MACHEnergy

Mount Pleasant Operation

A JOINT VENTURE WITH JCDA Japan Coal Development Australia

Appendix K

Environmental Risk Assessment

Modification 8

Resource Strategies

ABN 26 895 061 298

Report on Environmental Risk Assessment

in Support of Modification 8 to Development Consent DA 92/97

for the Mount Pleasant Operation

Date	Details	Approved by	
1	Report issued	WJD	28.11.2025

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EXECUTIVE SUMMARY

Introduction

The Mount Pleasant Operation is an open cut coal mine located approximately 3 kilometres (km) north-west of Muswellbrook in the Upper Hunter Valley of New South Wales (NSW). Development Consent DA 92/97 (as most recently modified by Modification 6) allows MACH Mount Pleasant Operation Pty Ltd (MACH)[1] to carry out mining operations at the Mount Pleasant Operation until December 22, 2026.

In September 2022, the Mount Pleasant Optimisation Project was approved and MACH was granted Development Consent SSD 10418 increasing the production rate and extending the mine life by 22 years until 2048. A recent decision in the NSW Court of Appeal has created uncertainty about the approvals status of the Mount Pleasant Operation beyond the currently approved mining period.

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).

An Environmental Risk Assessment (ERA) has been conducted in support of the Modification application and is reported herein.

Objectives

The detailed objectives of the ERA were as follows:

- To clearly define the context for the ERA (as established by the Modification).
- To identify environmental-related risks intrinsically associated with the components of the Modification.
- To establish a risk profile for environmental risks and use this risk profile for the subsequent development and prioritisation of risk treatment strategies (if required).
- To provide the basis for communication of the Modification environmental risks to relevant stakeholders.

[1] MACH Mount Pleasant Operation Pty Ltd and the unincorporated Mount Pleasant Joint Venture are herein referred to as MACH.

Risk Assessment Process

The risk assessment approach was based on the requirements of AS/NZ ISO 31000:2018 Risk Management – Guidelines (Standards Australia, 2018). The following topics were addressed:

- Surface Water.
- Groundwater.
- Biodiversity.
- Rehabilitation and Closure.
- Air Quality, Noise and Blasting.
- Health.
- Land Use.
- Social and Economic.
- Heritage (including Aboriginal Cultural Heritage).
- Other.

ERA Outcomes

The risk assessment identified 36 relevant risks. No extreme residual risks were identified. One residual high risk was identified, and there were thirty residual medium risks and five residual low risks.

The one high residual risk refers to dam failure, and such a risk will always be ranked as a high risk (high consequence – low likelihood). The ranking of this risk as a high risk does not negatively reflect on MACH's management practices for the dam.

All other risks were ranked as medium or low.

The most significant categories of risk identified by the ERA are:

- Air quality, noise and blasting.
- Surface water.
- Social and economic.

The environmental related risks identified by this ERA will be addressed in appropriately detailed assessments in the main text of the Modification Report and the specialists' reports (where relevant) included as Appendices to the Modification Report, including:

- Noise and Blasting Assessment.
- Air Quality Assessment.
- Groundwater Assessment.
- Surface Water Assessment.
- Road Transport Assessment.
- Visual and Landscape Assessment.

- Social Impact Assessment.
- Economic Assessment.
- Greenhouse Gas Assessment and Mitigation Plan.
- Groundwater Dependent Ecosystem Assessment.

These assessments will provide greater confidence in the predicted potential impacts, validate whether compliance with relevant performance measures, criteria and licence limits are expected to be maintained with the Modification, and assist with the quantification of any mitigation measures (such as water licenses required and biodiversity offsets).

ERA Recommendations

Actions identified for resolution in the Modification Report, included:

- Coordination of model assumptions and findings between the surface water and groundwater assessments to establish final void lake behaviour and groundwater inflows – addressed in the Surface Water Assessment and Groundwater Assessment.
- Undertaking detailed site water balance modelling, including low rainfall periods, to inform onsite water management – addressed in the Surface Water Assessment.
- Engaging with Muswellbrook Shire Council and other relevant authorities regarding potential community infrastructure demands – addressed in the Social Impact Assessment.

The following key additional actions were identified to be implemented into workstreams at the Mount Pleasant Operation:

- Reviewing air quality monitoring data regularly, for example, monthly reconciliation of data, year-on-year reconciliation and rolling annual reconciliation.
- Continuing to apply best practice dust controls and investigating innovative methods to reduce dust emissions from the Mount Pleasant Operation.
- Reviewing, and if necessary, updating existing management measures (predictive system) for blast fume management.
- Calculating dust control water demand for dry year and identifying strategies for dust suppression (either sufficient water resource availability or alternative chemical suppressants).
- Continuing to engage with neighbouring mines regarding potential water sharing.
- Continuing to implement the Stakeholder Engagement Program beyond submission of the Modification Report.
- Continuing to progress re-transmission tower licence process with the Australian Communications and Media Authority (ACMA).

1. INTRODUCTION

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

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

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

Under Development Consent 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.

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).

An Environmental Risk Assessment (ERA) has been conducted in support of the Modification application and is reported herein.

[2] MACH Mount Pleasant Operations Pty Ltd and the unincorporated Mount Pleasant Joint Venture are herein referred to as MACH.

2. SCOPE AND PURPOSE OF THE STUDY

2.1. Overall Scope

The overall scope of the environmental risk assessment was to identify, analyse, and evaluate environmental-related risks, and make recommendations for risk treatments (if required) in relation to the components of the Modification.

2.2. Detailed Objectives

The detailed objectives of the ERA were as follows:

- To clearly define the context for the ERA (as established by the Modification).
- To identify environmental-related risks intrinsically associated with the components of the Modification.
- To establish a risk profile for environmental risks and use this risk profile for the subsequent development and prioritisation of risk treatment strategies (if required).
- To provide the basis for communication of the Modification environmental risks to relevant stakeholders.

2.3. Exclusion

The ERA did not seek to address detailed environmental risks associated with current operations which have been addressed in other MACH risk assessments.

3. DEFINITIONS

Audit: the process used to confirm compliance with procedures used for the control of risk. Audit is critical when high risks are controlled by procedures.

Communication and consultation: continual and iterative processes that an organisation conducts to provide, share or obtain information and to engage in dialogue with stakeholders regarding the management of risk.

Consequence: the outcome of an event affecting objectives.

Control: measure that is modifying risk.

Inherent Risk: the level of risk when limited action has been taken to mitigate or reduce the risk.

Likelihood: chance of something happening (may be measured as probability or frequency).

Maximum Reasonable Consequence: A consequence estimated to be at the upper end of the range of consequences that is considered to be reasonable giving fair credit to existing risk controls. Note: maximum reasonable consequence is typically lower than worst case consequences.

Monitoring: continual checking, supervising, critically observing or determining the status in order to identify change from the performance level required or expected.

Residual Risk: the risk that remains after risk controls have been applied.

Risk: effect of uncertainty on objectives.

Risk Analysis: process to comprehend the nature of the risk and to determine the level of risk.

Risk Evaluation: process of comparing the results of risk analysis with risk criteria to determine whether the risk and/or its magnitude is acceptable or tolerable.

Risk Identification: process of finding, recognising and describing risks.

Risk Management: coordinated activities to direct and control an organisation with regard to risk.

Risk Treatment: process to modify risk.

Stakeholders: person or organisations who may affect, be affected by, or perceive themselves to be affected by a decision or activity.

4. ABBREVIATIONS

Key abbreviations within the report are summarised below

Abbreviation	Explanation
ACMA	Australian Communications and Media Authority
AIP	NSW Aquifer Interference Policy
ALARP	As low as reasonably practicable
ANCOLD	Australian National Committee on Large Dams
CHPP	Coal Handling and Preparation Plant
ERA	Environmental Risk Assessment
FEA	Fines Emplacement Area
GHG	Greenhouse Gas
IPC	Independent Planning Commission
MACH	MACH Mount Pleasant Operation Pty Ltd and the unincorporated Mount Pleasant Joint Venture
Mtpa	Million tonnes per annum
MOD	Modification
MWD2	Mine Water Dam 2
PAF	Potentially Acid Forming
RBS	Risk Breakdown Structure
RFS	Rural Fire Service
ROM	Run-of-Mine
SSD	State Significant Development
TARP	Trigger Action Response Plan

5. REFERENCES

The primary reference for the ERA was:

- AS/NZ ISO 31000:2018 Risk Management – Guidelines (Standards Australia, 2018).

Supporting references were:

- HB 203:2012 Managing environment-related risk (Standards Australia, 2012).
- MDG1010 Minerals Industry Safety and Health Risk Management Guideline (Department of Trade and Investment, 2011).
- Impact and risk analysis for the Hunter subregion. Product 3-4 for the Hunter subregion from the Northern Sydney Basin Bioregional Assessment, Department of the Environment and Energy, Bureau of Meteorology, CSIRO and Geoscience Australia, Australia (Herron et al., 2018).

6. RISK MANAGEMENT

6.1. Risk Management – An Overview

Risk management is an integral part of good management practice. It is an iterative process consisting of steps, which, when taken in sequence, enable continual improvement in decision-making.

Risk management is not a matter of becoming risk averse and unnecessarily avoiding risks. Risk management enables an organisation to understand its risks and decide how to manage those risks.

6.2. Risk Management Process

The risk management process is presented in Figure 1 showing the key steps in the risk management process. These steps are:

- Establishment of context (scope, context, criteria).
- Risk identification.
- Risk analysis.
- Risk evaluation.
- Risk treatment.
- Monitoring and review.
- Communication and consultation.
- Recording and reporting.

Each step, as applied to the Modification ERA, is discussed on the following pages.

It is noted that although terms are often used interchangeably, there is a significant difference between the process of risk assessment and that of risk management.

Risk assessment is fundamentally a "desktop" exercise, which assists an organisation to understand its risks and develop strategies for managing those risks. The full process of risk management may involve subsequent implementation of additional risk controls, and ongoing monitoring and review of risk controls to enable an organisation to confirm that risk treatment strategies have been implemented and remain effective.

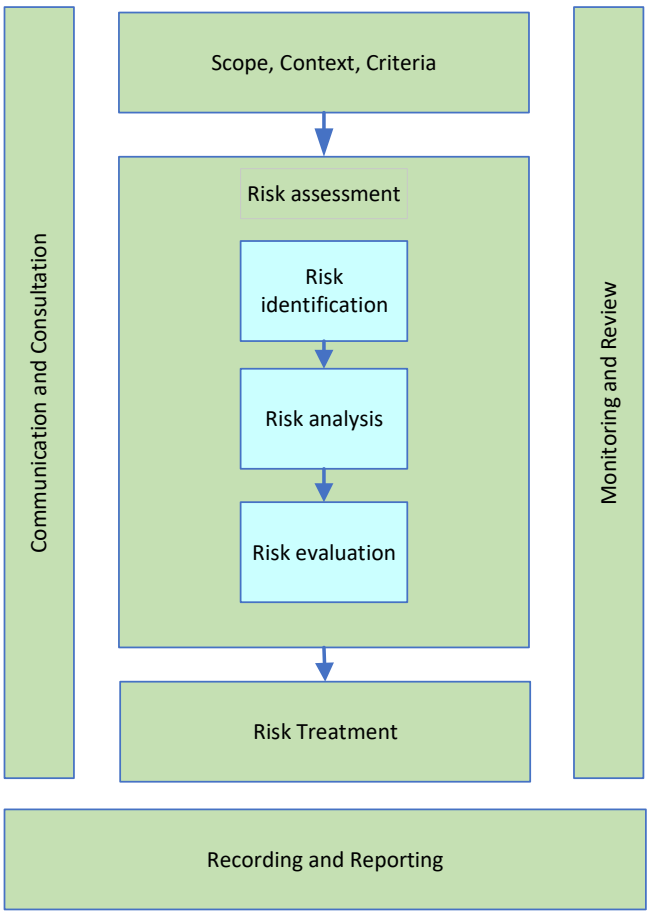


Figure 1: Risk Management Process (from ISO 31000-2018)

7. ESTABLISH THE CONTEXT

7.1. The Purpose of This Step

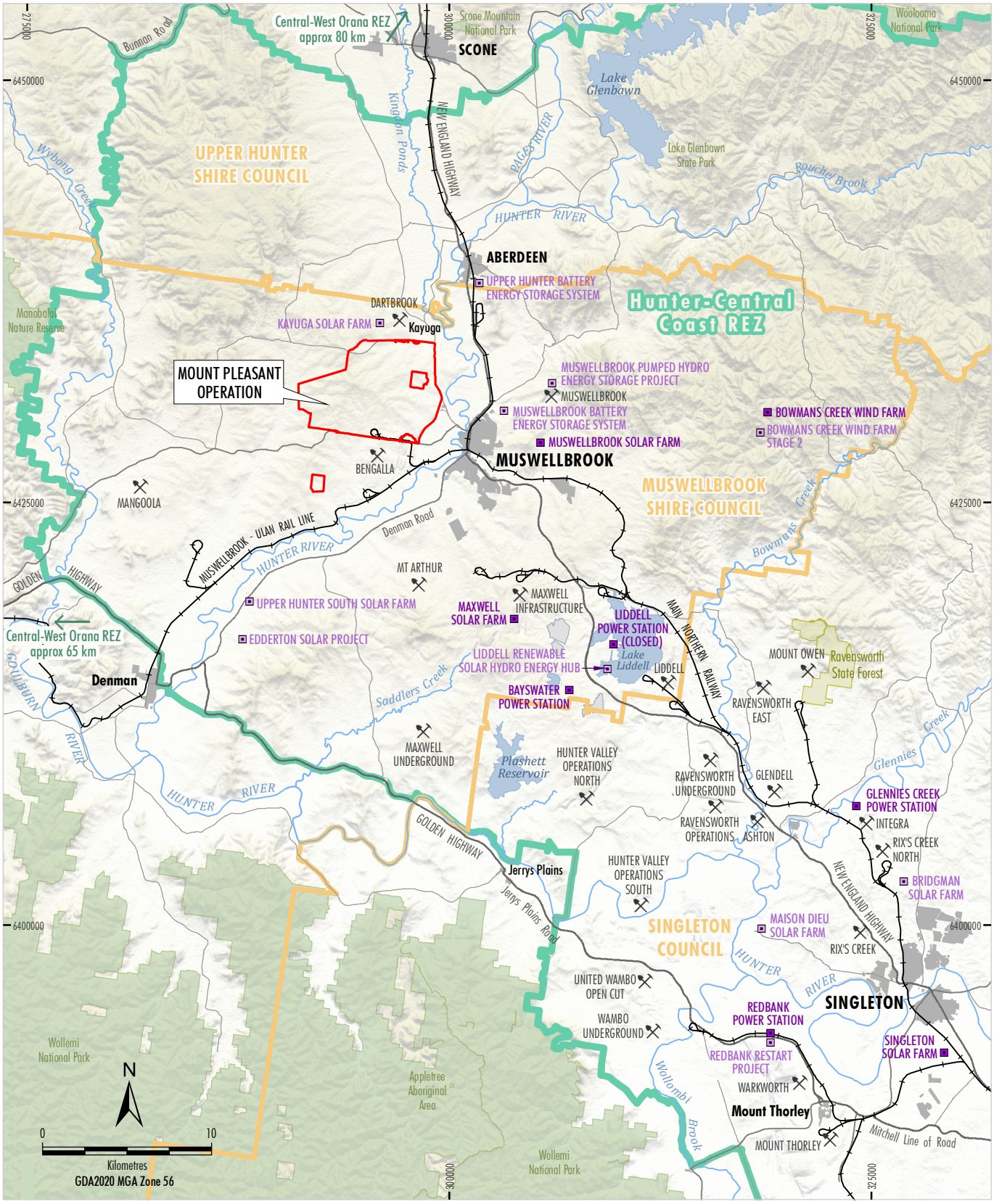
7.1.1. Background

Risk is the "effect of uncertainty on objectives". Therefore, it is not possible to identify environmental risks without first establishing a context for the ERA.

The context and scope of the ERA were clarified with the risk assessment team prior to commencement.

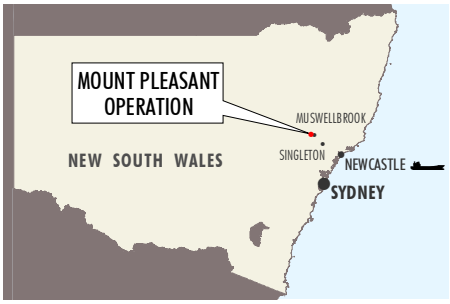
7.1.2. Context Statement

The Mount Pleasant Operation produces thermal coal using open cut mining methods and has an approved operational capacity of up to 10.5 million tonnes per annum (Mtpa) of Run-of-Mine (ROM) coal until December 22, 2026 under Development Consent DA 92/97 (as modified). The location of the Mount Pleasant Operation is shown on Figure 2 on the following page.



MAC-18-02A MOOB_Figure 1

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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Location of the Mount Pleasant Operation

Figure 2

The key features of the Modification include:

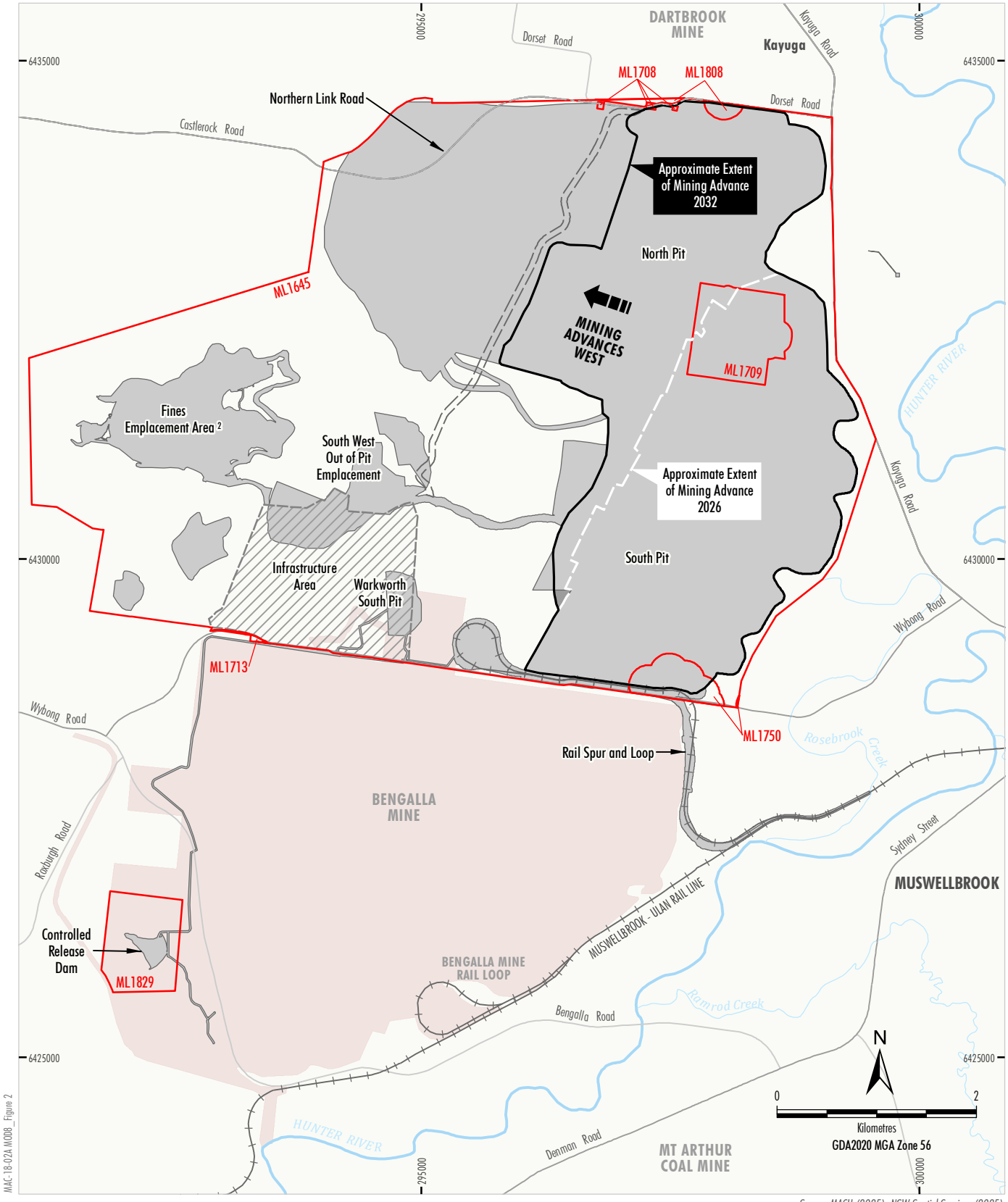
- A six year extension of permitted (ROM coal) mining operations to 31 December 2032.
- An increase in the approved ROM coal extraction rate under Development Consent DA 92/97 from 10.5 Mtpa to 12.5 Mtpa.

The Modification will involve no material changes to existing:

- Mining tenements.
- Mining methods.
- Primary site access.
- Electricity supply and distribution.
- Mine infrastructure area.
- Coal handling and preparation plant (CHPP), coal stockpile, and rail loading facilities.
- Rehabilitation objectives and methods.
- The existing hours of operation and key on-site activities.

A general overview of the key spatial components of the Modification is shown on Figure 3.

Further information is provided in the Modification Report.



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

Overview of the Modification

Figure 3

7.2. ERA Attendees

The following persons participated in the ERA.

Name	Job Title	Organisation	Role/Expertise in ERA
Stirling Bartlam	Executive Manager Approvals	Resource Strategies	B.Sc (Geographical Sciences), with over 20 years' experience as an environmental project management and approvals consultant in the resource industry.
Bill Danaher	Director, Risk Management Intercontinental Pty Ltd (Facilitator)	RMI	PhD, B.Sc, member of Standards Australia Committee that developed AS/NZS 4360; over 30 years' experience as facilitator of numerous risk assessments in the mining industry; lecturer in risk management at University of Queensland.
Colin Driscoll	Environmental Biologist	Hunter Eco	PhD, B.Sc, with over 40 years' scientific and environmental assessment experience.
Andrew Durick	Modelling Team Lead / Principal Groundwater Modeller	Australasian Groundwater & Environmental Consultants Pty Ltd	M.App.Sc, with over 25 years' experience in groundwater modelling and assessment.
Roman Haverkamp	Senior Engineer	RWDI Australia	B.A. (Hons), with over 15 years of industrial experience in environmental noise and construction noise and vibration assessment.
Joanna Hinks	Principal	Resource Strategies	B.Eng(Env), M.Sc, REAP, with over 15 years' experience as an environmental project management and approvals consultant in the resource industry.
Thanh Huynh	Environmental Project Manager (Scribe)	Resource Strategies	B.Eng, with 3 years' experience as an environmental project management and approvals consultant in the resource industry.
Chris Lauritzen	General Manager – Resource Development	MACH	B.Sc (Geol), F.AusIMM, GAICD, with over 35 years' industrial experience.
Tony Marszalek	Senior Principal Engineer	ATC Williams	B.Eng(Civil), M.Eng.Sc, with over 30 years' experience as a consulting Water Resources Engineer.
Aleks Todoroski	Director	Todoroski Air Sciences	B.Eng, with over 35 years' experience in air quality and noise analysis, assessment and management.

7.3. Methodology

The following methodology was adopted for this ERA.

1. Prior to the risk assessment workshop, pre-population of the draft Risk Register occurred. This was done by means of a feedback questionnaire sent to workshop participants. Review of the Mount Pleasant Optimisation Project ERA also occurred.

2. For the ERA, a multi-disciplinary group was assembled, with the aim of providing maximum input to the risk assessment process. Attendance is summarised in Section 7.2 above. It is considered that all relevant disciplines were represented.

3. Copies of photographs, drawings etc. were available for review by the workshop team to assist in the risk assessment process.

4. At the beginning of the workshop, the following occurred:

    - A presentation was undertaken so that all participants were aware of the scope of the Modification and its associated footprint.
    - Objectives of the risk assessment workshop were provided and a brief overview of the risk management process occurred.

5. The ERA was subdivided into the following Risk Breakdown Structure (RBS) to assist in identifying and ranking risks:

    - Surface Water.
    - Groundwater.
    - Biodiversity.
    - Rehabilitation and Closure.
    - Air Quality, Noise and Blasting.
    - Health.
    - Land Use.
    - Social and Economic.
    - Heritage (including Aboriginal Cultural Heritage).
    - Other.

6. Review of pre-populated risk information occurred during the workshop, and amendments were made and additional information added as considered appropriate.

7. For each risk, an inherent risk analysis was undertaken. This included allocation of a credible worse-case consequence.

8. Existing/proposed risk controls were documented. For the purposes of the ERA, where a particular risk control has been confirmed and budgeted to be within the scope of the Modification, then this was classified as an existing risk control.

9. A residual risk ranking was also undertaken. Maximum reasonable consequences were assigned in the risk assessment process, taking existing risk controls into account. Maximum reasonable consequences may be different to credible worse-case consequences irrespective of the role of risk controls.

10. Risk treatments (actions) were recommended

The risk analysis matrix used for ranking risks is included in Appendix One.

Risks recorded in the Risk Register are presented in Appendix Two.

8. RISK IDENTIFICATION

The purpose of this step was to identify, for each RBS topic, the environmental risks intrinsically associated with the components of the Modification. Risk identification was undertaken by means of review of previous ERAs and by seeking direct feedback from workshop attendees (prior to, and during, the workshop).

9. RISK ANALYSIS AND RISK EVALUATION

9.1. The Purpose of This Step

The purpose of this step is to assign consequences, and the likelihood of those consequences for a given risk. Consequence and likelihood are combined to give a measure of risk. This analysis is undertaken by considering the existing risk controls.

9.2. Risk Analysis Matrix

The risk analysis matrix used for ranking and prioritising risks is presented in Appendix One.

9.3. Risk Evaluation Criteria

The MACH Risk Ranking Matrix includes evaluation/classification of risk as Extreme, High, Medium and Low. An objective of the ERA was to consider whether risks controls would be sufficient to reduce risks as low as reasonably practicable for the Modification.

9.4. Risk Register

The Risk Register in Appendix Two lists:

- Number.
- Category (RBS).
- Risk Description.
- Possible Causes.
- Possible Consequences.
- Inherent Risk Analysis.
  - Consequence.
  - Likelihood.
  - Level of Inherent Risk.
- Existing Risk Controls/Risk Controls Confirmed within Project Scope.
- Residual Risk Analysis.
  - Consequence.
  - Likelihood.
  - Level of Residual Risk.
- Actions Required.

It should be noted that three types of risk analysis (qualitative, semi-quantitative and quantitative) are possible. A semi-quantitative analysis was used and is reported in the current study.

9.5. Role of Risk Register

The Risk Register is the key outcome from the ERA. It should be seen as a "living" document and be continually reviewed and updated through the assessment and determination process for the Modification. Once the Modification is determined, risks within the Risk Register should be transitioned into MACH's onsite risk management system.

10. RISK TREATMENT

10.1. The Purpose of This Step

The purpose of this step is to develop risk treatments. A summary of generic risk treatment strategies is presented below.

10.2. Generic Risk Treatment Strategies

10.2.1. Risk Avoidance

Risk avoidance requires that a given activity is not undertaken as a means of managing its associated risk. Risk avoidance has limited applicability.

10.2.2. Risk Transfer

Risk transfer involves the transference of risk to another party either by contractual transfer or direct physical transfer of the risk. This also has limited applicability in an environmental context.

10.2.3. Reduction of Consequence and/or Likelihood

Risks may be reduced by reduction of consequences and/or likelihood. Typically, a hierarchy of risk control options exists:

- Elimination of a risk.
- Substitution of a lesser risk.
- Reduction of risk by engineering controls.
- Reduction of risk by procedural controls.
- Use of protective equipment (for safety risks).

10.2.4. Risk Retention

Any risk that cannot be eliminated or avoided must, to some extent, be retained. Risk management enables risk retention to be undertaken with knowledge.

11. RECORDING AND REPORTING ERA OUTCOMES

11.1. Summary

Thirty-six environmental related risks were identified as a result of the Modification ERA. As noted in previous discussion, these risks refer intrinsically to the proposed components of the Modification, and there was no attempt to capture the detailed environmental risks currently existing at the Mount Pleasant Operation.

It should also be noted that as well as capturing the risk description, the Risk Register also captures possible causes of each risk. The detailed risk analysis and focus on risk controls took into account the possible causes for each risk.

11.2. Risk Profile

The residual risk profile is summarised in the graph below (Figure 4).

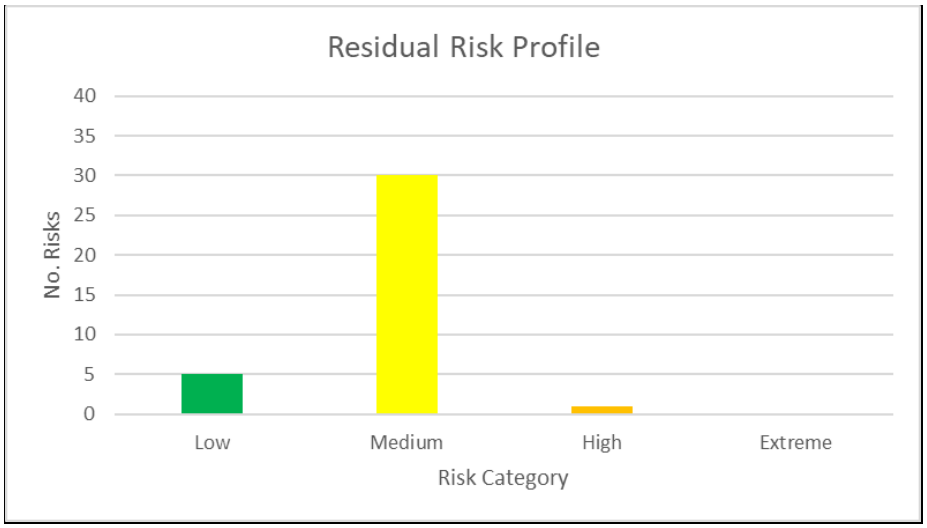


Figure 4: Residual Risk Profile

No extreme residual risks were identified. One residual high risk was identified. There were thirty residual medium risks and five residual low risks.

It should be noted that the one high residual risk refers to dam failure, and such a risk will always be classified as a high consequence-low likelihood risk. Therefore, although the likelihood of failure was considered to be rare, such a risk inevitably is ranked as a high risk.

The retention of this risk as a high risk does not negatively reflect on MACH's management practices for the dam.

11.3. Distribution of Risks by RBS Category

The graph below (Figure 5) shows the numerical distribution of risks on the basis of RBS categories. It also shows the distribution of risk rankings for each category.

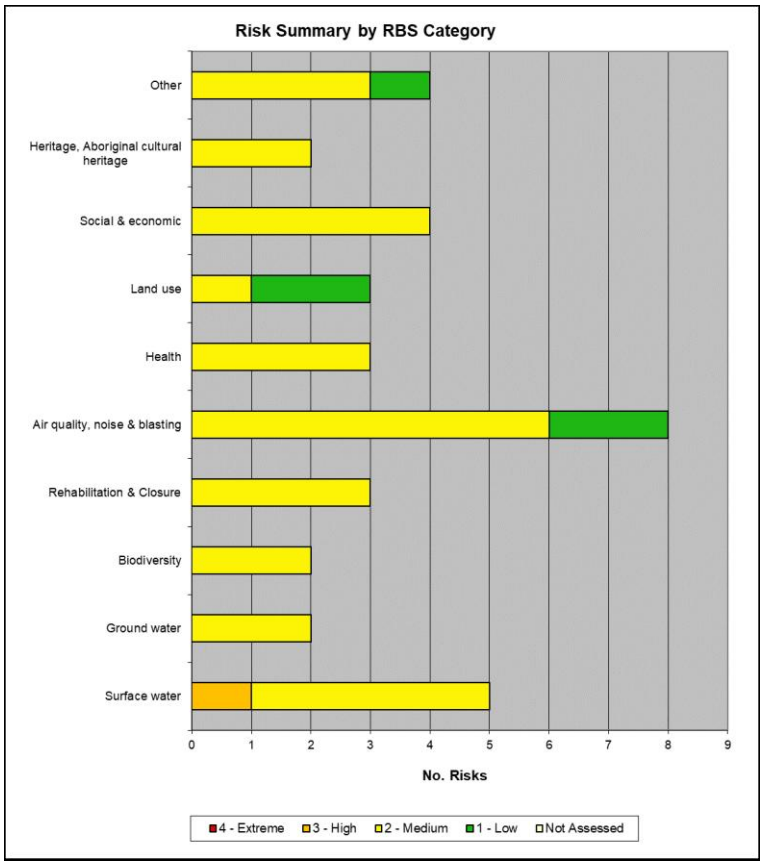


Figure 5: Distribution of Risks by Category

This graph demonstrates that the most significant categories of risk are:

- Air quality, noise and blasting.
- Surface water.

The Risk Register provides a summary of each of the risks in terms of RBS category. Full details are included in Appendix Two.

11.4. Weighting of Risks by RBS Category

MACH's Risk Register template also provides a summary of weighted risk by RBS category. The weighting process involves assigning scores as follows:

- 4 – Extreme.
- 3 – High.
- 2 – Medium.
- 1 – Low.

The weighted distribution of risks is presented in the pie chart below (Figure 6).

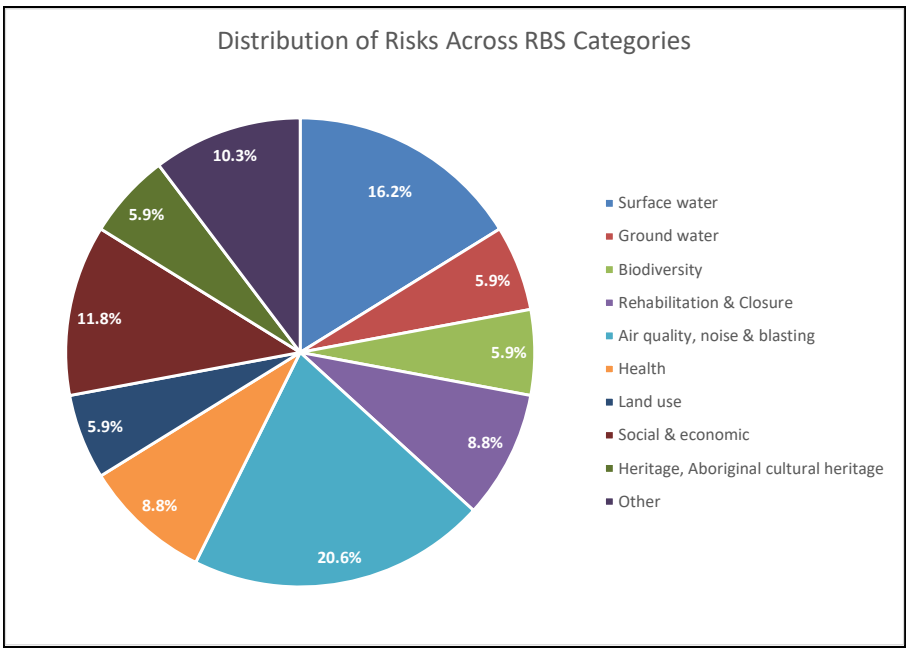


Figure 6: Weighted Distribution of Risks by Category

Using this method, the key categories of risk are:

- Air quality, noise and blasting (20.6%).
- Surface water (16.2%).
- Social and economic (11.8%).

Specific assessments for each of these topics will occur (see Section 11.5 below).

11.5. Summary of Key Risk Controls

The environmental related risks identified by this ERA will be addressed in appropriately detailed assessments in the main text of the Modification Report, and the specialists' reports (where relevant) included as Appendices to the Modification Report, including:

- Noise and Blasting Assessment.
- Air Quality Assessment.
- Groundwater Assessment.
- Surface Water Assessment.
- Road Transport Assessment.
- Visual and Landscape Assessment.
- Social Impact Assessment.
- Economic Assessment.
- Greenhouse Gas Assessment and Mitigation Plan.
- Groundwater Dependent Ecosystem Assessment.

These assessments will provide greater confidence in the predicted potential impacts, validate whether compliance with relevant performance measures, criteria and licence limits are expected to be maintained with the Modification, and assist with the quantification of any mitigation measures (such as water licenses required).

Actions identified for resolution in the Modification Report, included:

- Coordination of model assumptions and findings between the surface water and groundwater assessments to establish final void lake behaviour and groundwater inflows – addressed in the Surface Water Assessment and Groundwater Assessment.
- Undertaking detailed site water balance modelling, including low rainfall periods, to inform onsite water management – addressed in the Surface Water Assessment.
- Engaging with Muswellbrook Shire Council and other relevant authorities regarding potential community infrastructure demands – addressed in the Social Impact Assessment.

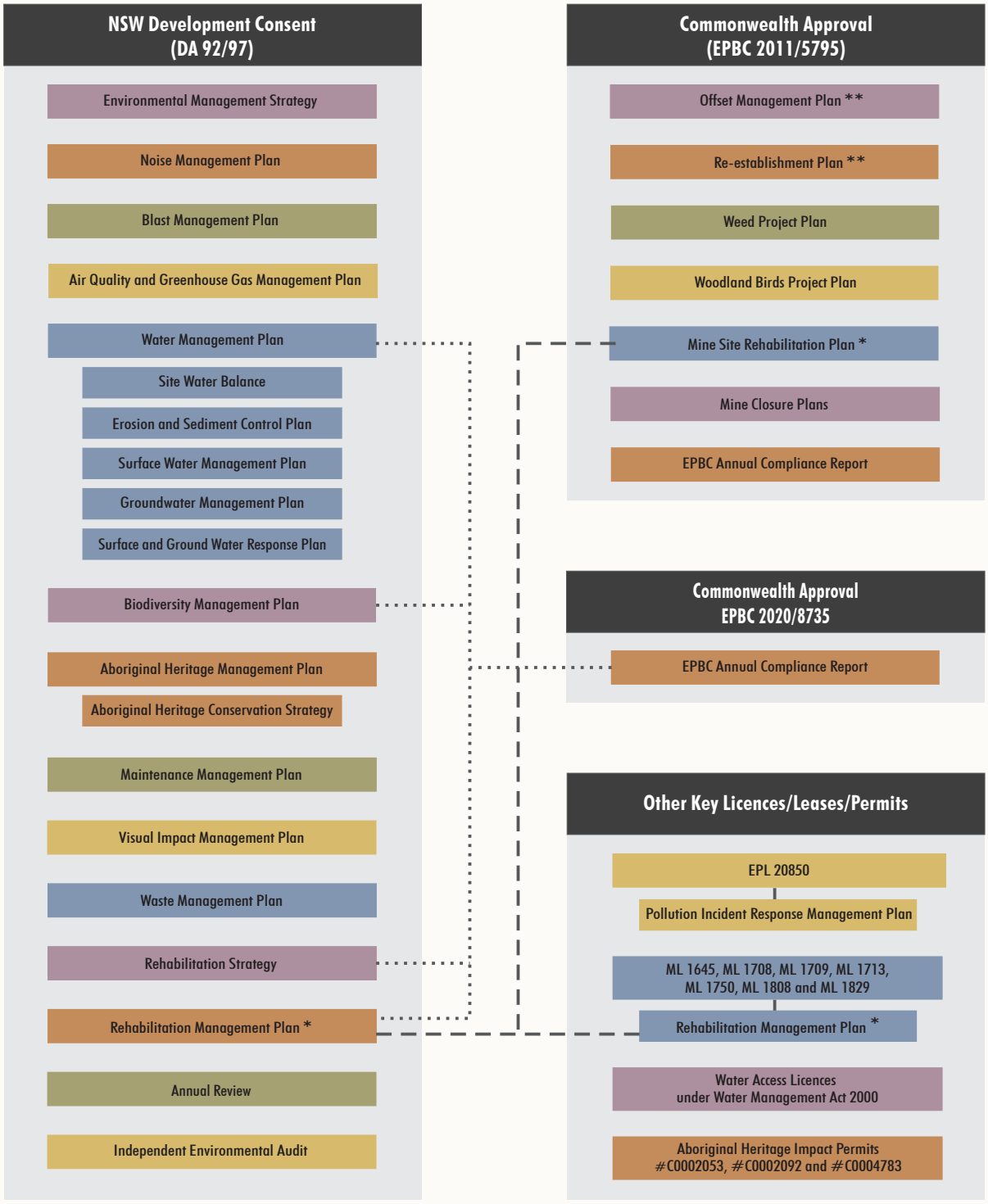
Risk treatment will continue beyond the assessment and determination process for the Modification. This ERA considered the appropriateness of the existing environmental management system at the Mount Pleasant Operation, which is summarised in Figure 7 on the following page. The following key additional actions were identified to be implemented into workstreams at the Mount Pleasant Operation:

- Reviewing air quality monitoring data regularly, for example, monthly reconciliation of data, year-on-year reconciliation and rolling annual reconciliation.
- Continuing to apply best practice dust controls and investigating innovative methods to reduce dust emissions from the Mount Pleasant Operation.
- Reviewing, and if necessary, updating existing management measures (predictive system) for blast fume management.
- Calculating dust control water demand for dry year and identifying strategies for dust suppression (either sufficient water resource availability or alternative chemical suppressants).
- Continuing to engage with neighbouring mines regarding potential water sharing.
- Continuing to implement the Stakeholder Engagement Program beyond submission of the Modification Report.
- Continuing to progress re-transmission tower licence process with the Australian Communications and Media Authority (ACMA).

12. CONSULTATION AND COMMUNICATION

Consultation and communication are essential parts of the risk management process. The selection of an expert multi-disciplinary group ensured that appropriate consultation occurred during the risk assessment process. The facilitator notes that adequate input was obtained from all attendees.

Communication of risk is an ongoing process. However, the development of the Risk Register provides the basis for communication of these aspects of risk to appropriate personnel.



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NOTES

* The Rehabilitation Management Plan has been developed to meet the requirements for a Rehabilitation Management Plan (Condition 56, Schedule 3 of Development Consent DA 92/97 and Mining Regulation 2016).
Following approval of the Mine Site Rehabilitation Plan (Conditions 19 and 20 of EPBC 2011/5795), the Rehabilitation Management Plan would be reviewed and revised if necessary.

** The Offset Management Plan and Re-establishment Plan has been developed to meet the requirements of both the Offset Management Plan and the Re-establishment Plan.

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Environmental Management System
Structure Summary

Figure 7

13. CONSENSUS MATTERS

No consensus differences emerged within the workshop team during the risk identification, analysis and evaluation stages. All risk rankings and any associated recommendations were agreed by the workshop team.

14. MONITORING AND REVIEW

The risk management process is not a static process and risks may change with time (positively or negatively). Therefore, although the ERA represents an understanding by the workshop team of environmental risks currently associated with the Modification, it cannot be guaranteed that the level of risk will not change over time and that new risks will not emerge.

Therefore, there needs to be an ongoing strategy of monitoring and review of risks. Because of the severity of the consequences of some of the risks, ongoing audit of risk treatments is recommended. This is considered to be critical where procedural treatments are used to manage high and significant risks.

Risks within the Risk Register should be transitioned into MACH's onsite risk management system following the determination of the Modification application to ensure that ongoing monitoring and review occurs.

APPENDIX ONE: MACH RISK RANKING MATRIX

MOD 8 Environmental Risk Assessment

Risk Assessment Criteria & Descriptions

MACHEnergy

Consequence	Health / safety / environment	Financial / technology	Governance / compliance	Customers	People	Social licence / reputation	Delivery – contractors / projects / operations
Insignificant	First aid injury or illness No treatment required No lasting environmental damage or impact Remediation costs <$10K	*Financial Impact* (i) <= $500K (ii) Fraud < $10K Short-term (< 1 day) non-critical IT outage	Legislative breach without penalty or further action	Informal complaint by a customer	Shortfall in staff numbers or organisational capability with no direct impact on the business An event that requires minimal effort and management time to resolve	Isolated local adverse media coverage Informal or unfounded complaint to MACH	Short term loss of saleable product < 1% of planned Project delay < 5 days Project cost overrun < 2% of budget
Minor	Medical treatment injury Medically treated occupational health effect Restricted work injury Environmental damage which has short term impact Minor remediation costs $10k to $50k	*Financial Impact* (i) $500K <= $2M (ii) Fraud $10K < $25K Loss of IT systems 1 < 2 days	Legislative breach resulting in informal regulatory investigation Breach of development consent or EPL resulting in no-action or an improvement notice Policy related complaint leading to no action	Formal complaint by customer with no remedial action Minor breach of sales contract Off specification sale – requiring remediation	A management or critical role remains vacant for a period of up to 2 months Reduced morale resulting in some reduced performance	Repeated or district-wide adverse media coverage Informal complaint to regulator with no action taken	Short term loss of saleable product > 1% and < 2.5% of planned Project delay 5 - 10 days Project cost overrun 2 - 5% of budget
Moderate	Lost time injury Lost time occupational health effect Multiple medical treatments Environmental damage – medium term impact <2 years Moderate remediation costs $50k to $500k	*Financial Impact* (i) $2M <= $10M (ii) Fraud $25K < $250K Loss of IT systems 2 < 5 days	Legislative breach resulting in show cause notice Breach of development consent or EPL resulting in show cause notice Policy related complaint requiring remedial action	Contamination of product affecting customer Multiple complaints from customers	A management or critical role remains vacant for a period of over 2 months	Sustained or state-wide adverse media coverage Community trust negatively affected Prosecution resulting in: (i) Company fine < $100k (ii) Individual fine < $50k	Short term loss of saleable product > 2.5% and < 10% of planned Project delay 10 - 20 days Project cost overrun 5 to 20% of budget
Major	Fatality Case of permanent incapacity / occupational health effects Environmental damage - long term impact 2 to 10 years Major remediation costs $500k to $2M	*Financial Impact* (i) $10M <= $25M; or (ii) Fraud $250K < $500K Loss of IT systems 5 < 10 days	Legislative breach resulting in prosecution or litigation Breach of development consent or EPL resulting in stop work order Policy related breach leading to termination or personnel	Material breach of a sales contract Off specification sale leading to rejection of a cargo Loss of offtake customer International arbitration dispute	One or more management or critical roles remain vacant for a period of over 3 months Epidemic resulting in multiple staff absences Incapacity of managing director Negative morale resulting in impact to operational KPIs	Extended or nation-wide adverse media reference Community support or trust eroded Prosecution resulting in: (i) Company fine $100k < $500k (ii) Individual fine $50k < $100k	Short term loss of saleable product > 10% and < 25% of planned Project delay 20 – 50 days Project cost overrun 20 to 50% of budget
Severe	Multiple fatalities Multiple cases of permanent total disability / occupational health effects Environmental damage – permanent or impact lasts over 10 years Significant remediation costs >$2M	*Financial Impact* (i) > $25M; or (ii) Insolvency or receivership; or (iii) Fraud > $500K Loss of IT systems > 10 days	Legislative breach resulting in criminal conviction Breach of development consent or EPL resulting in mine closure	Loss of foundation /JV customer International arbitration award against MACH	Staff walkout Unexpected departure of multiple management or critical roles Pandemic resulting in multiple staff absences Board and/or MD replaced	Continuous national/international adverse media coverage Community opposition Prosecution resulting in: (i) Company fine > $500k (ii) Individual fine >$100k	Short term loss of saleable product >25% of planned Project delay > 50 days Project cost overrun > 50% of budget

Likelihood	Description	Frequency	Probability
Rare	May only occur in exceptional circumstances	Once every 50 years	<1%
Unlikely	Doubtful to occur during a specified time period	Once every 20 years	1-10%
Possible	Might occur in some circumstances	Once every 5 years	10-50%
Likely	Will probably occur in most circumstances	Once every 1 to 2 years	50-80%
Almost Certain	Expected to occur in most circumstances	Multiple times in a year	> 80%

		Consequence				
		Insignificant	Minor	Moderate	Major	Severe
Likelihood	Almost Certain	1 - Low	3 - High	3 - High	4 - Extreme	4 - Extreme
	Likely	1 - Low	2 - Medium	3 - High	4 - Extreme	4 - Extreme
	Possible	1 - Low	2 - Medium	3 - High	3 - High	4 - Extreme
	Unlikely	1 - Low	2 - Medium	2 - Medium	3 - High	3 - High
	Rare	1 - Low	1 - Low	2 - Medium	2 - Medium	3 - High

APPENDIX TWO: RISK REGISTER

					Risk Analysis (Inherent)				Risk Analysis (Residual)			
Number	**Category**	**Risk Description (What can happen that affects MACH's objectives?)**	**Possible Causes**	**Possible Consequences**	**Consequence**	**Likelihood**	**Level of Inherent Risk**	**Existing Risk Controls / Risk Controls Confirmed Within Project Scope**	**Consequence**	**Likelihood**	**Level of residual Risk**	**Actions required**
1	Surface water	Seepage/runoff from mine disturbance areas may bypass the water management system.	Insufficient planning of mine drainage and seepage controls. Failure of mine drainage and seepage controls. Occurrence of activities that extend beyond planning controls. Inadequate maintenance of structures. Failure of earthwork structures, dams and drains. Spillway flow of mine affected water. Excess water accumulation in storages/open cut due to increased catchment.	Uncontrolled direct drainage of mine affected water offsite. Poor water quality in waste rock emplacement sediment dams, affecting water quality and environmental values of Rosebrook Creek, the Hunter River and/or Hunter River alluvium. Increased total suspended solids in waterways from soil eroded offsite. Changes in stream salinity (due to mine activities). Excess open cut water interferes with mining operations and integrity of mine water management system.	Minor	Likely	**2 - Medium**	Surface water assessment (including updated site water balance) to identify predicted performance, size of additional water storages and allow for contingency measures (Modification Surface Water Assessment). Implementation of existing management measures described in the Water Management Plan (including planning and management of sediment dams and Trigger Action Response Plans [TARPs]). Engineering design of drainage control measures, e.g. seepage collection measures implemented downstream of the FEA. Collection drains directing runoff to water storages. Appropriate planning of drainage management (Ground Disturbance Permit process). Waste rock geochemical testwork, assessment and management. Controlled release system.	Minor	Possible	**2 - Medium**	None recommended.
2	Surface water	There may be unforeseen or elevated contaminants in controlled released water.	Ineffective water management. Inaccurate testing. Failure to test for credible contaminants.	Adverse impact on water quality and environmental values of the Hunter River (water quality constituents other than salinity).	Minor	Possible	**2 - Medium**	Surface water assessment (including updated site water balance) to identify predicted performance and contaminants of concern (Modification Surface Water Assessment). Compliance with the relevant Environment Protection Licence and the Hunter River Salinity Trading Scheme (in particular, release requirements). Implementation of existing management measures described in the Water Management Plan (including Trigger Action Response Plans [TARPs]). Waste rock geochemical testwork, assessment and management. Capture and re-use of water on site. High flows in the Hunter River diluting release flows.	Minor	Unlikely	**2 - Medium**	None recommended.
3	Surface water	Contaminant spills may be released into the external environment.	Occurrence of spillage, e.g. diesel, flocculant. Thickener failure. Poor storage practices. Inadequate maintenance.	Adverse impact on downstream water quality and environmental values.	Minor	Possible	**2 - Medium**	Design of surface water controls, including the Erosion and Sediment Control Plan, and management of disturbed areas. Appropriate containment and bunding of storage areas. Surface water assessment to identify risks and mitigations (Modification Surface Water Assessment). Existing management measures described in the Water Management Plan (including TARPs) are implemented. Pollution Incident Response Management Plan.	Minor	Unlikely	**2 - Medium**	None recommended.
4	Surface water	Final mine void may overflow.	Inaccurate modelling of void. Failure to implement design correctly. Final landform changes.	Adverse impact on downstream water quality and environmental values.	Major	Unlikely	**3 - High**	Integration between surface water and groundwater assessments (including updated final void water balance) to identify predicted performance (Modification Surface Water Assessment and Modification Groundwater Assessment). Final void water balance assessment to predict final void behaviour under varying climatic conditions. Design of final landform to limit the potential for final void overflows (limiting catchment to the void). Additional modelling prior to closure.	Major	Rare	**2 - Medium**	Coordinate model assumptions and findings between surface water and groundwater assessments to establish final void lake behaviour and groundwater inflows.
5	Surface water	Dam failure may occur.	Inadequate dam design. Inadequate dam construction. Inadequate operation and maintenance of dam. Earthquake outside design envelope. Rainfall event outside design envelope.	Adverse impact on downstream water quality. Downstream flooding. Potential loss of life.	Severe	Unlikely	**3 - High**	Continued implementation of existing management measures and monitoring, including the periodic review of monitoring results against modelling predictions, as described in the Water Management Plan (which includes a Groundwater Management Plan and Surface and Ground Water Response Plan with TARPs). Engineering design and construction control measures. Adherence to Dams Safety NSW requirements. Regular dam inspections.	Severe	Rare	**3 - High**	None recommended.
6	Ground water	Degradation to existing groundwater quality may occur.	Migration of mine affected groundwater (e.g. from open cut or waste rock emplacements) to receiving environment. Changes in the magnitude or nature of operational activities at nearby mines. Poorer quality water travelling off site impacting nearby aquifers and discharging to surface drainages. Inadequate seepage control from FEA.	Adverse impact on water quality and environmental values of Sandy Creek or Hunter River, or long-term changes to groundwater levels or flow direction in the vicinity of the final void. Loss of use for local water users. Adverse impacts on downstream biota.	Minor	Possible	**2 - Medium**	Design of the Fines Emplacement Area in accordance with relevant guidelines and requirements (e.g. Australian National Committee on Large Dams [ANCOLD] Guidelines and Dams Safety NSW requirements). Design of other water storages onsite (with varying levels of engineering applied to reduce the potential for release). Groundwater modelling to identify predicted performance supported by field investigations, mapping and monitoring data (Modification Groundwater Assessment). Continued implementation of existing management measures and monitoring, including the periodic review of monitoring results against modelling predictions, described in the Water Management Plan (which includes a Groundwater Management Plan and Surface and Ground Water Response Plan with TARPs). Design of the final landform, supported by model simulations, to encourage sink conditions for the void. Physical separation of waste emplacement from Hunter River.	Minor	Unlikely	**2 - Medium**	None recommended.
7	Ground water	Mount Pleasant operational impacts on groundwater may be greater than predicted affecting stream baseflow and groundwater drawdown for private groundwater users.	Model parameter non-uniqueness, i.e. the model may not provide the best representation of the groundwater systems at site and what is predicted for the future. Incomplete understanding of the groundwater system/connections and geological features.	Greater than predicted impacts on Groundwater Dependent Ecosystems (GDEs) from lowered groundwater levels due to dewatering. Adverse impacts to existing private groundwater supply bores.	Minor	Likely	**2 - Medium**	The ability to monitor water levels and implement "make good" provisions in accordance with the NSW *Aquifer Interference Policy* (AIP) (New South Wales Government, 2012) and Water Management Plan, including licensing. Groundwater modelling to understand potential impacts (both during and post-mining) supported by field investigations, mapping and monitoring data (Modification Groundwater Assessment). Uncertainty analysis undertaken to assess potential inaccuracies in the model predictions and provide probability distribution of key predictions (Modification Groundwater Assessment). Continued implementation of existing management measures and monitoring, including the periodic review of monitoring results against modelling predictions, described in the Water Management Plan (which includes a Groundwater Management Plan and Surface and Ground Water Response Plan with TARPs). Buffer of MACH Energy owned land.	Minor	Possible	**2 - Medium**	None recommended.

					Risk Analysis (Inherent)				Risk Analysis (Residual)			
Number	Category	Risk Description (What can happen that affects MACH's objectives?)	Possible Causes	Possible Consequences	Consequence	Likelihood	Level of Inherent Risk	Existing Risk Controls / Risk Controls Confirmed Within Project Scope	Consequence	Likelihood	Level of residual Risk	Actions required
8	Biodiversity	The predicted loss of vegetation and fauna habitat or potential impact on threatened species may be more than predicted.	Groundwater drawdown. Direct disturbance beyond planned. Failed rehabilitation/rehabilitation not meeting expectation. Failure of weed or pest control. Failure in pre-clearance survey (e.g. species present but not identified). Failure in management of fauna species during pre-clearance and clearance activities. Change in understanding of a species and/or its vulnerability to loss.	Greater than expected impact on listed threatened species, or impacts to downstream aquatic ecology or groundwater dependent ecosystems (vegetation and stygofauna).	Minor	Likely	**2 - Medium**	Implementation of a comprehensive Biodiversity Management Plan including pre-clearance surveys (vegetation clearance) protocols and demarcation of clearance boundaries as part of site Ground Disturbance Permit. Baseline and operational monitoring (in accordance with the Biodiversity Management Plan) and provision of offsets for residual impacts. Mitigation associated with the improved environmental values in the proposed Biodiversity Offset - leading to a low net impact at a regional scale. Maintaining awareness of listing process. Translocation Program of Tiger Orchid (monitoring and implementation).	Minor	Possible	**2 - Medium**	None recommended.
9	Biodiversity	There may be the potential for increased incidence of bushfires.	Poor vegetation control. Lightning strike. Electrical failure in equipment (powerline). Arson.	Adverse impact on property and potentially life. Adverse impact on biodiversity (would require a substantial change in bushfire frequency).	Minor	Possible	**2 - Medium**	Continued implementation of existing management measures described in the Bushfire Management Plan, including maintenance of fuel load, strategic grazing, maintenance of appropriate fire-fighting equipment and fire trails, consultation with RFS and training.	Minor	Unlikely	**2 - Medium**	None recommended.
10	Rehabilitation & Closure	There may be a failure to meet rehabilitation criteria.	Lack of availability of soil resources to develop required growth media. Poor characterisation of soil resources. Challenges in rehabilitating the Fines Emplacement Area. Presence of land contamination associated with long term infrastructure areas. Seasonal variation.	Inability to establish the required plant community types under the EPBC Act Approval. Inability to relinquish the mine lease.	Minor	Possible	**2 - Medium**	Implementation and ongoing investigation of innovative methods to implement rehabilitation and geomorphological design of the final landform of the Mount Pleasant Operation, including collaboration with the University of Newcastle. Ongoing monitoring of rehabilitation and continued management in accordance with the Rehabilitation Management Plan. Ongoing assessment of availability of soil resources and management of topsoil recovery. Assessment of potential land contamination as part of mine closure. Collaboration with mining contractor (Thiess). Continued implementation of management measures described in the Waste Management Plan.	Minor	Unlikely	**2 - Medium**	None recommended.
11	Rehabilitation & Closure	Geochemical properties of waste rock and/or fine rejects material may require additional management to avoid offsite impacts.	Ongoing systemic failure of existing controls. Misplacement of potentially acid forming material.	Degradation of water quality both on and offsite.	Moderate	Possible	**3 - High**	Geochemical testwork and assessment to identify predicted performance. Implementation of Water Management Plan including PAF controls, water quality monitoring and TARPs. High acid neutralising capacity of encapsulating materials. Ongoing geochemical testwork of selected materials. Implementation of management measures described in the Fines Emplacement Plan.	Moderate	Rare	**2 - Medium**	None recommended.
12	Rehabilitation & Closure	Final landform may not be stable.	Poor design and construction. Unforeseen soil properties. Failure to use correct materials. Failure to correctly construct final landform. Failure to design and maintain drainage paths. Ineffective onsite waste disposal (e.g. waste tyre disposal). Insufficient soil management and storage for future use in rehabilitation.	Degraded water quality on and offsite. Adverse impacts on rehabilitation and landform erosion.	Moderate	Possible	**3 - High**	Implementation and ongoing investigation of innovative methods to implement rehabilitation and geomorphological design of the final landform of the Mount Pleasant Operation, including collaboration with the University of Newcastle. Modelling of geomorphological stability of modification landforms to identify predicted performance. Ongoing rehabilitation projects (including micro-relief rehabilitation and revegetation). Ongoing management until a stable landform is achieved. QA/QC process for landform shaping and compliance with design. Regular Government audits. Continued implementation of management measures described in the Waste Management Plan. Assessment of soil resources to identify predicted availability. Continued management in accordance with the Rehabilitation Management Plan.	Moderate	Unlikely	**2 - Medium**	None recommended.
13	Air quality, noise & blasting	There may be greater than predicted (24 hour exceedance or annual basis) dust emissions from the mine operating at proposed capacity (incrementally or cumulatively with other mining projects).	Bushfire/dust storm. ROM production increase. Climatic conditions (e.g. extended drought). Change to mining sequence and locations of dust generating activity. Greater area of wind erosion (e.g. from non-rehabilitated areas).	Adverse impact on amenity and potentially health of nearby private residents and communities (including Muswellbrook, Kayuga and Aberdeen).	Minor	Likely	**2 - Medium**	Mine design controls to minimise dust emissions (e.g. shorter haul roads). Air quality modelling to identify predicted performance (Modification Air Quality Assessment). Existing management measures described in the Air Quality and Greenhouse Gas Management Plan, including: • dust controls (e.g. use of water carts); • monitoring (including real time monitoring); • a Trigger Action Response Plan (TARP) based on weather conditions and measured dust levels (including Environment Protection Licence shutdown requirements); • predictive modelling; and • training.	Minor	Possible	**2 - Medium**	Continue to apply best practice dust controls and investigate innovative methods to reduce dust emissions from the Mount Pleasant Operation. Review operating data regularly e.g. monthly reconciliation of data, year on year reconciliation and rolling annual reconciliation.
14	Air quality, noise & blasting	There may be excess dust generated if there is insufficient water available to mitigate/supress dust	Insufficient water supply. Insufficient water cart capacity/availability.	Regulatory breach. Potential impacts on health of nearby residents.	Minor	Likely	**2 - Medium**	Development of an updated site water balance for the Modification, which considers water usage for dust suppression (Modification Surface Water Assessment). Continued implementation of the Air Quality and Greenhouse Gas Management Plan (refer to Risk #13) and Water Management Plan. Dust shutdown requirement. Rapid fill system for water carts. Higher percentage of water cart compared with total fleet (compared with other mining operations). Option to use dust suppressants. Capture and re-use of water on site from expanded areas. Additional water storage capacity (MWD2). Regular review of water balance model during operations to identify risk of shortfall and allow for contingency measures (e.g. acquire additional surface water licences).	Minor	Possible	**2 - Medium**	Undertake detailed site water balance modelling, including low rainfall periods, to inform onsite water management. Calculate dust control water demand for dry year and confirm sufficient water resource availability (or alternative chemical) for dust suppression. Continue to engage with neighbouring mines regarding potential water sharing.
15	Air quality, noise & blasting	There may be inaccurate prediction of fugitive emissions of greenhouse gases.	GHG accounting may be inaccurate. Change in operating circumstances. Lack of suitable mitigation measures.	Greater than expected GHG emissions. Requirement for higher GHG offsets (financial) to mitigate environmental impact.	Minor	Possible	**2 - Medium**	Suitable fugitive gas model for fugitive emissions. Transparent assumptions regarding calculation methodology. Credible and meaningful strategy for ongoing GHG reductions. Development of an updated greenhouse gas emission inventory to identify predicted performance (Modification Greenhouse Gas Assessment and Mitigation Plan). Continued implementation of the greenhouse gas mitigation measures described in the Air Quality and Greenhouse Gas Management Plan. Controls managed by others, including State, Federal and international authorities, agencies and organisations (safeguard mechanism).	Minor	Unlikely	**2 - Medium**	None recommended.

					Risk Analysis (Inherent)				Risk Analysis (Residual)			
Number	Category	Risk Description (What can happen that affects MACH's objectives?)	Possible Causes	Possible Consequences	Consequence	Likelihood	Level of Inherent Risk	Existing Risk Controls / Risk Controls Confirmed Within Project Scope	Consequence	Likelihood	Level of residual Risk	Actions required
16	Air quality, noise & blasting	Offsite concentration of blasting fumes and dust may be greater than predicted.	Poor blast execution. Environmental factors such as rain and adverse weather conditions. Soil conditions including groundwater faults and loose earth.	Potential amenity/health impacts to neighbours. Regulatory breach and/or reputational damage to MACH Energy.	Minor	Likely	**2 - Medium**	Air quality modelling and blast assessment to identify predicted performance (Modification Air Quality Assessment and Noise and Blasting Assessment). Continued implementation of existing management measures described in the Air Quality and Greenhouse Gas Management Plan and Blast Management Plan. Blast management protocols (match blast design to conditions and use of liners). Monitoring and checking of prevailing wind conditions prior to blasting.	Minor	Possible	**2 - Medium**	Review, and if necessary, update existing management measures (predictive system).
17	Air quality, noise & blasting	There may be unexpected offsite impacts from odorous emissions associated with coal self-heating (spontaneous combustion).	Wynn seam is prone to spontaneous combustion. Failure to rapidly bury/manage material prone to spontaneous combustion.	Offsite amenity impact from presence of odour.	Minor	Likely	**2 - Medium**	Continued implementation of existing management measures described in the Air Quality and Greenhouse Gas Management Plan and Spontaneous Combustion Management Plan.	Minor	Possible	**2 - Medium**	None recommended.
18	Air quality, noise & blasting	Noise generated by activities in the pit at night may be greater than predicted (affecting community SE, E and NE of the site).	Increase in coal extraction rate. New noise generated by activities in north pit at night to the community NE of the site (2027 onward). Additional fleet items onsite. Failure to respond to real-time triggers. Failure to maintain noise attenuation. Low frequency noise with potential to exacerbate perceived noise levels. Noise from increased rail movements. Increase in road traffic movements.	Impact on amenity of affected residents.	Minor	Likely	**2 - Medium**	Mine planning. Noise modelling to identify predicted performance (Modification Noise and Blasting Assessment). Existing management measures described in the Noise Management Plan, including: • noise attenuation on fixed and mobile plant and other noise management measures; • monitoring (including real time and directional monitoring); • compliance monitoring; • regular sound power testing of fleet; • a TARP based on weather conditions and measured noise levels (including pro-active noise management at night to mitigate noise during noise-enhancing met conditions); • predictive modelling; • training; and • installation of noise mitigation on relevant houses (on request) in accordance with the Development Consent. Rail transport noise assessment (Modification Noise and Blasting Assessment). Liaison with rail operators regarding potential measures to reduce rail noise. Road transport noise assessment (Modification Noise and Blasting Assessment). The inclusion of management/mitigation measures for required site transport of people and consumables.	Minor	Possible	**2 - Medium**	None recommended.
19	Air quality, noise & blasting	Daytime construction noise associated with the Mine Water Dam 2 and raising of the Fines Emplacement Area may be greater than expected.	Change in fleet being used. Additional fleet items onsite. Failure to respond to real-time triggers. Failure to manage noise attenuation. Low frequency noise with potential to exacerbate perceived noise levels.	Impact on amenity of affected residents.	Minor	Possible	**2 - Medium**	Day shift activity only. Mine planning. Noise modelling to identify predicted performance (Modification Noise and Blasting Assessment). Existing management measures described in the Noise Management Plan, including: • noise attenuation on fixed and mobile plant and other noise management measures; • monitoring (including real time and directional monitoring); • compliance monitoring; • regular sound power testing of fleet; • a TARP based on weather conditions and measured noise levels; • predictive modelling; • training; and • installation of noise mitigation on relevant houses (on request) in accordance with the Development Consent.	Insignificant	Possible	**1 - Low**	None recommended.
20	Air quality, noise & blasting	There may be greater than expected ground vibration and airblast effects associated with blasting of overburden material.	Operator error. Presence of unidentified geological structures. Air blast and unfavourable atmospheric conditions.	Potential impact on amenity of nearby properties.	Minor	Possible	**2 - Medium**	Blast assessment to identify predicted performance (Modification Noise and Blasting Assessment). Continued implementation of existing management measures described in the Blast Management Plan. Identify potential impacts in assessment process and update blast control zones.	Minor	Rare	**1 - Low**	None recommended.
21	Health	There may be higher than expected cumulative dust impacts, including extended impacts over a longer period of time.	ROM production increase. Climatic conditions (e.g. extended drought). Change to mining sequence and locations of dust generating activity. Greater area of wind erosion (e.g. from non-rehabilitated areas).	Adverse impact on amenity and health of the surrounding community.	Minor	Likely	**2 - Medium**	Continued implementation of the Air Quality and Greenhouse Gas Management Plan (refer to Risk #13). Air quality modelling to identify predicted performance (Modification Air Quality Assessment).	Minor	Possible	**2 - Medium**	Continue to apply best practice dust controls and investigate innovative methods to reduce dust emissions from the Mount Pleasant Operation.
22	Health	Modification activities may generate unexpected instantaneous night-time noise.	Adverse weather conditions at night. Operator error. Inadequate maintenance and staff training. Lack of responsiveness.	Adverse impact on amenity and health of the surrounding community. Potential for increased sleep disturbance for the local community.	Minor	Likely	**2 - Medium**	Noise modelling to identify predicted performance (Modification Noise and Blasting Assessment). Mine planning and continued implementation of the Noise Management Plan (refer to Risk #18), including installation of noise mitigation on relevant houses (on request) in accordance with the Development Consent. Training and awareness for staff. Minimise use of equipment at exposed locations at night. Real-time monitoring.	Minor	Possible	**2 - Medium**	None recommended.
23	Health	There may be greater than predicted cumulative noise impacts from all sources of noise from MPO and nearby mines.	Change to fleet being used. Potential for other mines to expand operations. Change in nature of operations at other mines. Degradation of attenuation controls for equipment (fixed and mobile fleet).	Increased levels of annoyance and potential health impacts within the surrounding community.	Minor	Likely	**2 - Medium**	Mine planning and continued implementation of the Noise Management Plan (refer to Risk #18), including installation of noise mitigation on relevant houses (on request) in accordance with the Development Consent. Noise modelling to identify predicted performance (Project Noise and Blasting Assessment). Cumulative noise strategy. MACH Energy quarterly meeting with other mines. Consultation with other mines on the Noise Management Plan.	Minor	Possible	**2 - Medium**	None recommended.
24	Land use	Activities associated with mine construction and operations may adversely impact on local equine industry.	Unpredicted increase in noise and dust. Unpredicted increase in traffic. Adverse perception of visual impact.	Potential for reduction in business income and value.	Minor	Possible	**2 - Medium**	Ongoing consultation/dialogue regarding the Mount Pleasant Operation (including opportunities to provide feedback). Geomorphological landform design and progressive rehabilitation to address visual concerns. Viewshed modelling and Visual Impact Assessment to identify predicted performance (Modification Visual and Landscape Assessment). Implementation of existing management measures described in the Visual Impact Management Plan. Physical separation of the mine and the customer site. Geographic location (not expanding beyond existing mining tenements and mining away from Muswellbrook). Significant area of south pit dump established and initial rehabilitation complete.	Minor	Rare	**1 - Low**	Continue to implement the Stakeholder Engagement Program beyond submission of the Modification Report.

					Risk Analysis (Inherent)				Risk Analysis (Residual)			
Number	Category	Risk Description (What can happen that affects MACH's objectives?)	Possible Causes	Possible Consequences	Consequence	Likelihood	Level of Inherent Risk	Existing Risk Controls / Risk Controls Confirmed Within Project Scope	Consequence	Likelihood	Level of residual Risk	Actions required
25	Land use	There may be adverse change to rural agricultural communities and towns and their activities as a result of the Modification.	Significant changes in land management practices and use of local suppliers. Requirement for additional biodiversity offset areas and Aboriginal Conservation Areas. Population changes, e.g. loss of self-identified rural/agricultural communities and/or change in population of Muswellbrook from permanent families to Drive-in-Drive-Out workers.	The reduction in agricultural output results in flow-on effects to other agricultural suppliers impacting other users. Cumulative increased pressure on affordable and available housing. Perception of surrounding landholders that their land value may decrease as a consequence of ongoing mining operations.	Minor	Possible	**2 - Medium**	Purchase agreements for the most affected near neighbours. Geomorphological landform design and progressive rehabilitation to address visual concerns. Management strategies for water, noise, dust and control of weeds/feral species – as documented in existing Environmental Management Plans. Use local licensees. Consideration of agricultural productivity in the selection of biodiversity offset areas, if required. Identification of potential social impacts (Modification Social Impact Assessment).	Minor	Rare	**1 - Low**	None recommended.
26	Land use	Land contamination may result in impacts on future use of mined land.	Inadequate storage practices during operations (e.g. bunding). Inadequate records regarding soil contamination. Inadequate site remediation.	Long term limitations of use of land. Expensive/unscheduled remediation.	Minor	Possible	**2 - Medium**	Operational controls for handling materials (including spill management). Continued management in accordance with the Rehabilitation Management Plan (including assessment of potential land contamination as part of mine closure).	Minor	Unlikely	**2 - Medium**	None recommended.
27	Social & economic	Continuation of the mine may lead to unanticipated social impacts (e.g. community perceptions of noise and dust impacts result in increased levels of stress and anxiety within the community).	Increase in MPO employment. Longer period of exposure to noise and dust, etc. Change to mine footprint and visual extent of the mine. Closure of Castlerock Road.	Reduced social outcomes and/or a poor relationship (e.g. mistrust) between MACH Energy and its neighbours and stakeholders.	Minor	Likely	**2 - Medium**	Ongoing consultation/dialogue regarding the Mount Pleasant Operation (including opportunities for the community to provide feedback). Air quality and noise modelling to identify predicted performance (Modification Air Quality Assessment and Noise and Blasting Assessment), and identification of potential social impacts (Modification Social Impact Assessment). Continued implementation of the Air Quality and Greenhouse Gas Management Plan and Noise Management Plan and Visual Impact Management Plan. Continued community contributions. Implementation of the Stakeholder Engagement Program beyond submission of the Modification Report.	Minor	Possible	**2 - Medium**	Continue to implement the Stakeholder Engagement Program beyond submission of the Modification Report.
28	Social & economic	Cumulative incremental impacts from MPO and other mining projects and renewable projects may adversely affect community infrastructure (roads, accommodation, services).	Poor consultation or engagement with neighbours and other stakeholders. Overlap of timing of other projects and demand on community infrastructure.	Reduced social outcomes and/or a poor relationship (e.g. mistrust) between MACH Energy and its neighbours and stakeholders.	Minor	Likely	**2 - Medium**	Ongoing consultation/dialogue regarding the Mount Pleasant Operation (including opportunities for the community to provide feedback). Identification of potential social impacts (Modification Social Impact Assessment). Continued community support and funding. Limited construction activity associated with the Modification.	Minor	Possible	**2 - Medium**	Engage with Muswellbrook Shire Council and other relevant authorities regarding potential community infrastructure demands.
29	Social & economic	Economic benefits from mining including the Modification may not be evenly distributed in the community (e.g. portion of Muswellbrook on low incomes may not receive the same economic benefit as others).	Inherent social inequity in area. Not all local people can directly benefit from the mining operation.	Potential to further the divide between members of the community - those who benefit from mining and those who experience negative impacts of mining.	Minor	Likely	**2 - Medium**	Ongoing consultation/dialogue regarding the Mount Pleasant Operation (including opportunities for the community to provide feedback). Continued community support and funding, including Planning Agreements with Councils. Identification of potential social impacts (Modification Social Impact Assessment).	Minor	Possible	**2 - Medium**	None recommended.
30	Social & economic	Economic benefits of the Modification may not be realised in the local area.	Mine workers and their families may not reside in the local area. Adoption of new mining technologies, including equipment automation.	Reduced social outcomes and/or a poor relationship (e.g. mistrust) between MACH Energy and its neighbours and stakeholders.	Minor	Likely	**2 - Medium**	Identification of potential social impacts (Modification Social Impact Assessment). MACH Energy does not currently have any intention to utilise equipment automation due to the complexity of the coal deposit. In the event future technological advances make automation viable, MACH Energy would develop mitigation and management measures in consultation with relevant authorities.	Minor	Unlikely	**2 - Medium**	None recommended.
31	Heritage, Aboriginal cultural heritage	There may be unanticipated impact on Aboriginal heritage items/locations.	Heritage accidently disturbed. Sites not identified through previous survey effort.	Incremental "loss of country" as part of Aboriginal cultural values.	Minor	Likely	**2 - Medium**	Continued liaison with Traditional Owners. Avoidance of impacts where practicable. Surveys and assessments prior to disturbance and as an input into mine design processes. Operational controls related to ground disturbance (including the Ground Disturbance Permit process) in accordance with the Aboriginal Heritage Management Plan.	Minor	Possible	**2 - Medium**	None recommended.
32	Heritage, Aboriginal cultural heritage	There may be unanticipated impact on historical heritage items.	Uncontrolled blasting. Non-compliance with commitments (archival recording).	Requirements to make good any damage. Loss of heritage items.	Minor	Likely	**2 - Medium**	Assessment of potential impacts on historical heritage items. Archival recording and/or test excavation for select heritage items prior to disturbance. Blast monitoring and potentially amendment of blast design to reduce vibration impacts on sensitive historical heritage items.	Minor	Unlikely	**2 - Medium**	None recommended.
33	Other	There may be adverse impacts on safety or amenity of local road network.	Extension of the duration of time of mining (and associated traffic). Alteration of local road network (including the Northern Link Road). Minor increase in operational traffic above existing levels. Construction related traffic works and activities.	Potential safety incident. Adverse impact on road users, e.g. change to journey time.	Minor	Likely	**2 - Medium**	Engineering design of the Northern Link Road alignment to maximise safety and amenity. Assessment of potential traffic movements to identify predicted performance (Modification Road Transport Assessment). Planning Agreement on Muswellbrook Shire Council and Road Maintenance Management Plan. Restrictions to site access routes. Management/mitigation measures for required site transport of people and consumables, including Mount Pleasant Operation requirements regarding place of residence and/or fatigue management to address employee driving distances.	Minor	Possible	**2 - Medium**	None recommended.
34	Other	There may be increased or long term night-lighting impacts on surrounding receivers including Muswellbrook township.	Incorrect placement/orientation of mining rigs. Changing location of mining activities.	Adverse impact on affected communities.	Minor	Likely	**2 - Medium**	Mine planning (e.g. development of the Eastern Out of Pit Emplacement). Viewshed modelling and Visual Impact Assessment to identify predicted performance (Modification Visual and Landscape Assessment). Continued implementation of existing night lighting management measures described in the Visual Impact Management Plan.	Insignificant	Likely	**1 - Low**	None recommended.
35	Other	There may be unanticipated visual impacts as a result of short term dynamic changes or longer term cumulative changes.	Newly exposed receivers due to the northern extension of the final landform. Increase in landform elevation.	Adverse impact on affected communities.	Minor	Possible	**2 - Medium**	Ongoing consultation/dialogue regarding the Mount Pleasant Operation (including opportunities to provide feedback). Geomorphological landform design and progressive rehabilitation. Viewshed modelling and Visual Impact Assessment to identify predicted performance (Modification Visual and Landscape Assessment). Implementation of existing management measures described in the Visual Impact Management Plan.	Minor	Unlikely	**2 - Medium**	Continue to implement the Stakeholder Engagement Program beyond submission of the Modification Report.

					Risk Analysis (Inherent)				Risk Analysis (Residual)			
Number	**Category**	**Risk Description (What can happen that affects MACH's objectives?)**	**Possible Causes**	**Possible Consequences**	**Consequence**	**Likelihood**	**Level of Inherent Risk**	**Existing Risk Controls / Risk Controls Confirmed Within Project Scope**	**Consequence**	**Likelihood**	**Level of residual Risk**	**Actions required**
36	Other	The approved final landform may interfere with TV reception in low-lying areas.	Progressive raising of the landform affects transmission from the Rossgole Transmission Tower.	Adverse impact on affected communities.	Minor	Possible	**2 - Medium**	Re-transmission station has been approved (not yet constructed).	Minor	Unlikely	**2 - Medium**	Continue to progress re-transmission tower licence process with the Australian Communications and Media Authority (ACMA).