
BARALABA SOUTH PROJECT – ECONOMIC IMPACT ASSESSMENT

BARALABA SOUTH PTY LTD

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EXECUTIVE SUMMARY

BACKGROUND

Baralaba South Pty Ltd (formerly Mount Ramsay Coal Company Pty Ltd and Wonbindi TLO Holdings Pty Limited), a wholly owned subsidiary of Baralaba Coal Pty Ltd (Baralaba Coal Company), is proposing to develop the Baralaba South Project (the Project), which will produce up to 2.5 million tonnes per annum (Mtpa) Run of Mine (ROM) coal. Approval is being sought to develop a greenfield open cut coal mine using traditional truck and excavator methods. A mine life of 23 years with up to two years of construction is proposed covered by Mining Lease Application (MLA) 700057.

Product coal would be hauled approximately 40km by public road using covered road trains to the existing Train Load Out (TLO) facility located approximately 2km east of Moura. Realignment of an approximate 4.5 km section of the Moura-Baralaba Road is proposed to the east of the MLA to enable the mining activity.

This economic impact assessment report has been prepared to examine the likely impacts of the Project on the regional catchment (in which the mine is proposed to be located) and Queensland economies.

The most relevant economy against which to examine the regional impacts associated with the Project is comprised of the Banana Local Government Area (LGA) (in which the Project is located), as well as the LGAs of Central Highlands, Gladstone, Rockhampton, Livingstone and Woorabinda. This area is referred to as the regional catchment. More localised impacts in the Banana LGA and Central Highlands – East Statistical Area 2 have also been examined. This area is referred to as the local catchment.

EXISTING ECONOMIC ENVIRONMENT

Population in the local catchment experienced a large contraction in 2015 due to completion of a number of major projects in the region and has generally been declining since. Between 2015 and 2022, there were only two years recording annual increases (a 0.3% increase in population in 2019, and a 0.9% increase in 2022) (ABS, 2023a). This contrasts with the experience in the rest of the regional catchment which has seen population expand year on year since a decline in 2016 following major projects transitioning to operation in the regional catchment. Over the 19 years to 2041, the local catchment is expected to record a population decline averaging 0.2% per annum, while the rest of the regional catchment is anticipated to grow by 0.9% annually on average (with an overall projected growth rate for the regional catchment of 0.8% per annum) (ABS, 2023a; QGSO, 2023a).

Mining is the primary industry in both the local and regional catchment, contributing 73.3% of the total industry Gross Value Add (GVA) in the local catchment (\$4,835 million) and 42.3% in the regional catchment (\$10,617 million) (AEC, unpublished). The industry is also the largest employer in the local catchment providing 35.4% of the catchment's total jobs in 2021, and the second largest employer in the regional catchment supporting 9.4% of total regional jobs (ABS, 2022b). Data from the Queensland Government (2022a) indicates there were seven coal mines operating in the local catchment in 2021-22, producing 42.5 Mt of saleable coal. The regional catchment has strategic assets supporting mining operations with two of Queensland's major ports in Gladstone and Rockhampton.

Gross Regional Product (GRP) in both local and regional catchments has been falling year-by-year since its peak in 2016-17 (in chain volume measures), which was mostly due to a decline in mining activity in both the local catchment and the rest of the regional catchment since 2016-17 (AEC, unpublished). The contraction in mining activity was primarily caused by extreme weather events, COVID-19 and embargoes placed on Australian coal by China in late 2020 (RBA, 2019; Mining Technology, 2023). A reduction in GVA from manufacturing and financial and insurance services industries also contributed to the falling GRP in the rest of the regional catchment over the past five years.

Unemployment rate in the local catchment has mostly been lower than the regional catchment and Queensland's over the past decade, reflective of the relatively transient nature of the workforce. The local catchment has recorded a declining unemployment rate since December 2021, reaching the lowest rate of 3.1% within the last ten years in December 2022 (ABS, 2023b; Jobs and Skills Australia, 2023). The regional catchment's unemployment rate has mostly been above the state's rate, recording a low of 3.4% in the last ten years in December 2022.

The median house sales price in the local catchment has generally increased since 2016-17 (with the exception of a 3.5% fall in 2020-21), to \$210,165 in 2021-22 (QGSO, 2023b). The number of house sales in the local catchment increased from 260 sales in 2016-17 to 527 sales in 2021-22, underpinning the steady growth in prices since 2016-17. A similar trend was recorded in the regional catchment’s property market with the median house price in the area reaching \$365,600 in 2021-22 after a low of \$278,400 in 2017-18.

The number of rental bonds lodged hovered around 1,000 bonds per annum in the local catchment between 2013-14 and 2019-20 but has since declined to 689 bonds lodged in 2022-23 (QGSO, 2023c). The regional catchment has experienced a similar decline in bonds lodged in recent years. The most common rental dwelling type in the local catchment is three-bedroom houses while four-bedroom houses are more common in the regional catchment. Average median rents for three-bedroom houses in the local catchment fell significantly from \$460/week in 2011-12 to \$220/week in 2016-17, before rising to \$330/week in 2022-23. The median four-bedroom house rental price followed the same trend as the local catchment, declining significantly between 2011-12 and 2016-17, but has since recovered to be at similar prices as in 2011-12 at \$480/week in 2022-23.

REGIONAL IMPACT ASSESSMENT

Potential Beneficial Impacts

Key beneficial impacts arising from the Baralaba South Project 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 Baralaba South Project

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), as well as decommissioning and rehabilitation, flowing from both direct and indirect impacts. The Project is estimated to support an additional: <ul style="list-style-type: none"> • \$13.5 million in GRP per annum in the regional catchment during construction. • \$170.2 million GRP per annum in the regional catchment during operations. • \$1.6 million GRP per annum in the regional catchment during post-mine decommissioning and rehabilitation. At peak, the Project is estimated to result in an increase in GRP of 0.5% compared to what would be expected to occur without the Project.
Employment and Incomes	The Project will increase employment and household incomes during construction, operation and decommissioning/ rehabilitation, 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: <ul style="list-style-type: none"> • 114 Full Time Equivalent (FTE) jobs per annum in the regional catchment during construction. • 333 FTE jobs per annum in the regional catchment during operations. • 4 FTE jobs per annum in the regional catchment during post-mine decommissioning and rehabilitation.
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. Much of the flow-on impacts are expected to be realised within the regional catchment, boosting businesses in surrounding regions of the Project site. Prominent industry beneficiaries from flow-on from this Project include transport and storage, trade, business services 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.

Impact	Description
Government Revenue	<p>The project will provide a lift in Queensland and Australian government revenues through a variety of taxes and royalties. Overall, the Baralaba South Project is estimated to deliver an annual average of:</p> <ul style="list-style-type: none"> • \$68.7 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. • \$62.6 million in additional revenue to the Queensland Government compared to what would occur without the Project, primarily through royalty payments. <p>These additional revenues can be used by government to provide additional infrastructure and services to support business and households throughout Australia.</p>

Source: AEC

Potential Adverse Impacts

Key adverse impacts arising from the Baralaba South Project 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 potential 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 Baralaba South Project

Impact	Description
Impacts on Agricultural Production	<p>The Project is located in an area primarily used for cattle grazing which may be adversely impacted as a result of the Project. Based on a total Project disturbance area of approximately 1,300 ha (including transmission lines), of which approximately 892 ha is grazing land, there could be approximately \$104,000 per annum in potential value lost in cattle grazing over the life of the Project at peak grazing land disturbance. The land will be progressively rehabilitated to return the land to a post-mining land use for grazing (assumed to be returned to approximately 75% of original grazing land use over a ten-year period post-mining). Over 100 years, the impact to agriculture from the Project is estimated to have a net present value of approximately \$1.01 million (using a 7% discount rate). This assumes the land disturbed would otherwise provide a value of grazing production of approximately \$116.6/ha (in line with the average value in the Banana SA2 in 2021) and all of this value would be lost as a result of the Project until the land is rehabilitated.</p>
Impacts on Local Businesses from Competition for Resources	<p>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, particularly for manufacturing. 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. However, compared to base case (i.e., without 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.</p>
Impacts on Local Property Values	<p>The Project is not anticipated to have an impact on the local property market during construction. All non-local workers will be accommodated within the expanded Baralaba accommodation camp owned by the Baralaba Coal Company. Non-local workers during operations are also expected to be accommodated in the accommodation camp, however, there may be potential for some of the approximately 25% of local workforce to represent workers relocating to the local catchment. Assuming between 5% (low range estimate) and 20% (high range estimate) of the local workforce reflects people relocating to the local catchment, this would equate to an additional demand of 5 and 25 dwellings at peak operations (this would reflect only a small portion of the annual level of rental bonds lodged in the local catchment of between 650 and 1,000 bonds per annum in the past five years). While this impact is included as a potential adverse impact, given the current population decline and relatively stagnant property market in the local catchment, it is anticipated that any impact the Project has on attracting residents, and demand this places on the local property market, will likely be of benefit to the local community rather than place any undue burden on the cost of housing.</p>

Impact	Description
Impacts on Industry from AUD and Exchange Rates	The Project has the potential to support the Australian dollar through demand for imported goods and services as well as production of coal 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 Queensland 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, it is expected there is a low probability of the Project impacting on the value of the Australian dollar and exchange rates and any impacts would be negligible.

Source: AEC

CUMULATIVE IMPACT ASSESSMENT

Projects included for consideration in the cumulative impact assessment are outlined in Table A. 6 in the Major Projects section of Appendix A. The cumulative impact assessment focuses on the potential for impacts identified in the Regional Impact Assessment above to be exacerbated by the concurrent development of a range of projects in the region. In undertaking this analysis, it has been assumed that all projects identified proceed in accordance with timelines outlined in Appendix A (based on existing information in the public domain); for projects in which timelines are not known or are currently on hold, specific timings have not been adopted but it has been assumed these will occur at some time over the next decade (though not all will occur concurrently). This is considered a cautious scenario (i.e., an extreme scenario that is unlikely to be realised) as it is highly unlikely that all projects proposed will proceed to development, or that all proposed timelines will be achieved. There are also a number of projects that are anticipated to be completed prior to the Project commencing construction, with limited levels of overlap between projects. As such, it is highly likely that impacts assessed in this cumulative impact assessment are overstated.

It should also be recognised that some of the projects listed represent extensions that will replace or augment activities from existing operations that are nearing completion. Where this occurs, these projects will effectively result in a continuation of jobs and economic activity rather than a genuine lift in activity (outside of short-term construction impacts).

Table ES. 3 provides a summary of the potential cumulative adverse impacts of the Project in consideration of other major projects in the region. Note the cumulative impact assessment is based on the potential for cumulative development to exacerbate the impacts of the Baralaba South Project (as outlined above) and to what degree. The impact assessment does not assess the aggregate impacts of all developments in combination, but rather the relative implications of developing the Baralaba South Project should other projects also be undertaken concurrently.

Table ES. 3. Assessment of Cumulative Adverse Impacts

Impact	Description
Impacts on Agricultural Production	Many of the developments considered in the cumulative impact assessment are likely to either temporarily or permanently impact on agricultural production through disruption or take-up of land. Of most significance will be projects that result in the permanent degradation or removal of productive agricultural land. Cumulative development of projects may thereby exacerbate adverse impacts on agricultural production in the region through an overall contraction of land available for agricultural purposes.
Impacts on Local Business from Competition for Resources	Concurrent development of a number of major projects in the regional catchment will result in additional demand and competition for labour and other inputs to supply these projects. Cumulatively, the projects could result in higher costs of production in the regional catchment compared to what would be expected to otherwise occur, which may erode the viability of some businesses, in particular smaller businesses operating near the margin or lower income paying industries that may struggle to attract and retain labour. The increased competition for resources may also hinder to some degree the region's capacity to develop local supply chains and secure local supply contracts for these major projects in the short term. As a result, in the short to medium term, the regional catchment will likely become more reliant on imported goods and services to supply the needs of these projects as well as the local population. This will mean a reduction in the local capture of flow-on benefits arising from

Impact	Description
	<p>proposed major projects such as the Baralaba South Project than may otherwise be expected to occur. However, it should be noted that:</p> <ul style="list-style-type: none"> • Many of the projects outlined in Appendix A are proposed to be developed prior to the Baralaba South Project and have minimal ongoing operational activity locally (e.g., solar farm projects), with limited overlap of activities. • The local catchment is projected to record population decline, and the Project may thereby be considered to support local businesses.
<p>Impacts on Local Property Values</p>	<p>The Baralaba South Project is one of a number of major projects expected to occur in the local catchment. It is likely that most workers permanently migrating to the region will choose to reside in key centres in the regional catchment such as Gladstone or Rockhampton, with many of the projects considered in the cumulative impact assessment located in or near these centres. Workforces for projects located in the local catchment are also likely to largely locate in these centres and operate on a DIDO arrangement. This has the potential to increase demand and prices for housing in these centres. Some workers could seek to relocate to towns within the local catchment within driving distance to the projects. Although the Project is expected with positive impact on the local property market by attracting residents and subsequently demand for local dwellings, if all the projects considered in this assessment proceed, there could be upward pressure on rent and sales prices. However, in consideration of the projected decline in population in the local catchment, as well as an expectation that many of the projects listed in the local catchment would be developed prior to Baralaba South Project, it is expected that the cumulative impacts of the Project on the local catchment property market would be minimal. As the Project is not expected to have impacts on property markets elsewhere in the regional catchment, cumulative development of the Project with projects elsewhere in the regional catchment has not been examined.</p>
<p>Impacts on Industry from AUD and Exchange Rates</p>	<p>Some of the projects considered in the cumulative impact assessment will result in an increase in exports over and above what would be achieved by the Project alone. The combination of these projects is likely to place upward pressure on exchange rates in consideration of national trade balances, and thereby adversely affect trade-exposed industries, and it is possible the contribution of the Baralaba South Project's exports to exchange rate impacts may be exacerbated. The impact on exchange rates (and thereby trade-exposed industries) is assessed to be higher than the impact of the Baralaba South Project in isolation, though the marginal impact of the Baralaba South Project on exchange rates will still be small.</p>

Source: AEC

MITIGATION STRATEGIES

Mitigation strategies to ensure benefits of the Project to the local catchment, regional catchment and Queensland are maximised and any potential adverse impacts are minimised include:

- To minimise adverse impacts on agricultural production in the local catchment, the proponent will avoid or minimise disturbance of productive land in any areas not immediately affected by mining activity and ensure land is of adequate safety standards for continuing grazing activities.
- To maximise local benefits derived from the Project, and consistent with existing policies implemented by Baralaba Coal Company, the proponent and contractors engaged by the proponent will source labour locally where possible and practical and provide training opportunities where practical.
- The Baralaba Coal Company has long standing relationships with local business and an established supply chain for its existing activities in the regional catchment. To maximise local benefits derived from the Project, the proponent (and contractors engaged by the proponent) will continue to support local business in line with the precedent set by the Baralaba Coal Company by utilising these established supply networks and providing sufficient opportunities and information for local business to secure new supply contracts.
- While the Baralaba South Project is anticipated to have minimal impacts in terms of additional demand for accommodation/ housing in the local area, the proponent will monitor the local accommodation/ housing market and demands placed on it by its workforce during construction.

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 indicates that the Project will deliver positive outcome (i.e., net benefit) to the Queensland economy under all three discount rates scenario presented in Table ES. 4. At a standard discount rate of 7%, the Project is estimated to deliver a net present value (NPV) of approximately \$715.6 million, returning \$1.29 of benefit for every dollar of cost spent (i.e., benefit cost ratio (BCR) of 1.29).

Table ES. 4. Summary CBA Results of Baralaba South Project Impacts to Queensland

Real Discount Rate	PV Costs (\$B)	PV Benefits (\$B)	NPV (\$B)	BCR
4%	\$5.35	\$6.36	\$1.20	1.32
7%	\$4.10	\$4.69	\$0.72	1.29
10%	\$3.18	\$3.55	\$0.43	1.25

Source: AEC.

Sensitivity analysis across the key variables highlighted a 90 percent probability the Baralaba South Project will provide an NPV between \$53.0 million and \$1,302.9 million, with the Project most sensitive to revenue and operating costs. Whilst this appears a broad range, in consideration of the level of investment by the proponent and anticipated revenue estimated to be generated by the project, this represents a relatively narrow upper (combination of all anticipated best case) and lower (combination of all anticipated worst case) band of outcomes for the variables examined. This is highlighted by the narrow band in which the BCR ranges.

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1. INTRODUCTION

1.1 BACKGROUND

Baralaba South Pty Ltd (formerly Mount Ramsay Coal Company Pty Ltd and Wonbindi TLO Holdings Pty Limited), a wholly owned subsidiary of Baralaba Coal Pty Ltd (Baralaba Coal Company), is proposing to develop the Baralaba South Project (the Project), which will produce up to 2.5 million tonnes per annum (Mtpa) Run of Mine (ROM) coal. Approval is being sought to develop a greenfield open cut coal mine using traditional truck and excavator methods. Construction is expected to take approximately two years followed by a mine life of approximately 23 years (with an overlap in construction and operation in the second year of construction).

Product coal would be hauled approximately 40 kilometres (km) by public road using covered road trains to the existing Train Load Out (TLO) facility located approximately 2 km east of Moura. Realignment of an approximate 4.5 km section of the Moura-Baralaba Road is proposed to the east of the Mining Lease Area (MLA) to enable the mining activity.

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 Queensland economies to support an Environment Impact Statement (EIS) for the Project.

1.2 PURPOSE OF THIS REPORT

This report is developed as a background 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, at least, maintained if the project proceeds.

2. ASSESSMENT APPROACH

2.1 ADDRESSING THE EIS TERMS OF REFERENCE

This economic impact assessment report is designed to meet the requirements for assessing economic impacts of the project as set out in the Final Terms of Reference (ToR) for an Environmental Impact Statement (EIS) for the proposed Baralaba South Project (Queensland Government, 2017a).

The economic impact assessment report (this report) is required to meet the components set out in section 8.12 (Social and Economic) as well as other components in section 8 as they pertain to economic values and impacts of the ToR.

Additional detail of the requirements and how these are addressed is outlined in the table below.

Table 2.1. Project Terms of Reference for Assessing Economic Impacts

ToR Requirement	Where Addressed
Describe the likely impacts (positive and negative) of the project on the economies materially impacted by the project and any mitigation measures to be implemented. The analysis should describe both the potential and direct economic impacts including estimates costs, if material, on industry and the community (including impacts on land productivity and property values).	Sections 5 and 8
Discuss the potential impact on the normal supply/ demand of extractive resource availability in the region both during and after construction and any economic consequences and proposed mitigation measures (if required) for the region.	Section 5.4
The assessment should identify opportunities to capture the social and economic benefits of the project, including: <ul style="list-style-type: none"> • Strategies for local supply contracts • Training strategies for local residents • Opportunities to support local small businesses • Any recruitment and training programs to be offered • Regional workforce development plans • Strategies that promote the location of workers and their families in regional centres • A description of estimated proportions of worker visa, FIFO, DIDO and local workers during the construction and operational phases of the project 	Sections 3.2, 5 and 7

Section 2 and 3 of the EIS ToR also outlines mandatory and other requirements of an EIS, which includes the following requirements pertinent to the economic impact assessment, in addition to those outlined in the table above:

- Provision of baseline information relevant to the environmental risks of the project. Analysis of the existing economic environment using baseline information is presented in section 4 of this report, supported by additional information in Appendix A.
- To the extent of the information available, examine the cumulative impacts of the project on environmental values over time and in combination with impacts created by the activities of other adjacent and upstream and downstream developments and landholders. An assessment of the cumulative impacts of the Project in consideration of other major projects is presented in section 6 of this report.

2.2 STANDARDS AND GUIDELINES

This report has also been prepared in accordance with the Queensland Government's Economic Impact Assessment Guideline (Queensland Government, 2017b). As per the Queensland Government's EIA Guidelines, the economic impact assessment is required to include a regional impact analysis, using one of the following accepted modelling approaches for assessing economic impacts:

- Input-output (IO) modelling.
- Partial equilibrium analysis.

- Computable general equilibrium (CGE) analysis.

CGE analysis has been used for modelling economic impacts in this assessment, with modelling undertaken by Prime Research. Additional details regarding the assessment method used is provided in Appendix B. The regional impact assessment is required to examine:

- The level of stimulus to the regional and state economy.
- The level and location of employment change through:
 - Direct labour inputs.
 - Indirect labour inputs.
 - The projected effects on the local economy, including housing, labour costs and services.

The regional impact assessment is presented in section 5 of this report. Other potential adverse and beneficial impacts of the project are also examined in this section.

The EIA Guidelines also outline a cost-benefit analysis should be undertaken for all major complex projects that are anticipated to wide-ranging and detailed economic impacts. The CBA has broadly been undertaken in accordance with:

- Queensland Government's Business Case Development Framework – Cost Benefit Analysis Guide (Queensland Government, 2021a).
- Australian Government guidance note for conducting Cost Benefit Analysis (OBPR, 2020) and the *Handbook of Cost Benefit Analysis* (Australian Government, 2006).

Additional details regarding the CBA assessment method used is provided in Appendix C. The results of the cost benefit analysis are presented in section 8 of this report.

2.3 METHOD OF ASSESSMENT

2.3.1 Existing Economic Environment

The existing economic environment section provides an overview of the existing economic profile of 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 provides an assessment and overview of the prevailing conditions of the economy based on available data sets at time of writing. Recent developments and decisions (i.e., in the past three to six months) are unlikely to be fully reflected in the statistics and data presented as the collation and release of data sets often lag by months and even years.

2.3.2 Regional Impact Assessment

The regional impact assessment 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 regional impact assessment 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.

- A summary assessment of the key identified impacts based on the above analysis.

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

2.3.3 Cumulative Impact Assessment

The cumulative impact assessment in section 6 qualitatively examines the potential impacts on the local/ regional economy where a large number of currently planned projects for the Study Area (including the Project) proceed.

The assessment of cumulative impacts has been undertaken based on input and information from:

- Desktop review of other projects planned for the region and the impacts identified in relevant documentation.
- Considered evaluation by the project team of the likely consequences of identified impacts.

The cumulative impact assessment is presented in section 6. Projects considered in the cumulative impact assessment are outlined in 'Major Projects' in Appendix A, noting that given the broad region examined and individual project locations and timings, not all of these projects are considered likely to deliver a cumulative impact on the local/ regional economy in conjunction with the Project.

2.3.4 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 7.

2.3.5 Cost Benefit Analysis

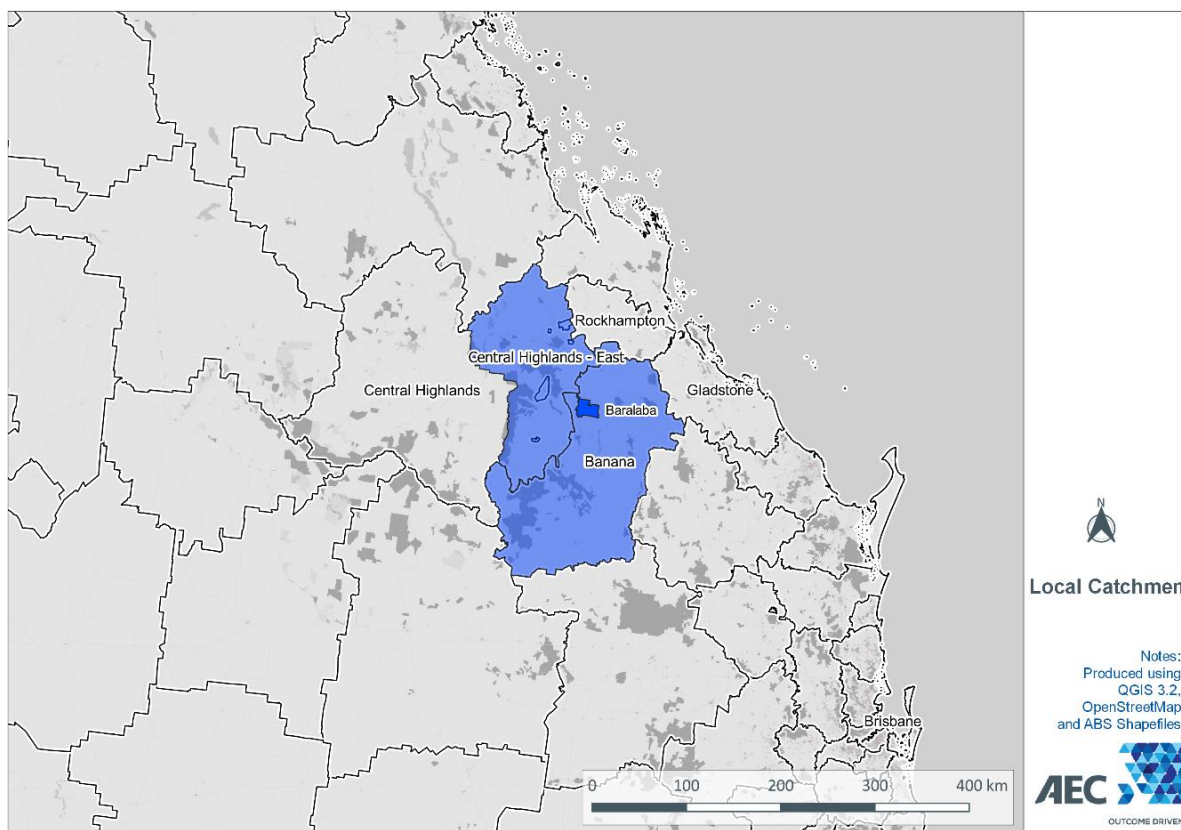
The cost benefit analysis has been conducted in line with Queensland and Australian Government guidelines, examining the stream of socio-economic costs and benefits anticipated from the project. Additional details regarding the CBA assessment method used is provided in Appendix C. The results of the cost benefit analysis are presented in section 8 of this report.

2.4 STUDY AREA

The study area for examining the economic impacts of the Project has been based on the mine location, export location and in consideration of the likely sources of labour, goods and services that will be utilised by the Project, as this represents the regional economy most likely to be directly and/ or indirectly affected by the Project. The Regional Impact Assessment (section 5) focuses on the impacts within this region.

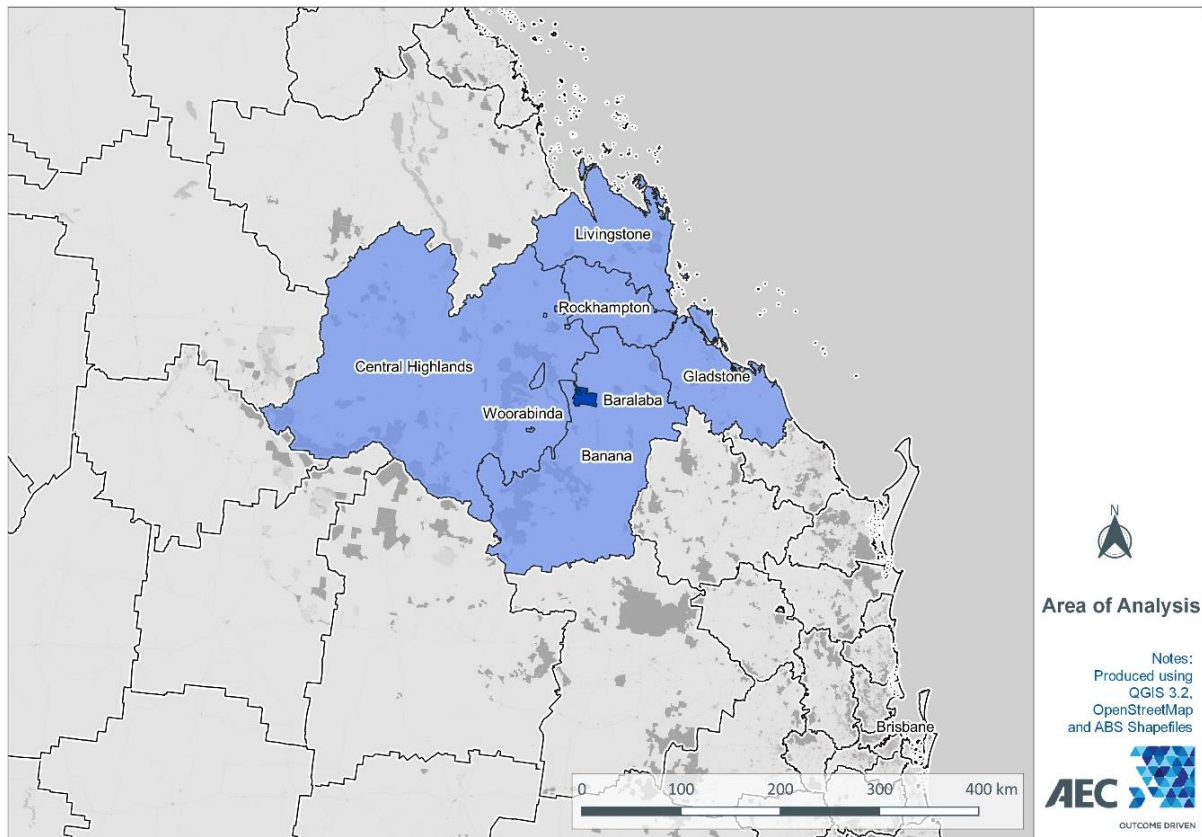
The mine is located in the lower Bowen Basin region of Central Queensland, approximately eight kilometres (km) south of the township of Baralaba and 115 km west of Rockhampton. All elements of the mine itself are located within Banana Local Government Area (LGA). However, given the mine location is also close to Central Highlands LGA (and Baralaba North Mine is in Central Highlands LGA), Central Highlands – East Statistical Area 2 (SA2) (which includes Woorabinda) has been included as part of the local catchment (Figure 2.1).

Figure 2.1. Map of Local Catchment



The coal product will be transported to Port of Gladstone for export. The workforce for the Project, as well as many of the goods and services used during construction and operation, is likely to be sourced largely from the local catchment, the rest of Central Highlands LGA, Rockhampton LGA and Livingstone LGA. As such, the most appropriate catchment area for the economic impact assessment has therefore been identified as encompassing the LGAs of Banana, Central Highlands, Woorabinda, Gladstone, Rockhampton and Livingstone (hereafter referred to as the regional catchment) (Figure 2.2). Modelling has also been undertaken for Queensland.

Figure 2.2. Map of Regional Catchment



Some impacts examined in this report also include analysis at a more localised level where appropriate and relevant. The agricultural impacts have been analysed using 2020-21 data for the Banana Statistical Area Level 2 (SA2); the most recent (i.e., 2021-22) agricultural production and value data is available only at the state and national level. The Banana SA2 was used as the mine is located within the SA2 boundaries.

The cost benefit analysis (section 8) focuses on the impacts of the Project to the State of Queensland, rather than the regional economy specifically.

The regional profile presented in section 4 focuses on the existing economic environment in the local and regional catchment economies, with comparisons to Queensland provided where appropriate for context.

3. PROJECT OVERVIEW AND ASSUMPTIONS

3.1 PROJECT DESCRIPTION

The Baralaba South Project (the Project) is a green field, open cut coal mine using traditional truck and excavator methods. The Project will provide up to approximately 2.5 Mtpa of ROM coal to produce pulverised coal injection (PCI) coal for international export to the steel production industry. A mine life of 23 years is proposed covered by Mining Lease Application (MLA) 700057.

The open-cut coal mining activities would target the Baralaba Coal Measures, including the basal sub-unit Kaloola Member, where the structural dip of the Permian geology brings them to or near the surface within MLA 700057. The targeted total ROM coal to be mined is up to approximately 49.0 million tonnes (Mt), estimated to produce approximately 36.0 Mt of PCI product coal over the life of the Project. Overburden and interburden will be disposed of in out-of-pit spoil dumps located contiguous with the pit excavation, and in-pit dumps as part of ongoing progressive rehabilitation behind the advancing operations.

Product coal would be hauled approximately 40 km by public road using covered road trains to the existing train load-out (TLO) facility located approximately 2 km east of Moura. Realignment of an approximate 4.5 km section of the Moura-Baralaba Road is proposed to the east of the MLA to enable the mining activity. Product coal would be transported by rail to the Port of Gladstone for export to international markets.

The main activities associated with the Project include:

- A greenfield open-cut coal mine to be developed within the Mining Lease Application (MLA) 700057, including:
 - Open-cut mining operations using conventional truck and excavator methods.
 - A Coal Handling Preparation Plant (CHPP).
 - A mining infrastructure area, including workshops, administration buildings, fuel and chemical storage facilities, warehouse and hardstand areas.
 - ROM coal and product coal stockpile pads.
 - Topsoil stockpiles, laydown areas and borrow areas.
 - Haul roads and internal roads.
 - Water management infrastructure.
 - Backfilling of mine voids with waste rock behind the advancing open-cut mining operations and the placement of waste rock in out-of-pit emplacements adjacent to the pit extents.
 - Dewatering of CHPP coal rejects and disposal on-site within mine voids behind the advancing open-cut mining operation.
 - Recovery and recycling of processed wastewater through the CHPP.
 - Other associated minor infrastructure, plant, equipment, and activities; and
 - Exploration activities.
- Realignment of approximately 4.5 km of Moura Baralaba Road to the east of MLA 700057.

The Project also includes the development of an electricity transmission line (ETL) of approximately 8 km in length within a 20 metre (m) wide easement, which will be linking with the Baralaba Substation locating approximately 6 km east-south-east of the Baralaba township. The final ETL alignment, which will be subject to separate approvals, will be determined at a later date in consideration of the outcomes of the assessments conducted for the EIS.

3.2 PROJECT SCENARIO

Construction is currently planned to commence in 2029 with operations commencing in 2030, producing up to 2.5 Mtpa ROM coal and produce pulverised coal injection (PCI) coal product with a planned production life of 23 years. For modelling and analysis purposes in this study:

- Construction has been assumed to occur in the 2028-29 financial year (FY0) with the bulk of construction works completed over a 12-month period (with the exception of completion of the Coal Handling and Preparation Plant (CHPP) which is planned to be completed in the 2029-30 financial year).
- Operations are assumed to commence in the 2029-30 financial year (FY1). Total production of approximately 36.0 Mt of PCI coal is planned to be produced over the life of the mine.

The Project is expected to require a peak of up to 268 jobs during construction, and a peak operational workforce of 521 jobs (equating to 488 full time equivalent (FTE) jobs). In undertaking economic modelling, FTE job estimates have been used for both construction and operations.

The non-local workforce for the Project will be accommodated in an expansion of the existing Baralaba accommodation camp, which is owned and operated by the Baralaba Coal Company. Modelling for the Baralaba South Project has included the anticipated costs of the expansion on the basis that the expansion is required to accommodate the Baralaba South Project workforce.

3.2.1 Construction

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

3.2.1.1 Construction Costs and Timing

The capital cost for developing the Project is estimated to be \$157.0 million. A breakdown of capital costs is provided in Table 3.1, by financial year. 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	FY0	FY1	Total
Access/ Haulage Roads	\$17.0	\$0.0	\$17.0
Dam/ Levy	\$17.0	\$0.0	\$17.0
Pit Water Pumping and Pipes	\$4.0	\$0.0	\$4.0
Mine Infrastructure Area - Civils	\$4.0	\$0.0	\$4.0
Mine Infrastructure Area - Buildings	\$15.0	\$0.0	\$15.0
CHPP - Civils	\$5.0	\$0.0	\$5.0
CHPP - Facility	\$10.0	\$45.0	\$55.0
Electrical Supply Infrastructure	\$14.0	\$0.0	\$14.0
Communications Infrastructure	\$1.0	\$0.0	\$1.0
Accommodation Camp/ Village	\$7.5	\$2.5	\$10.0
Project Management/ Client Costs	\$7.5	\$7.5	\$15.0
Total	\$102.0	\$55.0	\$157.0

Source: Baralaba Coal Company (2023)

3.2.1.2 Construction Labour

Construction is estimated to require a peak of up to 268 workers in the first year of construction (FY0). Over the two-year construction period, it is estimated a total of approximately 313 FTE jobs will be supported (including 15 project management workers).

3.2.1.3 Source of Goods/ Services

Construction will use local and regional contractors, labour and suppliers where feasible, with the construction workforce supplemented by a small proportion of non-local workers. The economic analysis assumes 95% of the construction workforce will be sourced from within the regional catchment, with the remaining 5% sourced from other regions of Queensland. Project management staff are expected to primarily be from other regions of Queensland (75%), with 25% from within the regional catchment. The proportion of labour sourced from within the regional catchment reflects the capacity within the regional economy's labour market as many of the major projects will be completed and transfer to operations post 2026 given the current list presented in Table A. 6. 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 3.2. A detailed procurement plan will be developed in subsequent stages of the mine planning.

Table 3.2. Assumed Sources of Goods and Services During Construction

Component	Regional Catchment	Rest of Queensland	Rest of Australia	International
Access/ Haulage Roads	25%	75%		
Dam/ Levy	25%	75%		
Pit Water Pumping and Pipes	10%	10%	50%	30%
Mine Infrastructure Area - Civils	25%	75%		
Mine Infrastructure Area - Buildings		80%	15%	5%
CHPP - Civils	25%	75%		
CHPP - Facility	5%	15%	30%	50%
Electrical Supply Infrastructure		20%		80%
Communications Infrastructure			20%	80%
Accommodation Camp/ Village	10%	80%	10%	
Project Management/ Client Costs	25%	75%		

Source: Baralaba Coal Company (2023)

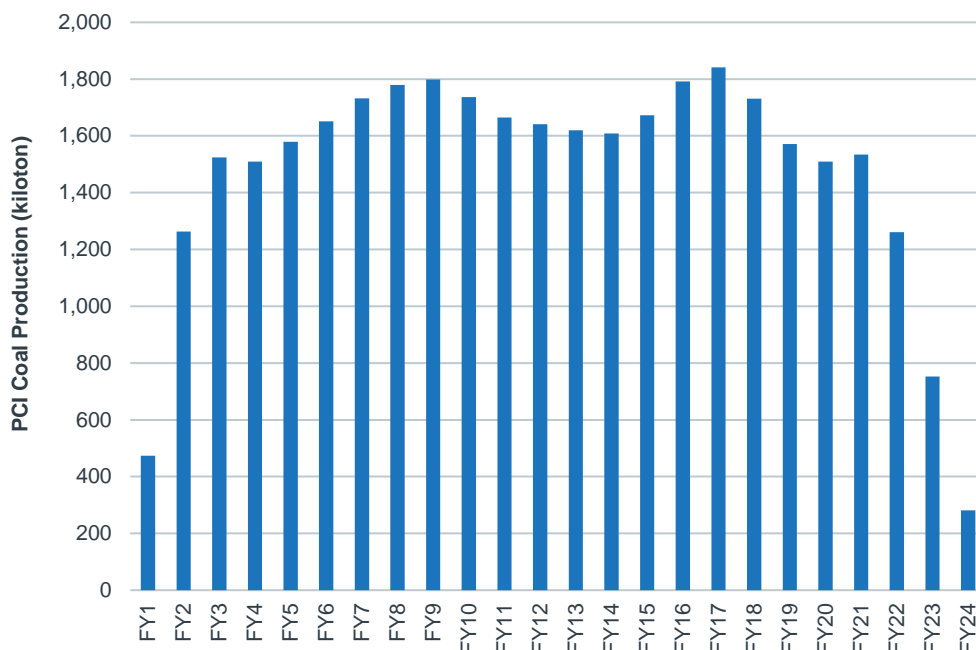
3.2.2 Operations

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

3.2.2.1 Production and Timing

Figure 3.1 outlines the annual production of PCI coal (product coal) on a financial year basis, assuming an approximately 23-year mine life (with partial year operations in FY1 and FY24), as per the scenario used in modelling economic impacts.

Figure 3.1. Annual Production of PCI Coal (kiloton)



Source: Baralaba Coal Company (2023)

3.2.2.2 Coal Prices

The quarterly average price of coking coal fluctuated between USD256/t and USD244/t over the eight quarters since the third quarter of 2021 (Focus Economics, 2023). The price for low and ultra-low volatile PCI coal is expected to be around USD154.2/t and USD270/t averaging USD211.8/t by the end of 2023 (KPMG, 2023). The price of PCI coal is expected to be between USD131.0/t – USD213.0/t over the next five years, averaging USD156.5/t by 2027. While future global demand for metallurgical coal is forecast by the IEA to fall slightly to 2030 and 2050, the decline is expected to be relatively small due to the limited number of readily available alternatives to the steel industry (Queensland Treasury, 2022a).

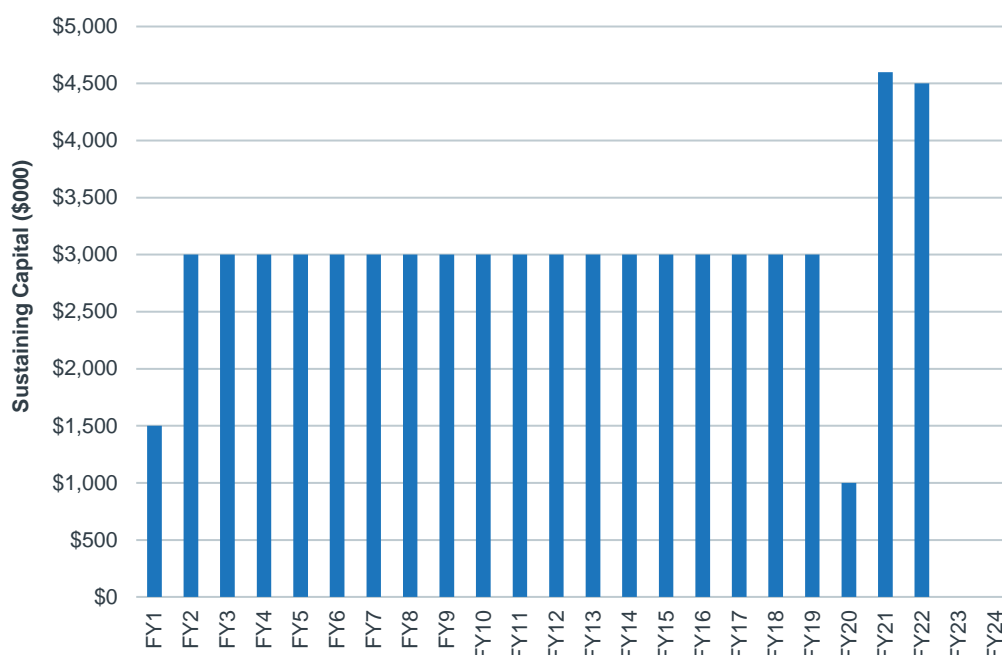
In discussions with the proponent, future coal prices for the Project have been assumed to average USD180/t, which falls within the range expected by the market. An average exchange rate of 0.07AUD/USD is assumed for the analysis.

3.2.2.3 Operating Expenditure

Estimates of operating costs have been provided by the proponent. The average cost per tonne of PCI product coal is estimated to be between \$165 and \$180 (AUD) (excluding royalty expense).

There is also an additional spend each year on sustaining capital, with assumed timing and value used in modelling outlined in Figure 3.2.

Figure 3.2. Spend on Sustaining Capital (\$000)



Source: Baralaba Coal Company (2023)

3.2.2.4 Operations Labour

Estimates of employment during operations were provided by the proponent. A summary of FTE employment at peak production is provided in Table 3.3, noting the FTE estimate of 488 is based on 521 total people employed at peak.

Table 3.3. Peak Labour Estimates During Operations (FTEs)

Category	Peak Labour Estimates
Direct + Contractor Mining Labour	417
Direct + Contractor Processing Labour	32
Direct + Contractor Other Labour	39
Total	488

Source: Baralaba Coal Company (2023)

The annual operational labour for the Project, including mining and processing, was estimated based on production in each year relative to peak production.

3.2.2.5 Source of Goods/ Services

Operational staff for the Project are anticipated to be sourced from within the local and regional catchment where possible. The economic modelling assumes 95% of the operations workforce will be sourced from within the regional catchment (with 70% being drive-in drive-out workers and 25% being locals that will travel to and from the mine site and their place of residence on a daily basis), with the remaining 5% sourced from other regions of Queensland (fly-in fly-out workers). The proportion of labour sourced from within the regional catchment reflects the Project will provide opportunities for existing local and regional workers, as well as existing capacity within the regional economy’s labour market with skills relevant to the Project. 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 derived from standard industry structures for the coal 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 at an estimated aggregate cost of approximately \$71.0 million, which has been incorporated into the operating costs above.

Following the completion of mining activity, an approximate five years decommissioning and rehabilitation phase is anticipated, which will include:

- Highwall treatment/ sealing, decommissioning and removal of mine site infrastructure, and mine site rehabilitation.
- Revegetation activity with the ultimate of returning the land to grazing use post mining.

Estimates of labour for ongoing rehabilitation and decommissioning activities were developed based on multipliers from the transaction tables used in the CGE modelling.

The economic analysis assumes 95% of labour will be sourced from within the regional catchment for rehabilitation and decommissioning, with the remaining 5% sourced from other regions of Queensland. For the purposes of the economic impact assessment, assumptions regarding where goods and services will be sourced from were derived from standard industry structures and in consideration of the local capacity in the supply chain to meet demands.

3.3 WORKFORCE ACCOMMODATION

The majority of both the construction and operational workforce are anticipated to be sourced from the local (25%) and regional (70%) catchments, with only 5% sourced from elsewhere in Queensland. The non-local workforce will be accommodated in the expanded Baralaba accommodation camp, which is owned and operated by the Baralaba Coal Company. The accommodation camp, located eight km north of the Project, has 156 single accommodation units as well as recreation and dining facilities onsite.

The Baralaba accommodation camp expansion requirements are anticipated to be up to 255 rooms prior to construction to provide for the maximum combined Baralaba North and South total workforce requiring temporary (on shift) accommodation.

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 as the Baralaba North Mine winds down. With the Project, mining activity (and jobs and supply contracts) will continue to be delivered in the region that would otherwise be lost.

4. EXISTING ECONOMIC ENVIRONMENT

This section provides a summary of the current economic environment of the local catchment where the proposed mine will be located as shown in Figure 2.1) as well as the regional catchment area shown in Figure 2.2. Comparisons to Queensland are provided where relevant. Graphs and tables of the analysis below are included in Appendix A.

Key economic attributes of the study areas include:

- In 2022, the overall regional catchment recorded 234,543 residents, of which 22,176 persons were in the local catchment. Over the past ten years, while the local catchment experienced an annual population decline of 0.2% on average, the rest of the regional catchment recorded an increase of 0.7% per annum on average, resulting in an average annual population growth rate for the regional catchment (including the local catchment) of 0.6% over this period.
- The local catchment recorded a large population contraction in 2015 (also experienced in 2016 for the regional catchment) resulting from the completion of a number of major projects. The local catchment population has continued to decline since, with only two years since 2015 recording annual increases (a 0.3% increase in population in 2019, and a 0.9% increase in 2022). This contrasts with the experience in the rest of the regional catchment which has seen population expand year on year since the decline in 2016.
- Over the 19 years to 2041, the local catchment is expected to record a population decline averaging 0.2% per annum while the rest of the regional catchment is forecast to increase by 0.9% annually on average (with an overall projected growth rate for the regional catchment of 0.8% per annum). This growth in the rest of the regional catchment is 0.1 percentage points stronger than that expected for Queensland over the next 19 years.
- Mining is the dominant industry in the local and regional catchment. In 2021-22, the sector accounted for 73.3% of the total industry Gross Value Add (GVA) in the local catchment (\$4,835 million) and 42.3% in the regional catchment (\$10,617 million), respectively. Mining was the largest employer in the local catchment providing 35.4% (5,452) of the local catchment's total jobs by place of work, while it was the second largest employer in the overall regional catchment supporting 9.4% (10,142 jobs) of the regional catchment's total employment.
- Data from the Queensland Government indicates there were seven coal mines operating in the local catchment in 2021-22, producing 42.5 Mt of saleable coal. In addition to the seven mines reported in this data, the Bluff Mine temporarily reopened in 2022 following acquisition by Bowen Coking Company, but is planned to be moved into care and maintenance in November 2023 (McCarthy, 2023); Bowen Coking Coal, 2022).
- Agriculture and construction are the next two biggest industry employers in the local catchment after mining, accounting for 12.7% and 8.3% of the area's total employment, respectively, in 2021. These two sectors made up a total of 11.7% of total industry GVA in the local catchment in 2021-22, at \$529.7 million and \$241.9 million, respectively.
- Health care, mining and construction were the top three sectors of employment in the regional catchment in 2021. Health care was the largest employer providing 13.0% (14,090) of the regional catchment's total jobs and contributed \$1,320.8 million (5.3%) in GVA. The construction industry accounted for 9.4% (10,097) of the regional catchment's total jobs and \$1,548.7 million (6.2%) of the region's total industry GVA in 2021-22.
- The regional catchment's Gross Regional Product (GRP) was \$26.8 billion in 2021-22, of which the local catchment contributed \$7.0 billion. Since its peak in 2016-17, GRP had been falling year-by-year mostly due to a decline in mining activity in both the local catchment and the rest of the regional catchment since 2016-17. Mining GVA in the local catchment contracted by approximately \$3.43 billion over the last five years. This has primarily been due to disruption caused by various events such as the Tropical Cyclone Debbie in 2017, COVID-19 and embargoes placed on Australian coal by China in late 2020 (RBA, 2019; Mining Technology, 2023). A similar trend was observed for the rest of the regional catchment, however, to a lesser extent with an overall reduction of \$2.53 billion in mining GVA since 2016-17. A reduction in GVA from manufacturing (\$236.6

million) and financial and insurance services industries (\$144.4 million) also partially contributed to the falling GRP in the rest of the regional catchment over the past five years.

- The regional catchment had a labour force of 132,507 in March 2023, of which 13,544 were in the local catchment. Both the local and regional catchment experienced a fall in labour force between December 2016 and December 2017, followed by strong growth to early 2020. Impacts from COVID-19, the war in Ukraine (and associated supply chain impacts and inflationary issues) as well as the embargo on Australian coal by China combined to see the labour force in the local and regional catchment plateau in 2020 and 2021, before falling in late 2021 through to mid-2022. The labour force in the two catchments has now recovered, expanding rapidly since June 2022.
- The local catchment's unemployment rate was 3.2% in March 2023. It had mostly been lower than Queensland's over the past ten years. The area recorded 23 consecutive quarters of lower unemployment before rising above the state's rate of 4.3% in December 2021. Since then, the local catchment's unemployment has declined, reaching the lowest rate within the last ten years in December 2022 (of 3.1%). The low unemployment rates in the local catchment are reflective of a relatively transient (largely mining) workforce in the local catchment.
- The regional catchment's unemployment rate was 3.6% in March 2023. Despite a relatively similar trend as the local catchment, the unemployment rate in the regional catchment has consistently been higher than the local catchment over the past 10 years and mostly above the state's rate. This is due to the lifestyle difference with people living in regional cities being more likely to remain in the cities during periods without work than in the local catchment. With major jobs increases in construction (1,119) and health care (3,190) industries between 2016 and 2021, the regional catchment recorded the lowest unemployment rate of in the last ten years in December 2022 (of 3.4%) which was 0.2 percentage points lower than Queensland.
- The local catchment recorded a self-sufficiency rate of 64.8%, meaning that 64.8% of total jobs located in the region were filled by local residents that both lived and worked in the local catchment in 2021 (9,937 jobs in the local catchment were filled by local residents). Mining recorded the lowest level of self-sufficiency (37.3%) with 3,432 of jobs in this industry sourced from outside the catchment. This was followed by the construction industry which recorded 40.5% self-sufficiency and 759 imported workers in 2021. The local catchment was highly self-contained with 96.5% of total employed residents working within the local catchment, and only 3.5% of residents with a job travelling outside the local catchment for work. With a relatively strong mining footprint in the surrounding regions, the local catchment had 122 residents (5.7% of total exported workers) working in the mining industry outside the local catchment.
- The regional catchment was 94.2% self-sufficient, with 101,774 jobs in the regional catchment filled by residents of the regional catchment in 2021. Mining had the lowest level of self-sufficiency (72.9%), employing 2,749 people from outside of the regional catchment. Mining also recorded the highest number of residents (1,470) working outside the regional catchment in 2021. The region was highly self-contained with 96.8% of total employed residents working within the catchment.
- The average weekly personal income in the local catchment in 2021 was \$1,723. Mining workers recorded the highest weekly income of \$2,413, followed by electricity, gas, water and waste services (\$2,276) and construction (\$1,863) workers. The local catchment had a higher average weekly income compared to the regional catchment (\$1,407) and Queensland (\$1,345) in 2021.
- The median house sales price in the local catchment declined year on year between 2011-12 and 2016-17, from \$335,200 to \$117,200 in 2016-17. Since then, the local catchment has generally recorded annual increases in sales prices (with the exception of a 3.5% fall in 2020-21), to \$210,165 in 2021-22. The number of house sales in the local catchment increased from 260 sales in 2016-17 to 527 sales in 2021-22, underpinning the steady growth in prices since 2016-17.
- The number of rental bonds lodged in the local catchment hovered around 1,000 bonds per annum between 2014-15 and 2019-20, but since has steadily dipped each year to a total of 689 in 2022-23. Houses are the most common rental dwelling type in the local catchment (accounting for around 80.0% of rental dwellings over the past five years), of which three-bedroom houses comprise the largest share. The number of bonds lodged for three-bedroom houses has followed the overall trend for all dwellings in the local catchment, averaging

between approximately 450 and 540 lodgements between 2013-14 and 2019-20. The number of lodgements has since experienced year-by-year decline to 2022-23, declining to 340 lodgements. Despite the number of bonds lodged increasing between 2011-12 and 2013-14 and then remaining steady to 2019-20, the average weekly median rent for three-bedroom houses fell significantly between 2011-12 and 2016-17 from \$460/week to around \$220/week. This mirrored the experience of the dwelling sales market. Since 2016-17, average median weekly rents for three-bedroom houses have been steadily increasing, to around \$330/week in 2022-23, despite the downward trend in the number of bonds lodged since 2019-20.

- The local catchment has recorded a relatively small and volatile level of residential building approvals between 2016-17 and 2022-23, experiencing a significant decline between 2016-17 and 2017-18 (from 41 to 10 dwelling approvals, resulting in a sharp fall in value from \$15.5 million to \$4.6 million) and then seeing the value hovering between \$10.5 million and \$11.5 million over the next three years. However, strong growth has been recorded in 2021-22 and 2022-23, with the value of dwelling approvals increasing to \$15.9 million then \$18.0 million.
- A similar trend was recorded in the regional catchment's property and rental market, however four-bedroom house was instead the most common rental dwelling type in the regional catchment. The median house price in the area reached a low of \$278,400 in 2017-18 before rising to reach \$365,600 in 2021-22. The median four-bedroom house rental price was around \$440/week in 2021-22 which has further increased to around \$480/week in 2022-23. Building approvals in the regional catchment recorded two consecutive years of decline to ultimately reach 383 approvals with a total value of \$149.0 million in 2018-19, from 641 approvals with a total value of \$198.9 million in 2016-17. The regional catchment experienced a bounce back in the following two years reaching a peak of 866 approvals worth \$458.7 million in 2020-21. The number and value of building approvals in the regional catchment fell again in 2021-22, both by approximately 17.0%.

5. REGIONAL IMPACT ASSESSMENT

The following section examines the economic impacts of the Project within the regional catchment and the state of Queensland in response to the EIS ToR. Impacts within more localised geographic regions 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 2023 Australian dollar values unless otherwise specified.

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 what growth may be in the regional and state economies without the Project proceeding. Assumptions used in developing baseline estimates of growth are outlined in Appendix B.

The CGE modelling does not separately examine the impact of each stage as outlined in section 3.2, rather it examines the impact of Project's activity across all relevant stages 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 three time periods:

- FY0, the period of a bulk of construction works.
- FY1 to FY24, representing the operational impacts (plus some residual construction works in FY1).
- FY25 to FY29, representing the post-mining decommissioning and rehabilitation phase.

In interpreting the results of the modelling presented in this section it should be recognised that, as first product coal will be produced in FY1 with the residual construction work being conducted in the same year, the impacts presented in FY1 as part of operational phase will include some impacts attributable to construction activity.

5.1 CONTRIBUTION TO THE ECONOMY

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

- **Directly**, through construction activity, the extraction and export of PCI coal and onsite rehabilitation activities.
- **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 and royalty revenues.

The following sub-sections examine the Project's impact on gross regional (the regional catchment) and state (Queensland) product as well as impacts on output by industry in the regional catchment and Queensland 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 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 regional catchment GRP and Queensland Gross State Product (GSP) between the commencement of construction through to completion of mine decommissioning and rehabilitation are illustrated in Figure 5.1.

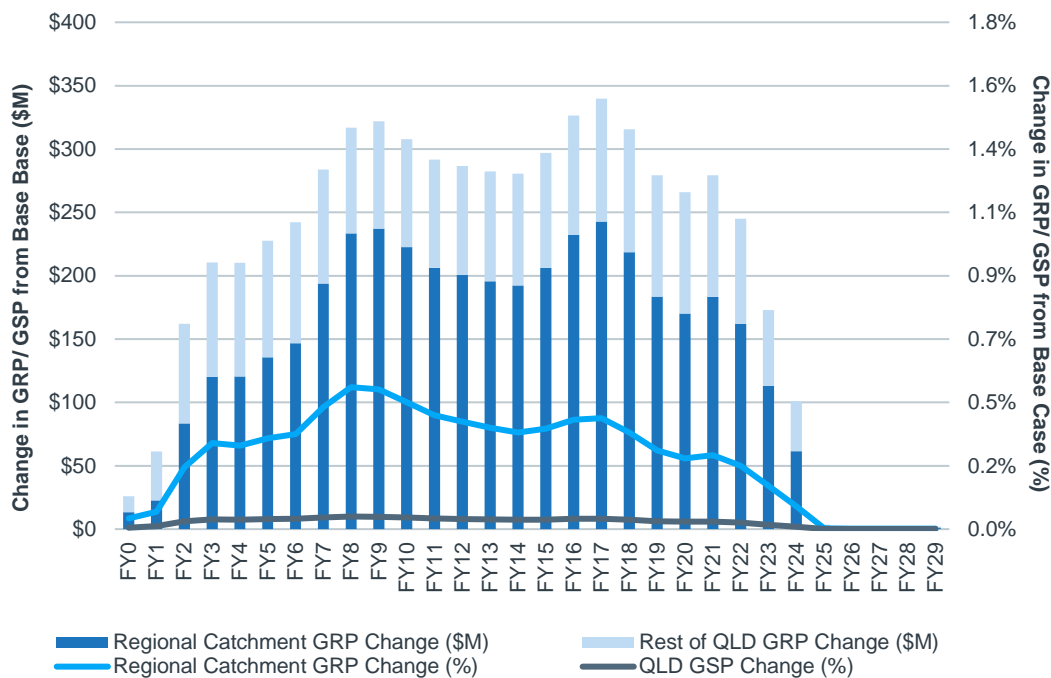
The outcomes suggest that the Project will positively contribute to the regional and state economies across all three stages with the largest economic benefit being generated during the operational phase. The Project's economic contribution is expected to increase incrementally over the first nine years of operation to reach its peak in FY9 at

\$237.2 million in GRP and \$322.0 million in GSP, then decline slightly before reaching a higher peak in FY17 at \$242.9 million in GRP and \$339.8 million in GSP. GRP (and GSP) contribution is expected to eventually lower over the last seven years of operation and across decommissioning and rehabilitation phase as the Project concludes.

The construction phase (FY0) is estimated to contribute \$13.5 million in GRP (\$25.9 million in GSP) and the operational phase is estimated to support an average contribution of \$170.2 in GRP between FY1 and FY24 (\$254.5 in GSP). The decommissioning and rehabilitation phase is estimated to support an average of \$1.6 million and \$2.3 million to the regional and state economies per annum between FY25 and FY29, respectively. The majority of the contribution to gross product from the Project is expected to occur within the regional catchment across all three stages (approximately 52.0% during construction, 66.9% during operation and 72.4% during decommissioning and rehabilitation).

In percentage terms, the Project is anticipated to result in a peak of a 0.5% increase in regional catchment GRP in FY9. While the highest peak value increase in regional catchment GRP and Queensland GSP is estimated to occur in FY17 (\$242.9 million in regional catchment, \$339.8 in Queensland), the percentage change in regional catchment GRP/ Queensland GSP is estimated to be lower than in FY9. This reflects an expected expansion of the regional catchment and Queensland economies over time, and thereby a slightly lower percentage lift in the regional catchment/ Queensland economy from the Project.

Figure 5.1. Annual Impact on GRP/GSP, 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 regional catchment and Queensland compared to the base case are presented in Table 5.1.

The impact on industry output is expected to be highest for the construction industry during the construction (FY0) and the decommissioning and rehabilitation phases (FY25 to FY29), while mining is expected to receive the greatest impact during operations (FY1 to FY24).

The transport and storage industry is also expected to experience a considerable lift in output during operations due to expenditure on logistics and port handling, while other industries such as trade, business services and public services, health and education are also anticipated to record sizeable increases in output due to the increase 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.

Manufacturing is the primary industry expected to experience 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. This reduction in activity 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 business as competition for resources drives input prices up (including labour, see section 5.2.3). 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. The electricity, gas, water and waste services industry is also expected to see a decline in output relative to the base case, however, to a lesser extent.

On percentage basis, the mining industry will have the largest industry output change, increasing by 1.0% in the regional catchment on average per annum between FY1 and FY24, while manufacturing (-0.9%) and electricity, gas, water and waste services (-0.7%) are estimated to record the largest percentage declines relative to the base case. All other industries in the regional catchment are estimated to record changes in output of .5% or less, while only the mining industry is estimated to experience a percent change in output of more than 0.1% at a state level.

Table 5.1. Average Annual Impact on Industry Output, Deviation from the Base Case

Industry	Construction		Operations		Post-Mining	
	Regional Catchment	QLD	Regional Catchment	QLD	Regional Catchment	QLD
Change in Industry Output (\$M)						
Agriculture, forestry & fishing	-\$0.9	-\$2.5	-\$0.9	-\$3.5	\$0.0	-\$0.1
Mining	-\$4.9	-\$9.0	\$323.9	\$309.9	-\$0.8	-\$1.1
Manufacturing	-\$24.9	-\$42.4	-\$108.0	-\$168.8	-\$1.7	-\$2.6
Electricity, gas, water and waste services	-\$11.9	-\$15.5	-\$24.7	-\$33.8	-\$1.0	-\$1.0
Construction	\$87.5	\$114.2	\$5.1	\$15.2	\$11.6	\$12.9
Trade	\$2.6	\$4.7	\$10.8	\$29.3	\$0.1	\$0.1
Transport and storage	-\$3.9	-\$4.7	\$27.1	\$28.3	-\$0.2	-\$0.1
Communication ¹	-\$0.4	-\$2.3	-\$0.1	-\$2.6	-\$0.1	-\$0.1
Finance and insurance	-\$0.1	\$0.2	\$1.1	\$1.2	-\$0.1	-\$0.1
Business services ²	-\$0.5	\$3.4	\$10.8	\$19.0	\$0.0	\$0.0
Public services, health and education	\$3.8	\$3.0	\$10.6	\$26.4	\$0.0	\$0.0
Recreation and other services	\$0.3	-\$0.8	\$4.3	\$6.6	-\$0.1	-\$0.1
Ownership of dwellings	\$2.5	\$2.9	\$5.9	\$27.0	\$0.0	\$0.0
Total Change (\$M)	\$49.3	\$51.2	\$266.0	\$254.2	\$7.7	\$8.0

Industry	Construction		Operations		Post-Mining	
	Regional Catchment	QLD	Regional Catchment	QLD	Regional Catchment	QLD
Change in Industry Output (%)						
Agriculture, forestry & fishing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Mining	0.0%	0.0%	1.0%	0.2%	0.0%	0.0%
Manufacturing	-0.2%	0.0%	-0.9%	-0.1%	0.0%	0.0%
Electricity, gas, water and waste services	-0.4%	-0.1%	-0.7%	-0.1%	0.0%	0.0%
Construction	1.4%	0.1%	0.1%	0.0%	0.1%	0.0%
Trade	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Transport and storage	-0.1%	0.0%	0.5%	0.0%	0.0%	0.0%
Communication ¹	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Finance and insurance	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Business services ²	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%
Public services, health and education	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%
Recreation and other services	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%
Ownership of dwellings	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%
Total Change (%)	0.1%	0.0%	0.3%	0.0%	0.0%	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** rather than place of usual residence.

Employment requirements of the Project are outlined in section 3.2 across the construction, operations and decommissioning/ rehabilitation 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 regional catchment and Queensland 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.

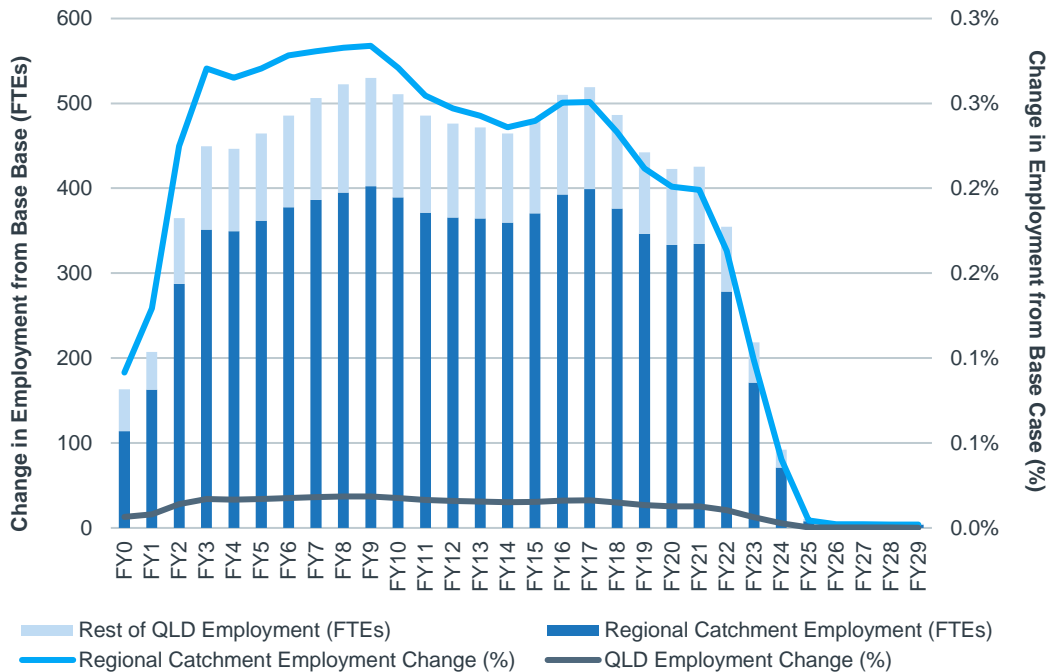
An overview of employment outcomes is illustrated in Figure 5.2. This figure indicates that jobs supported by the Project in the regional catchment increase as the Project is constructed, transitions to operations and reaches peak production in FY9. Between FY1 and FY24, the Project is expected to result in a net increase in employment of 7,996 FTE job years¹ in the regional catchment compared to what would be expected to occur without the Project, or an average of 333 FTE jobs per annum. The fluctuation in the Project's annual employment impact reflects the projected levels of annual production outlined in section 3.2.2.1. Employment is estimated to decline from FY21 onwards as production falls until mining operations cease in FY24 and transition to post-mining decommissioning and rehabilitation.

The net impacts on employment in Queensland are estimated to be higher than in the regional catchment as the Project is anticipated to also support jobs outside of the regional catchment. The annual employment in Queensland is expected to follow a similar trend to that forecasted in the regional catchment over the life of the Project and estimated to be approximately one-third more than the net impact in the regional catchment.

¹ Where one FTE job year is equivalent to one person working full time for a period of one year. In this manner, ten FTE job years equates to ten people working full time for one year, as well as one person working full time for ten years, or any combination of workers and years in between that sums to ten FTE job years.

On a percentage basis, the Project’s impact on employment in the regional catchment is estimated to peak at approximately 0.3% above the base scenario in FY9 and trend downward thereafter. The Project’s impact on employment in Queensland is estimated to reach 0.02% above the base scenario in FY2 and remain at this level for most years of operations before trending downward in FY19.

Figure 5.2. Annual Impact on Employment, Deviation from the Base Case



Source: Prime Research (unpublished)

Estimates of the average annual impact on employment by industry in the regional catchment and Queensland, compared to the base case, are outlined in Table 5.2. The increase in construction is strongest during the construction period, whilst the increase in mining is strongest during operations when operations for workers for the Project will be in peak demand. Similar to the impact to GRP/ GSP, the most impacted industry by employment during decommissioning and rehabilitation is construction.

Other industries that are moderately and positively impacted by the Project during its operation, compared to the base case, are public services, health and education, trade, business services, transport and storage, and recreation and other services. The strongest adverse impact is expected to be in the manufacturing industry for the reasons outlined in section 5.1.2.

Although the overall impact on employment on a percent basis compared to the base case is relatively small (0.1% during construction and 0.2% during operations in the regional catchment), the impact on the mining, manufacturing and electricity, gas, water and waste services industries specifically is above 0.5% in the regional catchment during operations. During operation, employment in the regional catchment is anticipated to increase jobs in the mining industry by 1.5% on average per annum and reduce employment in the manufacturing and electricity, gas, water and waste services industries by an average of 0.8% and 0.7% per annum respectively.

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

Industry	Construction		Operations		Post-Mining	
	Regional Catchment	QLD	Regional Catchment	QLD	Regional Catchment	QLD
Change in Employment (FTEs)						
Agriculture, forestry & fishing	-3	-9	-1	-12	0	0
Mining	-13	-21	285	279	-1	-1
Manufacturing	-21	-41	-63	-119	-1	-1
Electricity, gas, water and waste services	-14	-18	-27	-36	-1	-1
Construction	148	201	-5	16	6	7
Trade	10	25	38	95	1	1
Transport and storage	-11	-11	19	19	0	0
Communication ¹	0	-2	1	0	0	0
Finance and insurance	1	6	2	7	0	0
Business services ²	-2	11	21	44	0	1
Public services, health and education	18	23	52	120	1	1
Recreation and other services	1	1	10	17	0	0
Ownership of dwellings	0	0	0	0	0	0
Total Change (FTEs)	114	163	333	431	4	6
Change in Employment (%)						
Agriculture, forestry & fishing	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Mining	-0.1%	0.0%	1.5%	0.3%	0.0%	0.0%
Manufacturing	-0.3%	0.0%	-0.8%	-0.1%	0.0%	0.0%
Electricity, gas, water and waste services	-0.4%	-0.1%	-0.7%	-0.1%	0.0%	0.0%
Construction	1.3%	0.1%	0.0%	0.0%	0.0%	0.0%
Trade	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%
Transport and storage	-0.2%	0.0%	0.3%	0.0%	0.0%	0.0%
Communication ¹	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Finance and insurance	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%
Business services ²	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%
Public services, health and education	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%
Recreation and other services	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%
Ownership of dwellings	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Change (%)	0.1%	0.0%	0.2%	0.0%	0.0%	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 Skills Requirements

Modelling results show that demand for labour is anticipated to be strongest (compared to the base case) in the occupations of technicians and trades workers and labourers during construction and highest for machinery operators and drivers, technicians and trades workers and professional workers during the operational phase. These occupations and skills are highly represented in the mining and construction industries.

On a percent basis, the strongest impact is expected in the labourers occupation during construction, increasing by 0.3%, while the most significant impact during operations is anticipated in the machinery operators and drivers occupation, increasing by 0.8% on average. Impacts across all occupations will be minimal during rehabilitation and decommissioning. The Project is expected to have minimal impact at a State level.

Of note, all occupations are expected to increase in the regional catchment and Queensland 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, Deviation from the Base Case

Occupation	Construction		Operations		Post-Mining	
	Regional Catchment	QLD	Regional Catchment	QLD	Regional Catchment	QLD
Change in Employment (FTEs)						
Managers	4	10	23	34	1	1
Professionals	11	19	42	71	0	1
Technicians and Trades	33	45	74	80	2	2
Community and Personal Services	5	9	18	37	0	0
Clerical and Administrative	4	12	20	38	1	1
Sales	3	8	14	27	0	0
Machinery Operators and Drivers	16	19	129	123	0	0
Labourers	37	40	13	21	1	1
Total Change (FTEs)	114	163	333	431	4	6
Change in Employment (%)						
Managers	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Professionals	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%
Technicians and Trades	0.2%	0.0%	0.3%	0.0%	0.0%	0.0%
Community and Personal Services	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%
Clerical and Administrative	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Sales	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%
Machinery Operators and Drivers	0.1%	0.0%	0.8%	0.1%	0.0%	0.0%
Labourers	0.3%	0.0%	0.1%	0.0%	0.0%	0.0%
Total Change (%)	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%

Source: Prime Research (unpublished)

5.2.3 Impacts on Incomes and Real Wages

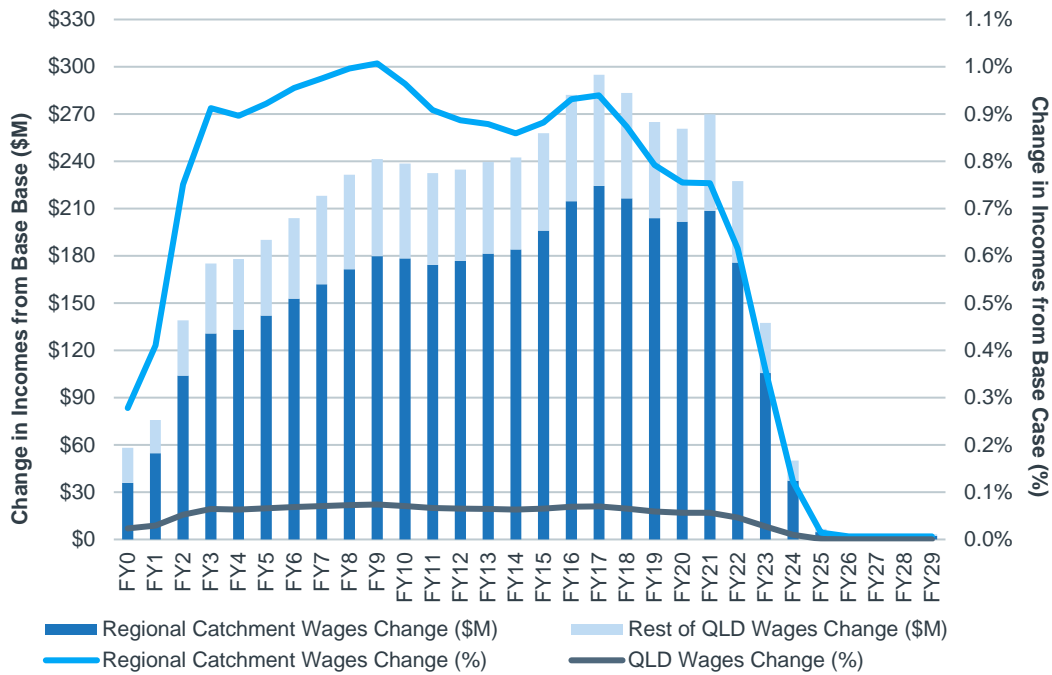
5.2.3.1 Impacts on Employee Incomes

Modelling outcomes of the impacts of the Project on incomes in the regional catchment and Queensland over the life of the Project are presented in Figure 5.3. Incomes supported by the Project are projected to rise rapidly between FY0 and FY9, as the Project is constructed, transitions to operations and reaches peak production where labour demands are strongest. Unlike employment impacts, the net change in incomes is estimated to continue to rise in general through the operational phase, peaking in FY17, while employment supported by the Project is anticipated to peak in FY9. This reflects that the increase in employment generated by the Project will provide competitive tension for labour which will drive an increase in the average employment income (i.e. real wages growth) over time (this is examined in more detail in section 5.2.3.2 below).

The annual impact on incomes is expected to follow a similar trend in Queensland. By FY21, employee incomes are estimated to be \$269.8 million more in Queensland compared to the base case, of which 77.3% is captured within the regional catchment, after which the Project's impact on incomes is expected to decline as production winds down. During decommissioning and rehabilitation, the impact on incomes will average \$3.9 million in Queensland, of which 67.7% is captured within the regional catchment.

In percent terms, there is a small increase in incomes in both the regional catchment and Queensland. The impact on incomes is expected to peak at 1.0% in FY9 before seeing a downward trend thereafter. The impact on incomes in Queensland is anticipated to peak at 0.07% in FY5 and remain at this level for most years of operation before declining in FY19.

Figure 5.3. Annual Impact on Incomes, Deviation from the Base Case



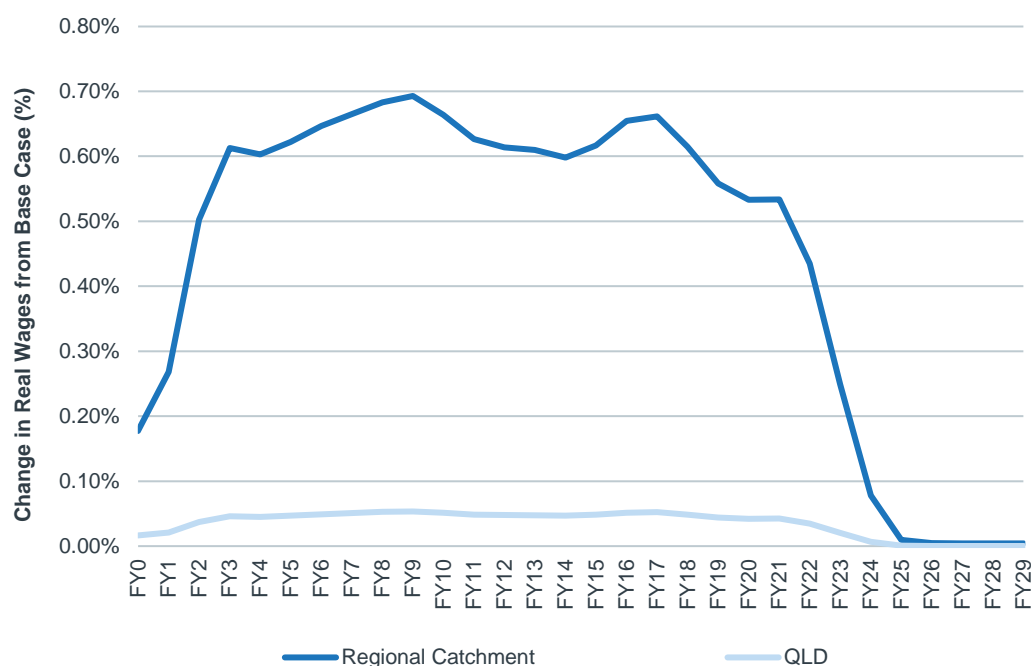
Source: Prime Research (unpublished)

5.2.3.2 Impacts on Real Wages

As indicated in 5.2.3.1, 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 sections 5.2.1 and 5.3.2) 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 regional catchment and Queensland will lift, generating additional incomes throughout the economy. This effect is best observed through the impact of the Project on real wages, which represents the real (i.e., above inflation) changes to average salaries in the economy.

The Project is anticipated to contribute to an approximately 0.7% increase to real wages in the regional catchment at its peak in FY9. After that, the Project’s impact on real wages is expected to generally soften despite a later peak at 0.7% in FY17. The downward trend over time reflects an underlying expansion of the regional catchment and Queensland economies over time, which dilutes the overall impact on real wage growth from the Project. Impacts to real wages in Queensland are relatively minor, averaging around 0.04% during production.

Figure 5.4. Annual Percent Change in Real Wages, Deviation from the Base Case



Source: Prime Research (unpublished)

5.3 IMPACTS TO BUSINESSES

5.3.1 Beneficial Impacts

Support for Businesses in the Mining Supply Chain

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. Much of the flow-on impacts are expected to be realised within the regional catchment, boosting businesses in surrounding regions of the Project site. Prominent industry beneficiaries from flow-on from this Project include transport and storage, trade, business services 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. Without the Project, it is anticipated this activity would be lost to the local and regional economy following the cessation of operations at the Baralaba North Mine in the future.

Increased Demand for the Port of Gladstone

The Project scenario for this economic analysis assumes all PCI coal produced by the Project is exported through the Port of Gladstone. The export of PCI coal produced will increase business activity for the Port of Gladstone, as well as the transport industry for transport of the coal to Gladstone.

In 2021-22, the Port of Gladstone had a total throughput of approximately 120 Mt (Gladstone Ports Corporation, 2022a). Coal exports accounted for 55% of total port throughput. The future capacity of Port of Gladstone is expected to reach 300 Mtpa (Gladstone Ports Corporation, 2022b), supported by the \$760 million Port of Gladstone Gatcombe and Golding Cutting Channel Duplication Project, for which an EIS was approved with conditions, which will provide a two-way passage from the outer harbour, around East Banks, to the western side of Facing Island (State Development, 2023b). The Port is thereby expected to have sufficient capacity to handle the up to 1.8 Mtpa of product coal produced by the Baralaba South Project and the Project is thereby expected to have minimal impact on the Port’s operational capacity, while providing demand for port services to support Port expansion activities.

5.3.2 Adverse Impacts

Impact on the Local Grazing Industry

The Project is located on an area currently used for cattle grazing. It is estimated that the Project will have a total disturbance area of approximately 1,300 ha (including the ETL), including approximately 892 ha of grazing land will be disturbed if the Project proceeds.

Cattle and calves grazing are the prominent activity in Banana SA2 (the SA2 in which the Project area lies) accounting for approximately 75.0% of the region's total agriculture production in 2020-21. The SA2 had an average value of production of \$116.6/ha for grazing in 2020-21 (ABS, 2022c, d). Based on a total disturbance area of 892 ha of grazing land, this equates to approximately \$104,000 per annum in potential value lost in cattle grazing over the life of the Project at peak grazing land disturbance. To be conservative, the analysis has assumed the entire 892 ha are removed from grazing production in FY0, however, it should be noted that disturbance of this land will occur progressively over the life of the mine and there may be potential to maintain production in some areas prior to being disturbed.

The proponent is committed to progressively rehabilitating the disturbed land as a result of mining activity on the mine site, with the final landform post decommissioning and rehabilitation to be suitable for returning to grazing purposes. For the purposes of this analysis, it has been assumed that rehabilitation will gradually (over a 10-year period) return the land to approximately 75% of the original production value post-mining. Over 100 years, the impact to agriculture from the Project is estimated to have a net present value of approximately \$1.01 million (using a 7% discount rate).

The total disturbance area accounts for approximately 0.03% of the livestock grazing area in Banana SA2. As such, lost activity of \$104,000 per annum at peak disturbance may overestimate the potential value lost as cattle grazing in the area could be intensified and activities currently undertaken in the disturbance area could be potentially located elsewhere.

Impacts on Businesses from Competition for Resources

The Project will result in 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. Manufacturing is the most adversely impacted industry, as labour and resources are likely to flow from this industry to the regional catchment to support the Project.

A summary of impacts on industry output is provided in section 5.1.2. The increase in real wage detailed in section 5.2.3 highlights the increasing costs to businesses as real wages are higher than the base case throughout the mine life, which will place some cost pressures on businesses and may squeeze out some businesses operating on the margin, in particular those operating in sectors that have little scope to raise prices of their goods and services to absorb rising costs of production. Mitigation measures will be put in place to mitigate the impacts on businesses, as detailed in section 7.

Impacts on Industry from Exchange Rates

The Project will result in the export of an additional approximately 36.0 Mt of coal that would not otherwise occur without the Project over 23 years. There is some potential for this export activity to result in an increase in exchange rates as a result of Project's impacts on balance of payments, which would make Australian exports less competitive, while imported goods and services would cost comparatively less. This primarily impacts industries that operates in global markets competing with international producers, such as agriculture and manufacturing. The potential impacts on balance of payments are examined in more detail in section 5.7; the identified impact from the Project is anticipated to be negligible.

Potential Water-Related Impacts on Industry

Peak groundwater to be taken or interfered with for the Project will reach 1.6 megalitres per day (ML/d), with an average of 1.1 ML/day during the operational life of the mine (Watershed, 2023). Groundwater level drawdown would be largely contained within the Permian coal measures extending from the open cut pit extent. As such, the predicted impacts of the Project to groundwater will not overlap with any existing/ approved mining activities. A

Water Management Plan would be developed for the Project and would include details of the groundwater monitoring program to monitor the impacts of the Project on groundwater.

The Surface Water Impact Assessment (Engeny, 2023a) indicates that mitigation strategies will be put in place to manage and contain mine affected water and to minimise potential impacts on water quality and quantity.

The Flood Impact Assessment (Engeny, 2023b) assessed the potential flood impacts of the Project including on flood depths, velocity and duration. The assessment included examination of impacts on agricultural land uses (cropping and grazing) in the vicinity of the Project. The assessment identified that all properties with cropping or grazing lands were assessed as meeting flood impact objectives. Further details of the potential flood impacts are provided in the Flood Impact Assessment.

Based on the above, and with appropriate mitigation strategies as outlined in the groundwater and surface water technical studies, there is anticipated to be a minimal impact on industry and any economic impacts will be localised and immaterial.

5.4 IMPACTS TO NORMAL SUPPLY/ DEMAND OF EXTRACTIVE RESOURCES

5.4.1 Construction

An estimated 56,160m³ of quarry material is anticipated to be required for Project construction for the development of a product haul road and ROM haul roads. If suitable material is identified on-site for road construction, the material will be extracted from borrow pits within the Project disturbance footprint within MLA 700057. Suitable clay and rock materials (for embankments, bunds, etc.) will be predominantly sourced from the box cut spoil. If required, existing hard rock quarries located in the region may be used to meet Project construction requirements.

Over 40 million tonnes of hardrock quarry materials were produced in Queensland each year between 2011 and 2022 (Queensland Government, 2023h). There are 45 State owned quarry resources located within a 125 km radius of the Project, including 17 with current sales permits under the *Forestry Act 1959* and 25 identified potential quarry sites (DAF, 2020a; DAF, 2020b). Seven hard rock quarries producing on average greater than 200,000 tonnes of material (2015-2016) have been identified between the Project and Gladstone / Rockhampton (DNRM, 2015).

Assuming a conversion rate of 2.4 tonnes per 1m³ of quarry material for a compacted road base (LS Quarry, undated), a maximum total of approximately 135,000 tonnes of quarried material may be required from quarries in the region (though it is anticipated to be considerably less as suitable materials identified on site will be used in the first instance). Given existing annual volumes of quarried materials in Queensland, and a number of major quarry operations located in proximity to the Project site, the Project is not anticipated to have tangible impact on the normal supply/ demand of extractive resource availability in the region or Queensland through construction.

5.4.2 Operations

The Project will result in the extraction and export of an additional approximately 36.0 Mt of coal that would not otherwise occur without the Project over 23 years, equating to approximately 1.5 Mtpa on average, with a peak production of 1.8 Mtpa. The regional catchment currently produces more than 59 Mtpa of coal each year (see Appendix A, Table A. 1), indicating the Project will deliver an increase in coal production within the regional catchment of approximately 2.5% compared to current annual production. More broadly the Central region of Queensland produces approximately 77 Mtpa of coal, whilst Queensland production is around 235 Mtpa on average over the last five years.

The development of the Baralaba South Project will coincide with mining activity at the existing Baralaba North Mine at the start of production. However, Baralaba North Mine is currently scheduled to close in the early 2030s and after this, the Baralaba South Project will in part replace the coal extraction of the Baralaba North Mine. It is unlikely that the Project will therefore have a tangible impact on the normal supply/ demand of extractive resource availability in the region or Queensland.

5.5 CONTRIBUTION TO GOVERNMENT

5.5.1 Approach

Estimates of taxation revenue to the Queensland and Australian Government have been developed based on benchmarks of taxation revenue received compared to relevant Queensland 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, 2023f) compared to total wages and salaries paid to Australian employees (ABS, 2023g, h) between the financial years of 2012-13 and 2021-22. 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, 2023f) compared to total wages and salaries paid to Australian employees (ABS, 2023g, h) between the financial years of 2012-13 and 2021-22. This was applied to estimates of incomes paid in Australia from the CGE modelling.
- Company income tax (Australian Government): total company tax received (ABS, 2023f) compared to total gross profit of businesses in Australia (i.e., total GDP less total wages and salaries paid to employees) (ABS, 2022a; ABS, 2023g, h) between the financial years of 2012-13 and 2021-22. 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, 2023f) compared to total Australian GDP (ABS, 2022a) between the financial years of 2012-13 and 2021-22. This was applied to estimates of GDP from the CGE modelling.
- Payroll tax (Queensland Government): total payroll tax received (ABS, 2023f) compared to total wages and salaries paid to Queensland employees (ABS, 2023g, h) between the financial years of 2012-13 and 2021-22. This was applied to estimates of incomes paid in Queensland 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, Baralaba Coal Company will also pay the Queensland Government royalties for the extraction of coal. Royalty payments were estimated using coal rates outlined by the Queensland Government (QRO, 2023).

5.5.2 Tax Revenues

Details of anticipated taxation revenue from both direct and flow-on activity associated with the Project, relative to the base case, are summarised in Table 5.4. The Queensland Government is expected to receive more than half of the additional revenue, primarily through royalty payments. It should be noted that a portion of Australian Government revenues are likely to provide benefits to Queensland through the subsequent expenditure and redistribution of these revenues to provide services and infrastructure throughout Australia.

The Project is estimated to provide additional revenues of approximately \$68.7 million to the Australian Government per annum, equating to an average annual increase in Australian Government revenues of 0.01% from the \$623.2 billion received in 2021-22 (Commonwealth of Australia, 2022). In terms of present value, the Project is anticipated to increase the Australian Government aggregated tax revenue by a total of \$512.4 million.

On an average annual basis, the Project is estimated to provide additional revenues of approximately \$62.6 million per annum to the Queensland Government, equating to an average annual increase in Queensland Government revenues of approximately 0.08% from the \$74.2 billion received in 2021-22 (Queensland Treasury, 2022b). The Project is expected to contribute an additional of \$488.2 million in present value terms to State revenue.

Table 5.4. Aggregate Government Revenues from the Project

Taxes	Estimated Revenue (\$M)	Proportion of Additional Government Revenue	Present Value of Estimated Revenue – 7% Discount Rate (\$M)
Queensland Government Revenues			
Payroll Tax	\$138.6	9.6%	\$45.1
Royalties	\$1,301.8	90.4%	\$443.1
Total	\$1,440.4	100.0%	\$488.2
Australian Government Revenues			
Personal Income Tax	\$1,352.3	85.6%	\$438.7
Fringe Benefits Tax	\$30.9	2.0%	\$10.0
Company Tax	\$13.5	0.9%	\$4.3
GST	\$183.0	11.6%	\$59.3
Total	\$1,579.7	100.0%	\$512.4

Note: Totals may not sum due to rounding.

Source: ABS (2022, 2023f, g, h), QRO (2023), Prime Research (unpublished), AEC.

5.6 IMPACT ON LOCAL PROPERTY VALUES

Direct and flow-on employment generated by the Project is expected to result in an increase in both the temporary and permanent population within the local catchment during the Project.

The Project is anticipated to have a peak workforce of around 268 people during construction. Given the specialised nature of the work to be completed during the construction phase and its temporary nature, it has been assumed that Rockhampton and Gladstone (DIDO) will provide 95% of the workforce due to being major centres within close proximity to the Project. The remaining 5% will be sourced from towns within the study area. The DIDO and FIFO workers will require temporary accommodation, equating to about 255 workers at peak construction requiring accommodation.

Once operational, the workforce is estimated to peak at 521 workers, with a similar split between local, DIDO and FIFO workers as during construction. This equates to approximately 390 non-local workers requiring accommodation at peak, though with rostering considerations the number of beds needed will be within the capacity of Baralaba Coal Company's expanded worker accommodation camp (see section 5.6).

All non-local workers will be accommodated within Baralaba Coal Company's accommodation camp and will thereby have no impact on local property markets.

Both sales and rental prices in the local catchment fell sharply between 2011-12 and 2016-17, but have gradually been increasing since. Even so, prices remain well below 2011-12 levels (see section 4 and Appendix A). Population in the local catchment has also been declining in recent years, with population projections indicating this is expected to continue through to 2041. The Project thereby has the potential to act as an attractor of people to the local catchment to assist in halting the current decline.

During construction, given the short term nature of the construction activity it is unlikely any construction workers will relocate to the local catchment; the 25% of local workers is assumed to reflect existing residents of the local catchment. As such, impacts on the local property market during construction are anticipated to be negligible. However, of the local operational workforce (25% of operations jobs), while most of these workers will represent people already residing in the local catchment, some may represent employees and their families relocating to the local catchment (which may place pressures on the local property market). At peak operations, around 130 mining workers are expected to reside in the local catchment – where between 5% and 20% of these reflected people relocating to the local catchment that could place demand on the local property market of between 5 and 25 dwellings. This would reflect only a small portion of the annual level of rental bonds lodged in the local catchment each year (between 650 and 1,000 bonds lodged per annum in the past five years).

Given the Project is not expected to commence construction until 2029, current market conditions may not be a good guide to conditions at the time of the Project. However, with population projections indicating an expectation for population decline in the local catchment, as well as the recent trend of declining rental bonds lodged each year, it can reasonably be expected that any impact the Project has on attracting residents, and demand this places

on the local property market, will likely be of benefit to the community and assist in halting the current rental market decline rather than place any undue burden on the cost of housing.

5.7 IMPACTS ON BALANCE OF PAYMENTS

The Project will impact on Queensland 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 approximately 36.0 Mt of PCI coal for export over 23 years (annual average of approximately 1.5 Mtpa), 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.

5.7.1 Exports

Including direct and flow-on activity, construction of the Project is estimated to result in a contraction in Queensland exports of \$72.8 million per annum (this includes interstate and international exports). During operations, the export of coal is estimated to contribute an additional \$81.5 million in Queensland exports on average per annum.

For Australia, international exports are estimated to decline by \$64.2 million per annum during construction and increase by an estimated \$109.2 million per annum on average during operations.

Impacts of post mine decommissioning and rehabilitation are immaterial on net export balances, and as such, have been excluded.

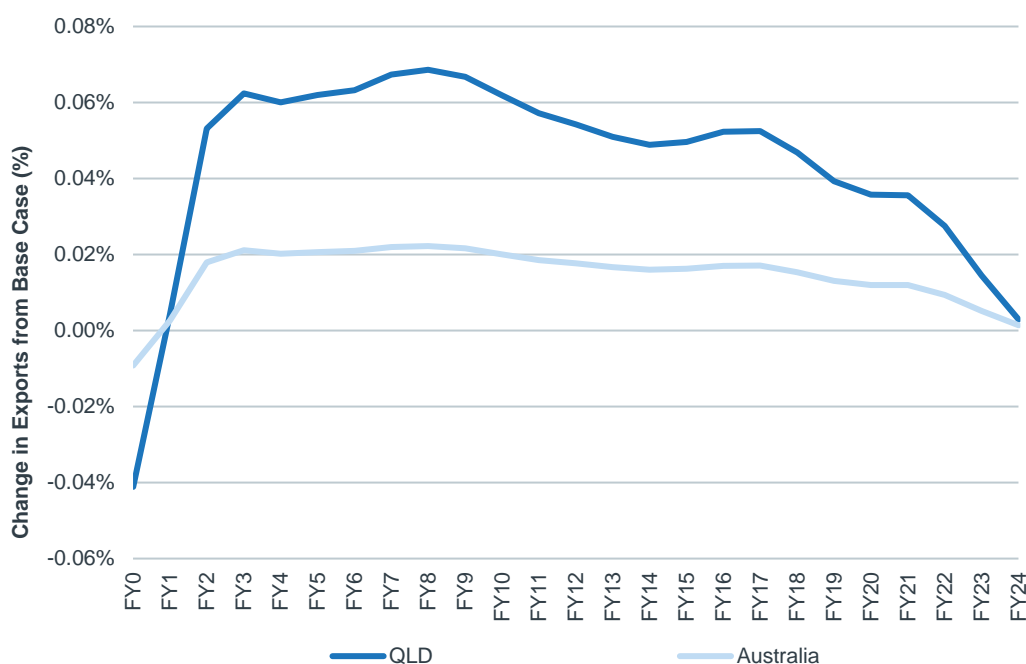
Table 5.5. Average Annual Change in Exports, Deviation from the Base Case (\$M)

Region	Construction	Operations
Queensland	-\$72.8	\$81.5
Australia	-\$64.2	\$109.2

Source: Prime Research (unpublished)

On a percent basis, the Project's contribution to Queensland exports is anticipated to average an increase of approximately 0.05% during operations between FY1 to FY24, whilst for Australia the export of coal will provide an average annual increase in Australian exports of about 0.02%. Exports decline sharply in FY0 due to the increase in domestic demand for goods and services driven by construction phase activity, as well as some operating activity in this year, but with no corresponding exports of product coal.

Figure 5.5. Annual Percent Change in Exports, Deviation from the Base Case



Note: Queensland exports include interstate and international exports; Australia exports include only international exports.
 Source: Prime Research (unpublished).

5.7.2 Imports

The Project will source various resources from outside Queensland and Australia throughout construction, operations and decommissioning and rehabilitation during the Project’s life, as detailed in section 3.2. During the primary construction period, the Project is anticipated to contribute an additional \$45.3 million in imports on average per annum (including direct and flow-on impacts), whilst additional imports during operations is estimated to be around \$63.9 million per annum in Queensland. The contribution to Australia’s imports is estimated to be approximately \$58.2 million per annum during construction and approximately \$121.5 million per annum during operation.

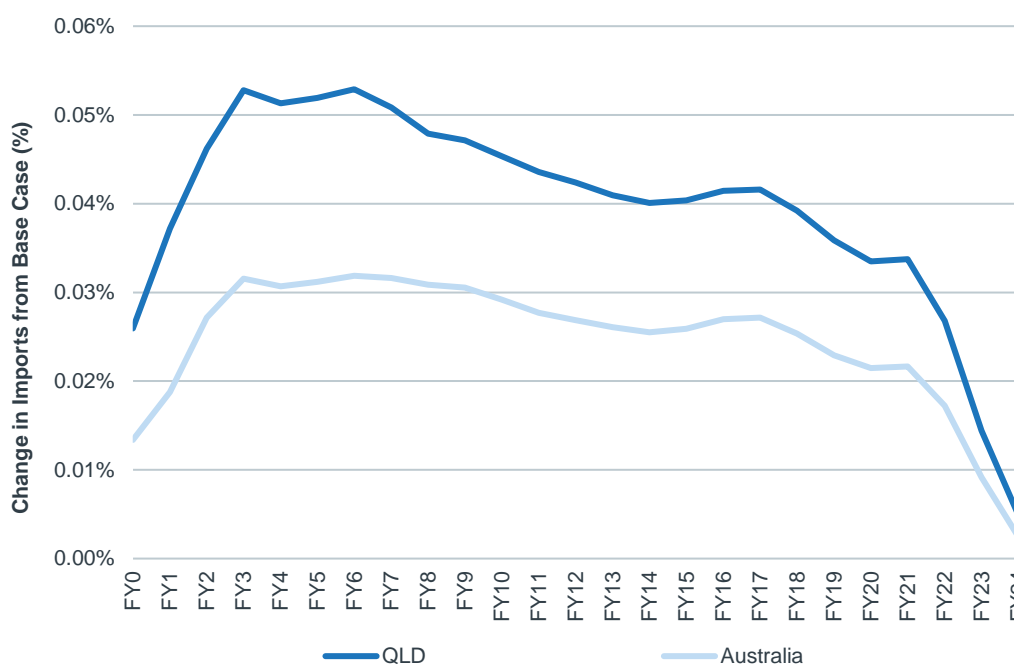
Table 5.6. Average Annual Change in Imports, Deviation from the Base Case (\$M)

Region	Construction	Operations
Queensland	\$45.3	\$63.9
Australia	\$58.2	\$121.5

Source: Prime Research (unpublished)

On a percent basis, the increase in Queensland imports is estimated to represent an increase of approximately 0.03% during construction and 0.04% during operation, whilst the increase for Australia is approximately 0.01% during construction and 0.02% during operation.

Figure 5.6. Annual Percent Change in Imports, Deviation from the Base Case



Note: Queensland imports include interstate and international exports; Australia exports include only international exports.
 Source: Prime Research (unpublished).

5.7.3 Net Trade Balances

During construction, Queensland’s net imports is estimated to increase by \$118.1 million per annum on average, while Australia’s net imports are estimated to increase by \$122.4 million on average per annum, compared to the base case.

During operations, the Project will support an increase in net exports of \$17.6 million per annum on average in Queensland while it will support a raise in net imports of \$12.3 million per annum on average 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 2022, Australia was a net exporter with a net trade balance of approximately \$135.1 billion, comprised of total exports of \$595.1 billion and total imports of \$460.0 billion (DFAT, 2023). Australia’s net trade balance has historically been volatile and Australia has typically been a net importer. Between 2000-01 and 2016-17 only five of the 17 years resulted in more exports than imports (net trade balance averaging -\$12.0 billion over this period). However, from 2016-17, Australia has consistently been a net exporter with net trade balance averaging \$60.5 billion from 2016-17 to 2021-22.

The Project’s increase in net exports of \$17.6 million per annum on average during operation will strengthen the Australian dollar and contribute to an increase in net exports. Notwithstanding this fact, in consideration of the Project’s contribution to total Australian exports and imports, the Project is unlikely to noticeably impact on Australia’s net trade balances and exchange rates.

5.8 SUMMARY OF IMPACTS

Key beneficial impacts arising from the Project are outlined in Table 5.7. Impacts are examined in consideration of what would otherwise occur if the Project does not proceed.

5.8.1 Potential Beneficial Impacts

Table 5.7. Assessment of Beneficial Impacts of the Baralaba South Project

Impact	Description
Economic Growth	<p>The Project will contribute to economic growth through increased industry output and Gross Regional Product (GRP) during construction and operation (i.e., production), as well as decommissioning and rehabilitation, flowing from both direct and indirect impacts. The Project is estimated to support an additional:</p> <ul style="list-style-type: none"> • \$13.5 million in GRP per annum in the regional catchment during construction. • \$170.2 million GRP per annum in the regional catchment during operations. • \$1.6 million GRP per annum in the regional catchment during post-mine decommissioning and rehabilitation. <p>At peak, the Project is estimated to result in an increase in GRP of 0.5% compared to what would be expected to occur without the Project.</p>
Employment and Incomes	<p>The Project will increase employment and household incomes during construction, operation and decommissioning/ rehabilitation, 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:</p> <ul style="list-style-type: none"> • 114 Full Time Equivalent (FTE) jobs per annum in the regional catchment during construction. • 333 FTE jobs per annum in the regional catchment during operations. • 4 FTE jobs per annum in the regional catchment during post-mine decommissioning and rehabilitation.
Support for Local Businesses	<p>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. Much of the flow-on impacts are expected to be realised within the regional catchment, boosting businesses in surrounding regions of the Project site. Prominent industry beneficiaries from flow-on from this Project include transport and storage, trade, business services and public services, health and education.</p> <p>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.</p>
Government Revenue	<p>The project will provide a lift in Queensland and Australian government revenues through a variety of taxes and royalties. Overall, the Baralaba South Project is estimated to deliver an annual average of:</p> <ul style="list-style-type: none"> • \$68.7 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. • \$62.6 million in additional revenue to the Queensland Government compared to what would occur without the Project, primarily through royalty payments. <p>These additional revenues can be used by government to provide additional infrastructure and services to support business and households throughout Australia.</p>

Source: AEC

5.8.2 Potential Adverse Impacts

Key adverse impacts arising from the Baralaba South Project 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 potential 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 5.8. Assessment of Adverse Impacts of the Baralaba South Project

Impact	Description
Impacts on Agricultural Production	The Project is located in an area primarily used for cattle grazing which may be adversely impacted as a result of the Project. Based on a total Project disturbance area of approximately 1,300 ha (including transmission lines), of which approximately 892 ha of grazing land, there could be approximately \$104,000 per annum in potential value lost in cattle grazing over the life of the Project at peak grazing land disturbance. The land will be progressively rehabilitated to return the land to a post-mining land use for grazing (assumed to be returned to approximately 75% of original grazing land use over a ten-year period post-mining). Over 100 years, the impact to agriculture from the Project is estimated to have a net present value of approximately \$1.01 million (using a 7% discount rate). This assumes the land disturbed would otherwise provide a value of grazing production of approximately \$116.6/ha (in line with the average value in the Banana SA2 in 2021) and all of this value would be lost as a result of the Project until the land is rehabilitated.
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, particularly for manufacturing. 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. However, compared to base case (i.e., without 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 Project is not anticipated to have an impact on the local property market during construction. All non-local workers will be accommodated within the expanded Baralaba accommodation camp owned by the Baralaba Coal Company. Non-local workers during operations are also expected to be accommodated in the accommodation camp, however, there may be potential for some of the approximately 25% of local workforce to represent workers relocating to the local catchment. Assuming between 5% (low range estimate) and 20% (high range estimate) of the local workforce reflects people relocating to the local catchment, this would equate to an additional demand of 5 and 25 dwellings at peak operations (this would reflect only a small portion of the annual level of rental bonds lodged in the local catchment of between 650 and 1,000 bonds per annum in the past five years). While this impact is included as a potential adverse impact, given the current population decline and relatively stagnant property market in the local catchment, it is anticipated that any impact the Project has on attracting residents, and demand this places on the local property market, will likely be of benefit to the local community rather than place any undue burden on the cost of housing.
Impacts on Industry from AUD and Exchange Rates	The Project has the potential to support the Australian dollar through demand for imported goods and services as well as production of coal 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 Queensland 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, it is expected there is a low probability of the Project impacting on the value of the Australian dollar and exchange rates and any impacts would be negligible.

Source: AEC

6. CUMULATIVE IMPACT ASSESSMENT

This section provides an assessment of the cumulative economic impacts arising from development of a number of projects concurrently with the Project in the regional catchment. In particular, this section is designed to address the cumulative economic impacts arising from large project workforces associated with proposed major projects being constructed in overlapping timeframes.

6.1 CUMULATIVE IMPACT ASSESSMENT FRAMEWORK

The cumulative impact assessment examines the potential cumulative impact of a large number of major infrastructure and industry projects (including the Baralaba South Project) being developed concurrently in the regional catchment.

Note the cumulative impact assessment is based on the potential for cumulative development to exacerbate the impacts of the Baralaba South Project (as outlined in section 5.8) and to what degree. The impact assessment does not assess the aggregate impacts of all developments in combination, but rather the relative implications of developing the Project should other projects also be undertaken concurrently.

Projects included for consideration in the cumulative impact assessment are as per the projects outlined in Table A. 6 in the Major Projects section of Appendix A. The cumulative impact assessment focuses on the potential for impacts identified in section 5 to be exacerbated by the concurrent development of a range of projects in the region. In undertaking this analysis, it has been assumed that all projects identified proceed in accordance with timelines outlined in Appendix A (based on existing information in the public domain); for projects in which timelines are not known or are currently on hold, specific timings have not been adopted but it has been assumed these will occur at some time over the next decade (though not all will occur concurrently). This is considered a cautious scenario (i.e. an extreme scenario that is unlikely to be realised) as it is highly unlikely that all projects proposed will proceed to development, or that all proposed timelines will be achieved. There are also a number of projects that are anticipated to be completed prior to the Project commencing construction, with limited levels of overlap between projects. As such, it is highly likely that impact rating assessed in this cumulative impact assessment are overstated.

It should also be recognised that some of the projects listed represent extensions that will replace or augment activities from existing operations that are nearing completion. Where this occurs, these projects will effectively result in a continuation of jobs and economic activity rather than a genuine lift in activity (outside of short-term construction impacts).

6.2 POTENTIAL CUMULATIVE IMPACTS

6.2.1 Potential Beneficial Cumulative Impacts

The development of the Baralaba South Project in combination with multiple other major projects will result in higher output, GRP, employment and household income estimates in the regional catchment and Queensland than those depicted in section 5. Other potential beneficial impacts of concurrent development may include:

- Increase in employment opportunities would support the retention of labour in the region and potentially see some inward migration of labour to fill employment positions generated by the projects. Additional business activity and population would increase demand for a range of business and household support services. Given the softening in population growth and the labour force in the regional catchment in recent years, delivery of a suite of projects will provide an important contribution to stabilising and supporting growth in the region in the medium term.
- Increased labour compensation and real wage effects in order to attract constrained labour resources, thereby enhancing some household incomes.
- Development of a “critical mass” of projects to support existing and potentially expand local supply chain networks.
- Increased in government revenues through taxation and royalties.

- Coordinated and potentially enhanced use of infrastructure developed to support major projects.
- Enhanced business, consumer and investor confidence arising from greater certainty in demand for goods, services and local infrastructure and assets.

While there are some real and tangible cumulative benefits likely to arise from the concurrent development of a number of projects, with respect to government as well as local community and business investment in the local and regional economy, it is more important to understand the stresses that will be collectively created by multiple projects. As such, the focus of the cumulative impact assessment is on understanding these stresses.

6.2.2 Potential Adverse Cumulative Impacts

Key resources (factors of production) likely to be affected by development of multiple projects in terms of increased demand and competition include:

- Labour.
- Capital.
- Accommodation and land.
- Transport and other infrastructure/ services.

Adverse impacts potentially resulting from increased stresses on the above factors of production have been identified through the preceding analysis, desktop review of other projects proposed for the region and the impacts identified in relevant documentation. The key potential adverse impacts expected to result are assessed below and include:

- Impacts on agricultural production from land disruption and competition for land.
- Impacts on local/ Queensland business through competition for labour and labour draw.
- Impacts on residential property values through increased demand and amenity effects.
- Impacts on trade exposed industries through exchange rates affects.

Given the limited information available regarding many of these projects, and uncertainty regarding which projects may ultimately be developed and their timing, it is difficult to assess with any confidence the cumulative impacts of multiple projects being developed and operating concurrently.

6.2.2.1 Impacts on Agricultural Production

The economic impact assessment for the Baralaba South Project has assumed a disturbance area of 819.7 ha of grazing land which is approximately 0.03% of the livestock grazing area in the Banana SA2. Removal of this land from agricultural production is estimated to result in approximately \$104,000 in potential value lost in cattle grazing each year during the Project life. The site will be progressively rehabilitated (over the period of five years) and returned to full productive use following project completion (i.e., post decommissioning and rehabilitation). Over the life of the mine and the period until the land returns to full grazing production value, the impact to agriculture from the Project is estimated to have a net present value of approximately \$950,000 (using a 7% discount rate).

Many of the other developments considered in the cumulative impact assessment are also likely to impact on agricultural production through disruption or take-up of land, in particular resource projects. Whilst some projects would only temporarily impact on agricultural production (e.g., land impacted by mining projects could realistically be rehabilitated to pre-development standard, whilst many infrastructure projects primarily impact on land during the construction period), some projects would likely result in a permanent degradation of agricultural land in the region. As such, the development of other resource and infrastructure projects in the regional catchment could exacerbate the adverse impacts on agricultural production in the region that may be delivered by the Project alone, through a combination of reduced capacity to replace this activity elsewhere in the regional catchment and overall contraction of land available for agricultural purposes.

6.2.2.2 Impacts on Business from Competition for Resources

Potential impacts of the Baralaba South Project on business as a result of increased competition for and cost of labour are presented in section 5.3. The analysis outlines that competition for resources will result in a small “crowding out” effect for some industries as resources (in particular labour) are drawn from some sectors of the regional catchment, Queensland and national economy to the Baralaba South Project and its support services. The concurrent development of the Project and the projects listed in Table A. 6 in the Major Projects section of Appendix A may exacerbate these impacts as a result of additional demand and competition for labour and other business inputs such as capital, goods and services used in production processes, transport infrastructure and utilities.

Cumulatively, it is likely the projects will result in higher costs of production in the regional catchment compared to what would be expected to otherwise occur, which may erode the viability of some businesses, particularly smaller businesses already operating on or near the margin and those businesses that are unable to increase final prices of their goods and services to match the increased costs of production (i.e., any good or service that can be readily substituted with a lower cost import). This could exacerbate issues of “crowding out” of some businesses and industries and will likely reduce availability of lower income paying services that support business and household activities such as retail trade, government administration, education (in particular primary and secondary) and some health and community services.

The increased competition for resources may also hinder to some degree the region’s capacity to develop local supply chains and secure local supply contracts for these major projects in the short term. As a result, in the short to medium term, the regional catchment will likely become more reliant on imported goods and services to supply the needs of these projects as well as the local population – this will mean a reduction in the local capture of flow-on benefits arising from proposed major projects such as the Baralaba South Project than may otherwise be expected to occur.

Where the projects considered in this cumulative impact assessment all proceed, the adverse impacts on business from the Project will be more likely to occur than the impacts outlined in section 5. However, it should be noted that:

- Many of the projects outlined in Appendix A are proposed to be developed prior to the Baralaba South Project and have minimal ongoing operational activity locally (e.g., solar farm projects), with limited overlap of activities.
- The local catchment is projected to record population decline, and the Project may thereby be considered to support local businesses.

6.2.2.3 Impacts on Local Property Values

Development of multiple projects concurrently will result in greater levels of workers looking to relocate to the local and regional catchment, and higher imported (FIFO/ DIDO) labour requirements for each project than would be required if each project were undertaken in isolation. This will increase accommodation requirements to house these imported workers. A number of the projects included in the cumulative impact assessment are located in the local catchment, whilst approximately 67.5% are located elsewhere in the regional catchment.

As with the Baralaba South Project, to mitigate impacts on residential property markets, proponents of these major projects will likely utilise accommodation camps/ villages to house workers at least during construction of the projects to accommodate FIFO/ DIDO workforces. Competition for labour generated by multiple major projects is also likely to reduce the capability for individual projects to source local labour and thereby increase the requirement for FIFO/ DIDO workforces. This may place pressure on existing accommodation camps/ villages in the region and may require expansion of existing camps or the development of new accommodation camps in both the local and regional catchment to meet workforce requirements.

All non-local workforce for the Baralaba South Project will be accommodated in the expanded Baralaba accommodation camp, which is owned and operated by the Baralaba Coal Company. Prior to construction, the Baralaba accommodation camp would be expanded by 255 rooms to accommodate the construction workforce. The Project’s DIDO/ FIFO workforce needs will be fully accommodated within this camp and the cumulative development of other projects (and potential increase in requirement for non-local workers) is not expected to impact on the proponent’s ability to accommodate these workers within the camp.

As a result, the potential for cumulative development of multiple major projects to exacerbate the Baralaba South Project's impacts on residential property values will primarily be driven by:

- Some workers choosing to permanently migrate to the region, thereby increasing loads on existing housing supply.
- Non-project workers being attracted to the region to back-fill positions vacated as a result of labour draw to the projects, or to support businesses involved in supplying major projects.

It is likely that most workers permanently migrating to the region will choose to reside in key centres in the regional catchment such as Gladstone or Rockhampton, with many of the projects considered in the cumulative impact assessment located in or near these centres. Workforces for projects located in the local catchment are also likely to largely locate in these centres and operate on a DIDO arrangement. This has the potential to increase demand and prices for housing in these centres. Some workers, however, will likely seek to relocate to towns within the local catchment within driving distance to the Project. Although the Project is expected with positive impact on the local property market by attracting residents and subsequently demand for local dwellings, if all the projects considered in this assessment proceed, there could be upward pressure on rent and sales prices. However, in consideration of the projected decline in population in the local catchment, as well as an expectation that many of the projects listed in the local catchment would be developed prior to Baralaba South Project, it is expected that the cumulative impacts of the Project on the local catchment property market would be minimal. As the Project is not expected to have impacts on property markets elsewhere in the regional catchment, cumulative development of the Project with projects elsewhere in the regional catchment has not been examined.

6.2.2.4 Impacts on Industry from Australian Dollar and Exchange Rates Affects

Export-oriented projects have the potential to impact on exchange rates through a small improvement in Australia's balance of trade, which can adversely affect trade-exposed industries (such as agriculture, many manufacturing businesses and tourism) as their products and services become more expensive to foreign buyers. The impact on exchange rates and trade exposed industries as a result of Baralaba South Project coal exports is assessed as being very low (see section 5.8.2).

Some of the projects considered in the cumulative impact assessment are primarily export oriented developments (e.g., Port of Gladstone Gatcombe and Golding Cutting Channel Duplication Project), although will not in and of themselves increase exports. Rather these projects are designed to accommodate projected future growth in exports and thereby support economic growth in the region. Some projects will also directly result in increased exports such as the mining projects.

The combination of these projects is likely to place upward pressure on exchange rates in consideration of national trade balances, and thereby adversely affect trade-exposed industries. The cumulative impact of the Project on exchange rates in consideration of other potential projects is assessed to be higher than the impact of the Baralaba South Project in isolation, though the impact on exchange rates (and thereby trade-exposed industries) is still expected to be small in consideration of overall domestic trade flows.

7. MITIGATION AND ENHANCEMENT STRATEGIES

Assessment of the economic impacts of the Project above identified the Project will result in additional mining activities in the local and regional catchments to supplement and replace activities of the Baralaba North Mine as it winds down production. This will provide an important retention of jobs and economic activity within the regional catchment and Queensland economies that would otherwise be lost without the Project. Economic impacts of the Project are anticipated to be positive, with minimal adverse economic impacts.

While the potential adverse economic impacts from the Project are assessed to be low, there are some potential areas that should be monitored, and strategies employed to ensure benefits of the Project to the local catchment, regional catchment and Queensland are maximised and any potential adverse impacts minimised:

- To minimise adverse impacts on agricultural production in the local catchment, the proponent will avoid or minimise disturbance of productive land in any areas not immediately affected by mining activity and ensure land is of adequate safety standards for continuing grazing activities.
- To maximise local benefits derived from the Project, and consistent with existing policies implemented by Baralaba Coal Company, the proponent and contractors engaged by the proponent will source labour locally where possible and practical and provide training opportunities where practical.
- The Baralaba Coal Company has long standing relationships with local business and an established supply chain for its existing activities in the regional catchment. To maximise local benefits derived from the Project, the proponent (and contractors engaged by the proponent) will continue to support local business in line with the precedent set by the Baralaba Coal Company by utilising these established supply networks and providing sufficient opportunities and information for local business to secure new supply contracts.
- While the Baralaba South Project is anticipated to have minimal impacts in terms of additional demand for accommodation/ housing in the local area, the proponent will monitor the local accommodation/ housing market and demands placed on it by its workforce during construction.

It should be recognised that these strategies form part of the proponent's Project planning and modelling/ analysis of impacts in this report has been based on these strategies being implemented.

8. COST BENEFIT ANALYSIS

8.1 METHOD AND APPROACH

The cost benefit analysis (CBA) assesses the impact of the Project scenario outlined in section 3.2 compared to a scenario without the Project, to understand the net benefit of the Project to Queensland. All values are expressed in 2023 Australian dollar terms, discounted to 2023-24 present values.

The ‘without project’ scenario assumes the Baralaba South Project is not developed and no alternative coal producing mine is developed elsewhere in Queensland. Base economic growth assumptions are assumed to be as per the baseline scenario used for the CGE modelling (refer to Appendix B).

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.: $NPV = PV \text{ Benefits} - PV \text{ Costs}$. The BCR provides the ratio between the PV of benefits and PV of costs, i.e., $BCR = PV \text{ Benefits} / PV \text{ Costs}$.

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.

The methodology used in conducting the CBA is outlined in Appendix C. Other key considerations for the CBA are outlined in the sections below.

8.1.1 Modeling Timeframes

The CBA examines the impacts of the Project over 100 years from 2028-29 (FY0) to 2127-28, incorporating the construction period, the operational life of the Project, decommissioning/ rehabilitation activities, as well as ongoing impacts of the Project on agriculture post-rehabilitation through to 2127-28.

8.1.2 Discount Rates

A base discount rate of 7% has been used for demonstration purposes (in line with 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).

8.2 QUANTIFICATION AND VALUATION OF COSTS AND BENEFITS

8.2.1 Costs

8.2.1.1 Initial Capital Costs

Construction expenditure for developing the Project is estimated at approximately \$157.0 million. A summary of construction expenditure by year is provided in section 3.2.1.1.

8.2.1.2 Lifecycle/ Sustaining Capital Costs

Lifecycle/ sustaining capital costs for the Project by year is provided in section 3.2.2.3.

8.2.1.3 Operating/ Maintenance Costs

The average cost per tonne of PCI coal is estimated to be between \$165 and \$180 (AUD) excluding royalty expense. Further details are outlined in section 3.2.2.3. Royalty payments of \$36.64 per tonne are also anticipated. This has been excluded from the assessment as revenue is included as a benefit and royalty payments will represent a transfer payment from the proponent to the Queensland Government.

8.2.1.4 Post-Mine Decommissioning/ Rehabilitation Costs

Estimates of expenditure on post-mine decommissioning and rehabilitation are summarised in section 3.2.3. Progressive rehabilitation activities will be undertaken on an ongoing basis throughout the Project life at an estimated aggregate cost of approximately \$71.0 million.

8.2.1.5 Value of Foregone Agricultural Production

Impacts to agriculture are estimated as per those outlined in section 5.3.2. To be conservative, the analysis has assumed the entire current land use for grazing of approximately 892 ha are removed from production in FY0, however, it should be noted that disturbance of this land will occur progressively over the life of the mine and there may be potential to maintain production in some areas prior to being disturbed.

The total grazing land disturbed by the Project is assumed to be return to approximately 75% of its original production value post mining with a linear ramp up across ten years from 2053-54 to 2062-63.

8.2.1.6 Impact on Ecosystem Value

In addition to the agricultural value, the land the Project will be located on provides habitat and ecosystem value. The Project site is primarily characterised by cattle property used for grazing purposes. The site has previously been extensively cleared for agricultural purposes. The Baralaba region is dominated by the Dawson River floodplain, with relatively flat ground.

In assessing the ecosystem value provided by the Project site, estimates of ecosystem value per hectare for grass/ rangelands from Costanza *et al* (2014) have been applied to the approximately 1,300-hectare disturbance area (excluding food production, as this is captured in the value of agricultural production above), converted to Australian dollars (RBA, 2023) and inflated to 2023 prices (ABS, 2023i). This provides an estimated ecosystem value of \$5,665/ha per annum.

The ecosystem value for grass/ rangelands has been applied as this category from Costanza *et al* (2014) most closely reflects the type of biome the Project will be located. The 2014 study builds previous work undertaken by Costanza *et al* in 1997 which is referenced in the 2014 study. Values from Costanza *et al* (2014) used in this assessment provide a measure of the value of the Project site in terms of a range of ecosystem services. The 1997 study outlines that this includes the following:

- Providing habitat and refuge for flora and fauna.
- Regulation, control and cycling of chemicals, gas and nutrients in soil and the atmosphere.
- Erosion, sediment and waste treatment and control.
- Water regulation and supply.
- Recreation and cultural values.

The timeline for the habitat and ecosystem value lost has been assumed to follow the timeline for the lost agricultural production above. To be conservative, the annual ecosystem value has been assumed to be removed in full on an ongoing basis throughout construction and operations of the Project, despite the progressive (and post-mining) rehabilitation on the Project site. The ecosystem value is assumed to incrementally return to 75% of its original ecosystem value over a ten-year period as a result of post-mining rehabilitation works.

8.2.1.7 Cost of Greenhouse Gas Emissions

Estimated of total greenhouse gas emissions generated by the Project are outlined in the corresponding Air Impacts section of the EIS and the supporting Air Quality Assessment (Trinity, 2023). This CBA has included estimates of

scope 1 emissions (direct associated with clearing vegetation, fugitive gas emissions, fuel combustion on-site and off-site) and scope 2 emissions (indirect associated with electricity consumption for the purpose of the Project). The Project is estimated to produce a total of approximately 3,584 kt CO₂-e emissions over its 23-year lifespan.

In valuing the cost of emissions, an average price for Australian Carbon Credit Units (ACCUs) was used. Over the twelve months from April 2022 to March 2023, the generic ACCU spot price varied between \$30.0 per t CO₂-e and \$40.0 per t CO₂-e (Clean Energy Regulator, undated). For the purpose of this study, the average price of \$35.0 per t CO₂-e has been assumed. This price was applied to annual t CO₂-e produced by the Project to provide the total value of additional GHG emissions resulting from the Project each year.

8.2.1.8 Costs from Increased Travel

The Project will generate additional transport movements than would otherwise occur without the Project 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 are generated by the Project during construction and operation were developed by Stantec (2023).

It is assumed that all workers are using light vehicle (with an occupancy of 1.2 persons per vehicle) to travel to the Project site from their original destination. Workforce shift changes are considered to be from Baralaba workforce accommodation camp to the Project site, whilst workforce roster changes are considered to be from an airport or hometown to the workforce accommodation camp.

Construction and operations are assumed to operate 24/7 over 335 days each year to account for unfavourable weather conditions. Construction and operation peak one-way trips per day for a list of outlined activities are summarised in Table 8.1.

Table 8.1. Project Traffic Generation Summary

Item	Travel From	To	Typical Vehicle	Peak Trips per Day (One way)	
				Construction	Operation
Deliveries – parts, explosives, waste	Gladstone/ Rockhampton	Mine	Class 9 truck	2	3
Oversized loads	Gladstone/ Rockhampton	Mine	Low loader	1	1
Other deliveries - Small Trucks	Gladstone/ Rockhampton	Mine	Class 3 truck	5	5
Fuel	Gladstone/ Rockhampton	Mine	B-Double	1	2
Workforce shift change (Local)	Local from North (e.g. Baralaba)	Mine	Light vehicle	23	46
	Local from South (e.g. Banana and Moura)	Mine	Light vehicle	44	86
Workforce (Accommodated by Baralaba Coal)	Baralaba	Mine	Light vehicle	168	326
Workforce roster change (DIDO and FIFO)	West of Site	Baralaba	Light vehicle	4	6
	East of Site (e.g. Rockhampton, Gladstone, Biloela)	Baralaba	Light vehicle	44	66
Coal haulage	Mine	TLO	ABB-Quad Type 2 Road Train	-	49
Total	-	-	-	292	590

Source: Stantec (2023)

In developing the annual estimates of vehicle movements, the following approach was undertaken:

- For construction, the peak annual FTE estimate was assumed to correspond with the peak construction vehicle movements. The number of vehicle movements for the second year of construction was estimated based on the difference in FTEs from the peak year.
- For operation, the peak year of operations labour is assumed to correspond to the peak operation workforce vehicle demand. The peak year of production is assumed to correspond to the peak deliveries and coal haulage demands. The number of vehicle movements for the other years of operation were estimated based on the difference in FTEs and production level from the peak year.

Estimates of the total vehicle kilometres travelled each year were developed based on the following assumptions (Google Map, 2023):

- Light vehicle movements between:
 - The mine and Baralaba: 8 km each way.
 - The mine and the mid-point between Banana and Moura: 44 km each way.
 - The mine and Baralaba Workforce Accommodation Camp: 8 km each way.
 - Baralaba Accommodation Camp and Raglan (mid-point between Rockhampton and Gladstone): 180 km each way.
 - The Baralaba Accommodation Camp and West of Baralaba (i.e., Woorabind): 42 km each way.
- Heavy vehicle movements between:
 - The mine and Ragland (mid-point between Rockhampton and Gladstone): 186 km each way.
 - The mine and TLO Facility: 44 km each way.

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

- Additional vehicle operating costs comprising additional fuel and vehicle maintenance costs.
- Additional road damage costs.
- Road safety costs due to increased travel.

These costs are examined below.

Additional Fuel and Vehicle Maintenance Costs

Estimated fuel costs for road traffic were based on the price for diesel in Banana (used for heavy vehicles and buses) of approximately 227.0c/L and for unleaded petrol (used for light vehicles) of approximately 209.90c/L on 12 October 2023 (PetrolSpy, 2023). GST of 10% and fuel excise rate of 48.80c/L (ATO, 2023) were subtracted from these prices to provide the resource cost for diesel and unleaded petrol. The amount of diesel used per kilometre were estimated at 0.32 litre per kilometre (L/km), 0.76L/km and 0.24L/km for rigid truck, articulated truck and non-freight carrying truck respectively. While it is estimated 0.12 litre of unleaded used per kilometre for light vehicles (ABS, 2020).

Additional maintenance costs for road vehicles were estimated based on ATAP (2016) and adjusted for inflation between June 2013 and June 2023 (ABS, 2023i).

Table 8.2. Vehicle Repair and Maintenance Costs (c/km)

Vehicle	Cost (c/km)
Car – Average	7.9
Rigid Truck – Light (2 axle, 4 tyre)	7.7
Articulated Truck – 5 axles	27.9
Combination Vehicle – Rigid (3 axle) + dog trailer (5 axle)	31.7
Combination Vehicle – B-Double	33.3
Combination Vehicle – A B combination	43.6

Source: ATAP (2016)

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

Additional Road Damage Costs

Additional road damage costs for road vehicle were estimated based on Transport for NSW (TfNSW, 2020) and adjusted for inflation between June 2019 and June 2023 (ABS, 2023i).

Table 8.3. Road Damage Costs (c/km)

Vehicle	Cost (c/km)
Cars and Motorcycles	5.18
Rigid Truck – Light	5.18
Articulated Truck – 5 axles	19.55
Combination Vehicle – Rigid 3 axle plus trailer	19.41
Combination Vehicle – B-Double	29.77
Combination Vehicle – A B combination	33.50

Source: TfNSW (2020)

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

Road Safety Costs

The increased travel is expected to result in higher risk of road crashes. The Traffic Impact Assessment (Stantec, 2023) outlines the primary routes anticipated to be used following the construction and operations of the Project. Road surface (i.e., sealed or unsealed), division (i.e., divided or undivided) and width were identified for each route to determine the average crash rates per 100 million vehicle kilometres travelled on non-urban roads using the data from ATAP (2016).

The average crash rates were estimated as follow:

- 1.05 persons per 100 million kilometres travelled resulting in fatality.
- 20.06 persons per 100 million kilometres travelled resulting in injuries.
- 30.60 persons per 100 million kilometres travelled resulting in property damage only.

The following values per crash types were used, based on the value estimates from ATAP (2016) and adjusted for inflation to June 2023 dollar terms (ABS, 2023i).

- 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 \$2.86 million per person.
- Injury crashes: approximately \$660,000 per person.
- Property damage crashes: approximately \$11,000 per person.

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

8.2.2 Benefits

8.2.2.1 Revenue from Operations

Assumptions used for estimating revenues supported by the Project are summarised in section 3.2.2. In total, the Project is estimated with revenues of approximately \$9.13 billion during steady state operations.

8.2.2.2 Benefits to Employees

The Project will directly provide employment for Queenslanders through mining operational activities. The value of these jobs can be measured in terms of the employee compensation that they support. The Project's operational activities are estimated to support a total of approximately \$333.50 million in employee compensation over its lifespan during steady state operations.

Employment benefit is the net of wages and salaries labour receives, income tax paid by individuals and the opportunity cost to these individuals for their time. The opportunity cost is often valued based on the alternative income labour would receive without the Project, through alternative employment or social security payments. For the purpose of this study, it was assumed that 25% of the wages and salaries paid to operations employee represents a net benefit to these individuals as opposed to the base case.

8.2.3 Impacts that Have Not Been Quantified

The following potential benefits and costs of the Project have not been quantified for inclusion in the CBA due to data limitations:

- Potential impacts on business from project impacts on surface water and groundwater, as any potential impacts on business and industry are anticipated to be minimal as outlined in section 5.3.2.
- Potential social amenity impacts from the development and operation of the Project, such as noise and dust. These costs have not been included in consideration of the Project location. The Project is located in cattle grazing area and the nearest township to the Project (Baralaba) is located approximately eight kilometres from the Project site. The potential impacts of the Project on noise and air quality are examined in the Noise Impact Assessment (AARC, 2023) and Air Quality and Greenhouse Assessment (Trinity, 2023).
- Potential impacts from increased traffic volumes (road and rail) in terms of potential implications on travel times for local traffic or impacts to safety. The Traffic Impact Assessment outlines that the Project key haulage route – Moura-Baralaba Road is anticipated to remain under-occupied, with at least 77% spare capacity after accounting for the Project's proposed generated traffic (Stantec, 2023). No issue was found to be associated with the proposed project intersections (i.e., the intersection forms and accesses) through to 2030, however treatments were advised to improve road safety and accommodate the proposed ABB-Quad road trains. Key project risks on road safety were identified to primarily relate to coal haulage between the mine and the TLO. Update of existing management plans (including the school bus interaction management plan, stock movement interaction management plan, transport management plan, and road asset management plan) was advised to reflect the proposed haulage characteristics of the Project as outlined in the Traffic Impact Assessment.

8.3 CBA RESULTS

The table below presents the PV of the identified costs and benefits associated with the Project, between the financial year ended June 2029 and June 2128, at a discount rate of 4%, 7% and 10%. In the scenario of the highest discount rate (i.e., 10%), the Project is estimated to deliver positive net benefit of approximately \$432.0 million, returning \$1.25 of benefit for every dollar of cost spent (i.e., BCR of 1.25).

Table 8.4. Summary CBA Results of Baralaba South Project Impacts to Queensland

Impact	PV (\$M) – 4% Discount Rate	PV (\$M) – 7% Discount Rate	PV (\$M) – 10% Discount Rate
Costs			
Initial Construction Cost	\$127.30	\$109.37	\$94.38
Lifecycle/ Sustaining Capital Costs	\$34.79	\$22.81	\$15.56
Operating/ Maintenance Costs	\$3,265.41	\$2,163.61	\$1,489.50
Decommissioning/ Rehabilitation Costs	\$44.51	\$26.14	\$16.31
Value of Lost Agricultural Production	\$1.68	\$1.01	\$0.68
Impact on Ecosystem Value	\$119.24	\$71.90	\$47.94
Cost of Greenhouse Gas Emissions	\$66.13	\$43.29	\$29.52
Increased Cost of Transport	\$104.40	\$69.08	\$47.61
Total Costs	\$3,763.49	\$2,507.22	\$1,741.49
Benefits			
Revenue from Operations	\$4,791.70	\$3,109.40	\$2,097.19
Employee Benefits	\$174.90	\$113.46	\$76.48
Total Benefits	\$4,966.61	\$3,222.85	\$2,173.67
Summary			
Net Present Value (NPV)	\$1,203.12	\$715.63	\$432.18
Benefit Cost Ratio (BCR)	\$1.32	\$1.29	\$1.25

Source: AEC

8.4 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 8.2).

Each of the assumptions has been tested in isolation with all other inputs held constant, with the results reported in Table 8.5 in terms of the modelled change in NPV resulting from the variance in the base assumptions at a discount rate of seven percent. 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 ten percent confidence interval, with the “five percent” and “95 percent” representing a 90 percent probability that the distribution and NPV will be within the range outlined in the table.

The table shows that, at a discount rate of seven percent, there is a 90 percent probability the Baralaba South Project will provide an NPV between \$53.0 million and \$1,302.9 million. The Project is most sensitive to the revenues delivered. Sensitivity testing returned a positive NPV across 96.3% of the 5,000 iterations run in Monte Carlo analysis.

Table 8.5. Sensitivity Analysis Summary, Discount Rate 7%

Variable	NPV (\$M)	
	5%	95%
Costs		
Initial Construction Cost	\$650.2	\$711.0
Lifecycle/ Sustaining Capital Costs	\$656.6	\$699.2
Operating/ Maintenance Cost	\$315.6	\$1,006.5
Decommissioning/ Rehabilitation Costs	\$655.9	\$692.7
Value of Lost Agricultural Production	\$655.4	\$699.6
Impact on Ecosystem Value	\$633.4	\$731.7
Cost of Greenhouse Gas Emissions	\$651.7	\$699.9
Increased Cost of Transport	\$645.1	\$734.3
Benefits		
Revenue from Operations	\$132.9	\$1,228.0
Employee Benefits	\$656.4	\$698.4
Combined	\$53.0	\$1,302.9

Notes: The percent distributions used for each variable are provided below:

- Initial construction costs: maximum 30% higher, minimum 20% lower.
- Lifecycle/ sustaining capital costs: maximum 30% higher, minimum 20% lower.
- Operating/ maintenance costs: maximum 30% higher, minimum 20% lower.
- Decommissioning/ rehabilitation costs: maximum 30% higher, minimum 20% lower.
- Value of lost agricultural production: normally distributed with standard deviation of 0.2.
- Impact on ecosystem value: normally distributed with standard deviation of 0.2.
- 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.
- Revenue from operations: normally distributed with standard deviation of 0.1.
- Employee benefits: normally distributed with standard deviation of 0.1.

Source: AEC.

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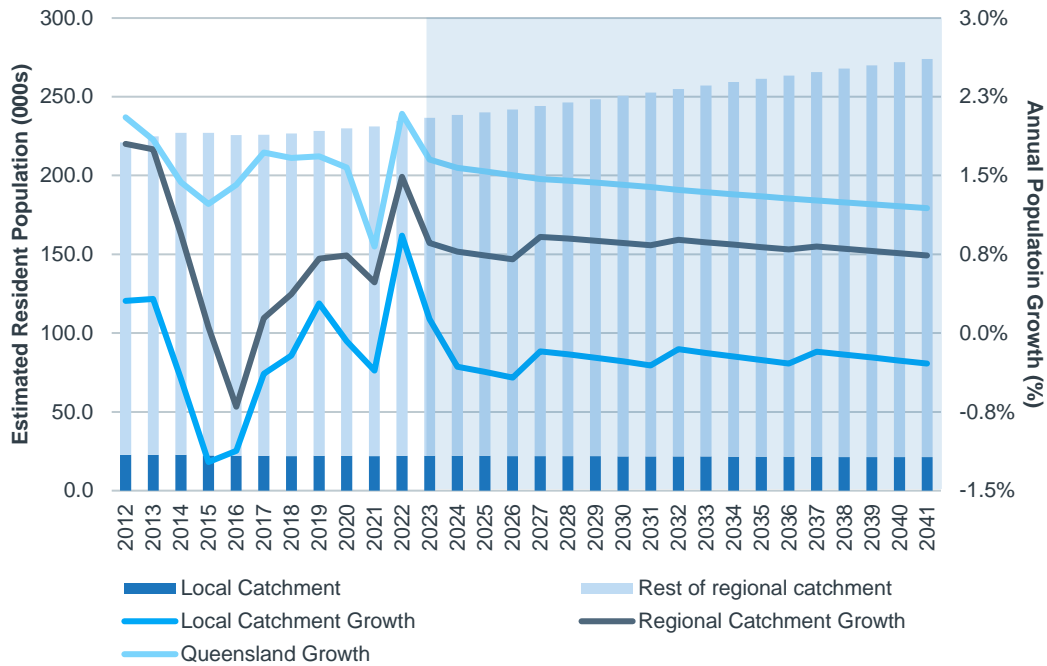
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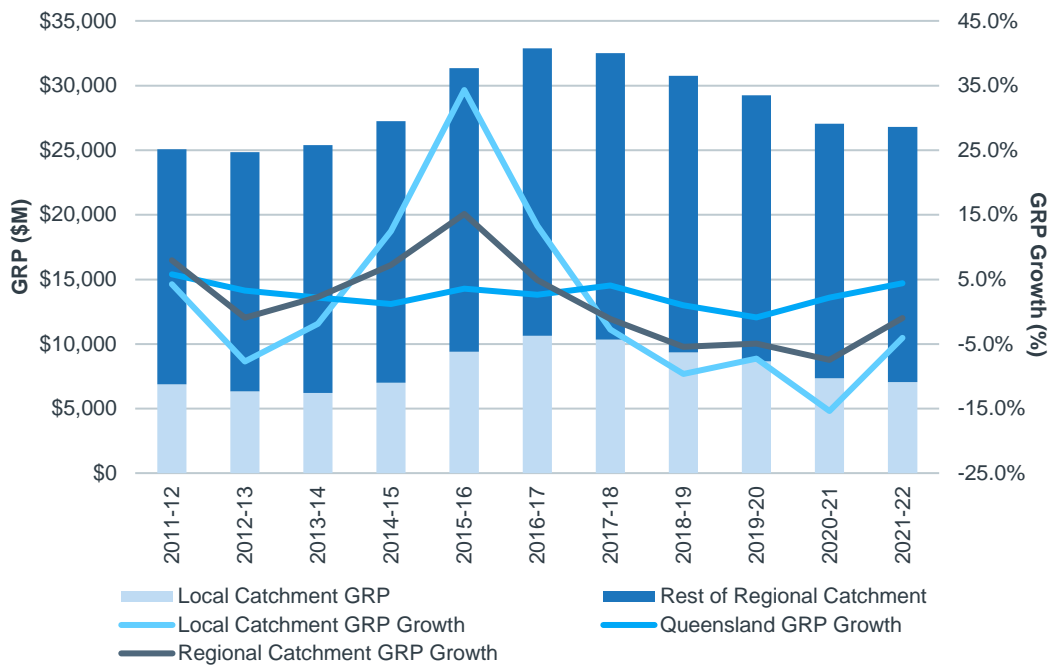
APPENDIX A: SOCIO-ECONOMIC OVERVIEW

Figure A. 1. Historical and Projected Population, 2012-2041



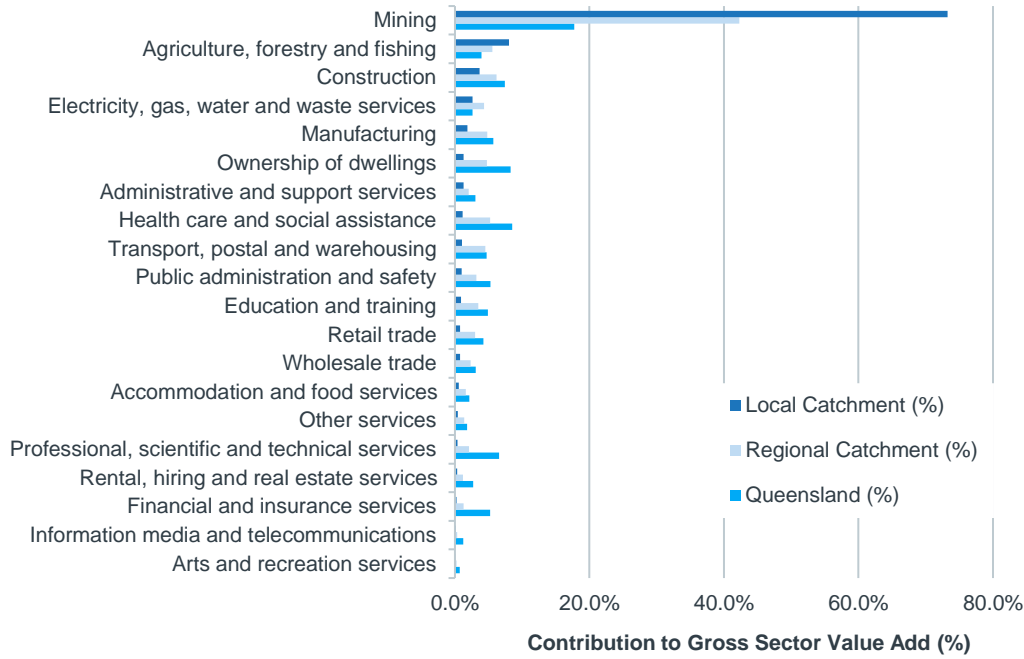
Source: ABS (2023a), QGSO (2023a)

Figure A. 2. Gross Regional Product 2011-12 to 2021-22 (Chain Volume Measure)



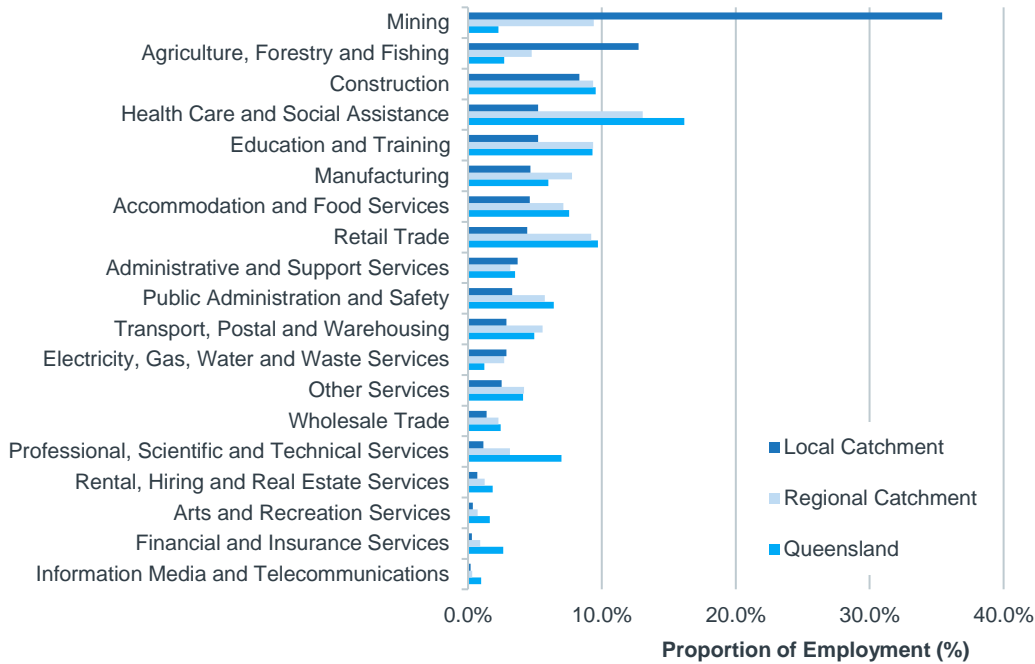
Source: AEC (unpublished)

Figure A. 3. Industry Share of Total Industry Gross Value Added (GVA), 2021-22



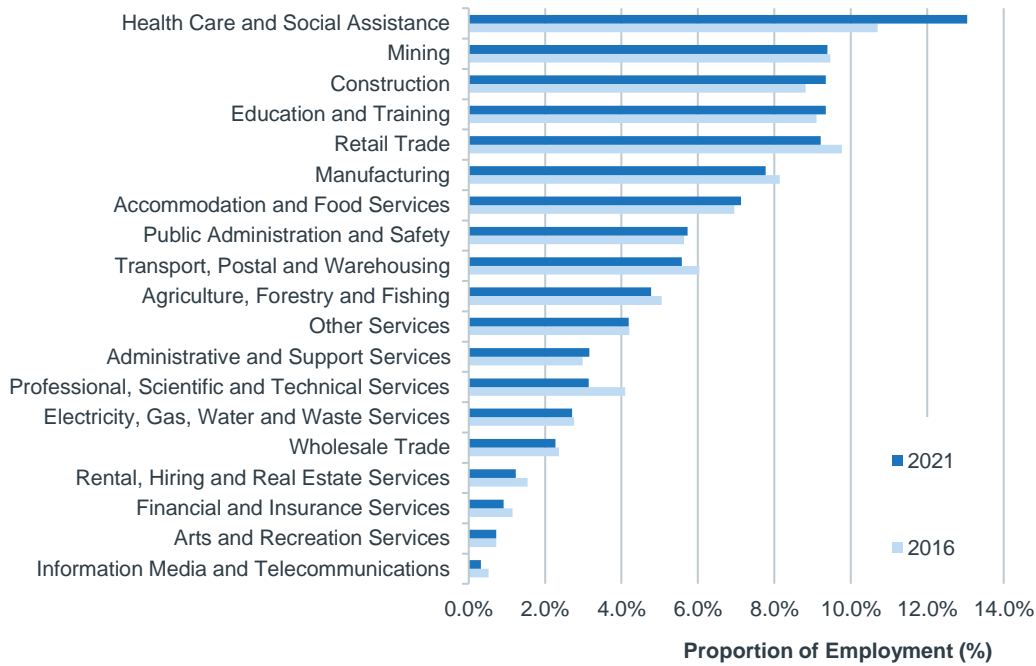
Source: AEC (unpublished)

Figure A. 4. Employment by Industry by Place of Work, 2021



Source: ABS (2022b)

Figure 8.1. Regional Catchment’s Employment by Industry by Place of Work, 2016 and 2021



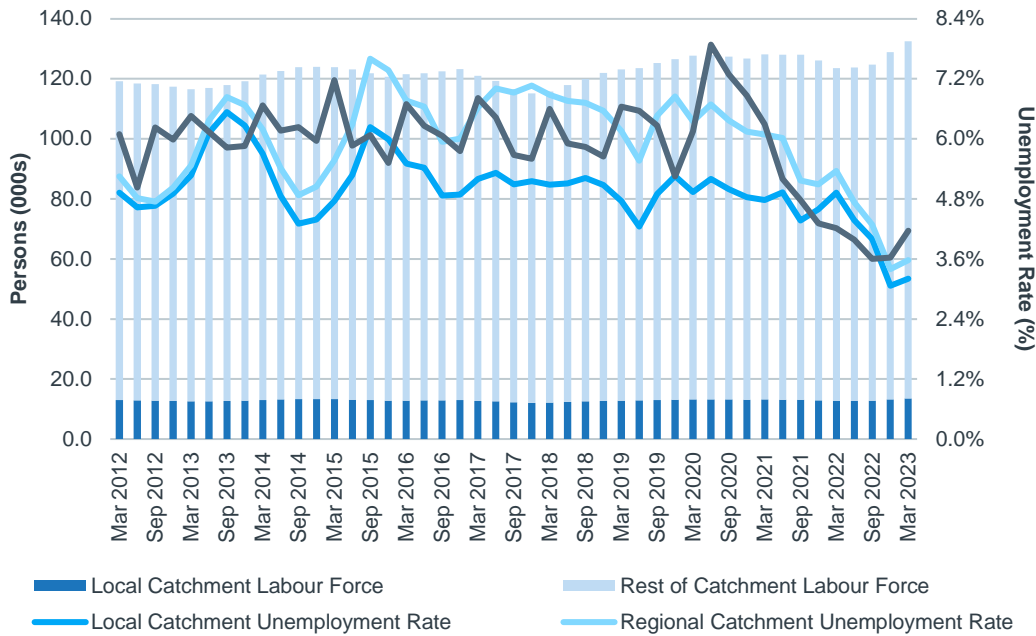
Source: ABS (2022b)

Table A. 1. Saleable Coal Production (Tonnes)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Local Catchment	51,382,212	49,281,661	52,298,025	50,685,427	49,600,722	42,537,612
Regional Catchment	69,460,058	65,545,527	70,762,939	69,758,243	66,973,731	59,303,078
Local Catchment Change	1.99%	-4.09%	6.12%	-3.08%	-2.14%	-14.24%
Regional Catchment Change	-0.81%	-5.64%	7.96%	-1.42%	-3.99%	-11.45%

Source: Queensland Government (2022a)

Figure A. 5. Labour Force and Unemployment



Source: ABS (2023b), Jobs and Skills Australia (2023)

Table A. 2. Journey to Work by Job Location, Local Catchment, 2021

Industry	Live and Work in Local Catchment	Work in Local Catchment, Live Elsewhere	Live in Local Catchment, work elsewhere
Agriculture, Forestry and Fishing	1,805	151	53
Mining	2,019	3,432	122
Manufacturing	562	140	2
Electricity, Gas, Water and Waste Services	334	104	9
Construction	517	759	31
Wholesale Trade	164	44	7
Retail Trade	638	41	0
Accommodation and Food Services	604	107	13
Transport, Postal and Warehousing	328	110	18
Information Media and Telecommunications	20	12	6
Financial and Insurance Services	44	0	12
Rental, Hiring and Real Estate Services	78	31	0
Professional, Scientific and Technical Services	167	10	7
Administrative and Support Services	348	220	6
Public Administration and Safety	456	52	3
Education and Training	785	21	15
Health Care and Social Assistance	723	84	33
Arts and Recreation Services	44	10	0
Other Services	302	83	22
Total	9,937	5,411	359

Source: ABS (2022b), ABS (2023c, d)

Table A. 3. Journey to Work by Job Location, Regional Catchment, 2021

Industry	Live and Work in Local Catchment	Work in Regional Catchment, Live Elsewhere	Live in Regional Catchment, work elsewhere
Agriculture, Forestry and Fishing	4,978	176	173
Mining	7,393	2,749	1,470
Manufacturing	8,231	167	63
Electricity, Gas, Water and Waste Services	2,815	109	28
Construction	9,120	977	464
Wholesale Trade	2,435	22	48
Retail Trade	9,574	375	96
Accommodation and Food Services	7,414	286	72
Transport, Postal and Warehousing	5,780	247	134
Information Media and Telecommunications	343	3	17
Financial and Insurance Services	971	17	27
Rental, Hiring and Real Estate Services	1,290	47	60

Industry	Live and Work in Local Catchment	Work in Regional Catchment, Live Elsewhere	Live in Regional Catchment, work elsewhere
Professional, Scientific and Technical Services	3,260	138	124
Administrative and Support Services	3,228	183	155
Public Administration and Safety	6,066	124	88
Education and Training	9,929	162	54
Health Care and Social Assistance	13,763	327	182
Arts and Recreation Services	757	29	9
Other Services	4,428	99	67
Total	101,774	6,239	3,332

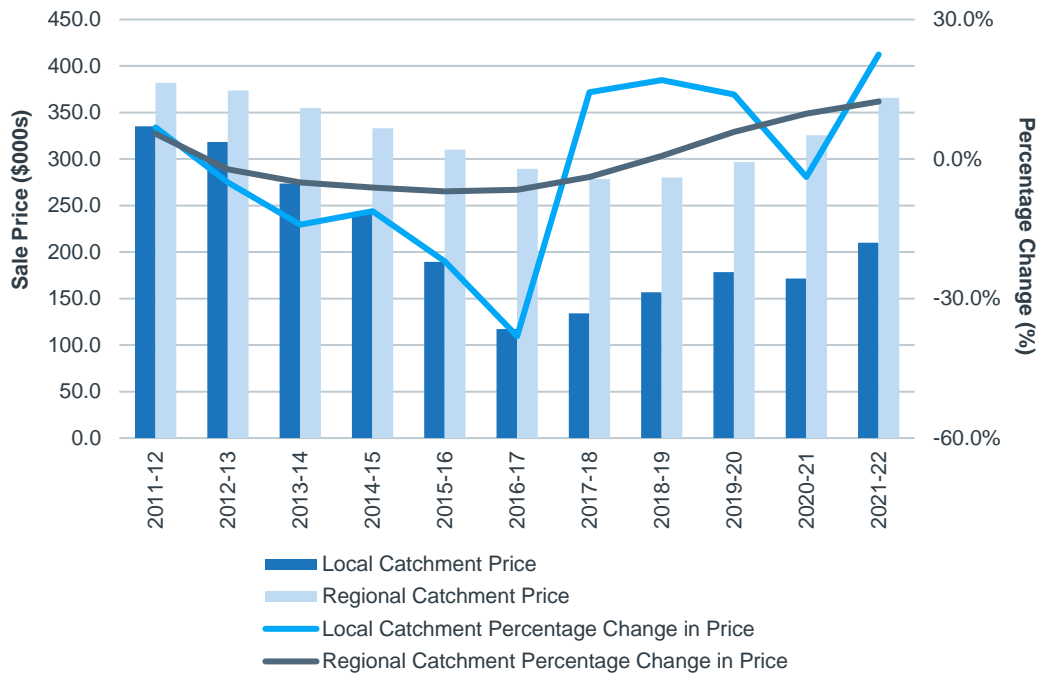
Source: ABS (2022b), ABS (2023c, d)

Table A. 4. Average Income by Industry (weekly \$), 2021

Industry	Local Catchment	Regional Catchment	Queensland
Agriculture, Forestry and Fishing	\$1,123.86	\$1,141.01	\$1,072.98
Mining	\$2,413.49	\$2,441.10	\$2,416.61
Manufacturing	\$1,505.59	\$1,661.89	\$1,356.55
Electricity, Gas, Water and Waste Services	\$2,275.70	\$2,056.07	\$2,015.73
Construction	\$1,862.83	\$1,533.89	\$1,477.58
Wholesale Trade	\$1,724.30	\$1,536.42	\$1,465.80
Retail Trade	\$759.54	\$780.46	\$876.37
Accommodation and Food Services	\$782.68	\$642.74	\$683.64
Transport, Postal and Warehousing	\$1,675.04	\$1,749.35	\$1,428.75
Information Media and Telecommunications	\$1,284.90	\$1,228.13	\$1,535.13
Financial and Insurance Services	\$1,178.96	\$1,475.23	\$1,794.50
Rental, Hiring and Real Estate Services	\$1,653.81	\$1,334.48	\$1,522.87
Professional, Scientific and Technical Services	\$1,336.06	\$1,448.69	\$1,754.90
Administrative and Support Services	\$1,524.46	\$1,176.34	\$1,073.89
Public Administration and Safety	\$1,280.57	\$1,541.16	\$1,683.85
Education and Training	\$1,254.43	\$1,335.70	\$1,377.41
Health Care and Social Assistance	\$1,230.32	\$1,295.07	\$1,385.41
Arts and Recreation Services	\$1,015.53	\$792.26	\$1,018.39
Other Services	\$1,305.51	\$1,043.84	\$1,068.75
Average weekly income (total)	\$1,722.59	\$1,406.95	\$1,344.82

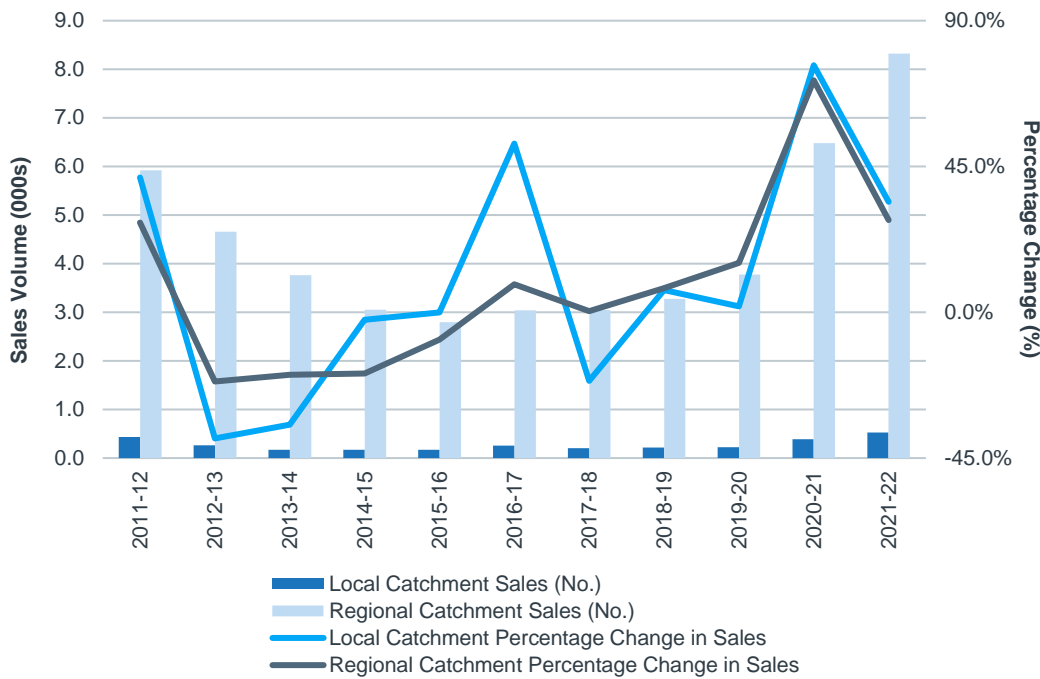
Source: ABS (2022b)

Figure A. 6. Property Price and Percentage Changes



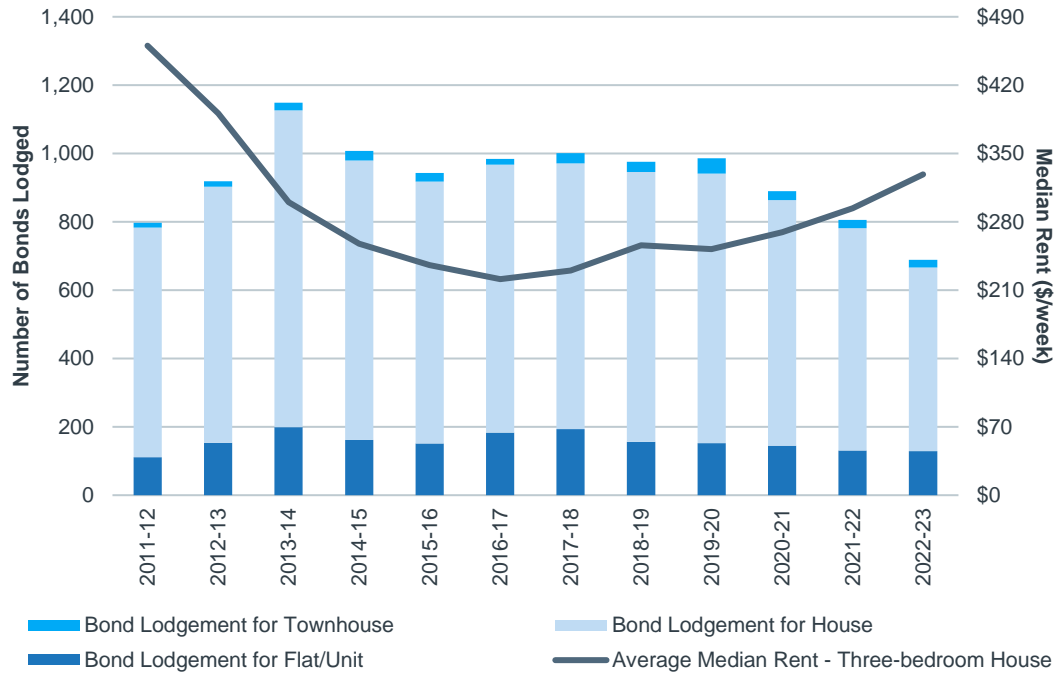
Source: QGSO (2023b)

Figure A. 7. Residential Sales Volume and Percentage Change



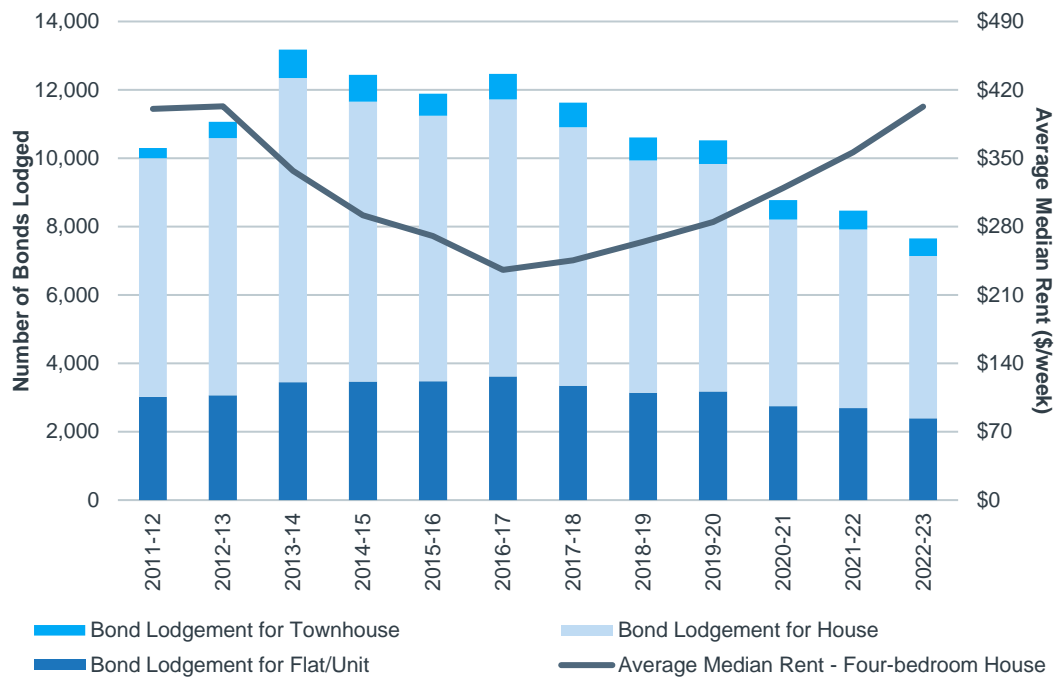
Source: QGSO (2023b)

Figure A. 8. Bond Lodgements (Total) and Average Weekly Rental Prices for Three-bedroom Houses, Local Catchment



Source: QGSO (2023c)

Figure A. 9. Bond Lodgements (Total) and Average Weekly Rental Prices for Four-bedroom Houses, Regional Catchment



Source: QGSO (2023c)

Table A. 5. Residential Building Approvals Values and Volume, 2016-17 to 2022-23

	Local Catchment	Regional Catchment	Queensland
Residential Values (\$000's)			
2016-17	15,700	198,925	14,017,421
2017-18	4,633	166,450	13,920,857
2018-19	11,540	149,000	11,880,711
2019-20	10,504	215,882	11,430,104
2020-21	10,689	458,699	16,199,030
2021-22	15,892	381,122	17,206,637
2022-23 (As at May 2023)	18,009	343,633	17,496,241
Average Annual Growth (2016-17 to 2021-22)	0.24%	13.89%	4.19%
Residential Volume (No.)			
2016-17	41	641	43,217
2017-18	10	488	43,167
2018-19	25	383	33,300
2019-20	17	503	30,482
2020-21	30	866	41,977
2021-22	19	718	38,483
2022-23 (As at May 2023)	50	633	32,059
Average Annual Growth (2016-17 to 2021-22)	-14.26%	2.29%	-2.29%

Source: ABS (2023e)

Table A. 6. Current List of Major Projects

Project	Description	Cost	Construction Timing
Local Catchment			
Blackwater South Coking Coal project	A proposed open cut coal mine and associated infrastructure in the Bowen Basin, extracting up to 8 million tonnes of product coal per year for approximately 90 years, for steel production. Employment: 500 - 750 (construction) and 1,200 (operational)	\$1,000	2029-N/A
Mackenzie Coal Project	A coal resource project locating on the existing Blackwater railway line to Gladstone with potential for export. The project is currently shelved.	N/A	TBD
Minyango Coal Project stage 1	An underground coal mine with a capacity of up to 9 million tonnes per annum (run of mine coal), contributing up to 7 million tonnes per annum for export.	\$750	2021-2024
Gemini Project	A greenfield open-cut metallurgical coal resource with a capacity of up to 1.9 million tonnes per annum run-of-mine over a 25-year lifespan.	\$250	2024-2027
Callide Wind Farm	A proposed wind farm project with an estimated capacity of up to 430 MW across a 30-year lifespan.	\$900	2024-2026
Specimen Hill Wind Farm	A proposed wind farm with a capacity of up to approximately 336 MW across a lifespan of 25+ years. Employment: 250-350 (construction) and 15-30 (operational)	\$806.20	2023-2024
Baralaba Solar Farm	A proposed wind farm project with an estimated capacity of up to 100 MW. This project is currently inactive.		2024-2026
Dingo Solar Farm	A solar farm project with an estimated capacity of up to 85 MW supplying power to 35,000 households.	\$140	2024
Bluff Solar Farm	A solar farm project with up to 100 MW capacity is currently shelved. Employment: approximately 300 (construction) and 2-6 (operational).	\$160	2024-2026

Project	Description	Cost	Construction Timing
Banana Range Wind Farm	A wind farm project with an estimated capacity of up to 230 MW. Stage 1 is currently in development. Planning approvals are being sought for Stage 2. Employment: 150-200 (construction) and 10-15 (operational)	\$500	2024-2026
Smoky Creek Solar Power Station	The power station will have a maximum generation capacity of approximately 1.2 million MWh per year, which will feed into the Powerlink Queensland (PLQ) Calvale to Stanwell 275kV transmission lines, providing green power to over 206,000 homes. Employment: up to 350 (construction) and 10 (operational)	\$550	2024-2025
Boulder Creek Wind Farm	A proposed wind farm with a capacity of up to approximately 372 MW. Employment: 250-350 (construction) and 10-20 (operational)	\$765.10	2023-2025
Mount Hopeful Wind Farm	A proposed wind farm with a capacity of up to approximately 350 MW across a lifespan of minimum 25 years. Employment: 220+ (construction) and 8-12 (operational)	\$750	2024-2026
Rest of Catchment			
Gregory Crinum M-Block	A proposed extension to the east of Gregory Crinum Mine, including both open-cut and underground mining. The extension will extend the operations for up to 20 years.	N/A	N/A
Ensham Life of Mine extension project	A proposed extension to the west of the existing underground mining of the Ensham Mine to increase the lifespan of the current mine by up to nine years, which can deliver up to 38 million tonnes of thermal coal. The project will support the existing operational workforce (603) until 2035 instead of 2028.	N/A	N/A
Valeria Met Coal Mine	A greenfield open-cut metallurgical and thermal coal resource project with the capacity of up to 20 million tonnes per year over a life of 37 years. Employment: 1,400 (construction) and 1,250 (operational)	\$1,500	2024-2026
Springsure Creek coal mine project	A greenfield underground thermal coal mine with a capacity of up to 11 million tonnes per year. Employment: up to 350 (construction), 585 (operational). The project is currently shelved.	\$1,194	N/A
Wilton Fairhill Project	A greenfield open-cut metallurgical (steelmaking) coal resource project with an initial expected lifespan of 10 years with potential for extension to over 20 years. Employment: 130 (operational)	\$250	2023
Rolleston Expansion	A proposed extension to the existing Rolleston Coal Mine to increase the approved production from 14 million tonnes per annum run-of-mine coal to up to 19 million tonnes per annum with an extended life of approximately 30 years.	\$400	2022-2025
Arrow Bowen Pipeline	The project includes the construction and operation of a 580km high pressure gas pipeline conveying coal seam gas in the Bowen Basin to a liquefied natural gas plant on Curtis Island near Gladstone. Currently considered shelved because of the postponement in developing the Bowen Basin coal seam gas project.	\$1,207	N/A
Bowen Gas Project (includes Blackwater and Norwich Park CSG fields)	Proposed buried high-pressure steel pipeline from the Bowen Basin to a gas hub 22km west of Gladstone, where it will join the proposed Surat Pipeline. Employment: 700 (con); 10 (op).	\$500	N/A
Aldoga Solar Farm	The solar farm can provide a maximum capacity of 445 MW that will feed directly into the existing on-site Larcom Creek Terminal Substation. Employment: up to 350 (construction) and 10 (operational)	\$500	2023-2025

Project	Description	Cost	Construction Timing
Central Queensland Hydrogen project	A proposed staged renewable hydrogen production and export facility with three gigawatts (GW) of electrolyser capacity, targeting the production of 900 tonnes of hydrogen per day by 2031. At its peak, the project can support more than 8,900 jobs and deliver \$17.2 billion to the hydrogen export over the lifespan of 30 years.	\$2,000	2027-2031
Rodds Bay Solar Farm	An announced 300-megawatt solar farm. Employment: more than 300 (construction). The project is inferred to be currently shelved.	\$350	N/A
Gregory Solar Farm	A solar farm project with a capacity of 215 MW.	N/A	2022-2023
Gladstone LNG Upstream Field Development (Sustaining)	An integrated liquefied natural gas (LNG) project.	\$990	2021-2023
Bouldercombe Solar Farm	A announced solar farm project with a capacity of 280 MW.	\$475.90	2022-2024
Rolleston Solar Farm	A proposed 90 MW solar farm with 300,000 tracker mounted solar photovoltaic panels	\$140	2025-2027
Raglan Solar	An announced ground-mounted solar park with a total capacity of 300 MW.	\$327	2022-2024
H2-Hub™ Gladstone project	An industrial-scale green hydrogen and ammonia production complex at Yarwun in the Gladstone State Development Area. Employment: 550 (construction) and 140 (operational).	\$4,700	2025-N/A
Bouldercombe Battery Project	A battery project with a capacity of 50MW/100 MWh (with 2 hours storage depth) that will be able to power up to 4,167 homes.	\$100	2021-2023
Biorefinery	A project that produces renewable diesel and sustainable aviation fuel. Employment: 60 (construction and operational)	\$500	2023-N/A
Gladstone Nickel	A nickel/cobalt refinery project in Gladstone. Employment: 2,600 (construction) and 1,130 (operational)	\$3,650	N/A
Alpha HPA Facility – Stage 2	The second stage of the HPA refinery project in Gladstone. Employment: more than 300 (construction) and 120 (operational)	~\$300	N/A
Queensland Beef Corridors	Sealing of over 150 kilometers of key agricultural products transport corridors across Central Queensland to increase efficiency and eliminate unnecessary logistical costs created by substandard roads.	\$134	N/A
Rookwood Weir Project	A landmark project that will ultimately generate intensive agricultural industry development along with supporting urban and industrial growth and water security. Employment: 100 (construction).	\$352	2020-2023
Fitzroy To Gladstone Pipeline	A 117-kilometre pipeline will run from the Lower Fitzroy River in Rockhampton and connect to Gladstone Area Water Board's existing water network at Yarwun. Employment: 190-200 (construction)	\$983	2023-2026
Bruce Highway - Rockhampton Ring Road (North & South Packages)	The project for Rockhampton is to bypass 18 sets of traffic lights with four new lanes through the Bruce Highway in order to address congestion in the area	\$1,065	2023-2026
Port of Gladstone Gatcombe and Golding Cutting Channel Duplication Project	Duplication of the existing Gatcombe and Golding Cutting shipping channels to allow for improved two-way passage by deepening and widening the existing channels. This will allow passage for larger vessels under all weather and tidal conditions.	\$760	2023-2026

Project	Description	Cost	Construction Timing
Shoalwater Bay Military Training Area – Remediation Project	A project that will sustain the training area for continued military use. The works include the construction of urban operations training facilities, information and communication technology infrastructure, waste management and medical facilities across the expanded SWBTA	\$135	2020-2024

Source: QMCA (2022), CSQ (2023), State Development (2023a, b), Queensland Government (2020, 2021b, 2022b, 2023a, b, c, d, e, f, g), AEC (2022), IESC (2022), Power Technology (2021, 2023), Glencore (2023), Global Energy Monitor Wiki (2022), Arrow Energy (2023), ACCIONA (2020, 2021), Australia New Zealand Infrastructure Pipeline (2020), PV Magazine (2020), Advance Rockhampton (2023), Alpha HPA (undated), Genex (undated), Defence (undated), SunWater (2023), Building Queensland (2017), Gladstone Area Water Board (2022), Gameng (2023), Bowen Coking Coal (2022), Magnetic South (undated), DP Energy (undated), Russo (2022), Banana Shire Council (2023), Bluff Solar Farm Pty Limited (2017), OX2 (2023), EDF Renewables (2023), Edify (2023), Boulder Creek Wind Farm (2023), Mount Hopeful Wind Farm (2023).

APPENDIX B: CGE METHODOLOGY

MODEL OVERVIEW

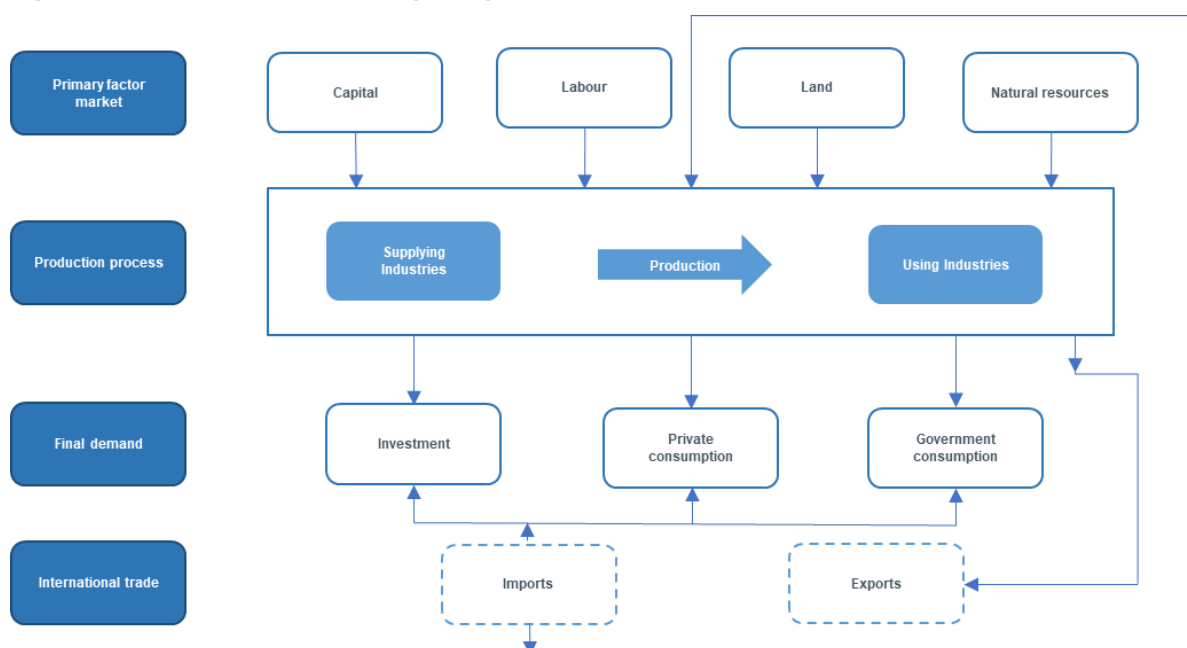
Computable General Equilibrium (CGE) economic models represent the workings of the economy through a system of interdependent behavioural and accounting equations linked to an input-output database.

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 Project on the regional catchment, Queensland 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 manufacturing activity for 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 (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 the Queensland 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% per annum. In the ‘base case’, Australian labour productivity growth is to be at a slightly lower rate of 1.3% per annum.

Table B.1. Base Case Economic Growth Assumptions

Region	Average Annual Growth (%)
Queensland	2.0%
Australia	2.9%

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).

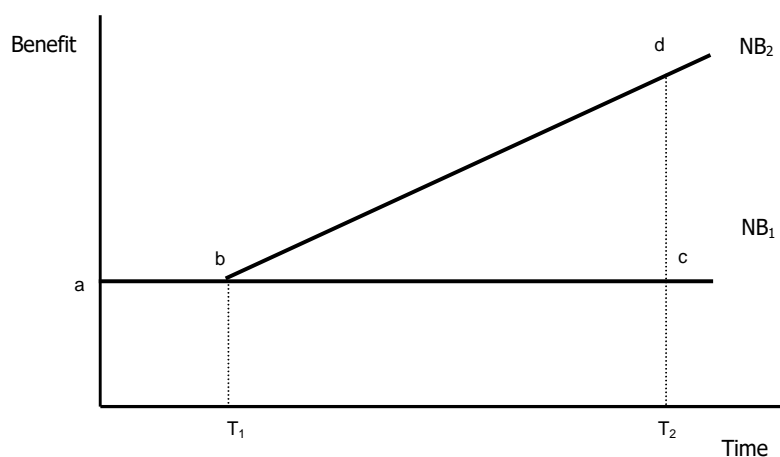
APPENDIX C: CBA METHODOLOGY

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 NB₁ (bc) over time T₁ to T₂ in Figure C.1. The investment in the project at time T₁ is likely to generate a benefit, which is represented by line NB₂ (bd). Therefore, the net benefit flowing from investment in the project is identified by calculating the area (bcd) between NB₁ and NB₂.

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 Queensland 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:

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

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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OUTCOME DRIVEN

