

AMD Water Management Plan

Buller

Plateaux Continuation Project

August 2026

BPCP-ENV-PLN-010

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1.0 Introduction

1.1 Purpose

The purpose of the Buller Plateaux Continuation Project (BPCP, the Project) Acid and Metalliferous Drainage Water Management Plan (AMD WMP, This Plan) is to set out the objectives, risks, proposed controls, responsibilities, and training requirements to effectively manage AMD water-related risks across all phases of the BPCP in accordance with the relevant resource consent condition. 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 indicated in Figure 1. The PDCA cycle is a strong way to operationalise compliance based on continuous improvement.

- PLAN → Risk Assessment & Management Planning
- DO → Implementation & Operational Controls
- CHECK → Monitoring, Measurement & 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 cycle.

Source: AS/NZS ISO 14001:2016

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

- A brief introduction to the physical and hydrological environment to provide background for informed decision making.
- An explanation of how water moves around the site in each mine phase, where discharges to the receiving environment occur, and where water is retained on site.
- An analysis to identify key risks and proposed control measures to reduce those risks.
- A description of water quality limits and other associated consent requirements, including monitoring to ensure compliance with the consent requirements.

1.2 Management Plan Scope

This Plan forms part of the planning framework for the BPCP and encompasses AMD and total suspended solids (TSS) impacted waters in the MFS, ESE, and the UWHR sub-areas of the BPCP.

The AMD and water management at the Stockton Mining Area is covered in the Stockton Water Management Plan (**STO-ENV-PLN-013**) and the Stockton AMD Management Plan (**STO-ENV-PLN-016**) and Millerton Block Water and AMD Management Plan (**STO-ENV-PLN-027**) as well as the AMD and water management at the Cypress mining area. These Management Plans and associated consent conditions are therefore outside the scope of This Plan.

The following additional management plans are to be read in conjunction with This Plan as these documents also have a bearing on the management of water quality:

- Rehabilitation Management Plan: **BRL Doc: BPCP-ENV-PLN-002**
- AMD Engineered Landform Management Plan (AMD ELFMP): **BRL Doc: BPCP-ENV-PLN-011**
- Mine Closure Concept Strategy (MCCS): **BRL Doc: BPCP-ENV-PLN-050**
- Water Infrastructure Design Plan: **BRL Doc: BPCP-ENV-PLN-012**
- Erosion and Sediment Control Plan for Land-Disturbance Activities: **BRL Doc: BPCP-ENV-PLN-013**
- Hazardous Substances Management Plan: **BRL Doc: BPCP-ENV-PLN-014**
- Aquatic Ecology Management Plan: **BRL Doc: BPCP-ENV-PLN-006**

1.3 Management Plan Objectives

Control and treatment of AMD impacted waters is a key engineering control for the BPCP, which is based on national and international best practice guidance (e.g., INAP, 2014; DFAT, 2016, Cavanagh et al., 2018). To manage the risks associated with AMD water, BRL has developed objectives which are in alignment with these international guidance documents and include:

- Characterisation of primary and secondary potential AMD sources through a comprehensive water management classification system;
- Source hazard definition and indication of pathways to environmental receptors to inform mine planning and water management;
- Minimisation of AMD risks through mine design, planning and production scheduling, and implementation of AMD prevention or mitigation strategies throughout the construction, operation, and closure phases;
- Closure planning that integrates mine development and operations through an adaptive life of mine plan to manage potential AMD risks according to established design principles and procedures; and
- Ensuring discharges and water quality in the receiving waterways complies with the resource consent conditions.

TSS management objectives within This Plan are also referred to within the Erosion and Sediment Control Plan for Land-Disturbance Activities and include:

- Identify potential sources of erosion that contribute to TSS in mine impacted waters (MIW);
- Assess the impact of elevated TSS on receptors;
- Prevent, control, and treat elevated TSS through sediment management control and diversion measures; and

- Monitor sites to comply with Water Quality Objectives (WQOs) reducing impact on downstream environment and communities.

This Plan describes the management measures, monitoring, and reporting requirements to meet these objectives and is iterative and aligned with the PDCA cycle during mine planning, operations through to closure phases.

AMD risks have been identified through a broad-brush risk assessment (BBRA) that is provided as Attachment 1. Key AMD-related risks for water and management controls identified by this BBRA are explained in further detail in This Plan. Furthermore, This Plan also identifies the key Standard Operating Procedures (SOPs) that will be utilised by operational teams to manage these key water quality 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 ELF Management Plan:

Table 1: Proposed standard operating procedures.

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

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 (This Plan)

Note: BPCP-ENV-SOP-001 to BPCP-ENV-SOP-007 are referenced in This Plan and are referred to as SOP#8 to SOP#15 for simplification.

2.0 Project Description

2.1 Overview

BRL (which includes its subsidiary companies BT Mining Limited, Bathurst Coal Limited, and Buller Coal Limited) 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

The BPCP comprises five key sub-areas (Figure 2), each with defined project scopes and site-specific geoenvironmental hazards including:

- **Stockton Mining Area (Stockton):** Completion of mining of existing pits and remaining coal resources. Ongoing utilisation of existing infrastructure.
- **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.
- **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.
- **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.
- **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.

Comprehensive information on each sub-area is available in the BPCP FTAA³ Application Assessment of Environmental Effects (AEE). The key sub-areas of the BPCP are shown in Figure 2 .

³ Fast Track Approvals Act 2024

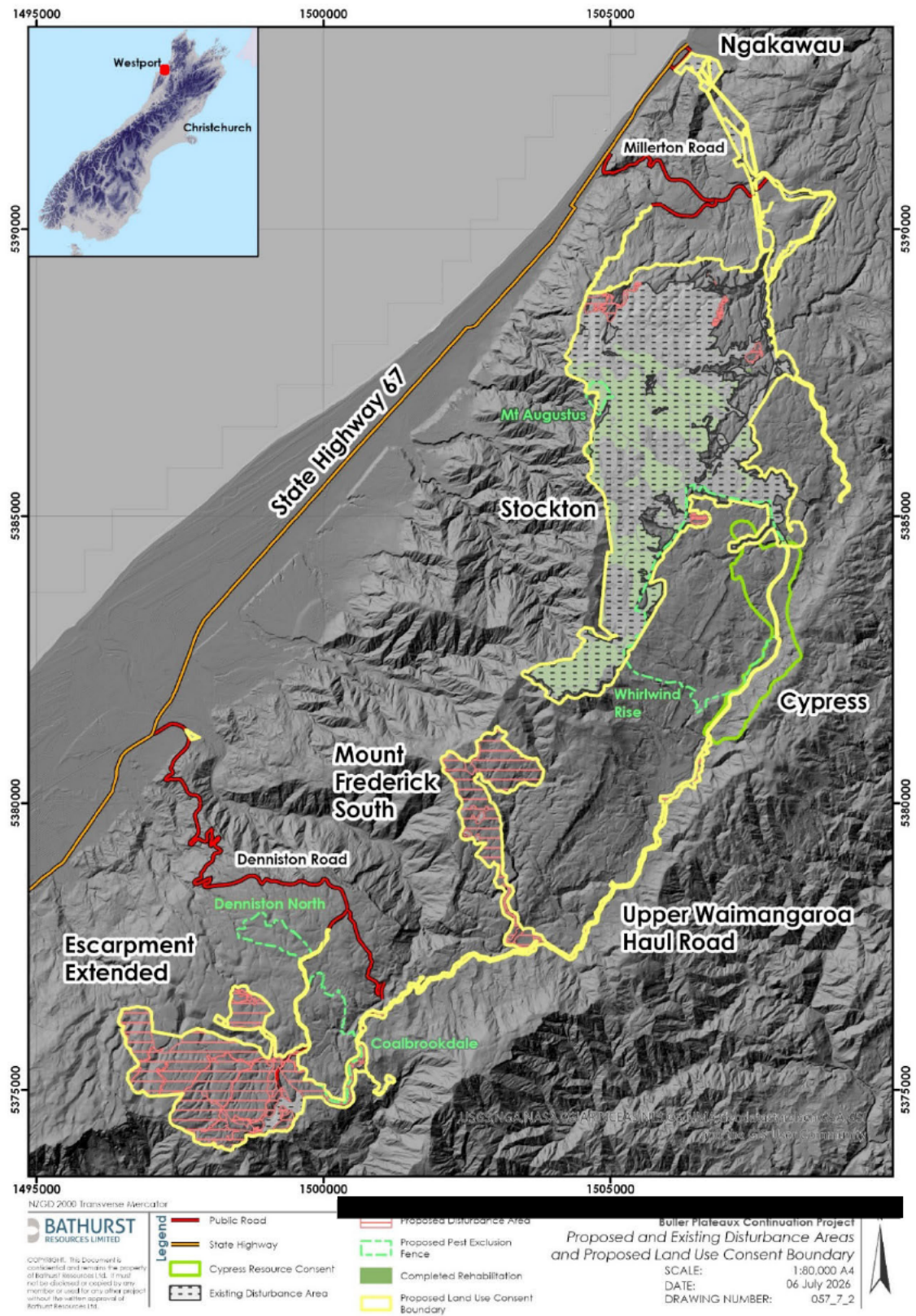


Figure 2: BPCP proposed and existing disturbance areas and proposed land use consent boundary.

2.3 Project Timeline

Indicative BPCP timelines are reflected in Figure 3. There are four distinct project phases that are defined by the way AMD impacted waters are planned to be managed:

- **Construction Phase:** defined by the commencement of earthworks on site up until the active water treatment plants (WTP)s and associated WTP ponds are established. This will require routing of water and minor water management / treatment using a small portable water treatment plant(s) (pWTP) to neutralise acidity using either Ca(OH)_2 (hydrated lime/calcium hydroxide) or NaOH (caustic); and the addition of flocculants as required to treat TSS. AMD sludge management is also required (MWM, 2026f).
- **Operational Phase:** Water Management and active water treatment using CaO, flocculants, and metal-chelating agents with AMD sludge being separated from treated discharge water by lamella clarifiers and mechanical sludge dewatering using pressure filtration (plate and frame filters (Process Flow, 2026a)) with AMD sludge disposal to engineered landforms (ELFs). Some passive treatment commences for ELFs that are completed.
- **Active Closure Phase:** Active water treatment continues with a gradual transition to passive treatment of ELF basal seepage. AMD sludge disposal will either be onsite at an appropriate location, disposal at Stockton, or by other approved methods that may be developed over the Operational Phase of the BPCP.
- **Post Closure Phase:** defined by the decommissioning of the WTPs with water treatment being completed by gravity fed passive treatment systems. The proposed technology being a mussel shell bioreactor (MSR). AMD sludge disposal will either be onsite at an appropriate location, disposal at Stockton, or by other approved methods that may be developed over the Operational Phase of the BPCP. Back-up options include disposal to approved offsite landfills.

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

Project timelines are presented in Figure 3.

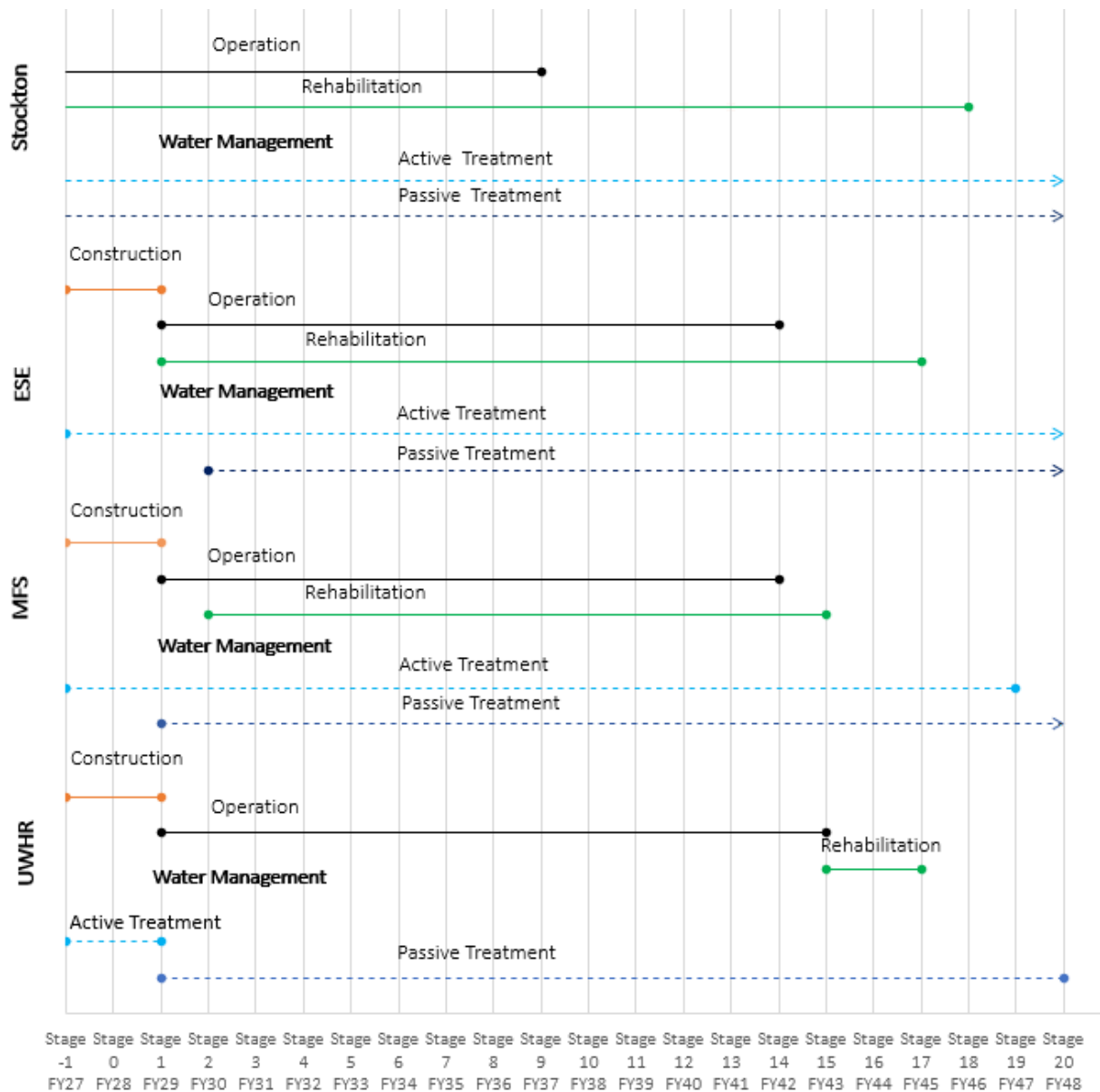


Figure 3: BPCP project timelines (by stage and by indicative year).

2.3.1 MFS Project Timeline

The Construction Phase commences in 2027 through to 2028. Mining at MFS is proposed to commence in 2029 and will cease at the end of 2042, with rehabilitation activities complete by this time. The Active Closure Phase is planned to cease in 2046 with a transition from active treatment to passive treatment of MIW. Passive treatment then occurs from 2047. This is summarised in Table 2.

Table 2: Planned MFS timescale and mine phases.

MINE PHASE	YEARS (inclusive)	ACTIVITIES
Construction Phase	2027-2028	2 years to establish mine infrastructure, the WTP, and the associated WTP ponds. Active water treatment by portable WTP (pWTP) will occur during this phase.
Operations Phase	2029-2042	Active mining and/or rehabilitation works underway. Active treatment occurring at the WTP and operation of a limited number of MSRs.
Active Closure Phase	2043-2046	Active mining has ceased. Completion of rehabilitation has been undertaken. Active treatment and associated infrastructure remain operational until ELF seepage water quality is deemed suitable for treatment through MSRs. MSR passive treatment systems become active at different times for each ELF.
Post Closure Phase	2047 onward	Active treatment ceases and all ELF seepage treated with MSRs.

Note: The above timeframes are planned and may change depending on mining progress and unforeseen delays.

2.3.2 ESE Project Timeline

The Construction Phase commences in 2027 through to 2028. Mining at ESE is proposed to commence in 2028 with the development of the ESE Box-cut. Active mining at ESE is assumed to cease at the end of 2040, with rehabilitation activities complete by the end of 2043. The Active Closure Phase ceases in 2057 with a transition from active treatment to passive treatment of MIW. Passive treatment then occurs from 2058. This is summarised in Table 3.

Table 3: Planned ESE timescale and mine phases.

MINE PHASE	YEARS (inclusive)	ACTIVITIES
Construction Phase	2027-2028	Construction of ancillary infrastructure and use of portable water treatment plants until the main ESE WTP is established in the second year of the Construction Phase. The Construction Phase overlaps the Operations Phase in year 2028. Active water treatment by portable WTP (pWTP) will occur during this phase.
Operations Phase	2029-2043	Active mining and/or rehabilitation works underway. Active treatment occurring at the WTP and operation of a limited number of MSRs.
Active Closure Phase	2044-2057	Active mining has ceased. Completion of rehabilitation has been undertaken. Active treatment and associated infrastructure remain operational until ELF seepage water quality is deemed suitable for treatment through use of MSRs. MSR passive treatment systems become active at different times for each ELFs.
Post Closure Phase	2058 onward	Active treatment ceases and all ELF seepage treated with MSRs.

Note: The above timeframes are planned and may change depending on mining progress and unforeseen delays

3.0 Statutory Requirements and Approvals

This Plan has been prepared to meet all statutory and resource consent requirements related to management of AMD impacted waters for BPCP sub-areas that include MFS, ESE, and UWHR.

3.1 Consent Requirements

Consent requirements that are relevant to This Plan are listed in Attachment 2 with reference to the relevant section within This Plan that detail how the conditions will be implemented.

3.2 Standards and Guidelines

BRL is committed to undertaking all Project activities in full compliance with New Zealand legislation and any application resource consent conditions.

This Plan identifies best practicable management options for AMD, which is based on international guidance, to address key AMD risks for the BPCP. These guidance documents are listed below in Table 4 and have been referred to in the technical documents (e.g., as contained in the references to This Plan) to inform the decision-making process.

Table 4: Standards and guidelines relevant to This Plan.

STANDARD/GUIDELINE	RELEVANCE
AMIRA, 2002	Acid Rock Drainage (ARD) test handbook.
DFAT, 2016	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)
INAP, 2020	Rock placement strategies to enhance operational and closure performance of mine rock stockpiles.
INAP, 2024	ARD/AMD source control for mine rock stockpiles.
MEND, 2009	Prediction manual for drainage chemistry from sulfidic geologic materials.

3.3 Stakeholder Consultation

BRL is committed to active engagement with stakeholders to understand the operational effects of BPCP activities upon the environment. BRL recognises that a range of stakeholders, both internal and external to its operations, have economic, environmental, social, and cultural interests in the BPCP. BRL retains responsibility for stakeholder relations and aims to ensure that it engages with stakeholders in a clear, open and honest manner, both as part of regular operations and during the statutory processes associated with application for and maintenance of resource consents, permits, access arrangements and licences.

BPCP's Environment and Community Team is responsible for relationships primarily relating to the mine's resource consents, permits, access arrangements, licences, and the other environmental performance undertakings.

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 main application.

Once This Plan is approved, this section will document all future stakeholder engagement undertaken for subsequent versions.

4.0 Environmental Setting

4.1 Regional Geology

The Eocene Brunner Coal Measures (BCM), host to economic coal resources, 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 the overlying Kaiata Mudstone (KMS), contribute to AMD in the Buller Plateaux region; this is shown in Figure 4.

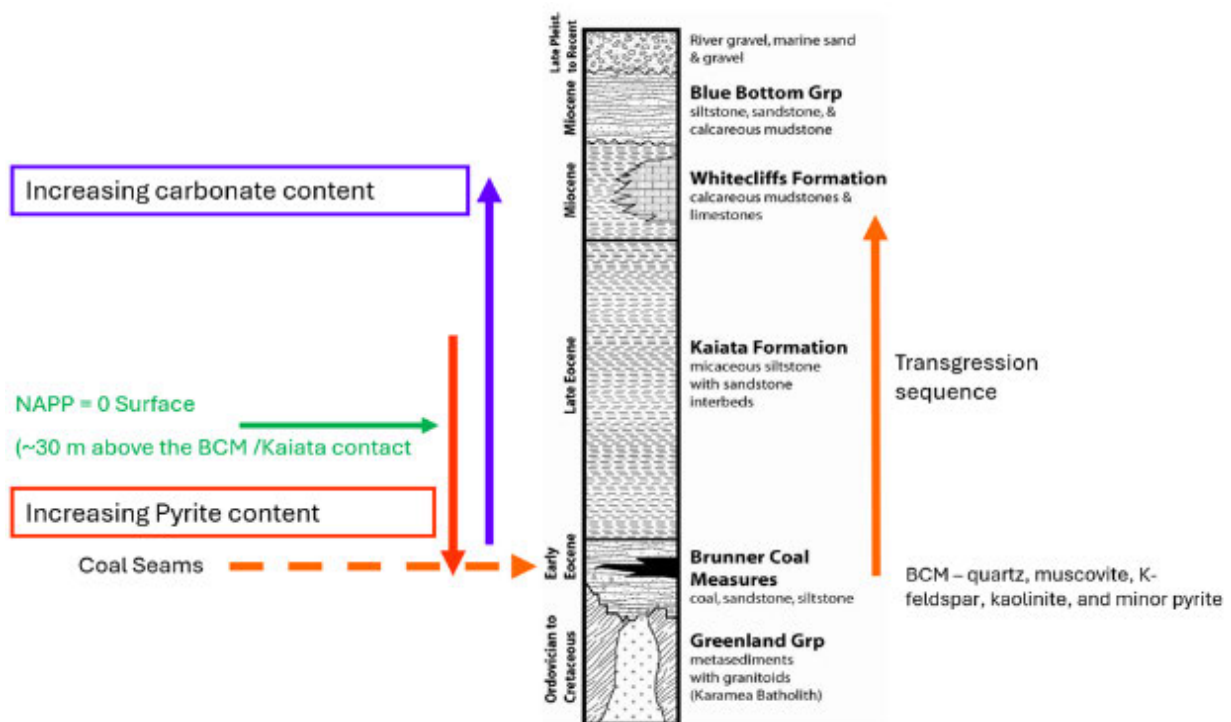


Figure 4: Stratigraphic column of the Denniston and Stockton Plateaux.

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.

As noted in literature (e.g., Pope et al., 2010), fluvial systems tend to be lower in pyrite compared to marine-influenced systems. At ESE and MFS project 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 (BRL, 2026h). 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 Catchments

MFS, ESE, and UWHR sit within four drainage basins (Figure 5):

- Cascade Creek catchment located to the east of the plateaux at the foot of Mount William.
- Whareatea River catchment located in the centre of the plateau.
- Waimangaroa River catchment located to the north of the plateau at the foot of the Mount William range.
- Rapid Stream that drains to the Whareatea River and sits between the Waimangaroa River to the north and the Whareatea River to the south.

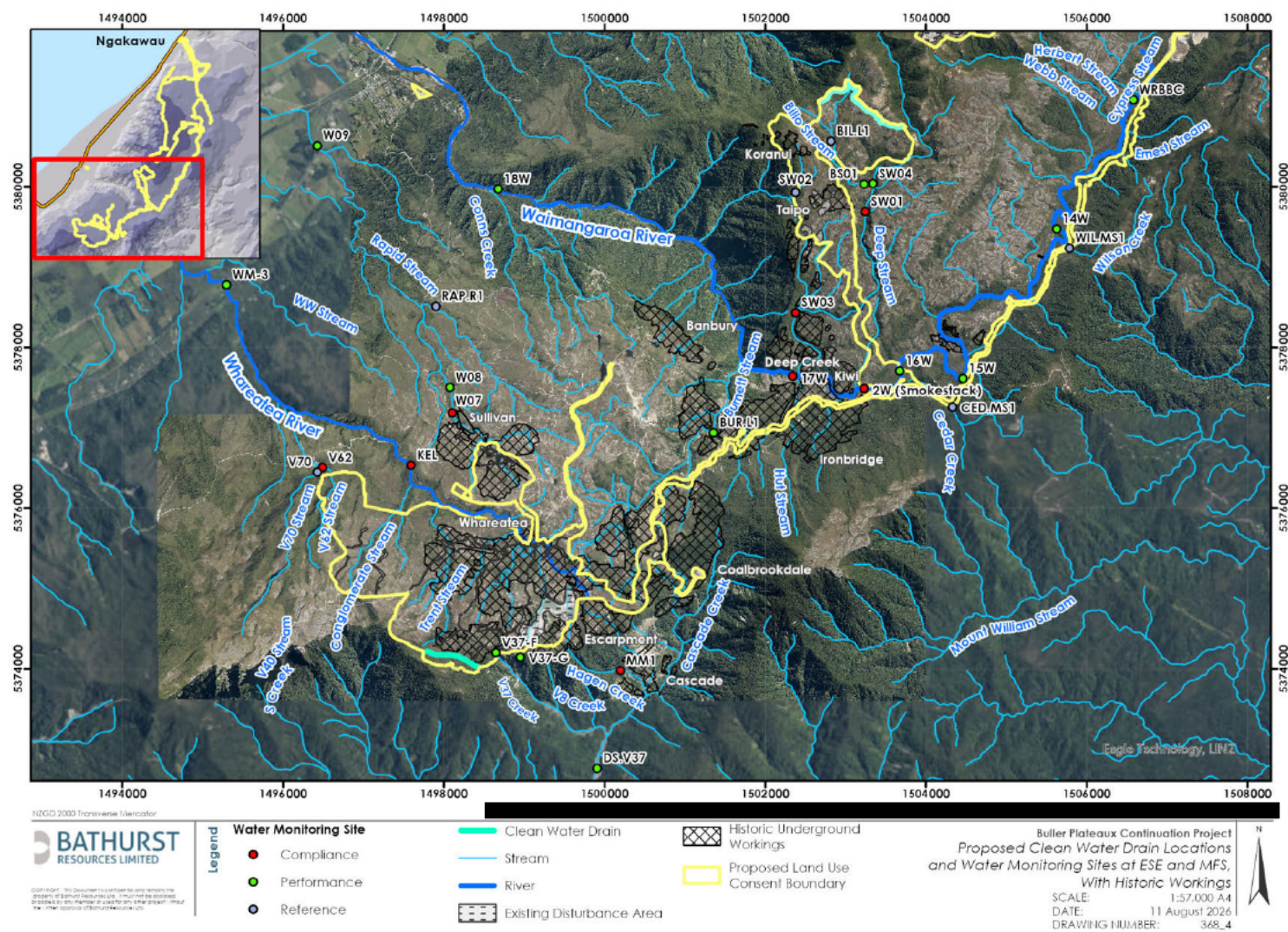


Figure 5: Waterways and water quality monitoring sites associated with the ESE, MFS, and UWHR project sub-areas.

4.3 Climate

The Deniston Plateau, located on the West Coast of New Zealand's South Island, is a temperate maritime climate characterised by high annual average rainfall, cool temperatures, and frequent cloud cover. Annual precipitation often exceeds 5,000 mm. Temperatures on the plateau are moderate, with colder and damp winters and mild summers. The combination of geology, high rainfall and moderated temperatures creates the unique ecological and hydrological characteristics of the Deniston Plateau.

Data are available from the Lake Brazil Meteorological Station, summarised on a monthly basis are available from 25 January 2013 through 31 December 2023 (~11 years). Potential evaporation (PE) has been calculated based on the Penman method (Penman, 1948) using daily data from Lake Brazil Meteorological Station and estimates of solar radiation based on the position of the projects on the surface of the earth; an energy deficit⁴ is apparent for all months, with PE calculated as approximately 15% of mean annual rainfall (5,414 mm/yr average rainfall for the 11-year period). The median rainfall intensity during any rain event was relatively high at ~1 mm/hr, with intensities greater than 1 mm/hr making up over 90% of the total observed rainfall.

The lowest monthly rainfall over the 11-year dataset was ~100 mm (December 2021) while the highest was 1,390 mm (January 2022). Monthly PE only exceeded monthly rainfall on two occasions out of 132 months on record, or ~1.5% (January 2013 and December 2021).

4.4 Historic Mining Activity

Extensive historic mining activities are present within the BPCP area (Figure 5), which have led to degraded water quality and the contamination of many surface waterways from AMD:

- 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 Deniston Plateau discharges into Cascade Creek, Waimangaroa River, Rapid Stream, and Whareatea River (near the coast where Rapid Stream enters) (Jewiss et al., 2020).
- The most recent mining operations on the Deniston Plateau took place at the existing openpit Escarpment Mine from 2014 to 2016; now on care and maintenance. The existing Escarpment Mine is supported by passive water treatment systems which continues to treat AMD from the historic escarpment underground mine as well as the recent seepage from the Barren Valley ELF (BV 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.

⁴ The term energy deficit used here refers to the difference between rainfall and potential evapotranspiration. In other words, rainfall is higher than evaporation on an annual and monthly basis.

The proposed UWHR alignment is over the Coalbrookdale and Ironbridge mine underground workings. Ironbridge Mine operated between 1889 and 1944. 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 475 m 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).

4.5 Groundwater

Groundwater studies were completed for MFS (MWM, 2026c) and ESE (MWM, 2026d). Outcomes indicate that:

- Groundwater levels are most likely already lower than natural conditions due to the dewatering effect of historical workings.
- Pit excavation and dewatering will intercept the water table, forming a groundwater sink during operations. During operations and post-closure, the passive drainage of backfilled pit voids (ELF underdrains) will mean this condition likely remains. At ESE, mining out and sealing the existing underground workings within the pit footprint will reduce the amount of uncontrolled underground mine discharge to the Cascade Creek catchment by approximately 40%.

5.0 Water Management Classification

This section explains the types of water that will be associated with the BPCP. Some waters will require management to minimise the effects of sulfide mineral oxidation and the generation of AMD.

5.1 Water Classes - Summary

This section summarises the types of water that will be encountered and/or will be created by the BPCP as determined by the AEE. Classification of waters will support a better understanding of water management. Table 5 identifies the types of water that will be present and describes the general designated management requirements. These classifications have been derived from studies that are detailed in the following reports:

- AMD Overview Report (MWM, 2026a)
- Sediment Overview Report (MWM, 2026b)

Table 5: BPCP water classification

WATER CLASS	WATER TYPE	DESCRIPTION OF WATER TYPE	MANAGEMENT REQUIREMENTS	MONITORING
1	Clean water (Section 5.2)	Unimpacted water which is diverted around disturbed areas associated with proposed mine workings.	No treatment is proposed for these waters with the expectation that they are not affected by AMD and TSS caused by BPCP activities. Addresses a key principle of water management – avoid clean water run-on to project sub-areas.	Confirm water is suitable for discharge (untreated). Monitoring is explained in BRL (2026d).
2	AMD Impacted Waters (Section 5.3)	Low pH, elevated sulfate and potential constituents of concern (PCOC) such as Al, Fe, and trace metals. Noting TSS/turbidity can also be generated from Fe- and Al- precipitates.	Water treatment being either active or passive, depending on flow rate, water quality, and mine phase.	Confirm treated water is suitable for discharge.
3	Legacy AMD Impacted Waters (Section 5.4)	AMD from historic workings.	BRL will look at control and treatment of these waters where practicable (e.g., initial pit at ESE intercepts large area of underground workings that will be directed from pit sumps for treatment) leading to betterment of surrounding waterways. Underground workings are completely mined out within the BPCP pit areas thus removing this legacy load.	Monitoring will be undertaken to understand betterment of waterways (ESNZ, 2026).
4	Suspended Sediment Impacted water (Section 5.5)	Waters that have a high sediment load due to erosion of surfaces through rainfall and surface water flows but are not affected by AMD.	Water treatment being either active or passive, depending on flow rate, water quality, discharge pathway and mine phase.	Assess treated water is suitable for discharge.

WATER CLASS	WATER TYPE	DESCRIPTION OF WATER TYPE	MANAGEMENT REQUIREMENTS	MONITORING
			Passive treatment includes sediment retention ponds, check dams, floc blocks (further details in BRL, 2026d)	
5	Rehabilitated ELF Surface Water (Section 5.6)	Once ELF surfaces are stabilised (after revegetation and rehabilitation) surface run off waters will be discharged to the surrounding streams without treatment.	No treatment is proposed for these waters after 2 years with the expectation (based on experience at Stockton) that they are not affected by AMD or TSS. This requires a non-acid forming cover system to minimise AMD effects. It is assumed with grass hydroseeding that surfaces are stabilised in 2 years with subsequent low TSS, suitable for discharge.	Assess water is suitable for discharge (untreated).
6	Mine Impacted Waters (MIW) (Section 5.7)	Includes both AMD and TSS impacted waters that will be directed to active and passive treatment systems. This can also include nitrogenous compounds from project-related activities.	Water treatment is either active or passive, depending on flow rate, water quality, and mine phase.	Assess water is suitable for discharge (treated).
7	Treated water (Section 5.8)	Waters which have undergone active and/or passive water treatment prior to discharge to the receiving environment.	Waters are discharged to the receiving environment.	Performance and compliance monitoring to confirm that active and passive treatment meets design specifications and water quality objectives (e.g., Hickey, 2026a,c)
8	Spill, Bypass and Direct Discharge water (Section 5.9)	Discharge of MIW during high flow events resulting in untreated MIW discharge to the surrounding waterways noting that some TSS will be removed by sedimentation within pit sumps.	Due to the high rainfall environment, it is impracticable to treat all MIW through the WTP. Discharge structures will be required.	Performance and compliance monitoring
9	Closure Water Bodies – Water Management (Section 5.10)	Long-term water bodies left in place to support water management (i.e., Active Closure Phase water management).	Active Closure Phase maintenance and management. Potentially transitioning into facilities that provide ecosystem services in the Post Closure Phase or water supply for Kawatiri Energy Limited. Some waterbodies may include MSR polishing ponds that will be active for many decades into the Post Closure Phase.	Performance and compliance monitoring
10	Closure Waterbodies –	Established to provide ecosystem services (e.g., pit	Minor post closure maintenance and management.	Performance and compliance

WATER CLASS	WATER TYPE	DESCRIPTION OF WATER TYPE	MANAGEMENT REQUIREMENTS	MONITORING
	Ecosystem services (Section 5.10)	lakes rehabilitated as an artificial waterbody).		monitoring (intensity declining with time)
11	Groundwater (Section 5.11)	Groundwaters within the project sub-areas may be affected by AMD. Any effects are expected to be minor and report to the ELF seepage network.	Efficient collection of in-pit ELF seepage is predicated on maintaining a lower phreatic surface within the backfilled material than that external to the pit.	Monitoring of groundwater levels and effects monitoring of nearby surface waters

5.2 Clean Water

Clean water is water that falls on undisturbed catchments within or outside of the mine footprint via rainfall or run-on to the BPCP. It is expected this water does not require treatment prior to discharge into the receiving environment.

5.2.1 Management

Clean water diversion is part of the overall water management philosophy including minimising water ingress into the ELFs that can mobilise PCOC. Clean water will be diverted away from mining disturbance areas wherever possible to reduce the volumes of MIW (i.e., clean water being contaminated by being mixed with MIW, requiring treatment) and any subsequent treatment of these waters. General management options include:

- Diversion of clean run-on water from upslope areas away from mine operating areas, pits, and ELFs.
- Avoid the construction of clean water diversion structures and drains with/within PAF materials to minimise the risk of AMD. Performance monitoring is required to confirm any effects are acceptable if PAF intersection is unavoidable. Unacceptable water quality may require treatment (see Attachment 1: BBRA).
- Installation of velocity reduction and sedimentation capture structures with progressive rehabilitation of exposed surfaces where possible.
- Construction of roads and other infrastructure to be comprised of NAF materials where possible or will be managed appropriately.
- Design of the ELF batter slopes and running surfaces to shed water as quickly as possible.
- Key planned clean water diversions are displayed in Figure 5 at MFS and ESE include the following drains:
 - MFS, East Pit, northern clean water diversion drains (CWDD).
 - ESE, southern CWDD.

Performance monitoring of water quality (and visual estimates of quantity) will be undertaken monthly near the discharge location. If water quality monitoring results suggest there is the potential

for non-compliance, then adaptive management processes need to be implemented. This could include treatment or routing water into the AMD impacted water system.

CWDDs will be designed with consideration for the following (BRL, 2026a; 2026d):

- Clearly defined upstream catchment areas to understand maximum diversion of clean water.
- Ensure clean water drain infrastructure is designed for suitable rainfall events and if exceeded there are clear pathways for the spillage of water to minimise effects on the environment and to minimise health and safety issues.
- Clean water discharge outlets to receiving streams designed to dissipate energy to reduce erosion risk within the catchment and to not overwhelm the waterway being discharged to.

5.3 AMD Impacted Water

AMD impacted water includes all water that has been in contact with mined materials that contain sulfides and are affected by elevated PCOC due to sulfide mineral oxidation. There are a number of subcategories for AMD impacted water (see Sections 5.3.1 – 5.3.4) that will be generated by the BPCP.

5.3.1 ELF Seepage

ELFs are designed to contain acid forming materials and are designed to minimise longer-term AMD risks for poor water quality (post closure) (i.e., limiting oxygen ingress, promoting water shedding), while directing seepage to basal sub-catchments for redirection to either active or passive treatment systems. ELF seepage collection points are located at the base of each ELF to capture toe seepage, through engineered underdrains. There are several ELF basal catchments where ELF seepage will be captured including at:

- **ESE:** Six basal sub-catchments (Figure 6)
- **MFS:** Fourteen basal sub-catchments (Figure 7)

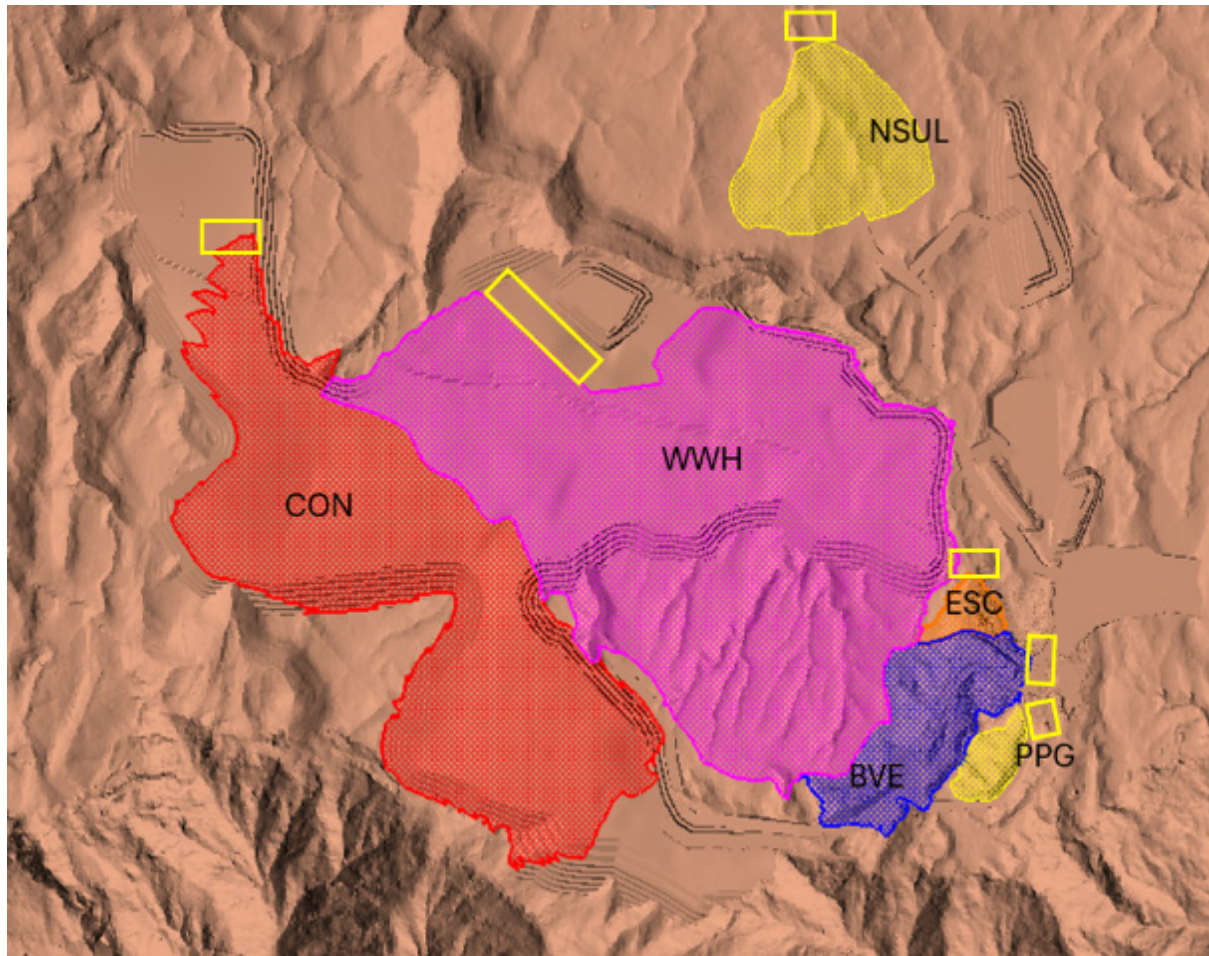


Figure 6: ESE ELF basal sub-catchments and MSR locations (yellow boxes).

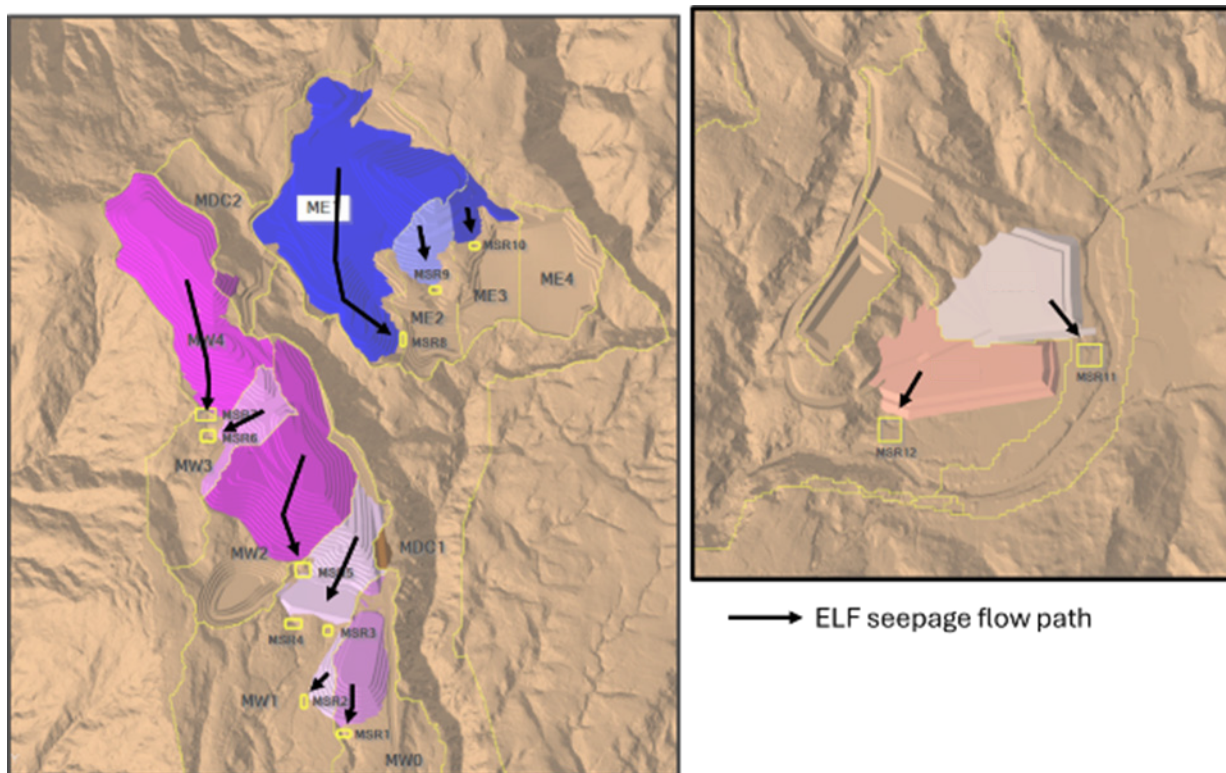


Figure 7: MFS ELF basal sub-catchments and MSR locations (yellow boxes)

5.3.2 Hardstand / Haul Roads

Hardstand and haul roads are vital operating spaces and transportation routes for mining activities. The construction of these facilities may require the use of PAF material. Where possible the surface of these facilities will be sheeted with NAF materials. If PAF materials are used for surfacing, the runoff may require collection for active treatment or be passively treated using TSS management controls. Performance monitoring is required to confirm water quality is acceptable for discharge to the receiving environment.

5.3.3 Highwalls

Seepage and surface water generated from highwalls may be affected by AMD. This water may require treatment during the BPCP Operational Phase. Progressive ABA⁵ block model development and water load balance model (WLBm) updates during the Operational Phase will expand on the knowledge base of PCOC source loads for pit highwalls and the active or passive treatment requirements during closure and post-closure phases. Road cuttings will be monitored for water quality and discharged (via sediment ponds) without treatment and in accordance with effluent discharge standards. Performance monitoring will confirm water quality meets acceptable discharge standards.

⁵ Acid Base Accounting

5.3.4 Pits

Active pits are potentially a significant source of AMD and TSS and waters derived from many domains (e.g., highwalls, coal floor, blasted materials, ELF seepage) will be directed to pit sumps with water being pumped to the WTP for treatment.

The collection of pit sump water will continue until:

- Mining of the resource is complete; and
- A decision is made for pit sump filling (with rock or water) to commence (refer to Section 9.3).

5.4 Legacy AMD Impacted Waters

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.

Studies (MWM, 2026a) indicate that the proposed ESE mining activities will contribute to an improvement in water quality and aquatic ecology in a number of AMD affected streams (e.g., Cascade Creek) by the removal of some historical underground workings and associated uncontrolled legacy AMD discharges.

Monitoring will be undertaken in accordance with the Aquatic Ecology Management Plan (STO_ENV_BLN-006) to confirm betterment outcomes. This is considered further by ESNZ (2026).

5.5 Suspended Sediment Impacted Water

Sediment impacted waters have a high sediment load due to erosion of surfaces through rainfall and surface water flows but are not affected by AMD. Such waters are likely to occur along haul roads and infrastructure areas that are surfaced with NAF material, soil stripping areas, and run-off from NAF cover systems placed over ELFs (including unstabilised NAF rehabilitation areas).

Suspended solids can also be generated by the treatment of AMD impacted waters that generate iron (Fe) and aluminium (Al) hydroxide precipitates. Such precipitates can also contribute to the measured turbidity and have similar effects to TSS generated from suspended sediment.

Three methodologies are utilised in the measurement of suspended solids in waters:

- Clarity indicates how well you can see through water.
- turbidity is how cloudy the water appears because of sediment / other solids (e.g., Fe- and Al- precipitates).
- TSS is how much sediment is in the water.

The following clarifications are provided on suspended solids measurements:

- Both clarity (m) and turbidity (NTU) can be measured in the field, whereas TSS is a lab-based measurement in mg/L.
- The general relationship is the higher the TSS, the higher the turbidity and lower the clarity.

- A relationship between lab TSS and turbidity has been developed for the WLBM for MFS and ESE to facilitate field-based monitoring.
- Compliance sites utilise both continuous and discrete turbidity measurements as the WQO.
- The development and use of the clarity and turbidity relationship is used for performance measurement sites in the low-land areas. At these locations it is the change in visual clarity at SH67 (MW-3, W09, 18W) which is the compliance measure for aesthetic effects.
- Sediment impacted waters are discussed in This Plan, however, to avoid duplication, management of the TSS impacted water is covered in detail in the Sediment Overview Report (MWM, 2026b) and by the Water Infrastructure Design Plan (BRL, 2026a) and Erosion and Sediment Control Plan for Land-Disturbance Activities (BRL, 2026d).

5.6 Rehabilitated ELF Surface Water

Progressive rehabilitation of ELFs is a significant aspect of AMD water management. ELFs are capped with a layer of NAF material then subsoil and soil layers that act to reduce water infiltration, restricts oxygen exposure to the underlying PAF material and support vegetation growth.

During the transition phase between planting of vegetation and stabilisation of the ELF surface such that it is resistant to erosion, there is a risk for elevated TSS. Erosion during this rehabilitation process is known to lead to soil armouring, which can also reduce sediment loads. The following approach is proposed for rehabilitation:

- Topsoiling, hydroseeding, and revegetation will commence according to the Rehabilitation Management Plan (BRL, 2026f) and the Mine Closure Concept Strategy (2026b), effectively providing the final cover system that will mitigate long term oxygen flux through this surface.
- It is estimated that revegetation will be established within 2 years, based on hydroseeding of grass, and that surfaces will be stable such that waters can be released direct to clean water drains and then the receiving environment without further management.
- Performance monitoring will be undertaken to confirm water quality is suitable for discharge after 2 years. If waters remain of poor quality, then a longer period for active treatment and/or passive treatment options will be required.

5.7 Mine-impacted Water

Mine-impacted water includes water affected by both AMD and TSS. They are derived from operating areas of the mine where AMD forming materials are being mined and ongoing disturbances that generate sediment.

5.8 Treated Water

Water treatment is an integral part of the BPCP water management system and infrastructure. Treated water is water that has passed through either:

- An active water treatment plant (WTP), or
- A passive treatment system (PTS)

Active and passive treatment staging is shown in Figure 3. Further details on AMD treatment are provided in later sections of this plan.

5.9 Spill, Bypass, and Direct Discharge Water

Given the high rainfall environment, storage of MIW and transfer of all water to the WTP from active pits / pit sumps is impracticable due to the significant infrastructure that would be required, and AMD impacted water is planned to spill and/or be discharged during higher flow conditions to receiving streams. These effects have been assessed (Hickey, 2026a, 2026c; MWM, 2026h, 2026i) and management during phases are discussed in This Plan.

5.10 Closure Waterbodies

Several mine voids will be present at closure of the BPCP. These are described in Table 6 and may include three types of mine voids, following re-purposing at closure, to provide:

- Short term water management services during the Active Treatment Phase potentially transitioning into facilities that provide ecosystem services in the Post Closure Phase.
- Long term water management services into the Post Closure Phase.
- Ecosystem services by the end of earthworks (i.e., at completion of the Operational Phase).

The location of these closure water bodies is provided in Figure 8 and Figure 9.

Ecosystem services are discussed in ESNZ (2026). Further details on closure management of these pit voids are provided in Section 11.3.

Table 6: Closure water management infrastructure (ESE and MFS)

Void	Area (m ²)	Volume (m ³)	Average Depth (m)	Max Depth (m)	Purpose
ESE sub-area					
Lake Brazil	19,669	28,670	1.5	7.0	Transition to providing ecosystem services in the Post Closure Phase.
Ex-pit Seal	24,148	240,000	14.1	20	Transition to providing ecosystem services in the Post Closure Phase.
Ex WTP Sump	12,419	56,101	4.5	6.7	Transition to providing ecosystem services in the Post Closure Phase.
WWH Sump	44,570	821,017	18.4	22.7	Long Term Water Treatment Infrastructure (e.g., passive treatment)
CON Sump	8,339	35,943	4.3	5.0	Long Term Water Treatment Infrastructure (e.g., passive treatment)
MFS sub-area					
MFS East Coal Floor	7,406	18,617	3.1	6.2	Transition to providing ecosystem services in the Post Closure Phase.

Void	Area (m ²)	Volume (m ³)	Average Depth (m)	Max Depth (m)	Purpose
MFS East Sump	23,983	322,109	9.3	18.6	Transition to providing ecosystem services in the Post Closure Phase.
MFS West Sump	38,595	732,163 ²	16.0	32.0	Transition to providing ecosystem services in the Post Closure Phase.
MFS WTP Sumps	8,552	51,513	5.5	11.0	Transition to providing ecosystem services in the Post Closure Phase.

1 - Final volume after backfill at closure

2 - Based on the total potential design capacity.

Additional water bodies present at closure are associated with the passive treatment systems, which will remain in place until treatment is no longer required and then will be decommissioned or retained. This will include:

- The MSR ponds– which will have AMD impacted water ponded over mussel shells to enable equalised flow through the downflow system.
- The MSR polishing pond – designed as the same size as the MSR but having improved water quality that requires oxidation and precipitation of iron and any adsorbed trace metals.

These ponds are shown in Table 7 below and illustrated in Figure 6 and Figure 7 (Section 5.3.1).

Table 7: Closure MSR water management infrastructure (ESE and MFS)

MSR and Polishing Pond	MSR Area (m ²)	Polishing Pond Area (m ²)	MSR Depth (m)	Polishing Pond Depth (m)
ESE sub-area				
BVE ELF MSR	1,537	1,537	1.5	1.5
CON ELF MSR	8,339	8,339	1.5	1.5
NSUL ELF MSR	1,994	1,994	1.5	1.5
PPG ELF MSR	306	306	1.5	1.5
ESC ELF MSR	245	245	1.5	1.5
WWH ELF MSR	12,991	12,991	1.5	1.5
MFS sub-area				
MSR1 ELF MSR	512	512	1.5	1.5
MSR2 ELF MSR	128	128	1.5	1.5
MSR3 ELF MSR	345	345	1.5	1.5
MSR4 ELF MSR	345	345	1.5	1.5
MSR5 ELF MSR	1,582	1,582	1.5	1.5
MSR6 ELF MSR	375	375	1.5	1.5
MSR7 ELF MSR	1,683	1,683	1.5	1.5
MDC1 ELF MSR	49.1	49.1	1.5	1.5
MDC2 ELF MSR	42.4	42.4	1.5	1.5

MSR and Polishing Pond	MSR Area (m ²)	Polishing Pond Area (m ²)	MSR Depth (m)	Polishing Pond Depth (m)
MSR8 ELF MSR	2,644	2,644	1.5	1.5
MSR9 ELF MSR	331	331	1.5	1.5
MSR10 ELF MSR	204	204	1.5	1.5
MSR11 ELF MSR	244	244	1.5	1.5
MSR12 ELF MSR	244	244	1.5	1.5

Note: Both the MSR and the MSR Polishing Ponds can be made deeper to increase the hydraulic residence time, and/or allow for AMD sludge accumulation at the bottom of the MSR polishing pond.

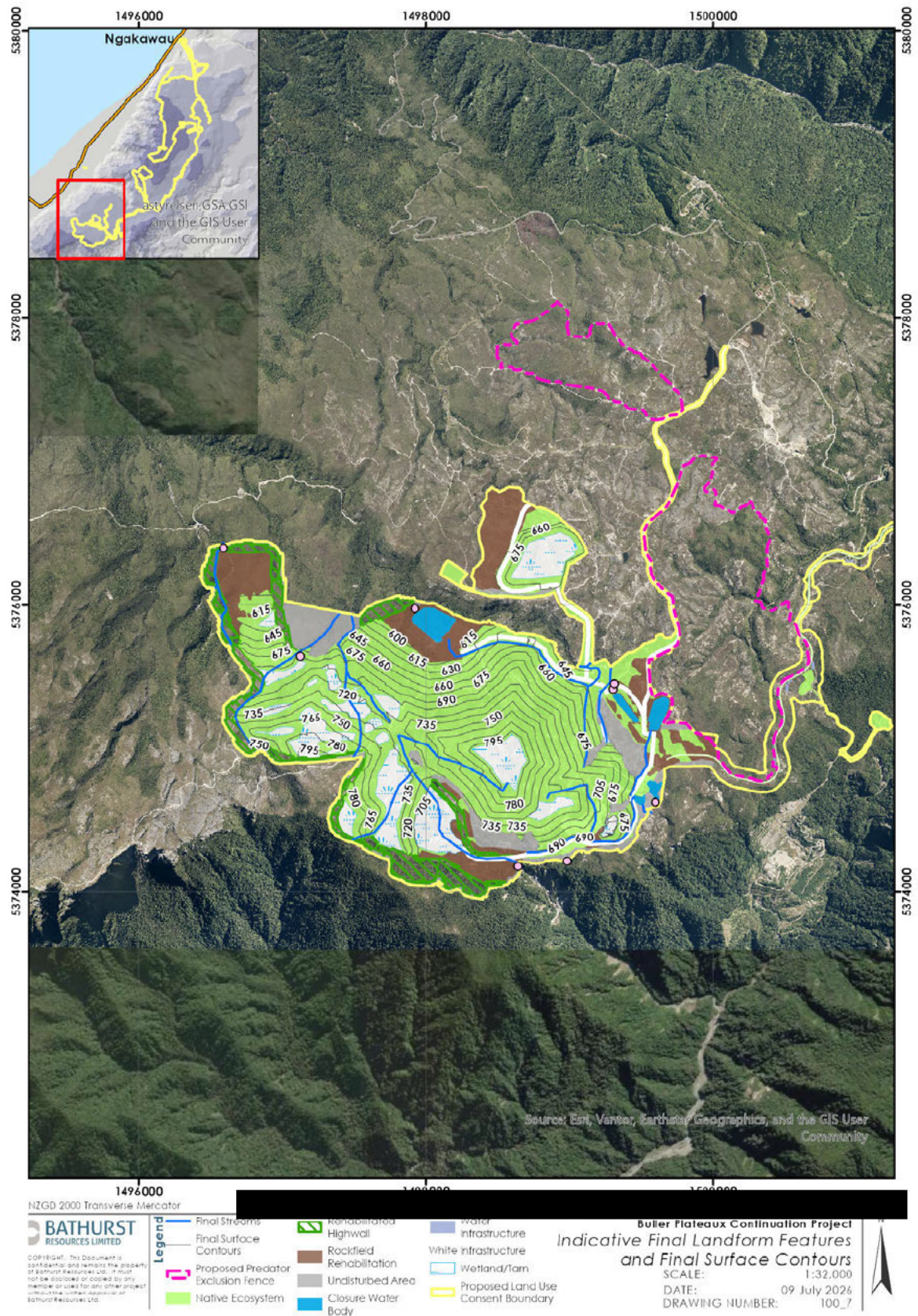


Figure 8: ESE final landform features

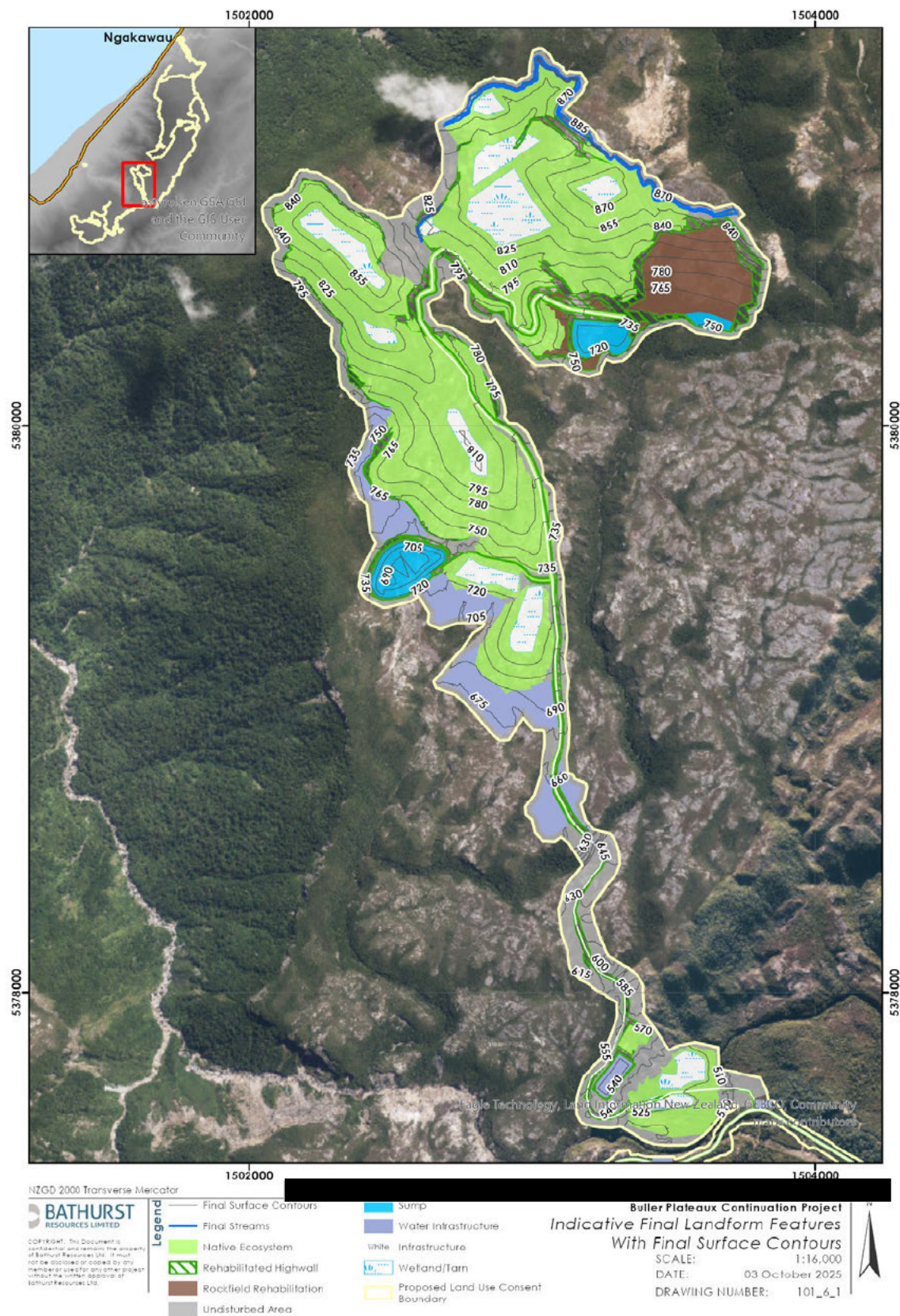


Figure 9: MFS final landform features

5.11 Groundwater

Groundwater flows are strongly influenced by underground mining activities at MFS, ESE, and along parts of the UWHR. The following considerations are noted with regard to groundwater characterisation and management:

- Groundwater flow from underground workings can be impacted by AMD.
- Groundwater levels can already be lower than natural conditions due to the dewatering effect of historical workings. Further mining will intercept the water table forming a groundwater sink during operations, which is likely to remain in closure.
- At ESE, mining out and sealing off the existing underground workings within the pit footprint will reduce the amount of underground mine discharge to the Cascade Creek catchment by approximately 40%. This has betterment opportunities and has been assessed through the BPCP (ESNZ, 2026).
- Sealing of underground workings that connect to pit voids may be required to prevent the loss of MIW to the receiving environment. A standard operating procedure will be required for this activity.

Further details are discussed in MWM (2026c; 2026d).

6.0 Risk Assessment

Water management risks associated with AMD have been identified through a broad-brush risk assessment (BBRA) that is provided as Attachment 1. Key risks, as identified through the BBRA, are managed by This Plan.

6.1 Risk Assessment Process

High-priority AMD water management related risks, associated with the management, control, and treatment of water, have been identified for the BPCP. Other risks associated with prediction, prevention, and minimisation of AMD are discussed in the AMD ELF Management Plan (BRL, 2026c).

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 HSEC⁶ Framework, and the ***BRL-HST-STD-001 Risk Management Standard***.

The following risk assessments were also undertaken to complement the AMD WMP risk assessment:

- AMD broad-brush risk assessment (BBRA): Attachment 1.
- Environment and Community (E&C) Broad Brush Risk Assessment (BBRA), ongoing regular reviews in accordance with the Bathurst corporate standards (HSEC Framework).

6.2 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.

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

The key potential impacts to surface and groundwater downstream from the Project have been identified through the BBRA process and include:

- Suspended solids as identified as TSS in the BBRA.
- AMD, which is typically low pH and elevated acidity, sulfate (SO₄), and certain PCOCs such as aluminium (Al), iron (Fe), and lesser amounts of trace metals that include cobalt (Co), copper (Cu), manganese (Mn), nickel (Ni), and zinc (Zn).
- Minimum environmental flows to maintain aquatic ecology habitats.
- Minimum flow rates required to maintain site Kawatiri Energy Limited (KEL) to generate hydroelectricity.

⁶ Health, Safety, Environment, Community

Impacts to water quality that arise from spills and leaks from hazardous materials are minimised through management measures in the BRL's Hazardous Substances Management Plan (**BPCP-ENV-PLN-014**).

Impacts to health and safety from identified risks such as underground workings, extreme weather events causing flooding, inundation due to earthquake are covered in the sites EHS system and BRL's Emergency Preparedness and Response Plan.

6.3 AMD Risks and Management Measures

The BBRA (Attachment 1) identified the hazards, key risks, management, control, and treatment of AMD and TSS impacted waters. This section does not replicate the BBRA which provides both the inherent and residual risk rating after consideration of achievable management measures. However, this section aims to provide the management measures for each mine phase through understanding of background data (geochemical rock and water) to minimise the risk and engineering design for control and treatment.

All relevant recommendations from the AMD Overview Report (MWM 2026a) have been cross referenced in this report. Detailed recommendations relating to the ELFs are contained in BPCP-ENV-PLN-011 ELF MP (BRL, 2026c) and cross-referenced where applicable.

AMD and TSS Risks are considered further based on the mining phase listed as:

- Construction Phase water management
- Operational Phase water management
- Active Closure water management
- Post Closure water management

7.0 Construction Phase Water Management

7.1 Introduction

The Construction Phase relates to the BPCP time-period when the active water treatment plants and associated ponds (e.g., surge ponds) have not yet been constructed and commissioned at MFS and ESE in their entirety, and small portable water treatment plants, or engineering controls, are required.

The Construction Phase is two years (Figure 3) and starts with the commencement of earthworks within the ESE sub-area and continues until the permanent ESE water treatment plant is commissioned (within three years of the commencement of mining activities) and includes the following activities:

- Road Construction (UWHR and MFS Access Road) (starts with the commencement of earthworks within the UWHR sub-area and continues until the commencement of coal haulage between the ESE sub-area and/or the MFS sub-area through to the Stockton sub-area)
- Construction of ancillary mine infrastructure and mine development at MFS and ESE sub-areas

Until the permanent WTP are constructed, the Approval Holder must operate temporary water treatment systems as required to ensure the downstream receiving water quality limits specified by this authority are met.

This section of the Plan addresses the management of AMD during the Construction Phase for MFS, ESE, and the UWHR. The management of TSS is discussed in other documents (e.g., BRL 2026a,d).

This AMD WMP will be updated prior to the Construction Phase commencing and then in accordance with the PDCA adaptive management cycle and document review requirements as listed in Section 16.0.

7.2 AMD Hazard

It is recognised that the BPCP activities associated with ground disturbance can generate AMD, which is related to the disturbance of PAF materials including KMS and BCM.

Two AMD source hazards have been identified as being present for the BPCP prior to the commissioning of the WTP at ESE and MFS:

- Cut surfaces (e.g., road cuttings, infrastructure area cuttings, soil stripping) through BCM and KMS (and potentially quaternary materials) with the potential to generate AMD.
- Fill areas (i.e., where depressions in the topography are filled with rock to raise the original surface as part of construction of a road or infrastructure area), and ELF's that have the potential to generate AMD seepage.

The classification and management of sulfidic materials to minimise potential effects is discussed in the BRL, 2026c. The following management measures are identified as recommendations from BRL, 2026c during the Construction Phase and include:

- Update the water and load balance model prior to the commencement of the Construction Phase for ESE and MFS to ensure effects are understood and water treatment infrastructure is appropriate.
- Develop a suitable water management system for MFS and ESE infrastructure areas to ensure AMD and TSS effects are managed.
- Monitor and review PCOC loads during the construction phase through performance monitoring.
- Update water and load balance modelling, as required, for ESE and MFS, ensuring that the current estimated PCOC loads reflect real outcomes, and water treatment infrastructure is appropriate.

Alternative WLBM scenarios suggest that wet years may lead to spilling from pit sumps. As such, it is recommended that where practical, sump water volumes are kept low to allow for sufficient storage to minimise the risk of spilling. Install instrumentation to sump bypass infrastructure, WTP discharges and direct discharges such that the frequency, duration, and water volume discharges is recorded and reviewed annually.

7.3 Potential AMD Effects

MFS, ESE, and UWHR will be affected by AMD during the Construction Phase. Source control techniques (BRL, 2026c) will be employed to minimise effects.

7.3.1 UWHR and MFS Access Road

The following effects are identified (MWM, 2026f):

- For cut road surfaces, the screening assessment for AMD indicates that the additional load from cut surfaces has limited impact (based on the planned area of exposed cut surfaces). The key driver of poor water quality at 2W (Smokestack) is the current background water quality (MWM, 2026a).
- For fill areas, load modelling indicates that acidity could increase by ~1 mg CaCO₃/L at Smokestack, which is ~15% of the current (background) acidity measured at Smokestack (6 mg CaCO₃/L) if no management was undertaken.

Management of the larger fill areas (nominally identified as >2 m high and >10,000 m³, identified as ~44% of the total BCM fill areas) is recommended to minimise AMD and TSS effects in the longer term (i.e., planning for closure) by undertaking source control activities during the Construction Phase by:

- Construction of larger fill areas as engineered fill areas (EFA) using design principles discussed in the ELF design philosophy report (MWM, 2026g). The specific design objectives for EFA are explained in the AMD ELF Management Plan (BRL, 2026c).
- Installing a low permeability layer (LPL) or geosynthetic clay liner (GCL) atop PAF fill material to minimise net percolation into these materials.
- Complete, ahead of construction, an assessment of AMD seeps (natural and historic) along the UWHR to confirm background effects.

- Developing a suitable performance monitoring program for the roads to ensure that any AMD effects are acceptable.
- Complete, ahead of construction, an assessment of the effects of collapsing the Ironbridge underground mine workings on water quality.
- Develop and implement the sealing of underground workings (as explained by BPCP-ENV-SOP-03) to minimise continual potential discharges from underground mine water to the receiving environment.
- Install clean water diversion, control and direction of waters to the environment.
- Implement sediment control as proposed in the erosion and sediment control management plans (BRL, 2026a, 2026d)

7.3.2 ESE and MFS

Infrastructure will be constructed at ESE, in the vicinity of the existing area of disturbance at the existing Escarpment Mine, with ancillary structures constructed around the planned mine site. A box cut and mine development activities will be undertaken. At MFS, infrastructure will be placed at the bottom of the MFS Access Road, adjacent to the Waimangaroa River, and at the base of the planned MFS West Pit.

Moderate amounts of overburden will be moved during the Construction Phase, which could generate moderate acidity and AMD sludge loads (Table 8).

Table 8: Construction Phase acidity loads and AMD sludge volumes

BPCP Sub-Area	Indicative Year	Project Stage	Overburden Moved (bcm)	Acid Load (t/yr)	AMD Sludge (3 wt% solids) m ³
MFS	FY27	Stage -1	395,600	42	4,831
MFS	FY28	Stage 0	1,394,100	147	17,023
MFS	FY29	Stage 1	850,700	89	10,388
ESE	FY27	Stage -1	659,200	61	7,143
ESE	FY28	Stage 0	4,348,200	404	47,114

Green cells relate to the Construction Phase. Grey Cells are the first year of the WLBW for MFS and ESE

bcm = bank cubic metres.

For reference, the Barren Valley ELF (~350,000 m³; ~750,000 t) that has been constructed at the existing Escarpment Mine generates 10-20 t/yr of acidity, which indicates the proposed acidity loads that will be generated on the Construction Phase are suitable as analogue data for planning purposes (i.e., treatment requirements). The acidity and TSS loads that can be practicably captured and controlled will be treated by pWTPs and/or passive treatment processes until the permanent WTP can be commissioned.

During the Construction Phase, AMD treatment is expected to generate AMD sludge, which will be disposed of within Pit 3 Pit Lake at ESE (200,000 m³ capacity) and within a purpose-built 10,000 m³ sump at MFS near the MFS Coal Pad.

7.4 Construction Phase AMD Water Management Summary

This section describes the general water management approach during the Construction Phase for MFS, ESE, and the UWHR.

Prior to construction activities commencing, the WLBM for the Construction Phase will be updated to ensure the assessment of effects presented in This Plan are current and that water treatment infrastructure is appropriate.

7.4.1 MFS

At MFS, the construction Phase is over 2 years (2 stages).

7.4.1.1 Stage -1 Water Management

The water management system is provided in Figure 10.

Construction will follow the Erosion and Sediment Control Plan for Land-Disturbance Activities (BRL, 2026d), and, where waters are impacted by AMD, will be directed to a treatment sump located within the Coal Pad area. Where waters cannot flow passively to the treatment sump, they will be pumped as required.

The treatment sump (~10,000 m³) will be combined with a small pWTP to dose neutralising agents (either CaO or NaOH) to incoming waters. This will neutralise acidity with MIW, targeting treatment of AMD to pH 7.5, and maximise removal of metals. During higher flows, waters will pass through the sump for capture of sediment and precipitates, however, a portion of suspended solids may pass through without settling.

Treated water discharge from the sump will be to the Waimangaroa River (upstream of 2W (Smokestack)). This discharge location is shown schematically in Figure 10.

The Access Road and infrastructure areas will be discharged via sediment retention ponds as per BRL (2026a) to the receiving environment where water quality is suitable.

All discharges will be monitored to identify effects to the receiving environment. Infrastructure will be designed to achieve suitable discharge water quality as part of adaptive management.

Mount Frederick South (MFS) Construction Phase, Stage -1, Flow Diagram

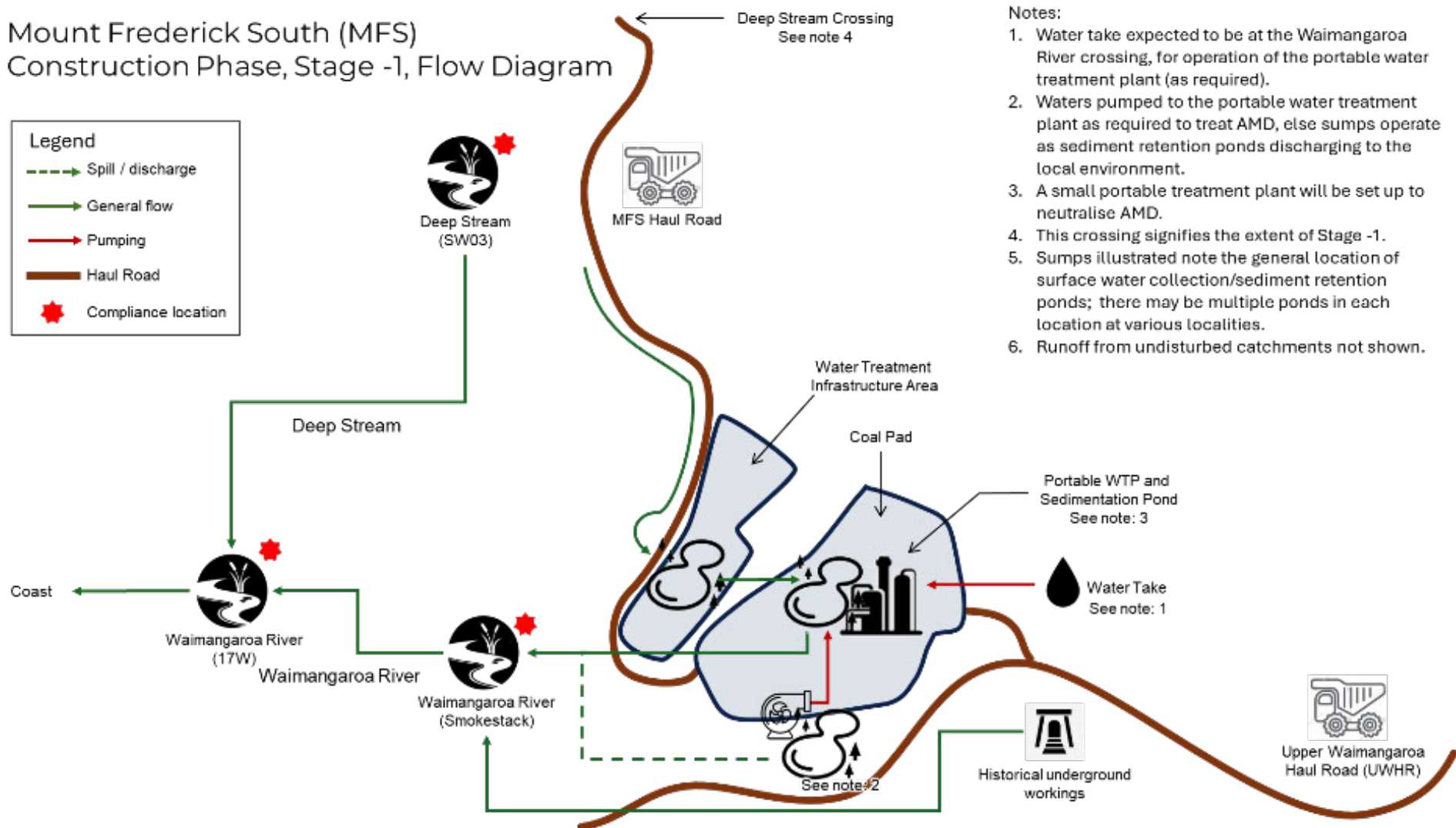


Figure 10: MFS Construction Phase, Stage -1, Water Management

7.4.1.2 Stage 0 Water Management

The water management system for Stage 0 is provided in Figure 11.

As construction continues towards the West Pit, construction waters will be directed to the Coal Pad sump for treatment until a local treatment sump can be constructed downstream of the West Pit construction activities. This new MFS sump will collect:

- West Pit ELF seepage and surface runoff.
- Infrastructure Pad seepage and surface runoff.
- West Pit Sump waters.
- MFS access road runoff.

The MFS treatment sump will be utilised for treatment of AMD impacted waters, where a small pWTP will dose neutralising agents (either CaO or NaOH). Ensure monitoring during construction of the ELF is undertaken to confirm that seepage water and flow is collected and incorporated into the ELF construction requirements and construction QA/QC⁷ procedure as per the AMD ELFMP.

As identified in BBRA risks #9, #10, #11, #19, and #104, construction activities associated with road and sedimentation ponds will follow the Erosion and Sediment Control Plan for Land-Disturbance Activities (BRL, 2026d). Where waters are impacted by AMD, these waters will be directed to the MFS sump for treatment.

Management of TSS may include the following activities

- Road design to ensure space available for sedimentation ponds.
- Allowance for additional engineering controls.
- Stabilise section(s) of road with asphalt.
- Performance monitoring and maintenance road sealing in problematic areas.

The treatment system will allow sedimentation and flocculation / precipitation to occur prior to discharge. However, during flood events, a portion of suspended solids may pass through the system.

Waters discharging from the portable treatment plant and MFS sump will be directed to a tributary of Deep Stream (upstream of monitoring site SW03). Treated water quality parameters will be monitored closely and potential pumping if required, to mix with the Waimangaroa River may occur to ensure the WQO for both Deep Stream and the Waimangaroa River are met.

The Access Road and infrastructure areas will be discharged via sediment retention ponds as per BRL (2026a).

⁷ Quality Assurance / Quality Control

After the active WTP is constructed and commissioned, all AMD and TSS impacted waters will be treated through the WTP. Waters requiring only TSS sedimentation will be managed through local sedimentation ponds as per BRL (2026a,d).

Mount Frederick South (MFS) Construction Phase, Stage 0, Flow Diagram

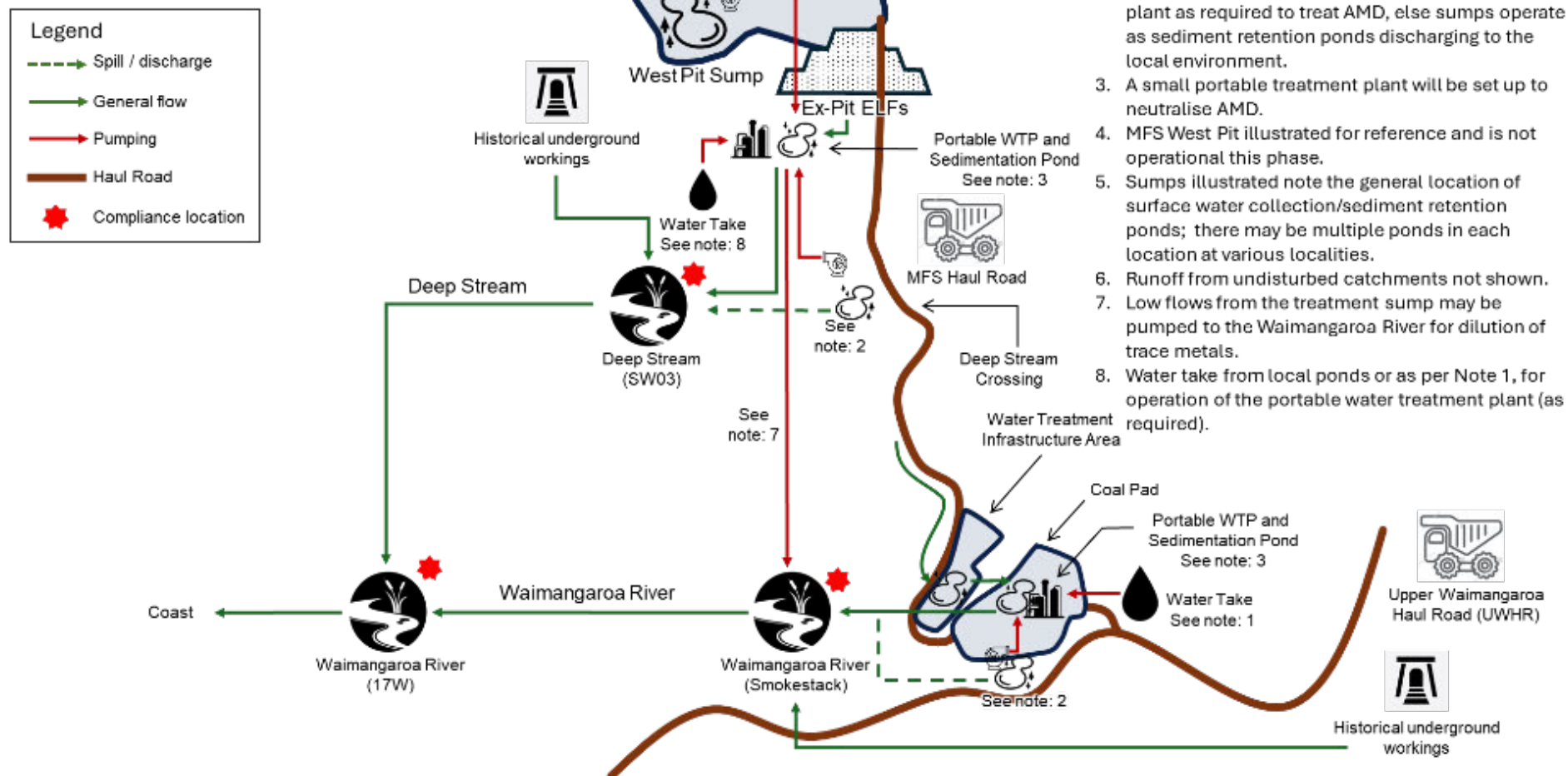


Figure 11: MFS Construction Phase, Stage 0, Water Management

7.4.2 ESE

7.4.2.1 Stage -1 Water Management

The water management system is provided in Figure 12.

The Pit 3 Pit Lake will be used as the main MIW treatment sump. Here, a small pWTP will dose neutralising agents (either CaO or NaOH) to incoming AMD impacted waters.

Construction activities follow the Erosion and Sediment Control Plan for Land-Disturbance Activities (BRL, 2026d). Where waters are impacted by AMD, these will be directed to the Pit 3 Pit Lake for treatment.

Water entering the Pit 3 Pit Lake will be confined to a single inlet for targeted dosing and mixing. Sedimentation and flocculation / precipitation will occur within the Pit 3 Pit Lake. Discharge water will flow to V8 Creek (a tributary of Cascade Creek) via Lake Brazil (a sump adjacent to the Pit Lake) with compliance monitoring at site M-M1 (Figure 12).

During higher flows, a small portion of suspended solids may pass through to the outlet. Additional sediment management controls will be available (e.g., floc addition and sedimentation in Lake Brazil), as was undertaken successfully during mining at Escarpment Mine around 2016.

The infrastructure areas are to be constructed via cut and fill, with excess overburden placed within the Barren Valley ELF extension. Water from these areas will be managed through Pit 3 Pit Lake, and, where seepage from fill areas cannot be controlled, these sections will be filled with NAF material.

All discharges will be monitored to identify effects to the receiving environment. Infrastructure will be assessed for ways to achieve suitable discharge water quality as part of the PDCA adaptive management process.

Clean water diversions will be constructed as required.

ESE Construction Phase, Stage -1, Flow Diagram

Notes:

1. All pond water is pumped to Pit 3 Pit Lake. A pond here will later be used as the WTP Polishing Pond.
2. Water take from Pit 3/Lake Brazil for operation of the portable water treatment plant (as required).
3. ESE Pit extent illustrated for reference.
4. Runoff from undisturbed catchments not shown.
5. Sediment retention ponds will be located at various localities. A single pond is shown for simplicity.
6. Construction activity stormwater may be pumped from sediment retention ponds to the Pit 3 Pit Lake for AMD treatment as required.
7. These waterways may receive impacted waters for a limited period during the construction of water infrastructure controls (e.g., channels, sumps and pumping stations) prior to the waters being directed to Pit 3 Pit Lake. Monitoring of any discharges will undertaken.

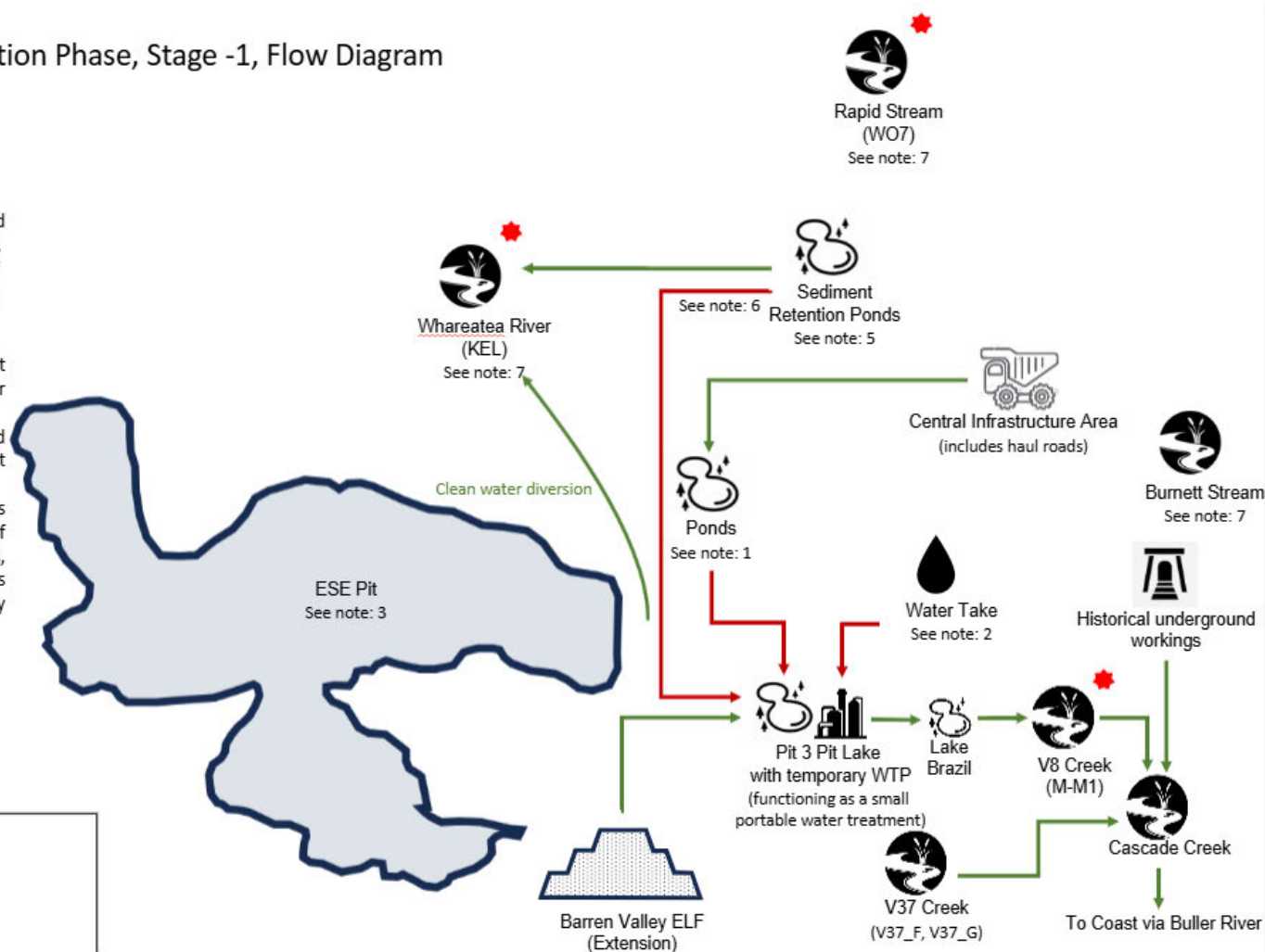
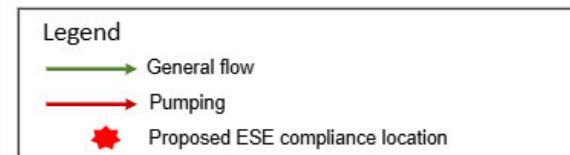


Figure 12: ESE Construction Phase, Stage -1, Water Management

7.4.2.2 *Stage 0 Water Management*

The water management system is provided in Figure 13.

The Pit 3 Pit Lake and pWTP will continue to treat AMD impacted waters until the active WTP is constructed, where the pWTP will then be decommissioned. The active WTP is expected to be constructed early in this stage ahead of major earthworks associated with developing the mine. Once constructed, the active WTP will be fed from the Pit 3 Pit Lake until the Ex-Pit Seal is constructed (the planned surge sump). All AMD impacted water will then pass through the active WTP where it will discharge to the polishing pond (constructed in Stage -1) and then to the Whareatea River.

All discharges will be monitored to identify effects to the receiving environment with compliance sites on the Whareatea River (KEL) and Rapid Stream (W07) (Figure 13). Infrastructure will be designed and assessed for ways to achieve suitable discharge water quality as part of adaptive management.

Construction activities will continue to operate under the Erosion and Sediment Control Plan for Land-Disturbance Activities (BRL, 2026d), and, where waters are impacted by AMD, are directed to the active WTP for treatment via the surge sump (Pit 3 Pit Lake initially and later the Ex-Pit Seal). Water requiring only settlement of TSS will be managed through sediment retention ponds.

Clean water diversions will be constructed as required to limit the volume of water needing treatment.

Mine development (box cut and CWDD construction) will generate a large amount of overburden; this will be placed within the Barren Valley ELF extension and Central ELF. Surface and seep water will be transported by gravity or pumping to the pWTP / active WTP for treatment.

The ESE Box-cut will be developed during this time.

ESE Construction Phase, Stage 0, Flow Diagram

Notes:

1. The Ex-Pit Seal is used as the Surge Pond for the full scale WTP.
2. Water take from local ponds for operation of the portable water treatment plant (as required).
3. ESE Pit extent illustrated for reference.
4. Runoff from undisturbed catchments not shown.
5. Sediment retention ponds will be located at various localities. A single pond is shown for simplicity.
6. Construction activity stormwater may be pumped from sediment retention ponds to the Ex-Pit Seal for AMD treatment as required.
7. These catchments will be impacted during the construction phase. The waterways may receive impacted waters for a limited period during the construction of water infrastructure controls (e.g., channels, sumps and pumping stations) prior to the waters being directed to the Ex-Pit Seal. Monitoring of any discharges will undertaken.

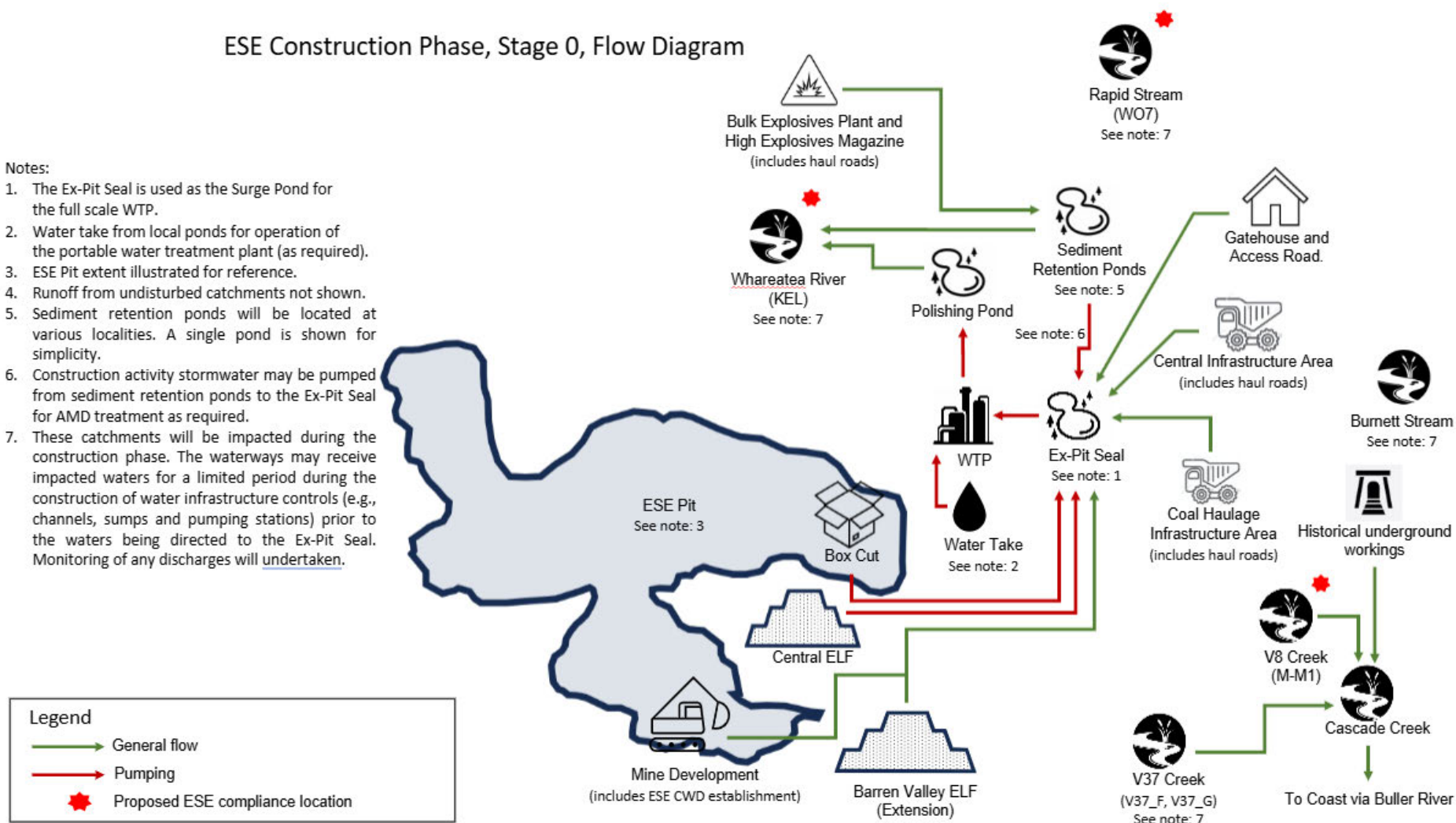


Figure 13: ESE Construction Phase, Stage 0, Water Management

7.4.2.3 Barren Valley ELF

The existing BV ELF will be extended using overburden (i.e., mine rock) placed in this area during the Construction Phase. This will require:

- The BV ELF underdrain to be extended.
- The BV ELF MSR to be decommissioned and mine rock dumped overtop as part of the ELF. ELF seepage will report to the underdrain and be captured for treatment.

7.4.3 UWHR

As identified in BBRA #9, #10, #11, #19, and #104 construction activities associated with road and sedimentation ponds will follow the Erosion and Sediment Control Plan for Land-Disturbance Activities (BRL, 2026d). This will include the following features:

- Water infrastructure, such as channel, culverts, diversions, silt fences, temporary sumps, and permanent sediment retention ponds (BRL, 2026d).
- Temporary treatment of TSS and AMD using pWTPs where required.
- Performance and compliance water quality monitoring.
- Road design to ensure space available for sedimentation ponds.
- Allowance for additional engineering controls.
- Stabilise section(s) of road with Asphalt.
- Performance monitoring and maintenance Road sealing in problematic areas.
- MWM 2026a Recommendation #6, #42, #43, #44:
 - Undertake further AMD assessment of the materials that will be disturbed during construction of the UWHR.
 - Complete, ahead of construction, an assessment of AMD seeps (natural and historic) along the UWHR to map the specific sources of background effects.
 - Undertake geotechnical drilling programmes along the length of the UWHR as it is constructed and access the core for geotechnical and geochemical properties.
 - Ensure all colluvium will be carted to Stockton for disposal as PAF (unless ABA testing confirms it is NAF).
 - Undertake continual AMD assessment of the materials that will be disturbed during construction of the UWHR.

7.5 AMD Treatment

AMD treatment is expected to be required during the Construction Phase in some areas. This section summarises these treatment processes. As noted in MWM (2026a) recommendation #20: Portable WTP are required for MFS, ESE, and potentially the UWHR to treat AMD and TSS.

7.5.1 UWHR and MFS Access Road

AMD generated from exposed cut surfaces and constructed fill areas along the UWHR and MFS Access Road is predicted to be minor and controlled through dilution and undertaking of source control activities (MWM, 2026f).

7.5.2 MFS and ESE

The acidity loads (Table 8) that can be practicably captured and controlled at MFS and ESE will be treated by portable treatment systems and/or passive treatment processes. This will involve using a small pWTP to dose neutralising agents (either CaO or NaOH) to AMD impacted water directed to a purposely constructed treatment sump or existing suitable sump, to provide neutralisation of acidic waters and targeted treatment to pH 7.5 to maximise removal of metals. The addition of flocculants may be used as required to precipitate AMD floc and TSS. Deployment of these systems depends on the nature and duration of specific construction activities and will rely on the experience of the BRL team with management of AMD at Stockton mine. Based on existing data, the acid loads that are expected include:

- The peak MIW PCOC loads reporting to the MFS WTP occur in 2040, with approximately 324 tonnes per year (t/year) of acidity, 31 t/year of aluminium (Al), and 13 t/year of iron (Fe). Modelling also indicates that 2041 is the peak year for TSS load, with 870 t/year of TSS.
- Peak MIW PCOC loads reporting to the ESE WTP occur in 2036/37, with approximately 4,700 tonnes per year (t/year) of acidity, 460 t/year of aluminium (Al) and 210 t/year of iron (Fe). 2035 was the peak year for sediment load, with 1,550 t/year.
- Active treatment at MFS will be required for about 4 years after completion of rehabilitation before MSRs can treat PCOC loads to meet the water quality limits proposed by Hickey (2026a) in receiving waterways. This is related to lower sulfur content and smaller quantities of overburden disturbance compared to ESE.
- Active treatment at ESE will be required for ~15 years after mining operations cease before MSRs can treat PCOC loads to meet the limits proposed by Hickey (2026a) in receiving waterways. Some ELF seepage will be able to be treated effectively with MSRs earlier than this.
- Models demonstrate that at transition from active water treatment to passive treatment systems the acid loads from each ELF will range from ~1 t/yr to ~300 t/yr, which will require treatment for many decades for the identified PCOC.
- Approximately ~200 tonnes of acid could be treated each year at MFS generating ~20,000 m³ of AMD sludge over the two-year period for the disturbance of ~1,800,000 bcm of overburden.

- Approximately 60 tonnes of acid could be treated at ESE generating 10,000 m³ of AMD sludge for the disturbance of ~660,000 bcm of overburden in the first year.
- These acidity loads are conservative for planning purposes given the BV ELF (~356,000 bcm) generated acid loads of 10-20 t/yr (MWM, 2026b).

7.6 AMD Sludge Management

The following AMD sludge management is proposed:

- **ESE:** The current Escarpment Mine Pit 3 Pit Lake and other existing water treatment infrastructure (e.g., Lake Brazil) will be used to treat and settle AMD sludge (i.e., the system is in place, except for the treatment plant). Backfill of rock will eventually bury this AMD sludge. Pit 3 has a capacity of ~200,000 m³.
- **MFS:** A temporary sump of 10,000 m³ will be built near the MFS Coal Storage Pad. This will be operational until the MFS WTP is constructed and will manage treatment of any AMD impacted water during the Construction Phase. The sump will require periodic cleaning and removal of AMD sludge to ESE or Stockton to ensure sufficient capacity for AMD sludge settlement. Once the WTP is operating this AMD sludge sump will be backfilled.
- Management processes will be developed to dewater AMD sludge prior to removal and disposal.
- In the second year of Construction at MFS and ESE, AMD sludge will be placed in unlined cells within ELFs (BRL, 2026f).

7.7 Water Treatment Plant Commissioning

The treatment of AMD and TSS is expected throughout Construction, Operation, and Active Closure Phases and until such time that full transition to passive treatment systems is achieved. During the Construction Phase both the MFS WTP and ESE WTP will be commissioned and commence operating taking over the management of MIW from the pWTP. The following processes will be undertaken to commission the WTP:

- Confirm during the detailed design that the estimated acidity load of ~200 t/yr at MFS and ~60 t/yr at ESE during the Construction Phase is reasonable for planning water treatment infrastructure.
- WTP Commissioning Phase Requirements Report: This study will be completed during the detailed design phase. The report will explain the intensive monitoring program that will be undertaken and how waters will be managed during this commissioning phase.
- WTP Performance Report. A study will be completed during the Commissioning Phase to define ongoing QA/QC of the WTP once operational to confirm ongoing performance of the plant to meet water quality objectives.

7.8 Surface Water Discharge Paths

This section describes the waterways that surface waters will be discharged to during the Construction Phase. Monitoring of water quality will occur according to the monitoring plan in Section 13.0 of this AMD WMP.

7.8.1 MFS

The following surface water types may be discharged to Deep Stream directly, or via tributaries:

- Clean water diversions.
- TSS impacted water, post sediment retention ponds (e.g., vegetation stripping).
- Treated water from pWTP.

The following surface water types may be discharged to the Waimangaroa River:

- Clean water diversions.
- Treated water from pWTP.
- Treated water from the active WTP (later in the phase).
- TSS impacted water, post sediment retention ponds.

7.8.2 ESE

The following surface water types may be discharged to either a tributary of Cascade Creek or the Whareatea River:

- Clean water diversions.
- TSS impacted water, post sediment retention ponds (e.g., vegetation stripping).
- Treated water from pWTP.
- Treated water from the active WTP (later in the phase).

TSS impacted water, post sediment retention ponds, may report to Rapid Stream and Burnett Stream.

7.8.3 UWHR

The majority of surface water from the UWHR will be discharged to the Waimangaroa River directly, or via tributaries (e.g., Burnett Stream). A small portion is expected to discharge to a tributary of Burnett Stream. This water will typically come from sediment retention ponds and clean water diversions.

7.9 Underground Workings

Underground workings can present a potential risk to water quality as identified in BBRA risks #12, #49, #50, and #51 and are discussed further in MWM (2026a). Underground workings will be managed in accordance with the Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2016, including:

- Ground instability/voids.
- Inundation and inrush risks.
- Unknown or historic workings intersecting operations.

The BRL Health And Safety Management System and Principal Hazard Management Plans (PHMP) will be developed to address the risks associated with working in and around historic underground workings. Two surface visual inspection mapping exercises were undertaken:

- Sullivan and Central ELF Mapping (BRL, 2024).
- Upper Waimangaroa Haul Road & Mount Frederick South Access Road Void Assessment (BRL, 2026g).

7.9.1 Sullivan and Central ELF Mapping

The Sullivan NSUL NAF ELF footprint confirmed no direct connection to the Sullivan underground workings. The Central ELF Footprint was inspected in two polygons areas with the northern polygon mapping no observations of underground working collapse on the surface. The southern polygon mapping identified significant surface expression of collapsed underground workings. The high wall adjacent to the southern point of the Escarpment Mine settling pond shows a cross-section through a collapsed zone. This area is not included in the historic workings plans, but there appears to be an open drive at the toe of the high wall. These cracks will connect surface water flows with the coal surface and any underground workings within the coal.

A groundwater assessment has been undertaken in ESE area in conjunction with the underground working void study. Groundwater is contained and routed through the area to a number of sumps during operation and then through MSRs during Active and Post Closure Phases (Refer to Appendix R Groundwater Technical Report in AMD overview report (MWM, 2026a)). This includes water that migrates through exposure of underground working through pit excavations as well as any infiltration through the southern polygon area where known collapsed underground workings are within the ELF footprint.

Develop a PHMP for working in the southern polygon of the Central ELF footprint that further evaluates the risks that the voids present and update controls to minimise risk to both safety and the environment.

Develop and implement the sealing of underground workings (as per BPCP-ENV-SOP-03) to minimise water ingress and potential AMD seepage from workings and groundwater quality. Monitor and model water loss to validate that acceptable volumes are met.

7.9.2 UWHR and MFS Access Road Assessment

BRL (2026g) undertook a high-level assessment of the potential upward migration of voids from historic underground coal mine workings beneath the proposed UWHR and MFS Access Road on the Buller Plateaux. Underground voids are located in the vicinity of the proposed UWHR, largely confined to the southern extent and the only known underground voids near the MFS Access Road are at the northern end of the proposed road.

The disturbance of these underground workings could generate AMD. Hence, BRL has completed a void impact assessment on the UWHR alignment to address health and safety, and environmental risks (BRL, 2026g). [PW1.1] and notes that any underground workings beneath the UWHR could be managed by several processes including:

- Probe drilling before any construction activities, targeting areas of suspected underground workings to confirm the depth of in-situ cover to the underlying coal seam and underground void (if any).
- Excavation to remove the void hazard, then replace them with compacted backfill.
- Collapse blasting and then backfill.
- Grouting is also an option.

The workings may require dewatering prior to collapse of the roof. This will be assessed as part of the void assessment studies (BRL, 2026g) as the UWHR is constructed. This water may require treatment through a portable water treatment plant for AMD and for TSS. Further details on this portable treatment system are provided in MWM (2026j). If these workings discharge to the receiving environment, then further assessment is required as part of the void assessment studies (BRL, 2026g) as the UWHR is constructed.

- Upon completion of the investigative works along the access roads, development a PHMP that further evaluates the risks that the voids present and update controls to minimise risk to both safety and the environment.
- Develop and implement the sealing of underground workings (BPCP-ENV-SOP-03) to minimise water ingress and potential AMD seepage from workings and impacts to groundwater. Monitor and model water loss to validate that acceptable volumes are met.

These management measures are consistent with MWM (2026a) recommendations #7, #33, and #34.

7.10 Flooding

Flooding and uncontrolled release of MIW has been identified (BBRA risks #30 and #95) as a risk to water quality throughout all phases and the following management measures are planned:

- Preventative maintenance plan for infrastructure to ensure capacity is designed and maintained.
- Stock spares for critical/vulnerable items for infrastructure.

- Ensure experience with sump construction and water management in high rainfall events.
- Performance monitoring of pWTP and pumps.
- Enable manual controls of water routing for unforeseen events.
- Utilise ESNZ (existing expert) to undertake assessment of flow regime and confirm flow rate, and determine effects, and seek opportunities (such as piping water directly to Kawatiri).

7.11 Pit Inundation

Pit inundation has been identified as a potential risk (BBRA risk #54) impacting water quality through extreme weather events or mechanical failures. To mitigate these risks the following management measures are planned:

- Maintain the in-pit surge pumps.
- Divert water away from the pit to reduce ingress.
- Monitor weather forecasts and prepare in advance.
- Develop an PHMP to include flooding and earthquake events.

7.12 Surface Water Contamination from Hazardous Spills

BBRA risk #90 identifies risks from spills or leaks from hazardous chemicals on site. To mitigate these risks the following management measures are actioned in accordance with Health and Safety at Work (Hazardous Substances) Regulations 2017:

- Development and implementation of a Hazardous Substances Management Plan for site.
- Transportation, storage, placarding and disposal of chemicals will be in accordance with the SDS⁸ will be compliant with New Zealand's Hazardous Substances and New Organisms (HSNO) Act or the Globally Harmonised System.
- Approval is obtained for all chemicals bought on site through the Safety Manager and listed on the Site Chemical Register along with the SDS and be legally verified as approved for use in New Zealand through the EPA Approved Hazardous Substances Database.
- No chemicals are permitted to be disposed of on site in the ELF or landfills unless specifically designed and approved (such as for the treatment of AMD).
- Training is to be undertaken for operators in accordance with HSNO regulations.
- PPE⁹ must be available in compliance with the SDS.

⁸ Safety Data Sheet.

⁹ Personal Protective Equipment.

8.0 Operational Phase Water Management

8.1 Introduction

The Operational Phase is defined by the commencement of active water treatment using WTPs and the associated WTP ponds at MFS and ESE and continues until the final rehabilitation of landforms is complete and the project transitions through Active to Post Closure Phases.

The Operational Phase from a water management perspective of the UWHR sub-area is defined as starts with the commencement of coal haulage between the ESE sub-area and/or the MFS sub-area through to the Stockton sub-area and continues until the road corridor has been rehabilitated in accordance with the Rehabilitation Management Plan (BRL, 2026f).

This section addresses the management of AMD during the Operational Phase for MFS, ESE, and the UWHR. The management of TSS is also discussed in other documents (e.g., BRL 2026a,d). This AMD WMP will be updated prior to Operational Phase commencing and then in accordance with the PDCA adaptive management cycle and document review requirements as listed in Section 16.2.

8.2 AMD Hazards

Significant quantities of overburden with the potential to generate AMD will be excavated during this Phase. These data are shown in Figure 14 (for ESE) and Figure 15 (for MFS). Data indicates that the rocks at ESE have a greater risk for AMD.

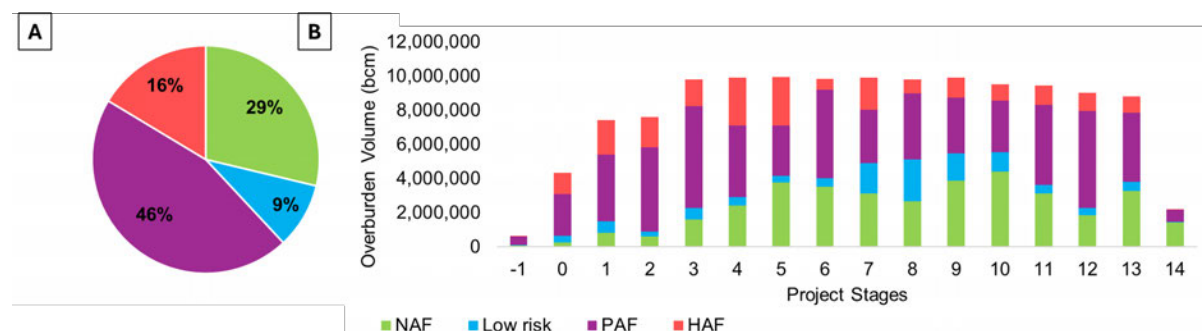


Figure 14: ESE overburden summary based on AMD classification

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

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

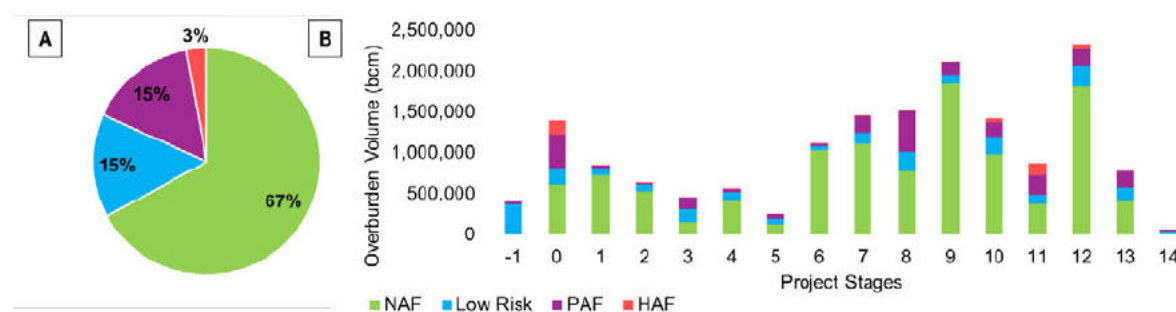


Figure 15: MFS overburden summary based on AMD classification

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

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

8.3 Potential AMD Effects

Forecasting AMD treatment requirements is essential for planning purposes to ensure the effects of TSS and AMD are managed. WLBM (MWM, 2026h, i) for ESE and MFS were prepared to model the quantity of acidity that would report to the water treatment plants. The raw WTP influent data (acidity, TSS, Al, and Fe loads) for MFS and ESE are provided in the following section in Table 9 and Table 10 respectively. Additional geochemical rock characterisation information collection will continue during the Construction and Operational phases MWM (2026a) and BRL (2026c).

8.3.1 MFS Operational Phase AMD Effects

The MFS WTP construction is scheduled to be complete in 2028 (Stage 0) following completion of the WTP and associated WTP ponds; this signifies the start of the WLBM for MFS. Loads to the WTP are shown in Table 9. The Operational Phase for the MFS is scheduled to commence in 2029 (Stage 1) and continues until 2042 when final rehab is complete (i.e., 2 years after final rehabilitation of ELFs). The Active Closure Phase is scheduled to commence in 2043 and continues until 2046 when there is a complete transition from Active Treatment to Passive Treatment in 2047.

Operational Phase MIW loads (2029 – 2042) are shown in Table 9. These potential effects will be managed by the MFS WTP.

Table 9: MFS WTP Influent

YEAR	MINE STAGE	ACIDITY LOAD (Tonnes)	TSS (Tonnes)	Al LOAD (Tonnes)	Fe LOAD (Tonnes)
2027	-1	42	128	4	2
2028	0	147	452	14	5
2029	1	89	276	9	3
2030	2	92	333	9	3
2031	3	100	345	10	4
2032	4	121	405	12	4
2033	5	144	466	14	5
2034	6	168	524	16	6
2035	7	239	719	23	9
2036	8	297	727	29	12

YEAR	MINE STAGE	ACIDITY LOAD (Tonnes)	TSS (Tonnes)	Al LOAD (Tonnes)	Fe LOAD (Tonnes)
2037	9	309	833	30	12
2038	10	307	866	30	12
2039	11	321	773	31	13
2040	12	324	743	31	13
2041	13	315	869	30	12
2042	14	265	821	26	10
2043	15	193	391	20	8
2044	16	141	29	14	7
2045	17	46	14	5	3
2046	18	47	14	5	2
Total	20	3,706	9,730	360	146

Green cells indicate the Construction Phase of the Project, prior to treatment via the active WTP. This mine phase is not covered by the WLM. Loads are based on Stage 1 loads as a proportion of material quantities in Stage 1 compared to materials disturbed in Stage -1 and Stage 0

Blue cells indicate the Active Closure Phase of the Project. Treatment in this phase is by the active WTP.

8.3.2 ESE Operational Phase AMD Effects

The ESE WTP is scheduled to commence in 2028 (Stage 0) following construction of the WTP¹⁰, which is the start of the WLM for ESE. Loads to the WTP are shown in Table 10. The Operational Phase of ESE is scheduled to commence in 2029 (Stage 1) and continues until 2043 when final rehabilitation is complete (i.e., 2 years after final rehabilitation of ELFs). The Active Closure Phase is scheduled to commence in 2044 and continues until 2057 when there is a complete transition from Active Treatment to Passive Treatment at the Post Closure Phase.

Operational Phase MIW loads (2029 – 2043) are shown in Table 10. These potential effects will be managed by the ESE WTP.

Table 10: ESE WTP Influent

INDICATIVE YEAR	MINE STAGE	ACIDITY LOAD (tonnes)	TSS (tonnes)	Al LOAD (tonnes)	Fe LOAD (tonnes)
2027	-1	61	186	7	3
2028	0	404	1,226	44	20
2029	1	724	1,499	76	33
2030	2	702	1,662	75	32
2031	3	1,426	2,041	149	65
2032	4	1,866	1,825	200	89
2033	5	2,373	2,042	255	114
2034	6	3,017	2,197	317	142
2035	7	3,774	2,351	386	173
2036	8	4,515	2,419	455	205
2037	9	4,502	1,778	452	206

¹⁰ Note: the associated surge sump remains under construction in 2028; the Pit 3 Pit Lake is used for this period.

INDICATIVE YEAR	MINE STAGE	ACIDITY LOAD (tonnes)	TSS (tonnes)	Al LOAD (tonnes)	Fe LOAD (tonnes)
2038	10	4,081	1,949	410	185
2039	11	3,200	1,845	325	146
2040	12	4,133	1,878	414	187
2041	13	4,457	1,975	444	201
2042	14	4,028	1,688	402	183
2043	15	3,384	1,703	339	154
2044	16	2,325	1,176	235	109
2045	17	1,637	1,152	167	77
2046	18	1,211	99	119	56
2047	19	1,008	99	99	47
2048	20	898	99	89	42
2049	21	807	99	80	38
2050	22	729	99	73	34
2051	23	673	99	67	31
2052	24	637	100	64	30
2053	25	604	100	61	28
2054	26	574	100	58	27
2055	27	547	100	55	26
2056	28	522	100	53	25
2057	29	508	100	51	24
Total		59,327	33,786	6,021	2,732

Green cells indicate the Construction Phase of the Project. Indicative Year 2027 is not covered by the WLBW. Loads are based on 15% of Stage 0 based on material quantities in Stage 0 (4,348,200 bcm) versus Stage -1 being 659,20 bcm.

Blue cells indicate the Active Closure Phase of the Project. Treatment in this phase is by the active WTP.

8.3.3 Summary

The acidity loads (generated predominantly by pH, Al, and Fe) from the MFS and ESE mining activities during the Operational Phase are minimised due to the use of ELFs and source control engineering options to help to reduce the quantity of AMD. Nevertheless, AMD will be generated (as shown in Table 9 and Table 10) and will require treatment to meet water quality objectives.

8.4 Operational Phase AMD Water Management

This section describes the general water management approach during the Operational Phase for MFS, ESE, and the UWHR.

8.4.1 MFS

Operations begin in the West Pit with the West Pit Sump constructed ahead of mining. MIW from operations is directed to the sump where it will be pumped to the MFS WTP for treatment. Where possible, clean water will be diverted around the operation, and TSS impacted water will be managed using sediment controls. Later, the East Pit is developed where MIW from this pit will be managed via the East Pit Sump and will be pumped to the MFS WTP for treatment.

The pit sumps are located downstream of mining activities to enable water collection via gravity, with limited pumping requirements. Cutoff drains above the East Pit will direct clean water into Billo Stream and Deep Stream. Surface water drainage networks collect MIW and direct it to the pit sumps. As the pits are progressively backfilled with waste rock, creating ELF, underdrains will be constructed to collect seepage and direct it to the pit sumps.

Abstraction of up to 140 litres per second of water from the Waimangaroa River, in the vicinity of NZTM N5377653 E1503681, is permitted for use as process water to support BPCP activities with the rate of take measured, recorded, and reported to WCRC in accordance with the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010, as described in condition TAK7. If the flow of the Waimangaroa River (as measured at monitoring location 2W) is < 178 litres per second (Q95 low flow), the abstraction of water must cease. A fish screen will be installed, operated, and maintained on the Waimangaroa River water intake to ensure that kōura are prevented from passing into the intake.

Water treated through the WTP is discharged into the Waimangaroa River above water monitoring location 2W. The WTP capacity will be sized such that the East and West pit sumps minimise spilling directly to the environment.

The following catchments will be influenced by the proposed MFS mine area:

- Billo Stream Catchment.
- Deep Stream Catchment.
- Waimangaroa River Catchment.

Operational water management infrastructure will be maintained beyond completion of mining and rehabilitation, until such time that water discharge quality can meet compliance criteria through use of passive treatment. Figure 18 illustrates the water management process throughout the MFS Operational Phase.

The Approval Holder may abstract water from any of the sumps or pits within the MFS sub-area of the BPCP for use as process water to support BPCP activities.

At the completion of the works to disestablish and/or decommission diversion channels as part of the BPCP, the banks of any associated natural waterways are reinstated to prevent erosion and ensure bank stability.

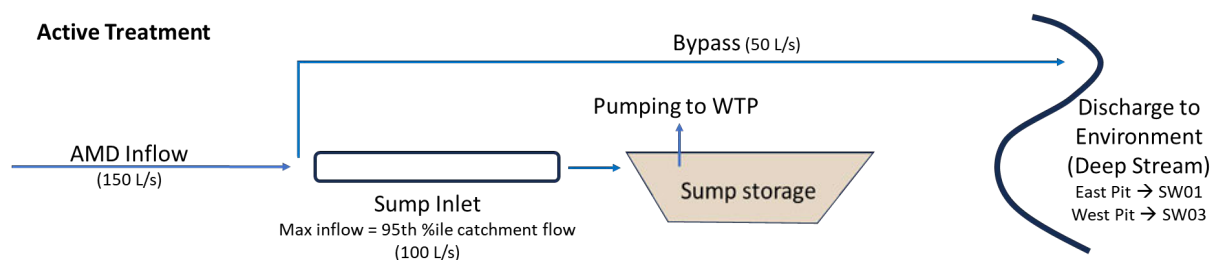


Figure 16: Sump gravity bypass mechanism.

Note: Flow rates in schematic are indicative only and do not represent model outputs.

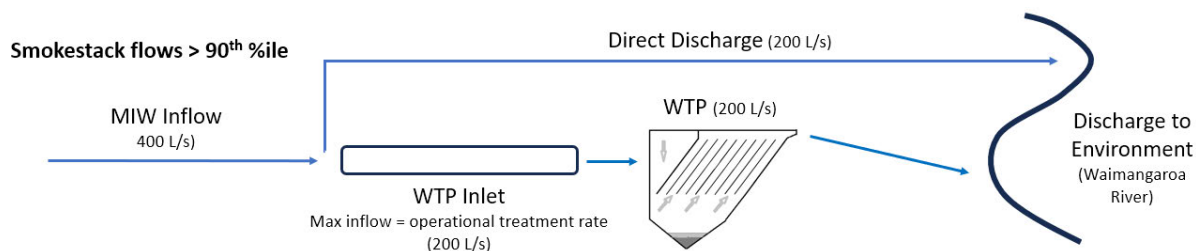


Figure 17: Direct discharge to the Waimangaroa River mechanism.

Note: Flow rates in schematic are indicative only and do not represent model outputs.

8.4.1.1 Water Impoundment

The Approval Holder may impound water within the following sumps and ponds within the MFS sub-area:

- Multiple, progressive in-pit and ex-pit sumps and ponds within the MFS sub-area;
- Multiple sediment retention devices along haul road routes;
- MFS Water Treatment Plant surge pond, at approximately NZTM E1503366 N5377945;
- MFS Water Treatment Plant polishing pond, at approximately NZTM E1503265 N5377669;
- West Pit Sump, at approximately NZTM E1502554 N5379503;
- East Pit Sump, at approximately NZTM E1503235 N5380348;
- Multiple passive treatment polishing ponds to be progressively established throughout the MFS sub-area;
- Multiple closure waterbodies to be retained for ecosystem purposes beyond the completion of active Mining within the MFS sub-area; and
- Multiple constructed tarns to be established as part of final landforms as part of rehabilitation within the MFS sub-area.

8.4.1.2 Storm Water Management

When river flows are equal to or greater than the 95th percentile flow criteria, a proportion of MIW that is directed to the East and West Pit Sumps will be bypassed via gravity around the sump and discharged into the natural catchment (Deep Stream). This is facilitated by a device constructed for each individual sump, represented by Figure 16. This water is partially treated through sedimentation and is designed to occur on average ~18 days/year (~5% of the time).

Where Waimangaroa River flows are equal to or greater than the 90th percentile flow criteria (occurring on average ~37 days/year; ~10% of the time), MIW from the sumps is pumped directly into the Waimangaroa River (in addition to maximum treated water discharge). Direct discharge events will be facilitated by a mechanism described in Figure 17.

-
- During these release events key water quality parameters will be monitored through the development and implementation of a Surface Water Sampling and Analysis SOP (BPCP-ENV-SOP-08). This SOP will be developed prior to Construction Phase and will be updated during the Operational Phase to ensure locations for event-based monitoring are relevant to the changing operation and that adaptive management measures are incorporated.
 - Storm water samplers are a NALGENE® Storm Water Sampler, or equivalent. The storm water sampler bottles are deployed above the water level prior to a rainfall event, fill with rising stage water once water either flows over them or reaches the intake level when deployed into a stream. They close off by means of a float valve or ball cock, preventing any further water from mixing with the sample. The stoppering system maintains the integrity of the water sample from atmospheric exchange after collection.
 - This Plan will be reviewed along with validation of key inputs to the WLBM to optimise sump operation, WTP offtake rates and minimise discharges in excess of those predicted to maintain compliance at monitoring sites.

Mount Frederick South (MFS) Active Water Treatment Flow Diagram

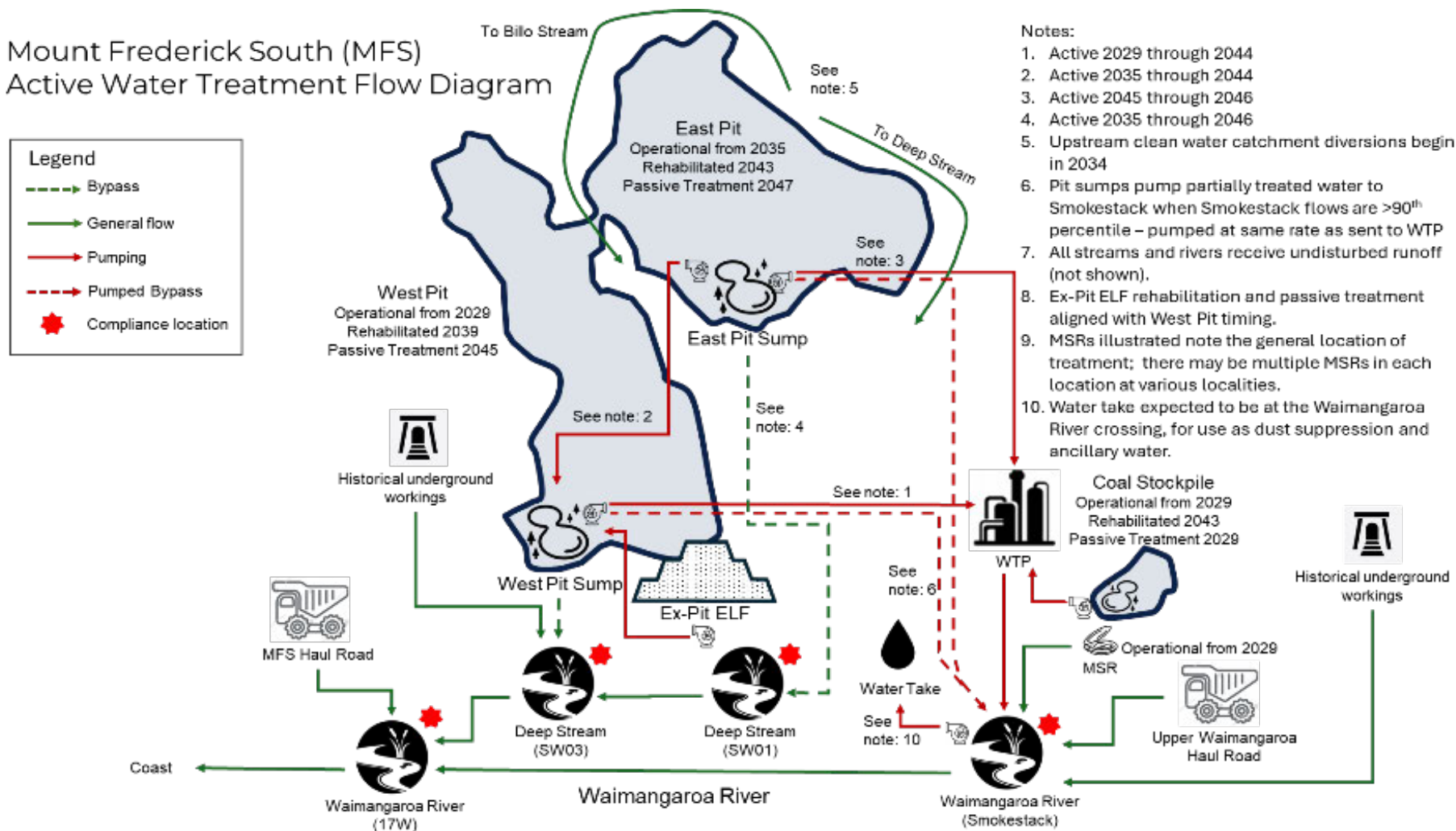


Figure 18: MFS Active Treatment Phase Water Management.

Note: this figure captures both the Operational and Active Closure Phases

8.4.2 ESE

MIW from operations will be collected in sumps and gravity fed or pumped to the WTP Surge Pond, where it will be pumped to the ESE WTP for treatment. Engineered clean water drains will divert water around the operation as far as practical, and TSS impacted water will be managed using sediment controls.

Mine infrastructure will be designed to facilitate high flow discharge events (sump bypass or spilling) based on a 95th percentile criteria. A 95th percentile discharge event describes release of the component of MIW flows exceeding the 95th percentile directly to the receiving environment. Discharge events will be facilitated by either bypass mechanisms or from pit sump spilling, as described below in order to protect infrastructure during high rainfall events where:

- A bypass mechanism will be constructed for each sump to bypass flows above a specified percentile during high rainfall events. The bypass mechanism is represented by the schematic in Figure 19. For some sumps, the bypass mechanism will not be active for all years due to pit geometry constraints.
- Where a bypass mechanism is not operational for a particular sump, spilling may occur, with pumping rates configured to allow this to occur approximately 5% of the time (Figure 20). It is noted that mine infrastructure will be designed to avoid spilling where a bypass mechanism is implemented for a sump. As such, spilling mechanisms and bypass mechanisms do not occur concurrently.
- In-pit sumps will be constructed to enable gravity water collection during the mine Operations Phase.
- Mined-out pit will be progressively backfilled with mined rock, creating ELF. Underdrains will aid collection of ELF seepage.
- During these release events, key water quality parameters will be monitored through the development and implementation of a Surface Water Sampling and Analysis SOP (BPCP-ENV-SOP-08). This SOP will be developed prior to Construction Phase and will be updated during the Operational Phase to ensure locations for event-based monitoring are relevant to the changing operation and that adaptive management measures are incorporated.
- Storm water samplers are a NALGENE® Storm Water Sampler, or equivalent. The storm water sampler bottles are deployed above the water level prior to a rainfall event, fill with rising stage water once water either flows over them or reaches the intake level when deployed into a stream. They close off by means of a float valve or ball cock, preventing any further water from mixing with the sample. The stoppering system maintains the integrity of the water sample from atmospheric exchange after collection.
- This Plan will be reviewed along with validation of key inputs to the WLBM to optimise sump operation, WTP offtake rates and minimise discharges in excess of those predicted to maintain compliance at monitoring sites.

The following catchments will be influenced by the proposed ESE mine with a total disturbance footprint of 460 ha:

- Rapid Stream Catchment
- Cascade Creek Catchment
- Whareatea River Catchment

MIW from the majority of the area disturbed by ESE will report to the Whareatea River Catchment to maintain the rivers flows. Water reporting to Rapid Stream Catchment comprises runoff and seepage from the NSUL ELF, whilst the affected catchment reporting to Cascade Creek is a relatively small area to the east of the ESE pit footprint. During some stages of the Operations Phase of the mine, in-pit water discharges to the Cascade Creek Catchment via V37 Creek will occur. A portion of treated water from the WTP will also be discharged to Cascade Creek via V8 Stream to enhance/improve the water quality (Cascade Creek is highly impacted by historic MIW).

Figure 21 illustrates the water management process through this Operational Phase.

The Approval Holder may abstract water from any of the sumps or pits within the ESE sub-area of the BPCP for use as process water to support BPCP activities.

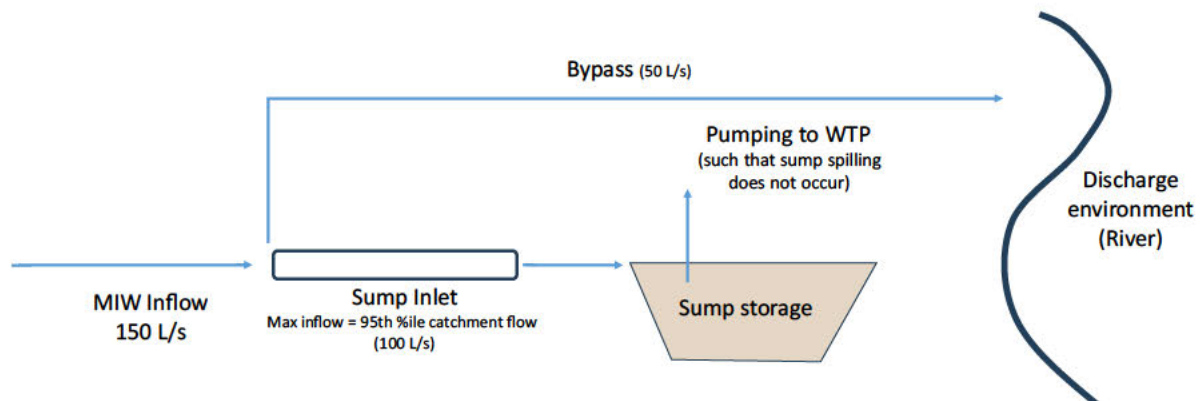


Figure 19: Bypass mechanism example.

Note: Flow rates in schematic are indicative only and do not represent model outputs.

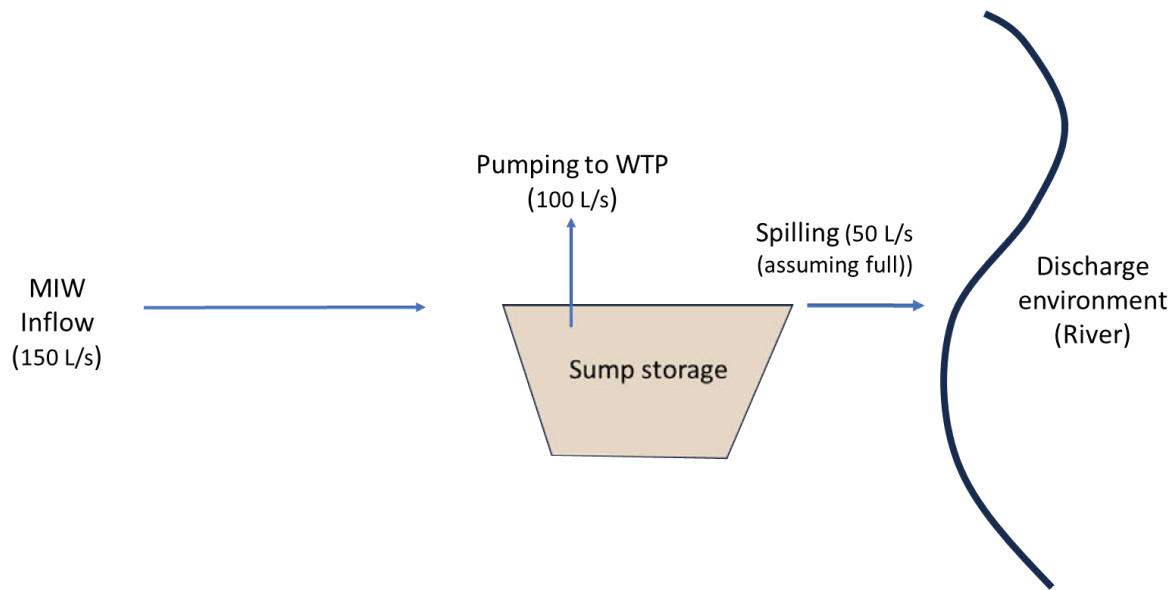


Figure 20: Spilling mechanism example.

Clean water diversions will be developed to minimise the amount of water reporting to the active pits by capturing all upstream water, and therefore reducing the amount of MIW produced, including (Figure 21):

- Cutoff drains along the southern highwall will direct clean water into V37 Creek.
- Cutoff drain along the western highwall will direct clean water into V62 Creek.
- A pipeline, then surface channel, will convey upstream clean water back into Conglomerate Creek.

Operational water management infrastructure will be maintained following completion of mining until full rehabilitation of the final landform has been completed, and water discharge quality meets compliance criteria through use of passive treatment. At the completion of the works to disestablish and/or decommission diversion channels as part of the BPCP, the banks of any associated natural waterways are reinstated to prevent erosion and ensure bank stability.

Runoff from infrastructure areas including the Eastern Infrastructure and Coal Loadout Area and the Central Infrastructure Area will be directed to the Surge Pond for treatment. Sediment control structures will be emplaced to prevent uncontrolled release of sediment to the environment.

8.4.2.1 Water Impoundment

The Approval Holder may impound water within the following sumps and ponds within the ESE sub-area:

- Multiple, progressive in-pit and ex-pit sumps and ponds within the ESE sub-area;
- Multiple sediment retention devices along haul road routes;

-
- ESE Water Treatment Plant surge pond (also known as the Ex-Pit Seal), at approximately NZTM E1499610 N5375250;
 - ESE Water Treatment Plant polishing pond, at approximately NZTM E1499400 N5375280;
 - Lake Brazil, at approximately NZTM E1499581 N5374701;
 - Pit 3 Pit Lake, at approximately NZTM E1499310 N5374790;
 - Multiple passive treatment polishing ponds to be progressively established throughout the ESE sub-area;
 - Multiple closure waterbodies to be retained for ecosystem purposes beyond the completion of Mining within the ESE sub-area; and
 - Multiple constructed tarns to be established as part of final landforms as part of rehabilitation within the ESE sub-area.

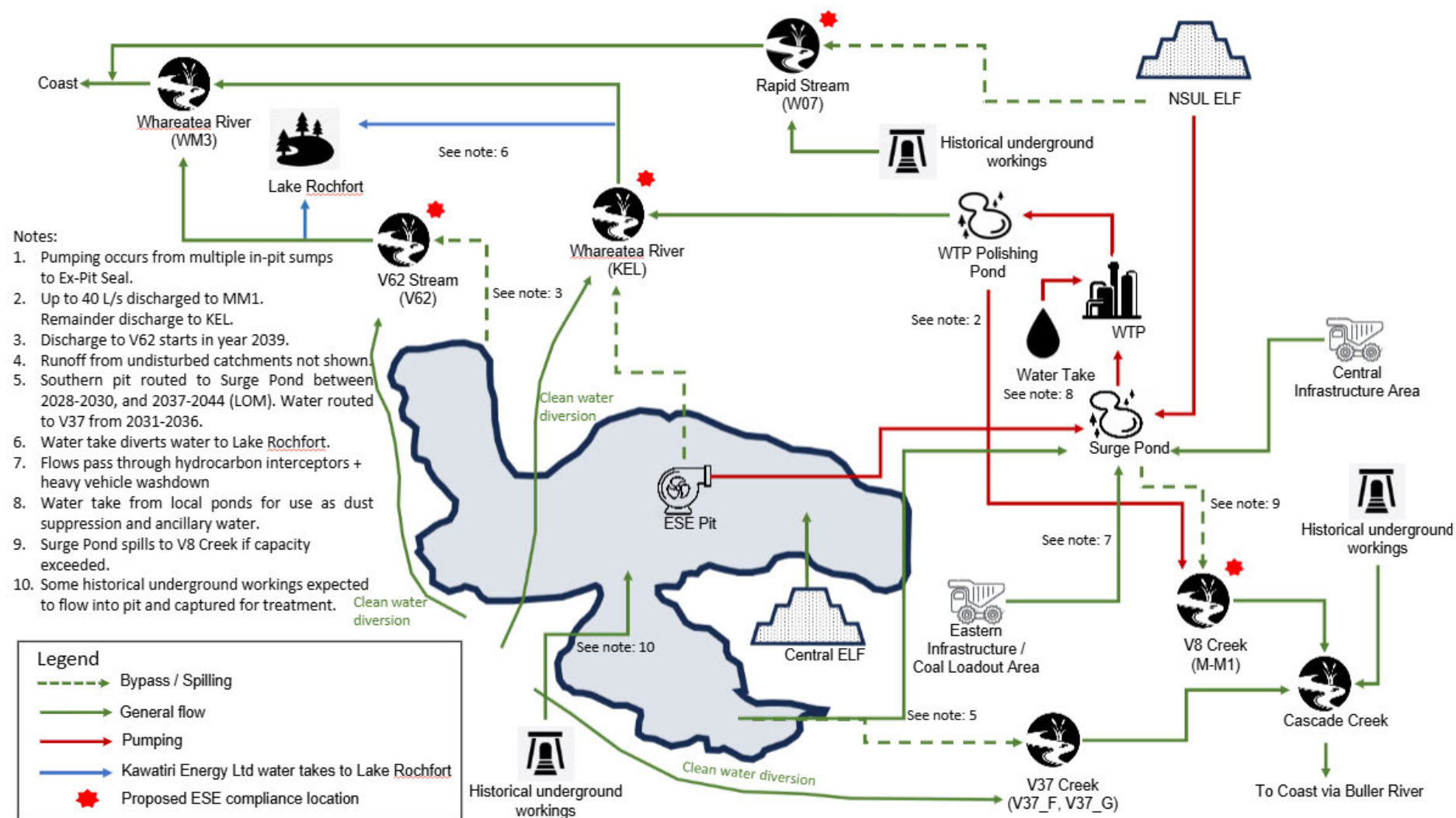


Figure 21: ESE Active Treatment Phase Water Management. Note: this captures the Operational and Active Closure Phases

8.4.3 UWHR

Water management of the UWHR during the Operational Phase of the BPCP will include the following features, as described in the Erosion and Sediment Control Plan for Land-Disturbance Activities (BRL, 2026d):

- Road surface run-off and runoff from disturbed areas will be captured and treated using sediment management controls such as sediment retention ponds and silt fences.
- Natural surface run-off will be diverted along and under the road via clean water drains and culverts, maintaining the natural water flow and quality feeding into the Upper Waimangaroa River.
- Disturbed areas not required for operations will be stabilised (e.g., rehabilitated).
- Dust will be suppressed by water spray delivered by water trucks.
- AMD will be managed using source control principles such that treatment is not required (MWM, 2026f).
- A water quality and infrastructure monitoring program will be designed to assess environmental effects and ensure sediment management controls are maintained and operating effectively.

Prior to the commencement of the Operating Phase of either the UWHR and the MFS Access Road, BRL will prepare a road maintenance and monitoring plan for the relevant road. The objectives of the road maintenance and monitoring plan will include:

- Ensuring the functionality and operability of the road to enable access and egress to and from the BPCP sub-areas and transportation within the BPCP;
- Ensuring water quality discharging to receiving waterways complies with the conditions of this Approval.
- The plan will include the following:
 - an inspection and monitoring regime of road surface, stormwater diversions, bunds, channels, stormwater treatment devices, surfaces stabilised against erosion, and culverts;
 - procedures for maintaining the efficacy of stormwater diversions, channels, bunds and stormwater treatment devices;
 - procedures for the removal of accumulated sediment within stormwater treatment devices;
 - roles and responsibilities;
 - records of maintenance;
 - incident response procedures; and
 - adaptive management procedures.

BRL will implement the road maintenance and monitoring plan throughout the operational phase of the road. The road maintenance and monitoring plan will be made available to the Approval Authority on written request.

The Approval Holder may abstract water from any of the sumps or pits within the UWHR sub-area of the BPCP for use as process water to support BPCP activities.

8.4.3.1 Water Impoundment

The Approval Holder may impound water within multiple sediment retention devices within the UWHR sub-area.

8.5 Active AMD Treatment

This section discusses active treatment of AMD during the operational phase for MFS and ESE to mitigate the risks identified in BBRA risks #54, #75-#80, and #92. Treatment of TSS utilises the same water management system and is removed by the WTP. MWM (2026a) recommendations #20, #21 and #27-#31 include the following ongoing management measures:

- Portable WTP are required for MFS, ESE, and potentially the UWHR to treat AMD and TSS.
- WTP are required for MFS and ESE. Treatment is required for AMD and TSS.

Two active WTPs are proposed for the BPCP within the ESE and MFS mining areas to treat the potential AMD loads described in Table 9 and Table 10.

8.5.1 AMD Treatment Process

Details on the active WTPs proposed for the ESE and MFS are provided in Process Flow (2026a; 2026b). In summary, the WTPs will utilise the following equipment and processes to treat MIW:

- WTP Surge Ponds (the “WTP Surge Pond” and “Stockpile Surge Pond” at MFS and the Ex-Pit Seal Surge Pond at ESE) – receiving water from the run-off, seepage areas, and from pumping from the pit sumps.
- Powdered CaO silos and mixing tanks to generate a neutralising slurry for MIW water from the surge ponds.
- Pontoon mounted pumps to transfer water from the surge ponds to the acidity neutralisation tank.
- pH controlled CaO slurry dosing of AMD in the acidity neutralisation tank.
- Flocculant and metal-chelating agent dosing to CaO neutralised water prior to transfer to the Lamella Clarifiers.
- Separation of suspended and precipitated solids in the Lamella Clarifier with partial sludge return to the Lamella Clarifier in-flow (i.e., High Density Sludge (HDS) loop).

- Remaining sludge is thickened with flocculant and pumped to a pressure filter for dewatering to create a "filter cake". Dewatered filter cake is discharged to a bunker for loadout and trucking to disposal areas.
- Sulfuric acid (i.e., pH) trimming of the Lamella Clarifier thickener overflow (treated supernatant) to remove additional metals and meet pH compliance limits where required.
- Treated supernatant will report to a polishing pond after the pH correction before discharge to the receiving environment.

Water treatability trials conducted by Process Flow (2026b) determined that neutralisation with calcium oxide (CaO), coagulation with Metalzorb FZ, and flocculation with Rheomax 1030 effectively reduces TSS and dissolved metals in the supernatant, producing water quality consistent with ESE and MFS guideline values (Hickey, 2026a, 2026c).

Regular monitoring and review will be undertaken to ensure the WTP system performance is meeting design expectations and discharge WQOs. Adaptive management through the PDCA cycle based on WTP performance results will be undertaken.

To optimise sedimentation and AMD collection, water is typically stored within surge ponds where it may accumulate rapidly, due to storm events, but is then pumped to the WTP over an extended period of time relative to the capacity of the WTP. This allows for optimised sedimentation and AMD treatment to be achieved.

8.5.2 WTP Design Standards

WTP effluent discharge design standards are shown in Table 11 and are applied to WTP discharge at both ESE and MFS within the WLBM to understand effects on the receiving environment.

Installation, operation, and maintenance of continuous instrumental monitoring of pH at the point of discharge from both the ESE WTP polishing pond and the MFS WTP polishing pond will occur. This monitoring will be operational prior to the commissioning of the permanent WTPs and will remain in place until after the decommissioning. This continuous instrumental pH monitoring will include real-time telemetry to enable prompt operational response to maintain compliance.

The annual data capture rate must achieve at least 90%, after quality control procedures have been applied to exclude spurious values arising from factors such as sensor fouling, calibration drift, instrument maintenance downtime, and outages in power or telemetry. The instruments must receive calibration and inspection at a frequency no less than 3-monthly.

Table 11: WTP effluent discharge design standards.

PARAMETER	INFLUENT (mg/L) ³	TREATED EFFLUENT CONCENTRATION (mg/L)	TREATMENT EFFICIENCY (%)
Acidity	360	2.5	99.3
Alkalinity	0.5	5.5	-
Ca	62	Calculated ¹	-
Mg	19.2	Mg input water quality ²	-
Na	3.1	Na input water quality ²	-
K	7.1	K input water quality ²	-

PARAMETER	INFLUENT (mg/L) ³	TREATED EFFLUENT CONCENTRATION (mg/L)	TREATMENT EFFICIENCY (%)
SO ₄	570	SO ₄ input water quality ²	-
Al	44	0.074	99.8
Fe	9.5	0.01	99.9
Ni	0.197	0.0027	98.6
Mn	1.78	0.18	89.9
Cr	0.0045	0.0011	75.6
Cd	0.00088	0.000025	97.2
Co	0.081	0.001	98.8
Cu	0.0133	0.00025	98.1
Pb	0.00116	0.00005	95.7
Tl	0.0026	0.00117	55.0
Zn	1.04	0.0058	99.4
DOC	1	0.25	75.0
TSS	16	1.5	90.6
pH	3.2	4.5 – 7.0	-

¹ Calcium is calculated (as is done in the WLBMs). The amount of Ca in the WTP effluent is a function of influent Ca concentration and the amount of CaO required to neutralise the influent acidity.

² These parameters are not affected by active treatment. Hence the inflowing concentration is the same as the effluent concentration.

³ Influent data collected from Manchester Street drain at Stockton Mine.

8.5.3 WTP Process Flow Schematics

The proposed locations and process schematics for the two WTPs are shown in the figures listed below:

- Figure 22 provides the ESE water treatment plant process schematic.
- Figure 23 provides the MFS water treatment plant process schematic.
- Figure 24 provides the ESE water treatment plant location.
- Figure 25 provides the MFS water treatment plant location.

Prior to its construction, BRL will prepare a detailed design for the permanent ESE and MFS WTPs. The detailed designs will be prepared by a suitably qualified and experienced person (SQEP) in general accordance with the concept design submitted as part of the BPCP application for approvals under the Fast-track Approvals Act 2024.

The objective of the detailed design is to ensure that treated water discharged from the permanent ESE and MFS WTPs will meet the conditions of this Approval, including compliance at the monitoring sites KEL and M-M1 during both the ESE Operating phase and the ESE Active Closure phase and compliance at the monitoring sites 2W and 17W during the MFS Operating phase and the MFS Active Closure phase.

8.5.4 AMD Chemical Treatment

Water treatment chemicals include (but may not be limited to) neutralising agents, coagulants, flocculants, and metal chelating agents. The anticipated use of water treatment chemicals listed in (a) – (k) below for water treatment purposes as part of BPCP activities will be undertaken in accordance with the manufacturer's specifications:

- a) Calcium oxide;
- b) Calcium hydroxide;
- c) Sodium hydroxide;
- d) Polyaluminium chloride;
- e) Metalsorb FZ;
- f) Rheomax 1030, Rheomax 1050 or Rheomax 9030;
- g) Magnafloc 338, Magnafloc 800 HP or Magnafloc 10;
- h) Crystalfloc B610 or Crystalfloc L3RC;
- i) SNF Floquat FL4440 or SNF Flopam AN923VHM;
- j) Acidified ferric chloride; and
- k) Sulfuric acid.

Trials of the use of alternative water treatment chemicals not listed above may occur for up to three-months provided that:

- a) The trial water treatment chemical has first undergone laboratory bench testing to assess its likely effectiveness;
- b) The trial water treatment chemical is not a Class 9 hazardous substance (substances toxic to the environment), as defined by the Hazardous Substances and New Organisms Act 1996 and the Globally Harmonised System; and
- c) The trial water treatment chemical is used in accordance with the manufacturer's specifications.

BPCP will notify the Approval Authority in writing at least 5 working days prior to trialling any new water treatment chemical(s). The notification will include the purpose of the trial, the type and chemical composition of the trial water treatment chemical, the manufacturers SDS for the trial water treatment chemical, the proposed location of dosing (including the dosing equipment and chemical dosing rates) for the trial, and an outline of how the requirements of (a) – (c) have been met.

BPCP will cease the trial immediately upon identification that the trial has resulted in non-compliance with any condition of this Approval.

BPCP may propose to use alternative water treatment chemicals not listed above on an ongoing basis by outlining this change within, or as a variation to, the Annual Work Plan. The proposal within the Annual Work Plan will include:

- a) The purpose of the water treatment;
- b) The type and chemical composition of the water treatment chemical(s);
- c) The manufacturers SDS for the water treatment chemical(s);
- d) The location(s) where the chemical(s) will be dosed (including the dosing equipment and chemical dosing rates); and
- e) The findings with regard to treatment effectiveness of any laboratory bench testing and/or the results of any trial undertaken.

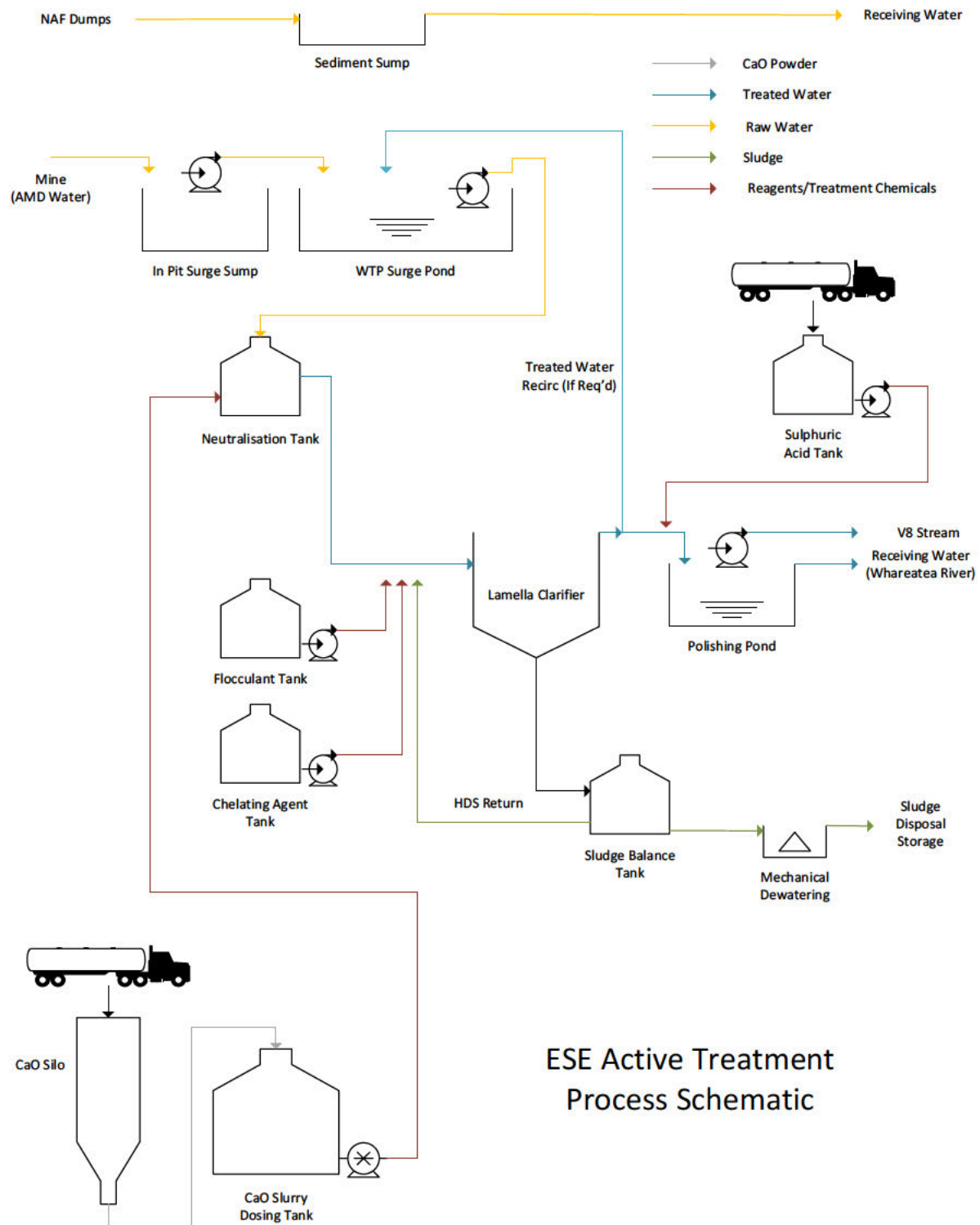
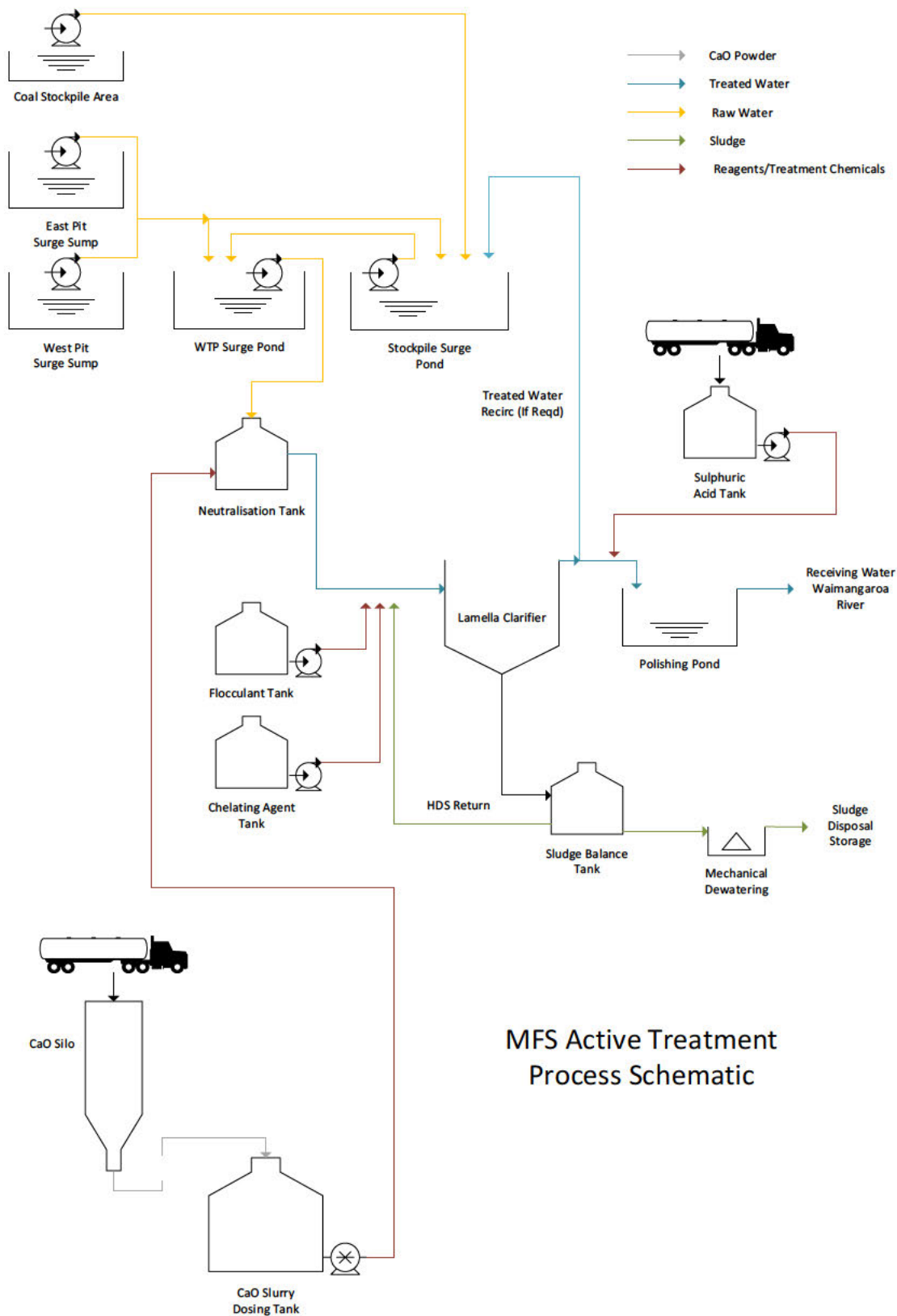


Figure 22: ESE water treatment plant process schematic

Source: Process Flow (MWM,2026a).



MFS Active Treatment Process Schematic

Figure 23: MFS water treatment plant process schematic

Source: Process Flow ((MWM,2026a).

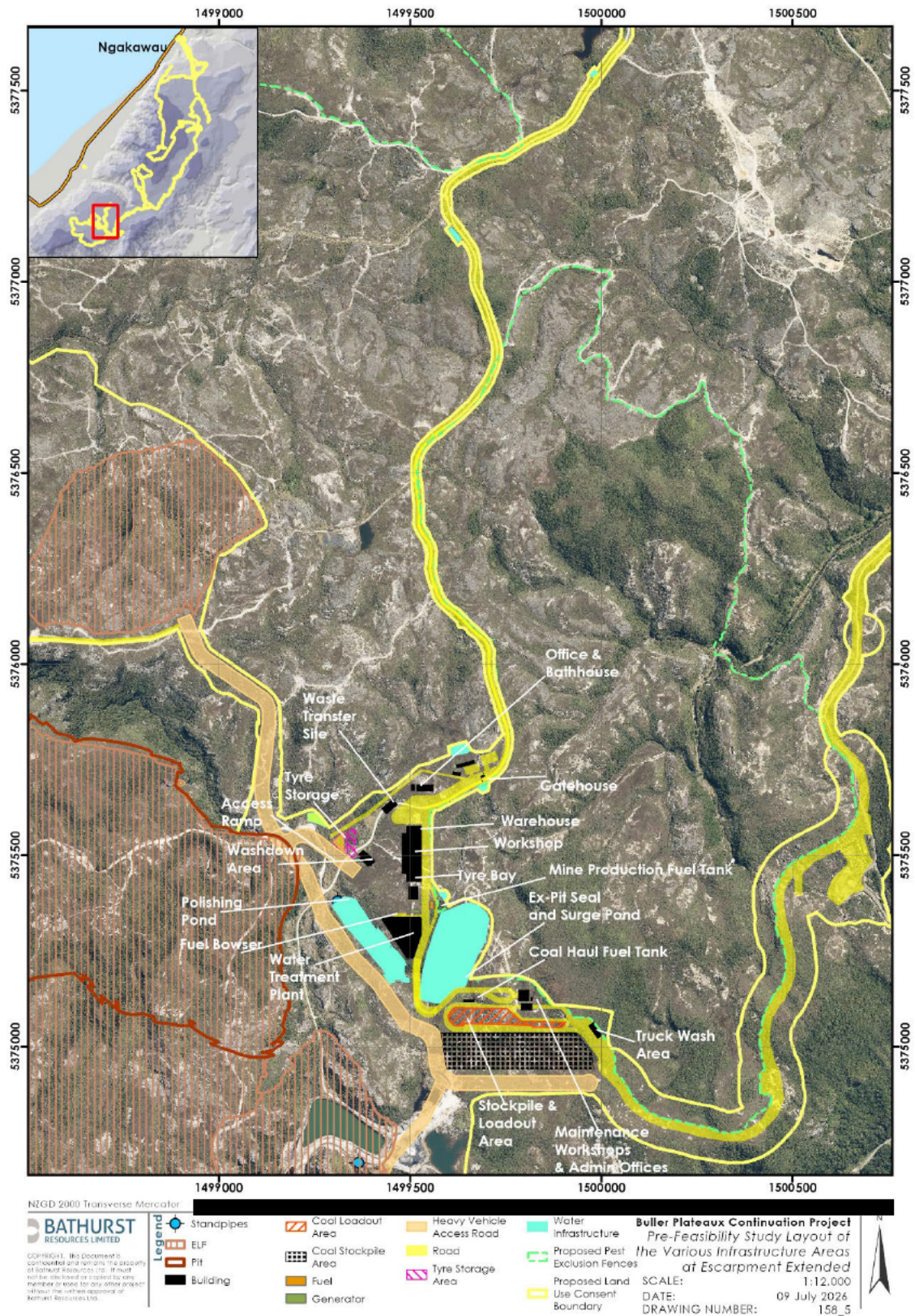


Figure 24: ESE water treatment plant in related infrastructure location map

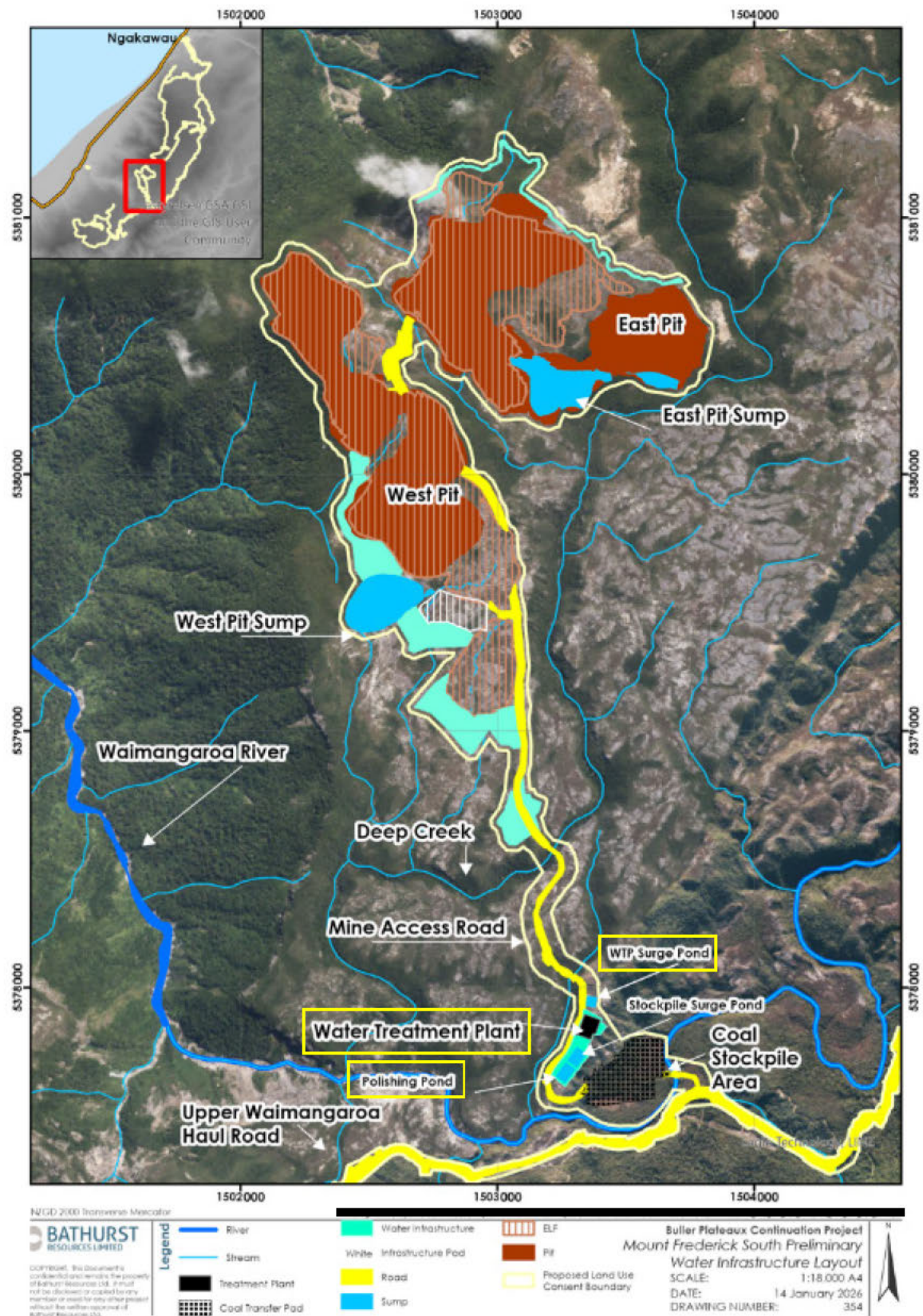


Figure 25: MFS water treatment plant location map

8.5.5 AMD Sludge Management

Two types of sludge will be generated at the BPCP including:

- Pond Fines
- AMD Sludge

This section of the Plan discusses the management of these by-products and aligns with MWM (2026a) recommendations #27-31.

8.5.5.1 Pond Fines

It is anticipated that significant quantities of pond fines will be generated on a weekly basis as part of sediment and erosion control procedures (e.g., check dams, silt ponds, active working pits, etc). These 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 proposed engineered landform (ELF) at ESE and MFS, which is the general 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.

8.5.5.2 AMD Sludge

Sludge management will comprise thickening and dewatering of sludge for final disposal from the WTP or from the PTS in the MFS sub-area with sludge 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 in the ESE sub-area will 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.

Further details are provided in the AMD ELFMP (BRL, 2026c).

An assessment of the acidity load versus the volume of AMD sludge generated (3 wt% solids) was undertaken (i.e., volume (m³) AMD sludge per tonne of acidity treated) to understand the effects of TSS and acidity loads on AMD sludge generation rates. Data indicates that:

- Over the active water treatment period the ESE and MFS water treatment plants will generate an average of 38 m³ of AMD sludge per tonne of acidity. This is comparable to estimates at Stockton of 20 – 40 m³.

- Maximum estimated BPCP (MFS and ESE) AMD sludge volume to acidity load ratios (67 – 117 m³/t) occur in the early years of MFS and ESE operations when acidity loads are low in comparison to TSS loads (i.e., TSS makes up the majority of AMD sludge volumes during this phase of the BPCP). These higher numbers are likely overly conservative as a heavy sediment load will have a higher sludge density, which would decrease the volume of sludge generated per tonne of acidity neutralised.
- Lower AMD sludge volumes to acidity loads occur in the later years of the ESE and MFS operations when acidity loads are high in comparison to TSS loads (17 - 21 m³/t).

Table 12 provides a summary by year of AMD Sludge volumes for the Construction, Operational, and Active Closure phases. Post Closure phase AMD sludge generation rates, associated with passive treatment, is discussed in Section 10.3.

Table 12: AMD sludge volumes (m³) for ESE and MFS WTP (WLBM base case models)

STAGE	TOTAL SLUDGE WET 3% SOLIDS (m ³)		TOTAL SLUDGE WET 12% SOLIDS (m ³)		TOTAL SLUDGE DRY (m ³)		SLUDGE VOL. PER TONNE ACIDITY (m ³) ¹
	ESE	MFS	ESE	MFS	ESE	MFS	
Year 2027	*	*	*	*	*	*	*
Year 2028	47,114	*	11,779	*	1,413	*	117
Year 2029	60,619	10,388	15,155	2,597	1,819	312	87
Year 2030	65,838	12,313	16,459	3,078	1,975	369	98
Year 2031	88,960	12,844	22,240	3,211	2,669	385	67
Year 2032	88,898	15,097	22,225	3,774	2,667	453	52
Year 2033	103,857	17,441	25,964	4,360	3,116	523	48
Year 2034	117,838	19,707	29,459	4,927	3,535	591	43
Year 2035	132,928	27,177	33,232	6,794	3,988	815	40
Year 2036	145,091	28,247	36,273	7,062	4,353	847	36
Year 2037	123,436	31,906	30,859	7,977	3,703	957	32
Year 2038	123,090	32,985	30,773	8,246	3,693	990	36
Year 2039	107,442	30,099	26,861	7,525	3,223	903	39
Year 2040	121,239	29,149	30,310	7,287	3,637	874	34
Year 2041	128,821	33,207	32,205	8,302	3,865	996	34
Year 2042	113,369	30,930	28,342	7,732	3,401	928	34
Year 2043	104,894	15,766	26,224	3,942	3,147	473	34
Year 2044	72,627	3,038	18,157	759	2,179	91	31
Year 2045	62,137	1,185	15,534	296	1,864	36	38
Year 2046	20,335	1,173	5,084	293	610	35	17
Year 2047	17,528	-	4,382	-	526	-	17
Year 2048	16,026	-	4,006	-	481	-	18
Year 2049	14,768	-	3,692	-	443	-	18
Year 2050	13,688	-	3,422	-	411	-	19
Year 2051	12,918	-	3,230	-	388	-	19
Year 2052	12,431	-	3,108	-	373	-	20
Year 2053	11,970	-	2,993	-	359	-	20

STAGE	TOTAL SLUDGE WET 3% SOLIDS (m ³)		TOTAL SLUDGE WET 12% SOLIDS (m ³)		TOTAL SLUDGE DRY (m ³)		SLUDGE VOL. PER TONNE ACIDITY (m ³) ¹
	ESE	MFS	ESE	MFS	ESE	MFS	Total
Year 2054	11,566	-	2,892	-	347	-	20
Year 2055	11,196	-	2,799	-	336	-	21
Year 2056	10,866	-	2,717	-	326	-	21
Year 2057	10,669	-	2,667	-	320	-	21
Total	1,972,160	352,653	493,040	88,163	59,165	10,580	38 (average)

3% solids content relates to AMD sludge density without mechanical dewatering; 12% solids content is after mechanical dewatering.

‘-’ Active water treatment is not proposed

Construction Phase (green); * Further details are provided in Table 8.

Blue cells indicate the Active Closure Phase of the Project

1. Sludge: acidity ratio derived from total AMD sludge from MFS and ESE divided by total acidity from MFS and ESE

8.5.6 Decommissioning of Operational Sumps

A number of operational sumps associated with management of MIW at MFS and ESE will be decommissioned during, or at completion of the Operational Phase. This will occur once ELF's are rehabilitated and surface runoff no longer requires treatment.

The WTP sumps will be retained until active treatment ceases (discussed in Section 9.4.3).

Sumps retained after closure are discussed in Section 11.3.

8.5.6.1 MFS

At the end of the MFS Operational Phase, the Coal Stockpile sumps will be decommissioned after the area is rehabilitated.

8.5.6.2 ESE

The following sumps at the ESE will be decommissioned:

- Pit 3 Pit Lake – this will be backfilled with overburden during the first few years of operations to make way for the Barren Valley ELF extension.
- Escarpment Sump – this will no longer be required at the end of the Operational Phase.

8.6 Passive Water Treatment

Passive treatment of AMD impacted waters will commence during the Operational Phase as ELF's are rehabilitated and seepage water quality is suitable for management by way of passive treatment. Further details are provided in Section 10.4.

8.7 Surface Water Discharge Paths

This section summarises the waterways that surface waters will be discharged to during the Operational Phase to minimise impacts to the receiving environment based on the operational design discussed in this section. Changes to these water discharge paths will be determined in the annual

review process. Both surface and groundwater quality monitoring will be undertaken during Operational Phase as per the monitoring plan specified in Section 13.0. Monitoring will be facilitated by installation of groundwater monitoring wells prior to commencement of mining.

8.7.1 MFS

The following surface water types may be discharged to Deep Stream directly, or via tributaries (e.g., Billo Stream):

- Clean water diversions.
- TSS impacted water, post sediment retention ponds (e.g., vegetation stripping).
- MIW Bypass Water.
- Treated water from passive treatment systems.
- Rehabilitated ELF surface water.

The following surface water types may be discharged to the Waimangaroa River:

- Treated water from the active WTP.
- Treated water from passive treatment systems.
- TSS impacted water, post sediment retention ponds (e.g., haul roads).
- Direct discharged MIW: When the flow of the Waimangaroa River is >7.194 cumecs (the non-exceedance 90th percentile flow as measured at monitoring site 2W) a controlled bypass of the MFS water treatment plant during the Operations and Active Closure phases will operate, with discharge to the Waimangaroa River without treatment from either the West Pit Sump or the East Pit Sump. The rate of the pumped bypass will not exceed the design maximum rate of pumping to the MFS water treatment plant. (the non-exceedance 90th percentile flow is a metric that describes the flow of a waterway that is exceeded 10% of the time, i.e. the flow that is not exceeded 90% of the time).

8.7.2 ESE

The following surface water types may be discharged to the Whareatea River directly, or via tributaries (e.g., Conglomerate Stream, V62 Stream) during the Operational Phase:

- Clean water diversions.
- TSS impacted water, post sediment retention ponds.
- MIW bypass water.
- Treated water from passive treatment systems.
- Treated water from the WTP.
- Rehabilitated ELF surface water.

The following surface water types may be discharged indirectly to the Cascade Creek:

- Clean water diversions.
- TSS impacted water, post sediment retention ponds.
- MIW bypass water.
- Treated water from the WTP. Up to 40 L/s of treated water will be pumped to V8 Creek (tributary of Cascade Creek), with the remainder discharging to the Whareatea River.
- Rehabilitated ELF surface water.

8.7.3 UWHR

The majority of surface water from the UWHR will be discharged to the Waimangaroa River directly, or via tributaries (e.g., Burnett Stream). A small portion is expected to discharge to a tributary of Burnett Stream.

This water will typically come from sediment retention ponds and clean water diversions.

9.0 Active Closure Phase Water Management

9.1 Introduction

The Active Closure Phase aims for the completion of all rehabilitation activities and the stabilisation of rehabilitated surfaces such that surface runoff does not require treatment for TSS and AMD through the WTPs. The duration of this phase is expected to be:

- 4 years for MFS
- 14 years for ESE

9.2 AMD Hazards

Acid forming overburden will be managed to minimise AMD by source control technologies (e.g., ELF and EFAs). This AMD WMP will be updated prior to the Active Closure Phase commencing and then in accordance with the PDCA adaptive management cycle and document review requirements as listed in Section 16.0. Acidity loads are expected to decrease rapidly (9.6 % per year) once rehabilitated, until long term loads derived from on-going oxygen flux are achieved.

AMD loads that require treatment during this Active Closure Phase are shown in Table 9 and Table 10 (Section 8.3).

9.3 Active Closure Phase Water Management

This section describes the general water management approach during the Active Closure Phase for MFS, ESE, and the UWHR.

9.3.1 MFS

The Active Closure Phase for MFS is signified by the completion of ELF rehabilitation with MIW emanating from ELF seepage and some exposed coal floor and highwall areas. The MIW is expected to require active water treatment via the WTP. Surface water not impacted by AMD will be diverted around MIW collection sumps where possible.

During this phase, passive water treatment will already occur in limited locations where suitable water quality can be achieved. ELF seeps will transition to passive treatment over this phase until all MIW is managed passively. Exposed coal floor areas and highwalls will report to MSR polishing ponds (elevated in alkalinity) to neutralise acidity.

Sump bypass and direct discharge continue to operate during active treatment of sumps (described in Section 8.4.1).

This water management is illustrated in Figure 18 (Section 8.4.1).

9.3.2 ESE

During the Active Closure Phase at ESE, active water treatment will occur in combination with passive water treatment. Therefore, pumping from in-pit sumps to the WTP will be ongoing and sumps will be set to bypass during flows >95th percentile as described in Section 8.4.2.

Passive treatment systems will gradually come online as soon as practicable i.e., as water quality in various seepage catchments reduces sufficiently to meet water quality objectives. As such, in-pit pumping, and volumes of water treated by the WTP, will reduce over the duration of the Active Closure Phase. Runoff from rehabilitated ELF's will be discharged directly to the waterways provided that the water quality meets the objectives through the monitoring programme specified in Section 13.0.

Water management is illustrated in Figure 21 (Section 8.4.2).

9.3.3 UWHR

During the Active Closure Phase, mining has ceased, and rehabilitation of the MFS and ESE sub-areas is planned to be complete, however, active treatment of MIW in those sub-areas continues. Use of the UWHR is then limited to activities associated with active water treatment requirements (e.g., transport of chemicals, MSR materials, and AMD sludge) and maintenance purposes.

Management of sediment and erosion within and after this phase would rely on the roadway and infrastructure areas being rehabilitated and remaining surfaces being stabilised with aggregate (BRL, 2026d). Sediment retention ponds may be left in place to capture any remaining sediment generation but would not be maintained with the expectation that any further erosion would be short-term and with minimal sediment accumulation.

AMD will be managed using source control principles such that treatment is not required (MWM, 2026f; BRL, 2026b).

9.4 Active Water Treatment

Active water treatment will continue until AMD seepage from ELF's, and other source have decreased such that water treatment activities can transition to passive treatment systems.

9.4.1 MFS

The Active Closure Phase for MFS is 4 years with acidity loads declining from ~200 tonnes per year to ~50 tonnes per year at the transition to passive treatment of AMD impacted waters (Table 9).

AMD sludge will be transported to ESE for disposal in the AMD sludge disposal cells located on the Coal Infrastructure Pad or will be taken to Stockton for disposal.

9.4.2 ESE

The Active Closure Phase for ESE is 14 years with acidity loads declining from ~2,300 tonnes per year to ~500 tonnes per year at the transition to passive treatment of AMD impacted waters (Table 10).

AMD sludge will be transported to AMD sludge disposal cells located on the Coal Infrastructure Pad or will be taken to Stockton for disposal.

9.4.3 Decommissioning of WTP Ponds

A number of ponds associated with the WTP at MFS and ESE will be decommissioned at the end of the Active Closure Phase. This will occur once ELF seepage may be managed through use of a passive treatment systems and once the WTP is decommissioned. In the Post Closure Phase, operational

sumps outside of those decommissioned in the Operational Phase will be converted to be passive treatment systems (i.e., active treatment will stop along with pumping of MIW, surface runoff will be diverted around the sumps, and only AMD impacted water will report to them for passive treatment).

The following ponds will be decommissioned at the end of the Active Closure Phase and transition to providing ecosystem services:

MFS:

- WTP Surge Sump.
- WTP Polishing Pond.

ESE:

- WTP Surge Sump (Ex-pit Seal).
- WTP Polishing Pond.

If required, effluent from MSRs may be directed into these ponds (i.e., as is currently occurring at the existing Escarpment Mine with the Pit 3 Pit Lake) to neutralise any acidity generated within these ponds.

9.4.4 Treatment Volumes

Volumes of MIW treated by the WTP are described in the following sections.

Passive treatment of AMD impacted waters will commence during the Operational and Active Closure Phases as ELFs are rehabilitated and discharge water quality from the passive treatment systems can ensure compliance limits are still met. Further details are provided in Section 10.3.

9.4.4.1 MFS

Modelling indicates that over the Operational and Active Closure Phases, 71,460,000 m³ of water is predicted to be treated by the WTP over the expected 18 years that it is active, the majority of which is during the Operational Phase (2026h). Figure 26 presents the modelled annual water treatment volumes of the life of the MFS. The black dotted lines depict the start and finish of the active closure phase.

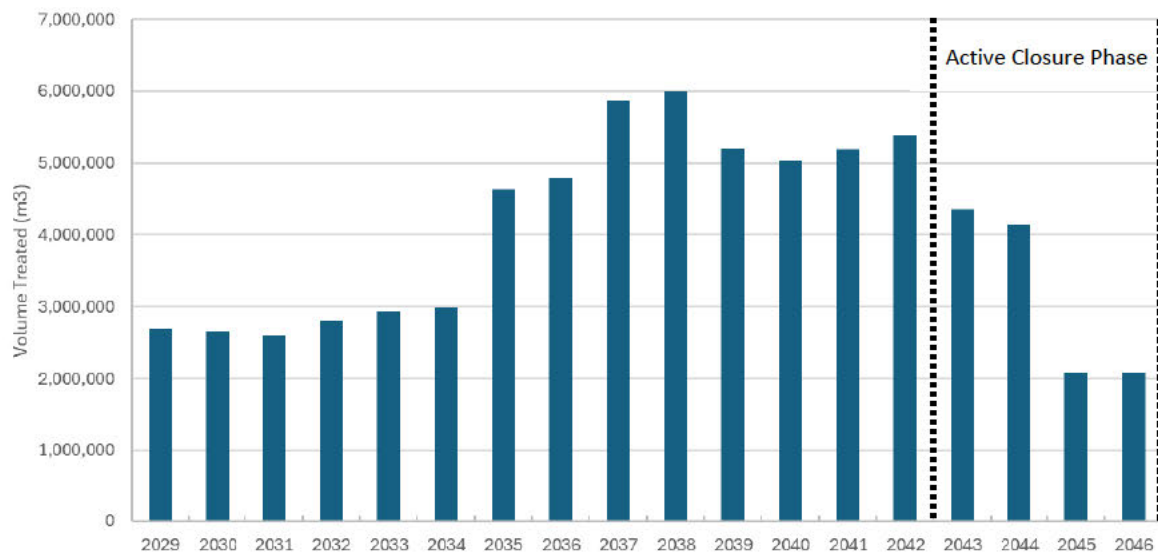


Figure 26: Volume of water treated through the MFS WTP

The Operational Phase is represented as the period up to the first dashed line (end of 2042), where the Active Closure Phase is from 2043 to 2046.

9.4.4.2 ESE

Modelling indicates that over the Operational and Active Closure Phases, 366,000,000 m³ of water is predicted to be treated by the WTP over the expected 30 years that it is active (MWM, 2026i) (Figure 27). Due to the length of time the Active Treatment Phase occurs for, the volume of treatment between phases is very similar.

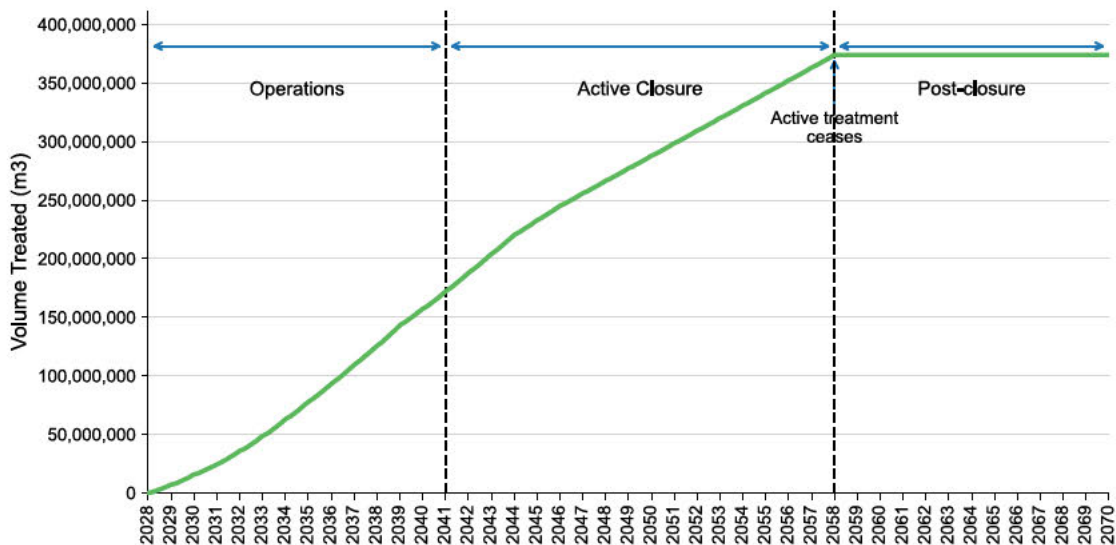


Figure 27: Volume of water treated through the ESE WTP.

9.5 Surface Water Discharge Paths

This section describes the waterways that surface waters will be discharged to during the Active Closure Phase to minimise impacts to the receiving environment based on the Active Closure design discussed in this section. Based on adaptive management through the PDCA cycle, changes to designs

and outputs may vary and will be reviewed on an annual basis or in line with this AMD WMP review process as discussed in Section 16.0. Both surface and groundwater quality monitoring will be undertaken during Active Closure Phase as per the monitoring plan specified in Section 13.0.

9.5.1 MFS

The following surface water types may be discharged from the MFS sub-area to Deep Stream directly, or via tributaries (e.g., Billo Stream):

- Clean water diversions (if left remaining).
- MIW Bypass Water.
- Treated water from passive treatment systems.
- Rehabilitated ELF surface water.

The following surface water types may be discharged from the MFS sub-area to the Waimangaroa River:

- Direct discharged MIW.
- Treated water from the active WTP.
- Treated water from passive treatment systems.
- Rehabilitated ELF surface water.

9.5.2 ESE

The following surface water types may be discharged from the ESE sub-area to the Whareatea River directly, or via tributaries (e.g., Conglomerate Stream, V62 Stream) during the Operational Phase:

- Clean water diversions.
- MIW bypass water.
- Treated water from passive treatment systems.
- Treated water from the WTP.
- Rehabilitated ELF surface water.

The following surface water types may be discharged from the ESE sub-area indirectly to the Cascade Creek:

- Clean water diversions.
- MIW bypass water.
- Treated water from the WTP. Up to 40 L/s of treated water will be pumped to V8 Creek (tributary of Cascade Creek), with the remainder reporting to the Whareatea River.

- Rehabilitated ELF surface water.

9.5.3 UWHR

The majority of surface water from the UWHR will be discharged to the Waimangaroa River directly, or via tributaries (e.g., Burnett Stream). A small portion is expected to discharge to a tributary of Burnett Stream.

This water will typically come from rehabilitated / stabilised surfaces.

9.5.4 Monitoring

Surface water monitoring locations remain the same as those described in the Operational Phase in Section 8.7. Detailed surface water and ground water monitoring requirements are provided in Section 13.0.

It is expected that water quality monitoring of the UWHR will cease in the Active Closure Phase once the road is no longer used for the transport of coal.

9.6 Additional Studies

The following activities will be undertaken to support the management of AMD during the Active Closure Phase:

- Performance monitoring during operations to improve the understanding of the likely duration of the Active Closure Phase.
- Early implementation of passive treatment systems and associated performance monitoring will provide an opportunity to monitor treatment performance and inform closure planning.
- Updating of the WLBM's once sufficient data are available to calibrate the model (e.g., cover system performance and net percolation rates; source terms; water treatment efficiencies, etc.) to improve confidence in model results for closure.

10.0 Post Closure Phase Water Management

10.1 Introduction

The Post Closure Phase is defined by the cessation of active water treatment using WTPs and the transition to passive treatment. The ESE sub-area and the MFS sub-area can each be confirmed as being in 'Post Closure' phase when the receiving water quality meets the compliance limits specified within the resource consent conditions using only passive treatment systems for a period of two years. Once this condition is achieved at either or both of these sub-areas, the Approval Holder can decommission the relevant active water treatment plant(s).

- For the ESE sub-area, the monitoring data from the following Compliance monitoring locations must be used to confirm the transition to Post Closure: KEL, W07, V62, and M-M1.
- For the MFS sub-area, the monitoring data from the following Compliance monitoring locations must be used to confirm the transition to Post Closure: SW01, SW03, 2W, and 17W.

The transition to passive treatment is scheduled to occur:

- At MFS in Year 2047
- At ESE in Year 2057

10.2 AMD Hazards

During the Post Closure Phase long term AMD loads will be driven by ongoing oxygen flux through the rehabilitated surfaces of ELF. This AMD WMP will be updated prior to the Post Closure Phase commencing and then in accordance with the PDCA adaptive management cycle and document review requirements as listed in Section 16.2. Modelled acidity loads that require treatment during the Post Closure Phase, at the proposed MSRs are shown below in Table 13 (Section 10.4).

10.3 Post Closure Water Management Infrastructure

Following the transition from active treatment to passive treatment (i.e., transition to the Post Closure Phase) the following infrastructure will remain:

- Active treatment systems will remain in place for a period of 2 years (care and maintenance) as a contingency in case passive treatment system performance is sub-optimal. After this period the plant will be decommissioned and removed from site if passive treatment performance is acceptable. Pumping of AMD impacted waters to the Cascade catchment may still be required for three years after active WTP cease operation until loads can be managed by the MSR.
- Several pit sumps/voids will be retained for water management (i.e., passive treatment and polishing ponds). These include WWH Sump, MFS East Sump, and MFS West Sump and small portions of CON coal floor and MFS East coal floor that are not rehabilitated.
- Passive treatment systems treating ELF basal seepage.

- AMD sludge disposal areas.
- Roading and auxiliary infrastructure to access passive treatment systems and disposal areas.

The location of these water bodies is shown in Figure 8 and Figure 9 (Section 5.10). The location of passive treatment systems at ESE and MFS are shown in Figure 6 and Figure 7 (Section 5.3.1) respectively.

In regard to final landform design:

- Water bodies (e.g., surge sumps) used for managing MIW during the Active Treatment Phase will be incorporated into passive treatment systems (e.g., MSRs, Polishing ponds).
- When ELF seepage water does not require passive treatment, the MSR will be converted into a wetland. The details of this are discussed in the Mine Closure Concept Strategy (BRL, 2026b).

10.4 Passive Treatment

The proposed approach using MSR to treat AMD impacted waters is based on ~20 years of experience and research with over a decade of operational experience at Stockton and Escarpment mines. These studies indicate a key design standard of MSR is the surface area. Numerous studies show that for 1 L/s flow, a surface area of ~100 m² is required. Space has been provided in mine planning to ensure this key design feature is not compromised.

However, there are potential treatment capacity risks for long term passive treatment of AMD impacted waters associated with ELF basal seepage. Passive treatment capacity risk (based on industry guidance (e.g., INAP, 2021)) for each ELF basal sub-catchment have been assessed to identify that in most cases MSR flows and loads are appropriate except for the larger ELFs.

Table 15 presents modelled flow rates and acidity loads into each MSR for passive treatment. The loads and rates are dependent upon the size of ELF from where the AMD drainage flows. An analysis to understand MSR efficiency risk has been undertaken with MSRs being classed as “suitable”, “suitable but two MSRs may be required” and “suitable but multiple systems may be required”. This analysis is discussed below.

Suitable:

- **Green:** ≤ ~50 t/yr acidity.
- **Green:** ≤ ~50 L/s average flow rate.

Suitable but two systems may be required:

- **Orange:** < ~100 t/yr acidity (two reactors may be required) but > 50 t/yr acidity.
- **Orange:** < ~100 L/s average flow rate (two reactors may be required) but > 50 L/s average flow rate.

Suitable but multiple systems may be required:

- **Red:** > ~100 t/yr acidity (multiple reactors may be required).

- **Red:** > ~100 L/s average flow rate (multiple reactors may be required).

Results indicate that two MSR treatment systems may have capacity constraints. Further work is required to confirm that multiple MSR reactors will work and/or the use of other technologies that can increase treatment rates / treatment efficiencies (options are explained in Table 13).

Water management modelling has scheduled the expected MSR commencement dates, which are presented in Table 15.

Table 13: MSR treatment capacity summary.

MSR	FLOW RATE (L/s) ¹	ACIDITY LOAD RANGE (t/yr) ^{2,3}	ACIDITY LOAD AT MSR START DATE (t/yr) ²	MSR ACTIVATION DATE (FY) ⁴	COMMENTS
BVE	13.9	21.1 (42.7)	38.2	2058	No issues anticipated
CON	75.3	86.0 (174.4)	174.4	2058	Potential capacity constraints (flow and load). Consider: • Multiple MSR (possibly up to 4) • Increased desludging to maintain optimal flow rates • Other treatment technologies. • Longer term active treatment
NSUL-Closure	18	(14.0) ²	5.1	2046	No issues anticipated: NAF ELF – treatment for Zn + other PCOC
PPG	2.76	(1.6) ²	0.1	2058	No issues anticipated: NAF ELF – treatment for Zn + other PCOC
ESC	2.36	3.1 (6.2)	11.9	2030	No issues anticipated
WWH	117	153.1 (310.4)	299.1	2058	Potential capacity constraints (flow and load). Consider: • Multiple MSR (possibly up to 6) • Increased desludging to maintain optimal flow rates. • Other treatment technologies. • Longer term active treatment
MSR1	4.63	5.8 (11.7)	11.2	2045	No issues anticipated
MSR2	1.15	1.4 (2.9)	2.7	2045	No issues anticipated
MSR3	3.12	2.0 (4.1)	3.8	2045	No issues anticipated
MSR4	3.12	5.3 (10.7)	16.1	2045	No issues anticipated
MSR5	14.3	16.7 (25)	24.2	2045	No issues anticipated
MSR6	3.39	4.0 (5.5)	5.3	2045	No issues anticipated
MSR7	15.2	17.7 (29.6)	28.5	2045	No issues anticipated
MDC1	0.45	(0.1)	0.1	2029	No issues anticipated; potential to use low S overburden (i.e., <0.015 wt%) and remove the need for Post Closure Phase passive treatment.
MDC2	0.40	(0.1)	0.1	2038	No issues anticipated; potential to use low S overburden (i.e., <0.015 wt%) and remove the need for Post Closure Phase passive treatment.
MSR8	23.9	29.1 (43.5)	43.3	2047	No issues anticipated
MSR9	2.99	3.4 (5.2)	5.1	2047	No issues anticipated
MSR10	1.84	2.3 (2.8)	2.7	2047	No issues anticipated
MSR11	2.20	2.6 (5.2)	8.6	2029	No issues anticipated

MSR	FLOW RATE (L/s) ¹	ACIDITY LOAD RANGE (t/yr) ^{2,3}	ACIDITY LOAD AT MSR START DATE (t/yr) ²	MSR ACTIVATION DATE (FY) ⁴	COMMENTS
MSR12	2.21	2.6 (5.3)	8.9	2029	No issues anticipated

1. Final catchment data as provided by BRL in the WLBMs.
2. From BRL rehabilitation model data.
3. Numbers relate to oxygen flux based on limestone being available (1.35 t/ha/yr) and numbers in brackets represent the potential acidity load if the limestone was exhausted (2.7 t/ha/yr). Numbers are prior to exclusion of occluded zones in the ELF (35%).
4. As provided in the WLBMs.

10.5 MSR Design, Operation and Maintenance

MSRs are proposed to treat ELF seepage using a two-stage passive treatment system consisting of primary treatment within the MSR and secondary treatment in a MSR polishing pond. Standard operation of the MSR is discussed in this section and will be operationalised through the MSR Operation and Maintenance SOP (BPCP-ENV-SOP-13). MSR locations will be progressively installed with the final closure water management relating to the MSR design presented in Figure 28. The proposed MSR design, operation and maintenance will be refined based on the Operational Phase trials.

Stage 1: Mussel Shell Reactor (Primary Treatment):

- MSR treatment to remove PCOC within the MSR substrate (e.g., composed of fresh or weathered mussel shells).

Stage 2: Polishing Pond (Secondary Treatment):

- MSR effluent flows into a polishing pond for aerobic treatment. This promotes Fe³⁺ hydroxide formation for further Zn removal and oxidation of secondary contaminants. The Polishing Pond are designed to be the same size as the MSR providing ~24 hours residence time.

The general location of the MSRs are subject to the following conditions:

Prior to each MSR establishment within ESE and MFS sub-areas of the BPCP, a detailed scale plan or aerial photograph will be provided to the Approval Authority showing:

- the location of the proposed passive treatment system(s) containing shellfish shells and the associated discharge point(s);
- the location(s) of natural watercourses in proximity to (a); and
- the proposed receiving environment monitoring location(s).

Annually thereafter the provision of any initial detailed scale plan or aerial photograph as required by the Approval Authority, in an addendum to the Annual Monitoring Report. This addendum provides an updated detailed scale plan or aerial photograph showing:

- the locations of all established and commissioned passive treatment systems containing shellfish shells and the associated discharge point(s);
- the locations of any shellfish shell stockpiles (for the purpose of ensuring adequate supply is on hand to construct and maintain mussel shell bioreactors);
- the locations of natural watercourses in proximity to the above;
- the receiving environment monitoring location(s);
- the quantity of shells deposited in passive treatment systems in the previous 12 months; and
- The quantity of shells stockpiled in the previous 12 months.

The following design criteria are used:

- MSR design is based on the highest anticipated ELF flow rates (e.g., 40% of net percolation).
- A hydraulic residence time (HRT) of 24 hours is proposed as the background design criterion.
- Shell layer thickness will be a minimum of 1.5 m, comparable to other operating designs (e.g., Whirlwind and BV ELF MSRs).
- A minimum water cover depth of 0.30 m above the shells is required to manage shell odours and equalise flow through the substrate.
- A minimum freeboard depth of 0.50 m is required to accommodate reduced permeability and provide surge capacity during higher flows or rainfall events.
- A design factor of two is applied to the MSR footprint to account for inclusion of the polishing pond. If excavated to the same depth as the MSR, the polishing pond will provide a longer residence time. Final dimensions will be determined during detailed design.
- MSR overflow will be included in the design to manage higher than anticipated flows. Overflow will report to the polishing pond where partial treatment will occur.
- MSR will be designed as downflow systems to enable efficient AMD sludge removal.
- Collection of ELF toe seepage and piping to the MSR may be required where space is limited.
- Poorly ventilated locations close to MSR discharges can lead to elevated hydrogen sulfide gas (H₂S). MSR design will avoid construction of closed or confined spaces.
- Mine water and stormwater are diverted away from any mussel shell stockpile location(s) and that any discharge from the mussel shell stockpile(s) is directed toward the water management system for the associated sub-area.
- Evaluate the expansion of the MSR design to incorporate an increase by 10% (i.e., 10% additional surface area to account for increased flows due to climate change forecasts).

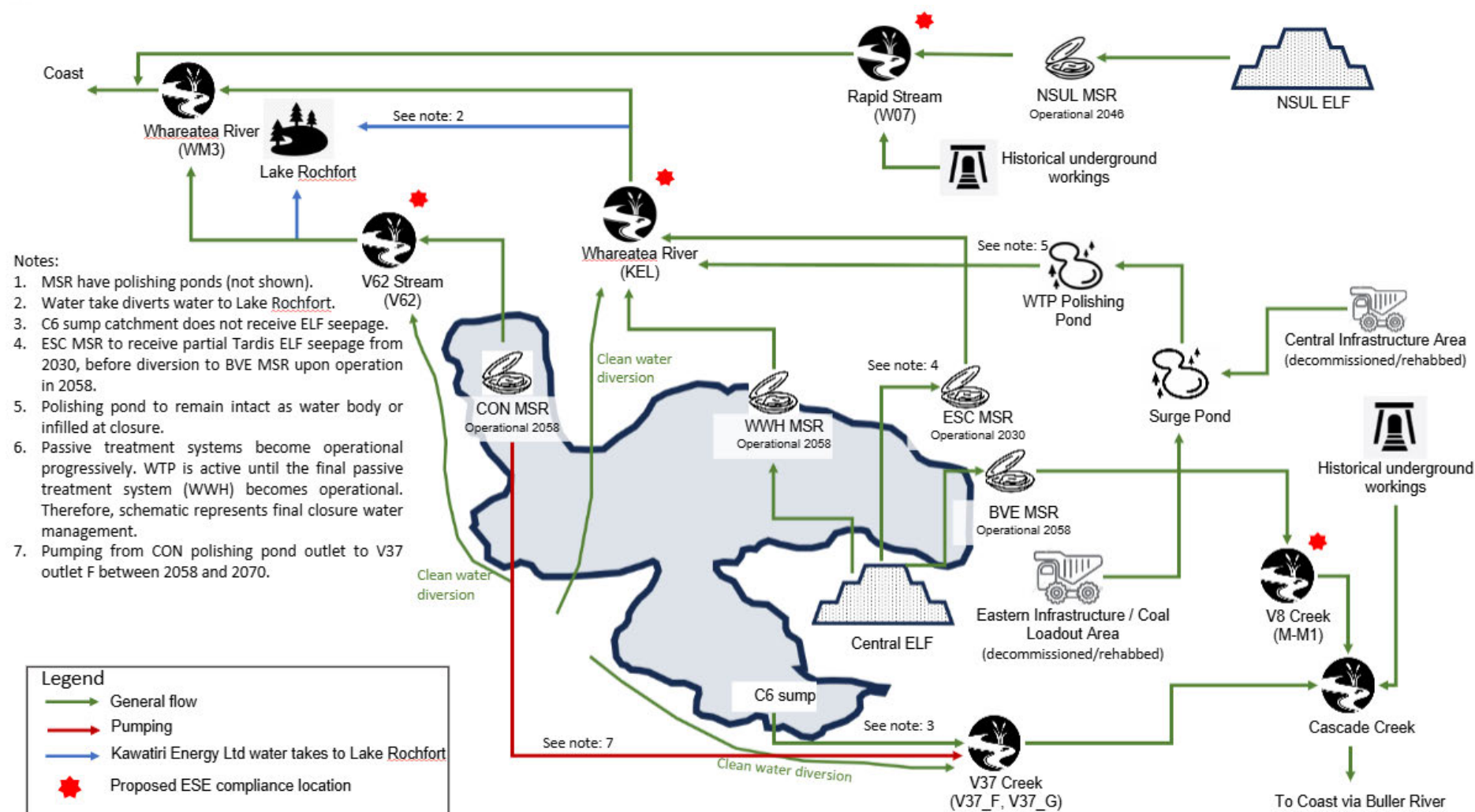


Figure 28: ESE Passive Treatment Phase Water Management. Note: this schematic captures the final Closure Phase

The following materials will be required for MSR construction and operation:

- Mussel shells: chipped shells (fresh or weathered) for MSR construction and periodic replacement during maintenance.
- Pipework: HDPE influent and effluent pipes to convey AMD to the MSR and treated water to downstream discharge locations or polishing ponds.
- MSR lining: HDPE or low permeability rock liners may be required to minimise basal seepage depending on site specific conditions. Basal seepage in downflow MSR is generally treated.
- Underdrainage: perforated PVC pipes within the shell layer to collect effluent and maintain hydraulic performance. No gravel drainage medium is required as the shells provide adequate permeability.
- Risers: each MSR and polishing pond will include risers connected to the basal drainage network to control water levels. These will be adjustable PVC structures.
- Overflow: spillways will be included to manage flow variability and will be armoured to prevent erosion.
- Monitoring equipment including v-notch weirs, continuous stage height loggers for flow measurement, and continuous pH and electrical conductivity loggers.

Regular inspections are required to support performance monitoring and early detection of treatment inefficiencies. Inspections will include:

- Inspection of upstream sediment management infrastructure constructed to capture suspended sediment in influent water and exclude surface water from the MSR.
- Inspection of MSR and polishing pond inlets and outlets for blockages.
- Assessment of flow rates to identify potential hydraulic restrictions associated with sludge accumulation.
- Assessment of water level and freeboard within the MSR relative to the spillway.
- Measurement of sludge accumulation depth and permeability to confirm acceptable hydraulic performance.
- Inspection of the polishing pond including visual assessment of water clarity, odour, algal growth, and sludge accumulation.
- Verification of established safety features.

Two mechanisms can drive desludging including:

- Reduced permeabilities due to sludge accumulation leading to overflow of the MSR and therefore bypass of untreated AMD.
- Reduced treatment efficiencies for trace metals such as Zn leading to sub-optimum performance.

For maintenance of the MSRs (e.g., desludging) the system or part of the system needs to be taken off-line. This could involve dosing of bypass water with CaO or NaOH, designing MSRs to incorporate bays such that individual bays can be bypassed and drained for desludging while others remain operating. MSR Polishing ponds could also be constructed deeper to accommodate all sludge generation or be desludged periodically, if required.

Adaptive management will be used to manage MSR performance during closure of the BPCP. Performance monitoring will support adaptive management processes. Through adaptive management the MSR capacity could be increased by 10% (BBRA risk #92 and MWM (2026a) recommendation #26).

10.5.1 AMD Sludge Management

AMD sludge (predominantly Fe and Al) is generated from the treatment of acidic AMD impacted waters. Downflow MSRs are an efficient process to remove Fe and Al, acting as a vertical flow reactor as well as a neutralising PTS with pH correction such that AMD sludge forms at the surface of the MSR. This sludge can effectively be removed as part of routine maintenance as demonstrated at operating MSRs.

MSRs require desludging approximately every 5 years. This duration may be shorter for MSRs receiving higher acidity loads (i.e., higher dissolved Fe and Al loads), as MSRs are sized for flow rather than acidity load and desludging could occur every 1 to 2 years. Confirmation of desludging frequency will be determined from field trials during the Operational Phase of the project. Desludging is undertaken by temporarily isolating and dewatering the MSR, after which the accumulated sludge layer at the surface of the reactor is mechanically removed using an excavator. Desludging requires removal of a small portion of remnant shells together with the sludge. These shells remain in the sludge and provide acid neutralisation capacity buffering any acidity during disposal. An example of AMD sludge removal from a MSR following dewatering of the reactor is shown in Figure 29.



Figure 29: Example of AMD sludge removal from a MSR following reactor dewatering using an excavator.

Location: Escarpment Mine: BV-ELF MSR.

MSRs are proposed for the treatment of seepage from ELF's at closure of the ESE and MFS sub areas. Projected sludge quantities generated by MSRs are shown in Table 14. Desludging timing of the MSRs will be refined during the operational phase trials and updated WLBMs; The MSR details herein will be incorporated into the MSR Operation and Maintenance SOP (BPCP-ENV-SOP-13).

The volume of sludge generated per tonne of acidity treated by MSRs is significantly lower than the sludge volume generated by active treatment (i.e., 1 to 2 m³ per tonne of acidity (MSR) compared to 20 to 40 m³ (CaO treatment at 3 wt% solids)). This difference is caused by a higher sludge solids content in MSR sludge (likely to be closer to >20 wt% solids), as opposed to an order of magnitude step change in acidity loads being treated. The change from active treatment to passive treatment is therefore projected to decrease AMD sludge quantities by an order of magnitude.

When active treatment is still occurring after ELF's have been rehabilitated (i.e., Active Closure Phase), AMD sludge disposal will either be onsite at an appropriate location, disposal at Stockton, or by other approved methods that may be developed over the Operational Phase of the BPCP. In the Post Closure Phase similar locations will be used. A back up option includes disposal to offsite landfills.

Other options for AMD sludge management will be evaluated during the Operational Phase. If studies indicate that the method can provide geochemical stability, containment integrity, and cost-effective handling to align with closure objectives then this may be implemented at a later date (with additional regulatory approval as required). The following management measures are proposed:

- Investigate additional disposal options for AMD sludge during the Operational Phase of the BPCP.
- Avoid placement of AMD sludge with acid forming materials as some trace metals (Mn > Co = Zn > Ni) are preferentially mobilised from AMD sludge under acidic conditions (i.e., placement with acid forming materials).
- Include water quality monitoring at strategic locations within catchments and sub-catchments to detect any increase in PCOC concentrations due to AMD sludge disposal. This includes performance monitoring of ELF basal seepage.
- Validate basal seepage performance monitoring data against model predictions and based on update WLBMs, determine timing of the transition to passive treatment.
- Develop a management process for the AMD sludge disposal that is supported by adaptive management processes including performance water quality monitoring. This management process will include recording of AMD sludge volumes and disposal locations within any landforms. This will support signoff of the process by the appointed SQEP.

Data indicates that the quantity of sludge generated after 5 years is highly variable across the various MSR PTS and is a function of the influent acidity load (as determined by the sludge volumes to acidity loads measured at the BV ELF MSR). A total of ~5,170 m³ of sludge will be generated every 5 years once all MSR are operating (although there will be a decline in loads of at least 0.62% per year (Treasury, 2017) from the start date of the MSR so this is a conservative value).

Table 14: AMD sludge generation rates for ESE and MFS MSRs.

BPCP SUB-AREA	ELF	MSR ACTIVATION DATE	MSR DESIGN ACIDITY (t/yr) ¹	MSR SURFACE AREA (m ²) ¹	SLUDGE QUANTITY AFTER 5 YEARS (m ³)	SLUDGE THICKNESS AFTER 5 YEARS (mm)
-	BV-ELF	-	10	350	74.9	214
ESE	BVE	2058	38.2	1,537	286	186
ESE	CON	2058	174.4	8,339	1,308	157
ESE	NSUL	2046	5.1	1,994	39	19
ESE	PPG	2058	0.1	306	1	3
ESE	WWH	2030	299.1	12,991	2,243	173
ESE	ESC	2030	11.9	245	89	363
MFS	MSR1	2045	11.2	512	84	165
MFS	MSR2	2045	2.7	128	20	159
MFS	MSR3	2045	3.8	345	28	82
MFS	MSR4	2045	16.1	345	121	351
MFS	MSR5	2045	24.2	1,582	182	115
MFS	MSR6	2045	5.3	375	39	105
MFS	MSR7	2045	28.5	1,683	214	127
MFS	MDC1	2029	0.1	49	0.7	15
MFS	MDC2	2038	0.1	42	0.4	10
MFS	MSR8	2047	43.3	2,644	325	123
MFS	MSR9	2047	5.1	331	38	115
MFS	MSR10	2047	2.7	204	20	98
MFS	MSR11	2029	8.6	244	65	265
MFS	MSR12	2029	8.9	244	67	274
Total					5,170	

1. Acidity loads are based on the activation date of the MSR as per the water and load balance models.

10.6 Surface Water Discharge Paths

This section describes the waterways that surface waters will be discharged to during the Post Closure Phase to minimise impacts to the receiving environment based on the Post Closure design discussed in this section. Based on adaptive management through the PDCA cycle, changes to designs and outputs may vary and will be reviewed on an annual basis or in line with this AMD WMP review process as discussed in Section 16.0. Surface and groundwater quality monitoring will be undertaken during Post Closure Phase as per the monitoring plan specified in Section 13.0.

10.6.1 MFS

The following surface water types may be discharged from the MFS sub-area to Deep Stream directly, or via tributaries (e.g., Billo Stream):

- Clean water diversions (if left remaining).
- Treated water from passive treatment systems.
- Rehabilitated ELF surface water.

The following surface water types may be discharged from the MFS sub-area to the Waimangaroa River:

- Treated water from passive treatment systems.
- Rehabilitated ELF surface water.

10.6.2 ESE

The following surface water types may be discharged from the ESE sub-area to the Whareatea River directly, or via tributaries (e.g., Conglomerate Stream, V62 Stream) during the Operational Phase:

- Clean water diversions (if left remaining).
- Treated water from passive treatment systems.
- Rehabilitated ELF surface water.

The following surface water types may be discharged indirectly from the ESE sub-area to the Cascade Creek:

- Clean water diversions (if left remaining).
- Rehabilitated ELF surface water.

10.6.3 UWHR

The majority of surface water from the UWHR will be discharged to the Waimangaroa River directly, or via tributaries (e.g., Burnett Stream). A small portion is expected to discharge to a tributary of Burnett Stream.

This water will typically come rehabilitated / stabilised surfaces.

10.7 Monitoring

Surface water monitoring locations remain the same as those described in Section 8.7. Detailed surface water and ground water monitoring requirements are detailed in Section 13.0.

It is expected that water quality monitoring of the UWHR will have ceased by this phase.

11.0 Closure

Closure objectives must be defined at the start of the project to ensure that the appropriate AMD water management steps are developed and implemented to achieve the agreed closure objectives.

11.1 Overarching Closure Objectives

The overarching closure objectives for AMD water management are:

- Ensure that water discharging from the MFS, ESE, and UWHR sub-areas is of the highest practicable quality, and as a minimum, complies with all statutory and non-statutory requirements over the BPCP phases.
- Ensure the health and safety of communities are managed during operational and closure phases.

It is essential that closure objectives are understood to enable the definition of appropriate engineering controls to achieve these objectives, and to ensure that information is appropriately communicated to stakeholders.

11.2 High Level Closure Objectives

High level closure completion criteria for MFS, ESE, and the UWHR have been developed for the Post Closure Phase and are summarised in Table 15. These criteria will be periodically reviewed and aligned with the Mine Closure Concept Strategy (BRL, 2026b).

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 30.

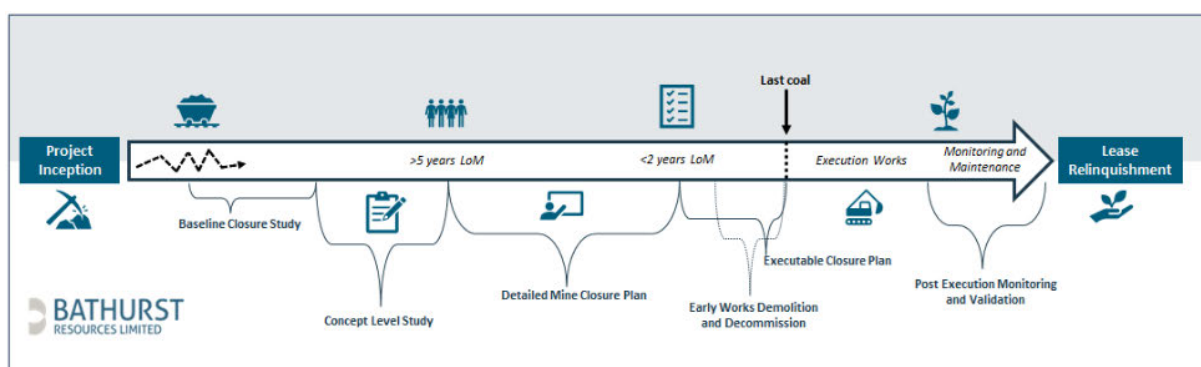


Figure 30: BRL detailed mine closure planning timeframes

Justification for completion criteria in Table 15 is based on the AMD risk assessment, which identifies key risk themes for closure as being final landform stability, water management infrastructure, and water quality. Risks associated with landform stability are covered by the AMD ELFMP.

Table 15: High-level AMD closure completion criteria for the BPCP.

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.¹¹ - ELFs are geotechnically stable. - ELFs are considered geomorphically stable landforms resistant to elevated erosion and the loss of sediment - ELFs 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 constructed 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.	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. - 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;

¹¹ 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
			- 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. - Water quantity needs to achieve water quantity objectives. - The project needs to demonstrate betterment of several waterways.	- Consistently meeting water quality and quantity objectives at all water 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 monitoring data – performance and compliance monitoring. - 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.

11.3 Closure Waterbodies

Closure waterbodies have been summarised in Table 6. Further work is required for other voids that will be utilised for ecosystem services at the end of the Active Closure Phase, for instance:

- There is interest from Kawatiri Energy Limited (KEL) in the opportunity to use water within these pit voids for its hydro-energy system. An agreement is being finalised with KEL to maximise these opportunities over the project life.
- Closure voids (Table 6) are within the Brunner Coal Measures and water quality is likely to be affected by AMD. These AMD effects can be managed by ensuring the effluent from a MSR (elevated alkalinity) is discharged direct to these voids. Such processes have been validated at the Escarpment Mine where the Pit 3 Pit Lake (within BCM) was treated using MSR effluent with pH increasing from ~3.7 to ~ pH 7.5 (MWM, 2026a) (Figure 31). The approach is understood but requires detailed design to facilitate the development of a pit lake suitable for either ecosystem services or water supply to KEL.

- BRL will undertake monitoring of the water quality within each identified closure waterbody to determine whether that waterbody may in time be suitable for rehabilitation to provide aquatic habitat. The monitoring frequency, sampling methodology and parameters to be analysed will be reviewed in accordance with This Plan and included within the Mine Closure Plan.
- Undertake a SQEP review of monitoring data during Operational, Active Closure, and Post Closure Phases, and validate data against model predictions and incorporate changes to monitoring type and frequency changes into This Plan, relevant SOPs and the following management plans:
 - AMD ELF MP
 - Mine Closure Management Plan
 - Erosion and Sediment Control Plan for Land Disturbance Activities
- Detailed design needs to consider issues such as water quality objectives, grading down of highwall slopes and potential effects on disturbance footprint, creation of littoral zones, water management infrastructure requirements, existing AMD/TSS sludge within voids, AMD sludge disposal opportunities within these voids, pit lake stratification studies, etc.

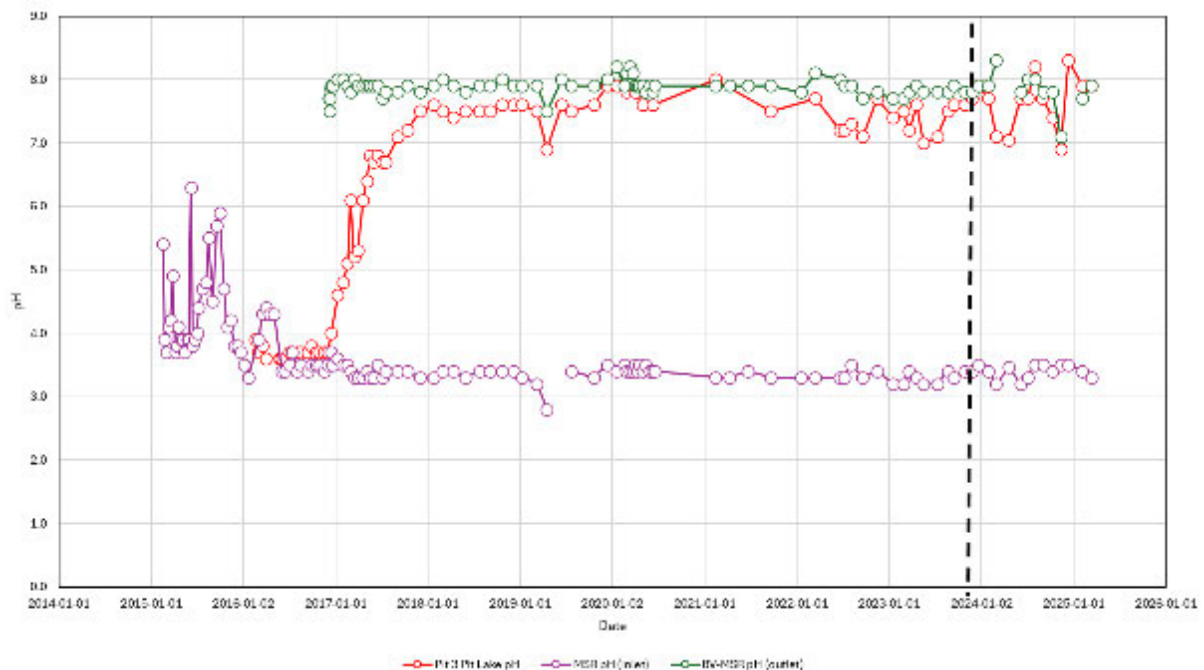


Figure 31: Pit 3 Pit Lake water quality prior to and after MSR effluent commenced

The black dashed line represents the point when the MSR was desludged.

11.4 Ecological Betterment

A number of ecological betterment opportunities have been identified as part of the BPCP for the ESE sub-area, which, has been historically and still is affected by AMD. Betterment will be determined by ecological studies of recovery of the receiving streams (ESNZ, 2026), which will be undertaken during the operational and closure phases of the BPCP. These studies will develop a dataset through survey work and supporting performance monitoring water quality data. The following sections describe betterment opportunities that have been identified.

11.4.1 Sullivan NAF ELF

A NAF ELF will remain at closure (NSUL ELF) as shown in Figure 6. Net percolation through this structure is expected to be circum-neutral due to materials being NAF. These waters will be treated by an MSR that will provide a significant amount of alkalinity to treated waters. This alkalinity load could be used to offset AMD from the historic Sullivan underground mine that have impacted Rapid Stream.

The current base case mine plan is to discharge the treated water directly to Rapid Stream, with compliance monitoring occurring at W07 in the upper catchment. However, transfer of the treated water to neutralise AMD associated with the Sullivan Underground Mine could provide catchment wide benefits for Rapid Stream. Studies will be undertaken over the BPCP Operational Phase to confirm the opportunities for betterment.

11.4.2 Cascade Creek

It is predicted that the construction of the ex-pit seal at ESE will work to capture ~40% of the AMD that is currently discharging into Cascade Creek from underground workings (MWM, 2026a).

The development of the ESE sub-area may also divert a significant quantity of AMD impacted water from the Escarpment Underground Mine (Escarpment Adit discharge) from the V37 catchment that drains into the Cascade Creek into the ESE mine water network. This discharge is on average 7.8 L/s with a pH of ~ 3.07 and an average acidity of 117 mg CaCO₃/L.

The following management measures will be implemented to support the betterment predictions:

- Undertake performance monitoring of PCOC loads to validate and improve betterment outcomes for certain waterways (e.g., Rapid Stream, Cascade Creek Trib (V8), V37 Creek, and Cascade Creek).
- Validate ESE groundwater studies that indicate that flow rates could be reduced by 40% contributing to a significant reduction in the AMD load reporting to the Cascade Creek catchment and removal of the Escarpment Adit discharge to V37 Creek that reduces load to the Cascade Creek through a monitoring program to confirm these improvements. This will be developed as part of future Betterment studies (e.g., ESNZ, 2026).
- The potential betterment associated with this reduction in AMD load to the catchment will be assessed by ecological studies (ESNZ, 2026) and supported by water quality performance monitoring data to quantify the benefits.

11.4.3 Specific Studies to be Undertaken

The specific studies that are proposed to confirm betterment are contained in the Aquatic Ecology Management Plan (STO_ENV_BLN-006).

11.5 Relinquishment

Once the closure criteria defined in Table 15 are achieved and the project has transitioned into the Post Closure Phase, there will be the opportunity to consider relinquishment where existing assets and water management infrastructure are transferred to the appointed regulatory authority. Relinquishment criteria will be based on the high-level criteria provided in Table 15 with refinement to acknowledge:

- Evolution of the project which can be dynamic, driven by market variables.
- The passage of time that could affect treatment technologies that may be used and community/regulatory expectations on water quality and quantity.
- Generational expectations.
- The evolving nature of risk and financial bonds.

Successful closure and the ability to relinquish the project to the appointed regulatory authorities requires sign-off by a SQEP. The decision will also be accepted by the West Coast Regional Council (WCRC) and will consider:

- Confirmation that final landforms (ELFs and water management infrastructure) are acceptable for closure requires sign-off by the EoR.
- Confirmation that final landforms are geochemically stable at closure and water treatment is appropriate requires sign-off by a SQEP.

12.0 Water Quality Objectives

Water quality objectives for AMD impacted waters have been defined by Hickey (2026a) for MFS, ESE, and the UWHR. Hickey (2026a) uses a combination of guidance documents/standards, the nature of the existing receiving environment and historic activities (both water quality and ecology), and the anticipated effects of future activities, to recommend compliance limits for relevant contaminant discharges, from MFS, ESE, and UWHR and assesses why those limits are appropriate to manage/improve water quality and ecological outcomes. These compliance limits are presented in the following sections. PCOC are based on a comprehensive assessment of background water quality within the area and further details are provided in the AEE and BPCP FTAA Application.

12.1 Water Quality Objectives

Site-specific bioavailable guidelines for metals and other contaminants were developed for application to the Buller Plateaux receiving waters by Hickey (2026a,b,c). These guideline values (GVs) incorporate toxicity-modifying factors (TMFs) (e.g., pH, hardness, DOC, temperature) where appropriate and are used for chronic and acute (no-effect) assessments. Equations are provided for differing levels of protection (LoP) – appropriate for application to receiving waters with differing levels of AMD influence. A weight of evidence (WoE) classification was developed to assess Buller Plateaux streams for AMD influence and the appropriate LoP Water quality criteria proposed for the sub-areas of the BPCP are based on levels of protection (LoP). Table 16 presents the bioavailability guideline value (GV) equations for chronic GV and acute GV for differing levels of protection (LoP). The TMF range for pH, hardness (as CaCO_3) and dissolved organic carbon (DOC). Turbidity limits are presented in Table 18. Water monitoring sites are presented in Figure 32.

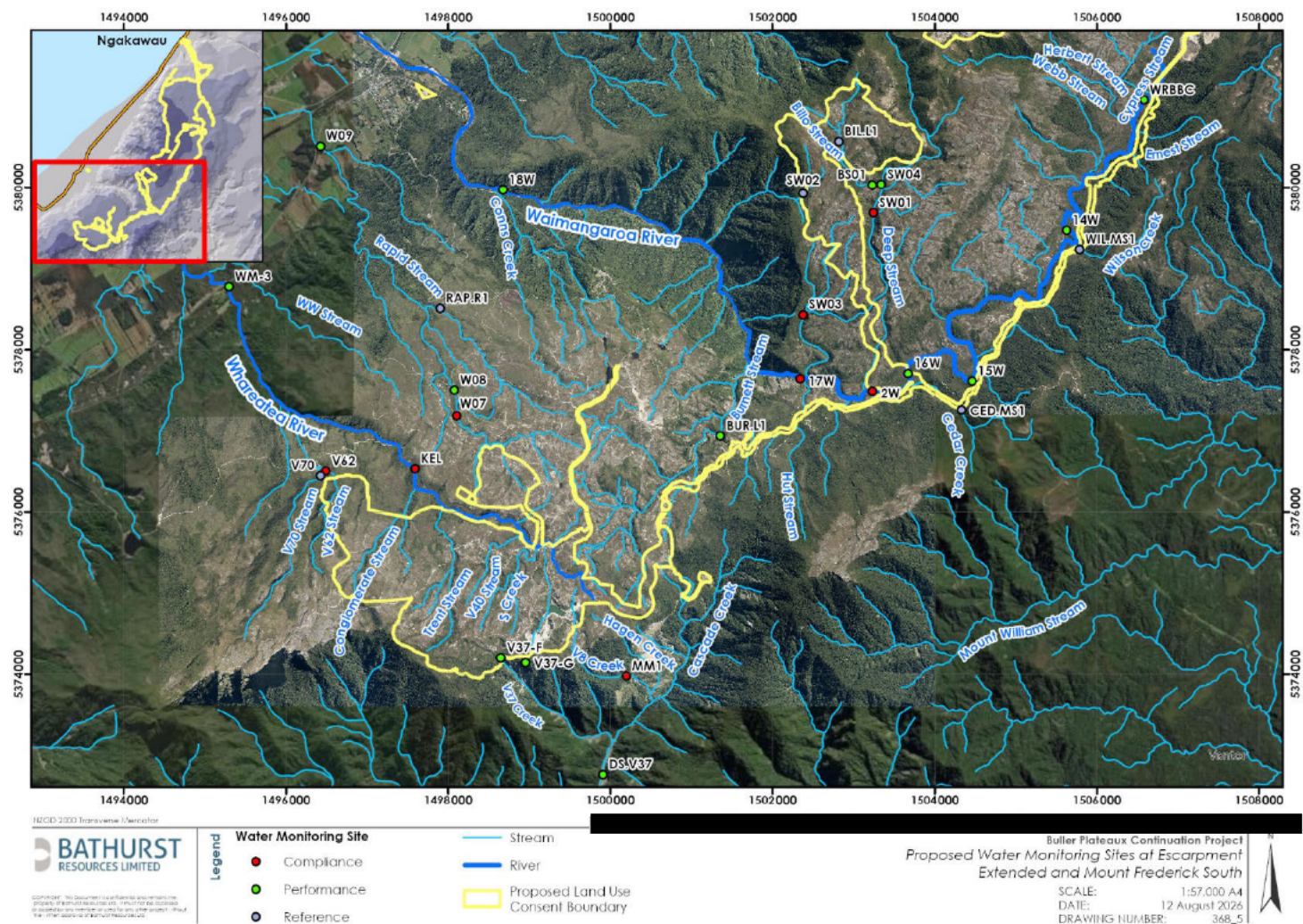


Figure 32: Proposed Water Monitoring Sites at ESE and MFS

Table 16: Water quality objectives based on levels of protection.

APPLICATION (Note 1)	GUIDELINE VALUE (µg/L) (Note 2)	TMF RANGE (Note 3).
Dissolved Aluminium Guideline Values (µg/L)		
	Chronic Al GV	
95% LoP. pH ≤ 6.5	500	pH: ≤ 6.5 (Note 4)
95% LoP. pH > 6.5	exp(0.645×ln(DOC) + 2.255×ln(Hardness) + 1.995×pH + (-0.284×ln(Hardness)×pH) -9.898) *Note if algorithm is ≤ pH 6.5 use 500.	pH: 6.5 – 8.7 Hardness: 10 – 430 mg/L DOC: 0.08 – 12.3 mg/L
90% LoP	95% LoP / 0.79	
80% LoP	95% LoP / 0.58	
Dissolved Copper Guideline Values (µg/L)		
	Chronic Cu GV	
95% LoP	DGV _{0.5} x (DOC/0.5) ^{0.697} where DGV _{0.5} = 0.73	pH: 6 – 8.5 Hardness: 35-400 mg/L DOC: 0.1 – 20 mg/L
90% LoP	DGV _{0.5} x (DOC/0.5) ^{0.697} where DGV _{0.5} = 0.89	
80% LoP	DGV _{0.5} x (DOC/0.5) ^{0.697} where DGV _{0.5} = 1.4	
	Acute Cu GV	
95% LoP	exp (-6.6 + 0.78xpH + 0.58×ln(Hardness) + 0.70×ln(DOC)	pH: 6.0-8.8 Hardness: 35-898 mg/L DOC: 0.1-30 mg/L
90% LoP	exp (-6.3 + 0.78xpH + 0.58×ln(Hardness) + 0.70×ln(DOC)	
80% LoP	exp (-5.8 + 0.78xpH + 0.58×ln(Hardness) + 0.70×ln(DOC)	
Dissolved Iron Guideline Values (µg/L)		
All LoP	500	All conditions
Dissolved Zinc Guideline values (µg/L)		
	Chronic Zn GV	
95% LoP	exp(0.947xln(Hardness) - 0.815xpH + 0.398xln(DOC) + 4.63)	pH: 5.7 – 8.1 Hardness: 15 – 399 mg/L DOC: 0.3 – 22.9 mg/L
90% LoP	95% LoP / 0.67	
80% LoP	95% LoP / 0.39	
	Acute Zn GV	
95% LoP	exp (2.5 - 0.12xpH + 0.6×ln(Hardness) + 0.13×ln (DOC)	pH: 5.4 – 8.5 Hardness: 14 – 826 mg/L DOC: 0.1 – 22 mg/L
90% LoP	exp (2.9 - 0.12xpH + 0.6×ln(Hardness) + 0.13×ln (DOC)	
80% LoP	exp (3.4 - 0.12xpH + 0.6×ln(Hardness) + 0.13×ln (DOC)	
Dissolved Cobalt Guideline values (µg/L)		
	Chronic Co GV	
95% LoP	Exp((0.414xLn(hardness))-1.285)	Hardness range: 52-396 mg/L
90% LoP	Exp((0.414xLn(hardness)-0.427)	
80% LoP	Exp((0.414xLn(hardness)+0.557)	
	Acute Co GV	
95% LoP	95%Chronic CoGV/0.16	Hardness range: 52-396 mg/L
90% LoP	95%Chronic CoGV/0.11	
Dissolved Nickel Guideline values (µg/L)		
80% LoP	95%Chronic CoGV/0.062	
	Chronic Ni GV	
95% LoP	11x(Hardness/30) ^{0.85}	Hardness range: 30-400 mg/L. No guidance for pH application range. Normally taken as physiological pH range as used for testing (pH 6.5-8.5)
90% LoP	13x(Hardness/30) ^{0.85}	
80% LoP	17x(Hardness/30) ^{0.85}	
	Acute Ni GV	
95% LoP	95%Chronic NiGV/0.16	Hardness range: 30-400 mg/L
90% LoP	95%Chronic NiGV/0.11	
80% LoP	95%Chronic NiGV/0.062	
Dissolved Manganese Guideline values (µg/L)		
	Chronic Mn GV	
95% LoP	Exp((0.411xLn(hardness)+4.46)	Hardness range: 25-670 mg/L Simplified equation for hardness only calculated at pH 7.5. Look-up tables provided for pH 5.8 to 8.4.
90% LoP	Exp((0.411xLn(hardness)+4.89)	
80% LoP	Exp((0.411xLn(hardness)+5.38)	
	Acute Mn GV	
95% LoP	(Exp((0.878xLn(hardness)+4.84)))/2.13	Hardness range: 25-250 mg/L
90% LoP	(Exp((0.878xLn(hardness)+6.90))/2.13	
80% LoP	(Exp((0.878xLn(hardness)+7.20))/2.13	
Dissolved Cadmium Guideline values (GVs, µg/L)		

APPLICATION (Note 1)	GUIDELINE VALUE (µg/L) (Note 2)	TMF RANGE (Note 3).
	Chronic Cd GV	
95% LoP	$10^{(0.83 \cdot \text{LOG}_{10}(\text{Hardness}) - 2.46)}$	Hardness range: 17-280 mg/L
90% LoP	$(10^{(0.83 \cdot \text{LOG}_{10}(\text{Hardness}) - 2.46)}) \cdot 1.84$	
80% LoP	$(10^{(0.83 \cdot \text{LOG}_{10}(\text{Hardness}) - 2.46)}) \cdot 4.15$	
	Acute Cd GV	
95% LoP	$(10^{(1.016 \cdot \text{LOG}_{10}(\text{Hardness}) - 1.71)}) \cdot 0.47$	Hardness range: 5.3-360 mg/L
90% LoP	$(10^{(1.016 \cdot \text{LOG}_{10}(\text{Hardness}) - 1.71)}) \cdot 0.61$	
80% LoP	$(10^{(1.016 \cdot \text{LOG}_{10}(\text{Hardness}) - 1.71)}) \cdot 2.1$	
	Nitrate-N (ANZG – hardness (H)-dependent; guideline)	
	Chronic Nitrate-N GV	
95% LoP	1100 (H<30); 2600 (H30-150); 29,000 (H >150)	Hardness dependent
90% LoP	1500 (H<30); 4200 (H30-150); 38,000 (H >150)	
80% LoP	2300 (H<30); 7100 (H30-150); 56,000 (H >150)	
	Acute Nitrate-NGV	
	Not available	
	Nitrate-N (NPS-FM; standard)	
	Chronic Nitrate-N Standard (median standard)	
95% LoP	2400	
90% LoP	Below “bottom line”	
80% LoP	Below “bottom line”	
	Acute Nitrate-N Standard (95th percentile standard)	
95% LoP	3500	
90% LoP	Below “bottom line”	
80% LoP	Below “bottom line”	
	Chronic ammoniacal-N (ANZG guideline)	
95% LoP	1200	pH and temperature dependent. Values at pH 7 and 15°C.
90% LoP	2000	
80% LoP	3600	
	Acute ammoniacal-N (ANZG guideline)	
	Not available	
	Chronic ammoniacal-N (NPS-FM median standard)	
95% LoP	580	pH dependent. Values at pH 7.
90% LoP	Below “bottom line”	
80% LoP	Below “bottom line”	
	Acute ammoniacal-N (NPS-FM 95th percentile standard)	
95% LoP	968	pH dependent. Values at pH 7.
90% LoP	Below “bottom line”	
80% LoP	Below “bottom line”	
	Ammoniacal-N (ANZG 2026 default guideline)	
	(mg/L) at pH 8, temperature 20°C (Note 5)	
99% LoP	0.13	
95% LoP	0.4	
90% LoP	0.68	
80% LoP	1.3	
	Ammoniacal -N (NPS-FM; standard)	
	Ammoniacal -N Standard (median standard)	
	(mg/L) at pH 8, temperature 20°C (note 6)	
	0.24	
95% LoP	0.40	
	pH (note 7)	
	Maintain in range 4.5 – 7.0 for WTP discharge	

Source: Hickey (2026a) Table 10-1 and Table F-29

Note 1: The level of protection (LoP) values are species protection levels based on narrative descriptors from ANZG (2018).

Note 2: The compliance range for pH at Smokestack is 4.5 to 7.0. The equations vary in their calibrated TMF ranges. For monitored water quality values less than the lowest calibrated TMF value the calculated guideline value (GV) will apply to that monitoring occasion.

Note 3: Toxicity modifying factors (TMFs) are pH, hardness (calcium and magnesium concentrations) and dissolved organic carbon (DOC, measured as dissolved non purgeable organic carbon (DNPOC) in natural waters).

For pH, hardness and DOC values exceeding the TMF range use the lowest or highest calculated LoP value (except for dissolved aluminium where a 500 µg/L LoP applies to waters below pH 6.5 for all hardness and DOC concentrations).

Note 4: pH minimum for aluminium is based on the pH transition for Al^{3+} and Al-DOM (dissolved organic matter) binding which have elevated concentrations at lower pH levels. This pH threshold also corresponds to that used in the ANZG (2018) and ANZECC (2000) guidelines for Australia and New Zealand.

Note 5: For pH less than 8 and/or temp less than 20°C refer to Table F-30 & F-31 Hickey (2026a) for adjusted value. If pH<6 and Temp <10°C then adjustment to pH 6 and Temp 10°C applies.

Note 6: guidance states that they should not be applied to low ionic strength waters (EC <50 µS/cm)

Note 7: Upper pH to be confirmed from bryophyte analysis for sites with differing levels of protection.

The summary of site-specific turbidity guideline values for short- and long- term protection of ecological communities, aesthetic and performance are presented in Table 17. The proposed compliance locations for Escarpment and Mount Frederick South mine water discharges shown on Figure 32.

Table 17: Summary of site-specific turbidity guideline values (Source Table 7-1 Hickey 2026a)

Classification/Nominal protection level	Short-term (acute) turbidity (NTU) maximum/limit, exposure period	Long-term (chronic) turbidity (NTU) median/95 th percentile/exposure reporting period ^{f, g}
Ecological – continuous ^{a, e}	550 max ^a /100, 7-d rolling median	+5 NTU median above background/+20 NTU 95 th percentile/annual
Ecological – discrete ^{b, e}	550 max ^a	As above
Aesthetic ^{c, e}	n/a	+50% change from background for median; [>1.6 m median clarity (bathing)/annual] ^h
Performance ^{d, e}	n/a	25 NTU 15-sample rolling median

^a Continuous monitoring with 10-min logging frequency and targeting >90% data capture after quality control and clean up procedures for reporting period – to exclude potential spurious instrumental values or debris contacting probe. The 7-d rolling median assessed weekly based on telemetered data. Discrete daily sampling should be used for easily accessible sites upstream and downstream of a WTP. Sites must have reliable access for sample collection during high flow events.

^b Discrete compliance assessment will differ with monitoring frequency (see Hickey, 2026a Appendix E, Table E-2).

^c Aesthetic compliance assessment for mine-related effects based on continuous monitoring at Buller Plateaux compliance sites and calculated flow adjustment.⁵⁰ Weekly or monthly discrete sampling at SH67 to validate upstream monitoring adjustments. Annual compliance period for aesthetic assessment. (Indicative Compliance assessment for discrete monitoring sample numbers provided in Hickey, 2026a Appendix E, Table E-2).

^d Proposed limit for “Performance” assumed to be based on weekly or monthly discrete sampling (see Hickey, 2026a Appendix E). Key sites could be assessed based on continuous or discrete monitoring. Trend assessments for Performance sites may be based on annual or 6-yearly monitoring data depending on significance of site. Site MM1 is a Compliance assessment for this turbidity threshold (see Hickey, 2026a Appendix E).

^e All measurements to exclude “extreme event” flood conditions. A proposed 1 in 10-year rainfall event is proposed as an extreme event (see Hickey, 2026a Section 7.1.2).

^f Compliance assessment for ecological protection to be based on annual median and 95th percentile for site compared with background from upstream or reference site.

^g **Indicative values shown in Hickey, 2026a Appendix E (Table E-2)** based on monitoring data for median and 95th percentile (n>8) or mean and maximum values. Visual clarity reduction estimate is for 50% clarity reduction with calculated turbidity (from Davies-Colley et al. 1992) with assessment based on annual median of monitoring data. A site-specific relationship between turbidity and black disk visual clarity should be developed from representative stream samples for Performance assessment sites.

^h Indicative bathing threshold is “suitable” classification from consensus curves for suitability for bathing, with >1.1 m being “marginally suitable” Smith and Davies-Colley (1992). The aesthetic median clarity for bathing would only be applicable to rivers with recreational bathing activity and may only be applicable to summer periods.

Table 18: Turbidity monitoring sites

No.	Mine catchment	River/stream	Site name/code	Compliance/performance	Justification	Monitoring type/frequency	Note
1	ESE	Whareatea R.	KEL	Compliance	Downstream WM-2. Will receive mine discharges. No upstream reference site on Whareatea – V70 to be used.	Continuous turbidity/ discrete weekly turbidity	1
2	ESE	Whareatea R.	WM-3	Performance	Aesthetic effects.	Discrete monthly turbidity	1,2
3	ESE	Cascade Creek trib. (V8 Creek)	MM1	Compliance (metals & nutrients)/ Performance (turbidity)	Impacted by underground AMD and receives WTP discharge.	Discrete weekly turbidity. Turbidity limit applies.	1,3
4	ESE	Whareatea R. tributary	V62	Compliance	Drains mining area. Receives bypass discharges. Reference site on V70 to be used.	Continuous turbidity/ discrete weekly turbidity	4
5	ESE	Whareatea trib	V70	Performance & reference	Reference site for Whareatea R. monitoring (KEL & WM-3).	Continuous turbidity/ discrete weekly turbidity	1,5
6	ESE	Rapid Stm	W07	Compliance	Mining in upper catchment.	Continuous turbidity/ discrete weekly turbidity	4
7	ESE	Rapid Stm	W09 (@SH67)	Performance	Aesthetic effects	Discrete monthly turbidity	1,2
8	MFS	Deep Stream	SW01	Compliance	D/s East Mine sump	Continuous turbidity/ discrete weekly turbidity	1
9	MFS	Deep Stream	SW03	Compliance	D/s West Mine sump	Continuous turbidity/ discrete weekly turbidity	1
10	MFS	Waimangaroa R.	Smokestack (SS) (2W)	Compliance	D/s WTP	Continuous turbidity/ discrete weekly turbidity	1
11	MFS	Waimangaroa R.	WR d/s Deep Stream (17W)	Compliance	D/s WTP and Deep Stm inflow (East and West sump bypass flows).	Continuous turbidity/ discrete weekly turbidity	1
12	MFS	Waimangaroa R.	u/s Deep Stream & Smokestack (16W)	Performance & reference	Reference site for Waimangaroa R. monitoring (Smokestack (2W), d/s Deep Stream (17W) and @SH67 (18W)).	Continuous turbidity/ discrete monthly turbidity	1
13	MFS	Waimangaroa R.	Billo Stream tributary (site BIL.L1)	Performance & reference	Reference site for SW01 and SW03 monitoring	Continuous turbidity/ discrete weekly turbidity	1,6
14	MFS	Waimangaroa R.	@SH67 (18W)	Performance	Aesthetic effects	Discrete monthly turbidity	1,2

Source: Hickey (2026a) Appendix E Table E-1: Proposed compliance, performance and reference monitoring sites for turbidity. Site locations shown on Figure 32. Annual compliance assessment proposed based on limits in Table 7-1. LoPs and indicative limits provided in Hickey, 2026a Table E-2.

Notes:

1. Maintained for duration of active mining in catchment. Annual compliance assessment for median and maximum limits. (Note: this applies to all sites as no lower LoP GV's available for turbidity. Except for the Performance classification for MM1 with Compliance limit of 25 NTU based on a 15-sample rolling median). Trend assessments for Performance sites may be based on annual or 6-yearly monitoring data depending on significance of site.
2. Performance for turbidity and clarity (converted from turbidity – indicative values provided in Table E-2). Monitoring frequency may need to be increased to weekly for initial overburden removal and mining period. Mining-related turbidity/clarity measured at Buller Plateaux compliance sites could be translated to SH67 sites using flow relationships.⁵² Annual assessment and reporting.
3. Improvement trend monitoring based on implementation of AMD treatment. Note: This AMD treatment not expected to markedly improve variable turbidity in this stream (Table E-2).

-
4. *Background water quality and baseline biological sampling required. Maintained for duration of active mining in catchment – may have delayed start for compliance monitoring as catchment mining planned for late stage. Annual compliance assessment for median and maximum limits.*
 5. *Maintained for duration of active mining in catchment. Continuous monitoring to provide reference turbidity condition for inter-annual variability.*
 6. *Maintained for duration of active mining in catchment. Continuous monitoring to provide reference turbidity condition for inter-annual variability. Note: Billo Stream site (BS01) which has background data will be mined out after 5-years.*

12.2 Water Quality Monitoring Parameters

Table 19 provides a summary of the parameters presented in Appendix L, Hickey (2026a,b,c) for the PCOC included in the basic and comprehensive surface water suites and groundwater monitoring suites for the Project water sampling programme. Arsenic, lead and chromium are not included in this suite as determined by Hickey (2026a).

Table 19: Summary of water quality monitoring parameters.

PARAMETER	COMPREHENSIVE SUITE	BASIC SUITE	GROUNDWATER SUITE	STORM WATER SAMPLER ^a
pH	✓	✓	✓	✓
Temperature	✓	✓	✓	
Electrical conductivity	✓	✓	✓	✓
Acidity (to pH 8.3)			✓	
Alkalinity			✓	
TSS*			✓	
Turbidity	✓	✓	✓	✓
Sulfate	✓	✓	✓	
Dissolved aluminium	✓	✓	✓	✓
Dissolved cadmium	✓		✓	
Dissolved calcium	✓	✓	✓	✓
Dissolved cobalt	✓			
Dissolved copper	✓		✓	
Dissolved iron	✓		✓	✓
Dissolved nickel	✓		✓	
Dissolved magnesium	✓	✓	✓	✓
Dissolved manganese	✓		✓	
Dissolved zinc	✓	✓	✓	
Nitrate-N	✓		✓	
Nitrite-N ^a	✓		✓	
Ammoniacal-N	✓		✓	
DOC (DNPOC)	✓	✓	✓	
Field Measurements				
pH	✓	✓	✓	
Temperature	✓	✓	✓	
Electrical conductivity	✓	✓	✓	
Dissolved oxygen	✓	✓	✓	

PARAMETER	COMPREHENSIVE SUITE	BASIC SUITE	GROUNDWATER SUITE	STORM WATER SAMPLER ^a
Oxidation reduction potential			✓	
Turbidity	✓	✓	✓	

Source Hickey (2026a), Appendix L, Tables L-5, L-6

Abbreviations: DOC = dissolved organic carbon; DNPOC = dissolved non-purgeable organic carbon.

^a Nitrite-N is standardly reported with nitrate-N laboratory measurements.

Calcium and Magnesium are used to calculate hardness.

*TSS - for the ESE and MFS east and west sump and WTP performance monitoring where both TSS and turbidity are required

^a Storm Water Sampler is event-based sample obtained from the 95% percentile stage height at gauging stations (Hickey, 2026a Appendix L).

13.0 Monitoring

This section discusses the water monitoring program that is proposed for the BPCP. The water quality monitoring program for sites within these waterways is tailored to individual sites dependent on the purpose of the water quality monitoring site and availability of water quality data. Types of monitoring include:

- Performance monitoring – to assess effectiveness and adaptive management of water management infrastructure and operational practices in the effort to ensure compliance (and betterment) water quality is on track and will be achieved. The location of bypass storm water quality sampling and response will be determined during the detailed design phase.
- Compliance monitoring – to ensure the BPCP is achieving its approved water quality objectives.
- Reference Site monitoring – to provide background data to understand climatic variables (e.g., El Niño Southern Oscillation) within unimpacted catchments and as the background for the turbidity for the annual assessment and the rolling median and 95th percentiles.

Monitoring will be undertaken in accordance with the development and implementation of standard operating procedures for surface and groundwater quality monitoring (BPCP-ENV-SOP-08 and BPCP-ENV-SOP-09) which describes:

- Field sampling procedures, including discrete field measurements of pH, electrical conductivity and temperature.
- Quality control procedures for items above.
- Analytical results database management, data analysis and reporting.

Field monitoring equipment calibration including continuous monitoring instrumentation will be undertaken in accordance with the development of the Equipment Calibration and QA/QC SOP (BPCP-ENV-SOP-010).

13.1 Introduction

Further water quality monitoring will occur at compliance, performance and reference monitoring sites over the construction, operational, and closure phases of the project within the MFS, ESE, and the UWHR sub-areas.

UWHR and MFS project sub-areas:

- Waimangaroa River Catchment.
- Deep Stream catchment.
- Burnett Stream catchment

ESE sub-area:

- Cascade Creek catchment.
- Rapid Stream catchment.
- Whareatea River catchment.

The water quality monitoring program for sites within these waterways is tailored to individual sites dependent on the purpose of the water quality monitoring site and availability of water quality data.

Table 20 provides a summary of the proposed monitoring program for the MFS, ESE, and the UWHR sub-areas. Details on the proposed water quality monitoring frequency, parameters tested and relationship to project activities are provided within subsequent sections of this plan.

All surface water sampling will be undertaken in accordance with the Surface Water Sampling and Analysis SOP (BPCP-ENV-SOP-08) including QA/QC procedures (includes sampling procedure, Certified Reference Materials, duplicates, data management, internal lab (QA/QC) and definition/response for unacceptable QA/QC outcomes. This SOP and/or BPCP-ENV-SOP-010 will also include trends and compliance assessment calculations including calculating Hazen percentiles for statistical comparisons for the numeric compliance limit.

An additional Groundwater Sampling and Analysis SOP (BPCP-ENV-SOP-09) will be developed in conjunction with the installation of groundwater monitoring wells for groundwater sampling.

13.2 Background Water Quality

Understanding background water quality is essential to develop water quality objectives for the Project given that many waterways in the vicinity of the BPCP are degraded by historical mining activities and the discharge of untreated AMD to streams. The following actions will be undertaken to expand the existing dataset and validate modelling parameters:

- Undertake continuous monitoring data (flow, EC, pH and turbidity) to provide time-based data to fully characterise the relationships between flow and physico-chemistry at compliance monitoring locations (e.g., 2W: Smokestack) prior to construction commencing and then continuing throughout life of mine phases.
- Validate the TSS and turbidity relationships for relevant WLBMs surfaces with field and laboratory data during construction, operational and active closure phases.
- Establish turbidity/clarity relationships for SH67 sites pre-commencement.
- Validate and refine flow weighted water quality source terms (mg/L) used for WLBMs.
- Validate storage and WTP capacity required to manage extreme rainfall events or wet years.
- Update the water and load balance models to validate management and monitoring measures prior to each stage commencing.

Water quality compliance monitoring sites with >24 individual discrete samples are considered to be representative of background water quality for the BPCP provided these samples were collected over

an extended timeframe (many months) and the samples included seasonal data and higher and lower flow periods.

Compliance water quality monitoring locations have >24 samples at the time of data compilation up to ~Q2 of calendar year 2026 with full datasets retained in a database.

Performance and reference monitoring locations with <24 samples at the time of data compilation are shown in **Blue** in Table 20 and displayed in Figure 32. These sites will be continually monitored through the life of the BPCP to validate the proposed management processes.

Table 20: Water quality monitoring program (MFS, ESE, UWHR).

PROJECT SUB-AREA	STREAM / RIVER	SITE NAME	TYPE
UWHR	Waimangaroa River	WRBBC	Performance
UWHR	Waimangaroa River	14W	Performance
UWHR	Waimangaroa River	15W	Performance
MFS	Waimangaroa River	16W ¹	Performance
MFS / UWHR	Waimangaroa River	2W (Smokestack)	Compliance
MFS / UWHR	Waimangaroa River	17W	Compliance
MFS	Waimangaroa River	18W	Performance
MFS / UWHR	Wilson Creek (Waimangaroa River tributary)	WIL.MS1	Reference
MFS / UWHR	Cedar Creek (Waimangaroa River tributary)	CED.MS1	Reference
UWHR	Burnetts Stream	BUR.L1	Performance (turbidity)
MFS	Deep Stream	SW01	Compliance
MFS	Deep Stream	SW03	Compliance
MFS	Deep Stream	SW04	Performance
MFS	Billo Stream	BS01	Performance (turbidity)
MFS	Billo Stream tributary	BIL.L1	Reference
MFS	Deep Stream unnamed tributary	SW02	Performance ²
ESE	V8 Creek (Cascade Creek tributary)	MM1	Compliance
ESE	V37 Stream (Cascade Creek tributary)	V37-F ³	Performance
ESE	V37 Stream (Cascade Creek tributary)	V37-G ³	Performance
ESE	Cascade Creek	DS.V37	Performance (ecology)
ESE	Rapid Stream	W07	Compliance
ESE	Rapid Stream	W08	Performance
ESE	Rapid Stream	W09	Performance
ESE	Rapid Stream tributary	RAP.R1	Reference
ESE	Whareatea River	KEL	Compliance
ESE	Whareatea River	WM-3	Performance

PROJECT SUB-AREA	STREAM / RIVER	SITE NAME	TYPE
ESE	V70 (Whareatea River tributary)	V70	Reference and Performance (turbidity)
ESE	V62 (Whareatea River tributary)	V62	Compliance

^{2,3} no data available as at Q4 2025.

¹ Consider the pre-BPCP 2W data will reflect the background conditions at 16W. This site is included as an add to background site for assessing compliance at 2W (Smokestack).

² To take over from BIL.L1 and become a reference site at the start of the Post Construction phase.

³ These sites will be monitored once disturbed, currently insufficient flow to sample.

13.3 Compliance Monitoring

Compliance monitoring is required to ensure the potential effects of the BPCP are managed. Compliance monitoring is focused on surface water quality and flow rate.

When making comparison to a background for the purposes of water quality compliance assessment against the conditions of this Approval, the following relationships will be applied:

- After the completion of the construction phase at the MFS sub-area, and also prior to the Reference site BIL.L1 (unnamed tributary of Billo Stream) being impacted by Mining and Mining Operations at the MFS sub-area, BRL will relocate all reference monitoring associated with BIL.L1 to occur at the former performance monitoring site SW02 (unnamed Waimangaroa River tributary). Following this transition, the monitoring site SW02 will continue to operate as a water quality and aquatic ecology Reference site for the MFS sub-area, and the BIL.L1 monitoring site will be decommissioned.
- 16W is the background monitoring site for 2W and 17W; and
- V70 is the background monitoring site for KEL, W07 and V62.

13.3.1 Compliance Monitoring Locations

Significant efforts have been undertaken to ensure that any effects of the BPCP will be understood through compliance monitoring. Compliance monitoring sites are provided in Table 20 and are shown in Figure 32. These sites will be used for all mine phases including construction for these sub-areas. The following adjustments to compliance monitoring locations is proposed:

MFS:

- After the completion of the construction phase at the MFS sub-area, and also prior to the Reference site BIL.L1 (unnamed tributary of Billo Stream) being impacted by Mining and Mining Operations at the MFS sub-area, the Approval Holder must relocate all reference monitoring associated with BIL.L1 to occur at the former Performance monitoring site SW02 (unnamed Waimangaroa River tributary).
- Following this transition, the monitoring site SW02 must continue to operate as a water quality and aquatic ecology Reference site for the MFS sub-area, and the BIL.L1 monitoring site may be decommissioned.

ESE:

- The Approval Holder must establish and commence compliance monitoring at the Compliance monitoring site V62 (V62 Stream) no less than 12 months prior to the commencement of disturbance within the V62 catchment of the ESE sub-area.

13.3.2 Water Quality Targets

Water quality targets are indicated in Section 12.1, including toxicity modified factor (TMF) limits for metals, and turbidity concentrations. Proposed limits vary depending on the designated LoP, as determined by Hickey (2026a,b,c), for each receiving waterway.

13.3.3 Water Quantity Targets

Water quantity is an important issue for users downstream of the ESE sub-area. Continuous flow will be monitored at water quality monitoring locations KEL and V62 to confirm environmental flows are maintained for downstream users.

BRL has made the following commitments:

- Ensure water quality does not impinge on Kawatiri Energy Limited's existing use rights (i.e., baseline water quality for Al, Cd, Cu, Fe, Mn, Zn).
- Maintain environmental flows – noting base flow is expected to increase at water monitoring locations KEL and V62 in the Active Closure and Post Closure phases as established by the modelling undertaken (Figure 33).
- Establish a working group to discuss these issues and opportunities to re-purpose water management infrastructure after the Active Closure Phase for hydro-energy opportunities.
- There are no identified drinking water takes from the Whareatea River downstream of the proposed ESE mine or the Waimangaroa River downstream of the proposed MFS mine and UWHR.
- The Buller Plateaux compliance sites on Whareatea River (site KEL) and Waimangaroa River (site 17W) should have a maximum compliance limit of 11.3 mg/L nitrate-N to ensure that any future drinking water takes are less than the maximum permissible MAV (Hickey, 2026a).

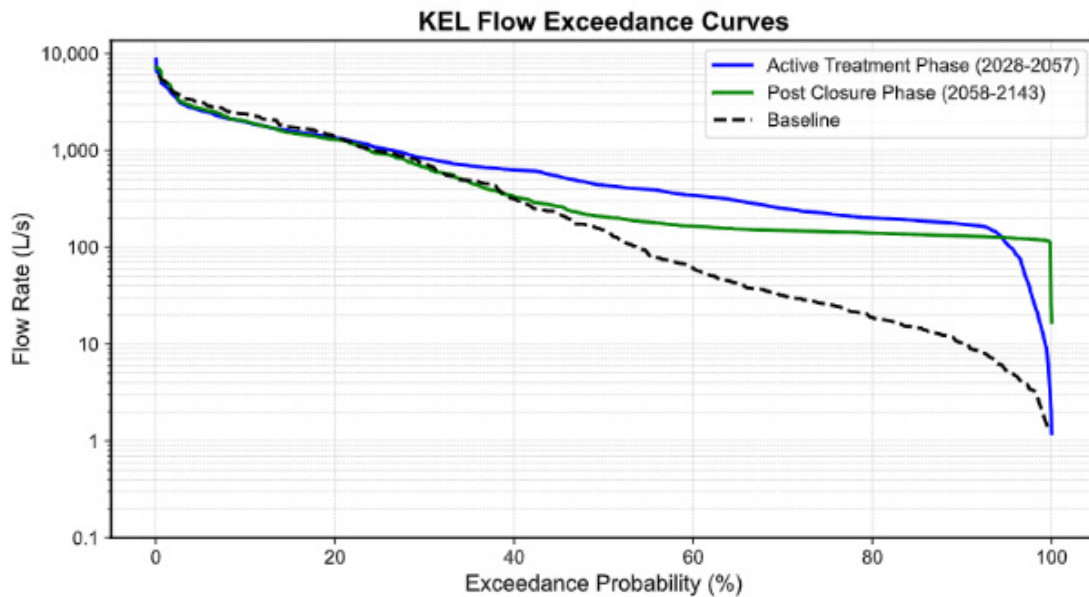


Figure 33: KEL flow exceedance curve (WLB output from MWM (2026i))

13.3.4 Compliance Water Sampling Requirements

The compliance water sampling requirements are summarised in Table 22. A summary of the monitoring frequency and type for compliance sites is provided in Table 23 through Table 26. Water quality monitoring is a key objective including continuous monitoring and laboratory sample analysis. Some sites also require monitoring of water quantity to ensure environmental flows meet downstream user requirements.

The water quality monitoring regime has been developed by Hickey (2026a,b,c) and these documents can be referenced for detail description and background information.

No compliance monitoring of groundwater is proposed as any effects will be identified at surface water quality monitoring locations.

Continuous instrumental monitoring must include real-time telemetry and data logging at 10-minute intervals. For the annual reporting period, the continuous instrumental monitoring data capture rate must target at least 90%, with a minimum acceptable data capture rate of 80%, after quality control procedures have been applied to exclude spurious values arising from factors such as sensor fouling, calibration drift, instrument maintenance downtime, and outages in power or telemetry. All continuous monitoring instruments providing compliance monitoring data must receive calibration and inspection at a frequency no less than 3-monthly.

13.3.4.1 TSS/Turbidity

Site-specific protection thresholds for acute and chronic exposures to turbidity were derived by Hickey (2026c) and use an add-to-background calculation. The WLBMs for ESE and MFS predict the total suspended solids (TSS) concentrations downstream of the mining activities. A conversion factor for TSS to turbidity was applied, based on a site-specific relationship developed from local monitoring data from Stockton Mine (MWM, 2026c).

All the compliance and reference sites have proposed continuous turbidity monitoring with additional weekly discrete turbidity monitoring. The weekly monitoring would be used to check calibration of the continuous turbidity sensors (rather than for compliance assessment).

The proposed compliance assessment would be based on an add-to-background calculation for compliance site relative to the associated reference site for the annual median and annual 95th percentile limits. Additionally, there are 7-d rolling median and a maximum limit condition that would apply at the downstream compliance sites as listed in Table 17. Performance sites with a lower frequency of sampling would apply a 15-sample rolling median for comparison with the long-term limit.

13.3.4.2 *Clarity*

- Prior to commencement of BPCP activities in the ESE, MFS, and UWHR sub-areas, a site-specific relationship between turbidity and black disk visual clarity from representative samples covering a range of low and high flow conditions must be developed to inform compliance conditions. A site-specific relationship must be developed for both the Whareatea River (monitoring site WM-3) and the Waimangaroa River (monitoring site 18W) as these will be used for clarity compliance assessment once BPCP activities commence in the ESE, MFS and UWHR sub-areas.
- Prior to commencement of BPCP activities in the ESE, MFS, and UWHR sub-areas continuous turbidity monitoring at the lowland performance monitoring sites WM-3 (Whareatea River) and 18W (Waimangaroa River) will occur for a minimum of 12 months to establish the pre-mining background annual median turbidity. The pre-mining background annual median clarity, is to be used for clarity compliance assessment once BPCP activities commence in the ESE, MFS and UWHR sub-areas, and can be calculated by applying the site-specific relationship developed to the measured pre-mining background annual median turbidity and clarity.
- BPCP will manage the activities undertaken at the ESE, MFS, and UWHR sub-areas such that the visual clarity at the lowland performance monitoring sites WM-3 (Whareatea River) and 18W (Waimangaroa River) does not exceed the following criteria as a result of BPCP activities:
 - No greater than a 50% change in the annual median visual clarity compared with the historical background annual median visual clarity.
- The annual median visual clarity at each site will be calculated from the measured annual median continuous turbidity monitoring record at WM-3 and 18W by applying the site-specific relationships developed as discussed above. The calculated annual visual clarity statistics will then be compared to the pre-mining background annual visual clarity statistics to assess compliance with the annual median visual clarity visual clarity.

13.3.4.3 *Nutrients*

The nitrogen assessment considers three potential sources of dissolved nitrogen which may be elevated in Buller Plateaux receiving waters because of BPCP activities at ESE and MFS (Hickey, 2026b). These include:

- Runoff from nitrogen-based explosives used for mining.

- Nutrients from treated sewage discharge disposal areas.
- Nutrients from fertiliser applied as part of the remediation and revegetation.

A range of adaptive management approaches are recommended by MWM (2026k) to minimise the loss of nitrogen compounds from Ammonium-Nitrate Fuel Oil (ANFO) use and for methods to treat nitrogenous compounds.

The management of nutrients from treated sewage discharge disposal areas has been assessed by Courtenay Environmental Consulting (2026) with Table 21 providing a summary of the recommended treatment systems. Whilst not related to AMD water management (This Plan), the inclusion of this source of nutrient is included herein due to the overall monitoring requirements of nutrients. The potential catchments where treated sewage discharge are likely to occur are discussed in Hickey (2026b) and the impacts of nutrients on those receiving environments is discussed in Hickey (2026a).

Table 21: Recommendation treatment systems for wastewater land application

Treatment System Location	Design Volume (L/day)	Recommended treatment system
Admin/Gate	1,100	Septic to Sand Bed
Central	5,900	Specifically designed secondary treatment system
Coal Haulage	600	Septic to Sand Bed
Bulk Explosives	350	Septic to Sand Bed

Source: Courtenay Environmental Consulting (2026)

The secondary treatment system has been based on providing an effluent quality for total nitrogen of 30 mg/L while the average nitrogen concentration for the discharge from the sand beds is expected to be around 37 mg/L. The bacteriological concentration (as faecal coliforms (FC)) in the discharge from the secondary treatment system is expected to be in the range of 104 – 105/100 mL while for the sand bed the concentration is expected to be in the range of 102 – 103/100 mL.

Nutrients from the application rate of 90 kg/ha of slow-release fertiliser that is proposed for use in the rehabilitation areas at the time of tree planting was assessed by Hickey (2026b). The fertiliser has a 20% N content by weight and the potential for nutrient increase from fertiliser run-off in both Deep Stream and the Whareatea River would represent a minimal risk for exceedance of the proposed toxicity limit. The risk to Deep Stream is further minimised by the operational transfer of most of the sump water to the WTP for discharge to Waimangaroa River.

Hickey (2026b) assessment concludes that the ESE sub-area was identified as likely the most susceptible receiving water for nutrients (N) concentration increases for potential toxicity effects, with the Whareatea River and the KEL compliance location providing the basis for this assessment.

The screening assessment for potential ecotoxic effects of N has found that the predominant driver of N addition to Buller Plateaux streams from BPCP activities is expected to be from ANFO/blasting, and that the cumulative assessment identified no additional concerns with respect to addition of N from proposed treated sewage discharges or N leached from proposed fertiliser additions for rehabilitation.

The assessments of increased concentrations were made in comparison to the ANZG (2025a) GVs for nitrate-N and the NPS-FM standards. This assessment did not consider potential eutrophication which is addressed elsewhere (Hogsden and Jellyman, 2026).

Compliance monitoring for nitrate-N and ammoniacal-N and associated TMFs (pH, hardness, temperature) is proposed for all compliance sites for ecological protection from potential toxicity.

Monitoring for nitrate-N and ammoniacal-N should also be undertaken at lowland sites along State Highway 67 (SH67) to provide background information pre-commencement for a 1-year period because of the potential for increased nitrogen from mining activities. Monthly performance monitoring nitrate-N and ammoniacal-N and associated TMFs (pH, hardness, temperature) is proposed for SH67 sites for the duration of mining (Hickey, 2026a).

To manage any future demand for drinking water downstream of the project areas, the nitrate-nitrogen concentration at the Compliance monitoring sites 17W (Waimangaroa River), KEL (Whareatea River) and V62 (V62 Stream) must not exceed 11.3 milligrams per litre.

Table 22: Summary of water quality compliance monitoring requirements

Project sub-area	Location / catchment	Stream/ River	Site name	Code	Compliance/ Reference	Included in LoP classification assessment	Level of protection (%)	Monitoring parameters					Notes
								pH	Metals	Hardness/ DOC	Nutrients	Turbidity	
MFS	Waimangaroa	Waimangaroa River	2.1W (above Smokestack)	16W	Reference		n/a	✓	✓	✓	✓	c,d	1
MFS / UWHR	Waimangaroa	Waimangaroa River	2W (Smokestack)	2W	Compliance	✓	80	✓	✓	✓	✓	c,d,s	2,3
MFS / UWHR	Waimangaroa	Waimangaroa River	WR d/s Deep Stream	17W	Compliance	✓	80	✓	✓	✓	✓	c,d	2,3,4
MFS / UWHR	Waimangaroa	Waimangaroa River trib	E (Wilsons Creek)	WIL.MS1	Reference		n/a	✓				d,s	5
MFS / UWHR	Waimangaroa	Waimangaroa River trib	J (Cedar Creek)	CED.MS1	Reference		n/a	✓				d,s	5
MFS	Deep	Billo Stream trib	Billo trib	BILL1	Reference	✓	n/a	✓	✓	✓	✓	c,d,s	6
MFS	Deep	Deep Stream	SW01	SW01	Compliance	✓	95	✓	✓	✓	✓	c,d,s	7
MFS	Deep	Deep Stream	SW03	SW03	Compliance	✓	95	✓	✓	✓	✓	c,d,s	7
ESE	Whareatea	Whareatea River trib	V70	V70	Reference	✓	n/a	✓	✓	✓	✓	c,d	8
ESE	Rapid	Rapid Stream trib	Rapid Stream tributary	RAP.R1	Reference		n/a	✓	✓	✓	✓	d	9
ESE	Rapid	Rapid Stream	W07	W07	Compliance	✓	95	✓	✓	✓	✓	d	10
ESE	Whareatea	Whareatea River	KEL	KEL	Compliance	✓	95	✓	✓	✓	✓	d	11
ESE	Cascade	Cascade Creek trib (V8)	MM1	MM1	Compliance	✓	80	✓	✓	✓	✓	d	12
ESE	Whareatea	Whareatea River trib	V62	V62	Compliance	✓	95	✓	✓	✓	✓	d	13

Source: Appendix G (Hickey 2026a)

Abbreviations: Proposed sampling regime for turbidity: c = continuous; d = discrete; s = Storm Water sampler. LoP = Level of Protection.

Notes:

1. Reference site upstream of WTP discharge to Waimangaroa River.
2. Downstream of WTP discharge. Compliance based on an add-to-background for trace metals elevated upstream (i.e., a conservative basis).
3. Compliance site integrates WTP and occasional bypass discharges. Potential Upper Waimangaroa Haul Road (UWHR) influence with Storm Water samplers for events.
4. Compliance site integrates WTP, Deep Stream intermittent sump bypass discharges (above SW01 & SW03) and historic mining inputs. Metal and nutrient monitored concentrations at this site used to calculate SH67 concentrations.
5. Reference sites for UWHR discharges from treatment sumps - turbidity and limited acid drainage. Discrete sampling and Storm Water samplers.
6. Reference site upstream of SW01 and SW03 Deep Stream sites.
7. Compliance sites located downstream of East and West sump intermittent discharges.
8. Reference site for Whareatea River compliance monitoring at KEL.
9. Reference site for compliance assessment at W07 on Rapid Stream.
10. Compliance site for ELF seepage discharge to Rapid Stream.
11. Compliance location on Whareatea River. Receives WTP, WTP polishing pond, sump/surge pond and clean water discharges from the ESE pit. Metal and nutrient monitored concentrations at this site used to calculate SH67 concentrations.

12. Sites discharging to Cascade Creek which currently receive historic AMD discharges. Some WTP polishing pond, stormwater and clean water diversion during operational period. Remediation of some of the AMD discharge to occur. Proposed for 80% level of protection for metals and nutrients for MM1; Compliance/Performance LoP for turbidity is 25 NTU rolling 15-sample median (Table 7-1 RMA Science 2026) - based on intermittent elevated turbidity associated with AMD inputs.
13. Compliance site receives clean diversion water and ESE pit water. Enters Whareatea River downstream of KEL. Metal and nutrient monitored concentrations at this site can be used to calculate SH67 concentrations (see footnote ⁵⁰).
14. Continuous pH/EC/temperature monitoring is proposed at five sites (Waimangaroa River, 2W; Deep Stream, SW01, SW03; Whareatea River, KEL; V8 Creek, MM1)

13.3.5 Compliance Monitoring Duration

An essential part of demonstrating that AMD management is appropriate during the Post Closure Phase is a suitable monitoring program that demonstrates geochemical stability has been achieved over an appropriate timeframe. Any long-term Post Closure Phase monitoring program will acknowledge that with increasing confidence in data trends (over time) that there will be a decreasing monitoring intensity.

It is anticipated that the frequency of monitoring will reduce in the Post Closure Phase with a risk-based approach taken, in line with observations made during the Operational, Active Closure, and Post Closure phases. This may include a reduction in monitoring frequency and/or monitoring variables (e.g., PCOC). It is proposed that this risk-based monitoring program will be developed during the Operational Phase of the BPCP. ANZG (2018) requires 2 years of monthly monitoring to confirm background water quality conditions and water quality trends. A similar timeframe is expected before any decrease in monitoring frequency and monitoring parameters is considered. Any changes proposed relating to the frequency of monitoring and/or monitoring parameters will be provided in the Annual Monitoring Report (Section 14.2.2), to be approved by the West Coast Regional Council.

The following tables present compliance and reference monitoring locations, with frequency and type of sample per phase.

Table 23: Site summary and monitoring frequency for reference and compliance sites for background/baseline

Project sub-area	Stream/ River	Code	Type	Level of protection	Background / baseline work (until end of 2026)					
					Flow (continuous)	Turbidity (continuous)	High flow / flood samples (as and when)	Water quality 'Basic'	Water quality 'Compliance'	Ecology
UWHR	Waimangaroa River	15W	Performance	80%				Fortnightly		min 3
MFS	Waimangaroa River	16W	Reference (Performance)	80%	use 2W					min 3
MFS / UWHR	Waimangaroa River	2W	Compliance	80%	existing	Y	Yes		Fortnightly	min 3
MFS / UWHR	Waimangaroa River	17W	Compliance	80%	Use 2W & SW03	Y	Yes		Fortnightly	min 3
MFS / UWHR	Waimangaroa River trib	WIL.MS1	Reference	95%						min 3
MFS / UWHR	Waimangaroa River trib	CED.MS1	Reference	95%						min 3
MFS	Billo Stream trib	BILL1	Reference	95%						min 3
MFS	Deep Stream	SW01	Compliance	95%	existing	Y	Yes		Fortnightly	min 3
MFS	Deep Stream	SW03	Compliance	95%	Yes	Y	Yes		Fortnightly	min 3
ESE	Whareatea River trib	V70	Reference (+ Performance turbidity)	n/a	Yes	Y	No	Fortnightly		min 3
ESE	Rapid Stream trib	RAP.R1	Reference	n/a						min 3
ESE	Rapid Stream	W07	Compliance	95%	Yes				Fortnightly	min 3
ESE	Whareatea River	KEL	Compliance	95%	Yes	Y	Yes		Monthly	min 3
ESE	Cascade Creek trib (V8)	MM1	Compliance	80%					Monthly	min 3
ESE	Whareatea River trib	V62	Compliance	95%	Yes	Y	Yes		Fortnightly	min 3

Source Hickey, 2026a Table L1:

Notes: 1. "High flow samplers" = Storm Water Samplers.

Water quality analysis suite indicated in Table 19.

Table 24: Site summary and monitoring frequency for reference and compliance sites during construction stage

Project sub-area	Stream/ River	Code	Type	Level of protection	Construction					
					Turbidity (sample)	EC + pH + temp (continuous) (performance)	High flow samplers	Water quality 'Basic'	Water quality 'Comprehensive'	Ecology
UWHR	Waimangaroa River	15W	Performance	80%	weekly			Monthly		
MFS	Waimangaroa River	16W	Reference (Performance)	80%	weekly			Monthly		annually
MFS / UWHR	Waimangaroa River	2W	Compliance	80%	weekly	Yes	Yes		Weekly	annually*
MFS / UWHR	Waimangaroa River	17W	Compliance	80%	weekly		Yes		Weekly	annually*
MFS / UWHR	Waimangaroa River trib	WILMS1	Reference	95%						annually
MFS / UWHR	Waimangaroa River trib	CED.MS1	Reference	95%						annually
MFS	Billo Stream trib	BILL1	Reference	95%						annually
MFS	Deep Stream	SW01	Compliance	95%		Yes	Yes		Fornightly	annually*
MFS	Deep Stream	SW03	Compliance	95%		Yes	Yes		Fornightly	annually*
ESE	Whareatea River trib	V70	Reference (+ Performance turbidity)	n/a			No	Monthly		annually
ESE	Rapid Stream trib	RAP.R1	Reference	n/a						annually
ESE	Rapid Stream	W07	Compliance	95%					Fornightly	annually*
ESE	Whareatea River	KEL	Compliance	95%			Yes		Fornightly	annually*
ESE	Cascade Creek trib (V8)	MM1	Compliance	80%		Yes			Fornightly	annually*
ESE	Whareatea River trib	V62	Compliance	95%			No		Fornightly	annually*

Source Hickey, 2026a Table L2:

Notes: 1. "High flow samplers" = Storm Water Samplers.

Water quality analysis suite indicated in Table 19.

Table 25: Site summary and monitoring frequency for reference and compliance sites during operations/active mining/active closure

Project sub-area	Stream/ River	Code	Type	Level of protection	Operations / active mining / active closure						
					Flow continuous	Turbidity (continuous)	Turbidity (sample)	EC + pH + temp (continuous) (performance)	High flow samplers	Water quality 'compliance suite'	Ecology
UWHR	Waimangaroa River	15W	Performance	80%		Yes	monthly				
MFS	Waimangaroa River	16W	Reference (Performance)	80%	use 2W	Yes				Weekly	annually
MFS / UWHR	Waimangaroa River	2W	Compliance	80%	existing	Yes	weekly	Yes	Yes	Weekly	annually*
MFS / UWHR	Waimangaroa River	17W	Compliance	80%	Use 2W & SW03	Yes	weekly		Yes	Weekly	annually*
MFS / UWHR	Waimangaroa River trib	WIL.MS1	Reference	95%							annually
MFS / UWHR	Waimangaroa River trib	CED.MS1	Reference	95%							annually
MFS	Billo Stream trib	BILL1	Reference	95%			weekly				annually
MFS	Deep Stream	SW01	Compliance	95%	existing	Yes	weekly	Yes	Yes	Weekly	annually*
MFS	Deep Stream	SW03	Compliance	95%	Yes	Yes	weekly	Yes	Yes	Weekly	annually*
ESE	Whareatea River trib	V70	Reference (+ Performance turbidity)	n/a	Yes	Yes	weekly		No	Weekly	annually
ESE	Rapid Stream trib	RAP.R1	Reference	n/a							annually
ESE	Rapid Stream	W07	Compliance	95%	Yes	Yes	weekly			Weekly	annually*
ESE	Whareatea River	KEL	Compliance	95%	Yes	Yes	weekly	Yes	Yes	Weekly	annually*
ESE	Cascade Creek trib (V8)	MM1	Compliance	80%			weekly	Yes		Weekly	annually*
ESE	Whareatea River trib	V62	Compliance	95%	Yes	Yes	weekly		Yes	Weekly	annually*

Source Hickey, 2026a Table L3:

Notes: 1. "High flow samplers" = Storm Water Samplers.

Water quality analysis suite indicated in Table 19.

Table 26: Site summary and monitoring frequency for reference and compliance sites during post-closure (passive treatment)

Project sub-area	Stream/ River	Code	Type	Level of protection	Post-closure (all passive treatment)				
					Turbidity (continuous)	Turbidity (sample)	Water quality 'Basic'	Water quality 'compliance suite'	Ecology
UWHR	Waimangaroa River	15W	Performance	80%					
MFS	Waimangaroa River	16W	Reference (Performance)	80%					annually
MFS / UWHR	Waimangaroa River	2W	Compliance	80%				Monthly	annually*
MFS / UWHR	Waimangaroa River	17W	Compliance	80%				Monthly	annually*
MFS / UWHR	Waimangaroa River trib	WIL.MS1	Reference	95%				?	annually
MFS / UWHR	Waimangaroa River trib	CED.MS1	Reference	95%				?	annually
MFS	Billo Stream trib	BILL1	Reference	95%				Monthly	annually
MFS	Deep Stream	SW01	Compliance	95%				Monthly	annually*
MFS	Deep Stream	SW03	Compliance	95%				Monthly	annually*
ESE	Whareatea River trib	V70	Reference (+ Performance turbidity)	n/a				Monthly	annually
ESE	Rapid Stream trib	RAP.R1	Reference	n/a				Monthly	annually
ESE	Rapid Stream	W07	Compliance	95%				Monthly	annually*
ESE	Whareatea River	KEL	Compliance	95%				Monthly	annually*
ESE	Cascade Creek trib (V8)	MM1	Compliance	80%				Monthly	annually*
ESE	Whareatea River trib	V62	Compliance	95%				Monthly	annually*

Source Hickey, 2026a Table L4:

Notes: 1. "High flow samplers" = Storm Water Samplers.

Water quality analysis suite indicated in Table 19.

13.3.6 Meteorological Monitoring

Meteorological monitoring stations to assist in water management will be installed, operated and maintained at the ESE (Lake Brazil) and MFS sub areas:

- a) Escarpment (Lake Brazil Met): E1499587 N5374633
- b) Mount Frederick: E1503919 N5381817
- c) MFS: E1503192 N5379929

Where:

- Stations (a) – (b) must involve measurement of rainfall, relative humidity, air temperature, wind speed, maximum wind gust, and wind direction.
- Station (c) may involve measurement only of rainfall.
- Meteorological monitoring data at Stations (a) – (c) must be telemetered to enable consideration of current meteorological conditions in real time, along with data logging at 10-minute intervals to enable robust meteorological analysis.

13.4 Performance Monitoring

Performance monitoring at the BPCP is designed to assess the effectiveness of water management infrastructure and operational practices. It complements compliance monitoring by providing early warning of potential issues and informs adaptive management processes.

Site water across BPCP sub-areas is managed via a range of measures mandated by consents for Mining Operations as well as voluntary measures implemented to assist day-today site management of water in order to support mining operations and community expectations.

It is anticipated that the frequency of monitoring will reduce with a risk-based approach taken, in line with observations made during the Operational, Active Closure, and Post Closure phases. This may include a reduction in monitoring frequency and/or monitoring variables (e.g., PCOC). It is proposed that this risk-based monitoring program will be developed during the Operational Phase of the BPCP.

The objectives of performance monitoring are:

- Evaluate the effectiveness of water management infrastructure (e.g., sediment ponds, seepage collection systems, active treatment systems, passive treatment systems).
- Identify trends in water quality and quantity that may indicate emerging risks.
- Support adaptive management by providing data to refine operational practices.
- Inform closure planning and long-term water treatment requirements.

13.4.1 Surface Water Performance Monitoring

Surface water performance monitoring requirements covers flow, turbidity, field parameters (EC, pH, temperature), water quality (e.g., metals), and ecology. Each sub-area of the Project has numerous

proposed performance sites, with differing monitoring requirements. These requirements are presented in the following sections.

Performance monitoring systems will be established during the Construction Phase for surface and groundwater. This will include the installation of groundwater monitoring wells to obtain background information before the commencement of the Operational Phase.

Monitoring of any effects on surface water quality during the Construction Phase will be in alignment with water quality objectives proposed by Hickey (2026a) at the following sites (see Figure 5).

Performance monitoring locations for MFS, ESE, and the UWHR sub-areas are presented in Figure 5.

Table 27 and Table 28 includes requirements for the Construction Phase. Table 29 and Table 30 presents the monitoring requirements for the Operations Phase and Active Closure Phase. Table 31 presents the monitoring requirements for the Post Closure phase.

Table 27: MFS and UWHR surface water performance monitoring requirements for Construction Phase.

Monitoring Location	Monitoring Type	Turbidity (continuous)	Turbidity (sample)	EC, pH and temperature (continuous)	High Flow Samplers	Water Quality 'Basic' ¹	Water Quality 'Comprehensive suite' ¹	Aquatic Ecology
BUR.L1	Local reference (Performance)	Yes	Monthly	Monthly	-	Monthly		Annually
WRBBC	Performance	-	Weekly	-	-	Monthly	-	Annually
14W	Performance	-	Weekly	-	-	Monthly	-	Annually
15W	Performance à Reference	-	Weekly	-	-	-	Monthly	Annually
16W	Performance	-	Monthly	-	-	Monthly	-	Annually

Notes: ¹Water quality suite outlined in indicated in Hickey (2026a).

²SW02 to replace BIL.L1 and become a reference site after the Construction Phase.

- indicates not required.

Table 28: ESE surface water performance monitoring requirements for Construction Phase.

Monitoring Location	Monitoring Type	Flow (cont.)	Turbidity (cont.)	Turbidity (sample)	High Flow Samplers	Water Quality 'Basic' ¹	Water Quality 'Comprehensive suite' ¹	Aquatic Ecology
V37-F	Performance	Yes (weir)	-	Monthly	-	-	Weekly	Annually
V37-G	Performance	Yes (weir)	-	Monthly	-	-	Weekly	Annually
BUR.L1	Performance	-	Yes	Monthly	-	-		Annually

(Burnett Stream) (turbidity only).

The commencement of monitoring V37-F and V37-G (V37 Stream) will occur once discharge to these locations from BPCP activities within the ESE sub-area occurs.

Table 29: MFS surface water performance monitoring requirements for Operations and Active Closure phases.

Monitoring Location	Monitoring Type	Turbidity (continuous)	Turbidity (sample)	EC, pH and temperature (continuous)	High Flow Samplers	Water Quality 'Basic' ¹	Water Quality 'Comprehensive suite' ¹	Aquatic Ecology
16W	Local reference (Performance)	Yes	Monthly	-	-	-	Weekly	Annually
BS01	Performance (turbidity)	-	Weekly	-	-	Monthly	-	Annually
SW04	Performance	-	-	-	-	-	Monthly	Annually
SW02	Performance à Reference ²	Yes	-	-	-	-	Monthly	Annually
18W	Performance	Yes	Monthly	-	-	Monthly	-	Annually

Notes: ¹Water quality suite outlined in indicated in Hickey (2026a). -indicates not required.

²SW02 to replace BIL.L1 and become a reference site after the Construction Phase.

Table 30: ESE surface water performance monitoring requirements for Operations and Active Closure phases.

Monitoring Location	Monitoring Type	Flow (cont.)	Turbidity (cont.)	Turbidity (sample)	High Flow Samplers	Water Quality 'Basic' ¹	Water Quality 'Comprehensive suite' ¹	Aquatic Ecology
V70	Reference	-	Yes	Weekly	-	-	Weekly	Annually
W08	Performance	-	-	-	-	-	Monthly	Annually
W09	Performance	-	Yes	Monthly	-	-	Monthly	Annually
WM-3	Performance	-	Yes	Monthly	-	-	Monthly	Annually
V37-F	Performance	Yes (weir)	-	Monthly	-	-	Weekly	Annually
V37-G	Performance	Yes (weir)	-	Monthly	-	-	Weekly	Annually
d/s V37	Performance	-	-	-	-	-	Monthly	Annually

Notes: ¹Water quality suite outlined indicated in Hickey (2026a). -indicates not required. cont. = continuous monitoring.

Table 31: ESE surface water performance monitoring requirements for Post Closure Phase.

Monitoring Location	Monitoring Type	Turbidity (cont.)	Turbidity (sample)	Water Quality 'Basic' ¹	Water Quality 'Comprehensive suite' ¹	Aquatic Ecology
V70	Reference (+ Performance turbidity)	Yes	-	-	Monthly	Annually
W08	Performance	-	-	-	-	Annually
W09	Performance	Yes	-	-	-	Annually
WM-3	Performance	Yes	-	-	-	Annually
V37-F	Performance	-	-	-	Monthly	Annually
V37-G	Performance	-	-	-	Monthly	Annually
d/s V37	Performance	-	-	-	-	Annually

Notes: ¹Water quality suite outlined in indicated in Hickey (2026a).

-indicates not required.

cont. = continuous monitoring.

13.4.1.1 UWHR

The UWHR crosses numerous waterways. Streams within the southern portions of the UWHR are affected by MIW. For instance, Burnetts Stream is degraded by historic AMD impacted drainage. Surface water performance monitoring requirements for UWHR are presented in Table 32. The table includes requirements for the Operations Phase and Active Closure Phase. Limited performance monitoring is included for the Post Closure Phase as presented in Table 33.

Table 32: UWHR surface water performance monitoring requirements for Construction, Operations and Active Closure Phases.

Monitoring Location	Monitoring Type	Flow (cont.)	Turbidity (cont.)	Turbidity (sample)	EC, pH and temperature (continuous)	High Flow Samplers	Water Quality 'Basic' ¹	Water Quality 'Compliance suite' ¹	Aquatic Ecology
WRBBC	Reference (+ Performance turbidity)	-	-	-	-	-	-	Monthly	Annually
14W	Performance	-	-	-	-	-	Monthly	-	Annually
15W	Performance	-	Yes	Monthly	-	-	Monthly	-	Annually
BUR.L1	Performance	-	-	Weekly	-	Yes	Monthly	-	Annually
Selected Sediment Ponds 2	Performance	-	Yes	Monthly					

Notes:

¹Water quality suite outlined in indicated in Hickey (2026a).

² Sediment ponds that discharge from the UWHR to Cascade Creek will be assessed during rainfall events to confirm sediment is being managed appropriately. Noting that the creek is heavily impacted by AMD and any AMD from these ponds will be negligible when compared to the existing load.

- indicates not required.

cont. = continuous monitoring.

n/a = not applicable.

Table 33: UWHR surface water performance monitoring requirements for Post Closure Phase.

Monitoring Location	Monitoring Type	Turbidity (cont.)	Turbidity (sample)	Water Quality 'Basic' ¹	Water Quality 'Comprehensive' ¹
WRBBC	Reference (+ Performance turbidity)	-	-	-	Monthly
14W	Performance	-	-	-	-
15W	Performance	-	-	-	-
BUR.L1	Performance	-	-	-	-

Notes: ¹Water quality suite outlined in indicated in Hickey (2026a).

- indicates not required.

cont. = continuous monitoring.

n/a = not applicable.

13.4.2 Groundwater Performance Monitoring

Performance monitoring is proposed for groundwater monitoring wells located near key mine infrastructure to assess potential seepage and plume migration. During the Construction Phase, long term groundwater monitoring infrastructure will be established at MFS and ESE. This will be facilitated by the installation of monitoring wells at proposed locations, intended to monitor pre-mining conditions and changes that may occur to groundwater quality and groundwater levels during the operational and post-closure project phases. Proposed groundwater monitoring areas were identified in the respective Groundwater Technical Reports for MFS (MWM, 2026c) and ESE (MWM, 2026d) and are discussed below together with other groundwater management requirements:

- Well installation will ensure that no drilling mud or associated discharges enter any surface water bodies, and that all drilling sites are remediated after completion of drilling operations within the Stockton, ESE, MFS and UWHR sub-areas.
- Groundwater monitoring wells will be established and ongoing monitoring will occur by a SQEP as part of the performance monitoring programme at both ESE and MFS during the Operational Phase and Active Closure Phase as per the Groundwater Sampling and Analysis SOP (BPCP-ENV-SOP-09) and in accordance with NEMS (2019) and the Equipment Calibration SOP (BPCP -ENV-SOP-010).
- Develop and implement a standard operating procedure including performance monitoring for the sealing of underground workings (BPCP-ENV-SOP-03) to manage the loss of AMD impacted waters to the receiving environment.
- During operations and post-closure phases and in accordance with the PDCA cycle, the utilisation of data collected through the monitoring programmes will validate predications and adaptive management through the development and implementation of the Groundwater Management SOP (BPCP -ENV-SOP-011). This SOP will also analyse monitoring data for potential seepage data screening collection and migration along groundwater flow pathways and confirm that post-closure pit floor runoff does not impact groundwater quality.

- Install nested vibrating wire piezometers following rehabilitation to monitor the phreatic surface within the ELF to confirm the basal drainage network is performing adequately and the pit remains a hydraulic sink, thereby minimising the potential for ELF seepage to reach surface water receptors.
- Undertake biannual seepage surveys following rehabilitation to validate seepage rates through the rehabilitation surface.
- Develop and implement an ELF cover system management procedure that incorporate ELF phreatic surface data, and external groundwater level and quality data which enables proactive management of unexpected seepage pathways.
- Undertake performance monitoring to validate that WLBM remains current over the life of the project and into the commencement of the Post Closure Phase. This includes leading and lagging performance indicators:
 - Oxygen flux and net percolation rates into the ELFs (referred to in the AMD ELFMP).
 - Water quality and quantity of ELF seepage.
 - Peak acidity loads and longer-term loads managed by passive treatment technologies.

13.4.2.1 MFS

Proposed groundwater monitoring areas for MFS are indicated in Figure 34. These areas are located between potential sources (e.g., ELFs) and receptors (e.g., streams) and are in close proximity to source hazards to provide the earliest possible warning of potential AMD seepage impacting groundwater. The following management measures support the monitoring of groundwater in the MFS area:

- Undertake investigations to validate the hydrogeological condition for subsurface seepage collection at the MFS Coal Transfer Pad.
- Install and monitor additional groundwater monitoring wells in target locations positioned between potential sources (e.g., ELF) and receptors (e.g., streams), and in close proximity to sources to confirm ELF seepage is not migrating via groundwater pathways. (The existing groundwater monitoring network will be impacted by the MFS project sub-area, with all except three wells (DC33, DC45, and DC46) likely to be decommissioned).
- Undertake hydrogeological testing of wells (e.g., slug tests) during well installation to improve the site-specific K dataset and model calibration.

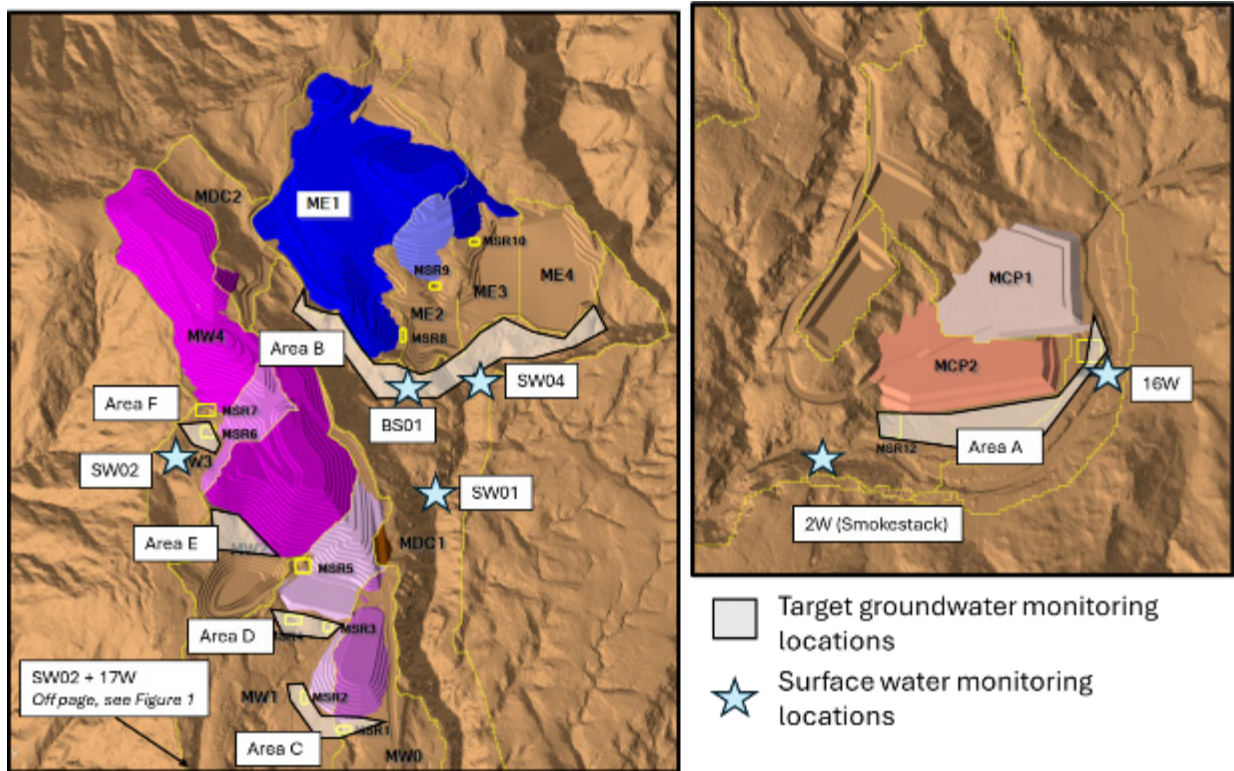


Figure 34: MFS - proposed groundwater monitoring areas.

13.4.2.2 ESE

Proposed groundwater monitoring areas for ESE are indicated in Figure 35. These areas are located between the in-pit ELF's and surface water receptors, whilst being in close proximity to sources to provide the earliest possible warning of potential seepage impacting groundwater. The following management measures support the monitoring of groundwater in the ESE area:

Continue and complete groundwater quality sampling to validate background conditions and support performance monitoring, particularly between ELF's and surface water receptors.

- Prior to operations commencing in the ESE sub-area, validate the ESE groundwater assessment (including estimates of hydraulic properties (e.g., hydraulic conductivity, K) of the BCM and Basement units documented in other areas of the Buller Plateaux with ESE data.
- Undertake monitoring in the Cascade Creek catchment to detect any changes to underground workings flows and AMD loads reporting to Cascade Creek to validate betterment opportunities.

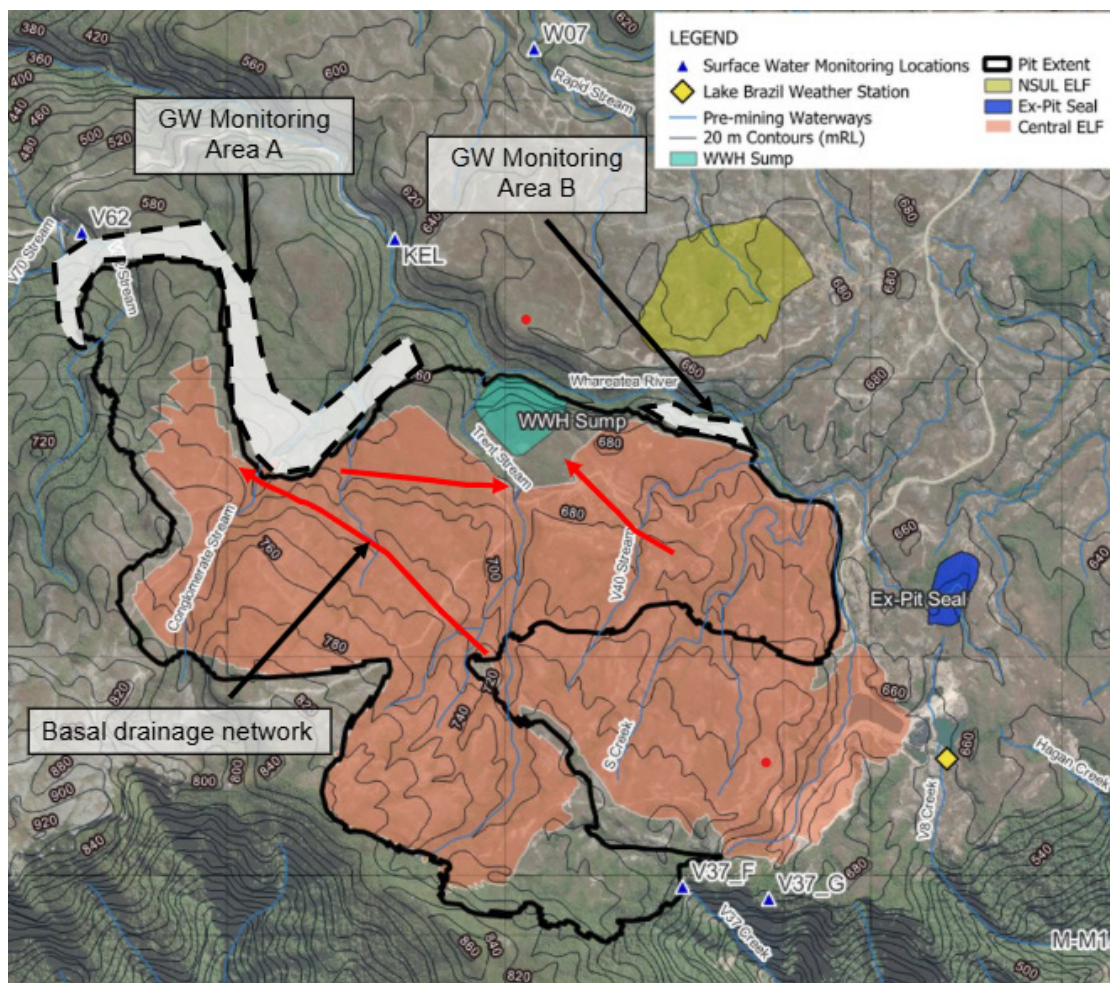


Figure 35: ESE - proposed groundwater monitoring areas.

As indicated, the groundwater monitoring network will be implemented during the Construction Phase, or as soon as practicable to collect background data prior to commencement of mining. Performance monitoring will be undertaken during the Operational Phase and Active Closure Phase to measure both changes in groundwater quality and groundwater levels.

The groundwater sampling site is listed in Table 19. Groundwater level monitoring will involve installation of pressure transducers with data loggers in selected monitoring wells at each site, and manual measurements of all monitoring wells. Continuous groundwater level monitoring (e.g., sub daily measurements) will help determine the relationships between groundwater levels, rainfall, and surface waterways draining the site. Manual measurements undertaken during pressure transducer download events will increase the groundwater level dataset whilst verifying the pressure transducer data and allowing for calibration of the sensors.

Groundwater monitoring data collected will be reported in an annual water report alongside surface water monitoring.

13.4.2.3 Groundwater Performance Monitoring MFS

Groundwater performance monitoring for the MFS sub-area is presented in Table 34. It is noted that the monitoring frequency for groundwater quality sampling and groundwater level monitoring

indicated for the Active Closure Phase will be reviewed on an annual basis. If groundwater quality and groundwater levels have stabilised at acceptable levels, the monitoring frequency may be reduced.

Table 34: Proposed MFS Groundwater performance monitoring summary

MINING PHASE	MONITORING TYPE	MONITORING FREQUENCY	DESCRIPTION
Construction Phase (2028-2030) ¹	Groundwater Quality ⁶ and field measurements ⁷	Monthly	Collect background groundwater quality data prior to mining activities.
	Groundwater Level	Continuous and Monthly manual measurements ²	Analyse baseline changes in groundwater levels prior to mining activities.
Operational Phase (2030-2043) ¹	Groundwater Quality ⁶ and field measurements ⁷	Quarterly	Monitor groundwater quality in response to active mining activities.
	Groundwater Level	Continuous and quarterly manual measurements ²	Monitor changes in groundwater levels in response to active mining activities including dewatering and in-pit collection sumps.
Active Closure Phase (2043-2046) ¹	Groundwater Quality ⁶ and field measurements ⁷	Quarterly ³	Monitor groundwater quality in response to cessation of active mining activities.
	Groundwater Level	Continuous and quarterly manual measurements ^{2, 3}	Monitor changes in groundwater levels in response to cessation of active mining activities (e.g., cessation of dewatering).
Post Closure Phase (2047 onwards) ^{1, 3}	Groundwater Quality ⁶ and field measurements ⁷	Quarterly/annually ⁴	Monitor changes in groundwater quality following cessation of active treatment and full implementation of passive treatment systems.
	Groundwater Level	Quarterly/annual manual measurements ⁵	Monitor changes in groundwater levels following cessation of active treatment and full implementation of passive treatment systems.

Notes: ¹ Dates based on current project timeline.

² Continuous monitoring to be implemented in select monitoring wells, to be determined following installation. Manual measurements undertaken in all monitoring wells. Manual measurements and groundwater level pressure transducers with data loggers to be undertaken at time of groundwater quality sampling events.

³ Monitoring frequency proposed to be reviewed on annual basis and may be reduced e.g., where parameters have stabilised or are shown to be reducing.

⁴ Monitoring frequency may reduce to annual following no significant increase in PCOCs during final five years of Active Closure Phase. Monitoring may cease following no significant increase in PCOCs during first five years of Post Closure Phase. Otherwise, monitoring may cease when a risk assessment demonstrates that PCOCs have stabilised at acceptable levels and residual risks to the environment are negligible.

⁵ Monitoring frequency may reduce to annual following no significant change in groundwater levels during final five years of Active Closure Phase. Monitoring may cease following no significant change in groundwater levels during first five years of Post Closure Phase. Otherwise, monitoring may cease when groundwater levels are demonstrated to have stabilised.

⁶ Groundwater quality monitoring requirements include laboratory analyses for alkalinity, acidity (to pH 8.3), sulfate, dissolved aluminium, dissolved zinc, dissolved iron, dissolved nickel, dissolved copper, dissolved cadmium, dissolved manganese, dissolved

calcium, sodium, potassium, magnesium, chloride, dissolved organic carbon, total suspended solids, turbidity, nitrate, and total nitrogen, ammoniacal-N.

⁷ Field measurements made at all groundwater monitoring locations must include the groundwater level, pH, temperature, electrical conductivity, oxidation reduction potential and dissolved oxygen.

13.4.2.4 Groundwater Performance Monitoring ESE

Groundwater performance monitoring for the ESE sub-area is presented in Table 35. It is noted (similarly to MFS) that the monitoring frequency for groundwater quality sampling and groundwater level monitoring indicated for the Active Closure Phase will be reviewed on annual basis. If groundwater quality and groundwater levels have stabilised at acceptable levels, the monitoring frequency may be reduced.

Table 35: Proposed ESE Groundwater performance monitoring summary

MINING PHASE	MONITORING TYPE	MONITORING FREQUENCY	DESCRIPTION
Construction Phase (2028-2030) ¹	Groundwater Quality ⁶ and field measurements ⁷	Monthly	Collect background groundwater quality data prior to mining activities.
	Groundwater Level	Continuous and Monthly manual measurements ²	Analyse baseline changes in groundwater levels prior to mining activities.
Operational Phase (2030-2043) ¹	Groundwater Quality ⁶ and field measurements ⁷	Quarterly	Monitor groundwater quality in response to active mining activities.
	Groundwater Level	Continuous and quarterly manual measurements ²	Monitor changes in groundwater levels in response to active mining activities including dewatering and in-pit collection sumps.
Active Closure Phase (2043-2057) ¹	Groundwater Quality ⁶ and field measurements ⁷	Quarterly ³	Monitor groundwater quality in response to cessation of active mining activities.
	Groundwater Level	Continuous and quarterly manual measurements ^{2,3}	Monitor changes in groundwater levels in response to cessation of active mining activities (e.g., cessation of dewatering).
Post Closure Phase (2058 onwards) ^{1,3}	Groundwater Quality ⁶ and field measurements ⁷	Quarterly/annually ⁴	Monitor changes in groundwater quality following cessation of active treatment and full implementation of passive treatment systems.
	Groundwater Level	Quarterly/annual measurements ⁵ manual	Monitor changes in groundwater levels following cessation of active treatment and full implementation of passive treatment systems.

Notes: ¹ Dates based on current project timeline.

² Continuous monitoring to be implemented in select monitoring wells, to be determined following installation. Manual measurements undertaken in all monitoring wells. Manual measurements and groundwater level pressure transducers with data loggers to be undertaken at time of groundwater quality sampling events.

³ Monitoring frequency proposed to be reviewed on annual basis and may be reduced e.g., where parameters have stabilised or are shown to be reducing.

⁴ Monitoring frequency may reduce to annual following no significant increase in PCOCs during final five years of Active Closure Phase. Monitoring may cease following no significant increase in PCOCs during first five years of Post Closure Phase. Otherwise, monitoring may cease when a risk assessment demonstrates that PCOCs have stabilised at acceptable levels and residual risks to the environment are negligible.

⁵ Monitoring frequency may reduce to annual following no significant change in groundwater levels during final five years of Active Closure Phase. Monitoring may cease following no significant change in groundwater levels during first five years of Post Closure Phase. Otherwise, monitoring may cease when groundwater levels are demonstrated to have stabilised.

⁶ Groundwater quality monitoring requirements include laboratory analyses for alkalinity, acidity (to pH 8.3), sulfate, dissolved aluminium, dissolved zinc, dissolved iron, dissolved nickel, dissolved copper, dissolved cadmium, dissolved manganese,

dissolved calcium, sodium, potassium, magnesium, chloride, dissolved organic carbon, total suspended solids, turbidity, nitrate, and total nitrogen.

⁷ Field measurements made at all groundwater monitoring locations must include the groundwater level, pH, temperature, electrical conductivity, oxidation reduction potential and dissolved oxygen.

13.4.3 PCOC Monitoring

A number of PCOC were identified by geochemical testing as elevated, yet detailed studies completed as part of the AEE indicates that they are unlikely to be higher than the water quality limits at the compliance monitoring locations. This includes:

- Arsenic (As), Chromium (Cr III), and Lead (Pb) due to the oxidation of sulfide minerals.
- Nitrogenous compounds due to the use of ANFO.

Performance monitoring is proposed for ELF basal seepage to confirm these PCOC are low and are unlikely to exceed recognised water quality limits for nitrogenous compounds as listed in Table 36.

Monitoring will occur after peak ELF sulfate concentrations have been determined and will then continue monthly for 2 years (ANZG (2018) recommendation) to confirm background water quality conditions and water quality trends before any decrease in performance monitoring frequency and monitoring parameters is considered. Any changes proposed relating to the frequency of monitoring and/or monitoring parameters will be provided in the Annual Monitoring Report (Section 14.2.2), to be approved by the West Coast Regional Council.

Table 36: ELF Basal Seepage Pits Performance Monitoring Requirements

MONITORING TYPE	MONITORING FREQUENCY	LOCATION	PERFORMANCE MONITORING SCREENING CRITERIA
As	Monthly	ELF Basal Seepage Discharge Location.	ANZG (2018) 95% guideline value: 0.013 mg/L
Cr (III)	Monthly	ELF Basal Seepage Discharge Location.	ANZG (2026a) 95% guideline value: 0.007 mg/L
Pb	Monthly	ELF Basal Seepage Discharge Location.	CCME (2020) Hardness and DOC dependent
Nitrogenous compounds	Monthly	ELF Basal Seepage Discharge Location.	As per BRL, 2026c Table 19 (ammonia, nitrate and total N)

13.4.4 Operational Infrastructure Performance Monitoring

Surface water performance monitoring will be undertaken at key operational infrastructure locations as shown in Table 37 . The following activities will be undertaken:

- Confirm the water quality of clean water drains are suitable.
- Confirm the source terms developed for the WLBM are suitable (e.g., highwall runoff; pit sumps).
- Validate flow rates for ELF seepage and hence net percolation rates to support closure planning.
- Confirm water quality of ELF seepage.
- Confirm water treatment by-pass flow (quality and quantity).
- Confirm active and passive water treatment performance based on influent and effluent concentrations and flow rates.
- Confirm sediment control ponds along the UWHR and the MFS Access Road are not affected by AMD.
- Confirm rehabilitated surface water quality is appropriate for discharge to the receiving environment within 2 years of rehabilitation being completed.

The above performance monitoring requirements have been established to monitor key risks associated with operational infrastructure (Attachment 1). If other risks are identified during the BPCP, then a performance monitoring programme will be established. Performance monitoring will be integrated into an adaptive management process to respond to any unexpected events and trends.

Table 37: Operational Infrastructure Performance Monitoring

MONITORING TYPE	LOCATION AND MONITORING FREQUENCY	MONITORING REQUIREMENTS
Clean Water Drains	• Various Locations as required. • Monthly testing	• Turbidity (sample) • Water Quality - Basic
Highwalls, pit sumps, haul roads, hard stands)	• Monthly over the first year then decreasing to as required to support adaptive management processes	• Turbidity (sample) • Water Quality - Comprehensive
ELF Seepage	• 5 ELFs set up with continuous flow monitoring. • Other sites have v-notch weirs. • Continuous monitoring is rotated every 3 months	• Flow Rate (Continuous + sample) • Water Quality - Comprehensive
Water Treatment Plant (WTP)	• Following the WTP commissioning phase samples will be collected on a weekly basis from the influent and effluent of the WTP unless real-time	• Flow Rate (Continuous) • Turbidity (Continuous) • Water Quality – Comprehensive • AMD sludge quantity

MONITORING TYPE	LOCATION AND MONITORING FREQUENCY	MONITORING REQUIREMENTS
	monitoring is available to confirm WTP performance. - AMD sludge generation rates will be monitored as transported for disposal. - AMD sludge generation rates in the Surge Pond (6 monthly sonar measurements – see Section 13.0).	
WTP By-pass	Monitor by-pass water quality and flow rate when occurring.	- Flow Rate (Continuous) - Turbidity (Continuous) - Water Quality - Comprehensive
MSR	- Flow monitoring for influent and effluent of the MSR and MSR Polishing Pond. - Any by-pass flow to be monitored. - Monthly water quality monitoring for MSR influent and MSR Polishing Pond effluent. - Monitoring parameters and frequency to be based on key water quality risks that will be influenced by influent water quality, treatment efficiencies, and secondary contaminants. - Monitoring of the MSR polishing pond influent and effluent to confirm that secondary contaminants are being managed. - AMD sludge generation rates will be monitored within the MSR and MSR Polishing Pond (see Section 13.4.6)	- Flow Rate (Continuous + sample) - Water Quality – Comprehensive - AMD sludge quantity
Silt Ponds, Retention Ponds, Water Diversion infrastructure, and other sediment control structures	- Monitoring to be undertaken along the UWHR, MFS Access Road, and at other locations where TSS is managed by passive systems prior to release. - Monitoring is to ensure AMD is being managed. - Monthly testing.	- Turbidity (sample) - Water Quality - Basic
Rehabilitated surfaces	- Monthly sampling of rehabilitated slopes for 2 years to confirm turbidity is low and that runoff is not affected by AMD. - Sampling to be undertaken during higher rainfall events.	- Turbidity (sample) - Water Quality - Basic

13.4.5 WTP AMD Sludge Accumulation

AMD sludge (comprised of TSS and AMD precipitates) will form in mine water infrastructure associated with the active WTP (e.g., the Ex-pit Seal Pit) and monitoring is required to ensure that the infrastructure maintain suitable operating capacity. Monitoring will be undertaken using sonar to measure the depth of the AMD sludge layer. This process is already undertaken at the Stockton Mine.

When AMD sludge levels are potentially compromising the operation of the facility the water levels will be lowered (either by pumping or decanting with water sent to the water treatment plant) to excavate the materials. The process is likely to be done on an annual basis but may be longer if the sumps are dug deeper or accumulation rates are low. It is expected any required cleaning will be undertaken during low flow periods when flows can be pumped to the WTP either directly from the pit or via designated staging sumps. Cleaning operations may be temporarily suspended during a rain event to allow the sump to be utilised if required.

13.4.6 MSR AMD Sludge Accumulation

AMD sludge will accumulate on the surface of the MSR and within the MSR polishing pond. Monitoring of sludge accumulation will be undertaken by visual measurements of the MSR and by sonar measurements of the MSR polishing pond.

Monitoring will be undertaken and reviewed during the Operational Phase (upon completion of the first ELF) to validate that MSR can manage higher acidity and flow rates than recommended by international literature (e.g., INAP, 2021) to meet water quality objectives.

Monitoring will be undertaken and reviewed during the Operational Phase (upon completion of the first ELF) to validate that the MSR Polishing Pond will achieve water quality objectives for PCOC and secondary contaminants (e.g., ammoniacal nitrogen, nitrate, hydrogen sulfide). Validation will occur through performance monitoring data that the quantity of Fe that passes through the MSR and whether or not any FeCl₃ dosing is required for the polishing pond to treat residual Ni and Zn (i.e., validate whether 20% of influent Fe reporting to the polishing pond is reasonable).

Evaluate efficacy of the MSRs based on performance data and continue investigation into alternate passive treatment options to extend or supplement the MSR PTS.

When AMD sludge levels are potentially compromising the operation of the facility (e.g., limiting the throughput of the MSR), the water levels will be lowered, and the materials will be excavated. One MSR bay for be lowered at a time to enable desludging whilst treatment operations continue. Polishing Ponds will also involve two bays and could be constructed deeper to accommodate AMD sludge.

13.5 Surface Water Discharge Points

Several discharge points will be established during the Operational and Closure Phases of the MFS and ESE sub-areas. The discharge points for Operational Phase are presented in Figure 36 (MFS sub-area) and Figure 37 (ESE sub-area). As identified in the Hydrology Assessment Report (MWM, 2026e), the catchments for these discharge points may undergo significant changes compared to the pre-development catchment area. The primary risk identified relates to scouring where catchment areas (and therefore discharge rates) exceed those observed prior to development of the mine. Risks associated with AMD water being discharged to the environment are to be monitored by compliance and performance monitoring sites outlined in this report.

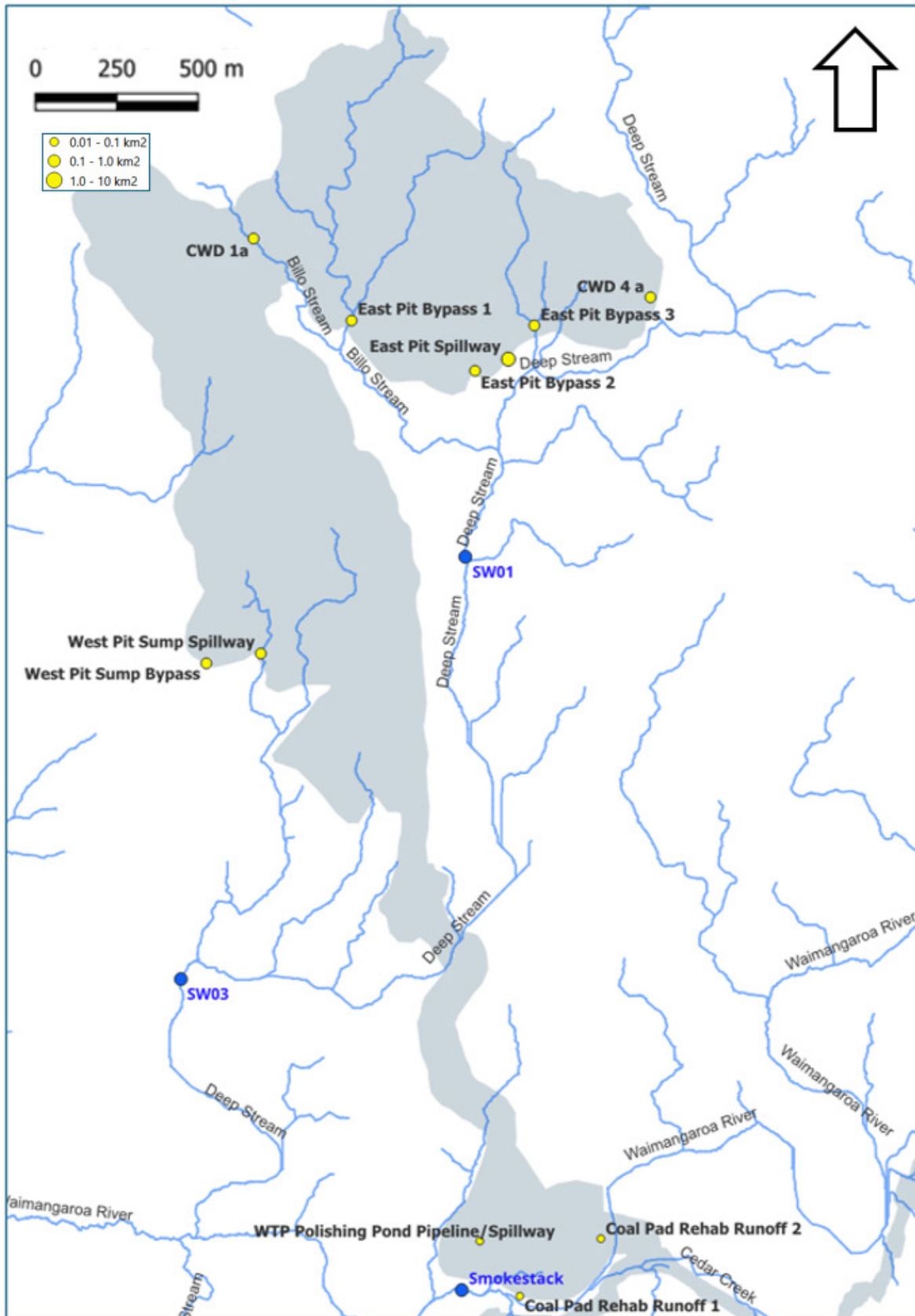


Figure 36: MFS discharge locations options and monitoring sites.

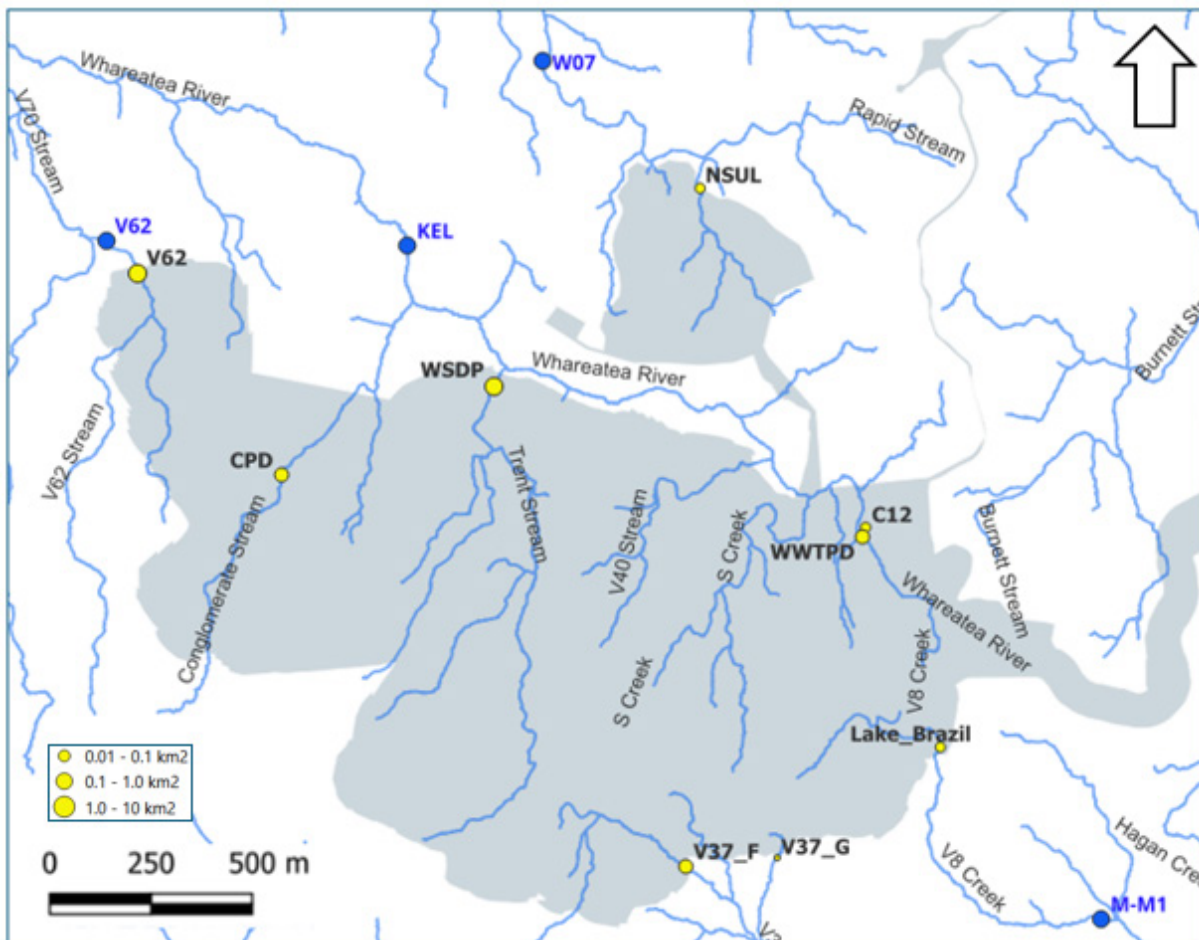


Figure 37: ESE catchments, discharge location options and monitoring locations.

13.6 Reference Sites

Reference sites provide a local reference for water chemistry and biological monitoring. Reference sites are classified as either in Excellent or Good condition as determined through water quality and ecological indicators in Hickey (2026a). Compliance sites are linked to a reference site to assess limits for some water quality monitoring requirements (Hickey, 2026a). The locations of the reference sites including the type and frequency of monitoring are detailed in Section 13.3. Biological monitoring is detailed in the Aquatic Ecology Management Plan.

13.6.1 Post Closure Reference Monitoring

Post closure monitoring will be updated in accordance with the PDCA cycle based on trend analysis and assessment which will begin after five years of monitoring, noting that results will be interpreted cautiously until 10 years of annual data are available (BPCP-ENV-PLN-006). Prior to this review, the post-closure reference monitoring will be limited to annual ecological monitoring. The review of reference monitoring as presented in Table 26: Site summary and monitoring frequency for reference and compliance sites during post-closure (passive treatment), will occur during the Operational and Passive Closure phases.

The BPCP will reinstate approximately 20.9 km of streams within the Project area. Reinstatement will occur progressively through the operational and closure phases and is expected to be staged across several years. Detailed staging and design will be undertaken at a later stage of the Project, at which time the specific locations and timing of stream reinstatement will be confirmed. A post-reinstatement background survey will be completed once water quality conditions are suitable to support aquatic life. This will include sampling water quality, habitat, periphyton, bryophytes and macroinvertebrates, and kōura. Further details of the reinstatement plan are included in BPCP-ENV-PLN-006.

14.0 Reporting Requirements

14.1 Internal Reporting

Water monitoring 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).

All potential and actual non-compliances with this Plan identified by site personnel during site inspections or monitoring activities are to be rectified in accordance with Section 14.0 and 16.0. This system keeps track of non-compliances, corrective actions, responsibilities, planned and actual completion dates. Community complaints are recorded within the Community Complaints Register and addressed as per the Community Complaints Procedure.

14.2 External Reporting Requirements

This section summarises the external reporting requirements associated with AMD water management.

14.2.1 Annual Work Plan

Prior to undertaking any activities on site, and annually thereafter, BRL shall provide an Annual Work Plan (AWP) to the Peer Review Panel for review. The Peer Review Panel will review the Management Plans, Background or Monitoring Report, and make recommendations to the DOC, WCRC, and Buller District Council (BDC) regarding the adequacy and approval of these documents. The Annual Work Plan will include a description of proposed AMD water management works proposed in the next 12-month period including infrastructure, discharge locations and compliance monitoring.

14.2.2 Annual Monitoring Report

BRL is committed to providing the Approval Authority and Ngāti Waewae by 31 August each year an annual water quality monitoring report which will cover a hydrological year: 1 July – 30 June, inclusive:

- A summary of the results and findings of all water quality, meteorology and aquatic ecology monitoring undertaken during the course of the reporting year in accordance with the conditions of the approval and This Plan including a summary using the metal ecotoxicity quotient (MEQ) method for presenting data as defined in consent condition QUA17 and QUA18.
- A description of AMD water management works completed within previous 12-month period.
- Summary of AMD loads treated through the WTPs.
- Review of AMD water compliance monitoring trends by a SQEP geochemical specialist, noting any deviation from predicted trends and recommendations and actions implemented.
- Flow rates at specified locations to meet minimum flow requirements.

- Non-compliances and incidents reported and corrective actions implemented.

14.2.3 Monthly Water Quality Report

BRL commits to providing a monthly water quality monitoring report to the Approval Authority no later than the end of the following month. The monthly water quality monitoring report must:

- Summarise the results of all continuous and discrete water quality monitoring undertaken at each of the Compliance sites associated with the Stockton, MFS, ESE, and UWHR sub-areas. Annual water quality compliance statistics must be summarised on a rolling basis each month, incorporating all monitoring data from the prior 12-month period; and
- Describe any discrete water quality monitoring results at Compliance monitoring sites that did not meet receiving water criteria, and detail whether these identify non-compliance in an instantaneous context, or non-compliance is anticipated in the context of a rolling median or rolling 95th percentile.

14.2.4 Non-compliance Reporting

BRL will notify the Approval Authority within 24 hours of becoming aware of receiving any water quality monitoring results that exceed the compliance limits specified in This Plan, and of the actions taken or to be undertaken by BRL to achieve compliance with This Plan.

15.0 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 AMD WMP across all aspects of the Project. Effective and regular communication at all levels reinforces the message that water management issues are taken seriously and that the AMD WMP has the active support of all employees and contractors and is factored into mine planning, engineering and implementation aspects.

15.1 Roles and Responsibilities

Details of roles and responsibilities associated with this Plan are provided in Table 38 below.

Table 38: Responsible personnel and tasks

POSITION	ACCOUNTABLE TASK
BRL General Manager	• Provide adequate resources for the implementation of this AMD WMP. • Ensure that Water management considerations are included in the selection and installation of all infrastructure at MFS and ESE.
Mine Manager / SSE	• Ensure appropriately qualified and resourced personnel are appointed to the key roles and their responsibilities are well understood. • Ensure periodic auditing and review of this Plan is undertaken.
BRL Environmental Manager	• Be responsible for supporting the implementation of the requirements of this AMD WMP and communicating any issues to the Mine Management Team. • Responsible for sourcing sufficient mussel shells for MSR construction and maintenance. • Develop water quality triggers once sufficient background data is available in consultation with the Technical Services Manager. • Ensure the controls herein are implemented, maintained and effective. • Ensure personnel working at the operation are aware of the mine site Water controls whilst working at MFS and ESE. • Ensure work practices comply with this AMD WMP. • Be responsible for supporting the implementation of the requirements of this AMD WMP and communicating any issues to the BPCP Management Team. • Undertake periodic inspections of MFS and ESE's operations to assess compliance with the AMD WMP. • Actively promote AMD water management to all site personnel. • Carry out studies over the BPCP Operational Phase to confirm opportunities for betterment in consultation with the Technical Services Manager. • Coordinate and participate in the on-going review of the Water Management Plan. • Developing and making accessible information regarding water management at MFS and ESE (e.g. This Plan, procedures, training, and so forth). • Facilitating regular inspections, audits and maintenance of water management systems. • Scheduling and budgeting for monitoring requirements required for background, construction, operations and closure phases of the BPCP. • Coordinate the working group between KEL and BRL to assess the opportunities over the BPCP life to consider final land use/water use opportunities.

POSITION	ACCOUNTABLE TASK
	- 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 Water. - Address the external reporting requirements of the AMD WMP 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. - Produce internal and external reports. - Maintain on-going communication with regulatory authorities. - Oversee the development of training initiatives with respect to Water management. - Coordinate the investigation process for any Water management incidents or complaints. - Notify the General Manager of any issues arising which will necessitate a review of this AMD WMP. - Delegate to authorised alternate to cover any absence or unavailability. - Analyse monitoring data against established triggers and instigate investigations as required. - Prior to construction activities commencing, a WLBW for the Construction Phase will be developed to ensure the assessment of effects presented in this Plan are reasonable and that water treatment infrastructure is appropriate.
Technical Services Manager	- Responsible for implementing the proposed water management controls (drains, LPL, ELF covers etc.) from MFS, ESE and UHWR. - Responsible for undertaking mine scheduling and planning activities to implement this AMD WMP. - Responsible for managing the construction of the ELF cover system and associated QA/QC programs.
Water Engineer	- Ensuring that water management designs adhere to and incorporate the relevant site strategies and standards. - Ensuring the instruction of workers (alongside Environment and Community Superintendent), implementation and overseeing of the requirements of this Plan, including monitoring and review of the effectiveness. - Ensuring that the inspection, management of data, and development of work schedules for maintaining water management infrastructure is undertaken. - Providing site water management representation and input in relation to mine projects. - Ensuring that monitoring and reporting obligations are fulfilled. - Contribute to investigations into water management responses (as part of the adaptive management process) where required. - Ensure that staff and/or contractors that they supervise are suitably trained to follow processes outlined in this Plan and other documents as referenced. This includes a regular review of training requirements to ensure that each staff member/contractor is appropriately trained to carry out their duties.
Environmental Scientist	- Supporting the BRL Environmental Manager with day-to-day Water management activities. - Coordinate and manage Water data collection - QA/QC review of laboratory reported datasets. - Interpret Water datasets and update / develop management systems / procedures. - Periodic auditing of Water management data. - Compile key Water management data for internal and external reporting.

POSITION	ACCOUNTABLE TASK
Suitably Qualified and Experienced Person (SQEP)	- BRL to assign a SQEP to approved water infrastructure. - Water Management and water treatment systems signed off by a SQEP. - Water quality (for closure) signed off by a SQEP. - 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. - Review of this Plan and other activities associated with AMD water management will be undertaken by a SQEP.
Mine Engineer / Mine Planner	Responsible for implementation of the water infrastructure designs.
BRL Health and Safety Coordinator	- Ensuring all employees are fully trained and aware of relevant requirements. - 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.
Supervisors	- Responsible for ensuring the instruction of workers, implementation and overseeing of the requirements of this AMD WMP, 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.
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 water 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.

15.2 Training and Inductions

The training that is anticipated to be required to prepare staff to deliver the monitoring and reporting requirements of this Plan is summarised in Table 39. In addition to the standard document review process discussed in Section 16.2, all training materials and deliverables will be reviewed where there has been defined outcome of an investigation due to an incident or accident occurring. 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 on appropriate activities.

- Incident related to AMD 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 39: 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
Hazards, near miss and Incidents reporting.	Induction and yearly	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
Water treatment systems	Yearly review and competent person	SQEP, Water Engineer
Water infrastructure design	Yearly review and competent person	Mine Engineer/Planner, SQEP, Water Engineer
Mine influenced water monitoring	Yearly review and training	Supervisors, Environmental Officer
pWTP mobilisation and operation	Yearly review and training	Water Engineer, Supervisors
WTP operation	Yearly review and training	Water Engineer, Supervisors
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
Surface water monitoring programme	Yearly review and competent person	Environmental Scientist
Groundwater Monitoring programme	Yearly review and competent person	Environmental Scientist
Aquatic Ecology Monitoring programme	Yearly review and competent person	Environmental Scientist

16.0 Management Plan Approval and Revision

Review of this Management Plan and other activities associated with AMD will be undertaken by an independent 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 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.

16.1 Peer Review Panel Purpose

The purpose of the PRP is to:

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

16.2 Review Requirements

This Plan and all associated training materials and deliverables will be reviewed where there has been defined outcome of an investigation due to an incident or accident occurring.

The 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 Peer Review Panel (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 the following interrelated management plans that may impact on this Plan and vice versa:

- Erosion and Sediment Control Management Plan
 - ELF Management Plan
 - Mine Closure Concept Strategy (and once developed, the Mine Closure Plan)
 - Aquatic Ecology Management Plan
- A change in standard operating procedures directly or indirectly related to This Plan including but not limited to those listed in Section 1.3.

16.3 Data Management and Change Register

This Plan is issued, revised, and amended under authorisation of the Senior Site Executive (SSE).

A copy of This Plan will be stored electronically with access available to all workers. The signed hard copy will be maintained in the Westport document library. Relevant databases and models supporting This Plan will be located on the BPCP server.

Reasons for making changes will be documented and recorded in the document management table (Table 40). A copy of the original document and subsequent versions will be kept for records and marked as obsolete. Each new/updated version will be issued with a version number and date to eliminate obsolete documentation being used.

Table 40: Document management

Document Management:			
Regulatory Approvals Authorities:			
Document Owner:			
Document Owner Name:			
GM HSEC Approval Signature:			
Date:			
Document Approver:			
SSE/GM Name:			
SSE/GM Signature:			
Date Approved:			
Revision History:			
Date	Version No.	Lead Author	Contributing Authors
Version No.:	Detail / Changes:		

Next Planned Review:

17.0 Glossary of Terms

Term/Abbreviation	Definition
ABA	Acid Base Accounting
AEE	Assessment Of Environmental Affects
AMD	Acid and Metalliferous Drainage
AMD ELF MP	Acid Metalliferous Drainage Engineered Landform Management Plan
AMD WMP	Acid and Metalliferous Drainage Water Management Plan
ANFO	Ammonium-Nitrate Fuel Oil explosives
ARD	Acid Rock Drainage
AWP	Annual Work Programmes
BBRA	Broad Brush Risk Assessment
BCM	Brunner Coal Measures
bcm	Bank Cubic Metres
BDC	Buller District Council
BVE	Barren Valley ELE
BPCP	Buller Plateaux Continuation Project
BRL	Bathurst Resources Limit
BV	Barren Valley
CHPP	Coal Handling and Processing Plant
CWDD	Clean Water Diversion Drain
Cypress	Cypress Mining Area
DFAT	Department of Foreign Affairs and Trade
DGV	Design Guideline Value
DNPOC	Dissolved Non-purgeable Organic Carbon
DOC	Dissolved Organic Carbon
DoC	Department Of Conservation
DOM	Dissolved Organic Matter
EC	Electrical Conductivity
E&C	Environment And Community
EFA	Engineered Fill Area
ELF	Engineered Landform
ELFMP	Engineered Landform Management Plan
EMS	Environmental Management System
ENV	Environmental
ESE	Escarpment Extended
FC	Faecal Coliforms
FTAA	Fast Track Approvals Act

Term/Abbreviation	Definition
GARD Guide	Global Acid Rock Drainage Guide
GCL	Geosynthetic Clay Liner
GV	Guideline Value
HAF	Highly Acid Forming
HDS	High Density Sludge
HRT	Hydraulic Residence Time
HSEC	Health, Safety, Environment, Community
HSNO	Hazardous Substances and New Organisms Act
ICMM	International Council of Mining and Metals
INAP	International Network for Acid Prevention
JHA	Job Hazard Analysis
K	Hydraulic conductivity
KEL	Kawatiri Energy Limited
KMS	Kaiata Mudstone
KPI	Key Performance Indicators
LoP	Levels Of Protection
LPL	Low Permeability Layer
MCCS	Mine Closure Concept Strategy
MEQ	Metal Ecotoxicity Quotient
MFS	Mount Fredrick South
MIW	Mine Impacted Waters
MOQO	Mining Operations and Quarrying Operations Regulations 2016
MSR	Mussel Shell Bioreactor
MWM	Mine Waste Management
N	Nutrients (Nitrogen)
NAF	Non-Acid Forming
NAPP	Net Acid Producing Potential
NEQ	Nutrient Ecotoxicity Quotient
NP	Net Percolation
NSUL ELF	North Sullivan Engineered Landform
PAF	Potentially Acid Forming
PCOC	Potential Constituents of Concern
PCP	Principal Control Plans
PDCA	Plan Do Check Act
PE	Potential Evaporation
PHMP	Principal Hazard Management Plans
PLN	Plan

Term/Abbreviation	Definition
PRP	Peer Review Panel
PTS	Passive Treatment System
pWTP	Portable Water Treatment Plant
QA/QC	Quality Assurance / Quality Control
RMA	Resource Management Act
SDS	Safety Data Sheet
SOP	Standard Operating Procedure
SQEP	Suitably Qualified and Experienced Person
SSE	Site Senior Executive
STO	Stockton Mining Area
Stockton	Stockton Mining Area
TMF	Toxicity Modifying Factors
TSS	Total Suspended Solids
UWHR	Upper Waimangaroa Haul Road
WCRC	West Coast Regional Council
WMP	AMD Water Management Plan
WoE	Weight of Evidence
WQO	Water Quality Objective
WRD	Waste Rock Dump
WTP	Water Treatment Plant

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Attachment 1: AMD Risk Assessment

A Buller AMD Water Management Broad-Brush Risk Assessment (BBRA) Final for AMD was undertaken for MFS, ESE, and the UWHR.

This document is available as a Digital Microsoft Excel file (BRL)

Attachment 2: Relevant Consent Conditions

Consent conditions to be inserted upon issue of the final decision.