CHAPTER 15

Monitoring and Maintenance

1. Introduction

The DMRP Risk Register and the overarching DMRP play a critical role in identifying and managing potential rehabilitation and closure risks to people, property, the environment and infrastructure. Overall, the risk profile for the Hazelwood Rehabilitation Project is low, with no risks classified as very high, once the site transitions to Phase 2 (Passive Rehabilitation). This phase begins when the pit lake achieves the required fill level (RL+45m AHD), which significantly enhances the mine batter and mine floor stability and serves as the key factor in mitigating a substantial portion of the site risks.

As the site progresses to Phase 3 (Post Closure), the continued implementation of various controls eliminates six risks entirely or reduces them to 'So Far As Is Reasonably Practicable' (SFAIRP). Although the risks have been reduced to SFAIRP, there are still three risks that remain at a high-risk rating and five at a medium risk. Although these risks have a higher than desirable final risk rating, ENGIE have completed all practical controls associated with these risks, with the resultant risk profile an outcome of the assessed post closure land use. An example of this is the potential of drowning which is a risk associated with publicly accessible water bodies.

The DMRP will reside under the site Environmental Management System (EMS). The EMS contains the primary mechanisms for managing the rehabilitation and compliance arrangements for the site. Figure 15.1 shows statutory approvals and environmental management systems and plans for the site. This is consistent with the approach identified in *Chapter 27 Environmental Management Framework* in the HRP EES.

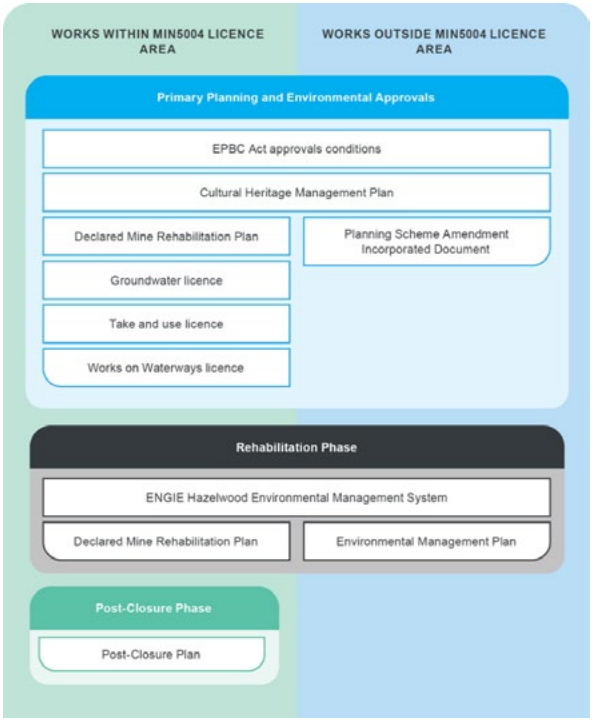

Figure 15.1:
Hazelwood environmental management system framework

To ensure comprehensive risk management, the DMRP Risk Register has been integrated into other key risk registers maintained by ENGIE, including the Stability Risk Register (within the GCMP), the Fire Risk Register (in the FRMP), and the Environmental Risk Register (in the EMS). This integration ensures consistency across all relevant management documents.

Building on the risk mitigation strategies developed in *Chapter 14 - Risk Assessment and Management* , this chapter will broadly discuss the approach to risk mitigation i.e. the types of risk controls and the key documents that are intended to be utilised to manage the risks associated with the site and provide confidence that the project will meet its completion criteria:

- Environmental Management System (EMS);
- Ground Control Management Plan (GCMP);
- Fire Risk Management Plan (FRMP); and
- Landfill Environmental Monitoring Program (LEMP)
- Risk Management Plan (RMP)

This chapter outlines the activities that will be undertaken during the three phases of closure, which are detailed in Table 15.1.

Table 15.1: Closure phases

PHASE	DESCRIPTION
Phase 1: Active Rehabilitation (includes lake filling)	Physical activities that will be carried out to achieve the landform in accordance with the approved rehabilitation plan and whilst activities, landforms and risk mitigation systems are actively maintained through human intervention. This is also known as Phase 1. • Decommissioning of assets/infrastructure • Removal of assets • Preparing the pit for fill • Rehabilitation and profiling earth works • Revegetation • Actively filling pit void to RL +45m AHD • Active management of fire services
Phase 2: Passive Management (post fill)	The period of time when the site is monitored and periodically maintained, however, active management is no longer required (or limited as far as reasonably practicable) and active filling has ceased. Pit Lake level management commences through this phase. Moderated alternative land use such as grazing could occur during this phase. This is also known as Phase 2. Rehabilitation performance monitoring • Passive landform management • Maintaining lake levels • Demonstrate closure criteria are met • Commencement of monitoring and maintenance activities • Rezoning/sale of land • Data collection • Management of landforms to address minor erosion and rills to avoid more significant erosion issues • Management of vegetation cover to ensure adequate groundcover • Management of weeds, pests and pathogens • Ongoing management of fuel loads (grazing and mowing) to address the risks associated with fire.
Phase 3: Post Closure	Relinquishment will occur when the closed mine or mine feature for which management and monitoring has been completed and tenure has been surrendered. The responsibility will be transferred to the next landowner, relevant regulating authority or third party. Post closure is the period when land management responsibility has been relinquished to the future land manager and alternative funds are used to monitor and maintain the landforms. This is also known as Phase 3 and is known as post closure in the MRSD Act and Regulations. • Closure criteria have been achieved • Payment into Declared Mine Fund has occurred • Management of repurposed landforms by third party • Relinquishment of MIN5004

1.1 RISK MITIGATION

A comprehensive set of risk controls have been identified for the active rehabilitation, passive management and post closure phases of the rehabilitation project. The controls are categorised into three main types:

Engineering Controls: These controls require minimal human intervention and are often already in place. Examples include design features, systems, and physical objects that mitigate risks without ongoing human input.

Administration Controls: These controls rely on human intervention for their enactment, maintenance or performance monitoring. Examples include maintenance schedules, emergency response plans, and regular monitoring activities.

Supporting Documents: These documents outline where the controls are documented and provide detailed procedures and management plans. Examples include Trigger Action Response Plans (TARPs), standard operating procedures, and comprehensive management plans.

The DMRP risk workshops revealed that the number of controls required to adequately mitigate risk decreased over time, indicating a reduced need for active intervention as risks were mitigated or eliminated. Some controls, particularly engineering controls, were identified as having the potential to significantly reduce the impact of risks across all three phases. These controls, often embedded in the design, were effective in reducing multiple risks and lowering the overall risk rankings across sequential phases.

In addition to the typical suite of engineering, administrative or supporting document risk controls, those controls which have the ability to significantly alter the risk outcome were also identified and, in some cases, reviewed for their suitability to the closure phases. For these 'critical' controls, ENGIE Hazelwood has developed critical control performance standards, known as "Critical Control Performance Standards (CCPS)". The standards have evolved and have been further developed with the input of internal expertise and subject matter experts. Each standard outlines the risk event, objectives, performance requirements, supporting activities, verification processes, triggers for action, and assigned accountability. The standards are regularly updated and audited and will be reviewed in detail as the site transitions through the rehabilitation phases. Currently, 23 critical controls are operational, which are relevant to current site conditions (including mine void water retention arrangements) and ENGIE Hazelwood's proposed pit lake filling works.

These critical controls address four key hazard areas:

- Major Mine Fire: Controls to prevent and manage fire incidents within the mine.
- Batter and/or Mine Floor Failure: Controls to ensure the structural stability of mine walls and floors.
- Site Security: Measures to secure the site against unauthorized access and potential threats.
- Adverse Environment: Controls to mitigate environmental impacts and ensure compliance with environmental standards.

These critical controls were reviewed for their effectiveness during the 2024 DMRP risk workshops to support the DMRP submission (refer to *Chapter 13 - Risk Identification* and *Chapter 14 - Risk Assessment and Management*). The effectiveness of each control was rated based on current performance. The full list of critical controls relevant for ENGIE during the active rehabilitation period is detailed in Table 15.2.

Table 15.2: Critical controls

CRITICAL CONTROL	CONTROL NO	CONTROL TYPE	EFFECTIVENESS	RESPONSIBILITY
HAZARD: MINE FIRE				
Plan – fire readiness (site on Low / Moderate / Severe / Extreme Days)	0094	Administrative	Good	Mine Production Manager
Fire Services System – Remote / manual fire protection of exposed coal and batters	0206	Administrative	Good	Mine Services Superintendent
Design and placement of suitable mineral earth to cover exposed coal i.e. roads, rehabilitation, benches	0383	Engineering	Satisfactory	Technical Services Manager
Fire Services – Fire protection of exposed coal and mechanical plant (wetting down areas of exposed coal)	0443	Administrative	Good	Mine Production Manager
Activate Emergency Response Plan	0616	Administrative	Good	Site – Security Manager
HAZARD: BATTER AND/OR MINE FLOOR				
Aquifer depressurisation	0103	Engineering	Good	Technical Services Manager
Design – Geometry of Batter, Bench, Surcharge Dump and Embankments	0119	Engineering	Very Good	Technical Services Manager
Horizontal Drains	0231	Engineering	Very Good	Technical Services Manager
Geotechnical Inspections	0245	Administrative	Good	Technical Services Manager
Design and placement of suitable mineral earth to cover exposed coal i.e. roads, rehabilitation, benches	0383	Engineering	Satisfactory	Technical Services Manager
Operational and Maintenance of the MMD channel and Low Flow Pipe	0576	Engineering	Very Good	Technical Services Manager
Monitoring of ground movement and hydrogeological conditions by instrumentation	0601	Administrative	Good	Technical Services Manager
Penstock – 3GL Water Flow (Morwell River Flood Diversion Structure)	1107	Engineering	N/A *	Technical Services Manager
Maintain lake level RL+45m	0123	Engineering	Not Rated	Technical Services Manager
HAZARD: ADVERSE ENVIRONMENT				
Aquifer depressurisation	0103	Engineering	Good	Technical Services Manager
Design – Geometry of Batter, Bench, Surcharge Dump and Embankments	0119	Engineering	Very Good	Technical Services Manager
Horizontal Drains	0231	Engineering	Very Good	Technical Services Manager
Fire Services – Fire protection of exposed coal and mechanical plant (wetting down areas of exposed coal)	0443	Administrative	Good	Mine Production Manager
Operational and Maintenance of the MMD channel and Low Flow Pipe	0576	Engineering	Very Good	Technical Services Manager
Monitoring of ground movement and hydrogeological conditions by instrumentation	0601	Administrative	Good	Technical Services Manager
Aquifer water quality monitoring	1052	Administrative	N/A *	Technical Services Manager
HAZARD: SITE SECURITY				
Activate Emergency Response Plan	0616	Administrative	Good	Site – Security Manager
Site Access Control	0648	Administrative	Good	Security and Emergency Services Manager

** N/A denotes potential critical control, 'Not Rated' denotes new critical control identified for Passive Rehabilitation phase, which does not have a critical control effectiveness rating assessed.*

Two critical controls were identified as 'N/A' as they lacked performance standards since they have not yet been implemented onsite. These controls are currently being updated and incorporated, with supporting performance standards being developed.

The necessary critical control performance standards (CCPS) for each critical control during the active rehabilitation and passive management phases are detailed in Appendix C of the Post Closure Risk Management Plan.

2. Evolution of Risk with Rehabilitation Phases

Further to the assessment of risk in response to known or present hazards is their evolution over time. Identified hazards and the risk they pose changes as the surrounding environment evolves as rehabilitation progresses from Active management to Passive management and onwards to Closure/ Post Relinquishment management. In the context of Hazelwood Mine, many of the identified hazards, and their risk, will change as water levels within the mine void rise to the design level of +45 m RL.

As the risk of most known hazards diminishes with a rising water level in the void, some required monitoring and controls will become redundant. For example, as the mine floor has become submerged, approximately 50% of the mine's exposed coal is no longer at risk of ignition. As the water level rises, and all exposed coal is submerged, this risk will decrease to almost 0%. As such, controls for fire management such as fire service pipelines will become redundant, as the risk is no longer present.

Established risk levels and thresholds consider the mine in an active management phase of rehabilitation. They provide a snapshot of risk as we know it today. But it does not consider the transition to passive management. The DMRP provides an outline for transitioning ground control management from active to passive management. To achieve this ENGIE has sought to understand:

- When/at what pit void water level) does the transition from active to passive occur.
  - Is this the removal of global scale hazards?
- What new risks present under passive management (if any)?
- Can these risks be quantified/managed with existing knowledge/controls?
- What controls are redundant?
- What controls can be reduced?

The majority of controls have some relationship with the proposed mine void water level. The water level at which a control moves from active to passive is specific to the source, pathway and potential receptors of a hazard. It will also change depending on the domain and potential presence of a Special Area of Interest. The assessment of these controls efficacy, redundancy or introduction of new controls will be assessed against specific reference mine void water levels.

2.1 REFERENCE LEVELS

Reference levels have been identified at specific horizons within the mine void to identify a place at which verification of assessed parameters and outcomes should be undertaken. Reference Levels are not hold points. It is not intended for activities, particularly water filling, to stop at these points. The intent is that these reference levels trigger requisite works to validate previous assumptions and provide ample time to undertake additional precautionary measures to manage ground control risks, if required, so rehabilitation may continue without interruption.

Reference levels are consistent across the mine void and consider the impacts of water level rise on all domains concurrently. As such, some reference levels span 5m vertical distances to include multiple critical levels in each review.

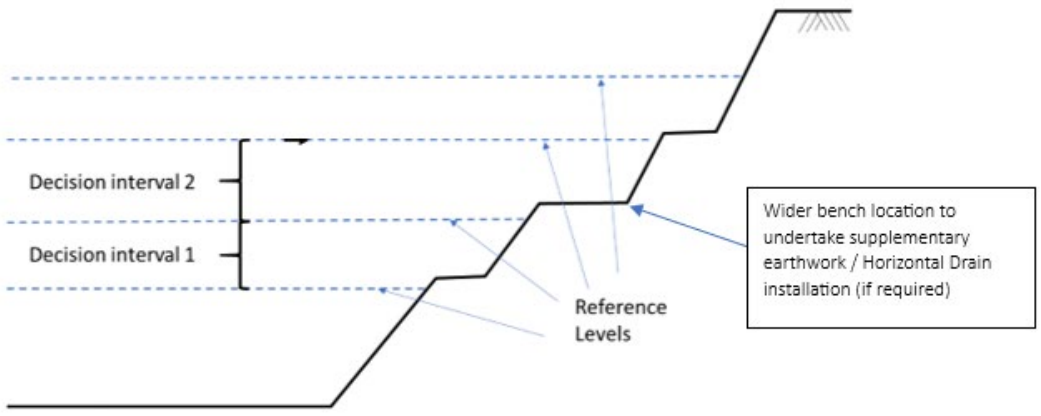

Figure 15.2 – Illustration of Decision Points after MLRA (2022), updated by CMQ (2024)

In developing reference levels, consideration has been given to the following aspects:

- Consequence of (potential) batter failure - As a result of proximity of Mine Batters / Domains to significant infrastructure.
- Current mine geometry – Location of suitable (width and height) benches that would permit the re-design / augmentation of earthworks and or other stability controls if needed.
- Lake filling time and volume – The time taken for the lake to rise between consecutive reference lake levels. There should be sufficient time between subsequent reference lake levels to facilitate a meaningful re-analyses of slope performance outcomes and review of outcomes.
- Weight Balance exceedance – The weight above the top of each aquifer across the mine void is greater than the aquifer groundwater pressure thereby preventing floor heave and induced batter instability.
- Hydrogeological Equilibrium – This is defined as the approximate long-term balance of inflows (i.e. rainfall, groundwater seepage and 'minimised' aquifer groundwater bore discharge) to outflows (i.e. evaporation), resulting in a scenario where surface water inflows are not required to maintain this balance.

Based on the accumulated knowledge and understanding of minimum pit lake levels and known geotechnical hazards, the following reference levels have been adopted for batter stability management:

1. -7 m RL – Base of the HARE/HARA
2. +8 m RL – Current approved pit lake level (WPV 2019)
3. +25 m RL – Height at which to validate global batter slope stability across all domains
4. +40.5 m RL – Height at which to validate weight balance across all domains

2.2 CONTROL DE-ESCALATION

Control de-escalation will occur as risk profiles change through the rehabilitation life cycle. To de-escalate a control a process of prediction, verification and confirmation of key metrics will be used. If movement is within predicted and accepted ranges, it has been verified as an accurate representation of in-situ conditions and confirmed with re-assessment (if required) it may be removed provided a separate control appropriately manages any residual risk.

Where possible, removal of controls should align with achieving closure criteria. However, it should be noted that some closure criteria will be achieved earlier than others. Maintaining controls in some domains may be required based on expected localised stability responses.

2.3 ACTIVE TO PASSIVE REHABILITATION

The change from Active to Passive rehabilitation reflects the key milestone of achieving batter stability at +45 m RL. At this lake level the batters are expected to be stable, with the pit water body providing enough buttressing to adequately counter global scale batter failure. At this water level, weight balance is also achieved (+45 m RL) by buttressing the slopes and surcharging the floor with the weight of the pit lake.

This means that previous critical controls related to managing batter stability may no longer be critical. In effect they have been replaced by a new critical control – maintaining the pit water body at +45 m RL. Once these primary risks are controlled through passive means (maintaining a water-level), then the overall risk profile of the mine reduces substantially.

It is important to note that in some domains key stability criteria will be net in advance of +45 m RL. Where this is the case, some controls in these domains will be progressively replaced or removed as other controls take effect. An example of this would be a batter no longer at risk of block movement due to the effect of the pit lake water level. If the batter is stable at +30 m RL, then controls such as stability bore monitoring and horizontal bores will be assessed for removal based on a new critical control of maintaining a minimum pit lake water level of +30 m RL taking effect.

This means the use of specific controls will be progressively phased out or maintained but repurposed. An example is stability monitoring bores; once the pit lake level becomes the critical control, stability bores will no longer need trigger levels and associated TARPs. Where possible, they will be decommissioned. However, some stability bores may be well situated for aquifer recharge monitoring or monitoring of ongoing stress relief or recompression of batters. These bores would be maintained but effectively repurposed, going from a critical management tool to a non-critical monitoring tool.

The decommissioning and repurposing of controls will reflect the ongoing evolution of risk within each domain, which is expected to reduce as the mine transitions from active to passive rehabilitation. A summary of the change in control criticality, and the reduction of hazards through rehabilitation phases. These are summarised in **Table 15.3**. Also included in **Table 15.3** is a summary of the primary hazards removed or reduced as controls change and the transition between phases occurs.

2.4 PASSIVE TO POST RELINQUISHMENT

The transition to Post Relinquishment in the context of Hazelwood primarily refers to the cessation of site-based works and the ongoing maintenance and monitoring of the rehabilitated landforms. The remaining or ongoing controls are intended to be passive – requiring minimal to no upkeep and fulfilling their role without interaction and minimal oversight.

This phase is primarily to allow for verification of modelled outcomes, maintenance and monitoring. This period is to be used to ensure all controls are working as required and that measurable stability indices are within acceptable ranges.

If closure criteria cannot be achieved, a review of the closure criteria's appropriateness/validity must occur and re-assessment of the risk, and potential adoption of new closure criteria, is to occur if required. Where possible some domains, or portions of domains, may be suitable for early or partial relinquishment, allowing for utilization of some part of the mine by private or community interests.

2.5 POST RELINQUISHMENT

To manage ongoing geotechnical risks, a Ground Hazards Management Plan (GHMP) is proposed for incorporation into the Post-Closure Plan. The intent of the GHMP is to supersede the GCMP with a change in focus from controlling critical risks, to managing residual risk. The GHMP should include a framework to rectify damage to receptors, due to mining induced movement.

Table 15.3: Summary of control changes through rehabilitation phases

REHABILITATION PHASE	CONTROLS REDUCING IN CRITICALITY	CONTROLS INCREASING IN CRITICALITY	HAZARDS REDUCED/REMOVED	POTENTIAL NEW HAZARDS IDENTIFIED
Active to Passive Management	Geotechnical Model –The geotechnical model is well understood. Batter shaping works are completed. Stability bores – Some stability bores are still required for ongoing monitoring in critical domains. Some may be removed if metrics are achieved. Extensometers – The majority of extensometers are redundant as HARE/HARA is submerged. Inclinometers – Some inclinometers are still required for ongoing monitoring in critical domains. Some may be removed if metrics are achieved. Sub-surface drainage – Majority have been submerged. Some horizontal bores may need to be added to upper benches. Pump bores – Reduced pumping requirement as weight balance is affected by increasing pit lake water body. Some may be removed if metrics are achieved. Geotechnical Inspections – Majority of exposed areas now submerged or under grassed clay capping. Largely replaced by LiDAR and bathymetric survey.	Pit lake water body level – Critical control to maintain global pit slope stability. Must be maintained at +45 m RL (within flux zone). Live monitoring – Critical control to replace reduced geotechnical inspections and minimization of monitoring network. Bathymetric survey – to assess potential movement of batters and degradation of surcharges below water level.	Block Sliding – The risk of block sliding is largely managed at +30 m RL (excluding WFSB), and completely managed at +45 m RL by the full pit lake. Aquifer induced floor heave – Weight balance is achieved at +45 m RL. Aquifer depressurisation pumping can continue to taper off. Kinematic failure – Release of discrete coal blocks from the batter is buttressing effect of the lake waterbody and the reprofiling and capping of upper batters. No receptors exist for kinematic failure. Ignition of exposed coal – The risk of fire induced instability is removed as all exposed coal batters are submerged and or clay capped. Degradation of surcharges – Degradation of surcharges overtime is managed by the weight of the lake waterbody providing a surcharge weight. No surcharges are exposed to surface erosion processes.	Recharging joints – The recharging of coal joints presents a potential stability issue for the mine. As the water level of the pit lake rises, the water table further from the mine is expected to follow. While it is unlikely to cause stability issues in the mine batters, due to the presence of the pit lake providing confining pressure, it may lead to expansion of joints and rebound in the mine surrounds. Aquifer repressurisation – Aquifer repressurisation will likely lead to rebound as the effects of consolidation are partially off-set. This has the potential to cause ground strain near the mine.
Passive to Post Relinquishment Management	Geotechnical Model –The geotechnical model is well understood. Batter shaping works are completed. Stability bores – Some stability bores are still required for ongoing monitoring in critical domains. All others decommissioned. Inclinometers – Some inclinometers are still required for ongoing monitoring in critical domains. All others decommissioned. Pump bores – Reduced pumping requirement as weight balance is achieved/maintained. Progressive removal of pump bores not required to top-up lake levels. Geotechnical Inspections – Significantly reduced frequency of inspection. Largely replaced by LiDAR and live monitoring. Bathymetric survey – Reduces in criticality as lake level replaces surcharge effect.	Pit lake water body level – Critical control to maintain global pit slope stability. Must be maintained at +45 m RL (within flux zone). Live monitoring – Critical control to replace reduced geotechnical inspections and minimization of monitoring network.	Surficial erosion – Final installation and validation of erosion protection measures (including wave action). Ongoing maintenance maybe required.	Vandalism – As the site is progressively relinquished monitoring and maintenance equipment is potentially more accessible to the public.
Post Relinquishment to Relinquishment	Pump bores – Removal of all pump bores not required to top-up lake levels.	As above	As above	As above

3. Management Plans

Key management documents provide detailed monitoring systems to ensure a sufficient level of supporting data and evidence is provided to demonstrate achievement of the established rehabilitation objectives for the Mine.
The monitoring programs are structured to align with the closure criteria.

Trigger, Action, Response Plans (TARPs) are a structured approach used to monitor and manage risks. The identified hazards are classified by risk level. TARPs require ongoing monitoring to ensure that any changes in risk levels are promptly addressed. For each trigger level, TARPs outline specific actions to mitigate the identified risks. The process for development, integration and implementation of the TARPs on site are addressed in each specific management plan. The TARPs are detailed in the relevant management plan.

3.1 FIRE RISK MANAGEMENT PLAN

The Fire Risk Management Plan (FRMP) 2023 for the Hazelwood Mine outlines the strategies to manage and mitigate fire risks during the active and passive rehabilitation phases of closure. The FRMP was first developed in 2015 and approved in 2016, with further updates completed in 2017 and 2019 to support Hazelwood's Work Plan Variation applications. The FRMP 2019 has since been updated to reflect new knowledge and current management practices. ENGIE Hazelwood manages fire risks that could affect the environment, public, land, property or infrastructure.

The FRMP 2023 was prepared to comply with Schedule 8 of the MRSD Regulations. It is a "live" document, meaning it will be updated as new information and operational changes occur. The plan focuses on fire risk mitigation within the MIN5004 area, excluding the Hazelwood Power Block and Cooling Pond site areas.

The FRMP 2023 includes detailed risk assessments, identifying high consequence events and critical controls to prevent or mitigate these events. No high consequence mine fire-related events were identified in this assessment.

The FRMP 2023 incorporates key site documentation and outcomes from workshops with representatives from Earth Resource Regulator (ERR), WorkSafe, and the Country Fire Association (CFA).

Overall, the FRMP 2023 aims to ensure that fire risks are effectively managed during the rehabilitation of the Hazelwood Mine, protecting the environment, public, and infrastructure.

The FMRP 2023 cross-refers to a number of subsidiary documents, such as the Fire Readiness Planning Guidelines, which require ENGIE Hazelwood to undertake daily monitoring and assessment of forecast Fire Danger Ratings and determine appropriate resourcing for fire preparedness and response activities at the Hazelwood site. It also refers to monitoring procedures for areas of interest (e.g. hot spots) and monitoring of current weather conditions.

The current monitoring arrangements within the FRMP 2023 are expected to be implemented during the active rehabilitation and passive rehabilitation phases of the project, subject to relevant modifications as the pit lake level increases and the amount of exposed coal within the mine is gradually reduced.

It is anticipated that, by the commencement of the post-closure phase, mine fire risks will have been significantly reduced as a result of the pit lake landform (acting as a passive mine fire risk control), which will limit the scope of any ongoing fire-related monitoring activities in the long-term.

3.2 GROUND CONTROL MANAGEMENT PLAN (GCMP)

3.2.1 OVERVIEW AND CONTEXT

The Hazelwood Rehabilitation Project Ground Control Management Plan (GCMP) outlines the strategies and processes for managing geotechnical hazards and ensuring mine stability during the rehabilitation and closure phases of the Hazelwood Mine. It addresses the requirements of Schedule 12 of the MRSD Regulations.

Following the cessation of operations in March 2017, the site has transitioned through closure, demolition, and initial rehabilitation activities, with a focus on achieving a safe, stable, sustainable, and non-polluting landform. This GCMP is tailored to address the geotechnical and hydrogeological challenges associated with these efforts, aligning with regulatory requirements and long-term closure objectives.

Key objectives of the GCMP include identifying and managing geotechnical hazards, implementing effective controls, maintaining adaptability through real-time monitoring, and fulfilling legislative and statutory obligations. The plan prioritises the safety of people, environmental protection, and the prevention of infrastructure damage or reputational harm.

3.2.2 KEY MONITORING AND RISK MANAGEMENT ASPECTS

The GCMP identifies a range of geotechnical hazards inherent to the mine's geology. Significant hazards include ground movements, aquifer pressures, and the potential for instability during water retention and mine closure activities. Key aspects relating to ground control monitored are summarised in Table 1.

Table 15.4: Aspects monitored in the GCMP

ELEMENT	DESCRIPTION
Geotechnical and Hydrogeological Conditions	• Monitoring of horizontal and vertical displacements using extensometers, GNSS systems, and real-time telemetry. • Observations of movement patterns, such as subsidence reversal and batter slope behaviours, inform updates to conceptual geotechnical models.
Hydrogeology	• Management of the M1 and M2 aquifers, critical to preventing floor heave and maintaining stability. • Active depressurisation and groundwater flow modelling using MODFLOW Unstructured Grids to assess regional impacts and inform trigger levels for intervention.
Seismicity	• Assessment of seismic risks, including dynamic (seismic) analysis using peak ground acceleration (PGA) values and compliance with ANCOLD guidelines for dam and infrastructure stability.
Drainage and Erosion	• Surface and subsurface drainage systems are maintained to manage water inflows and prevent erosion, supported by predictive modelling of rainfall impacts.
Trigger Action Response Plans (TARPs)	• TARPs define threshold levels for ground movement, water levels, and other key parameters to ensure timely responses to potential risks.

3.2.3 ADAPTIVE MONITORING AND DATA MANAGEMENT

The GCMP emphasises the use of real-time monitoring systems and adaptive processes to manage evolving geotechnical conditions. This includes:

- Predictive Modelling: Calibration of geotechnical, hydrogeological, and hydrological models to improve accuracy and confidence in long-term planning.
- Data Integration: Comprehensive databases for material properties, monitoring results, and risk assessments are maintained and continuously updated.
- Stakeholder Communication: Transparent reporting to regulatory bodies, community stakeholders, and ENGIE's internal teams ensures alignment and accountability.

3.2.4 TRANSITION AND LONG-TERM PLANNING

The GCMP serves as a framework, incorporating continuous monitoring, incident reviews, and iterative updates to adapt to site-specific conditions and emerging knowledge. As risks are eliminated or reduced, monitoring requirements will decrease accordingly, ensuring efficient use of resources. Key phases include transitioning rehabilitation activities from immediate hazard mitigation to achieving the final landform.

Key milestones include:

- Active to Passive Rehabilitation – achievement of +45 m RL lake level.
- Passive to Post Relinquishment Rehabilitation – maintenance of +45 m RL lake level for 5-10 years.
- Post Relinquishment to Relinquishment – relinquishment of ML5004 and transfer of assets to a third party.

3.3 ENVIRONMENTAL MANAGEMENT SYSTEM

The HRP has an Environmental management system which consists of both environmental management plans and risk registers. Environmental risks to land, water, air, flora and fauna and impacts to human health are considered as part of the Hazelwood Environmental Aspects and Impacts assessment process. Risks are identified and ranked by various internal stakeholders including site personnel, operational staff and the HRP management team in accordance with AS ISO 31000:2018.

Risks identified for the HRP are documented in the Hazelwood Environmental Aspects and Impacts Register (OrgID 56984). This risk assessment informs the monitoring programs, environmental controls, and training outlined in this document. The risk assessment is site specific and considers all risks to the environment and human health, control measures in place and compliance with the relevant legislation. Risk consequence and likelihood are assessed in accordance with ENGIE Hazelwood's EMS Environmental Aspects Procedure (OrgID 1067).

The Risk Management and Monitoring Plan (RMMP) specifies the environmental management and monitoring requirements for the project. The RMMP provides a single, controlled, up to date resource for staff to access that is specific to the HRP and has been prepared with reference to EPA Publication 1851.2 – Implementing the general environmental duty: A guide for licence holders (EPA Publication 1851.2) and AS/NZS ISO 14001:2016 Environmental management systems – Requirements with guidance for use (AS/NZS ISO 14001:2016).

3.4 LANDFILL ENVIRONMENTAL MONITORING PLAN

All landfills within the MIN5004 area are subject to a Landfill Environmental Monitoring Plan (LEMP) as a requirement under the Operating Licence for the Hazelwood site. This will transition to an aftercare management plan upon completion of landfill rehabilitation.

3.5 RISK MANAGEMENT PLAN

The Risk Management Plan (RMP) is intended to meet the requirement of Section 45 of the Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019 (MRSD Regulations) and
The Risk Management Plan (RMP) is designed to fulfil the requirements of Section 45 of the Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019 (MRSD Regulations) and Mining Licence Condition 1A (Risk Management), of MIN5004 for ENGIE Hazelwood Mine, overseen by the Department of Jobs, Skills, Industry and Regions (DJSIR). These conditions mandate that the licensee must identify and assess the likelihood and impact of risks, as well as their potential effects on the environment, public health, land, property, or infrastructure. This document underscores ENGIE Hazelwood's dedication to identifying hazards and reducing risks, in compliance with The Mineral Resources (Sustainable Development) Act 1990 (Vic) (MRSDA), associated regulations, and rehabilitation project requirements.

The RMP elaborates on ENGIE Hazelwood's risk management process concerning "mining" hazards and risks that may arise from activities on site, such as construction and rehabilitation, which could impact nearby sensitive receptors. The RMP sets a framework for assessing the risks posed by identified hazards and implementing mitigation and control measures to eliminate or minimise risks as much as is reasonably practicable.

Aligned with the PCRMP, the RMP is part of the 2025 DMRP submission, fulfilling the Mine Licence requirements. This document does not aim to address the requirements of the Occupational Health and Safety Act 2004 (Vic) (OH&S Act) and the associated Occupational Health and Safety Regulations 2007 (Vic) (OH&S Regulations) related to Major Mining Hazards (MMH) of a prescribed mine.

The RMP serves as a management tool, providing a systematic process to control and reduce risks, impacts, and consequences to acceptable levels.

4. DMRP Monitoring Schedule

4.1 PROPOSED APPROACH TO MONITORING SCHEDULE

Monitoring of changes to environmental conditions and the effectiveness of risk mitigations and controls is essential to ensuring risks are adequately understood and managed. A comprehensive suite of environmental monitoring is undertaken at Hazelwood as a requirement of:

- Licence conditions: including but not limited to water licences, the EPA Operating Licence and Mining Licence MIN5004.
- Critical Control Performance Standards: to monitor the effectiveness of critical controls.
- Management plans including the associated TARPs: to monitor and respond to changes in existing conditions.
- The general environmental duty under the *Environment Protection Act 2017* (Vic).

As the rehabilitation project progresses through the three key activity phases, environmental monitoring requirements reduce in response to the transition to passive controls and a reduction in risk profile. The key phases of the Hazelwood rehabilitation project are shown in chapter 2 figure 2.7 and can be described as:

Phase 1: Active rehabilitation

- Decommissioning of assets/infrastructure (mostly complete)
- Removal of assets (mostly complete)
- Preparing the pit for fill (mostly complete)
- Rehabilitation and profiling earthworks (underway)
- Revegetation (well underway)
- Actively filling pit void to RL +45m AHD
- Active management of fire services (ongoing)

Phase 2: Passive management

- Rehabilitation performance monitoring
- Passive landform management
- Maintaining lake levels
- Demonstrate closure criteria are met
- Commencement of aftercare and maintenance plan
- Rezoning/sale of land
- Data collection

Phase 3: Post closure

- Closure criteria have been achieved
- Payment into post closure fund has occurred
- Management of repurposed landforms by third party
- Relinquishment of MIN5004

Environmental management documentation will be updated ahead of each project milestone to reflect change in environmental monitoring requirements as detailed in Table 15.4.

Table 15.5: Phases and evolution of key management documents

PHASE	DESCRIPTION
Phase 1: Active Rehabilitation	• The EMS will focus on decommissioning site rehabilitation activities, ensuring that environmental impacts are minimized and compliance with environmental regulations is maintained. • The GCMP will address ground stability issues, ensuring that the land remains safe and stable as mining operations cease and current mine void water retention arrangements continue (i.e. focusing on transitionary risk management). • The FRMP will ensure that fire risks are managed effectively during the closure process, with specific measures in place to prevent and respond to any fire incidents.
Phase 2: Passive Management	• The EMS will be updated to reflect the transition to water management, including monitoring water quality and managing aquatic ecosystems. • The GCMP will continue to address ground stability, particularly around the newly formed pit lake, ensuring that the surrounding land remains stable. • The FRMP will be updated to include ongoing fire risk assessments and mitigation strategies related to the presence of the pit lake. • The EMS, GCMP and FRMP will undergo final updates to ensure that all environmental, ground control, and fire risk measures are in place for the site's handover. • As the management and monitoring requirements reduce it is envisioned that these management plans can be consolidated and combined into a single Post Closure Monitoring and Management Plan (PCMMP) derived from the post closure risk assessment finalised ahead of transition from phase 2 to 3. • This phase will involve comprehensive reporting and documentation to demonstrate that all rehabilitation objectives have been met.
Phase 3: Post Closure The responsibility will be transferred to the next landowner, relevant regulating authority or third party	• Post mining land managers will be responsible for implementing the post closure monitoring and maintenance plan • Monitoring requirements will need to be minimised to So Far As Is Reasonably Practicable (SFAIRP) to ensure that site management requires the least amount of monitoring necessary. • Where risks have been eliminated or reduced to SFAIRP, monitoring is proposed to cease. Similarly, where a suitable baseline has been established and additional data will not further inform management practices, it is also proposed that monitoring will cease.

In addition to site-based data acquisition, ENGIE Hazelwood continues to contribute to and utilise monitoring information generated through regional monitoring networks, to inform the closure planning process. This includes the annual and five-yearly groundwater and land level condition monitoring reports submitted to the Latrobe Valley Regional Groundwater Monitoring Committee (LVRGMC).

4.2 MONITORING SCHEDULE

A high-level environmental monitoring schedule is presented in Table 15.6. This schedule, aligned to risk area, provides a description of the key monitoring activities which are or will be undertaken during the three rehabilitation phases with the supporting statutory documents containing the detail associated with each control also listed.

Water Structures Management plan and assets register contain the details of the water storage dams, water management ponds and other water structures. The plan details to what monitoring is in place and how it is managed at a site operational level. These assets are continually reviewed based on operational need and decommissioning plan associated with the asset register.

Table 15.6 Monitoring schedule summary

HAZARD	MONITORING OBJECTIVE	MONITORING FUNCTION	ACTIVE REHABILI-TATION	PASSIVE REHABILI-TATION	POST CLO-SURE	KEY MANAGE-MENT OR STUDY DOCUMENT
CATEGORY: GEOTECHNICAL						
Seismic Events	To monitor and identify changes to the geotechnical stability of the mine void and rehabilitated areas as a result of seismic activity.	Monitoring seismic activity analysis to inform design checked maximum geometry and volume of material confirming assessment & impacts (Landform design CC#00119)	Yes	No	No	GCMP
		Ongoing movement and water level monitoring as per the GCMP	Yes	Yes	Yes	
		Ongoing seismic alarms and quarterly seismic activity reports by SRC Victoria.	Yes	Yes	Yes	
		Monitoring of ground movement and hydrogeological conditions by instrumentation (CC #0601)	Yes	Yes	No	
Erosion	To monitor and identify changes to the geotechnical stability and condition of the mine void and rehabilitated areas of the site due to the erosional impacts	Wind speed and direction with annual reporting	Yes	Yes	No	GCMP & EMS
		Wave height with annual reporting	Yes	Yes	No	
		Slope and treatment condition with annual reporting	Yes	Yes	No	
		Monitoring of the revegetation of batters as per the EMS	Yes	Yes	Yes	
		Erosion assessments & Design implementation monitoring	Yes	Yes	No	
		Drainage / cover design and monitoring	Yes	Yes	Yes	
		Monitoring of ground movement and hydrogeological conditions by instrumentation (CC #0601)	Yes	Yes	Yes	
		Geotechnical Inspections (CC#0245)	Yes	Yes	No	
Geotechnical Instability	To monitor and identify changes to the geotechnical stability and condition of the mine void and rehabilitated areas of the site.	Monitoring adherence to design - Geometry of Batters, Benches, Embankment and Rehabilitation Design (CC #0119)	Yes	No	No	GCMP
		Geotechnical inspections & movement monitoring	Yes	Yes	Yes	
		Monitoring of ground movement and hydrogeological conditions by instrumentation (CC #0601)	Yes	Yes	No	
		Geotechnical Inspections (CC#0245)	Yes	Yes	No	
Contamination	To assess the contamination impacts as a results due to an uncontrolled events impacting the HARA / HARE and Pit Lake	Geotechnical Stability Assessments confirmed design adequacy	Yes	Yes	No	GCMP & EMS
		Monitoring of the HARA / HARE (including movement)	Yes	Yes	No	
		Bathometric surveys (displacement or possible movement)	Yes	Yes	No	
		Monitoring of ground movement and hydrogeological conditions by instrumentation (CC #0601)	Yes	Yes	No	
		Geotechnical Inspections (CC#0245)	Yes	Yes	No	
		Mine Void Audit	Yes	Yes	No	
		Stability Assessment Reports	Yes	Yes	No	
		Geotechnical Inspections inc. MMD redesign (CC#0245)	Yes	Yes	No	

HAZARD	MONITORING OBJECTIVE	MONITORING FUNCTION	ACTIVE REHABILI-TATION	PASSIVE REHABILI-TATION	POST CLO-SURE	KEY MANAGE-MENT OR STUDY DOCUMENT
CATEGORY: GEOTECHNICAL						
Water infiltration / water ingress	To assess the impacts of water infiltration from the Morwell Main Drain (MMD) as a result of ground movement	Current stability lines and new locations identified in the deformation analysis, 6 monthly report DMR	Yes	Yes	No	GCMP
		Total and differential vertical movement, horizontal strains, and slope/tilt, 6 monthly report DMR	Yes	Yes	No	
		M1/M2 aquifer piezometric heads, 6 monthly report DMR	Yes	Yes	No	
		M1 Coal/Clay water levels., 6 monthly report DMR	Yes	Yes	No	
		Periodic inspections and monitoring of MMD (CC #0576)	Yes	Yes	No	
		Monitoring of ground movement and hydrogeological conditions by instrumentation (CC #0601)	Yes	Yes	No	
		Geotechnical Inspections (CC#0245)	Yes	Yes	No	
		GCMP including all geotechnical Domains, inspections & TARPs.	Yes	Yes	No	
Ground Movement	To assess the impacts of ground movement due to aquifer depressurisation	Aquifer depressurisation (CC #0103)	Yes	Yes	No	GCMP
		Monitoring of ground movement and hydrogeological conditions by instrumentation (CC #0601)	Yes	Yes	No	
		GCMP including all geotechnical Domains, inspections & TARPs	Yes	Yes	No	
		Geotechnical Inspections (CC#0245)	Yes	Yes	No	
		Verification modelling	Yes	Yes	No	
		Regional Groundwater Committee Annual Report & Groundwater Committee 5-Yearly Review Document	Yes	Yes	No	
Floor Heave	Ensuring floor heave does not occur at a scale which compromises the achievement of a safe, stable and sustainable pit lake.	Monitoring Lake levels	No	Yes	No	GCMP
		Monitoring of ground movement and hydrogeological conditions by instrumentation (CC #0601)	Yes	Yes	No	
		GCMP including all geotechnical Domains, inspections & TARPs	Yes	Yes	No	
		Geotechnical Inspections (CC#0245)	Yes	Yes	No	
		Regional Groundwater Committee Annual Report & Groundwater Committee 5-Yearly Review Document	Yes	Yes	Yes	
Hydrogeological	Ensuring aquifers and their associated pressures remain at target levels.	Current groundwater pressure monitoring devices and any new locations proposed as part of the external pump bore installations	Yes	Yes	No	GCMP & EMS
		Monitoring M1/M2 aquifer piezometric heads.	Yes	Yes	No	
		Monitoring M1 Coal/Clay piezometric heads.	Yes	Yes	No	
		Monitoring Pumping rates from M1 and M2 pump bores.	Yes	Yes	No	
CATEGORY: FIRE						
Exposed Coal on Lease & Vegetation	Early detection of fire risk directly associated with exposed coal and the implementation of the mitigation control measures.	Monitoring Lake levels	Yes	Yes	No	FRMP & EMS
		Fire reduction & fuel removal completed annually prior to fire season (CC #0094)	Yes	Yes	No	
		Monitoring fire suppression water system, wetting down areas of exposed coal (CC #0443)	Yes	Yes	No	
		Fire suppression water system, wetting down areas (available until lake is filled) (CC #0206)	Yes	Yes	No	
		Capping exposed coal with clay (CC #0383)	Yes	No	No	
		Emergency Response Plan (CC #0616)	Yes	Yes	No	
		Vegetation Management Plan	Yes	Yes	Yes	
		Fire Risk Management Plan	Yes	Yes	Yes	
		Fire Breaks	Yes	Yes	Yes	
		BESS construction design and fire suppression controls	Yes	Yes	No	
		Fire & emergency response resource arrangements for management prior to escalation (internal & external)	Yes	Yes	No	
		Bushfire Management Plan (AusNet fire management plan)	Yes	Yes	Yes	
		Fire & emergency response training & competency	Yes	Yes	No	
		2024 ENGIE Hazelwood Mine Fire Mitigation Report (FRC)	Yes	Yes	No	
		Municipal Fire Management Plan	Yes	Yes	Yes	
		FRV Preparedness Guideline Hazelwood Mine	Yes	Yes	No	
		Use of planning scheme to restrict activities (e.g. prevent inappropriate plantation)	No	No	Yes	

HAZARD	MONITORING OBJECTIVE	MONITORING FUNCTION	ACTIVE REHABILI-TATION	PASSIVE REHABILI-TATION	POST CLO-SURE	KEY MANAGE-MENT OR STUDY DOCUMENT
CATEGORY: SECURITY						
Site Access	To identify and monitor potential risks associated with site access, whether authorised or unauthorised and implement a management structure that ensures effective control measures are maintained	Site security such as signage, fencing and public access limitations	Yes	Yes	Yes	RMP
		Security Cameras / patrols	Yes	Yes	No	
		Site access control (CC # 0648)	Yes	Yes	Yes	
		Emergency Response Plan (CC #0616)	Yes	Yes	No	
		Alarm and SCADA system responding to faults	Yes	Yes	No	
CATEGORY: ENVIRONMENT						
Contamination	Early identification of potential risks relating to site contamination including landfills (ash, hard rubbish, asbestos etc), Acid Sulphate Soils (ASS), water sources, seepage and wastes	Surcharges installed as per design on HAP4 (CC #0119)	Yes	Yes	No	EMS & GCMP
		Prevent access to asbestos dumps to the public until license surrender i.e. fencing & signage	Yes	Yes	No	
		Waste placement (asbestos), capping & rehabilitation in accordance with EPA License requirements	Yes	Yes	Yes	
		Designs for closure in accordance with EPA & ANCOLD requirements	Yes	Yes	No	
		Security measures to limit vehicle access (e.g. fencing)	Yes	Yes	Yes	
		Review of EPA requirements to ensure post closure land uses are appropriate	Yes	Yes	No	
		Landfill Management Plan (EPA requirement)	Yes	Yes	Yes	
		Land management plan	Yes	Yes	No	
		Aftercare plan	No	No	Yes	
		EPA license requirements	Yes	Yes	Yes	
		Landform design	Yes	Yes	No	
		Redesign and maintenance of Morwell Main Drain (MMD), includes lining (CC #0576)	Yes	Yes	No	
		Monitoring of water quality as per sampling regime	Yes	Yes	Yes	
		Investigated and quantify quality of water used to fill the pit	Yes	Yes	No	
		Pit water quality investigations & modelling including understanding water sources for lake filling	Yes	Yes	No	
		Contaminated soils investigation; cover / rehabilitation	Yes	Yes	No	
		Implementation of recommendations from PSI & DSI completed	Yes	Yes	No	
		Controls implemented as per the completed 53V & 53X certificate of environmental audit	Yes	Yes	No	
		Maintenance of equipment & machinery	Yes	Yes	No	
		Site investigations for historic contamination sites	Yes	Yes	No	
		Unexpected Finds Procedure	Yes	Yes	Yes	
		Remaining infrastructure register (i.e. asbestos, fuels etc.)	Yes	Yes	Yes	
Cultural and Historical Heritage	Early identification of and management of artefacts, infrastructure or areas of significant cultural value to ensure their protection	Site surveys & inspections as part of CHMP	Yes	Yes	No	CHMP
		CHMP in accordance with Aboriginal Heritage Act 2006	Yes	Yes	No	
		CVA in consultation with the RAP, gain endorsement and implement recommendations from CVA	Yes	Yes	No	
		Work procedure to relocate / remove aboriginal heritage places prior to works, in accordance with CHMP	Yes	Yes	Yes	
		Removal (de-listing) of applicable heritage sites from the VHI	Yes	Yes	No	
		Implement unexpected finds protocol	Yes	Yes	Yes	
		Historical Heritage inductions	Yes	Yes	No	
		Archaeological supervision / monitoring program where applicable	Yes	Yes	Yes	
		Site surveys & inspections as part of the Historic Heritage Assessment	Yes	Yes	Yes	
		Work procedure to relocate / remove historic heritage places prior to works, in accordance with the Historic Heritage Assessment	Yes	Yes	No	
		Use of planning scheme	No	No	Yes	

HAZARD	MONITORING OBJECTIVE	MONITORING FUNCTION	ACTIVE REHABILI-TATION	PASSIVE REHABILI-TATION	POST CLO-SURE	KEY MANAGE-MENT OR STUDY DOCUMENT
CATEGORY: ENVIRONMENT						
Dust	Early identification of potential risks relating to dust	Onsite real time monitoring of dust (PM10 & PM2.5)	Yes	Yes	No	EMS & FRMP
		Preventative dust suppression measures e.g. water cart, water sprays on coal area (CC #0443)	Yes	Yes	No	
		Ongoing seeding of rehabilitated batters	Yes	Yes	Yes	
		Monitoring Lake levels	Yes	Yes	No	
		Rehabilitation of redundant roads	Yes	Yes	No	
		Modelling of dust from the mine operations has been completed	Yes	Yes	No	
		Severe weather preparedness plans	Yes	Yes	No	
		Dust trigger action response plan	Yes	Yes	No	
		CEMP	Yes	Yes	No	
		Worksite Environmental Management Plan (WEMP)	Yes	Yes	No	
		Dust modelling reporting	Yes	Yes	No	
Extreme weather events	Early identification of potential risks relating to extreme weather events such as high rainfall events	Controlled outlet structure	Yes	Yes	Yes	EMS & GCMP
		Ground Control Management Plan (GCMP) incl. trigger action response plan, severe weather response plans, dams, routine monitoring	Yes	Yes	No	
		Runoff Management Plan	Yes	Yes	No	
		Monitoring of stream flows	Yes	Yes	No	
		Controlled inlet structure	Yes	Yes	Yes	
Greenhouse gases	Identification of greenhouse gas sources and the early monitoring and maintenance remediation	Electrical substitution of fixed equipment	Yes	Yes	No	EMS
		Equipment maintenance	Yes	Yes	No	
		ESS Technical assessment	Yes	Yes	No	
Noise and Vibration	Early identification of noise and vibration sources and the ongoing monitoring of these activities	Appropriate & suitable equipment selection for activities	Yes	YEs	No	CEMP & WEMP
		Buffer around site boundary (e.g. distance from site)	Yes	Yes	No	
		Noise & vibration modelling	Yes	Yes	No	
		Activity planning (i.e. hours of operation)	Yes	Yes	No	
		Regular maintenance of equipment & machinery	Yes	Yes	No	
		Inspection regime during earthworks	Yes	Yes	No	
		EES Technical Assessment - Noise & Vibration guidance	Yes	Yes	No	
Odour & Fumes	Early identification of odour and fume sources and ongoing monitoring	Buffer around site boundary (e.g. distance from site)	Yes	Yes	No	EMS
		The odours generated from the imported materials are monitored and controlled	Yes	Yes	No	
		Activity planning (i.e. to avoid movement of saturated material on high wind days)	Yes	Yes	No	
		Imported materials management plan guidance	Yes	Yes	No	
Pest	To identify and monitor potential risks associated with pest presence and activity across the site and implement a management framework that ensures effective and ongoing control measures are in place.	Monitoring & reporting of pest animals	Yes	Yes	Yes	
		Pest animal management plan (incorporating Catchment & Land Protection Act requirements)	Yes	Yes	Yes	
Rehabilitated land condition	To assess and monitor the condition of rehabilitated land to ensure it meets environmental, safety, and operational standards, and to implement a management framework that supports ongoing compliance and continuous improvement.	Rehabilitation material geochemical assessment / Landloch	Yes	Yes	No	EMS
		Land capability assessment by SGS / Landloch	Yes	Yes	No	
		Routine soil testing	Yes	Yes	No	
		Environmental audits	Yes	Yes	Yes	
		Clean Up Plan guidance	Yes	Yes	No	
		Vegetation Management Plan guidance	Yes	Yes	Yes	
		Land Use Plan (identifies agricultural land use)	Yes	Yes	No	
		Hydronumerics Assessment for Stratification	Yes	Yes	No	
		RGS Lake Water Balance & Water Quality Assessment	Yes	Yes	No	
Structural Failure	To identify, assess and monitor risks of structural failure associated with ground movement, and implement a management framework that ensures early detection and timely mitigation to protect site integrity, safety, and operational continuity	Decommissioning of dams	Yes	Yes	No	EMS & GCMP
		Dam surveillance & inspection program	Yes	Yes	Yes	
		GNSS Real-time ground movement monitoring	Yes	Yes	No	
		Monitoring of ground movement and hydrogeological conditions by instrumentation (CC #0601)	Yes	Yes	No	

HAZARD	MONITORING OBJECTIVE	MONITORING FUNCTION	ACTIVE REHABILI-TATION	PASSIVE REHABILI-TATION	POST CLO-SURE	KEY MANAGE-MENT OR STUDY DOCUMENT
CATEGORY: ENVIRONMENT						
Vegetation	To monitor and assess vegetation condition and coverage across the site, and implement a management framework that ensures ecological integrity is maintained, rehabilitation objectives are met, and compliance with environmental obligations is achieved	Landform / vegetation design	Yes	Yes	No	EMS
		Cleaning of earth moving plant & equipment	Yes	Yes	No	
		Active maintenance of vegetation	Yes	Yes	Yes	
		Lease and license condition requirements	Yes	Yes	Yes	
		Stock exclusion	No	No	Yes	
		Fencing controls	Yes	Yes	Yes	
		Offsets and security	Yes	Yes	Yes	
		Weed Management Plan guidance	Yes	Yes	Yes	
		Vegetation Management Plan guidance	Yes	Yes	No	
		Imported materials management plan guidance	Yes	Yes	No	
		Aftercare management plan guidance	Yes	Yes	Yes	
		CEMP Guidance	Yes	Yes	No	
		WEMP Guidance	Yes	Yes	No	
		Site integrated Pest Animal Management plan guidance	Yes	Yes	Yes	
Visual amenity	To assess and monitor the visual amenity of the site and surrounding areas, and implement a management framework that minimises visual impacts, supports community expectations, and aligns with environmental and planning requirements	Final landform design	Yes	Yes	No	EMS
		Fixed lighting design	Yes	Yes	No	
		ESS Technical assessment guidance	Yes	Yes	No	
Water Quality	To monitor and assess water quality across site pit lake, catchments and storage areas, and implement a management framework that ensures compliance with environmental standards, supports early detection of contamination risks, and promotes sustainable water use	Pit Water Body surface water and deep-water quality, 6 monthly in the DMR	Yes	Yes	No	EMS and GCMP
		Measured versus modelled data, validation of the RGS model and tech guidance.	Yes	Yes	No	
		Groundwater quality (full suite of chemical parameters e.g. nutrients, salts and metal(loids))	Yes	Yes	Ye	
		Site climate data and collated in the DMR	Yes	Yes	No	
		HARA Rehabilitation Plan	Yes	Yes	No	
		RGS & Hydronumerics assessment for stratification	Yes	Yes	No	
		Monitoring of water quality & nutrient levels as per sampling regime and adherence to critical control (CC #1052)	Yes	Yes	No	
		Pit water quality investigations & modelling including understanding water sources for lake filling	Yes	Yes	No	
		Signage following a biological outbreaks such as blue green algae	Yes	Yes	Yes	
		Placement of internal overburden dump to reduce interconnection potential	Yes	No	No	
		Decommissioning and management of sealed bores	Yes	Yes	No	
		Manage M1 pumping to minimise seepage from lake (for active rehabilitation stage)	Yes	Yes	No	
		Depressurisation of aquifer & extraction license (CC #0103)	Yes	Yes	No	
		Monitoring of ground movement and hydrogeological conditions (CC #0601)	Yes	Yes	No	
		EES Technical Assessment guidance - Groundwater studies	Yes	Yes	No	
		Surface water Monitoring and Management Plan guidance	Yes	Yes	No	
		Final landform design (CC #0119) and capping	Yes	No	No	
		Clay capping and top soil capping criteria (e.g. quality, design etc.)	Yes	No	No	
		Rehabilitation and aftercare plan guidance for safe use site - asbestos, landfill and ash	Yes	Yes	Yes	
Weed and pathogens	To identify, monitor, and manage the presence of weeds and pathogens across the site, and implement a control framework that minimises ecological impact, supports rehabilitation success, and ensures compliance with biosecurity and environmental standards	Cleaning of earth moving plant & equipment	Yes	Yes	No	EMS
		Active maintenance of declared weeds	Yes	Yes	Yes	
		Lease and license condition requirements	Yes	Yes	Yes	
		Weed Management Plan (incorporating Catchment & Land Protection Act requirements)	Yes	Yes	Yes	
		Verification of top soil material prior to entering site	Yes	Yes	No	
		CEMP	Yes	Yes	No	
		Imported materials management plan guidance	Yes	Yes	No	

4.3 MAINTENANCE ACTIVITIES

Maintenance activities are crucial to ensure the long-term sustainability of the restored environment as the site transitions through the rehabilitation phases. Maintenance activities associated with managing soil structure or quality, water systems, and vegetation growth to prevent erosion will be required to be implemented at varying frequencies. Regular inspections and repairs of any infrastructure, landforms, capping layers, and water management systems are potentially required to ensure they maintain their effectiveness.

Additionally, ongoing assessments of biodiversity and ecosystem health may be required to be performed to ensure that the rehabilitated area supports native species and functions as intended. These maintenance requirements will continue to be refined and revised through the rehabilitation phases and are given in Table 15.7.

Table 15.7 – Maintenance Activities

HAZARD	MAINTENANCE ACTIVITIES	ACTIVE REHABILITATION	PASSIVE REHABILITATION	POST CLOSURE	KEY MANAGEMENT AND STUDY DOCUMENT
CATEGORY: GEOTECHNICAL					
Erosion	Maintain Pit Lake level		Yes	Yes	GCMP & EMS
Water infiltration / water ingress	GCMP including all geotechnical Domains, inspections & TARPs.	Yes	Yes	No	GCMP
	Operation and inspection of MMD channel	Yes	Yes	No	
Ground Movement	GCMP including all geotechnical Domains, inspections & TARPs	Yes	Yes	No	
	Penstock - 3GL Water Flow (Morwell River Flood Diversion Structure) (CC#1107)	Yes	Yes	No	
Floor Heave	Maintain Pit Lake level at RL+45m AHD	No	Yes	No	
	Depressurisation of aquifer & extraction license (CC #0103)	Yes	Yes	No	
CATEGORY: FIRE					
Exposed Coal on Lease & Vegetation	Filling and maintaining the mine void with water to RL +45m	Yes	Yes	No	FRMP & EMS
	Fire reduction & fuel removal completed annually prior to fire season (CC #0094)	Yes	Yes	No	
	Fire suppression water system, wetting down areas of exposed coal (CC #0443)	Yes	Yes	No	
	Fire suppression water system, wetting down areas (available until lake is filled) (CC #0206)	Yes	Yes	No	
	Capping exposed coal with clay (CC #0383)	Yes	No	No	
	Maintenance in accordance with the Vegetation Management Plan	Yes	Yes	Yes	
	Maintenance activities outlined in the Fire Risk Management Plan	Yes	Yes	Yes	
	Maintenance of Fire Breaks	Yes	Yes	Yes	
	Fire & emergency response resource arrangements for management prior to escalation (internal & external)	Yes	Yes	No	
	Maintenance activities outlined in the Bushfire Management Plan (AusNet fire management plan)	Yes	Yes	Yes	
	Maintaining fire & emergency response training & competency	Yes	Yes	No	
	Maintenance guidance outlined in the 2024 ENGIE Hazelwood Mine Fire Mitigation Report (FRC)	Yes	Yes	No	
	Maintenance activities outlined in the Municipal Fire Management Plan	Yes	Yes	Yes	
	FRV Preparedness Guideline Hazelwood Mine	Yes	Yes	No	

HAZARD	MAINTENANCE ACTIVITIES	ACTIVE REHABILITATION	PASSIVE REHABILITATION	POST CLOSURE	KEY MANAGEMENT AND STUDY DOCUMENT
CATEGORY: SECURITY					
Site Access	Maintaining site security such as signage, fencing and public access limitations	Yes	Yes	Yes	RMP
	Maintaining security Cameras / patrols	Yes	Yes	No	
	Guidance outlined in the site access control (CC # 0648)	Yes	Yes	Yes	
	Maintaining alarm and SCADA system responding to faults	Yes	Yes	No	
CATEGORY: ENVIRONMENT					
Contamination	Maintenance activities as part of the surcharges on HAP4 (CC #0119)	Yes	Yes	No	EMS & GCMP
	Maintenance activities to prevent access to asbestos dumps to the public until license surrender i.e. fencing & signage	Yes	Yes	No	
	Landcare maintenance activities to limit vehicle access (e.g. fencing)	Yes	Yes	Yes	
	Maintenance activities as outlined in the Landfill Management Plan (EPA requirement)	Yes	Yes	Yes	
	Land management plan maintenance activities	Yes	Yes	No	
	Aftercare plan maintenance activities	No	No	Yes	
	Maintenance requirements as r of the EPA license requirements	Yes	Yes	Yes	
	Gross pollutant trap on MMD	Yes	Yes	Yes	
	Morwell Main Drain (MMD) maintenance, includes activities outlined in the critical control (CC #0576)	Yes	Yes	No	
	Cover / rehabilitation measures	Yes	Yes	No	
	Maintenance implementation of recommendations from PSI & DSI	Yes	Yes	No	
	Controls and maintenance activities implemented as per the completed 53V & 53X certificate of environmental audit	Yes	Yes	No	
	Maintenance of equipment & machinery	Yes	Yes	No	
Cultural and Historical Heritage	Maintenance activities outlined in the CHMP in accordance with Aboriginal Heritage Act 2006	Yes	Yes	No	CHMP
Dust	Maintenance as a result of onsite real time monitoring of dust (PM10 & PM2.5)	Yes	Yes	No	EMS& GCMP
	Preventative dust suppression measures e.g. water cart, water sprays on coal area (CC #0443)	Yes	Yes	No	
	Ongoing seeding of rehabilitated batters	Yes	Yes	Yes	
	Maintaining Pit Lake levels	Yes	Yes	No	
	Rehabilitation of redundant roads	Yes	Yes	No	
	Modelling of dust from the mine operations has been completed	Yes	Yes	No	
	Maintenance activities as part of the CEMP	Yes	Yes	No	
	Maintenance activities outlined in the Worksite Environmental Management Plan (WEMP)	Yes	Yes	No	
Extreme weather events	Maintenance of the inlet and outlet structures	Yes	Yes	Yes	EMS
	Maintenance activities outlined in the Ground Control Management Plan (GCMP) incl. trigger action response plan, severe weather response plans, dams, routine monitoring	Yes	Yes	No	
Greenhouse gases	Electrical substitution of fixed equipment	Yes	Yes	No	EMS
	Equipment maintenance	Yes	Yes	No	
	ESS Technical assessment outcomes	Yes	Yes	No	
Noise and Vibration	Appropriate & suitable equipment selection for activities	Yes	YEs	No	CEMP & WEMP
	Buffer around site boundary (e.g. distance from site)	Yes	Yes	No	
	Noise & vibration modelling	Yes	Yes	No	
	Activity planning (i.e. hours of operation)	Yes	Yes	No	
	Regular maintenance of equipment & machinery	Yes	Yes	No	
	Inspection regime during earthworks	Yes	Yes	No	
	EES Technical Assessment - Noise & Vibration guidance	Yes	Yes	No	
Odour & Fumes	Buffer around site boundary (e.g. distance from site)	Yes	Yes	No	EMS
	The odours generated from the imported materials are monitored and controlled	Yes	Yes	No	
	Activity planning (i.e. to avoid movement of saturated material on high wind days)	Yes	Yes	No	
	EES Technical Assessment - Hydronumerics assessment on stratification (no odour mentioned in the report) guidance	Yes	Yes	No	
	Imported materials management plan guidance	Yes	Yes	No	

4. DMRP MONITORING SCHEDULE

HAZARD	MAINTENANCE ACTIVITIES	ACTIVE REHABILITATION	PASSIVE REHABILITATION	POST CLOSURE	KEY MANAGEMENT AND STUDY DOCUMENT
CATEGORY: ENVIRONMENT					
Pest	Monitoring & reporting of pest animals	Yes	Yes	Yes	EMS
	Pest animal management plan (incorporating Catchment & Land Protection Act requirements)	Yes	Yes	Yes	
Rehabilitated land condition	Rehab material geochemical assessment	Yes	Yes	No	EMS
	Land capability assessment by SGS / Landloch	Yes	Yes	No	
	Routine soil testing	Yes	Yes	No	
	Environmental audits	Yes	Yes	Yes	
	Clean up plan guidance	Yes	Yes	No	
	Vegetation Management Plan guidance	Yes	Yes	Yes	
	Land Use Plan (identifies agricultural land use)	Yes	Yes	No	
Stratification	Fencing	Yes	Yes	Yes	EMS
	Hydronumerics Assessment for Stratification	Yes	Yes	No	
	RGS Lake Water Balance & Water Quality Assessment	Yes	Yes	No	
Structural Failure	Decommissioning of dams	Yes	Yes	No	EMS & GCMP
	Dams surveillance & inspection program	Yes	Yes	Yes	
	GNSS Real-time ground movement monitoring	Yes	Yes	No	
	Monitoring of ground movement and hydrogeological conditions by instrumentation (CC #0601)	Yes	Yes	No	
Vegetation	Landform / vegetation design	Yes	Yes	No	EMS
	Cleaning of earth moving plant & equipment	Yes	Yes	No	
	Active maintenance of vegetation	Yes	Yes	Yes	
	Lease and license condition requirements	Yes	Yes	Yes	
	Stock exclusion	No	No	Yes	
	Fencing controls	Yes	Yes	Yes	
	Offsets and security	Yes	Yes	Yes	
	Weed Management Plan guidance	Yes	Yes	Yes	
	Vegetation Management Plan guidance	Yes	Yes	No	
	Imported materials management plan guidance	Yes	Yes	No	
	Aftercare management plan guidance	Yes	Yes	Yes	
	CEMP Guidance	Yes	Yes	No	
	WEMP Guidance	Yes	Yes	No	
	Site integrated Pest Animal Management plan guidance	Yes	Yes	Yes	
Visual amenity	Final landform design	Yes	Yes	No	EMS
	Fixed lighting design	Yes	Yes	No	
	ESS Technical assessment guidance	Yes	Yes	No	

HAZARD	MAINTENANCE ACTIVITIES	ACTIVE REHABILITATION	PASSIVE REHABILITATION	POST CLOSURE	KEY MANAGEMENT AND STUDY DOCUMENT
CATEGORY: ENVIRONMENT					
Water Quality	RGS Technical Study guidance	Yes	Yes	No	EMS & GCMP
	HARA Rehabilitation Plan	Yes	Yes	No	
	RGS & Hydronumerics assessment for stratification	Yes	Yes	No	
	Fencing	Yes	Yes	Yes	
	Monitoring of water quality & nutrient levels as per sampling regime and adherence to critical control (CC #1052)	Yes	Yes	No	
	Pit water quality investigations & modelling including understanding water sources for lake filling	Yes	Yes	No	
	Signage following a biological outbreaks such as blue green algae	Yes	Yes	Yes	
	Placement of internal overburden dump to reduce interconnection potential	Yes	No	No	
	Decommissioning and management of sealed bores	Yes	Yes	No	
	Manage M1 pumping to minimise seepage from lake (for active rehabilitation stage)	Yes	Yes	No	
	Depressurisation of aquifer & extraction license (CC #0103)	Yes	Yes	No	
	Monitoring of ground movement and hydrogeological conditions (CC #0601)	Yes	Yes	No	
	EES Technical Assessment guidance - Groundwater studies	Yes	Yes	No	
	Surface water Monitoring and Management Plan guidance	Yes	Yes	No	
	Final landform design (CC #0119) and capping	Yes	No	No	
	Clay capping and top soil capping criteria (e.g. quality, design etc.)	Yes	No	No	
	Vegetation Management Plan	Yes	Yes	Yes	
	Rehabilitation and aftercare plan guidance for safe use site - asbestos, landfill and ash	Yes	Yes	Yes	
	Land maintenance and management plan	Yes	Yes	Yes	
Weed and pathogens	Cleaning of earth moving plant & equipment	Yes	Yes	No	EMS
	Active maintenance of declared weeds	Yes	Yes	Yes	
	Lease and license condition requirements	Yes	Yes	Yes	
	Weed Management Plan (incorporating Catchment & Land Protection Act requirements)	Yes	Yes	Yes	
	Verification of top soil material prior to entering site	Yes	Yes	No	
	CEMP	Yes	Yes	No	
	Imported materials management plan guidance	Yes	Yes	No	

4.4 REVIEW AND ENDORSEMENT PROCESS

The results of environmental monitoring inform the knowledge base for the ongoing development of the DMRP. As ENGIE Hazelwood progresses through the active rehabilitation phase of the project and concludes key technical studies, a continual improvement and review method to capture new information and site progression will be adopted. This continual improvement process is shown in Figure 15.2.

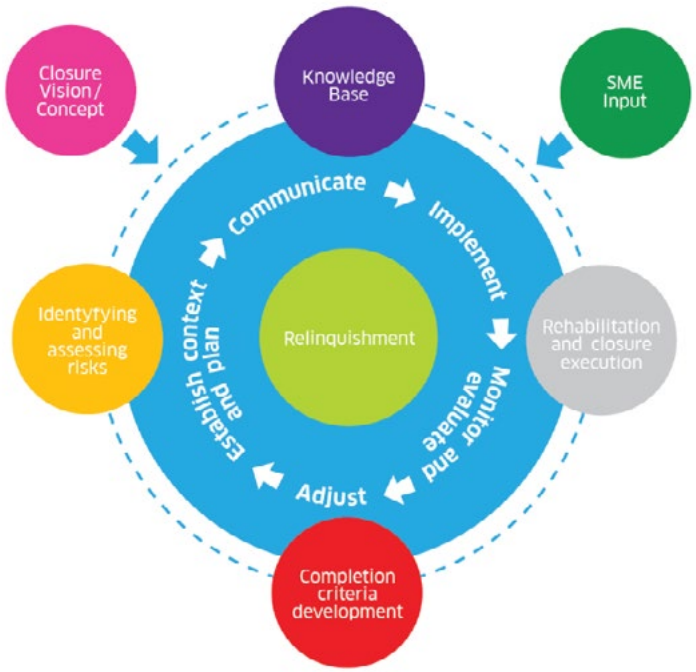

Figure 15.2 Process to review and refine closure knowledge

The Mine Land Rehabilitation Authority (MLRA) will be responsible for administering the declared mine register and ultimately the Declared Mine Fund which will cover the costs associated with post-closure management and monitoring activities.

Subject matter experts supported by ENGIE Hazelwood technical staff will revise and update the management plans and the associated monitoring requirements within each, relative to the current risk status. It is likely that ERR will also provide periodic review and approval of key changes to the management documents as the site transitions through the rehabilitation phases.

ENGIE Hazelwood will be responsible for environmental monitoring requirements during Phase 1 (active rehabilitation) and Phase 2 (passive management). It is envisioned that the majority of the monitoring and maintenance requirements will no longer be required by the time the site transitions into Phase 3 (post closure), although ongoing monitoring and maintenance activities to be implemented at the site will be documented in the post-closure plan within the DMRP (**see Appendices B and C**).