MACH Energy

Mount Pleasant Operation

A JOINT VENTURE WITH JCDA Japan Coal Development Australia

Appendix H

Economic Assessment

Resource Strategies

Modification 8

AnalytEcon

Mount Pleasant Operation – Modification 8

Economic Assessment prepared for
MACH Energy Australia Pty Ltd

December 2025

ACN 140 021 450

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Abbreviations

ABS	Australian Bureau of Statistics
ACDF	Aboriginal Community Development Fund
ACCU	Australian Carbon Credit Unit
AGE Consultants	Australasian Groundwater and Environmental Consultants Pty Ltd
AHIP	Aboriginal Heritage Impact Permit
ANREU	Australian National Registry of Emissions Units
AUD	Australian dollar
BMP	Blast Management Plan
CBA	Cost benefit analysis
CIC	Critical Industry Cluster
CER	Clean Energy Regulator
CHPP	Coal Handling and Preparation Plant
CO_2-e	Carbon dioxide equivalent
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EA	Economic Assessment
EA Guidelines	Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals (2015)
EA Technical Notes	Technical Notes supporting the EA Guidelines (2018)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EP&A Act	Environmental Planning and Assessment Act 1979
FTE	Full-time equivalent
GDP	Gross domestic product
GHG	Greenhouse gas
GOS	Gross operating surplus
GRP	Gross regional product
GSP	Gross state product

GWMP	Groundwater Management Plan
ha	Hectare
IO	Input-output
kcal/kg	Kilocalorie per kilogram
km	Kilometre
LEA	Local effects analysis
LGA	Local government area
LQ	Location quotient
MACH	MACH Mount Pleasant Operations Pty Ltd or the unincorporated Mount Pleasant Joint Venture
Mount Pleasant Operation Region	Local region consisting of Muswellbrook, Upper Hunter, and Singleton LGAs
Mt	Million tonnes
Mtpa	Million tonnes per annum
NMP	Noise Management Plan
NO_2	Nitrogen Dioxide
NPV	Net Present Value
NSW	New South Wales
PM_{10}	Particulate matter less than 10 microns
$PM_{2.5}$	Particulate matter less than 2.5 microns
RAP	Registered Aboriginal party
ROM	Run-of-mine
SA_3 Region	Local region consisting of the Upper Hunter Statistical Area 3 Region
SIA	Social Impact Assessment
SSD	State Significant Development
SMC	Safeguard Mechanism Credit units
TMP	Traffic Management Plan
VPA	Voluntary Planning Agreement
VIMP	Visual Impact Management Plan
WMP	Water Management Plan

EXECUTIVE SUMMARY

The Mount Pleasant Operation is an open cut coal mine and associated infrastructure located approximately 3 kilometres (km) north-west of Muswellbrook in the Muswellbrook Local Government Area (LGA) of New South Wales (NSW). MACH Mount Pleasant Operation Pty Ltd is the manager of the Mount Pleasant Operation as agent for and on behalf of the unincorporated Mount Pleasant Joint Venture between MACH Energy Australia Pty Ltd (MACH) and J.C.D. Australia Pty Ltd.[1]

MACH is proposing an extension of life to the existing mining operations approved under Development Consent DA 92/97 (the Modification) to create greater certainty for the Mount Pleasant Operation and to increase extraction rates due to operational efficiencies identified.

This Economic Assessment (EA) forms part of the Modification Report, which has been prepared to accompany the Modification application. The EA has been prepared in accordance with the NSW Government's Guidelines for the economic assessment of mining and coal seam gas proposals (NSW Government, 2015) (the EA Guidelines) and the Technical Notes supporting the Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals (NSW Government, 2018) (the EA Technical Notes). The EA Guidelines require the following analyses to be undertaken:

- a cost-benefit analysis (CBA) to assess the net benefit that the Modification would deliver to the NSW community; and
- a local effects analysis (LEA) to assess the net benefit that the Modification would deliver to the local region.

NET BENEFITS OF THE MODIFICATION FOR THE NSW COMMUNITY

The net benefits to NSW have been derived by comparing the outcomes in two scenarios:

- the 'Modification Scenario', in which the Modification is approved and mining at the Mount Pleasant Operation continues until 2032; and
- the 'Reference Case', in which the Modification is not approved, and mining at the Mount Pleasant Operation ends in 2026, in line with Development Consent DA 92/97.

[1] Throughout this assessment, MACH Mount Pleasant Operation Pty Ltd and the unincorporated Mount Pleasant Joint Venture are referred to as MACH.

The CBA shows that the Modification would generate net benefits of $776 million in net present value (NPV) terms for the NSW community. These net benefits consist of:

- additional royalties of $645 million in NPV terms; and
- the NSW share of the additional company income taxes that MACH would pay of $131 million in NPV terms.

The Modification would benefit the workforce employed at the Mount Pleasant Operation. If approved, the Modification would employ an average of 555 full-time equivalent (FTE) NSW-based workers from 2026 to 2032. Over that timeframe, these workers would earn an aggregate disposable income of $430 million in NPV terms, or $333 million in NPV terms more than if the Mount Pleasant Operation ceases mining operations at the end of 2026.

The Mount Pleasant Operation's NSW suppliers are also likely to benefit if the Modification is approved. If the share of operating expenditures that MACH directs at NSW-based suppliers remains the same going forward, additional purchases of around $724 million in NPV terms would be made from NSW suppliers.

The Modification would potentially give rise to external effects that would impact third parties. However, with the exception of greenhouse gas (GHG) emissions, MACH would mitigate these. The costs of these external effects would therefore be internalised by MACH, so that no net cost is attributable to the NSW community. The cost of the NSW share of incremental Scope 1 and 2 GHG emissions attributable to the Modification is estimated at less than $0.1 million in NPV terms; this represents a cost to the NSW community.

The results of sensitivities undertaken to establish the robustness of the net benefit estimates to changes in the underlying assumptions suggest that the Modification would generate significant net benefits to NSW in a broad range of circumstances.

NET BENEFITS OF THE MODIFICATION FOR THE LOCAL REGION

The LEA is intended to describe the effects of a project on the community living in the local region. The EA Guidelines define the local region as the Statistical Area Level 3 (SA3) area that contains the proposed development. In the case of the Modification, the relevant SA3 area is the 'Upper Hunter SA3 Region' (the SA3 Region). The SA3 Region includes the towns of Muswellbrook and Scone and surrounding regions.

A little less than half of the Mount Pleasant Operation's operational workforce lives in the SA3 Region. The approach in this EA is therefore to also consider the local impacts of the Modification for a second region that better aligns with the places of residence of the local workforce, and which would therefore better capture the local economic effects of the Modification. That region – referred to as the 'Mount Pleasant Operation Region', consists of the LGAs of Muswellbrook, Upper Hunter, and Singleton, and captures the places of residence of around 70 per cent of the operational workforce.

If approved, the Modification would deliver significant employment and income benefits to the local region (however defined):

- on average, there would be an additional 340 FTE operational jobs in the Mount Pleasant Operation Region or 236 in the SA3 Region between 2026 and 2032;
- over that timeframe, the additional disposable income accruing to the local operational workforce amounts to $230 million in NPV terms in the Mount Pleasant Operation Region or $171 million in the SA3 Region; alternatively
- over the same timeframe, the local operational workforce would earn $169 million in NPV terms more than the median wage in the Mount Pleasant Operation Region or $128 million in the SA3 Region.

Local suppliers would also benefit if the Modification is approved. If past purchasing patterns continue going forward, MACH would direct an additional $24 million in NPV terms at suppliers located in the Mount Pleasant Operation Region ($15 million in the SA3 Region).

The additional environmental, social and traffic-related costs to the local community have generally been assessed as small or negligible; where these occur, they would be resolved by MACH. The potential local impacts of the additional GHG emissions that would be generated if the Modification is approved have been considered.

1. INTRODUCTION

The Mount Pleasant Operation is an open cut coal mine and associated infrastructure, located approximately 3 kilometres (km) north-west of Muswellbrook in the Muswellbrook Local Government Area (LGA) of New South Wales (NSW).

MACH Mount Pleasant Operation Pty Ltd is the manager of the Mount Pleasant Operation as agent for and on behalf of the unincorporated Mount Pleasant Joint Venture between MACH Energy Australia Pty Ltd (MACH) (95 per cent owner) and J.C.D. Australia Pty Ltd (5 per cent owner).[2]

1.1. PURPOSE AND SCOPE OF THE ECONOMIC ASSESSMENT

MACH is proposing an extension of life to the existing mining operations approved under Development Consent DA 92/97 to create greater certainty for the Mount Pleasant Operation and an increase in extraction rate due to operational efficiencies identified (the Modification).

This Economic Assessment (EA) forms part of the Modification Report, which has been prepared to accompany the Modification application.

The EA of the Modification has been prepared in accordance with the Guidelines for the economic assessment of mining and coal seam gas proposals (NSW Government, 2015) (the EA Guidelines) and the Technical Notes supporting the Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals (NSW Government, 2018) (the EA Technical Notes). The EA Guidelines require the following analyses to be undertaken:

- a cost-benefit analysis (CBA) to assess the net benefit that the Modification would deliver to the NSW community; and
- a local effects analysis (LEA) to assess the net benefit that the Modification would deliver to the local region.

[2] Throughout this assessment, MACH Mount Pleasant Operation Pty Ltd and the unincorporated Mount Pleasant Joint Venture are referred to as MACH.

1.2. ABOUT THIS REPORT

This report is structured as follows:

- Section 2 describes the Mount Pleasant Operation, the Modification, and the local context;
- Section 3 describes the CBA, how the key benefits have been derived and various sensitivities;
- Section 4 describes the local region and the LEA; and
- Section 5 comments on the significance of the resource.

Supporting documentation is presented in the following appendices to the EA:

- Appendix A describes the net producer surplus calculation;
- Appendix B describes the predicted incremental net environmental, social and transport costs of the Modification;
- Appendix C contains the detailed results of the sensitivity analysis;
- Appendix D describes the Modification's contribution to NSW gross state product (GSP); and
- Appendix E describes the methodology for deriving the flow-on effects of the Modification.

2. MOUNT PLEASANT OPERATION AND CONTEXT FOR THE MODIFICATION

This section describes the Mount Pleasant Operation, the Modification and key aspects of the Modification, and other relevant industrial developments in the region.

2.1. APPROVED MOUNT PLEASANT OPERATION

The Mount Pleasant Operation is an open cut coal mine and associated rail spur and product coal loading infrastructure, located approximately 3 km north-west of Muswellbrook in the Upper Hunter Valley of NSW (Figure 2-1).

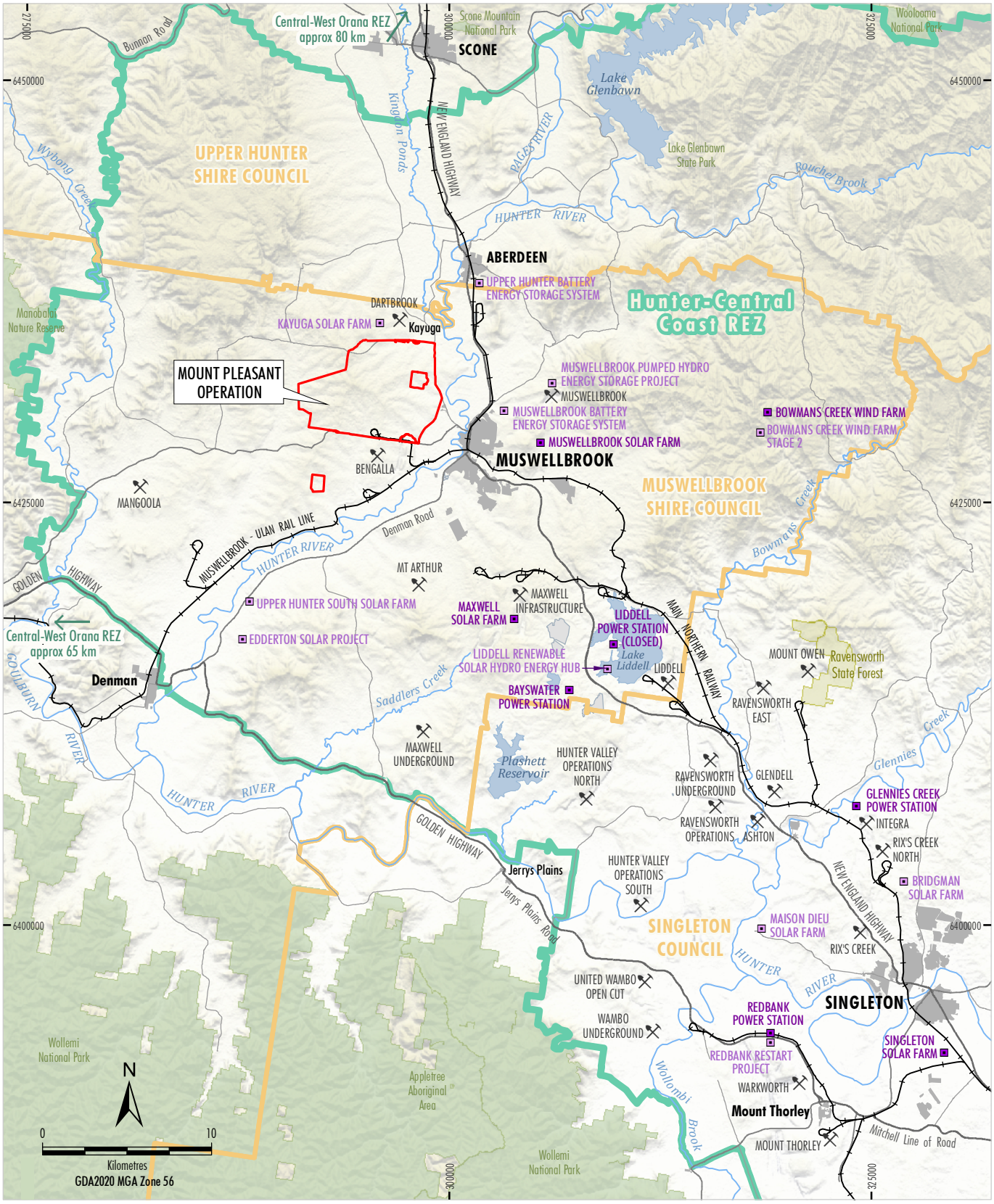
The Mount Pleasant Operation Development Consent DA 92/97 was granted on 22 December 1999. The Mount Pleasant Operation was also approved under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in 2012 (EPBC 2011/5795).

MACH Energy Australia Pty Ltd (MACH) acquired the Mount Pleasant Operation from Coal and Allied Operations Pty Ltd on 4 August 2016. MACH commenced construction activities at the Mount Pleasant Operation in November 2016 and commenced mining operations in late 2017, in accordance with Development Consent DA 92/97 and EPBC 2011/5795.

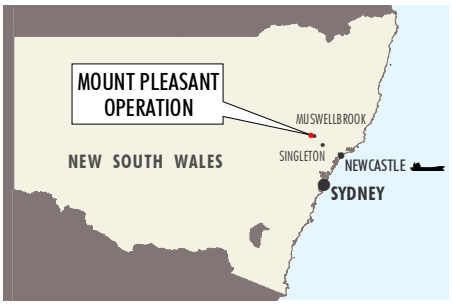
Under Development Consent DA 92/97, the Mount Pleasant Operation is approved to produce up to 10.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal. Thermal coal products from the Mount Pleasant Operation are transported by rail to the Port of Newcastle for export, or to domestic customers for use in electricity generation.

The approved mine includes a coal handling and preparation plant (CHPP) and a rail loop and spur, conveyor and load-out facility connecting the mine to the Muswellbrook–Ulan Rail Line. Other major components of the mine include:

- multiple open cuts;
- multiple out-of-pit waste rock emplacements;
- a mine infrastructure area;
- water management infrastructure;
- ROM and product coal stockpiles; and
- a fines emplacement area.



Source: NSW Spatial Services (2025); EnergyCo (2024)



LEGEND

- Mining Operation
- Existing/Approved Major Energy Generation Site
- Proposed Major Energy Generation Site
- Railway
- National Parks and Wildlife Estate
- State Forest/Reserve
- Local Government Boundary
- Hunter-Central Coast Renewable Enery Zone (REZ)
- Mining Lease Boundary (Mount Pleasant Operation)

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MOUNT PLEASANT OPERATION

Location of the Mount Pleasant Operation

Figure 2-1

Development Consent DA 92/97 has been modified on six occasions to accommodate changes or additions to infrastructure and to extend the life of the mine. Modification 7 was similar in scope to this Modification and was withdrawn in November 2024.

In 2022, MACH obtained a separate NSW State Significant Development (SSD) approval in accordance with the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the Mount Pleasant Optimisation Project (SSD 10418). The Mount Pleasant Optimisation Project permits the extraction of additional coal reserves by increasing the rate of coal extraction to 21 Mtpa of ROM coal and the continuous operation of the Mount Pleasant Operation until 2048.

2.2. THE MODIFICATION

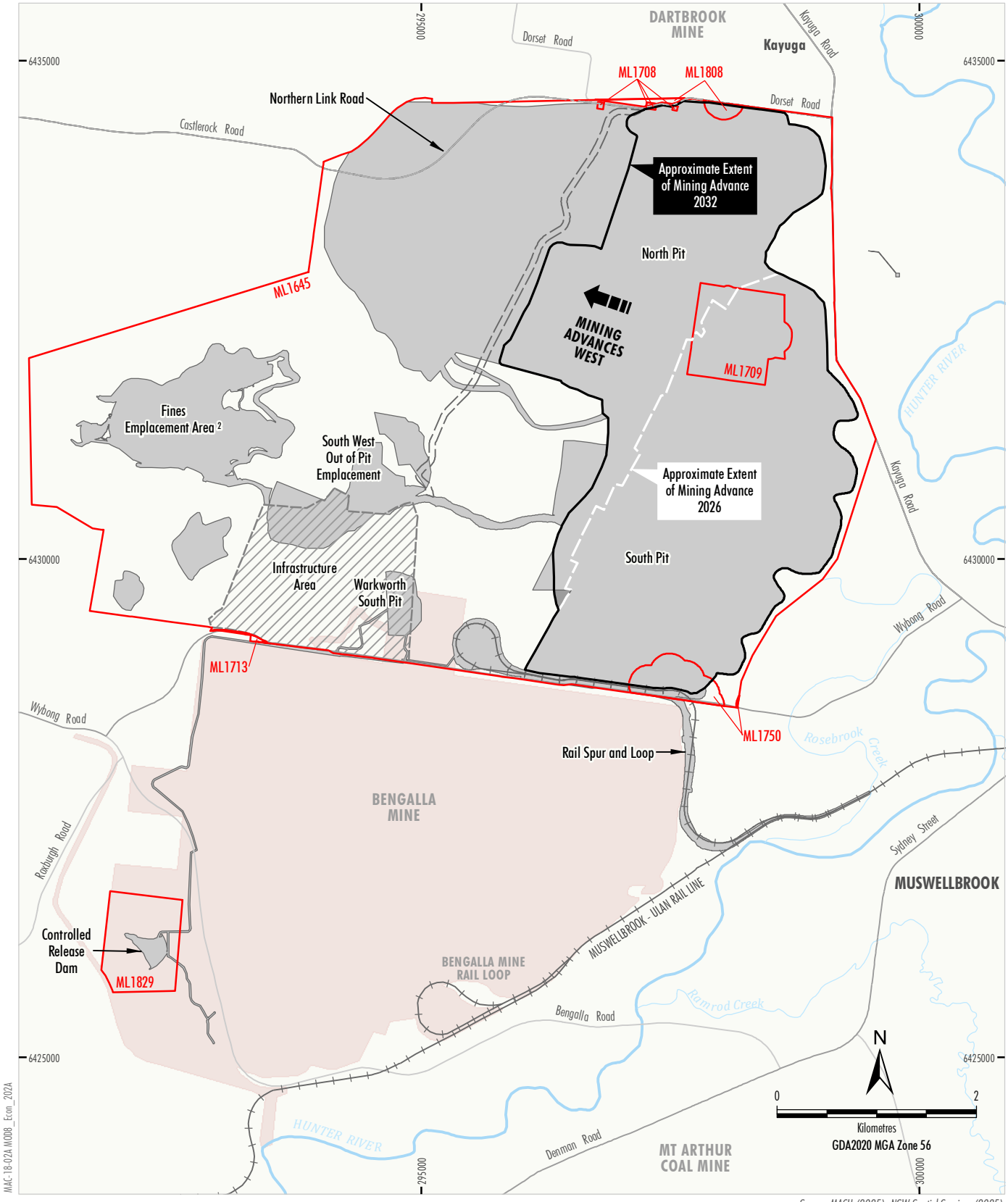
Figure 2-2 shows the general arrangement of the Modification. The Modification would include the following key changes to the approved Mount Pleasant Operation:

- a six year extension of permitted (ROM coal) mining operations to 31 December 2032; and
- an increase in the approved ROM coal extraction rate from 10.5 Mtpa to 12.5 Mtpa.

The Modification would not result in material changes to existing:

- mining tenements;
- mining methods;
- primary site access;
- electricity supply and distribution;
- mine infrastructure area;
- CHPP, coal stockpile and rail loading facilities;
- rehabilitation objectives and methods; and
- the existing hours of operation and key on-site activities.

The Mount Pleasant Operation is carried out generally in accordance with the surface disturbance area depicted and described in Appendix 2 of Development Consent DA 92/97. Condition 2 of Schedule 2 of Development Consent DA 92/97 recognises that MACH may carry out development generally in accordance with the project layout plans, including (to the extent authorised by the terms of the consent) the approved Mount Pleasant Operation surface disturbance plan.



Source: MACH (2025); NSW Spatial Services (2025); Department of Planning and Environment (2016)

LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Approved Surface Disturbance Plan - DA 92/97 [1]
- Services Corridor Being Developed Under SSD-10418 to be Used Under the Modification
- Extension of Open Cut Mining and Emplacement Area (Land Lawfully Disturbed under SSD-10418)
- Revised Infrastructure Area Envelope
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

[1] Excludes some incidental Project components such as water management infrastructure, access tracks, topsoil stockpiles, power supply, temporary offices, other ancillary works and construction disturbance.

[2] The general arrangement of the Fines Emplacement Area has been amended from the area shown in DA 92/97 to reflect as-built structures.

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MOUNT PLEASANT OPERATION

General Arrangement of the Modification

Figure 2-2

2.3. KEY MODIFICATION PARAMETERS

Key Modification parameters are described in the following.

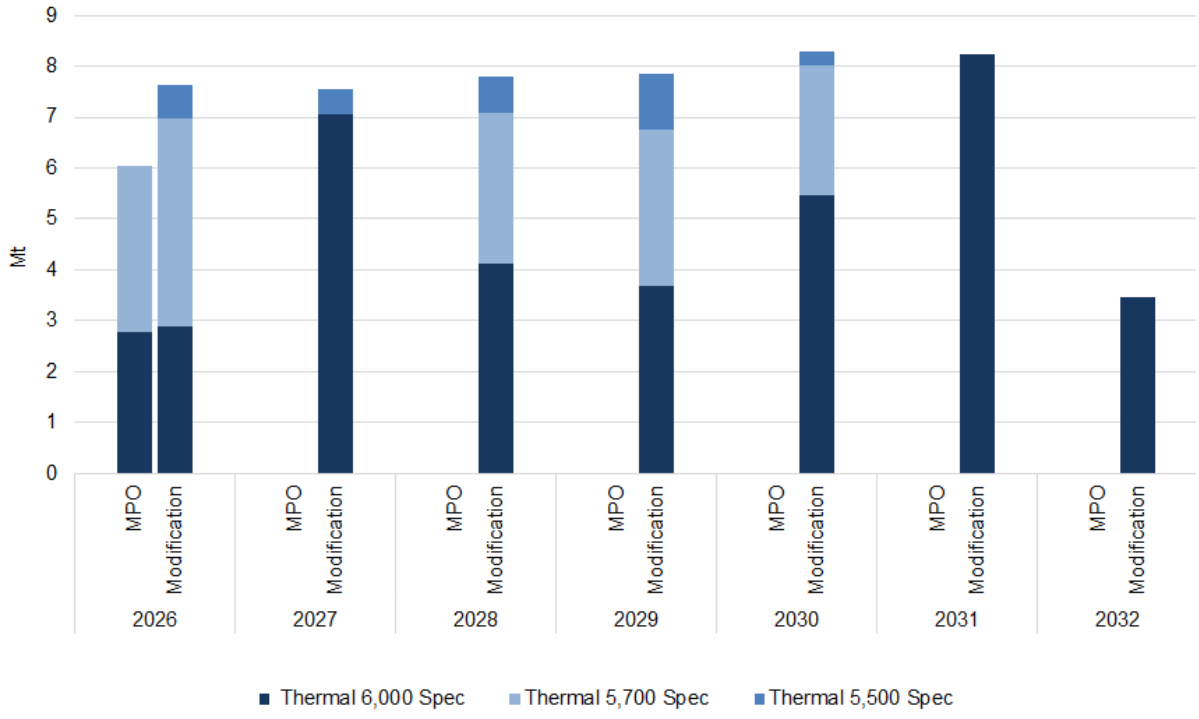
2.3.1. Product coal

PRODUCT COAL PRODUCTION

Figure 2-3 shows comparative indicative product coal production profiles for the Mount Pleasant Operation and the Modification, respectively:

- Under Development Consent DA 92/97, coal production at the Mount Pleasant Operation would end in December 2026. In 2026, average product coal output would be around 6 Mtpa.
- If the Modification is approved, coal production would continue through to the end of 2032. Product coal production would increase to 7.6 Mtpa in 2026 and thereafter, peaking at 8.3 Mtpa in 2030, and ending at 3.5 Mtpa in 2032.

Figure 2-3. Indicative product coal production profile – Mount Pleasant Operation and Modification



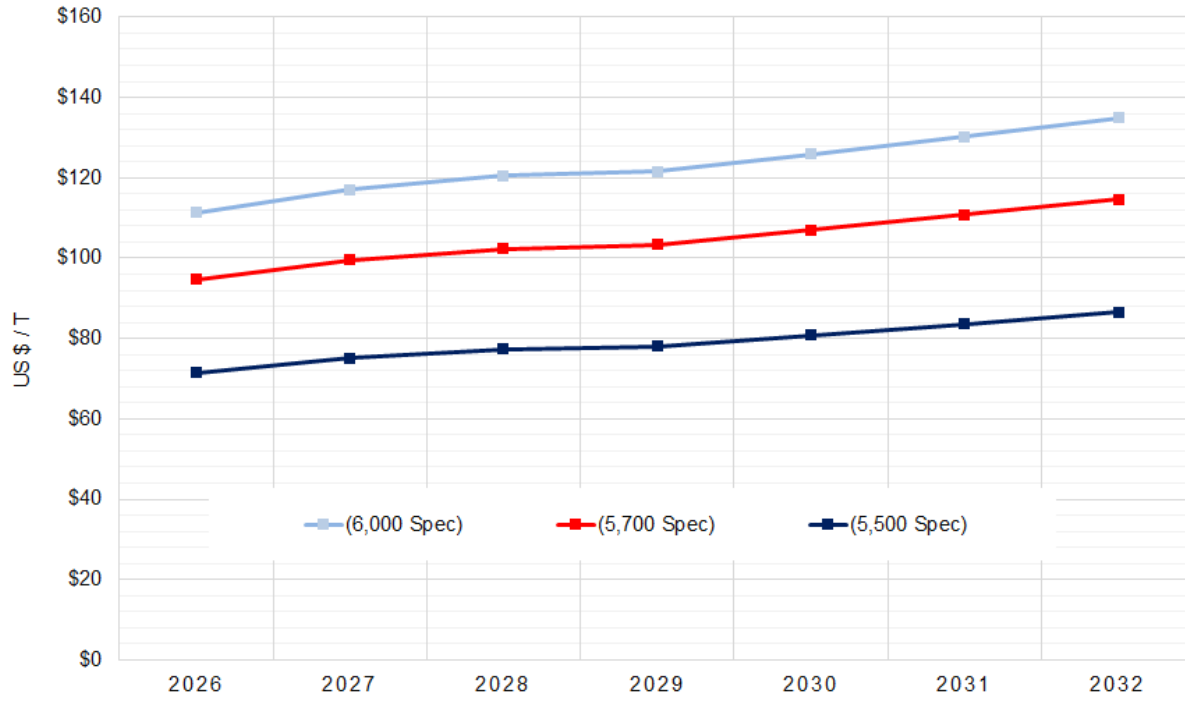
Notes: MPO refers to the Mount Pleasant Operation in the absence of the Modification.
6,000, 5,700, and 5,500 refer to thermal product coal specifications of 6,000 kilocalorie per kilogram (kcal/kg), 5,700 kcal/kg and 5,500 kcal/kg, respectively.

Source: MACH.

PRODUCT COAL PRICES

Figure 2-4 below shows the benchmark thermal coal price projections applied to model future revenues from coal sales, based on consensus price forecasts as of August 2025.

Figure 2-4. Benchmark thermal product coal price projections (US$/tonne)



Notes: 6,000, 5,700, and 5,500 refer to thermal product coal specifications of 6,000 kcal/kg, 5,700 kcal/kg and 5,500 kcal/kg, respectively.

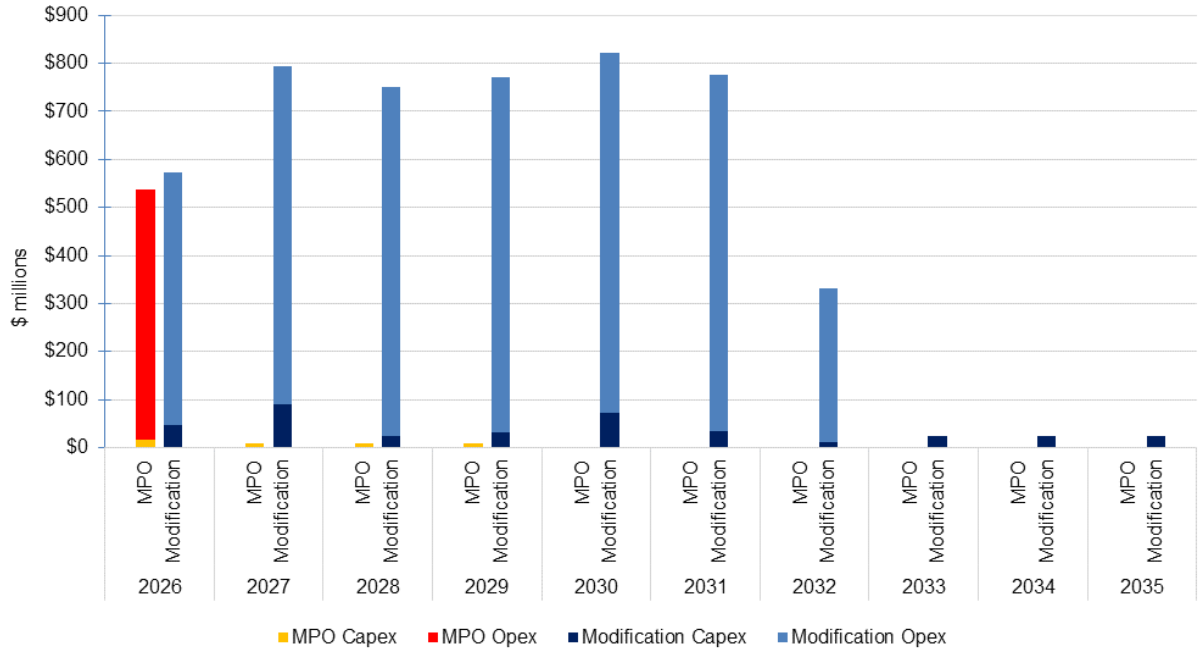
Source: MACH.

2.3.2. Capital and operating expenditures

Figure 2-5 compares projected operating and capital expenditures for the Mount Pleasant Operation and the Modification, respectively. Capital expenditures include outlays on development, sustaining and project capital, and closure costs. Operating expenditures include the costs of all ongoing mining-related activities, rail and port charges, the cost of the private royalties, as well as marketing fees.

Operating expenditures for the Mount Pleasant Operation in 2026 are expected to amount to around $519 million, with capital (including closure) costs estimated at $40 million in net present value (NPV) terms from 2026 to 2029. From 2026 to 2032, operating costs for the Modification are projected at around $4.5 billion (around $3.7 billion in NPV terms). Capital (including closure) costs are projected at $370 million ($300 million in NPV terms).

Figure 2-5. Capital and operating expenditure – Modification and Mount Pleasant Operation ($2026)



Notes: MPO refers to the Mount Pleasant Operation in the absence of the Modification.
CAPEX refers to capital expenditures including development, sustaining, and closure expenditures.
OPEX refers to operational expenditures, including mining, transportation and marketing expenditures.

Source: MACH.

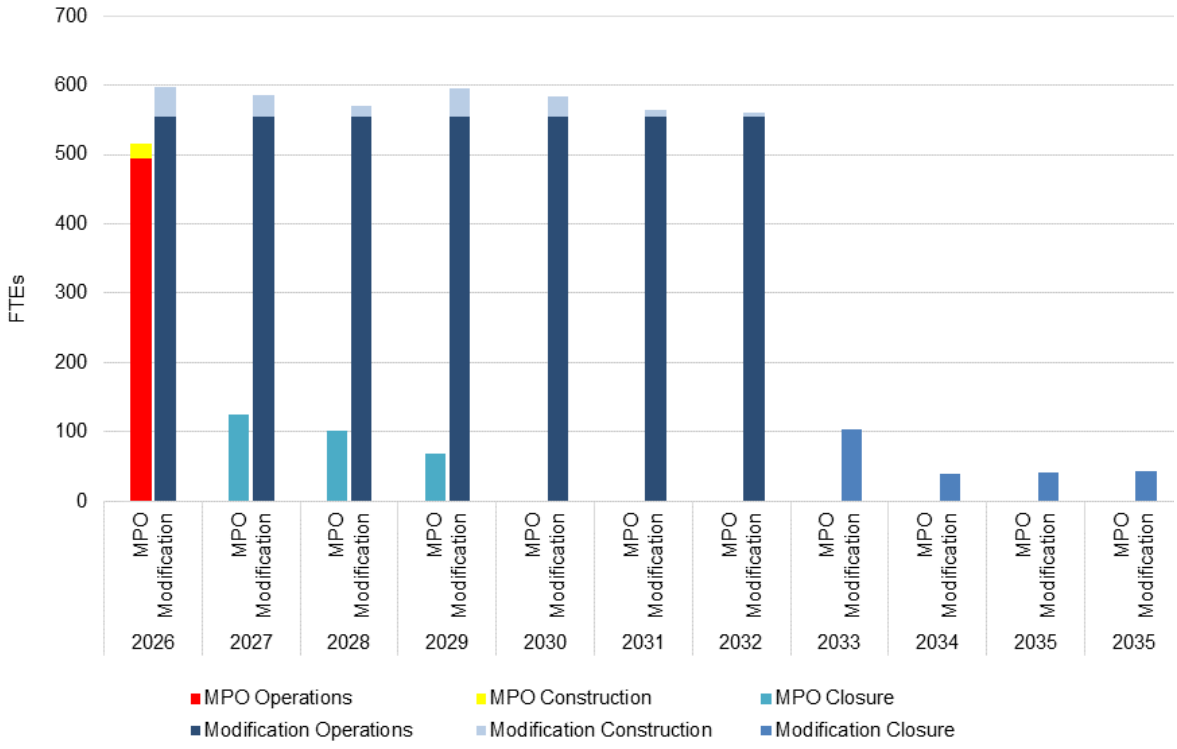
2.3.3. Workforce profile

Figure 2-6 shows the respective workforce profiles for the Mount Pleasant Operation and the Modification.

In 2026 in the absence of the Modification, total employment at the Mount Pleasant Operation would be approximately 494 full-time equivalent (FTE) workers engaged in operations and associated supporting roles. An additional 22 FTE workers would be engaged in construction activities. From 2027 to 2029, a decreasing number of workers would undertake closure activities.

Conversely, if the Modification is approved the total operational workforce would be an estimated average of 555 FTE operational workers from 2026 to 2032. On average, around 25 FTE workers would be engaged in construction activity over this timeframe, with on average 61 workers engaged in closure activities post-mining from 2033 to 2035. We note that, for the purpose of this economic analysis, a small number of the Modification operational staff that undertake construction-related roles have been categorised as belonging to the construction workforce. The assessed number of operational workers is therefore conservative.

Figure 2-6. Workforce profile – Modification and Mount Pleasant Operation (FTEs)



Source: MACH.

2.4. OTHER RESOURCE PROJECTS IN THE REGION

The Mount Pleasant Operation is located within a recognised mining and industrial precinct, with the Bengalla Mine located immediately to the south and Dartbrook Mine located immediately to the north (Figure 2-1). Other nearby operating coal mines include the Mount Arthur Coal Mine and Mangoola Coal.

The potential for interactions between other resource projects in the region and the Modification is relevant for assessing the cumulative 'external effects' associated with the Modification (summarised in Section 0 and described in Appendix B). Table 2-1 shows other existing and proposed projects in the vicinity of the Mount Pleasant Operation. Where relevant, the potential cumulative environmental impacts have been considered in the specialist studies undertaken for the Modification.

Many other mines are located in the Hunter region. Potential interactions with these mines are typically limited to the shared use of the Main Northern Railway, the shared use of supporting contractors, contributions to regional background air quality and traffic movements and socio-economic effects on the area (e.g. support industries based in Muswellbrook and other centres in the Hunter Valley).

Table 2-1. Resource projects located in close vicinity of the Mount Pleasant Operation

Project	Description	Location	Project life	Max ROM Mtpa
Operational projects				
Bengalla Mine	Open cut coal mine	Immediately south of the Mount Pleasant Operation	2039	15
Mount Arthur Coal Mine	Open cut coal mine	8 km south of the Mount Pleasant Operation	2030	25
Mangoola Coal	Open cut coal mine	8 km west of the Mount Pleasant Operation	2030	13.5
Maxwell Underground Mine	Underground coal mine	10 km south-southwest of the Mount Pleasant Operation	2047	8
Projects in care and maintenance and/or administration				
Dartbrook Mine	Underground coal mine	Immediately north of the Mount Pleasant Operation	2027	6
Closed projects				
Muswellbrook Coal Mine	Open cut and underground coal mine	North-west of Muswellbrook	Mining ended in 2022, undergoing rehabilitation	N/a

Source: Development Consent, Section 89E of the EP&A Act: Bengalla Continuation Modification, SSD-5170, 19 December 2018. SSD Modification Mount Arthur Coal MOD 2 (Pathway to 2030); https://www.planningportal.nsw.gov.au/major-projects/projects/mt-arthur-coal-mod-2-pathway-2030. SSD Modification, Mod 8; https://www.planningportal.nsw.gov.au/major-projects/projects/mod-8-0. Part4 Determination, Dartbrook Coal; https://www.planningportal.nsw.gov.au/major-projects/projects/mod-7-bord-and-pillar-mining-and-extension. https://www.idemitsu.com.au/mining/operations/muswellbrook-site.

3. COST-BENEFIT ANALYSIS OF THE MODIFICATION

The EA Guidelines require a CBA to be prepared to evaluate the economic impacts of a coal mining proposal on the NSW community. This section describes the methodology for deriving the components of the CBA, the results of the analysis, and the results of sensitivities to test the robustness of the assumptions.

3.1. NSW CBA REQUIREMENTS

CBA is a technique for assessing the economic merits of an initiative or development (such as undertaking a mining investment) from the perspective of society; in this case, from the perspective of the NSW community. A CBA compares all costs and benefits attributable to the initiative, discounted to a common point in time, to arrive at an overall assessment of whether the initiative is 'net beneficial'; that is, whether society would benefit from its implementation. A development is net beneficial if the NPV of the sum of benefits minus the sum of costs is greater than zero.

In the analysis presented in this EA – both the CBA and the LEA – draw on the same data set. The central assumptions that underpin the analyses are common to both:

- the application of a central discount rate of 7 per cent per annum to discount all costs and benefits back to a common point in time (the year 2025), noting that given the short timeframes between the preparation of this EA and when construction and mining would begin if the Modification is approved, inflows and outflows in 2026 have not been discounted;[3]
- the use of internally consistent prices, expressed in 2026 Australian dollars (AUD) ($2026); and
- the use of a common timeframe, beginning in 2026 and ending in 2036, to enable all incremental costs and benefits attributable to the Modification to be captured, including any residual costs and benefits that may be relevant beyond the life of the mine.

Preparing a CBA requires that the economic merits of a proposal are compared to a meaningful counterfactual. The CBA examines the incremental (net) benefits that would arise if the Modification is approved, referred to as the 'Modification Scenario', relative to those that would arise in the counterfactual 'Reference Case', whereby operations at the Mount Pleasant Operation would cease in 2026 (consistent with what is currently approved under DA 92/97). Table 3-1 summarises these scenarios.

[3] Changing the year from when monetary flows are discounted adjusts all revenues and costs by the same proportion but does not change the relativities and underlying economics of an investment.

Table 3-1. Reference Case and Modification Scenario

	Reference Case Scenario		Modification Scenario	
Production timeline	2026		2026 to 2032	
Product coal production				
Annual average (Mtpa)	6.0		7.3	
Peak (Mtpa)	6.0		8.3	
Total (Mt)	6.0		50.8	
Average total workforce (FTEs)*				
Operations	2026	494	2026 to 2032	555
Construction	2026	22	2026 to 2032	25
Closure	2027 to 2029	99	2033 to 2035	61

Notes: *As noted in Section 2.3.3, workforce categories have been adjusted to assess some limited operational support roles as construction roles. Mt = million tonnes.

Source: MACH.

Table 3.1 in the EA Guidelines contains a list of the potential costs and benefits of a proposal that are attributable to NSW in the CBA; these are derived in the following subsections.

As a general matter, a CBA relies on the 'opportunity cost' principle to value goods and services. For 'conventional', market-based transactions, such as the sale of coal outputs or the purchase of labour and other inputs, the relevant value is determined with reference to market prices. For so-called 'external effects' or 'externalities' – environmental costs and other impacts on third parties for which there are no obvious prices – alternative valuation methods need to be used. These valuation methods are prescribed in the EA Technical Notes. Where relevant, they are described in Section 0.

3.2. COAL ROYALTIES

The incremental coal royalty payments attributable to the Modification are shown in

Table 3-2. NSW coal royalty payments were calculated by multiplying gross mining revenues, net of allowable deductions for coal beneficiation, and net of estimated levies, with the ad valorem royalty rate of 10.8 per cent.

Table 3-2 shows that the Modification would result in royalty payments to NSW of $742 million in NPV terms, an additional $645 million in NPV terms relative to the Reference Case whereby the Mount Pleasant Operation would close at the end of 2026. This would correspond to total (undiscounted) royalty payments of $898 million, or $801 million more than in the Reference Case.

Table 3-2. Incremental royalty calculation (2026 to 2032, $2026)

	Modification	Reference Case	Difference	Notes
		(NPV $million)		
Assessable revenues	$7,032	$924	$6,109	Product coal production × AU$ coal prices
Allowable deductions				
Beneficiation	$157	$22	$135	Beneficiation deduction of $3.71 per tonne (full cycle of washing)
Levies	$3	$1	$3	Coal Research Levy, Mines Rescue Levy, Mine Subsidence Levy, Long Service Leave Levy
Net disposal value	$6,872	$901	$5,971	Assessable revenue net of allowable deductions
NSW royalty	$742	$97	$645	10.8 per cent (open-cut coal royalty rate) × net disposal value

Note: Totals may not sum precisely due to rounding.
Source: MACH, AnalytEcon analysis.

3.3. COMPANY INCOME AND OTHER TAXES

3.3.1. Company income taxes

The EA Guidelines require an estimate of the total annual company income tax payable for a project, of which a share corresponding to the proportion of Australia's population based in NSW should be attributed to NSW. Aggregate Commonwealth company income tax payments were derived by deducting operating and capital expenditures, wages and salaries, royalty and other tax payments from gross revenues to derive taxable income, as shown in Table 3-3.

Table 3-3. Incremental company income tax calculation (2026 to 2036, $2026)

	Modification	Reference Case	Difference	Notes
		(NPV $million)		
Coal revenues	$7,032	$924	$6,109	Product coal production × AU$ coal prices
Less:				
Operating and capital costs	$4,018	$558	$3,459	Operating, capital expenditures
Labour costs	$717	$162	$555	Wages & salaries for the operational, construction, and closure workforce
Royalties	$742	$97	$645	NSW royalty payments
All other taxes	$67	$21	$46	Payroll, land taxes, rates
Total assessable income	$1,489	$85	$1,404	Coal revenues minus all costs
Company tax	$447	$25	$421	30% of total assessable income
Share of company tax attributable to NSW	$139	$8	$131	31.2% of company tax (NSW share of Australian population)

Notes: Totals may not sum precisely due to rounding. As of March 2025, the NSW population was around 31.2 per cent of the Australian population.

Source: MACH, AnalytEcon analysis. Australian Bureau of Statistics (ABS), 2025.

3.3.2. Local government rates

Local government rates are levied on individuals and businesses located within an LGA and are collected by the council, to the benefit of the local NSW community. The EA Guidelines do not comment on the treatment of local government rates.

In this EA, the local government rates paid by MACH have been incorporated in the costings for the Mount Pleasant Operation and the Modification, respectively, but have conservatively not been counted as a benefit for NSW. In the Financial Year 2025-26, MACH paid more than $3 million in rate payments to various councils, including around $2.9 million to Muswellbrook Shire Council.

3.3.3. Land taxes

Land taxes are levied on the value of NSW land owned by individuals and businesses. Land taxes accrue to the State of NSW and benefit the NSW community. The EA Guidelines also do not comment on the treatment of land taxes.

MACH pays around $200,000 per annum in land taxes. Land taxes have been included in the costings in both the Modification and the Reference Case scenario but have also conservatively not been counted as a benefit for NSW.

3.4. NET PRODUCER SURPLUS

Table 3.5 in the EA Guidelines sets out the approach to be applied to determine the net producer surplus, in effect an approximation of cash profits. The total direct net benefit to the producer is the difference between the value of the output, and expenditures on inputs, i.e., the costs of production.

The net producer surplus attributable to NSW is the economic rent attributable to the NSW owners of the capital, which depends on the Australian share of the Mount Pleasant Operation's ownership. The Mount Pleasant Operation is owned by the unincorporated Mount Pleasant Joint Venture between MACH (95 per cent ownership share), and J.C.D. Australia Pty Ltd (5 per cent ownership share). MACH is, in turn, owned by Droxford International, a subsidiary of Indonesia's Salim Group, while J.C.D. Australia Pty Ltd is Japanese owned. Neither of these companies have an Australian ownership share, and no share of the net producer surplus would therefore accrue to NSW. The details of the net producer surplus calculation are reported in Appendix A.

3.5. INDIRECT BENEFITS TO NSW

3.5.1. Economic benefits to existing landholders

The EA Guidelines note that a mining proponent may purchase or lease land from existing landholders at a price which exceeds the opportunity cost of the land, for instance when a premium above market prices is paid for land acquisitions or leases. The corresponding surplus is an economic benefit that accrues to existing landholders and should be attributed to NSW.

In the case of the Modification, any future acquisitions, such as properties provided with voluntary acquisition rights may include a premium to market value. However, the resulting net benefit accruing to landholders is insignificant relative to the overall net benefit to NSW generated by the Modification, and these premia often include a component of compensation to account for the costs of relocation. Therefore, any economic benefits accruing to local landholders are unlikely to be material and have not been estimated.

3.5.2. Economic benefits to NSW workers

The mining industry is a significant employer of skilled workers, such as machinery operators, technicians and trades workers, as well as managers, professionals and support workers. At the same time, average wages in the Australian mining sector are significantly higher than in other industries that require similarly skilled workers, such as the construction, transport, utilities and manufacturing sectors. Wages and salaries paid to the Mount Pleasant Operation workforce are also higher than the average or median NSW wage.

The EA Guidelines discount higher than average wages that might accrue to the workforce of a mining project, noting that the starting point of any analysis should be that workers do not earn a 'wage premium' even if they earn more working in the mining sector. The EA Guidelines instead suggest that higher wages paid in the mining sector reflect factors such as more demanding working conditions or the need to compensate workers to move to a different location to accept a job. As such, wage premia should not be deemed a benefit to NSW workers.

The reasoning set out in the EA Guidelines is not correct and improperly overlooks a potentially important welfare gain that accrues to workers (the labour surplus). First, standard economic analysis which draws on considerable empirical evidence in Australia and overseas suggest that, at least over the longer term, wage differentials for otherwise similar jobs reflect productivity differences between industries, rather than some form of personal opportunity cost or disutility. Thus, an Australian Treasury analysis of firm-level tax data showed that more productive businesses pay higher real wages (Australian Government, 2017). The relationship between real wages and labour productivity holds across all business characteristics examined, including business size and export exposure.[4]

The reasoning in the EA Guidelines approach is also not consistent with that set out in the NSW Government's guides to cost-benefit (NSW Government, 2017 and 2023). The 2017 NSW Government Guide to Cost-Benefit Analysis, for instance, states that (Table 2.2, p. 13):

> *Labour surplus is the difference between a worker's actual wages and what they are willing to accept (their reservation wage). If an initiative increased hourly wage rates, the incremental increase would be a benefit.*

In summary, the EA Guidelines discount the benefits that would accrue to NSW workers – in terms of additional employment at high wages and salaries – as a result of the Modification, and none have been included in the summary CBA results shown in Table 3-6. The benefits of the Modification for the Mount Pleasant Operation workforce are nonetheless potentially substantial:

- As currently approved under DA 92/97 production at the Mount Pleasant Operation will come to an end in December 2026. If the Modification is approved, it would offer continuous employment to, on average,[5] 555 FTE operational workers and 25 construction workers from 2026 through to 2032. The great majority of operational workers are NSW residents (see Table 4-1).
- Between 2026 and 2032, the Modification's NSW workforce would earn an aggregate gross income of $841 million ($686 million in NPV terms), corresponding to an aggregate disposable income of $527 million ($430 million in NPV terms).
- Relative to a counterfactual whereby employment at the Mount Pleasant Operation ceases in 2026, the NSW workforce would earn an additional $426 million ($333 million in NPV terms) in disposable income if the Modification is approved.

[4] A recent analysis by the Productivity Commission (PC, 2023) concluded that productivity growth is the main driver of real wage growth for almost all of the labour force. In mining and agriculture, the main determinant of higher wages remains productivity growth, although changes in the terms of trade have also played a role.

[5] As noted in Section 2.3.3, the workforce categories have been adjusted to assess some limited operational support roles as construction roles.

3.5.3. Economic benefits to suppliers

The EA Guidelines note that NSW suppliers may receive an economic benefit in the form of higher surpluses if they supply a new mining development, and that the value of that economic benefit should be incorporated in the CBA.

Quantifying such a benefit to suppliers poses practical difficulties. There are no published statistics as to which businesses located in NSW are also NSW-owned. Even if NSW-owned businesses could be identified, it is generally not known whether the goods and services supplied by these businesses are produced in NSW or whether they are 'imported' from elsewhere in Australia (or from overseas). Depending on the situation, the additional 'surplus' that these businesses might then earn from supplying the Modification may consist of a pure wholesale or retail margin, rather than value added. [6] These data limitations imply that economic benefits to NSW suppliers cannot be measured.

An illustrative calculation suggests that benefits to suppliers are nonetheless likely to be significant. If the Modification is approved, MACH would incur incremental operating expenditures between 2026 and 2032 of around $3.2 billion in NPV terms. An analysis of the Mount Pleasant Operation's operating expenditures suggests that 23.5 per cent of operating expenditures were directed towards suppliers with a NSW postcode. If that share of NSW expenditures remains the same going forward, incremental operating expenditures of around $724 million in NPV terms would be directed towards NSW suppliers between 2026 and 2032. If it is assumed, for illustrative purposes, that 10 per cent of these additional NSW expenditures represent some form of margin, the additional surplus accruing to NSW suppliers in the Modification Scenario would be around $72 million in NPV terms.

3.6. NET PUBLIC INFRASTRUCTURE COSTS

No public infrastructure costs are expected to be incurred for the Modification, and none have therefore been included in the CBA.

[6] There is little public information about wholesale margins (likely to be more appropriate for a large purchaser such as MACH). The petroleum industry reportedly earned wholesale margins between 2.0 and 3.4 per cent over the last 10 years to 2017-18 (Australian Competition and Consumer Commission, 2020). The most recent research published by the Reserve Bank of Australia for retail goods indicates that in 2012-13, wholesalers' gross margins on average comprised 15 per cent of final sales prices, with just over 2 per cent representing wholesalers' net margins (Ballantyne and Langcake, 2016).

3.7. NET ENVIRONMENTAL, SOCIAL AND TRANSPORT-RELATED COSTS

The predicted net environmental, social and transport-related costs of the Modification, referred to as 'external effects', are summarised in Table 3-4 below and discussed in detail in Appendix B. Table 3-4 shows that, with the exception of greenhouse gas (GHG) emissions, the incremental external effects attributable to the Modification are minor or negligible and would be 'made good' by MACH. GHG emissions from the Mount Pleasant Operation would remain below the Safeguard Mechanism baseline in both the Reference Case and the Modification Scenario. No additional operational costs associated with Safeguard Mechanism obligations have therefore been included in the CBA. Notwithstanding, Scope 1 and Scope 2 GHG emission costs have been estimated for the Modification and Reference Cases (Table 3-4).

Table 3-4. Incremental external effects of the Modification and mitigation/valuation

Externality	Incremental effects of the Modification	Mitigation / valuation
Noise and blasting	Operational, cumulative, road traffic, and blasting noise assessments generally found the Modification to be compliant with existing consent conditions and/or identified mitigation measures. The Modification would not result in impacts on the acoustic amenity of the surrounding community beyond what is already approved for the Mount Pleasant Operation.	Noise mitigation and management costs included in costs to 2032. MACH applies a comprehensive suite of noise mitigation and management measures, including a Noise Management Plan and a Blast Management Plan. These would continue to be applied if the Modification is approved.
Agriculture	No additional surface disturbance beyond the approved surface development area for the Mount Pleasant Operation	N/a
Air quality	The proposed increase to ROM coal extraction rate and mine life extension would have minimal air quality impacts on locations surrounding the Mount Pleasant Operation beyond what is already approved.	Air quality management costs up to 2032 are included in costs. A range of dust mitigation measures are applied at the Mount Pleasant Operation and would continue to be applied if the Modification is approved. Reactive operational mitigation strategies and management measures, as well as a predictive system would also continue to be implemented.
Greenhouse gas	Incremental Scope 1 and 2 GHG emissions are estimated at 1.515 million tonnes of carbon dioxide-equivalent (Mt CO_2-e). Based on current Safeguard Mechanism settings, the Modification would generate net SMCs, so that no Australian Carbon Credit Units (ACCUs) or SMCs would need to be retired to compensate for projected GHG emissions.	The anticipated Safeguard Mechanism Credits (SMCs) have been included as offsetting items in the general project costings. The valuation of the Modification's Scope 1 and 2 GHG emissions on the basis of ACCUs results in a total cost of $85 million in NPV terms. The attribution of GHG emissions to NSW on the basis of NSW' share of the world population results in a cost of $0.09 million in NPV terms.
Surface water	The Surface Water Assessment indicates that the Modification is not expected to materially impact the environmental values of the	Surface water management costs up to 2032 have been included

Externality	Incremental effects of the Modification	Mitigation / valuation
	receiving surface waters. The mines operating in the vicinity of the Mount Pleasant Operation operate in a highly regulated water system. Given these various regulatory controls, the cumulative impacts on downstream water users are expected to be negligible.	in costs. MACH would conduct surface water management in accordance with the Water Management Plan (including the Erosion and Sediment Control Plan, Surface Water Management Plan and Surface and Ground Water Response Plan) for the Mount Pleasant Operation incorporating the Modification. Water demands associated with the Modification would be met by existing surface and groundwater entitlements held by MACH. No additional surface water-related costs have therefore been included in the CBA.
Groundwater	The Modification would cause only a slight expansion of the drawdown area compared to the approved Mount Pleasant Operation. With the current and planned monitoring program, potential groundwater impacts are considered effectively managed, ensuring ongoing protection of the regional groundwater system and associated ecosystems.	Groundwater management costs up to 2032 have been included in costs. MACH would continue to undertake groundwater management in accordance with the Groundwater Management Plan and Surface and Ground Water Response Plan.
Biodiversity	The Modification would involve the progressive clearance of woodland and derived native grassland within the existing approved development footprint.	Biodiversity management costs up to 2032 have been included in costs. MACH has established some 12,875 hectares (ha) of biodiversity offsets to obtain Commonwealth approvals and provided around $2 million towards endangered species recovery actions. No additional costs have been applied.
Aboriginal heritage	No additional impacts are expected relative to the approved Mount Pleasant Operation.	Aboriginal heritage management costs up to 2032 have been included in costs.
Historic heritage	No additional impacts are expected relative to the approved Mount Pleasant Operation.	Historic heritage management costs up to 2032 have been included in costs.

Externality	Incremental effects of the Modification	Mitigation / valuation
Visual amenity	The dynamic landscape impacts of the Modification can conservatively be assessed as moderate. Higher visual impacts would occur during the initial development of the waste rock emplacement landform, but these would be reduced with ongoing rehabilitation and the establishment of native vegetation. Topographic changes would be permanent.	Visual management and rehabilitation costs up to 2032 have been included in costs. MACH manages and mitigates visual impacts in accordance with a Visual Impact Management Plan, which would be revised to reflect the Modification. MACH adopts mitigation strategies to ameliorate any visual impacts. In the medium term, the Modification rehabilitation strategy would emulate the existing landscape; the planned final landform is an example of best practice mine geomorphic rehabilitation.
Social	If the Modification is approved, stakeholders would continue to experience both positive and negative impacts, which include traffic and nuisance (noise, dust, visual) impacts, but also employment opportunities, higher standards of living, support for local businesses and the community (including via the Voluntary Planning Agreement [VPA]). If the Modification is not approved and mining ceases at the Mount Pleasant Operation, neighbouring property owners would benefit, but the closure of the mine would have a major negative impact on the community.	VPA community contributions are included in costs. MACH and the Mount Pleasant Operation have implemented a range of mitigation strategies to reduce social impacts, including various community engagement mechanisms and strategies, the Aboriginal Community Development Fund (ACDF), and the VPA with Muswellbrook Shire Council.
Road transport	The existing road network can adequately accommodate the Modification traffic. No specific measures or upgrades are required to mitigate the impacts of the development on the capacity, safety and efficiency of the road network as a result of the changed road traffic conditions associated with the Modification.	VPA road maintenance contributions and road transport management costs up to 2032 have been included in costs. The existing Traffic Management Plan would continue to be reviewed, and appropriate additional procedures would be implemented if required.

Source: AnalytEcon.

3.8. LOSS OF SURPLUS TO OTHER INDUSTRIES

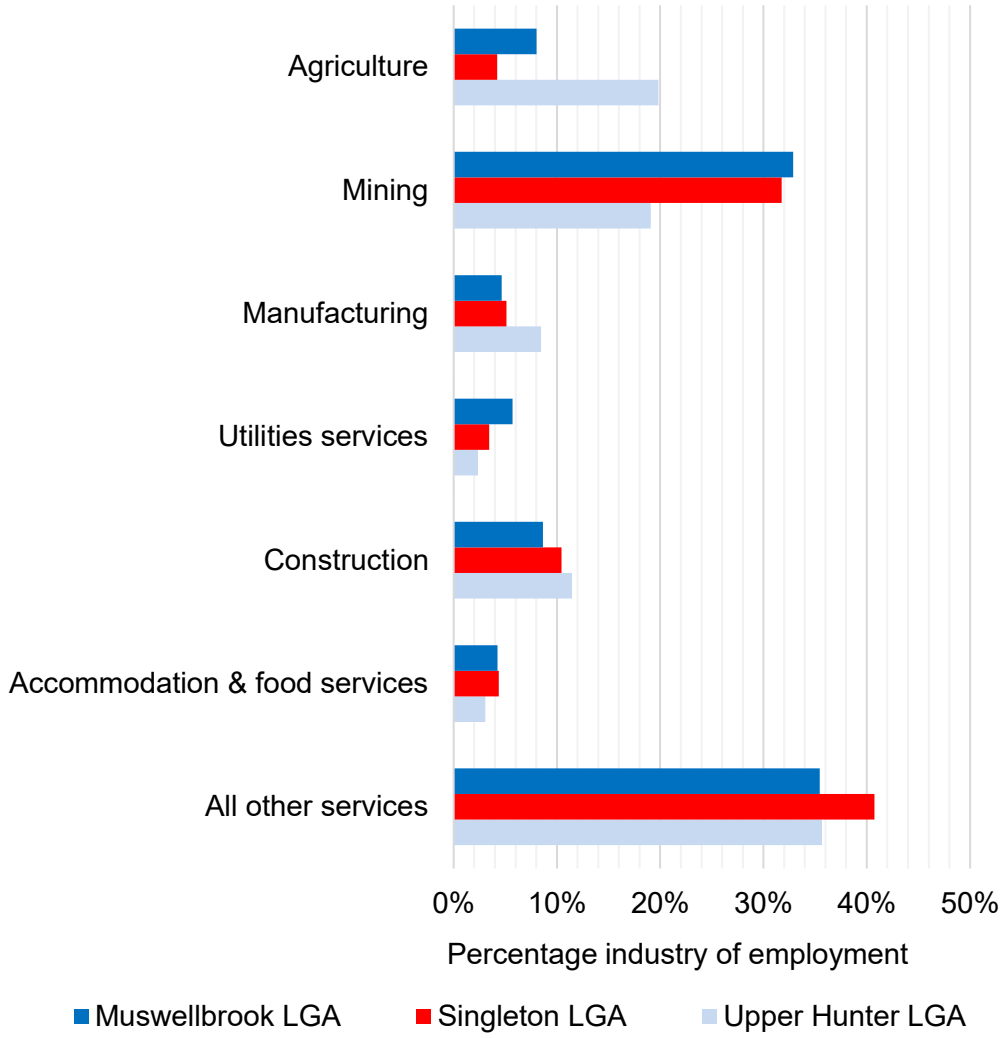
The Upper Hunter Valley, where the Mount Pleasant Operation is located, is a very diverse part of NSW where heavy industry such as mining coexists with agriculture, including viticulture, and the equine industry, as well as a range of tourism activities centred on the natural and man-made attractions of the region.

The approved Mount Pleasant Operation is located in the Muswellbrook mining precinct in the Upper Hunter Valley with the Bengalla Mine located directly to the south and the Dartbrook Mine to the north. (Figure 2-1). The Mount Pleasant Operation abuts the Hunter River floodplain with the town of Muswellbrook located some 3km to the East. Other mines within a 20 km radius of the Mount Pleasant Operation include the Mount Arthur Coal Mine, Mangoola Coal, and the Muswellbrook Coal Mine. Further towards the south-east, there are multiple open-cut and underground coal mines located near the town of Singleton in Singleton LGA. Both Muswellbrook and Singleton are considered mining towns.

The EA Guidelines specify that the CBA should incorporate changes in economic surplus arising in other NSW industries such as the tourism or equine industries. Figure 3-1 shows employment by industry in Muswellbrook, Singleton and the Upper Hunter LGAs as described in the most recent (2021) Australian Bureau of Statistics (ABS) Census (ABS, 2024). Particularly in Muswellbrook and Singleton LGAs, the mining sector is the single most important employer, employing 33 per cent and 32 per cent of the workforce, respectively. As noted in the Social Impact Assessment (SIA) for the Modification (Just Add Lime, 2025; p.24), particularly full-time employment and median incomes in Muswellbrook are high. This is driven by the large share of working population employed in the mining sector who generally earn around 60 per cent more than the median industry earnings.

Employment in agriculture, forestry and fishing (which also includes horse breeding and horse studs) plays less of a role in these Muswellbrook and Singleton LGAs (8 per cent in Muswellbrook and 4 per cent in Singleton) but is important in the Upper Hunter LGA where 20 per cent of people were employed in agriculture in 2021. Employment in accommodation and food services – services typically associated with tourism – accounted for around 4 per cent in Muswellbrook and Singleton LGAs, and 3 per cent in the Upper Hunter LGA.

Figure 3-1. Employment by industry in the local region (2021)



Notes: All other services covers wholesale trade; retail trade; transport, postal and warehousing; information media and telecommunications; financial and insurance services; rental, hiring and real estate services; professional, scientific and technical services; administrative and support services; public administration and safety; education and training; health care and social assistance; arts and recreation services; other services.

Source: ABS, 2024.

The following sections briefly review the implications of the Modification for the equine, viticulture and tourism industry in the vicinity of the Mount Pleasant Operation. The Modification would result in the disturbance of approximately 592 ha of land within the approved surface disturbance plan as mining operations progresses through to 2032. Given that the Modification would not expand the surface disturbance beyond that approved under Development Consent DA 92/97, no direct agricultural impacts have been considered.

Overall, and while there are some equine and tourism businesses in the vicinity of the Mount Pleasant Operation, it does not seem likely that the Modification would have a material additional impact on these businesses relative to the approved Mount Pleasant Operation:

- The Modification open cut extent would remain wholly within the existing Mount Pleasant Operation mining leases.
- If the Modification is approved, mining would advance towards the west, further away from the Hunter River where equine and other agricultural enterprises are located. Any impacts would continue to be ameliorated with progressive rehabilitation and as the Mount Pleasant Operation progressively moves north and west.

3.8.1. Equine industry

The Upper Hunter Strategic Regional Land Use Plan (NSW Government, 2012) recognises two agricultural Critical Industry Clusters (CICs):

- the equine CIC, which produces thoroughbred horses for the racing industry, but also includes horse agistment and breeding for other purposes; and
- the viticulture CIC, which focuses on wine production, along with associated tourism.

The equine industry in the Hunter Valley is centred Scone in the Upper Hunter LGA, and includes a highly integrated concentration of horse breeding facilities and related infrastructure and support services (MACH Energy, 2020). The NSW Government (2012) has defined the land characteristics that are supportive of equine CIC, including various locations in the Muswellbrook LGA.

A number of equine businesses are located in the vicinity of the Mount Pleasant Operation, including Rosebrook Australian Stock Horses, located around 2.5 km south-southeast of the Mount Pleasant Operation. Further south, equine businesses are Abbey Thoroughbreds, Balmoral Stud, Edinglassie Stud, and (south of the Bengalla Mine) Bengalla Stud. The Mount Pleasant Operation is located a significant distance from the commercial centres of the equine CIC, including Scone with a concentration of horse studs and support facilities, and from what is considered the ‘epicentre’ of the thoroughbred breeding industry (MACH Energy 2020).

3.8.2. Viticulture

There are no viticulture enterprises in the vicinity of the Mount Pleasant Operation. The Upper Hunter Wine Region includes the area from Singleton to Murrurundi, including the towns of Muswellbrook, Denman, Gundal, Sandy Hollow, Scone and Stroud.[7] According to Wine Australia's Geographic Indications database, the great majority of vineyards are located in the vicinity of Denman or further south, near Pokolbin and in the Broke Forwich area.[8,9]

3.8.3. Tourism

MACH Energy (2020) note that the Upper Hunter Country Touring Map does not identify any tourism sites in the immediate vicinity of the Mount Pleasant Operation, with the nearest tourist sites being:

- the Hunter Belle Cheese and Karoola Wetlands in and around Muswellbrook, approximately 3 km east of the Mount Pleasant Operation;
- the recreation area, river walk, golf course and horse facilities in and around Aberdeen, approximately 5 km north of the Mount Pleasant Operation; and
- the Muswellbrook Racecourse, located approximately 2.5 km to the south, south-east of the Mount Pleasant Operation.

[7] https://findawinery.com/huntupperfreg.html; accessed 25 November 2025.

[8] https://experience.arcgis.com/experience/6300ec9b34c442e3ac297f86603dcf0d#data_s=id%3AdataSource_1-1948b2462f3-layer-4%3A8; accessed 25 November 2025.

[9] The NSW Government's (2012) assessment of viticulture CICs similarly includes land in the Broke-Fordwich and Pokolbin sub-regions, high-quality land within 20 km of Denman, the parish of Belford and suburbs, and properties proximate to the Hunter Wine Country Private Irrigation District pipeline.

3.9. NET BENEFITS OF THE MODIFICATION

This section summarises the results of the CBA, which compares the benefits accruing to NSW in the Modification Scenario relative to the Reference Case.

3.9.1. Attribution of benefits to NSW

Table 3-5 summarises how the net benefits of the Modification have been attributed to NSW, as described in previous subsections.

Table 3-5. Attribution of Modification net benefits to NSW (2026 to 2036, $2026)

Benefit	Total value (NPV $million)	Proportion attributed to NSW (Per cent)	Value for NSW CBA (NPV $million)
NSW royalties	$645	100%	$645
Company income tax	$421	31.2%	$131
Net producer surplus	$983	0%	$0

Source: AnalytEcon analysis.

3.9.2. Net benefits of the Modification for NSW

Table 3-6 summarises the estimated net benefits of the Modification for NSW. The NPV of the net benefits are estimated at $776 million NPV terms, consisting of royalties of $645 million in NPV terms, and the NSW share of company income tax of $131 million in NPV terms.

Table 3-6. Incremental net benefits of the Modification for the NSW community (2026 to 2036, $2026)

Incremental costs	(NPV $million)	Incremental benefits	(NPV $million)
External effects – GHG emissions	<$1	Royalties	$645
		NSW share of company income tax	$131
Total direct and indirect costs	<$1	Total direct and indirect benefits	$776
Net benefits to NSW			$776

Note: Totals may not sum precisely due to rounding.
Source: AnalytEcon.

The Modification would potentially give rise to some additional external effects that would impact third parties. However, MACH would mitigate the great majority of these, including through the deployment of state-of-the-art equipment and via compensation provisions that would address affected private landowners or other third parties. These external effects therefore do not impose a cost on the NSW community. The NSW share of incremental GHG emissions attributable to the Modification is estimated at around $90,000 in NPV terms and constitutes a cost to the NSW community.

3.10. SENSITIVITY ANALYSIS

The EA Guidelines require a proponent to undertake sensitivity analyses of a range of variables as part of the CBA. It should be noted that the CBA model framework is not well suited to capture the impacts of material external shocks, for instance, sustained changes in interest rates or coal prices. In such circumstances, management would be expected to respond, for instance, by changing production or cutting expenses. In contrast, the CBA model takes the production profile and all costs as fixed, irrespective of whether the producer surplus turns negative.

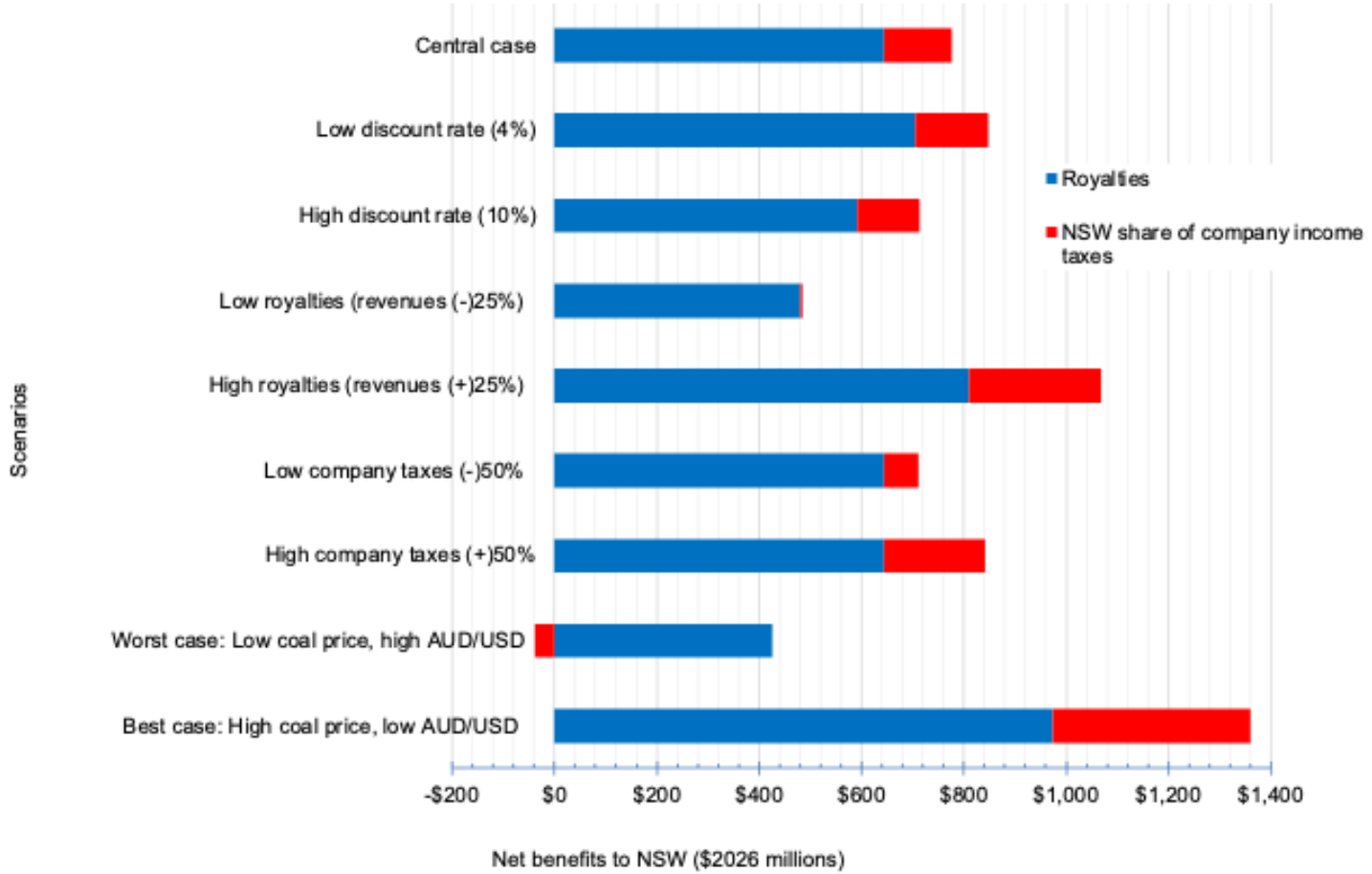
Figure 3-2 below summarises the results of the sensitivity analysis for key assumptions:[10]

- variations in the central discount rate of 7 per cent – 4 per cent versus 10 per cent for all years through to 2036;
- variations in royalty payments – all coal revenues reduced/increased by 25 per cent, respectively, for all years through to the end of production in 2032;
- variations in the company tax rate of plus or minus 50 per cent for all years through to 2036;
- a 'worst case' scenario, which combines a 20 per cent fall in coal prices with an appreciation of the AUD/USD exchange rate by 20 per cent for all years through to the end of production in 2032; and
- a 'best case' scenario, which conversely combines a 20 per cent rise in coal prices with a depreciation of the AUD/USD exchange rate by 20 per cent for all years.

The results of the sensitivity analysis suggest that the net benefits accruing to the NSW community remain positive in all the scenarios modelled (see Appendix C for details).

[10] The sensitivity for different carbon valuations and allocations of carbon costs is shown in Annex B.3.6. It should be noted that, with the exception of the discount rate sensitivity, these variations are all additive.

Figure 3-2. Summary sensitivity analysis of net benefits to NSW



Source: AnalytEcon.

In the 'worst case' scenario – in which coal prices are assumed to fall by 20 per cent and the exchange rate would simultaneously rise by 20 per cent over the entire forecasting horizon – coal royalties would remain at $386 million in NPV terms (although the producer surplus and taxation revenues would be negative). However, these scenarios are not necessarily particularly meaningful. As noted above, a CBA analysis is not a suitable tool for modelling the outcomes arising from material external 'shocks'. Second, there are structural factors that make a 'low coal price/high exchange rate' scenario (and the converse) unlikely. The AUD is a 'commodity currency' whereby a fall in commodity prices typically results in a depreciation of the Australian exchange rate and vice versa (Atkin et al. 2021, Downes et al. 2014). The implication is that a decline in USD denominated coal prices would, at least to an extent, be offset by a depreciation of the AUD.

3.11. DISTRIBUTIONAL IMPACTS OF THE MODIFICATION

As described in previous sections of this report, the Modification would deliver significant net benefits – estimated at $776 million in NPV terms – to the NSW community as a whole. These net benefits consist of royalties flowing directly to the NSW Government, as well as the NSW share of company income taxes that would accrue to the NSW Government indirectly. Either way, these are funds that are available to the NSW Government to be expended to benefit all people living in NSW.

The Modification would benefit the NSW workforce of the Mount Pleasant Operation. Between 2026 and 2036, the Modification would on average employ 531 FTE operational workers based in NSW and 24 FTE construction workers based in NSW (noting that a share of operational workers have been classed as part of the construction workforce). If the Modification is not approved, the Mount Pleasant Operation would only employ 473 FTE operational workers based in NSW in 2026, and a small closure workforce from 2027 to 2029. The disposable income that would accrue to the NSW workforce of the Mount Pleasant Operation if the Modification is approved until the site's rehabilitation and closure in 2036 is estimated at $527 million or $430 million in NPV terms.

Given the significant operating costs that would be incurred over the life of the Modification, local and NSW suppliers can be expected to benefit from additional sales. If current expenditure patterns continue, an additional $724 million in NPV terms would be directed towards NSW suppliers between 2026 and 2032 if the Modification is approved.

The assessments of the likely external effects associated with the Modification suggest that no significant adverse effects on other local industries, such as the equine, viticulture or tourism industries would be expected. As described in Section 3.7, the additional (negative) environmental and other impacts of the Modification on third parties are predicted to be very limited.

4. LOCAL EFFECTS ANALYSIS

This section describes the LEA that has been prepared for the Modification. The LEA is intended to complement the CBA by assessing the economic effects of a project on the local region, consisting of the additional:

- direct and flow-on effects on employment and disposable incomes that would benefit local workers;
- operational expenditures that would benefit local suppliers;
- rate payments to the Shires of Muswellbrook, Upper Hunter and others; and
- payments that would flow to a variety of social and cultural causes under the Mount Pleasant Operation's VPA.

4.1. LOCAL REGION

As noted in Section 2 the Mount Pleasant Operation is located within the boundaries of the Muswellbrook LGA, in the Hunter Valley region of NSW. For the purpose of undertaking the LEA, the EA Guidelines require proponents to adopt a study area that should match a Statistical Area Level 3 (SA3) geographic definition; that SA3 Region should contain the proposed development. In the case of the Mount Pleasant Operation, the relevant SA3 area is the Upper Hunter SA3 Region (the SA3 Region). The SA3 Region includes the towns of Muswellbrook and Scone and broadly aligns with the Muswellbrook and Upper Hunter LGAs, respectively.

The LEA is intended to capture the effects of a development on the local economy, particularly the additional employment and income that accrues to the local workforce. From this perspective, the SA3 Region is not a good approximation of the geographical area where the Modification would lead to increased local economic activity, since a significant share of the workforce lives outside of the SA3 Region. Table 4-1 indicates that 33 per cent of the Mount Pleasant Operation workforce lives in Muswellbrook LGA, and 16 per cent in Upper Hunter LGA, so that a combined 49 per cent of the operational workforce lives in the SA3 Region. While smaller percentages of the workforce live in Cessnock, Maitland, and other adjacent LGAs, an additional 21 per cent of the current workforce reside in the Singleton LGA.

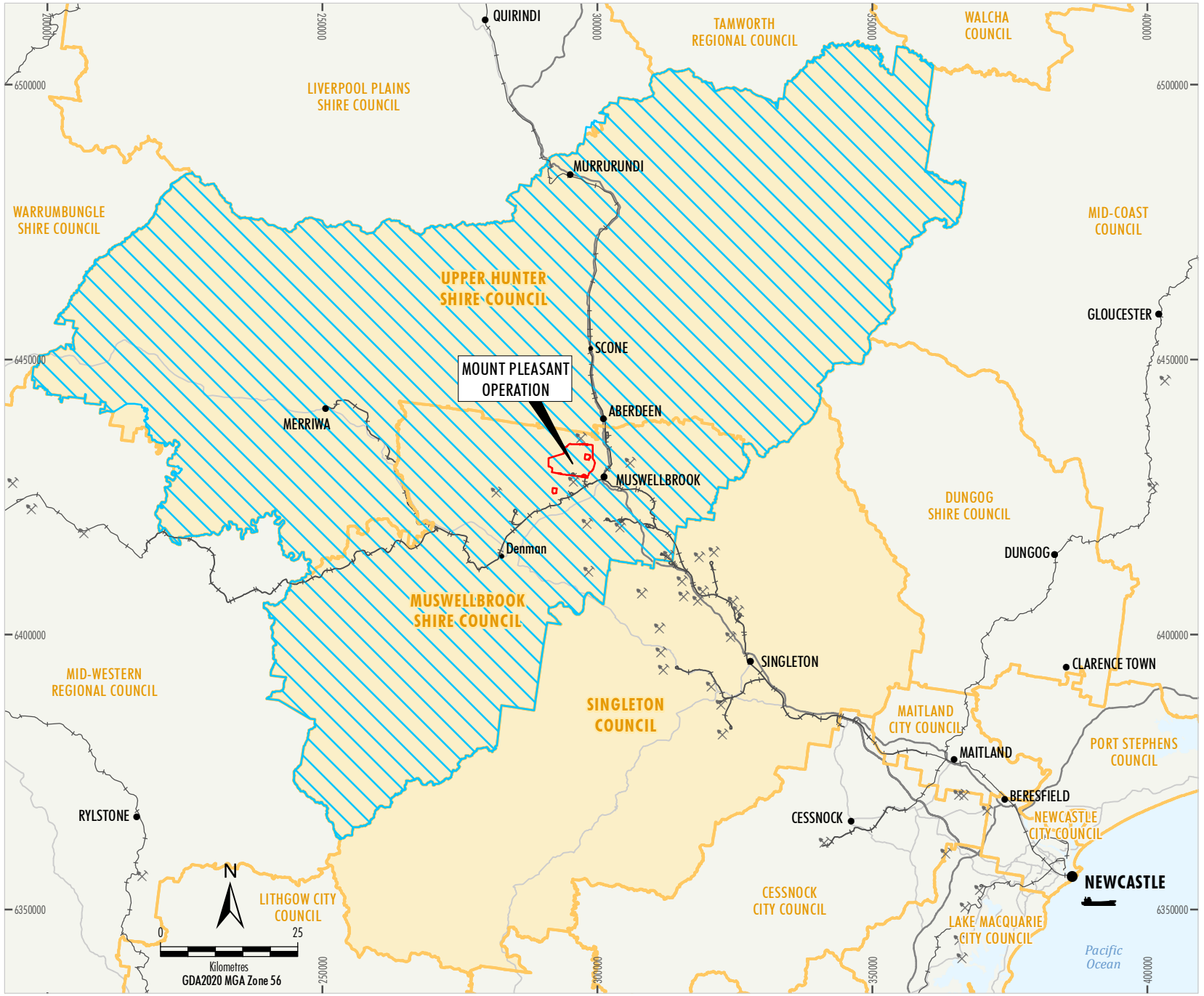
Table 4-1. Place of residence of the Mount Pleasant Operation operational workforce

Place of residence	Percentage share of total
Muswellbrook LGA	33%
Upper Hunter LGA	16%
Singleton LGA	21%
Cessnock LGA	7%
Maitland LGA	5%
Other NSW	13%
Other Australia	4%
Total	100%
Upper Hunter SA3 Region	49%
Mount Pleasant Operation Region	70%

Notes: Totals may not sum precisely due to rounding. % = per cent.
Source: MACH.

Given that the SA3 Region includes the places of residence of only about half of the operational workforce, the approach adopted in this EA is to also consider the local impacts of the Modification for a second region that would better capture the local economic impacts of the Modification (Figure 4-1):

- the 'SA3 Region' corresponding to the Upper Hunter SA3 Region, which captures the places of residence of around 49 per cent of the Mount Pleasant Operation operational workforce; and
- the 'Mount Pleasant Operation Region', consisting of Muswellbrook, Upper Hunter, and Singleton LGAs, which captures the places of residence of around 70 per cent of the Mount Pleasant Operation operational workforce.



LEGEND

- Mining Operation
- Railway
- Highway
- Principal Road
- Upper Hunter SA3 Region
- Local Government Area
- Mount Pleasant Operation Region
- Mining Lease Boundary (Mount Pleasant Operation)

Source: MACH (2025); Australian Bureau of Statistics (2025); NSW Spatial Services (2025)

MACHEnergy

MOUNT PLEASANT OPERATION

SA3 Region and
Mount Pleasant Operation Region

Figure 4-1

MAC-18-02A MOD8_Econ_203A

4.2. LOCAL EMPLOYMENT AND INCOME EFFECTS

This section derives the incremental local employment and income effects attributable to the Modification.

4.2.1. Incremental local operational workforce

As noted above, in the absence of the Modification, the Mount Pleasant Operation would cease operations in 2026, and would employ, on average, a total of 494 operational FTE workers in 2026. If the Modification is approved, the operational workforce would be deployed from 2026 through to 2032 and consist of an average total of 555 FTE workers over that timeframe.

For the LEA it is necessary to compare employment and disposable income averages for the Reference Case and the Modification Scenario. To be consistent, employment averages need to be compared over a common timeframe, namely the operational timeframe of the Modification from 2026 (Year 1) to 2032 (Year 7). Over that timeframe:

- the operational workforce in the Modification Scenario is projected to consist of 555 FTE operational workers, on average; while
- the operational workforce in the Reference Case would consist of 71 FTE operational workers, on average.[11]

Of these operational workers, a share live locally, in the SA3 Region and/or in the Mount Pleasant Operation Region. Table 4-2 shows the numbers of operational workers who are estimated to live in these two local regions on average between 2026 and 2032. These shares have been derived from the places of residence of the Mount Pleasant Operation workforce (Table 4-1). For instance, since around 70 per cent of the operational workforce lives in the Mount Pleasant Operation Region, it can be assumed that in the Modification Scenario 389 FTE operational workers would live in the Mount Pleasant Operation Region (70 per cent x 555 FTEs). The remaining 166 FTE operational workers (555 – 389) are assumed to live outside of the Mount Pleasant Operation Region.

[11] That is, this average covers the year 2026 when the Mount Pleasant Operation would employ 494 NSW-based operational workers, but also the years 2027 through 2032 when the Mount Pleasant Operation would employ no operational workers.

Table 4-2. Operational workforce – Modification scenario and Reference Case (FTE averages, 2026 to 2032)

	SA3 Region			Mount Pleasant Operation Region		
	Mod. Scenario	Reference Case	Incr. workforce	Mod. Scenario	Reference Case	Incr. workforce
Ordinarily resident in region	271	34	236	389	49	340
Not ordinarily resident in region	284	36	248	166	21	145

Note: Totals may not sum exactly due to rounding.
Source: AnalytEcon.

4.2.2. Incremental local disposable income

Table 4-3 derives the incremental disposable income that would accrue to the operational workforce living in the Mount Pleasant Operation Region and the SA3 Region, respectively, if the Modification is approved. The incremental disposable income benefit attributable to the Modification is calculated by comparing the additional disposable income which the operational workforce would earn with the median local wage.

Table 4-3 should be read as follows:

- Row (1) contains the incremental numbers of operational workers assumed to live in the Mount Pleasant Operation Region and the SA3 Region, respectively, if the Modification is approved (consistent with Table 4-2).
- Rows (2) through (4) derive the difference between the average disposable income earned by operational workers if the Modification is approved with the median disposable income in the Mount Pleasant Operation Region and the SA3 Region, respectively. For instance, the average disposable income of an operational worker if the Modification is approved would be $129,956, as compared to the median average disposable income in the SA3 Region of $48,175.
- Row (5) multiplies the additional annual disposable income per person if the Modification is approved with the corresponding number of additional FTE jobs to derive the annual incremental disposable income.
- Row (6) determines the aggregate incremental disposable income for the operational workforce between 2026 and 2032 if the Modification is approved for the Mount Pleasant Operation Region and the SA3 Region, respectively.

Table 4-3. Incremental increase in disposable income – Operational workforce (2026 to 2032)

		Units	Mount Pleasant Operation Region	SA3 Region
(1)	Incremental direct employment – operational workforce (2026 to 2032)	FTE jobs	340	236
(2)	Average disposable income Modification operational workforce	$ per year	$129,956	
(3)	Median disposable income in the local region	$ per year	$49,270	$48,175
(4)	Average increase in disposable income (2) – (3)	$ per year	$80,685	$81,781
(5)	Aggregate increase in disposable income per year (4) x (1)	$M per year	$27.4	$19.3
(6)	Aggregate increase in disposable income over the operational mine life (2026-2032)	NPV $M (Sum total $M)	$169 ($192)	$128 ($135)

Notes: Median employee incomes for the two regions were sourced from the ABS' 'Data by Region' database and adjusted for inflation using the Australian wage price index.

Source: ABS 2025c; 2025d.

In summary, if the Modification is approved:

- an additional 340 operational jobs would be held by operational workers residing in the Mount Pleasant Operation Region from 2032 to 2036 (236 in the SA3 Region); and
- over that same timeframe, the additional disposable income that would accrue to the operational workforce would be $169 million in NPV terms more than the median local wage in the Mount Pleasant Operation Region ($128 million in the SA3 Region).

4.3. LOCAL FLOW-ON EFFECTS

This section describes the incremental 'second-round' or 'flow-on' effects that the Modification would generate for the local community. The input-output (IO) approach for deriving these flow-on effects, the necessary caveats, and the derivation of multipliers is detailed in Appendix E.

4.3.1. Choice of input-output analysis

'Flow-on' effects refer to the adjustments in the economy that follow on from an initial change in the demand for goods, services and labour arising from a significant development such as the Modification. Such a change in demand for a range of inputs sets the economy in motion as the productive sectors buy and sell goods and services from one another, and households earn additional incomes.

The approach for estimating flow-on effects in this EA is to rely on IO analysis to derive various 'multipliers'. The primary reasons for selecting this methodology are the simplicity and clarity with which the underlying assumptions can be set out and appropriate caveats made. IO multipliers are classified into 'types', depending on how many economic feedback loops they encompass. 'Type IA' multipliers capture the immediate impacts on income, employment or value added from all industries whose output is required to produce the additional output from the Modification. Type IB and Type IIA multipliers additionally capture feedback effects from households and other industries, but are calculated in a way that compounds any errors and breaches in the assumptions that underpin IO analysis. A more conservative approach is therefore to use only Type IA multipliers, and this is the approach adopted in this EA.

4.3.2. Local income and employment flow-on effects

Table 4-4 shows the estimated incremental employment-related flow-on effects from the Modification for the Mount Pleasant Operation Region and the SA3 Region, respectively. For consistency, local flow-on effects have been calculated for the NSW operational workforce only (i.e. excluding the construction, and rehabilitation and closure workforce). These are:

- total disposable income flow-on benefits of $134 million in NPV terms for the Mount Pleasant Operation Region ($23 million annually), or $79 million in NPV terms for the SA3 Region ($14 million annually); and
- annual average employment flow-on benefits of 61 FTE jobs for the Mount Pleasant Operation Region, or 43 FTE jobs for the SA3 Region.

The flow-on effects summarised in Table 4-4 should be understood as additional to the direct disposable income and employment effects that would occur if the Modification is approved.

Table 4-4. Incremental flow-on effects (Type IA) for the Modification operational workforce (2026 to 2032, $2026)

		Mount Pleasant Operation Region		SA3 Region	
	Units	Total	Annual	Total	Annual
Disposable income	NPV $M	$134	$23	$79	$14
Employment	Annual average FTE jobs	N/a	61	n/a	43

Source: AnalytEcon.

4.4. OPERATIONAL EXPENDITURES IN THE LOCAL REGION

An analysis of the Mount Pleasant Operation's 2023 operating expenditures by postcode suggests that around:

- 0.8 per cent of expenditures were directed at suppliers located in the Mount Pleasant Operation Region; and
- 0.5 per cent of expenditures were directed at suppliers located in the SA3 Region.

Using these ratios, it is possible to estimate the share of expenditures directed local suppliers going forward, assuming that these shares remain more or less the same over time (Table 4-5). Table 4-5 suggests that the Modification would result in additional operating expenditures of around:

- $24 million in NPV terms in the Mount Pleasant Operation Region; and
- $15 million in NPV terms in the SA3 Region.

Table 4-5. Estimated incremental operating expenditures – directed at local suppliers (2026 to 2032, $2026)

	Modification	Reference Case	Difference
		NPV $M	
Operating expenditures	$3,577	$499	$3,077
Share of operating expenditures attributable to:			
Mount Pleasant Operation Region suppliers	$28	$4	$24
SA3 Region suppliers	$18	$2	$15

Note: Operating expenditures exclude private royalty payments, VPA payments, and payments to local government.

Source: MACH, AnalytEcon.

4.5. LOCAL COUNCIL AND COMMUNITY SUPPORT

As a significant local business and employer, MACH contributes to the local community by paying council rates, but also via the VPA signed with Muswellbrook Shire Council.

In Financial Year 2025-26, MACH contributed around $2.9 million in rate payments to Muswellbrook Shire Council, and smaller sums to Upper Hunter Shire Council, Gunnedah Council and Warrumbungle Shire Councils amounting to more than $3 million per annum in total. If the Modification is approved, the Mount Pleasant Operation would pay around $30.8 million in rate payments or $23.1 in NPV terms until 2035 or when closure activities have been completed.

The Mount Pleasant Operation's VPA with Muswellbrook Shire Council provides for significant payments that are intended to compensate the Council for infrastructure costs incurred, as well as contributing to the local community. The VPA for the Mount Pleasant Operation, which would be extended if the Modification is approved includes the following contributions:

- a $500,000 annual community contribution indexed by the consumer price index (CPI), to be administered by a community representative committee;
- a share of the costs associated with road maintenance apportioned to the Mount Pleasant Operation, up to $220,000 per annum (also indexed by CPI);
- a $20,000 contribution toward an Environmental Officer; and
- on a best efforts basis, the engagement of four apprentices from Muswellbrook Shire and Aberdeen over the life of the mine.

The community contributions that are also administered by MACH staff make a meaningful contribution to:

- the sustainability and wellbeing of Aboriginal communities via the ACDF, which has invested more than $8.4 million to date into projects that benefit Upper Hunter Valley Aboriginal communities; and
- the MACH Community Sponsorship Fund, which provides grants to charities across the local community in the areas of health and wellbeing, sporting, community, non-for-profit organisations, and education.

The SIA for the Modification (Just Add Lime, 2025) notes that MACH supports a range of highly valued social programs and activities for the community directly through funding, human resource, support and guidance, and indirectly through MACH workers volunteering for community and emergency services. Aboriginal organisations such as the ACDF, Wanaruah Local Aboriginal Land Council, Ungooroo Aboriginal Corporation, and Blackrock Industries are empowered through MACH's support to provide medical and mental health services, education programs and pathways, school holiday programs, scholarships, business mentoring and start-up grants, and cultural activities. These activities benefit Aboriginal and non-Aboriginal people in Muswellbrook and surrounding communities.

4.6. EFFECTS ON OTHER LOCAL INDUSTRIES

As described in Section 3.8 the Mount Pleasant Operation is located in a diverse part of NSW where heavy industry like mining coexist with agriculture and tourism industries.

There appear to be no viticulture enterprises in the immediate vicinity of the Mount Pleasant Operation, but there are some horse studs and tourism businesses. The Agricultural and Land Resources Assessment for the Mount Pleasant Optimisation Project (MACH, 2020) identified no equine or viticulture enterprises that would experience material additional adverse direct impacts as a result of the project, and also noted that the Mount Pleasant Operation is located a significant distance from the key parts of the equine CIC. A number of horse studs are visually impacted by the approved Mount Pleasant Operation, but also by other mines in the vicinity. Of the local tourism businesses, the Muswellbrook Race Club is located between the Bengalla Mine and the Mount Arthur Coal Mine, and around 2.5 km south, south-east of the Mount Pleasant Operation.

In summary, as noted in Section 3.8, it does not seem likely that the Modification would have a material additional impact on these local industries, given that:

- the Modification open cut extent would remain wholly within the existing Mount Pleasant Operation mining leases; and
- mining if the Modification is approved would advance west, away from the Hunter River where equine and other agricultural enterprises are located.

4.7. ENVIRONMENTAL IMPACTS ON THE LOCAL COMMUNITY

The approved Mount Pleasant Operation is located in the Muswellbrook mining precinct (Figure 2-1), approximately 3 km from Muswellbrook. As summarised in Section 0 and set out in detail in Appendix B, MACH applies a range of physical measures and operating procedures in order to minimise or eliminate adverse environmental impacts as a result of the Modification on the local community. In particular:

- The Noise and Blasting Impact Assessment (RWDI Australia, 2025) found that, with all proposed noise and blasting management and mitigation measures in place, the Modification would comply with the existing Mount Pleasant Operation Consent conditions and would not impact the acoustic amenity of the surrounding community above approved levels.
- The Air Quality Impact Assessment (Todoroski Air Sciences [Todoroski], 2025) noted that the Mount Pleasant Operation has been operating since 2016 with a strong air quality compliance record. Todoroski (2025) also concluded that the Modification would have minimal air quality impacts beyond what is already approved.

MACH would continue to implement its adaptive management approach to on-site noise, blasting and air quality management to maintain compliance with applicable Development Consent DA 92/97 criteria over the life of the Modification. No material residual noise and particulate matter impacts are predicted after the implementation of the noise and dust mitigation measures in accordance with existing Development Consent DA 92/97.

As discussed in Section 0 and Appendix B, the Modification would be a source of additional GHG emissions relative to those of the Mount Pleasant Operation, although the mine would generate emissions below its Safeguard Mechanism facility baseline in either scenario. The impacts of GHG emissions arise globally, but are also thought to vary by geography. Unless a locality is known to be particularly exposed to certain weather events it is very difficult to comment on GHG emissions impacts at that specific locality. If GHG emissions costs were allocated to the local region on the basis of, say, the share of the local population of world population or regional gross product (GRP) as a share of global gross domestic product (GDP), the resulting damage estimate would be in the range of $565 to $8,377, which may not be particularly meaningful and would, in any case, not be considered material.[12]

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4.8. NET BENEFITS OF THE MODIFICATION FOR THE LOCAL REGION

Table 4-6 summarises the net effects of the Modification for the local region, focusing only on the NSW operational workforce. The first two columns show the direct and incremental effects of the Modification for the Mount Pleasant Operation Region and the SA3 region, respectively, between 2026 and 2036:

- The Modification would create 389 FTE operational jobs for workers in the Mount Pleasant Operation Region, or 271 FTE operational jobs for workers in the SA3 Region. Relative to the Reference Case, 340 FTE operational jobs would be created in the Mount Pleasant Operation Region, or 236 in the SA3 Region.
- The operational workers would earn $273 million in NPV terms in disposable income in the Mount Pleasant Operation Region or $203 million in NPV terms in the SA3 Region. Relative to the Reference Case, the incremental disposable income earned by these workers would be $230 million or $171 million in NPV terms, respectively.
- Local expenditures by the Mount Pleasant Operation are estimated at $28 million and $18 million in NPV terms in the Mount Operation Pleasant Region and the SA3 Region, respectively. Relative to the Reference Case, local expenditures are estimated at $24 million and $15 million in NPV terms, respectively, in the two regions.
- Local government rates are expected be the same in either region and amount to $23 million in NPV terms, or $12 million in NPV terms relative to the Reference Case.
- VPA payments would amount to around $8 million in NPV terms if the Modification is approved in either region, or $4 million in NPV terms relative to the Reference Case

In addition to the direct net benefits attributable to the Modification, the Modification would generate 'second round' or 'flow-on' effects throughout the local region and the wider economy. The final column of Table 4-6 considers the combined incremental employment and disposable income and associated flow-on effects in the two regions:

- an additional 401 FTE jobs would be created in the Mount Pleasant Operation Region, compared to 279 FTE jobs in the SA3 Region; and
- the additional disposable income generated in the Mount Pleasant Operation Region would amount to $364 million in NPV terms, compared to $250 million in NPV terms in the SA3 Region.

The additional environmental, social and traffic-related costs to the local community have been generally assessed as small or negligible; where these occur, they would be resolved by MACH. The potential local impacts of the additional Scope 1 and Scope 2 GHG emissions that would be generated if the Modification is approved have been considered. Assessing the incremental corresponding costs is problematic, but using conventional cost allocation metrics these would be estimated at less than $10,000 in NPV terms.

Table 4-6. LEA Summary – Local effects of the Modification ($2026)

		Direct effects of the Modification		Incremental effects of the Modification		Combined incremental and flow-on effects of the Modification	
		Mount Pleasant Operation Region	SA3 Region	Mount Pleasant Operation Region	SA3 Region	Mount Pleasant Operation Region	SA3 Region
FTE NSW operational jobs	Annual average	389	271	340	236	401	279
Disposable income	NPV $M	$273	$203	$230	$171	$364	$250
Operational expenditure	NPV $M	$28	$18	$24	$15	N/a	N/a
Local government rates	NPV $M	$23	$23	$12	$12	N/a	N/a
VPA payments	NPV $M	$8	$8	$4	$4	N/a	N/a
Externality benefit/cost							
GHG emissions *	NPV	$741	$412	$589	$327	N/a	N/a
Share of world population							
Share of world GDP		$10,973	N/a	$8,723	N/a		

Notes: FTE job and disposable income numbers refer only to the operational workforce. M = million.

* ABS (2025c) and Remplan (2025) suggest that the combined population and GRP estimates for the Mount Pleasant Region (consisting of Muswellbrook, Singleton, and Upper Hunter LGAs) are around 56,864 and $27 billion, respectively. The population of the SA3 Region is estimated at around 31,223. The Mount Pleasant Operation Region therefore accounts for about 0.0007 per cent of the world population and about 0.01 per cent of world GDP, while the SA3 Region accounts for around 0.0004 per cent of the world population, noting that there are no published estimates of the GRP of the SA3 Region. Multiplying by the global damage cost estimate of $85 million in NPV terms suggests that, on a population basis, the incremental social damage cost attributable to the Mount Pleasant Region would be $589 in NPV terms or $327 in NPV terms for the SA3 Region. On a GRP/GDP basis, the incremental social damage attributable to the Mount Pleasant Region would be $10,973 in NPV terms.

Source: AnalytEcon.

5. SIGNIFICANCE OF THE RESOURCE

The net benefits that are attributable to the Modification as described in this EA indicate its significance, in terms of the taxation revenues, including NSW royalties, and the additional employment and disposable income that it would generate. These net benefits would accrue at both the State and the local level.

The Modification's incremental contribution to NSW GSP is estimated at almost $1.3 billion in NPV terms. As set out in Appendix D, the change in GSP as a result of the Modification being approved captures the incremental benefits accruing to NSW from the additional:

- disposable income paid to the NSW workforce, as well as the NSW share of personal taxes;
- royalty payments generated by the Modification;
- NSW share of company income taxes that would be paid by the Modification; and
- payroll taxes, land taxes and local government rates.

On a conservative assessment, the Modification would create 555 operational FTE jobs per annum on average between 2026 and 2032, of which 531 are expected to be filled by NSW workers. The disposable income accruing to the NSW operational workforce is estimated at $398 million in NPV terms.

Between 2026 and 2032 the State of NSW would benefit from additional flow-on effects:

- $212 million in NPV terms in disposable income;
- on average, 408 FTE jobs per annum; and
- $232 million in NPV terms in additional value added or contribution to GSP.

If approved, the Modification would give rise to operating expenditures of $3,577 million in NPV terms between 2026 and 2032, compared to $499 million in NPV terms for the Mount Pleasant Operation currently approved under DA 92/97. On current trends, a little less than a quarter of those operating expenditures would be directed at NSW suppliers.

The Modification would finally deliver significant net direct and flow-on benefits to the local region. For the Mount Pleasant Operation Region, consisting of Muswellbrook, Upper Hunter and Singleton LGAs where 70 per cent of the current operational workforce live, these incremental benefits are estimated at:

- 340 FTE direct operational jobs, and an additional 61 FTE flow-on jobs; and
- additional disposable income for the operational workforce of $230 million in NPV terms, which would generate an additional $134 million in flow-on disposable income.

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APPENDIX A NET PRODUCER SURPLUS

Table A-1. Incremental net producer surplus calculation (2026 to 2036, $2026)

Modification				Mount Pleasant Operation			
Revenues (NPV $M)		**Costs (NPV $M)**		**Revenues (NPV $M)**		**Costs (NPV $M)**	
Gross mining revenue	$7,032	Wages & salaries	$717	Gross mining revenue	$924	Wages & salaries	$162
		Operating costs	$3,717			Operating costs	$519
		Closure/rehabilitation	$112			Closure/rehabilitation	$35
		Capital costs	$188			Capital costs	$4
		All taxes	$1,256			All taxes	$144
Total	$7,032		$5,990	Total	$924		$864
Producer surplus			$1,042	Producer surplus			$59
Net producer surplus (Modification Scenario – Reference Case)							$983
New South Wales share of the net producer surplus							$0

Note: Totals may not sum exactly due to rounding.
Source: AnalytEcon analysis.

APPENDIX B NET ENVIRONMENTAL, SOCIAL AND TRANSPORT RELATED COSTS

B.1. NOISE AND BLASTING IMPACTS

Appendix A of the Modification Report contains the Noise and Blasting Impact Assessment (RWDI Australia Pty Ltd [RWDI], 2025) for the Modification.

PREDICTED NOISE AND BLASTING IMPACTS

Operational noise modelling indicates that the operational noise generated by the Modification would comply with the relevant existing Development Consent DA 92/97 noise criteria during all assessment periods under the modelled meteorological conditions. The reported night-time noise levels for the 2027 and 2031 scenarios incorporate pro-active noise mitigation measures to manage noise emissions at one privately-owned residential receiver.

Further (RWDI, 2025):

- The low-frequency noise assessment indicated that it is unlikely that any of the receivers surrounding the Mount Pleasant Operation would be subject to dominant low-frequency content warranting modifying factor corrections.
- The land area noise assessment found that one vacant privately owned lot (with existing acquisition rights) exceeded the relevant criteria.
- The predicted cumulative operational noise from the Modification, Bengalla Mine, Mount Arthur Coal Mine, Mangoola Coal Operations and Dartbrook Mine was found to comply with the cumulative noise criteria for all operation scenarios and assessment periods.
- The assessment of maximum noise level events potentially generated by the Modification demonstrated compliance with the relevant sleep arousal noise criteria.
- The road traffic noise assessment identified exceedances at seven privately-owned residential receivers, which are all subject to acquisition or mitigation upon request rights in the Development Consent DA 92/97. These seven receivers already experience exceedances without the Mount Pleasant Operation, and the Modification would not cause new exceedances. The relative increase in noise levels with and without the Mount Pleasant Operation would likely exceed 2 dB during peak construction activities, and MACH would continue to implement all feasible and reasonable mitigation measures during potential road traffic noise impacts.

- An assessment of noise levels associated with the Mount Pleasant Operation rail spur indicated compliance at all receivers except receiver 21 where a 1 dB exceedance was predicted assuming medium wheel defects, which is considered 'negligible'. This receiver already has noise mitigation installed by MACH.
- An assessment of noise from the local rail network found that the minimum offset distance to the railway line required to achieve compliance would increase marginally. A number of receivers are found to exceed the relevant rail noise criteria; however, these exceedances would also occur without the Mount Pleasant Operation rail movements. MACH would continue to work with rail service providers to identify wagons with audible wheel defects to remove them from the rail fleet.
- A blasting assessment considered the proposed increase in the Maximum Instantaneous Charge weight used for the largest blast size. The assessment established new minimum buffer zone distances where on site blast monitoring data would be required to inform blast design, as well as other management and mitigation measures to ensure compliance with the relevant blasting criteria.

Overall, RWDI (2025) concludes that, given the noise and blasting management and mitigation measures in place for the Mount Pleasant Operation, the Modification can comply with the existing Mount Pleasant Operation Consent conditions under Development Consent DA 92/97. The Modification is not expected to impact on the acoustic amenity of the surrounding community beyond what is already approved.

MITIGATION AND MANAGEMENT MEASURES

An analysis of the level of pro-active mitigation measures and the frequency at which they would potentially be required was conducted and established that they would be compatible with achieving the Modification's overall production schedule.

MACH applies a comprehensive suite of noise mitigation and management measures on-site, including the application of contemporary technology to fixed plant, noise suppression mechanisms fitted to major mobile equipment, and operating mobile equipment in less exposed areas during the night. Noise management at the Mount Pleasant Operation will continue to be undertaken in accordance with the Noise Management Plan (NMP), which provides for a range of noise management and control measures, noise mitigation programs, as well as the management of exceedances and complaints. Blast management will continue to be undertaken in accordance with the Blast Management Plan (BMP), which provides for blast management and control measures, reporting regimes and the management of exceedances and complaints.

VALUATION

The costs associated with the range of noise mitigation measures, including equipment modifications and implementing the NMP and BMP, have been incorporated in MACH's operating and capital expenditure costings. Given that no material additional noise impacts have been identified, the Modification would not require any amendment to the existing Development Consent DA 92/97 operational noise criteria for the Mount Pleasant Operation. No additional valuation of noise impacts is therefore warranted.

B.2. AIR QUALITY IMPACTS

Appendix B of the Modification Report contains the Air Quality Impact Assessment (Todoroski, 2025) for the Modification.

PREDICTED AIR QUALITY IMPACTS

The air dispersion modelling methodology prepared Todoroski (2025) used local weather and dust monitoring data, incorporated conservative emission estimates and considered activity at other nearby coal mining operations. The results of the air quality study indicated that the Modification would have minimal air quality impacts beyond what is already approved (Todoroski, 2025).

Air dispersion modelling showed that (Todoroski, 2025):

- no privately-owned receptors are predicted to exceed the Modification-only 24-hour average particulate matter less than 2.5 microns ($PM_{2.5}$), particulate matter less than 10 microns (PM_{10}) or annual average dust deposition criteria;
- one parcel of vacant land to the north of the Mount Pleasant Operation is predicted to exceed the relevant Voluntary Land Acquisition and Mitigation Policy criteria for vacant land, and already has acquisition upon request rights for noise impacts in Development Consent DA 92/97;
- cumulative PM_{10} and total suspended particulate level exceedances are predicted to arise at two receptors (which are already afforded acquisition rights), but the contribution of the Modification to the exceedances is small, and these would occur with or without the Modification; and
- with the application of a reactive dust mitigation strategy and incorporating real-time/predicted management systems, no privately-owned receivers are expected to exceed the cumulative 24-hour average $PM_{2.5}$ and PM_{10} criteria.

While nitrogen dioxide (NO_2) may be emitted from some blasts, an assessment of potential NO_2 associated with blast fumes was not considered warranted for the Modification, provided that a best-practice operational blast system continues to be used.

MITIGATION AND MANAGEMENT MEASURES

The Mount Pleasant Operation Air Quality and Greenhouse Gas Management Plan outlines MACH's reactive operational dust mitigation strategies and management measures, and the predictive system. A range of dust mitigation measures are applied at the Mount Pleasant Operation, including:

- the use of water (i.e. wet suppression) during drilling;
- minimising the fall height of overburden materials where practicable;
- the application of water and regular maintenance of unsealed haulage surfaces;
- the application of water on dozer travel routes and work areas;
- three-sided enclosure and activation of fogging sprays during ROM coal unloading;
- enclosures for conveyors and transfer points with application of water sprays at transfer points;
- the use of a luffing stacker to reduce fall height of coal at stockpiles;
- water application to stabilise surface of stockpile and vegetative wind breaks to reduce wind speed over surface of stockpile; and
- water application to stabilise surface of inactive exposed surfaces and primary rehabilitation on areas inactive for extended periods.

In addition to these physical mitigation measures, reactive operational dust mitigation strategies and management measures would continue to be implemented to minimise potential dust impacts during mining operations, consistent with the Environment Protection Licence 20850 for the Mount Pleasant Operation. These include high dust concentration alarms, which trigger dust management actions, including:

- temporarily ceasing the on-site operations causing levels at dust monitors to reach the criterion level; or
- temporarily ceasing operations that are likely to have a significant off-site impact due to adverse weather conditions.

A predictive system using daily forecast meteorological and dust dispersion predictions is also utilised to supplement the reactive operational dust mitigation strategies.

VALUATION

The assessment of air quality impacts by Todoroski (2025) found that the Modification would have minimal additional air quality impacts, either in isolation or cumulatively. Consistent with the EA Technical Notes, the costs of ongoing air quality management and mitigation measures, which would continue to be implemented if the Modification is approved, have been included as part of MACH's costings. No additional valuation of air quality impacts is therefore warranted.

B.3. GREENHOUSE GAS EMISSIONS IMPACTS

Appendix I of the Modification Report contains the Greenhouse Gas Assessment and Mitigation Plan (MACH, 2025a) and the Greenhouse Gas Calculations (Todoroski Air Sciences, 2025) for the Modification.

B.3.1. Predicted greenhouse gas impacts

The Modification is predicted to give rise to 1.906 Mt carbon dioxide equivalent (CO_2-e) of Scope 1 and Scope 2 emissions from 2026 until decommissioning is completed (Table B-1), or incremental Scope 1 and 2 emissions of 1.515 Mt CO_2-e relative to the Reference Case.

The Safeguard Mechanism (underpinned by the Commonwealth *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015*) provides baseline GHG emissions and GHG offset requirements for applicable facilities, which currently includes the existing Mount Pleasant Operation, and would continue to include Mount Pleasant Operation should the Modification be approved. The Safeguard Mechanism sets a baseline level of GHG emissions for facilities such as Mount Pleasant Operation. If a facility exceeds its baseline level, it is required to surrender to the Clean Energy Regulator (CER) Australian Carbon Credit Units (ACCUs) or, following recent reforms, alternatively Safeguard Mechanism Credit units (SMCs) equivalent to the exceedance to offset these GHG emissions. Conversely, if a facility's emissions remain below the baseline, it would generate SMCs.

The potential carbon offset (ACCUs/SMCs) liabilities under the Safeguard Mechanism for the Mount Pleasant Operation and the Modification have been estimated based on the Scope 1 GHG emission forecasts (Table B-1). As is the case for the Mount Pleasant Operation, the assessed Scope 1 emissions of the Modification are expected to remain below the baseline, and the Modification is expected to generate 0.281 million SMCs (credits). As is shown in Table B-1, the Safeguard Mechanism baseline and any corresponding liabilities or credits refer to the operational period of the Modification or the Mount Pleasant Operation, respectively. Any

Scope 1 emissions that arise post-mining during decommissioning do not fall under the Safeguard Mechanism ROM coal baseline and must be accounted for separately.

Table B-1. GHG emissions projections Modification versus Mount Pleasant Operation (2026 – 2036)

	Modification	Mount Pleasant Operation	Difference
		Mt CO2-e	
GHG emissions projections			
Scope 1	1.810	0.362	1.448
Scope 2	0.103	0.036	0.067
Total	1.913	0.398	1.515
Safeguard Mechanism calculations			
Baseline emissions (during operations)	2.073	0.338	1.735
Emissions liability/credit	-0.281	-0.035	-0.246
Scope 1 emissions post-operations	0.018	0.059	-0.041
Total Scope 1 emissions	1.810	0.362	1.448

Source: Todoroski Air Sciences, 2025.

B.3.2. Mitigation measures

Existing GHG mitigation and management measures implemented at the Mount Pleasant Operation would continue to be applied for the Modification. These measures are generally focused on reducing fuel usage, through optimisation of haul roads, minimising rehandling and maintaining fleet in good operating order. The costs associated with various mitigation measures to minimise the overall generation of GHG emissions have been incorporated in MACH's costings.

B.3.3. Valuation of emission credits under the Safeguard Mechanism

As noted above, in either the Modification Scenario or the Reference Case, the GHG emissions generated by the Mount Pleasant Operation are expected to remain below the respective baselines, so that the facility would generate SMCs in either scenario. While noting that ACCU price forecasts are highly uncertain, the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) (DCCEEW, 2023) has published forecasts of ACCU prices to 2035 prepared by RepuTex Energy (2023). For the purposes of the CBA, the SMCs have been valued using the RepuTex (2023) ACCU forecasts and incorporated as credits in the Modification Scenario and Reference Case.[13] The incremental value of the ACCUs/SMCs that would be generated in the Modification Scenario amounts to around $14 million in NPV terms (Table B-2).

Table B-2. Valuation of Safeguard Mechanism credits in the CBA (ACCUs/SMCs) ($2026)

Emissions / valuation	Modification Scenario	Reference Case	Difference
Emissions credits (Mt CO2-e)	0.281	0.035	0.246
Emissions credit valuation – Value of ACCUs (NPV $M)	$16	$2	$14

Notes: Totals may not sum precisely due to rounding. The RepuTex ACCU forecast ends in 2034. 2035 and 2036 ACCU values have been estimated using the average annual growth rate over the life of the forecast. $2024 ACCU price forecasts have been converted to $2026 prices using a CPI estimate to October 2025.

Source: Todoroski, 2025 and RepuTex Energy, 2023.

B.3.4. Valuation of GHG emissions – EA Technical Notes

The EA Technical Notes offer guidance on valuing the GHG emissions of a project, namely:

- first, the scope of the emissions to be valued;
- second, the general approach for valuing the emissions; and
- third, the share of the value of the emissions that should be attributed to NSW.

[13] For practical purposes, ACCUs and SMCs are considered equivalent in this EA and are assumed to have the same value.

EMISSIONS COVERED

The EA Technical Notes require the Scope 1 and Scope 2 emissions of a project to be reported and valued, noting that, unlike Scope 3 emissions, these are under the direct control of a project proponent.

MARKET PRICES

The EA Technical Notes emphasise the need to use market prices to value emissions. Given that, at the time of writing the EA Technical Notes, there was considered to be (p.48) "*no identified carbon price in Australia*", future prices for European Union Allowances, as determined on the European Energy Exchange were suggested as a market-based option.

Since the time of publication of the EA Technical Notes, ACCUs have gained widespread acceptance as valid carbon offsets and are now regularly traded in secondary markets. The ACCU scheme was established in 2011 as part of the Carbon Farming Initiative, but its role has expanded with the commencement of the Safeguard Mechanism in 2016. An issued ACCU represents one tonne of CO_2-e that is sequestered (stored) or avoided by a project, subject to certain eligibility requirements being met. ACCUs are held and can be transferred within Australia in accounts in the Australian National Registry of Emissions Units (ANREU). They are purchased by the Australian Government to meet Australia's climate change commitments, by industrial facilities that are covered by the Safeguard Mechanism, and by 'voluntary' purchasers: state and local governments or corporate buyers who have made voluntary emissions reductions pledges.

ACCUs were initially sold through auctions held by CER, where the last auctions held in April 2022 and March 2023 yielded prices of around $17 per ACCU. ACCU spot prices in the secondary markets have been significantly higher although variable, trading upward of $38 in November 2025, but have since declined.[14]

ACCU transactions volumes in secondary markets have grown considerably, reflecting increasing public confidence in the scheme (Westpac and Carbon Market Institute, 2024). Confidence in the scheme was also strengthened by the introduction of ACCU futures contracts on the Australian Securities Exchange,[15] as well as improvements in the information available about specific types of ACCUs in the ANREU. Recent reforms of the Safeguard Mechanism have further strengthened demand for ACCUs on the part of covered facilities, but demand for ACCUs from investors, traders and intermediaries is

[14] https://coremarkets.co/resources/market-prices; accessed 30 November 2025.

[15] ACCU futures are also traded on overseas exchanges, such as the CME Group.

also strong. According to Core Markets,[16] 'voluntary demand' on the part of corporate buyers that are not covered by emissions reduction legislation is predicted to grow steadily, particularly as ACCUs are increasingly preferred over international carbon offsets.

Finally, the Australian Government is committed to ensuring the integrity of the ACCU Scheme.[17] The governance, administration and integrity of the scheme have to date been reviewed three times:

- in December 2022 by an independent panel led by Professor Ian Chubb (2022), which found the ACCU scheme to be sound;
- by the Climate Change Authority in 2023, which concluded that the ACCU scheme was fundamentally well-designed; and
- by the Australian National Audit Office in 2024, which concluded that the administration of the scheme to be largely effective.

The Modification and Mount Pleasant Operation Scope 1 and 2 emissions were valued using ACCUs, as forecast by RepuTex Energy (2023) and referenced by DCCEEW in its 2023 emissions projections. On that basis, the estimated global cost of the incremental Scope 1 and 2 GHG emissions of the Modification would be $85 million in NPV terms.

ATTRIBUTION OF GHG EMISSIONS TO NEW SOUTH WALES

The third aspect of valuing a project's incremental carbon emissions concerns what share of the corresponding social cost should be attributed to NSW. The EA Technical Notes say that the value of the externality should be limited to the impact on NSW, consistent with how all other costs/benefits are measured within the CBA.

The EA Technical Notes do not describe a specific methodology for adjusting the overall externality cost of GHG emissions to reflect the impact to NSW. In the past, various approaches have been accepted by the NSW Government and the Independent Planning Commission, including allocating the cost of GHG emissions on the basis of:

- NSW' share of global GDP, as in the EA for the Mount Pleasant Optimisation Project (AnalytEcon, 2021);
- NSW' share of the global population, as in the EA for the Mangoola Coal Continued Operations Project (Cadence Economics, 2019); and

[16] https://coremarkets.co/insights/accu-price-dynamics-a-guide-for-anyone-with-a-carbon-exposure; accessed on 30 November 2025.
[17] https://www.dcceew.gov.au/climate-change/emissions-reduction/accu-scheme/reviews-and-reforms; accessed 30 November 2025.

- NSW' share of the Australian population, as in the EA for the Maxwell Underground Coal Mine Project (Deloitte Access Economics, 2019).

As a matter of economics, there is generally no single 'correct' way for allocating or apportioning costs. In the current context, the alternative approaches for apportioning social costs are based either on production, as measured by GDP, which is a price dependent measure and hence only a proxy for physical production, or consumption, as proxied by population. As production and consumption are essentially equivalent, as measured by total GDP, the difference comes down whether the liability for social costs rests with producers or with consumers (who are ultimately the beneficiaries of the production processes that give rise to emissions).

The implications of all three methods for allocating the costs of the Modification's incremental Scope 1 and Scope 2 GHG emissions are summarised in Table B-3. For the purpose of determining the net benefits of the Modification to the NSW community in the CBA, we have attributed the incremental Scope 1 and Scope 2 GHG emissions costs to NSW on the basis of the share of the NSW population of the world population. This approach results in incremental GHG emissions costs of around $90,000 in NPV terms to NSW. Variations to the carbon price and allocation methods are considered in the sensitivity analysis in Section B.3.6.

Table B-3. Modification incremental Scope 1 and Scope 2 GHG emissions costs valued using ACCUs and cost attribution to NSW ($2026)

Global cost	NSW allocation of GHG emissions on the basis of:		
	NSW share of global GDP	NSW share of global population	NSW share of Australian population
	(NPV $M)		
$85	$0.25	$0.09	$27

Notes: As of March 2025, the NSW population was around 8.6 million, compared to the Australian population of 27.5 million and a world population (2024) of around 8.1 billion. In 2024, Australian GDP was around 1 per cent of world GDP, and NSW GSP was around 30.3 per cent of Australian GDP.

Source: RepuTex Energy, 2023; ABS 2025, 2025b; World Bank 2024, 2024a; AnalytEcon.

B.3.5. Valuation of GHG emissions – NSW Treasury Business Case Guidelines

As part of its updated 'NSW Government Investment Framework', the NSW Treasury has recently published estimated carbon values (NSW Government, 2024). These carbon values have been applied as a sensitivity to value the incremental emissions attributable to the Modification. However, it should be understood that the purpose of these

published carbon values is to assist Government agencies in evaluating trade-offs between alternative investment options. As noted in NSW Government (2024, p.1), these carbon values are notional, 'shadow prices' that are intended for internal government use only: no explicit carbon price is ever paid by any NSW Government agency, nor by any private sector entity in NSW. On that basis the societal cost of the incremental emissions attributable to the Modification Scope 1 and Scope 2 GHG emissions would be estimated at $224 million in NPV terms.

B.3.6. Greenhouse gas valuation sensitivity

The results for the different carbon prices and methods of allocating the aggregate carbon costs to NSW, as well as the implications for the net benefit to NSW of the Modification are summarised in Table B-4. In summary, depending on the GHG valuation and attribution method that is adopted, the imputed costs of the Modification's incremental Scope 1 and 2 GHG emissions vary between $0.07 million and $365 million in NPV terms, and the corresponding net benefit to NSW between $776 million and $411 million in NPV terms, respectively.

Table B-4. Greenhouse gas valuation sensitivity

	ACCUs			NSW Treasury carbon prices		
	Low	Medium	High	Low	Moderate	High
	(NPV $M)					
	Global carbon costs					
Incremental GHG costs	$64	$85	$106	$158	$224	$365
NSW net benefit	$712	$691	$670	$619	$553	$411
	Allocation to NSW on the basis of NSW share of world GDP					
Incremental GHG costs	$0.19	$0.25	$0.31	$0.47	$0.66	$1.08
NSW net benefit	$776	$776	$776	$776	$775	$775
	Allocation to NSW on the basis of NSW share of world population					
Incremental GHG costs	$0.07	$0.09	$0.11	$0.16	$0.23	$0.38
NSW net benefit	$776	$776	$776	$776	$776	$776
	Allocation to NSW on the basis of NSW share of Australian population					
NSW net benefit	$20	$27	$33	$49	$70	$114
NSW net benefit	$756	$750	$743	$727	$706	$663

Source: AnalytEcon.

B.4. GROUNDWATER IMPACTS

The Groundwater Assessment (Australasian Groundwater and Environmental Consultants Pty Ltd [AGE Consultants], 2025) for the Modification is provided in Appendix C of the Modification Report.

B.4.1. Predicted groundwater impacts

Predictive modelling through to 2045 prepared as part of the Groundwater Assessment for both the Reference Case and the Modification Scenario found that (AGE Consultants, 2025):

- additional drawdown due to the Modification is spatially limited, typically to less than 2 meters (m) beyond the existing area of influence, with cumulative drawdown largely driven by regional mining activities;
- the indirect take from alluvial aquifers is minimal, peaking at 1.8 megalitres (ML/year (Hunter River alluvium) and <1 ML/year (Sandy Creek and Dart Brook) post-mining;
- baseflow reduction to the Hunter River is predicted to peak at approximately 42 ML/year, which is less than 0.05 per cent of mean annual flows and therefore hydrologically insignificant;
- six registered private bores are predicted to experience a drawdown greater than 2 m in a cumulative scenario (where drawdown occurs from the Modification and the approved operations of the Dartbrook Mine, Bengalla Mine, and Mount Arthur Coal Mine); of these bores, only two low-yield or inactive bores are attributable to the Modification;
- groundwater dependent ecosystems are not predicted to experience measurable drawdown impacts;
- groundwater quality impacts are expected to remain negligible, with seepage and salinity managed under the existing Fines Emplacement and Water Management framework;
- the cumulative impacts of the Modification can be effectively managed consistent with the requirements of the *Water Management Act 2000*; and
- MACH holds sufficient water access licenses (WALs) under the *Water Management Act 2000* (NSW) to account for all direct and indirect groundwater take consistent with the NSW Aquifer Interference Policy (AIP).

Overall, AGE Consultants (2025) conclude that the Modification would cause only a slight expansion of the drawdown area compared to the approved Mount Pleasant Operation,

with impacts remaining well below those predicted in the 1997 Environmental Impact Statement. With the current and planned monitoring program, potential groundwater impacts are considered effectively managed, ensuring ongoing protection of the regional groundwater system and associated ecosystems.

B.4.2. Mitigation Measures

MACH would continue to conduct groundwater management in accordance with the Water Management Plan (WMP, including the Groundwater Management Plan (GWMP) and Surface and Ground Water Response Plan) if the Modification is approved. The WMP encompasses monitoring of groundwater levels, water quality, and inflows, and includes a Trigger Action Response Protocols plan in the event that results are detected outside the acceptable range. In accordance with DA 92/97, MACH would review and evaluate the environmental performance of the Modification for the previous calendar year by the end of March each year.

The approved GWMP outlines a monitoring program to collect groundwater levels and quality measurements and allow actual impacts to the local groundwater system to be compared against those identified in the environmental assessments. It focuses on collecting information on the potential impacts on:

- groundwater levels on neighbouring properties and any beneficial groundwater users;
- groundwater quality; and
- water access licence compliance.

The approved GWMP identifies 34 active monitoring bores; MACH has since added additional groundwater monitoring sites and has committed to further additions.

Finally, during operations, the Fines Emplacement Area would be managed in accordance with the Fines Emplacement Plan for the Mount Pleasant Operation.

B.4.3. Valuation Approach

The EA Technical Notes say that the economic significance of potential impacts on water resources should primarily be measured with reference to the market price of the relevant water resource(s) and, if relevant, other factors potentially not captured by market prices (such as specific locational or seasonal effects that may affect third parties). As no additional water licences would need to be purchased, no costs associated with additional water licences have been included.

The EA Technical Notes set out options for estimating the water-related costs borne by third parties, including the owners of potentially impacted bores. These include the costs

of water treatment, providing an alternative water source, or compensating for lost income, among others. The costs associated with the proposed groundwater management measures have been incorporated in MACH's operating and capital expenditure costings.

B.5. SURFACE WATER IMPACTS

The Surface Water Assessment (ATC Williams, 2025) for the Modification is provided in Appendix D of the Modification Report.

B.5.1. Predicted Surface Water Impacts

The Surface Water Assessment indicates that the Modification is not expected to materially impact the environmental values of the receiving surface waters (ATC Williams, 2025):

- there would be a small and likely indiscernible reduction of flows in the Hunter River at Muswellbrook during operations and post-closure;
- the potential impacts of predicted overflows from sediment dams and Environment Dam 3 on downstream water quality would be negligible;
- it is highly unlikely that the Modification would contribute to any significant impacts to the water quality of Sandy Creek; and
- the potential impacts of controlled discharges on downstream water quality is expected to be negligible (e.g. no exceedances of water quality objective due to controlled discharges).

The various mines operating in the vicinity of the Mount Pleasant Operation operate in a highly regulated water system. Given these various regulatory controls, the cumulative impacts on downstream water users are expected to be negligible.

The water management system is predicted to have some periods of lower water supply reliability when available water determinations are reduced for licensed extraction from the Hunter River (ATC Williams, 2025). Consistent with the approved Mount Pleasant Operation, MACH may implement additional adaptive water-use efficiency measures (such as the additional use of chemical dust ameliorants, selective increases in ROM coal bypass to reduce the CHPP water demand) or to source excess mine water from adjoining mines for use on site, in order to reduce the make-up water demand from the Hunter River over the life of the Modification.

B.5.2. Mitigation Measures

MACH would conduct surface water management in accordance with the Water Management Plan (including the Erosion and Sediment Control Plan, Surface Water Management Plan and Surface and Ground Water Response Plan) for the Mount Pleasant Operation incorporating the Modification.

B.5.3. Valuation Approach

The EA Technical Notes recommend that surface water impacts primarily be measured with reference to the market price of water, subject to ensuring that any remaining third-party effects are properly accounted for.

The water balance modelling undertaken as part of the Surface Water Assessment indicates that external water demands associated with the Mount Pleasant Operation incorporating the Modification would be met by existing surface and groundwater entitlements held by MACH (ATC Williams, 2025) with additional adaptive water-use efficiency measures consistent with the approved Mount Pleasant Operation adopted during periods of lower water reliability.

There is no indication that the water requirements for the Modification would impact third parties in a manner that is not already captured by market prices.

No additional surface water-related costs would therefore be incurred in the Modification Scenario relative to the Reference Case, and none have been included in the CBA.

B.6. BIODIVERSITY IMPACTS

B.6.1. Predicted biodiversity impacts

The Mount Pleasant Operation area has been used for agricultural practices, including grazing of cattle and sheep, for over 100 years. It consists of a grassy landscape including areas of grassy woodland and derived native grassland with few paddock trees.

The total Mount Pleasant Operation approved surface disturbance area encompasses approximately 2,650 – 2,700 ha. The Modification would require the progressive clearance of woodland and derived native grassland within the existing approved development footprint to 2032. As mining activities would be largely restricted to the South Pit until December 2026, the surface disturbance area at the end of that year would be approximately 1,500 ha, much less than the originally approved total authorised for surface disturbance.

An incremental increase in noise, dust and light spill on the adjacent habitat as a result of the Modification is unlikely to significantly impact local fauna populations, noting that the vegetation adjacent to the Modification area is mostly open derived native grassland. The Modification is unlikely to increase the risk of weeds and pests given control programs are implemented at the Mount Pleasant Operation.

B.6.2. Mitigation and management measures

Surface disturbance areas at the Mount Pleasant Operation would continue to be rehabilitated and revegetated progressively once disturbed areas are no longer required for operational or construction activities. Management measures prescribed in the Biodiversity Management Plan would continue to be implemented if the Modification is approved. These include:

- revegetation of post-mining landforms;
- pre-clearance surveys;
- relocation programs and targeted investigations of identified flora;
- collecting and propagating seed;
- salvaging and re-using material from the site for habitat enhancement;
- controlling weeds and feral pests; and
- bushfire management.

B.6.3. Valuation

Development Consent DA 92/97 for the approved Mount Pleasant Operation was granted in December 1999, prior to the implementation of offsetting policies in NSW. Broadly speaking, no biodiversity offsets are required for the approved development under Development Consent DA 92/97, but some 12,875 ha of biodiversity offsets have been established for the Mount Pleasant Operation for the purpose of the Commonwealth approval (EPBC 2011/5795). MACH has also provided some $2 million to date towards priority recovery actions for the Regent Honeyeater and Swift Parrot under EPBC 2011/5795. Given that the existing Development Consent DA 92/97 surface disturbance plan already has a significant biodiversity offset in place under a combination of Commonwealth and state legislation, no additional cost has been applied.

B.7. ABORIGINAL HERITAGE IMPACTS

B.7.1. Predicted impacts

The Mount Pleasant Operation has been subject to numerous previous assessment and surveys of Aboriginal heritage items. 2,007 tangible Aboriginal heritage sites have been identified at the Mount Pleasant Operation to date, of which, some 1,341 sites are known to have been managed (i.e. salvaged/ impacted) under the currently approved Mount Pleasant Operation.

B.7.2. Mitigation and management measures

Aboriginal heritage sites within approved disturbance areas are managed in accordance with an approved Aboriginal Heritage Management Plan and existing Aboriginal Heritage Impact Permits (AHIPs). The mitigation, management and monitoring measures in the Aboriginal Heritage Management Plan and the AHIPs were developed through extensive consultation with registered Aboriginal parties (RAPs) during various cultural heritage assessments. MACH undertakes cultural heritage recording and salvage activities with the involvement of RAPs in accordance with the Aboriginal Heritage Management Plan and the AHIPs.

As part of the approved Mount Pleasant Operation, an Aboriginal Heritage Conservation Strategy was initially developed with the assistance of the RAPs and the Office of Environment and Heritage (now Heritage NSW). In consultation with RAPs and Heritage NSW, MACH is establishing a permanent Keeping Place and cultural centre adjacent to the Hunter River and east of the Mount Pleasant Operation. In addition to the Keeping Place and cultural centre, the Munmurra River Grinding Grooves site has recently been registered and will be protected in perpetuity as part of a Conservation Agreement under the EPBC Act.

Finally, consistent with the Aboriginal Heritage Management Plan:

- consultation with the RAPs would continue for the life of the mining operations at the Mount Pleasant Operation;
- any unrecorded Aboriginal sites that may be identified would also be managed in accordance with the plan;
- where impacts cannot either be avoided or avoidance is unwarranted, community surface collection, site survey or test/salvage excavation would be undertaken prior to any proposed works; and
- Aboriginal cultural heritage would continue to be a part of all employee and contractor inductions.

B.7.3. Valuation approach

Consistent with the EA Technical Notes, the costs associated with the implementation of the Aboriginal Heritage Management Plan and associated processes have been included in the Mount Pleasant Operation operating costs. No additional costs have been incorporated in the CBA.

B.8. HISTORIC HERITAGE IMPACTS

Potential impacts on historic heritage arising from the Modification have been assessed in the Modification Report with reference to the findings of the previous Mount Pleasant Optimisation Project Historic Heritage Assessment (Extent Heritage Pty Ltd, 2020), which considered the impacts on the same historical sites. A number of these sites have already been managed (e.g. archived) and demolished.

B.8.1. Predicted impacts

One historical heritage place of local heritage significance (MP20 Kayuga Coal Mine) is located within the disturbance area of the Modification.

The Kayuga Coal Mine (MP20) is located within the Mount Pleasant Operation approved surface disturbance plan. Extent Heritage Pty Ltd (2020) concluded that this direct impact would be appropriately mitigated by implementing recommended management measures.

Two places of State heritage significance were also identified within the broader Muswellbrook area (Extent Heritage Pty Ltd, 2020).

Potential indirect impacts on heritage sites associated with blasting were also considered. The assessment concluded that the Modification would have no adverse impacts associated with blasting, given that all blasting activities would be carried out to meet the prescribed blasting criteria in the approved BMP.

Other potential indirect impacts relating to air quality, acoustic, visual amenity and altered 'use' have also been considered. Any potential indirect impacts would be avoided or mitigated by implementing management measures consistent with the Mount Pleasant Operation Historic Heritage Management Plan (MACH, 2025b) and other site environmental management plans.[18]

[18] MACH has prepared a draft Historic Heritage Management Plan that addresses the requirements of Development Consent SSD 10418.

B.8.2. Mitigation and management measures

Management measures for the identified historic heritage sites would be described in a Historic Heritage Management Plan to be developed should the Modification be approved, which would describe specific management measures for each historical heritage site. MACH would continue to implement blasting management measures in accordance with the BMP.

B.8.3. Valuation approach

Consistent with the EA Technical Notes, the costs associated with the development and implementation of the Historic Heritage Management Plan have been included in the Mount Pleasant Operation operating costs.

B.9. VISUAL AMENITY

Appendix F of the Modification Report contains the Visual and Landscape Assessment (MACH, 2025c) for the Modification.

B.9.1. Predicted impacts

Potential landscape impacts were assessed within a 5 km boundary of the Modification, and on the basis of landscape character zones as a basis for identifying key landscape features. MACH (2025c) note that the dynamic landscape impact of the Mount Pleasant Optimisation Project on the landscape at the regional, subregional and local scales has previously been assessed as moderate. Given that the extent of the proposed final landform of the Modification would be less than that of the Mount Pleasant Optimisation Project, the dynamic landscape impacts of the Modification would also (conservatively) be moderate.

Where visual impacts are concerned, the overall potential direct and diffuse light effects of the Modification would be consistent with the impacts of the approved Mount Pleasant Operation, and existing lighting mitigation measures would continue to be applied. The potential visual impacts of the Modification would be associated with the expansion in vertical and horizontal scale of the waste rock emplacement landform, construction activity, lighting effects and the extension to the duration of operations for an additional six years (MACH, 2025c). Higher visual impacts would occur during the initial development of the waste rock emplacement landform. As ongoing rehabilitation and native vegetation is established the visual effects would be lowered; however, topographic changes would be permanent.

B.9.2. Mitigation and management measures

The Modification rehabilitation strategy would continue to emulate the vegetation patterns, landforms and colours of the existing landscape (consistent with the approved Mount Pleasant Operation strategy) to reduce the contrast with surrounding landscape setting. The final landform has also been designed to achieve an upper profile and micro-topographic contouring that emulates natural landscape topography and is an example of best practice mine geomorphic rehabilitation. In the long term, this design feature of the Mount Pleasant Operation improves visual integration.

The following mitigation strategies would ameliorate visual impacts from the Modification:

- an initial bund would be constructed to reduce views into the mining area as mining advances northward before subsequently being integrated into the waste rock emplacement;
- progressive rehabilitation of the waste rock emplacement landform; and
- lighting mitigation strategies.

MACH manages and mitigates visual impacts associated with the approved Mount Pleasant Operation in accordance with a Visual Impact Management Plan (VIMP) (MACH, 2025d). If it is approved, the existing VIMP would be revised to reflect the Modification.

B.9.3. Valuation approach

Consistent with the EA Technical Notes, the costs associated with the development and implementation of the Modification rehabilitation strategy and visual mitigation measures have been included in the Mount Pleasant Operation costs. Based on the conclusions of the Visual and Landscape Impact Assessment (MACH, 2025c), it is considered that any residual visual impacts would not be material and would not therefore give rise to additional costs that would need to be considered.

B.10. SOCIAL IMPACT ASSESSMENT

Appendix G of the Modification Report contains the Social Impact Assessment ([SIA], Just Add Lime, 2025) for the Modification.

B.10.1. Predicted impacts

The results of the SIA were developed around a framework of assessing and updating previous work undertaken around the Mount Pleasant Operation, data collection, and a

process of engagement with a range of stakeholders. Overall, the SIA concluded that MACH and the Mount Pleasant Operation have built strong links to the community (particularly to the Aboriginal community) that have a significant impact within Muswellbrook and beyond.

If the Modification is approved, stakeholders would continue to experience both positive and negative impacts. The negative impacts are related to activities generally common to all mines, such as workforce management and traffic, as well as nuisance impacts such as noise, dust and lighting. The positive social impacts identified include employment opportunities and associated high standards of living, as well as support for local businesses and the community. Many of the positive social impacts also arise as a result of community contributions via the VPA, including the specific programs, activities and management practices undertaken by MACH and the Mount Pleasant Operation.

If the Modification is not approved and mining ceases at the Mount Pleasant Operation, the quality of life and wellbeing of neighbouring property owners would improve. Overall, however, the feedback from stakeholders is that the closure of the Mount Pleasant Operation if the Modification is not approved would have a devastating impact on the community, particularly because a number of other mining and industrial facilities are also slated for closure.

B.10.2. Mitigation and management measures

MACH and the Mount Pleasant Operation have implemented a range of mitigation strategies to reduce the existing social impacts. These include community engagement under MACH's various community engagement mechanisms and strategies, the ACDF, the VPA with Muswellbrook Shire Council, and implementation of the approved Mount Pleasant Operation site wide environmental management plans. For impacts that are a continuation of existing impacts, no new mitigation or monitoring measures are proposed. Ongoing and regular monitoring activity, along with existing engagement and complaints mechanisms provide ways to identify where existing management strategies are not meeting expectations. The SIA also notes that approval of the Modification provides time for proper closure planning, with the opportunity to mitigate negative social impacts of the mine's eventual closure.

B.10.3. Valuation

Given that both the positive and the negative impacts of the Mount Pleasant Operation would largely be unchanged if the Modification is approved, no valuation of social impacts has been included in the CBA.

B.11. ROAD TRANSPORT IMPACTS

Appendix E of the Modification Report contains the Road Transport Assessment (The Transport Planning Partnership, 2025) for the Modification.

B.11.1. Predicted impacts

The Road Transport Assessment concludes that the existing road network can adequately accommodate the Modification traffic. No specific measures or upgrades are required to mitigate the impacts of the development on the capacity, safety and efficiency of the road network as a result of the changed road traffic conditions associated with the Modification (The Transport Planning Partnership, 2025).

Previous road safety audits on the access routes used by Mount Pleasant Operation traffic and on Castlerock Road did not identify any high-risk issues. With the forecast changes in traffic in the region, other developments in the region and growth, future levels of service experienced by drivers on the key access roads for the Modification would remain satisfactory. The key intersections which would be used by Modification traffic are expected to operate at good levels of service with short delays and spare capacity without requiring upgrading. The planned construction of the Muswellbrook Bypass and the realignment of the Mount Pleasant Northern Link Road would not have a significant impact on general traffic conditions. These planned alterations and would have a negligible impact on traffic conditions on the Modification access roads (The Transport Planning Partnership, 2025).

B.11.2. Mitigation and management measures

The existing Traffic Management Plan (TMP) for the Mount Pleasant Operation is considered to provide appropriate guidance for all vehicles accessing the site and would apply to Modification-generated traffic. If the Modification is approved, the TMP would continue to be reviewed, and appropriate additional procedures would be implemented if the existing practices are shown not to be efficient.

B.11.3. Valuation

The costs associated with the development and implementation of the TMP have been included in the Modification operating costs. In addition, MACH makes road maintenance contributions to the Muswellbrook Council in accordance with the VPA with Muswellbrook Council. The costs associated with the VPA have been included in the Modification operating costs.

APPENDIX C DETAILED RESULTS OF THE SENSITIVITY ANALYSIS

Table C-1. Sensitivity analysis results

	Total net benefits NSW	Royalties	NSW share of company income taxes
Central case	$776	$645	$131
Low discount rate (4%)	$848	$705	$143
High discount rate (10%)	$714	$592	$121
Low royalties (revenues (-)25%)	$484	$480	$4
High royalties (revenues (+)25%)	$1,068	$810	$259
Low company taxes (-)50%	$710	$645	$66
High company taxes (+)50%	$842	$645	$197
Worst case: Low coal price, high AUD/USD	$386	$425	-$39
Best case: High coal price, low AUD/USD	$1,361	$975	$386

APPENDIX D MODIFICATION CONTRIBUTION TO NSW GSP

From an economic perspective, the extent to which a commercial development contributes to the welfare of a country or state differs from a private benefit calculation, which focuses on the consumer surplus or profits. The public benefit of a project is measured with reference to value added. Value added is the additional value of goods and services that are newly created in an economy, and that are available for domestic consumption or for export.

Value added is a central concept in the Australian System of National Accounts, where it is referred to as 'gross value added' to emphasise that this measure is gross of the consumption of fixed capital (that is, depreciation). Gross value added is the difference between output and intermediate inputs (the value created by production) and equals the contribution of labour and capital to the production process. Subject to adjustments that need to be made to ensure that valuations are internally consistent by accounting for various taxes and subsidies, the sum of gross value added across all industries in a country or state equals GDP or gross state product (GSP), respectively.

Formally, GSP at market prices derived using the income approach (GSP(I)) measures the sum of income flows accruing to the factors of production, plus taxes less subsidies on production and imports (ABS, 2021):

$$\begin{aligned}\text{GSP(I)} = {} & \text{Compensation of employees and contractors} \\ & + \text{Gross operating surplus} \\ & + \text{Gross mixed income} \\ & + \text{Taxes} - \text{Subsidies on production and imports}\end{aligned}$$

Where:

- The Gross Operating Surplus (GOS) is a measure of the surplus accruing to the owners of incorporated enterprises, and is the difference between gross output, and intermediate consumption, the compensation of employees and long-term contractors, and taxes less subsidies on production and imports.
- Gross mixed income is a similar concept as GOS and refers to the share of income from production that can be attributed to unincorporated businesses (for instance, self-employed people) and is not relevant here.
- Taxes (subsidies) on production include taxes on products, such as GST and import duties, and other taxes (subsidies) on production, such as payroll taxes or subsidies, land taxes, stamp duties and taxes on pollution.

The change in GSP as a result of the Modification being approved therefore captures the incremental benefits accruing to NSW from:

- the additional salaries and wages paid to the NSW workforce;
- the share of the Modification's GOS that can be attributed to NSW, including coal royalty payments to NSW and Commonwealth income taxes that can be attributed to NSW residents; and
- the additional payroll taxes, land taxes and local government rates paid to NSW and to local government.

Table D-1 shows the estimated incremental contribution of the Modification to NSW GSP.

Table D-1. Incremental value added of the Modification ($2026)

Components of value added	Modification	Mount Pleasant Operation (NPV $m)	Difference
Compensation of employees and long-term contractors:			
Disposable income	$430	$97	$333
NSW share of net personal income tax & other receipts	$54	$12	$42
NSW share of Modification GOS:			
Producer surplus	$0	$0	$0
Royalties	$742	$97	$645
Company tax	$139	$8	$131
Other taxes on production less subsidies on production:			
Payroll	$39	$9	$30
Land taxes	$2	$1	$1
Local government rates	$23	$11	$12
Externalities:			
GHG emissions	$0.11	$0.02	$0.09
Net change in GSP	$1,429	$235	$1,286

Source: AnalytEcon analysis.

APPENDIX E Input-output analysis and derivation of flow-on effects

This appendix describes the methods used to calculate the flow-on effects of changes in the level of mining investment and production in NSW and the local economy.

E.1. INPUT-OUTPUT MULTIPLIERS

Economic impacts can be measured in terms of income, value added and employment, which in turn gives rise to income, value added and employment multipliers. Multipliers are classified into 'types'. Type I multipliers refer only to flow-on effects in the production sectors, while Type II multipliers incorporate subsequent impacts on households:

- Type IA multipliers refer to the 'initial' and 'first-round' effects arising from an increase in demand from a proposal. The first-round effect captures the immediate subsequent impacts on income, employment or value added from all industries whose output is required to produce the additional output from the proposal.
- Type IB multipliers refer to the initial and 'production induced' effects, which encompass first-round effects and additionally 'industrial support' effects. Industrial support effects capture subsequent effects that occur after the first-round effects (since the initial output effect from a proposal will induce additional output in other industries, which will in turn lead to further rounds of effects and so on).
- Type IIA multipliers incorporate the effects of the initial increase in output from a proposal on households and refer to the sum of production-induced and consumption-induced effects.

E.2. LIMITATIONS OF INPUT-OUTPUT ANALYSIS

The principal advantage of the impact multiplier method is the simplicity with which levels of mining investment, employment and output can be translated into measures of changes in regional income and employment. However, the accounting conventions that form the basis of input-output models and hence how multipliers are derived impose several restrictive assumptions. Some of these assumptions pertain to input-output analysis generally while others relate to the use and interpretation of input-output analysis at a regional or state, as opposed to a national level.

Many of these assumptions can lead to an overstatement of the impacts of a proposal (Bess and Ambargis 2011, Coughlin et al. 1991). The implication is that the resulting regional impact estimates should therefore be interpreted as an upper bound of the likely effects. There are

additionally specific issues that arise in deriving local value added multipliers. Value added includes profits that are distributed on the basis of ownership of capital assets, which becomes increasingly uncertain as the analysis becomes more granular. The calculation of value added multipliers at a local level is therefore not meaningful.

E.2.1. Fixed capital stocks

The National Accounts, on which input-output analysis is based, do not explicitly account for fixed capital stocks. This is an issue with input-output analysis generally, as fixed capital has a significant impact on how an industry adjusts over time. A corollary to this is that input-output analysis is static in the sense that it takes no account of the time required for the composition of inputs and outputs of production to shift to a changed level in output. Industries that require large amounts of fixed capital and labour adjust slowly, particularly when they are near full employment or when the supply of skilled labour is tight. These dynamics are hard to predict, but the implication over the short-to medium-term is that input-output effects will be overstated to varying degrees across industries.

The fixed nature of the capital stock is a critical issue in local impact assessments. In moving from the national to a state or local level, the location of fixed assets becomes increasingly important in establishing the goods and services that are supplied locally and those which are imported. Moreover, there is no information as to whether fixed assets are owned locally or whether the owners are located outside the region or state. Consequently, determining the valued added by local industry becomes increasingly problematic.

E.2.2. Supply constraints

Relatedly, when the initial impact considered is an increase in production, the assumption of fixed production patterns requires that there is a sufficient endowment of resources that is either available in (or able to migrate to) a local region to meet the increase in demand for inputs whose supply is fixed. These inputs include resources such as land and water, as well as labour with adequate skills.

E.2.3. Homogenous and fixed production patterns

The input coefficients that measure inter-industry flows between sectors are ‘fixed’ in input-output models; at any level of output, an industry’s relative pattern of purchases from other sectors is unchanged. These assumptions are likely to be inconsistent with production patterns in the local economy, since the local economy may not have on offer the range of inputs required for a given industry. Therefore, the impact of the change in output on the local economy will differ from that implied by a national multiplier.

E.2.4. Fixed prices

Input-output analysis assumes that prices in the economy in question are held constant, so that the additional material and labour inputs are available at existing prices and wage rates. In reality, prices of inputs may change with substantive changes in their demand. To the extent that there is an impact on prices, imputed output effects will be overstated. However, this is only a problem in input-output analysis for projects of a sufficient scale to materially shift the demand for production inputs and the total supply of industry output.

E.3. DERIVATION OF MULTIPLIERS

E.3.1. Concordance of the national accounts with census employment data

The Australian National Accounts input-output tables set out the flows of industry inputs (columns) and outputs (rows) for 114 industry classifications. The input output tables are for the year 2021-22 which were released in March 2024. The ABS census records employment at an aggregated level with 19 industry classifications. The employment data was drawn from the most recent, 2021, census. The concordance between the census and the accounts is set out in Table E-1.

Table E-1. Industry concordance between the industries in the National Accounts and industry level employment data in the 2021 census

2011 ABS census Aggregate Industry	ABS National Accounts industry codes	
	Starting from	Ending with
Agriculture, forestry and fishing	101	501
Mining	601	1001
Manufacturing	1101	2502
Electricity, gas, water and waste services	2601	2901
Construction	3001	3201
Wholesale trade	3301	3301
Retail trade	3901	3901
Accommodation and food services	4401	4501
Transport, postal and warehousing	4601	5201
Information media and telecommunications	5401	6001
Financial and insurance services	6201	6401
Rental, hiring and real estate services	6601	6702

2011 ABS census Aggregate Industry	ABS National Accounts industry codes	
	Starting from	Ending with
Professional, scientific and technical Services	6901	7001
Administrative and support services	7210	7310
Public administration and safety	7501	7701
Education and training	8010	8210
Health care and social assistance	8401	8601
Arts and recreation services	8901	9201
Other services	9401	9502

Source: ABS, 2024. 2021 ABS Census.

To construct the flows of industry inputs and outputs at the same level of the census, the rows and columns are summed. For example, there are seven industries classified as being part of the broader agriculture classification. Summing the seven rows aggregates the outputs of agriculture as a whole into each of the 114 industries. Summing the resulting new rows across the seven individual agricultural industries give the total input requirements for agriculture as a whole from each the 114 regions. The final result is a balanced flow table with 19 industry classifications.

The balancing items include rows and columns that are important for the regional impact analysis:

- there are rows for wages and salaries, imports and value added, respectively; and
- there are columns for household consumption, as well as for other final demands.

E.3.2. Requirements matrix and first round (Type IA) output multipliers

The initial requirement for an extra dollar's worth of output of a given industry is called the initial output effect. It equals one in total for all industries, since an additional dollar's worth of output from any industry will require the initial one dollar's worth of output from that industry plus any induced extra output. The first round effect is the amount of output required from all industries of the economy to produce the initial output effect.

First round effects can be measured by deriving the 'direct requirements matrix'. In this matrix, the coefficients in a given industry's column show the amount of extra output required from each industry to produce an extra dollar's worth of output from that industry. The requirements matrix has been constructed from the Australian input-output (flows) table by standardising the inputs into each industry to produce one unit of output in each industry. This is achieved by dividing each row of the table by the total output on an industry-by-industry basis.

The first round impact multiplier is then the sum of the standardised inputs for a given industry. For example, each element of the column for agriculture is divided by total agricultural output and then summed to obtain the total input requirement for one addition unit of output. The initial multiplier can be interpreted as the direct costs of an additional unit of production at current prices. Given these inputs are supplied domestically, the costs are other industry outputs and therefore contribute to total economic output. The sum of the initial output effect (which equals one) and the first round effect is the Type IA output multiplier. This is simply the total first round contribution of a project to the economy. For a project that is small when compared to the size of the industry, the first round and Type IA impact multipliers are valid given the requirements are representative of those used in the project.

E.3.3. Simple output or Type IB multiplier

The simple Type IB multiplier takes into account the inputs required for the increased agricultural output (for example) that must also be produced, which requires the expansion of these industries and those that support them. These may be seen as series of flow-on effects that continue until the overall industry flows are again balanced.

Calculation of the simple multipliers requires solving a matrix equation. Let A be the 19 by 19 matrix of industry requirements (as discussed above), x a vector of inputs used in each of the industries and y a vector of net outputs from the economy. Net output can be standardised to 1 for each industry, giving rise to the simple linear input-output equation:

$$Ax - x = 1$$

Solving for the overall input requirement to one additional unit of output from each industry:

$$x = (I - A)^{-1}$$

where I is an identity matrix with ones along the main diagonal and zeros elsewhere, and the superscript -1 denotes the matrix inverse. Summing the columns of $(I - A)^{-1}$ gives the simple multipliers. For example, summing the agricultural column gives the total inputs from all industries needed to sustain the production of one additional unit of net agricultural output at the national level.

The simple multiplier represents a shift in the composition of industry output, as well as the total level of industry output assuming constant prices. This may be reasonably valid for a small increase in, for example agricultural, output. However, for large change like what has occurred in the Australian mining industry, output prices for most industries will adjust in an offsetting manner. That is, the relative prices for the outputs that are used more extensively in mining will rise, while prices for those that are less extensively use will fall. The implication is that the simple multiplier will, for a given increase in mining output, overstate the flow-on

effects in industries where relative prices rise and understate flow-on effects where relative prices fall.

For a project that is small relative to the size of industry the price effects will be small and the bias in the simple multiplier may be ignored. However, the composition of flow effects will vary if the input requirements for the project differ from those of the industry. A comparison can lead to useful caveats regarding the simple multiplier effects on other industries.

E.3.4. Total or Type IIA output multiplier

The total multiplier takes into account the relationship between wages and household demand, that is, the increase (decline) in household demand that results from a rise (fall) in household income. This is derived by adding the wages row and the household expenditure column to the A matrix from the requirements table. Let the expanded matrix be denoted B. The total multipliers are analogous to the simple multiplier and given by the column sums of the matrix $(I - B)^{-1}$.

The key issue with the total multiplier is that wage rates and output price changes will tend to offset the effect. In a limiting case, an increase in wage rates will result in an increase in output prices and leave total output and real household expenditure unchanged. However, if the project is small relative to the size of the economy the effects on household income and wages can be ignored.

E.3.5. Employment, income and value added multipliers

First round, simple and total employment, income and value add multipliers can be calculated in much the same way as the output multipliers. The caveat noted for wage rates and employment in the previous section applies.

E.3.6. Employment multipliers

To calculate employment multipliers requires information about employment by industry that is provided in the ABS National Accounts (Table 20). For each industry, the FTE level of employment is divided by total industry output. This creates a vector of employment requirements per unit of output (denoted h) that can be used to convert the physical input requirements per additional unit of industry output into requirements for labour. The sum of these labour requirements constitute the employment multipliers, written in matrix notation as:

- Type IA: hA;
- Type IB: $h(I - A)$; and
- Type IIA: $h(I - B)$.

These multipliers give the FTEs of employment needed to support an additional unit of output. These multipliers can be adjusted to Type IA, Type IIA multipliers by expressing the multiplier as the total employment needed per person directly employed on the project. This is done by dividing each of the multipliers above by the number of workers required per unit of output. They are not the number of jobs created as this will be impacted by the number of part-time workers who are converted to full-time workers or vice versa.

E.3.7. Income multipliers

The calculation of the income multiplier is done in the same way. The wage and salary requirement per unit are given in the requirements table. Designating these as a vector the income multipliers written in matrix notation are:

- Type IA: wA;
- Type IB: $w(I - A)$; and
- Type IIA: $w(I - B)$.

These multipliers can be adjusted to Type1A, Type 2a multipliers by expressing the multiplier as the total income per dollar of salaries and wages expended directly on the project. This done by dividing each of the multipliers above by the salaries and wages required per unit of output.

E.3.8. Value added multipliers

Value added is the value of industry output less the costs of inputs, whether produced domestically or imported (the contribution to regional GDP). This can again be calculated, as a vector, from the requirements table as value added per unit of industry output. The multipliers are then calculated in an identical way to employment and income:

- Type IA: vA;
- Type IB: $V(I - A)$; and
- Type IIA: $v(I - B)$.

These multipliers can be adjusted to Type 1A, Type 2a multipliers by expressing the multiplier as the total income per dollar of value added by the project. This done by dividing each of the multipliers above by the valued added per unit of output.

E.4. REGIONAL IMPACTS

It is not possible to maintain the level of consistency that exists in national input-output tables at a regional level. Comprehensive data on industry composition, household consumption and the flow of goods and services to and from regions is not available.

A standard approach that can be reproduced across different regional definitions in a consistent manner is to use employment by industry data to form what are known as location quotients (LQs). LQs are used to translate economy-wide input-output relationships into regional relationships. Hence national input-output tables need to be adjusted to better reflect the characteristics of the local economy (Table E-2).

Table E-2. NSW, SA3 and Mount Pleasant Operation Region: FTE employment by industry as a percentage of total employment (2021 Census)

Industry	NSW	SA3 Region	Mount Pleasant Operation Region
Agriculture, forestry and fishing	2.0%	12.0%	8.2%
Mining	1.0%	16.8%	19.0%
Manufacturing	5.5%	5.0%	4.6%
Electricity, gas, water and waste services	1.0%	2.7%	2.6%
Construction	8.6%	6.3%	6.7%
Wholesale trade	2.8%	2.3%	2.5%
Retail trade	9.0%	7.3%	7.6%
Accommodation and food services	6.2%	6.2%	6.5%
Transport, postal and warehousing	4.6%	2.9%	2.9%
Information media and telecommunications	1.8%	0.3%	0.3%
Financial and insurance services	5.3%	0.9%	0.9%
Rental, hiring and real estate services	1.7%	0.9%	1.0%
Professional, scientific and technical Services	8.9%	3.3%	3.1%
Administrative and support services	3.2%	4.1%	4.3%
Public administration and safety	6.1%	4.2%	5.5%
Education and training	8.7%	6.8%	6.4%
Health care and social assistance	14.4%	9%	8.9%
Arts and recreation services	1.4%	1.7%	1.3%
Other services	3.4%	3.8%	4.1%
Total	100.0%	100.0%	100.0%

Note: Totals may not sum exactly due to rounding.
Source: AnalytEcon.

E.4.1. Locational quotients

A raw LQ is simply the percentage of FTE employment in a given industry and region, divided by the percentage of FTE employment in a given industry at the national level. This may be written for the ith industry and the jth region as:

$$LQ_{i,j} = \frac{\text{employment}_{i,j}}{\sum_{i} \text{employment}_{i,j}} \Big/ \frac{\sum_{j} \text{employment}_{i,j}}{\sum_{i}\sum_{j} \text{employment}_{i,j}}$$

The LQ has a natural interpretation for an industry within a region:

- if the LQ is less than one, the goods and services from that industry will tend to be imported into the region to meet demand; while
- if the LQ is greater than one, the goods and services from that industry will tend to be exported into the region to meet demand elsewhere.

Given that goods and services and labour requirements are the same in all regions, the relationship will tend to be proportional so long as the actual size of the labour force does not represent a constraint. These are standard assumptions in an input output analysis. However, at the regional level, the violation of these assumptions can often be more apparent. For example, specialised good or services demanded for a project may simply not be produced domestically and may have to be imported, with a consequent reduction in regional flow-on effects. However, this can be addressed within the context of the requirements table if project information on where purchases are made is available.

Total employment may not be a constraint for a large region, such as a state. However, while a large proportion of people may be employed in an industry in a small region, the overall workforce in that industry may not be sufficient to meet labour requirements. While this may in part be offset by migration, it can simply be more efficient to import goods and services into the region.

It is recommended practice (Bess and Ambargis 2011) to adjust the raw LQs in small regions by the following formula:

$$LQ_{i,j} = \begin{cases} LQ_{i,j} & if \;\; LQ_{i,j} < 1 \\ 1 & if \;\; LQ_{i,j} >= 1 \end{cases}$$

LQs consist of the ratio of an industry's share of regional earnings to the industry's share of national earnings. This adjustment has the effect of holding constant or reducing regional

flow-on effects. The basic idea is that industries in the region are not likely to produce all of the intermediate inputs required to produce the change in final demand. In these cases, local industries must purchase intermediate goods and services from producers outside the region, thereby creating leakages from the local economy.

E.4.2. Regional multipliers

Given LQ is a vector of location quotients, the regionally adjusted Type IA and Type IB input multipliers are calculated by multiplying the industry requirements by the quotients. The output multipliers are the column sums of the matrix:

$$(I - LQ \times A)^{-1}$$

where × denotes element-by-element multiplication of each column of A by LQ.

The income, employment and value add multipliers are calculated in the same manner as the national multipliers.

E.4.3. Adjusted mining industry expenditures

The LQ adjusts for locally sourced intermediate inputs. Therefore, the expenditure column of the input-output matrix, which includes wages, GOS, taxes and imports needs to be rebalanced to sum to total industry output. The balancing item is imports. Wages, GOS, and taxes are from the ABS input output table for coal mining and are assumed to be the same at every regional level. The Australian and the adjusted State and regional mine expenditure are shown in Table E-3.

Table E-3. Australian, NSW, SA3 and Mount Pleasant Operation Region: regional LQ adjusted mine expenditures

Expenditure	NSW	SA3 Region	Mount Pleasant Operation Region
Agriculture, forestry and fishing	0.1%	0.1%	0.1%
Mining	2.7%	5.6%	3.3%
Manufacturing	2.7%	2.4%	2.7%
Electricity, gas, water and waste services	1.2%	1.5%	0.9%
Construction	3.9%	2.9%	3.0%
Wholesale trade	1.3%	1.3%	1.3%
Retail trade	0.5%	0.4%	0.5%
Accommodation and food services	0.4%	0.4%	0.5%
Transport, postal and warehousing	2.0%	1.2%	1.4%

Expenditure	NSW	SA3 Region	Mount Pleasant Operation Region
Information media and telecommunications	0.2%	0.0%	0.2%
Financial and insurance services	3.7%	0.8%	3.7%
Rental, hiring and real estate services	1.4%	0.8%	1.4%
Professional, scientific and technical Services	3.3%	1.2%	2.8%
Administrative and support services	0.5%	0.5%	0.5%
Public administration and safety	0.5%	0.4%	0.6%
Education and training	0.0%	0.0%	0.0%
Health care and social assistance	0.0%	0.0%	0.0%
Arts and recreation services	0.1%	0.1%	0.1%
Other services	1.3%	1.4%	1.2%
Total Domestic Inputs	35.3%	30.5%	24.1%
Wages and Salaries	15.1%	15.1%	15.1%
Gross Operating Surplus	42.0%	38.3%	46.2%
Taxes	0.7%	7.6%	0.7%
Imports	7.6%	10.6%	11.6%
Total	100.0%	100.0%	100.0%

Note: Totals may not sum exactly due to rounding.

E.5. ESTIMATES OF MULTIPLIERS

The multipliers reported in the following were derived from national level multipliers in accord with the LQs described above. State and regional multipliers were derived using employment LQs to translate economy-wide input-output relationships into regional relationships. Table E-4 shows NSW mining multipliers derived from the 2010 National Accounts tables and employment data for:

- income;
- employment (FTE); and
- value added (contribution to GDP).

Table E-4. NSW mining input-output multipliers

Multiplier	Type IA	Type IB	Type IIA
Income	1.63	3.12	4.14
Employment	1.88	3.58	5.82
Value added	1.18	2.32	2.87

Source: AnalytEcon.

Table E-5 shows these multipliers for the SA3 Region and the Mount Pleasant Operation Region.

Table E-5. Upper Hunter SA3 and Mount Pleasant Operation Region mining input-output multipliers

	SA3 Region			Mount Pleasant Operation Region		
Multiplier	IA	IB	IIA	IA	IB	IIA
Income	1.46	2.68	3.35	1.58	1.98	3.94
Employment	1.66	2.97	4.09	1.80	3.33	4.88
Value added	1.15	2.21	2.41	1.18	2.28	2.57

Source: AnalytEcon.