

APPENDIX T CONSTRUCTION PHASE REPORT

Construction Phase Report

Buller Plateaux Continuation Project

21 July 2026

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Buller Plateaux Continuation Project

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EXECUTIVE SUMMARY

Bathurst Resources Limited (BRL) is seeking to obtain authorisation through the Fast-track Approvals Act (FTAA) to progress development and mining of the coal resources across the wider Buller Plateaux. This project is referred to as the Buller Plateaux Continuation Project (BPCP or Project).

The purpose of the BPCP is to re-consent the existing infrastructure and mining operations associated with the existing Stockton Mine and provide access to additional coal mining areas across the Buller Plateaux, as the coal resources in the current Stockton Mine are close to depletion, and further coal resources for blending are required. There are five key Project sub-areas:

- Stockton mining area (Stockton)
- Mount Frederick South (MFS)
- Escarpment Extended (ESE)
- Upper Waimangaroa Haul Road (UWHR)
- Cypress mining area (Cypress)

This report discusses the Construction Phase of the BPCP for MFS, ESE, and UWHR and provides an assessment of the potential effects, proposed monitoring and methods of minimising any potential effects associated with acid and metalliferous drainage (AMD) and elevated total suspended solids (TSS) associated with ground disturbance.

Background

To support the FTAA approval process, Mine Waste Management Limited (MWM) was commissioned by BRL to undertake an assessment of effects and identify management strategies to address the management of AMD and TSS associated with the Construction Phase of the BPCP, which includes:

- Road Construction (UWHR and the MFS Access Road).
- Construction activities at MFS and ESE sub-areas (e.g., preliminary earthworks to construct water management infrastructure and ancillary infrastructure, and mine pre-development activities).

The proposed management activities relate to the BPCP time-period when the active water treatment plants (WTPs) 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 (pWTPs), or engineering controls, are required. The Construction Phase is two years.

Objectives

The objectives of this report, based on a traditional Source-Pathway-Receptor (SPR) risk assessment process, are to:

- Identify the potential source hazards for elevated AMD and TSS within these locations during the Construction Phase.

- Identify potential receptors (i.e., waterways) that could be affected by TSS and AMD, given pathways exist from the source hazards to the receptor during the Construction Phase.
- Explain how related risks will be minimised and what mitigation methods will be utilised.
- Explain what performance monitoring will be undertaken.

Some infrastructure, such as the haul and access roads, will remain into the Post Closure Phase. Hence, to minimise long term management requirements, it is proposed that source control technologies are utilised to minimise effects for the long term (i.e., utilise controls in the Construction Phase that will be suitable for the Closure Phase). Therefore, the assessment of effects for the UWHR and MFS Access Road during the Construction Phase may be relied on to manage effects during the later mining phases.

AMD Source Hazard

It is recognised that the BPCP activities associated with ground disturbance can generate AMD, which is related to the disturbance of potentially acid forming (PAF) materials including Kaiata Mudstone (KMS) and Brunner Coal Measures (BCM).

Two AMD source hazards have been identified for the BPCP at MFS, ESE and the UWHR during the Construction Phase:

- 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 engineered landforms (ELFs) that have the potential to generate AMD seepage from these fill structures.

The risks associated with AMD at ESE and MFS have been discussed in other reports (e.g., MWM, 2026a,b). AMD studies have also been completed along the proposed path of the UWHR and MFS Access Road. Current acid base accounting (ABA) data are provided in Appendix C. Further information gained during the Construction Phase will be used to refine the geochemical model for the UWHR and MFS Access Road. This process will also support appropriate material management processes.

A site visit to the UWHR corridor (MWM, 2026d) identified waterways impacted by AMD from historical mining activities and also AMD impacted drainage from roads currently used to service the regional power transmission infrastructure; a roadside drainage sample during the site visit had a pH of 3.57 with a sulfate content of 17.2 mg/L and an acidity of 15 mg CaCO₃/L. Other natural seeps within the area had significant iron-discoloration (Appendix B). Areas of historic underground workings occur beneath the proposed UWHR corridor.

Surficial rock samples collected from the site visit had sulfur contents ranging from 0.055 – 2.83 wt% with 10 of the 12 samples collected being classified as PAF based on the AMIRA (2002) classification system. ABA data (n=435 samples) provided by BRL demonstrates a similar trend with materials in the UWHR area being much higher in sulfur compared to the ESE and the MFS sub-areas (Appendix C). This suggests the UWHR paleoenvironment had a stronger marine influence (higher sulfate waters) during depositional phase compared to ESE and MFS.

It is expected all BCM are PAF and the Escarpment AMD classification system (e.g., Olds et al., 2015) will be used for classifying these materials. The proposed UWHR corridor also intersects KMS that includes both PAF and NAF materials. The acid neutralisation capacity (ANC) for the KMS ranges from -2¹ to 228 kg H₂SO₄/t (Appendix B). The AMD classification system used at the Cypress Mine (McLachlan, 2022) should be used for classifying KMS to confirm its geochemical nature.

Testing and validation of the materials geochemical nature will be required as the road is constructed to ensure that blasted materials, as well as cut and fill materials, are managed appropriately. Quaternary colluvium materials are present in the area, and these are dominated by BQP² clasts (pers. comm. Eden Sinclair, BRL), but could include remobilised BCM or KMS (e.g., Malloch et al., 2017), which could also be PAF. ABA testing of the colluvium is also required, however for this study it is assumed all colluvium is PAF and will be disposed into an engineered landform at ESE or Stockton, unless testing confirms otherwise,

TSS Source Hazards

Sediment and elevated TSS in waterways are expected during construction due to ground disturbance. TSS management will be required during the Construction Phase for all disturbed areas, such as:

- Cut surfaces (e.g., highwalls and pits).
- Rock fill surfaces (e.g., infrastructure pad fill areas and ELF's).
- Roadway surfaces.
- Infrastructure areas (e.g., WTP and coal storage pads, etc).
- Unrehabilitated or partially rehabilitated surfaces.
- Soil stockpile areas.

Construction activities throughout the Project sub-areas are expected to generate sediment from these disturbed areas. The Construction Phase will consist of soil stripping, cutting in-situ ground, backfilling topographical depressions, and constructing infrastructure pads and ELF's. As vegetation is removed or areas are left exposed, the surfaces could be eroded leading to an increase in sediment in downgradient waterways.

Assessment of Environmental Effects and Management Processes

An assessment of potential environmental effects was undertaken:

- For the UWHR and the MFS Access Road during the Construction Phase.
- For the ESE and MFS infrastructure areas during the Construction Phase.
- For the UWHR and MFS Access Road during the operational and closure phases (noting any engineering controls would need to be established in the Construction Phase of the BPCP).

¹ ANC values can be negative when the test (acid digestion followed by back titration) is affected by the presence of stored acidic salts in the sample that means there is more acid in the sample than was added (hence the negative value).

² BQP = granite porphyry

UWHR and the MFS Access Road

An assessment was undertaken to quantify the potential effects to the receiving environment using the Waimangaroa River water monitoring location 2W ('Smokestack'). This location was selected for assessment purposes as:

- The location is below the initial section of MFS Access Road crossing over the Waimangaroa River and the MFS infrastructure area.
- The location is downstream of a significant portion of the proposed UWHR.
- The location has a longer history of water quality data collection when compared to site 17W further downstream.
- There is limited influence upstream by historic underground workings, reducing the uncertainty of the origin of any effects that may present themselves during the construction and operation of the UWHR.

The following potential effects were identified:

- For cut road surfaces, the screening assessment for AMD indicates that the additional AMD load from cut surfaces has limited impact based on the amount of exposed cut surfaces (2.63 ha). The key driver of poor water quality at 2W (Smokestack) is the current background water quality.
- For fill areas, load modelling indicates that acidity could increase by 0.92 mg CaCO₃/L at Smokestack, which is ~15% of the current (background) acidity measured at Smokestack (6.0 mg CaCO₃/L) if no management was undertaken.
- Management of the larger fill areas associated with the UWHR and the MFS Access Road (nominally identified as > 2 m high and >10,000 m³, identified as ~44% of the total BCM fill areas) is recommended to minimise AMD 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 Engineered Landform Design Philosophy report (MWM, 2026n). The specific design objectives for EFA are explained in the AMD ELF Management Plan (BRL, 2026d).
 - Installing a low permeability layer (LPL) or geosynthetic clay liner (GCL) atop PAF fill material to minimise net percolation into these materials.
- A suitable performance monitoring programme for the roads to ensure that any AMD effects are acceptable is described in the AMD Water Management Plan (BRL, 2026e).

TSS (in the absence of AMD) was not considered herein as it is assumed that management processes within the Erosion and Sediment Control Plan for Land-Disturbance Activities (BRL, 2026), which is considered best practice for managing TSS and follows guidance from GD05 (Auckland Regional Council, 2023), are implemented and achieve appropriate management of TSS.

ESE and MFS Infrastructure Areas

Infrastructure will be constructed at ESE, in the vicinity of disturbance at the existing Escarpment Mine, with ancillary structures constructed around the planned ESE 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 (Table E1). The derivation of these loads (acid and AMD sludge) is explained in MWM (2026i).

Table E1: 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		Stage -1	395,600	42	4,831
MFS		Stage 0	1,394,100	147	17,023
MFS *		Stage 1	850,700	89	10,388
ESE		Stage -1	659,200	61	7,143
ESE *		Stage 0	4,348,200	404	47,114

Green cells relate to the Construction Phase.

** Indicates the first year of the WLBM for MFS and ESE (MWM, 2026j,k). Data are used to determine the acidity and sludge loads for the construction phase (pro rata),*

AMD sludge quantities explained in MWM (2026i).

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 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. Further details are provided in MWM (2026i).

During the Construction Phase, AMD treatment is expected to generate AMD sludge. To manage accumulation within treatment sumps and the active WTPs, the sludge will be periodically disposed of within Pit 3 Pit Lake at ESE (200,000 m³ capacity) and left within the purpose-built 10,000 m³ sump at MFS near the MFS Coal Pad, which will be backfilled after active treatment begins. AMD sludge will also be placed in cells within ESE ELF's after the Pit 3 Pit Lake is backfilled. The MFS facility will require periodic cleaning and removal of AMD sludge to ESE or Stockton to ensure sufficient capacity for AMD sludge settlement in this sump

Monitoring of Effects

MFS and UWHR

Monitoring of any effects on water quality during the Construction Phase will be in alignment with water quality objectives proposed by Hickey (2026) at the following sites:

- Compliance Monitoring:
 - 2W (Smokestack) (Waimangaroa River), relating to the MFS WTP Infrastructure Area and Coal Pad and construction of the UWHR.
 - SW01 and SW03 (Deep Stream), relating to the MFS West Pit Sump and associated ELFs, and Infrastructure Pad construction.
 - 17W (Waimangaroa River), relating to all MFS construction cumulative effects.
- Performance monitoring:
 - BUR.L1 (Burnett Stream), relating to the UWHR construction (turbidity only).
 - WRBBC (Waimangaroa River), relating to the UWHR construction.
 - 14W (Waimangaroa River), relating to the UWHR construction.
 - 15W (Waimangaroa River), relating to the UWHR construction.
 - 16W (Waimangaroa River), relating to the UWHR construction.

ESE

Monitoring of any effects on water quality during the Construction Phase at ESE will be include:

- Compliance Monitoring:
 - MM1 (Cascade Creek Trib (V8 Creek)).
 - KEL (Whareatea River).
 - W07 (Rapid Stream).
- Performance Monitoring:
 - V37_F and V37_G locations (within drainage that enters Cascade Creek Trib (V37 Creek)).
 - BUR.L1 (Burnett Stream) (turbidity only).

Management of AMD and TSS

The management of AMD is explained in:

- The Water Treatment Report: MFS and ESE (MWM, 2026i)
- The Sludge Management Report (MWM, 2026l).
- The AMD ELF Management Plan (BRL, 2026d).

- The AMD Water Management Plan (BRL, 2026e).

The management of TSS is explained in:

- The Water Treatment Report: MFS and ESE (MWM, 2026i)
- The Sludge Management Report (MWM, 2026l).
- The Sediment Overview Report (MWM, 2026m)
- Erosion and Sediment Control Plan for Land Disturbance Activities (BRL, 2026a)
- AMD ELF Management Plan (BRL, 2026d)
- AMD Water Management Plan (BRL, 2026e)
- Water Infrastructure Design Plan (BRL, 2026b)
- Mine Closure Concept Strategy (BRL, 2026g)

Summary

Table E2 provides a summary of AMD and TSS source hazards and potential risks before and after engineering controls are proposed. Monitoring is also recommended to ensure that the engineering controls are effective.

Table E2: AMD and TSS Source Hazard Management

SOURCE HAZARD	PRIOR TO ENGINEERING CONTROLS	AFTER ENGINEERING CONTROLS ARE IMPLEMENTED	MONITORING
AMD			
Cut Surfaces	Wall runoff and cut surfaces can generate AMD.	Clean water diversion, control and direction of waters to sediment retention ponds. Ensure surfaces are clean with minimal fines left in place that could generate AMD. If required direct break-in waters to the pWTP.	Targeted monitoring at source (i.e., at the base of highwalls) to confirm effects are minor. Compliance and Performance monitoring.
Rock Fill Areas	Larger fill areas could generate AMD seepage.	Construct fill area as EFAs to minimise oxidation of materials. Install low permeability layers (LPLs) or Geosynthetic Clay Liners (GCLs) to minimise NP.	Targeted monitoring at source (i.e., seepage) to confirm effects are minor. Compliance and Performance monitoring.
Infrastructure areas, ELFs and Coal Pads	Larger fill areas could generate AMD seepage.	Construct fill area as ELFs to minimise oxidation of materials. Collect all seepage and treat, either through a mussel shell bioreactor (MSR) or by a pWTP.	Targeted monitoring at source (i.e., seepage) to confirm effects are minor. Compliance and Performance monitoring.

SOURCE HAZARD	PRIOR TO ENGINEERING CONTROLS	AFTER ENGINEERING CONTROLS ARE IMPLEMENTED	MONITORING
TSS			
Cut Surfaces	Wall runoff and cut surfaces can erode leading to elevated TSS in runoff.	Clean water diversion, control and direction of waters to sediment retention ponds. Ensure surfaces are clean with minimal fines left in place that could contribute to sediment loss. Sediment control as proposed in the erosion and sediment control management plans (BRL, 2026a, 2026b)	Targeted monitoring at source (i.e., at the base of highwalls) to confirm effects are minor. Compliance and Performance monitoring.
Rock Fill Areas	Surfaces can erode leading to elevated TSS in runoff.	Clean water diversion, control and direction of waters to sediment retention ponds. Sediment control as proposed in the erosion and sediment control management plans (BRL, 2026a, 2026b)	Targeted monitoring to confirm effects are minor. Compliance and Performance monitoring.
Infrastructure areas, ELF's and Coal Pads	Surfaces can erode leading to elevated TSS in runoff.	Clean water diversion, control and direction of waters to sediment retention ponds. Sediment control as proposed in the erosion and sediment control management plans (BRL, 2026a, 2026b)	Targeted monitoring to confirm effects are minor. Compliance and Performance monitoring.

Red = higher risk; orange = moderate risk; green = lower risk

Recommendations

The following recommendations are provided:

- Complete (as part of the feasibility study) further infill drilling ahead of construction along the UWHR and MFS Access Road to confirm the AMD and geotechnical nature of materials.
- Complete, ahead of construction, an assessment of AMD seeps (natural and historic) along the UWHR to map the specific sources of baseline effects.
- Complete, ahead of construction, an assessment of the effects of collapsing the Ironbridge underground mine workings on water quality and develop adaptive management processes as required.
- Ensure construction of EFAs to minimise AMD meets design requirements as explained in the AMD ELF Management Plan (BRL, 2026d).
- 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.
- Undertake an adaptive management approach for the Construction Phase and ensure adaptive management processes are in place and are explained in the AMD Water Management Plan (BRL, 2026e).

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1 INTRODUCTION

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1.1 Project Background

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1.2 Objectives

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- Identify potential receptors (i.e., waterways) that could be affected by TSS and AMD, given pathways exist from the source hazards to the receptor during the Construction Phase.
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2 PROJECT DESCRIPTION

This section provides an overview of the MFS, ESE, and UWHR sub-areas of the BPCP.

2.1 **Escarpment Extended**

2.1.1 *Project Description*

The ESE sub-area is located on the Denniston Plateau. This sub-area includes the existing consented Escarpment Mine currently under care and maintenance, a proposed extension into the adjacent mining areas covered by Mining Permits MP51279 and MP60138, and the Sullivan Coal Mining Licence (CML 37161). Access to this area is currently provided via the existing public road network on the Denniston Road, but under the BPCP it will be connected to the Stockton sub-area by the proposed UWHR.

Coal mined at ESE will be transported to the Stockton sub-area via the proposed UWHR for processing or washing as required at the coal handling and processing plant (CHPP) or the clean coal sizing and handling system, before being transported via the 2-5 haul road and aerial ropeway to the Ngakawau Rail Loadout.

The Escarpment Borrow Pit will also be established to provide materials for the construction and establishment of ESE infrastructure, the construction of the UWHR, and for any ongoing maintenance requirements. ESE will also have four primary ancillary areas to support the mining operations:

- Gatehouse / Admin Office Area.
- Central Infrastructure Area.
- Coal Haulage Infrastructure Area.
- Bulk Explosives Plant and High Explosives Magazine

The construction of these infrastructure areas will be undertaken as part of the BPCP Construction Phase. This will require the management of TSS and AMD.

2.1.2 *Construction Phase Activities*

This section describes the activities that will be undertaken at ESE prior to the commissioning of the ESE active WTP. This includes (as shown in Figure 1):

- Topsoil and vegetation stripping, and construction of water management infrastructure.
- Development of initial access roads and establishment of security facilities.
- Construction of the Central Infrastructure Area (including the WTP pad and WTP polishing pond). Later followed by WTP construction and commissioning.
- Coal Haulage Infrastructure Area.
- Construction of haul roads (surrounding the ancillary areas).
- ESE active WTP (including commissioning).
- [REDACTED]
- Development of the Escarpment Borrow Pit and Ex-pit Seal excavation.

- Development of the initial Box Cut.
- Mine Development (includes establishment of the ESE clean water drain (CWD))
- Extension of the Barren Valley engineered landform (BV ELF).
- Construction of the Central ELF.

The construction of these infrastructure areas will be undertaken as part of the BPCP Construction Phase. This will require the management of TSS and AMD. Mine scheduling indicates that the Construction Phase at ESE will be approximately two years and will involve:

- Year 1 (Stage -1): Construction of water management infrastructure for the Construction Phase, the WTP Polishing Pond, the Central Infrastructure Area (which includes the WTP pad), Coal Haulage Infrastructure Area, haul roads (surrounding the infrastructure pads), and development of the BV ELF extension.

- [REDACTED]

TSS management during construction will consist of erosion and sediment controls, outlined in the Erosion and Sediment Control Plan for Land Disturbance Activities (BRL, 2026a). Surface water will be collected and controlled and where necessary, AMD and TSS impacted waters will be managed through use of pumping of waters to a pWTP and local sediment retention ponds. The ESE Borrow Pit may be developed as required to provide NAF fill and sheeting material for the construction activities.

During construction AMD impacted waters will be managed through use of a pWTP and the Pit 3 Pit Lake initially until the active ESE WTP is constructed early in Stage 0 where it will take over treatment. Waters will be passively directed to the treatment plants where possible, while areas downstream of treatment will be pumped back to it. Treatment extends to all AMD impacted waters generated within the Construction Phase, including treatment of the existing BV ELF waters. The treatment plant will neutralise AMD to pH 7.5, using Ca(OH)_2 or NaOH as the acid neutralising agent, while the Pit 3 Pit Lake will collect TSS and AMD precipitates.

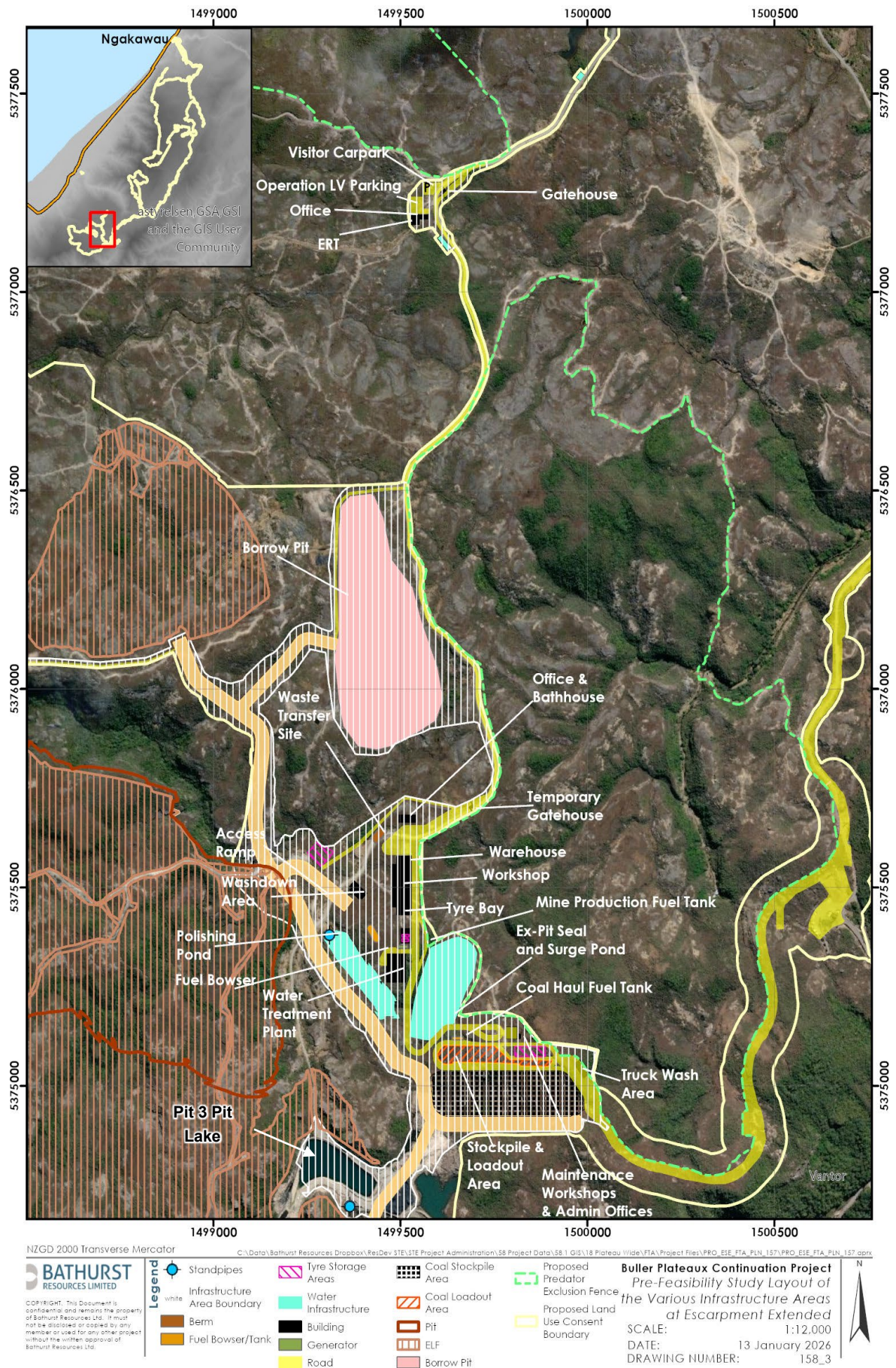


Figure 1: ESE Infrastructure areas to be constructed within the Construction Phase.

2.2 Mount Frederick South

2.2.1 Project Description

The MFS sub-area is located approximately 1 kilometre (km) southwest of the Mount Frederick mining area at the Stockton Mine. This area will be accessed via the proposed UWHR, with an access road being constructed from the UWHR up into the MFS mine area (MFS Access Road).

MFS will be mined progressively from two distinct pits - West Pit and East Pit. Mining in this area will largely be integrated with Stockton, with minimal semi-permanent infrastructure located at the site. There will also be coal transfer stockpiles, located at the Coal Pad, and water management infrastructure including an active WTP.

There are historic underground mines within the MFS sub-area, dating back to the late 1800's (refer Section 3.1 and Figure 5).

2.2.2 Construction Phase Activities

The activities to be undertaken during the Construction Phase at MFS include (as shown in Figure 2):

- Topsoil and vegetation stripping, and construction of water management infrastructure.
- Access over the Waimangaroa River, Deep Stream and an unnamed tributary of the Waimangaroa River (i.e., culvert and bridge construction).
- MFS Coal Pad construction.
- MFS Access Road construction (includes access to the West Pit Sump and the West Pit).
- WTP Infrastructure Area construction, later followed by WTP construction and commissioning.
- MFS West Pit Sump.
- Infrastructure pad adjacent to the West Pit Sump.
- Ex-Pit ELF #1 and partial construction of Ex-Pit ELF #2.

The construction of these infrastructure areas will be undertaken as part of the BPCP Construction Phase. This will require the management of TSS and AMD. Mine scheduling indicates that the Construction Phase at MFS will be approximately two years and will involve:

- Year 1 (Stage -1): Construction of the Waimangaroa River and unnamed tributary crossings, construction of the Coal Pad, WTP Infrastructure Pad, and the southern portion of the MFS Access Road (South of the Deep Stream crossing).
- Year 2 (Stage 0): Completion of the MFS Access Road up to the West Pit (includes construction of the bridge traversing the Deep Stream, and access to the West Pit Sump and the West Pit), construction of the West Pit Sump (including the construction of the associated Ex-Pit ELFs), construction of an infrastructure pad adjacent to the West Sump, construction and commissioning of the MFS active WTP, and completion of the Coal Pad with the remaining overburden of the MFS Access Road.

TSS management during construction will consist of erosion and sediment controls, outlined in the Erosion and Sediment Control Plan for Land Disturbance Activities (BRL, 2026a). Surface water will be

collected and controlled and where necessary, AMD and TSS impacted waters will be managed through use of pumping of waters to a pWTP and local sediment retention ponds.

A temporary sump of 10,000 m³ will be built near or within the MFS Coal Pad; this will be operational until the MFS active WTP is commissioned. The sump will manage treatment of AMD impacted water generated from the construction activities by way of a pWTP (using Ca(OH)₂ or NaOH as the acid neutralising agent) to pH 7.5. The sump will collect sedimentation of TSS and precipitates. Once the active WTP is commissioned and operating, this temporary sump will be backfilled. Where possible, AMD impacted waters will be transported to the temporary sump passively via gravity, and, where necessary, via pumping.

A similar system will be constructed at the base of the construction activities at the West Pit to capture and treat AMD impacted waters from these construction activities until such point that the active WTP can take over.

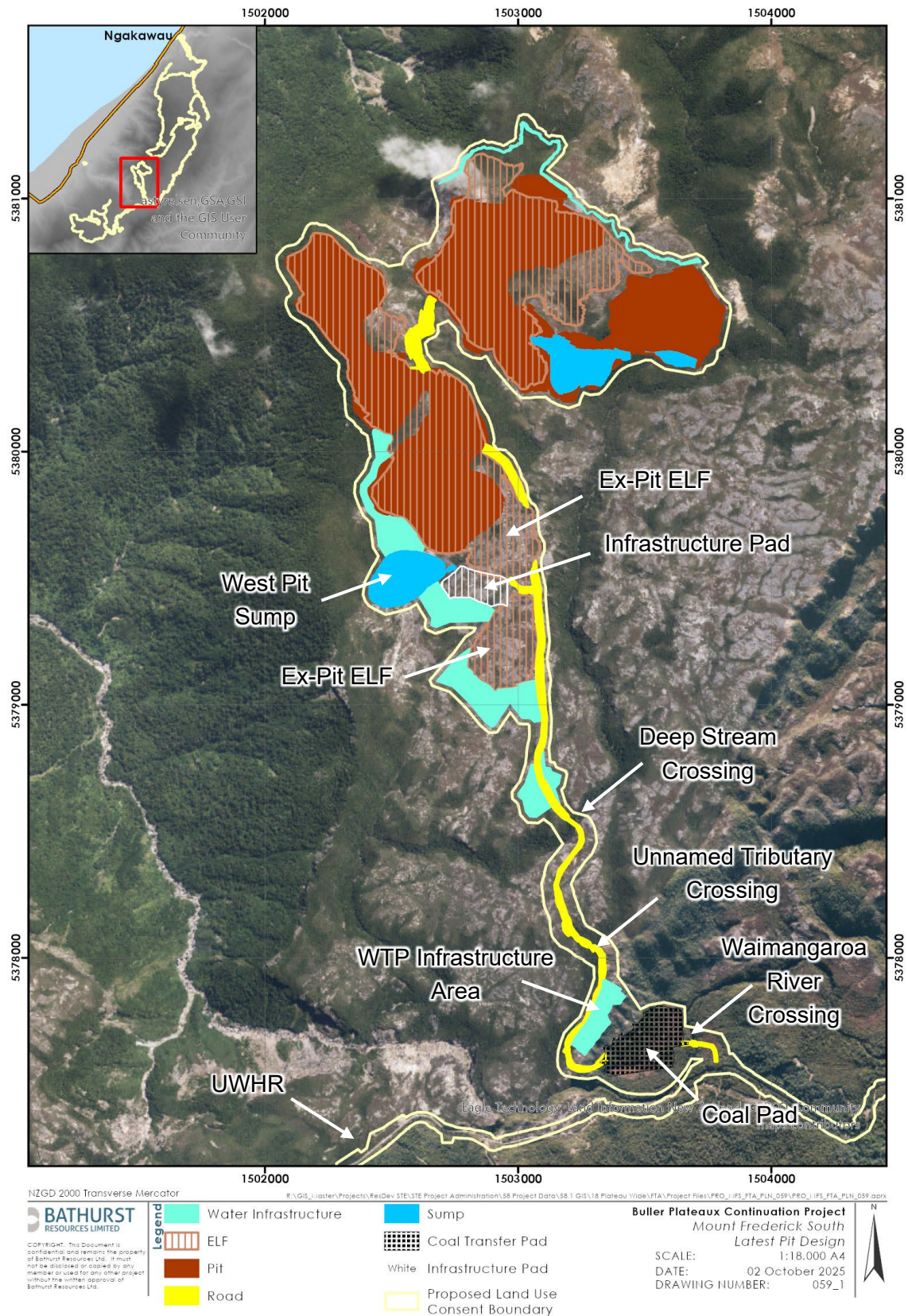


Figure 2: MFS Access Road, infrastructure areas, and associated construction areas.

2.3 Upper Waimangaroa Haul Road

2.3.1 Project Description

The UWHR is a transport corridor that is proposed to provide access to the MFS and ESE sub-areas within the Buller Plateaux area and connect the new mining areas to the existing coal processing infrastructure at Stockton Mine. The proposed route is within the Waimangaroa Valley, on the western side of the Mount William Range and will be constructed between the ESE sub-area and the Cypress Mine located adjacent to the Stockton Mine (Figure 3).

The UWHR will also provide access for service and other vehicles to move between the various BPCP sub-areas, preventing the need for heavy machinery and trucks to utilise the public road network during operations. It has been selected as the preferred coal haulage option, on the basis of an extended optioneering assessment that considered multiple criteria such as footprint, technical risk, closure requirements, permitting, environmental effects, capital and operating cost (BRL, 2025a). Key features include:

- An alignment of 11.5 km long; most of which crosses areas that are already disturbed (e.g., existing roading infrastructure) to minimise the disturbance footprint.
- 4 km of the haul road traverses previously undisturbed ground, comprising 1 km adjacent to the ESE mining area and 3 km connecting the haul road to Cypress mining operations in the north.
- A pavement width of 8.6 m, designed for a double lane roadway for use of road train style haul trucks, cambered road design, with drainage channels and safety berms each side of the road.

2.3.2 Construction Phase Activities

For the UWHR construction, it is expected that management of waters during the Construction Phase is undertaken by:

- Erosion and sediment control construction as described in the Erosion and Sediment Control Plan for Land Disturbance Activities (BRL, 2026a).
- Activities are staged into manageable areas to limit the impact of the works on the receiving environment, and monitoring of TSS and AMD impacts on water is undertaken using compliance and performance monitoring sites. If required, the following actions can be undertaken:
 - Where sediment retention ponds are in place and require treatment of AMD, these waters will be neutralised to pH 7.5 by the addition of NaOH into the inlet waters of the ponds. This will continue until engineering controls are in place to limit AMD generation from the UWHR, and monitoring demonstrates these controls are effective.
 - Where sediment retention ponds are not available, waters can be treated using portable treatment systems (MWM, 2026i), noting that these will be designed to capture the majority of flow, however, high flows may bypass the system, but effects will be managed by dilution.

- Post-construction, it is expected that the following controls are in place:
 - Sediment is managed via stabilisation of surfaces through rehabilitation and stabilisation of roading surfaces (e.g., aggregate), with the inclusion of water infrastructure, sediment retention ponds, and other sediment controls within the surface water drainage system for ongoing sediment management.
 - AMD generation is minimised by way of road surfaces being capped with a NAF³ trafficable layer and the nominally significant fill areas incorporating a low permeability layer (LPL) or geosynthetic clay liner (GCL) atop the PAF⁴ material to further limit water ingress, combined with the fill areas constructed as engineered fill areas (EFA) using appropriate design principles discussed in the ELF Design Philosophy Report (MWM, 2026n) and as explained in the AMD ELF MP (BRL, 2026d).

³ *Non-acid forming*

⁴ *Potentially acid forming*

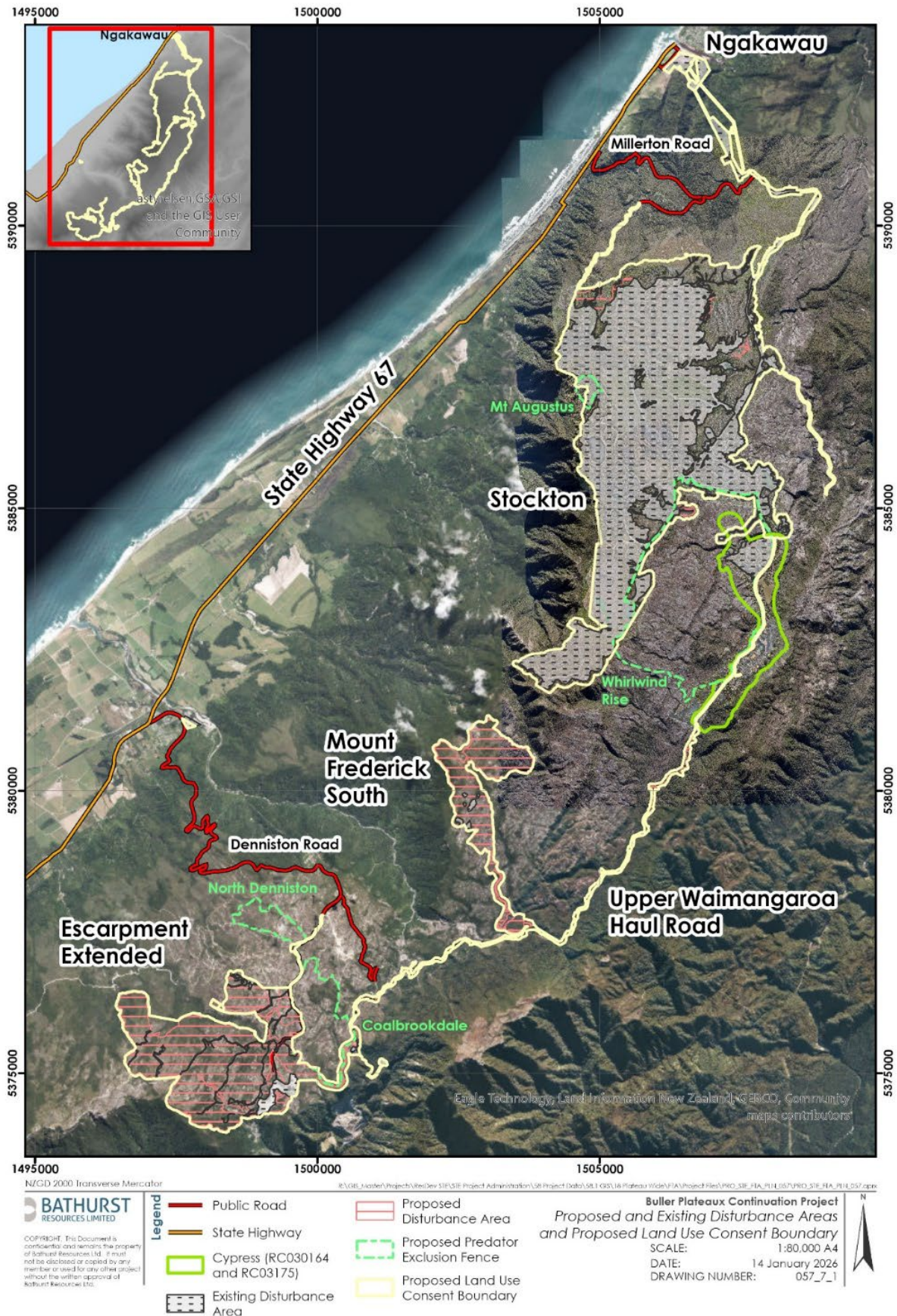


Figure 3: UWHR corridor relative to the ESE sub-area and Cypress mine.

2.4 Project Schedule

The ESE sub-area, and the UWHR will need to be developed concurrently. This is key, as coal extracted (once accessed) from the ESE sub-area will need to be transported via the UWHR for washing and/or sizing at the Stockton CHPP, and will then be transported via the 2-5 haul road and aerial ropeway for dispatch from the rail loadout facilities located at Ngakawau.

Approximately one year after ESE is operational and producing coal, MFS development will begin construction. The staggered development times are part of future blending requirements ensuring coal quality meets customer specification. Figure 4 presents an overview of the mining and water treatment phases for the BPCP, showing the staggered approach.

This report focuses on the first two years, identified as the Construction Phase, where pWTPs will be used to manage mine impacted water (MIW) prior to the completion of the WTPs and associated infrastructure (e.g., surge ponds).

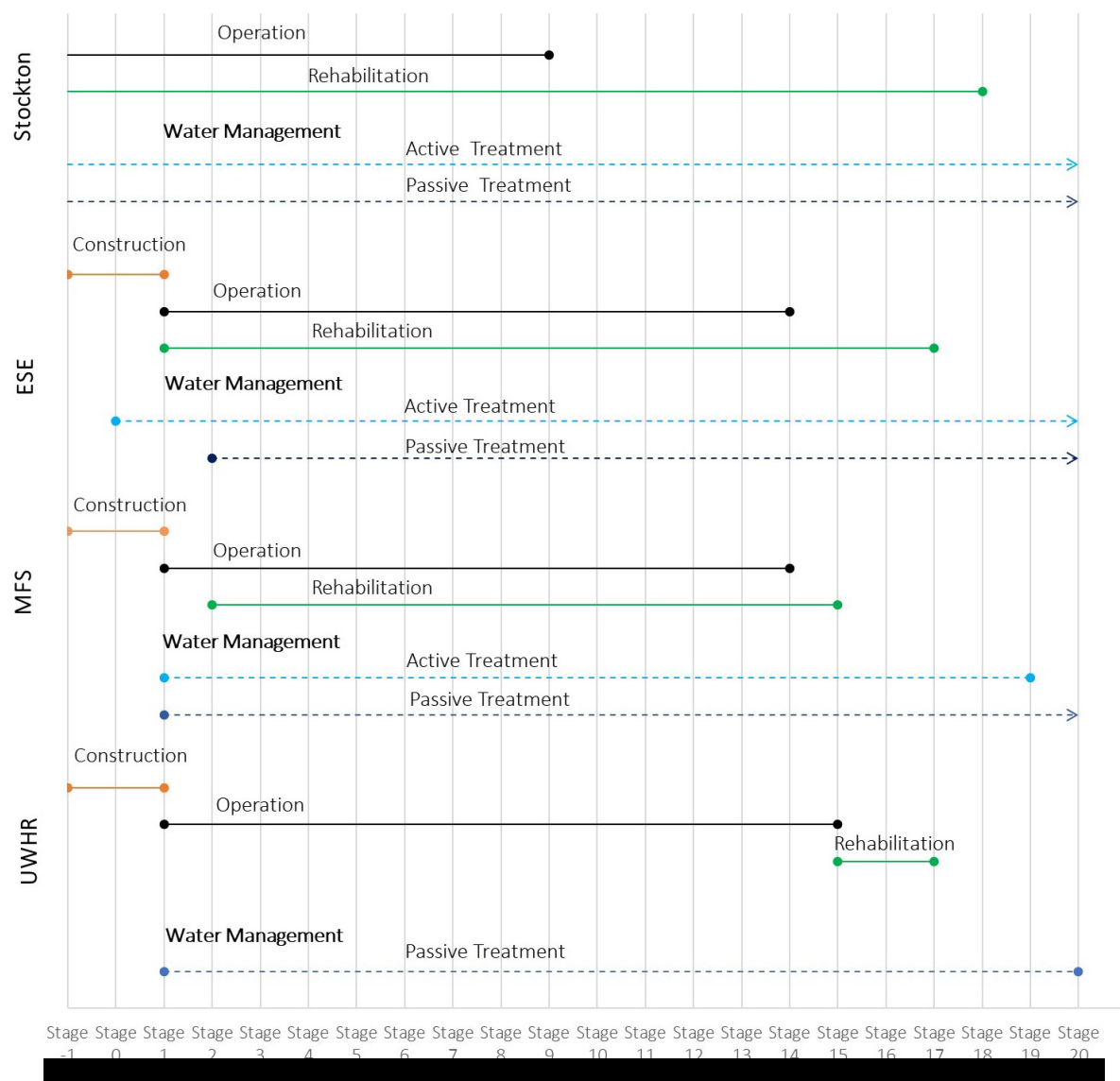


Figure 4: BPCP timelines (by stage and by indicative year).

3 ENVIRONMENTAL SETTING

3.1 Legacy Mining Effects

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

- At the MFS sub-area there are numerous adits, waste rock disposal areas, and collapsed workings due to historic underground and minor outcrop mining activities. The historic underground Taipo and Koranui Mines are within the footprint of the MFS West Pit.
- Within the ESE sub-area there are several areas of historic underground workings including the Sullivan Mine, Sullivan West Mine, historical Escarpment Mine, Whareatea Mine, Davies & Party Mine, Plateau Mine, Coalbrookdale Mine, and Cascade Mine. For instance, AMD discharge from historic underground workings of the Denniston Plateau discharges into Cascade Creek, Waimangaroa River, Rapid Stream, and Whareatea River (near the coast where Rapid Stream enters) (Jewiss, 2018; Jewiss et al., 2020).
- The most recent mining operations on the Denniston Plateau took place at the existing open-cut Escarpment Mine from 2014 to 2016 including development of infrastructure for the treatment of AMD using passive treatment technologies. These previous mining operations (currently under care and maintenance) are contained within the ESE sub-area footprint. The existing open cut Escarpment operation also developed MIW treatment systems and continues to treat AMD from the historic escarpment underground mine as well as the recent seepage from the BV ELF via a passive treatment system (mussel shell bioreactor (MSR)). AMD from the historic site flowed into several lakes near the Escarpment Mine all of which were acidic and severely impacted by AMD. Currently these lakes are circum-neutral and have low trace element concentrations due to the treatment processes implemented by BRL.
- The southern portion of the UWHR through to the intersection with the proposed MFS Access Road has historically been mined via underground extraction, and pre-existing impacts associated with the exposure of PAF materials are present. The proposed UWHR alignment is over the Coalbrookdale and Ironbridge mine underground workings. Ironbridge Mine operated between 1889 and 1944, closing due to fires. The workings stretched from Burnett's Stream to Deep Stream (Wright, 2008). Historic information suggests these underground workings are within 10 m of the proposed UWHR in some sections. The upper coal seam floor is more than 14 m below the surface, dipping to the south away from the Waimangaroa River. A drainage drive continues to drain workings to the Waimangaroa River and this drive (as shown on historic mine plans) intersects coal floor at 475m RL, suggesting workings that lie below this level are likely flooded, while 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 access 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 several 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).



3.2 Climate

The climate of the Buller Plateaux is characterised as temperate alpine with mild to cool temperatures, high humidity, and an average annual rainfall of 5,500 to 6,000 mm/yr (Chater, 2024).

Meteorological (Met) stations within the Project area are located at:

- Stockton (Stockton Office Met – 790 mRL⁵)
- Cypress (Cypress Met - 725 mRL)
- Escarpment (Lake Brazil Weather Station - 640 mRL)
- A rain gauge is also present on Mt Frederick (1056 mRL).

Rainfall has been observed to vary across the monitoring stations, however, is relatively consistent with respect to altitude (Chater, 2024), with the exception of Lake Brazil which receives equal or slightly more than the Cypress gauge. This rainfall to altitude relationship is illustrated in Figure 6 as a proportion of Stockton Met.

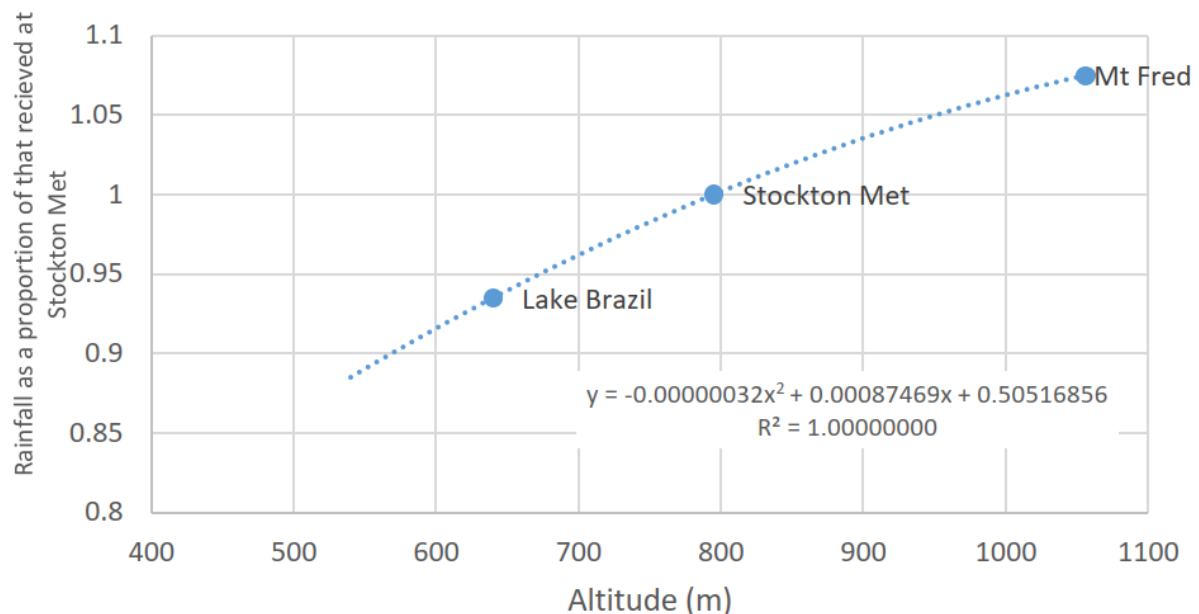


Figure 6: Daily rainfall rates, as a proportion of Stockton Meteorological Station, relative to altitude

Source: Chater (2024)

Stockton receives between 353.3 mm and 632.0 mm of rainfall on average each month with a recorded minimum of 104.4 mm and maximum of 1,611.6 mm (Chater, 2024). Stockton Met comprises of a robust, complete, record, while the other meteorological sites listed contain data gaps; for this reason, rainfall statistics for these other sites draw on Stockton Met when producing complete datasets.

Based on the altitude relationship of meteorological sites (Figure 6), Table 1 describes the proportion of annual rainfall, relative to Stockton, that is expected at the associated Project locations.

⁵ metres reduced level

Table 1: Predicted annual rainfall as a proportion of Stockton Met

LOCALE	PROPORTION OF STOCKTON RAINFALL
Cypress	0.92
MFS Upper	1.038
MFS Lower	0.935
Escarpment	0.935

Source: BRL

Figure 7 illustrates the monthly mean rainfall, and Table 2 presents the historic rainfall data, from the Stockton Office Met station.

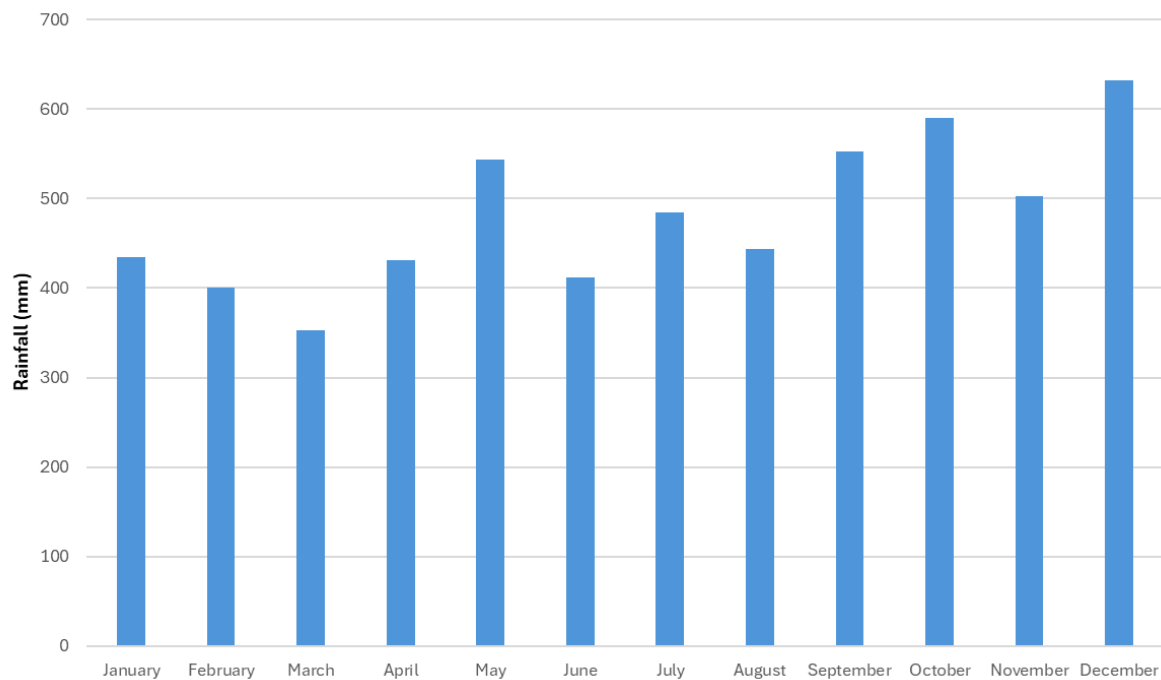


Figure 7: Stockton Met average monthly rainfall

Reporting period: March 2008 to December 2023

Source: Chater (2024)

Table 2: Rainfall statistics for Stockton weather station

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL TOTAL
Mean	435.0	400.5	353.3	431.5	544.1	412.1	484.5	443.5	552.3	589.9	503.2	632.0	5,793.2
Min	113.2	157.4	186.2	267.4	104.4	153.6	222.0	210.4	191.4	241.8	171.0	167.4	4,604.6
Max	982.0	1,611.6	627.6	796.2	956.2	699.2	822.0	982.6	1,091.8	1,198.4	1,066.4	1,120.0	7,112.2
Max daily (midnight to midnight)	240	409	165	254	242	184	417	233	194	235	257	233	
Av no. days > than 10mm	8.1	7.2	7.7	9.5	11.3	9.8	11.0	10.9	12.1	12.9	9.6	10.6	
Max 24-hour rainfall from available 10- min record:	Stockton Met 490.2 mm (starting 14/07/2012 07:10)												

Source: Chater (2024)

3.3 Hydrology

The Construction Phase activities are planned to occur within the Waimangaroa and Whareatea River catchments.

3.3.1 MFS and UWHR Hydrology

The upper Waimangaroa River catchment, located between the Mt Frederick and Mt William ranges, encompasses multiple waterways, from Deep Stream through to Cypress Stream, illustrated within Figure 8. This network of rivers drain the MFS and UWHR sub-areas and, to a lesser extent, ESE (via Burnett Stream). Notable tributaries include:

- Deep and Billo Streams, relating to the proposed MFS mining area.
- Whirlwind and Herbert Streams, relating to the Mount Fred mining area at Stockton.
- Cypress Stream and Byrne Creek, relating to the Cypress mining area.
- Downstream of the Deep Stream tributary is the confluence of Burnett Stream into the Waimangaroa River, a stream that reports from Coalbrookdale and Burnetts Face mining areas with limited contribution from ESE. Burnett Stream is impacted by historic mining activities (MWM, 2026c).

3.3.2 ESE Hydrology

The Whareatea River sits to the west of the Waimangaroa River catchment and lays within the Denniston Plateau, receiving waters from the V72 Stream through to S Creek, illustrated within Figure 8. Construction activities will occur within the Whareatea River and V8 Creek head waters, while future mining associated with the ESE sub-area (Figure 8) will result in a hydrological impact to the following waterways:

- Whareatea River
- S Creek
- V40 Stream
- Trent Stream
- Conglomerate Stream
- V62 Stream
- V8 Creek
- V37 Creek
- Rapid Stream

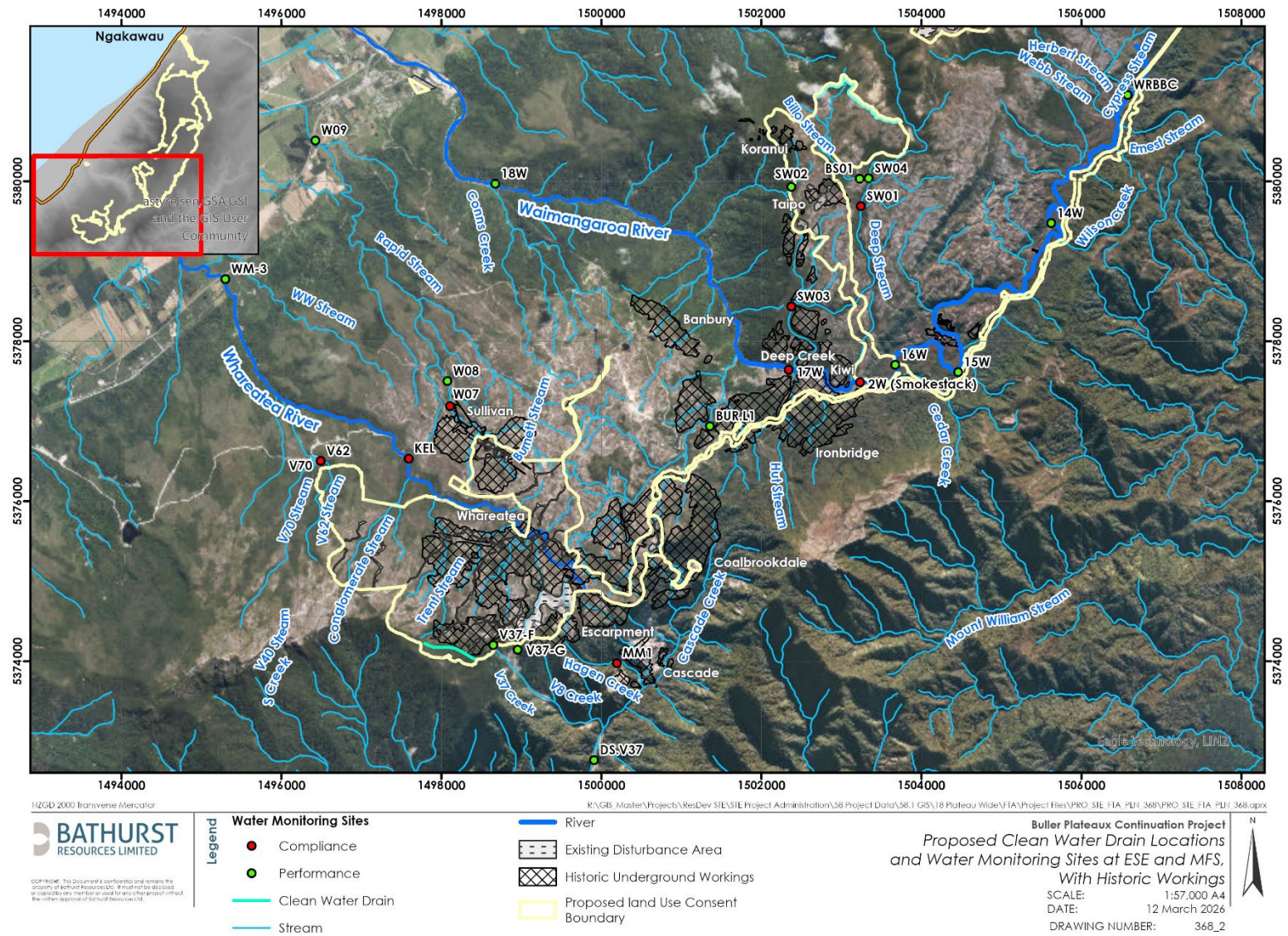


Figure 8: Waterways associated with the ESE, MFS, and UWHR Project areas.

3.3.3 Construction Phase Effects

During the Construction Phase of the BPCP as relating to MFS, ESE, and UWHR, several streams have the potential to be impacted by development of the infrastructure areas and roadways. Monitoring of any effects on water quality during the Construction Phase will be undertaken at MFS, UWHR, and ESE.

MFS and UWHR (including the MFS Access Road)

Monitoring of any effects on water quality during the Construction Phase will be in alignment with water quality objectives proposed by Hickey (2026) at the following sites:

- Compliance Monitoring:
 - 2W (Smokestack) (Waimangaroa River), relating to the MFS WTP Infrastructure Area and Coal Pad and construction of the UWHR.
 - SW01 and SW03 (Deep Stream), relating to the MFS West Pit Sump and associated ELFs, and Infrastructure Pad construction.
 - 17W (Waimangaroa River), relating to all MFS construction cumulative effects.
- Performance monitoring:
 - BUR.L1 (Burnett Stream), relating to the UWHR construction (turbidity only).
 - WRBBC (Waimangaroa River), relating to the UWHR construction.
 - 14W (Waimangaroa River), relating to the UWHR construction.
 - 15W (Waimangaroa River), relating to the UWHR construction.
 - 16W (Waimangaroa River), relating to the UWHR construction.

ESE

Monitoring of any effects on water quality during the Construction Phase at ESE will be include:

- Compliance Monitoring:
 - MM1 (Cascade Creek Trib (V8 Creek)).
 - KEL (Whareatea River).
 - W07 (Rapid Stream).
- Performance Monitoring:
 - V37_F and V37_G locations (within drainage that enters Cascade Creek Trib (V37 Creek)).
 - BUR.L1 (Burnett Stream) (turbidity only).

During construction of the ESE Infrastructure Area, waters within the construction area that would otherwise report to the Whareatea River, Rapid Stream, and Burnett Stream will be directed into Cascade Creek via V8 Creek, reducing their overall catchment size. These locations are shown in

Figure 9. Once permanent WTP and associated ponds are established at the ESE Infrastructure Area the upper Whareatea River catchment area will be reinstated.

This report focuses on the effects on local waterways from the Construction Phase activities at MFS and ESE sub-areas. Further details on the effects on local waterways due to mining activities at MFS and ESE (i.e., operational and closure phases) are provided in the detailed water and load balance models (MWM, 2026j.k).

Some infrastructure, such as the haul and access roads, will remain into the Post Closure Phase. Hence to minimise long term management requirements it is proposed that source control technologies are utilised to minimise effects (i.e., utilise controls in the Construction Phase that will be suitable for the Closure Phase). Therefore, the assessment of effects for the UWHR and the MFS Access Road (during the Construction Phase) can also be relied on to manage effects for later mining phases.

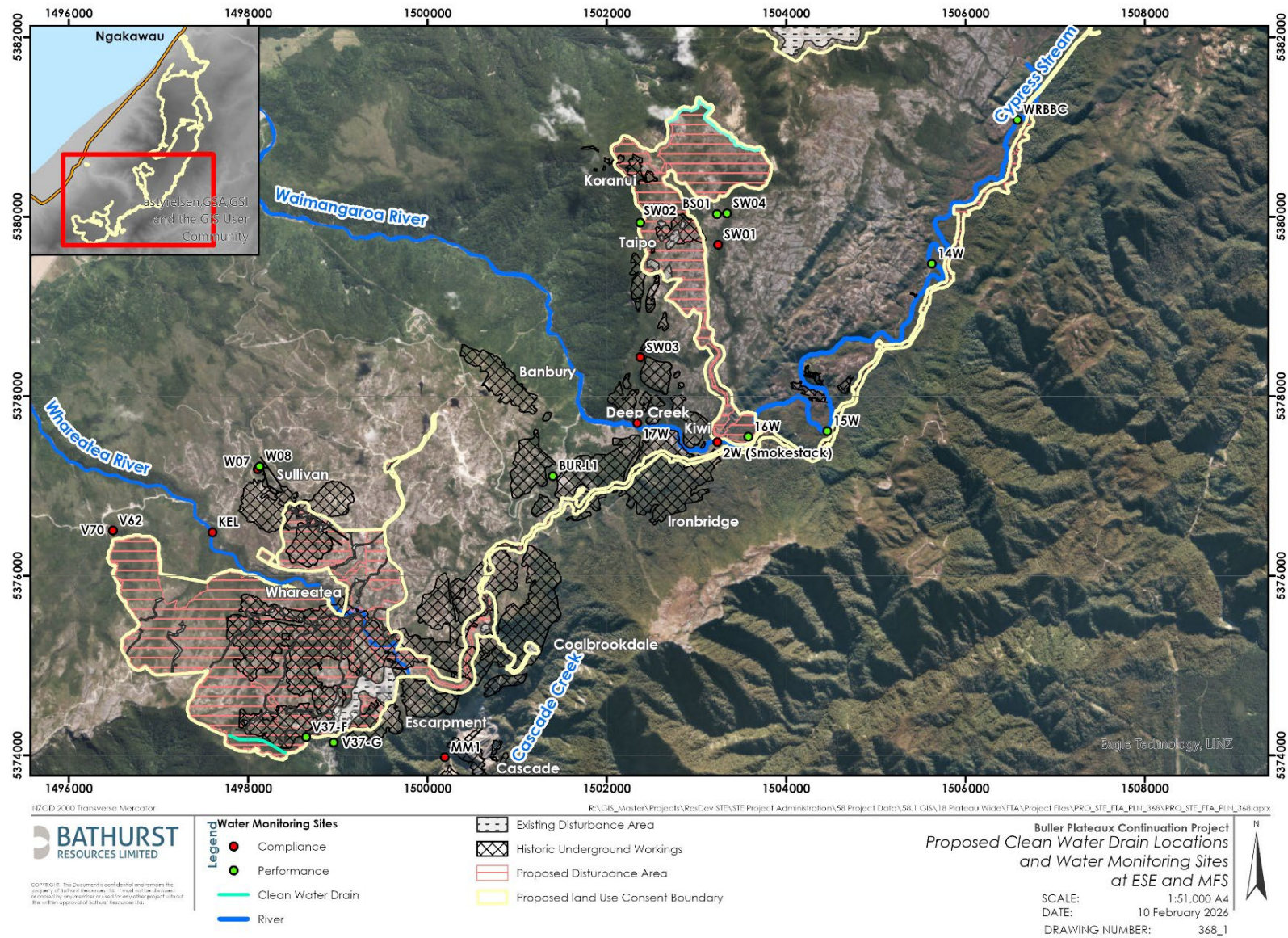


Figure 9: Water monitoring sites.

3.3.4 *Smokestack Hydrology*

Water monitoring location 2W (Smokestack) is a pivotal water quality monitoring location for the UWHR construction due to:

- The location is below the initial section of MFS Access Road crossing over the Waimangaroa River and the MFS infrastructure area.
- The location being downstream of a significant portion of the proposed UWHR.
- Having a longer history of water quality data collection when compared to site 17W further downstream.
- Limited influence upstream by historic underground workings, limiting the uncertainty of the origin of any effects that may present themselves during the construction and operation of the UWHR.

Understanding the hydrology of the catchment is critical to estimate water quality effects related to the BPCP Construction Phase activities. Water monitoring locations Smokestack, located in the Waimangaroa River, W-M2, located in the Whareatea River, and S25, located in Granity Stream, were assessed to understand hydrological responses that may occur with the Construction Phase catchments, for use in estimating effects:

- Smokestack is located between Gomorrah and Cedar Creeks in the Waimangaroa River.
- W-M2 is located immediately upstream of the Whareatea River and Conglomerate Stream confluence within the Whareatea River.
- S25 is located within Granity Stream of the Millerton Catchment

These monitoring locations and associated catchment areas are illustrated in (Figure 10).

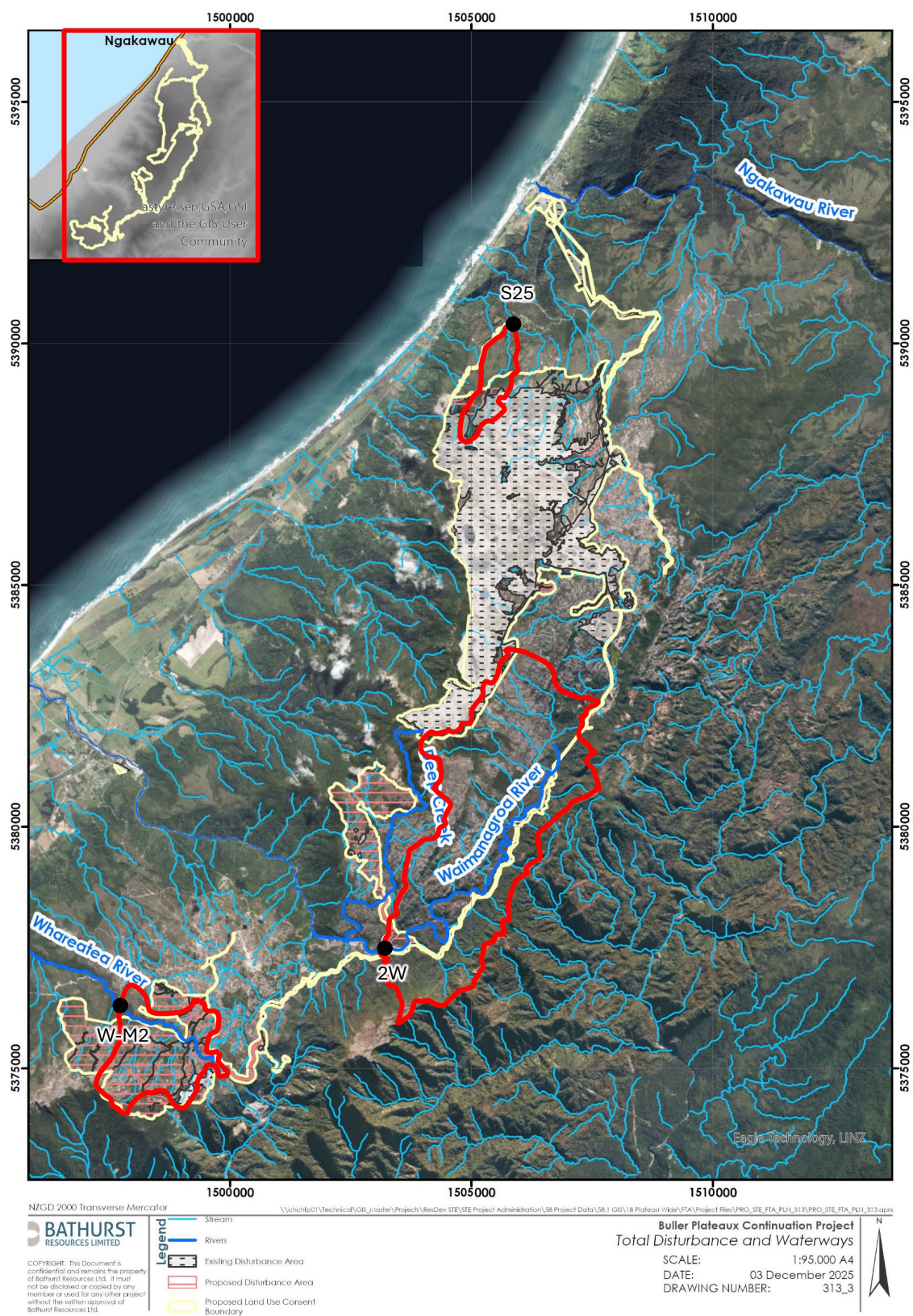


Figure 10: Catchments associated with monitoring sites S25, Smokestack, and W-M2.

Source: Supplied by Bathurst Resources Ltd (catchments overlaid by MWM)

Black dots indicate approximate monitoring site locations

Catchment areas: S25 = 132 ha, Smokestack = 1,680 ha, W-M2 = 394 ha.

It is expected that the Upper Waimangaroa River and Upper Whareatea River catchments receive similar amounts of rainfall to each other. These catchments share a similar feature of exposed pavement throughout the catchments, while the Waimangaroa River contains a significantly higher proportion of vegetated catchment. These characteristics help to understand the observed flow yields from these sites. For the purpose of understanding the impact of vegetated catchment, the monitoring site S25, located within the Granity Stream catchment (Stockton: Figure 10), is compared to these sites (noting the Millerton catchment experiences less rainfall than the other catchments, and therefore the flow yield is reduced as a result).

Comparison of flow yields to exceedance percentiles between Smokestack, W-M2, and S25, are shown in Figure 11. Comparison of flow yield allows for removing the effect of catchment size and consequently time of concentration associated with the catchment. The observed yields characterise W-M2 as a catchment with a high runoff coefficient and little flow attenuation, describing it as a flashy site. S25 flows are attenuated and therefore has higher base flows which can be linked to the vegetated catchment. Smokestack has similarities to both sites, with a relatively high runoff coefficient and high base flows associated with the catchment's mix of vegetated pavement rock areas.

It is expected that catchments within and around these major waterways will exhibit similar hydrological responses to rainfall as the Smokestack and W-M2 catchments, relative to soil and vegetation characteristics. Further details on the hydrology of the BPCP areas are provided in MWM (2026g).

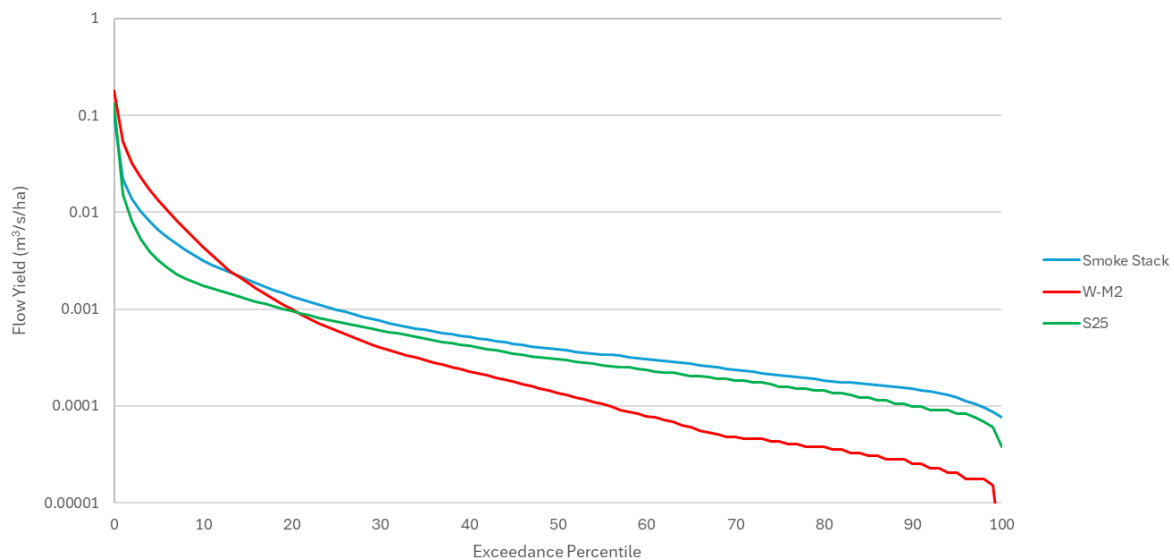


Figure 11: Flow yields of Smokestack¹, W-M2² and S25³ monitoring sites

Source: Data supplied by BRL

1 - Data from September 2012 to April 2015.

2 - Data from March 2011 to Feb 2015.

3 - Data from April 2015 to May 2024.

These characteristics are further observed within the hydrograph presented in Figure 12, where W-M2 flow reduces significantly after a rainfall event, S25 flow remains relatively high for some time after an event, and Smokestack exhibits flow characteristics that fall between the flows of the other two sites. The y-axis has been set to the 99th non-exceedance percentile flow for the respective site.

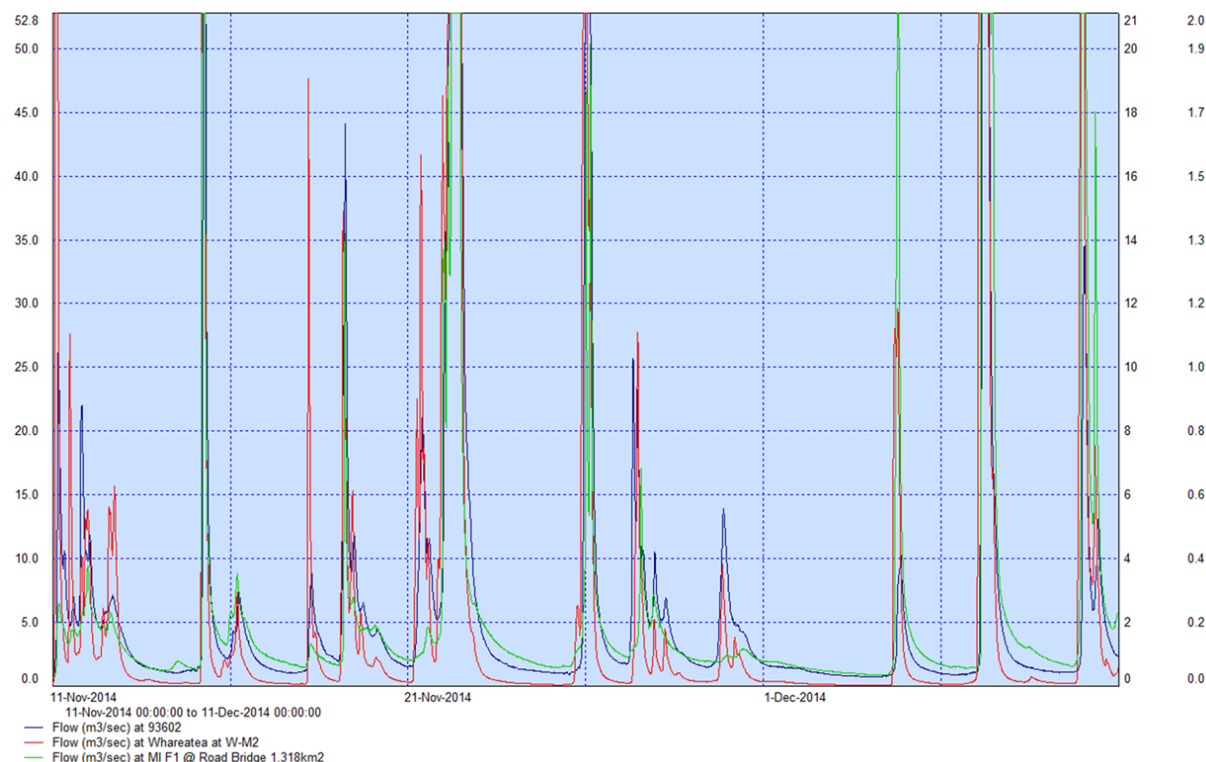


Figure 12: Hydrograph of Smokestack (blue), W-M2 (orange) and S25 (green)

Y-axis maximum set to capture up to the 99th exceedance percentile for all sites.

3.4 Vegetation

The BPCP catchment areas are characterised as a diverse mixture of vegetated and forested areas, sparsely vegetated areas, tussock lands, and pavement rock with varying thicknesses of topsoil. The topography ranges from steep terrains to gentle slopes, with areas of level ground around the Denniston Plateau. Typically, the catchment is characterised by steep vegetated areas and flat to gentle sloped pavement. The forested areas are typically found on steeper slopes and in and around water bodies. Pavement areas, where vegetated, are typically covered with tussock, shrubs and moss with limited topsoil. Further details are provided by Ecological Solutions (2025a,b,c) and The Ecology Company (2026).

As shown in Figure 13, forested areas are predicted to exhibit a lower runoff coefficient for rainfall, resulting in a longer release of flows and smaller relative peaks (Figure 13). In contrast, pavement “bare” areas will likely exhibit higher peak flows and shorter elevated flow times resulting from the higher runoff coefficient and reduced soil depth.

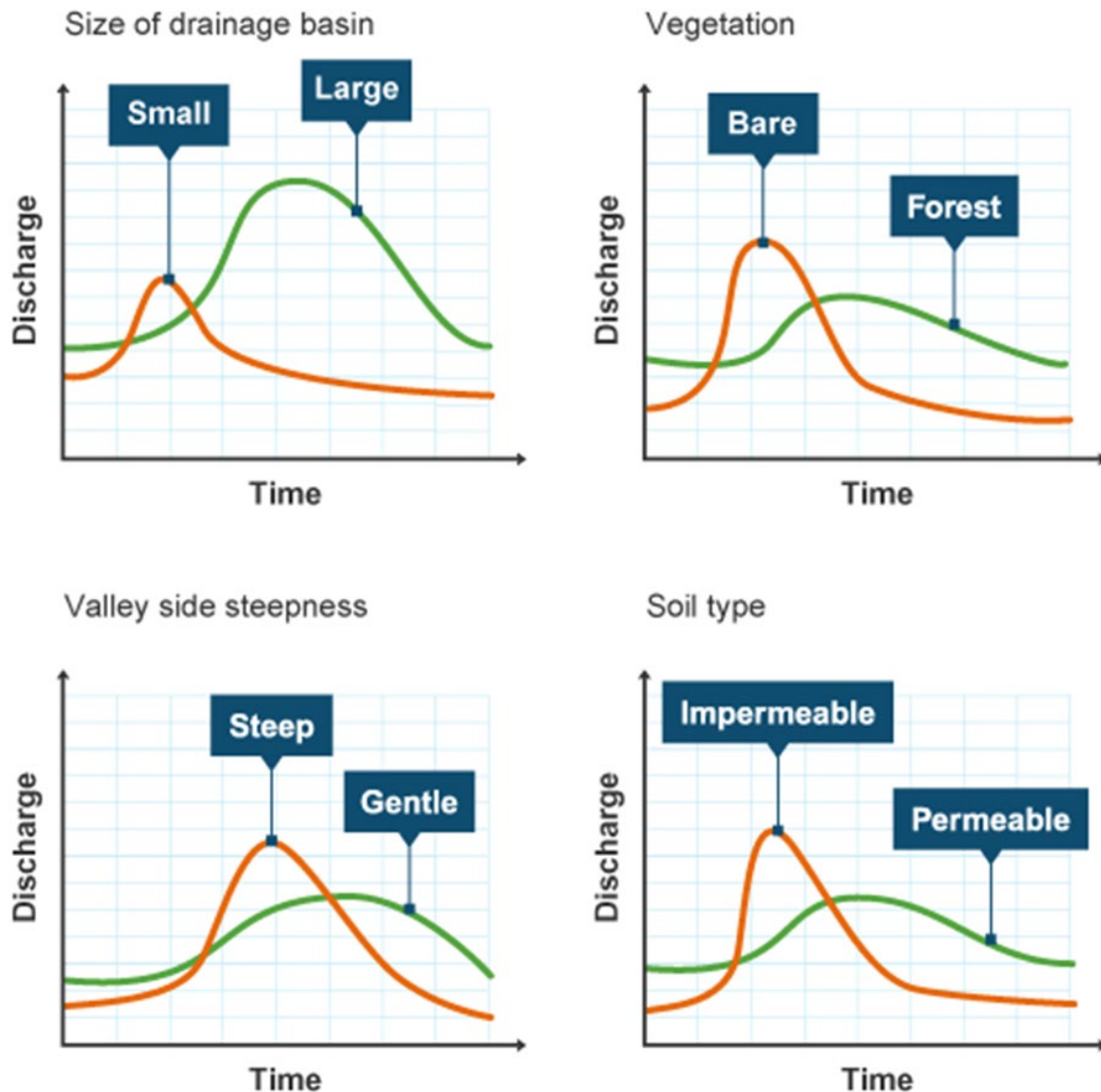


Figure 13: Typical hydrographs resulting from various topography and vegetation types.

Source: <https://alevelrivers.weebly.com/storm-hydrographs.html>

3.5 Geology

The Buller Coalfield in the West Coast Basin-and-Range Province has undergone subsidence and extension since the Late Cretaceous (Flores and Sykes, 1996). The Brunner Coal Measures (BCM), deposited from the middle Eocene to Oligocene, form the foundational layer of a transgressive sequence, which are a succession of lacustrine and estuarine sedimentary rocks consisting of clastic rocks and coal seams. The BCM unconformably overlie the basement rocks comprising Greenland Group turbidite sequences, intruded by granites and porphyries. The BCM are dominated by sandstones inter-layered with siltstones, mudstones, carbonaceous mudstones, 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 (Flores and Sykes, 1996). The BCM are conformably overlain by, and laterally interfingered with, the Eocene marine Kaiata mudstone (KMS) formation, which has increasing carbonate content upwards away from the BCM contact (Flores and Sykes, 1996).

A review of the palaeogeological environment was undertaken by Flores and Sykes (1996). The interpretations suggest that the MFS and ESE sub-areas were dominated by a fluvial system. As noted in literature (e.g., Pope et al., 2010), fluvial systems tend to be lower in pyrite compared to marine-influenced systems.

This lower AMD 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 lithologies present along the UWHR comprise KMS, BCM, and colluvium materials. KMS will not be used for the construction of the road (i.e., fill areas) due to its poor geotechnical properties. Data (Appendix B) indicates these near-surface surficial materials are from a higher sulfur estuarine/marine environment.

3.6 AMD Source Hazards

Lithologies with the potential to form AMD are expected within the MFS, ESE, and UWHR sub-areas and without appropriate management could lead to AMD impacted waters. An understanding of the AMD source hazards will help define the potential water quality risks for the Project. This section provides a summary of the AMD source hazards.

3.6.1 Introduction to AMD

AMD, containing toxic concentrations of metals, salts, and acidity, is a result of water contamination due to mineral oxidation caused by mining activities. AMD is typically generated by the excavation of rocks that contain sulfide minerals, such as pyrite. When these minerals are exposed to oxygen and water, they undergo weathering processes and oxidise, generating acidity and releasing trace metals. Microorganisms accelerate this process.

3.6.2 Classification of AMD

Classification of materials with regard to their geochemical nature is important to understand the quantities of AMD-generating materials that will require management. Standard classification systems (i.e. AMIRA (2002) and Price (2009)) use net acid producing potential (NAPP) and net acidity generation (NAG) pH to classify samples as PAF, NAF, or uncertain (UC).

The use of these standard AMD classification systems for the common lithologies in the BPCP area results in many samples being classified as uncertain due to negligible acid neutralising capacity (ANC) and low sulfur content. This generates operational issues for materials scheduling, management, and placement as well as AMD treatment requirements. As a result, site-specific classification systems have been developed for BCM and KMS materials (MWM, 2026a) for PAF, NAF, and high acid forming (HAF)⁶:

- KMS along the UWHR will be classified using the process developed by McLachlan (2022) and BRL (2022).
- BCM at MFS will be classified using the MFS Classification process (MWM, 2026b).

⁶ Noting UC is removed from site specific classification systems as this does not explain to operators what should be done with the materials.

- BCM at ESE and for the UWHR will be classified using the ESE Classification process (Olds et al., 2015).
- Insufficient characterisation has been undertaken on the colluvium, which may exhibit various origins associated with BCM, KMS, and/or basement materials upslope of the UWHR. ABA testing of the colluvium is required (as part of road construction activities), however for this study it is assumed all colluvium is PAF and will be disposed into an engineered landform at ESE or Stockton, unless testing confirms otherwise
- The appropriate classification system will need to consider the characteristics of the colluvium to determine the appropriate classification system. This will be resolved by industry standard acid base accounting techniques.

3.6.3 AMD Management

To mitigate the risks associated with AMD, BRL has developed a hierarchy of controls (Management Steps) which is in alignment with international guidance documents (e.g., INAP, 2024; DFAT, 2016), of how to manage the potential effects of AMD:

1. Determine the closure objectives for the mine.
2. Understand the source hazards.
3. Prevent oxidation of sulfide minerals.
4. Minimise the mobilisation of stored oxidation products.
5. Control and treatment of mine-impacted waters.
6. Complete an assessment of the potential effects.
7. Monitor performance.

3.7 Sediment and Erosion Hazards

3.7.1 Introduction

The Project sub-areas are within a high rainfall alpine environment. Vegetation removal and land disturbance along the UWHR corridor and within construction and break-in areas has the potential to result in soil erosion and migration of sediments into natural waterways if not managed correctly.

During construction, elevated TSS has the potential to originate as a result of rainfall and concentrated surface water flows coming into contact with:

- Disturbed areas of land.
- Soil stockpiles.
- Unstabilised surfaces from both cut and fill sections.

Release of this sediment into the environment has the potential to increase turbidity and TSS loads affecting the downstream receiving environment. Elevated turbidity within waterways has the potential to impact plants and wildlife by way of reducing light penetration, impacting photosynthesis of aquatic plants, and directly affecting instream ecology, habitats and food sources. Sedimentation within the

waterway would result in smothering and damage of vegetation and habitats. Ultimately, ecology within the waterway environment will be at risk of being negatively impacted by an increase in TSS.

3.7.2 Erosion Management

Surface erosion management and control is guided by GD05 (Auckland Regional Council, 2023), amended for higher rainfall environments, and is described within the Erosion and Sediment Control Plan for Land Disturbance Activities (BRL, 2026a). This includes:

- Timing disturbance activities in periods of dry weather.
- Minimising surface exposure.
- Limiting concentration of surface flows.
- Managing of high-risk surfaces.
- Suitably designing water management structures to reduce the risk of erosion.
- Progressive stabilisation and revegetating of areas throughout the construction process.

Erosion management will be completed through managing water velocities and stabilising surfaces as soon as practicable. Stabilisation methods will include deployment of aggregate, slash, mulch, geotextiles / biodegradable liners, hydroseeding, revegetation and vegetative direct transfer (VDT). For instance, minimising sediment loss and high velocity run off from high walls will be completed by deployment of slash on benches and hydro-seeding selected areas

Shadbolt and Weber (2007) describe a field trial conducted at Stockton Mine which evaluated the performance of different erosion control methods, illustrating the importance of appropriate stabilisation methods on exposed soil. The results demonstrated the significant reduction in TSS through the application of straw mulch (Figure 14) - a temporary stabilisation method typically used within the construction industry.

Elder et al. (2011) summarise a field sampling study at Stockton Mine where surface water sampling was undertaken in several locations within the mine during a moderate rain event of 80 mm within 24 hours (Figure 15). These samples identified the comparatively low TSS observed in samples taken from rehabilitated areas compared to active mining and dumping areas, identifying hydroseeded areas performing the best, followed by VDT areas and straw mulched areas.

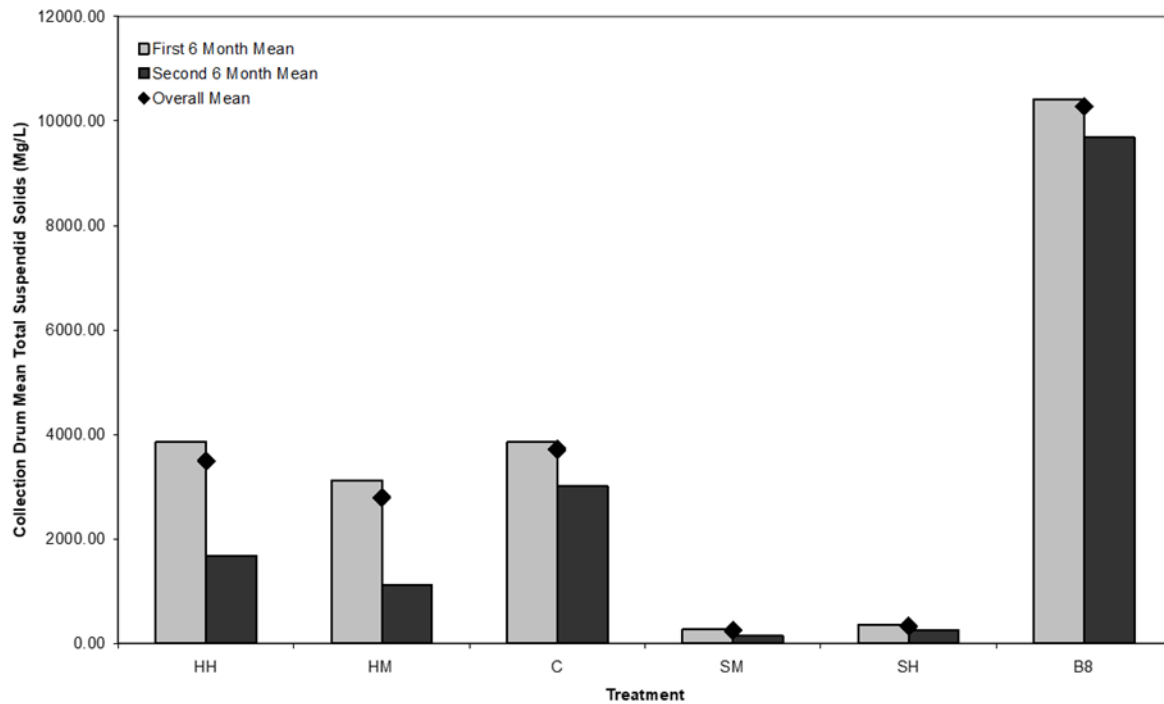


Figure 14: TSS (mg/L) for all trial plots divided into 6 monthly intervals.

Source: Shadbolt and Weber (2007)

HH - Hydro-seeding applied at a high rate

HM - Hydro-seeding applied at a medium rate

C - A control plot as bare soil

SM - Straw mulch applied at a medium rate

SH - Straw mulch applied at a high rate

B8 - Polyvinyl alcohol-based binding agent, Binder8 – noting the slope of this trial area was steeper than the others, which probably contributed to higher TSS loss.

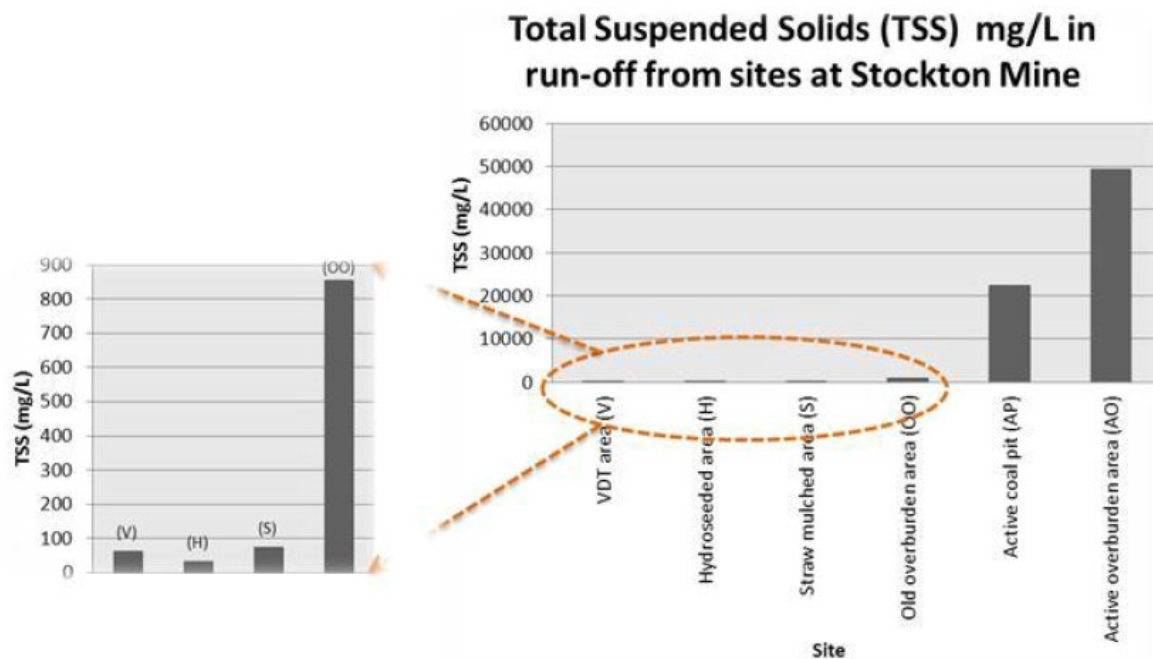


Figure 15: Total suspended solids (mg/L) in water run-off from sites under different treatments.

Source: Elder et al, (2011)

3.8 Summary of Environmental Hazards and Risks

Table 3 summarises the key hazards and risks associated with the Construction Phase of the BPCP for MFS, ESE, and UWHR that will require management.

Table 3: Summary of environmental hazards and risks.

HAZARDS	ENVIRONMENTAL RISKS	RELEVANT PROJECT ACTIVITIES
Exposure and disturbance of sulfur-bearing materials	PAF materials (BCM, KMS, and potentially colluvium) are present within the Project sub-areas. Oxidation of sulfur-bearing materials and/or mobilisation of sulfate salts may lead to AMD (i.e., acidity and metals) that may have an adverse impact on surface water and ecosystems (e.g., aquatic ecology).	Exposure of sulfur-bearing materials may occur in association with areas such as: • Cut surfaces • Fill areas • Infrastructure pads at ESE and MFS
Erosion of sediment	Erosion, generation, and release of sediments into the environment will have the potential to increase turbidity, reducing light penetration in waterways. This can adversely affect photosynthesis of the aquatic plants within the waterway. Sedimentation will likely occur, resulting in smothering and damage of vegetation and habitats, as well as having the potential to carry AMD generating materials into waterways.	Elevated TSS has the potential to originate from: • Clearing / removal of the vegetation and soil along the UWHR alignment, MFS Access Road, and infrastructure areas. • Earthworks (i.e., material movement associated with cut and fill activities). • Destruction of vegetation. • Haul road operation.

3.9 Water Quality Objectives

Water quality objectives have been developed for the BPCP and are explained in Hickey (2026). These water quality objectives are applied to the Construction Phase.

3.10 Adaptive Management Approach for Environmental Risks

Potential environmental effects as described in Table 3 can be managed by adaptive management principles. Adaptive management is a recognised management option under the Resource Management Act (RMA) (e.g., Leckie, 2017; Weber, 2020). Effective adaptive management is supported by understanding the nature and duration of possible events that could occur, monitoring these events, and then having options in place should there be variance from the expected condition. This requires:

- Understanding the risks.
- Monitoring as an early warning (i.e., performance monitoring).
- Variance planning.
- Implementation of management processes.

Variance can be managed by use of various management processes. Adaptive management is expected to be undertaken as shown in Table 4.

Table 4: Adaptative management methodology for identified hazards

HAZARD	RISK	PERFORMANCE MONITORING TECHNIQUE	MANAGEMENT TOOL
Sediment	Level of TSS identified downstream of work area exceeds performance criteria	Water quality monitoring sites	Review of sediment and erosion controls, including: • Sediment retention ponds performance • Condition of water infrastructure • Amount of upstream unstabilised surfaces Followed by actions to improve sediment capture or reduce its generation as per BRL (2026a).
AMD	Level of AMD observed downstream of work area exceeds performance criteria	Water quality monitoring sites	Review localised effects of PAF materials, including: • Seepage from PAF fill areas • Runoff from exposed PAF cut surfaces Followed by actions to improve water quality (e.g., prevent, control, treat).

4 **ESE CONSTRUCTION PHASE**

This section describes the Construction Phase activities associated with the ESE sub-area of the BPCP. Haul roads and infrastructure areas are to be constructed by cutting (i.e., excavating), filling, or a combination of the two to achieve design (referred to as “cut and fill”). Locations to be excavated are referred to as cut surfaces, and locations to be filled are referred to as fill areas.

4.1 **Introduction**

Management of TSS and AMD is required for disturbed surfaces during the Construction Phase, namely:

- Cut surfaces (e.g., highwalls and pits).
- Rock fill surfaces (e.g., infrastructure pad fill areas and ELFs).
- Roadway surfaces.
- Infrastructure areas (e.g., WTP and coal storage pads, etc).
- Unrehabilitated or partially rehabilitated surfaces.
- Soil stockpile areas.

The following facilities will be constructed within the Construction Phase:

- Project Stage -1:
 - Site works to establish construction phase water management infrastructure including the pWTP.
 - WTP Polishing Pond.
 - Central Infrastructure Area (this includes the WTP Infrastructure Area).
 - Coal Haulage Infrastructure Area.
 - Haul Roads (surrounding the ancillary areas).
 - BV ELF Extended (extension of the BV ELF, includes decommissioning of the existing BV ELF MSR and development of a basal drainage network).
- Project Stage 0:
 - ESE active WTP (including commissioning).
 - Haul Roads.
 - Bulk Explosives Plant and High Explosives Magazine.
 - Gatehouse / Admin Office Area and Access Road.
 - Develop the Ex-Pit Seal⁷.
 - Develop the ESE Box Cut.

⁷ The Ex-pit Seal is a project focused on sealing a section of underground workings to prevent MIW (from the ESE mining activities) travelling through historic workings and into the Cascade Creek.

- Mine Development (includes establishment of the ESE clean water drain (CWD)).
- BV ELF Extended.
- Central ELF (includes development of basal drainage network).

The ESE Borrow Pit may be developed as required during the Construction Phase, based on the material properties of the waste that is observed during development of the area, and for final sheeting of areas with NAF material.

4.2 Material Quantities

BRL indicate a total of ~5,007,253 m³ (bank cubic metres) will be excavated during the Construction Phase, i.e., Stage -1 and Stage 0 (Table 5). This equates to 659,153 m³ in Stage -1 and 4,348,100 m³ in Stage 0 (Table 5).

Table 5: ESE material movements during the Construction Phase

ACTIVITY	CUT (bcm)	FILL (bcm)	AREA (ha)
Stage -1			
Coal Haulage Infrastructure Area	245,888	141,700	13.7
WTP Polishing Pond	102,674	-	1.7
Central Infrastructure Area	185,007	164,278	9.3
Haul Roads (surrounding the ancillary areas)	91,440	70,128	4.94
Water Management Sump	34,144	-	0.68
Barren Valley ELF Extended	-	283,047	2.3
Total	659,153	659,153	32.62
Stage 0			
Haul Roads	5,114	42,600	2.70
Bulk Explosives Plant and High Explosives Magazine	8,145	9,042	8.80
Gatehouse / Admin Office Area and Access Road	35,987	108,805	4.70
Ex-Pit Seal	714,000	419,738	3.31
Box Cut	2,700,000	-	14.80
Mine Development	884,854	-	
Barren Valley ELF Extended	-	3,117,414	19.00
Central ELF	-	650,502	8.97
Borrow Pit	-	-	7.70
Total	4,348,100	4,348,100	69.98

bcm = bank cubic meters

The infrastructure areas will be constructed via cut and fill. Where cut material is unsuitable as fill for construction, materials will be sourced from the ESE Borrow Pit and the Ex-Pit Seal Pit.

Table 6 describes the classification breakdown of overburden material during the Construction Phase.

Table 6: ESE Construction Phase overburden classification (bcm)

INDICATIVE YEAR	PROJECT STAGE	NAF	LOW RISK	PAF	HAF	TOTAL OVERBURDEN ¹
FY27	Stage -1	83,772	22,975	503,498	48,889	659,100
FY28	Stage 0	258,659	403,758	2,428,686	1,257,096	4,348,200 ²

All results in bcm (bank cubic meters)

1. Total overburden and grand totals are calculated and rounded from source data; therefore, may not equal the sum of the rounded figures shown and those in Table 5.

2. The ESE Operational Phase WTP will become operational near the beginning of this stage.

4.2.1 AMD Hazards

The quantity of rock within Stage -1 is approximately twice that of the BV ELF that is located at the existing Escarpment Mine (356,000 m³). The BV ELF generates 10-20 tonnes of acidity per year, hence management of AMD seepage from the planned ELFs. Any excess waste rock will be placed within the BV ELF extension during Stage -1 and 0, and within the Central ELF during Stage 0. Seepage from these structures will be:

- Directed to the pWTP at Pit 3 Pit Lake for treatment of AMD and TSS up until such stage that the active WTP is operational, at which points seepage will be directed to the active WTP.
- Any areas that cannot be passively directed to passive treatment systems at closure will be identified during the Construction Phase and will be constructed using NAF materials.

Acidity and AMD sludge loads have been determined for the Construction Phase at ESE (MWM, 2026I) as shown in Table 7. Analysis indicates that ~60 tonnes of acidity will be generated during Stage -1 of the Construction Phase and ~7,000 m³ of AMD sludge will be created by the treatment of this acidity and TSS. Stage 0 is expected to generate ~400 tonnes of acidity, ~47,000 m³ of AMD sludge, however, it is expected that the vast majority of this will be treated via the active WTP.

Table 7: ESE 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
ESE	FY27	Stage -1	659,100	61	7,143
ESE	FY28	Stage 0	4,348,100	404	47,114

bcm = bank cubic metres.

4.3 ESE Access

Access to ESE will be via Denniston Road and the Whareatea Mine Road. Public access will be controlled by way of a gate house. The gate house area will also include an admin office, parking, nursing facilities, and emergency response buildings; these are located remotely from the operational areas to provide clearance from blasting.

The access road up to the ESE mine will be upgraded to allow mine vehicles suitable access to and from the mine. Access roads to the ESE mine will have an 8 m wide running surface within a 15 m access corridor to allow for inclusion of drains, berms and cut and fill components. These access roads will remain as gravel roads with a speed limit of 40km/hr.

4.4 Haul Roads

Haul roads within the ESE sub-area (this excludes the UWHR and MFS Access Road) - surrounding the infrastructure areas and providing access to ELF's and the initial Box Cut and development areas - are designed to accommodate CAT 777 and CAT 789 heavy haulage trucks. Haul roads will be designed to allow a minimum running width of 27m, they will include protection berms and allow for drainage channels and sediment structures following guidance from BRL (2026a). Design of haul roads will generally follow a design similar to Figure 16. NAF roading materials will be used to overlay haul roads, minimising AMD generation.

Two road crossings occur over the Whareatea River where sufficiently sized culverts / box culverts will be used to ensure flows are unimpeded. NAF material will be used in the construction of these crossings.

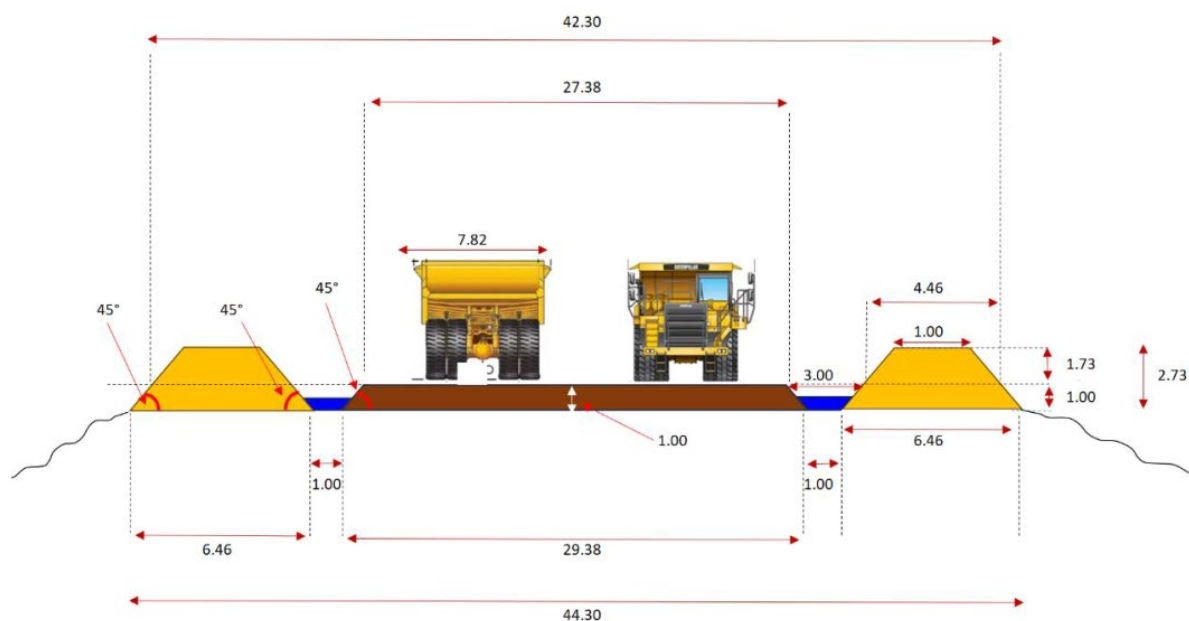


Figure 16: Generic design for a fill section of haul road.

Source: BRL

4.5 Infrastructure Areas

These areas will be overlayed with NAF material to minimise AMD generation.

The Central Infrastructure Area will be the main mine production hub, located adjacent to the operations. This includes laydown areas, fuel and supplies delivery, warehousing, refuse management, mine maintenance facilities, tyre handling, the active WTP and associated ponds, production mining offices, and parking for the mining equipment.

The Coal Haulage Infrastructure Area is located south-east of the Central Infrastructure Area, where the UWHR connects with the ESE mine. It includes a flat pad approximately 500 m x 250 m in area to act predominantly as a coal production stockpiling and loading area, with separate accesses for coal haul road trains and mine trucks. Dust associated with traffic will be managed with water carts as required. If required, sprinkler systems would be set up to manage dust to within required limits.

4.6 Project Stage -1 Construction Activities

Project Stage -1 activities include construction of water management infrastructure for the Construction Phase, the WTP Polishing Pond, the Central Infrastructure Area (which includes the WTP pad), Coal Haulage Infrastructure Area, haul roads (surrounding the infrastructure pads), and development of the existing BV ELF. The ESE Borrow Pit may be developed if required. During this time the active WTP will be under construction but is not expected to be operational.

4.6.1 Water Management

During Stage -1, water will be managed in the following manner:

- The Pit 3 Pit Lake will be utilised for treatment of AMD impacted waters. Here, a small pWTP will dose neutralising agents (either $\text{Ca}(\text{OH})_2$ or NaOH) to incoming waters to provide near-source neutralisation of acidic waters, allowing targeted treatment of AMD to pH 7.5 to maximise removal of metals; as described in the Water Treatment Report (MWM, 2026i).
- Construction activities will be undertaken, following the Erosion and Sediment Control Plan for Land-Disturbance Activities (BRL, 2026a), and, where waters are impacted by AMD, are directed to the pit lake for treatment. This will be completed by gravity (where possible) and pumping as required.
- The treatment system (treatment sump and pWTP) will operate such that, where possible, waters entering the pit lake are confined to a single inlet where dosing (from the pWTP) and mixing can occur. Sedimentation and flocculation / precipitation will occur within the pit lake. Discharge water will flow to V8 Creek (a tributary of Cascade Creek) via Lake Brazil (a sump adjacent to the pit lake).
- During high flows, waters continue to pass through the pit lake for sedimentation, however, a small portion of suspended solids is expected pass through to the outlet. Additional sediment management controls are available (e.g., floc addition and sedimentation within Lake Brazil) as was undertaken successfully during mining at Escarpment Mine in ~2016.
- The Central Infrastructure Area and Coal Haulage Infrastructure Area is to be constructed via cut and fill, with any excess waste placed within the BV ELF Extended. These waters will be managed through the pit lake, and, where seepage flows from fill areas cannot be managed, these areas will be filled with NAF material.
- Clean water diversions will be constructed where possible to limit the total water requiring management.

- Figure 17 provides a general schematic of the ESE sub-area, illustrating water movements and treatment during the Stage -1 of construction phase activities. Figure 18 focuses on impacted catchments and the planned disturbance area at the end of Stage -1.

The following notes are provided:

- The existing BV ELF MSR will be removed as the ELF is extended with overburden placement; therefore, the underdrain will need to be extended as part of the extended BV ELF basal sub-catchment construction.
- The Pit 3 Pit Lake will be used as the surge sump for the active WTP until such time that the surge sump (Ex-Pit Seal) is completed in Stage 0.
- During this phase, AMD sludge will accumulate in Pit 3 Pit Lake (200,000 m³ capacity).
- AMD sludge may be received from MFS Construction Phase activities, and this will be placed in the Pit 3 Pit Lake or in cells within ELFs at ESE.
- Discharge from Pit 3 Pit Lake will flow through Lake Brazil to allow for additional polishing time, and then to Cascade Creek Trib (V8 Creek) (Figure 17). Compliance monitoring at M-M1 in V8 Creek will ensure treatment is to a suitable standard.
- TSS will be the dominant contributor to AMD sludge during the Construction Phase (due to lesser quantities of ELF seepage).
- Where AMD and/or TSS impacted waters do not passively flow into Pit 3, they will be collected in sumps and pumped to it for treatment.
- A basal drainage network will be required to capture all seepage from PAF fill areas / ELFs to direct this water to a collection sump for treatment in the Pit 3 Pit Lake, and future treatment by a MSR at closure of the Project.
- The management of TSS associated with the Construction Phase is discussed in BRL (2026a).
- A water take is planned to be taken from the Pit 3 Pit Lake / Lake Brazil to provide water for Project-related activities (e.g., operation of the pWTP, dust suppression, etc).

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.
8. A sediment retention pond will be located within the footprint of the borrow pit. Should waters be impacted by AMD this will be pumped to Pit 3 for treatment.

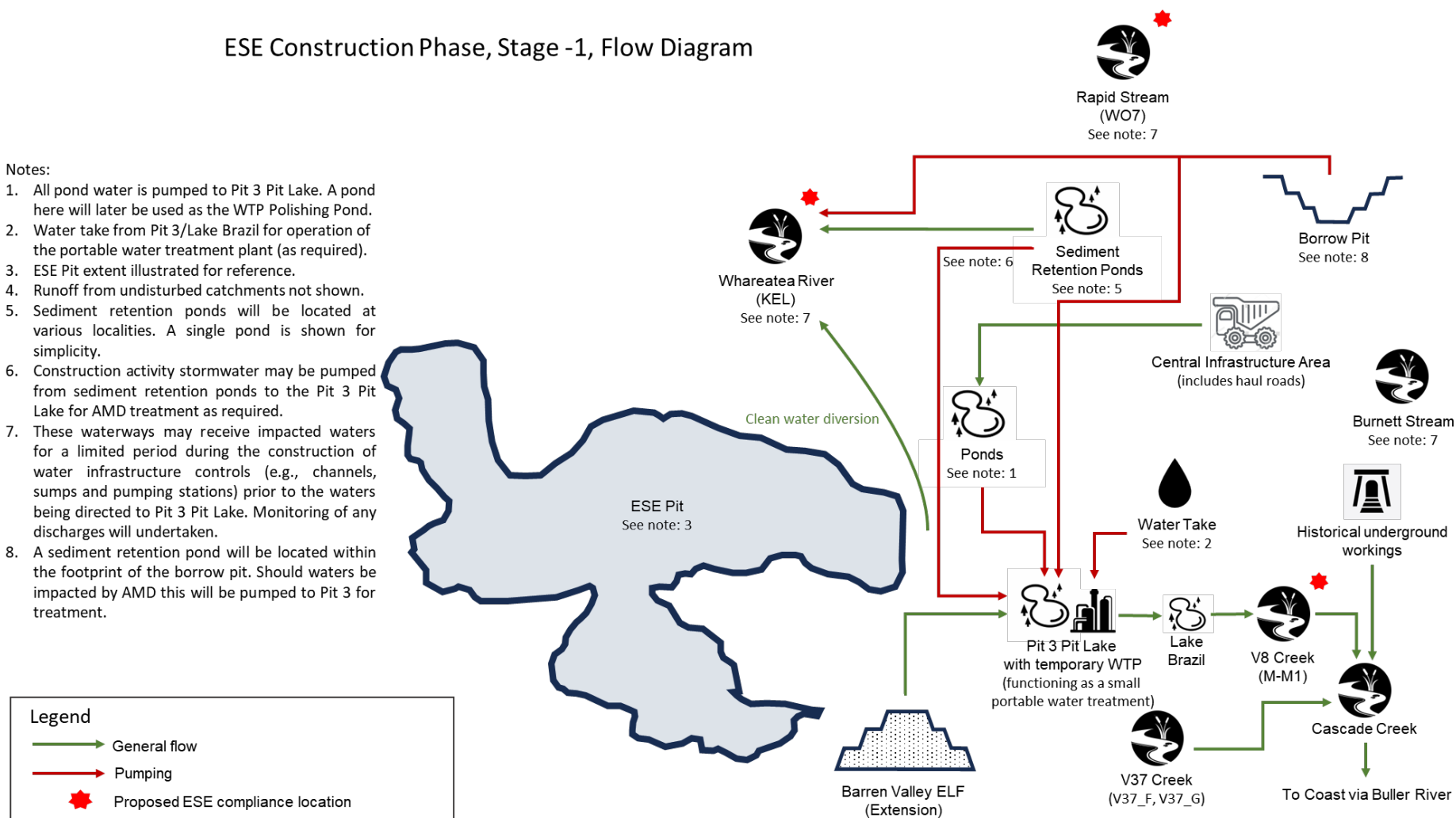


Figure 17: ESE Construction Phase Stage -1 Water Management.

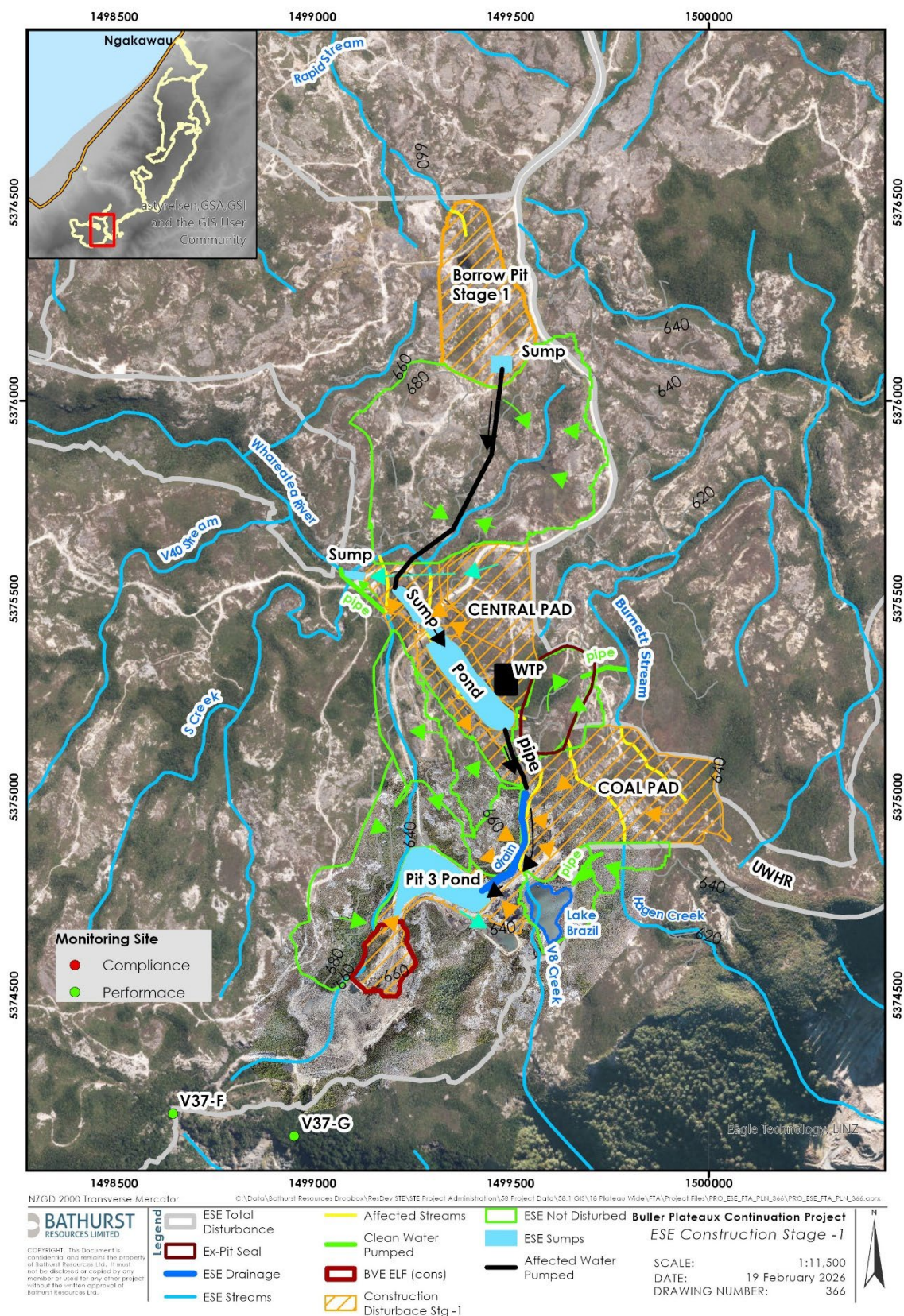


Figure 18: ESE Construction Phase Stage -1 disturbance.

4.7 ESE Stage 0 Construction Activities

ESE Stage 0 activities include construction of the active ESE WTP, [REDACTED], Gatehouse / Admin Office Area and access road, haul roads, Ex-Pit Seal, development of the BV ELF Extended and Central ELF, Box Cut, and development of the mine to the south (establishment of the CWD). The ESE Borrow Pit may be developed as required.

The active WTP is expected to be commissioned and become operational near the start of this stage, prior to the majority of material movement. The Ex-Pit Seal will continue to be under construction (i.e., the future active WTP Surge Sump), and therefore the active WTP will be fed from the Pit 3 Pit Lake up until such time that the Ex-Pit Seal pit can be converted to being the surge sump, at which point the active WTP system is considered fully commissioned.

4.7.1 Water Management

During Stage 0, water will be managed in the following manner:

- The Pit 3 Pit Lake and pWTP will continue to be utilised for treatment of AMD impacted waters until such time that the active WTP is constructed (expected early in this stage), where the pWTP will be decommissioned. At completion of the active WTP, water will be drawn from the pit lake, where the pit lake will be used as the surge sump until the Ex-Pit Seal is constructed. The polishing pond (constructed in Stage -1) will take the treated waters prior to discharging them to the Whareatea River. From this point on, waters requiring treatment will pass through the active WTP.
- Construction activities will continue to operate under the Erosion and Sediment Control Plan for Land Disturbance Activities (BRL, 2026a), with waters impacted by AMD 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 TSS management will be directed through local sediment retention ponds.
- Clean water diversions will continue to be constructed where possible to limit the total water requiring management.
- The Box Cut and mine development will generate a large amount of waste rock, which will be placed within the BV ELF Extended and Central ELF. The BV ELF Extended will, over time, cover the Pit 3 Pit Lake; prior to this, the Ex-Pit Seal will be constructed and will be used as the active WTP surge sump. A basal drain network will be developed prior to construction of ELFs.
- The mine development waters will flow under gravity for treatment, while the Central ELF and Box Cut waters will be collected in the box cut and be pumped for treatment.
- Figure 19 provides a general schematic of the ESE sub-area, illustrating water movements and treatment at the end of the construction phase activities. Figure 20 focuses on impacted catchments and the planned disturbance area during this Stage 0.

The following notes are provided:

- AMD sludge will accumulate in Pit 3 Pit Lake at ESE (200,000 m³ capacity). Later in Stage 0, these materials will be buried by mine rock, as part of the BV ELF Extension, once MIW is being treated by the active ESE WTP.

- Once the ESE WTP is commissioned, AMD sludge will be placed in the BV ELF Extended.
- The BV ELF underdrain will need to be extended further during this time. Development of an underdrain as part of the Central ELF will also be required.
- AMD sludge may be received from MFS Construction Phase activities, and this will be placed in the Pit 3 Pit Lake until it is filled with mine rock as part of the BV ELF Extended construction. AMD sludge will then be placed in cells within the ESE ELFs.
- Discharge from Pit 3 Pit Lake will flow through Lake Brazil to allow for additional polishing time, and then to Cascade Creek Trib (V8 Creek) (Figure 17). Compliance monitoring at M-M1 in V8 Creek will ensure treatment is to a suitable standard.
- Discharge from the polishing pond into the Whareatea River will be compliance monitored at KEL. This water may be pumped to V8 Creek where required.
- TSS will be the dominant contributor to AMD sludge during the Construction Phase (due to lesser quantities of ELF seepage).
- Where AMD and/or TSS impacted waters do not passively flow into Pit 3 (or later, the Ex-Pit Seal), they will be collected in sumps and pumped to it for treatment.
- A basal drainage network will be required to capture all seepage from PAF fill areas / ELFs to direct this water to a collection sump for treatment.
- The management of TSS associated with the Construction Phase is discussed in BRL (2026a).
- A water take is planned to be taken from the local ponds / Lake Brazil to provide water for Project-related activities (e.g., operation of the pWTP, dust suppression and commissioning / operation of the ESE active WTP).

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.
8. A sediment retention pond will be located within the footprint of the borrow pit. Should waters be impacted by AMD this will be pumped to the Ex-Pit Seal for treatment.

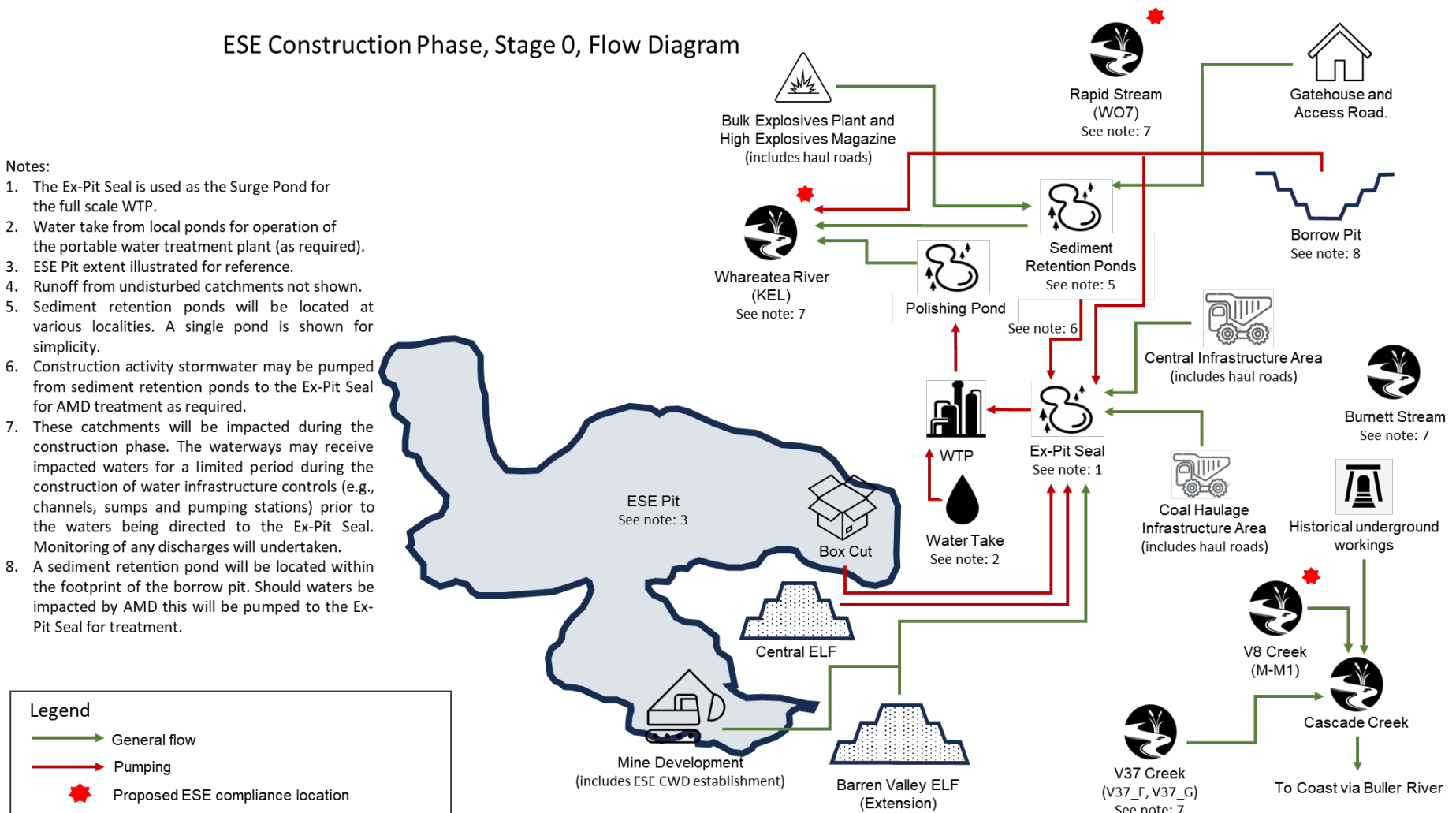


Figure 19: ESE Construction Phase Stage 0 Water Management

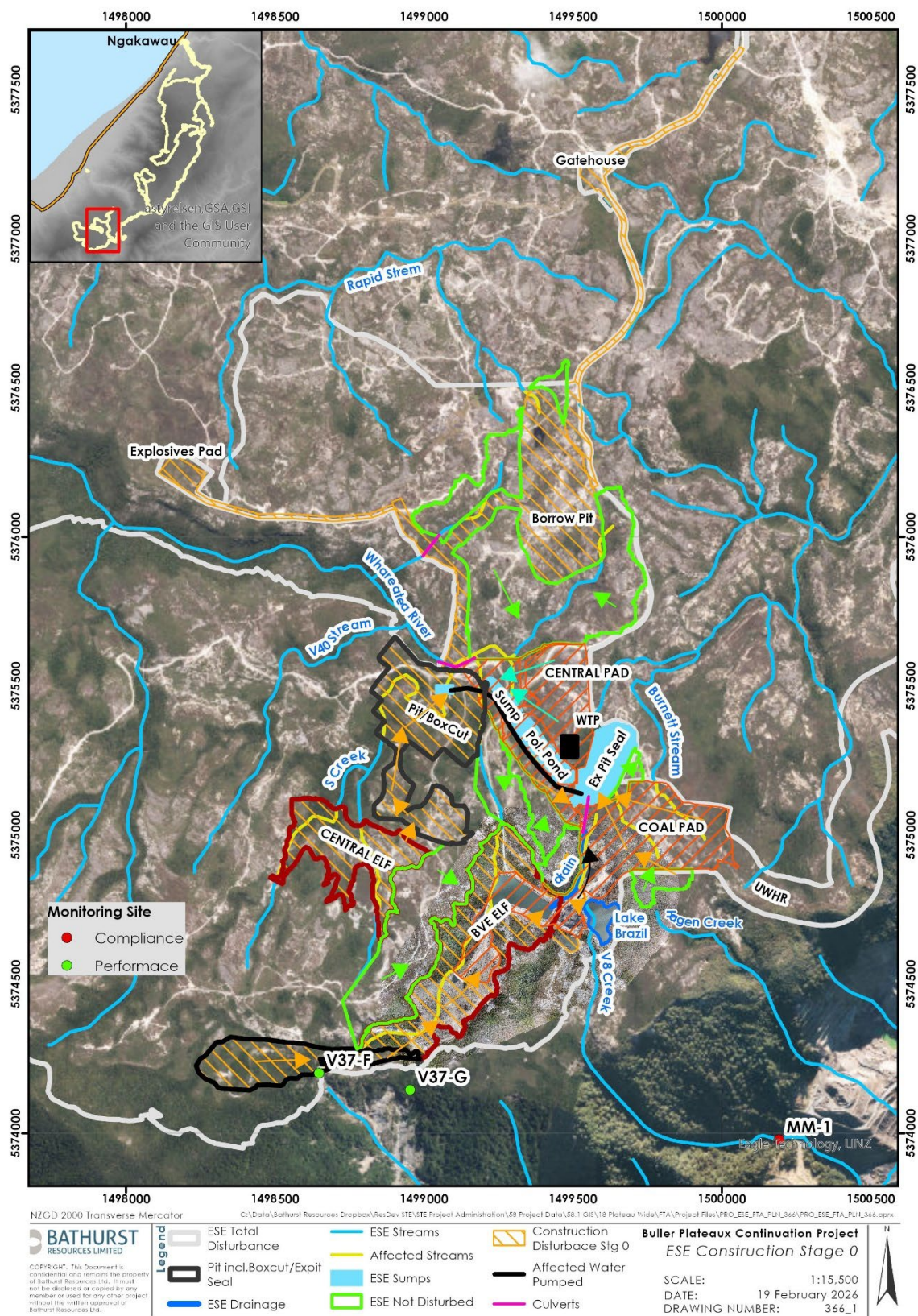


Figure 20: ESE Construction Phase Stage 0 disturbance.

4.8 Monitoring

Performance monitoring is proposed to confirm effects on receiving waterways are minimal. This will include:

- Monitoring of sediment retention ponds to ensure TSS and AMD effects are being managed and is in alignment with expectations (BRL, 2026a, 2026e).
- Monitoring of any pWTP activities for AMD and TSS to ensure discharge water is suitable for release (i.e., compliance is expected at compliance monitoring locations).
- Monitoring of BUR.L1 (Burnett Stream) and V37_F and V37_G (draining to V37 Creek) to identify any effect to the waterways.

Compliance monitoring is to be undertaken to ensure effects on receiving waterways are minimal. This will include:

- Monitoring of receiving water quality at monitoring location M-M1 in Cascade Creek tributary (V8 Creek).
- Monitoring at monitoring locations KEL (Whareatea River) and W07 (Rapid Stream) to identify any effect to the waterways.

See Figure 9 for proposed performance and compliance monitoring locations.

Adaptive management processes will be in place to manage any observed deviation from expectations.

4.9 Post Construction Water Management

At completion of construction and commissioning of the active WTP and associated ponds, MIW within ESE sub-area will be managed through use of the ESE active WTP.

All MIW will be directed to the surge sump by way of channel, sumps and pump stations, while waters impacted only by TSS will be managed with sediment retention ponds. Some MSRs may start during the Operational Phase.

Description of water management is provided by MWM (2026k).

5 **MFS CONSTRUCTION PHASE**

This section describes the Construction Phase activities associated with the MFS sub-area of the BPCP. An access road and infrastructure area are to be constructed by cutting, filling, or a combination of the two to achieve design.

5.1 **Introduction**

Where practicable, management of TSS and AMD is required for disturbed surfaces during the Construction Phase, namely:

- Cut surfaces (e.g., highwalls and pits).
- Rock fill surfaces (e.g., infrastructure pad fill areas and ELF's).
- Roadway surfaces.
- Infrastructure areas (e.g., WTP and coal storage pads, etc).
- Unrehabilitated or partially rehabilitated surfaces.
- Soil stockpile areas.

The following facilities will be constructed within the Construction Phase:

- Project Stage -1 (Figure 21):
 - The Waimangaroa River Crossing (connection of the MFS Access Road to the UWHR).
 - MFS Access Road, up to Deep Stream (including crossing of an unnamed tributary of the Waimangaroa River).
 - MFS WTP Infrastructure Area.
 - Coal Pad.
- Project Stage 0 (Figure 23):
 - MFS active WTP (including commissioning).
 - Crossing over Deep Stream.
 - MFS Access Road, up to the West Pit (includes access to the West Pit Sump and the West Pit).
 - MFS West Pit Sump.
 - Infrastructure pad adjacent to the West Pit Sump.
 - Ex-Pit ELF #1 and partial construction of Ex-Pit ELF #2.
 - Coal Pad (completion based on the remaining material from the Access Road).

5.2 Material Quantities

BRL indicate a total of ~1,789,727 m³ (bank cubic metres) will be excavated during the Construction Phase, i.e., Stage -1 and Stage 0 (Table 8). This equates to 395,665 m³ in Stage -1 and 1,394,062 m³ in Stage 0. Table 8 details the material movements occur during the Construction Phase.

Table 8: MFS material movements during the Construction Phase

ACTIVITY	CUT (bcm)	FILL (bcm)	AREA (ha)
Stage -1			
MFS Access Road	115,759	1,871	3.01
Coal Pad	-	393,794	6.1
WTP Infrastructure Area	279,906	-	2.31
Total	395,665	395,665	11.42
Stage 0			
MFS Access Road	154,355	66,004	5.74
Coal Pad	-	124,528	-
Infrastructure Pad	-	130,050	2.79
West Sump	1,239,707	-	5.00
Ex-Pit ELF #1	-	935,612	7.35
Ex-Pit ELF #2	-	137,869	4.87
Total	1,394,062	1,394,062	25.75

bcm = bank cubic meters

The Coal Pad will be constructed from the waste material from the MFS Access Road and WTP Infrastructure Area. The access road and WTP Infrastructure Area will be lined with NAF material to limit AMD. NAF material will be sourced from the construction areas, and from the ESE borrow pit (as required). Table 9 describes the classification breakdown of overburden material during the Construction Phase.

Table 9: MFS Construction Phase overburden classification (bcm)

INDICATIVE YEAR	PROJECT STAGE	NAF	LOW RISK	PAF	HAF	TOTAL OVERBURDEN ¹
■	Stage -1	-	365,500	30,100	-	395,600
■	Stage 0	599,300	210,800	414,100	169,900	1,394,100 ²

All results measured in bcm (bank cubic meters)

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

2. The MFS active Operational Phase WTP will be available near the beginning of this stage.

5.2.1 AMD Hazards

The quantity of rock within Stage -1 is approximately that of the existing BV ELF that is located at the existing Escarpment Mine (356,000 m³). The BV ELF generates 10-20 tonnes of acidity per year, hence management of AMD seepage from the planned ELF's. Three ELF's are planned during the construction

phase, the Coal Pad ELF, and two Ex-Pit ELFs planned at the south of the West Pit. Seepage from these structures will be:

- Directed to pWTPs located within or around the ELFs for treatment of AMD and TSS up until such stage that the active WTP is operational, at which points seepage will be directed to the active WTP.
- Any areas that cannot be passively directed to passive treatment systems at closure will be identified during the Construction Phase, and will be constructed using NAF materials (e.g., fill areas of the MFS Access Road).

Acidity and AMD sludge loads have been determined for the Construction Phase at MFS (MWM, 2026I) as shown in Table 10. Analysis indicates that ~40 tonnes of acidity will be generated in the first year and ~140 tonne of acidity in the second year of Construction Phase (Stage -1 and Stage 0) and ~20,000 m³ of AMD sludge will be created by the treatment of this acidity over the 2-year period.

Table 10: MFS 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

Green cells relate to the Construction Phase.

bcm = bank cubic metres.

5.3 MFS Access Road

The MFS Access Road has been designed to minimise disturbance by following the ridgeline across the topography. Key design details are:

- 3.4 km in length, with a width allowing for 1.5 times the width of the largest vehicle (Volvo A60 (60 t payload, 100 t gross) or equivalent).
- Single lane access, supplemented with passing bays.
- Drainage channels on each side, with safety berms where appropriate.
- Sediment retention ponds and associated water management structures spaced along the length of the road.
- Lining with NAF material as a roading base.

The construction of the MFS Access Road will generate moderate quantities of cut material. The cut material from this, the WTP infrastructure area, and crossing constructions will be utilised to construct the MFS Coal Pad located at the base of the MFS Access Road (i.e., an ELF).

5.3.1 Water Crossings

Three significant water crossings (see Figure 21) are proposed along the length of the MFS Access Road:

- To connect the MFS Access Road to the UWHR a culvert crossing over the Waimangaroa River is required. It is proposed that access across the Upper Waimangaroa River to MFS be achieved through the installation of large box culverts (5 barrels of ~4 m high x ~4 m wide).
- A culvert crossing across an unnamed tributary reporting to site 17W in the Waimangaroa River (downstream of water monitoring location Smokestack).
- Access to the MFS mining area across Deep Stream Gorge is planned via a 48 m long Truss Bridge as part of the MFS Access Road.

Disturbance to waterways associated with the installation of culverts and bridges has the potential to increase TSS in the related waterways. The management of these effects are discussed in BRL (2026a).

5.4 Fill Areas

Fill areas will be required along the MFS Access Road for crossing depressions in the topography. The Coal Pad and West Pit Ex-Pit ELF will be constructed of fill material as ELFs. The following is noted:

- Table 11 presents the fill volumes for the MFS Access Road, with respect to downstream water quality compliance monitoring locations. The associated three larger fill areas are shown in Figure 21.
- Fill volumes associated with the Coal Pad is described in Table 8.
- Fill volumes associated with the West Pit Ex-Pit ELFs is shown in Table 8.
- The WTP Infrastructure Area has no fill associated with it.

Table 11: MFS Access Road associated fill volumes

REPORTING MONITORING SITE	FILL VOLUME (bcm)
2W (Smokestack)	200
SW03	240
17W	2,596

Where bcm = bank cubic metres

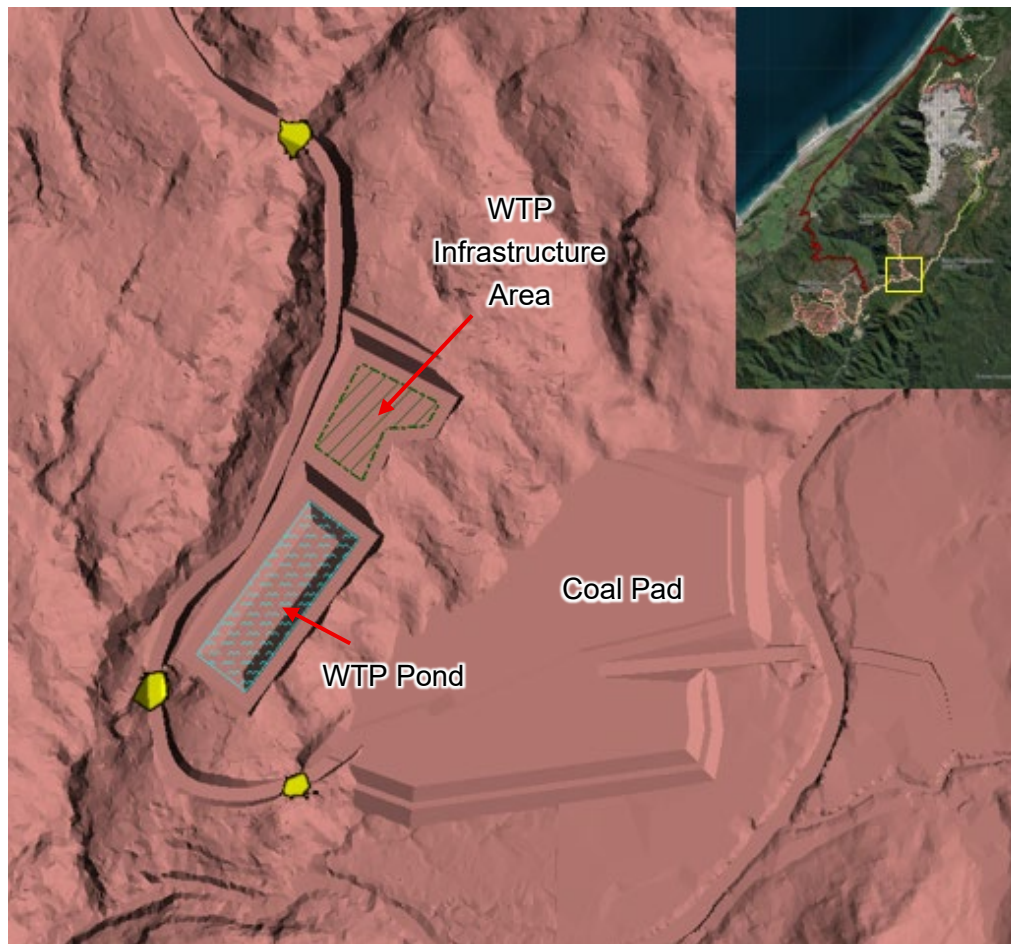


Figure 21: MFS Access Road associated WTP Infrastructure Area and Coal Pad

Source: Supplied by BRL; major fill areas of the MFS Access Road are highlighted yellow.

5.5 Coal Pad

Waste rock from the excavation of the MFS Access Road and WTP Infrastructure Area will be used to construct the Coal Pad. The Coal Pad will be located on the western banks of the Waimangaroa River, where the MFS Access Road joins the UWHR. The pad will be constructed to utilise waste rock to form an engineered platform of ~6 ha surface area for stockpiling coal from MFS to be transported to Stockton Mine. The Coal Pad will be constructed as an ELF, with seepage being directed to a MSR for treatment.

5.6 West Pit Sump, Infrastructure Pad and Ex-Pit ELFs

The West Pit Sump will be constructed ahead of mining to allow collection of all MIW associated with the West Pit. It will also act as a surge sump for the active WTP. It is designed to have a maximum potential volume of 750,000 m³, requiring 1,239,707 bcm of waste to be excavated, which will be placed within two Ex-Pit ELFs.

An infrastructure pad, located on an ELF adjacent to the West Pit Sump, will allow for a small, temporary supervisory office and crib room.

5.7 Project Stage -1 Construction Activities

Project Stage -1 activities include construction of the Waimangaroa River and unnamed tributary crossings, construction of the Coal Pad, WTP Infrastructure Pad, and the southern portion of the MFS Access Road (South of the Deep Stream crossing). Construction commences once there is access from the UWHR.

5.7.1 Water Management

During the Construction Phase water will be managed in the following manner:

- A sump will be constructed within the Coal Pad area (~10,000 m³) and will be utilised for treatment of AMD impacted waters associated with the construction of the Coal Pad, WTP Infrastructure Area, and a section of the MFS Access Road. A small pWTP will be used to dose neutralising agents (either Ca(OH)₂ or NaOH) to incoming waters to provide near-source neutralisation of acidic waters, allowing targeted treatment of AMD to pH 7.5 to maximise removal of metals; as described in the Water Treatment Report (MWM, 2026i).
- The construction activities will be undertaken following the Erosion and Sediment Control Plan for Land-Disturbance Activities (BRL, 2026a), and, where waters are impacted by AMD, are directed to the Coal Pad sump for treatment. This will be completed by gravity (where possible) and pumping (as required).
- The treatment system will operate such that, where possible, waters entering the Coal Pad sump are confined to a single inlet where dosing and mixing can occur. Sedimentation and flocculation / precipitation will occur within the sump. Waters discharging from the sump are expelled to the Waimangaroa River (upstream of monitoring site Smokestack).
- During high flows, waters will continue to pass through the sump for sedimentation, however, a portion of suspended solids may pass through to the outlet. Additional sediment management controls will be made available (e.g., floc addition to waters entering sumps).
- The MFS Access Road will be lined with NAF material. These waters are expected to not be significantly impacted by AMD and will be discharged via sediment ponds to the receiving environment at completion of the MFS Access Road, unless suitable for discharge prior. These discharges will be monitored to identify any effect to the waterway
- After construction and commissioning of the active WTP, any AMD waters will be treated via the active MFS WTP, while waters requiring only sedimentation will be managed through local sedimentation ponds as per BRL (2026a).

Figure 22 provides a general schematic, illustrating water movements and treatment during the construction phase activities.

Figure 23 illustrates planned water movements during the Stage -1 construction phase, presents impacted water catchments and the planned disturbance areas during this phase.

A priority activity for the Construction Phase is the establishment of the MFS active WTP and associated WTP ponds as soon as practicable to minimise potential effects of the Project. It is anticipated this will be constructed early within Stage 0 but before the end of Stage 0.

The following notes are provided:

- Acidity and TSS loads will be derived from the MFS Coal Pad and WTP Infrastructure area as well as from the MFS Access Road.
- AMD sludge captured in the sump will be periodically removed and will be sent to the Pit 3 Pit Lake based at ESE or by disposal in cells within ELF's at ESE.
- TSS will be the dominant contributor to AMD sludge during the Construction Phase (due to lesser quantities of ELF seepage).
- A basal drainage network will be required to capture all seepage from the Coal Pad to direct this water to collection sumps for treatment and then enable the construction of a MSR post construction.
- Sumps will be constructed around the Coal Pad to manage surface runoff.
- The management of TSS associated with the construction of these facilities during the Construction Phase is discussed in BRL (2026a).
- A water take is planned adjacent to the Waimangaroa River near the proposed MFS Access Road crossing for Project-related activities (i.e., for operation of the pWTP, dust suppression, etc.).

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

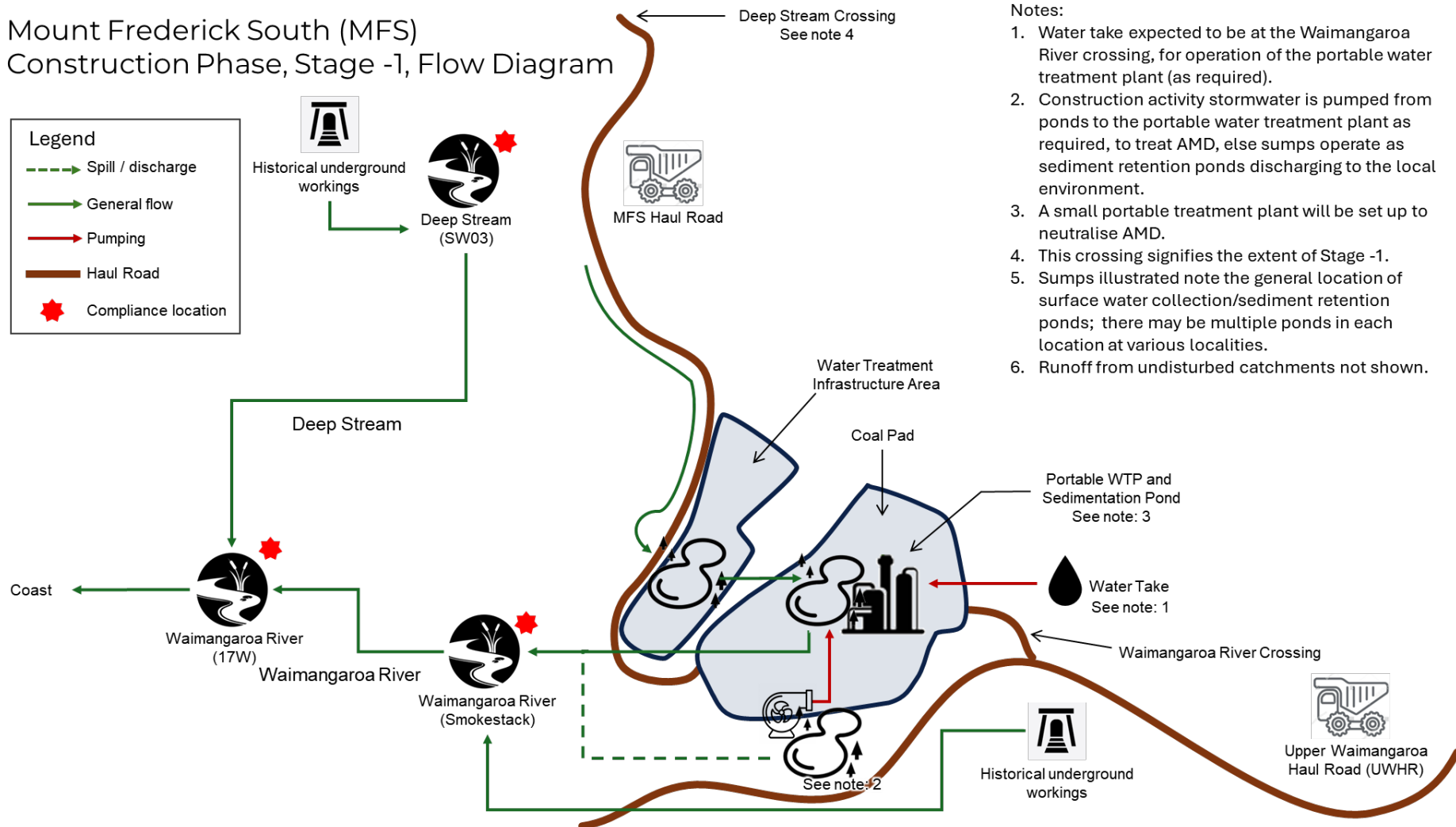


Figure 22: MFS Construction Phase Stage -1 water management

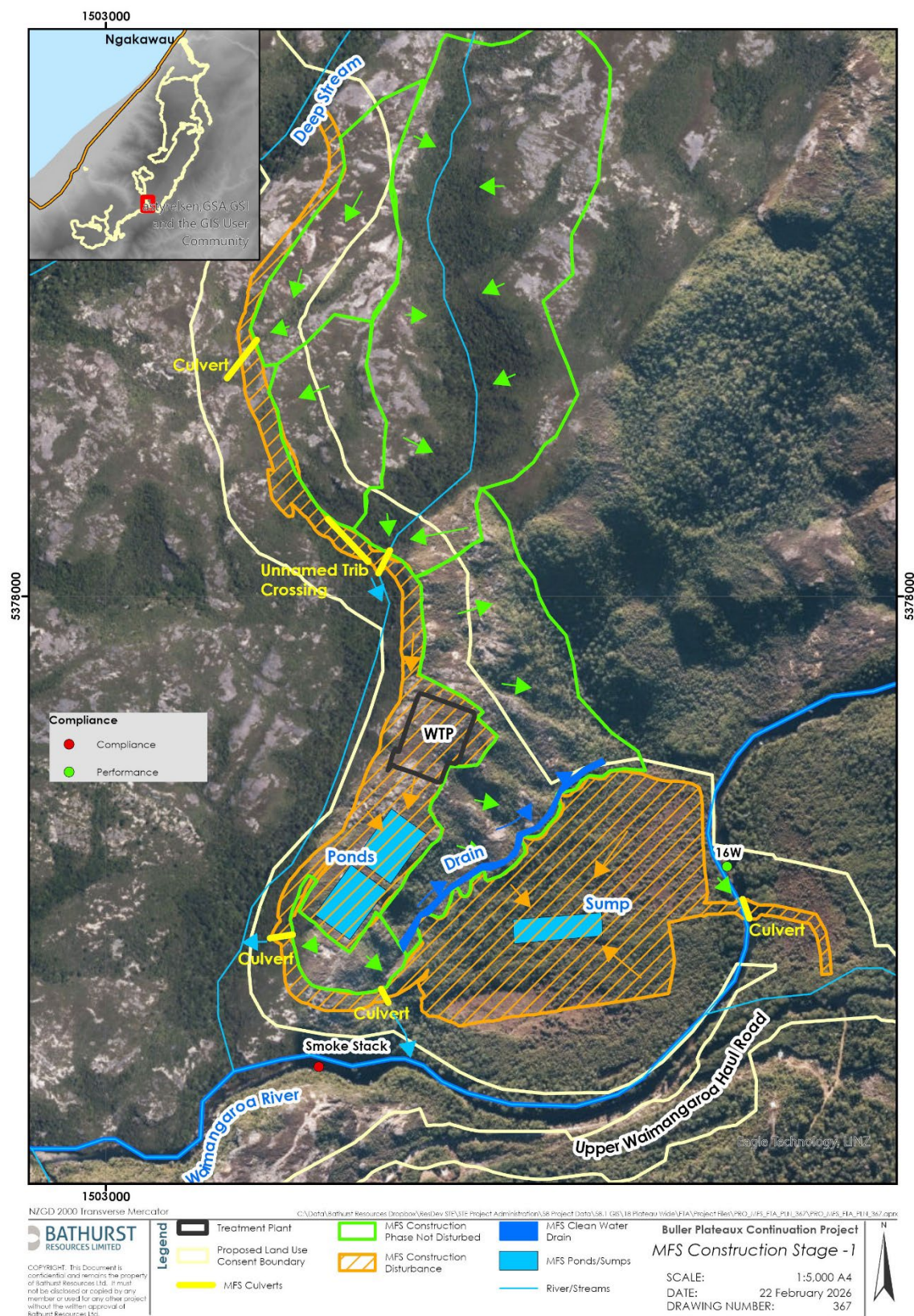


Figure 23: MFS Construction Phase Stage -1 disturbance.

5.8 MFS Stage 0 Construction Activities

Stage 0 encompasses completion of the MFS Access Road up to the West Pit (includes access to the West Pit Sump and the West Pit), construction of the West Pit Sump (including the construction of associated Ex-Pit ELF), construction of an infrastructure pad adjacent to the West Sump, construction and commissioning of the MFS active WTP, and completion of the Coal Pad with the remaining overburden of the MFS Access Road.

5.8.1 Water Management

During the Construction Phase, mine impacted waters will be managed by the following processes:

- Construction water, where impacted by AMD, will continue to report to the treatment system located at the Coal Pad until a treatment sump can be constructed within the West Pit construction area. It will collect:
 - West Pit ELF seepage and surface runoff.
 - West Pit Sump waters.
 - Infrastructure Pad seepage and surface runoff.
 - MFS access road runoff.
- The treatment sump will include a pWTP and will dose neutralising agents to the AMD impacted water (either $\text{Ca}(\text{OH})_2$ or NaOH) to provide near-source neutralisation of acidic waters, allowing treatment of AMD increasing pH to ~7.5.
- The construction activities will be undertaken following the Erosion and Sediment Control Plan for Land-Disturbance Activities (BRL, 2026a). Where waters are impacted by AMD, these waters will be directed to the treatment sump. Waters requiring only sediment management will be managed using sediment retention ponds before discharge to location drainage paths.
- The treatment system (treatment sump and pWTP) will operate such that, where possible, waters entering the treatment sump are confined to a single inlet where dosing and mixing can occur. Sedimentation and flocculation / precipitation will occur within the sump.
- During higher flows, waters continue to pass through the treatment sump for sedimentation, however, a portion of suspended solids may pass through to the system. Additional sediment management controls will be made available (e.g., floc addition).
 - Water discharging from the sump will be directed to a tributary of Deep Stream (upstream of monitoring site SW03) as shown in Figure 24.
 - Treated water may be pumped to the Waimangaroa River (using the planned WTP pipeline) for better dilution of trace metals.
- The MFS Access Road and infrastructure areas will be lined with NAF material. These waters will be discharged via sediment ponds to the receiving environment at completion of construction unless suitable for discharge prior. Discharges will be monitored to identify any effect to the waterway.

- After construction and commissioning of the active WTP, all AMD and TSS impacted waters will be treated via the MFS active WTP, while waters requiring only sedimentation will be managed through local sedimentation ponds as per BRL (2026a).
- After the Construction Phase is complete, the treatment sump will continue to operate as a collection point for the West Pit ELF seepage which will be pumped to the West Pit Sump. The West Pit Sump becomes the main collection point for pumping mine impacted waters to the MFS active WTP during the Operational and Active Closure phases of the Project.

Figure 24 illustrates planned water movements during the Stage 0 Construction Phase, presents impacted water catchments and the planned disturbance areas during this phase.

Figure 25 provides a general schematic, illustrating water movements and treatment during the construction phase activities.

The following notes are provided:

- Acidity and TSS loads will be derived from the West Pit Sump and associated ELFs, and the infrastructure pad.
- AMD sludge captured in the sump and from the active WTP will be periodically removed and will be sent to the Pit 3 Pit Lake or to cells within ELFs at ESE, or to Stockton for disposal.
- TSS will be the dominant contributor to AMD sludge during the Construction Phase (due to lesser quantities of ELF seepage).
- A basal drainage network will be required to capture all seepage from the ELFs and Infrastructure Pad to direct this water to collection sumps for treatment and then enable the construction of a MSR post construction.
- Sumps will be constructed around the ELFs, Infrastructure Pad and access road to manage surface runoff.
- The management of TSS associated with the construction of these facilities during the Construction Phase is discussed in BRL (2026a).
- A water take is planned adjacent to the Waimangaroa River near the proposed MFS Access Road crossing and from the local ponds to provide water for Project-related activities (e.g., dust suppression and commissioning / operation of the MFS active WTP).

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

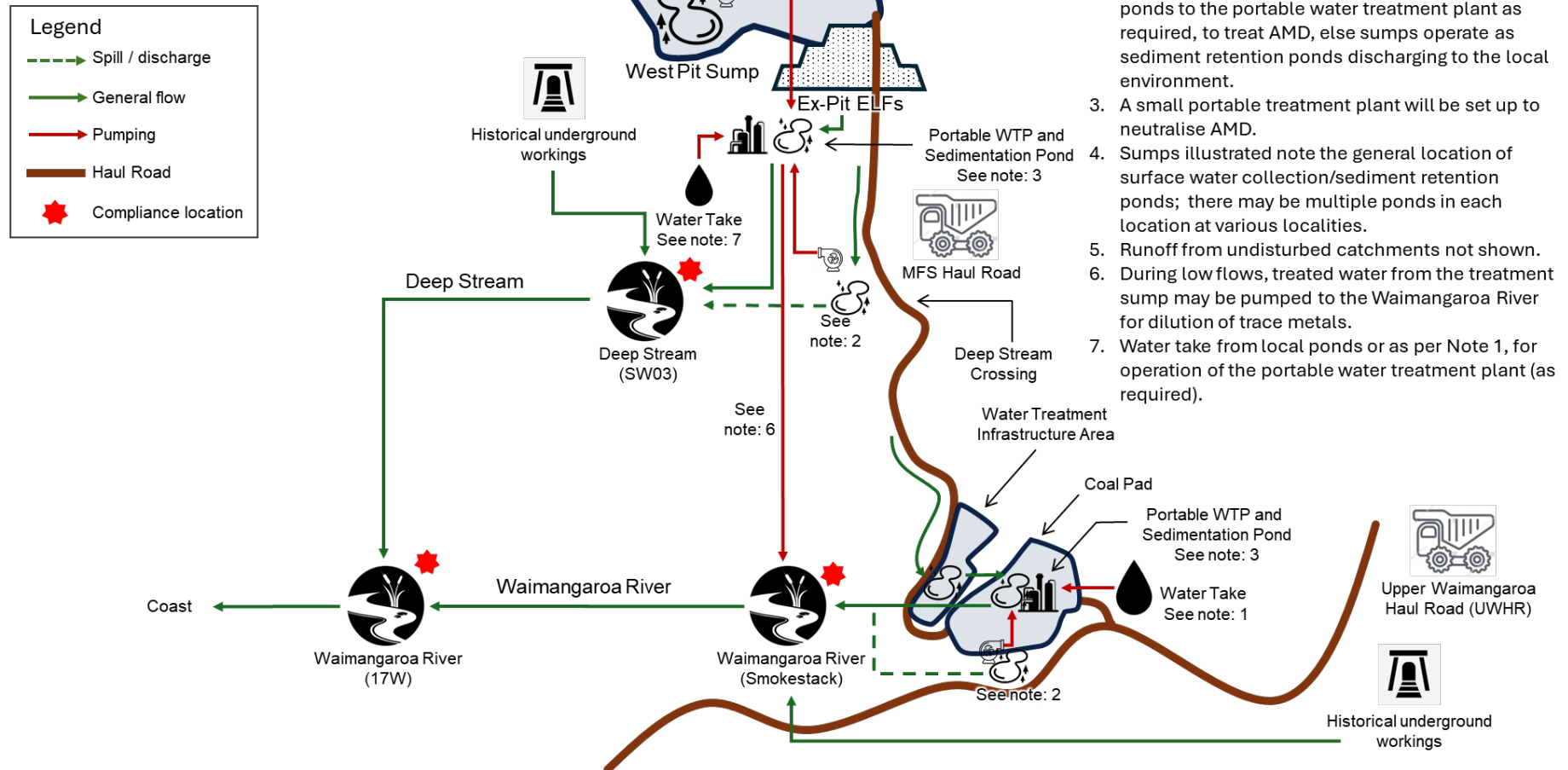


Figure 24: MFS Construction Phase Stage 0 water management.

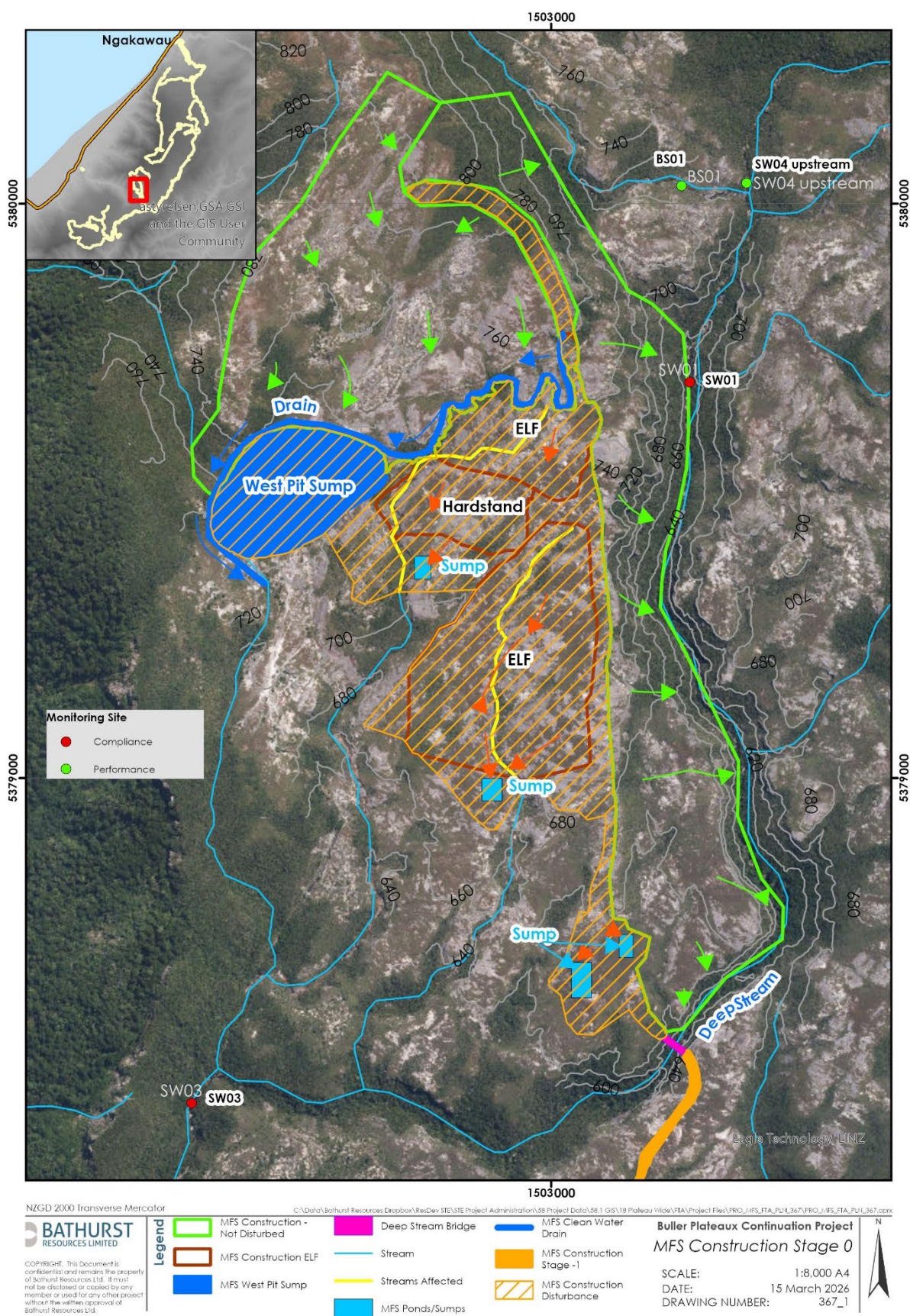


Figure 25: MFS Construction Phase Stage 0 disturbance

5.9 Monitoring

Compliance monitoring is to be undertaken to ensure effects on receiving waterways are minimal. This will include the following locations as shown in Figure 9:

- 2W (Smokestack) in the Waimangaroa River.
- SW01 in Deep Stream
- SW03 in Deep Stream.
- 17W in the Waimangaroa River

Compliance criteria for turbidity, pH, and dissolved metals include those potential constituents of concern (PCOC) recommended by Hickey (2026).

Performance monitoring is proposed to ensure any effects on receiving waterways are minimal for the Construction Phase at MFS (Stage -1 and Stage 0). This will include:

- Monitoring of sediment retention ponds, to ensure TSS and AMD effects are being managed and are in alignment with expectations (BRL, 2026a, 2026e). Further details are provided in the AMD Water Management Plan (BRL, 2026e).
- Monitoring of any pWTP activities for AMD and TSS to ensure discharge water is suitable for release (i.e., compliance is expected to be achieved at compliance monitoring locations). Further details are provided in the AMD Water Management Plan (BRL, 2026e).

See Figure 9 for proposed performance and compliance monitoring locations. Adaptive management processes will be in place to manage any observed deviation from expectations.

5.10 Post Construction Water Management

At completion of construction and commissioning of the MFS active WTP, the following activities will be undertaken as the sub-area transitions into the Operational Phase:

- MIW within MFS sub-area will be managed through use of the MFS active WTP.
- The temporary Coal Pad sump used for Construction Phase water treatment will be decommissioned.
- Batter slopes are rehabilitated and surface water will be directed to the receiving environment.
- Sumps constructed around the Coal Pad to manage surface runoff will continue. Waters will be discharged using erosion and sediment control processes (BRL, 2026a). Where waters are affected by AMD, that may affect compliance at Smokestack, they will be pumped to the MFS active WTP.
- Sumps constructed to collect the Coal Pad seepage will be converted into MSRs and/or polishing ponds for passive treatment of seepage flows; this is expected to occur in 2029 (MWM, 2026j).
- The treatment sump at the West Pit will transition to a surge sump which directs its flows to the active WTP until such time that the West Pit Sump construction is completed. This sump will

continue to capture the ELF seepage and surface runoff (until such time that it's rehabilitated where surface runoff can be directed into the receiving environment); post construction of the West Pit Sump, these waters will then be pumped to the West Pit Sump (MWM, 2026j).

- Post-construction, NAF material will be placed atop the MFS Access Road surface, and treatment is then limited to sediment management through use of local sediment retention ponds and erosion management.

6 UWHR

This section describes the Construction Phase activities associated with the UWHR sub-area of the BPCP. The potential effects of the UWHR during the operational and closure phases are also summarised within this section given the static nature of the haul road and the requirement to focus on source control during construction to minimise long term management requirements (i.e., on-going treatment) during the Post Closure Phase.

6.1 Background

The UWHR traverses through the Waimangaroa River catchment, the Hut Stream catchment, the Gomorrah Creek catchment, and the Burnett Stream catchment where the road cuts through sections of BCM and KMS materials. The upper Waimangaroa River catchment has relatively limited historic mining disturbance compared to the Hut Stream, Gomorrah Creek, and Burnett Stream catchments, which pass through historic mining areas (see Figure 28). However, it is affected by historic mining operations at Stockton (i.e., pre 2017 mining by Solid Energy (New Zealand) limited and its state-owned predecessors) due to AMD from the southern areas of the mine and other activities as identified in the UWHR site visit (MWM, 2026d).

6.2 General Haul Road Design

6.2.1 Introduction

The proposed UWHR has been designed to accommodate road trains for the purpose of transporting coal from the ESE and MFS sub-areas to Stockton Mine's CHPP. The road surface will largely be unsealed, although construction of the running surface will support sealing as required on steep gradients where maintenance becomes an issue. Figure 26 illustrates a typical cross-section design for the UWHR.

Typical features of the UWHR will include:

- Lining of the roadway with a NAF aggregate material and cambered from the centre outwards.
- Roadside drainage paths.
- Edge protection, in the form of safety bunding.
- Benched highwall profiles, and
- Fill areas.
- Highwall and clean water diversion drains / culverts.

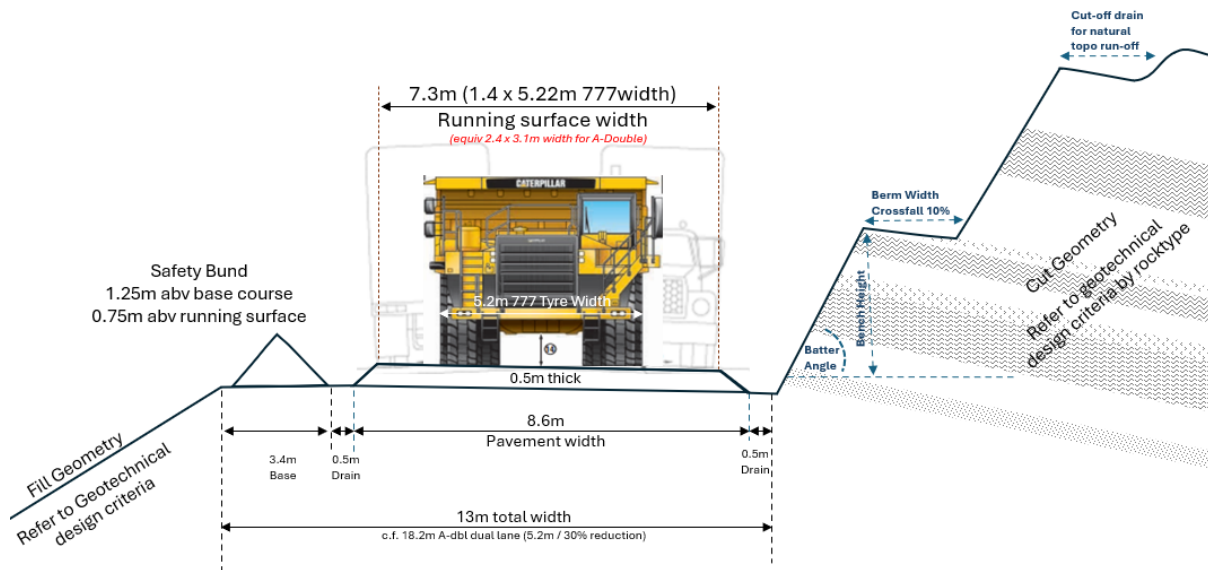


Figure 26: Section views of the typical haul road layout for the UHWR.

Source: BRL (2025a)

6.2.2 Sediment and Erosion Control

Construction activities will entail disturbing land to form the roadways and infrastructure areas, followed by rehabilitating and stabilising the land to limit erosion and sediment generation. Throughout this process, controls will need to be in place to minimise the effect on the environment. Surface erosion management and control is guided by GD05 (Auckland Regional Council, 2023), amended for higher rainfall environments, and is described within the Erosion and Sediment Control Plan for Land Disturbance Activities (BRL, 2026a). Key principles during the construction process include:

- Sediment and erosion control planning prior to disturbance.
- Minimising disturbance of the construction footprint.
- Clean water diversions around the disturbance footprint.
- Implementation of sediment control structures and perimeter controls.
- Protection of surfaces to reduce the risk of surface erosion.
- Monitoring and reviewing of infrastructure.

Figure 27 provides an example of these principles for the UHWR.

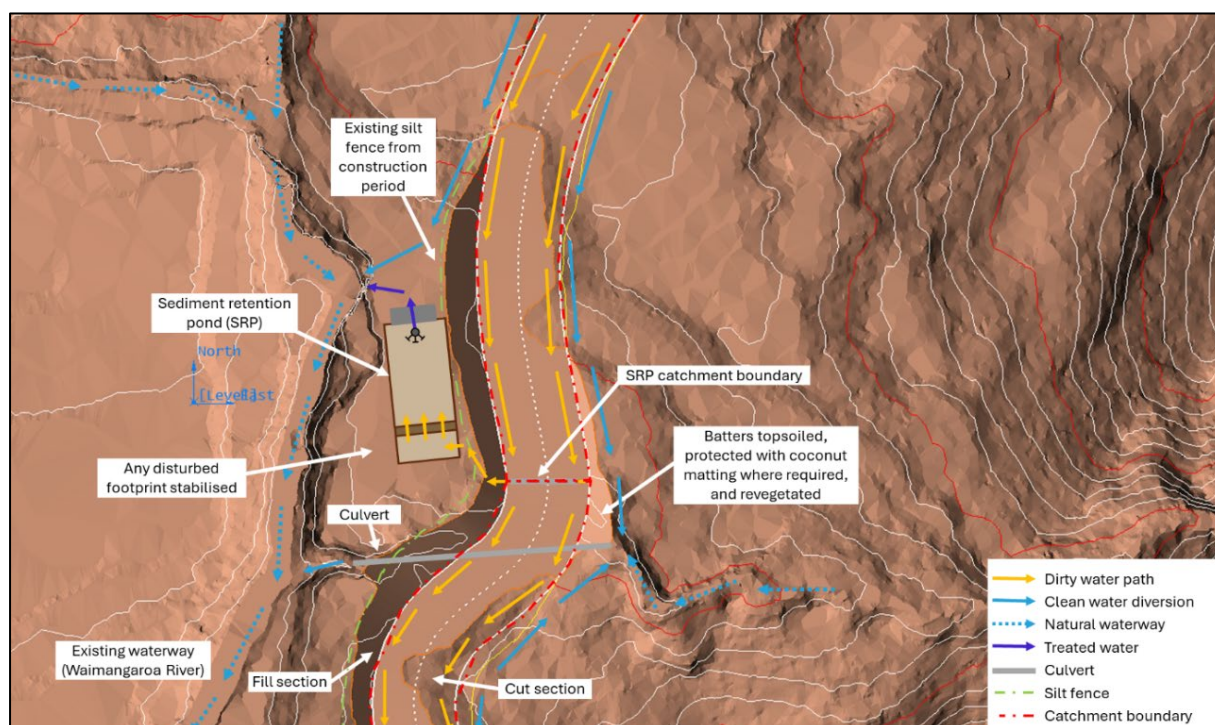


Figure 27: Sediment and erosion control plan (depicted as post-construction).

Source: BRL (2025b)

6.2.3 UWHR Cut Areas

UWHR cut surface areas that have the potential to encounter AMD generating lithologies are provided in Table 12. The sum of these surfaces is 2.87 ha (3D area). The cut surfaces residing upstream of monitoring point Smokestack represent a 3D surface area of 1.61 ha, that intersects various lithologies (i.e., PAF and NAF KMS, BCM).

Table 12: UWHR cut section surface areas with AMD potential.

REPORTING MONITORING SITE	INTERSECTING LITHOLOGY	3D CUT SURFACE AREA (ha)	2D CUT SURFACE AREA ¹ (ha)
2W (Smokestack)	PAF KMS	0.20	0.17
2W (Smokestack)	NAF KMS	0.57	0.48
2W (Smokestack)	BCM	0.84	0.71
17W *	PAF KMS	0.09	0.08
17W *	BCM	0.20	0.17
BUR.L1	BCM	0.97	0.82
Total	KMS (PAF + NAF), BCM	2.87	2.44

Source: BRL

1 – Based on a factor of $0.85 \times 3D$ Cut Surface Area

* 2W (Smokestack) reports through to 17W, however, for clarity of additional cut surfaces outside of the 2W contribution, 17W figures have been presented as the total cut area less 2W cut areas.

For the purpose of understanding effects within the Smokestack catchment, the MFS Access Road has been incorporated into this AEE where it would have a bearing on water quality. Cut surfaces relating

to the MFS Access Road, reporting to Smokestack, have a total surface area of 1.02 ha (3D area). Cut surfaces relating to the WTP infrastructure area will be managed by active treatment during the Operations and Active Closure Phases of MFS (MWM, 2026j) and will be rehabilitated at closure; therefore, this area is not considered to have an effect on the Waimangaroa River water quality at Smokestack.

The total 3D cut surface area that resides upstream of the Smokestack catchment as a result of construction activities is 2.63 Ha.

6.2.4 UWHR Fill Areas

Numerous fill areas will be present along the UWHR alignment, however, many fill areas are of small volume or are a thin covering of cut sections (i.e., road base). Table 13 presents the major fill areas (greater than a 2 m depth) along the UWHR. The location of major fill sections with a volume greater than 10,000 m³ are identified as fill section numbers **4** and **6** in Table 13 and in Figure 28.

Table 14 presents the total quantities of fill required to achieve the proposed road design, identifying a total of 76,327 m³ of BCM and 123,417 m³ of granite.

Table 13: UWHR major BCM fill areas

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

* 2W (Smokestack) reports through to 17W, however the 17W figures have been presented separately for clarity.

BCM fill volumes includes granite as being necessary to make up the required fill. Sections presented in bold represent fill volumes greater than 10,000 m³; locations of these areas are presented in Figure 28 as red circles.

Table 14: Total UWHR fill volumes

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

* 2W (Smokestack) reports through to 17W, however the 17W figures have been presented separately for clarity.

Fill sections relating to the MFS Access Road are described in Table 11 and include:

- One section of 200 m³, where drainage from these materials will report to Smokestack.
- A combined volume of 2,396 m³, where drainage from these materials will report downstream of Smokestack to 17W.

A total of 2,596 m³ of fill areas associated with the MFS Access Road will report to the Waimangaroa River.

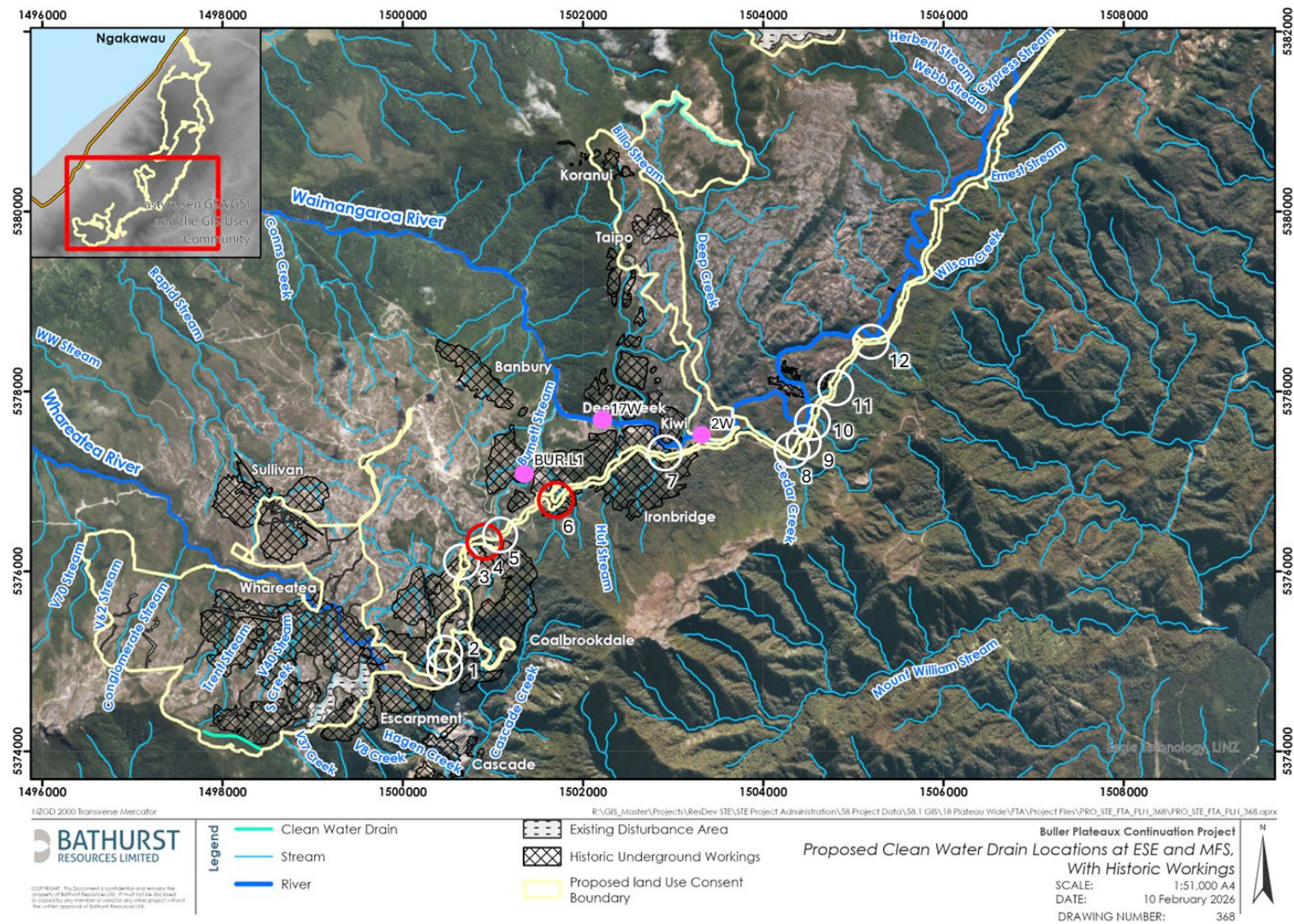


Figure 28: UWHR major BCM fill section localities.

Circles represent data in Table 13. The UWHR section north of fill location 12 uses granite material for fill, i.e., no BCM will be used in this section of road.

6.2.5 Ironbridge Mine Workings

The proposed UWHR alignment is over the Coalbrookdale Mine and Ironbridge Mine underground workings. Historic information suggests these underground workings are within 10 m of the proposed road surface for some sections. Further information is provided in Section 3.1.

The management of these voids, beneath the UWHR is required for health and safety reasons and to manage environmental risks. BRL advise that any underground workings beneath the UWHR alignment might be managed by a number of methods depending upon the proximity of historical workings to the road surface, the volume of UG voids remaining, the host rock geology, anticipated pavement loads and the risks the combination of these factors present. Remediation, if required, could include blasting the roof to collapse the void with additional fill being placed over top, rafting of the road base across historical workings through the placement of additional foundation fill thickness or grouting where voids are small and not open or connected at depth.

Impact to water quality from controlled collapse of the Ironbridge underground mine workings is required during construction of the UWHR. This will be addressed during the detailed design phase and potential discharges to the receiving environment will be assessed and managed such that water quality limits are achieved.

6.3 Assessment of Effects

In consideration of the UWHR design and construction effects, and the relevant aspects of the environmental setting, the key environmental hazards to waterways associated with the UWHR sub-area are identified to be:

- Release of sediment associated with disturbance of the roadway footprint; and
- Geoenvironmental hazards associated with the blasting and collapse, exposure, and movement of cut and fill materials with the potential to generate AMD.

6.3.1 TSS

The potential effects of TSS are well recognised and have been assessed as part of the wider Project related studies. The management of TSS is explained in:

- The Water Treatment Report: MFS and ESE (MWM, 2026i)
- The Sludge Management Report (MWM, 2026l).
- The Sediment Overview Report (MWM, 2026m)
- Erosion and Sediment Control Plan for Land Disturbance Activities (BRL, 2026a)
- AMD: ELF Management Plan (BRL, 2026d)
- AMD: Water Management Plan (BRL, 2026e)
- Water Infrastructure Design Plan (BRL, 2026b)
- Mine Closure Concept Strategy (BRL, 2026g)

6.3.2 AMD

Geological information for the UWHR sub-area has been regionally derived from the Geological and Nuclear Sciences 1:250,000 scale QMAP. BRL's Vulcan block model (BRL, 2024a), and field validation (Holmes, 2024) indicating the presence of BCM and KMS within the UWHR development corridor (Appendix A). Modelling also suggests significant colluvium sourced from the Mt William Range is present in the catchment, some of which represents landslide material.

Previous studies (MWM, 2026d,h) have presented ABA data for the proposed UWHR and have shown that the BCM and KMS are PAF within the proposed road corridor. KMS includes both NAF and PAF materials according to the geological model (MWM, 2026d). Colluvium material within the UWHR has not been classified but is conservatively assumed to be PAF for the purposes of this assessment.

To confirm the site-specific conditions, several samples were collected along the UWHR corridor during a site visit in September 2024 (Figure 29) to understand the AMD potential of the near surface lithologies (MWM, 2026d, provided in Appendix B). The following near surface lithologies were identified and sampled along the corridor:

- Quaternary deposits (colluvium) – colluvium, landslide deposits, and talus, which have been mobilised from further up the slope and comprise a mixture of siltstones, sandstones, mudstones and carbonaceous materials (not sampled).
- BCM – observed within existing current road cuttings / ditches, exposed outcrops on the plateau (sites 1 to 3).
- KMS – highly weathered and in locations including streambanks (sites 4 to 9, and 11 to 13).

Results from the ABA analysis of 12 samples are provided in Appendix B, and the data are summarised as follows:

- BCM samples were predominantly classified as PAF and had very little ANC, which is in agreement with the general understanding of this lithological unit. Total sulfur concentrations in the BCM ranged from 0.055 to 2.46 wt %S with an average concentration of 0.93 wt %S, with one sample collected from the BCM sandstone pavement (Sample WHR#9) classified as NAF.
- Both weathered and unweathered KMS were predominantly classified as PAF, with weathered mudstone exhibiting low ANC. Total sulfur concentrations ranged from 0.087 to 2.83 wt %S with an average concentration of 1.49 wt %S.

Data are also available from geochemical testing of drillholes at either end of the proposed UWHR. These data are provided in Appendix C.

Some samples identified as NAF KMS in the geological model had very little ANC and were acid generating. It was noted that NAF KMS may convert to PAF material over geological time periods as carbonate minerals leach out, possibly under low O₂ conditions preserving sulfides. As part of the construction activities, road materials encountered will be further characterised to ensure they are dealt with appropriately.

Colluvium within the UWHR has not been classified for AMD potential but is conservatively assumed to be PAF for the purposes of this assessment. Colluvium will be transported to Stockton and/or ESE for disposal within an ELF.

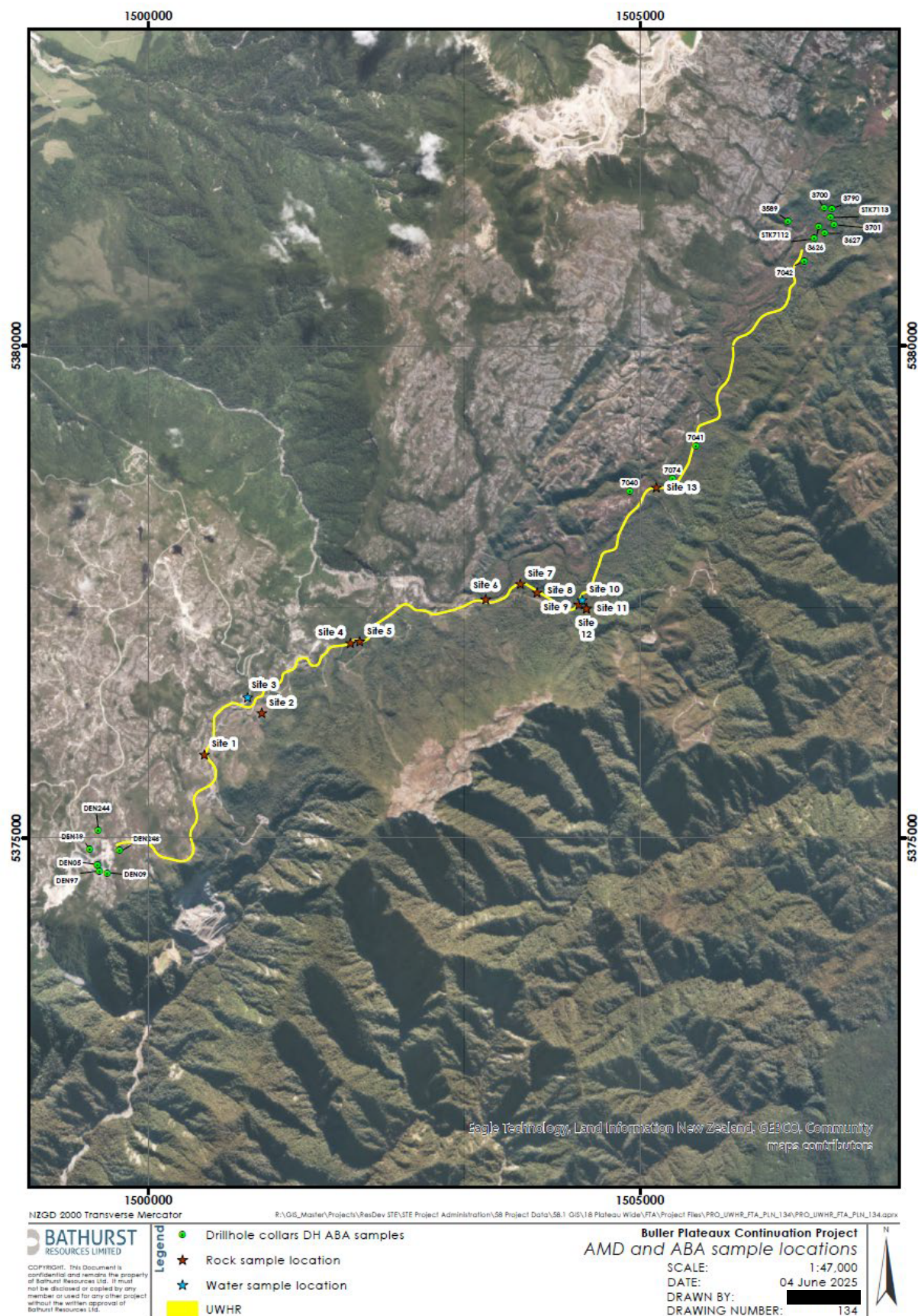


Figure 29: Map of site visit sampling locations.

Further details provided in Appendix B. Drillhole ABA data are provided in Appendix C.

6.3.3 Background Water Quality

Two water samples (Site 3 and Site 10, (blue stars) - see Figure 29) were collected during the site visit from a roadside ditch (Site 3) and from a seep (Site 10). These data are presented in Table 15, with comparison to water quality consent limits for the Whareatea River, as per the conditions of consent (RC10193) for the existing Escarpment Mine, as screening criteria to provide context on water quality parameters that may be elevated in the Waimangaroa catchment. These water quality reference values (WQ Ref Value) are useful to provide a preliminary contextualisation of the potential impacts of AMD and TSS for the Project (noting new criteria have since been developed for the BPCP (Hickey, 2026)).

Table 15. Water Quality Data – UWHR (Waimangaroa River).

PARAMETER NAME ¹	UNITS	SITE 3	SITE 10	WQ REF VALUE ²
LAB CERTIFICATE ID		817-2024-00088098	817-2024-00088099	
pH	Unitless	3.8	7.0	4.5 – 6.5
EC	mS/m	7.9	12.0	---
Total alkalinity	mg CaCO ₃ /L	<1	43	---
Acidity to pH 8.3	mg CaCO ₃ /L	15	14	---
TSS	mg/L	26	13	15
Total dissolved solids	mg/L	44	79	---
Turbidity	NTU	19.1	15.7	15
Chloride	mg/L	3.57	4.65	---
Sulfate	mg/L	17.2	4.22	---
Aluminium	mg/L	0.844	0.011	0.5
Antimony	mg/L	<0.001	<0.001	---
Arsenic	mg/L	<0.001	0.002	---
Boron	mg/L	<0.03	<0.03	---
Cadmium	mg/L	<0.0002	<0.0002	0.0012 / 0.0003
Calcium	mg/L	0.3	11.7	---
Chromium	mg/L	<0.001	<0.001	0.20 / 0.05
Cobalt	mg/L	0.0012	0.0009	0.18 / 0.044
Copper	mg/L	0.0030	<0.0005	0.0013 / 0.002
Iron	mg/L	1.06	0.91	1.1 ³
Lead	mg/L	0.0007	<0.0005	0.026 / 0.0065
Magnesium	mg/L	0.44	6.60	---
Manganese	mg/L	0.0238	0.383	1.1 ³
Mercury	mg/L	<0.0005	<0.0005	---
Nickel	mg/L	0.0058	0.0015	0.068 / 0.017
Potassium	mg/L	0.52	0.32	---
Selenium	mg/L	<0.005	<0.005	---
Silica	mg/L	4.99	4.01	---
Sodium	mg/L	3.05	3.75	---
Thallium	mg/L	<0.0005	<0.0005	---
Tin	mg/L	<0.0005	<0.0005	---
Zinc	mg/L	0.022	<0.002	0.54 0.012

1 - Metals are reported as dissolved concentrations.

2 - Dual limits are provided for contaminants when pH < 5.5 and pH > 5.5 as per RC10193;

3 - The compliance limit for Fe and Mn is a combined value of 1.1 mg/L

Red data illustrates exceedance of the reference value.

Source: MWM (2026d).

Results show that a few parameters exceed the water quality reference values for the two samples. The following comments are provided:

- The seepage identified at Site 10 had a pH > 6.5 as well as high alkalinity (43 mg/L CaCO₃ equivalent). Also at this location was Site 9 with Sample WHR#9 being identified as NAF KMS, which suggests the source of this seepage might be from NAF KMS.
- The water sample collected in the roadside ditch (Site 3) was low pH (pH 3.8).
- Sulfate (at Site 3) is low (< 20 mg/L) but highest in the roadside cutting water sample.
- Al, Cu, and Zn (at Site 3) are elevated, likely as a result of AMD associated with the existing road cutting through BCM.
- The sample from Site 3 is considered to be a reasonable representation of water quality from highwalls through the BCM, although this should be adjusted for sulfur content to address AMD risk.

The water quality monitoring location Smokestack (Figure 8) is located on the Waimangaroa River at the southern end of the Upper Waimangaroa catchment. Water quality monitoring provides preliminary background water quality for the catchment (MWM, 2026c). This data indicates that the existing Waimangaroa River water quality at Smokestack can be elevated in metals such as Al and Zn, which is related to a combination of natural seeps, historic mine workings, and existing roads. For water quality modelling purposes these preliminary data are used as background water quality and are inputs into the water and load balance models.

6.3.4 Performance Monitoring

The following performance monitoring locations (Figure 9) are proposed:

- Burnetts Creek at water monitoring location BUR.L1 relating to the construction of the UWHR. The following notes are provided:
 - Monitoring will be for turbidity and metals as explained in the AMD Water Management Plan (BRL, 2026e).
 - Turbidity data will be used for performance monitoring to ensure the management of sediment is appropriate (BRL, 2026a).
 - The stream is degraded by AMD. The performance objective is the water quality will be no worse than current background water quality.
- Waimangaroa River at water quality monitoring locations WRBBC, 14W, 15W and 16W relating to the construction of the UWHR. The following notes are provided:
 - Monitoring will be for turbidity and metals as explained in the AMD Water Management Plan (BRL, 2026e).
 - During the construction and operational phases at the MFS sub-area, water will be discharged upstream of monitoring site Smokestack (MWM, 2026j). Additional performance monitoring (at 16W) to understand any effects on water quality that relate to the UWHR.

- Any sediment ponds that discharge from the UWHR waters into Cascade Creek will be assessed for turbidity as explained in the AMD Water Management Plan (BRL, 2026e).

6.3.5 Compliance Monitoring

Compliance monitoring location is required for the UWHR to provide monitoring of any effects on water quality within the Waimangaroa River. This will be undertaken within the Waimangaroa River at monitoring locations 2W (Smokestack) and 17W.

The proposed water quality compliance limits for these water quality monitoring sites are provided in Hickey (2026).

Water monitoring location 2W was selected as an effects assessment site for understanding potential effects the UWHR construction may have on the receiving environment. This was based on the following reasons:

- The location of Smokestack is below the initial section of MFS Access Road crossing over the Waimangaroa River and can therefore assess the cumulative effects of the MFS and UWHR sub-areas.
- The location is downstream of a significant portion of the proposed UWHR.
- The site has a longer history of water quality data collection when compared to site 17W further down in the catchment.
- Smokestack provides an assessment of water quality for multiple tributaries, noting the impracticability of monitoring numerous minor waterways along the length of the UWHR.

6.4 Management of AMD Effects: Cut Surfaces

The following sections present an estimation of the acidity loads associated with the cut surfaces of the UWHR (as explained in Table 12) and the proposed engineering controls for the management of these loads.

6.4.1 Analysis

A water quality model was developed to understand the effects of AMD from the UWHR cut surfaces at Smokestack. Derivation of cut surface water quality source terms for the UWHR sub-area have been defined in MWM (2026e) using data available from monitoring site MRC3, a section of BCM within the Grand Canyon (Mackenzie, 2008).

The resulting UWHR highwall / cut surface source term is presented in Table 16 as UWHR Cut Surface, where data are derived from site 3 along the UWHR (Figure 29). Data are presented as a daily load (kg/ha/day), where a decreasing concentration occurs with an increasing rainfall, as illustrated in Figure 30 by acidity within the St Patricks Stream at Stockton. The model takes this load and mixes it with the Waimangaroa River water quality at monitoring site Smokestack.

Source terms for the Waimangaroa River have been defined using sampling data from Smokestack. The sampling period is from February 2025 to August 2025 and data are available in MWM (2026c).

Table 16. Source terms UWHR cut surfaces

PARAMETER	Site 3 ^{3, 4} (mg/L)	UWHR CUT SURFACE (kg/ha/day)
Average wt% S	-	0.932
pH ²	3.8	-
Acidity to pH 8.3	15	5.48
Chloride	3.57	1.30
Sulfate	17.2	6.28
Aluminium	0.844	0.31
Antimony	<0.001	0.00018
Boron	<0.03	0.005
Cadmium	<0.0002	0.00004
Calcium	0.3	0.110
Chromium	<0.001	0.00018
Cobalt	0.0012	0.00044
Copper	0.0030	0.0011
Iron	1.06	0.39
Lead	0.0007	0.00026
Magnesium	0.44	0.161
Manganese	0.0238	0.009
Mercury	<0.0005	0.00009
Nickel	0.0058	0.002
Potassium	0.52	0.19
Selenium	<0.005	0.0009
Sodium	3.05	1.114
Tin	<0.0005	0.00009
Zinc	0.022	0.008
Silica	4.99	1.82
Arsenic	<0.001	0.00018
Thallium	<0.0005	0.00009

1 - Upper Waimangaroa Haul Road = which uses the average sulfur for the area (MWM, 2026d)

2 - pH is not converted into a load due to the complexity of assignment to variable flow rates. A pH of 3.8 has been used for modelling, which is for a high sulfur content (0.932 wt% S) compared to other Project areas and is considered conservative.

3 - With the exception of pH (unitless), all concentrations are reported in mg/L.

4 - Source: MWM (2026d)

Red data uses ½ the limit of reporting concentrations to determine load

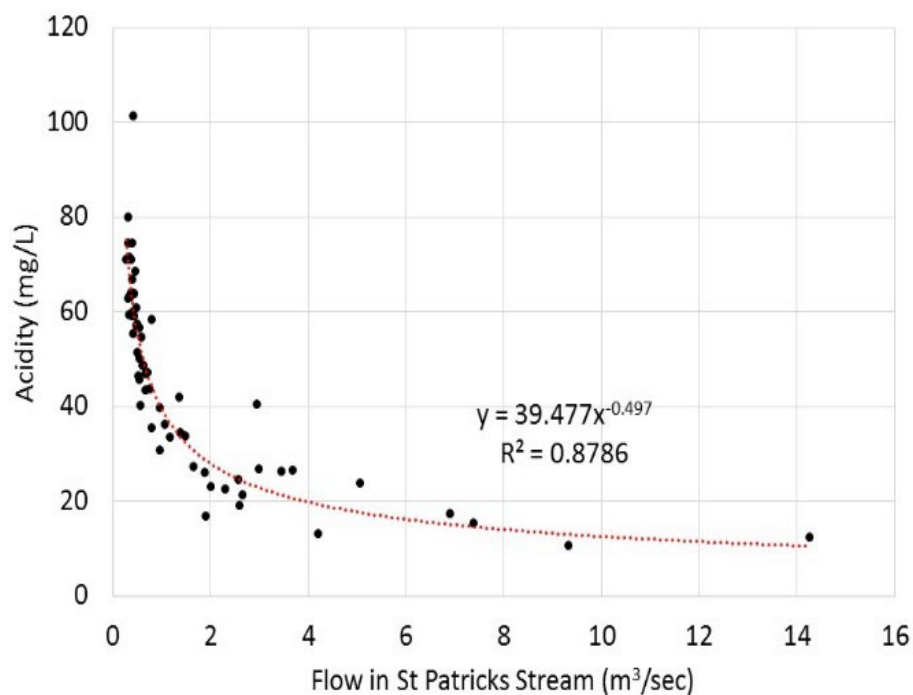


Figure 30: Flow versus acidity – St Patricks Stream (S16), Stockton Coal Mine.

Source: Weber et al. (2015)

Flow rates within the modelling were as follows:

- UWHR cut surfaces were based on the W-M2 flow yield (refer Section 3.3.4) and 2D cut surface areas (refer Table 12). W-M2 was used due to the catchment being typically considered a flashy site and is likely to act similarly to the road cut surfaces exposed by the UWHR.
- Flow rates for the remaining Smokestack catchment utilised the Smokestack flow yield and the respective catchment area less that of the cut surfaces.

Table 17 provides the flow yield data used to estimate cut surface flow values. These results are illustrated in Figure 11. For the purpose of modelling a worst-case water quality, the 95th exceedance percentile flow yield has been chosen (formatted bold in the following table).

Table 17: 24-hour volume yield.

EXCEEDANCE PERCENTILE	24 HOUR VOLUME YIELD (m³/ha/day)	
	SMOKESTACK	W-M2
95th	10.71	0.72
75th	18.43	3.77
50th	36.63	16.09
25th	136.65	137.26
10th	377.47	369.36

Source: Supplied by Bathurst Resources Ltd

6.4.2 Potential Effects

To understand the potential effects of the UWHR and MFS cut surfaces on water quality at monitoring site Smokestack, the following approach was undertaken:

- The cut surfaces load associated with PCOC was derived using the method presented in the Source Term Report (MWM, 2026e) for the UWHR (0.932 wt% S).
- This load was applied into a numerical model to estimate water quality at Smokestack, based on 95th exceedance percentile flows (as shown in Figure 11).
- Table 18 provides the estimated cut surfaces concentration based on the 95th exceedance percentile flow yield (i.e., what water quality may be observed coming off cut surfaces based on the given flow yield).
- Table 19 provides the predicted water quality at Smokestack, based on the Table 18 concentrations and average water quality at Smokestack, relative to 95th exceedance percentile flows.

The water quality consent conditions (RC10193) for the Escarpment Mine were used as a reasonable water quality reference value (WQ Ref Value) for this analysis.

Table 18: Cut surface water quality at the 95th exceedance percentile flow yield

ANALYTE ¹	RESULTANT CONCENTRATION	WQ REF VALUE ²	
		pH <5.5	pH >5.5
	mg/L	mg/L	mg/L
Aluminium	501	0.5	0.5
Cadmium	0.059	0.0012	0.0003
Chromium	0.30	0.2	0.05
Cobalt	0.71	0.18	0.044
Copper	1.8	0.0013	0.002
Iron	630	1.1	1.1
Lead	0.42	0.026	0.0065
Manganese	14.1	1.1	1.1
Nickel	3.4	0.068	0.017
Zinc	13.1	0.054	0.012

1 – Metals concentrations are expressed as dissolved metals.

2 – Based on water quality consent conditions (RC10193) for the Escarpment Mine

Bold text identifies analytes considered main PCOC (based on the order of magnitude difference between the WQ Reference Value and the resultant concentration). Note – the concentrations are high as runoff is unlikely under this model scenario (0.01 L/ha/s).

Table 19: Smokestack resultant water quality at the 95th exceedance percentile flow yield

ANALYTE ¹	SMOKESTACK MEAN CONCENTRATION	RESULTANT SMOKESTACK CONCENTRATION	WQ REF VALUE ²	
			pH <5.5	pH >5.5
	mg/L	mg/L	mg/L	mg/L
Aluminium	0.36	0.41	0.5	0.5
Cadmium	0.00008	0.000085	0.0012	0.0003
Chromium	0.00033	0.00036	0.2	0.05
Cobalt	0.004	0.0041	0.18	0.044

ANALYTE ¹	SMOKESTACK MEAN CONCENTRATION	RESULTANT SMOKESTACK CONCENTRATION	WQ REF VALUE ²	
			pH <5.5	pH >5.5
	mg/L	mg/L	mg/L	mg/L
Copper	0.00025	0.00041	0.0013	0.002
Iron	0.05	0.107	1.1	1.1
Lead	0.0001	0.00014	0.026	0.0065
Manganese	0.12	0.121	1.1	1.1
Nickel	0.006	0.006	0.068	0.017
Zinc	0.021	0.022	0.054	0.012

1 – Metals concentrations are expressed as dissolved metals

2 – Based on water quality consent conditions (RC10193) for the Escarpment Mine

Smokestack water quality source: MWM (2026c)

Orange data illustrate exceedance over a single pH compliance range for Zn (no toxicity modification applied)

It should be noted that:

- Whilst the concentrations (Table 18) can be calculated based on various flows and a constant load method, it does not mean this water quality will occur in the field as a conservative approach has been used and surfaces are unlikely to generate runoff at flows of 0.01 L/ha/s .
- At low flows the cut surfaces are not expected to generate runoff. At the 95th exceedance percentile it is assumed that a low rainfall event generates the flow on the cut surface that generates high concentrations.

The following information is deduced from the water quality model:

- Cut surface water quality parameters (as compared with the WQ REF Value), indicate that Al, Cu, Fe, and Zn are the main potential constituents of concern (PCOC) as compared to mean water quality data for Smokestack (see Table 18).
- The tabulated data (Table 19) shows that zinc is identified as a PCOC that could be elevated at Smokestack. However, Smokestack water quality, when screened against the water quality reference values, exceeds the limits without the additional of the UWHR cut surfaces (based on Smokestack background water quality should pH be elevated above pH 5.5).
- Whilst the additional conservative load from cut surfaces has a modest increase in concentration, a key driver of water quality at Smokestack is the current impact of historic mining and disturbance.

As the exposure of PAF material (cut surfaces) is to be relatively small, and spread throughout the catchment, a dilution method is proposed for managing the AMD generated from exposed PAF surfaces.

6.4.3 Engineering Controls for Cut Surfaces

Minor engineering controls are required for cut surfaces to manage AMD effects. Drainage channels will be constructed along the extent of the haul road and, where required, will direct runoff from cut surfaces to sediment retention ponds to be treated with the haul road waters. Treatment of these sediment ponds using a pWTP may be used to ensure compliance with water quality limits.

6.4.4 Adaptive Management

Performance monitoring and adaptive management processes will be in place to manage any observed deviation from expectation (e.g., contributing to aesthetic effects (iron staining) and/or potential non-compliance with regards to water quality objectives at compliance and performance monitoring locations). Further details are provided in the AMD Water Management Plan (BRL, 2026e).

6.5 Management of AMD Effects: Fill

Fill material for the UWHR will be derived from suitable material generated (BCM) in the cut sections of the roadway, which will be supplemented with NAF granite material sourced from the ESE or A-Drive borrow pits. BRL has advised that cut material, which is geotechnically (or otherwise) unsuitable for road fill (i.e., KMS and colluvium) is to be disposed of within existing waste rock disposal areas at Stockton or ESE in accordance with existing operational waste management practices.

Nominal⁸ amounts of excess/unsuitable material proposed for co-disposal at Stockton and ESE:

- Stockton: up to 50k bcm.
- ESE: up to 25k bcm.

These quantities are considered negligible relative to planned overburden disposal volumes at each site (e.g., Table 5).

6.5.1 Analysis

In order to evaluate the potential acidity load from the fill areas a source hazard evaluation was undertaken as explained in (Table 20), which presents the assumptions and outcomes of the acidity load evaluation for a 10,000 m³ fill area with a maximum depth of 2 m and no management controls.

Table 20: 10,000 m³ fill area load evaluation

SOURCE TERM	VALUE	UNITS	ASSUMPTIONS
ACIDITY LOAD INPUTS			
Fill volume	10,000	m ³	Nominal base case load volume.
Fill area	5,000	m ²	Equivalent to 0.5 Ha
Fill depth	2	m	The majority of large fill areas have an average depth of 2 m
Fill mass	22,000	tonnes	Assumed BCM backfill density = 2.2 t/m ³
Average sulfur content of fill	0.932 wt%	wt %S	Based on approximately average sulfur concentration in BCM from grab samples from the area (MWM, 2026d).
Maximum potential acidity (MPA)	30.6	kg H ₂ SO ₄ /t	Conversion of wt %S to acidity
Total acidity load	639	t CaCO ₃	Acidity potential contained within the fill material (converted from H ₂ SO ₄ /t equivalence to CaCO ₃ /t equivalence.

⁸ The nominal quantity, not based on a materials balance. The detailed quantity is to be confirmed as part of routine materials management during the construction phase with opportunities taken to utilise material in-situ along the UWHR to the greatest extent practicable based on its suitability for construction.

SOURCE TERM	VALUE	UNITS	ASSUMPTIONS
Acidity	85	mg CaCO ₃ /L	Derived from predicted average water quality from seepage at the Cypress North PAF ELF (1,230 mg/L) through an 18 m high PAF column adjusted to a fill thickness of 2 m = 137 mg/L. Note: Cypress North PAF ELF was used as a better example of a higher sulfur fill area. Average sulfur content for the Cypress North PAF ELF is 1.5 wt%, hence the acidity (mg/L) was reduced by 0.932wt%S/1.5wt%S.
Average rainfall	5,400	mm/yr	
Net Percolation	0.5 ¹	unitless	50% of rainfall will percolate into the fill.
ACIDITY LOAD OUTPUTS			
Annual Infiltration rate	13,500,000	L/yr	Average rainfall x surface area x runoff coefficient
Flow rate	0.43	L/s	Annual infiltration rate converted to flow rate
Acidity load	36	mg/s	Acidity x flow rate
Acidity load	0.0036	mg/m ³ /s	Acidity load/m ³

¹ - Used as a conservative value until further data is obtained

The predicted acidity flow rate of 36 mg/s from a 10,000 m³ fill area represents a total acidity load release to the catchment of ~1.1 t/yr with an annual reduction of the total sulfur load (e.g., MPA) within the fill of approximately ~0.18% per year.

6.5.2 Potential Effects

The additional acidity from the BCM fill areas after construction was determined from:

Acidity load per m³ of rock = 0.0036 mg/m³/s (Table 20).

- The quantity of BCM fill within the catchment (78,924 m³), noting that BRL suggest BCM is the only suitable PAF material that will be used as fill, while the remaining fill will be NAF granite (and does not contribute to acidity load).
- Flow yield of 10.71 m³/ha/day (95th %ile, 10.71 m³/ha/day).
- The catchment size (2,467 ha).

Table 21: Fill volumes by catchment

MODEL ASPECT	UNITS	SMOKESTACK	17W ¹	BUR.L1	TOTAL
Catchment area	Ha	1,680	287	500	2,467
Total BCM fill volume	m ³	24,568 [#]	10,524 [#]	44,032	78,924 [#]

[#] Includes volumes associated with the MFS Access Road as 200 m³ reporting to Smokestack and 2,396 m³ reporting downstream of Smokestack.

¹ 2W (Smokestack) reports through to 17W, however the 17W figures have been presented separately for clarity.

Acidity was calculated to be 0.94 mg CaCO₃/L once all flow paths combine (below Smokestack). This is 16% of the current acidity at Smokestack (currently 6.0 mg CaCO₃/L (MWM, 2026c)) if no management is undertaken.

Analysis indicates that ~62% of the increase in acidity (noted above) in the catchment would come from the two fill areas with volumes greater than 10,000 m³. Management of these areas using a LPL or GCL to minimise infiltration would significantly reduce the acidity load to the Waimangaroa catchment as well as mitigate effects closer to the source, reducing the additional acidity from 16% down to 6% (based on the 62% reduction associated with managing the two fill areas >10,000 m³). Given that the installation of the GCL is required during construction, rather than as a management option, the GCL should be installed as a precautionary approach. A LPL or GCL will therefore negate the requirement for treatment of these larger fill structures once constructed.

6.5.3 *Engineering Controls for Fill Materials*

Based on the outcomes of the assessment of environmental effects for the fill material, there are two fill sections within the UWHR corridor that have a volume greater than 10,000 m³ that will require management to mitigate potential risks from AMD. These locations are illustrated in Figure 28 (red circled areas 4 and 6).

An important component of the AMD management strategy is to minimise the exposure of PAF materials to oxygen and water. A LPL or a GCL has been proposed as an AMD engineering control for fill areas of concern, reducing net percolation rates and oxygen flux.

A GCL typically consists of a layer of sodium bentonite powder bonded between two or more woven and non-woven geotextiles layers. This would typically be designed with the following generic considerations:

- Fill sections being brought up to design elevation with overburden materials.
- An appropriate foundation layer applied for the GCL (i.e., base course).
- Installation of the GCL, following manufacturer installation procedure.
- A protective layer placed upon the GCL.
- NAF material placed onto the protective layer, bringing the roadway to the final design elevation.
- Batter slopes for these fill areas are expected to follow a similar process, however, revegetation of batter slopes will also be undertaken.
- Appropriate QA/QC procedures will be an essential aspect of the GCL installation process, ensuring the design performance of the GCL is achieved, reducing the risk of seepage.
- Installation of a GCL is expected to reduce hydraulic conductivity through the fill areas from 10⁻⁶ m/s to 10⁻¹¹ m/s effectively rendering the fill areas impermeable. The seepage rate and AMD load is assumed to be negligible after the GCL installation.

A LPL follows a similar process to the GCL with the installation of a single low permeability material to achieve a similar level of performance such that effects at compliance monitoring locations are negligible.

6.5.4 *Adaptive Management*

Performance monitoring and adaptive management processes will be in place to manage any observed deviation from expectations (e.g., contributing to aesthetic effects (iron staining) and/or potential non-

compliance with regards to water quality objectives at compliance and performance monitoring locations). Further details are provided in the AMD Water Management Plan (BRL, 2026e).

These adaptive management processes may include:

- Lining of road with asphalt or similar, post construction, to reduce infiltration rate.
- Lining of other smaller fill sections with GCL.

7 SUMMARY AND RECOMMENDATIONS

This report discusses the Construction Phase of the BPCP for MFS, ESE, and UWHR and provides an assessment of the potential effects, proposed monitoring and methods of minimising any potential effects associated with acid and metalliferous drainage (AMD) and elevated total suspended solids (TSS) associated with ground disturbance.

7.1 Assessment of Environmental Effects

The AEE has identified the following hazards associated with the proposed Construction Phase of the BPCP:

- Exposure and disturbance of sulfur-bearing materials may result in the release of AMD (i.e. acidity and metals) that may have an adverse impact on surface water and aquatic ecosystems (i.e., ecotoxicity issues).
- Erosion resulting in generation of sediment and release of this sediment into the aquatic environment. Sedimentation will likely occur, resulting in smothering and damage of vegetation and habitats, as well as having the potential to carry AMD pollutants into the waterways.

This relates to:

- Road Construction (UWHR and the MFS Access Road).
- Construction activities at MFS and ESE sub-areas (e.g., preliminary earthworks to construct water management infrastructure and ancillary infrastructure, and mine pre-development activities).
- The Construction Phase is approximately two years at both ESE and MFS, i.e., this is the expected time frame to gain access to the area, construct, and commission the proposed active WTPs and supporting water management infrastructure (e.g., the active WTP Surge Ponds).

7.2 General Water Management

Short term water management during the Construction Phase at both ESE and MFS will include the following features:

- Water infrastructure, such as channel, culverts, diversions, temporary sumps and permanent sediment retention ponds (BRL, 2026a).
- Pump stations and pWTPs, where required, for management of TSS and AMD.
- Performance and compliance water quality monitoring.

Water management of the UWHR and MFS Access Road during the construction and operational phases of the sub-areas (long term management) will include the following features (BRL, 2026c):

- Cut surfaces (e.g., road cuttings) and road surface run-off will be captured in sediment retention ponds that will be managed during the construction and operational phases, as per (BRL, 2026a).

- Natural surface run-off will be diverted along and under the road via channels and culverts, maintaining the natural water flow and quality feeding into the Upper Waimangaroa River.
- A water quality monitoring programme will be undertaken to inform management of environmental effects during the construction and operational phases, ceasing in the closure phase after rehabilitation of the road is complete.
- Dust will be suppressed by water spray delivered by water trucks during the Construction and Operational phases.
- AMD will be managed using source control principles such that any need for treatment is minimised.

At closure, the UWHR and MFS Access Road will be rehabilitated, allowing minimum access for site maintenance. It is expected that AMD and TSS generation will be suitably controlled for closure to not require ongoing management.

7.3 Construction Management Strategies

The following methodology will be used throughout the construction process to address the environmental risks to waterways.

7.3.1 AMD Management

Methodology includes:

- AMD generated from exposed cut surfaces along the UWHR and MFS Access Road is predicted to be minor and controlled through dilution. Performance monitoring will be established.
- Management of the larger fill areas along the UWHR and MFS Access Road (nominally identified as > 2 m high and >10,000 m³, identified as ~44% of the total BCM fill areas) is recommended to minimise AMD 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 EFA using design principles discussed in the Engineered Landform Design Philosophy report (MWM, 2026n). The specific design objectives for EFA are explained in the AMD ELFMP (BRL, 2026b).
 - Installing a LPL or GCL atop the PAF material to minimise net percolation into these materials.
 - Undertaking a performance monitoring programme for the roads to inform ongoing management of AMD effects.
- pWTPs will be used at ESE and MFS during the Construction Phase until the active WTP can be commissioned. AMD sludge will be captured and disposed into Pit 3 or to cells within ELF's at ESE or another suitable facility.

- The management of AMD risks associated with the disturbance of AMD materials during the Construction Phase is explained in the following documents:
 - AMD Water Management Plan (BRL, 2026e)
 - AMD ELF Management Plan (BRL, 2026d)

7.3.2 TSS Management

Methodology includes:

- Sediment and erosion control practices will follow the Erosion and Sediment Control Plan for Land-Disturbance Activities (BRL, 2026a).
- TSS from construction activities, post-sediment controls, is predicted to be minor.
- Performance monitoring will be established to confirm that effects are minor.
- The management of TSS is explained in the following documents:
 - Water Treatment Report: MFS and ESE (MWM, 2026i)
 - Water Infrastructure Design Plan (BRL, 2026b)
 - Erosion and Sediment Control Plan for Land Disturbance Activities (BRL, 2026a)
 - AMD: Water Management Plan (BRL, 2026e)
 - Mine Closure Concept Strategy (BRL, 2026g)
 - AMD: ELF Management Plan (BRL, 2026d)

7.3.3 Adaptive Management

An adaptive management approach should be developed to ensure that the management plans are appropriately modified as new information becomes available to reduce the environmental impact of any unforeseen risks that may arise during construction and operation of the UWHR.

7.4 Recommendations

The following recommendations are provided:

- Complete (as part of the feasibility study) further infill drilling ahead of construction along the UWHR and MFS Access Road to confirm the AMD and geotechnical nature of materials.
- Complete, ahead of construction, an assessment of AMD seeps (natural and historic) along the UWHR to map the specific sources of baseline effects.
- Complete, ahead of construction, an assessment of the effects of collapsing the Ironbridge underground mine workings on water quality and develop adaptive management processes as required.
- Ensure construction of EFAs to minimise AMD meets design requirements as explained in the AMD ELF Management Plan (BRL, 2026d).

- 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.
- Undertake an adaptive management approach for the Construction Phase and ensure adaptive management processes are in place and are explained in the AMD Water Management Plan (BRL, 2026e).

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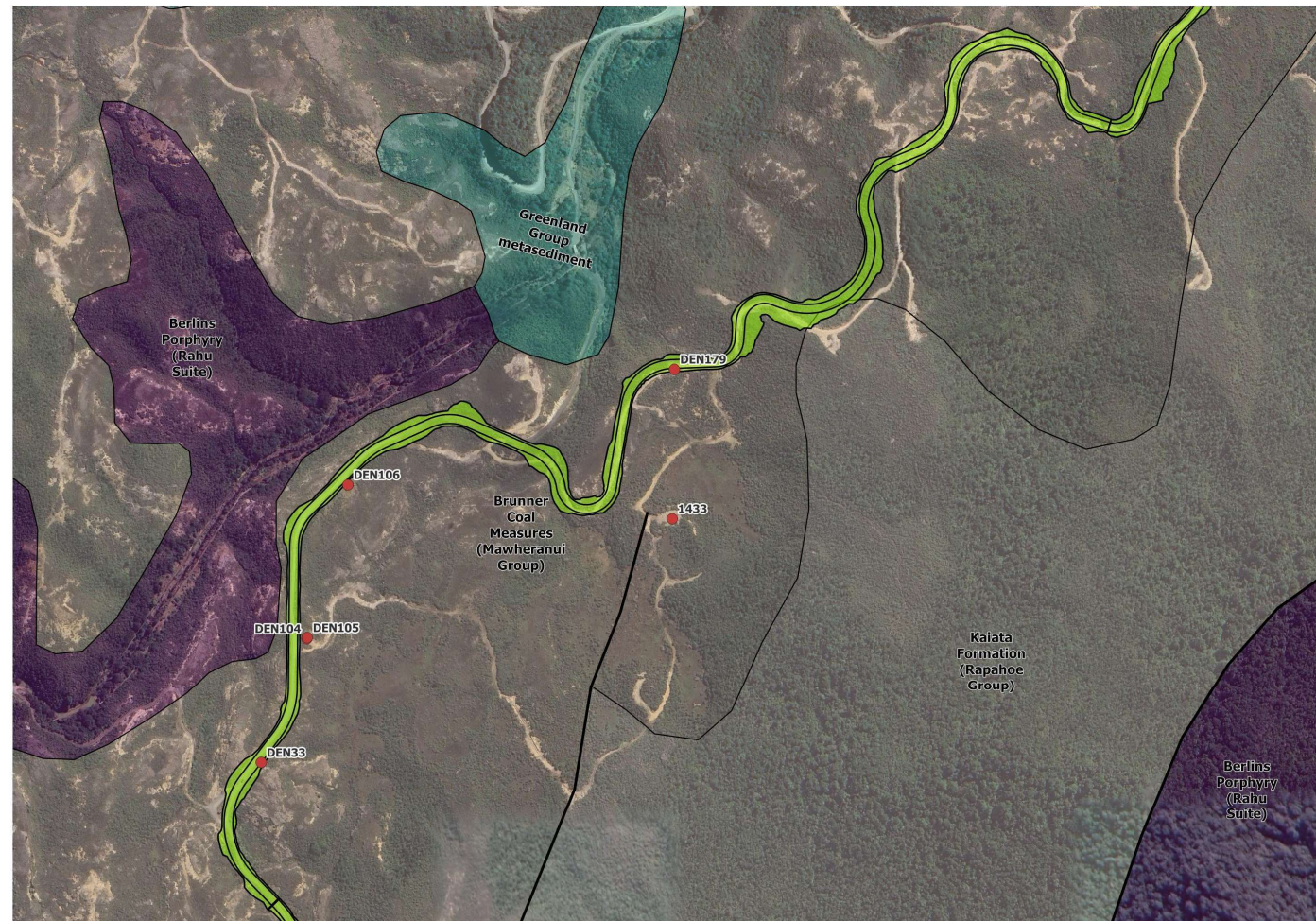
9 LIMITATIONS

Attention is drawn to the document “Limitations”, which is included in Appendix D of this report. The statements presented in this document are intended to provide advice on what the realistic expectations of this report should be, and to present recommendations on how to minimise the risks associated with this project. The document is not intended to reduce the level of responsibility accepted by Mine Waste Management, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in doing so.

APPENDIX A UWHR GEOLOGY

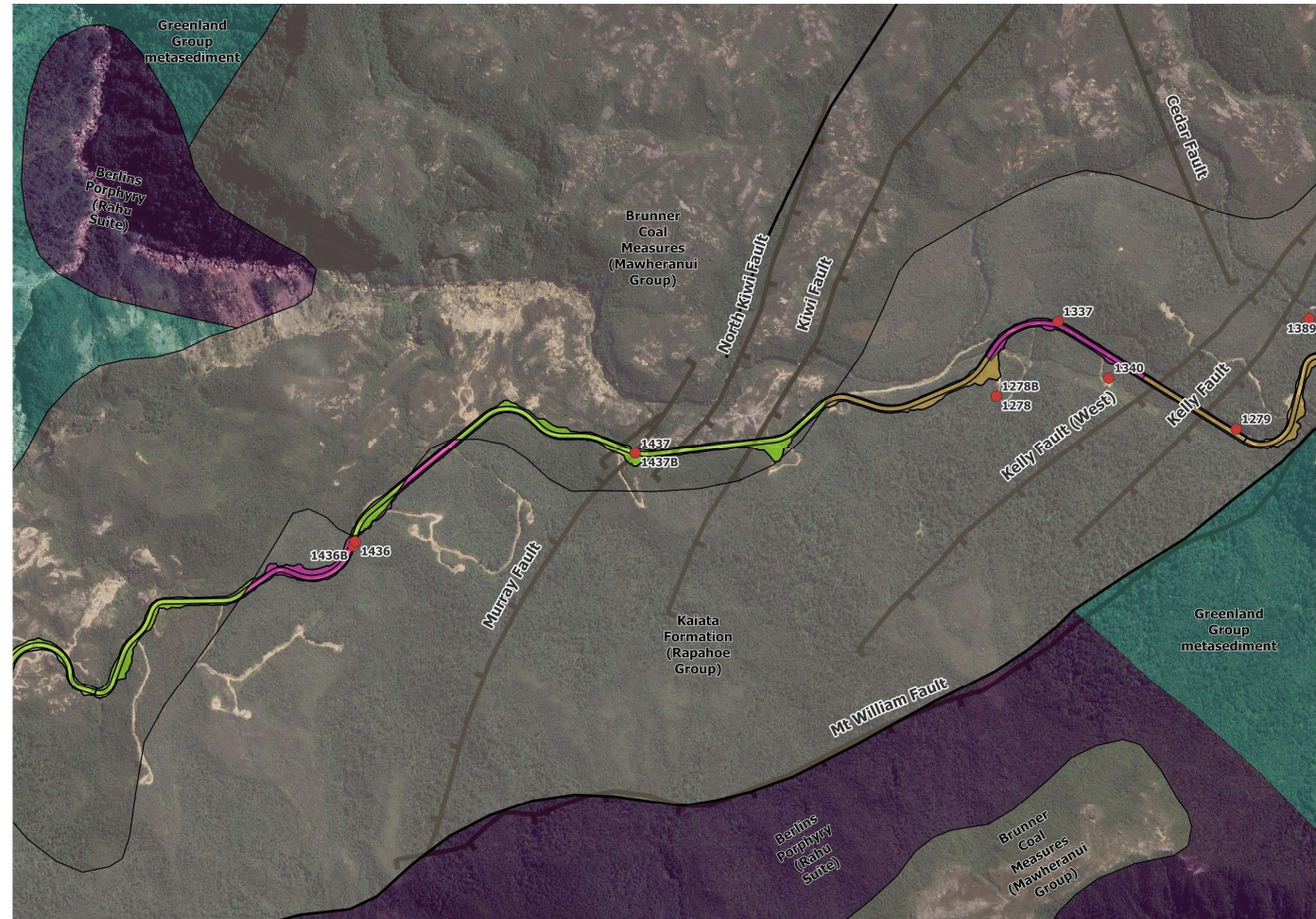
Cascade to Burnetts Face

- Drill holes within 100m of road centerline
- Rock Units intersected by Road Design
 - Brunner Coal Measures
- GNS faults
 - Inactive fault, exposed
- GNS Geological Units
 - Berlins Porphyry (Rahu Suite)
 - Brunner Coal Measures (Mawheranui Group)
 - Greenland Group metasediment
 - Kaiata Formation (Rapahoe Group)
- Google Satellite



Burnetts Face to Bridge

- Drill holes within 100m of road centerline
- Rock Units intersected by Road Design
 - Brunner Coal Measures
 - NAF Kaiata Mudstone
 - PAF Kaiata Mudstone
- GNS faults
 - Inactive fault, exposed
- GNS Geological Units
 - Berlins Porphyry (Rahu Suite)
 - Brunner Coal Measures (Mawheranui Group)
 - Greenland Group metasediment
 - Kaiata Formation (Rapahoe Group)
- Google Satellite



Bridge to Ford

- Drill holes within 100m of road centerline

Rock Units intersected by Road Design

- Brunner Coal Measures
- NAF Kaiata Mudstone

GNS faults

- Inactive fault, exposed

GNS Geological Units

- Brunner Coal Measures (Mawheranui Group)
- Greenland Group metasediment
- Kaiata Formation (Rapahoe Group)

Google Satellite



Ford to Cypress

- Drill holes within 100m of road centerline
- Cypress Consent Footprint

Rock Units intersected by Road Design

- Brunner Coal Measures
- NAF Kaiata Mudstone
- PAF Kaiata Mudstone

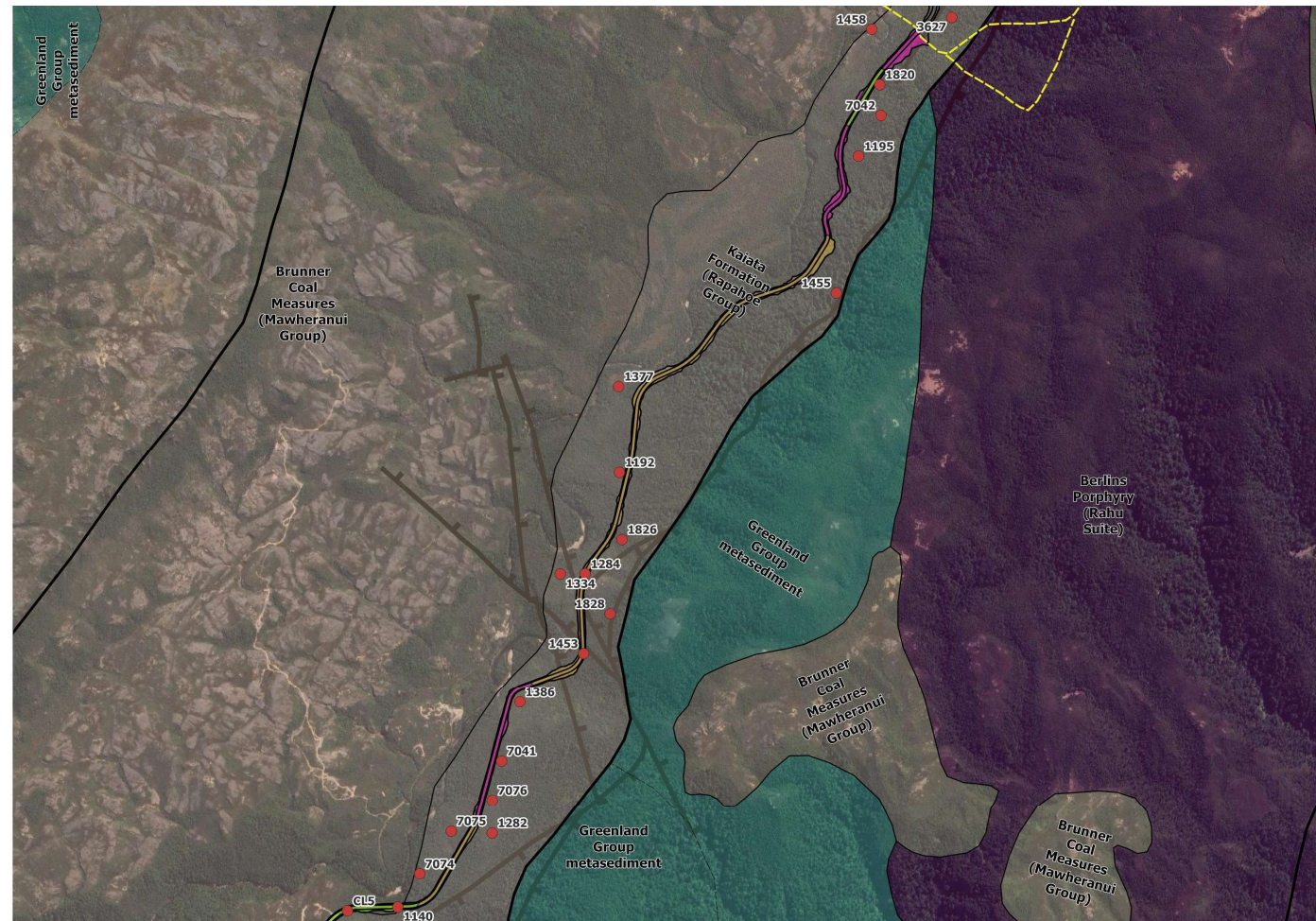
GNS faults

- Inactive fault, exposed

GNS Geological Units

- Berlins Porphyry (Rahu Suite)
- Brunner Coal Measures (Mawheranui Group)
- Greenland Group metasediment
- Kaiata Formation (Rapahoe Group)

Google Satellite



APPENDIX B UPPER WAIMANGAROA HAUL ROAD SITE VISIT

MEMORANDUM

Recipient: [REDACTED] – Bathurst Resources Limited

From: [REDACTED] – Mine Waste Management Limited

Date: 20 July 2026

Cc: [REDACTED] (BRL); [REDACTED] (BRL)

Document Number: J-NZ0453-001-M-FINAL

Document Title: Upper Waimangaroa Haul Road Site Visit

Mine Waste Management Limited (MWM) has provided this memorandum to Bathurst Resources Limited (BRL) to summarise the field notes and observations from the site visit undertaken on the 25 July 2024 to assess the proposed path for the proposed Upper Waimangaroa Haul Road (UWHR).

BACKGROUND

A site visit was undertaken to look at the UWHR alignment and obtain rock samples for geochemical classification to understand the AMD¹ source hazards and assess run-off water quality from exposed PAF² and NAF³ materials in the area. This memorandum summarises the site visit observations and supplementary data from laboratory testing of samples collected (water and rock).

BRL note that no Kaiata Mudstone or colluvium will be used as foundations for the proposed UWHR due to its poor geotechnical properties. These materials will be carted to either end of the UWHR for disposal. Such materials may have benefits for the other project areas (i.e., cover/capping material).

OVERVIEW

The following provides an overview of the key findings from the site visit:

- The site visit provided a good perspective of the proposed UWHR alignment.
- BRL has advised that cut material, which is geotechnically (or otherwise) unsuitable to be used within fill sections (such as Kaiata Mudstone and colluvium) is to be removed from the site and will be disposed of accordingly within existing waste disposal areas at Stockton and Escarpment Extended (ESE) in accordance with existing operational waste management practices.
- The proposed UWHR alignment is over the Ironbridge Mine underground workings. An image of these workings is available in Attachment A.

¹ Acid and metalliferous drainage

² PAF – potentially acid forming

³ NAF = non-acid forming

- Highly weathered Kaiata Mudstone was identified in a few locations. There may be benefit in using these materials as a capping layer to limit water and oxygen ingress into PAF materials. The quantities (hence the actual opportunity) are not defined.
- The UWHR sub-area has significant colluvium, landslide deposits, and talus, which has been mobilised from further up the slope. If these materials are from rocks that can generate AMD (e.g., a PAF material source upslope), then further characterisation is required on the geochemical nature of the colluvium. This has been seen at other projects in the area due to the deposition of landslide materials (e.g., Malloch et al., 2017).
- The geological / geochemical model needs to be validated during construction of the UWHR. For instance, further consideration is required for leaching of NAF Kaiata mudstone by net infiltration of rainfall over geological timeframes as this can leach out carbonate minerals yet preserve sulfides such that the 30 m cut-off above the Kaiata/BCM contact observed at Cypress (i.e., $\text{NAPP} = 0 \text{ kg H}_2\text{SO}_4/\text{t}$) may not apply. This has been demonstrated at Cypress Mine (McLachlan, 2022) as shown in Figure 1 where NAF Kaiata Mudstone has been converted to PAF (Weathered Kaiata).
- As part of road construction, further geotechnical drilling and geochemical analysis along the length of the UWHR, should be undertaken to validate the geological and geochemical model.
- Seepage from undisturbed catchments/ drainage paths was elevated in Fe (pH 4-5), most likely a function of groundwater interacting with geological materials elevated in Fe-bearing minerals (e.g., pyrite; Fe-carbonates). Such seeps are shown in Figure 2. This suggests that Fe will be present in seepage from NAF Kaiata Mudstone engineered landforms.
- A number of rock samples and water samples were collected during the site visit. Data are presented in Table 1 and Table 2. Results indicated the presence of PAF material and poor water quality in some areas (e.g., roadside ditches through BCM). This included elevated Al, Cu, and pH that is non-complaint with resource consent limits (RC10193) for the existing Escarpment Mine (both $> \text{pH } 6$ and also $< \text{pH } 4.5$).

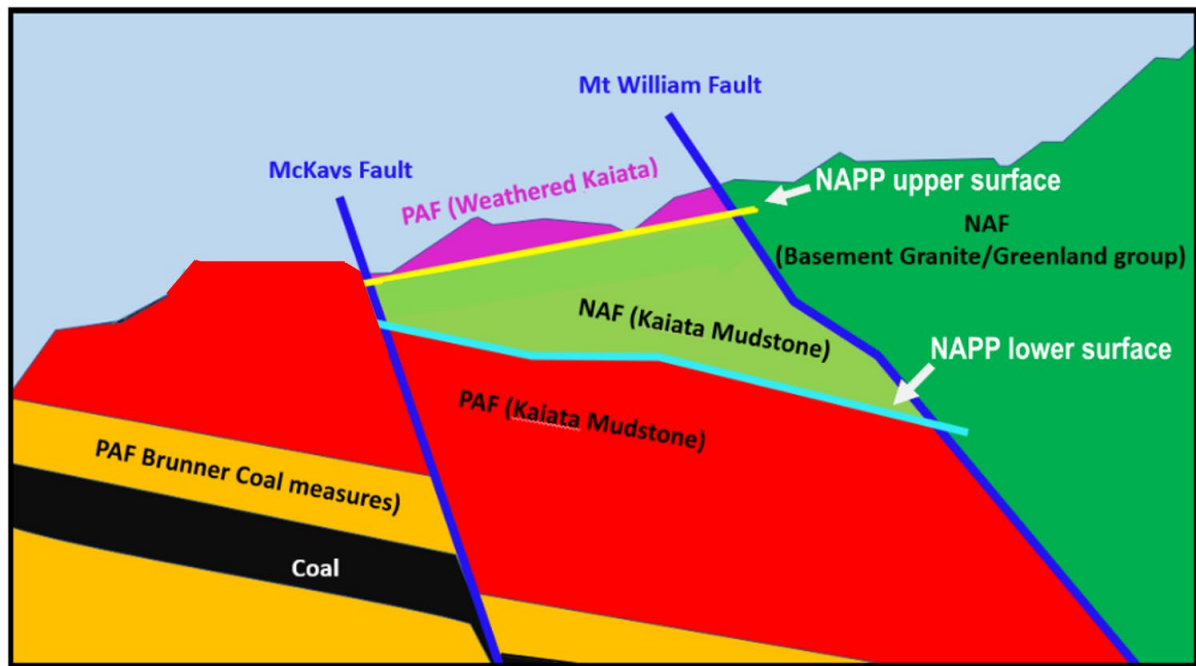


Figure 1. Geological / geochemical model for the Cypress Coal Mine.

Source: McLachlan (2022)



Site 7 – stream bank



Site 10 – water sample only

Figure 2: Fe-staining associated with seepage from groundwater / near surface flow through Kaiata Mudstone. These are naturally occurring seeps and are likely due to the underlying geology of immediate area.

SITE VISIT NOTES

The assessment of lithological units was completed using the BRL high level Cypress geological model (Geological Model). This model is contained in Attachment A

The following sites were visited:

Site 1: Brunner Coal Measures

- Coalbrookdale gate house and sign in to Cascade Mine.
- Exposed outcrops on plateau area.

- Laminated sandstone/siltstone with jarosite staining (weathered) – Sample WHR#1.
- Overlain by a sandstone pavement (indurated)– Sample WHR#2.

Site 2: Brunner Coal Measures

- Roadside cutting.
- Siltstone/mudstone/carbonaceous materials – Sample WHR#3.

Site 3: Brunner Coal Measures

- Roadside cutting.
- PAF drainage along road ditch. Upper sections (~10%) is coarse PAF sandstone
- ~100m of roadside drain.
- Near to G3 location sign.
- Water Sample: Sample Site 3 taken to understand PAF AMD runoff from exposed material/walls.

Site 4: Contact between Brunner Coal Measures and Kaiata Mudstone

- pH in Drain (indicator strips) ~ 4.
- Identified as PAF Kaiata Mudstone as indicated by the Geological Model.
- KM is dark brown and friable.
- Sample WHR#4 obtained.

Site 5: Kaiata Mudstone

- Kaiata Mudstone – Dark Brown and Friable.
- pH 4 in roadside ditch (indicator strips).
- Sample WHR#5.

Site 6: Kaiata Mudstone

- Kaiata Mudstone – potentially NAF as indicated by the Geological Model.
- Highly weathered (spheroidal weathering) – dark grey; iron oxidation.
- Riverbank of the Waimangaroa River.
- Sample WHR#6.

Site 7: Kaiata Mudstone

- Stream bank.
- Reasonably competent grey/brown Kaiata Mudstone.
- Seep pH 5 draining into stream – iron staining (see Figure 2).

- As indicated by the Geological Model, this sample was assumed to be PAF Kaiata - – Sample WHR#7.

Site 8: Kaiata Mudstone

- Access to Power Line.
- Grey Kaiata Mudstone – Sample WHR#8.

Site 9: Kaiata Mudstone

- Grey Kaiata Mudstone.
- The Geological Model suggest NAF Kaiata – Sample WHR#9.

Site 10: Natural AMD Seep

- AMD seep beside the road (Fe precipitates).
- Water Sample taken – Site 10.
- pH 5.
- Source is unknown (underground discharge / natural / road cutting?).

Site 11: Kaiata Mudstone

- Grey Kaiata Mudstone from roadside ditch – Sample WHR#11.

Site 12: Highly Weather Kaiata Mudstone

- Highly weathered Kaiata Mudstone.
- Sample 11 taken from grey materials below this sample.
- High clay content – Sample WHR#12.

Site 13: Kaiata Mudstone

- Grey Kaiata Mudstone – Sample WHR#13.

The site locations are shown in Figure 3.

GEOCHEMICAL DATA

Water samples and rock samples were collected along the southern length of the UWHR. Sample locations are shown in Attachment A and in Figure 3. The following samples were collected:

- 12 surface rock chip samples
- 3 water samples

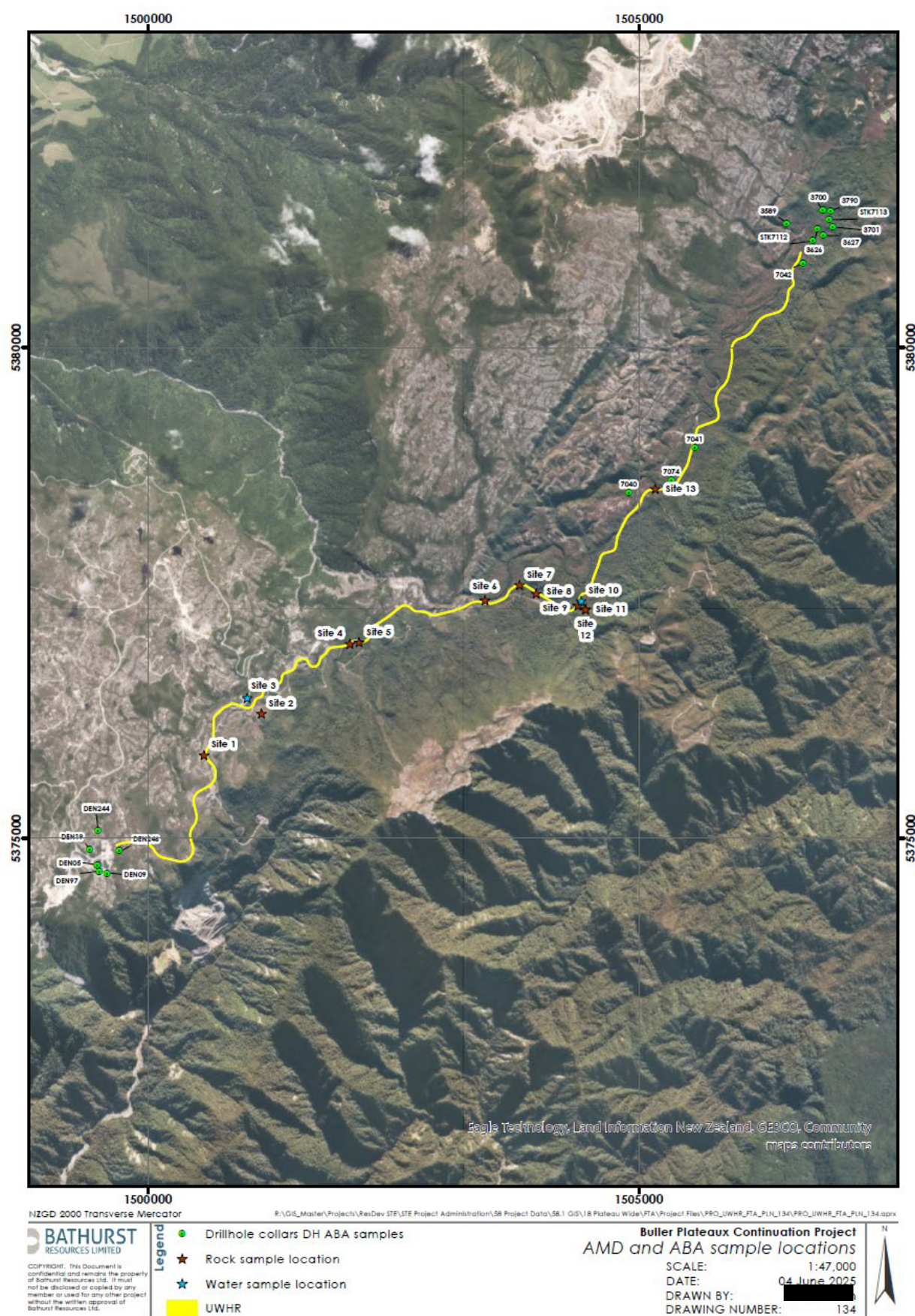


Figure 3: Map of sampling locations.

Note: Drillhole ABA data are discussed in MWM (2026).

Geochemical Data Review

Acid Base Accounting (ABA) data are provided in Table 1. The following comments are provided on these data:

- Rinse pH was generally low (< pH 5.3) for all samples except for one sample that had a rinse pH (Sample WHR#9) of 7.98. The most reasonable explanation for this is that these near surface samples have been weathered with the oxidation of sulfides (generating acidic oxidation products as evidenced by low rinse pH data).
- Brunner coal measure samples had very little ANC⁴, which is in agreement with general observations of this lithological unit elsewhere in the Buller coalfield.
- Three samples had negative ANC values, which align with low rinse pH values and demonstrate the samples contain acidic salts.
- A sample of sandstone pavement (Sample WHR#2) had very low sulfur and was classified as NAF by the NAPP⁵ calculation.
- Some samples identified as NAF Kaiata Mudstone in the Geological Model (see Attachment A) had very little ANC and were acid generating. This might be due to the leaching of carbonates within near-surface materials (as seen at Cypress – see Figure 1).
- There is a good relationship between NAPP and NAG acidity demonstrating the data are reliable.

⁴ Acid Neutralisation Capacity (determined by acid digestion of the sample followed by back titration to determine how much acid has been consumed – further details available [AMIRA, 2002]).

⁵ Where NAPP (Net Acid Producing Potential) = MPA – ANC (MPA = maximum potential acidity = wt% S x 30.6

Table 1: Acid Base Accounting Data – Proposed UWHR.

LOCATION	DESCRIPTION	SAMPLE NO	RINSE pH	RINSE EC	SULFUR	ANC	NAPP	NAG pH	NAG pH 4.5	NAG pH 7	AMIRA CLASSIFICATION
					wt%	kg H ₂ SO ₄ /t	kg H ₂ SO ₄ /t		kg H ₂ SO ₄ /t	kg H ₂ SO ₄ /t	
Site 1	Brunner Coal Measures-laminated sandstone/siltstone	WHR#1	3.12	546	2.46	-2.2	75.28	2.35	55.05	64.45	PAF
Site 1	Brunner Coal Measures-siltstone pavement	WHR#2	4.90	13.4	0.055	1.7	-0.03	4.75	-	5.67	NAF
Site 2	Brunner Coal Measures-siltstone/mudstone/carbonaceous materials	WHR#3	3.58	122	0.28	0.2	8.33	3.31	8.42	22.72	PAF
Site 4	Dark Brown friable Kaiata Mudstone	WHR#4	3.47	203	1.39	-3.7	42.53	2.68	18.80	31.14	PAF
Site 5	Dark Brown friable Kaiata Mudstone	WHR#5	3.61	238	1.64	3.7	46.49	2.57	25.47	43.49	PAF
Site 6	Weathered dark grey Kaiata Mudstone	WHR#6	3.49	305	0.68	-1.2	20.75	3.25	6.45	17.01	PAF
Site 7	Grey/brown Kaiata Mudstone	WHR#7	4.53	92.0	1.17	17.2	18.59	2.83	13.67	29.29	PAF
Site 8	Grey Kaiata	WHR#8	3.84	236	2.04	14.6	47.78	2.46	35.64	55.62	PAF
Site 9	Grey Kaiata	WHR#9	7.98	365	1.86	92.9	-36.00	6.62	-	0.59	NAF
Site 11	Grey Kaiata	WHR#11	5.29	129	1.72	25.6	27.00	2.58	26.82	43.85	PAF
Site 12	Grey Kaiata	WHR#12	4.14	75.3	0.087	2.4	0.22	4.18	1.37	16.23	PAF
Site 13	Grey Kaiata	WHR#13	3.61	318	2.83	11.0	75.60	2.24	54.54	77.8	PAF

Further details on test methods are available (AMIRA, 2002).

Water Quality Data

Two water samples (Site 3 and Site 10) were collected during the site visit. These data are presented in Table 2. The water quality consent conditions (RC10193) for the existing Escarpment Mine (Table 2) were used as reference values for determining potential constituents of concern (PCOC) that are elevated across the monitoring sites. Although the consent conditions are for compliance at the downstream monitoring site W-M2 below the Escarpment Mine, these limits are useful for contextualising the potential impacts of AMD for the Project.

Table 2: Water Quality Data – Proposed UWHR.

PARAMETER NAME	UNITS	SITE 3	SITE 10	WATER QUALITY REFERENCE VALUE ²
Lab ID		817-2024-00088098	817-2024-00088099	
Total Alkalinity	mg CaCO ₃ /L	<1	43	
Chloride	mg/l	3.57	4.65	
Sulfate	mg/l	17.2	4.22	
Conductivity	mS/m	7.9	12.0	
Dissolved Aluminium	mg/l	0.844	0.011	0.5
Dissolved Antimony	mg/l	<0.001	<0.001	
Dissolved Boron	mg/l	<0.03	<0.03	
Dissolved Cadmium	mg/l	<0.0002	<0.0002	0.0012 / 0.0003
Dissolved Calcium	mg/l	0.3	11.7	
Dissolved Chromium	mg/l	<0.001	<0.001	0.20 / 0.05
Dissolved Cobalt	mg/l	0.0012	0.0009	0.18 / 0.044
Dissolved Copper	mg/l	0.0030	<0.0005	0.0013 / 0.002
Dissolved Iron	mg/l	1.06	0.91	1.1 ¹
Dissolved Lead	mg/l	0.0007	<0.0005	0.026 / 0.0065
Dissolved Magnesium	mg/l	0.44	6.60	
Dissolved Manganese	mg/l	0.0238	0.383	1.1 ¹
Dissolved Mercury	mg/l	<0.0005	<0.0005	
Dissolved Nickel	mg/l	0.0058	0.0015	0.068 / 0.017
Dissolved Potassium	mg/l	0.52	0.32	
Dissolved Selenium	mg/l	<0.005	<0.005	
Dissolved Sodium	mg/l	3.05	3.75	
Dissolved Tin	mg/l	<0.0005	<0.0005	
Dissolved Zinc	mg/l	0.022	<0.002	0.054 / 0.012
pH		3.8	7.0	4.5 – 6.5
Suspended Solids	mg/l	26	13	15
Total Dissolved Solids	mg/l	44	79	
Turbidity	NTU	19.1	15.7	15
Acidity to pH 8.3	mg CaCO ₃ /L	15	14	
Dissolved Silica	mg/l	4.99	4.01	
Dissolved Arsenic	mg/l	<0.001	0.002	
Dissolved Thallium	mg/l	<0.0005	<0.0005	

1. The RC10193 compliance limit for Fe and Mn is a combined value of 1.1 mg/L
2. Several PCOC have two limits depending on whether the pH < 5.5 or the pH > 5.5 as per the RC10193 consent conditions for Escarpment Mine.
3. Red data are elevated against the water quality reference value.

Results show that a number of parameters exceed the water quality reference values for the two samples. The following comments are provided:

- The seepage identified at Site 10 had a pH > 6.5 as well as high alkalinity (43 mg/L CaCO₃ equivalent). Also in this location was site 9 with Sample WHR#9 being identified as NAF Kaiata Mudstone, which suggest the source of this seepage might be from NAF Kaiata Mudstone.
- The water sample collected in the roadside ditch (Site 3) was low pH (pH 3.8)
- Sulfate is low (< 20 mg/L), but higher in the roadside cutting water sample.
- Al and Cu are elevated in acidic drainage associated with the road cutting through BCM.
- The sample from Site 3 is likely to be a reasonable datapoint for water quality derived from highwalls cut through the BCM.

Summary

The following summary is provided:

- Geochemical data suggest the Geological Model is reasonably reliable, although some mudstone materials might be Brunner Coal Measures rather than Kaiata Mudstone. Regardless they are PAF. All materials should be treated as PAF unless geochemical data demonstrates otherwise.
- Leaching of carbonates within the Kaiata Mudstone is possible, as seen at Cypress (Figure 1), with surface materials more likely to be PAF than the same materials at depth. This might explain why some samples mapped as NAF Kaiata Mudstone are now PAF Kaiata Mudstone.
- Some highly weathered Kaiata Mudstone was identified, which was low in sulfur and low in ANC and might be useful capping materials for PAF materials. Further geochemical testing as part of road construction activities should be undertaken to confirm that such materials are benign, the quantity available, and the ability to be compacted into a low permeability layer.
- No colluvium materials were assessed as part of this study and may also have benefits for capping of PAF materials if future work, as part of road construction activities identified it is NAF.
- Water quality data indicates that poor water quality is present in the area associated with the road cutting and also natural seeps within the area.

CLOSING REMARKS

Please do not hesitate to contact Paul Weber at paul.weber@minewaste.com.au should you wish to discuss this memorandum in greater detail.

Attachments: Attachment A – UWHR Geochem Sampling
Attachment B – Laboratory Reports

REFERENCES

AMIRA, 2002. ARD Test Handbook - Project P387A Prediction and Kinetic Control of Acid Mine Drainage. AMIRA International Limited. Melbourne, Australia.

Malloch, K.R., Weber, P.A., Olds, W.E., 2017. Acid and Metalliferous Drainage Potential of an Alluvial Gold Mine Operation. New Zealand Annual AusIMM Branch Conference, Christchurch, 10 - 13 September, 154 – 163.

MWM, 2026. BPCP AMD Hazard Classification Summary. Mine Waste Management Report No. J-NZ0453-003-R-FINAL.

McLachlan, C., 2022. Determination of Acid Producing Potential Using pXRF: A Case Study from Cypress Mine, Stockton Plateau. IMWA 2022, Christchurch, New Zealand, pp. 253 – 258.

ATTACHMENT A – UWHR GEOCHEM SAMPLING

Upper Waimangaroa Haul Road

AMD sampling of Geology along Alignment

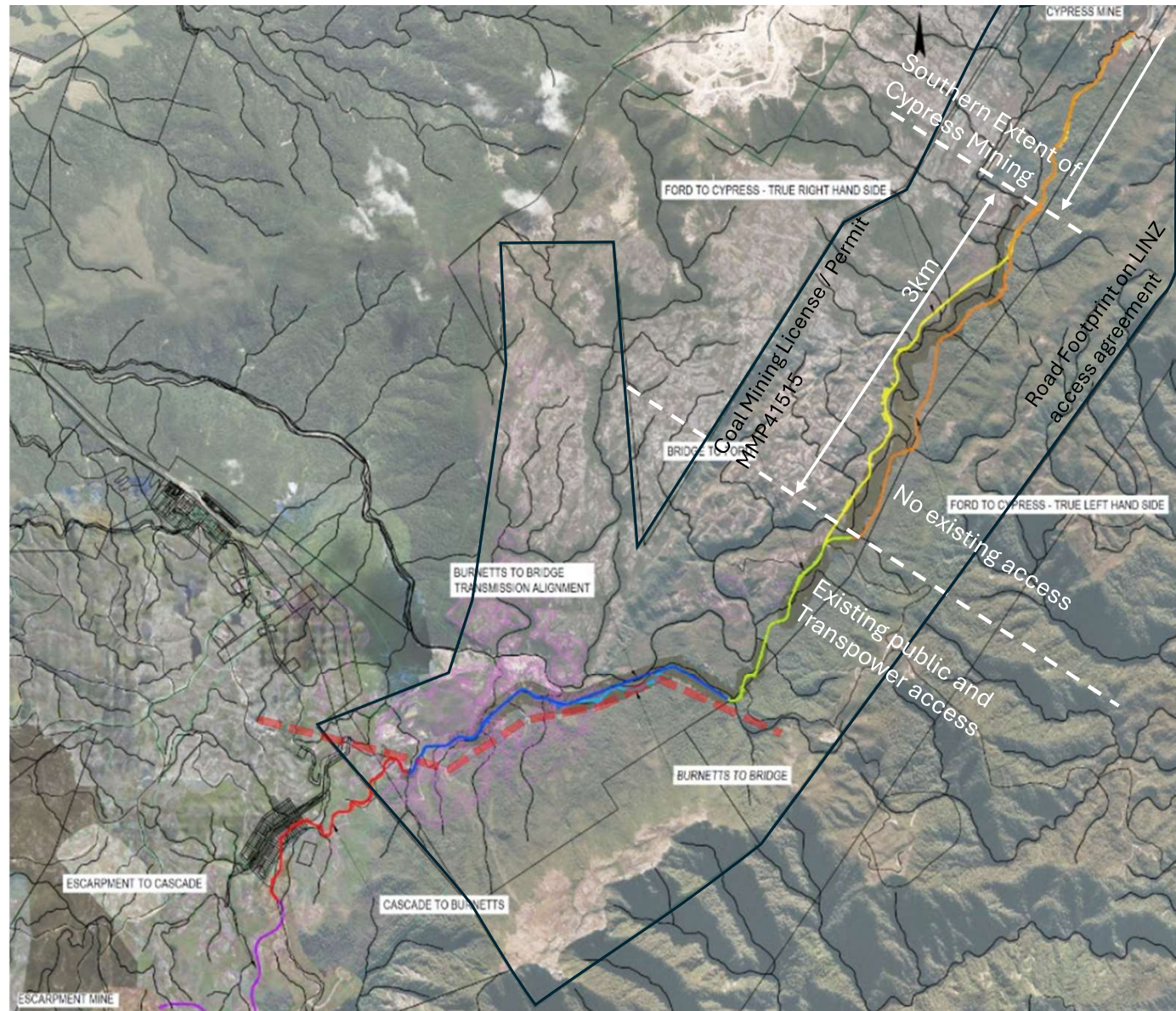
Objectives – AMD Sampling

- Confirm Geological classification of NAF and PAF Kaiata Mudstone
- Some Brunner Coal Measures sampled:
 - AMD potential very difficult to estimate as different lithologies have different sulphide contents
 - Will need sampling of drill core along road alignment to link AMD potential to Lithologies and volumes
 - The outcomes of this will be critical for the potential use of BCM as fill and rock armouring materials

GHD Alignment Options considered 2023 (concept)

19km haul (one way)

70min cycle time



Brunner Coal Measures (good road foundations) - NAF/PAF? - Excess of Engineering suitable fill (~20k BCM)

- Mix of coarse and fine sandstones (NAF?) with sandstone and siltstone (PAF?). ANC?



Sample sites

	Northing	Easting	Description	Notes
Site 1	- [REDACTED]	[REDACTED]	Brunner Coal Measures	Jarrasite
Site 2	- [REDACTED]	[REDACTED]	Brunner Coal Measures	Siltstone, Mudstone, Carbonaceous Units
Site 3	- [REDACTED]	[REDACTED]	Seepage	
Site 4	- [REDACTED]	[REDACTED]	Kaiata Mudstone PAF, pH4 water in drain	pH4 water in drain
Site 5	- [REDACTED]	[REDACTED]	Kaiata Mudstone PAF, pH4 water in drain	pH4 water in drain
Site 6	- [REDACTED]	[REDACTED]	Kaiata Mudstone NAF	
Site 7	- [REDACTED]	[REDACTED]	Kaiata Mudstone PAF	
Site 8	- [REDACTED]	[REDACTED]	Kaiata Mudstone PAF	Greyer than other PAF Kaiata
Site 9	- [REDACTED]	[REDACTED]	Kaiata Mudstone NAF	Grey colour
Site 10	- [REDACTED]	[REDACTED]	Typical weep expected	pH5.5 water in drain
Site 11	- [REDACTED]	[REDACTED]	Kaiata Mudstone NAF	Good Capping Material
Site 12	- [REDACTED]	[REDACTED]	Weathered Kaiata Mudstone Cap	potentially become PAF as carbonates have leached out
Site 13	- [REDACTED]	[REDACTED]	Kaiata Mudstone NAF	

Cascade to Burnetts Face

- Drill holes within 100m of road centerline

Rock Units intersected by Road Design

■ Brunner Coal Measures

GNS faults

— Inactive fault, exposed

GNS Geological Units

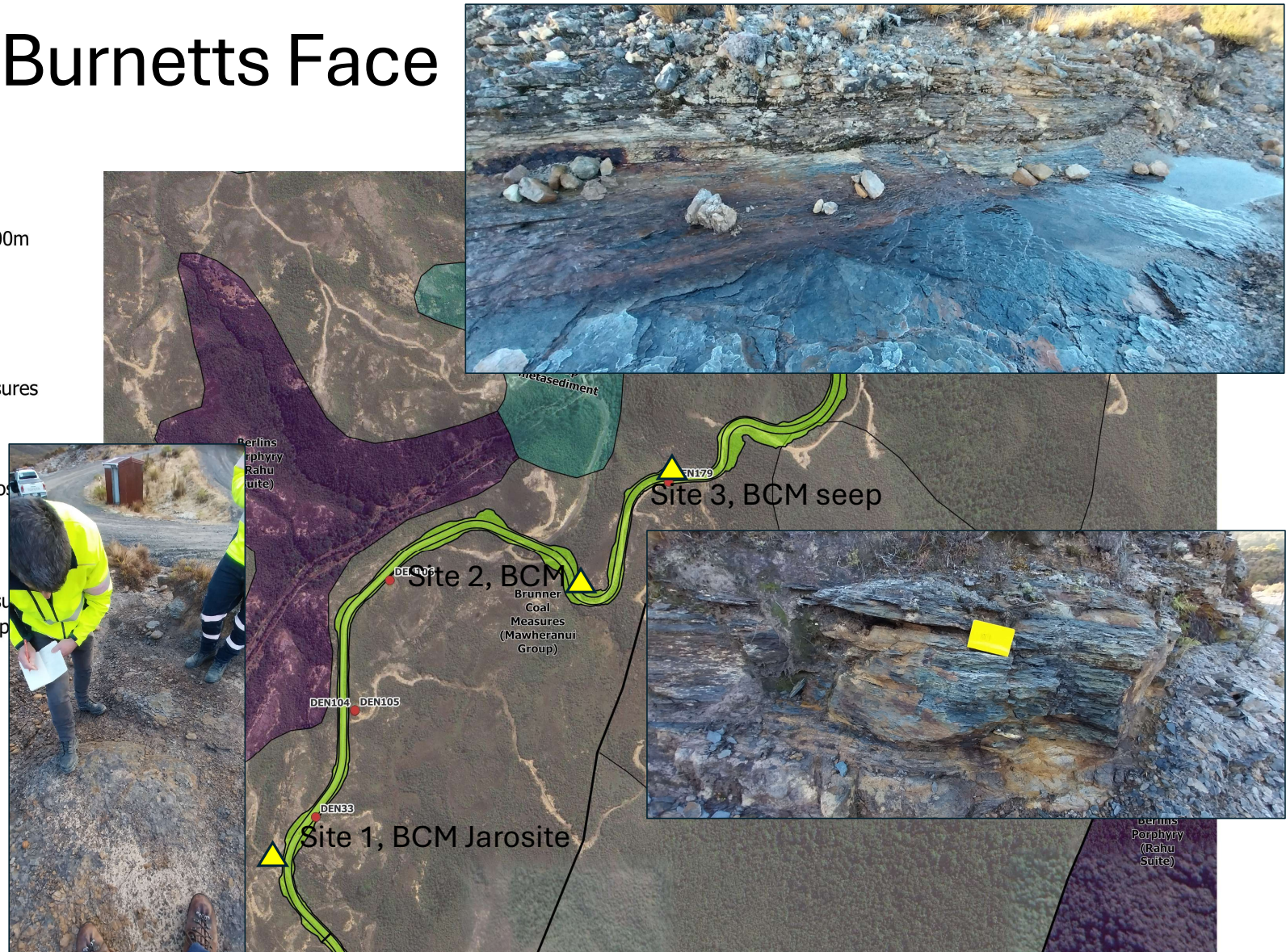
■ Berlins Porphyry (Rahu Suite)

■ Brunner Coal Measures (Mawheranui Group)

■ Greenland Group metasediment

■ Kaiata Formation (Rapahoe Group)

Google Satellite



Burnetts Face to Bridge

- Drill holes within 100m of road centerline

Rock Units intersected by Road Design

- Brunner Coal Measures
- NAF Kaiata Mudstone
- PAF Kaiata Mudstone

GNS faults

— Inactive fault, exposed

GNS Geological Units

- Berlins Porphyry (Rahu Suite)
- Brunner Coal Measures (Mawheranui Group)
- Greenland Group metasediment
- Kaiata Formation (Rapahoe Group)

Google Satellite



Burnetts Face to Bridge

- Drill holes within 100m of road centerline

Rock Units intersected by Road Design

- Brunner Coal Measures
- NAF Kaiata Mudstone
- PAF Kaiata Mudstone

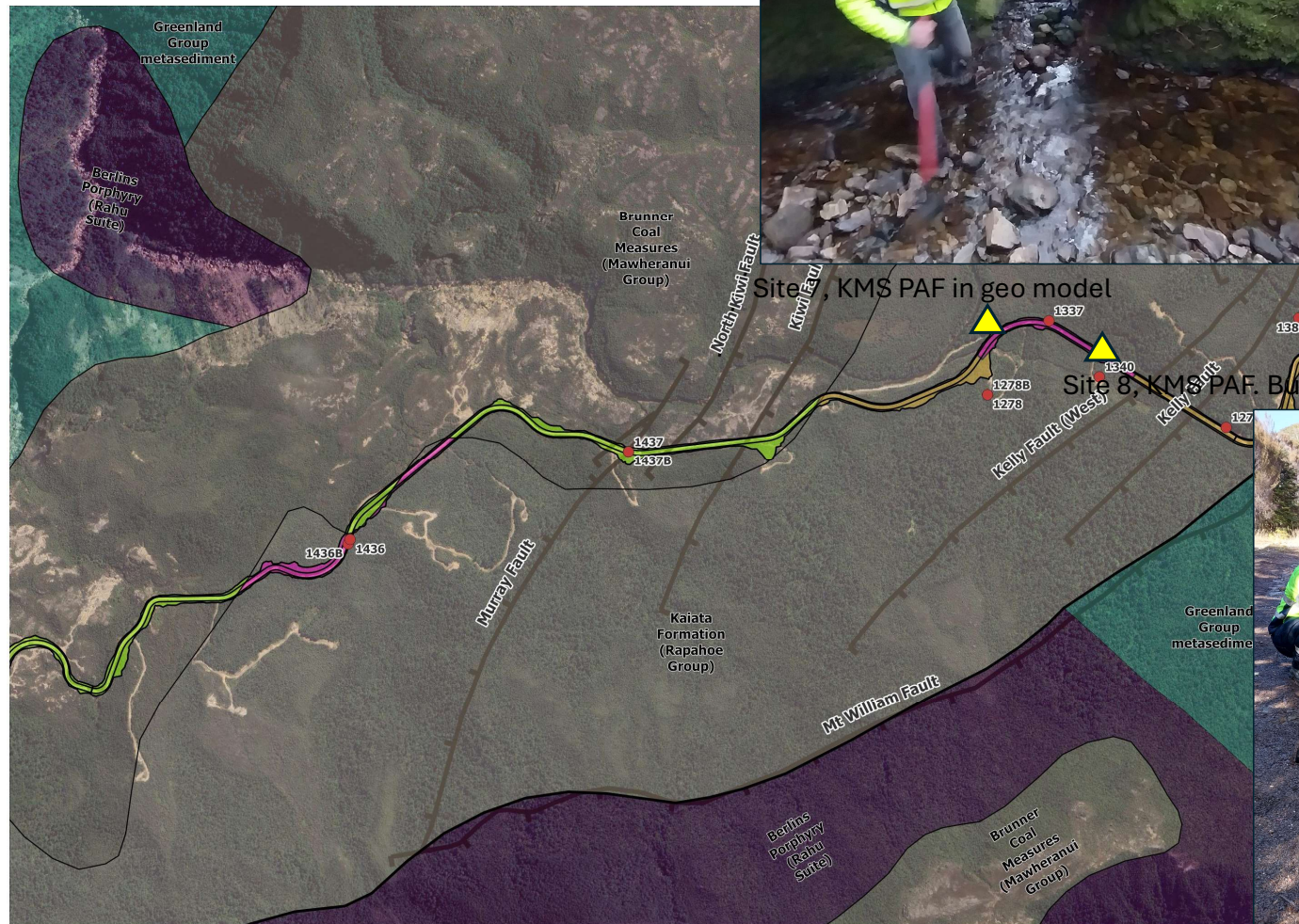
GNS faults

— Inactive fault, exposed

GNS Geological Units

- Berlins Porphyry (Rahu Suite)
- Brunner Coal Measures (Mawheranui Group)
- Greenland Group metasediment
- Kaiata Formation (Rapahoe Group)

Google Satellite



Site 7, KMS PAF in geo model

Site 8, KMS PAF. But Greyer



Bridge to Ford

- Drill holes within 100m of road centerline

Rock Units intersected



Ford to Cypress

- Drill holes within 100m of road centerline
- Cypress Consent Footprint

Rock Units intersected by Road Design

- Brunner Coal Measures
- NAF Kaiata Mudstone
- PAF Kaiata Mudstone

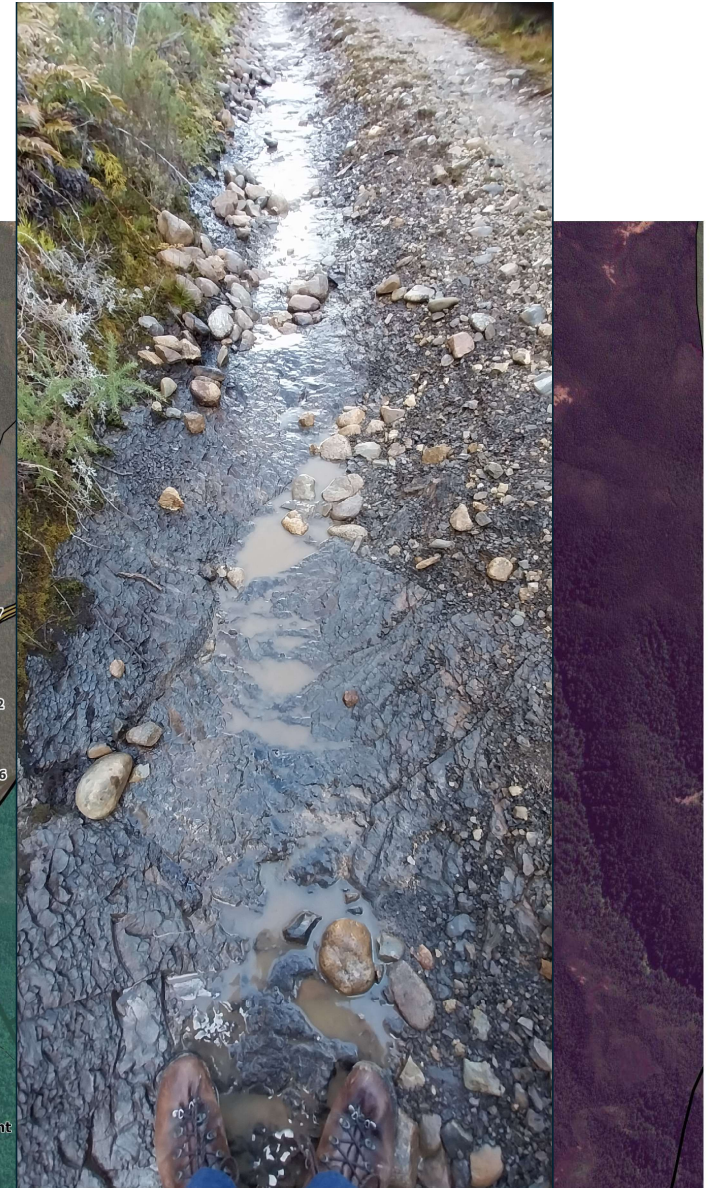
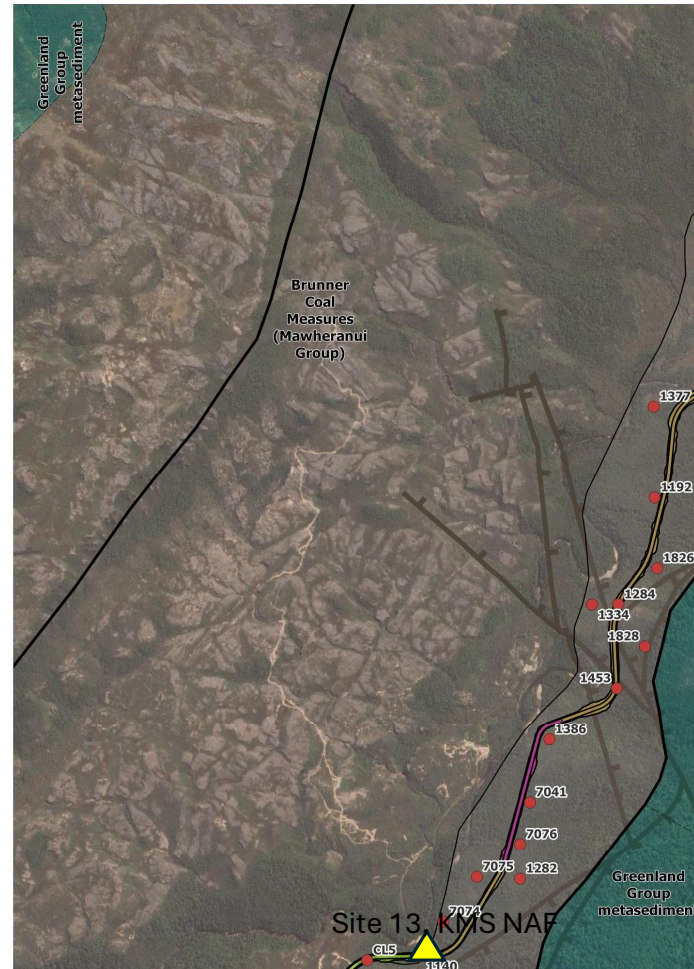
GNS faults

- Inactive fault, exposed

GNS Geological Units

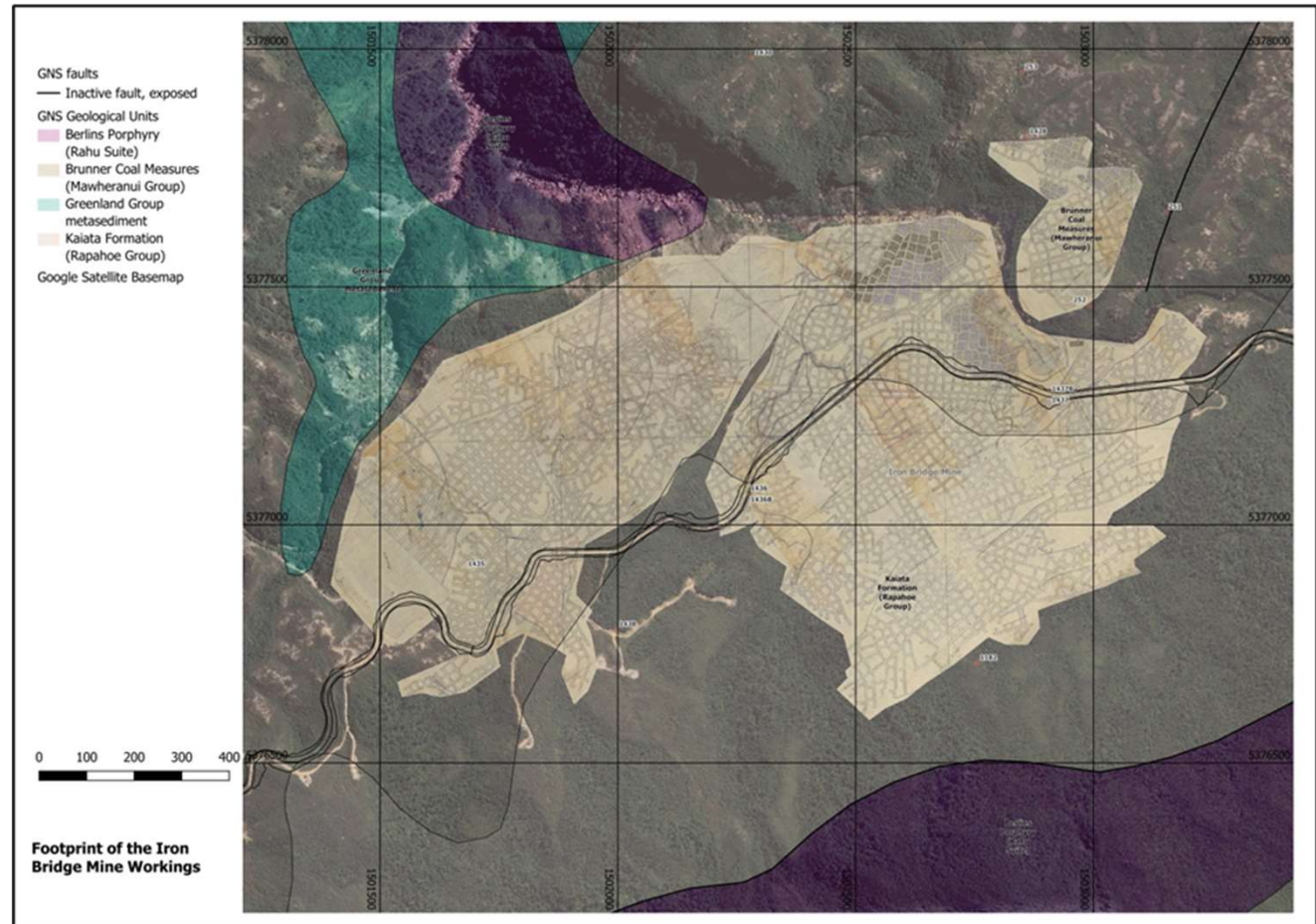
- Berlins Porphyry (Rahu Suite)
- Brunner Coal Measures (Mawheranui Group)
- Greenland Group metasediment
- Kaiata Formation (Rapahoe Group)

Google Satellite



Road Alignment and Ironbridge UG workings

Workings are extensive and alignments that don't traverse the workings are not possible. Typical ground prep for traversing with heavy equipment will involve rubblisation of the road foundations with potential AMD consequences

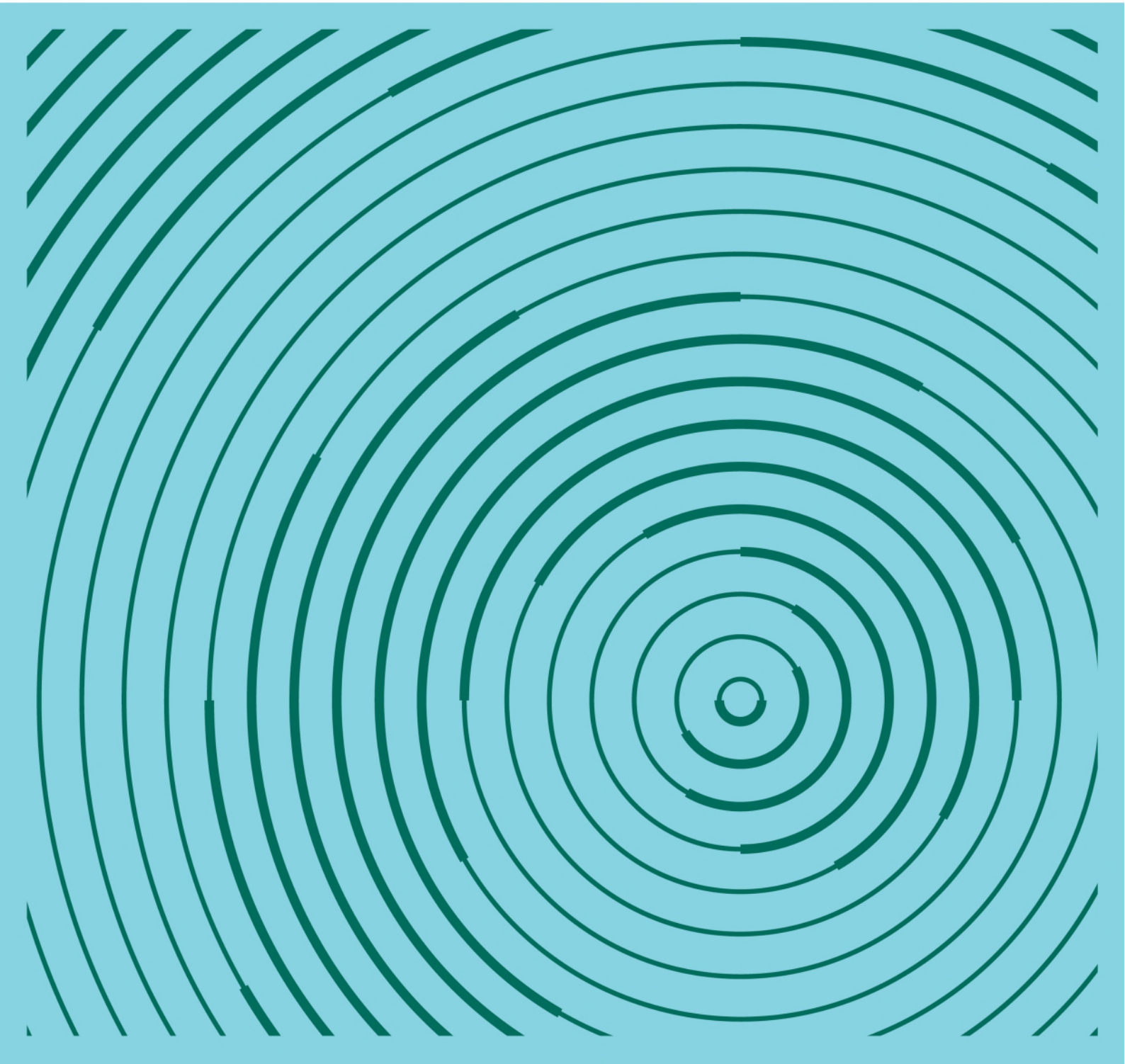


ATTACHMENT B – LABORATORY REPORTS

ABA analysis

Prepared for
Mine Waste
Management

August 2024
25-000676



Author [REDACTED]

Verum Group reference 25-000676

Client name Mine Waste Management

Client address

**Distribution
(other than client)** Nil

Date of Issue 15/08/2024

Reviewed by [REDACTED]
National Laboratory Manager

Approved by [REDACTED]
National Laboratory Manager

Document tracking

Version	Date	Changes made	Reviewer(s)

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1. Method Notes

Sample prep	Samples were received were dried and crushed in a ring mill with a split then crushed in the ring mill and screened to confirm fineness.	
1 - Rinse pH/EC	Sample <6mm, 30g sample, 150mL water. Measured after 12 hours	
2 – Total Sulphur	Leco combustion furnace	
3 – ANC Acid Neutralising Capacity	AMIRA Handbook 2002 (App C)	Client provided fizz rating.
4 – NAG Net Acid Generation	AMIRA Handbook 2002 (App D)	Results for titration to pH 4.5 and/or pH 7.0. If the pH after H ₂ O ₂ digestion was greater than 7 no titration was required.

A total of 12 samples were received. Samples were identified with as WHR#1-13 (#10 was not included).

All samples were tested for the five properties listed in the table above.

Quality assurance and sample duplicates were run as required by the methods.

Data is included in this report and also supplied as an Excel file.

2. Sample and Analysis data

Rinse pH, Electrical Conductivity and Sulphur					
Location	Description	Sample No	Rinse pH	Rinse EC	Sulphur %w
Site 1	Brunner Coal Measures- laminated sandstone/siltstone	WHR#1	3.12	546	2.46
Site 1	Brunner Coal Measures- siltstone pavement	WHR#2	4.90	13.4	0.055
Site 2	Brunner Coal Measures- siltstone/mudstone/carbonaceous materials	WHR#3	3.58	122	0.28
Site 4	Dark Brown friable Kaiata Mudstone	WHR#4	3.47	203	1.39
Site 5	Dark Brown friable Kaiata Mudstone	WHR#5	3.61	238	1.64
Site 6	Weatherd dark grey Kaiata Mudstone	WHR#6	3.49	305	0.68
Site 7	Grey/brown Kaiata Mudstone	WHR#7	4.53	92.0	1.17
Site 8	Grey Kaiata	WHR#8	3.84	236	2.04
Site 9	Grey Kaiata	WHR#9	7.98	365	1.86
Site 11	Grey Kaiata	WHR#11	5.29	129	1.72
Site 12	Grey Kaiata	WHR#12	4.14	75.3	0.087
Site 13	Grey Kaiata	WHR#13	3.61	318	2.83
Acid Neutralising Capacity					
Location	Description	Sample No	Fizz rating*	Digested pH	kg H ₂ SO ₄ /t %CaCO ₃
Site 1	Brunner Coal Measures- laminated sandstone/siltstone	WHR#1	0	1.97	0.00
Site 1	Brunner Coal Measures- siltstone pavement	WHR#2	0	1.98	0.17
Site 2	Brunner Coal Measures- siltstone/mudstone/carbonaceous materials	WHR#3	0	2.05	0.02
Site 4	Dark Brown friable Kaiata Mudstone	WHR#4	2	1.39	0.00
Site 5	Dark Brown friable Kaiata Mudstone	WHR#5	2	1.52	0.38
Site 6	Weatherd dark grey Kaiata Mudstone	WHR#6	2	1.63	0.00
Site 7	Grey/brown Kaiata Mudstone	WHR#7	2	1.66	1.76
Site 8	Grey Kaiata	WHR#8	2	1.48	1.49
Site 9	Grey Kaiata	WHR#9	2	1.92	9.48
Site 11	Grey Kaiata	WHR#11	2	1.52	25.63
Site 12	Grey Kaiata	WHR#12	2	1.40	0.25
Site 13	Grey Kaiata	WHR#13	2	1.34	1.12
*ANC Fizz rating provided by client					
Net Acid Generation					
Location	Description	Sample No	NAG pH after digest	NAG pH 4.5 kg H ₂ SO ₄ /t	NAG pH 7 kg H ₂ SO ₄ /t
Site 1	Brunner Coal Measures- laminated sandstone/siltstone	WHR#1	2.35	55.05	64.45
Site 1	Brunner Coal Measures- siltstone pavement	WHR#2	4.75	-	5.67
Site 2	Brunner Coal Measures- siltstone/mudstone/carbonaceous materials	WHR#3	3.31	8.42	22.72
Site 4	Dark Brown friable Kaiata Mudstone	WHR#4	2.68	18.80	31.14
Site 5	Dark Brown friable Kaiata Mudstone	WHR#5	2.57	25.47	43.49
Site 6	Weatherd dark grey Kaiata Mudstone	WHR#6	3.25	6.45	17.01
Site 7	Grey/brown Kaiata Mudstone	WHR#7	2.83	13.67	29.29
Site 8	Grey Kaiata	WHR#8	2.46	35.64	55.62
Site 9	Grey Kaiata	WHR#9	6.62	-	0.59
Site 11	Grey Kaiata	WHR#11	2.58	26.82	43.85
Site 12	Grey Kaiata	WHR#12	4.18	1.37	16.23
Site 13	Grey Kaiata	WHR#13	2.24	54.54	77.8

Food & Water Testing
ANALYTICAL REPORT

REPORT CODEAR-24-NC-024177-01REPORT DATE07/08/2024

AttentionBT Mining Ltd
[REDACTED]
[REDACTED]
Christchurch
NEW ZEALANDPhone[REDACTED]Copy to:[REDACTED]
Email[REDACTED]Contact for your orders: [REDACTED]Order code: EUNZCH-00185875
Submission Reference: [REDACTED] haul road samplingPurchase Order Number: [REDACTED]

SAMPLE CODE817-2024-00088098

Sample NameSite 3
Reception Date & Time: 30/07/2024 8:30Reception temperature: 14 °C
Analysis Started on: 30/07/2024Analysis Ending Date: 07/08/2024
Product TypeSurface WaterSampler(s) [REDACTED]
Sampled Date & Time24/07/2024 00:00

RESULTS		LOQ	
②NW345	Acidity to pH 8.3		
	Acidity	15	mg CaCO3/l1
②NW007	Chloride		
	Chloride (Cl)	3.57	mg/l0.02
②NW023	Conductivity		
	Conductivity	7.9	mS/m0.1
②NW098	Dissolved Aluminium		
	Aluminium	0.844	mg/l0.002
②NW099	Dissolved Antimony		
	Antimony (Sb)	<0.001	mg/l0.001
②NW583	Dissolved Arsenic		
	Arsenic (As)	<0.001	mg/l0.001
②NW103	Dissolved Boron		
	Boron (B)	<0.03	mg/l0.03
②NW104	Dissolved Cadmium		
	Cadmium (Cd)	<0.0002	mg/l0.0002
②NW105	Dissolved Calcium		
	Calcium (Ca)	0.3	mg/l0.1
②NW106	Dissolved Chromium		
	Chromium (Cr)	<0.001	mg/l0.001
②NW107	Dissolved Cobalt		
	Cobalt (Co)	0.0012	mg/l0.0005
②NW108	Dissolved Copper		
	Copper (Cu)	0.0030	mg/l0.0005
②NW109	Dissolved Iron		
	Iron (Fe)	1.06	mg/l0.01
②NW110	Dissolved Lead		
	Lead (Pb)	0.0007	mg/l0.0005
②NW112	Dissolved Magnesium		

Food & Water Testing

RESULTS			LOQ
②NW112	Dissolved Magnesium Magnesium (Mg)	0.44 mg/l	0.01
②NW113	Dissolved Manganese Manganese (Mn)	0.0238 mg/l	0.0005
②NW114	Dissolved Mercury Mercury (Hg)	<0.0005 mg/l	0.0005
②NW116	Dissolved Nickel Nickel (Ni)	0.0058 mg/l	0.0005
②NW117	Dissolved Potassium Potassium (K)	0.52 mg/l	0.01
②NW118	Dissolved Selenium Selenium (Se)	<0.005 mg/l	0.005
②NW472	Dissolved Silica Sand/silica	4.99 mg/l	0.02
②NW120	Dissolved Sodium Sodium (Na)	3.05 mg/l	0.01
②NW584	Dissolved Thallium Thallium (Tl)	<0.0005 mg/l	0.0005
②NW122	Dissolved Tin Tin (Sn)	<0.0005 mg/l	0.0005
②NW125	Dissolved Zinc Zinc (Zn)	0.022 mg/l	0.002
②NW195	pH (Tested beyond 15 minute APHA holding time) pH	3.8	0.1
②NW011	Sulphate Sulphate	17.2 mg/l	0.02
②NW206	Suspended Solids Suspended Solids	26 mg/l	3
②NW003	Total Alkalinity Alkalinity total	<1 mg CaCO3/l	1
②NW208	Total Dissolved Solids Total dissolved Solids	44 mg/l	10
②NW212	Turbidity Turbidity	19.1 NTU	0.01

SAMPLE CODE 817-2024-00088099

Sample Name	Site 10	Reception temperature:	14 °C
Reception Date & Time:	30/07/2024 8:30	Analysis Ending Date:	07/08/2024
Analysis Started on:	30/07/2024	Sampler(s)	
Product Type	Surface Water		
Sampled Date & Time	24/07/2024 00:00		

RESULTS			LOQ
②NW345	Acidity to pH 8.3 Acidity	14 mg CaCO3/l	1
②NW007	Chloride Chloride (Cl)	4.65 mg/l	0.02
②NW023	Conductivity Conductivity	12.0 mS/m	0.1

Food & Water Testing

		RESULTS		LOQ
②NW098	Dissolved Aluminium Aluminium	0.011	mg/l	0.002
②NW099	Dissolved Antimony Antimony (Sb)	<0.001	mg/l	0.001
②NW583	Dissolved Arsenic Arsenic (As)	0.002	mg/l	0.001
②NW103	Dissolved Boron Boron (B)	<0.03	mg/l	0.03
②NW104	Dissolved Cadmium Cadmium (Cd)	<0.0002	mg/l	0.0002
②NW105	Dissolved Calcium Calcium (Ca)	11.7	mg/l	0.1
②NW106	Dissolved Chromium Chromium (Cr)	<0.001	mg/l	0.001
②NW107	Dissolved Cobalt Cobalt (Co)	0.0009	mg/l	0.0005
②NW108	Dissolved Copper Copper (Cu)	<0.0005	mg/l	0.0005
②NW109	Dissolved Iron Iron (Fe)	0.91	mg/l	0.01
②NW110	Dissolved Lead Lead (Pb)	<0.0005	mg/l	0.0005
②NW112	Dissolved Magnesium Magnesium (Mg)	6.60	mg/l	0.01
②NW113	Dissolved Manganese Manganese (Mn)	0.383	mg/l	0.0005
②NW114	Dissolved Mercury Mercury (Hg)	<0.0005	mg/l	0.0005
②NW116	Dissolved Nickel Nickel (Ni)	0.0015	mg/l	0.0005
②NW117	Dissolved Potassium Potassium (K)	0.32	mg/l	0.01
②NW118	Dissolved Selenium Selenium (Se)	<0.005	mg/l	0.005
②NW472	Dissolved Silica Sand/silica	4.01	mg/l	0.02
②NW120	Dissolved Sodium Sodium (Na)	3.75	mg/l	0.01
②NW584	Dissolved Thallium Thallium (Tl)	<0.0005	mg/l	0.0005
②NW122	Dissolved Tin Tin (Sn)	<0.0005	mg/l	0.0005
②NW125	Dissolved Zinc Zinc (Zn)	<0.002	mg/l	0.002
②NW195	pH (Tested beyond 15 minute APHA holding time) pH	7.0		0.1
②NW011	Sulphate Sulphate	4.22	mg/l	0.02

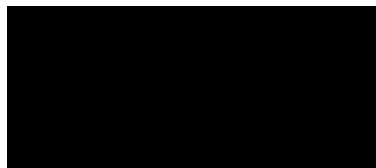
Food & Water Testing

	RESULTS		LOQ
②NW206 Suspended Solids			
Suspended Solids	13	mg/l	3
②NW003 Total Alkalinity			
Alkalinity total	43	mg CaCO ₃ /l	1
②NW208 Total Dissolved Solids			
Total dissolved Solids	79	mg/l	10
②NW212 Turbidity			
Turbidity	15.7	NTU	0.01

LIST OF METHODS

NW003 Total Alkalinity: APHA Online Edition 2320 B	NW007 Chloride: APHA Online Edition 4110 B
NW011 Sulphate: APHA Online Edition 4110 B	NW023 Conductivity: APHA 24th Edition 2510 B
NW098 Dissolved Aluminium: APHA Online Edition 3125 B mod.	NW099 Dissolved Antimony: APHA Online Edition 3125 B mod.
NW103 Dissolved Boron: APHA Online Edition 3125 B mod.	NW104 Dissolved Cadmium: APHA Online Edition 3125 B mod.
NW105 Dissolved Calcium: APHA Online Edition 3125 B mod.	NW106 Dissolved Chromium: APHA Online Edition 3125 B mod.
NW107 Dissolved Cobalt: APHA Online Edition 3125 B mod.	NW108 Dissolved Copper: APHA Online Edition 3125 B mod.
NW109 Dissolved Iron: APHA Online Edition 3125 B mod.	NW110 Dissolved Lead: APHA Online Edition 3125 B mod.
NW112 Dissolved Magnesium: APHA Online Edition 3125 B mod.	NW113 Dissolved Manganese: APHA Online Edition 3125 B mod.
NW114 Dissolved Mercury: APHA Online Edition 3125 B mod.	NW116 Dissolved Nickel: APHA Online Edition 3125 B mod.
NW117 Dissolved Potassium: APHA Online Edition 3125 B mod.	NW118 Dissolved Selenium: APHA Online Edition 3125 B mod.
NW120 Dissolved Sodium: APHA Online Edition 3125 B mod.	NW122 Dissolved Tin: APHA Online Edition 3125 B mod.
NW125 Dissolved Zinc: APHA Online Edition 3125 B mod.	NW195 pH (Tested beyond 15 minute APHA holding time): APHA 24th Edition 4500-H B
NW206 Suspended Solids: APHA Online Edition 2540 D	NW208 Total Dissolved Solids: APHA Online Edition 2540 C
NW212 Turbidity: APHA 24th Edition 2130 B	NW345 Acidity to pH 8.3: APHA Online Edition 2310 B (Free CO ₂)
NW472 Dissolved Silica: APHA Online Edition 3120 B mod.	NW583 Dissolved Arsenic: APHA Online Edition 3125 B mod.
NW584 Dissolved Thallium: APHA Online Edition 3125 B mod.	

Signature



Laboratory Manager
Laboratory Manager

EXPLANATORY NOTE

- ① Test is not accredited
- ② Test is subcontracted within Eurofins group and is accredited
- ③ Test is subcontracted within Eurofins group and is not accredited
- ④ Test is subcontracted outside Eurofins group and is accredited
- ⑤ Test is subcontracted outside Eurofins group and is not accredited
- ⑥ Test result is provided by the customer and is not accredited
- ⑦ Tested at the sampling point by Eurofins and is not accredited
- ⑧ Tested at the sampling point by Eurofins and is accredited
- ⑨ Test is RLP accredited
- ⑩ Test is subcontracted within Eurofins group and is RLP accredited

All test method Quality Controls including method blanks, reference samples, spikes, surrogates, and duplicate sample testing, have passed and are within the control limits.

N/A means Not Applicable

Not Detected means not detected at or above the Limit of Quantification (LOQ)

LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit

✗ (Unsatisfactory) means does not meet the specification

✓ (Satisfactory) means meets the specification

Food & Water Testing

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.

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The tests are identified by a five-digit code, their description is available on request.

Accreditation does not apply to comments or graphical representations.

Unless otherwise stated, all tests in this analytical report (except for subcontracted tests) are performed at 43 Detroit Drive, Rolleston, Christchurch, NEW ZEALAND.

The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.

Eurofins may subcontract the performance of part or all of the Services to a third party and the Customer authorises the release of all information necessary to the third party for the provision of the Services.

All samples become the property of Eurofins to the extent necessary for the performance of the Services.

Eurofins will not be required to store samples and may destroy or otherwise dispose of the samples or return the samples to the Customer (at the Customer's cost in all respects) immediately following analysis of the samples.

If the Customer pays for storage of the samples Eurofins will take commercially reasonable steps to store the samples for the agreed period in terms of industry practice.

The Eurofins water sampling service follows methodology based on AS/NZS 5667 and / or best practice to collect and transport samples that are fit for the purpose of analytical testing. The laboratory is not responsible for sampling activities unless explicitly indicated by the statement "Sampled by Eurofins" on the report for water samples.

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This report is produced and issued on the basis of information, documents and/or samples provided by, or on behalf of, the Customer and solely for the benefit of the Customer who is responsible for acting as it sees fit on the basis of this report. Neither Eurofins nor any of its officers, employees, agents or subcontractors shall be liable to the Customer nor any third party for any actions taken or not taken on the basis of this report nor for any incorrect results arising from unclear, erroneous, incomplete, misleading or false information provided to Eurofins.

Eurofins shall have no liability for any indirect or consequential loss including, without limitation, loss of production, loss of contracts, loss of profits, loss of business or costs incurred from business interruption, loss of opportunity, loss of goodwill or damage to reputation and cost of product recall (including any losses suffered as a result of distribution of the Customer's products subject of the Services prior to the report being released by Eurofins). It shall further have no liability for any loss, damage or expenses arising from the claims of any third party (including, without limitation, product liability claims) that may be incurred by the Customer.

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END OF REPORT

APPENDIX C UWHR ABA SUMMARY

MEMORANDUM

Recipient: [REDACTED] – Bathurst Resources Limited

From: [REDACTED] – Mine Waste Management Limited

Date: 21 July 2026

Cc: [REDACTED] – MWM; [REDACTED] – MWM

Document Number: J-NZ0453-009-M-FINAL

Document Title: Upper Waimangaroa Haul Road Acid Base Accounting Summary

Bathurst Resources Limited (BRL) is seeking to obtain authorisation through the Fast-track Approvals Act 2024 (FTAA) to progress development and mining of the coal resources across the wider Buller Plateaux. This project is referred to as the Buller Plateaux Continuation Project (BPCP or Project).

BACKGROUND

The purpose of the BPCP is to re-consent the existing infrastructure and mining operations associated with the existing Stockton Mine and provide access to additional coal mining areas across the Buller Plateaux, as the coal resource in the current Stockton Mine is close to depletion, and further coal resources for blending are required. There are five key project sub-areas:

- Stockton mining area (Stockton)
- Mount Frederick South (MFS)
- Escarpment Extended (ESE)
- Upper Waimangaroa Haul Road (UWHR)
- Cypress mining area (Cypress)

To support the FTAA approval process, Mine Waste Management Limited (MWM) was engaged by BRL to undertake an assessment of environmental effects (AEE). Part of this study was the assessment of Acid and metalliferous drainage (AMD) hazards for MFS, ESE, and UWHR sub-areas.

The information presented in this memorandum pertains only to the UWHR transport corridor that is proposed to provide access between Stockton and the additional mining areas within the Buller Plateaux.

OBJECTIVES AND SCOPE

Understanding the environmental geochemistry of materials that require management will be an important aspect of the Project. The objective of this memo is to:

- Present available Acid Base Accounting (ABA) data (surface and drillhole samples) from the proposed UWHR transport corridor; and
- Assess ABA data utilising AMIRA (2002) and Price (2009) guidelines as a screening tool to assess the acid generation risk across the main lithologies in the UWHR area.

PROJECT DESCRIPTION

The proposed UWHR is located within the Waimangaroa Valley, on the western side of the Mount William Range and will be constructed between the ESE sub-area and the existing Cypress Mine and from there will use the existing haul road to the Stockton Coal Handling and Preparation Plant. This report addresses the AMD issues around the yet to built sections of the UWHR.

The UWHR will also provide access for service and other vehicles to move between the various BPCP sub-areas. The UWHR is an essential link between the various BPCP sub-areas to prevent the need for heavy machinery and trucks to utilise the public road network. The UWHR has been selected as the preferred coal haulage option, based on an extended optioneering assessment that considered multiple criteria such as footprint, technical risk, closure requirements, permitting, environmental effects, capital and operating cost (BRL, 2025).

INTRODUCTION TO AMD

AMD refers to water impacted by mining activities, containing toxic metals, salts, and acidity. AMD is typically generated by the excavation of rocks that contain sulfide minerals, such as pyrite. When these minerals are exposed to oxygen and water, they undergo weathering processes and oxidise, generating acidity and releasing toxic metals. Microorganisms accelerate this process.

Classification of materials is important to understand the quantities of AMD-generating materials that require management. Classification is typically based on either (or both) the AMIRA (2002) or Price (2009) classification schemes until site-specific classification systems are developed.

CLASSIFICATION SYSTEMS

The AMIRA classification system uses net acid producing potential (NAPP) and net acidity generation (NAG) pH to classify samples as Potentially Acid Forming (PAF), Non-Acid Forming (NAF) or Uncertain (UC) (Figure 1). NAG testing of carbonaceous materials associated with coal mines can often be compromised by the generation of organic acidity creating low NAG pH and high acidities, resulting in UC classification (AMIRA, 2002).

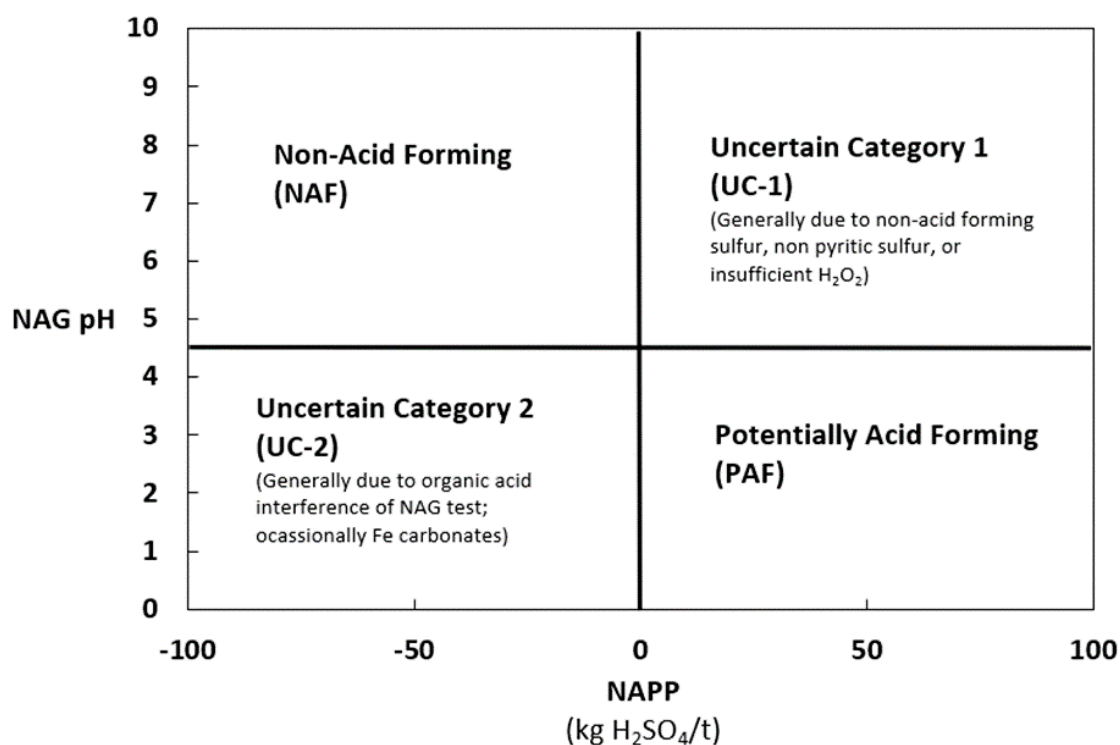


Figure 1: AMIRA (2002) AMD classification scheme for rock samples.

Source: Olds et al. (2015).

The Price classification system (Figure 2) uses the ratio between acid neutralising capacity (ANC) and maximum potential acidity (MPA) to classify samples as PAF, NAF or UC, where the neutralisation potential ratio (NPR) = ANC/MPA (Price, 2009).

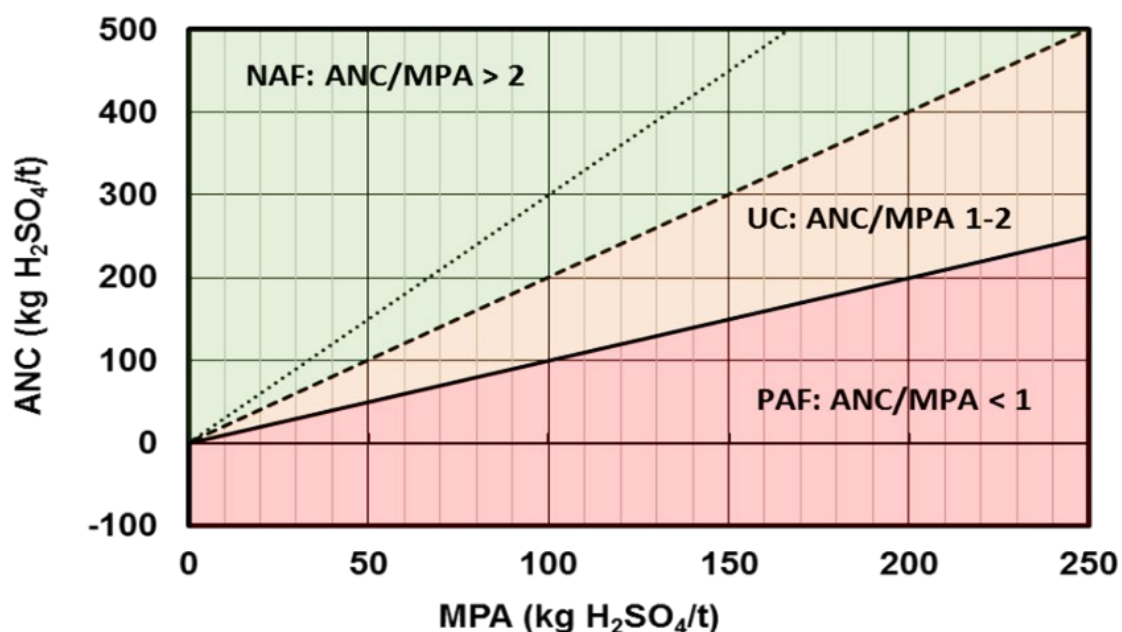


Figure 2: Price (2009) acid base accounting classification scheme for rock samples.

Source: Olds et al. (2015).

These criteria for the AMIRA (2002) and Price (2009) classification schemes can be presented in tabular form as shown in Table 1 and Table 2. Generally, both criteria are used to provide guidance on AMD risks for material types.

Table 1: AMIRA (2002) acid base accounting classification system.

CLASSIFICATION	CRITERIA	COMMENTS
Potentially Acid Forming (PAF)	NAPP ≥ 0 NAG pH ≤ 4.5	Sample always has a significant sulfur content, the acid generating potential of which exceeds the inherent acid neutralising capacity of the material.
Non-Acid Forming (NAF)	NAPP < 0 NAG pH > 4.5	Sample may, or may not, have a significant sulfur content but the ANC availability is more than adequate to neutralise the acid that theoretically could be produced.
Uncertain (UC)	NAPP ≥ 0 ; NAG pH > 4.5 NAPP < 0 ; NAG pH ≤ 4.5	An uncertain classification is used when there is an apparent conflict between the NAPP and NAG results.

Table 2: Price, 2009 acid base accounting classification system.

CLASSIFICATION	CRITERIA	COMMENTS
Potentially Acid Forming (PAF)	ANC/MPA < 1	Potentially acid generating material, unless sulfide minerals are non-reactive, or ANC is preferentially exposed on surfaces.
Non-Acid Forming (NAF)	ANC/MPA > 2	Non-potentially acid generation material, unless ANC is insufficiently reactive, extremely reactive sulfides are present, or preferential exposure of sulfides is found in the material.
Uncertain (UC)	$1 \leq \text{ANC/MPA} \leq 2$	Possibly PAF if ANC is insufficiently reactive or is depleted at a faster rate than sulfides.

Understanding the geochemical characteristics of overburden material within the Project area and assessment of materials against both the AMIRA (2002) and Price (2009) classification schemes allows the development of site-specific classification systems.

GEOCHEMICAL DATA

Two datasets were available to understand the AMD hazards for the UWHR project area:

- Surface rock samples were collected (n= 12) along the southern length of the UWHR. Sample locations are shown in Figure 3. These data have been presented in MWM (2026).
- ABA data are available from drillholes, and results were obtained from the BRL geological database. This included:
 - 18 Drillholes as shown in Figure 3.
 - 435 samples having a range of ABA data including wt% sulfur, ANC, and NAG data
 - 179 samples from the Kaiata Mudstone (KMS).
 - 234 samples from the Brunner Coal Measures (BCM).
 - 21 miscellaneous samples.

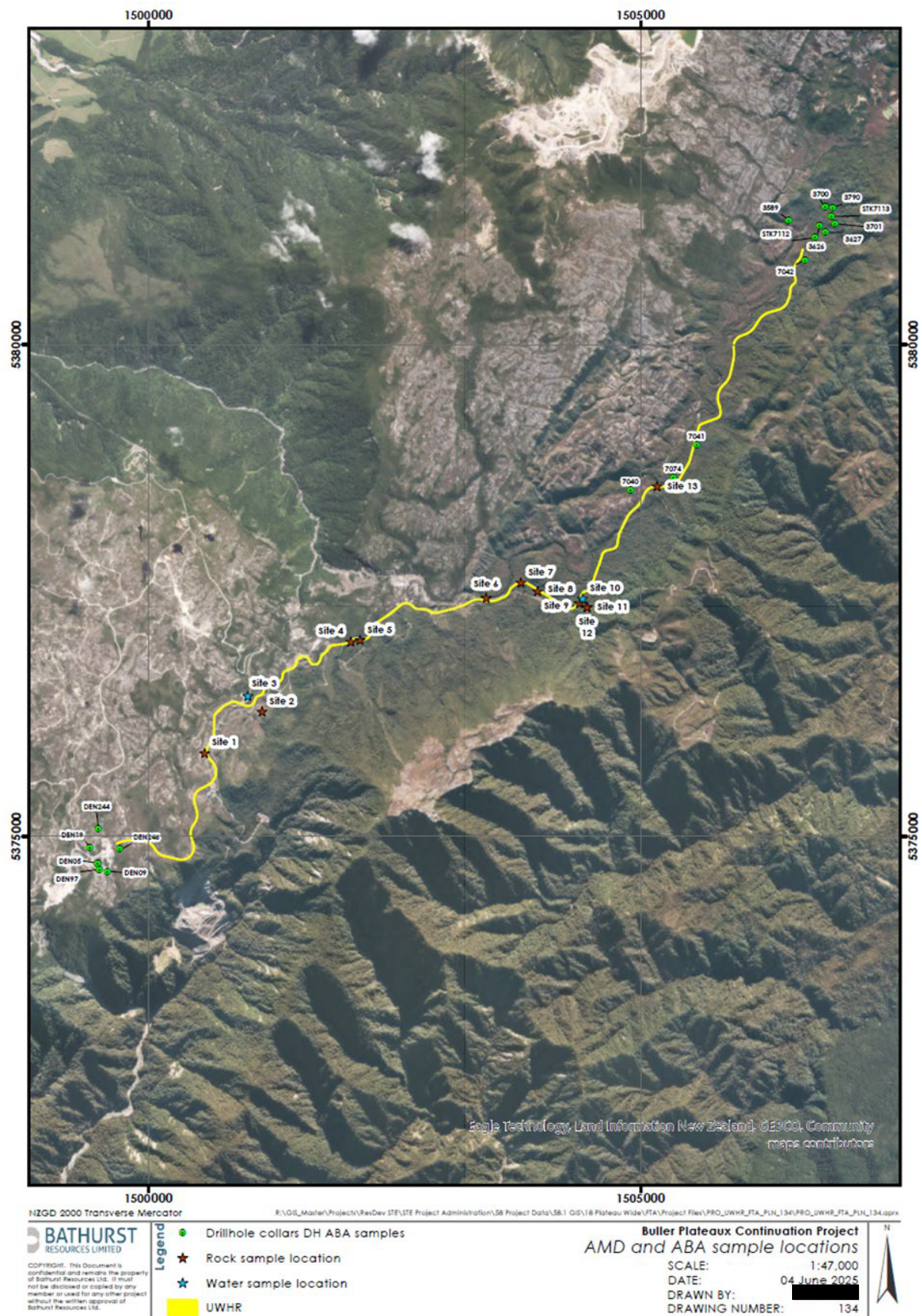


Figure 3: Map of sampling locations for the UWHR

RESULTS

ABA sampling was undertaken on select drillhole samples to further understand the AMD hazards for the UWHR. The following section presents the acid base accounting results of the UWHR. Full Results are presented in Attachment A. Results are presented in Figure 4, Figure 5, and Table 3.

The miscellaneous samples plot data from SUP (superficial soils), BSM (undifferentiated basement), QUAT and QT (quaternary materials). Mostly these are NAF.

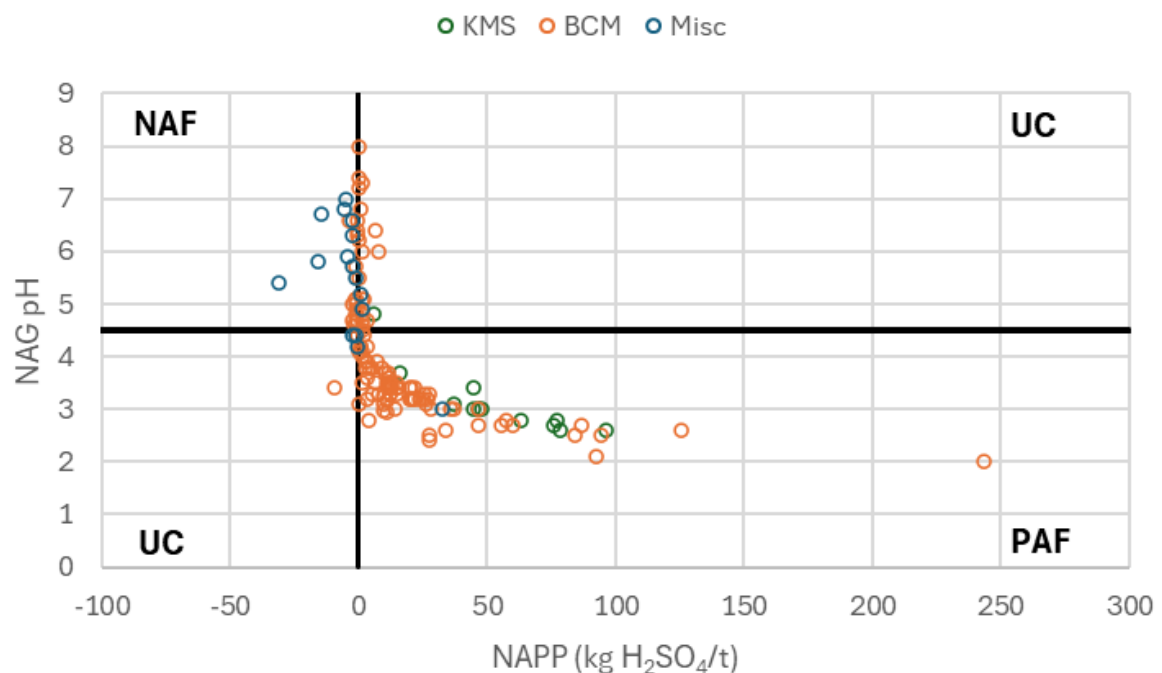


Figure 4: AMIRA (2002) ABA data classification of drill core samples

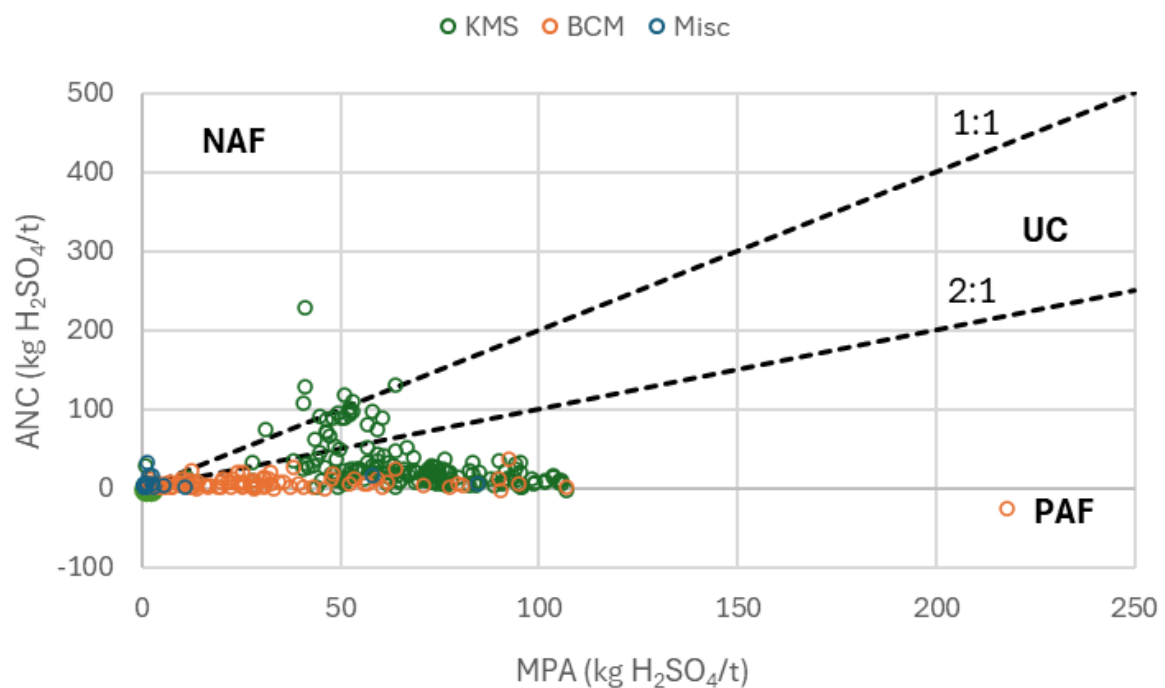


Figure 5: Price (2009) ABA classification of drillhole samples.

Table 3: ABA Summary of drillhole samples

		TOTAL S (wt%)			ANC (kg H ₂ SO ₄ /t)			MPA (kg H ₂ SO ₄ /t)			NAG (kg H ₂ SO ₄ /t)			NAG pH			NAPP (kg H ₂ SO ₄ /t)			PASTE pH	
	#	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Max
BCM	234	0.008	0.82	7.12	-25.2	4.54	36	0.245	25.03	217.87	1	31.52	129	2	4	8	-10.47	21.4	243.07	2.3	8.08
KMS	179	0.016	2.13	3.49	-2	29.02	228	0.490	65.22	106.79	5	56.67	100	2.6	3.13	4.8	-187	36.5	108.79	4.55	8.05
Misc	21	0.012	0.33	2.76	1	6.90	32	0.367	10.02	84.46	1	11.38	35	3	5.49	7	-30.7	3.45	78.46	4.56	6.87

= Number of samples

Misc: SUP, BSM, QUAT, QT

SUMMARY

Screening was undertaken using the AMIRA (2002) and Price (2009) guidelines to assess the acid generation risk across the main lithologies in the UWHR area. The following observations are provided:

- BCM has an average sulfur content of 0.82 wt% and a maximum of 7.12 wt%, which indicates a high acid generating potential. KMS have the highest risk for acid generation with an average total sulfur of 2.13 wt% and a maximum of 3.49 wt%. The miscellaneous samples have the lowest average sulfur of 0.33%.
- ANC is highest in KMS (average of 29 kg H₂SO₄/t which can generate a time delay before acid onset due to carbonate mineral buffering of acidity. BCM has a low average ANC of 4.54 kg H₂SO₄/t indicating limited acid buffering capacity.
- BCM materials had a minimum paste pH of 2.3 indicating the potential for immediate acid generation. Both KMS and miscellaneous samples have a higher minimum paste pH (4.55 and 4.56 respectively).
- The classification of the sample (Figure 1 and Figure 2) is based on standard screening protocols for AMD hazard assessment.

The distribution of samples provided in this memorandum is skewed toward the ends of the UWHR and there is less data from the central parts of the proposed transport corridor. Further work is required during construction of the haul road including:

- Additional sampling is required for classification of materials and operational decision making as the proposed haul road is constructed.
- The management of these materials, once classified, is dealt with as set out in the relevant management plans (BRL, 2026a,b).

CLOSING REMARKS

Please do not hesitate to contact Paul Weber at [REDACTED] or [REDACTED] should you wish to discuss this matter in greater detail.

Attachments: Attachment A – Raw Data Excel File

REFERENCES

- AMIRA, 2002. ARD Test Handbook - Project P387A Prediction and Kinetic Control of Acid Mine Drainage. AMIRA International Limited. Melbourne, Australia.
- BRL (Bathurst Resources Limited), 2025. Coal Haulage Project, Upper Waimangaroa Haul Road (UWHR) - Design Criteria, pp 63. Dated January 2025.
- BRL (Bathurst Resources Limited), 2026a. AMD Water Management Plan. Bathurst Resources Limited Document: BPCP-ENV-PLN-010.
- BRL (Bathurst Resources Limited), 2026b. AMD ELF Management Plan. Bathurst Resources Limited Document: BPCP-ENV-PLN-011.
- MWM (Mine Waste Management), 2026. Upper Waimangaroa Haul Road Site Visit. Mine Waste Management Report J-NZ0453- 001-M-FINAL.
- Price, W., 2009. Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. Mine Environment Neutral Drainage (MEND) Program, Smithers, British Columbia.

ATTACHMENT A – RAW DATA EXCEL FILE

BCM

SAMPLEID	Lab_SampleID	HOLEID	SAMPFROM	SAMPTO	Samp_Lith_D	Formation_D	ABA_Sul_T	ABA_ANC_hrs	ABA_MPA	MWM MPA Calc	ABA_NAG	ABA_NAG_pH	ABA_PASTE_pH	MWM NAPP Calc
GC-BU3538-015	A09-4251	3538	32	35	BCSS	BCM	2.01	8	61.506	61.506			5.05	53.51
GC-BU3538-016	A09-4252	3538	35	38	VCSS	BCM	1.22	2	37.332	37.332			5.08	35.33
GC-BU3538-017	A09-4253	3538	38	41	LCSS	BCM	1.41	2	43.146	43.146			4.94	41.15
GC-BU3588-021	A09-8375	3588	42	44	BMSS	BCM	1.74	12	53.244	53.244			5.69	41.24
GC-BU3588-022	A09-8376	3588	44	46	LMSS	BCM	1.04	13	31.824	31.824			6.88	18.82
GC-BU3588-023	A09-8377	3588	46	48	BMSS	BCM	1.57	18	48.042	48.042			6.96	30.04
GC-BU3588-024	A09-8378	3588	48	50	MSS	BCM	2.94	12	89.964	89.964			6.45	77.96
GC-BU3588-025	A09-8379	3588	50	52	LMSS	BCM	1	14	30.6	30.6			7.04	16.60
GC-BU3588-026	A09-8390	3588	52	54	LMSS	BCM	0.33	13	10.098	10.098			7.78	-2.90
GC-BU3589-001	A09-9187	3589		2	VCSS	BCM	0.03	4	0.918	0.918			6.04	-3.08
GC-BU3589-002	A09-9188	3589	2	4	VCSS	BCM	0.03	2	0.918	0.918			7.13	-1.08
GC-BU3589-003	A09-9189	3589	4	6	VCSS	BCM	0.03	2	0.918	0.918			7.21	-1.08
GC-BU3589-004	A09-9190	3589	6	8	VCSS	BCM	0.06	4	1.836	1.836			6.55	-2.16
GC-BU3589-005	A09-9191	3589	8	10	VCSS	BCM	0.03	4	0.918	0.918			6.82	-3.08
GC-BU3589-006	A09-9192	3589	10	12	VCSS	BCM	0.03	3	0.918	0.918			6.72	-2.08
GC-BU3589-007	A09-9193	3589	12	14	CSS	BCM	0.05	3	1.53	1.53			5.97	-1.47
GC-BU3625-018	A09-9183	3625	42	44	BMSS	BCM	0.9	8	27.54	27.54			7.28	19.54
GC-BU3625-019	A09-9184	3625	44	46	MSS	BCM	2.6	5	79.56	79.56			6.35	74.56
GC-BU3625-020	A09-9185	3625	46	48	MSS	BCM	0.65	7	19.89	19.89			7.28	12.89
GC-BU3625-021	A09-9186	3625	48	50	LMSS	BCM	0.04	8	1.224	1.224			7.09	-6.78
GC-BU3626-001	A09-9194	3626	4	6	BMSS	BCM	0.55	3	16.83	16.83			5.8	13.83
GC-BU3626-002	A09-9195	3626	6	8	LFSS	BCM	1.97	2	60.282	60.282			5.01	58.28
GC-BU3626-003	A09-9196	3626	8	10	LFSS	BCM	3.49	2	106.794	106.794			5.71	104.79
GC-BU3626-004	A09-9197	3626	10	12	LMSS	BCM	0.25	2	7.65	7.65			6.81	5.65
GC-BU3626-005	A09-9198	3626	16	18	MST	BCM	0.54	2	16.524	16.524			6.91	14.52
GC-BU3626-006	A09-9199	3626	18	20	LMSS	BCM	0.16	2	4.896	4.896			7.29	2.90
GC-BU3626-007	A09-9200	3626	20	22	LMSS	BCM	0.25	2	7.65	7.65			7.31	5.65
GC-BU3626-008	A09-9201	3626	22	24	LMSS	BCM	0.29	6	8.874	8.874			7.57	2.87
GC-BU3627-006	A09-9664	3627	12	14	BMSS	BCM	0.92	10	28.152	28.152			6.87	18.15
GC-BU3627-007	A09-9665	3627	14	16	BMSS	BCM	0.66	12	20.196	20.196			7.18	8.20
GC-BU3627-008	A09-9666	3627	16	18	BFSS	BCM	0.84	7	25.704	25.704			6.01	18.70
GC-BU3627-009	A09-9667	3627	18	20	BMSS	BCM	0.73	8	22.338	22.338			6.74	14.34
GC-BU3627-010	A09-9668	3627	20	22	BFSS	BCM	1.83	5	55.998	55.998			5.03	51.00
GC-BU3627-011	A09-9669	3627	22	24	CO	BCM	1.28	6	39.168	39.168			5.35	33.17
GC-BU3627-012	A09-9670	3627	24	26	LFSS	BCM	0.46	8	14.076	14.076			7.05	6.08
GC-BU3627-013	A09-9671	3627	26	28	LFSS	BCM	0.43	6	13.158	13.158			7.44	7.16
GC-BU3628-018	A09-11014	3628	40	42	BMSS	BCM	1.56	12	47.736	47.736			7	35.74
GC-BU3628-019	A09-11015	3628	42	44	BFSS	BCM	0.93	2	28.458	28.458			5.64	26.46
GC-BU3628-020	A09-11016	3628	44	46	BFSS	BCM	0.92	2	28.152	28.152			5.46	26.15
GC-BU3628-021	A09-11017	3628	46	48	BFSS	BCM	0.51	3	15.606	15.606			5.49	12.61
GC-BU3628-022	A09-11018	3628	48	50	LFSS	BCM	0.92	2	28.152	28.152			5.62	26.15
GC-BU3628-023	A09-11019	3628	50	52	CO	BCM	0.34	3	10.404	10.404			6.64	7.40
GC-BU3628-024	A09-11020	3628	52	54	LZSS	BCM	0.17	2	5.202	5.202			6.82	3.20
GC-BU3700-001	A09-9694	3700	4	6	LFSS	BCM	1.13	7	34.578	34.578			5.11	27.58
GC-BU3700-002	A09-9695	3700	6	8	CO	BCM	0.82	4	25.092	25.092			5.7	21.09
GC-BU3700-003	A09-9696	3700	8	10	LFSS	BCM	0.11	5	3.366	3.366			7.71	-1.63
GC-BU3700-004	A09-9697	3700	10	12	CO	BCM	0.13	5	3.978	3.978			7.79	-1.02
GC-BU3700-005	A09-9698	3700	16	18	FSS	BCM	0.31	7	9.486	9.486			7.72	2.49
GC-BU3700-006	A09-9921	3700	24	26	MSS	BCM	0.14	2	4.284	4.284			7.36	2.28
GC-BU3701-015	A09-9686	3701	30	32	BMSS	BCM	0.83	8	25.398	25.398			6.58	17.40
GC-BU3701-016	A09-9687	3701	32	34	BMSS	BCM	0.71	7	21.726	21.726			6.33	14.73
GC-BU3701-017	A09-9688	3701	34	36	BMSS	BCM	0.79	5	24.174	24.174			6.06	19.17
GC-BU3701-018	A09-9689	3701	36	38	BMSS	BCM	0.62	2	18.972	18.972			6.69	16.97
GC-BU3701-019	A09-9690	3701	38	40	BFSS	BCM	1.05	6	32.13	32.13			5.93	26.13
GC-BU3701-020	A09-9691	3701	40	42	LVFS	BCM	3.1	6	94.86	94.86			5.07	88.86
GC-BU3701-021	A09-9692	3701	42	44	LVFS	BCM	0.23	7	7.038	7.038			7.49	0.04

BCM

SAMPLEID	Lab_SampleID	HOLEID	SAMPFROM	SAMPTO	Samp_Lith_D	Formation_D	ABA_Sul_T	ABA_ANC_hrs	ABA_MPA	MWM MPA Calc	ABA_NAG	ABA_NAG_pH	ABA_PASTE_pH	MWM NAPP Calc
GC-BU3701-022	A09-9693	3701	44	45.55	LFSS	BCM	0.13	6	3.978	3.978			7.72	-2.02
GC-BU3702-006	A09-10329	3702	14	16	MST	BCM	2.31	4	70.686	70.686			5.33	66.69
GC-BU3702-007	A09-10330	3702	16	18	MSS	BCM	1	2	30.6	30.6			6.07	28.60
GC-BU3702-008	A09-10331	3702	18	20	BMSS	BCM	1.86	6	56.916	56.916			6.13	50.92
GC-BU3702-009	A09-10332	3702	20	22	BMSS	BCM	1.33	2	40.698	40.698			5.59	38.70
GC-BU3702-010	A09-10333	3702	22	24	BFSS	BCM	1	3	30.6	30.6			5.56	27.60
GC-BU3702-011	A09-10334	3702	24	26	LC	BCM	0.09	4	2.754	2.754			7.72	-1.25
GC-BU3702-012	A09-10335	3702	26	28	LZSS	BCM	0.32	4	9.792	9.792			7.69	5.79
GC-BU3705-013	A09-15251	3705	32	34	FSS	BCM	2.64	4	80.784	80.784			6.39	76.78
GC-BU3705-014	A09-15252	3705	34	36	BMSS	BCM	0.91	3	27.846	27.846			6.17	24.85
GC-BU3705-015	A09-15253	3705	36	38	BFSS	BCM	0.83	2	25.398	25.398			6.04	23.40
GC-BU3705-016	A09-15254	3705	38	40	BFSS	BCM	0.73	2	22.338	22.338			5.69	20.34
GC-BU3705-017	A09-15255	3705	40	42	BFSS	BCM	0.65	2	19.89	19.89			6.17	17.89
GC-BU3705-018	A09-15256	3705	42	43	CSS	BCM	2.53	2	77.418	77.418			6.12	75.42
GC-BU3705-019	A09-15257	3705	44	47	LVFS	BCM	0.08	4	2.448	2.448			6.06	-1.55
GC-BU3790-007	A09-12851	3790	18	20	BFSS	BCM	1.7	5	52.02	52.02			5.29	47.02
GC-BU3790-008	A09-12852	3790	20	22	CSS	BCM	0.78	20	23.868	23.868			6.45	3.87
GC-BU3790-009	A09-12853	3790	22	24	BFSS	BCM	1.25	26	38.25	38.25			5.58	12.25
GC-BU3790-010	A09-12854	3790	24	26	BFSS	BCM	1.06	21	32.436	32.436			4.75	11.44
GC-BU3790-011	A09-12855	3790	26	28	BCSS	BCM	0.83	20	25.398	25.398			5.08	5.40
GC-BU3790-012	A09-12856	3790	29	31	LVFS	BCM	0.19	2	5.814	5.814			7.48	3.81
GC-BU3791-013	A09-12839	3791	28	30	MST	BCM	3.02	36	92.412	92.412			6.65	56.41
GC-BU3791-014	A09-12840	3791	30	32	MSS	BCM	1.17	8	35.802	35.802			6.58	27.80
GC-BU3791-015	A09-12841	3791	32	34	FSS	BCM	2.09	24	63.954	63.954			6.11	39.95
GC-BU3791-016	A09-12842	3791	34	36	LC	BCM	0.41	22	12.546	12.546			7.46	-9.45
GC-BU3791-017	A09-12843	3791	36	38	MST	BCM	0.19	6	5.814	5.814			8.08	-0.19
GC-BU3791-018	A09-12844	3791	38	40	MST	BCM	0.39	9	11.934	11.934			7.92	2.93
GC-BU3793-018	A09-14332	3793	36	38	BCSS	BCM	1.93	13	59.058	59.058			6.11	46.06
GC-BU3793-019	A09-14333	3793	38	40	BFSS	BCM	1	12	30.6	30.6			5.74	18.60
GC-BU3793-020	A09-14334	3793	40	43	BFSS	BCM	0.74	11	22.644	22.644			5.95	11.64
GC-BU3793-021	A09-14335	3793	45	48	LFSS	BCM	0.05	12	1.53	1.53			7.19	-10.47
AMD_Bu7040_001		7040		2.33	CSS	BCM	0.469	2		14.3514		3.3		12.35
AMD_Bu7040_002		7040	3.02	3.69	LVFS	BCM	0.971			29.7126				29.71
AMD_Bu7040_003		7040	3.69	5.57	ZST	BCM	1.08			33.048				33.05
AMD_Bu7040_004		7040	5.57	8	CSS	BCM	0.133	1		4.0698		4.7		3.07
AMD_Bu7040_005		7040	8	10.56	VCSS	BCM	0.064			1.9584		5.1		1.96
AMD_Bu7040_006		7040	10.56	12	VCSS	BCM	0.084	1		2.5704		5.1		1.57
AMD_Bu7040_007		7040	12.8	14.14	LZSS	BCM	0.417			12.7602		3.5		12.76
AMD_Bu7040_008		7040	14.14	17	VCSS	BCM	0.026	2		0.7956		5		-1.20
AMD_Bu7040_009		7040	17	19.71	VCSS	BCM	0.008	1		0.2448		4.9		-0.76
AMD_Bu7040_010		7040	19.71	22	ZST	BCM	1.34			41.004				41.00
AMD_Bu7040_011		7040	22	25	MST	BCM	0.84			25.704				25.70
AMD_Bu7040_012		7040	30.48	33.11	SZN	BCM	0.026	3		0.7956		4.7		-2.20
AMD_Bu7041_006		7041	13.7	16.8	VFSS	BCM	2.91	5		89.046	84	2.5		84.05
AMD_Bu7041_007		7041	16.8	19.8	LFSS	BCM	1.52	11		46.512	34	3		35.51
AMD_Bu7041_008		7041	19.8	21.89	LVFS	BCM	3.16	2		96.696	97	2.5		94.70
AMD_Bu7041_009		7041	21.89	24.05	LFSS	BCM	1.96			59.976	63	2.7		59.98
AMD_Bu7041_010		7041	24.05	25.8	LC	BCM	0.745	1		22.797	26	3.2		21.80
AMD_Bu7041_011		7041	25.8	28	VCSS	BCM	0.766	2		23.4396	23	3.2		21.44
AMD_Bu7041_012		7041	28	30.3	VCSS	BCM	0.456	3		13.9536	13	3.4		10.95
AMD_Bu7041_013		7041	30.3	32	VCSS	BCM	0.587	3		17.9622	18	3.3		14.96
AMD_Bu7041_014		7041	32	33.35	LVFS	BCM	0.167	5		5.1102	23	4.1		0.11
AMD_Bu7041_015		7041	33.35	35	MSS	BCM	0.512	3		15.6672	18	3.4		12.67
AMD_Bu7041_016		7041	35	38.42	LMSS	BCM	0.455	3		13.923	16	3.5		10.92
AMD_Bu7041_017		7041	44.93	48	ZST	BCM	0.107	3		3.2742	70	3.1		0.27
AMD_Bu7041_018		7041	48	50.71	ZST	BCM	0.228	3		6.9768	109	2.8		3.98

BCM

SAMPLEID	Lab_SampleID	HOLEID	SAMPFROM	SAMPTO	Samp_Lith_D	Formation_D	ABA_Sul_T	ABA_ANC_hrs	ABA_MPA	MWM MPA Calc	ABA_NAG	ABA_NAG_pH	ABA_PASTE_pH	MWM NAPP Calc
AMD_Bu7041_019		7041	53.7	56	ZST	BCM	0.549	2		16.7994	21	3.4		14.80
AMD_Bu7041_020		7041	56	58.8	LVFS	BCM	0.952	1		29.1312	31	3		28.13
AMD_Bu7041_021		7041	58.8	60.5	VFSS	BCM	0.41	1		12.546	20	3.5		11.55
AMD_Bu7041_022		7041	60.5	62.51	LVFS	BCM	0.435	1		13.311	19	3.4		12.31
AMD_Bu7041_023		7041	62.51	64.27	VFSS	BCM	0.17	2		5.202	12	4.2		3.20
AMD_Bu7041_024		7041	64.27	65.24	PBCG	BCM	0.403	1		12.3318	13	3.6		11.33
AMD_Bu7042_006		7042	18.83	21.4	BVFS	BCM	1.98	5		60.588	57	2.7		55.59
AMD_Bu7042_007		7042	21.4	23.17	BVFS	BCM	0.917	3		28.0602	24	3.2		25.06
AMD_Bu7042_008		7042	23.17	25.63	BVFS	BCM	0.962	6		29.4372	25	3.2		23.44
AMD_Bu7042_009		7042	25.63	27.69	LVFS	BCM	1.95	2		59.67	58	2.8		57.67
AMD_Bu7042_010		7042	28.48	30.22	LZSS	BCM	0.772	4		23.6232	24	3.2		19.62
AMD_Bu7042_011		7042	30.22	33.4	LVFS	BCM	0.927	2		28.3662	37	3.1		26.37
AMD_Bu7042_012		7042	36.9	38.8	VFSS	BCM	0.14	3		4.284	22	4.1		1.28
AMD_Bu7042_013		7042	44.8	47.17	FSS	BCM	0.291	2		8.9046	15	3.9		6.90
GC-BU7063-003	WP19-0329	7063	13	18.98	MSS	BCM	2.1			64.26				64.26
GC-BU7064-002	WP19-0330	7064	8	12	MSS	BCM	1.4			42.84				42.84
GC-BU7069-007	WP20-0447	7069	23.44	27.42	MSS	BCM	1.89	-4		57.834				61.83
AMD_Bu7074_004		7074	11	13.85	MST	BCM	3.2	11		97.92	96	2.7		86.92
AMD_Bu7074_005		7074	13.85	16.2	VCSS	BCM	1.52			46.512	45	3		46.51
AMD_Bu7074_006		7074	16.75	17.73	CM	BCM	4.17	2		127.602	117	2.6		125.60
AMD_Bu7074_007		7074	17.73	18.5	VCSS	BCM	0.328	1		10.0368	13	3.8		9.04
AMD_Bu7074_008		7074	18.5	20	CSS	BCM	0.573	3		17.5338	18	3.5		14.53
AMD_Bu7074_009		7074	20	21.3	CSS	BCM	0.533	1		16.3098	15	3.4		15.31
AMD_Bu7074_010		7074	21.3	23.5	LFSS	BCM	1.24	1		37.944	39	3		36.94
AMD_Bu7074_011		7074	23.5	26.8	LZSS	BCM	0.966	2		29.5596	26	3.3		27.56
AMD_Bu7074_012		7074	26.8	27.4	MST	BCM	1.1	7		33.66	37	3.2		26.66
AMD_Bu7074_013		7074	27.4	30	VCSS	BCM	0.798	4		24.4188	24	3.4		20.42
AMD_Bu7074_014		7074	30	31	LZSS	BCM	0.918	6		28.0908	34	3.4		22.09
AMD_Bu7074_015		7074	31	32.8	GRCG	BCM	0.449	2		13.7394	11	3.7		11.74
AMD_Bu7074_016		7074	32.8	36.12	LFSS	BCM	0.894	2		27.3564	27	3.3		25.36
AMD_Bu7074_017		7074	36.12	38.02	HCM	BCM	0.859	6		26.2854	34	3.2		20.29
AMD_Bu7074_018		7074	38.02	41.5	VCSS	BCM	0.707	2		21.6342	21	3.4		19.63
AMD_Bu7074_019		7074	41.5	44	MST	BCM	0.767	33		23.4702	30	3.4		-9.53
AMD_Bu7074_020		7074	44	46	ZSS	BCM	0.122	3		3.7332	26	4.2		0.73
AMD_Bu7074_021		7074	46	46.58	LFSS	BCM	0.043	3		1.3158	25	4.6		-1.68
AMD_Bu7074_022		7074	57.95	58.9	ZSS	BCM	0.024	3		0.7344	18	5		-2.27
GC-BU7080-001	WP20-0449	7080	3.76	8.9	CSS	BCM	1.55	-2		47.43				49.43
GC-BU7081-005	WP20-0447	7081	22.24	26	CSS	BCM	1.36	-3		41.616				44.62
GC-BU7081-006	WP20-0447	7081	26	29.57	MST	BCM	2.09	-1		63.954				64.95
GC-BU7082-005	WP19-0410	7082	16.5	22.23	MSS	BCM	1.64	1		50.184				49.18
GC-BU7082-006	WP19-0410	7082	22.23	27.12	VFSS	BCM	1.43	6		43.758				37.76
GC-BU7087-002	WP19-0385	7087	2	6	FSS	BCM	1.44			44.064				44.06
GC-BU7087-003	WP19-0385	7087	6	9.38	CSS	BCM	1.27			38.862				38.86
GC-BU7088-007	WP20-0447	7088	28.24	34.09	CSS	BCM	1.46	-2		44.676				46.68
AMD_H_DEN-10-4	93/513	DEN05	37.53	37.63	HCM	BCM	0.44	-0.9	13.5	13.464	15	3	3.7	14.36
AMD_H_DEN-10-4	93/514	DEN05	38.05	38.25	HCM	BCM	0.92	0.3	28.2	28.152	41	2.5	3.8	27.85
AMD_H_DEN-10-4	93/515	DEN05	38.25	38.39	CQ	BCM	2.95	-2.4	90.3	90.27	74	2.1	3.1	92.67
AMD_H_DEN-10-4	93/516	DEN05	39.1	39.5	MST	BCM	0.13	0.9	4	3.978	13	3.6	3.9	3.08
AMD_H_DEN-10-4	93/517	DEN05	40.2	40.3	LC	BCM	7.12	-25.2	217.9	217.872	129	2	2.3	243.07
AMD_H_DEN-10-4	93/518	DEN05	41.27	41.47	HCM	BCM	0.09	1.6	2.8	2.754	20	3.5	4.2	1.15
AMD_H_DEN-10-4	93/519	DEN05	44.43	44.57	MSS	BCM	0.13	0.7	4	3.978	23	3.2	4	3.28
AMD_H_den08_08	84/662	DEN09	7	11	MSS	BCM	0.44	1	13	13.464	11	3.3	5.3	12.46
AMD_H_den08_09	84/822	DEN09	15	18	MSS	BCM	1.49	-1	46	45.594	27	2.7	6.2	46.59
AMD_H_den08_10	84/661	DEN09	30	34	MSS	BCM	0.38	1	12	11.628	10	3.7	5.9	10.63
AMD_H_den08_11	84/660	DEN09	35	37.2	HCM	BCM	1.07	-1	33	32.742	21	2.6	4.5	33.74
AMD_H_DEN19-10	96/322	DEN19	20.51	25.43	VCSS	BCM	0.01			0.306		7.4	6.3	0.31

BCM

SAMPLEID	Lab_SampleID	HOLEID	SAMPFROM	SAMPTO	Samp_Lith_D	Formation_D	ABA_Sul_T	ABA_ANC_1hs	ABA_MPA	MWM MPA Calc	ABA_NAG	ABA_NAG_pH	ABA_PASTE_pH	MWM NAPP Calc
AMD_H_DEN19-1196/323	DEN19	28.71	31.35	MSS	BCM	0.21			6	6.426	2	6.4	5.5	6.43
AMD_H_DEN19-1296/324	DEN19	33.75	35.85	ZST	BCM	0.25			8	7.65	2	6	4.8	7.65
AMD_H_DEN19-1396/325	DEN19	43.4	45.76	MSS	BCM	0.01				0.306		7.2	6.5	0.31
AMD_H_DEN19-1496/326	DEN19	47.72	50.11	MSS	BCM	0.05			2	1.53		7.3	6.4	1.53
AMD_H_DEN19-1596/327	DEN19	51.27	53.38	MSS	BCM	0.01				0.306		8	6.8	0.31
AMD_H_DEN19-1696/328	DEN19	54.52	57.73	MSS	BCM	0.04			1	1.224	5	6	6.5	1.22
AMD_H_DEN19-Cc96/329	DEN19		6	VCSS	BCM	0.03			1	0.918	1	6.8	7.3	0.92
AMD_H_DEN19-Cc96/330	DEN19	6	10	VCSS	BCM	0.01				0.306	6	6.2	7.1	0.31
AMD_BuDEN244_CMNG1348-1	DEN244	0.4	1.46	VCSS	BCM	0.115	1			3.519		3.9	6.13	2.52
AMD_BuDEN244_CMNG1348-1	DEN244	1.46	3.5	VCSS	BCM	0.635				19.431				19.43
AMD_BuDEN244_CMNG1348-1	DEN244	3.5	5.7	MST	BCM	0.829				25.3674				25.37
AMD_BuDEN244_CMNG1348-1	DEN244	5.7	6.42	VCSS	BCM	0.05				1.53		4.8	6.54	1.53
AMD_BuDEN244_CMNG1348-1	DEN244	6.42	8.1	LVFS	BCM	0.751				22.9806				22.98
AMD_BuDEN244_CMNG1348-1	DEN244	8.1	10.1	FSS	BCM	0.455				13.923				13.92
AMD_BuDEN244_CMNG1348-1	DEN244	12.07	13.54	CSS	BCM	0.083	1			2.5398		4.5	6.58	1.54
AMD_BuDEN244_CMNG1348-1	DEN244	13.54	15.54	GRCG	BCM	0.078	1			2.3868		4.6	6.2	1.39
AMD_BuDEN244_CMNG1348-1	DEN244	18.46	19.62	MSS	BCM	0.343	1			10.4958		3.1	5.31	9.50
AMD_BuDEN244_CMNG1348-1	DEN244	19.62	21.62	CSS	BCM	0.028	1			0.8568		6.4	7.02	-0.14
AMD_BuDEN244_CMNG1348-1	DEN244	23.94	25.3	GRCG	BCM	0.021	1			0.6426		6.6	6.31	-0.36
AMD_BuDEN244_CMNG1348-1	DEN244	25.84	27.88	LMSS	BCM	1.27				38.862				38.86
AMD_BuDEN244_CMNG1348-1	DEN244	28.23	30.23	CSS	BCM	0.136	1			4.1616		3.9	5.92	3.16
AMD_BuDEN244_CMNG1348-1	DEN244	31.7	32.83	MST	BCM	0.535				16.371				16.37
AMD_BuDEN244_CMNG1348-1	DEN244	34	34.5	VCSS	BCM	0.017	1			0.5202		6.3	6.62	-0.48
AMD_BuDEN244_CMNG1348-1	DEN244	37	38	FSS	BCM	0.63				19.278				19.28
AMD_BuDEN244_CMNG1348-1	DEN244	40.3	42	ZST	BCM	1.24				37.944				37.94
AMD_BuDEN244_CMNG1348-1	DEN244	42	43	CSS	BCM	0.152	2			4.6512		3.8	5.83	2.65
AMD_BuDEN244_CMNG1348-1	DEN244	45	46.85	VCSS	BCM	0.037	1			1.1322		5.5	6.6	0.13
AMD_BuDEN244_CMNG1348-1	DEN244	46.85	47.91	LFSS	BCM	0.838				25.6428				25.64
EX_R_BuDEN244_C106/337	DEN244	27.89	28.23	LMSS	BCM	1.18				36.108				36.11
AMD_BuDEN246_CMNG1348-1	DEN246	1.3	3.3	MST	BCM	0.829				25.3674				25.37
AMD_BuDEN246_CMNG1348-1	DEN246	3.3	5.3	CSS	BCM	0.016	4			0.4896		6.6	6.62	-3.51
AMD_BuDEN246_CMNG1348-1	DEN246	5.98	7.97	LFSS	BCM	0.133	2			4.0698		4.4	5	2.07
AMD_BuDEN246_CMNG1348-1	DEN246	10.42	11.7	CSS	BCM	0.07	1			2.142		4.7	5.83	1.14
AMD_BuDEN246_CMNG1348-1	DEN246	11.7	13.7	MSS	BCM	0.351				10.7406		3.16	5.02	10.74
AMD_BuDEN246_CMNG1348-1	DEN246	17.74	18.74	FSS	BCM	0.229	2			7.0074		3.8	5.33	5.01
AMD_BuDEN246_CMNG1348-1	DEN246	19.57	20.57	FSS	BCM	0.79				24.174				24.17
AMD_BuDEN246_CMNG1348-1	DEN246	21.8	22.8	CZN	BCM	0.283	1			8.6598		3.3	6.49	7.66
AMD_BuDEN246_CMNG1348-1	DEN246	22.8	23.8	VCSS	BCM	0.031	2			0.9486		5.1	6.47	-1.05
AMD_BuDEN246_CMNG1348-1	DEN246	26.86	27.86	ZST	BCM	1.29				39.474				39.47
AMD_BuDEN246_CMNG1348-1	DEN246	33.57	35.57	LFSS	BCM	1.05				32.13				32.13
AMD_BuDEN246_CMNG1348-1	DEN246	38	39	MSS	BCM	1.99				60.894				60.89
AMD_BuDEN246_CMNG1348-1	DEN246	40.27	41.27	FSS	BCM	0.974				29.8044				29.80
AMD_BuDEN246_CMNG1348-1	DEN246	42	43.1	LFSS	BCM	0.787				24.0822				24.08
AMD_BuDEN246_CMNG1348-1	DEN246	44	46	CSS	BCM	0.044	2			1.3464		4.7	5.9	-0.65
AMD_BuDEN246_CMNG1348-1	DEN246	50.7	52.7	MST	BCM	0.907				27.7542				27.75
AMD_BuDEN246_CMNG1348-1	DEN246	53.95	55.3	VFSS	BCM	0.368				11.2608		2.95	4.42	11.26
AMD_BuDEN246_CMNG1348-1	DEN246	55.3	56.3	VFSS	BCM	0.513				15.6978				15.70
AMD_BuDEN246_CMNG1348-1	DEN246	57.53	58.74	LFSS	BCM	0.195	1			5.967		3.3	4.76	4.97
AMD_BuDEN246_CMNG1348-1	DEN246	63.77	64.77	ZST	BCM	0.172	1			5.2632		3.8	5.14	4.26
AMD_BuDEN246_CMNG1348-1	DEN246	65.45	66.45	FSS	BCM	0.024	2			0.7344		5.1	6.24	-1.27
AMD_BuDEN246_CMNG1348-1	DEN246	66.45	67.83	LCSS	BCM	0.028	2			0.8568		4.8	5.69	-1.14
AMD_BuDEN246_CMNG1348-1	DEN246	67.83	69.3	VFSS	BCM	0.036	2			1.1016		4.7	5.76	-0.90
AMD_BuDEN246_CMNG1348-1	DEN246	69.94	71.1	VFSS	BCM	0.116	2			3.5496		4	5.54	1.55
AMD_BuDEN246_CMNG1348-1	DEN246	72.45	74.45	LFSS	BCM	0.325				9.945		2.99	4.58	9.95
AMD_BuDEN246_CMNG1348-1	DEN246	74.45	75.89	ZST	BCM	0.253	1			7.7418		3.5	5.2	6.74
AMD_BuDEN246_CMNG1348-1	DEN246	75.89	77.52	LCSS	BCM	0.056	1			1.7136		4.2	5.05	0.71

BCM

SAMPLEID	Lab_SampleID	HOLEID	SAMPFROM	SAMPTO	Samp_Lith_D	Formation_D	ABA_Sul_T	ABA_ANC_Is	ABA_MPA	MWM MPA Calc	ABA_NAG	ABA_NAG_pH	ABA_PASTE_pH	MWM NAPP Calc
AMD_BuDEN246_CMNG1348-1	DEN246	DEN246	77.52	78.16	ZST	BCM	0.311			9.5166		3.25	4.81	9.52
EX_R_BuDEN246_C106/338	DEN246	DEN246	19.27	19.57	FSS	BCM	1.06			32.436				32.44
AMD_H_DEN97_Cc12-71104	DEN97	DEN97		6	VCSS	BCM	0.02	2	1	0.612	6	5.7	6.6	-1.39
AMD_H_DEN97_Cc12-71105	DEN97	DEN97	6	12	FSS	BCM	0.44	2	13	13.464	7	3.5	5.7	11.46
AMD_H_DEN97-0712-71084	DEN97	DEN97	13.9	19.5	FSS	BCM	0.9		28	27.54	24	2.4	4.6	27.54
AMD_H_DEN97-0812-71085	DEN97	DEN97	19.5	32.2	VCSS	BCM	0.01	1		0.306	15	4.4	6.3	-0.69
AMD_STK7112_004	STK7112	STK7112	18.28	23.5	CSS	BCM	1.01	7		30.906				23.91
AMD_STK7112_005	STK7112	STK7112	23.5	28.5	CSS	BCM	1.22	11		37.332				26.33
AMD_STK7113_007	STK7113	STK7113	28	33	MSS	BCM	0.845	11		25.857				14.86
AMD_STK7113_008	STK7113	STK7113	33	38	MSS	BCM	0.889	6		27.2034				21.20

Kaiata Mudstone															
SAMPLEID	Lab_SampleID	HOLEID	SAMPFROM	SAMPTO	Samp_Lith_D	Formation_D	ABA_Sul_T	ABA_ANC_hs	ABA_MPA	MWM MPA Calc	ABA_NAG	ABA_NAG_pH	ABA_PASTE_pH	MWM NAPP Calc	
GC-BU3538-002	A09-4238	3538	6	8	MST	KMS	1.66	6	50.80	50.80			5.99	44.80	
GC-BU3538-003	A09-4239	3538	8	10	MST	KMS	2.72	18	83.23	83.23			7.16	65.23	
GC-BU3538-004	A09-4240	3538	10	12	MST	KMS	1.73	17	52.94	52.94			7.63	35.94	
GC-BU3538-005	A09-4241	3538	12	14	MST	KMS	1.94	18	59.36	59.36			7.66	41.36	
GC-BU3538-006	A09-4242	3538	14	16	MST	KMS	2.1	17	64.26	64.26			7.78	47.26	
GC-BU3538-007	A09-4243	3538	16	18	MST	KMS	2.34	17	71.60	71.60			7.82	54.60	
GC-BU3538-008	A09-4244	3538	18	20	MST	KMS	2.38	14	72.83	72.83			7.73	58.83	
GC-BU3538-009	A09-4245	3538	20	22	MST	KMS	2.38	7	72.83	72.83			7.28	65.83	
GC-BU3538-010	A09-4246	3538	22	24	MST	KMS	2.33	12	71.30	71.30			7.4	59.30	
GC-BU3538-011	A09-4247	3538	24	26	MST	KMS	2.33	9	71.30	71.30			7.58	62.30	
GC-BU3538-012	A09-4248	3538	26	28	MST	KMS	2.39	7	73.13	73.13			6.98	66.13	
GC-BU3538-013	A09-4249	3538	28	30	MST	KMS	3.11	2	95.17	95.17			6.97	93.17	
GC-BU3538-014	A09-4250	3538	30	32	MST	KMS	3.13	2	95.78	95.78			5.75	93.78	
GC-BU3588-001	A09-8355	3588	2	4	MST	KMS	1.37	26	41.92	41.92			7.57	15.92	
GC-BU3588-002	A09-8356	3588	4	6	MST	KMS	1.33	25	40.70	40.70			7.76	15.70	
GC-BU3588-003	A09-8357	3588	6	8	MST	KMS	1.36	30	41.62	41.62			7.77	11.62	
GC-BU3588-004	A09-8358	3588	8	10	MST	KMS	1.63	49	49.88	49.88			7.81	0.88	
GC-BU3588-005	A09-8359	3588	10	12	MST	KMS	1.66	22	50.80	50.80			7.87	28.80	
GC-BU3588-006	A09-8360	3588	12	14	MST	KMS	1.76	25	53.86	53.86			7.82	28.86	
GC-BU3588-007	A09-8361	3588	14	16	MST	KMS	1.89	29	57.83	57.83			7.94	28.83	
GC-BU3588-008	A09-8362	3588	16	18	MST	KMS	2.03	14	62.12	62.12			7.84	48.12	
GC-BU3588-009	A09-8363	3588	18	20	MST	KMS	1.71	14	52.33	52.33			7.75	38.33	
GC-BU3588-010	A09-8364	3588	20	22	MST	KMS	1.6	12	48.96	48.96			7.73	36.96	
GC-BU3588-011	A09-8365	3588	22	24	MST	KMS	2.11	7	64.57	64.57			7.74	57.57	
GC-BU3588-012	A09-8366	3588	24	26	MST	KMS	2.02	7	61.81	61.81			7.84	54.81	
GC-BU3588-013	A09-8367	3588	26	28	MST	KMS	2.25	8	68.85	68.85			7.38	60.85	
GC-BU3588-014	A09-8368	3588	28	30	MST	KMS	2.47	7	75.58	75.58			7.71	68.58	
GC-BU3588-015	A09-8369	3588	30	32	MST	KMS	2.55	7	78.03	78.03			7.74	71.03	
GC-BU3588-016	A09-8370	3588	32	34	MST	KMS	2.42	5	74.05	74.05			7.91	69.05	
GC-BU3588-017	A09-8371	3588	34	36	MST	KMS	2.48	5	75.89	75.89			8.05	70.89	
GC-BU3588-018	A09-8372	3588	36	38	MST	KMS	2.96	5	90.58	90.58			7.73	85.58	
GC-BU3588-019	A09-8373	3588	38	40	MST	KMS	2.75	4	84.15	84.15			7.59	80.15	
GC-BU3588-020	A09-8374	3588	40	42	MST	KMS	3.39	16	103.73	103.73			7.52	87.73	
GC-BU3625-001	A09-9166	3625	8	10	MST	KMS	1.01	75	30.91	30.91			7.16	-44.09	
GC-BU3625-002	A09-9167	3625	10	12	MST	KMS	1.86	81	56.92	56.92			7.37	-24.08	
GC-BU3625-003	A09-9168	3625	12	14	MST	KMS	2.09	47	63.95	63.95			7.71	16.95	
GC-BU3625-004	A09-9169	3625	14	16	MST	KMS	1.89	97	57.83	57.83			7.66	-39.17	
GC-BU3625-005	A09-9170	3625	16	18	MST	KMS	1.93	74	59.06	59.06			7.64	-14.94	
GC-BU3625-006	A09-9171	3625	18	20	MST	KMS	1.51	71	46.21	46.21			7.67	-24.79	
GC-BU3625-007	A09-9172	3625	20	22	MST	KMS	1.61	2	49.27	49.27			7.75	47.27	
GC-BU3625-008	A09-9173	3625	22	24	MST	KMS	1.85	33	56.61	56.61			7.7	23.61	
GC-BU3625-009	A09-9174	3625	24	26	MST	KMS	1.42	62	43.45	43.45			7.74	-18.55	
GC-BU3625-010	A09-9175	3625	26	28	MST	KMS	1.6	37	48.96	48.96			7.71	11.96	
GC-BU3625-011	A09-9176	3625	28	30	MST	KMS	1.77	23	54.16	54.16			7.54	31.16	
GC-BU3625-012	A09-9177	3625	30	32	MST	KMS	2.07	18	63.34	63.34			7.6	45.34	
GC-BU3625-013	A09-9178	3625	32	34	MST	KMS	2.19	16	67.01	67.01			7.61	51.01	
GC-BU3625-014	A09-9179	3625	34	36	MST	KMS	2.45	18	74.97	74.97			7.65	56.97	
GC-BU3625-015	A09-9180	3625	36	38	MST	KMS	2.38	23	72.83	72.83			7.56	49.83	
GC-BU3625-016	A09-9181	3625	38	40	MST	KMS	2.08	2	63.65	63.65			7.66	61.65	
GC-BU3625-017	A09-9182	3625	40	42	MST	KMS	1.43	2	43.76	43.76			7.41	41.76	
GC-BU3627-002	A09-9660	3627	4	6	MST	KMS	2.78	7	85.07	85.07			4.57	78.07	
GC-BU3627-003	A09-9661	3627	6	8	MST	KMS	3.01	11	92.11	92.11			4.85	81.11	
GC-BU3627-004	A09-9662	3627	8	10	MST	KMS	3.31	9	101.29	101.29			5.26	92.29	
GC-BU3627-005	A09-9663	3627	10	12	MST	KMS	3.07	9	93.94	93.94			5.2	84.94	
GC-BU3628-001	A09-10997	3628	6	8	MST	KMS	1.73	97	52.94	52.94			7.23	-44.06	
GC-BU3628-002	A09-10998	3628	8	10	MST	KMS	1.7	93	52.02	52.02			7.55	-40.98	

Kaiata Mudstone															
SAMPLEID	Lab_SampleID	HOLEID	SAMPFROM	SAMPTO	Samp_Lith_D	Formation_D	ABA_Sul_T	ABA_ANC_hs	ABA_MPA	MWM MPA Calc	ABA_NAG	ABA_NAG_pH	ABA_PASTE_pH	MWM NAPP Calc	
GC-BU3628-003	A09-10999	3628	10	12	CZN	KMS	1.66	88	50.80	50.80			7.62	-37.20	
GC-BU3628-004	A09-11000	3628	12	14	MST	KMS	1.52	73	46.51	46.51			7.5	-26.49	
GC-BU3628-005	A09-11001	3628	14	16	MST	KMS	1.34	128	41.00	41.00			7.53	-87.00	
GC-BU3628-006	A09-11002	3628	16	18	MST	KMS	1.98	90	60.59	60.59			7.65	-29.41	
GC-BU3628-007	A09-11003	3628	18	20	MST	KMS	1.67	118	51.10	51.10			7.67	-66.90	
GC-BU3628-008	A09-11004	3628	20	22	MST	KMS	1.33	108	40.70	40.70			7.59	-67.30	
GC-BU3628-009	A09-11005	3628	22	24	MST	KMS	1.54	66	47.12	47.12			7.5	-18.88	
GC-BU3628-010	A09-11006	3628	24	26	MST	KMS	1.46	45	44.68	44.68			7.57	-0.32	
GC-BU3628-011	A09-11007	3628	26	28	MST	KMS	1.5	26	45.90	45.90			7.58	19.90	
GC-BU3628-012	A09-11008	3628	28	30	MST	KMS	1.72	25	52.63	52.63			7.62	27.63	
GC-BU3628-013	A09-11009	3628	30	32	MST	KMS	2.03	32	62.12	62.12			7.51	30.12	
GC-BU3628-014	A09-11010	3628	32	34	MST	KMS	2.32	16	70.99	70.99			7.61	54.99	
GC-BU3628-015	A09-11011	3628	34	36	MST	KMS	2.36	15	72.22	72.22			7.62	57.22	
GC-BU3628-016	A09-11012	3628	36	38	MST	KMS	2.39	16	73.13	73.13			7.5	57.13	
GC-BU3628-017	A09-11013	3628	38	40	MST	KMS	2.27	10	69.46	69.46			7.32	59.46	
GC-BU3701-001	A09-9672	3701	2	4	LC	KMS	1.66	12	50.80	50.80			6.09	38.80	
GC-BU3701-002	A09-9673	3701	4	6	LC	KMS	0.91	10	27.85	27.85			6.52	17.85	
GC-BU3701-003	A09-9674	3701	6	8	MST	KMS	0.44	8	13.46	13.46			6.97	5.46	
GC-BU3701-004	A09-9675	3701	8	10	CZN	KMS	0.37	14	11.32	11.32			7.37	-2.68	
GC-BU3701-005	A09-9676	3701	10	12	LC	KMS	1.57	88	48.04	48.04			7.54	-39.96	
GC-BU3701-006	A09-9677	3701	12	14	MST	KMS	1.46	91	44.68	44.68			7.81	-46.32	
GC-BU3701-007	A09-9678	3701	14	16	MST	KMS	1.61	95	49.27	49.27			7.86	-45.73	
GC-BU3701-008	A09-9679	3701	16	18	MST	KMS	1.64	90	50.18	50.18			7.73	-39.82	
GC-BU3701-009	A09-9680	3701	18	20	MST	KMS	1.71	102	52.33	52.33			7.82	-49.67	
GC-BU3701-010	A09-9681	3701	20	22	MST	KMS	1.73	110	52.94	52.94			7.7	-57.06	
GC-BU3701-011	A09-9682	3701	22	24	MST	KMS	2.98	9	91.19	91.19			7.77	82.19	
GC-BU3701-012	A09-9683	3701	24	26	MST	KMS	2.94	34	89.96	89.96			7.81	55.96	
GC-BU3701-013	A09-9684	3701	26	28	MST	KMS	3.44	9	105.26	105.26			7.52	96.26	
GC-BU3701-014	A09-9685	3701	28	30	MST	KMS	3.09	6	94.55	94.55			5.96	88.55	
GC-BU3702-003	A09-10326	3702	8	10	MST	KMS	2.02	6	61.81	61.81			6.27	55.81	
GC-BU3702-004	A09-10327	3702	10	12	MST	KMS	2.78	8	85.07	85.07			6.55	77.07	
GC-BU3702-005	A09-10328	3702	12	14	MST	KMS	3.32	8	101.59	101.59			5.92	93.59	
GC-BU3705-001	A09-15239	3705	8	10	MST	KMS	1.43	37	43.76	43.76			7.21	6.76	
GC-BU3705-002	A09-15240	3705	10	12	MST	KMS	1.79	25	54.77	54.77			7.29	29.77	
GC-BU3705-003	A09-15241	3705	12	14	MST	KMS	2.02	20	61.81	61.81			7.38	41.81	
GC-BU3705-004	A09-15242	3705	14	16	MST	KMS	2.52	20	77.11	77.11			7.49	57.11	
GC-BU3705-005	A09-15243	3705	16	18	MST	KMS	2.24	39	68.54	68.54			7.62	29.54	
GC-BU3705-006	A09-15244	3705	18	20	MST	KMS	2.15	20	65.79	65.79			7.49	45.79	
GC-BU3705-007	A09-15245	3705	20	22	MST	KMS	2.42	19	74.05	74.05			7.55	55.05	
GC-BU3705-008	A09-15246	3705	22	24	MST	KMS	2.39	21	73.13	73.13			7.47	52.13	
GC-BU3705-009	A09-15247	3705	24	26	MST	KMS	2.09	130	63.95	63.95			7.91	-66.05	
GC-BU3705-010	A09-15248	3705	26	28	MST	KMS	2.6	14	79.56	79.56			7.54	65.56	
GC-BU3705-011	A09-15249	3705	28	30	MST	KMS	2.7	4	82.62	82.62			7.2	78.62	
GC-BU3705-012	A09-15250	3705	30	32	MST	KMS	3.22	5	98.53	98.53			6.78	93.53	
GC-BU3790-001	A09-12845	3790	6	8	MST	KMS	2.24	22	68.54	68.54			4.55	46.54	
GC-BU3790-002	A09-12846	3790	8	10	MST	KMS	2.72	32	83.23	83.23			5.36	51.23	
GC-BU3790-003	A09-12847	3790	10	12	MST	KMS	2.38	29	72.83	72.83			6.07	43.83	
GC-BU3790-004	A09-12848	3790	12	14	MST	KMS	2.99	23	91.49	91.49			5.75	68.49	
GC-BU3790-005	A09-12849	3790	14	16	MST	KMS	3.07	25	93.94	93.94			5.82	68.94	
GC-BU3790-006	A09-12850	3790	16	18	FSS	KMS	2.97	7	90.88	90.88			4.98	83.88	
GC-BU3791-001	A09-12827	3791	4	6	MST	KMS	0.03	29	0.92	0.92			6.08	-28.08	
GC-BU3791-002	A09-12828	3791	6	8	MST	KMS	0.91	33	27.85	27.85			5.89	-5.15	
GC-BU3791-003	A09-12829	3791	8	10	MST	KMS	1.24	35	37.94	37.94			6.32	2.94	
GC-BU3791-004	A09-12830	3791	10	12	MST	KMS	1.41	28	43.15	43.15			7.07	15.15	
GC-BU3791-005	A09-12831	3791	12	14	MST	KMS	2.08	22	63.65	63.65			6.17	41.65	
GC-BU3791-006	A09-12832	3791	14	16	MST	KMS	2.18	51	66.71	66.71			7.16	15.71	

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SAMPLEID	Lab_SampleID	HOLEID	SAMPFROM	SAMPTO	Samp_Lith_D	Formation_D	ABA_Sul_T	ABA_ANC_hs	ABA_MPA	MWM MPA Calc	ABA_NAG	ABA_NAG_pH	ABA_PASTE_pH	MWM NAPP Calc	
GC-BU3791-007	A09-12833	3791	16	18	MST	KMS	2.48	25	75.89	75.89			7.33	50.89	
GC-BU3791-008	A09-12834	3791	18	20	MST	KMS	2.53	20	77.42	77.42			7.32	57.42	
GC-BU3791-009	A09-12835	3791	20	22	MST	KMS	2.48	6	75.89	75.89			7.58	69.89	
GC-BU3791-010	A09-12836	3791	22	24	MST	KMS	2.49	37	76.19	76.19			7.56	39.19	
GC-BU3791-011	A09-12837	3791	24	26	MST	KMS	3.07	30	93.94	93.94			6.89	63.94	
GC-BU3791-012	A09-12838	3791	26	28	MST	KMS	3.11	32	95.17	95.17			6.75	63.17	
GC-BU3793-002	A09-14316	3793	4	6	MST	KMS	1.7	18	52.02	52.02			6.34	34.02	
GC-BU3793-003	A09-14317	3793	6	8	MST	KMS	1.51	86	46.21	46.21			7.5	-39.79	
GC-BU3793-004	A09-14318	3793	8	10	MST	KMS	1.34	228	41.00	41.00			6.78	-187.00	
GC-BU3793-005	A09-14319	3793	10	12	MST	KMS	1.94	34	59.36	59.36			7.14	25.36	
GC-BU3793-006	A09-14320	3793	12	14	MST	KMS	1.58	54	48.35	48.35			7.24	-5.65	
GC-BU3793-007	A09-14321	3793	14	16	MST	KMS	1.71	97	52.33	52.33			7.29	-44.67	
GC-BU3793-008	A09-14322	3793	16	18	MST	KMS	1.94	26	59.36	59.36			7.27	33.36	
GC-BU3793-009	A09-14323	3793	18	20	MST	KMS	2.15	24	65.79	65.79			7.39	41.79	
GC-BU3793-010	A09-14324	3793	20	22	MST	KMS	2.36	24	72.22	72.22			7.51	48.22	
GC-BU3793-011	A09-14325	3793	22	24	MST	KMS	2.4	26	73.44	73.44			7.54	47.44	
GC-BU3793-012	A09-14326	3793	24	26	MST	KMS	2.42	26	74.05	74.05			7.59	48.05	
GC-BU3793-013	A09-14327	3793	26	28	MST	KMS	2.37	24	72.52	72.52			7.55	48.52	
GC-BU3793-014	A09-14328	3793	28	30	MST	KMS	2.51	20	76.81	76.81			7.55	56.81	
GC-BU3793-015	A09-14329	3793	30	32	MST	KMS	2.78	20	85.07	85.07			7.37	65.07	
GC-BU3793-016	A09-14330	3793	32	34	MST	KMS	3.06	15	93.64	93.64			7.28	78.64	
GC-BU3793-017	A09-14331	3793	34	36	MST	KMS	3.38	15	103.43	103.43			7.07	88.43	
AMD_Bu7041_001		7041		3	MST	KMS	1.83	11		56.00	45	3		45.00	
AMD_Bu7041_002		7041	3	6	MST	KMS	1.89	21		57.83	40	3.1		36.83	
AMD_Bu7041_003		7041	6	9.3	MST	KMS	2.21	21		67.63	50	3		46.63	
AMD_Bu7041_004		7041	9.3	11.34	MST	KMS	2.46	12		75.28	68	2.8		63.28	
AMD_Bu7041_005		7041	11.34	13.7	MST	KMS	2.87	12		87.82	79	2.7		75.82	
AMD_Bu7042_001		7042	7.86	9.5	MST	KMS	1.94	43		59.36	17	3.7		16.36	
AMD_Bu7042_002		7042	9.5	11.5	MST	KMS	1.86	51		56.92	5	4.8		5.92	
AMD_Bu7042_003		7042	11.5	14.9	MST	KMS	2.26	21		69.16	51	3		48.16	
AMD_Bu7042_004		7042	14.9	16.9	MST	KMS	3	13		91.80	85	2.6		78.80	
AMD_Bu7042_005		7042	16.9	18.83	MST	KMS	3.45	9		105.57	100	2.6		96.57	
GC-BU7063-001	WP19-0329	7063	4.6	9	MST	KMS	2.5	3		76.50				73.50	
GC-BU7063-002	WP19-0329	7063	9	13	MST	KMS	3.1	4		94.86				90.86	
GC-BU7064-001	WP19-0330	7064	3	8	MST	KMS	2.9	4		88.74				84.74	
GC-BU7069-001	WP20-0447	7069	1.5	2.13	CLAY	KMS	0.016	3		0.49				-2.51	
GC-BU7069-002	WP20-0447	7069	2.13	5	MST	KMS	0.922	3		28.21				25.21	
GC-BU7069-003	WP20-0447	7069	5	9	MST	KMS	1.6	10		48.96				38.96	
GC-BU7069-004	WP20-0447	7069	9	14	MST	KMS	2.07	28		63.34				35.34	
GC-BU7069-005	WP20-0447	7069	14	19	MST	KMS	2.54	13		77.72				64.72	
GC-BU7069-006	WP20-0447	7069	19	23.44	MST	KMS	3.45	6		105.57				99.57	
AMD_Bu7074_002		7074	5	8	MST	KMS	2.06	18		63.04	55	3.4		45.04	
AMD_Bu7074_003		7074	8	11	MST	KMS	2.92	12		89.35	85	2.8		77.35	
GC-BU7081-001	WP20-0447	7081	4.5	9	MST	KMS	1.66	8		50.80				42.80	
GC-BU7081-002	WP20-0447	7081	9	13	MST	KMS	2.12	10		64.87				54.87	
GC-BU7081-003	WP20-0447	7081	13	17	MST	KMS	2.43	8		74.36				66.36	
GC-BU7081-004	WP20-0447	7081	17	22.24	MST	KMS	3.42	7		104.65				97.65	
GC-BU7082-001	WP19-0410	7082	1.49	5	MST	KMS	0.229			7.01				7.01	
GC-BU7082-002	WP19-0410	7082	5	9	MST	KMS	1.03			31.52				31.52	
GC-BU7082-003	WP19-0410	7082	9	13	MST	KMS	2.73	8		83.54				75.54	
GC-BU7082-004	WP19-0410	7082	13	16.5	MST	KMS	3.23	8		98.84				90.84	
GC-BU7087-001	WP19-0385	7087	1.85	2	MST	KMS	3.49	-2		106.79				108.79	
GC-BU7088-001	WP20-0447	7088	6.28	6.67	CLAY	KMS	0.018	2		0.55				-1.45	
GC-BU7088-002	WP20-0447	7088	6.67	9	MST	KMS	1.47	9		44.98				35.98	
GC-BU7088-003	WP20-0447	7088	9	13	MST	KMS	1.78	25		54.47				29.47	
GC-BU7088-004	WP20-0447	7088	13	18	MST	KMS	1.91	25		58.45				33.45	

Kaiata Mudstone														
SAMPLEID	Lab_SampleID	HOLEID	SAMPFROM	SAMPTO	Samp_Lith_D	Formation_D	ABA_Sul_T	ABA_ANC_hs	ABA_MPA	MWM MPA Calc	ABA_NAG	ABA_NAG_pH	ABA_PASTE_pH	MWM NAPP Calc
GC-BU7088-005	WP20-0447	7088	18	23	MST	KMS	2.43	15		74.36				59.36
GC-BU7088-006	WP20-0447	7088	23	28.24	MST	KMS	2.54	8		77.72				69.72
AMD_STK7112_001		STK7112	5.5	8.5	MST	KMS	1.81	20		55.39				35.39
AMD_STK7112_002		STK7112	8.5	13.5	MST	KMS	1.99	41		60.89				19.89
AMD_STK7112_003		STK7112	13.5	18.28	MST	KMS	3.11	20		95.17				75.17
AMD_STK7113_001		STK7113	4	6	MST	KMS	1.55	18		47.43				29.43
AMD_STK7113_002		STK7113	6	9	MST	KMS	1.59	21		48.65				27.65
AMD_STK7113_003		STK7113	9	13	MST	KMS	1.95	14		59.67				45.67
AMD_STK7113_004		STK7113	13	18	MST	KMS	2.4	16		73.44				57.44
AMD_STK7113_005		STK7113	18	23	MST	KMS	2.7	22		82.62				60.62
AMD_STK7113_006		STK7113	23	28	MST	KMS	3.21	13		98.23				85.23

Miscellaneous

SAMPLEID	Lab_SampleID	HOLEID	SAMPFROM	SAMPTO	Samp_Lith_D	Formation_D	ABA_Sul_T	ABA_ANC_hs	ABA_MPA	MWM MPA Calc	ABA_NAG	ABA_NAG_pH	ABA_PASTE_pH	MWM NAPP Calc
GC-BU3538-001	A09-4237	3538	4	6	LC	SUP	0.35	2	10.71	10.71			6	8.7
GC-BU3627-001	A09-9659	3627	2	4	LC	QUAT	2.76	6	84.456	84.46			4.56	78.5
GC-BU3702-001	A09-10324	3702	4	6	COL	QUAT	0.03	2	0.918	0.92			6.23	-1.1
GC-BU3702-002	A09-10325	3702	6	8	COL	QUAT	0.03	4	0.918	0.92			6.87	-3.1
GC-BU3793-001	A09-14315	3793	2	4	MST	QUAT	1.89	16	57.834	57.83			4.65	41.8
AMD_Bu7040_013		7040	33.11	35.3	GGB	BSM	0.032	5		0.98		5.9		-4.0
AMD_Bu7041_025		7041	65.24	67.8	GGB	BSM	1.06			32.44	35	3		32.4
AMD_Bu7042_014		7042	47.17	49	VFSS	BSM	0.095	2		2.91	9	5.2		0.9
AMD_Bu7042_015		7042	49	52.5	VFSS	BSM	0.05	17		1.53	4	5.8		-15.5
AMD_Bu7042_016		7042	52.5	54.92	ARG	BSM	0.028	3		0.86	7	5.7		-2.1
AMD_Bu7042_017		7042	54.92	57.8	CZN	BSM	0.082	17		2.51	1	6.7		-14.5
AMD_Bu7042_018		7042	57.8	61	ARG	BSM	0.04	6		1.22		7		-4.8
AMD_Bu7042_019		7042	61	63.3	MSS	BSM	0.018	3		0.55	2	6.3		-2.4
AMD_Bu7042_020		7042	63.3	64.9	MSS	BSM	0.012	3		0.37	2	6.6		-2.6
AMD_Bu7074_001		7074		5	LC	QT	0.081	5		2.48	24	4.4		-2.5
AMD_Bu7074_023		7074	58.9	61	GWK	BSM	0.027	2		0.83	17	5.5		-1.2
AMD_Bu7074_024		7074	61	63	GWK	BSM	0.041	32		1.25	17	5.4		-30.7
AMD_Bu7074_025		7074	63	64.9	GWK	BSM	0.182	4		5.57	12	4.9		1.6
AMD_H_DEN05-01	12-71065	DEN05	45	47.4	GRC	BSM	0.02	1	1	0.61	6	4.2	5.8	-0.4
AMD_H_DEN97-09	12-71086	DEN97	39.2	41.5	BQP	BSM	0.03	2	1	0.92	12	4.4	5.8	-1.1
AMD_H_DEN97-10	12-71087	DEN97	41.5	42.8	BQP	BSM	0.02	6	1	0.61		6.8	6.7	-5.4

ABA test results - Job 24-000676 Mine Waste Management

Location	Description	Sample No	Rinse pH	Rinse EC	Sulphur	ANC	ANC	ANC	ANC	NAG pH	NAG pH 4.5	NAG pH 7
					%w	Fizz rating*	Digested pH	kg H2SO4/t	%CaCO3	after digest	kg H2SO4/t	kg H2SO4/t
Site 1	Brunner Coal Measures- laminated sandstone/siltstone	WHR#1	3.12	546	2.46	0	1.97	0.00	0.00	2.35	55.05	64.45
Site 1	Brunner Coal Measures- siltstone pavement	WHR#2	4.90	13.4	0.055	0	1.98	1.71	0.17	4.75	-	5.67
Site 2	Brunner Coal Measures- siltstone/mudstone/carbonaceous materials	WHR#3	3.58	122	0.28	0	2.05	0.24	0.02	3.31	8.42	22.72
Site 4	Dark Brown friable Kaiata Mudstone	WHR#4	3.47	203	1.39	2	1.39	0.00	0.00	2.68	18.80	31.14
Site 5	Dark Brown friable Kaiata Mudstone	WHR#5	3.61	238	1.64	2	1.52	3.69	0.38	2.57	25.47	43.49
Site 6	Weatherd dark grey Kaiata Mudstone	WHR#6	3.49	305	0.68	2	1.63	0.00	0.00	3.25	6.45	17.01
Site 7	Grey/brown Kaiata Mudstone	WHR#7	4.53	92.0	1.17	2	1.66	17.21	1.76	2.83	13.67	29.29
Site 8	Grey Kaiata	WHR#8	3.84	236	2.04	2	1.48	14.64	1.49	2.46	35.64	55.62
Site 9	Grey Kaiata	WHR#9	7.98	365	1.86	2	1.92	92.92	9.48	6.62	-	0.59
Site 11	Grey Kaiata	WHR#11	5.29	129	1.72	2	1.52	25.63	2.61	2.58	26.82	43.85
Site 12	Grey Kaiata	WHR#12	4.14	75.3	0.087	2	1.40	2.44	0.25	4.18	1.37	16.23
Site 13	Grey Kaiata	WHR#13	3.61	318	2.83	2	1.34	11.00	1.12	2.24	54.54	77.8

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MINE WASTE MANAGEMENT

GREENROAD GROUP