

AMD Engineered Landform Management Plan

Buller Plateaux Continuation Project

August 2026

BPCP-ENV-PLN-011

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1.0 Introduction

1.1 Purpose

The purpose of the Buller Plateaux Continuation Project (BPCP) acid and metalliferous drainage (AMD) Engineered Landform (ELF) Management Plan (AMD ELFMP also referred to as This Plan) is to guide the design and development of safe, stable, and sustainable Engineered Landforms (ELFs), and E (EFA), collectively referred to as ELFs, that protect both people and the environment. This Plan applies to the following sub-areas of the BPCP:

- Mount Frederick South (MFS).
- Escarpment Extended (ESE).
- Upper Waimangaroa Haul Road (UWHR).

This Plan, developed by Bathurst Resources Limited (BRL), will evolve throughout the life of the BPCP to reflect changes in risk, design assumptions, and operational knowledge. It incorporates adaptive management, supported by performance monitoring and regular review.

BRL's commitment to continual improvement through adaptive management of environmental performance has been embodied by and implemented through the AS/NZS ISO 14001:2016 recognised approach referred to as the Plan–Do–Check–Act (PDCA) cycle as shown in Figure 1. This Plan has aligned the PDCA cycle with the International Financial Corporation/ World Bank Group Environmental Health and Safety (EHS) Guidelines for Mining (2007) as it is a strong way to operationalise compliance, as the IFC framework explicitly uses an environmental and social management-system approach based on continuous improvement.

- PLAN → Risk Assessment and Management Planning
- DO → Implementation and Operational Controls
- CHECK → Monitoring, Measurement, and Audit to test the efficacy of those controls
- ACT → Corrective Action, Continuous Improvement, and Plan Review

Under the Resource Management Act (RMA), adaptive management is a recognised management option (e.g., Leckie, 2017; Weber, 2020). Effective adaptive management can be achieved by understanding the nature and duration of possible events, monitoring the events, and having management options in place to overcome variance from the expected case.

The PDCA cycle is considered an ongoing internal audit cycle and a recognised tool for adaptive management.



Figure 1: Plan-Do-Check-Act Process.

Source: AS/NZS ISO 14001:2016

This Plan outlines key elements of the ELF management system at the BPCP including:

- Geochemical engineering controls to minimise effects on receiving waters due to acid and metalliferous drainage (AMD) from relevant facilities.
- Geotechnical controls to ensure ELF's are safe and stable.
- ELF engineering design, operational management, and closure of these facilities.

This AMD ELFMP outlines the objectives, risks, management controls, performance/compliance monitoring requirements, responsibilities, and training requirements to effectively manage risks for AMD from ELF's during the construction, operation, and closure phases of the BPCP.

Project phases referred to herein as Construction Phase equate to Initial Phase and Post Closure Phase equates to Passive Closure Phase in accordance with consent conditions WAT5 and WAT6.

1.2 Objectives and Scope

1.2.1 Management Plan Scope

This Plan forms part of the planning framework for the BPCP and encompasses the MFS, ESE, and the UWHR sub-areas of the BPCP. AMD management within the Stockton and Cypress sub-areas are covered by other management plans.

This Plan describes the management approach for ELF, which is based on international guidance, to address key AMD risks for the MFS, ESE, and UWHR sub-areas. AMD risks have been identified through a broad-brush risk assessment (BBRA) that is provided as Attachment 1. Key AMD-related risks and management controls identified by this BBRA are explained in further detail in This Plan, alongside the AMD Water Management Plan (AMD WMP) (BRL, 2026a). Furthermore, This Plan also identifies the key Standard Operating Procedures (SOP) that will be utilised by operational teams to manage these key AMD risks, which includes adaptive management to manage any variance from the expected case.

The following SOPs will be developed prior to commencement of the Construction Phase to support This Plan and the AMD Water Management Plan:

Table 1: Proposed standard operating procedures relevant to this management plan

SOP	Title	Further Details
BPCP-ENV-SOP-01	Rock sampling and analysis – Acid Base Accounting (ABA) and Material Classification	AMD ELF Management Plan (This Plan)
BPCP-ENV-SOP-02	Material management	AMD ELF Management Plan (This Plan)
BPCP-ENV-SOP-03	Sealing of underground workings	AMD ELF Management Plan (This Plan)
BPCP-ENV-SOP-04	ELF construction requirements and construction QA/QC ¹	AMD ELF Management Plan (This Plan)
BPCP-ENV-SOP-05	AMD sludge and pond management	AMD ELF Management Plan (This Plan)
BPCP-ENV-SOP-06	ELF cover system construction requirements	AMD ELF Management Plan (This Plan)
BPCP-ENV-SOP-07	EFA ² construction requirements and construction QA/QC	AMD ELF Management Plan (This Plan)
BPCP-ENV-SOP-08	Surface water sampling and analysis (including storm water)	AMD Water Management Plan (BRL, 2026a)
BPCP-ENV-SOP-09	Groundwater sampling and analysis	AMD Water Management Plan (BRL, 2026a)
BPCP-ENV-SOP-010	Equipment Calibration and QA/QC	AMD Water Management Plan (BRL, 2026a)
BPCP-ENV-SOP-011	Groundwater Management	AMD Water Management Plan (BRL, 2026a)
BPCP-ENV-SOP-012	Portable Water Treatment Plant	AMD Water Management Plan (BRL, 2026a)
BPCP-ENV-SOP-013	Mussel Shell Reactor (MSR) Operation and Maintenance	AMD Water Management Plan (BRL, 2026a)

¹ Quality Assurance and Quality Control

² Engineered Fill Area

SOP	Title	Further Details
BPCP-ENV-SOP-014	Management of Clean Water Diversion Structures	AMD Water Management Plan (BRL, 2026a)
BPCP-ENV-SOP-015	Road maintenance and monitoring	AMD Water Management Plan (BRL, 2026a)

Note: BPCP-ENV-SOP-001 to BPCP-ENV-SOP-007 are referenced in This Plan and are referred to as SOP#1 to SOP#7 for simplification

1.2.2 Objectives of the AMD ELFMP

This Plan sets out the framework to ensure ELF's are designed, operated, and closed in a manner that is safe, stable, and sustainable and in accordance with the relevant conditions of the approvals. The key objectives of the AMD ELFMP are to:

- Define roles and responsibilities for BRL personnel to ensure effective implementation.
- Deliver geotechnically safe landforms.
- Deliver geochemically stable landforms that enable a transition to passive treatment of ELF basal seepage at closure.
- Ensure rehabilitated surfaces are stable and sustainable post-closure and water quality is suitable for discharge to receiving streams.
- Ensure that water discharging from the ELF during construction and operation complies with resource consent conditions and downstream adverse environmental effects are managed in accordance with those conditions. Ensure that seepage water quality from the ELF's following treatment as explained in the AMD WMP (BRL, 2026a) are in compliance with resource consent conditions and downstream adverse environmental effects are managed in accordance with those conditions.

To achieve these objectives, through implementation of the AMD ELFMP, BRL will:

- Identify and manage key risks associated with ELF construction and AMD that could impact water quality objectives and conditions during the construction, operation, and closure phases of the BPCP.
- Develop a materials classification and management process to ensure the correct management and placement of materials.
- Integrate design objectives to minimise long-term geochemical risks and support closure water quality objectives.
- Implement engineering design standards to ensure long-term geotechnical stability.
- Facilitate successful transition to closure, to enable the use of active and passive water treatment systems to meet closure water quality objectives.
- Establish performance monitoring to validate ELF design effectiveness, particularly regarding water quality and water quantity.
- Use internal and external reporting to track management performance.

-
- Develop and implement systems that allow for adaptive management through continuous improvement over the life of the BPCP.
 - Implement training for BRL staff and contractors to ensure the requirements of This Plan are understood and effectively implemented.

2.0 Project Description

2.1 Overview

BRL (which includes its subsidiary companies BT Mining Ltd, Bathurst Coal Ltd, and Buller Coal Ltd) is a publicly listed New Zealand coal mining company with a focus on people and long-term environmental sustainability. BRL is New Zealand's largest coal mining company, producing over 2 million tonnes of coal each year and employing over 550 people.

The BPCP covers areas on both the Stockton Plateau and the Denniston Plateau (collectively referred to as the Buller Plateaux). The purpose of the BPCP is to enable ongoing utilisation of the existing infrastructure and mining operations associated with the Stockton Mine and provide access to additional coal mining areas across the Buller Plateaux, as the coal resource in the current Stockton operations are close to depletion, and further coal resources for blending are required. The Buller Plateaux is located approximately 15 km northeast of Westport on the West Coast of the South Island.

2.2 Project Site

2.2.1 Project Sub-areas

The BPCP comprises five key sub-areas, each with defined project scopes and site-specific geoenvironmental hazards:

1. **Stockton Mining Area (Stockton):** Completion of mining of existing pits and remaining coal resources. Ongoing utilisation of existing infrastructure.
2. **Mount Frederick South (MFS):** Mining is a combination of historically underground worked areas and unworked, and new areas. Coal will be transported to Stockton via the UWHR and an access road up to the sub-area.
3. **Escarpment Extended (ESE):** Mining is a combination of an existing pit (Escarpment), areas containing underground workings, and an extension into unworked areas. Coal will be transported to Stockton via the UWHR.
4. **Upper Waimangaroa Haul Road (UWHR):** A road connecting Stockton, the Escarpment Extended operations, and the Mount Frederick South access road, which will be used to transport coal to Stockton. The road is formed by a combination of upgrades to existing roads and the development of a new connecting section through the upper Waimangaroa Valley where there is currently no access road.
5. **Cypress Mining Area (Cypress):** Ongoing mining is authorised under existing consents, the only elements for inclusion in the BPCP are the renewal of Wildlife Act authorities and a variation to the compensation and rehabilitation provisions to integrate with the broader compensation and rehabilitation package across the full BPCP.

2.2.2 Summary

Comprehensive information on each project sub-area is available in the Project Description Summary. The key areas of the BPCP are shown in Figure 2.

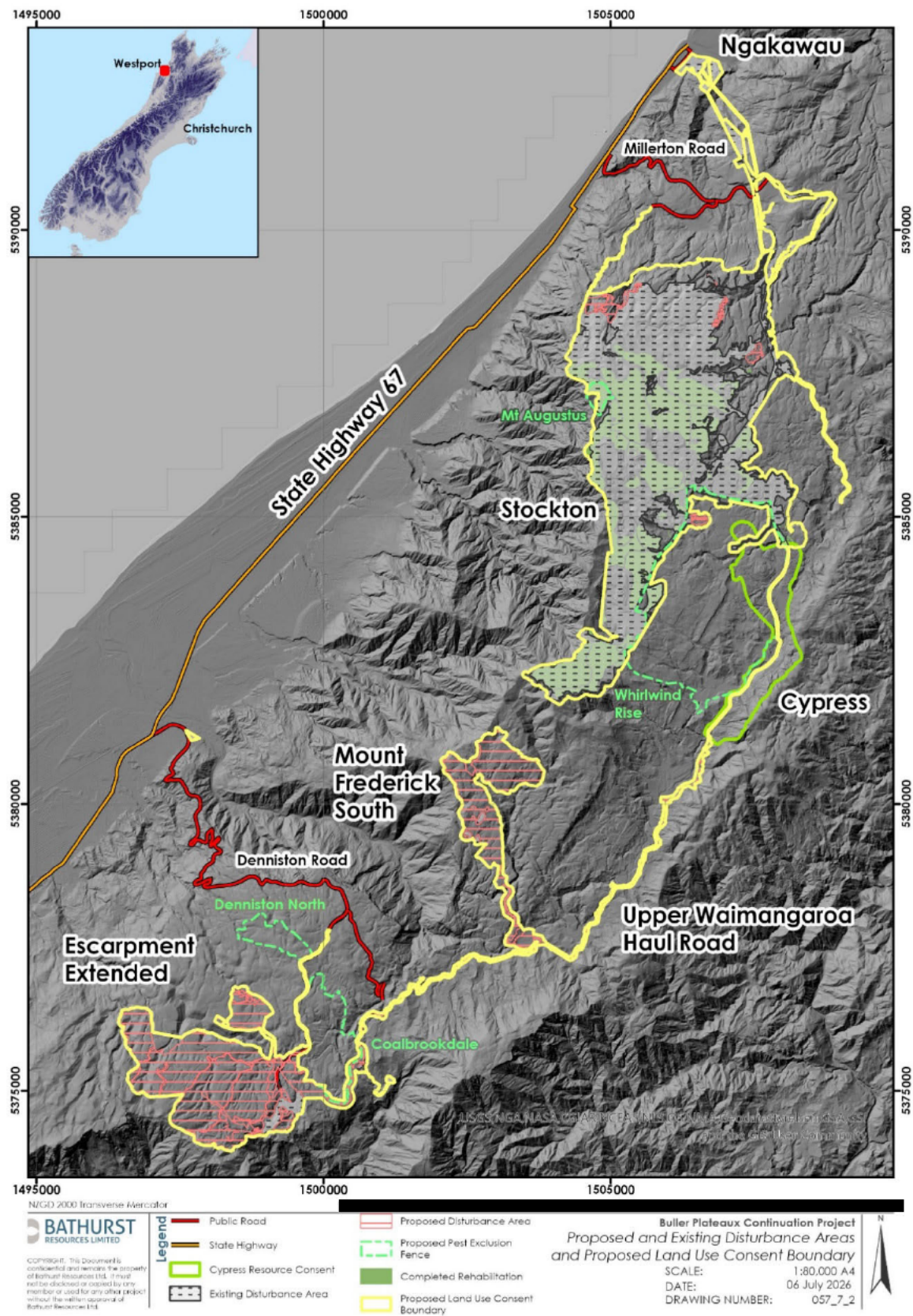


Figure 2: BPCP Proposed and Existing Disturbance Areas and Proposed Land Use Consent Boundary

2.3 Project Timeline

An indicative timeline for the mine phases for the wider BPCP, including each sub-area, is shown in Figure 3. The ESE sub-area, and the UWHR will need to be developed concurrently. This is key, as the UWHR will allow bulk transportation of coal over the Plateaux for washing at the existing CHPP at Stockton, and for sizing clean coal at Stockton and continued use of the 2-5 haul road and aerial ropeway at Stockton to deliver coal to the rail loadout facilities located at Ngakawau.

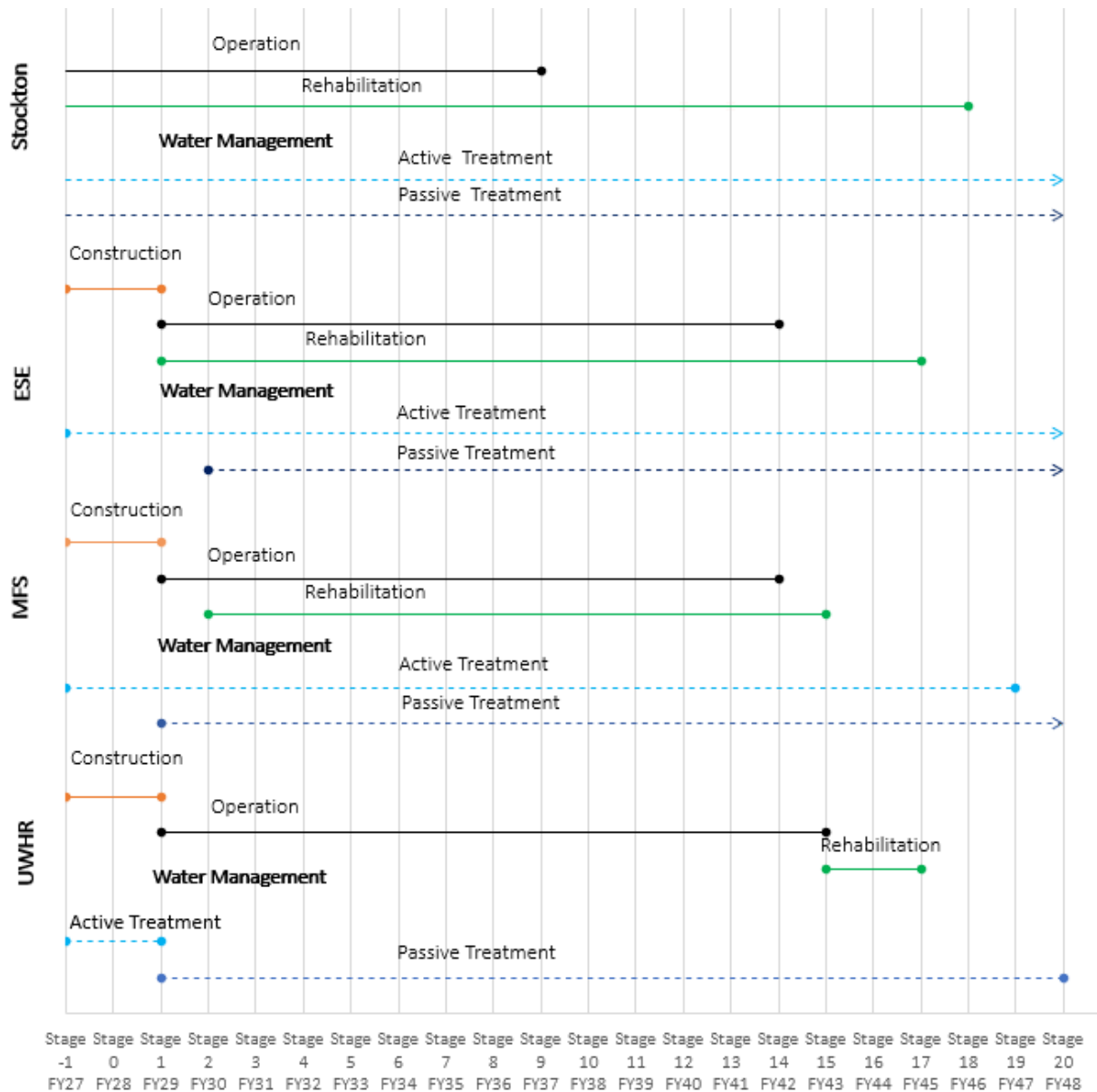


Figure 3: BPCP timeline (by stage and by indicative year).

3.0 Legal Framework

The environmental effects associated with the materials that will be disturbed and the potential effects on water quality for the BPCP will be regulated by consents approved under the Fast-track Approvals Act 2024 and the Resource Management Act 1991.

3.1 Standards and Guidelines

This AMD ELFMP identifies best practice management options for the construction of ELF's to manage AMD, which is based on international guidance. These guidance documents are listed below in Table 1 and have been referred to in the associated technical documents (e.g., as contained in the references to This Plan) to inform the decision-making process.

Table 2: Standards and guidelines relevant to This Plan

Standard/Guideline	Relevance
AMIRA, 2002	Acid Rock Drainage (ARD) test handbook.
CMER, 2018	Centre for Mineral Environmental Research – New Zealand (Cavanagh et al., 2018).
DFAT, 2016	Australasian leading practice sustainable development program for the mining industry - preventing acid and metalliferous drainage.
ICMM, 2019	Integrated mine closure, good practice guide.
INAP, 2014	Global Acid Rock Drainage Guide (GARD Guide) – created by the International Network for Acid Prevention
INAP, 2020	Rock placement strategies to enhance operational and closure performance of mine rock stockpiles.
INAP, 2024	AMD source control for mine rock stockpiles.
MEND, 2009	Prediction manual for drainage chemistry from sulfidic geologic materials.

3.2 Stakeholder Consultation

A draft of This Plan was supplied to relevant regulators and iwi as part of the FTAA pre-consultation engagement. The stakeholder consultation regarding associated technical reports and This Plan has been summarised in the Stakeholder Consultation section of the BPCP FTAA application. Once This Plan is approved, this section will document all future stakeholder engagement undertaken for subsequent versions.

3.3 Relevant Resource Consent Conditions

Proposed Consent conditions that are relevant to this AMD ELFMP are listed below in Table 3.

The relevant resource consent conditions are provided in Attachment 1.

Table 3: Proposed resource consent conditions relevant to this management plan

Consent	Summary	Reference in Plan

Conditions to be inserted upon issue of final decision.

4.0 Environmental Setting

4.1 Regional Geology

The Eocene Brunner Coal Measures (BCM) and Kaiata Mudstone (KMS) are a marine transgression sequence of estuarine high sulfur sedimentary rocks consisting of clastic rocks and coal seams. The BCM are characterised by high acidity and elevated metal concentrations (e.g., for instance: iron (Fe), aluminium (Al), nickel (Ni), zinc (Zn), cobalt (Co), copper (Cu)). The BCM, and overlying Kaiata Mudstone (KMS), contribute to AMD in the Buller Plateaux region. The stratigraphic column is shown in Figure 4.

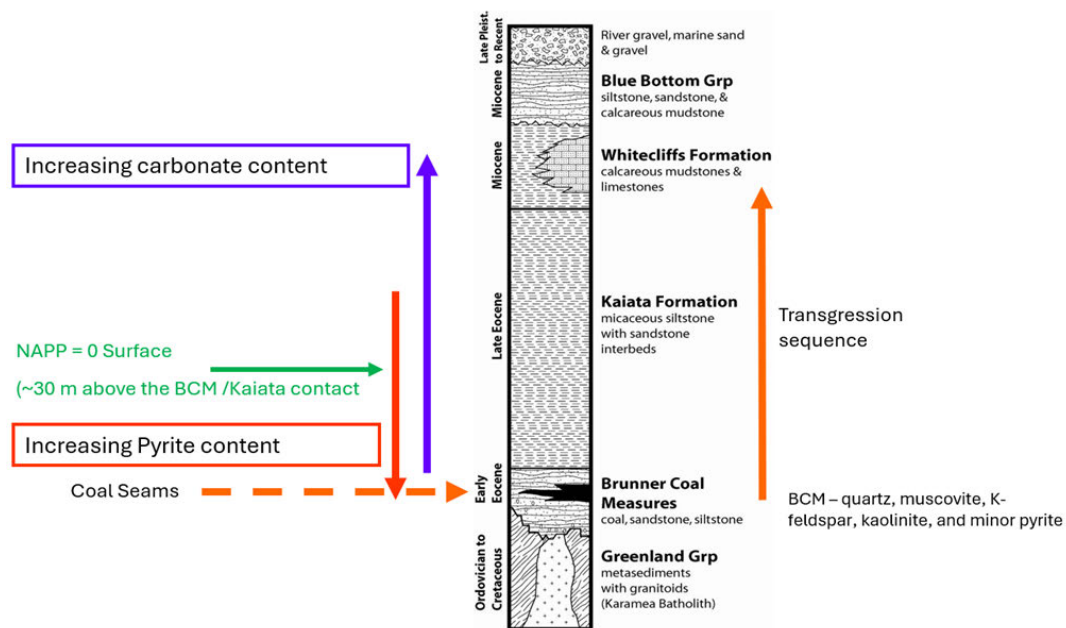


Figure 4: Stratigraphic column of the Denniston and Stockton Plateaux.

Regional variability for AMD source hazards across the project sub-areas (i.e., Stockton, MFS, ESE, and the UWHR) is heavily influenced by paleo-depositional environment of the BCM and to a lesser extent the KMS. The BCM form the foundational layer of a transgressive sequence of fluvial to estuarine high sulfur sedimentary rocks consisting of clastic sediments and coal seams. The sequence is 70 to 130 m thick and was deposited in a fluvio-paralic environment consisting of braided and meandering streams within a deltaic, barrier, tidal environment. The BCM are conformably overlain by, and laterally interfingered with, the Eocene marine KMS, which has increasing carbonate content upwards away from the BCM contact (Flores and Sykes, 1996). Geochemical AMD risks decrease away from the BCM/KMS contact such that at approximately 30 m above the BCM/KMS contact (Hughes, 2007) the acid generating potential is equivalent to the net acid neutralisation capacity resulting in a net acid producing potential (NAPP) of ~ 0 kg $\text{H}_2\text{SO}_4/\text{t}$. Materials stratigraphically higher (younger) above the NAPP = 0 surface are non-acid forming (NAF) and materials below the NAPP = 0 surface are potentially acid forming (PAF) as shown in Figure 4. Later studies (McLachlan, 2022) confirmed this transgression from PAF KMS to NAF KMS but noted that prolonged weathering (geological timescale) can convert NAF KMS to PAF KMS due to leaching of carbonates.

As noted in literature (e.g., Pope et al., 2010), fluvial systems tend to be lower in pyrite compared to marine-influenced systems. At the ESE and MFS sub-areas the AMD risks are expected to be lower than

at the adjacent Stockton Coal Mine as the BCM have a lower sulfur content compared to overburden materials at Stockton. This lower risk at ESE and MFS is due to the depositional environment being strongly influenced by fresh water fluvial sediments (low sulfur) south of Stockton with occasional periodic marine incursions (high sulfur), whereas the depositional environment at Stockton was predominantly a marine-influenced environment with higher sulfur materials (e.g., estuarine).

The BCM are often deficient in acid neutralising carbonate minerals such that the oxidation of pyrite typically leads to the rapid formation of AMD with little time lag to acid onset (Weber et al., 2008).

4.2 Historic Mining Activity

Extensive historic mining activities are present in the BPCP area, which have led to degraded water quality and the contamination of many surface waterways from AMD. BRL note the following:

- At the MFS sub-area there are numerous adits, waste rock disposal areas, and collapsed workings due to historic underground and minor outcrop mining activities. The historic underground Taipo and Koranui Mines are within the footprint of the MFS West Pit.
- Within the ESE sub-area there are several areas of historic underground workings including the Sullivan Mine, Sullivan West Mine, Escarpment Mine, Whareatea Mine, Davies & Party, Mine Plateau Mine, Coalbrookdale Mine, and Cascade Mine. For instance, AMD discharge from historic underground workings of the Denniston Plateau discharges into Cascade Creek, Waimangaroa River, Rapid Stream, and Whareatea River (near the coast where Rapid Stream enters) (Jewiss, 2018; Jewiss et al., 2020).
- The most recent mining operations on the Denniston Plateau took place at the existing opencut Escarpment Mine from 2014 to 2016; now on care and maintenance. The existing Escarpment Mine is supported by passive water treatment systems that continue to treat AMD from the historic escarpment underground mine as well as the seepage from the Barren Valley ELF.
- The southern portion of the UWHR to the intersection of the proposed MFS Access Road has historically been mined via underground extraction resulting in the exposure of PAF materials. The proposed UWHR alignment is over the Coalbrookdale and Ironbridge mine underground workings. Ironbridge Mine operated between 1889 and 1944, closing due to fires. The workings stretched from Burnett's Stream to Deep Stream (Wright, 2008) and are, in places, within 10 m of the proposed UWHR in some sections. The upper coal seam floor is more than 14 m below the surface, dipping to the south away from the Waimangaroa River. A drainage drive continues to drain workings to the Waimangaroa River and this drive (as shown on historic mine plans) intersects coal floor at 475m RL suggesting workings that lie below this level are likely flooded, but all areas close to the UWHR corridor are unlikely to be flooded. Further details on historic mining activities in the area are provided by Clough & Associates (2025). The northern portion of the route from the MFS connector road to Cypress has not previously been mined.

Studies completed as part of the BPCP FTAA application indicate that the proposed MFS and ESE mining activities will contribute to an improvement in water quality and aquatic ecology in a number of the above AMD affected streams (e.g., Cascade Creek, V37 Creek) by the removal of some historical underground workings and the capture of associated legacy discharges. This is considered further by ESNZ (2026).

5.0 Risk Assessment

5.1 Risk Assessment Process

Assessing source hazards, pathways, and potential AMD risks on receptors using a Source-Pathway-Receptor (SPR) assessment is critical for the management of AMD to ensure engineering controls are suitable. This process identifies potential AMD impacts and determines the management measures that are required to safeguard the receiving environment and demonstrate compliance with regulatory requirements. Management of risks and their effects through hazard identification, risk assessment and risk management associated with this Plan are completed in accordance with the Bathurst HSEC³ Framework, and the BRL-HST-STD-001 Risk Management Standard.

Furthermore, the following risk assessments were undertaken and are updated as new information or learnings are derived:

- AMD Broad-Brush Risk Assessment (BBRA) for the BPCP: 2026 (Attachment 1).
- Environment and Community (E&C) BBRA, including ongoing regular reviews in accordance with the BRL corporate standards (HSEC Framework).

5.2 Potential Impacts

Water and oxygen interacting with materials that contain sulfide minerals can generate AMD. The mine domain with the greatest source hazard risks (60-80% of total AMD load) are waste rock storage facilities (e.g., INAP, 2020), that include waste rock dumps (WRD), having no engineering controls to control sulfide mineral oxidation or the mobilisation of secondary sulfide oxidation products.

Engineered landforms (ELFs) are proposed for the BPCP to minimise the generation of AMD arising from traditional WRDs. Further details are provided in the ELF design philosophy report (MWM, 2026j), prepared for the BPCP that explains source control technologies (prevention and minimisation of AMD).

Previous studies indicate an inherent risk for several potential constituents of concern (PCOC) that could potentially be elevated in BPCP AMD impacted waters. These include:

- Low pH and elevated acidity
- Elevated sulfate
- Elevated Fe and Al leading to the formation of Fe- and Al- hydroxides, the release of Lewis acidity, and the formation of hydroxide floc leading to AMD sludge formation.
- Elevated trace metals.
- Elevated total suspended solids (TSS).

³ Health, Safety, Environment, Community

5.3 Risk Summary

Potential risks that may contribute to the potential PCOC listed above, have been identified for which management measures have been developed to meet closure objectives within This Plan. The identified potential risks that have been managed within This Plan include:

- Knowledge base is insufficient to validate the ABA based material definition, PCOCs and block model for AMD classification types.
- Incorrect classification of materials leading to inappropriate placement of overburden.
- Poor materials management compromising ELF design criteria leading to oxidation and the generation of stored acidity/PCOC.
- Inappropriate management of overburden materials close to AMD classification boundaries.
- Loss of seepage to underground workings.
- Advective oxygen ingress into the ELF underdrainage network or ELF materials.
- Limited clean water diversion leading to higher ELF seepage rates.
- Insufficient limestone added during construction leading to higher acidity loads in the longer term.
- Net percolation of rainfall is higher than expected leading to elevated AMD loads from ELFs.
- Oxygen flux through the cover system is higher than expected leading to higher AMD loads in closure.
- Inadequate or nascent groundwater monitoring surrounding ELF structures to monitor aquifer impacts.
- Geotechnical / Erosional stability of ELF not achieved.
- Engineered Fill Areas (EFA) generate higher acidity and PCOC loads than expected.
- Timely transition from active treatment to passive treatment of ELF seepage as anticipated.

These risks are further described in the BBRA (Attachment 1).

5.4 Management Measures

To mitigate the risks listed above associated with AMD generation for both ELF and EFA, BRL has developed a hierarchy of controls (Management Steps), which is in alignment with international guidance documents (e.g., INAP, 2014; DFAT, 2016), of how to manage the potential effects of AMD and the PDCA cycle for adaptive management. The hierarchy of controls includes:

- Determine the closure objectives for the mine.
- Understand the source hazards.
- Prevent oxidation of sulfide minerals.
- Minimise the mobilisation of stored mobile oxidation products.
- Control and treatment of mine-impacted waters.

- Complete an assessment of the potential effects.
- Monitor performance.

ELFs and EFAs are designed to provide the geochemical engineering controls required to prevent oxidation of sulfide minerals and minimise the mobilisation of any oxidation products and/or other water-soluble PCOC associated with AMD. Table 4 summarises the steps of AMD management associated with This Plan along with additional recommendations as listed in Appendix B.

Table 4: Summary of studies undertaken in relation to the six steps of AMD management.

Purpose	Objectives	Reference
Plan		
Set Closure Goals	• Meet required water quality criteria in receiving waters. • Transition to passive treatment of ELF AMD impacted waters. • Closure goals are set in order to minimise legacy issues associated with potential AMD sources and any in-perpetuity uncontrolled AMD from mine domains containing AMD generating materials. • These goals are re-evaluated throughout the mine life against performance monitoring results. • Closure goals will consider baseline conditions. • Betterment is proposed for some waterways impacted by AMD.	• Background Water Quality Report (MWM, 2026a). • Upper Waimangaroa Haul Road Site Visit (MWM, 2026b). • Mine Closure Concept Strategy (BRL, 2026b). • Water quality objectives (Hickey, 2026). • Proposed Consent Conditions. • Ecological Betterment studies (ESNZ, 2026)
Predict	• Prediction is critical to understanding the potential, severity, and longevity of AMD. • Prediction is facilitated by geochemical analysis, interpretations and a risk assessment. • A key prediction objective is to estimate, by modelling, water quality generated by various materials and mine domains that have the potential to generate AMD.	• Upper Waimangaroa Haul Road Site Visit (MWM, 2026b). • Factual Report. Geoenvironmental Hazards, Mt Fred South Project (MWM, 2026c). • Factual Report: Column Leach Testing, Mt Fred South Project (MWM, 2026d). • BPCP AMD Hazard Classification (MWM, 2026e). • UWHR Geochemistry ABA Summary (MWM, 2026f) • Cypress pXRF Summary (MWM, 2026g). • Escarpment Mine - Barren Valley ELF Water Quality Model (MWM, 2026h). • Water and Load Balance Model - Source Term Definition (MWM, 2026i). • AMD ELF Management Plan (This Plan)
Do		
Prevent and minimise	• Prevention of sulfide mineral oxidation, where practicable, is a key management step for AMD.	• Engineered Landform Design Philosophy (MWM, 2026j)

Purpose	Objectives	Reference
	- The prevention of AMD relates to reducing sulfide mineral oxidation as much as practicable by limiting the ingress of oxygen into a mine domain where it can oxidise sulfide minerals prevention strategies are implemented during operations to manage a future risk. - Where prevention is not practicable, or has already occurred, the next management step involves minimising the contaminant load reporting to the receiving environment. - This often involves progressive rehabilitation strategies focused on minimising ongoing sulfide oxidation (potential oxidation products) and the mobilisation of oxidation products with net percolation through the waste rock.	- Escarpment Reconsenting Cover System Field Investigation (MWM, 2026k). - Cover System Technical Report (MWM, 2026l). - AMD ELF Management Plan (This Plan). - AMD Water Management Plan (BRL, 2026a). - Mine Closure Concept Strategy (BRL, 2026b).
Control and Treat	- Control and treat measures are an important step in managing the effects of AMD to the receiving environment should AMD be identified in site impacted water. - Identify when active water treatment can transition to passive water treatment systems.	- Water Treatment Report: MFS and ESE (MWM, 2026m). - Passive Treatment System Design Toolkit (MWM, 2026n) - AMD Sludge Management (MWM, 2026o). - Active Water Treatment Plant – Basis of Design (Process Flow, 2026a). - Active Water Treatment Testing Report – Summary of Tests (Process Flow, 2026b). - AMD Water Management Plan (BRL, 2026a).
Assessment of Effects	Predict potential effects to the wider environment from the MFS, ESE, and UWHR sub-areas of the BPCP.	- Mt Fred South - Groundwater Technical Report (MWM, 2026q). - Escarpment Extended Mine Project - Groundwater Technical Report (MWM, 2026r). - ELF Water Quality and MSR Design Summary (MWM, 2026s). - Construction Phase Report (MWM, 2026t). - Mount Fred South - Water and Load Balance Model (MWM, 2026u). - Escarpment Extended Mine Project - Water and Load Balance Model Report (MWM, 2026v). - Hydrological Assessment (MWM, 2026w).

Purpose	Objectives	Reference
Check		
Monitor Performance	- Performance monitoring will be conducted to regularly evaluate how AMD management techniques are performing openly and objectively against closure goals and success criteria (e.g., ICMM, 2019). - Performance monitoring is used to validate and improve model results. - Performance monitoring is used to support adaptive management.	- AMD ELF Management Plan (This Plan). - AMD Water Management Plan (BRL, 2026a). - Routine and targeted sampling and analysis - SOPs - Proposed Consent Conditions. - Annual Work Plans.
Act		
Report and review	- Report on performance measures and implement changes in a timely and effective manner. - Review key Plans, SOPs, annual work plans and audits to implement adaptive management practices.	- AMD ELF Management Plan (This Plan). - AMD Water Management Plan (BRL, 2026a). - SOPs - Proposed Consent Conditions. - Annual Work Plans.

7.0 Material Classification and Scheduling

The purpose of this section is to describe how AMD source hazards are identified (Prediction) and scheduled for emplacement within an ELF. This includes using a risk-based material classification process and quantification of the amounts of materials that are potentially problematic for AMD. The classification applies to all materials disturbed including BCM (excluding coal destined for sale), KMS, and basement units, as well as any colluvium disturbed during the construction of the UWHR.

7.1 Objective

To classify, schedule, and excavate materials in a way that supports the safe, stable, compliant, and sustainable design, construction, and rehabilitation of the proposed ELFs.

7.2 Material Summary

Material types present within the ESE, MFS and UWHR sub-areas that will be excavated include:

- Topsoil
- Colluvium
- BCM
- KMS
- Granite, and other basement units
- Coal

Classification of these materials ensures they are placed appropriately for staged construction and long-term rehabilitation.

7.3 AMD Classification

The use of standard industry accepted AMD classification systems (e.g., AMIRA (2002) and Price (2009)) results in many BCM samples being classified as Uncertain, which generates operational issues for materials scheduling, management, and placement. In this regard, site-specific AMD classifications have been developed for the BCM at ESE and MFS sub-areas.

Excavation activities associated with the UWHR have KMS present in the northern section of the proposed haul road, which requires a different AMD classification scheme due to the greater acid neutralising capacity of the mudstone. The KMS can be either NAF or PAF depending upon its original depositional environment with carbonate content increasing away from the BCM contact (Figure 4). Due to faulting, the northern UWHR alignment alternates between NAF and PAF KMS.

Four AMD classification systems have been developed through site-specific material geochemical investigations. Proposed classification systems are detailed in Table 5. Further details on these classification systems are provided in BRL (2024a), MWM (2026e), McLachlan (2022), and Olds et al., (2015).

Ongoing improvement of the AMD classification systems will be part of all ELF Management Plan revisions (Section 17.2). Furthermore, the Project Geologist will continually update the site-specific ABA models as new data becomes available.

The following assessment will be undertaken as part of this continual improvement process:

- Sulfur speciation testing will be undertaken (10% of the original block model samples) to validate that total sulfur is a suitable analogue for calculations to determine the maximum potential acidity (MPA). This will provide a fairer (lesser) estimate of MPA to understand AMD risk.
- The pXRF data will be assessed by MFS to understand if there are paleoenvironmental drivers for Zn distribution.
- Review the HAF cutoff value once pit shells are finalised based on the costs and benefits of managing differing HAF volumes.

7.4 ABA Block Model

ABA block models have been developed for the ESE and MFS sub-areas (BRL, 2025a,b), which are used to provide estimates of material quantities and material schedules. These ABA block models will be updated regularly as infill resource definition and ABA drilling progresses. This will improve model confidence in AMD material classification and the location of these materials.

A geological model is available for the UWHR that provides guidance of underlying BCM, PAF KMS, and NAF KMS units. This geological model needs to be validated by drillholes placed in advance of the road development to confirm AMD characteristics of materials including colluvium, BCM, and KMS materials.

Table 5: AMD classification systems for the BPCP

Project	NAF	LOW RISK	PAF	HAF
Stockton (BRL, 2024a)	All greywacke / granites	NA	All BCM material	NA
Kaiata Mudstone (KMS) – UWHR (McLachlan, 2022)	- NAPP < 0, or - pXRF-Ca > 14,000mg/kg (on RC chip) and validated by ABA QA/QC testing	NA	NAPP ≥ 0 or pXRF-Ca ≤ 14,000 mg/kg	NA
ESE (Olds et al., 2015)	- S wt% ≤ 0.015; or 0.015 < S wt% ≤ 0.2 and NAPP ≤ 0; or 0.015 < S wt% ≤ 0.45 and NAG pH > 4.5	0.015 < S wt% ≤ 0.2 and NAG pH ≤ 4.5 and 0 < NAPP ≤ 5	0.015 < S wt% ≤ 0.2 and NAG pH ≤ 4.5 and NAPP > 5; or 0.2 < S wt% ≤ 0.45 and NAG pH ≤ 4.5; or 0.45 < S wt% ≤ 0.7	S wt% > 0.7
MFS (MWM, 2026c)	- S wt% ≤ 0.05; or 0.05 < S wt% ≤ 0.33 and NAG pH > 4.5	0.05 < S wt% ≤ 0.2 and NAG pH ≤ 4.5	0.2 < S wt% ≤ 0.33 and NAG pH ≤ 4.5; or 0.33 < S wt% ≤ 0.7	S wt% > 0.7

NAF = Non-acid forming

PAF = Potentially acid forming

BCM = Brunner Coal Measures

HAF = High acid forming

S wt% = weight percentage sulfur

NAPP = net acid producing potential – Further details on NAPP are available in AMIRA (2002)

NAG = net acid generation – Further details on NAG are available in AMIRA (2002)

pXRF = portable x-ray fluorescence

RC Chip = Reverse Circulation (drilling) chip sample

7.5 Materials Schedule

Material schedules have been developed by BRL which includes AMD classification criteria being applied to the material quantities. This schedule will be updated as new information becomes available and will be presented in the Annual Work Plan.

7.5.1 ESE Overburden Quantities

A materials schedule for ESE has been provided by BRL for (Stage 1 – Stage 14) of the ESE. The dataset is split into PAF, NAF, Low Risk, and High Acid Forming (HAF). Estimated extraction volumes are summarised in Table 6. For the purposes of material scheduling, HAF materials are managed under the same risk framework as PAF materials. This scheduling does not include Stockton borrow-pit materials (i.e., granite, which is classified NAF).

Relocation of NAF materials, including aggregate, from any of the BPCP sub-areas into any other BPCP sub-area will occur for civil construction, final landform construction, haul road maintenance, water management infrastructure establishment, and maintenance activities.

Table 6: ESE overburden quantities

INDICATIVE YEAR	PROJECT STAGE	NAF	LOW RISK	PAF	HAF	TOTAL OVERBURDEN ²
FY27 ¹	Stage -1	83,800	23,000	503,500	48,900	659,200
FY28 ¹	Stage 0	258,700	403,800	2,428,700	1,257,100	4,348,200 ³
FY29	Stage 1	820,400	679,500	3,888,400	2,041,700	7,429,800
FY30	Stage 2	610,200	294,000	4,935,700	1,763,300	7,603,100
FY31	Stage 3	1,591,700	694,800	5,957,300	1,560,500	9,804,100
FY32	Stage 4	2,421,200	482,500	4,202,500	2,819,600	9,925,600
FY33	Stage 5	3,779,500	378,400	2,958,200	2,822,500	9,938,500
FY34	Stage 6	3,536,300	481,300	5,185,700	636,600	9,839,800
FY35	Stage 7	3,123,300	1,798,600	3,105,600	1,886,100	9,913,400
FY36	Stage 8	2,670,100	2,446,800	3,882,200	803,700	9,802,600
FY37	Stage 9	3,862,300	1,615,500	3,250,200	1,195,200	9,923,000
FY38	Stage 10	4,403,500	1,131,400	3,013,400	983,700	9,531,900
FY39	Stage 11	3,126,900	514,100	4,659,400	1,146,900	9,447,200
FY40	Stage 12	1,862,300	432,800	5,672,800	1,062,500	9,030,200
FY41	Stage 13	3,260,800	540,200	4,040,300	962,600	8,803,800
FY42	Stage 14	1,418,800	27,600	720,200	19,400	2,185,800
Grand Total ²		36,828,900	11,943,600	58,403,500	21,009,600	128,185,500

All results measured in bcm (bank cubic meters)

1. Green cells represent the Construction Phase.

2. Total overburden and grand totals are calculated and rounded from source data; therefore, may not equal the sum of the rounded figures shown. Grand Total excludes Construction Phase materials.

3. The ESE active Operational Phase water treatment plant will be available during this stage.

Overburden materials are predominantly comprised of PAF (46%) with moderate quantities of HAF (16%), Low Risk (29%), and NAF materials (9%). The schedule is shown in Figure 5.

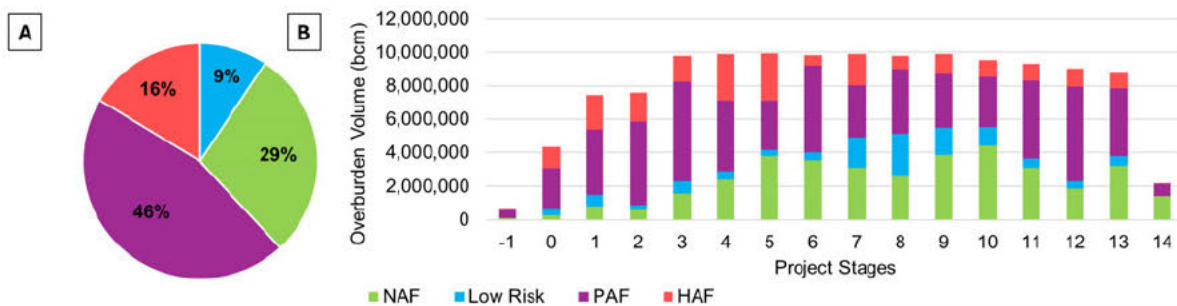


Figure 5: ESE overburden and borrow-pit materials by stage.

(A) Summary of ESE overburden volume by classification (Stage 1 – Stage 14).

(B) Total forecasted ESE overburden volumes and proportional composition by mine development stages.

7.5.2 MFS Overburden Quantities

Overburden quantity, split into NAF, Low Risk, PAF, and HAF are provided in Table 7 for the MFS project sub-area.

Relocation of NAF materials, including aggregate, from any of the BPCP sub-areas into any other BPCP sub-area will occur for civil construction, final landform construction, haul road maintenance, water management infrastructure establishment, and maintenance activities.

Table 7: MFS overburden quantities

INDICATIVE YEAR	PROJECT STAGE	NAF	LOW RISK	PAF	HAF	TOTAL OVERBURDEN ¹
FY27 ²	Stage -1	-	365,500	30,100	-	395,600
FY28 ²	Stage 0	599,300	210,800	414,100	169,900	1,394,100
FY29	Stage 1	724,100	87,000	38,100	1,700	850,700
FY30	Stage 2	529,300	80,200	17,000	300	626,600
FY31	Stage 3	149,100	154,700	150,300	5,700	459,700
FY32	Stage 4	413,400	107,800	39,800	500	561,400
FY33	Stage 5	130,800	64,100	61,700	-	256,600
FY34	Stage 6	1,023,500	55,600	25,200	5,700	1,109,800
FY35	Stage 7	1,108,300	143,500	198,800	9,300	1,459,700
FY36	Stage 8	771,900	239,200	499,900	1,500	1,512,400
FY37	Stage 9	1,845,900	108,200	154,700	4,500	2,113,100
FY38	Stage 10	980,000	216,100	181,400	44,900	1,422,200
FY39	Stage 11	367,700	125,100	227,800	151,300	871,900
FY40	Stage 12	1,809,000	255,300	202,700	66,800	2,333,600
FY41	Stage 13	405,000	170,000	200,200	2,300	777,300
FY42	Stage 14	8,300	14,400	41,300	1,500	65,400
Grand Total ¹		10,865,600	2,397,500	2,483,100	465,900	16,212,100

All results measured in bcm (bank cubic meters)

1. Total overburden and grand total are calculated and rounded from source data; therefore, may not equal the sum of the rounded figures shown.

2. Green cells represent the Construction Phase.

Data presented in Table 7 and Figure 6 indicates that the majority of overburden is low-risk material (NAF and Low Risk ~82% of the total overburden) with ~11 M bcm of NAF available.

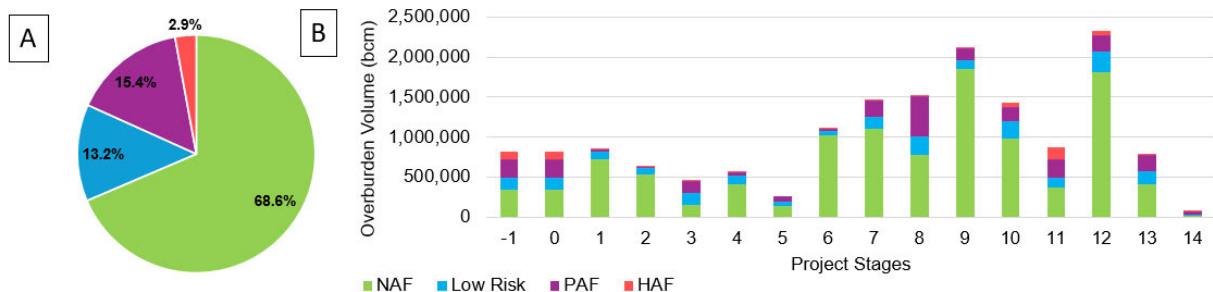


Figure 6: MFS overburden quantities by year.

(A) Summary of MFS overburden volume by classification (Stage 1 – Stage 14).

(B) Total forecasted MFS overburden volumes and proportional composition by mine development stages.

7.5.3 UWHR Material Quantities

Material quantities are provided for the UWHR as shown in Table 8. This table will be updated prior to construction commencing to incorporate any changes that may occur during the detailed design stage in accordance with the PDCA cycle. Data indicates a significantly lower quantity of disturbance compared to the ESE and MFS sub-areas.

The bulk fill strategy for the construction of the UWHR engineered fill areas (EFAs) relies on competent rock recovered from road alignment cuttings within BCM area and imported granite from the Stockton borrow pit (classified as NAF) or from within the ESE pit footprint where suitable.

Relocation of NAF materials, including aggregate, from any of the BPCP sub-areas into any other BPCP sub-area will occur for civil construction, final landform construction, haul road maintenance, water management infrastructure establishment, and maintenance activities.

No KMS or colluvial materials are used in the construction of the haul road due to their poor geotechnical performance. These materials will be transported to either Stockton or Escarpment mines for disposal within an ELF:

- Up to 25,000 bank cubic metres (bcm) of waste rock from the construction of the UWHR that is unsuitable for use as fill materials, due to its geochemical or geophysical properties, will be placed within Engineered Landforms at the ESE sub-area.
- Up to 50,000 bank cubic metres (bcm) of waste rock from the construction of the UWHR that is unsuitable for use as fill materials, due to its geochemical or geophysical properties, will be placed within Engineered Landforms at the Stockton sub-area

The total excavated BCM volumes available for reuse have been quantified by road section (Table 8). Likewise, the total volume of BCM unsuitable for placement, due to geochemical or lithological constraints, are also provided (Table 8).

Table 8: UWHR material quantities

UNSUITABLE FOR CONSTRUCTION*						
ROAD SEC	CATCHMENT	BCM DESIGN CUT TO FILL	ESE PAF ELF	ESE NAF ELF	PAF - STOCKTON	NAF - STOCKTON
		(m³)	(m³)	(m³)	(m³)	(m³)
E2C	Burnett's	14,049	-	-	-	-
C2B	Burnett's	26,455	-	-	-	-
B2B	Burnett's	3,528	-	-	-	-
B2B	Gomorrhah Ck	7,928	3,374	-	-	-
B2B	Upper Waimangaroa	-	322	932	-	-
B2F	Upper Waimangaroa	24,368	-	7,358	-	-
F2C	Upper Waimangaroa	-	-	-	3,266	4,894
Total	-	76,327	3,696	8,290	3,266	4,894

All results measured in bcm (bank cubic meters)

*Fill North of ford and south of Cypress Mine: A mixture of colluvium and basement, which may include Kaiata Mudstone (NAF or PAF) – percentage uncertain.

BCM = Brunner Coal Measures, ESE = Escarpment Extended

7.5.4 Material Schedule Review

The material schedule is critical for mine planning. The material schedule will be maintained for each BPCP sub-area and will be updated annually (within the Annual Work Plan); or when the mine plan changes; or when there is a significant variance in the waste rock block model (defined as a change of 10%).

7.6 Controls and Mitigation Measures

In alignment with the objectives to provide a geochemically stable ELF, proposed controls to mitigate the potential effects associated with material classification and material management are summarised below.

7.6.1 Material Sampling Procedure

Geochemical stability of the ELF is underpinned by understanding the nature of the rock being placed in the ELF and the geochemical properties of that waste rock which influences the location of deposition within the ELF. The ABA block model forms the basis for selective geochemically controlled material placement within the ELF. The following summary is provided to ensure suitable representative samples are selected for ABA testing and AMD classification, to update the ABA block model:

- Resource definition infill drilling: Drill hole sampling for AMD classification will ensure all core or chip from the sampled interval is included in the sample for core drilling. Correct sample processing (crushing and splitting) will be undertaken. Field splitting of RC drill hole samples will be completed using a correct device (riffle splitter, or cyclone splitter etc). Spot sampling will not be undertaken for ABA block model development.

- All resource definition drill core will be sampled to align with significant lithological units with >1 m thick intervals. Sample intervals of 2-5 m will be standard where no change in lithology is identifiable.
- All drill hole samples will be sized to align with the geochemical/geological block model.
- Composite lithology samples will be avoided unless there is significant stratigraphic variation over short intervals (<1 m) or is aligned to minimum intervals for selective mining.
- The rock below coal floor can often be elevated in sulfur/sulfides. These units will be sampled at an interval of ≤ 0.5 m. If the coal floor is benign or PCOC loads are acceptable, there is the potential for this to be left as pavement.

The sampling of materials and the testing of these materials to ensure the correct data are collected for the AMD classification of materials will be managed by:

BPCP-ENV-SOP-01: Rock Sampling and Analysis – Acid Base Accounting (ABA) and Materials Classification.

7.6.2 QA/QC and Data Management

The following is required for the laboratory analysis of ABA material and management of data:

- Selected laboratories will be IANZ⁴ accredited (or equivalent).
- Internal QA/QC to be completed by the testing laboratory as required by accreditation. Such data to be provided to BRL.
- It is recommended that at least one certified reference material (CRM) is provided with each consignment for QA/QC purposes. The CRM will include total wt% S.
- Selected CRM will be within the range of expected total sulfur wt% values for the consignment. Laboratory consignments where analysed CRM fail to fall within the referenced three standard deviations will be re-analysed.
- At least one field duplicate and lab repeat will be selected for every consignment at a rate of 1 per 20 samples. A range of duplicate materials will be selected over the course of a sampling program (i.e., different lithologies) across the consignments.
- QA/QC results to be reviewed on return of laboratory data to allow any issues to be raised before entry into database.
- The data management process will avoid manual transcript error during transfer of laboratory data to the database by the use of acquire import objects (or equivalent).
- Data obtained from drill programs will be used to validate/update the geological model, AMD Block model, and the AMD classification of materials.

The SOP for materials AMD analysis and classification (BPCP-ENV-SOP-01) includes the QA/QC processes, data management, and any corrective actions.

⁴ International Accreditation New Zealand

7.6.3 Material AMD Classification

Data obtained from the ABA analysis will be used to grade estimate non-coal blocks within the AMD block model. The non-coal blocks are then classified using the approved classification methods (Table 5) for that project area.

The sampling of materials and the testing of these materials to ensure the correct data are collected for the AMD classification of materials will be managed by:

BPCP-ENV-SOP-01: Rock Sampling and Analysis – Acid Base Accounting (ABA) and Materials Classification

7.6.4 ABA Block Model

The ABA block model for ESE, MFS, and UWHR will be updated as ABA data becomes available from resource definition drilling. The updated ABA block model will be used to update materials quantities and the material schedule.

7.6.5 Materials Management and Placement

This section addresses the risks associated with poor materials management. The following materials management will be undertaken:

7.6.5.1 Low sulfur / Low Zn Materials

Materials that are very low sulfur (< 0.015 wt% S) and can practicably be separated from other NAF materials will be used for areas that may be sensitive to runoff containing elevated Zn concentrations after mine closure. This could include material placement adjacent to streams and catchments where passive treatment technologies cannot be installed.

Based on the outcomes of the risk assessment (Attachment 1) as presented, BRL will update the AMD block model using a cut-off of 0.015 wt% S to identify materials that will be beneficial for sensitive areas (e.g., adjacent to streams or where treatment of seepage cannot occur)

7.6.5.2 Material Management

The fundamental management tool for classification of excavated materials in regard to AMD potential is the ABA Block Model. The model has been developed for MFS, ESE, and UWHR. As further resource definition drilling occurs, in advance of mining, the model resolution will be improved with ABA classification sample granularity decreasing.

The ABA Block Model will be used to:

- Guide blasting programs to minimise the mixing of acid forming materials with clean NAF rock where practicable. For instance, a blast pattern may be constructed shallower to avoid PAF at the base of the hole ensuring the blast is NAF.
- On occasion, where data gaps exist, blast hole chips may also be sampled to validate the ABA Block Model. This will not be standard practice due to health and safety issues of BRL staff working in active mining areas, turn-around time for sample results, and a common requirement

of needing to move overburden efficiently as soon as its blasted (which also minimises oxidation).

- Identification of NAF material including aggregate, which may be relocated from any of the BPCP sub-areas into other BPCP sub-area for various purposes including civil construction, final landform construction, haul road maintenance, water management infrastructure establishment and maintenance is permitted.
- Schedule material movements (daily and weekly basis).
- Provide digital dig plans to excavator operators to ensure NAF materials are not mixed with acid forming materials.

BRL acknowledge that it is difficult to obtain a representative sample without significant processing of many bulk samples from each mining flitch and for placed materials. Analysis using pXRF is not possible on BCM, as the only guide to AMD classification is sulfur and due to its low molecular weight, the margin of error is high and hence unreliable. pXRF will be used for Kaiata Mudstone, but this is only of importance for the UWHR sub-area.

Infill Reverse Circulation (RC) drilling will be the dominant form of QA/QC of the AMD Block Model.

A GPS vehicle tracking system will be used to ensure materials are correctly placed in the desired location, particularly NAF materials being used for cover system construction (which is a higher risk for closure if the wrong materials (e.g., HAF or PAF) are used).

A key risk for material management is PAF or HAF being placed in NAF ELF/stockpiles, prior to being reused for earthworks that require low sulfur materials (e.g., the 10 m oxidising zone of the ELF; cover systems). In this regard, the following materials characterisation process is proposed:

- Representative samples will be collected from the NAF stockpile at a rate of 1 sample per 50,000 bcm.
- Validation sampling of placed NAF for cover systems of 1 sample per 10,000 m². These samples will be sent to a suitable laboratory for ABA testing as per BPCP-ENV-SOP-01
- Additional monitoring of any NAF ELF / stockpile is proposed and documented in BPCP-ENV-SOP-02, which will include:
 - Visual observations of any seepage discolouration (e.g., Fe staining)
 - Monitoring of seepage and surface runoff.

The management and scheduling of these materials will be managed by:

BPCP-ENV-SOP-02: AMD Material Management

This SOP includes a management process to consider corrective procedures if materials are being placed in the incorrect location.

Soil retention and storage from disturbance within ELF footprints and upon rehabilitation is managed through the Rehabilitation Management Plan (BRL, 2026c) and specifies that the relocation of soil from any of the BPCP sub-areas into other BPCP sub-areas for the purposes of rehabilitation.

7.7 Monitoring

The following monitoring is proposed for materials classification and scheduling.

7.7.1 Compliance Monitoring

No compliance monitoring is required for the assessment and classification of materials with regard to AMD other than the materials will be classified by an appropriate AMD classification system to ensure the material management is appropriate.

Management requirements will be organic, and This Plan will be updated as new information is obtained with the details and management processes being explained in This Plan.

7.7.2 Performance Monitoring

Performance monitoring to manage the risks associated with AMD classification and material scheduling includes:

- Geochemical characterisation of materials (pre-excavation and placement) for AMD risks. Performance Monitoring is discussed in **BPCP-ENV-SOP-01: Rock Sampling and Analysis – Acid Base Accounting (ABA) and Materials Classification**. This performance monitoring is summarised in Table 9.
- Management processes are required to ensure the right materials are placed in the correct location. Performance Monitoring is discussed in **BPCP-ENV-SOP-02: AMD Material management**. This performance monitoring is summarised in Table 9.

Table 9: Performance monitoring summary: Material classification and scheduling

Monitoring Type	Monitoring Frequency	Description
ABA Testing	• Where required to improve confidence in the AMD block model classification, resource RC definition drill program will be undertaken (all non-coal material). Sampling frequency to align with key lithological changes of units >1 m, otherwise 1 m composites are required. • Lower confidence blocks in the AMD model will have infill drilling ahead of operations moving into the mining block.	• On-going assessment of ABA data for reconciliation of AMD Block Models to ensure the correct classification of materials.
Laboratory QA/QC (external)	• At least one CRM and one duplicate or repeat analysed per consignment, and a minimum duplicate rate of 1 per 20 samples.	• BRL to review that data are in alignment with laboratory QA/QC procedure (e.g., duplicates, CRM). • Review to be completed in a timely manner so that any QA/QC issues can be closed out as quickly as possible.
Laboratory QA/QC (internal)	• As per IANZ accreditation (or similar) requirements.	• BRL to review that data are in alignment with laboratory QA/QC procedure (e.g., duplicates, CRM). • Review to be completed in a timely manner so that any QA/QC issues can be closed as quickly as possible.

Monitoring Type	Monitoring Frequency	Description
Material Movement	- Reconcile the actual material tracking data on a monthly basis against that planned on the basis of the ABA Block Model to confirm performance of the planning and operations in achieving approved placement plan. - Undertake periodic daily checks on material movements, against the digital dig plant to ensure NAF and acid forming materials are being moved to the correct destinations.	BRL to ensure operators are following the agreed digital dig plan and placement locations.
Tiphead / stockpile material testing – material placement	Representative samples at a rate of 1 sample per 50,000 bcm will be collected from the NAF ELF/stockpile and tested for ABA to confirm materials are NAF	BRL to ensure ongoing testing is undertaken.

7.8 Standard Operating Procedures

Further details on adaptive management requirements, performance monitoring, are covered in the associated SOPs:

- **BPCP-ENV-SOP-01: Rock Sampling and Analysis – Acid Base Accounting (ABA) and Materials Classification**
- **BPCP-ENV-SOP-02: AMD Material Management**

8.0 ELF Design Objectives - Geochemical

8.1 Introduction

The prevention and minimisation of AMD risks are addressed through geochemical engineering controls integrated into the design of ELFs. These controls are based on proven source control technologies aligned with international best practice guidance (e.g., INAP, 2014; DFAT, 2016). BRL is committed to proactive source control, using ELFs to support long-term environmental stewardship in accordance with INAP (2024) principles for ESE and MFS.

HAF/PAF/Low Risk mine rock will be stored in ELFs that will be constructed and rehabilitated with strategies that focus on reducing AMD risks. AMD risks associated with advective oxygen supply to HAF/PAF/Low Risk materials will be managed through the construction of design elements which reduce airflow. Monitoring programs will validate that advective airflow processes are minimised.

8.2 Engineered Landforms

A number of ELFs are proposed for ESE and MFS. These are shown Table 10 for ESE and MFS. ELFs are subdivided into individual basal sub-catchment areas where seepage reports to a discrete location to be transferred to the active water treatment plant, or at closure by passive treatment.

Figure 7 shows the ELF basal sub-catchments for the ESE sub-area. Figure 8 shows the ELF basal sub-catchments for the MFS sub-area.

Table 10: BPCP engineered landforms and associated basal sub-catchments

Project Area	Basal ELF sub-catchment	Average Height (m)	ELF Average S (wt%)	10 m shell Average S (wt%)
ESE	BV-ELF	10.71	0.18	n/a
ESE	BVE	35.1	0.43	0.13
ESE	CON	35.7	0.28	0.13
ESE	NSUL	21.1	0.13	0.13
ESE3	PPG	17.6	0.09	0.13
ESE	WWH	59.7	0.38	0.13
ESE	ESC	19.5	0.34	0.13
MFS	MSR1	14.5	0.12	0.16
MFS	MSR2	12.6	0.12	0.164
MFS	MSR3	12.6	0.12	0.111
MFS	MSR4	12.6	0.12	0.057
MFS	MSR5	19.1	0.12	0.047
MFS	MSR6	10.1	0.12	0.047
MFS	MSR7	11.9	0.12	0.047
MFS	MDC1	9.0	0.049	0.047
MFS	MDC2	6.4	0.049	0.047
MFS	MSR8	18.4	0.14	0.052

Project Area	Basal ELF sub-catchment	Average Height (m)	ELF Average S (wt%)	10 m shell Average S (wt%)
MFS	MSR9	12.7	0.14	0.052
MFS	MSR10	8.4	0.14	0.052
MFS	MSR11	6.6	0.28	0.116
MFS	MSR12	7.8	0.28	0.116

Blue cells: NAF ELF basal sub-catchments (NSUL, PPG, MDC1, and MDC2).

n/a – not available

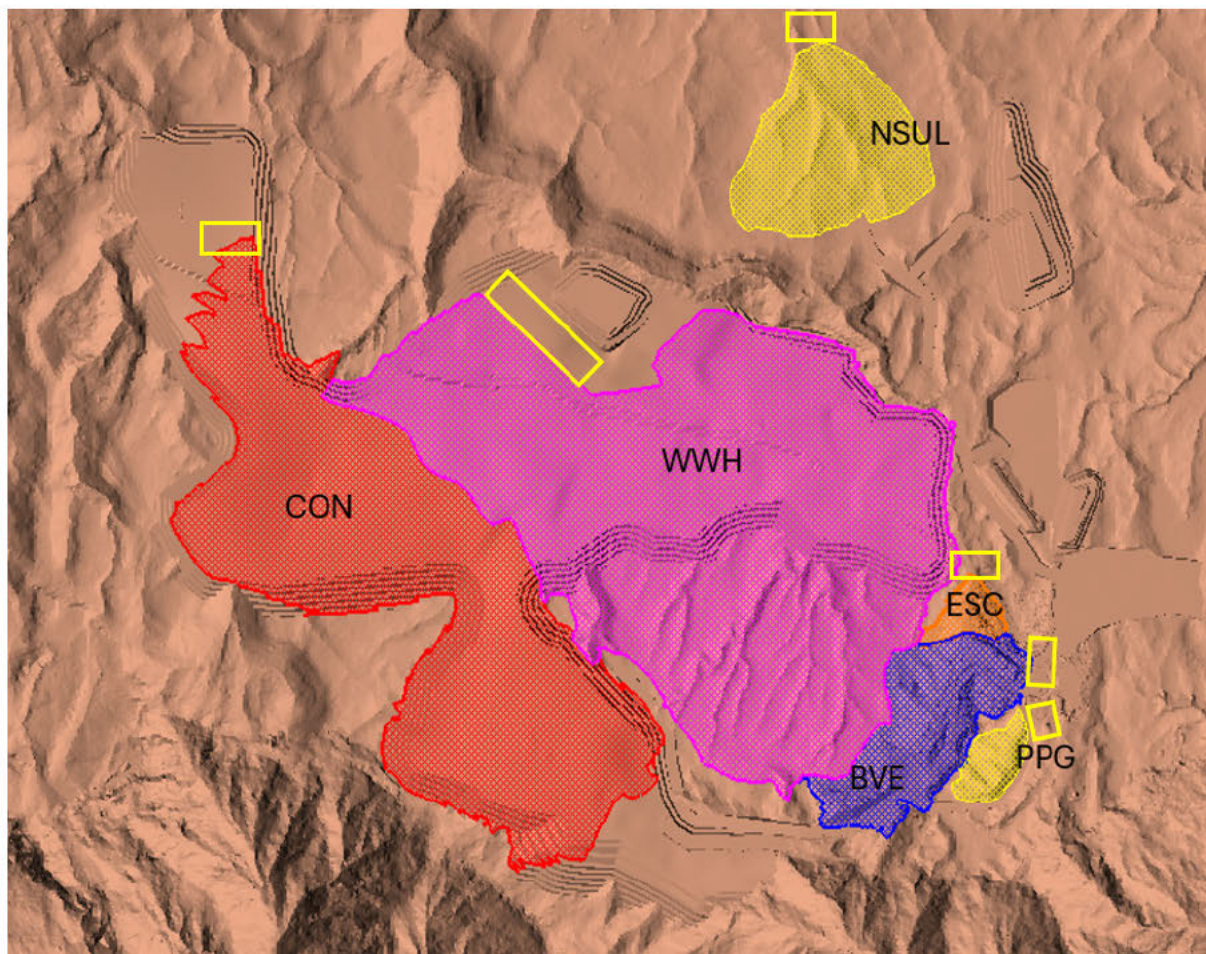


Figure 7: ESE ELF basal sub-catchments and MSR locations (yellow boxes).

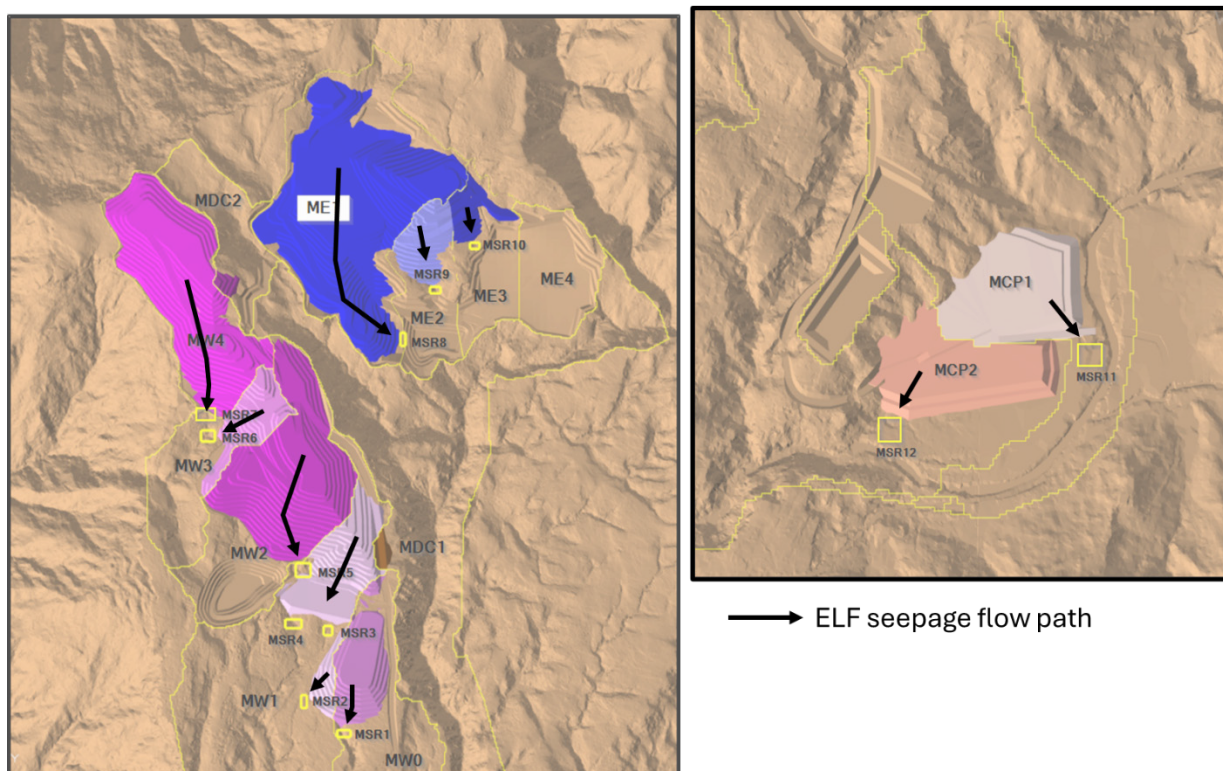


Figure 8: MFS ELF basal sub-catchments and MSR locations (yellow boxes)

8.3 ELF Design Objectives

Table 11 provides a summary of the ELF design objectives that are required for the management of waste rock to prevent and minimise AMD impacts. This Plan will be updated prior to the Construction and Operational Phases commencing and then in accordance with the PDCA adaptive management cycle and document review requirements as listed in Section 17.0. This allows for adaptive improvement of proposed management measures to align with improvements in baseline geochemistry and ABA block modelling and mine scheduling.

Table 11: ELF Design objectives and management measures

DESIGN FEATURE	DESIGN OBJECTIVES
Foundation Preparation and Earthworks	- Underground workings will be managed in accordance with the Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2016. - Mapping of the ELF footprint to ensure there are no direct pathways to underground workings such that ELF seepage drains to these workings and then discharges to the natural environment. Where these workings are identified and could be pathways for AMD, they will be sealed to prevent seepage loss to the receiving environment. A standard operating procedure (SOP) will be developed for this process (BPCP-ENV-SOP-03). - Clean water diversion to minimise water/rock interaction during construction and minimise the volumes of water requiring treatment. - Any topographic surface level seeps emanating from within the footprint of the ELF will be directed into basal underdrainage network. - NAF will be used as basal materials to minimise PCOC mobilisation due to seepage of water through these materials that could contribute to increased solute concentrations. - Construction of a basal underdrainage network to minimise water/rock interaction and reduce uncontrolled seepage pathways to ensure waters report to designated locations for management/treatment. - Construction of sediment ponds to flood the underdrain(s), provide an oxygen ingress barrier, and be available for passive treatment at closure (if required).
Clean Water Management	- Clean water diversion to minimise water/rock interaction and minimise the volumes of water requiring treatment. - ELF design to shed water as quickly as practical to reduce infiltration. - Compaction of final PAF surfaces (batter slopes by dozer) to shed water. Noting that compaction of NAF is to be avoided if lateral seepage will report to the batter slope. - Restrict/prevent ponding of water on the ELF footprint to reduce net percolation.
Materials Management	- Development of a material schedule and management SOP. - Where practicable, minimise time between blasting and placement of PAF/HAF materials in the ELF. - Ensure blasting generates materials that will create matrix supported materials rather than generating coarse materials that will create clast supported materials that will enable advective oxygen flow. - The SOP will ensure the correct materials are available and are placed in the correct location. This will be completed for all stages of mine planning, ideally avoiding a double handle of materials and limiting the amount of time that PAF materials are exposed before being covered. This will include topsoil and NAF scheduling for progressive rehabilitation. When additional NAF material is available, progressively cover the PAF lifts internally within the dump to minimise oxidation.
Lift Height	- Commence construction of new ELFs using a 2-5 m lift height and validate that oxygen ingress is limited to diffusion and no advective oxygen ingress occurs. A default height of 3 m is proposed as the starting height. - Operate low tip heads and confirm that advective airflow processes are minimised. - Undertake studies to confirm whether higher lifts (e.g., > 5m) can be used, yet advective oxygen ingress is prevented and diffusion of oxygen is limited to ~10 m horizontal depth into the ELF. - Confirm grainsize segregation does not occur via tip head inspections.

DESIGN FEATURE	DESIGN OBJECTIVES
	Ensure compaction of lift running surfaces to minimise advective airflow using traffic management procedures.
Encapsulation	- Placement of PAF and Highly acid forming (HAF) waste rock in the core of the ELF surrounded by low risk (lower sulfur materials) and then NAF materials. - Avoid PAF and HAF being placed on the outside edge of each lift during ELF construction. - Ensure a minimum of 1 m thickness of NAF is placed over PAF materials before soil placement. Based on mine scheduling a thicker NAF layer may be achievable. - Ensure a 10 m low sulfur shell is constructed around the ELF perimeter. This will include the NAF layer.
Geochemical Controls	- Limestone dosing to the ELF materials will be undertaken: 1.16 kg CaCO₃/tonne of waste rock - Undertake trials to optimise limestone dosing (e.g., higher application rates in the oxidising outer sections of the ELF and lesser rates in the core of the ELF).
Geotechnical Stability	Long term geotechnical stability is required to ensure ELFs are safe and stable. Stability is required to ensure that PAF materials will not be exposed in the long term, which could lead to AMD.
Cover System	- Develop and install a final rehabilitated cover system to limit net percolation and oxygen flux. - Measure cover system performance in regard to oxygen, temperature and water flux.
Progressive Rehabilitation	- Ensure detailed design incorporates sympathetic landscape design whilst meeting geochemical design constraints, which should be undertaken by a suitably qualified and experienced person (SQEP). This should include, for instance, backfilling of highwall bases with NAF and strategic use of vegetation direct transfer (VDT) for ecological purposes and erosion and sediment control. - During construction of the ELF, undertake progressive rehabilitation in accordance with the rehabilitation objective and Rehabilitation Management Plan. - Monitor placement of NAF, soils, and vegetation. - Develop engineered water diversion structures on the ELF to reduce surface flow velocity. - Revegetate surfaces in line with closure domain objectives and retain the integrity of the ELF slope to minimise oxygen and water ingress into the ELF and sediment loss from the ELF.
Performance Monitoring	- Geochemical characterisation and quality assurance / quality control (QA/QC) - As built ELF construction including material placement ABA data - Grainsize segregation and lift height - Compaction of running surfaces - Limestone material addition. - Oxygen ingress depth - Net percolation rates (as measured by seepage flow rates) - Seepage water quality
Sign-off	- Confirmation that final landforms (ELFs and water management infrastructure) are acceptable for closure requires sign-off by a SQEP. - Confirmation that final landforms are geochemically stable at closure and water treatment is appropriate requires sign-off by a SQEP.

8.4 ELF Design - Controls and Management Measures

Proposed controls as identified in the risk assessment to mitigate the potential effects associated with AMD classification and scheduling are summarised below. These design considerations apply to ELF and EFAs as explained in this section.

8.4.1 Planning

Detailed mine design and planning of each ELF and EFA is required prior to operational activities starting. This will be undertaken by the BRL Mine Engineer.

8.4.2 Foundation Preparation and Earthworks

The following management processes will be undertaken for all ELFs and EFAs constructed at MFS, ESE, and UWHR:

- Mapping of the ELF/EFA footprint during construction to determine if direct pathways to underground workings such that ELF/EFA seepage could drain to these workings. For instance:
NSUL NAF ELF footprint has been mapped (BRL, 2024c), which confirmed no direct connection to the Sullivan underground workings in the area of NSUL, however a small area within the southern polygon of the central ELF identified numerous cracks and collapsed areas with connections to the workings.
- Any natural seeps will be identified during foundation mapping so that these waters can be managed / controlled as cleanwater where practicable.
- Where these workings are identified and could be pathways for AMD, they will be sealed to prevent seepage loss to the receiving environment from the ELF/EFA footprint. **BPCP-ENV-SOP-03** addresses the management of these underground workings.
- Clean water upstream of the ELF/EFA could be piped or drained around the facility as a management option during the operational phase of the mine to minimise water/rock interactions.
- Any topographic surface level seeps emanating from within the footprint of the ELF will be directed into basal underdrainage network.
- Basal lift materials will be NAF where they are likely to be in contact with seepage along the ELF floor.
- Prior to construction of the first starter lift, ensure a drainage pathway (underdrain) is created so that any seepage from the ELF/EFA is directed to a few locations. The purpose is to avoid uncontrolled diffuse flow of AMD seepage. The outflow of the underdrain needs to be designed by a SQEP to prevent oxygen ingress into the ELF/EFA.
- Materials used for the underdrain will be inert NAF materials and be sized to provide adequate permeability for the designed underdrainage flows. This will be designed by a suitably qualified and experienced engineer.
- At the base of in-pit ELFs, the lower conductivity rock mass will promote seepage to preferentially follow the coal floor/pit floor surface. Sub-ELF underdrains and perimeter drains

will be cut into the bedrock above the phreatic surface to control seepage flow paths and direct seepage to water management structures.

- Ensure there is sufficient space for the construction of Collection ponds to be constructed at the base of the underdrains once the ELF batter slopes achieve a certain height above the seepage point to ensure the underdrain remains flooded (to prevent the ingress of oxygen). If permanent saturation of the underdrain is not possible then a piped u-bend may be required through the toe bunds.
- Consideration will be given to the potential for Collection ponds to be repurposed as passive treatment systems for ELF seepage at mine closure if this is required. Collection ponds need to remain flooded to ensure the underdrains do not become pathways for airflow.

8.4.3 ELF Water Management

Water flow through materials can mobilise stored acidic oxidation products and other PCOC. The following is recommended for ELF water management:

- Diversion of clean run-on water from upslope areas away from the ELF.
- Design of the ELF batter slopes and running surfaces to shed water as quickly as possible.
- Design running surfaces to grade gently back down towards the centre of the ELF (or away from ELF batter slopes) to connect with the haul road (drainage path off the ELF).
- Maintain a well graded drainage system along roadways used during ELF construction that is appropriately sized to minimise erosion.
- Where practicable, avoid ponding of water on waste rock (e.g., avoid sediment sumps on ELF surfaces).
- Compaction of the ELF running surfaces during operations to shed water and minimise infiltration of rainwater thus reducing the volume of seepage water.
- Flattening out any paddock dumped materials and ideally wheel roll or compact to allow them to shed water before significant rainfall events.

Further details on water management for the BPCP are covered in the AMD Water Management Plan (BRL, 2026a) the Erosion and Sediment Control Plan for Land Disturbance Activities (BPCP-ENV-PLN-013) and the Water Infrastructure Design Plan (BPCP-ENV-PLN-012).

8.4.4 Groundwater Management

ELFs will generate AMD, potentially influencing groundwater quality where seepage is not fully captured. The following comments are provided:

- At the base of in-pit ELFs, the lower hydraulic conductivity rock mass will promote seepage to preferentially follow the coal floor/pit floor surface. Sub-ELF underdrains and perimeter drains will be cut into the bedrock above the phreatic surface to control seepage flow paths and direct seepage to water management structures.
- Seepage from in-pit ELFs to underground workings will be minimal due to sealing of highwalls with low permeability material. A SOP is required for the management of these underground workings (**BPCP-ENV-SOP-03**).

- Post-closure, dewatering of mine pits will cease and groundwater levels will recover to some degree. This will result in reduced surface runoff and increased infiltration in areas where ELF have been constructed, and potentially higher groundwater levels compared to baseline due to groundwater mounding within the ELF.

8.4.5 ELF Surface Water Management

Clean water will be diverted away from ELFs as much as possible to minimise water volumes requiring management and to preserve natural flows within the receiving streams. Surface water within the ELF footprint requires management to prevent erosion of the ELF surface through the design of suitably sized water management structures as detailed in the Water Infrastructure Design Plan (BPCP-ENV-PLN-012) or the Erosion and Sediment Control Plan for Land Disturbance Activities (BPCP-ENV-PLN-013) where runoff / sump discharge reports directly to the natural waterway.

8.4.6 Materials Management

The following materials management processes will be undertaken:

- Develop a materials schedule (and quantities) to ensure the correct materials are available and are placed in the correct location. This will be completed for all stages of mine planning, ideally avoiding a double handle of materials and limiting the amount of time that PAF materials are exposed before being covered. This will include topsoil scheduling. Preliminary mine schedules are provided in Section 6.0 for the MFS, ESE, and UWHR sub-areas.
- Where practicable, BRL will minimise the time between blasting and placement of PAF and HAF waste. This will reduce the oxidation of sulfide materials.
- Ensure the running surfaces are compacted to minimise vertical rise of oxygen through the lift surfaces by advective processes.

8.4.7 Lift Height

It is recommended that the ELF lift construction process and the height of end-tips is designed to prevent grainsize segregation and minimise advective flux of oxygen. Research has shown that tipheads <4 – 6 m do not generate grainsize segregation (MWM, 2026j), which reduces the risk of advective oxygen flux.

However, waste rock placement strategies and tiphead height will be specific to the project materials, the equipment used, and the climate. The following approach is proposed:

- Extensive paddock dumping will be avoided as this can lead to ponding of water, stability risks, and increased saturation of materials during wetter periods.
- Commence construction using a 3 m lift height and confirm that grainsize segregation does not occur. This can be increased to 5 m provided advective airflow processes are minimised (see Section 13.0, which explains the additional work that is required to validate this opportunity).
- Complete trials and performance monitoring to deliver best practicable outcomes.
- Undertake studies to confirm whether higher lifts can be used (e.g., >5 m) yet advective oxygen ingress is prevented, and diffusion of oxygen is limited to ~10 m horizontal depth into the ELF.

- Undertake performance monitoring to confirm depth of oxygen ingress aligns with proposed design objectives of < 10 m horizontally into the ELF.
- Confirm that segregation does not occur for different materials at different tiphead heights. This will be undertaken by:
 - Visual observations (daily to weekly) of active tipheads by site supervisors (Figure 9) to confirm that materials are matrix supported rather than clast supported (in general) as explained in Table 12.
 - Regular (monthly) drone flights to record tiphead material structure to avoid health and safety issues of accessing tipheads. Photographic processing software to be used to record grainsize. This provides quantitative data for subsequent assessments of ELF performance.

Table 12: Clast vs matrix supported ELF

ELF MATRIX	PROPERTIES	COMMENTS
Clast Supported	Greater porosity Greater air voids Lower density	End-tipping results in the separation of coarser and finer particles creating a material that tends to be clast supported with higher overall porosity
Matrix Supported	Lower porosity Less air voids High density	Low-lift heights prevent material segregation such that the coarser materials are supported by a matrix of finer materials leading to lower porosity. Noting that co disposal of finer materials (e.g., sediment) has the ability to create materials that are matrix supported.

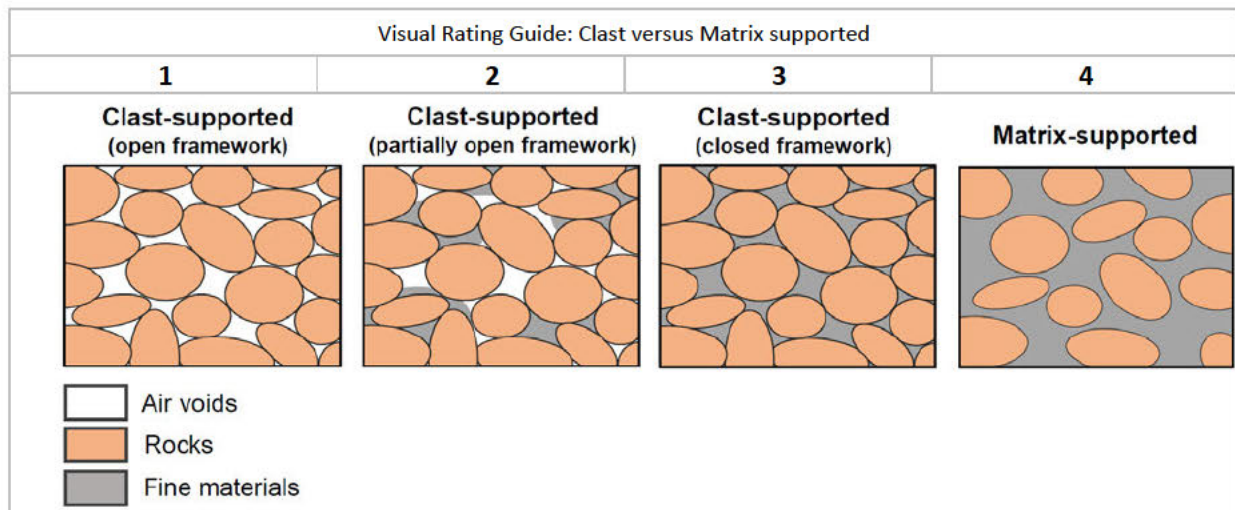


Figure 9: Clast (orange) supported versus matrix (grey) supported materials. Matrix supported materials have fewer pathways for oxygen ingress (oxygen / air voids shown in white).

8.4.8 Encapsulation

The encapsulation of reactive PAF materials with lower risk materials is a proven source control technology to reduce sulfide mineral oxidation. The greater the thickness of low sulfur bearing encapsulating material, the less oxygen diffusion from the atmosphere to the PAF materials assuming that advective and convective airflow is minimised by material placement strategies.

For the BPCP the following encapsulation options are recommended:

- Placement of higher sulfur materials (Low Risk, PAF, HAF materials) towards the centre of each lift in a zone of limited airflow. This prevents higher-risk material from being within the zone of higher oxygen movement near the front batter slopes of the ELF.
- Development of a perimeter bund of dozer flattened waste rock can be undertaken where grainsize segregation has occurred within the ELF. This can then be compacted as a toe barrier. Further work is required to confirm the height and width of any advective toe barrier and whether this is effective at the BPCP. This is discussed in Section 13.0.
- Each ELF will also be constructed using a lower sulfur (NAF) shell that will be a minimum of 10 m thick in the horizontal direction as discussed in Table 11.

8.4.9 AMD Sludge Management

During the Operational Phase of the mine and up until ELFs are fully rehabilitated, AMD sludge, and fines removed from sediment ponds and operational drains will be co-disposed within the ELF.

Water treatment sludge from the WTP or from the passive treatment systems from the MFS sub-area is planned to be placed within:

- ELFs in the MFS sub-area, until such time all MFS rehabilitation is complete; or
- ELFs in the ESE sub-area, until such time as all ESE rehabilitation is complete; or
- The Millerton ELF in the Stockton sub-area.

Water treatment sludge from the WTP or from the passive treatment systems from the ESE sub-area is planned to be placed within:

- ELFs in the ESE sub-area, until such time as all ESE rehabilitation is complete; or
- The Millerton ELF in the Stockton sub-area.

Disposal is dependent on geotechnical stability associated with sludge and fines within backfill and will occur by two methods:

- End tipped during normal waste operations.
- Disposal cells constructed within ELF surfaces which are backfilled with AMD sludge (Figure 10).

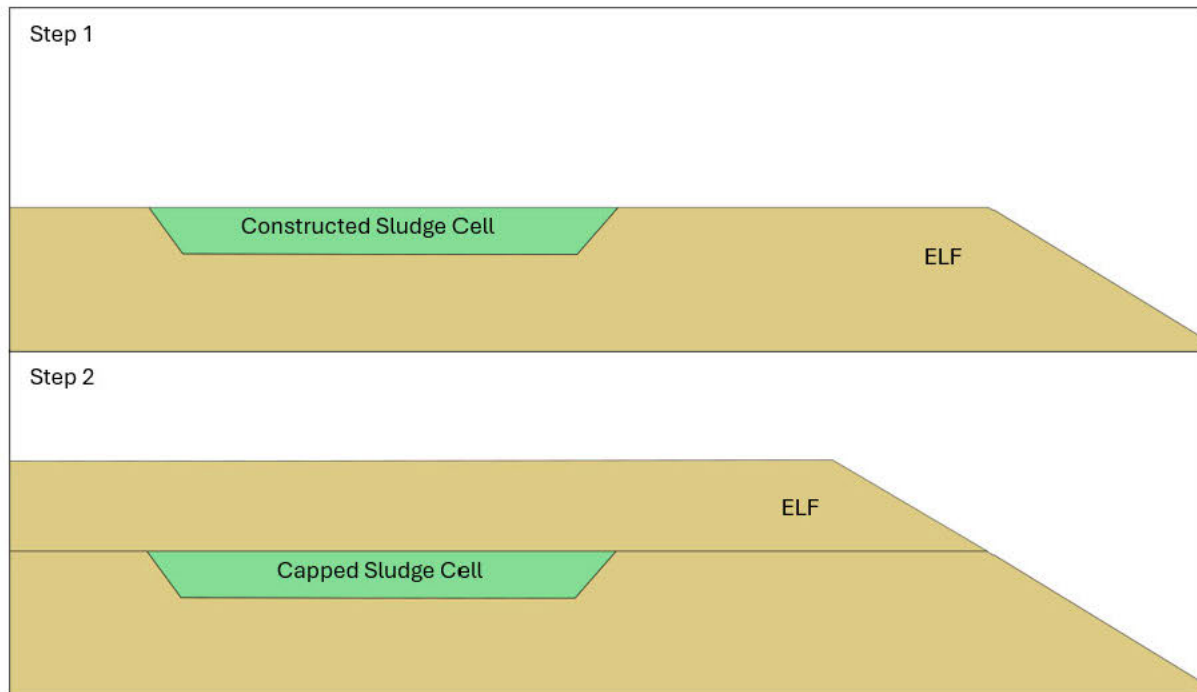


Figure 10: Intra-ELF sludge disposal.

Greater quantities of AMD sludge will be generated in the operational and active closure phases of the project when acidity loads are higher. Contributors to AMD sludge quantity include TSS and AMD (Fe, Al, calcium carbonate (CaCO_3)) as shown in Table 13.

Table 13: Mine phases and AMD treatment sludge quantities

PHASE	TREATMENT METHOD	TSS CONTRIBUTION	AMD CONTRIBUTION	SLUDGE QUANTITIES (WET)
Construction Phase	Portable active treatment systems	Moderate	Low	Moderate (10,000 to 20,000 m ³ /yr) ¹
Operational Phase	Active water treatment	High	High	High (~40,000 m ³ /yr) ²
Active Closure Phase	Active and passive water treatment	Moderate to low	High decreasing to moderate	High decreasing to moderate (~16,000 m ³ /yr decreasing) ³
Post Closure Phase	Passive water treatment	Low	Moderate	Moderate (~1,000 m ³ /yr) ⁴

Note: General annual estimates of sludge quantities are provided from the water and load balance models for BPCP sub-areas ESE and MFS (MWM, 2026a,b) for the construction, operational, active closure, and post closure phases.

1. Based on 3 wt% solids for the 2-year Construction Phase.

2. Based on 12 wt% solids for the Operational Phase

3. Based on 12% solids for FY2045

4. Passive treatment estimated to be >20% solids.

It is anticipated that high quantities of pond fines will be generated as part of sediment and erosion control procedures (e.g., check dams, silt ponds, active working pits, etc) during the operational phase (as well as to a much lesser extent during the construction phase). These pond fines materials may contain potentially acid forming (PAF) materials but will not contain WTP or PTS AMD sludge.

The materials will be disposed into pond fine disposal areas, a simple bunded cell built in the advancing tiphead of the ELF at ESE and MFS, which is the generally accepted approach for the management of these materials. There is no specific designation for where the materials will be placed, other than within an ELF (where sediment loss from the facility is controlled) unless geochemical analysis dictates otherwise as part of the PDCA cycle.

A SOP (**BPCP-ENV-SOP-05**) for the AMD sludge disposal within ELFs is supported through the PDCA cycle including performance water quality monitoring and reporting. The SOP includes recording of AMD sludge volumes and disposal locations within any landforms. Such data will be required for sign-off at closure by a SQEP.

8.4.10 Geochemical Controls

Geochemical controls will be undertaken for the BPCP in accordance with the PDCA cycle:

- Limestone will be applied to the running surfaces of each lift of the ELF or to each truckload of waste rock to support the neutralisation of acidity (estimated to be ~50%) associated with AMD within the ELF seepage domain.
- The addition of limestone to the running surface will provide the greatest interaction of NP with limestone due to the lower permeability of the running surface and lateral seepage of NP.
- The following dose rates are proposed:
 - ~7.5 kg limestone/m² per 3 m lift, in line with the dose rate for the Barren Valley ELF; or
 - 1.16 kg/tonne of waste rock.
- The dose rate could be adjusted for ELFs that have lower sulfur content or higher ANC (i.e., scaling). Further work is required to optimise the limestone dose rate. This is discussed in Section 13.0.

8.4.11 Cover System

A cover system is proposed for ELFs to minimise the amount of oxygen flux and water net percolation (NP) as well as providing a stable revegetation medium. Modelling has been undertaken for the proposed cover design where:

- NP is expected to be ~40%.
- Oxygen flux is expected to be 164 g/m²/yr of oxygen, which is equivalent to 2.7 tonnes of acidity/ha/yr.
- Net percolation rates and oxygen flux rates require validation through site specific studies (which are summarised in Section 13.0 – Further Work). These trials will be undertaken during the first two years of the BPCP once parts of the ELFs are rehabilitated. The following work will be undertaken:
 - Cover system field trials are initiated to validate modelling results for net percolation and oxygen flux are representative of ‘as built’ conditions in the field.
 - Full-scale constructed cover system be instrumented to allow for direct performance monitoring and confirmation the system is performing to expectations on ‘as built’ landforms.

Any variance from the design objectives (regarding NP and oxygen flux) needs to be considered from an adaptive management approach to ensure closure objectives can be achieved.

Each ELF will have a NAF cover layer of 1-3 m that is part of a lower sulfur shell (Figure 11 and Figure 12). This lower sulfur shell is a 10 m wide zone that will minimise longer term acidity loads and the duration of active treatment. Further work is required as part of the detailed design phase to confirm the maximum thicknesses and sulfur content of this zone (as detailed in Section 13.0).

8.4.12 Progressive Rehabilitation

Progressive rehabilitation is a significant management measure to minimise the impact of AMD long term.. The following approach will be undertaken:

- The outer batter slope will be dozed down and recontoured every 15 m, that being the inter-bench height, to final closure domain landform design and will be capped with a minimum of 1m of NAF material to prevent oxygen and water ingress.
- Topsoiling and revegetation will occur as soon as reasonably practicable after the NAF lift is placed, effectively providing the final outer slope cover system that will mitigate long term oxygen flux through this surface.
- Rehabilitation and revegetation activities are covered by the Rehabilitation Management Plan (BRL, 2026c).
- The detailed design stage will incorporate sympathetic landscape design whilst meeting geochemical design constraints. This should include, for instance, backfilling of highwall bases with NAF and strategic use of vegetation direct transfer (VDT) for ecological purposes and erosion and sediment control. The work needs to be completed by a SQEP.

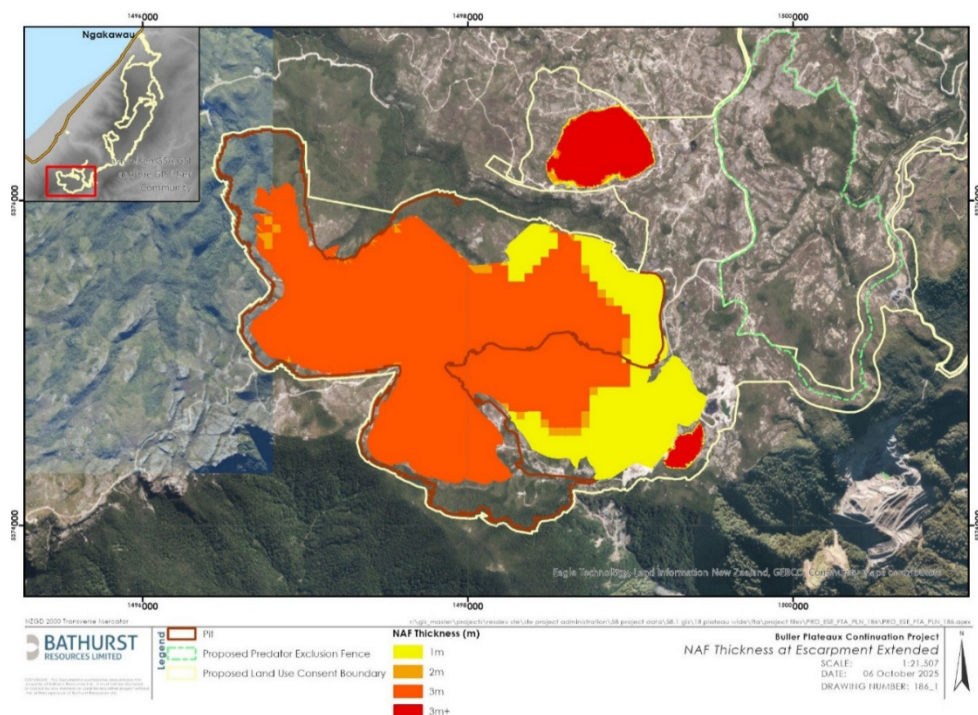


Figure 11: ESE NAF cover design thickness.

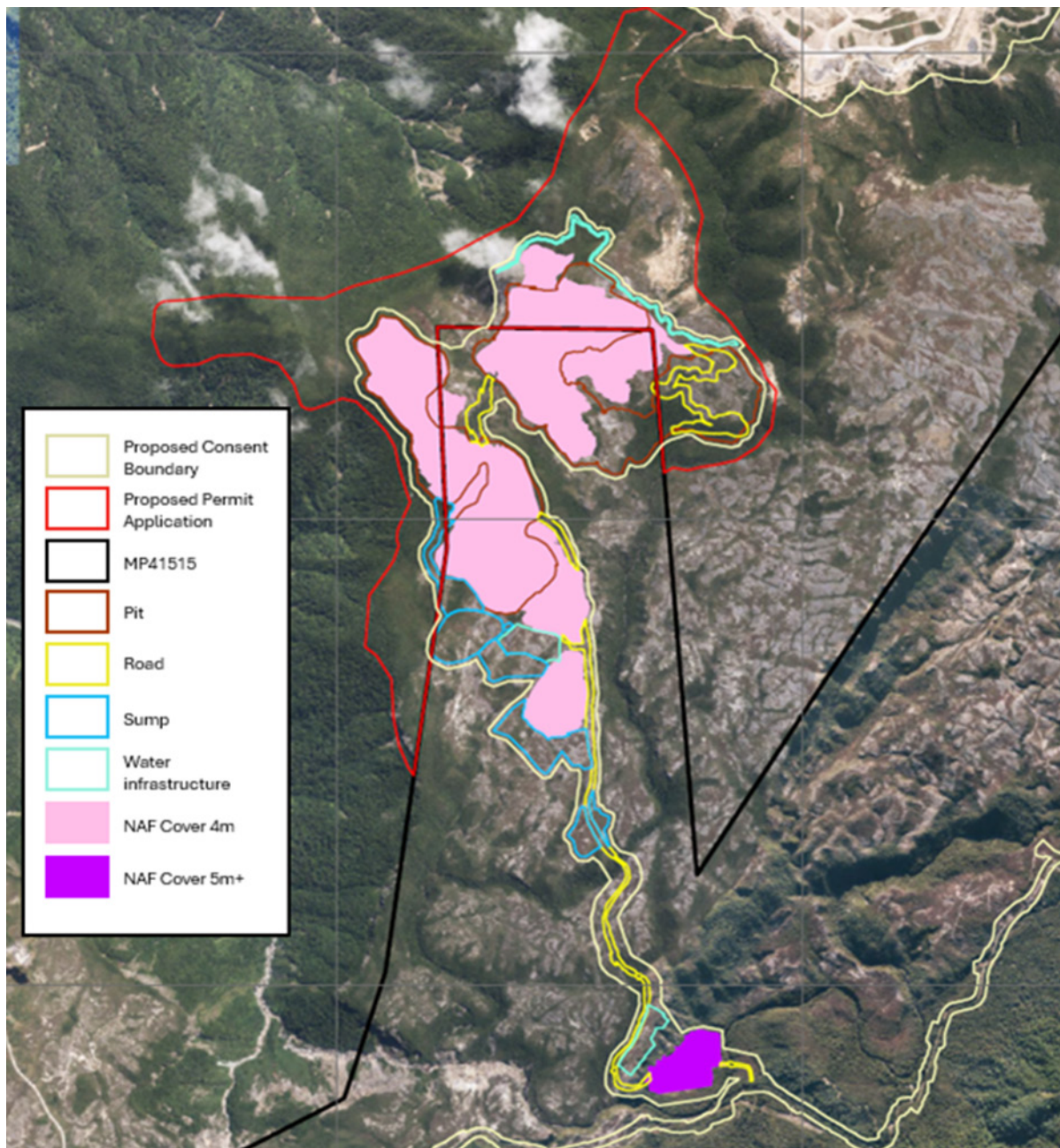


Figure 12: MFS NAF cover design thickness.

8.5 Monitoring

The following monitoring is proposed for the proposed ELF.

8.5.1 Compliance Monitoring

No geochemical waste rock compliance monitoring is required for the construction of the proposed ELFs, however performance monitoring will be undertaken in line with good international industry practice. Compliance monitoring is undertaken through water quality monitoring to meet the overall water quality objectives for the site and is discussed in detail in the AMD Water Management Plan (BPCP-ENV-PLN-010). Performance monitoring for the ELF construction is described in the next section.

8.5.2 Performance Monitoring

Intended performance monitoring for the BPCP to manage the risks associated with ELF Design through the PDCA cycle for adaptive management includes:

- Construction QA/QC is required during the construction of the ELF to ensure the facility has been constructed as per the basis of design (Table 14).
- An assessment of grainsize segregation will be undertaken to validate that the lift height is appropriate. If grainsize segregation is occurring the lift height will be reduced or a perimeter bund will be established including the construction of a lower permeability running surfaces.
- Reconciliations will be conducted to ensure that limestone is at the prescribed rate presented in this management plan (e.g., 7.5 kg limestone/m² per 3 m lift).
- Oxygen (and on occasion, temperature monitoring) will be used to confirm that the construction process excludes advective airflow into the core of the ELF (e.g., < 5% oxygen beyond 10 m horizontally) with a clear oxygen diffusion profile. Through the PDCA cycle, adaptive management processes will be implemented to achieve closure objectives, including but not limited to modification of dump strategy, additional internal compacted NAF layers, or differing limestone dose rates if required. Noting the key monitoring objective is to confirm that advective ingress into the core of the ELF does not occur (Figure 13) and water ingress into the profile is minimised.

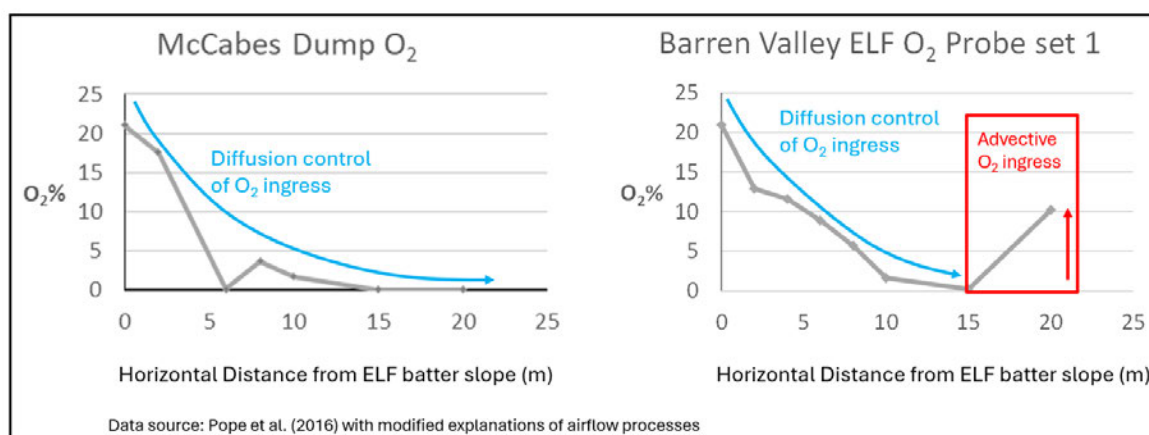


Figure 13: Oxygen ingress process processes

NB: Advective O₂ ingress identified in red box in Figure 13 is expected to be caused by an alternative oxygen flow path to what is measured at the rest of the diffusion-controlled probes.

- NP rates will be monitored to confirm that NP is appropriately modelled. Instrumentation, e.g., lysimeters will be installed during dump construction so monitoring can occur once rehabilitation is completed. If the modelled NP rates are not achieved, then further work is required to validate the treatment requirements and effects of the ELF seepage on downstream waterways at closure. Higher NP rates might require a longer active treatment phase.
- Monitoring of water quality and flow rate and geotechnical integrity at the discharge of the ELF underdrain will assist in understanding ELF geochemistry, water quality effects and confirm net percolation rates.

A summary of performance monitoring including frequency, is provided in Table 14.

Table 14: Performance monitoring summary

Monitoring Type	Monitoring Frequency	Description
Monitoring to confirm underground working seals are performing to design expectations.	Monthly sampling to establish baseline and to support performance monitoring	Monitoring of downgradient adits for flow and water quality.
Underdrains are flooded	Monthly	Visual inspections to confirm underdrains remain flooded by the sediment pond at the toe of the ELF.
Tiphead height monitoring	- Daily to weekly by site supervisors when tipheads are in operation. - GPS tracking of fleet.	- Visual inspections of tiphead height and whether grainsize segregation is occurring (matrix versus clast supported). Record information in a database. - GPS tracking will enable exact heights to be maintained.
Grain size segregation	Weekly when tipheads are in operation.	Monthly drone images that are assessed using software to determine grainsize provided flying conditions are suitable.
Compaction of running surfaces	Weekly by site supervisors	Ensure running surfaces are well compacted by vehicle movement.
Net Percolation	Weekly sampling and then reduced sampling intensity once results have stabilised	Operate trials for several years to understand NP through the cover system.
Oxygen Flux – advection	Monthly	- Install nested oxygen tubes at 2, 4, 8, 10, 15, 20, and 30 m horizontal intervals to confirm advective oxygen ingress processes are minimised. These systems will be installed into the first lift and then every 3 lifts (e.g., every 9 m) to confirm that the construction process is working. Multiple O₂ nests may be required to provide operational confidence that advection is excluded with monitoring frequency higher at the start. - Once confidence in the ELF construction process to minimise oxygen ingress is confirmed, the monitoring frequency can be reduced.
Oxygen Flux – Diffusion through the cover system	Install oxygen sensors through the cover system into the waste rock to verify model assumptions	Operate trials for several years to understand oxygen ingress through the cover system.
Seepage flow rates (underdrains)	Continuous flow (e.g., stage height coupled with V-notch weir)	Determine flow from underdrains to confirm model expectations for NP.
Seepage water quality (underdrains)	- Monthly for metals - Continuous EC and pH	Determine water quality for ELF seepage and that it confirms model expectations.
Underdrain structural integrity	Monthly or after high rainfall event.	Determine underdrain scouring or blockages have not occurred.
Groundwater monitoring	Quarterly	Monthly monitoring of groundwater quality downgradient of each ELF to confirm ELF design assumptions are correct. Monitoring

Monitoring Type	Monitoring Frequency	Description
		locations are provided in the Water Management Plan.
Limestone quality	Quarterly	- QA/QC testing to confirm limestone specification. - Reconciliation of material movements versus limestone quantities delivered to confirm limestone dose rate.
ELF Long Term Stability (Erosion)	Variable (as ponds are cleaned out).	- Confirm erosion and sediment loss is minimised by hydroseeding. Validate erosion rates as a function of sediment pond clean-out rates for new ELF areas. - Inspect lined drains on the ELF are performing to design criteria. - Inspection ELF outer edge surface and rehabilitation success.

8.6 Standard Operating Procedure

Further details on management processes and performance monitoring will be covered in the associated SOPs that will be developed prior to Construction and Operational Phases commencing in accordance with the PDCA cycle for adaptive management. These include:

- **BPCP-ENV-SOP-03:** Sealing of underground workings.
- **BPCP-ENV-SOP-04:** ELF construction requirements and QA/QC.
- **BPCP-ENV-SOP-05:** AMD Sludge Disposal within ELFs
- **BPCP-ENV-SOP-06:** ELF cover system construction requirements

10.0 EFA Design Objectives

10.1 Haul Road Engineered Fill Areas

There are Engineered Fill Areas (EFA) associated with the construction of the UWHR between Stockton and the ESE sub-area and the MFS Access Road (Figure 2). These EFA contain significantly smaller volumes of material compared to the ELFs and source-pathway-receptor (SPR) analysis (e.g., MWM, 2026t) has demonstrated that effects of these minor fill quantities are unlikely to have a significant effect on receiving streams if appropriate engineering controls are undertaken.

During the detailed design phase, where volumes of BCM fill is required to construct the road (e.g., > 10,000 m³ or > 2 m in depth), further mitigation may be required to reduce the potential for downstream impacts due to seepage from these structures. Low permeability layers (LPL) constructed out of available materials or Geosynthetic Clay Liners (GCLs) will be placed on top of bulk fill to reduce the ingress of meteoric water into the material and reduce advection of air into the structure. Where inert rock sources are economically available these may be used in place of BCM for engineered fill to eliminate the risk of AMD.

10.1.1 UWHR Engineered Fill Areas

Numerous fill areas are present along the UWHR alignment, however, many fill areas are of small volume or thin covering. Table 15 presents the major fill areas (greater than a 2 m depth) along the UWHR that will use BCM as the fill material and the relevant surface water monitoring location to assess water quality from the fill. The location of fill sections, pending detailed design, with a volume greater than 10,000 m³, which is a nominal value used to identify sections along the alignment that pose a higher AMD risk to water quality, are noted as section numbers 4 and 6, identified by the red circles.

Table 15: UWHR engineered fill areas

REPORTING MONITORING SITE	IDENTIFYING FILL SECTION NUMBER	FILL VOLUME (m ³)
BUR.L1	1	4,232
	2	2,412
	3	1,029
	4	10,628
	5	2,835
	6	38,414
17W ¹	7	1,605
2W (Smokestack)	8	3,629
	9	1,430
	10	4,796
	11	5,251
	12	1,556

¹2W (Smokestack) reports through to 17W, however the 17W figures have been presented separately for clarity.

BCM fill volumes includes granite as being necessary to make up the required fill. Sections presented in bold and red represent fill volumes greater than 10,000 m³ as shown by circles

Table 16 presents the anticipated total quantities of backfill required to achieve road design, identifying a total of 76,328 m³ of BCM and 130,922 m³ of granite. No BCM will be used north of Section 12 (Figure 14) for fill, rather granite will be used.

Table 16: UWHR fill volumes

REPORTING MONITORING LOCATION	LITHOLOGY OF FILL MATERIAL	FILL VOLUME (m ³)
2W (Smokestack)	BCM	24,368
	Granite	94,263
17W ¹	BCM	7,928
	Granite	2,755
BUR.L1	BCM	44,032
	Granite	33,904

¹2W (Smokestack) reports through to 17W, however the 17W figures have been presented separately for clarity.

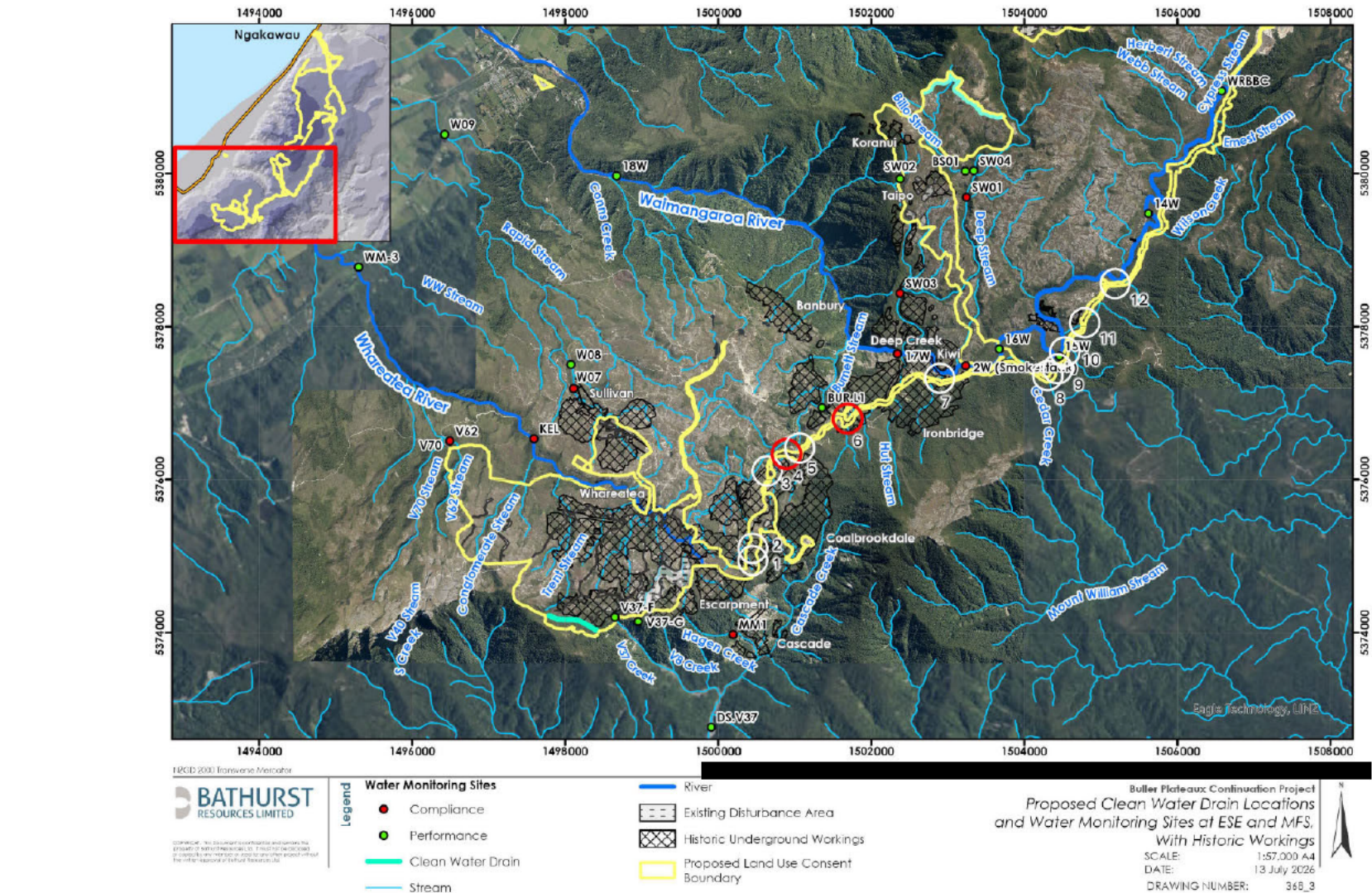


Figure 14: UWHR major fill section localities

Coloured circles (white and red) relate to data presented with red circles show areas with $> 10,000 \text{ m}^3$. Pink dots relate to water quality monitoring locations

The UWHR section north of fill location 12 has granite material used for fill, i.e., no BCM will be used in this section of road.

10.1.2 MFS Access Road Engineered Fill Areas

Fill sections relating to the MFS Access Road include:

- One section of 200 m³, which will report to Smokestack.
- A combined volume of 2,396 m³ will report downstream of Smokestack.

Seepage and runoff from a total of 2,596 m³ of fill areas associated with the MFS Access Road will report to the Waimangaroa River. The major fill sections and the coal stockpile area are illustrated in Figure 15. It is proposed that these fill sections are constructed using NAF materials to minimise the AMD risk. This means that the risk to the receiving environment is likely to be minimal. QA/QC will be required to confirm the placed materials are NAF. Limestone may be added to these materials where the fill area sits does not have downstream management processes (e.g., treatment), which will be assessed by risk assessment processes.

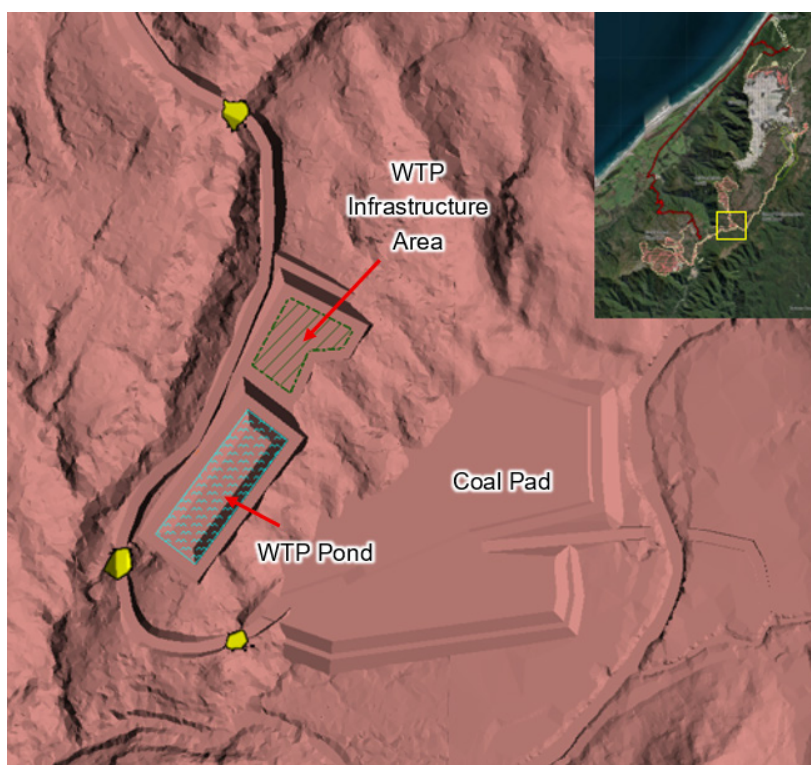


Figure 15: Lower MFS access road fill areas, coal stockpile area, and water treatment plant pad and polishing pond.

MFS engineered fill areas are highlighted in yellow and will be constructed from NAF materials.

10.2 EFA Design Objectives

EFA will be constructed to provide long term stability for the haul road and larger fill areas will be covered in a low permeability layer (LPL) or geosynthetic clay liner (GCL) to minimise potential AMD effects. Detailed design will be completed prior to the commencement of the BPCP Construction Phase.

10.2.1 EFA Construction Process

Due to the low linear volumes and extensive distances involved, suitable components of the BCM sourced from establishing the road alignments will be used locally as bulk fill in road construction. These BCM components will underlie base courses and sheeting (using inert rock types) that will be required to ensure road pavement quality is achieved due to the sandstones not performing well under abrasion and crushing caused by repeated vehicle movements. The compaction requirements for stable road foundations are anticipated to be greater than mine operations backfill ELF's. This will further assist with limiting advection in localised areas of BCM fill along access road alignments.

The construction of fill areas will be by paddock dumping or lifts < 2m high to improve geotechnical stability of the haul road and prevent advective ingress of oxygen.

The construction of the EFAs will be undertaken using: **BPCP-ENV-SOP-07: EFA Construction**.

10.2.2 Low Permeability Layer Cover System

A low permeability layer (LPL) cover system will be installed over large fill areas (> 10,000 m³) as shown in Figure 14,. The objective of this LPL is to reduce water ingress to < 1 x 10⁻⁸ m/s, such that effects are minimised (noting this aligns with previous resource consent requirements for the existing Escarpment Mine permeability requirements). This may require the use of weathered granite from the, or similar materials, or a GCL. LPLs will only be placed beneath road surfaces.

10.2.3 GCL Cover System

A GCL is proposed as a cover system over larger UWHR EFA areas to generate a low permeability layer that will minimise the net percolation and reduce oxygen flux significantly. A review of suitable low permeability layers (LPL) has been assessed previously as a cover system for PAF materials where a GCL was selected over other options (BRL, 2015). A GCL remains the preferred option for the UWHR EFA where materials fill is > 10, 000 m³.

10.2.4 GCL Installation Process

Upon arrival at the site, GCL rolls will be temporarily stored in a dry and protected laydown area to avoid prehydration (ASTM D 5888). The rolls will be visually inspected for any damage, with damaged product set aside for repair or replacement. Inspections will be carried out by the SQEP throughout construction to ensure damaged panels resulting from handling and installation are repaired or replaced.

As each panel is deployed, it will be given an independent panel number, and the manufacturer's roll number and the coordinates will be recorded, enabling tracking of each roll from the manufacturer to its final location. Placement of GCL panels will be with top edge and end laps being in the direction of ground slope. A lap of 300 mm (minimum) will be maintained for edge laps and 500 mm for end laps. Edge and end laps will be treated with a layer of free bentonite. Lapped surfaces need to be clean and free of wrinkles prior to bentonite treatment. Inspections will be carried out by a suitably qualified and experienced engineer throughout construction to ensure the GCL-L panels are installed in accordance with the technical specifications. A sand layer or similar will be installed above and below the GCL as a cushion layer to prevent the GCL from being punctured by large rocks. A management process needs to be developed for the construction of EFA and the installation of the GCL. GCL's will only be placed in

high-risk areas and cover both the road surfaces and batter slopes to prevent ingress of water. Areas will be further investigated during the detailed design phase and in accordance with the PDCA cycle for adaptive management in line with addition geochemical material management information to understand if batter slopes require a LPL.

10.2.5 UWHR Rehabilitation and Closure

At closure, the road width will be reduced and NAF subsurface layer and soil will be placed over the edges of the road to provide a rehabilitated surface.

Closure of the UWHR is discussed in the Mine Closure Concept Strategy (BRL, 2026b).

10.3 Monitoring

The following monitoring is proposed for the proposed EFAs.

10.3.1 Compliance Monitoring

Geochemical compliance monitoring is required for the construction of the proposed EFAs including geological and geochemical ABA classification to ensure that only insitu BCM materials are used (and no Kaiata Mudstone) and to understand the source hazard. Compliance monitoring is undertaken through water quality monitoring to meet the overall water quality objectives for the site and is discussed in detail in the AMD Water Management Plan (BPCP-ENV-PLN-010). Performance monitoring is described in the next section.

10.3.2 Performance Monitoring

Performance monitoring for the BPCP to manage the risks associated with EFA Design includes:

- Construction QA/QC will be undertaken during the construction of the EFA to ensure the facility has been constructed as per the basis of design.
- An assessment of grainsize segregation will be undertaken to validate that the lift height is appropriate. If grainsize segregation is occurring the lift height will be reduced.
- Compaction and long-term erosion performance. Hydrological/hydraulic modelling will be undertaken to allow for appropriate sediment retention device sizing based on catchment hydrology, peak flow calculations, channel/culvert sizing and erosion protection for cutoff drains. This will specify items such as maximum allowable erosion rates, gully/rill erosion thresholds, surface armouring requirements, or post closure storm event design standards during the detailed design phase. The *Erosion and Sedimentation Control Management Plan for land disturbance activities (BPCP-ENV-PLN-103)* specifies further detail in relation to erosion performance.
- Monitoring of water quality and flow rate at the discharge of the EFA to understand water quality effects and confirm net percolation rates.

Table 17: Performance monitoring summary

Monitoring Type	Monitoring Frequency	Description
Lift height and grainsize segregation monitoring	- Daily to weekly by site supervisors when tipheads are in operation. - GPS tracking of fleet. - Weekly observations for grainsize segregation by supervisors	- Visual inspections of tiphead height and whether grainsize segregation is occurring (matrix versus clast supported). Record information in a database. - GPS tracking will enable exact heights to be maintained.
Compaction	Monthly	Compaction of materials is required to develop a geochemically stable EFA. GPS Monitoring of heavy vehicles over the dump, that meets compaction criteria (To be determined), will be evaluated monthly.
EFA Loads	Monthly	Confirm seepage rates and quality from EFA are minimal.

10.4 Standard Operating Procedure

Further details on management processes and performance monitoring are covered in the associated SOP which will be developed prior to construction in accordance with the PDCA cycle for adaptive management:

- **BPCP-ENV-SOP-07:** EFA construction requirements and QA/QC.

11.0 Geotechnical ELF Design

This Section presents a summary of the geotechnical design and stability assessment criteria of the ELFs within the BPCP. The available material parameters used for the ELF design and analysis have been developed based on historical data, field engineering geological mapping, laboratory testing for the local area, and previous investigation reports. A significant library of geotechnical laboratory testing data is available for the neighbouring Stockton mine and this can be used as a cross reference when confirming rock mass and bedding shear material parameters

Table 18 presents the potential geotechnical risks identified for ELFs and the management measures that have been developed to address those geotechnical risks to an acceptable residual risk rating through the BBRA risk assessment.

11.1 ELF Detailed Design Criteria

The BPCP ELFs will be designed to achieve suitable levels of stability in terms of Factor of Safety (FoS) along with managing uncertainties in the designs for which sensitivity analyses are undertaken. A sensitivity analysis allows determination of the 'sensitivity' of the safety factor to variation in the input data variables (material strength parameters and groundwater pressure) which may be critical to the assessment of slope stability.

11.1.1 Static

Guidance on selection of structure importance levels and appropriate return periods for a particular facility is given NZS 1170.0 Structural Design Actions, Table 3.1, 3.2 and 3.3. For the site a design life of >100 years has been adopted, for Structure Importance Level 1. For Structure Importance Level 1 (IL1), it is expected there are low consequences for loss of human life or small to moderate economic, social, or environmental consequences.

Groundwater and surface water have been identified as a potential risk factor for design in previous studies. Therefore, slope stability analysis should allow for variation in groundwater profiles. For the final landform ELFs, assuming the rehabilitated land will be returned to native vegetation a design FoS of 1.3 for static and 1.1 for elevated groundwater cases will be adopted. These criteria for low-risk areas are in general accordance with suggested limit equilibrium criteria accepted in other regions⁵.

⁵ Auckland Council – Code of Practice for Land Development and Subdivision – Section 2 Earthworks and Geotechnical Requirements. Version 1.6, 24 September 2013. Table 2.C.1 Factors of Safety.

Table 18: ELF Design Geotechnical Risks and Management Measures

Risk No.	Risk Description	Cause	Consequence	Risk Rating	Control (Management Measures)	Residual Risk Rating
GEOT1	Incorrect material strength parameters adopted.	- Poor distribution of drill hole data. - Lack of site-specific geotechnical laboratory testing. - Poor laboratory data and/or management of laboratory data leading to incorrect classification.	- Waste materials have lower strength than allowed for in geotechnical analysis, leading to geotechnical failure of ELF. - Overly conservative ELF design geometries adopted, leading to inefficient ELF construction.	Moderate	- Additional exploration / geotechnical drill programs are planned and/or underway to increase geotechnical data resolution / improve confidence level in material parameters. - Use the existing significant dataset from the Stockton mine as a baseline and cross reference material parameters against this. - Regular geotechnical material strength testing to be conducted during mining to ensure the design material parameters are still appropriate.	Low
GEOT2	Incorrect classification of waste material leading to materials being placed in wrong destination	- Geologist assigns incorrect codes to lithology when logging drill core. - Geological block model classifies materials incorrectly. - Poor material management (e.g., dig plan or materials tracking) error.	- Low strength waste materials placed in incorrect area leading to a geotechnical failure of ELF. - Areas of low strength fill create a low strength 'cell' within ELF, leading to geotechnical failure. - Low strength material used to cap the surface of the ELF, causing excessive erosion. Leading to water ingress in ELF.	Moderate	- BRL Core Logging SOP. - Ensure the geological block model is 'ground truthed' during mining to confirm the model conforms with the exposed geology. Updates to be carried out as new geologic information becomes available. - Ensure the geological model is updated as additional data becomes available and mine scheduling / planning is updated accordingly. - Regular inspection of ELF to be conducted during construction to confirm materials are appropriate for their intended use.	Low

Risk No.	Risk Description	Cause	Consequence	Risk Rating	Control (Management Measures)	Residual Risk Rating
					Identified non-compliant material to be relocated where practicable or other mitigation options implemented.	
GEOT3	Hydrological regime within ELF different to that adopted for the geotechnical assessment.	- Porosity of ELF backfill lower than expected. - Differing permeability horizons within backfill are created. - Insufficient compaction of ELF cap allows surface water infiltration. - Ponding of surface water within ELF during construction.	- Elevated and/or perched piezometric pressures lead to additional ELF settlement or geotechnical failure. - Elevated or higher than expected piezometric pressures lead to liquefaction of ELF during seismic events.	Moderate	- Surface water managed appropriately during construction to ensure water does not pond or is not encapsulated within ELF. - Sensitivity analysis of piezometric surfaces will be conducted during slope stability analysis.	Low
GEOT4	Less than adequate ELF construction methods	- Foundation not appropriate to support ELF - Foundation of ELF not sufficiently prepared. - ELF does not receive sufficient compaction.	- Geotechnical failure of ELF due to foundation not being appropriately prepared prior to placement of backfill (low strength material not removed, sloping foundation not benched etc.). - Increased lift thickness or insufficient compaction of backfill resulting in lower bulk density of backfill, leading to geotechnical instability. - Increased lift thickness or insufficient compaction of backfill resulting in lower bulk density of backfill, resulting in a larger volume of waste materials.	Moderate	- ELF Construction Requirements and QAQC BPCP-ENV-SOP-04 to be developed. This SOP will be managed by the Technical Services Department. - Geotechnical inspection and Geological sign off of coal floor / ELF foundation to be conducted prior to placement of backfill. - GPS vehicle tracking system to be adopted to ensure ELF receives sufficient compaction from vehicle trafficking during construction.	Low
GEOT5	ELF construction deviates from	Insufficient survey control.	Design geometry of ELF batters exceeds those appropriate for the materials, leading to geotechnical failure.	Moderate	GPS to be installed in ELF construction machinery to guide operators, ensuring ELF is built to design geometries.	Low

Risk No.	Risk Description	Cause	Consequence	Risk Rating	Control (Management Measures)	Residual Risk Rating
	design geometries.	- As-built ELF geometries not able to be audited due to LTA access. - ELF design not communicated from Technical Services Department to Operations. - ELF design not followed	- Design geometry or ELF batters too conservative, leading to inefficient ELF construction. - ELF does not meet final landform design geometry, compromising mine closure objectives.		- Periodic aerial surveys of ELF conducted to check ELF as-built geometries against design geometries. - Dump Design and Management SOP. - Mine planning meetings to be conducted where ELF designs are communicated from Technical Services to Operations.	
GEOT6	Collapse of shallow historic underground working due to ELF loading	Insufficient in-situ cover between historic underground working and ELF.	- Poor distribution of drill holes leading to LTA understanding of historic underground working location, depth and / or size. Subsidence of isolated areas of ELF during construction leading to operational hazard. - Subsidence of isolated area of ELF causing loss of compaction. - Subsidence of isolated areas of ELF causing surface water to pond. - Subsidence of isolated areas of ELF causing surface water to infiltrate ELF.	Moderate	- Additional exploration / geotechnical drill programs are planned and/or underway to increase geotechnical data resolution and improve confidence level of location and size of historic underground workings. - Probe drilling in areas of suspected historic underground workings prior to ELF construction to prove location of historic underground working and / or if sufficient in-situ cover can be achieved. - Geotechnical inspection and sign off of coal floor / ELF foundation to be conducted prior to placement of backfill.	Low

11.1.2 BPCP Seismic/Earthquake Setting

The BPCP is located in an area of moderate to high seismicity compared to other regions of New Zealand in terms of Peak Ground Acceleration (PGA). According to the GNS Active Faults Database the closest active known fault to the site is the Lower Buller Fault, located approximately 5km due west. This fault has a very low recurrence interval reported (>5000 years). Other nearby faults include the Glasgow, Inangahua and Lyell Faults.

Under NZS 1170.0, for structures presenting a low degree of hazard to life and other property and low consequence (IL1) for a 100-year design life earthquake motions with a return period of 250 years are used for the ultimate limit state (ULS).

The ground motion estimates for the SLS events and ULS events described above are based on Table A1, ID 81 (Westport) of the Module 1 Earthquake Engineering Practice (NZGS/MBIE, 2021) and an effective earthquake magnitude of 6.0 suitable for the BPCP area. Table 18 below presents a summary of Seismic Hazard at the BPCP. This will be used unless a site-specific seismic hazard model has been developed.

Table 19: Summary of seismic hazard

Parameter	Standard
Design Life	100 years
Importance Level (AS/NZS 1170.0:2002 Table 3.1)	1
Seismic Stability Serviceability Limit State (SLS)	1 in 100 AEP
Ultimate Limit State (ULS)	1 in 250 AEP
Earthquake Magnitude (Mw)	6.0
PGA (SLS)	0.28 g
PGA (ULS)	0.41 g

Earthquake events are analysed using a pseudo-static approach, in which a horizontal load (PGA) is applied to the model to simulate the seismic loading.

Estimates of permanent displacements from seismic loadings are assessed using simplified empirical model (Newmark sliding-block analysis) from Jibson (2007). In this type of approach, the yield acceleration (k_y ; threshold ground acceleration necessary to overcome basal sliding resistance and initiate permanent slope movement) of a sliding mass is estimated by finding the average horizontal acceleration that results in a factor of safety of 1.0. The ratio of the average yield acceleration to the maximum seismic acceleration (k_y/k_{max}) is then used to estimate the displacement. Sliding block analysis is conducted using the United States Geological Survey (USGS) SLAMMER program.

For seismic stability in a SLS event the factor of safety must be ≥ 1.0 or if $FoS < 1.0$ the performance of the slope must be assessed by the permanent displacement threshold (refer to Bray, 2007).

11.2 Specific Detailed Design Requirements

Detailed ELF design will include assessment of the in-situ geology (foundation) and if variables such as unfavourable foundation slope angle, bedding plane shears and/or historic underground workings are present design modifications will be incorporated to reduce the risks. The assessment should also consider what type of fill material is available, its water content, grain size and what level of compaction it will receive. Table 17 below outlines the maximum slope design geometry for interim and final landform ELFs. Detailed site-specific slope stability analysis will be undertaken to ensure these design geometries meet the ELF Slope Stability Design Criteria and Seismic Displacement Thresholds (Table 20 and Table 21) and are therefore suitable for the specific site, material type and variables discussed above.

Table 20: ELF slope design geometry.

Condition	Maximum Overall Slope	Maximum Batter Slope	Minimum Bench Width	Maximum Batter Height
Interim ELF Backfill Slope (during construction).	26° (1V:2H)	37° (1V:1.3H)	7.5m	15m
Final Landform ELF Slope	16° (1V:3.3H)	18° (1V:3H)	7.5m	N/A

Table 21: ELF slope stability design criteria.

Design Groundwater Conditions	Elevated Groundwater Conditions	Seismic Stability	
		Pseudo-Static SLS	ULS
Groundwater conditions expected within design life.	Groundwater conditions associated with heavy and prolonged rainfall event.	Design Ground Acceleration of 0.28 g based on a 1:100 Annual Exceedance Probability.	Design Ground Acceleration of 0.41 g based on a 1:250 Annual Exceedance Probability.
FoS ≥ 1.3	FoS ≥ 1.1	FoS ≥ 1.0	FoS ≥ 1.0

Table 22: Seismic displacement thresholds (Bray and Travararou, 2007)

Displacement (D)	Performance Level	Implication
D < 1 cm	Stable	Negligible, no structural impact
1cm ≤ D < 10 cm	Minor	Small permanent displacement, minor cracking or settlement
10 cm ≤ D < 100 cm	Moderate	Noticeable deformation, potential loss of functionality of infrastructure
D > 100 cm	Severe / Failure	Large displacements, slope failure likely, major damage to structures

11.3 ELF Operational Management

The purpose of this section is to define the operational controls and maintenance activities required to ensure that waste rock and overburden dumps remain geotechnically stable, well-drained, and safe throughout the operational life of mine and following significant rainfall events. These controls aim to minimise erosion, manage runoff, and reduce risks to personnel, equipment, and downstream environments.

11.3.1 Dump Geometry and Surface Gradients

11.3.1.1 Surface Gradient and Drainage

Operational dump surfaces will be constructed and maintained with a minimum forward-sloping gradient to promote positive drainage and avoid ponding of water. Typical operating surface gradients are expected to be 2–5%, sufficient to shed rainwater while maintaining safe truck access and tipping operations. Localised low points or depressions that may retain water will be identified and rectified promptly.

Surface drainage will be directed toward designated internal berms or peripheral drains to prevent uncontrolled erosion of dump faces.

11.3.1.2 Batter and Face Control

Dump faces will be developed progressively in controlled lifts to achieve the design landform. Over-steepening of dump faces will be avoided to reduce instability and erosion risk. Where benching is used, benches shall remain free-draining and clear of excess loose material.

11.3.2 Dump Construction and Shaping

11.3.2.1 Dozer Use and Surface Management

A bulldozer will be used routinely to:

- Shape tipping areas and maintain consistent surface gradients.
- Push tipped material away from truck dump points to prevent high cones or inward-draining hollows.
- Maintain dump crests and control the development of dump edges.

Dozer work will be targeted to maintain a smooth, trafficable surface and reduce water concentration pathways.

11.3.2.2 Control of Truck Tipping

Truck tipping locations will be clearly defined and controlled to:

- Maintain safe edge distances.
- Prevent tipping in areas with poor drainage or soft ground conditions.

Dump edges will be visually inspected routinely, with physical bunds or windrows maintained where required for safety.

11.3.3 Routine Inspection and Monitoring

Waste dumps will be visually inspected on a regular basis, including:

- Drainage performance of active and inactive areas.
- Development of rills, gullies, or erosion features.
- Signs of slumping, cracking, or unusual settlement.

Inspections shall also be undertaken:

- Following prolonged or intense rainfall events.
- Prior to recommencement of tipping on previously inactive areas, any defects observed will be recorded and prioritised for remediation based on risk.

11.3.3.1 Post-Rainfall Assessment

After significant rainfall events, the following will be assessed:

- Surface water flow paths and evidence of ponding.
- Erosion of dump surfaces, benches, or faces.
- Damage to internal drainage features, windrows, or dump crests.

11.3.3.2 Repair Works

Where damage is identified:

- Dozers or graders will be used to re-establish positive drainage gradients.
- Erosion features will be backfilled and compacted as required.
- Blocked or damaged drains will be cleaned out or reconstructed.
- Any unstable material will be reworked to restore dump integrity before further tipping occurs.

11.3.3.3 Ongoing Improvement

Operational experience, weather performance, and inspection outcomes will be used to refine dump management practices ensuring integrity over time including dump geometry or operating methods through the PDCA cycle.

11.3.3.4 Record of materials

All material movements are recorded in the GPS system. These records are kept in a database and include material type, source and destination locations.

11.3.4 Water Management

Please refer to BPCP-ENV-PLN-010 Water MP that addresses further aspects of water management related to ELF'S.

11.3.5 Dust Management

Please refer to Dust Management Plan – BPCP-ENV-PLN-017_Final that addresses all aspects of dust management.

12.0 Closure

Closure objectives for any project needs to be defined at the start of the project to ensure that the appropriate AMD management steps are developed and implemented to achieve the agreed closure objectives. For AMD the key objective is water quality.

12.1 High Level Closure Objectives

High level AMD closure criteria for MFS, ESE, and the UWHR have been developed for the Post Closure Phase (on-going passive water treatment only) and are summarised in Table 23. These high-level AMD closure criteria will be refined over the life of the project using experience and information gained during the Operational and Active Closure phases of the BPCP and will be used to update the Mine Closure Plan based on timelines proposed in Figure 16.

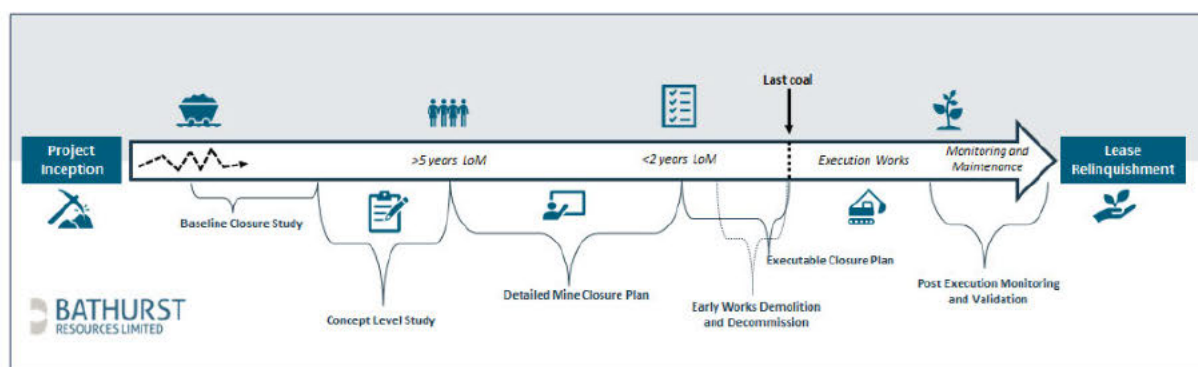


Figure 16: BRL detailed mine closure planning timeframes

Justification for completion criteria in Table 23 is based on the AMD broad-brush risk assessment (Attachment 2), which has identified key risks for closure as being final landform stability, water management infrastructure, and water quality.

Table 23: High-level AMD closure objectives.

CLOSURE CRITERION	JUSTIFICATION	HIGH LEVEL COMPLETION CRITERIA	VALIDATION
Landform stability	Stable landforms are required for closure to ensure: - Geotechnical stability - Geomorphic stability - Geochemical stability	- Non-use management areas (NUMA) such as pit highwalls are assessed for long-term geotechnical stability by the SQEP and in accordance with good international industry practice.⁶ - ELFs are geotechnically stable. - ELFs are considered geomorphically stable landforms resistant to	The following performance monitoring is required to demonstrate the closure criteria has been achieved: - Highwall stability has been assessed and signed off by the SQEP and in accordance with good international industry practice and the post mining land use (PMLU) as defined in the Closure Plan. - ELFs geotechnical stability is signed off by the SQEP as being acceptable.

⁶ Queensland Mine Rehabilitation Committee (QMRC) (2025).
Geotechnical stability of final voids as non-use management areas – Practice Note.
Queensland Mine Rehabilitation Committee, September 2025

CLOSURE CRITERION	JUSTIFICATION	HIGH LEVEL COMPLETION CRITERIA	VALIDATION
		elevated erosion and the loss of sediment • ELF are geochemically stable with oxygen ingress limited to diffusive airflow (i.e., construction methods undertaken to minimise advective airflow) and underdrain water quality stable and decreasing in PCOC concentrations. • Highwalls are geochemically stable. • Tarns must be construction where practicable on ELFs at MFS and ESE sub-areas • Water diversion structures or water bodies within the ELF footprint such as tarns are designed by a SQEP to minimise NP infiltration into the ELF and long-term erosion effects. • Reinstated streams designed by SQEP within the ELF footprint are geochemically and geomorphologically stable and align with the Mine Closure Management Plan and Consent Condition CLO1.	• Undertake geomorphic landform modelling • Rehabilitation and revegetation activities are complete and are signed off as stable by a SQEP as self-sustaining and maintenance free. • Oxygen ingress is low and limited to diffusive airflow as determined by monitoring data. • ELF underdrain seepage water quality is stable and decreasing in PCOC. • Geochemical stability is signed off by a SQEP – noting that ongoing treatment may be required for many years, yet PCOC loads are not expected to increase. • As build verification surveys to confirm ELFs have been built in accordance with specific design criteria. • SQEP design report developed for inclusion in the Annual Work Plan including SQEP input from: • Aquatic and riparian ecology; • Geochemistry; • Geotechnical engineering; and • Mine engineering.
Water Management infrastructure	• Safe and stable water management infrastructure are required for closure. • Post Closure water management infrastructure must be fit for purpose.	• Road cuttings and pit voids (water management infrastructure and ecosystem services) are geotechnically stable and safe. • Water management infrastructure is meeting design criteria for effluent water quality. • All unnecessary infrastructure removed.	The following performance monitoring is required to demonstrate the closure criteria has been achieved: • Highwall, pit void, and road cutting geotechnically stability is signed off by the SQEP as being acceptable in line with the PMLU. • Monitoring of passive treatment system influent and effluent water quality/quantity. • Water Management and water treatment systems signed off by a SQEP as being suitable for the long-term management of AMD.
Water Quality	• Water quality needs to achieve agreed water quality objectives.	• Consistently meeting water quality and quantity objectives at all water	• Water quality monitoring data – performance and compliance monitoring.

CLOSURE CRITERION	JUSTIFICATION	HIGH LEVEL COMPLETION CRITERIA	VALIDATION
	- Water quantity needs to achieve water quantity objectives. - The project needs to demonstrate betterment of several waterways.	- compliance monitoring locations. - Stability of treated AMD discharges. - Betterment is proposed for Rapid Stream, Cascade Creek Trib (V8), V37 Creek, and Cascade Creek.	- Water quality of treated AMD remains stable for 2 years after transition to the Post Closure Phase. - Water quality trends acceptable and signed off by a SQEP and being suitably managed.

1. Where geotechnically stability is signed off by the SQEP.

Once these closure criteria are achieved, then the project could transition to relinquishment where the assets are transferred to the appointed regulatory authority.

12.2 Documentation

As detailed in the Rehabilitation Plan (BPCP-ENV-PLN-002) and the Mine Closure strategy (BPCP-ENV-PLN-050).

13.0 Further Work

There remain several areas where additional work will be required to ensure the appropriate operational management of overburden, which will contribute to operational efficiencies and reduced operating costs. These proposed studies are provided in Table 24 below. A default position is also presented if the studies are not completed or are shown to be ineffective. Recent works (MWM, 2026x) provides detailed recommendations on specific AMD recommendations pertaining to ELF, EFA and water quality management.

Table 24: Further studies

Study	Explanation	When	Who	Default Position
Tiphead height	Higher tipheads may be possible through alternative engineering designs and or use of differing materials. Studies need to demonstrate that advective airflow processes are comparative to a 3 m lift.	Prior to lift heights being higher than 3 m as an operational rule.	SQEP	3 m lifts
Toe Barrier	Development of a perimeter bund of dozer flattened waste rock can be undertaken where grainsize segregation has occurred. This can then be compacted as a toe barrier. Further work is required to confirm the height and width of any advective toe barrier and whether this is effective at the BPCP. This may facilitate higher tipheads in the core of the ELF.	Prior to operational implementation of lifts higher than 3 m.	SQEP	3 m lifts
Limestone dose rates	Further work is required to optimise the limestone dose rate. Lesser amounts of limestone may be needed in the core of the ELF where materials are not oxidising or for lower sulfur content materials. Higher rates may be required in the 10 m oxidising surficial zone of the ELF.	Within 1-2 years of the Operational Phase commencing.	SQEP	7.5 kg limestone/m ² per 3 m lift or 1.16 kg/tonne of waste rock.
Net Percolation	Construction of cover systems to minimise net percolation rates to < 40% of rainfall would provide operational benefits for long term water treatment (e.g., passive treatment capacity). Further work could support optimisation of closure designs.	Within 2 years once the first rehabilitated ELF surfaces are completed.	SQEP	40% net percolation rates for closure modelling, 200m ² of space is require per 1L/s flow for passive treatment (MSR + Polishing Pond).

Study	Explanation	When	Who	Default Position
Oxygen Flux	Construction of cover systems to minimise oxygen flux would provide operational benefits for long term water treatment (e.g., commencement of passive treatment / cessation of active treatment). Further work could support optimisation of closure designs.	Within 2 years once the first rehabilitated ELF surfaces are completed.	SQEP	164 g/m ² /yr of oxygen (equivalent to 2.7 tonnes of acidity/ha/yr)
Closure water bodies	Studies to be undertaken to design tarns as closure water bodies on ELFs without adversely impacting on ELF NP rates and maintain appropriate water retention.	During Closure	SQEP	Proposed tarns to be GCL lined or have a LPL to minimise water ingress.
ELF Low Sulfur Shell	A 10 m thick low sulfur zone is proposed for each ELF to minimise the amount of acidity and PCOC generated in this oxidising zone. Further work is required as part of the detailed design phase to confirm the maximum thicknesses and sulfur content of this zone.	Prior to ELF construction commencing	Mining Engineer and/or a SQEP	10 m thick low sulfur zone.

15.0 Reporting Requirements

15.1 Internal Reporting

AMD classification data will be compiled and reported to internal management on a 12-monthly basis within the Environmental Management System (EMS) Management Review Process. The Environmental Manager will be responsible for scheduling this review and presenting performance against objectives and Key Performance Indicators (KPIs). AMD classification data reported will include:

- Summary of any new ABA drill data obtained and resultant changes to the ABA Block Model.
- Modelled AMD classification of material moved in the review period.
- Results of all QA/QC of materials.
- Any actions taken in response to monitoring triggers.
- The average sulfur content of the outer 10 m for final landforms completed in the period.

All potential and actual non-compliance with This Plan identified by site personnel during site inspections or monitoring activities are to be rectified in accordance with the Site Environmental Management Plan (SEMP). This system keeps track of non-compliances, corrective actions, responsibilities, planned and actual completion dates.

15.2 External Reporting

This section summarises the annual reporting requirements associated with materials management and construction of the engineered landforms.

15.2.1 Annual Work Plan

The classification, management, scheduling, and placement of materials will be summarised as part of the annual reporting process as documented in This Plan.

Prior to undertaking any activities on site, and annually thereafter, BRL will prepare an Annual Work Plan (AWP) in accordance with Project approval requirements. The AWP will outline proposed activities and demonstrate how management plans, including This Plan, will be implemented, and will be provided to the Peer Review Panel and relevant regulators for review and approval.

15.2.2 Annual Monitoring Report

With regards to AMD classification and materials management the following information will be provided in the monitoring report:

- ABA data for infill drilling and hole sampling and a summary of the ABA block model reconciliation.
- ABA data associated with placed materials (i.e., modelled AMD classification and source concentrations and placement locations, and any field QA/QC data to confirm the correct materials were placed in the correct location).
- Incident reporting and corrective actions undertaken for materials mishandling incidents.

-
- Updated material schedules (excavated and forward schedules) compared against required material volumes (e.g., NAF requirements).
 - Any changes to management processes, supported by technical studies to validate appropriateness of the change.

16.0 Roles, Responsibilities and Training

BRL is committed to continual training and awareness of all staff, employees, and contractors at the Mine. Training and awareness procedures are an integral part of ensuring the full implementation of the ELF Management Plan across all aspects of the MFS, ESE, and UWHR sub-areas. Effective and regular communication at all levels reinforces the message that water management issues are taken seriously and that the ELF Management Plan has the active support of all employees and contractors and is factored into mine planning, engineering and implementation aspects.

16.1 Roles and Responsibilities

Implicit in the effective management of AMD and ELFs is the allocation of responsibilities to key personnel. Details of roles and responsibilities associated with This Plan are provided in Table 25 below.

Table 25: Responsible personnel and tasks

Position	Accountable Task
BRL General Manager	• Provide adequate resources for the implementation of this ELF Management Plan. • Ensure that AMD management considerations are included in the selection and installation of all infrastructure at MFS and ESE. • Ensure adequate resources are available to construct and monitor ELFs in accordance with This Plan.
Mine Manager / SSE	• Ensure appropriately qualified and resourced personnel are appointed to the key roles and their responsibilities are well understood as required by This Plan. • Ensure periodic auditing and review of this Management Plan is undertaken
BRL Environmental Manager	• Be responsible for supporting the implementation of the requirements of this ELF Management Plan and communicating any issues to the Mine Management Team. • Ensure the controls herein are implemented, maintained and effective. • Ensure personnel working at the operation are aware of the mine site AMD controls whilst working at MFS and ESE. • Ensure work practices comply with this ELF Management Plan. • Be responsible for supporting the implementation of the requirements of this ELF Management Plan and communicating any issues to the BPCP Management Team. • Undertake periodic inspections of MFS and ESE's operations to assess compliance with the ELF Management Plan. Document these inspections and include this as a record within the AWP. • Actively promote AMD management to all site personnel. • Coordinate and participate in the on-going review of the ELF Management Plan. • Developing and making accessible information regarding AMD management at MFS and ESE (e.g. this ELF Management Plan, procedures, training, and so forth). • Facilitating regular inspections, audits and maintenance of AMD management systems. • Facilitating contact with stakeholders including the regulatory authorities to ensure awareness of the management actions being taken on site to address potential risks stemming from the management of AMD. • Address the external reporting requirements of the ELF Management Plan and manage the Annual Monitoring Report and Annual Work Plan process. • Oversee corrective action as required to address non-compliance and the reporting thereof to the consent authority.

Position	Accountable Task
	- Produce internal and external reports within area of responsibility. - Maintain on-going communication with regulatory authorities. - Oversee the development of training initiatives with respect to AMD management. - Coordinate the investigation process for any AMD management incidents or complaints. - Report performance on an on-going basis and as part of the EMS Management Review process to the BPCP Management Team. - Notify the General Manager of any issues arising which will necessitate a review of this ELF Management Plan. - Delegate to authorised alternate to cover any absence or unavailability. - Design of water management requirements for ELF construction and operations
Technical Services Manager	- Owns and maintains the BBRA for AMD for MFS, ESE, and UWHR. - Responsible for implementing the proposed AMD and water management controls to prevent and mitigate any AMD from MFS, ESE, and UWHR. - Responsible for implementing associated plans including the AMD Water Management Plan. - Responsible for ensuring a vehicle tracking system is used and that HAF, PAF, low risk and NAF materials are tracked. - Responsible for implementing the proposed waste rock material classification and characterisation and associated modelling programs, ensuring material movement aligns with the AMD block model. - Responsible for undertaking mine scheduling and planning activities outlined in this ELF Management Plan. - Responsible for implementing the proposed excavation and material management protocols and associated QA/QC programs. - Responsible for managing the construction of the ELF and other landforms and associated QA/QC programs. - Responsible for managing the construction of the ELF cover system and associated QA/QC programs including identifying corrective action. - Responsible for the geotechnical stability of the ELFs. - Responsible for ensuring low sulfur materials (< 0.015 wt% S) are incorporated into the AMD block model and are stockpiled for future use where practicable. - Scheduling and facilitating Mine planning meetings to communicate ELF designs are communicated from Technical Services to Operations - Conduct ELF percolation trials - Net percolation rates and oxygen flux - Develop and maintain the SOPs set out in This Plan and any new SOP that may be required. - Ensure ELF designs consider the opportunities set out in Table 11. - Construct EFAs in accordance with the detailed design requirements. - Ensure voids are managed in an appropriate manner - Clean water diversion drain management - Ensure slope stability analyses meet applicable thresholds and design criteria. - Responsible for the development and implementation of SOP#2, #3, #4, #5, #6, and #7.
Project Geologist	- Responsible for the development and implementation of SOP#1 and #2. - Maintain and update the AMD Block Model with new ABA data acquired from resource definition drillholes samples. - Validation of geological model to confirm AMD characteristics of materials (for drill holes placed in advance of the UWHR development)

Position	Accountable Task
	- Design and execution of resource definition infill drilling - Mapping of ELF footprints to determine the existence of direct pathways to underground workings and development of SOPs as required
Environmental Scientist	- Supporting the BRL Environmental Manager with day-to-day AMD management activities and SOP implementation. - In conjunction with the Geologist, develop and implement SOP#1 and #2 and contribute to the monitoring required for SOP#4, #5, #6, and #7. - Coordinate and manage AMD data collection, e.g., drill hole sampling, tiphead sampling, etc, and ensure a representative composite sample is obtained. - QA/QC review of laboratory reported datasets. - Interpret AMD datasets and update / develop management systems / procedures. - Coordinate and maintain an inventory of the delivery and deployment of acid neutralising materials such as limestone and other related products. - Periodic auditing of AMD management implementation in the field. - Compile key AMD management data for internal and external reporting. - Carry out NAF sampling from NAF stockpiles and cover systems as well as seepage and surface runoff monitoring.
Mine Engineer / Mine Planner	- Update materials schedules. - Provide digital dig plans to excavator and ELF construction plans to dozer operators. Undertake monitoring to ensure this is undertaken. - Provide waste rock schedule information for the annual work plan (AWP). Detailed mine design and planning of each ELF and EFA is required prior to operational activities starting. - Design and planning of ELFs and EFAs. - Responsible for the development and implementation of SOP#2, #3, #4, #5, #6, and #7.
Surveyor	- Visual observations of active tip heads. - Carry out drone flights to record tip head material structure where and as reasonably practicable.
BRL Health and Safety Coordinator	- Ensuring all employees are fully trained and aware of relevant requirements. - Ensure all staff are aware of AMD gas risks and that this remains a active component of the risk register. - Making available all the relevant equipment to manage spills and/or emissions of hazardous substances. - Ensuring that all relevant personnel are trained and that the training is up to date. - Stage mock emergency exercises to test and improve water management emergency response. - Facilitate Employee and Contractor inductions.
SQEP - Geotech	- Confirmation that final landforms (ELFs and water management infrastructure) are acceptable for closure requirements and are signed off. - Highwall and pit void stability has been assessed and signed off in accordance with good international industry practice (QMER, 2025). - Responsible for the QA/QC reporting in SOP#4 and #7.
SQEP – Environmental	- Confirmation that final landforms are geochemically stable at closure and water treatment is appropriate and signed off. - Review of this ELF Management Plan and other activities associated with AMD will be undertaken by a SQEP.

Position	Accountable Task
Supervisors	- Responsible for ensuring the instruction of workers, implementation and overseeing of the requirements of this AMD Management Plan, including monitoring the effectiveness of the methods set out in This Plan. - Reporting any activity which presents a risk to the safety and environmental responsible management of the site. - Visual observations (daily) of active tipheads by site supervisors to confirm that materials are matrix supported rather than clast supported (in general) as shown in Table 15. - A database (record of review) to be maintained using the Visual Rating Guide shown in Figure 10. - Responsible for implementation of SOP#2, #3, #4, #5, and #7.
All personnel	- Report any damage to mine water management infrastructure to the immediate supervisor and complete an incident report. - Maintain excellent erosion and sediment control processes to keep down potential sources of sediment and AMD in the runoff. - Report of uncontrolled discharges of stormwater except where bypass flows are provided for during higher rainfall events to immediate supervisor and complete an incident report.

16.2 Training and Inductions

The training that is anticipated to be required to prepare staff to deliver the implementation, monitoring and reporting requirements of This Plan is summarised in

Table 26. In addition to the standard document review process discussed in Section 19, all training materials and deliverables will be reviewed where there has been a change to management processes. In addition to the formal training provided to meet the objectives of This Plan, ongoing operational training will occur and include, though not limited to:

- Environmental issues are included within the Mine Induction Package and induction process and regular environmental awareness training through toolbox talks.
- Inclusion of AMD on the job hazard analysis (JHA) template.
- Regular topic for toolbox talks, including waste rock and AMD water management. All monitoring results will be assessed, and significant results or events will be raised for discussion via toolbox talks to encourage and remind staff of appropriate activities.
- Incidents related to ELF and EFA construction and operation will be raised for discussion via toolbox talks to encourage and remind staff on appropriate management measures.
- Training of staff involved in the management and treatment of mine impacted waters including water management, active treatment, and passive treatment.
- Site staff with suitable AMD experience will be tasked with training staff that lack experience yet require a certain level of knowledge to make informed decisions.

Table 26: Training Requirements

TRAINING ASPECT & REQUIREMENT	FREQUENCY	PEOPLE TO BE TRAINED
General AMD awareness and risk management, engineered landforms, and terminology.	On start up and during induction refreshers	All Personnel
Classification of waste rock materials in relation to elf and EFA designs.	Yearly review and training	Technical Services Manager, Geologist, Supervisors, Water Engineer, Environmental Officer. Contractors
AMD sludge management	Yearly review and training	Supervisors, Environmental Officer
ELF cover system design and installation	Yearly review and training	Technical Services Manager, Supervisors, Engineers
SOP#1 classification of materials	Yearly review and training	Geologists, Environmental Scientist
SOP#2 materials management	Yearly review and training	Geologists, Environmental Scientist Technical Services Manager, Supervisors, Engineers
SOP#3 sealing of underground workings	Yearly review and training, competent person	Technical Services Manager, Supervisors, Engineers
SOP#4 construction of engineered landforms	Yearly review and training, competent person	Technical Services Manager, Supervisors, Engineers
SOP#5 AMD sludge management	Yearly review and training	Technical Services Manager, Supervisors, Engineers
SOP#6 ELF cover system design and installation	Yearly review and training	Technical Services Manager, Supervisors, Engineers
SOP#7 construction of engineered fill areas	Yearly review and training, competent person	Technical Services Manager, Supervisors, Engineers

17.0 Management Plan Approval and Revision

Review of this AMD ELF Management Plan and other activities associated with AMD will be undertaken by a SQEP that has experience in the assessment and management of AMD. The AMD SQEP will be part of a Peer Review Panel (PRP) that will be appointed by the West Coast Regional Council (WCRC). The members of the PRP must be fully independent of the planning, design, and operations of BPCP. Such independence will be confirmed by the WCRC.

17.1 Peer Review Panel Purpose

The purpose of the PRP is to:

- Ensure that work is being undertaken in accordance with industry best practice.
- Review progress against the activities explained in This Plan
- Provide independent advice to the WCRC, as to whether or not the approved resource consent conditions relating to the design, construction, operation, maintenance, rehabilitation and closure of ELFs are being satisfied.
- Identify AMD risks and recommendations on how the AMD risks will be addressed for the ELFs.
- Provide peer review of key reports prepared for BRL for the WCRC on ELFs.
- Attend an annual meeting at site to discuss progress and understand project developments.

17.2 Review Requirements – AMD

This Plan and associated procedures will be periodically reviewed and revised to reflect updated operational data, modelling predictions, monitoring data, through the PDCA cycle or investigations due to incidents or at the request of a relevant regulatory authority.

The timing of This Plan review and approval will occur within three months of the following:

- The planned date for the internal annual review.
- The submission of an incident report relating to AMD reported where investigation outcome dictates a change to management practices.
- The submission of an external audit with additional or changed management measures.
- Any direction by a relevant regulatory authority to update This Plan or the PRP.
- A change to either the outputs for the Annual Work Plan or the Annual Monitoring Report that necessitates changes herein or vice versa.
- A change in standard operating procedures directly or indirectly related to This Plan including but not limited to those listed in Section 1.2.2.
- A change in the following interrelated management plans that may impact on This Plan and vice versa:
 - Erosion and Sediment Control Management Plan

18.0 Glossary of Terms

Term/Abbreviation	Definition
ABA	Acid Base Accounting
AMD	Acid and Metalliferous Drainage
AMD ELFMP	AMD Engineered Landform Management Plan
AMD WMP	AMD Water Management Plan
ARD	Acid Rock Drainage
AWP	Annual Work Plan
BBRA	Broad-Brush Risk Assessment
BCM	Brunner Coal Measures
bcm	Bank cubic meters
BPCP	Buller Plateaux Continuation Project
BRL	Bathurst Resources Limited
CHPP	Coal Handling and Processing Plant
CRM	Certified Reference Material
Cypress	Cypress Mining Area
DoC	Department Of Conservation
E&C	Environment and Community
EFA	Engineered Fill Area
EHS	Environmental Health and Safety
ELF	Engineered Landform
EMS	Environmental Management System
ENV	Environment/al
ESE	Escarpment Extended
FoS	Factor of Safety
FTAA	Fast-Track Approvals Act 2024
GARD Guide	Global Acid Rock Drainage Guide
GCL	Geosynthetic Clay Liner
HAF	Highly Acid Forming
HSEC	Health, Safety, Environment, Community
IANZ	International Accreditation New Zealand
ICMM	International Council of Mining and Metals
INAP	International Network for Acid Prevention
JHA	Job Hazard Analysis
KMS	Kaiata Mudstone
KPI	Key Performance Indicator
LPL	Low Permeability Layer

Term/Abbreviation	Definition
MFS	Mount Fredrick South
MPA	Maximum Potential Acidity
MSR	Mussel Shell Bioreactor
MWM	Mine Waste Management Limited
NAF	Non-Acid Forming
NAG	Net Acid Generation
NAPP	Net Acid Producing Potential
NP	Net Percolation
NUMA	Non-Use Management Area
PAF	Potentially Acid Forming
PCOC	Potential Constituents of Concern
PCP	Principal Control Plans
PDCA	Plan Do Check Act
PGA	Peak Ground Acceleration
PLN	Plan
PMLU	Post Mining Land Use
PRP	Peer Review Pannel
PTS	Passive Treatment System
pXRF	Portable X-Ray Fluorescent
pWTP	Portable Water Treatment Plant
QA/QC	Quality Assurance / Quality Control
RC	Reverse Circulation
SEMP	Site Environmental Management Plan
SOP	Standard Operating Procedure
SPR	Source Pathway Receptor
SQEP	Suitably Qualified and Experienced Person
SSE	Site Senior Executive
STO	Stockton Mine
Stockton	Stockton Mining Area
TSS	Total Suspended Solids
ULS	Ultimate Limit State
VDT	Vegetation Direct Transfer
UWHR	Upper Waimangaroa Haul Road
WCRC	West Coast Regional Council
WMP	AMD Water Management Plan
WRD	Waste Rock Dump
WTP	Water Treatment Plant

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Attachment 1: AMD Risk Assessment

A Broad-Brush Risk Assessment for AMD was undertaken for MFS, ESE, and the UWHR.

This document is available as a Digital Microsoft Excel file.

Attachment 2: Relevant Consent Conditions

Conditions to be inserted upon issue of final decision.