are outlined in Table ES.1. Beneficial impacts are examined in consideration of what would otherwise occur if the Project does not proceed.

Table ES.1. Assessment of Beneficial Impacts of the Cowal Gold Operations Underground Development

Impact	Description
Economic Growth	The Project will contribute to economic growth through increased industry output and Gross Regional Product (GRP) during construction and operation (i.e. production), flowing from both direct and indirect impacts. The Project is estimated to support an additional: • $38.9 million in GRP per annum in the Catchment during construction. • $106.3 million GRP per annum in the Catchment during operations. At peak, the Project is estimated to result in an average annual increase in GRP of 5.0% compared to what would be expected to occur without the Project (2024-25 to 2031-32).
Employment and Incomes	The Project will increase employment during construction and operations, compared to what would occur without the Project, flowing from both direct and indirect impacts. Including both direct and flow-on (supply chain) impacts, the Project is estimated to support an additional: • 159 Full Time Equivalent (FTE) jobs per annum in the Catchment during construction. • 236 FTE jobs per annum in the Catchment during operations. The increase in employment will also deliver increased incomes in the Catchment and NSW, both directly as a result of the jobs supported as well as through a small lift in real wages generated by increased competition for labour. Overall, the Project is estimated to support: • $11.1 million in additional incomes per annum in the Catchment during construction, with a further $39.6 million elsewhere in NSW. • $12.5 million in additional incomes per annum in the Catchment during operations, with a further $57.5 million elsewhere in NSW.
Support for Local Businesses	The Project will create opportunities to secure new contracts and increase sales to supply and service the needs of the Project through flow-on impacts in the supply chain during all phases of the Project. This will provide a boost for businesses in the Catchment and in the broader NSW economy. Prominent industry beneficiaries from flow-on from this Project include business services, trade, and public services, health and education. The Project will also result in the support of local suppliers and contractors, providing additional security and longevity of business incomes (and employment) in the region.
Government Revenue	The Project will provide a lift in State and Australian government taxation revenues through a variety of taxes and duties. Overall, the Project is estimated to deliver a total of: • $556.6 million in additional revenue to the Australian Government, through personal income tax, fringe benefits tax, company tax and GST, compared to what would occur without the Project. • $174.8 million in additional revenue to the NSW Government compared to what would occur without the Project, primarily through royalty payments. These additional revenues can be used by government to provide additional infrastructure and services to support business and households throughout Australia.

Source: AEC.

Potential Adverse Impacts

Key adverse impacts arising from the Cowal Gold Operations Underground Development are outlined in Table ES.2. Impacts are examined in consideration of what would otherwise occur if the Project does not proceed. This table also includes assessment of impacts on local property values and the Australian dollar / exchange rates, which can provide both beneficial consequences for some stakeholders and adverse consequences for others.

Table ES.2. Assessment of Adverse Impacts of the Cowal Gold Operations Underground Development

Impact	Description
Impacts on Local Businesses from Competition for Resources	There will be increased competition for labour and resources, leading to inflationary pressure and increased costs to businesses as well as potential difficulties for local businesses attracting and retaining staff. The increase in real wages also highlights the increasing costs to businesses as real wages are higher than the base case throughout the mine life. As a result, some industries are expected to see a small decline in activity and employment relative to the base case (e.g. manufacturing). However, compared to base case (i.e. without the Project) activity, the impacts of the Project on real wages and industry output are estimated to be relatively small, and will be offset to some degree by the benefits generated throughout the supply chain.
Impacts on Local Property Values	The majority of the Project's workforce is expected to be sourced from outside the Catchment and will need to be accommodated during the periods they are working within the Catchment. At peak, this is expected to result in approximately 180 beds being required at one time (in late 2022). Longer term, around 100 to 110 beds are estimated to be required at any one time. Workforce accommodation strategies are being investigated. The primary option for consideration is the construction of an accommodation village in West Wyalong. Lease / acquisition of existing commercial accommodation facilities in the local area is also being considered. In terms of impacts on the local property market: • The construction of an accommodation village would result in negligible impacts on local property values, as all non-local workers would be accommodated in the village. • Lease / acquisition of commercial accommodation would result in some contraction in the availability of commercial accommodation for non-Project related travellers to the area. This may be expected to result in some tightness in the market during peak visitor periods, with high occupancy rates and increased commercial accommodation room rates.
Impacts on Industry from AUD and Exchange Rates	The Project has the potential to support an appreciation in the Australian dollar and exchange rates through production of gold for export. This could adversely impact on trade-exposed sectors of the Australian economy (i.e., sectors that compete in global markets such as agriculture, manufacturing and tourism) by increasing the cost of domestic goods and services to foreign buyers. Industries such as agriculture, manufacturing and tourism are strong contributors to the NSW and national economy, though the contribution of these industries can fluctuate due to a number of macro-economic factors (including exchange rates). However, considering the total export value of the Project relative to total national exports, the Project is anticipated to result in only a marginal (0.01%) appreciation in the exchange rate. Impacts on industry from the Project due to appreciation of the Australian dollar are thereby anticipated to be negligible.

Source: AEC.

MITIGATION STRATEGIES

Assessment of the economic impacts of the Project identified the following primary issues, risks and impacts that need to be addressed include:

- Impacts on business activity in the Catchment through competition for resources (including labour) and rising production costs.
- Potential impacts on availability and affordability of accommodation resulting from non-local workers in the region.

To assist in addressing the issues identified above, CGO has identified and intends to implement a range of plans and strategies to mitigate impacts. These include:

- Encouraging contractors engaged to source labour locally wherever possible and provide training opportunities where appropriate to upskill the local workforce and existing open cut employees.

- Continued support for local business by utilising established supply networks and providing sufficient opportunities and information for local business to secure new supply contracts.
- Provision of sufficient and suitable accommodation for the non-local workforce to minimise impacts on the local property market and housing affordability. Workforce accommodation strategies were being investigated at the time of writing this study. The primary option for consideration is the construction of an accommodation village in West Wyalong. Potential sites for a village are being explored. The other option being investigated is the lease / acquisition of existing commercial accommodation facilities such as motels in the local area to house the workers.

COST BENEFIT ANALYSIS

The Net Present Value (NPV) of the project has been estimated as the difference between the present value (PV) of future benefits and PV of future costs. A Cost Benefit Analysis (CBA) for the Project shows that, assuming a discount rate of 7%, the NPV of the Project to the NSW economy is estimated at $314.4 million (Table ES.3). Even at a discount rate of 10%, the Project is estimated to result in a net benefit to NSW of $177.2 million. The benefit cost ratio (BCR) is estimated at 1.18, highlighting that the Project is estimated to return $1.18 for every dollar cost.

Table ES.3. Summary CBA Results of Cowal Gold Operations Underground Development Impacts to NSW

Real Discount Rate	PV Costs ($M)	PV Benefits ($M)	NPV ($M)	BCR
4%	$2,215.1	$2,729.3	$514.2	1.23
7%	**$1,793.5**	**$2,107.9**	**$314.4**	**1.18**
10%	$1,486.3	$1,663.5	$177.2	1.12

Source: AEC.

The CBA identifies that the Project is economically desirable for NSW with the benefits outweighing the costs across all discount rates examined (4%, 7% and 10%) (Table ES.3).

Sensitivity analysis shows that, at a discount rate of 7% and based on the assumptions used, there is a 90% probability the Project will provide an NPV between -$85.7 million and $715.9 million. Sensitivity testing returned a positive NPV across 89.6% of the 5,000 iterations run in Monte Carlo analysis, with the analysis most sensitive to the value of gold product. Given gold prices used in the analysis are considerably below current gold prices the sensitivity analysis is considered likely to overstate the probability of returning a negative NPV.

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1. INTRODUCTION

1.1 BACKGROUND

Evolution Mining (Cowal) Pty Ltd is proposing to develop an underground mining operation (the Cowal Gold Operations (CGO) Underground Development), which includes:

- Developing an underground gold mining operation beneath and adjacent to existing open cut operations at CGO's mine.
- Developing ancillary surface infrastructure including modifications to existing processing plant and a pastefill plant for stope void backfill.
- Extracting and processing up to 27 million tonnes of ore over the life of the underground mine.

An Environmental Impact Statement (EIS) is required for the proposed development to comply with the requirements in Clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*. As part of the EIS, analysis of the anticipated economic impacts of the project is required.

1.2 PURPOSE OF THIS REPORT

This report has been developed as a technical document for use in preparing the EIS. The report quantifies the expected beneficial and adverse economic impacts of the Project on the regional and state economies. The report also recommends mitigation strategies to ensure regional economic values are enhanced or, as a minimum, maintained if the project proceeds.

2. ASSESSMENT APPROACH

2.1 ASSESSMENT REQUIREMENTS

The Secretary's Environmental Assessment Requirements (SEARs) outline that the economic analysis is required to provide "an assessment of the likely economic impacts of the development, paying particular attention to the:

- Significance of the resource.
- Economic benefits of the development for the State and region.
- Demand for the provision of local infrastructure and services."

In addition to the SEARs, the *Guidelines for Economic Assessment of Mining and Coal Seam Gas Proposals (December 2015)* have been used as a basis for the scope of assessment required for the economic assessment. These guidelines indicate the following works as being required:

- A cost benefit analysis (CBA) to assess the public interest by estimating the net present value of the project to the New South Wales (NSW) community.
- A local effects analysis (LEA) to assess the likely impacts of the development in the locality / region in which the project is located.

In addition to the above, the following components are provided as part of this economic assessment:

- A profile of the existing economic environment of the local area to provide a basis for understanding the relative magnitude of local / regional impacts in the LEA.
- Development of appropriate mitigation strategies for identified economic impacts.

2.2 METHOD OF ASSESSMENT

2.2.1 Existing Economic Environment

The existing economic environment section provides an overview of the existing economic profile of the project study area (see section 2.3 for a definition of the Catchment used for the project study area) and provides a current baseline for assessment of the significance of potential impacts of the proposed development. Regional economic data collected during this stage is used to develop economic models and informs the 'base case' (or baseline scenario) against which the project's impacts are assessed.

A summary of the existing economic environment is presented in section 4, with supporting data and analysis in Appendix A.

The existing economic environment is presented in two sections:

- The first section provides an assessment and overview of the prevailing conditions of the economy based on available data sets at the time of writing. However, the timing of release of many data sets can lag by three to six months (and in the case of Census data this is only available every five years), which can mean recent developments and macro-economic conditions (including ramifications of COVID-19) are unlikely to be fully reflected in the statistics and data presented.
- The second section provides some additional context and analysis regarding recent impacts on the existing environment in consideration of the ramifications of COVID-19 for the Catchment and NSW economies.

2.2.2 Local Effects Analysis (LEA)

The LEA section uses economic impact modelling results as well as information from the existing environment and desktop research to analyse, assess and discuss the economic impacts of the project.

The LEA includes input and information from:

- Economic modelling using Computable General Equilibrium (CGE) modelling techniques (a description of CGE modelling is provided in Appendix B).
- Interpretation of modelling output in the context of the regional and state economies, and analysis of other non-quantified changes to the economic environment.
- Evaluation of the significance of impacts in relation to economic resources.

The assessment identifies the economic impacts specific to the project compared to what would be anticipated if the project does not proceed. The LEA is presented in section 5.

2.2.3 Development of Mitigation and Enhancement Strategies

The mitigation strategies section identifies strategies to avoid, reduce or mitigate the negative economic impacts and enhance and facilitate the capture of the positive impacts identified in the economic impact assessment. This includes:

- Defining and describing the objectives of the task / strategy.
- Identifying practical methods to protect and / or enhance economic values.
- Identifying practical monitoring measures.

Mitigation and enhancement strategies are presented in section 6.

2.2.4 Cost Benefit Analysis (CBA)

The CBA has been conducted in line with NSW and Australian Government guidelines, examining the stream of relevant economic, social and environmental costs and benefits anticipated from the project to assess the net present value of the project to the NSW community. Additional details regarding the CBA assessment method used is provided in Appendix C. The results of the cost benefit analysis are presented in section 7 of this report.

2.3 STUDY AREA

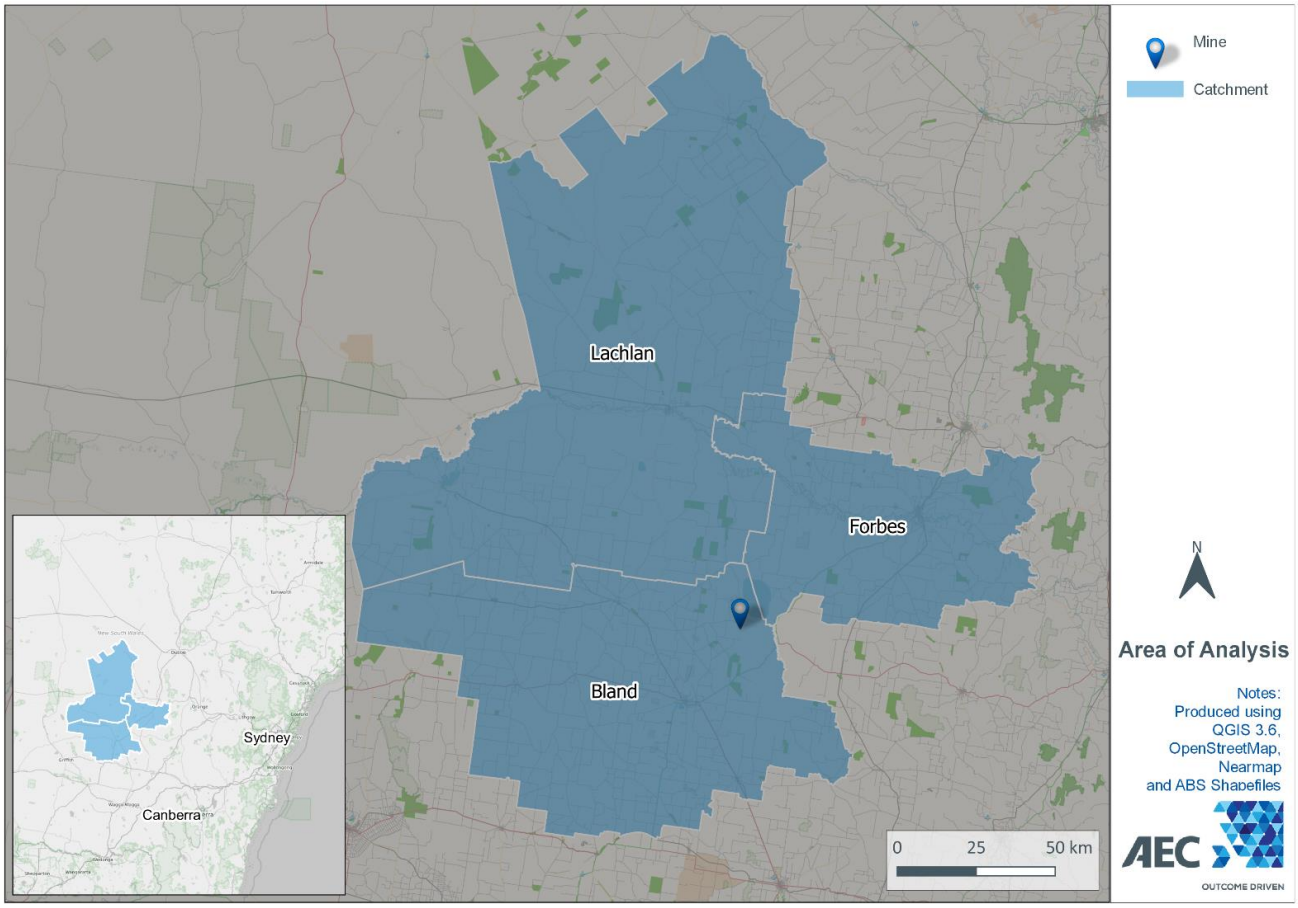
The study area used in the LEA is defined as the aggregation of the following Local Government Areas (LGA):

- Bland LGA (in which the project is located).
- Lachlan LGA.
- Forbes LGA.

The above study area is hereafter referred to as the “Catchment”.

This report uses 2019 LGA boundaries, as at the time of writing, no data had been released regarding the 2020 LGA boundaries. In September 2019, Murrin Bridge joined Lachlan Shire, representing a shift of approximately 1.9% of Cobar’s population into Lachlan (Lachlan Shire Council, 2020; ABS 2020d). This will make only a marginal difference to numbers outlined in this report.

Figure 2.1. Map of Catchment



Source: AEC.

3. PROJECT OVERVIEW AND ASSUMPTIONS

3.1 PROJECT DESCRIPTION

Approval is being sought to develop CGO's Underground Development (the Project), an underground gold mining operation located beneath and adjacent the footprint of the existing open pit operations. Current open pit operation is expected to wind down in the next decade and the underground mine will supplement and extend overall production of CGO. Underground mining production is expected to peak at just around 1.8 million tonnes per annum (Mtpa) of run of mine (ROM) ore, with approximately 27 Mt total anticipated over the life of the mine. Mining is expected to continue until approximately the second half of 2039. The development of the underground mine will occur within Mining Lease (ML) 1535.

The Project will use stope mining methods to extract ore, with delivery of the extracted ore to the surface by truck. It will include development of ancillary underground infrastructure to support the operation, including an air ventilation system, electrical reticulation, dewatering infrastructure, a loader and a paste fill plant.

3.2 PROJECT SCENARIO

Modelling conducted for the economic impact assessment is based on a scenario in which construction of the mine commences in June 2021, with construction activity anticipated to be effectively completed by the end of 2023-24. Extraction activities are expected to be undertaken concurrently with construction of the mine shafts, with primarily waste rock extracted over 2021-22 and 2022-23.

The Project is estimated to peak at around 1.8Mtpa of ROM ore, with a total of approximately 27 Mt of ore anticipated to be extracted over the life of the underground mine. The scenario modelled in this assessment is for mine production to be undertaken over a period from financial year 2020-21 to financial year 2039-40 (with operations ending in the second half of the 2039 calendar year). Operating activity in the initial years primarily reflects extraction of waste rock as part of the development of mining shafts.

Ore extracted from the underground mine will be processed at CGO's existing processing facility. The timing of processing of the underground ore, whilst not currently scheduled, will occur concurrently with the ore from the current open pit operations. For simplicity, modelling has assumed that ore is processed the same year in which it is extracted, with the exception of a small amount of ore extracted in 2020-21 which has been assumed to be processed the following year (2021-22). Modelling is based on a scenario of 1.84 million ounces of saleable gold being produced over the project life.

Workforce accommodation strategies are still being investigated, with construction of an accommodation village in West Wyalong the primary option currently being considered. Potential sites for a village are being explored. The other option being investigated is the leasing / acquisition of existing commercial accommodation facilities such as motels in the local area to house the workers. The modelling for the Project has included anticipated costs for an accommodation village.

Modelling of economic impacts has been undertaken in financial years.

Note: All dollar values presented in this section are in Australian dollar terms unless otherwise specified.

3.2.1 Construction

3.2.1.1 Construction Costs and Timing

The capital cost for developing the Project is estimated to be $319.4 million. Modelling is based on construction commencing in 2020-21, with all works completed by the end of 2023-24 except for $2.3 million in tailings landform works undertaken in 2029-30. A breakdown of construction costs by financial years used for modelling is presented in Table 3.1.

Table 3.1. Capital Cost Estimate for Project, $M

Component	2020-21	2021-22	2022-23	2023-24	2029-30	Total
Mine and Infrastructure	$2.7	$69.2	$144.9	$36.8	$0.0	$253.6
Project Management	$0.3	$3.3	$3.6	$1.4	$0.0	$8.6
Boxcut	$0.0	$7.6	$0.0	$0.0	$0.0	$7.6
Paste Fill Plant	$0.0	$10.1	$27.5	$5.1	$0.0	$42.8
Loader	$0.0	$0.0	$4.6	$0.0	$0.0	$4.6
Tailings landform	$0.0	$0.0	$0.0	$0.0	$2.3	$2.3
Total	**$3.0**	**$90.2**	**$180.6**	**$43.3**	**$2.3**	**$319.4**

Source: Evolution Mining (2020a).

3.2.1.2 Construction Labour

Construction activity between 2020-21 and 2023-24 is estimated to require a total of approximately 386,350 man hours. Estimates of man hours by month were converted to full time equivalent (FTE) worker estimates for each month assuming an average of 190 hours worked per month per FTE (based on a typical FTE worker working approximately 40 hours per week over 52 weeks, with four weeks holiday leave and one week sick leave).

Construction works are anticipated to provide employment for approximately 119 FTE workers during the peak year of construction (2022-23), with a peak monthly workforce of approximately 123 FTEs during this year. Timing for construction labour used for modelling is outlined in Table 3.2, including estimated labour costs (noting these labour costs are included within the construction costs outlined above).

Table 3.2. Construction Labour for Project

Component	2020-21	2021-22	2022-23	2023-24
Employment (FTEs)				
Mine and Infrastructure	14.3	41.5	95.1	18.5
Project Management	3.7	8.6	9.0	2.3
Paste Fill Plant	-	-	-	1.3
Loader	-	-	15.0	-
Total	**18.0**	**50.1**	**119.1**	**22.0**
Labour Costs ($M)				
Total	**$2.6**	**$10.2**	**$21.8**	**$4.7**

Source: Evolution Mining (2020a).

3.2.1.3 Source of Goods / Services

Construction will use labour from the Catchment where feasible, with the rest of the construction workforce supplemented by workers outside the Catchment. The economic analysis assumes all of the project management for the Project is sourced from the Catchment, but only 30% of mine and infrastructure, plant and loader workforces are sourced from within the Catchment, with the remaining 70% being sourced from other regions of NSW. The proportion of labour sourced from within the Catchment reflects the limited capacity within the Catchment's labour market. An overview of the existing labour market is provided in section 4 and Appendix A.

For the purposes of the economic impact assessment, assumptions regarding where goods and services will be sourced from were developed by the proponent.

A summary of the assumptions used is presented in Table 3.3.

Table 3.3. Assumed Sources of Goods and Services During Construction

Component	Catchment	Rest of NSW	Rest of Australia	Overseas
Mine and Infrastructure	20%	70%	10%	0%
Project Management	100%	0%	0%	0%
Boxcut	100%	0%	0%	0%
Paste Fill Plant	0%	70%	30%	0%
Loader	0%	0%	0%	100%
Tailings landform	100%	0%	0%	0%

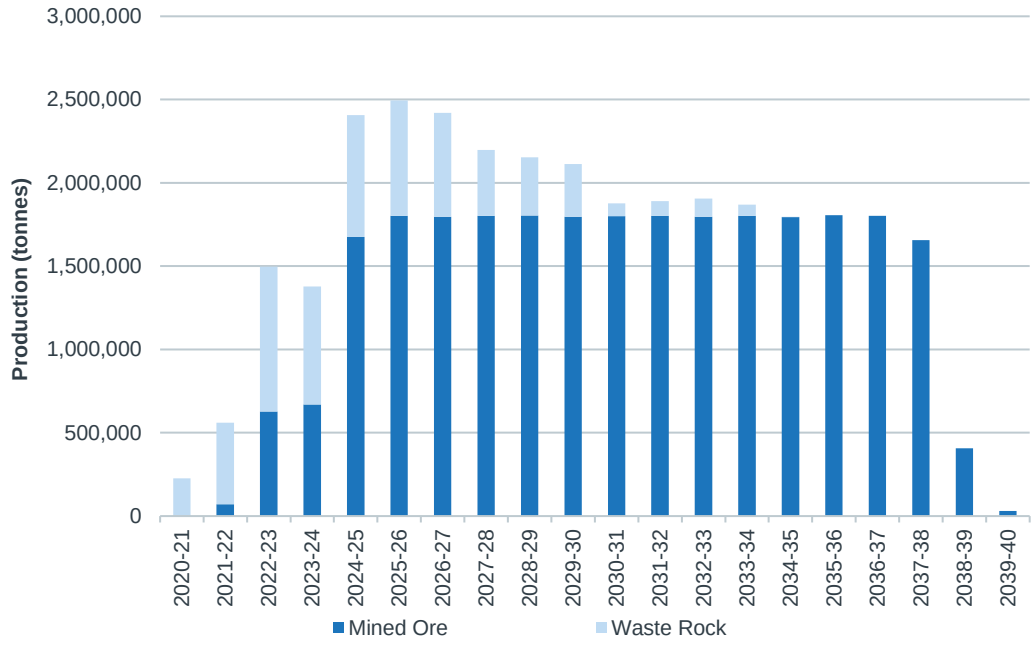
Source: Evolution Mining (2020a).

3.2.2 Operations

3.2.2.1 Production and Timing

Figure 3.1 outlines the annual production of mined ore (ROM) and waste rock on a financial year basis, between 2020-21 and 2039-40, as per the scenario used in modelling economic impacts.

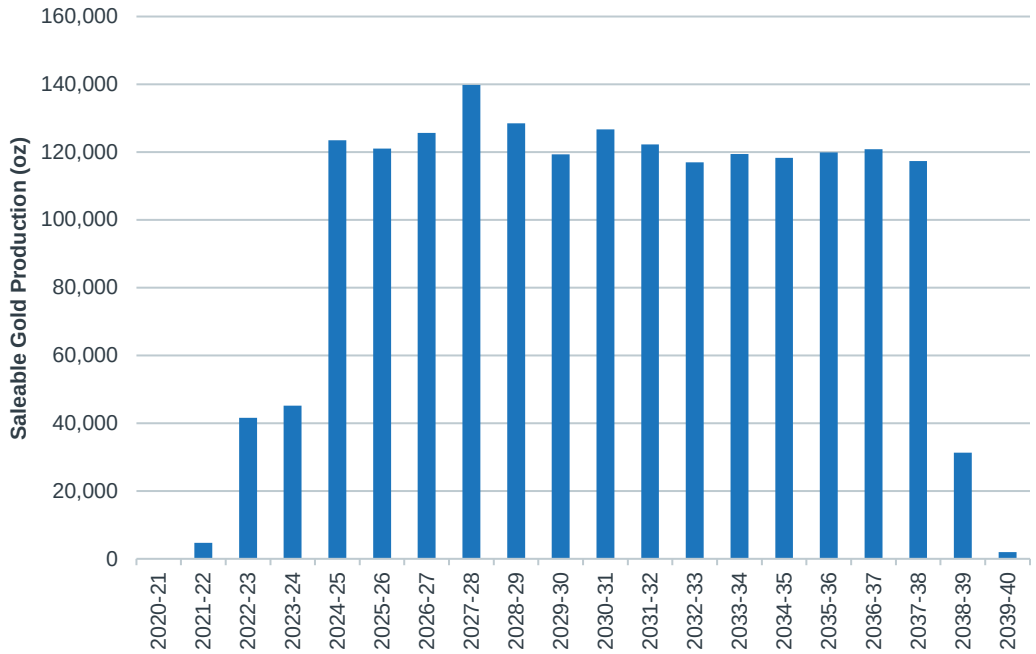
Figure 3.1. Annual Production of ROM Ore and Waste Rock (tonnes)



Source: Evolution Mining (2020a).

ROM ore extracted has been assumed to be processed in the year it is extracted for modelling, with the exception of a small amount of ROM ore extracted in 2020-21 which has been assumed to be processed the following year (in 2021-22). On average, over the life of the mine, the average rate of gold produced per tonne of ROM ore processed is estimated to be 0.069 ounces of gold per tonne of ROM ore, though this will vary year to year. Estimates of the annual production of saleable gold are outlined in Figure 3.2.

Figure 3.2. Annual Production of Saleable Gold (oz)



Source: Evolution Mining (2020a).

3.2.2.2 Gold Prices

Gold prices have been estimated based on data from ABC Bullion (2020), which indicates that gold prices between 2015-16 and 2019-20 have fluctuated between $1,700 per ounce and $2,600 per ounce. A conservative, average gold price of $2,000 per ounce has been assumed for modelling and the assessment of economic impacts.

3.2.2.3 Operating Expenditure

Estimates of operating costs and timing over the life of the mine were provided by the proponent. A summary of the average non-labour and labour operating expenditure unitary rates over the life of operations are outlined in Table 3.4. While non-labour mining costs are presented as a rate per tonne of mined material over the life of the Project, the actual timing of operating costs varied year to year based on anticipated timing of key activities (e.g. anticipated timing of development of mining shafts) rather than tonnes of mined material.

Table 3.4. Operating Expenditure

Component	Units	Unit Value ($)
Mining		
Non-Labour Mining Costs	$ per t of mined material	$52
Labour Mining Costs	$ per employee	$152,000
Processing Costs		
Non-Labour Processing Costs	$ per t of processed ore	$15
Labour Processing Costs	$ per employee	$150,000

Source: Evolution Mining (2020a).

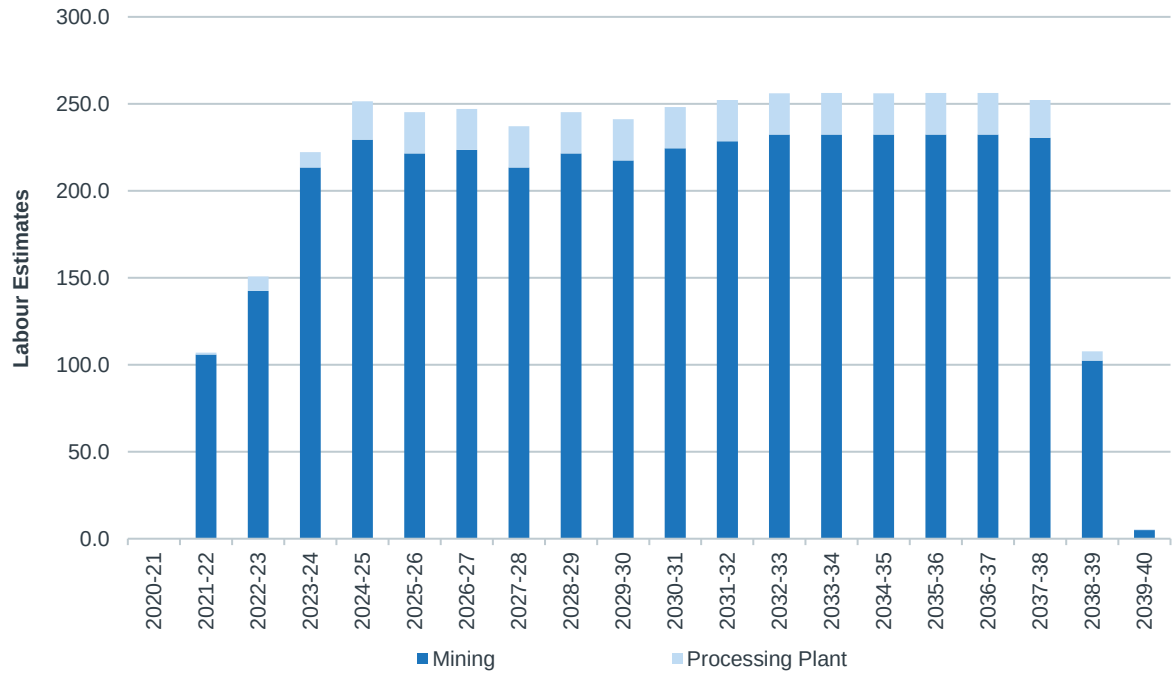
3.2.2.4 Operations Labour

Estimates of employment during operations were provided by the proponent. Timing for operations labour used for modelling is outlined in Figure 3.3.

The operations labour force includes staff at CGO's processing facility for processing of gold product. It should be recognised that the estimates of processing labour reflect a continuation of existing processing staff at CGO's processing facility; the Project will not result in an increase or additional labour at the facility from existing levels. These estimates thereby are an indication of the existing processing jobs supported by ore produced by the Project.

While a small amount of ore and waste rock is produced in 2020-21, no direct operations labour has been included in this year; there is considerable overlap in activity and skills between construction and operations mining labour and the ore and waste rock production in this year is assumed to be produced by the construction labour outlined in section 3.2.1.2 for this year.

Figure 3.3. Labour Estimates per Annum, Operations



Source: Evolution Mining (2020a).

3.2.2.5 Source of Goods / Services

CGO will aim to source operational staff for the Project from within the Catchment wherever possible, however, given the specialised nature of underground mining it is anticipated that at least initially the bulk of the mining workforce will need to be sourced from outside the Catchment. The economic modelling assumes:

- Half of the technical mining team from Evolution Mining will be sourced from within the Catchment, with the other half sourced from other regions of NSW.
- All contractors will be sourced from outside the Catchment but from other regions of NSW.
- All processing workers will be existing staff at CGO's processing facility and reside within the Catchment.

CGO will aim to attract mining workers to relocate and live in the Catchment throughout operations and will also provide opportunities for the existing CGO open cut workforce to be trained and upskilled for underground mining. It is anticipated that over time there will be some transition and relocation of labour. However, the modelling has assumed that the contractor workforce will be sourced from outside the Catchment throughout the operations phase to present a "worst case" scenario.

For the purposes of the economic impact assessment, assumptions regarding where goods and services will be sourced from were derived from standard industry structures for the gold mining industry and in consideration of the local capacity in the supply chain to meet demands.

3.2.3 Post-Mining Decommissioning and Rehabilitation

Progressive rehabilitation activities will be undertaken on an ongoing basis throughout the Project life including backfilling of shafts using paste produced at the paste fill plant, which has been incorporated into the operating costs above.

Most of the mining activity occurs below the surface. Decommissioning and rehabilitation of above ground areas will be undertaken as part of the decommissioning plans for the existing open cut operations on the site. As such, any post-mining decommissioning and rehabilitation is already included as part of the plan for the open cut operations, and therefore excluded from this analysis.

3.3 WORKFORCE ACCOMMODATION

Workforce accommodation strategies were being investigated at the time of writing this study. The primary option for consideration is the construction of an accommodation village in West Wyalong. Potential sites for a village are being explored. The accommodation village would be expected to have sufficient capacity to accommodate both the construction and operational non-local workforces. The other option being investigated is the lease / acquisition of existing commercial accommodation facilities such as motels in the local area to house the workers.

Construction costs for the modelling scenario have assumed the construction of an accommodation village, commencing in mid-2021 and costing approximately $11.4 million.

CGO is currently planning for the accommodation option to be in place throughout the Project to accommodate the non-local workforce. However, it is CGO's intention to assist in facilitating a localisation of the operational workforce as soon as it is economically viable and sufficient housing is available in the catchment. Where workers relocate to the Catchment over time there may be opportunities to either close, divest or reduce capacity of the accommodation option.

3.4 CONSEQUENCES OF NOT PROCEEDING WITH PROJECT

Where the Project does not proceed, the economic contribution to be delivered by the Project would not be realised. All economic modelling undertaken in this study (i.e. CGE modelling and cost benefit analysis) presents a comparison of Project impacts against a base case where the Project does not proceed. Both of these analyses present the net change that would occur due to the Project, compared to this base case.

The assumptions used in the base case are presented in Appendix B.

In understanding the implications of the Project not proceeding it is important to note the Project will enable continuation of mining activity in the region. With the Project, mining activity and supply contracts will be delivered in the region, with a retention of activity in the region as production at the current Cowal open cut mine winds down in the next decade.

4. EXISTING ECONOMIC ENVIRONMENT

4.1 ENVIRONMENT PRE-COVID-19

This section provides a summary of the economic environment of the Catchment based on the most recent data available at the time of writing. For the majority of indicators this does not provide an indication of the impacts of COVID-19, as at time of writing the most recently released data was either prior to COVID-19 or captured only the early stages of impacts in Australia. The analysis and findings presented in this section are supported in more detail in Appendix A.

A section examining the potential ramifications of COVID-19 on the Catchment economy (and more broadly in the State and Australia) is provided in section 4.2.

The following are key attributes of the Catchment's existing environment:

- **The Catchment's population has been in decline for the past two decades:** The Catchment recorded an estimated resident population of just under 22,000 people in 2019, equating to 0.3% of the population in NSW. Similar to many communities in regional NSW, the Catchment's population recorded a consistent annual decline of 1.3% on average between 2001 and 2006, likely due to the harsh drought conditions and reduced liveability of the region. Various mining and exploration projects have assisted in slowing population decline since 2006 (including the commencement of production at the current Cowal Gold mine in 2006).
- **The Catchment's population is anticipated to continue to decline marginally year on year to 2041:** The Catchment's population is anticipated to decline by 0.2% per annum on average to just over 21,000 residents by 2041.
- **The Catchment's economy is heavily influenced by fluctuations in mining and agricultural activity:** In 2018-19, the Catchment's economy recorded a Gross Regional Product (GRP) of approximately $1.5 billion in chain volume terms. Annual growth over the period since 2006-07 has been volatile, primarily influenced by fluctuations in mining and agricultural activity, with mining and agriculture, forestry and fishing contributing 18.8% and 16.8% of total sector Gross Value Added (GVA) activity, respectively, in 2018-19.
- **Mining is at the forefront of industry activity**: Mining was the most prominent industry in the Catchment in terms of contribution to total sector GVA in 2018-19. The current Cowal Open-Cut mining operation, located in the Catchment, is an open pit mining operation which commenced in 2005 and started processing in 2006. Currently CGO employs approximately 385 workers, most of whom are local employees and contractors. In 2019-20, open pit production reached 251,500 ounces of gold.
- **Construction activity has trended in line with mining expansion / development activity:** Construction was the fourth most prominent in terms of contribution to total sector GVA in the Catchment, contributing to 7.1% of activity in 2018-19. Construction activity has tracked that of the mining investment phase, peaking in 2012-13 in line with the mining boom, and declining over the following couple of years. In recent years, construction activity has surpassed the levels recorded at the peak of the mining boom.
- **Agricultural activity has a significant impact on local employment:** The Catchment has experienced considerable fluctuation in the number of workers (by place of work) year to year between 2006-07 and 2018-19. Employment rose from 9,440 in 2006-07 to a peak of 9,715 in 2010-11, before falling to below 8,900 workers by 2012-13. Employment then averaged around 9,000 workers through to 2017-18, before spiking to approximately 9,280 workers in 2018-19. As the largest employing industry in the Catchment, agricultural production and activity has a significant impact on employment levels in the Catchment. This industry is heavily impacted by climatic conditions, which can be highly variable between years.
- **The unemployment rate has been relatively volatile since 2010:** Between 2006 and 2010, the unemployment rate in the Catchment trended similar to the State but has since fluctuated modestly over time. The unemployment rate in the Catchment was higher than the State between mid-2012 and 2016 but has averaged just below that of the State over the past three years (at 4.4% compared to 4.7% respectively).

- **The Catchment is both highly self-sufficient and self-contained:** The Catchment is 91.2% self-sufficient, indicating that the majority of jobs in the local area are held by residents and there is an appropriate match between skillsets held by residents and the jobs that are available. This is largely due to the high number of agricultural, forestry and fishing workers who live and work in the Catchment, and likely reflects that many farmers work on their own properties. The Catchment has a higher self-containment rate (93.7%), reflecting that the vast majority of residents of the Catchment found suitable work in their region of residence, or relocated to the region for work purposes.
- **Residential approval activity has performed strongly in recent years:** Residential approval volumes in the Catchment have experienced modest growth in recent years, growing by 8.7% on average per annum since 2012-13 (compared to just 5.0% on average per annum in NSW). Growth in residential approvals is indicative of increased dwelling development in the region, which is reflective of some level of demand for housing supply. It is important to note that these growth estimates are off small volumes, ranging between 29 and 61 approvals between 2012-13 and 2018-19, and hence are not indicative of significant residential development activity. The value of residential approvals has grown modestly as well (6.5% per annum on average).
- **Within the Catchment, housing and rental market activity is primarily centred in Forbes LGA:** Since June 2017, residential house sales activity in Forbes LGA has averaged around 40 sales per quarter, whilst Bland and Lachlan LGAs recorded fewer than 30 sales per quarter on average. Rental activity demonstrates similar trends to sales. Since September 2017, rental activity in Forbes LGA has averaged around 67 bonds lodged per quarter, whilst Bland and Lachlan LGAs recorded fewer than 30 bonds lodged per quarter on average. Median house prices and rents were both consistently well below the State average.

4.2 IMPLICATIONS OF COVID-19

The COVID-19 pandemic is having a major impact on global, national, and state economies and financial systems. The spread of the virus has resulted in restrictions to the movement of people across borders, social distancing measures, and consequent loss of jobs, incomes, and businesses. It is anticipated that nominal estimates associated with economic activity across the nation will fall in coming years, compared to those presented in Section 4.1 of this report, due to the impacts on the Australian (and global) economy from COVID-19. Forecasts from the Federal Government (2020) indicate that in nominal terms, Australian GDP is projected to have increased by 2.0% in 2019-20, well below the increase of 5.3% in 2018-19, and may decline by 4.75% in 2020-21.

These impacts are anticipated to be felt in the long term, due to lasting changes in consumer behaviour and governments engaging in large-scale counter-pandemic fiscal programs, which will impact the economic landscape for decades to come. Interest rates provide a useful indicator of the long-term impact on the economy. Jorda, Singh, and Taylor (2020) revealed that following a pandemic, the response of the natural rate of interest will be skewed downwards by nearly 1.5 percentage points about 20 years later. This is reflective of low investment resulting from higher precautionary savings and the net debt expected to endure through to 2029-30 (Parliamentary Budget Office, 2020). Further long-term implications include reduced business start-ups, disrupted supply chains, lower levels of employment and thereby reduced circulation of incomes in the economy, and reduced labour productivity due to loss of skills by unemployed persons (BIS Bulletin, 2020).

An indicative estimate of the impact of COVID-19 to the NSW and Catchment economy to 30 May 2020 has been developed based on data from the Australian Bureau of Statistics (ABS, 2020e) outlining impacts on employment at the State level by industry. Employment impacts for the Catchment were developed assuming the proportional change in industry activity at the State have been experienced in the Catchment as well. Impacts on GRP were estimated assuming the value added activity per employee in 2018-19 holds constant. A summary of impacts for the Catchment and NSW is provided in Appendix A.

Based on these indicative estimates, as of 30 May 2020, the pandemic has resulted in a decline of approximately 650 employees (or 7.0%) in the Catchment compared to 2018-19 estimates. This falls in line with that of the State, which is estimated to have recorded a 7.0% decline in employment over the same period. The impact on Gross Value Added (GVA) has been slightly less pronounced, with the Catchment recording a decline of approximately $67.6 million due to the pandemic, a decline of 5.1%, compared to a decline of 5.3% for the State.

The JobKeeper Payment Scheme was introduced in April 2020 to support businesses and individuals during the pandemic by providing $1,500 payments to employers for eligible employees each fortnight. Within the Catchment, approximately 2,900 businesses applied for JobKeeper in April, followed by approximately 3,300 businesses in May (Treasury, 2020). It is anticipated that some of the small-medium enterprise businesses covered by the JobKeeper payment may struggle to recover once the payment has ended.

Longer term, with the Catchment's economy heavily influenced by fluctuations in agricultural activity, it is anticipated the economy will continue to be impacted by lower international demand for Australian agriculture produce until trade activity returns. As with most of regional Australia, lower population growth is expected over the next few years, due reduced migration resulting from the international travel ban implemented in March 2020. Property market activity prospects remain subdued; CoreLogic (2020) revealed that whilst regional areas have recorded higher growth in dwelling values than cities, there has still been a slowdown in property market activity as a result of the pandemic.

5. LOCAL EFFECTS ANALYSIS

The following section examines the economic impacts of the Project within the Catchment (local effects analysis), as well as impacts to the State of NSW for context. Impacts within more localised areas within the Catchment as well as Australia are also examined where relevant and appropriate.

This analysis uses economic modelling as well as findings from the literature review and existing environment to inform the assessment of economic impacts as appropriate. **All modelling outcomes are presented in 2020 Australian dollar values** unless otherwise specified. Computable General Equilibrium (CGE) modelling has been used in modelling impacts to the Catchment and State (modelling of impacts to the rest of Australia were also undertaken using CGE modelling but have not been reported as the vast majority of impacts will occur within NSW).

The modelling outcomes identified throughout this impact assessment depict the value and percent change in a range of economic indicators anticipated as a result of the Project. These estimates represent the net change in the respective indicators compared to projected growth in the Catchment (and State) economy without the Project proceeding. Assumptions used in developing baseline estimates of growth are outlined in Appendix B.

The direct activity associated with each stage (construction and operations) is outlined in section 3.2. CGE modelling outlines how this direct activity will deliver impacts to the Catchment and NSW economies both directly and through flow-on activity (e.g. supply chain impacts as well as increased consumption by households). However, CGE modelling does not examine separate stages of project activity (e.g. construction versus operations) or disaggregate impacts between direct and flow-on activity; rather it examines the direct and flow-on impacts of the Project in aggregate across all relevant stages of activity each year.

To provide some relativity of impacts by stage, analysis of CGE modelling results in sections 5.1 and 5.2 have been examined across two time periods:

- The first three years of the analysis period (2020-21 to 2022-23), which coincides with the bulk of the construction works (though this also includes some overlap with operational activity which will occur over this period).
- 2023-24 to 2039-40, representing the operational impacts (plus some residual construction works in the first year of the period).

In interpreting the results of the modelling presented in this section it should be recognised that:

- As production is assumed to commence at the end of 2020-21, the impacts presented in 2020-21 and 2022-23 as part of the construction phase will include some impacts attributable to operational activity (though the vast majority of impacts over this period are considered to be attributable to construction impacts).
- Similarly, as some residual construction works would occur in 2023-24, the impacts for this year presented in the operational phase will include some impacts attributable to construction activity (though the vast majority of the impacts over this period are considered to be attributable to operational impacts).

5.1 CONTRIBUTION TO THE ECONOMY

The Project will generate considerable output and gross product, both:

- **Directly**, through construction activity and the extraction and export of saleable gold.
- **Indirectly**, through additional demand for goods and services to support the Project, household consumption effects as a result of additional wages and salaries paid, and government expenditure through additional taxation revenues.

The following sub-sections examine the Project's impact on gross regional (the Catchment) and state (NSW) product as well as impacts on output by industry in the Catchment and NSW using CGE modelling results. CGE modelling results present the net impacts in aggregate form, rather than differentiating between direct and indirect impacts. Output as a measure of economic activity refers to the gross value of goods and services transacted, including the costs of goods and services used in the development and provision of the final product. Gross product

activity refers to the value of output after deducting the costs of intermediate goods and services. That is, gross product defines the true net economic contribution of the project, whilst estimates of industry output represent the overall increase in economic transactions, and thereby, industry production and activity.

5.1.1 Impacts on Gross Regional and State Product

Modelling outcomes of the impacts of the Project on the Catchment Gross Regional Product (GRP) and NSW Gross State Product (GSP) between the commencement of construction through to the completion of operations are presented in Figure 5.1.

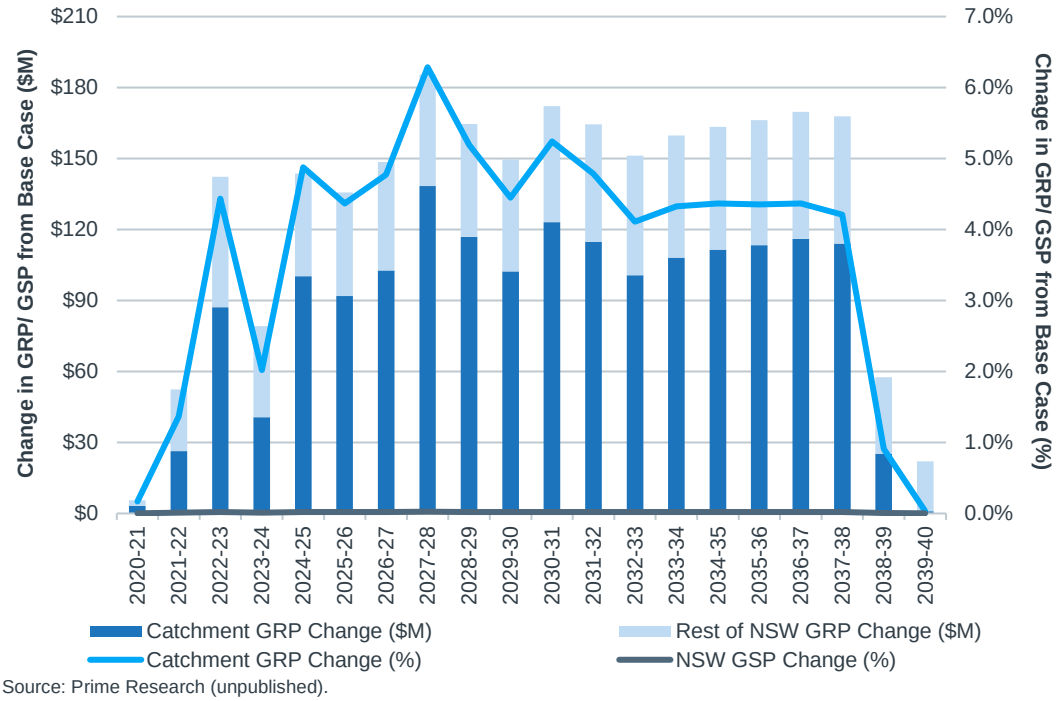
There is a steady increase in the Catchment and state economies during construction, peaking at $87.2 million in Catchment GRP / $142.3 million in GSP in 2022-23. This year corresponds with peak construction activity (see section 3.2.1.1), and also overlaps an initial spike in ROM production and processing activity (see section 3.2.2.1). Over the first three years the Project is estimated to average an increase in Catchment GRP of $38.9 million and increase in NSW GSP of $66.7 million.

GRP and GSP dip in 2023-24 as construction finishes and production remains relatively stable, before lifting again in 2024-25 as production increases to longer term rates of around 1.8 Mtpa ROM ore. From 2024-25 to 2037-38 GRP is estimated to average around $110 million and GSP average around $160 million, with some fluctuations year to year primarily based on annual variances in saleable gold produced. After 2037-38, the contribution to GRP / GSP is then estimated to fall as production winds down to 2039-40. In total, between 2023-24 and 2039-40, the Project is estimated to average an increase in Catchment GRP of $106.3 million and increase in NSW GSP of $154.8 million.

During both the construction and operations periods, the majority of the contribution to GSP will be captured locally in the Catchment (about 58% during construction and 69% during operations).

In percentage terms, the Project is anticipated to result in a peak increase in Catchment GRP of 6.3% in 2027-28 (corresponding with peak gold production), and average an increase of around 5.0% between 2024-25 and 2031-32. After this, while the value contribution to Catchment GRP is estimated to remain relatively steady through to 2037-38, the percent increase in Catchment GRP compared to the baseline is estimated to ease and average just over 4% between 2032-33 and 2037-38. This is driven by an underlying expansion of the Catchment and NSW economies over time, which results in a lower percent increase from the baseline (i.e. without Project scenario) despite the dollar contribution of the Project to GRP / GSP remaining relatively stable.

Figure 5.1. Annual Impact on GRP / GSP in the Catchment and NSW, Deviation from the Base Case



Source: Prime Research (unpublished).

5.1.2 Impacts on Industry Output

The impacts of the Project on industry output by industry in the Catchment and NSW compared to the base case are presented in Table 5.1. As expected, impacts on industry output are anticipated to be highest for the construction and mining industries between 2020-21 and 2022-23 (construction phase), whilst impacts on industry output will be highest in the mining industry between 2023-24 and 2039-40 (operations phase). The increase in activity for these industries during construction and operations phases reflects the direct activities of the Project.

Other industries that will experience moderate increases in activity during construction and operations include business services, trade, and public services, health and education. These industries will experience increased activity due to flow-on (or indirect) impacts of the Project from the increased demand for these services to supply the Project and its workforce, as well as additional household incomes and government revenues generating an increase in overall demand and expenditure for these services.

While overall the Project will deliver an increase in industry output, both directly and indirectly through flow-on activity, some industries are expected to see small decreases in activity relative to what would otherwise occur in the base case (without the Project). This reduction in activity for some industries from the base case is largely a reflection of factors such as competition for constrained labour resources (see section 5.2.1) and increased costs of businesses as competition for resources drives input prices up (including labour, see section 5.2.4). The manufacturing industry is expected to experience the largest adverse impacts from the Project during construction and operations in terms of a reduction in industry output compared to what would be expected to occur without the Project. The manufacturing industry provides a lot of similar skills as used in mining and typically operates in global markets competing with international producers, making it a price taker with limited capacity to increase price to accommodate rising input costs without losing market share. It should be noted that while the manufacturing industry is estimated to experience a small decline in business output compared to what would otherwise occur, the contraction in percentage terms is negligible (less than 0.04% in NSW) relative to the overall size of the industry.

On a percent basis, the construction industry will have the largest industry output change, increasing by 46.3% in the Catchment on average per annum during construction, whilst the mining industry will have the largest industry output change during operations, increasing by 31.1% in the Catchment on average per annum. At a state level, the percent change delivered by the Project is 0.3% in the mining industry and less than 0.04% across all other industries.

Table 5.1. Average Annual Impact on Industry Output in the Catchment and NSW, Deviation from the Base Case

Industry	Construction		Operations	
	Catchment	NSW	Catchment	NSW
Change in Industry Output ($M)				
Agriculture, forestry & fishing	-$3.0	-$5.1	-$1.8	-$5.3
Mining	$24.2	$16.9	$204.5	$195.9
Manufacturing	-$3.1	-$38.4	-$5.7	-$59.4
Electricity and water	-$1.9	-$11.8	-$1.8	-$10.1
Construction	$124.0	$120.0	$7.3	$4.5
Trade	$5.2	$12.7	$3.6	$15.2
Transport and storage	$1.0	-$0.5	$1.8	-$1.6
Communication[1]	-$0.5	-$1.5	-$0.5	-$3.0
Finance and insurance	-$0.4	$4.5	-$0.7	-$1.5
Business services[2]	$4.9	$20.4	$5.4	$17.5
Public services, health and education	$3.0	$7.7	$1.6	$13.8
Recreation and other services	$0.1	$0.6	$0.3	$2.2
Ownership of dwellings	$2.9	$7.8	$1.4	$15.7
Total Change ($M)	**$156.4**	**$133.2**	**$215.4**	**$183.9**

Industry	Construction		Operations	
	Catchment	NSW	Catchment	NSW
Change in Industry Output (%)				
Agriculture, forestry & fishing	-0.3%	0.0%	-0.2%	0.0%
Mining	4.3%	0.0%	31.1%	0.3%
Manufacturing	-1.0%	0.0%	-1.7%	0.0%
Electricity and water	-3.6%	0.0%	-3.0%	0.0%
Construction	46.3%	0.1%	2.5%	0.0%
Trade	1.4%	0.0%	0.8%	0.0%
Transport and storage	0.6%	0.0%	0.9%	0.0%
Communication[1]	-1.3%	0.0%	-1.1%	0.0%
Finance and insurance	-0.6%	0.0%	-1.0%	0.0%
Business services[2]	3.0%	0.0%	3.0%	0.0%
Public services, health and education	0.7%	0.0%	0.3%	0.0%
Recreation and other services	0.3%	0.0%	0.5%	0.0%
Ownership of dwellings	1.2%	0.0%	0.4%	0.0%
Total Change (%)	**4.1%**	**0.0%**	**4.9%**	**0.0%**

Note: (1) Includes postal and courier services and telecommunication services; (2) Includes services to mining, property and business services, professional services, administrative services and personal / household goods hiring.
Source: Prime Research (unpublished).

5.2 CONTRIBUTION TO EMPLOYMENT AND WAGES

5.2.1 Impacts on Employment

This section examines the impacts of the Project in terms of employment generation, incorporating both effects of direct and flow-on job creation, as derived using CGE modelling. All employment estimates in this section are based on **place of work** (i.e. based on where the jobs are located) rather than place of usual residence (i.e. where the workers live and are sourced from). A comparison of employment by place of work and place of usual residence is presented in section 5.2.2.

Employment requirements of the Project are outlined in section 3.2 across the construction and operations workforces, as are assumptions regarding the source of labour. Modelling has been undertaken to understand the likely impacts of the Project on total employment in the Catchment and NSW in consideration of constrained labour resources and expected increases in demand for goods and services in the regional, State and national economy as a result of flow-on industry and household consumption as well as government expenditure.

In interpreting the results in this section it should be noted that:

- The Project will, effectively, extend the life of mining operations in the Catchment. While the Project will deliver additional jobs compared to what would otherwise be expected to occur without the Project, when comparing to existing activity the operations phase of the Project can largely be considered as retaining jobs (both directly and through supply chain impacts) in the Catchment that otherwise may be lost (though construction activity will represent an increase over existing activity).
- COVID-19 is having a significant short-term impact on the NSW and Catchment economy and labour market, and these impacts are anticipated to continue to be felt in the longer term (as outlined in section 4.2). This Project will provide an important boost to both the Catchment and NSW, supporting jobs and economic growth at a time where such stimulus is required to stabilise the State economy.

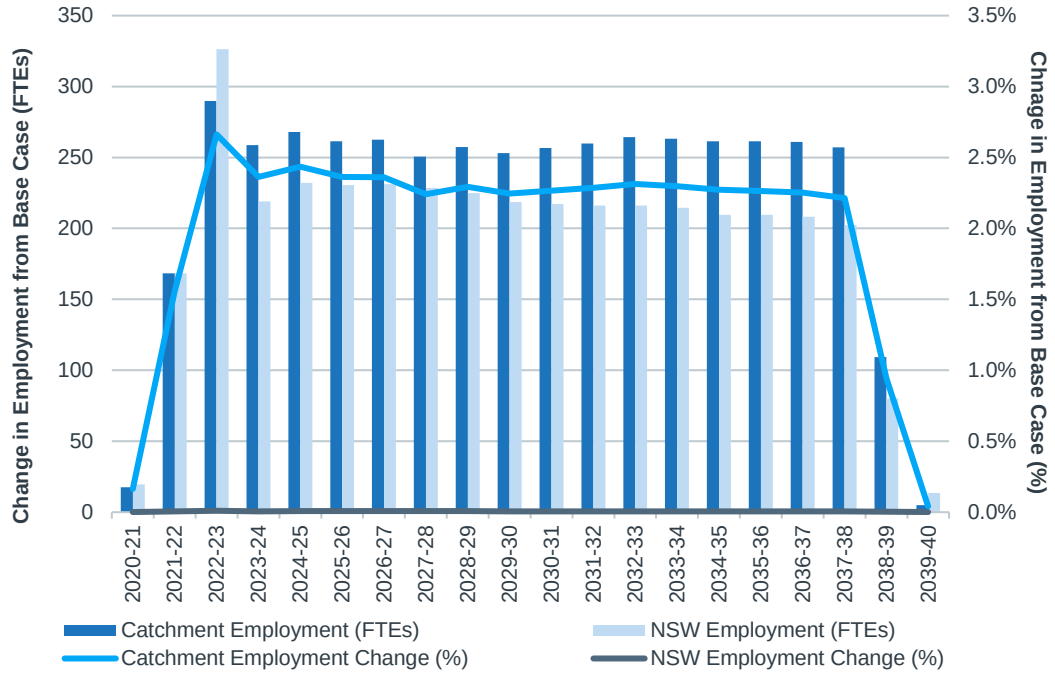
An overview of employment outcomes in presented in Figure 5.2 (noting that the NSW estimates are inclusive of the employment in the Catchment). The figure highlights that jobs supported by the Project (including direct and flow-on jobs) are estimated to grow during construction, peaking at around 290 in the Catchment in 2022-23. This year includes considerable overlap between construction and operations workforces, with a total of around 270 construction and operations workers directly engaged by the Project in aggregate in 2022-23, with the remaining 20 workers representing the net additional workers supported through flow-on activities for the year.

Between 2023-24 and 2037-38, the Project is expected to result in a net increase in employment of around 250 to 265 FTEs annually in the Catchment compared to what would be expected to occur without the Project, before dropping to around 110 FTEs in 2038-39 and five FTEs in 2039-40 as production tails in the last two years of operations.

The net impacts on employment in NSW are estimated to be slightly lower than the Catchment during operations, with economic modelling indicating employment will fall slightly outside the Catchment in NSW (compared to what would occur without the Project) as labour is drawn to the Catchment. This small contraction in employment in the rest of NSW primarily reflects that the Project will draw labour to the Catchment from the rest of NSW. Overall, the net increase in employment in NSW is expected to be between 25 and 40 FTEs less than the Catchment for most years during operation.

On a percentage basis, the Project's impact on employment in the Catchment is estimated to peak at approximately 2.7% above the base scenario in 2022-23 and then hold relatively steady at between 2.2% to 2.4% thereafter until production tails in the last two years of operations. The Project's impact on employment in NSW is estimated to peak at just 0.01% above the base scenario.

Figure 5.2. Annual Impact on Employment in the Catchment and NSW, Deviation from the Base Case



Source: Prime Research (unpublished).

Estimates of the average annual impact on employment by industry in the Catchment and NSW, compared to the base case, are outlined in Table 5.2. Reflecting the direct labour requirements of the Project, the increase in employment during the construction period is strongest in the construction industry, whilst during the operations phase the mining industry is estimated to experience the strongest increase in workers.

Other industries that are positively impacted by the Project, compared to the base case, are trade, business services, and public administration, defence, health, and education. The largest decline in employment experienced by an industry is expected to be the manufacturing industry for the reasons outlined in section 5.1.2.

On a percent basis, the impact on the construction industry in the Catchment is strong during the construction phase, increasing by 20.4% on average per annum. During operations, employment in the Catchment's mining industry is estimated to increase by 42.9% on average per annum compared to what would be expected without the Project.

Table 5.2. Average Annual Impact on Employment by Industry in the Catchment and NSW, Deviation from the Base Case

Industry	Construction		Operations	
	Catchment	NSW	Catchment	NSW
Change in Employment (FTEs)				
Agriculture, forestry & fishing	-7	-15	-2	-16
Mining	22	12	214	205
Manufacturing	-6	-46	-10	-83
Electricity and water	-2	-10	-2	-9
Construction	111	86	9	-18
Trade	16	47	10	37
Transport and storage	1	-4	2	-25
Communication[1]	-1	0	-1	-1
Finance and insurance	0	7	-1	3
Business services[2]	11	51	10	38
Public services, health and education	13	41	6	58
Recreation and other services	0	3	1	7
Ownership of dwellings	0	0	0	0
Total Change (FTEs)	**159**	**171**	**236**	**198**
Change in Employment (%)				
Agriculture, forestry & fishing	-0.2%	0.0%	0.0%	0.0%
Mining	4.8%	0.0%	42.9%	0.5%
Manufacturing	-1.2%	0.0%	-2.2%	0.0%
Electricity and water	-3.3%	0.0%	-3.0%	0.0%
Construction	20.4%	0.0%	1.6%	0.0%
Trade	1.0%	0.0%	0.6%	0.0%
Transport and storage	0.5%	0.0%	0.8%	0.0%
Communication[1]	-1.3%	0.0%	-1.2%	0.0%
Finance and insurance	-0.5%	0.0%	-0.8%	0.0%
Business services[2]	2.4%	0.0%	2.1%	0.0%
Public services, health and education	0.6%	0.0%	0.2%	0.0%
Recreation and other services	0.1%	0.0%	0.4%	0.0%
Ownership of dwellings	0.0%	0.0%	0.0%	0.0%
Total Change (%)	**1.5%**	**0.0%**	**2.1%**	**0.0%**

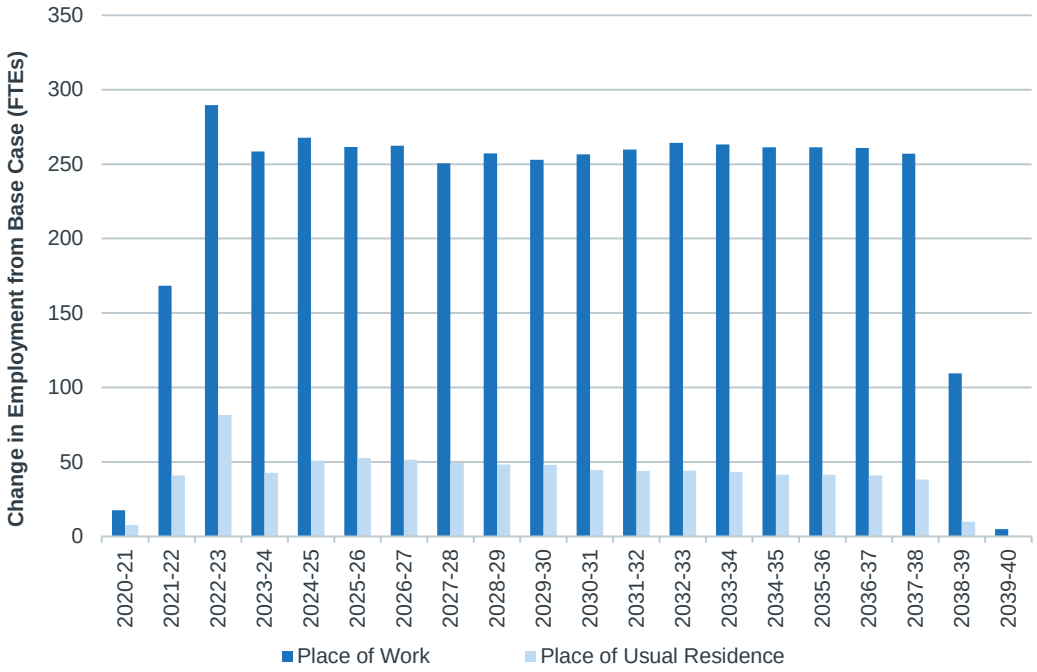
Note: (1) Includes postal and courier services and telecommunication services; (2) Includes services to mining, property and business services, professional services, administrative services and personal / household goods hiring.
Source: Prime Research (unpublished).

5.2.2 Impacts on Place of Work Compared to Place of Usual Residence

The above analysis outlined the anticipated change in employment in the Catchment and NSW due to the Project, based on where the jobs will be located (i.e. place of work). However, as outlined in section 3.2, a large proportion of both construction and operations workforces are expected to be sourced from outside the Catchment.

Figure 5.3 shows the annual impact on employment in the Catchment by place of work compared to place of usual residence. Modelling outlines that, including direct and indirect (flow-on) impacts, around 25% to 30% of total jobs supported in the Catchment during construction will be filled by locals. Whilst this figure drops to under 20% of jobs in the Catchment during operations in the modelling, as outlined in section 3.2.2.5 this represents a worst case scenario and CGO will implement plans to encourage the mining workforce to relocate to the region. Where workers relocate, the share of jobs filled by locals would be expected to increase over time.

Figure 5.3. Annual Impact on Employment in the Catchment, Deviation from the Base Case, Place of Work versus Place of Usual Residence



Source: Prime Research (unpublished).

5.2.3 Skills Requirements

Modelling results show that demand for labour during construction is anticipated to be strongest (compared to the base case) in the occupations of technicians and trades workers and labourers, whilst it is strongest in the occupations of machinery operators and drivers and technicians and trades workers during operations.

On a percent basis, the strongest impact is expected in the technicians and trades workers occupation during construction, increasing by 3.7%, whilst the strongest impact during operations is expected in the machinery operators and drivers occupation, increasing by 14.5%.

Of note, all occupations are expected to increase in the Catchment and NSW over the course of the Project. While some industries may be adversely impacted, this will partly reflect a redistribution of skills and occupations between industries.

Table 5.3. Average Annual Impact on Employment by Occupation in the Catchment and NSW, Deviation from the Base Case

Industry	Construction		Operations	
	Catchment	NSW	Catchment	NSW
Change in Employment (FTEs)				
Managers	12	22	28	28
Professionals	17	40	22	46
Technicians and Trades	45	26	39	24
Community and Personal Services	4	15	3	18
Clerical and Administrative	6	20	5	21
Sales	3	13	3	13
Machinery Operators and Drivers	31	14	120	36
Labourers	40	21	17	14
Total Change (FTEs)	**159**	**171**	**236**	**198**
Change in Employment (%)				
Managers	0.3%	0.0%	0.7%	0.0%
Professionals	1.1%	0.0%	1.3%	0.0%
Technicians and Trades	3.7%	0.0%	3.1%	0.0%
Community and Personal Services	0.6%	0.0%	0.4%	0.0%
Clerical and Administrative	0.6%	0.0%	0.4%	0.0%
Sales	0.6%	0.0%	0.5%	0.0%
Machinery Operators and Drivers	3.9%	0.0%	14.5%	0.0%
Labourers	3.0%	0.0%	1.2%	0.0%
Total Change (%)	**1.5%**	**0.0%**	**2.1%**	**0.0%**

Source: Prime Research (unpublished).

5.2.4 Impacts on Incomes and Real Wages

5.2.4.1 Impacts on Employee Incomes

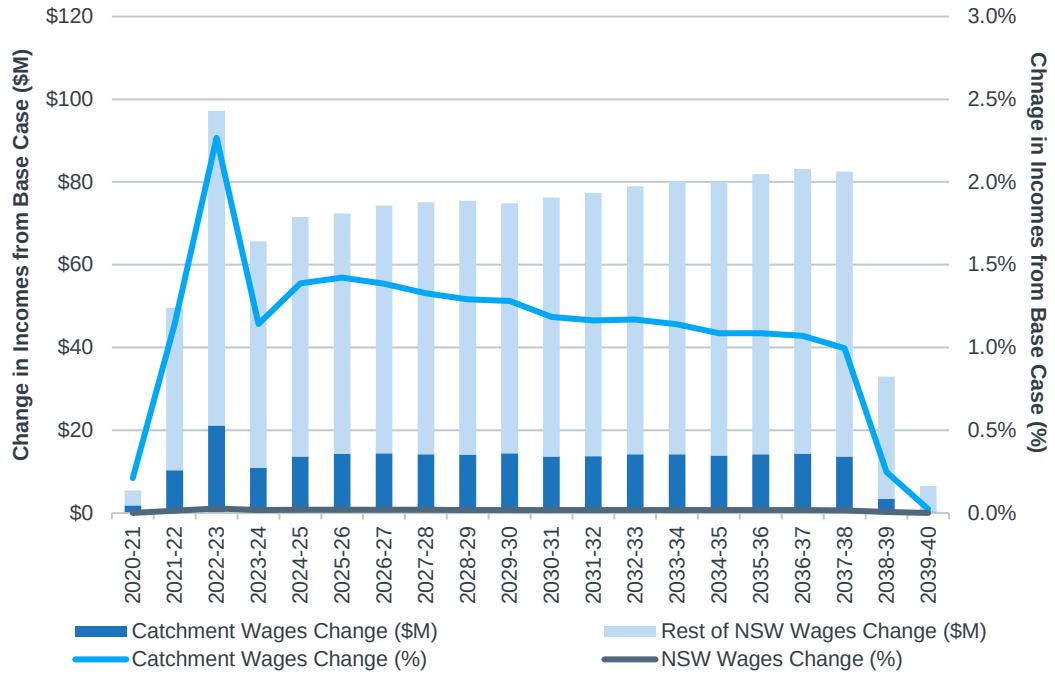
Modelling outcomes of the impacts of the Project on incomes in the Catchment and NSW over the life of the Project are presented in Figure 5.4, noting that income impacts are presented based on where the workers reside, i.e. place of usual residence. The modelling has examined a worst case scenario where none of the non-local mining operations workforce relocates to the Catchment over time. It is CGO's intention to assist in facilitating a localisation of the operational workforce. Transitioning the operational workforce to residing locally will increase the retention of incomes locally and thereby the estimated incomes retained in the Catchment would be greater than those outlined in this section where this occurs.

Incomes supported by the Project are projected to rise rapidly during the construction phase, peaking in 2022-23 at $21.1 million in the Catchment and $97.2 million in NSW (including the Catchment). This corresponds with peak employment impacts of the Project (see section 5.2.1).

Following the construction phase the net increase in incomes is estimated to drop to around $10.9 million in the Catchment and $65.6 million in NSW in 2023-24, then steadily increase annually through the operations phase to 2037-38. The increase in incomes reflects that the increase in employment generated by the Project will provide competitive tension for labour which will drive an increase in the average employee income over time (this is examined in more detail in section 5.2.4.2 below). While this competitive tension is expected to soften over time as the economy naturally expands (as outlined in section 5.1.1), demand for labour will still be higher than would be expected to occur without the Project resulting in ongoing upward pressure on employee incomes throughout NSW overall. By the last year of full production (2037-38) employee incomes are estimated to be $82.5 million more in NSW compared to the base case. Of this, more than 17% is estimated to be captured within the Catchment; this could be significantly higher should non-local operations workers relocate to the Catchment.

In percentage terms, there is a modest increase in incomes in the Catchment, peaking at 2.3% in 2022-23, before seeing a downward trend thereafter. There is only a small increase in incomes in NSW, peaking at 0.03%.

Figure 5.4. Annual Impact on Incomes in the Catchment and NSW, Deviation from the Base Case



Source: Prime Research (unpublished).

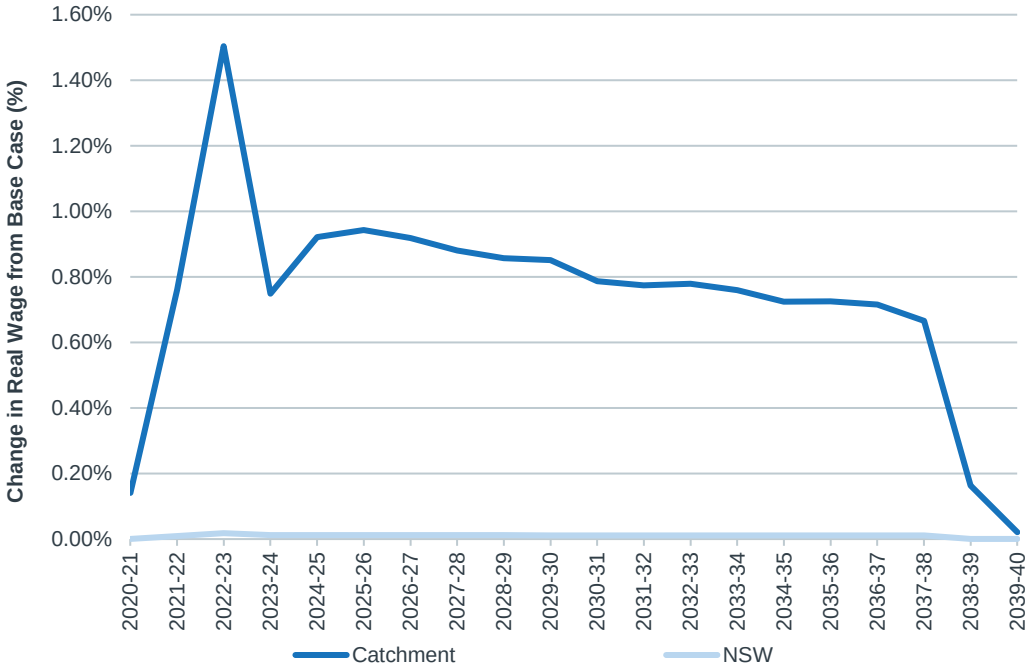
5.2.4.2 Impacts on Real Wages

As indicated in 5.2.4.1, impacts on employee incomes will not solely be driven by increased employment. The Project will result in a draw of labour from some sectors to support the construction and operation of the mine (see section 5.2.1) and, through competition in a constrained labour market, this will place upward pressure on the cost of attracting and retaining labour in the regional, state and national labour market. As a result, average incomes across the Catchment and NSW will lift, generating additional incomes throughout the economy. This effect is best observed through the impact of the Project on real wages, which represent the real (i.e., above inflation) changes to average salaries in the economy.

The Project is anticipated to contribute to a 1.5% increase to real wages in the Catchment at its peak in 2022-23, where construction and operations activities will overlap the most. Following construction, real wages are estimated to be approximately 0.9% higher in the Catchment initially during steady state operations (i.e. once ROM production reaches approximately 1.8 Mtpa), and gradually ease to around 0.7% in 2037-38, the last financial year of full production. This downward trend over time reflects an underlying expansion of the Catchment and NSW economies over time (including growth in the overall population and labour force), which dilutes the overall impact on real wage growth from the Project.

Impacts to real wages in NSW are marginal, averaging around 0.01% during production. The impacts to real wages are likely somewhat overstated in the modelling as the Project will likely use underutilised resources, which in consideration of the current COVID-19 impacted environment may be considerably higher over the coming years than reflected in the modelling. This means there is likely to be less inflationary pressure on wages than outlined in the modelling.

Figure 5.5. Annual Percent Change in Real Wages in the Catchment and NSW, Deviation from the Base Case



Source: Prime Research (unpublished).

5.3 CONTRIBUTION TO GOVERNMENT REVENUES

5.3.1 Approach

Estimates of taxation revenue to the NSW and Australian Government have been developed based on benchmarks of taxation revenue received compared to relevant NSW and Australian measures and applied to results from CGE modelling. The following benchmarks were applied by taxation item:

- Personal income tax (Australian Government): total income tax received (ABS, 2020f) compared to total wages and salaries paid to Australian employees (ABS, 2020g; ABS, 2020h) between the financial years of 2009-10 and 2018-19. This was applied to estimates of incomes paid in Australia from the CGE modelling.
- Fringe benefits tax (Australian Government): total fringe benefits tax received (ABS, 2020f) compared to total wages and salaries paid to Australian employees (ABS, 2020g; ABS, 2020h) between the financial years of 2009-10 and 2018-19. This was applied to estimates of incomes paid in Australia from the CGE modelling.
- Company income tax (Australian Government): total company tax received (ABS, 2020f) compared to total gross profit of businesses in Australia (i.e. total GDP less total wages and salaries paid to employees) (ABS, 2019a; ABS, 2020g; ABS, 2020h) between the financial years of 2009-10 and 2018-19. This was applied to estimates of GDP less incomes paid in Australia from the CGE modelling.
- Goods and Services Tax (GST) (Australian Government): total GST received (ABS, 2020f) compared to total Australian GDP (ABS, 2019a) between the financial years of 2009-10 and 2018-19. This was applied to estimates of GDP from the CGE modelling.
- Payroll tax (NSW Government): total payroll tax received (ABS, 2020f) compared to total wages and salaries paid to NSW employees (ABS, 2020g; ABS, 2020h) between the financial years of 2009-10 and 2018-19. This was applied to estimates of incomes paid in NSW from the CGE modelling.

Both direct and flow-on impacts are included in the estimation of the above taxation revenues.

In addition to the above, Evolution Mining will also pay the NSW Government royalties for the extraction of gold. Royalty payments were estimated using royalty rates outlined by the NSW Government (NSW Government,

2020b). The royalty rate for gold is an ad valorem royalty with a base rate of 4% of 'ex-mine' value[1]. In estimating the royalty rate, all processing costs have been deducted on the assumption these represent allowable deductions.

5.3.2 Tax Revenues

Details of anticipated taxation revenue from both direct and flow-on activity associated with the Project are summarised in Table 5.4. The NSW Government is expected to receive around $175 million in additional revenue, primarily through royalty payments, over the life of the Project. The Australian Government is estimated to receive more than $550 million in various taxes. It should be noted that a portion of Australian Government revenues are likely to provide benefits to NSW, with the State allocated a portion of GST revenue as well as through the subsequent expenditure and redistribution of Australian Government revenues to provide services and infrastructure throughout Australia (including NSW).

Table 5.4. Aggregate Government Revenues from the Project

Taxes	Estimated Revenue ($M)	Proportion of Additional Government Revenue
NSW Government Revenues		
Payroll Tax	$45.3	25.9%
Royalties	$129.5	74.1%
Total	**$174.8**	**100.0%**
Australian Government Revenues		
Personal Income Tax	$374.4	67.3%
Fringe Benefits Tax	$9.4	1.7%
Company Tax	$81.6	14.7%
GST	$91.3	16.4%
Total	**$556.6**	**100.0%**

Note: Totals may not sum due to rounding.
Source: ABS (2019a), ABS (2020f), ABS (2020g), ABS (2020h), NSW Government (2020b), AEC.

5.4 IMPACT ON LOCAL PROPERTY MARKET

As outlined in section 3.2, the majority of the Project's workforce is expected to be sourced from outside the Catchment and will need to be accommodated during the periods they are working within the Catchment. At peak, this is expected to result in approximately 180 beds being required locally, with this anticipated to occur in late 2022 as construction and operation activity overlaps. Longer term, around 100 to 110 beds are estimated to be required at any one time to accommodate the operations workforce (accounting for operations workforce rosters in which two of the four mining teams would be rostered on at any one time).

As outlined in the Social Impact Assessment (EMM, 2020a), without mitigation the increase in demand for accommodation and housing in consideration of existing supply would likely present a high risk of constraining availability and increasing prices (in particular in the rental and short stay accommodation market).

Workforce accommodation strategies were being investigated at the time of writing this study. The primary option being considered is the construction of an accommodation village in West Wyalong. Potential sites for a village are being explored. The accommodation village would be expected to have sufficient capacity to accommodate both the construction and operational non-local workforces. The construction of an accommodation village would significantly reduce the impact on the local accommodation and housing market, resulting in negligible impacts on local property values, as non-local workers would be accommodated in the village and thereby not require housing or short term accommodation from the local property market.

[1] The ex-mine value refers to the value of the mineral once it is mined and brought to the surface. In some cases the costs associated with the processing or treatment may be allowable deductions. However, the costs associated with exploration, development and mining of the ore body and the rehabilitation of the site are not allowable deductions (NSW Government , 2020b).

The other option being investigated is the leasing / acquisition of existing commercial accommodation facilities such as motels in the local area to house the non-local workforce. Were this option to be implemented, this would be expected to result in some contraction in the availability of commercial accommodation for non-Project related travellers to the area.

Data from Tourism Research Australia (TRA, 2020) indicates that the Statistical Area 2 (SA2) of West Wyalong averaged approximately 520 overnight visitors staying in the local area per night on average between 2015 and 2019. Of these, approximately 250 visitors per night on average stayed in hotels, motels or motor inns, while 35 stayed in other commercial accommodation (e.g. caravan parks), providing an average of 285 visitors per night staying in commercial accommodation (though his may fluctuate on a day-to-day basis). With a peak of 180 bed nights required in late 2022, and a long term average of around 100 to 110 beds during operations, the non-local workforce of the Project is estimated to represent more than 60% of average nightly visitors in commercial accommodation at peak and around 35% to 40% of average nightly visitors in commercial accommodation during operations.

Given the size of the non-local workforce relative to the existing number of overnight visitors to the area, this may be expected to result in some tightness in the market during peak visitor periods, with high occupancy rates and increased commercial accommodation room rates.

CGO is currently planning for the accommodation option to be in place throughout the Project to accommodate the non-local workforce. However, it is CGO's intention to assist in facilitating a localisation of the operational workforce as soon as it is economically viable and sufficient housing is available in the catchment so as not to increase local prices. This includes attracting mining workers to relocate and live in the Catchment throughout operations as well as providing opportunities for the existing CGO open cut workforce to be trained and upskilled for underground mining. It is likely that over time there will be some transition and relocation of labour to live locally.

Should the options to lease / acquire existing commercial accommodation facilities be undertaken to accommodate the workforce, where workers relocate to the Catchment over time there may be opportunities to either close, divest or reduce capacity of the accommodation option and thereby reduce CGO's impact on availability of short stay accommodation for other users.

5.5 IMPACTS ON BALANCE OF PAYMENTS

The Project will impact on NSW and Australia's balance of payments through both exports and imports. In interpreting the model results, the following should be noted:

- During construction, the Project will support an increase in imports to supply materials and equipment, placing downward pressure on Australia's exchange rate.
- Once operational, in the scenario modelled the Project is estimated to produce 1.84 million ounces of saleable gold for export through to 2039-40, while demands for imported goods and materials during operations will be relatively minimal. This will place upward pressure on Australia's exchange rate.

Movements in Australia's exchange rate has the effect of:

- Making exports of other goods / services produced domestically more or less competitive globally, and thereby impacting on international demand for other Australian goods / services. In general, upward pressure on exchange rates will make exports less competitive globally, and vice versa.
- Making the cost of overseas goods / services more or less expensive for domestic business and consumers, thereby impacting on domestic demand for imports. In general, upward pressure on exchange rates will make imports less expensive for domestic businesses and consumers, and vice versa.

5.5.1 Exports

Including direct and flow-on activity, construction of the Project is estimated to result in a contraction in NSW exports of $93.4 million per annum (this includes interstate and international exports). During operations, the export of gold is estimated to contribute an additional $78.8 million in NSW exports on average per annum.

For Australia, international exports are estimated to decline by $83.3 million per annum during construction and increase by an estimated $69.4 million per annum on average during operations.

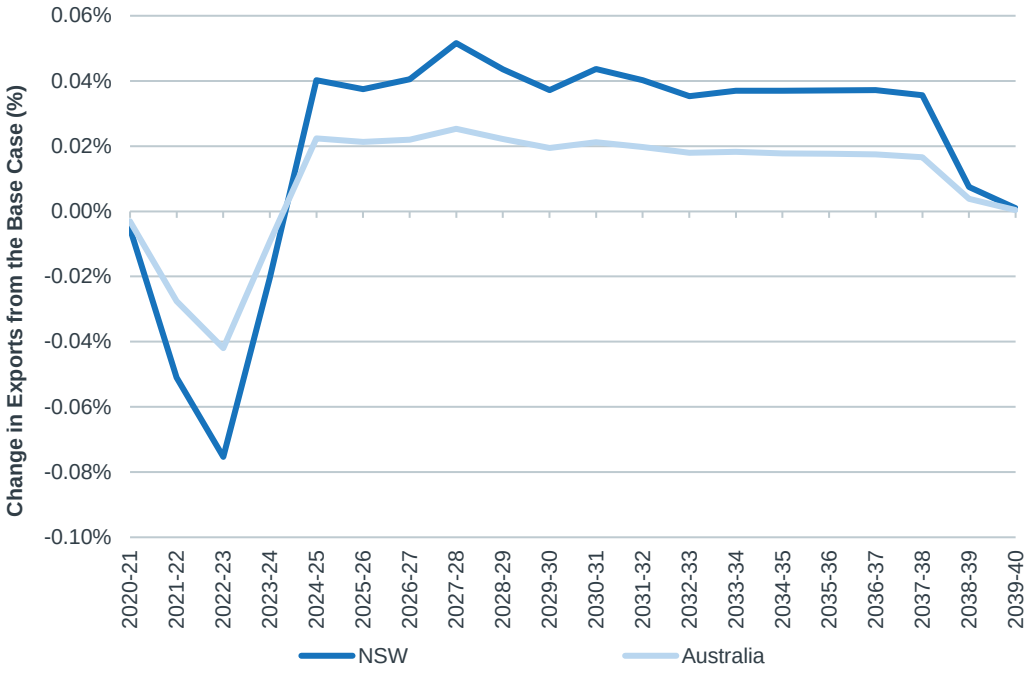
Table 5.5. Average Annual Change in Exports, Deviation from the Base Case ($M)

Region	Construction	Operations
NSW	-$93.4	$78.8
Australia	-$83.3	$69.4

Source: Prime Research (unpublished).

On a percent basis, the Project's contribution to NSW exports is anticipated to average an increase of around 0.04% during operations between 2023-24 to 2037-38 (before declining over the final two years), whilst for Australia the export of gold will provide an average annual increase in Australian exports of about 0.02% over the same period.

Figure 5.6. Annual Percent Change in Exports in NSW and Australia, Deviation from the Base Case



Source: Prime Research (unpublished).

5.5.2 Imports

The Project will source various resources from outside NSW and Australia throughout construction and operations during the Project life, as detailed in section 3.2. During the primary construction period, the Project is anticipated to contribute an additional $22.4 million in imports to NSW on average per annum (including direct and flow-on impacts), whilst additional imports during operations is estimated to be around $37.3 million per annum. The contribution to Australia's imports is estimated to be around $28.9 million per annum during construction and around $47.3 million per annum during operations.

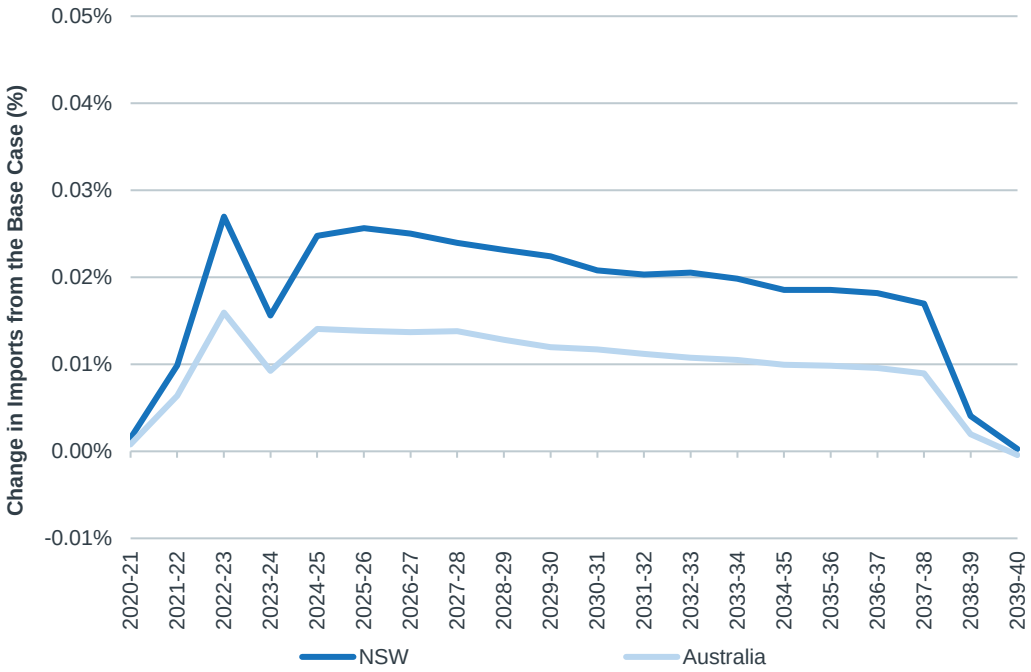
Table 5.6. Average Annual Change in Imports, Deviation from the Base Case ($M)

Region	Construction	Operations
NSW	$22.4	$37.3
Australia	$28.9	$47.3

Source: Prime Research (unpublished).

On a percent basis, the increase in NSW imports is estimated to represent an increase of just under 0.03% at peak during construction and average between 0.02% and 0.03% during operations, whilst the increase for Australia is estimated to be around 0.01% to 0.015% during both construction and operations.

Figure 5.7. Annual Percent Change in Imports in NSW and Australia, Deviation from the Base Case



Source: Prime Research (unpublished).

5.5.3 Net Trade Balances and Exchange Rate

During construction, NSW net imports is estimated to increase by $115.8 million per annum on average, while Australia's net imports are estimated to increase by $112.2 million on average per annum, compared to the base case.

During operations, the Project will support an increase in net exports of $41.5 million per annum on average in NSW and $22.0 million per annum on average per annum in Australia, compared to the base case.

Changes in Australia's net trade balance can impact on the value of the Australian dollar and exchange rates. In 2019, Australia was a net exporter with a net trade balance of $67.3 billion, comprised of total exports of $492.6 billion and total imports of $425.3 billion (DFAT, 2020). However, Australia's net trade balance has historically been volatile and Australia has typically been a net importer. Between 2000 and 2016, only three of the 17 years have resulted in more exports than imports, with the net trade balance averaging -$13.3 billion over this period. Over the past three years since 2017, however, Australia has been a net exporter, with the net trade balance increasing each year.

The Project's long-term increase in net exports during operations will support the Australian dollar and contribute to greater parity between domestic imports and exports. On average, the Project's increase in net exports will result in a marginal (0.01%) appreciation in the exchange rate during operations.

6. MITIGATION AND ENHANCEMENT STRATEGIES

6.1 KEY ISSUES, RISKS AND IMPACTS TO BE ADDRESSED

Assessment of the economic impacts of the Project in section 5 identified the primary issues, risks and impacts that need to be addressed include:

- Impacts on business activity in the Catchment through competition for resources (including labour) and rising production costs.
- Potential impacts on availability and affordability of accommodation resulting from non-local workers in the region.

6.2 MITIGATION AND ENHANCEMENT STRATEGIES

To assist in addressing the issues identified above, CGO has identified and intends to implement a range of plans and strategies to mitigate impacts. These include:

- Encouraging contractors engaged to source labour locally wherever possible and provide training opportunities where appropriate to upskill the local workforce and existing open cut employees.
- Continued support for local business by utilising established supply networks and providing sufficient opportunities and information for local business to secure new supply contracts.
- Provision of sufficient and suitable accommodation for the non-local workforce to minimise impacts on the local property market and housing affordability.

The above mitigation strategies are summarised in more detail below. It should be recognised that these strategies form part of CGO's Project planning, and modelling of impacts in this report has been based on these strategies being implemented (though modelling has assumed a "worst case" scenario where the underground mining workforce is sourced from outside the Catchment and none of this non-local labour engaged relocates to the Catchment over time).

6.2.1 Mitigation Strategy 1: Support Local Employment and Training

While the project scenario examined and economic modelling undertaken has assumed the majority of construction and mining labour will be sourced from outside the Catchment, this is reflective of the specific nature of underground mining skills relative to open cut operations, with these skills not readily available locally currently. To maximise local benefits derived from the Project, the proponent and contractors engaged by the proponent will be encouraged to source labour locally where possible and practical and provide training opportunities where practical. CGO aims to encourage operations workers to transition and relocate to the local area over time.

Mitigation Strategy: Support Local Employment and Training
Issue
To maximise the benefits of the project in the region, the proponent (and contractors engaged by the proponent) will be encouraged to use local labour (i.e. within one hour's drive of the mine site) for the Project where possible.
Objective
Maximise amount of labour sourced locally.
Mitigation / Enhancement Strategies

• CGO will engage a contractor (or contractors) to develop / operate the mine. To assist in meeting this objective:
  ○ Contract arrangements and management will be designed and negotiated to encourage and support the use of local labour to the extent possible and practical. This will include consideration of roster choices and shift length options.
  ○ The mining contractor will also be encouraged to implement and support training and development of local workers where practical.
• CGO staff that work full time at the mine will be encouraged to live locally. Approximately half of the CGO staff employed for the Project are expected to reside within the Catchment.

6.2.2 Mitigation Strategy 2: Support Local Business to Secure Supply Contracts

CGO has long standing relationships with local business and an established supply chain for its existing activities in the region. To maximise local benefits derived from the Project, CGO (and contractors engaged by the proponent) will continue to support local business by utilising these established supply networks and providing sufficient opportunities and information for local business to secure new supply contracts.

Mitigation Strategy: Support Local Business to Secure Supply Contracts
Issue
To maximise the benefits of the project in the region (and NSW), established supply networks will continue to be supported and the local supply chain will be encouraged and provided opportunities to supply goods and services to support the project.
Objective
Provide opportunities for local business to secure supply contracts for the project.
Mitigation / Enhancement Strategies

• Collaborate with Council, economic development organisations, local chambers of commerce and State Government to:
  ○ Inform local business of the goods and services required of the project, service provision opportunities and compliance requirements of business to secure contracts.
  ○ Collaborate with local business and encourage local business to meet the requirements of the Project for supply contracts.
• Develop relevant networks to assist qualified local and regional businesses tender for provision of goods and services to support the Project.

6.2.3 Mitigation Strategy 3: Minimise Impacts on the Local Property Market

The Project will likely result in some inward migration to Bland, in particular West Wyalong, to take up jobs generated by the project either directly or indirectly. Without mitigation this is expected to have a high risk of constraining supply and increasing accommodation and housing prices. Whilst workforce accommodation strategies are being investigated, the primary option for consideration is the construction of an accommodation village in West Wyalong. Potential sites for a village are being explored. The other option being investigated is the lease / acquisition of existing commercial accommodation facilities such as motels in the local area to house the workers.

It is CGO's intention to assist in facilitating a localisation of the operational workforce as soon as it is economically viable and sufficient housing is available in the catchment so as not to increase local prices. Transitioning the operational workforce to residing locally will increase the retention of incomes and expenditure of workers locally and thereby deliver increased economic benefits in the catchment whilst the mine is operational.

Mitigation Strategy: Monitor Impacts on the Local Property Market
Issue
The Project's non-local workforce will increase demand for accommodation in the local area. Without mitigation, this would be expected to place upward pressure on property and commercial accommodation prices and may impact on affordability.
Objective
Minimise impacts on local property markets and affordability.
Mitigation / Enhancement Strategies
• CGO will implement a non-local workforce accommodation plan that will involve either development of a worker accommodation village or lease / acquisition of commercial accommodation. • The accommodation option will ensure sufficient accommodation capacity is provided to accommodate both the construction and operational non-local workforces (anticipated peak of around 180 beds required at any one time). Providing worker accommodation for the non-local workforce minimise any potential impacts on the local housing market by the Project. • Should the options to lease / acquire existing commercial accommodation facilities be undertaken to accommodate the workforce, CGO will monitor requirements and explore opportunities to either close, divest or reduce capacity of the accommodation option where appropriate and thereby reduce CGO's impact on availability of short stay accommodation for other users. • It is CGO's intention to assist in facilitating a localisation of the operational workforce as soon as it is economically viable and sufficient housing is available in the catchment so as not to increase local prices. CGO will monitor local housing supply and availability and work with Council to identify opportunities for land release and housing development to support dwelling development where needed.

7. COST BENEFIT ANALYSIS

7.1 METHOD AND APPROACH

The following CBA to assess the net impact of the Project has been conducted at the state (NSW) level. The analysis examines the impacts resulting from the Project compared to the base case (or 'without project' scenario) to present a net stream of benefits and costs, to understand the public benefit of the Project to the NSW community.

The methodology used in conducting the CBA is outlined in Appendix C. Other key considerations for the CBA include:

- Modelling has been undertaken starting from the financial year ending June 2021, with impacts examined to the year ending June 2040, aligning with the anticipated construction and operations period for the Project. Consideration has also been given to potential impacts that may extend beyond this timeframe, however, given the nature of this Project it is anticipated impacts extending beyond the life of the mine will be negligible (see section 7.2).
- A base discount rate of 7% has been used for demonstration purposes (in line with many State and national standards for real discount rates used in economic appraisal of projects), with additional discount rates also examined (4% and 10%). As all values used in the CBA are in real terms, the discount rate does not incorporate inflation (i.e., it is a real discount rate, as opposed to a nominal discount rate).
- All values are expressed in 2020 Australian dollars.

Decision Criteria:

The Net Present Value (NPV) and Benefit Cost Ratio (BCR) will be the primary decision criteria for the economic appraisal. The NPV of a project expresses the difference between the present value (PV) of future benefits and PV of future costs, i.e.: NPV = PV Benefits – PV Costs. The BCR provides the ratio between the PV of benefits and PV of costs, i.e., BCR = PV Benefits / PV Costs.

Where the economic appraisal results in a:

- Positive NPV and BCR above 1: the project will be deemed as being desirable.
- NPV equal to zero and BCR of 1: the project will be deemed neutral (i.e., neither desirable nor undesirable).
- Negative NPV and BCR below 1: the project will be deemed undesirable.

The Internal Rate of Return (IRR), which indicates the discount rate which would return an NPV of $0 and a BCR of 1, is also reported.

7.2 DEFINITION OF WITH PROJECT AND BASE CASE SCENARIOS

CBA examines the net or incremental impacts (benefits and costs) of a project compared to a 'base case' scenario of what would be expected to occur without the project.

With Project Scenario

The 'with project' scenario is as per the project description in section 3.2.

Base Case Scenario

The 'base case' scenario assumes the Project is not developed. Under this scenario it is assumed that the approvals and decision whether to proceed with the Project will have no bearing on decisions for other alternative gold producing mines elsewhere in NSW (i.e., the operations and development of any other gold mining projects being considered in NSW will not be impacted by this Project). By not proceeding with the Project, the NSW economy would thereby not receive the activity outlined in section 3.2 (The Project will thereby deliver an additional 27Mt of gold product produced by mines in NSW through to 2039-40 than would otherwise be anticipated to occur).

Base economic growth assumptions are assumed to be as per the baseline scenario used for the CGE modelling (refer to Appendix B).

It is noted that current open pit operations are expected to wind down in the next decade and the underground mine will supplement and extend overall production of the Cowal mining complex; that is, without the Project the existing mining and processing operations would cease earlier than in the 'with project' scenario. While this may impact on the timing of mine closure, decommissioning and site rehabilitation activity, for the purposes of this CBA it has been assumed the Project will not impact on the overall timing of operations and closure of the broader Cowal mining complex.

7.3 COSTS AND BENEFITS EXAMINED

7.3.1 Costs

7.3.1.1 Construction Costs of the Project

Construction expenditure for developing the Project is estimated to cost of total of $319.4 million. A summary of construction expenditure by year is provided in section 3.2.1.1.

7.3.1.2 Operating and Closure Costs of the Project

Details of annual operating costs are outlined in section 3.2.2.3. These costs include operating expenses related to extraction of the resource, processing, transport as well as backfilling mine shafts. Royalty and tax payments have been excluded from the operating costs as these represent a transfer payment.

Decommissioning and site rehabilitation costs of the broader Cowal mining complex have been excluded as this activity would occur regardless of the Project and forms part of the broader site plan.

7.3.1.3 Value of Foregone Economic Activity

The Project will develop an underground gold mining operation beneath and adjacent to existing open cut operations at the Cowal Gold Mine, within the existing mining lease area. No existing activities on the site or neighbouring properties will be impeded or impacted by the Project. As such, the impact in terms of any foregone economic activity is expected to be negligible and has not been valued for inclusion in this assessment.

7.3.1.4 Air Quality Impacts

The air quality impact assessment (EMM, 2020b) indicates that the predicted concentrations and deposition rates for incremental particulate matter are below the applicable impact assessment criteria at all assessment locations, and that the Project represents minimal change from the existing open cut operations. Costs from air quality impacts of the Project are thereby anticipated to be negligible and have not been valued for inclusion in this assessment.

7.3.1.5 Greenhouse Gas Emissions

Estimates of total greenhouse gas emissions generated by the Project are outlined in the air quality impact assessment (EMM, 2020b). Including scope 1 emissions (direct associated with fuel combustion (diesel) by onsite plant and equipment as well as use of explosives) and scope 2 emissions (indirect associated with consumption of purchased electricity), the Project is estimated to produce:

- A total of 30,011 tonnes of CO_2-equivalent (t CO_2-e) emissions during on-site construction activity, comprised of 29,997 t CO_2-e through diesel emissions and 14.3 t CO_2-e through explosives emissions.
- A total of 926,319 t CO_2-e during operational and closure activity, comprised of 164,379 t CO_2-e through diesel emissions, 3,444 t CO_2-e through explosives emissions and 758,496 t CO_2-e through electricity emissions.

The timing of greenhouse gas emissions during operations is as per the timing outlined in the air quality impact assessment (EMM, 2020b). For construction, only an aggregate emissions estimate for construction is outlined in the air quality impact assessment and AEC have allocated the construction emissions across the years 2020-21 to 2023-24 in line with the share of total capital expenditure in these years (see section 3.2.1.1).

In valuing the cost of emissions, the spot price for Australian Carbon Credit Units (ACCUs) has been used, from the Emissions Reduction Fund (ERF). A study from January 2020 indicates the average spot price at the end of 2019 was approximately $17.50 per t CO_2-e (RepuTex Energy, 2020). A price of $17.50 per tonne CO_2-e has been used in this study.

7.3.1.6 Noise Impacts

The Project will be developed within an existing mining operation footprint with approved levels of activity and noise levels. The Noise and Vibration Impact Assessment (EMM, 2020c) outlines that all impacts from the Project, in conjunction with existing activities, will satisfy and be within approved existing noise limits during construction and operation and no significant noise impact is anticipated.

Assessment of traffic noise impacts related to the Project indicates that while traffic volumes will increase as a result of the Project, the increase in road traffic noise from existing levels is anticipated to be negligible (EMM, 2020c).

As noise impacts are assessed to be negligible this impact has not been valued for inclusion in the CBA.

7.3.1.7 Visual Amenity Impacts

The Project's infrastructure and activity will be primarily underground, with some surface infrastructure located within the existing mine site. The Visual Impact Assessment (EMM, 2020d) identifies two potential sources of visual impact, being the installation of the surface infrastructure (in particular the paste fill plant) and the use of lighting. The visual impact of the paste fill plant is assessed to be negligible to low, with the impact able to be mitigated by relatively modest design considerations at installation and by the growth of screening vegetation in the longer term. The cumulative impact of the additional lighting will be negligible as it will be a relatively small effect in the context of the scale of existing operations, including the approved lighting for the mine.

Impacts from subsidence will be negligible and confined to within the existing mining lease area and within natural variation (Beck Engineering, 2020), with negligible impacts on visual amenity.

As visual impacts are assessed to be negligible this impact has not been valued for inclusion in the CBA.

7.3.1.8 Groundwater Impacts

Groundwater modelling (Coffey, 2020) indicates that groundwater table drawdown is expected to lie completely within the CGO mining leases ML1535 and ML1791 over the life of the mine. Following mine closure, groundwater inflow to the open pit is expected to result in a lake forming in the open pit, with the pit lake level rising to a level where groundwater inflow is balanced by evaporation from the pit lake. Groundwater impacts to Lake Cowal and outside the mining leases are predicted to be negligible. As such this impact has not been valued for inclusion in the CBA.

7.3.1.9 Surface Water Impacts

Hydrological assessment by HEC (2020) indicates that the Project is not expected to adversely impact on the availability of water for users in the region, with no supply shortages anticipated as a result of the Project. While additional water is estimated to be required from the Lachlan River between 2021 and 2031, the hydrological assessment outlines that based on DPIE-Water trading records there has been adequate allocation assignment water available on the market from this source in previous years to meet the predicted demand requirement without impacting on supply availability for other users.

The hydrological assessment (HEC, 2020) also indicates that:

- There is a very low risk of more than negligible impacts on water quality changes in Lake Cowal as a result of underground mining.
- As the proposed Project and associated surface changes are contained within the current approved disturbance area, no additional post-closure impact on inflows to Lake Cowal is expected to occur as a result of the Project.

As the Project is not anticipated to adversely impact on supply of water for other users nor impacts on water quality, this impact has not been valued for inclusion in the CBA.

7.3.1.10 Subsidence Impacts

The assessment of subsidence impacts from underground mining (Beck Engineering, 2020) indicates the underground mine design and layout is appropriate for minimising potential surface subsidence, with subsidence levels within natural variation, and thereby is forecast to have negligible impact to the surface topology. No buildings or productive land uses are anticipated to be impacted by the Project. All costs for backfilling and mitigating subsidence are included within the operating costs, and no additional costs from subsidence are included in the CBA.

7.3.1.11 Ecological Impacts (Flora / Fauna)

The Project will be an underground mining operation entirely located within the existing mining lease area. Surface infrastructure will entirely be located within existing disturbed areas of the existing open cut mine, with no additional surface ecology impacts anticipated. The underground mine area will extend under Lake Cowal, however, no aquatic or terrestrial ecology impacts are anticipated, as outlined in groundwater (Coffey, 2020), surface water (HEC, 2020) and subsidence (Beck Engineering, 2020) studies, which indicate that:

- Groundwater drawdown is more likely to be higher in the deeper parts of the mine and drawdowns in the near surface layers would be negligible.
- There would be no hydraulic connectivity between the underground mine and Lake Cowal, due to the largely impermeable rock layers which contain the ore and the less permeable sediments which form the lake floor.
- Subsidence levels of around 10-15 mm would be expected to result from the mining operations, which is within the natural variation of the soil layers.
- Strict controls will be put in place to ensure there is no fracturing between the mine and the surface.

Overall, the studies show that there will be no direct impacts on terrestrial and aquatic ecology values and no likely indirect impacts to surface terrestrial ecology values from subsidence, groundwater drawdown or changes to the hydrology of the area. As such this impact has not been valued for inclusion in the CBA.

7.3.1.12 Traffic / Transport Impacts

The Project will generate additional transport movements for the movement of labour to the mine site, as well as transport associated general freight, movement of fuel and supplies. This will result in increased vehicle fuel and maintenance costs, road damage costs as well as increase the risk of accidents due to increased travel.

Estimates of vehicle movements generated by the Project were developed by EMM (2020e) and are summarised in the table below for construction and operations (peak) phases. Note that the table presents individual vehicle movements, i.e. round trip journeys to and from the mine site are counted as two vehicle movements. Assumptions used in developing these traffic estimates are presented in the Traffic Impact Assessment (EMM, 2020e).

Table 7.1. Traffic Generation Summary, Vehicle Movements per Day to / from the Mine Site

Phase	Total	Wyalong / West Wyalong	Forbes Shire	Lachlan Shire
Construction (Peak)				
Heavy Vehicles	10	8	1	1
Workforce - Buses	32	24	4	4
Workforce – Light Vehicles	168	136	16	16
Construction Total	**210**	**168**	**21**	**21**
Operations (Peak)				
Heavy Vehicles	10	8	1	1
Workforce - Buses	16	8	4	4
Workforce – Light Vehicles	84	60	12	12
Operations Total	**110**	**76**	**17**	**17**

Source: EMM (2020e)

The vehicle movements outlined above represent the peak daily traffic during construction and operations. In developing annual estimates of vehicle movements the following was undertaken:

- For construction, the peak monthly FTE estimate of approximately 123 FTEs (see section 3.2.1.2) were assumed to correspond with the peak construction vehicle movements. The number of vehicle movements for other months during construction were estimated based on the difference in FTEs from the peak month.
- For operations, the peak years of operations labour 2032-33 to 2034-35 were assumed to correspond with the peak operations vehicle movements. The number of vehicle movements for other years during operations were estimated based on the difference in FTEs from the peak years.

Daily vehicle movements were converted to annual estimates assuming the mine operates for 365 days a year. Estimates of the total vehicle kilometres travelled each year were developed based on the preferred routes outlined in the Traffic Impact Assessment (EMM, 2020e), providing average distances of:

- Approximately 45km each way for travel between Wyalong / West Wyalong and the mine site.
- Approximately 100km each way for travel between Forbes Shire and the mine site.
- Approximately 90km each way for travel between Lachlan Shire and the mine site.

It should be noted that non-local workers (i.e. those residing outside the Catchment) staying in Wyalong / West Wyalong while on rotation are also expected to travel to / from their place of residence to the accommodation village at the start / end of their rotation. For this assessment it has been assumed that all non-local labour would fly to / from West Wyalong airport, with the majority travelling between Sydney and West Wyalong. In consideration of the number of non-local workers, shift rotations, and an aircraft capacity of no more than 50 people per flight, approximately two flights per week (each way) have been assumed from 2021-22 to 2037-38, reducing to one flight per week in 2038-39, and that these flights would not occur without the Project. No flights have been assumed in 2020-21 or 2039-40 in consideration of low employment levels in these years. Additional road travel associated with travel to / from the airport is assumed to be negligible.

The cost of increased travel due to the Project has been measured through:

- Additional fuel and vehicle maintenance costs (road and air).
- Additional road damage costs.
- Road safety costs due to increased travel.

Air travel safety impacts have not been quantified and valued in consideration of the relatively low number of trips and low crash risk rate, making this impact negligible. Similarly, the marginal additional impacts to air transport infrastructure as a result of the additional flights is expected to be negligible and has not been quantified or valued in the CBA.

These costs are examined below.

Additional Fuel and Vehicle Maintenance Costs

Estimated fuel costs for road traffic were based on an average price in West Wyalong for diesel (used for heavy vehicles and buses) of approximately 122.90c/L and average price for unleaded petrol (used for light vehicles) of approximately 114.90c/L (PetrolSpy, 2020). These prices reflect the average cost for fuel as of August 13th 2020. GST of 10% and fuel excise rate of 42.30c/L (ATO, 2020) were subtracted from these prices to provide the resource cost for diesel and unleaded petrol. Average kilometres travelled per litre of diesel were estimated at 0.38 for heavy vehicles and 0.31 for buses, with 0.11 kilometres per litre of unleaded for light vehicles (ABS, 2019b).

Estimates of aircraft fuel costs were estimated based on the following:

- An average of approximately 3.125 litres of fuel consumed per 100 passenger tonne-kilometres (pax-km) for transpacific aircraft travel (ICCT, 2018), adjusted by 150% to account for regional travel.
- An average of 11.4 pax-km per aircraft kilometre flown for domestic aircraft in Australia in 2019-20 (BITRE, 2020).
- An average flight distance of 370 km between Sydney and West Wyalong.
- An average jet fuel price in Australia of approximately $0.70/L over 2018 and 2019 (Index Mundi, 2020).

Additional maintenance costs for road vehicles were estimated at 33.47 c/km for heavy vehicles, 13.88 c/km for buses and 6.67 c/km for light vehicles, based on data from ATAP (2016) and accounting for inflation between 2013 and 2020 (ABS, 2020e). Estimates of maintenance for aircraft per flight was not available. As a proxy the ratio between road vehicle maintenance to fuel costs was assumed to also apply for aircraft maintenance to aircraft fuel costs.

These rates were applied to the travel distances as estimated above.

Additional Road Damage Costs

Additional road damage costs were estimated at 25.16 c/km for heavy vehicles, 8.35 c/km for buses and 4.44 c/km for light vehicles, based on data from Transport for NSW (TfNSW, 2019) and accounting for inflation between 2019 and 2020 (ABS, 2020e).

These rates were applied to the travel distances as estimated above.

Road Safety Costs

The increase in travel may be expected to provide an increased risk of road crashes. The Traffic Impact Assessment (EMM, 2020) outlines the routes anticipated to be used, including whether the roads are sealed or unsealed and road widths. Data from ATAP (2016) provides average crash rates on non-urban roads per 100 million vehicle kilometres travelled for a range of road types and widths; based on the preferred routes, the following average estimated crash rates per 100 million vehicle kilometres travelled were used:

- To / from Wyalong / West Wyalong:
  - 0.6 crashes resulting in a fatality.
  - 20.19 crashes resulting in serious injury.
  - 24.75 crashes resulting in minor injuries/ property damage.
- To / from Forbes Shire:
  - 1.19 crashes resulting in a fatality.
  - 26.04 crashes resulting in serious injury.
  - 50.35 crashes resulting in minor injuries/ property damage.
- To / from Lachlan Shire:
  - 1.34 crashes resulting in a fatality.
  - 25.49 crashes resulting in serious injury.
  - 52.74 crashes resulting in minor injuries / property damage.

The following values per crash type were used, based on value estimates from ATAP (2016) inflated to 2020 dollar terms (ABS, 2020e):

- Fatal crashes (including medical costs, insurance, workplace production losses, legal costs, vehicle and property repair costs, and other costs such as travel delays and emergency service provision): approximately $2.61 million per crash.
- Serious injury crashes: approximately $596,000 per crash.
- Minor injury / property damage crashes: approximately $21,500 per crash.

These crash rates and values per crash were applied to the travel distances as estimated above.

7.3.2 Benefits

7.3.2.1 Value of Gold Product

Assumptions used for estimating revenues from gold production supported by the Project are summarised in sections 3.2.2.1 and 3.2.2.2.

Evolution Mining is an Australian-owned business headquartered in Sydney. The CBA examines the public benefit to the NSW community, and as a NSW-based business it is assumed all profits to Evolution Mining from the sale of gold product are retained in NSW.

7.3.2.2 Benefits to Labour

While expenditure on employees represents a cost (and is included in the operating costs in section 7.3.1.2), employment also represents a social benefit to those employed through a number of avenues, including the provision of incomes (and thereby providing higher standards of living), a sense of identity, self-worth and satisfaction. Employment has also been linked with a number of positive mental and physical health benefits.

Labour benefits are often excluded from CBA. The primary reason for this exclusion is a highly conservative assumption that the labour would otherwise be employed elsewhere with minimal difference in compensation. However, this assumption is inappropriate where labour would not otherwise be gainfully employed or where a project would result in backfilling of employment positions made available due to transfer of labour to the project.

The impacts of COVID-19 are having a significant short-term impact on the national and NSW labour market, and research in both Australia and overseas suggests the economic ramifications of COVID-19 may be felt for decades. It is therefore considered appropriate to consider the employment supported by the Project as a benefit to those employed.

Employment can be valued in terms of the wages and salaries labour receives less income tax and the opportunity cost to these individuals for their time. The opportunity cost is often valued based on the alternative income they would receive without the Project, either through alternative employment or through social security payments. For the purposes of this assessment it has been assumed that 50% of the wages and salaries paid to operations staff represents a net benefit to these individuals compared to the base case. Estimated labour and labour compensation is presented in sections 3.2.2.3 and 3.2.2.4.

7.4 CBA RESULTS

The table below outlines the present value (PV) of the identified costs and benefits associated with the Project, between the financial year ended June 2021 and financial year ended June 2040, at discount rates of 4%, 7% and 10%.

The CBA modelling for the project at the discount rate of 7% is economically desirable, with the following results:

- A Net Present Value (NPV) of $314.4 million over the assessment period with total present value (PV) benefits of approximately $2,107.9 million compared to an aggregated PV costs of approximately $1,793.5 million.
- A BCR of 1.18, highlighting that the Project is estimated to return $1.18 for every dollar cost.

The CBA identifies that at a 7% discount rate the Project is economically desirable with the benefits outweighing the costs. The Project returns a desirable result across each of the discount rates examined, with the BCR ranging between 1.23 (4% discount rate) and 1.12 (10% discount rate). The CBA is insensitive to the discount rate used with minimal change in BCR across discount rates examined. The Project has an Internal Rate of Return (IRR) of 16.8%.

Table 7.2. Summary CBA Results of Project Impacts to NSW

Impact	Total Value ($M)	PV ($M) – 4% Discount Rate	PV ($M) – 7% Discount Rate	PV ($M) – 10% Discount Rate
Costs				
Construction Costs	$319.4	$296.8	$281.6	$267.8
Operating and Closure Costs	$2,702.1	$1,891.2	$1,490.2	$1,200.8
Value of Foregone Economic Activity	Negligible			
Air Quality Impacts	Negligible			
Greenhouse Gas Emissions	$16.7	$12.3	$10.0	$8.3
Noise Impacts	Negligible			
Visual Amenity Impacts	Negligible			
Groundwater Impacts	Negligible			
Surface Water Impacts	Negligible			
Subsidence Impacts	Negligible			
Ecological Impacts	Negligible			
Traffic / Transport Impacts	$21.4	$15.6	$12.7	$10.6
Total Costs	***$3,059.6***	***$2,215.1***	***$1,793.5***	***$1,486.3***
Benefits				
Value of Gold Product	$3,688.5	$2,514.4	$1,939.5	$1,528.3
Benefits to Labour	$309.9	$214.9	$168.4	$135.2
Total Benefits	***$3,998.4***	***$2,729.3***	***$2,107.9***	***$1,663.5***
Summary				
Net Present Value (NPV)	**-**	**$514.2**	**$314.4**	**$177.2**
Benefit Cost Ratio (BCR)	**-**	**1.23**	**1.18**	**1.12**

Source: AEC.

7.5 SENSITIVITY ANALYSIS

The sensitivity analysis has been undertaken using a Monte Carlo analysis (refer to Appendix C) across the key assumptions used in the CBA modelling (the base assumptions used are outlined in section 7.3).

Each of the assumptions has been tested in isolation with all other inputs held constant, with the results reported in Table 7.3 in terms of the modelled change in NPV resulting from the variance in the base assumptions at a

discount rate of 7%. The final row of the table examines each assumption simultaneously to provide a "combined" or overall sensitivity of the model findings to the assumptions used. The table also outlines the distribution used allowing for a 10% confidence interval, with the "5%" and "95%" representing a 90% probability that the distribution and NPV will be within the range outlined in the table.

The table shows that, at a discount rate of 7%, there is a 90% probability the Project will provide an NPV between -$85.7 million and $715.9 million. Sensitivity testing returned a positive NPV across 89.6% of the 5,000 iterations run in Monte Carlo analysis, with the analysis most sensitive to the value of gold product. Given gold prices used in the analysis are considerably below current gold prices the sensitivity analysis is considered likely to overstate the probability of returning a negative NPV.

Table 7.3. Sensitivity Analysis Summary, Discount Rate 7%

Variable	NPV ($M)	
	5%	95%
Costs		
Construction Costs	$264.5	$351.1
Operating and Closure Costs	$69.2	$559.4
Greenhouse Gas Emissions	$311.5	$317.4
Traffic / Transport Impacts	$310.2	$318.6
Benefits		
Value of Gold Product	-$4.8	$633.4
Benefits to Labour	$286.7	$342.1
Combined	**-$85.7**	**$715.9**

Notes: The percent distributions used for each variable are provided below:
- Construction costs: maximum 30% higher, minimum 20% lower.
- Operating and closure costs: normally distributed with standard deviation of 0.1.
- Cost of greenhouse gas emissions: normally distributed with standard deviation of 0.2.
- Increased cost of transport: normally distributed with standard deviation of 0.2.
- Value of gold product: normally distributed with standard deviation of 0.1.
- Benefits to labour: normally distributed with standard deviation of 0.1.

Source: AEC.

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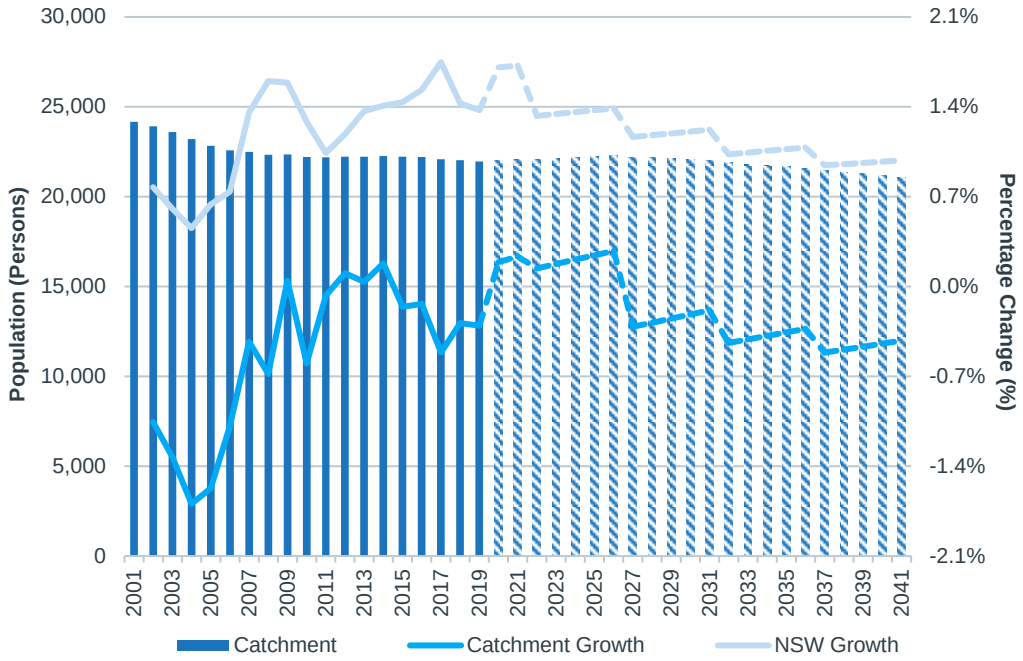
APPENDIX A: SOCIO-ECONOMIC OVERVIEW

POPULATION

The Catchment recorded an estimated resident population of approximately 22,000 people in 2019, equating to 0.3% of NSW (ABS, 2020a). Similar to many communities in central NSW, the Catchment's population recorded a consistent annual decline of 1.3% on average between 2001 and 2006. This compared to higher growth of 0.6% for the State. During this period, the Catchment (and most of central NSW) experienced severe drought, impacting the agricultural sector and liveability of the region, which may have contributed to the population loss (AGU, 2013; BluePlanet, 2020).

Following 2006, population growth still lagged behind that of the State (-0.2% compared to 1.4% average annual growth since 2006) (ABS, 2020a). Various mining and exploration projects have assisted in slowing population decline since 2006, with the main project the construction of the Cowal Gold mine in 2004, which commenced production in 2006 (and was acquired by Evolution Mining Limited in 2015) (Evolution Mining, 2019a). Other exploration projects included those carried out by Argent Minerals Limited, Thomson Resources, Sandfire Resources and St Barbara (Bland Shire Council, 2017).

Figure A. 1. Historical and Projected Population Growth, 2001 to 2041



Note: The solid lines represent historical growth, whilst the dashed lines represent projected growth estimates.
Source: ABS (2020a), DPIE (2019),

Population projections from the Department of Planning, Industry and Environment (2019) suggest the Catchment's resident population is expected to continue to decline at the rate experienced since 2006, with the average annual rate of decline projected to remain at -0.2% from 2019 to 2041. In contrast, the State is projected to increase by 1.2% per annum on average to 2041. By 2041, the Catchment's population is projected to fall to just over 21,000 people and is expected to represent 0.2% of the NSW population.

Table A. 1. Population Projections, 2019 to 2041

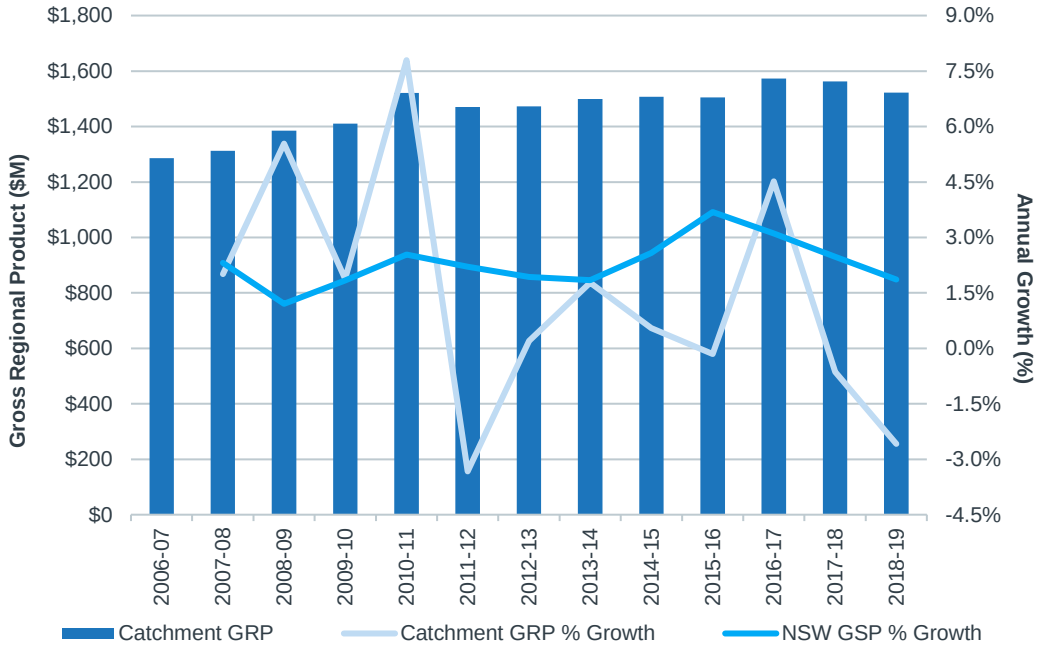
Region	2019	2021	2026	2031	2036	2041	Avg Ann Growth[(a)]
Catchment	21,953	22,046	22,278	22,001	21,581	21,080	-0.2%
NSW	8,089,817	8,369,289	8,953,226	9,499,936	10,012,300	10,503,815	1.2%

Note: (a) Average annual growth has been calculated between 2019 and 2041.
Source: ABS (2020a), DPIE (2019).

ECONOMY

In 2018-19, the Catchment's economy recorded a Gross Regional Product (GRP) of approximately $1.5 billion in chain volume terms[2] (AEC, unpublished[a]). This accounted for 0.2% of NSW Gross State Product (GSP) for the year. Between 2006-07 and 2018-19, the economy recorded average annual growth of approximately 1.4% (compared to 2.3% for the State). Annual growth over this period has been volatile, primarily influenced by fluctuations in mining and agricultural activity, with mining and agriculture, forestry and fishing contributing 18.8% and 16.8% of total sector Gross Value Added (GVA) activity[3], respectively, in 2018-19. The strongest growth was recorded in 2010-11 (7.8%), attributed to the substantial (43.1%) annual growth recorded in the agricultural, forestry and fishing industry in that year, followed by a 3.3% drop the following year, again due to fluctuating activity in the agricultural, forestry and fishing industry.

Figure A. 2. Gross Regional Product ($M), Chain Volume Measures, 2006-07 to 2018-19

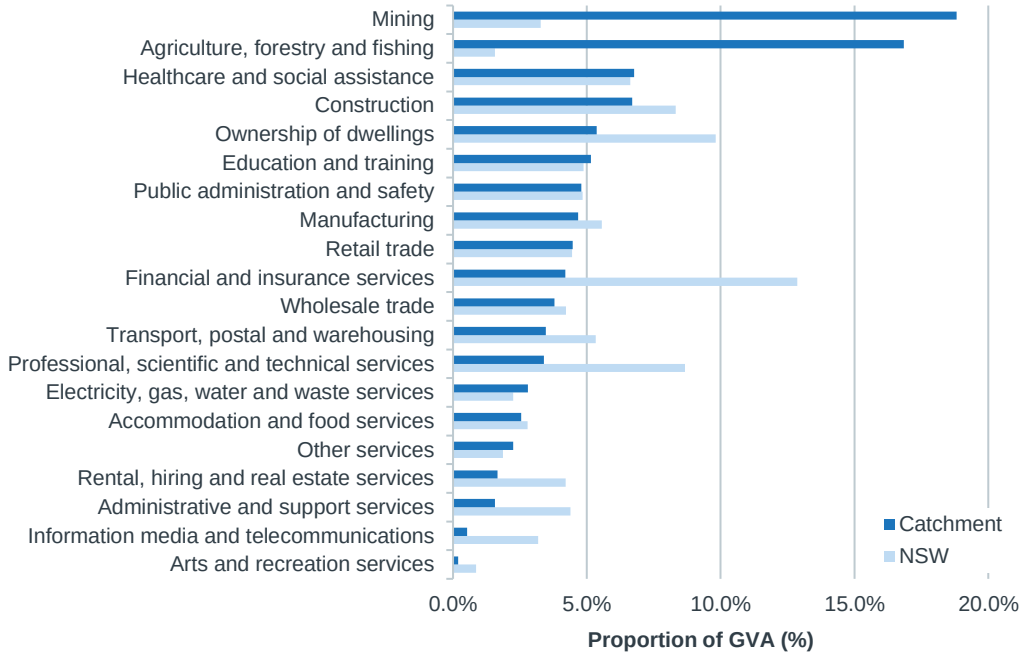


Source: AEC (unpublished[a]).

[2] Estimates of GRP are presented in 2018-19 real price terms.

[3] Sector GVA represents the contribution of all industries as well as the sector of ownership of dwellings to GRP, excluding taxes less subsidies on products.

Figure A. 3. Industry Share of Gross Value Add, 2018-19



Source: AEC (unpublished[a]).

Overall, there were approximately 2,890 businesses operating in the Catchment in 2019 (ABS, 2020b). The agriculture, forestry and fishing sector contributed the most to local businesses (50.4%), followed by construction (8.0%) and rental, hiring and real estate services (6.3%). With the exception of mining, this largely reflects the industry structure aforementioned, with construction and rental, hiring and real estate services acting as supporting industries to the primary activities undertaken. While mining and manufacturing are large contributors to regional GRP (and employment), they provide a relatively small proportion of total business counts. This reflects the large organisational structure of mining and manufacturing companies, with very large employee numbers per company. Business counts data are also impacted by where the registered address of the company is located, and some mining and manufacturing companies are likely registered where corporate headquarters are located rather than at the mine sites themselves.

Table A. 2. Business Counts by Industry, 2019

Industry	Catchment	NSW
Agriculture, Forestry and Fishing	50.4%	6.6%
Mining	0.3%	0.2%
Manufacturing	3.4%	3.4%
Electricity, Gas, Water and Waste Services	0.8%	0.3%
Construction	8.0%	16.1%
Wholesale Trade	3.0%	3.6%
Retail Trade	4.2%	5.6%
Accommodation and Food Services	3.4%	4.0%
Transport, Postal and Warehousing	5.2%	8.1%
Information Media and Telecommunications	0.1%	1.2%
Financial and Insurance Services	3.1%	9.1%
Rental, Hiring and Real Estate Services	6.3%	10.9%
Professional, Scientific and Technical Services	3.2%	13.4%
Administrative and Support Services	1.4%	4.2%
Public Administration and Safety	0.1%	0.4%
Education and Training	0.3%	1.5%
Health Care and Social Assistance	1.8%	6.0%

Industry	Catchment	NSW
Arts and Recreation Services	0.6%	1.3%
Other Services	4.6%	4.1%
Total (%)	**100.0%**	**100.0%**
Total (No.)	**2,895**	**806,472**

Source: ABS (2020b).

KEY INDUSTRIES

Mining

The below section refers to current mining activity in the Catchment, which is primarily associated with current operations at the Cowal Open-Cut Mine.

The Catchment is positioned in the Lachlan Orogen, a broad orogenic belt with world class gold, copper, lead, zinc and silver deposits (Downes, Peter & Pogson, Denis & Nix, L & Robson, David & Sherwin, Lawrence, 2004). Consequently, gold production and mineral exploration, is deeply rooted in the Catchment's history. This continues today, with mining positioned as the most prominent industry in the Catchment in terms of contribution to total sector GVA in 2018-19 (AEC, unpublished[a]).

The Cowal Open-Cut Mine, located in the Catchment, is an open pit mining operation which commenced in 2005 and started processing in 2006. Current operations at the open pit mine employs approximately 385 workers, most of which are local employees and contractors (Evolution Mining, 2019a). In 2019-20, open pit production reached 251,500 ounces of gold (down by 2.5% on the previous year). Whilst workforce arrangements have changed due to the COVID-19 pandemic, production volumes at the Cowal Open-Cut Mine have not been impacted (Evolution Mining, 2020b).

Table A. 3. Gold Production, Cowal Open-Cut Mine[(a)]

Indicator	2016-17	2017-18	2018-19	2019-20
Gold Production (oz)	237,940	263,015	257,951	251,500

Notes: (a) This data refers to current operations at the Cowal Open-Cut Gold Mine, and excludes anything related to this Project, as outlined in Section 3.
Source: Evolution Mining (2019a).

Essential to successful future mining activity, exploration activity continues to grow in the region (NSW Government, 2020a). Exploration companies that are currently undertaking activities in the Catchment include Argent Minerals, Thomson Resources, Sandfire Resources and St Barbara Limited (Bland Shire Council, 2018).

Agriculture

Agriculture, forestry and fishing is the second highest contributor to total sector GVA in the Catchment, accounting for 16.8% of activity in 2018-19. The industry is the largest employment in the Catchment, accounting for 22.1% of employment (by place of work) in 2018-19. In the Catchment, the total value of agricultural commodities produced was $795.8 million in 2015-16[4], with the largest share of this coming from broadacre crops at $453.5 million. The next largest share came from livestock slaughtered and other disposals, which had a value of $156.3 million. Within these sectors, activity is primarily concentrated around sheep, cattle, wheat, oat, and other crop variety production. NSW' agricultural industry is regularly affected by droughts, and this can significantly affect a region's ability to produce agricultural commodities. Currently, 42.5% of the Central West has been classified as a non-rough area, 7.0% classified as recovering and 50.5% as drought affected (Department of Primary Industries, 2020).

[4] The total value of agricultural commodities produced was reported as at the 2015-16 value, as more recent releases did not accurately capture the catchment's area.

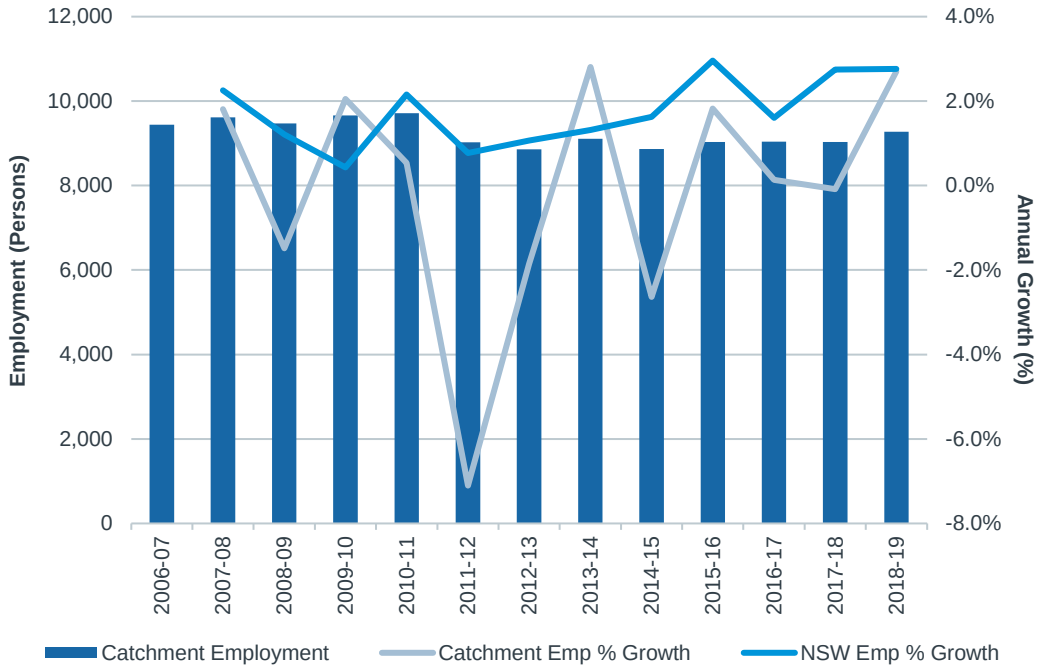
Construction

Construction is the fourth most prominent contributor to total sector GVA in the Catchment, contributing to 7.1% of activity in 2018-19 (AEC, unpublished[a]). Growth in construction activity has generally remained strong since 2006-07, except for the period between 2013-14 to 2014-15 where annual growth declined slightly on the previous years. Over the years to 2012-13, mining activity was in a substantial investment phase, which led to historically high levels of activity in infrastructure and resources related construction (RBA, 2019), with a GVA of $88.1 million for construction in 2012-13 (AEC, unpublished[a]). From this period onwards, construction activity declined in line with the decline in mining investment. In recent years, construction activity has surpassed the levels recorded at the peak of the mining boom, reflective of the growth in construction activity within the Cowal mine (including construction of the Integrated Waste Landform tailing facility, the plant expansion, Stage H stripping and twinning of the water pipeline) (Evolution Mining, 2019b).

LABOUR MARKET

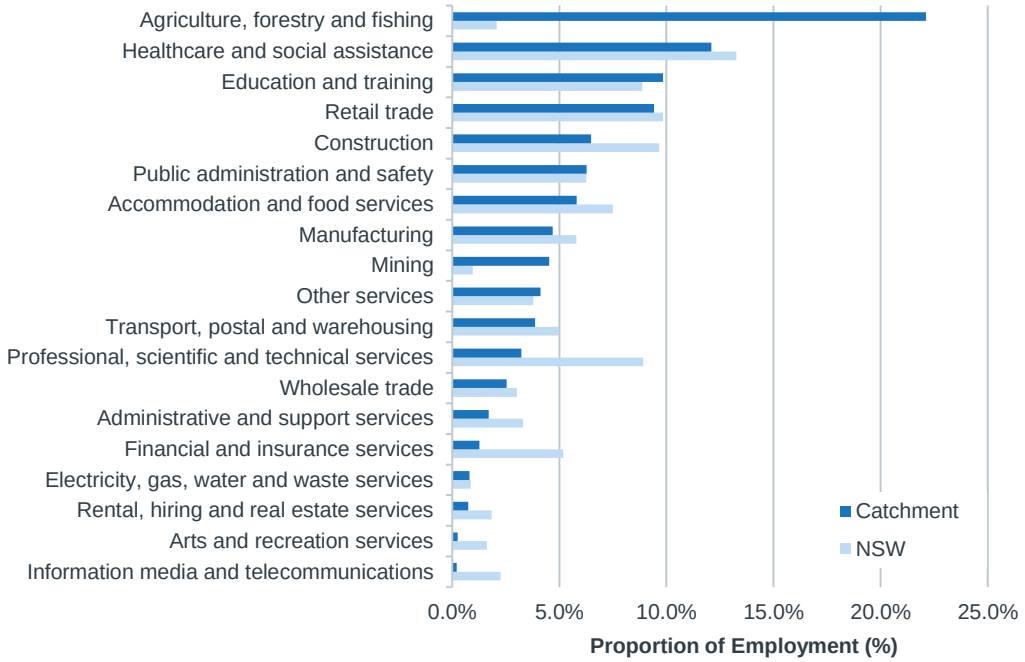
The Catchment has experienced considerable fluctuation in the number of workers (by place of work) year to year between 2006-07 and 2018-19. Employment rose from 9,440 in 2006-07 to a peak of 9,715 in 2010-11, before falling to below 8,900 workers by 2012-13. Employment then averaged around 9,000 workers until 2018-19, when it spiked to approximately 9,280 workers (AEC, unpublished[b]). The largest employing industry in the Catchment is agriculture, forestry and fishing, representing 22.1% of jobs in 2018-19. The next largest employing industries in the Catchment are key service activities supporting the local and regional population, with 12.1% of jobs in the healthcare and social assistance sector and 9.8% of jobs in the education and training sector in 2018-19. As the largest employing industry in the Catchment, agricultural activity has a significant impact on employment, though it is heavily impacted by climatic conditions, which can be highly variables between years.

Figure A. 4. Total Employment, PoW, 2006-07 to 2018-19



Source: AEC (unpublished[b]).

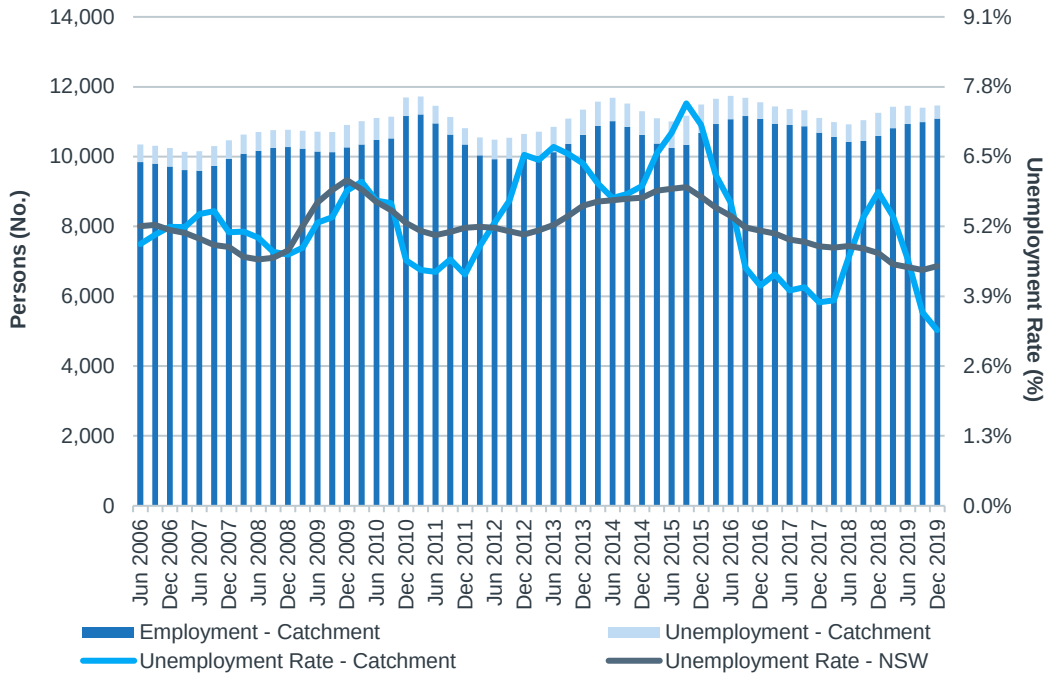
Figure A. 5. Employment by Industry, PoW, 2018-19



Source: AEC (unpublished[b]).

As of December 2019, the unemployment rate in the Catchment was recorded at 3.3% (lower than the 4.5% recorded for NSW) (DoESE, 2020). Between 2006 and 2010, the Catchment's unemployment rate generally trended in line with the State, but since 2010, the unemployment rate has been considerably more volatile than the State. This is typical of regional areas that are highly influenced by small changes in external factors. Despite recording a higher unemployment rate compared to the State between mid-2012 and 2016, the unemployment rate in the Catchment has averaged just below that of the State over the past three years (at 4.4% compared to 4.7% respectively).

Figure A. 6. Labour Force and Unemployment



Source: DoESE (2020).

The industry composition of the economy is also reflected in the occupational breakdown of workers. Managers were the most prevalent occupation held in 2016 (24.3%), likely reflective of the large number of farmers owning

their own businesses (ABS, 2017). Technicians and trades workers were the second most prevalent occupation held (13.2%), followed by labourers (12.8%), with both occupations driven by mining and manufacturing activity.

Table A. 4. Employment by Occupation, PoW, 2016

Occupation	Catchment	NSW
Managers	24.3%	13.7%
Professionals	12.6%	24.1%
Technicians & Trades Workers	13.2%	12.9%
Community & Personal Service Workers	9.6%	10.6%
Clerical & Administrative Workers	9.8%	14.1%
Sales Workers	8.2%	9.4%
Machinery Operators & Drivers	9.5%	6.2%
Labourers	12.8%	9.0%
Total	**100.0%**	**100.0%**

Source: ABS (2017).

In 2016, approximately 8,230 people lived and worked in the Catchment, whilst approximately 800 people were classified as imported labour (i.e. lived elsewhere but worked in the Catchment), and approximately 550 people as exported labour (i.e. worked elsewhere by lived in the Catchment) (ABS, 2017). Based on these figures, the Catchment is 91.2% self-sufficient[5], indicating that the majority of jobs in the local area are held by residents and there is an appropriate match between skillsets held by residents and the jobs that are available. This is largely due to the high number of agricultural, forestry and fishing workers who live and work in the Catchment and likely reflects that many farmers work on their own properties. The Catchment has a higher self-containment[6] rate (93.7%), reflecting that the vast majority of residents of the Catchment found suitable work in their region of residence, or relocated to the region for work purposes.

Table A. 5. Journey to Work by Job Location, Catchment, 2016

Industry	Live and Work Local[(a)]	Imported Labour[(b)]	Total Local Workers (PoW)[(c)]	Exported Labour[(d)]
Agriculture, Forestry and Fishing	2,025	232	2,257	134
Mining	354	60	414	71
Manufacturing	398	23	421	14
Electricity, Gas, Water and Waste Services	84	0	84	0
Construction	471	25	496	22
Wholesale Trade	219	7	227	17
Retail Trade	820	55	876	29
Accommodation and Food Services	475	41	516	22
Transport, Postal and Warehousing	307	48	355	24
Information Media and Telecommunications	19	3	22	0
Financial and Insurance Services	87	10	97	5
Rental, Hiring and Real Estate Services	58	5	63	3
Professional, Scientific and Technical Services	236	26	262	7
Administrative and Support Services	156	13	169	10
Public Administration and Safety	454	26	480	39
Education and Training	810	107	917	59
Health Care and Social Assistance	900	105	1,005	79

[5] Self-sufficiency refers to the proportion of people that live and work in the Catchment compared to the total that work in the Catchment. A higher self-sufficiency rate is preferable.

[6] Self-containment refers to the proportion of people that live and work in the Catchment compared to the total that live in the Catchment. A higher self-containment rate is preferable.

Industry	Live and Work Local[a]	Imported Labour[b]	Total Local Workers (PoW)[c]	Exported Labour[d]
Arts and Recreation Services	25	0	25	0
Other Services	332	11	343	17
Total	**8,230**	**797**	**9,028**	**552**

Notes: (a) The number of workers that both live and work in the catchment. (b) The number of workers that work in the catchment but live elsewhere (i.e. people that do not live in the catchment but commute to or temporarily stay in the catchment for work). (c) The combination of the first and second column, representing the total jobs located in the catchment (i.e. place of work employment data). (d) The number of workers that live in the catchment but work elsewhere (i.e. people that live in the catchment but commute from or temporarily stay outside the catchment for work). The combination of this column with the first column represents the total number of people residing in the catchment that have a job (i.e. place of usual residence employment data).
Source: ABS (2017).

Average annual income in the Catchment was lower than the NSW average in 2016, despite significant employment in mining – a high income industry ($52,070 per annum on average compared to $64,166 for the State).

Table A. 6. Income by Industry, PoW, 2016

Industry	Catchment	NSW
Agriculture, Forestry and Fishing	$50,605	$49,799
Mining	$96,302	$106,960
Manufacturing	$51,835	$66,284
Electricity, Gas, Water and Waste Services	$75,340	$89,361
Construction	$53,215	$65,118
Wholesale Trade	$56,206	$74,796
Retail Trade	$37,726	$42,092
Accommodation and Food Services	$29,686	$33,393
Transport, Postal and Warehousing	$49,297	$65,014
Information Media and Telecommunications	$46,064	$86,924
Financial and Insurance Services	$54,682	$98,110
Rental, Hiring and Real Estate Services	$38,768	$73,014
Professional, Scientific and Technical Services	$58,107	$85,270
Administrative and Support Services	$30,125	$51,409
Public Administration and Safety	$62,399	$79,977
Education and Training	$61,942	$66,048
Health Care and Social Assistance	$51,376	$61,008
Arts and Recreation Services	$61,116	$50,714
Other Services	$43,330	$48,904
Total	**$52,070**	**$64,166**

Source: ABS (2017).

PROPERTY MARKET

The Catchment's property market is currently characterised by modest growth in demand for residential dwellings, low diversity of housing stock, and low house prices and rents afforded by the recent drought conditions and reduced liveability.

The modest growth in demand for residential dwellings is evidenced by building approval trends. Residential approval volumes in the Catchment have experienced modest growth in recent years, growing by 8.7% on average per annum since 2012-13 (compared to just 5.0% for NSW) (ABS, 2020c). This level of growth is indicative of increased dwelling development in the region, which is reflective of some level of demand for housing supply. It is important to note that these growth estimates are off small volumes, ranging between 29 and 61 approvals between 2012-13 and 2018-19, and hence are not indicative of significant residential development activity. Whilst growing at a slower rate, demand for residential dwellings has also resulted in moderate growth in approval values over the same period (6.5% per annum on average compared to 8.6% for NSW) (ABS, 2020c).

Table A. 7. Residential Building Approval Values ($000) and Volumes (No.)

Financial Year	Catchment	NSW
Value		
2012-13	$12,780	$13,316,343
2013-14	$11,048	$16,543,353
2014-15	$10,870	$19,737,860
2015-16	$12,314	$24,561,262
2016-17	$13,655	$25,433,781
2017-18	$27,850	$26,688,321
2018-19	$18,598	$21,869,021
2019-20 YTD[(a)]	$10,595	$12,280,281
Average Annual Growth (2012-13 to 2018-19)	6.5%	8.6%
Number		
2012-13	37	42,789
2013-14	29	54,067
2014-15	29	63,344
2015-16	31	73,314
2016-17	39	73,045
2017-18	54	72,630
2018-19	61	57,423
2019-20 YTD[(a)]	29	31,417
Average Annual Growth (2012-13 to 2018-19)	8.7%	5.0%

Note: (a) Includes building approvals up to April 2020.
Source: ABS (2020c).

Table A. 8. Non-Residential Building Approval Values ($000)

Financial Year	Catchment	NSW
Value		
2012-13	$13,049	$8,702,809
2013-14	$10,705	$12,428,147
2014-15	$24,185	$9,377,691
2015-16	$20,781	$11,289,934
2016-17	$6,782	$14,358,156
2017-18	$20,740	$14,681,503
2018-19	$4,271	$16,608,114
2019-20 YTD[(a)]	$25,422	$13,326,380
Average Annual Growth (2012-13 to 2018-19)	-17.0%	11.4%

Note: (a) Includes building approvals up to April 2020.
Source: ABS (2020c).

Due to the rural nature (and availability of large land lots for separate houses), the Catchment recorded a low level of diversity in housing stock compared to the State in 2016, with approximately 91.8% of private dwellings recorded as separate housing compared to 65.3% in NSW (ABS, 2017).

Table A. 9. Dwelling Structure, 2016

Dwelling Structure	Catchment	NSW
Separate house	91.8%	65.3%
Semi-detached / Flat, unit or apartment	5.7%	33.3%
Caravan, cabin, houseboat	1.4%	0.8%
Improvised home, tent, sleepers out	0.3%	0.2%
House or flat attached to a shop, office, etc.	0.8%	0.4%
Total (%)	**100.0%**	**100.0%**
Total (No.)	**10,173**	**3,059,528**

Source: ABS (2017).

In 2016, the majority of occupied private dwellings were owned outright (43.2%), followed by being owned with a mortgage (27.6%) and rented (24.7%). Compared to the State, a higher proportion of residents in the Catchment had paid off their mortgage, and a smaller proportion of properties were rented. This may reflect the larger number of residents on high mining incomes who have sufficient incomes to purchase houses rather than rent.

Table A. 10. Housing Tenure, 2016

Housing Tenure	Catchment	NSW
Owned outright	43.2%	33.3%
Owned with a mortgage	27.6%	32.9%
Being purchased under a shared equity scheme	0.1%	0.1%
Rented	24.7%	31.8%
Being occupied rent-free	3.5%	1.0%
Being occupied under a life tenure scheme	0.2%	0.5%
Other tenure type	0.7%	0.5%
Total	**100.0%**	**100.0%**

Source: ABS (2017).

Within the Catchment, property market activity is primarily centred around Forbes LGA. Since June 2017, residential house sales activity in Forbes LGA has averaged around 40 sales per quarter, whilst Bland and Lachlan LGAs recorded fewer than 30 sales per quarter on average (FACS, 2020). In line with the low levels of activity, the median sales price within each catchment has remained significantly lower than the State. Over the year to December 2019, the median sales price averaged around $255,000 for Forbes LGA, $134,000 for Lachlan LGA and $191,000 for Bland LGA (compared to an average of $622,000 for the State). This is likely due to house price growth typically lagging that of metropolitan areas. Despite these trends, the growth in residential approval activity reveals modest demand for dwellings, with the potential for house sale prices to improve, evidenced by Bland and Forbes LGAs recording their highest sales prices in December 2019 since mid-2017.

Table A. 11. Median Sales Price by LGA[(a)]

Quarter	Bland	Lachlan	Forbes	NSW
Jun-17	$165,000	$130,000	$260,000	$700,000
Sep-17	$179,000	$167,000	$270,000	$662,000
Dec-17	$160,000	$176,000	$277,000	$675,000
Mar-18	$190,000	$128,000	$260,000	$655,000
Jun-18	$180,000	$150,000	$250,000	$660,000
Sep-18	$150,000	$188,000	$270,000	$625,000
Dec-18	$150,000	$188,000	$270,000	$650,000
Mar-19	$163,000	$137,000	$229,000	$635,000
Jun-19	$165,000	$130,000	$250,000	$651,000
Sep-19[(b)]	-	-	-	-
Dec-19	$245,000	(-) [(c)]	$286,000	$700,000

Notes: (a) The data has been provided at an individual LGA level, as sale volumes are not available for Bland and Lachlan LGAs in order to provide a weighted average for the Catchment. (b) Data was not provided for the September 2019 quarter. (c) A '(-)' represents that 10 or less properties were sold. The exact number has not been recorded due to privacy reasons.
Source: FACS (2020).

Table A. 12. Number of Sales by LGA[(a)]

Quarter	Bland	Lachlan	Forbes	NSW
Jun-17	s[(b)]	s	s	32,161
Sep-17	s	s	35	33,929
Dec-17	s	s	38	32,168
Mar-18	s	s	40	26,046
Jun-18	s	s	32	27,471
Sep-18	s	s	45	20,378

Quarter	Bland	Lachlan	Forbes	NSW
Dec-18	s	s	49	24,883
Mar-19	s	s	s	19,558
Jun-19	s	s	49	25,870
Sep-19[c]	-	-	-	-
Dec-19	s	(-) [d]	37	30,013

Notes: (a) The data has been provided at an individual LGA level, as sale volumes are not available for Bland and Lachlan LGAs in order to provide a weighted average for the Catchment. (b) Data was not provided for the September 2019 quarter. (c) An 's' indicates that 30 or less properties were sold. The exact number has not been recorded due to privacy reasons. (d) A '(-)' represents that 10 or less properties were sold. The exact number has not been recorded due to privacy reasons.
Source: FACS (2020).

Similar to housing sales activity, minimal rental activity has been recorded each quarter, with rents typically falling well below the State average. Since September 2017, rental activity in Forbes LGA has averaged around 67 bonds lodged per quarter, whilst Bland and Lachlan LGAs recorded fewer than 30 bonds lodged per quarter on average (FACS, 2020). Over the year to March 2020, median rents have averaged around $262 for Forbes, $215 for Lachlan LGA and $207 for Bland LGA (compared to $478 for NSW).

Table A. 13. Median Rent by LGA[a] ($)

Quarter	Bland	Lachlan	Forbes	NSW
Sep-17	$210	$210	$220	$470
Dec-17	$240	$210	$260	$475
Mar-18	$250	$220	$238	$480
Jun-18	$233	$200	$220	$480
Sep-18	$250	$235	$240	$480
Dec-18	$173	$200	$250	$480
Mar-19	$240	$245	$233	$480
Jun-19	$250	$220	$248	$475
Sep-19	$170	$200	$270	$480
Dec-19[b]	-	-	-	-
Mar-20	$200	$225	$268	$480

Notes: (a) The data has been provided at an individual LGA level, as rental bond volumes are not available for Bland and Lachlan LGAs in order to provide a weighted average for the Catchment. (b) Data was not provided for the December 2019 quarter.
Source: FACS (2020).

Table A. 14. Number of Rental Bonds Lodged by LGA[a]

Quarter	Bland	Lachlan	Forbes	NSW
Sep-17	s[b]	s	59	72,549
Dec-17	s	s	60	69,224
Mar-18	s	s	62	75,910
Jun-18	s	s	78	73,113
Sep-18	s	s	56	78,257
Dec-18	s	s	69	74,093
Mar-19	s	s	72	81,189
Jun-19	s	s	74	74,871
Sep-19	s	s	63	83,778
Dec-19[c]	-	-	-	-
Mar-20	s	32	74	82,731

Notes: (a) The data has been provided at an individual LGA level, as rental bond volumes are not available for Bland and Lachlan LGAs in order to provide a weighted average for the Catchment. (b) An 's' indicates that 30 or less bonds were lodged. The exact number has not been recorded due to privacy reasons. (c) Data was not provided for the December 2019 quarter.
Source: FACS (2020).

COVID-19 IMPACT

Table A. 15. JobKeeper Application Counts, April and May 2020

Area	April Application Count	May Application Count	Month on Month Growth (%)
Catchment	2,962	3,269	10.4%
NSW	604,014	635,328	5.2%

Notes: JobKeeper application counts were available at the postcode level, however, postcodes which recorded less than 5 applications did not provide data. Hence, the above estimates record a slight undercount on true volumes.
Source: Treasury (2020).

Table A. 16. COVID-19 Employment Impact, as of 30 May 2020

Area	2018-19 Employment	Estimated Employment as of 30 May 2020	Numerical Change	Percentage Change
Catchment	9,276	8,628	-648	-7.0%
NSW	3,600,987	3,347,342	-253,645	-7.0%

Source: ABS (2020e), AEC.

Table A. 17. COVID-19 GVA Impact, as of 30 May 2020

Area	2018-19 GVA ($M)	Estimated GVA as of 30 May 2020 ($M)	Numerical Change	Percentage Change
Catchment	$1,328.0	$1,260.4	-$67.6	-5.1%
NSW	$523,079.8	$495,573.7	-$27,506.1	-5.3%

Source: ABS (2020e), AEC.

APPENDIX B: CGE METHODOLOGY

MODEL OVERVIEW

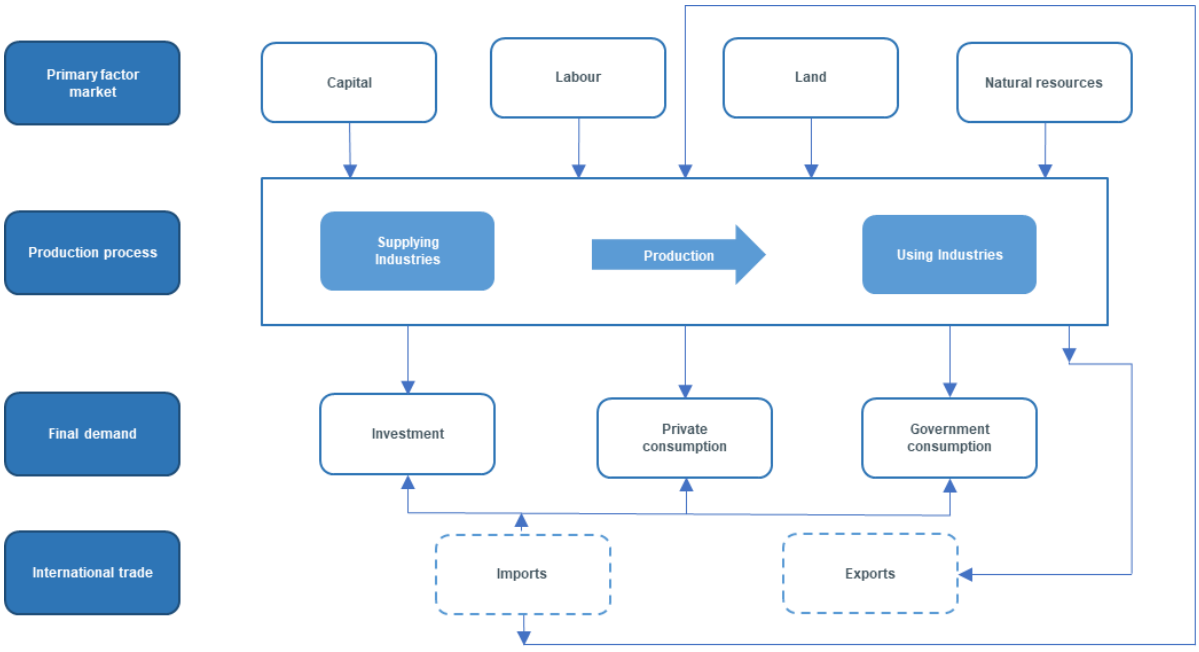
Computable General Equilibrium (CGE) economic models represent the workings of the economy through a system of interdependent behavioural and accounting equations linked to an input-output database.

Beginning with the production processes of individual industries, supported by inputs from other industries and the use of the primary factors of production, then adding in investment demand, private and government consumption, imports and exports, CGE modelling represents a fully integrated model of the world economy. In the model used for this assessment, production technology, individual markets, investment, trade and consumption are represented by equations with strong microeconomic foundations. The simultaneous solution of these equations in response to external changes (or 'shocks') generates the model solutions. When an economic shock, such as a new project, is applied to the model, each of the markets adjusts to a new equilibrium according to the economic theory and behavioural parameters that underpin the model.

In addition to recognising the linkages between industries in an economy, CGE models also recognise the constraints that apply in an economy (e.g. increased demand for labour will push the costs of labour up if there is full employment).

The CGE model used for this assessment is a dynamic model, which means it solves year-by-year, allowing a stream of annual results to be reported. Results are presented as deviations from a base (or reference) case, where the base case represents an anticipated growth path of the economy without the project.

Figure B.1. Representation of a Single Region in the CGE Model



MODELLING ASSUMPTIONS

The economic impacts of the three components of the Cowal Gold Operations Underground Development on the Catchment, NSW and national economies has been assessed by Prime Research utilising the Tasman Global Computable General Equilibrium (CGE) modelling framework.

Dynamic simulations using CGE modelling require two separate model runs. The first model run, known as the 'base case', simulates one view of the economic future. In this view of the future the Project does not proceed.

In the second model run, known as the 'with project case', an alternative view of the economic future is simulated. In this view of the future the Project development proceeds, and includes activities associated with mining activity for domestic and export markets.

Economic growth rates used in the modelling are based on near-term projections from Australian Government and State Treasuries, and medium to long term projections are a function of assumptions regarding changes in population, and particularly changes in the working age population), workforce participation rates and changes in labour productivity.

Regional population growth used in the modelling has been projected using an in-house demographic model. This model projects how populations change in each region and subsequently estimates changes in the working age population which flows through to regional labour supply and participation rates.

Population growth for the eight Australian States and Territories incorporates detailed ABS data on population levels, births, deaths and migration. Population growth in the regional catchment is based on information referenced from NSW Government.

Labour productivity growth is influenced by many factors, including capital intensity, training and education and composition of the workforce. Over the last 30 years Australia's labour productivity growth has averaged around 1.4 percent per annum. In the 'base case' Australian labour productivity growth is to be at a slightly lower rate of 1.3 percent per annum.

Table B.1. Base Case Economic Growth Assumptions

Region	Average Annual Growth (%)
NSW	2.1%
Australia	2.7%

Source: Prime Research (unpublished).

A constrained labour mobility assumption has been utilised between States, with labour mobility assumed to be motivated by real wage differentials. Labour mobility assumptions include both inter-industry labour movement within regions as well as inter-regional and interstate labour movement. Labour is assumed to not be sufficiently mobile to remove these real wage differentials completely (i.e., in order to attract labour, real wages will increase).

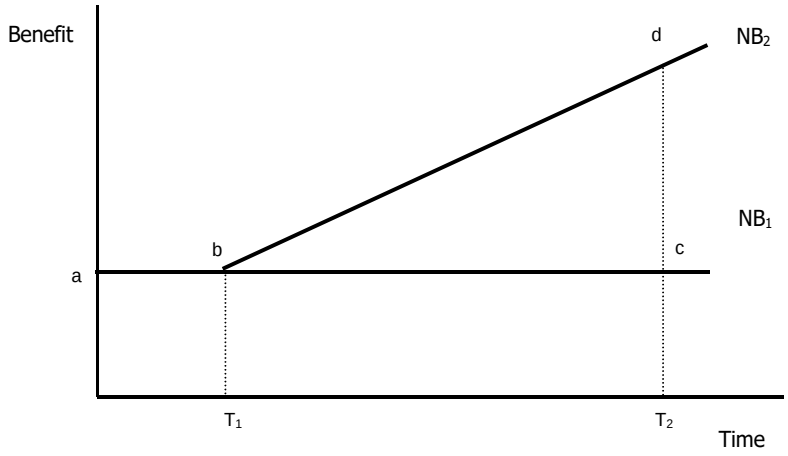
APPENDIX C: CBA METHODOLOGY

STEP 1: DEFINE THE SCOPE AND BOUNDARY

To enable a robust determination of the net benefits of undertaking a given project, it is necessary to specify base case and alternative case scenarios. The base case scenario represents the 'without project' scenario and the alternative or 'with project' scenario examines the impact with the project in place.

The base case (without) scenario is represented by line NB_1 (bc) over time T_1 to T_2 in Figure C.1. The investment in the project at time T_1 is likely to generate a benefit, which is represented by line NB_2 (bd). Therefore, the net benefit flowing from investment in the project is identified by calculating the area (bcd) between NB_1 and NB_2.

Figure C.1. With and Without Scenarios



Source: AEC.

STEP 2: IDENTIFY COSTS AND BENEFITS

A comprehensive quantitative specification of the benefits and costs included in the evaluation and their various timings is required and includes a clear outline of all major underlying assumptions. These impacts, both positive and negative, are then tabulated and where possible valued in dollar terms.

Some impacts may not be quantifiable. Where this occurs the impacts and their respective magnitudes will be examined qualitatively for consideration in the overall analysis.

Financing costs are not included in a CBA. As a method of project appraisal, CBA examines a project's profitability independently of the terms on which debt finance is arranged. This does not mean, however, that the cost of capital is not considered in CBA, as the capital expenses are included in the year in which the transaction occurs, and the discount rate (discussed below in Step 5) should be selected to provide a good indication of the opportunity cost of funds, as determined by the capital market.

STEP 3: QUANTIFY AND VALUE COSTS AND BENEFITS

CBA attempts to measure the value of all costs and benefits that are expected to result from the activity in economic terms. It includes estimating costs and benefits that are 'unpriced' and not the subject of normal market transactions but which nevertheless entail the use of real resources. These attributes are referred to as 'non-market' goods or impacts. In each of these cases, quantification of the effects in money terms is an important part of the evaluation.

However, projects frequently have non-market impacts that are difficult to quantify. Where the impact does not have a readily identifiable dollar value, proxies and other measures should be developed as these issues represent real costs and benefits.

One commonly used method of approximating values for non-market impacts is 'benefit transfer'. Benefit transfer (BT) means taking already calculated values from previously conducted studies and applying them to different study sites and situations. In light of the significant costs and technical skills needed in using the methodologies outlined in the table above, for many policy makers utilising BT techniques can provide an adequate solution.

Context is extremely important when deciding which values to transfer and from where. Factors such as population, number of households, and regional characteristics should be considered when undertaking benefit transfer. For example, as population density increases over time, individual households may value nearby open space and parks more highly. Other factors to be considered include, depending on the location of the original study, utilising foreign exchange rates, demographic data, and respective inflation rates.

Benefit transfer should only be regarded as an approximation. Transferring values from similar regions with similar markets is important, and results can be misleading if values are transferred between countries that have starkly different economies (for example a benefit transfer from the Solomon Islands to Vancouver would likely have only limited applicability). However, sometimes only an indicative value for environmental assets is all that is required.

STEP 4: TABULATE ANNUAL COSTS AND BENEFITS

All identified and quantified benefits and costs are tabulated to identify where and how often they occur. Tabulation provides an easy method for checking that all the issues and outcomes identified have been addressed and provides a picture of the flow of costs, benefits and their sources.

STEP 5: CALCULATE THE NET BENEFIT IN DOLLAR TERMS

As costs and benefits are specified over time it is necessary to reduce the stream of benefits and costs to present values. The present value concept is based on the time value of money – the idea that a dollar received today is worth more than a dollar to be received in the future. The present value of a cash flow is the equivalent value of the future cashflow should the entire cashflow be received today. The time value of money is determined by the given discount rate to enable the comparison of options by a common measure.

The selection of appropriate discount rates is of particular importance because they apply to much of the decision criteria and consequently the interpretation of results. The higher the discount rate, the less weight or importance is placed on future cash flows.

The choice of discount rates should reflect the weighted average cost of capital (WACC). For this analysis, a base discount rate of seven percent has been used to represent the minimum rate of return, which is in line with NSW and Australian Government guidelines. As all values used in the CBA are in real terms, the discount rate does not incorporate inflation (i.e., it is a real discount rate, as opposed to a nominal discount rate).

To assess the sensitivity of the project to the discount rate used, discount rates either side of the base discount rate (seven percent) have also been examined (four percent and ten percent).

The formula for determining the present value is:

$$PV = \frac{FV_n}{(1+r)^n}$$

Where:

PV = present value today

FV = future value n periods from now

r = discount rate per period

n = number of periods

Extending this to a series of cash flows the present value is calculated as:

$$PV = \frac{FV_1}{(1+r)^1} + \frac{FV_2}{(1+r)^2} + \cdots + \frac{FV_n}{(1+r)^n}$$

Once the stream of costs and benefits have been reduced to their present values the Net Present Value (NPV) can be calculated as the difference between the present value of benefits and present value of costs. If the present value of benefits is greater than the present value of costs, then the option or project would have a net economic benefit.

In addition to the NPV, the internal rate of return (IRR) and benefit-cost ratio (BCR) can provide useful information regarding the attractiveness of a project. The IRR provides an estimate of the discount rate at which the NPV of the project equals zero, i.e., it represents the maximum WACC at which the project would be deemed desirable. However, in terms of whether a project is considered desirable or not, the IRR and BCR will always return the same result as the NPV decision criterion.

STEP 6: SENSITIVITY ANALYSIS

Sensitivity analysis allows for the testing of the key assumptions and the identification of the critical variables within the analysis to gain greater insight into the drivers to the case being examined.

A series of Monte Carlo analyses has been conducted to test the sensitivity of the model outputs to changes in key variables. Monte Carlo simulation is a computerised technique that provides decision-makers with a range of possible outcomes and the probabilities they will occur for any choice of action. Monte Carlo simulation works by building models of possible results by substituting a range of values – the probability distribution – for any factor that has inherent uncertainty. It then calculates results over and over, each time using a different set of random values from the probability functions. The outputs from Monte Carlo simulation are distributions of possible outcome values.

During a Monte Carlo simulation, values are sampled at random from the input probability distributions. Each set of samples is called an iteration, and the resulting outcome from that sample is recorded. Monte Carlo simulation does these hundreds or thousands of times, and the result is a probability distribution of possible outcomes. In this way, Monte Carlo simulation provides a comprehensive view of what may happen. It describes what could happen and how likely it is to happen.

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