REPORT

Tonkin+Taylor

Hazardous Substances Technical Assessment

Buller Plateaux Continuation Project

Prepared for
Bathurst Resources Limited
Prepared by
Tonkin & Taylor Ltd
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Terms and definitions

Table 0.1: List of terms and abbreviations

Abbreviation	Definition
AEE	Assessment of Environmental Effects
AMD	Acid and Metalliferous Drainage
ANE	Ammonium nitrate emulsion, a thick oxidising emulsion used in the manufacture of explosives.
AN prill	Ammonium nitrate prill, a pelletised solid used in the manufacture of explosives.
ASL	Above mean sea level.
Bathurst	Bathurst Resources Limited, including its subsidiary companies BT Mining Ltd, Bathurst Coal Ltd, and Buller Coal Ltd.
BPCP	Buller Plateaux Continuation Project
Buller Plateaux	A collective reference to the Stockton Plateau and Dennison Plateau.
CaO	Calcium oxide, a solid water treatment compound. Sometimes referred to as quicklime. This solid reacts with water to produce calcium hydroxide (see below).
$Ca(OH)_2$	Calcium hydroxide, also referred to as lime slurry, a water treatment compound for pH adjustment. Sometimes referred to as high calcium hydrated lime.
CHPP	Coal Handling and Processing Plant (at Stockton)
CSL	Controlled substance licence
DEF	Diesel exhaust fluid, a urea solution fuel additive to reduce nitrogen oxide emissions from diesel vehicle exhaust.
DOC	Department of Conservation
Effect	Effect means any impact or change as a result of an activity and, as defined by Section 3 of the RMA, can be positive or negative, temporary or permanent, applicable to the past, present or future, or cumulative with other effects.
ELF	Engineered Landform
EPA	Environmental Protection Authority, New Zealand's national environmental regulator.
EPA Notice	Environmental Protection Authority Notice
ESE	Escarpment Extended Project sub-area
FTAA	Fast-track Approvals Act 2024
ha	Hectare, unit of area.
Hazard	'Hazard' describes physical situations, process and/or actions that have the potential to exert adverse effects on people, ecosystems and/or the built environment.
HIPAP-4	Hazardous Industry Planning Advisory Paper No.4 – Risk Criteria for Land Use Safety Planning, published by the State of New South Wales through the Department of Planning in 2011.
HSECMS	Health, Safety, Environment and Community Management System
HSNO	Hazardous Substances and New Organisms Act 1996
HSW-HS	Health and Safety at Work (Hazardous Substances) Regulations 2017
HSW-MHF	Health and Safety at Work (Major Hazard Facilities) 2016 Regulations

Abbreviation	Definition
HSW(MOQO)	Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2016
IBC	Intermediate Bulk Container; a standard 1,000 L package for liquids.
kg	Kilogram, unit of mass.
km	Kilometre, unit of distance.
kPa	Kilopascal, unit of pressure.
L	Litre, unit of volume.
LDP	Lime Dosing Plant
LINZ	Land Information New Zealand
LPG	Liquefied Petroleum Gas
MfE	Ministry for the Environment
MFS	Mount Frederick South Project sub-area
MMU	Mobile Mixing Unit, a vehicle with segregated compartments for in-situ preparation of explosives.
Risk	Risk is the likelihood of specified consequences of a specific event (eg, explosion) on people, ecosystems and/or the built environment. Therefore, the magnitude of risk is the product of probability and consequence (Risk = Probability × Consequences).
NEQ	Net Explosive Quantity, the total mass of explosive substances contained in a product or package, excluding the mass of all non-explosive components such as casings, packaging, detonators, or other inert materials.
PPE	Personal Protective Equipment. Example: gloves, respirators.
QRA	Quantitative risk assessment
RLAA	Resource Legislation Amendment Act 2017. An amendment act that modified the Resource Management Act 1991 (RMA), Conservation Act 1986, Reserves Act 1977, Public Works Act 1981, and Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2013.
RMA	Resource Management Act 1991
SDS	Safety Data Sheet
Stockton	Stockton Project sub-area, including the Stockton Mine and associated infrastructure.
T+T	Tonkin & Taylor Ltd
TARP	Trigger Action Response Plan
TNT equivalent	Trinitrotoluene (TNT) equivalent. A standardised way of expressing the quantity of explosive in terms of the equivalent mass of TNT that would release the same amount of energy.
UWHR	Upper Waimangaroa Haul Road (a Project sub-area)
VDT	Vegetation Direct Transfer
WCRC	West Coast Regional Council
WTP	Water Treatment Plant

Executive summary

Bathurst Resources Limited (including its subsidiary companies Bathurst Coal Ltd, and Buller Coal Ltd) and joint venture company BT Mining Ltd (collectively referred to as 'Bathurst') are seeking approvals through the Fast-track Approvals Act 2024 (FTAA) for the Buller Plateaux Continuation Project (BPCP, or the Project). The Project encompasses existing and proposed mining areas across the Stockton and Denniston Plateaux to enable continued coal production once current Stockton resources are depleted.

This hazardous substances technical assessment has been prepared to evaluate the effects of hazardous substance storage and use associated with the BPCP, which involves continued mining operations at Stockton Mine and the development of additional mining areas across the Stockton and Denniston Plateaux in the Buller District.

Hazardous substances will be stored and used at existing and proposed surface facilities including Stockton Mine, the Escarpment Extended (ESE) and Mount Frederick South (MFS) sub-areas, the Upper Waimangaroa Haul Road (UWHR) and at the Ngakawau Rail Loadout. The activities will include the storage and use of explosives and oxidisers for blasting, corrosive and toxic substances for water treatment, workshop gases, fuels, maintenance oils, and greases. Hazardous substance will primarily be in use during the operational phase of the mining. However, water treatment and refuelling are also anticipated to be required during construction works. Substance storage along the UWHR will be limited to substances used in water treatment systems.

The storage and use of hazardous substances in New Zealand are primarily governed by the Health and Safety at Work (Hazardous Substances) Regulations 2017, which specify control measures triggered by the volumes and types of substances used. Additional provisions apply under the Hazardous Substances and New Organisms Act 1996 and the Resource Management Act 1991, as implemented through Part 6 of the Operative Buller District Plan and Chapter Ngā Matū Mōrearea (Hazardous Substances) of the Te Tai o Poutini Plan.

The proposed activities require resource consent as a discretionary activity, as the storage and refuelling areas are unsealed in-situ refuelling occurs in unbunded working areas and, therefore, do not meet all controlled-activity standards of the Operative Buller District Plan.

This assessment has evaluated hazards and risks in accordance with the Ministry for the Environment's (MfE) Guidance for Hazardous Facilities (2000) and with supplementary reference to the New South Wales Department of Planning's Hazardous Industry Planning Advisory Paper series. The key risks identified for the BPCP include:

- Risk to people or property from fire or detonation at the explosives magazines, oxidiser compounds, workshops or diesel tank farms;
- Risk to ecosystems from spills of diesel during tank filling or mobile refuelling operations; and
- Risk to ecosystems from spills or leaks of environmentally hazardous liquids, such as corrosive water-treatment chemicals or maintenance products, during storage, transport and unloading.

The risks to people, property and the environment from an unintended detonation at the Class 1 explosives storage facilities are assessed as low. This is due to detonation risks at each facility being controlled through design (e.g. separation distances, fire-protection systems, lightning protection, and certified magazine construction) and management procedures (e.g. WorkSafe certification, restricted access, trained handlers, and emergency response planning).

While areas on the Denniston Plateau and around Stockton are sensitive, the large setbacks from dwellings and public access routes mean that the effects on the general public and property from explosive materials are less than minor.

The risks associated with fire at the fuel storage, bulk oxidiser, or workshop areas are likewise low, and are mitigated through separation of incompatible substances, elimination of ignition sources, provision of extinguishers and hydrant systems, and staff emergency training. All storage areas are isolated within secure infrastructure areas or active mine lease boundaries with no public access.

The environment is sensitive to the ecotoxic effects of a spill of diesel or other hazardous liquids. These risks will be managed through engineered and operational controls, including:

- The use of double-skinned or bunded tanks and storage areas, where practicable;
- Hydrocarbon separators at the new bulk fuel farms;
- Surface water diversion to sumps for containment of major spills; and
- Comprehensive procedures for inventory management, hazardous substances handling, spill-response and waste-management.

Taking these controls into account, the potential effects on the environment from the use and storage of hazardous substances as part of the BPCP are assessed as less than minor and are consistent with the objectives and policies of both the Operative Buller District Plan and the Te Tai o Poutini Plan.

1 Introduction

Bathurst Resources Limited (including its subsidiary companies Bathurst Coal Ltd, and Buller Coal Ltd) and joint venture company BT Mining Ltd (collectively referred to as 'Bathurst') is seeking approvals through the Fast-track Approvals Act 2024 (FTAA) for the Buller Plateaux Continuation Project (BPCP, or the Project).

The Project covers areas on both the Stockton Plateau and the Denniston Plateau (collectively referred to as the Buller Plateaux). The purpose of the Project is to reconsent the existing infrastructure and mining operations associated with the Stockton Mine and provide access to additional coal mining areas across the Buller Plateaux (Escarpment Extended (ESE) and Mount Frederick South (MFS) sub-areas), as the coal resource in the current Stockton operations are close to depletion, and further coal resources for blending are required.

Tonkin & Taylor Ltd (T+T) has been engaged by Bathurst to prepare this hazardous substances assessment in relation to the Project. This report has been prepared in accordance with the scope of work set out in our letter of engagement dated 31 November 2024 (T+T ref 1096446.0000).

1.1 Background

Bathurst operates various existing coal mines and mining infrastructure facilities at the Buller Plateaux, approximately 15 kilometres (km) north of Westport on the West Coast of the South Island. Bathurst is seeking to extend the life of its mining activities at the Stockton mine, continue activities at the Ngakawau Rail Loadout as well as commence mining activities within additional mining areas located on the Buller Plateaux to supply blended coal for the export market.

In 2024, the Project was included in the Fast-track Approvals Bill as a Schedule 2A 'listed project'. Bathurst has prepared a FTAA application seeking approvals for the Project under the Resource Management Act 1991, Crown Minerals Act 1991, Heritage New Zealand Pouhere Taonga Act 2014, Wildlife Act 1953 and Freshwater Fisheries Regulations 1983.The mining operations generally include the removal of surface vegetation and overburden, extraction of coal, the sorting, crushing and screening of coal, stockpiling and transport of coal and materials in heavy vehicles. Upon completion of the mining operations, the areas will be rehabilitated to self-sustaining landscapes and ecosystems.

1.2 Objective and scope

The objective of this report is to describe the proposed activities, identify the hazards and evaluate the actual and potential effects associated with hazardous substances storage and use, including potential cumulative effects.

The scope of work comprised the following:

- A visit to accessible areas of the Project footprint to gain an understanding of the key hazardous substances storage and handling activities at infrastructure areas within Stockton Mine and the general environmental setting;
- Review of the following environmental/emergency management procedures and plans in particular relating to waste management and emergency response:
  - Bathurst, May 2025, Stockton Mine Operational Waste Management Procedure (STO-ENV-PRO-028 v2.0).
  - Bathurst, November 2020, Stockton Mine Emergency Principal Control Plan v3 (STO-HST-PCP-002 v3.0).

  - Bathurst, May 2021, Stockton Mine Fire Protection and Prevention Procedure (STO-MPL-PRO-058 v1.0).
  - Bathurst, May 2025, Environment Protection and Response (Hazardous Substances) Environment Management Sub Plan, Stockton Mine (STO-ENV-PLN-005 v2.0).
  - Bathurst, Chemical and Hydrocarbon Spill Response Procedure (STO-HST-PRO-098).
  - Bathurst, July 2018, Incident Reporting and Notification Standard (BRL-HST-STD-002).
- Review of the following procedures and plans relating to Orica's facilities at the existing Stockton Mine for storage of Class 1 explosives and Class 5 oxidisers (precursors to explosives):
  - Orica, January 2024, Stockton Mine Site Emergency Plan (SHEC-AUS-FOR-EMG-001 v10).
  - Orica, June 2024, Site Overpressure Layouts (90993_0 and 90994_0).
  - Orica, November 2022, Plant General Layout (40109_G).
  - Orica, September 2024, Register Certified Handlers Certificates & Controlled Substance Licence.
- Review and collation of hazardous substances inventory information for the existing activities including:
  - Bathurst, Stock Inventory by Location, print date 24 October 2024.
  - Hazardous Substances Location compliance certificates for existing Ngakawau and Stockton facilities.
  - Estimates of operational inventory requirements for the ESE and MFS sub-areas, provided by Tony Jury of Bathurst and Craig Pledger of Orica.
- Review of publicly available aerial imagery to assess sensitive environmental and human receptors against existing and new areas of hazardous substances storage and use.
- Undertaking a qualitative risk assessment of the proposed substances and volumes to identify hazards, which may have effects beyond the site boundary and on the environment (e.g. waterways or soil). The assessment considers the risks arising from substances used in construction of the new infrastructure, mining operations and closure, where relevant.
- For storage of explosives magazines, a semi-quantitative assessment approach has been undertaken with consideration of the calculated blast overpressure radii around the storage locations to illustrate the consequence of an unplanned detonation.
- Preparation of this report documenting our assessment for submission of an application under the fast-track legislation.

2 Site location

An overview of the BPCP area is shown in **Figure 2.1**. It comprises multiple land parcels, with owners including Bathurst Coal Ltd, BT Mining Ltd, Buller District Council, the Crown (Department of Conservation (DOC), Land Information New Zealand (LINZ)), and KiwiRail. The Project comprises the following sub-areas:

- Stockton Mine: this comprises the following:
  - The existing mining operations within the Stockton Coal Mining Licence and ancillary activities including the Coal Handling and Processing Plant ("CHPP") and the Aerial Ropeway from Stockton to Ngakawau.
  - Two proposed predator-free exclusion areas.
  - Mining of additional areas in the north of the Stockton Mine.
  - Excavation activities in the A-Drive Borrow Pit.
  - The Ngakawau Rail Loadout.
- Mount Frederick South (MFS): this is a new opencast mining area with initial mining through old underground workings that will be accessed via the Upper Waimangaroa Haul Road.
- Escarpment Extended (ESE): this is located on the Denniston Plateau and will comprise new and existing opencast areas accessed via the Upper Waimangaroa Haul Road.
- Upper Waimangaroa Haul Road (UWHR): This is a haul road, connecting MFS and ESE, traversing through the existing Cypress mining area to the Stockton Mine.
- Cypress: Ongoing mining is authorised under existing consents, and the only elements for inclusion in the Project are the renewal of Wildlife Act authorities and a variation to some conditions to integrate with the broader compensation work proposed across the full BPCP and to allow for the UWHR.

The Waimangaroa Storage Yard will also be established as a laydown area to support road construction at Denniston. This facility is not expected to be used for hazardous substances storage and is not considered further in this assessment.

Further description of the surrounding environment is provided in Section 3.

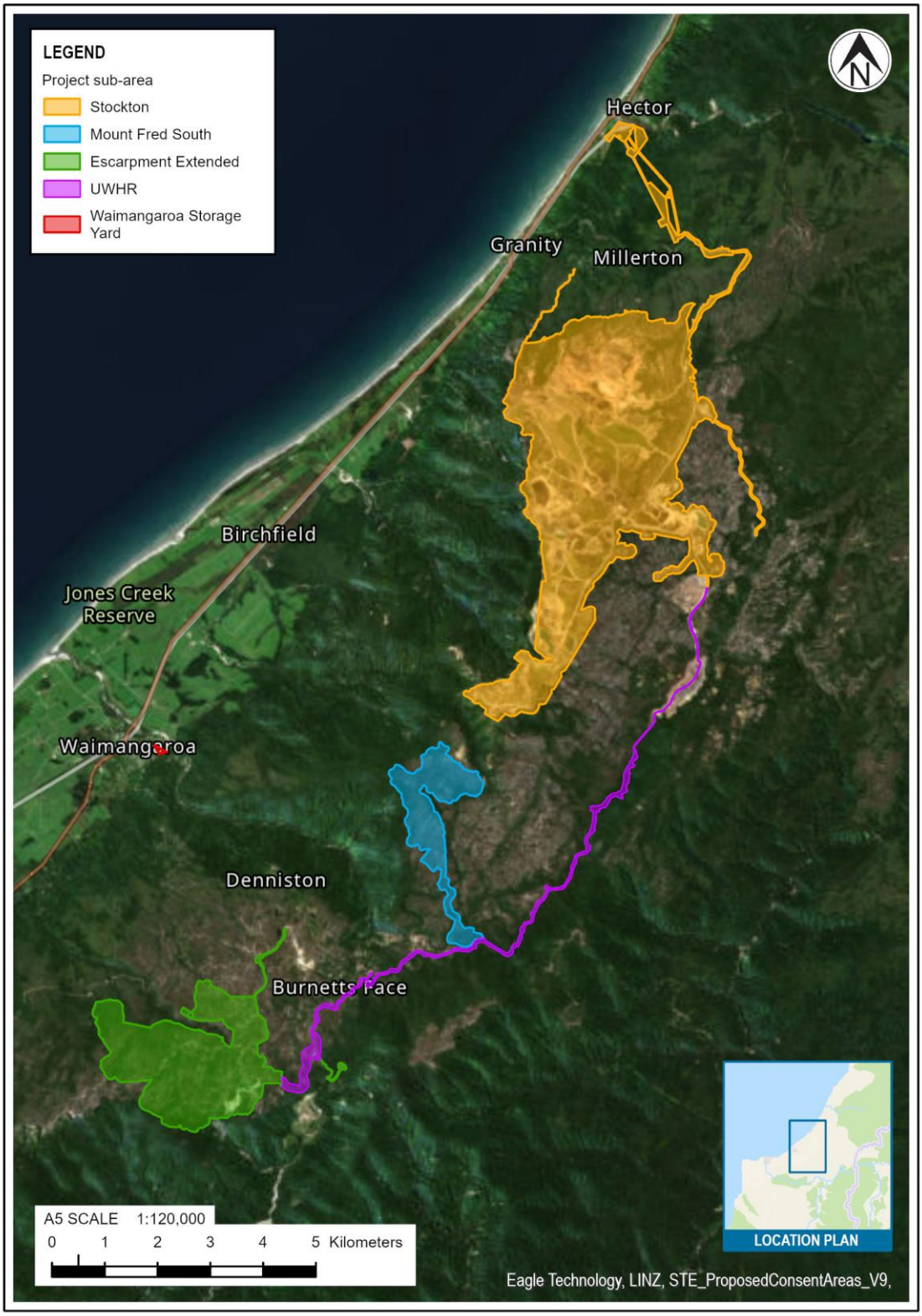


Figure 2.1: Key areas operated by Bathurst.

3 Site setting

3.1 Overview

The Project area is situated 2-10 km inland from the coast and is in an elevated sub-alpine area, occupying significant parts of the Denniston and Stockton Plateaux. The area has had a long history of coal mining, with many of the nearest residential dwellings originally established to support mining activities.

The Stockton Plateau comprises an active mining and infrastructure area that also includes rehabilitated areas and surrounding native habitat.

The Denniston Plateau includes evidence of historic mining activities and associated changes to the landscape and vegetation.

The Cypress Mine is an active working open-cast mine that will be rehabilitated over time, with full rehabilitation being completed by the expiry of the current consents in 2040.

The following sub-sections describe sensitive human and ecological receptors.

3.2 Sensitivity of local built environment

Different land uses and receiving environments have a varying level of sensitivity to the effects associated with hazardous substances. These activities are listed below in order of reducing sensitivity (i.e. starting with the most sensitive):

- Schools, hospitals, child-care facilities and aged care facilities.
- Residential areas and activities involving places of continuous occupation such as motels.
- Sporting complexes and activity open spaces.
- Commercial developments including activities such as offices, retail centres and restaurants.
- Light and heavy industrial activities.

The sensitivity of the built environment around the proposed BPCP sub-areas is discussed as follows.

3.2.1 Mining activities on the Buller Plateaux

The Buller Plateaux lie inland from the West Coast at an elevation of 400 – 1,100 m above mean sea level (ASL).

The Te Tai O Poutini Plan (a combined District Plan for the Buller, Grey and Westland District Councils) identifies the existing mine areas associated with the Stockton and Escarpment Mines as Special Purpose – Buller Coalfield zone, with surrounding land (and new Project sub-areas like MFS and UWHR) zoned as Open Space and General Rural, as shown in **Figure 3.1** below.

The following separation distances to sensitive activities apply:

- Active mining pits at the existing Stockton Mine are approximately 1 km south of the residences in the small settlement at Millerton, and approximately 1.7 km southeast of the nearest school, Granity School.
- The locations within the Stockton sub-area in which existing hazardous substances will continue to be stored (principally the water treatment facilities, workshops, refuelling bay, Class 1 explosives magazine and Class 5 explosives mixing and preparation compound) are significantly separated from any residential activity. [redacted] is the closest hazardous substances

store to off-site residences, which are approximately 2.5 km to the north in Millerton. The other hazardous substances storage areas in Stockton are at least 3.5 km south of Millerton.

- There are a small number of residences on the Denniston Plateau in the vicinity of the proposed ESE sub-area. The nearest residence is approximately 1.1 km northeast of the ESE sub-area Main Gate and 2.4 km northeast of the nearest part of the Central Infrastructure Area, where water treatment facilities, bulk fuel handling, workshops and associated hazardous substances storage will be located.
- These same residences in Denniston are approximately 2.4 km southwest of the nearest MFS sub-area boundary.
- The proposed new Class 5 compound for storage of the explosives precursors will be located in an isolated site northwest of the ESE sub-area, over 2.8 km from the nearest residences in Denniston.
- The proposed new Class 1 explosives magazine will be located on the easternmost edge of the ESE sub-area at a site that has previously been used for Class 1 storage. The closest residences to the magazine site are also in Denniston, approximately 2.7 km north. The closest school or medical facility is over 15 km west in Westport.
- There are a number of publicly accessible recreational tracks around the fringes of the BPCP areas. Tracks that pass through the proposed operational areas of the ESE sub-area will be closed to the public. This is discussed further in Section 3.2.3.

Overall, due to the significant separation distances provided between areas that are accessible to the public and locations where hazardous substances are stored and used at the BPCP areas, the sensitivity of the surroundings to human health hazards is considered low.

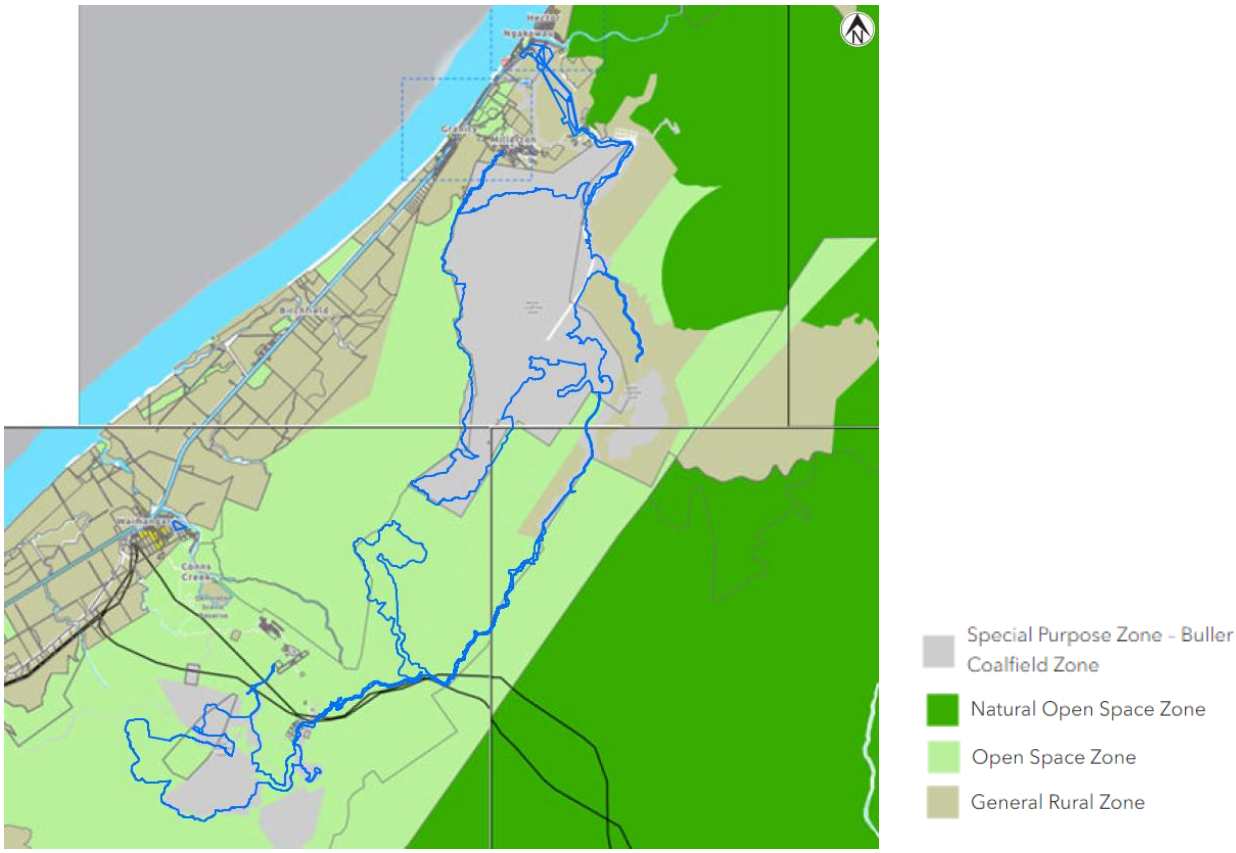


Figure 3.1: Te Tai O Poutini Plan zoning for the Buller Plateaux. Project boundary shown in blue (ProposedConsentAreasV5).

3.2.2 Ngakawau Rail Loadout

In the Te Tai O Poutini Plan, the Ngakawau Rail Loadout is in the Special Purpose – Buller Coalfield Zone as shown in **Figure 3.2** below. The closest residences to the north in Hector are in the Settlement Zone and the closest residences to the southeast are in the General Rural Zone. This existing facility is in much closer proximity to residences than the mining activities on the Plateaux. The neighbouring dwellings are approximately 30 m from the nearest boundary (excluding forested areas of the site that are not proposed to be cleared). Consequently, nearby residences can be considered as highly sensitive to potential effects of hazardous substances.

The activities at this facility are existing and are not proposed to change as a consequence of the BPCP and as such the risk profile does not change.

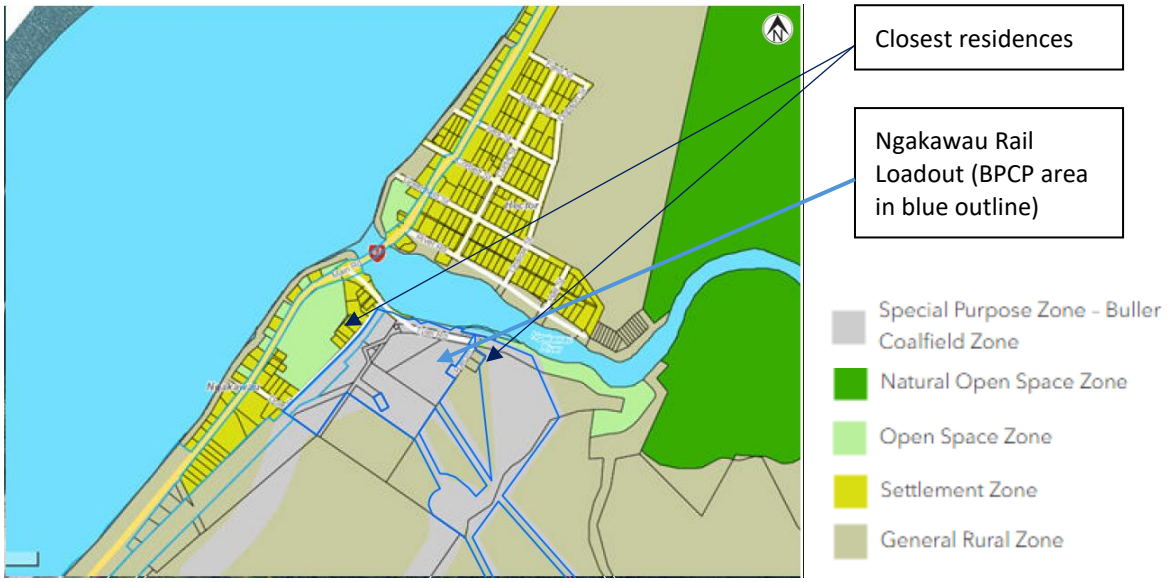


Figure 3.2: Te Tai O Poutini Plan zoning for the Ngakawau Rail Loadout and closest residences. Project boundary shown in blue (ProposedConsentAreasV5).

3.2.3 Recreational use of the Buller Plateaux

Recreational areas, such as walking and cycling tracks are also located near to, or within, the BPCP sub-areas. Recreation users are described in the Recreational Assessment prepared by Rob Greenaway & Associates (2026), and are summarised as follows:

- Heritage/short walk visitors.
- Walkers, trampers and trail-runners.
- Mountain bikers and cyclists.
- Four-wheel-drive users.
- Motorbike riders.

Walking and mountain biking tracks[1] that run close to and or pass through the BPCP sub-areas are shown in see **Figure 3.3**. Notable named tracks near to each Project sub-area are listed as follows:

- Stockton:
  - Millerton Bath House Track
- ESE:
  - The Waimangaroa to Lyell (Mackley) Track
  - The Denniston Bridle Track
  - The Denniston Township Walk
  - Denniston Historic Walks
  - The Denniston Incline
  - Coalbrookdale Walk
  - Myra's Track
- MFS:
  - Britannia Track (closed by a slip in 2023, yet to reopen)
  - The Waimangaroa to Lyell Track (also referred to as the Mackley Track)
- Ngakawau Rail Loadout:
  - Charming Creek Track

The Recreational Assessment identifies a number of informal tracks in the vicinity of the ESE sub-area (within the "Rochfort Stewardship Area") that are used for mountain biking, four-wheel driving and walking or running. Tracks that cross the ESE sub-areas will be closed. Many tracks east of the ESE sub-area – such as Myra's Track which crosses the UWHR toward Mount William – will continue to be accessible. This also includes mountain biking trails like the Drill Track, which passes approximately 660 m from the ESE Class 1 store at its nearest point. These tracks are discussed in detail in the Recreational Assessment.

Tracks within 750 m of blasting activities carried out in the existing Stockton Mine are blocked with signage notifying users of dates and times when blasting is scheduled. This is proposed to continue for mining activities associated with the proposed Stockton sub-area. The exclusion distances that will be applied for scheduled blasting in the new mining sub-areas (ESE and MFS) will be determined based on site-specific parameters, but are expected to be in the range of 500 – 1000 m. In accordance with the existing procedures for scheduled blasting, advance clearing runs of the

[1] As identified in the LINZ dataset: NZ Walking and Biking Tracks, 2024: https://data.linz.govt.nz/layer/52100-nz-walking-and-biking-tracks/

surrounding tracks will be undertaken, and blast guards (staff) will be posted to the access ways to manage access.

Recreational users of the Plateaux are generally present for short durations and do not directly interact with hazardous facilities used for mining.

Figure 3.3: Location of nearby walking and cycling tracks relative to the consent areas.

3.3 Natural environment

Treated surface water runoff from the BPCP areas will ultimately enter the following receiving waterways:

- The Stockton sub-area is located in the catchments of the Ngakawau and Waimangaroa River with some areas also discharging to the Granity and Twins Stream catchments;
- The proposed MFS and UWHR sub-areas are located in the Waimangaroa River catchment;
- The ESE sub-area is located in the catchments of the Whareatea and Waimangaroa Rivers, Cascade Creek and Rapid Stream; and
- The Ngakawau Rail Loadout stormwater runoff is discharged to the estuary at the outlet of the Ngākawau River[2].

The Earth Sciences NZ Ltd (ESNZ) has prepared an assessment of environmental effects on aquatic ecology (2026) for the Project, which describes the existing environment and ecological value of the Ngākawau River, Whareatea River, Waimangaroa River and Cascade Creek catchments. Aquatic ecology values and assessment for Stockton Plateau are described in a separate report (PDP et al. 2026). A Terrestrial Ecological Impact Assessment Report has been prepared by Ecological Solutions Limited (2026) to evaluate effects on the land-based ecosystems in the Project areas.

These assessments identify that the Buller Plateaux are located in the Ngākawau Ecological District, which is characterised by high annual rainfall, poorly drained, infertile soils, and unique biota. The composition of the natural geology results in naturally acidic, low-nutrient freshwater environments with limited buffering capacity, which support diverse plant, invertebrate, and fish ecosystems. The aquatic species are adapted to the natural acidity and low nutrient conditions, and are sensitive to chemical disturbance, particularly by alkaline substances. The terrestrial ecological impact assessment notes that the Project area hosts numerous *'Threatened'* and *'At Risk'* species and is home to distinctive vegetation and habitat types that are naturally uncommon. It classifies the ecological values as ranging from 'Low' at the cleared and recently disturbed locations to 'Very High' at the intact and well-connected habitats.

Overall, the surrounding natural habitats and waterways are considered highly sensitive to the effects of any spills of hazardous substances.

[2] Noting that discharge from the Ngakawau Rail Loadout to the Ngākawau River estuary has existing authorisation from the West Coast Regional Council (RC011040) and is not part of the scope of the BPCP.

4 Description of activity

4.1 Overview

Bathurst's existing Buller Plateaux operations involve hazardous substance storage and use, principally associated with vehicle and equipment refuelling and maintenance, blasting and water treatment at the Stockton mine and Ngakawau Rail Loadout. Bathurst has provided current inventory information for the Ngakawau and Stockton operations (these will continue to be used as part of the proposed ongoing operations) and an estimate of the hazardous substances required for the proposed sub-areas including the MFS, UWHR and ESE Project sub-areas.

Hazardous substances are expected to be used during construction of the new facilities and infrastructure associated with the BPCP, principally for refuelling of machinery and in the water treatment systems that will be established as part of the erosion and sediment controls. The majority of inventory will be associated with the operational mining phase of the Project, and ongoing use of substances used in the water treatment systems will continue into the closure phase.

The hazardous substances associated with each Project sub-area are described in Sections 4.2 to 4.6. The volumes and relevant hazard classifications for the hazardous substances (both existing and proposed) to be stored on the BPCP sub-areas are provided in detail in the inventory tables found in **Appendix A**.

Classifications for hazardous substances are assigned under the Globally Harmonised System (seventh revised edition) (GHS7), which was adopted in New Zealand in 2021. Both the former classifications assigned under the Hazardous Substances and New Organisms Act 1996 (HSNO) and the equivalent GHS7 classification are presented in the tables in **Appendix A**, because the HSNO classifications are still commonly used and understood in New Zealand and are referred to within the relevant health and safety regulations. HSNO classifications are used throughout this report for consistency with the current regulations.

4.2 Ngakawau Rail Loadout

The Ngakawau Rail Loadout is an existing facility near the coast at Ngakawau where coal is unloaded from the aerial ropeway into stockpiles and dispatched to rail or truck for transport to Lyttelton Port. The storage and use of hazardous substances at this facility is not proposed to change and will continue as part of the BPCP.

[redacted]

The detailed hazardous substances inventory is provided as **Table Appendix A.1**.

Figure 4.1: Overview of activities involving hazardous substances at Ngakawau Rail Loadout.

4.3 Stockton

The Stockton Mine is an existing activity, and mining is proposed to continue as a part of the BPCP,

stored at a separate magazine site within the Stockton sub-area.

[redacted]

Electricity supply for the Stockton Project sub-area is principally via mains power. Occasionally, self-contained diesel-powered generator sets are used at the Stockton Project sub-area to supply electric pumps for water management, and on mobile lighting towers, welders etc, and for back up electrical supply. [redacted]. Pumps in flood-prone areas are located on pontoons and either receive power via cables from generators on dry land, or where required, fuel may be stored on the pontoon within the pumps own fuel tank or an auxiliary fuel tank directly connected to the pump. Tanks are double-skinned to prevent leaks.

Electrical transformers are used at the main electrical substations, which contain an insulating oil that is typically non-hazardous. Transformers are closed loop systems and are not considered further in this assessment.

Bulk and packaged maintenance oils and greases are kept in the workshops and oil yards. These products are largely non-hazardous, though a subset have a chronic aquatic toxicity or mild human health classifications.

[redacted]

[redacted]. Other packaged substances, such as cleaning products, sealants, adhesives, coolants, have chronic human health hazards or low-level acute toxicity related to ingestion, aspiration or skin contact.

[redacted].

[redacted]

[redacted]

An overview of the Stockton Project sub-area with key annotations is shown in **Figure 4.2**. The detailed hazardous substances inventory is provided as **Table Appendix A.2**.

[3] Stockton Operational AMD Sludge Management, Bathurst resources Limited, 2026.

Figure 4.2: Overview of activities involving hazardous substances at Stockton Project sub-area.

4.4 Escarpment Extended

The ESE Project sub-area is located on the Denniston Plateau, approximately 16 km southwest of the Stockton Mine entrance gate, and approximately 7 km southwest of the Stockton sub-area boundary shown on **Figure 4.2**.

The Escarpment Mine is an existing mine currently under care and maintenance. The ESE sub-area includes the previously consented Escarpment Mine as well as additional areas. Mining operations in the ESE Project sub-area will progress over three phases: development (including construction), mining operations and closure. Hazardous substances will be principally required during the mining phase, with substances stored during development limited to those used in water treatment, generators and refuelling (fixed refuelling tanks are not proposed). Water treatment facilities are also expected to remain in the closure phase.

The new infrastructure areas proposed for the ESE sub-area mining phase include activities that involve hazardous substances storage and use, such as bulk diesel storage and refuelling, workshops (with associated waste oil, grease, cutting gases, packaged flammable liquids and aerosol products), and explosives storage compounds. These facilities are similar in scale or larger than those previously described for Stockton.

The Class 1 explosives magazine will be located at a remote location east of the ESE sub-area and will store blasting explosives, boosters and detonators.

The Class 5 explosives mixing and preparation compound operated by the drill and blast specialist contractor will be located on the northwestern side of the ESE area. Like at Stockton, this compound is proposed to store Class 5 ANE and AN prill in bulk, along with associated smaller stores for gasser and diesel, but paraffin oil will not be required.

The water treatment facilities at Escarpment Extended will principally use pH modifiers (calcium oxide or magnesium oxide in water, and sulphuric acid) which have associated corrosive hazards, and non-hazardous flocculants and chelating agents. During construction of the new facilities in the ESE sub-area, temporary water treatment systems will be established for management of sediment runoff. Construction phase treatment chemicals may include pH modifiers (caustic soda or lime slurry) and non-hazardous flocculants, in packages up to 1,000 L (i.e. in Intermediate Bulk Containers). These will be located in areas that drain back to the contained treatment ponds and corrosive liquids will be installed on covered portable bunds. Water treatment systems are likely to be maintained at the site in the closure phase, though passive systems such as mussel shell reactors will be used wherever suitable. These may be supplemented with dosing of ferric chloride from a 1,000 L IBC, which will also utilise covered portable bunding.

Workshops for vehicle and equipment maintenance will be established in the Central Infrastructure Area for the heavy mining equipment and at the Coal Haulage Infrastructure area for coal haulage fleet maintenance. The bulk fuel storage facility will be located at the Central Infrastructure area (285,000 L diesel), and a 60,000 L diesel tank will be located at the Coal Haulage Infrastructure Area. All new tanks proposed have been specified to have double-skinned containment to prevent leaks.

Many of the infrastructure facilities will be powered by generators for lighting, water pumps and other electricity needs; it is anticipated that approximately 2.5 MW of generator capacity will be required. Fuel tanks associated with the water pumps may be located on land or on floating pontoons. Generator fuel tanks will be above ground, typically less than 5,000 litres and as such would be below the volume threshold that requires stationary container compliance certification. However, double-skinned contaminant will be provided for each tank associated with a generator to meet the requirements of the Health and Safety at Work (Hazardous Substances) Regulations 2017 (HSW-HS regulations). The WTP at the Central Infrastructure Area and its associated pumps are

expected to have the greatest installed electricity demand, which will be supplied by a dedicated generator and a bulk diesel tank (20,000 L).

[redacted]

Key ESE locations are annotated on **Figure 4.3** below. The detailed hazardous substances inventory is provided as **Table Appendix A.3**.

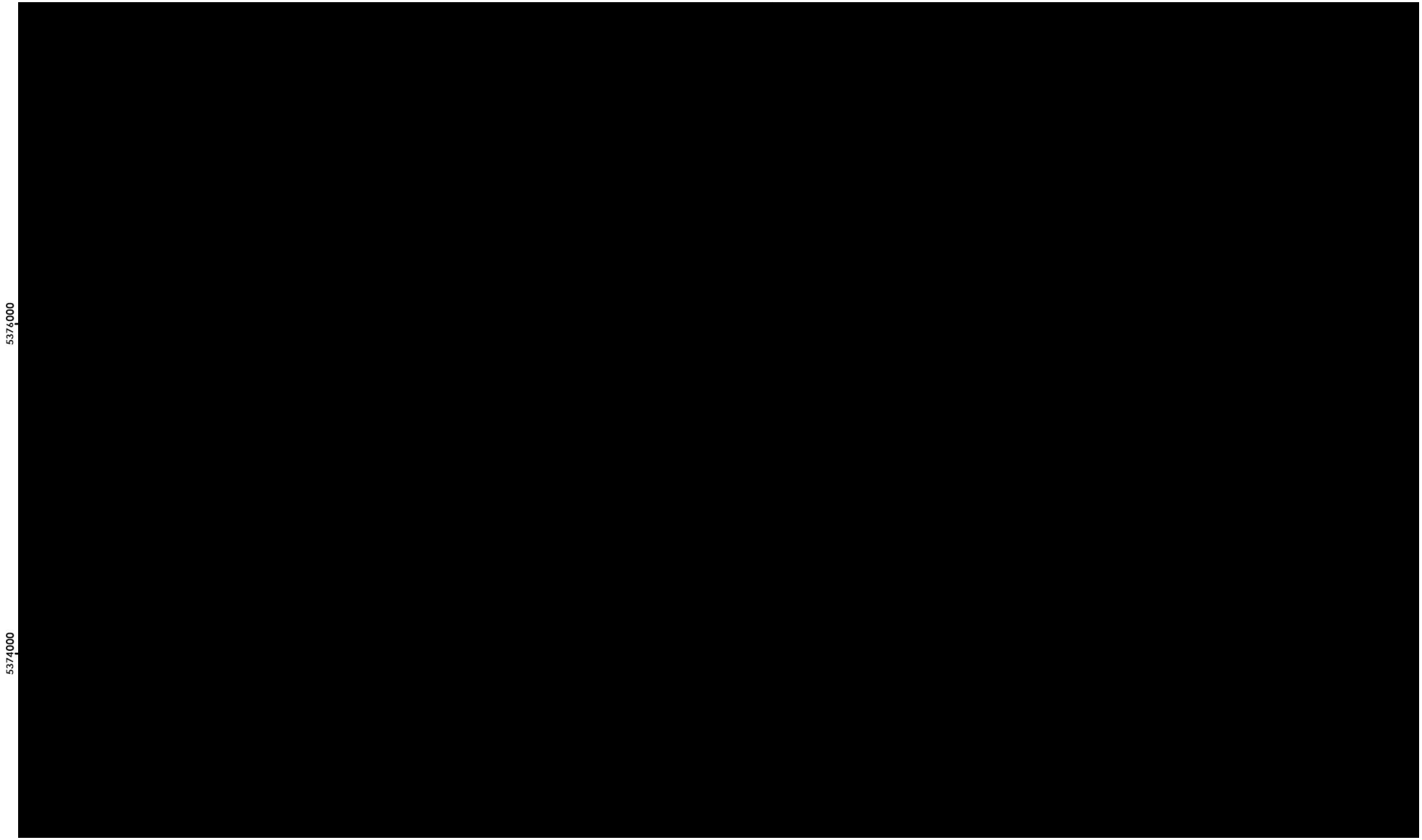


Figure 4.3: Overview of activities involving hazardous substances at ESE Project sub-area.

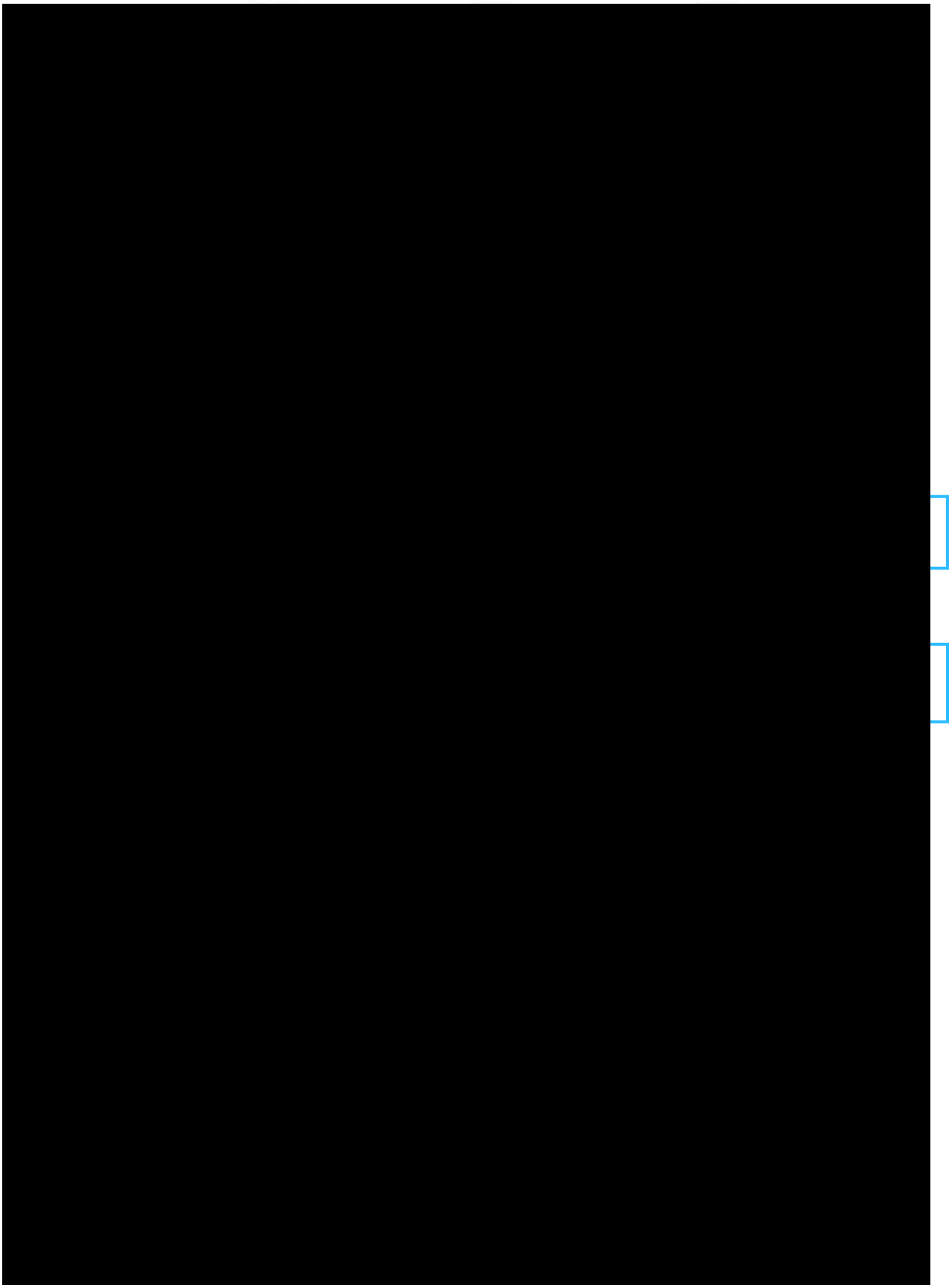
4.5 Mount Frederick South

The MFS Project sub-area is a proposed new opencast mining area that will be accessed via the Stockton sub-area or via the ESE sub-area along the UWHR. It holds no previous consents, and some areas were subject to historic underground mining activities. Like ESE, this sub-area will progress over three phases: development (including construction), mining and closure. Hazardous substances may be used during the development phase for water treatment as part of the erosion and sediment control systems and for and electricity generation. The mining phase hazardous substances storage at MFS is limited to substances required for water treatment, equipment fuelling and the transient use of hazardous substances brought to site for blasting. The MFS mining equipment will be serviced at the Stockton or ESE facilities. There will be a helicopter landing area adjacent to the mining operations, however, it will only be used for emergency access. Helicopter support will otherwise be provided from the Denniston bath house to dispatch drillers and machinery to MFS until the MFS access road is operational.

One 60,000 L double-skinned bulk diesel tank is proposed to be located at the MFS coal stockpile and haulage infrastructure area for truck refuelling and one double-skinned 15,000 L diesel tank adjacent to the WTP to supply its generator. The proposed generator capacity for the MFS sub-area is expected to be approximately 1 MW. Generators for pumps, lighting and infrastructure will be fuelled by additional small (< 5,000 L) double skinned diesel tanks where required.

Water treatment at the MFS sub-area will require pH modifiers (calcium oxide, and sulphuric acid) which have corrosive hazard classifications, along with non-hazardous flocculants and chelating agents. Magnesium oxide (non-hazardous) and its slurry (skin irritant) may be used as an alternative to calcium oxide. During construction of the new facilities in the MFS sub-area, temporary water treatment systems will be established for management of sediment runoff. Treatment chemicals may also include pH modifiers (such as caustic soda or lime slurry) and non-hazardous flocculants. During construction, areas where hazardous substances are stored will be designed to drain back to the containment ponds.

The MFS Project sub-area is located 10 km southwest of the Stockton Mine entrance gate, as shown on **Figure 2.1.** It will be accessible from the ESE and Stockton sub-areas via the proposed UWHR. An overview of the layout of the MFS sub-area is provided in **Figure 4.4** below. The detailed hazardous substances inventory is provided as **Table Appendix A.4**.



4.6 Upper Waimangaroa Haul Road

Coal extracted from the proposed mine areas must be sized and blended to customer specifications, and in some cases the coal needs to be processed (washed) to remove impurities. This requires 'wash coal' from the MFS, ESE, Stockton sub-areas and Cypress mine areas to be transported to the CHPP at the Stockton sub-area and 'clean bypass coal' to be transported to the Infeed for sizing and ultimately transported by road to the receiving point (Station 5) of the aerial ropeway to the Ngakawau Rail Loadout.

The UWHR will connect the MFS and ESE sub-areas to Stockton via the existing Cypress mine (see **Figure 2.1**). The alignment of the UWHR has been selected as the preferred coal haulage option on the basis of an extended options assessment that has considered multiple criteria including footprint, technical risk, closure requirements, permitting, capital and operating cost.

The UWHR will use existing roadways and tracks (which will require widening) for the majority of its 15 km length, and approximately 4 km of greenfield construction. The indicative design of the road fill section is shown in **Figure 4.5**, illustrating the construction of kerb channels to divert runoff to sumps and settling ponds and provide a backstop between the UWHR and the off-site environment in the event of a spill during transport.

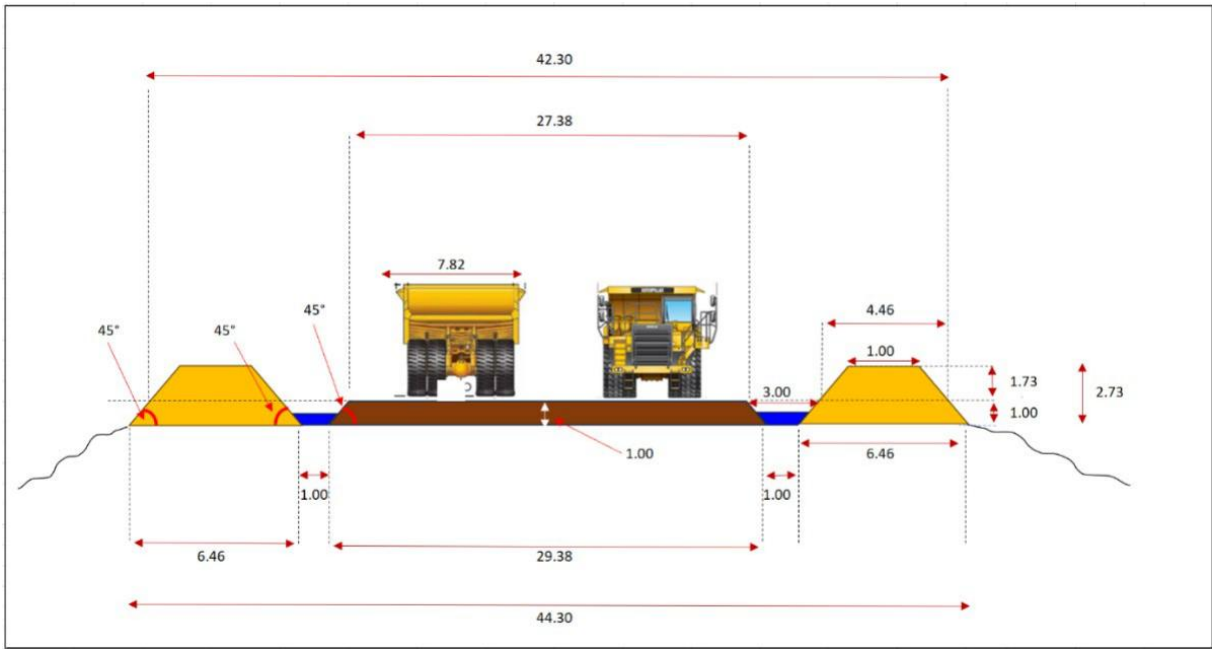


Figure 4.5: Generic Design for a Fill Section of Haul Road.

During construction of the UWHR, temporary water treatment systems will be established for management of sediment runoff. Treatment chemicals may also include pH modifiers (such as caustic soda or lime slurry) and non-hazardous flocculants. During construction, areas where hazardous substances are stored will be designed to drain back to the containment ponds and covered secondary containment will be provided for the hazardous liquids.

5 Surface water drainage and management

5.1 Introduction

For liquid hazardous substances, the primary potential pathway to the off-site environment in the event of a spill is through each site's drainage network, which conveys surface runoff to treatment systems. These treatment systems have been designed to manage contaminants associated with the construction and operational mining phases and the closure phase, including acidic seepage, suspended solids and metals.

The water treatment and management systems also provide a tertiary containment system to prevent immediate release of spills to off-site environments in an emergency scenario. The surface water drainage systems for each area are briefly described in the following subsection.

5.2 Erosion and sediment control

During construction of the new operational areas and UWHR, erosion and sediment controls will be implemented to limit impact to downstream environments from land disturbance.

The erosion and sediment systems are detailed in the Erosion and Sediment Control Plan for Land-Disturbance Activities (SLR Consulting Australia Pty Ltd, 2026) and the Construction Phase Report (Mine Waste Management Limited, 2026).

In principle, clean water diversions will direct runoff from undisturbed areas away from the earthworks, and runoff from within the disturbance areas will be directed to Sediment Retention Ponds or Decanting Earth Bunds. Chemical treatment may be provided in accordance with the Chemical Treatment Management Plan, which may include dosing of pH adjusting solutions or non-hazardous coagulants or flocculants depending on site-specific evaluation of soil characteristics, water quality parameters, treatment goals and operational conditions.

Ponds will be designed to overflow at 1% Annual Exceedance Probability rainfall events.

5.3 Surface water management

The BPCP sub-areas will be subject to a comprehensive water management and treatment programme, which will involve a network of drains, culverts, pipes, pumps, dams, and water treatment facilities. Mine water management processes are described and assessed in detail in the Stockton Plateau Aquatic Ecology: history, thresholds and long-term management Report (PDP et al, 2026), the AMD Overview Report (Mine Waste Management, 2026) and the Sediment Overview Report (Mine Waste Management, 2026).

Treatment systems in place at the Stockton sub-area and proposed for the MFS and ESE sub-areas and generally entail:

- Diversion of clean water to prevent flow into infrastructure areas or areas of disturbance within the mine;
- Conveyance of water from the disturbance or infrastructure areas to sumps for passive settling of solids;
- Conveyance to active water treatment systems for dosing with flocculants to assist with settling, chelating agents to remove dissolved metals and pH adjustment with calcium or magnesium oxides or sulphuric acid (noting in Stockton only calcium or magnesium oxides are to be used); and

- The resulting settled sludge is dewatered either drying cells, geotube bags, or mechanically (e.g. by filters or centrifuges) in the WTP. Dewatered sludge is incorporated into Engineered Land Forms (ELF) during operations.

The proposed water management and treatment systems for each Project sub-area are summarised in **Table 5.1** below. These systems are principally for management of contaminants associated with the disturbance of land associated with the Project. However, in the event of a large spill, the water treatment systems provide a degree of back-up containment (a 'catch-dam' function) for remediation and to minimise discharges to sensitive waterways.

Table 5.1: Overview of mine water management systems

Project sub-area	Water treatment
Stockton	Water that accumulates within the mine and infrastructure areas is directed to dams for storage or straight to the water treatment sumps. The treatment sumps are dosed to adjust pH, prior to discharge to local streams. Water quality testing is undertaken routinely for selected sites and reported annually to the West Coast Regional Council. Monitoring parameters include total suspended solids, turbidity, pH, specified metals, sulphates. The specific suite of analytes varies dependent on the test location. During high flow events, bypass and system overflow ("spill") water will be discharged into the receiving environment from the treatment systems.
MFS	Surface water from within the MFS mine operation areas will be conveyed to the two water sumps for passive settling of solids. Water from the sumps will then be pumped to the active water treatment plant at the southern end of the Mt Fred South area, where the water will be further treated to remove solids, dissolved metals and adjust pH. A water quality monitoring programme will also be established for discharges from this area. During high flow events, bypass and system overflow ("spill") water will be discharged into the receiving environment from the treatment systems.
ESE	As the mine and infrastructure areas are established, clean water diversions, settling sumps and a treatment plant will be established along with a water quality monitoring programme. The treatment plant will be located in the southern section of the Central Infrastructure Area and will include settling sumps, lamella thickeners, dosing systems for pH adjustment, flocculation and chelation, a polishing pond and sludge dewatering. The new refuelling farm, workshops and vehicle washing facilities at the Central Infrastructure Area will drain to hydrocarbon separators for pretreatment before discharge to the main ESE treatment network. During high flow events, bypass and system overflow ("spill") water will be discharged into the receiving environment from the treatment systems.
UWHR	Surface runoff from the road surfaces on the UWHR will be directed via earthen drainage channels to sediment retention ponds. Clean water diversions and culverts will prevent contamination of water outside of the roadway. During high flow events, bypass and system overflow ("spill") water will be discharged into the receiving environment from the treatment systems.

Project sub-area	Water treatment
Ngakawau Rail Loadout	Stormwater from the coal handling areas south of the rail-tracks, including the refuelling bay, is directed to three settling ponds on the eastern corner of the site. Water from these settling ponds is treated in a 'lamella' plant to filter out suspended solids. The treatment process includes dosing the water with caustic soda (30%) to raise pH levels. Stormwater collected from areas where coal is not handled (i.e. around the workshops and administration area to the north of the rail tracks) is directed to the clean water sump north of the workshops. During heavy rainfall events a level and flow switch will activate a pump to redirect runoff to the lamella plant for treatment of entrained solids.

6 Control and management of hazardous substances

6.1 Introduction

The key legislation for management of hazardous substances within the broader regulatory framework in New Zealand is:

- Health and Safety at Work (Hazardous Substances) Regulations 2017 (HSW-HS), which is administered by WorkSafe and sets rules for the storage and use of hazardous substances in the workplace, including risks to workers;
- Health and Safety at Work (Major Hazard Facilities) 2016 Regulations (HSW-MHF) which is also administered by WorkSafe and mandates specific duties relating to process safety that apply to facilities that exceed specified volumes of hazardous substances. These regulations manage the health and safety of workers and communities near large scale hazard facilities and do not apply to a mining operation to which the Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2016 apply;
- Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2016, also administered by WorkSafe for matters concerning worker health and safety in mining operations, including competency requirements in relation to safety-critical roles. These regulations include requirements to prepare principal hazard management plans for explosives (among other hazards) that detail the monitoring requirements, specific controls, and worker protection measures in place;
- Hazardous Substances and New Organisms (HSNO) Act and Regulations, which set minimum controls under the Environmental Protection Authority's Hazardous Property Controls Notice 2017 (EPA Notice) to manage the hazards and risks related to all hazardous substances use within domestic environments and from ecotoxic substances in both workplaces and domestic settings; and
- Resource Management Act (RMA), under which District Councils are responsible for the control of actual or potential effects of the use, development, or protection of land.

The Resource Legislation Amendment Act 2017 (RLAA) removed the explicit function of regional and territorial authorities under section 30 and 31 to control the adverse effects of the storage, use, disposal and transportation of hazardous substances to ensure that RMA controls do not duplicate controls in the HSNO Act and Health and Safety at Work Act.

The controls under the HSNO Act and HSW-HS regulations provide the minimum protection standards for both on-site and off-site people and environments from the potential adverse effects. However, the controls do not take into account the site-specific context, such as the proximity to sensitive waterways or density of nearby residential developments.

6.2 Health and Safety at Work (Hazardous Substances) regulatory controls

Control measures required under the HSW-HS regulations for the volumes and types of hazardous substances proposed to be used at the BPCP are summarised in **Table 6.1** . All the control measures applicable to the various hazardous substances, as set out in **Table 6.1,** will be adopted by Bathurst at the relevant Project sub-areas.

These HSW-HS controls are specific to the types of hazards presented by the substances and are implemented to protect people on site from harm. The measures to reduce the likelihood or consequence of an incident to on-site workers will also reduce the risks to off-site people. The controls specified for Class 9 ecotoxic substances duplicate those specified under the EPA Notice which are intended to protect ecosystems when using and storing ecotoxic substances.

Table 6.1: Summary and purpose of HSW-HS requirements

Control measure	Project sub-area and substances	Purpose of control
Signage (see Section 6.3)	Stockton and ESE • Explosive, flammable, oxidising, corrosive, toxic and ecotoxic substances Ngakawau Rail Loadout • Flammable, corrosive, and ecotoxic substances MFS • Flammable, corrosive, toxic and ecotoxic substances UWHR (water treatment systems) • Corrosive substances	Ensures off-site persons and emergency response personnel are able to identify the hazards at the site and take appropriate precautions.
Secondary containment (see Section 6.4)	Stockton and ESE • Diesel • Maintenance oils • Class 3 flammable liquid package storage • pH modifiers in water treatment (calcium oxide, sodium hydroxide) Ngakawau Rail Loadout • pH modifiers in water treatment (caustic soda) • Maintenance oils • Class 3 flammable liquid package storage MFS • Diesel • pH modifiers in water treatment (calcium oxide, sulphuric acid) UWHR (water treatment systems) • pH modifiers (calcium oxide or sodium hydroxide)	Prevents release of a hazardous liquid to the environment in the event of a failure of primary containment (tank or package) and enables recovery of the substance for safe disposal.
Fire extinguishers (see Section 6.16.3)	Stockton and ESE • Class 1 explosives • Class 5 explosives (ANE, AN prill) • LPG, acetylene and oxygen gases • Diesel • Class 3 flammable liquid package storage Ngakawau Rail Loadout • LPG, acetylene and oxygen gases • Diesel • Class 3 flammable liquid package storage MFS • Diesel UWHR • Not applicable	Enables swift emergency response to small fires in areas near hazardous substances to prevent ignition of flammable, explosive or oxidising substances.

Control measure	Project sub-area and substances	Purpose of control
Segregation of incompatible substances (see Section 6.5)	Stockton and ESE • All explosive, flammable, oxidising, corrosive and ecotoxic substances Ngakawau Rail Loadout • All flammable, oxidising, corrosive and ecotoxic substances MFS • All flammable, corrosive and ecotoxic substances UWHR (water treatment systems) • Corrosive substances	Minimises additional adverse consequences from a spill or fire by preventing reactive substances from mixing in the storage areas.
Substance secured from unauthorised access	Stockton and ESE • Class 1 explosives • Class 5 compound • LPG • Class 3 flammable liquid package storage • Sulphuric acid (WTP) Ngakawau Rail Loadout • LPG • Class 3 flammable liquid package storage MFS • Sulphuric acid (WTP) UWHR • Not applicable	Limits access to trained personnel and minimises the potential for operator error or tampering.
Emergency response planning (Section 6.16)	Stockton and ESE • Class 1 explosives • Class 5 compound • pH modifiers in water treatment (calcium oxide, sodium hydroxide, sulphuric acid) Diesel • LPG • Class 3 flammable liquid package storage • Maintenance oils Ngakawau Rail Loadout • Diesel • Class 3 flammable liquid package storage • pH modifiers in water treatment (caustic soda) MFS • Diesel • pH modifiers in water treatment (calcium oxide, sulphuric acid) UWHR (water treatment systems) • pH modifiers (sodium hydroxide)	Describes the emergency procedures for a site and takes into account any foreseeable emergency such as a fire, spill or injury. The Emergency Response Plan must be regularly tested by the site. These plans help to minimise the consequence of an emergency event, such as through preventing a small spill reaching a drain, extinguishing a small fire or enabling safe evacuation of an effected area.

Control measure	Project sub-area and substances	Purpose of control
Separation from public and protected spaces (Section 6.6)	Stockton and ESE • Class 1 explosives • Class 5 compound • Diesel • LPG • pH modifiers in water treatment (calcium oxide, sodium hydroxide, sulphuric acid) Ngakawau Rail Loadout • Diesel • Class 3 flammable liquid package storage • pH modifiers in water treatment (caustic soda) MFS • pH modifiers in water treatment (calcium oxide, sulphuric acid) UWHR (water treatment systems) • pH modifiers (sodium hydroxide)	Minimises any adverse event in the storage areas impacting on public places or protected places, and correspondingly any off-site event from impacting the storage area.
Tracking and record-keeping (Section 6.10)	Stockton and ESE • Class 1 explosives (storage and use) • Sulphuric acid (ESE only) Ngakawau Rail Loadout • Not applicable MFS • Class 1 explosives (use only) • Sulphuric acid UWHR • Not applicable	A record is must be kept for explosive or highly toxic substances, which details the identity of the person in control of the substance (see: certified handler), the location and quantity of the substance, any transfer of the substance to other locations, and details regarding any disposal of the substance including the date, manner, quantity and location of the substance disposed. This ensures that highly toxic or explosives substances are at all times either under the control of an appropriately trained worker or secured, and that the location of the substance is known throughout its lifespan in New Zealand.
Certified handler and controlled substance licence (Section 6.9.4 and 6.9.5)	Stockton and ESE • Class 1 explosives Ngakawau Rail Loadout Not applicable MFS • Class 1 explosives (in use only) UWHR • Not applicable	A certified handler is a person who is trained and qualified (holds a Certified Handler Compliance Certificate issued by a compliance certifier authorised by Work Safe) to handle acutely toxic or explosive substances. This control restricts activities involving these highly hazardous substances to people with demonstrated competency. For explosive substances or certain vertebrate toxic agents and fumigants, the person must also hold a controlled substance licence to possess and work with the material. This control is in place to protect the health and safety of workers and the public by limiting access to controlled substances.

Control measure	Project sub-area and substances	Purpose of control
Hazardous Substances Location Compliance certification required	Stockton and ESE • Class 1 explosives • Class 5 compound • Diesel • LPG Ngakawau Rail Loadout • Diesel • LPG • Class 3 flammable liquid package storage MFS • None UWHR (water treatment systems) • Sodium hydroxide	Independently certifies that the hazardous substance location where explosive, flammable, oxidising, toxic or corrosive substances are stored or used, has in place all applicable controls and notifications to manage the hazards (such as segregation of incompatibles, secondary containment, access restrictions).
Stationary Container System Compliance certification required (Section 6.7)	Stockton and ESE • Diesel • pH modifiers in water treatment (calcium oxide, sulphuric acid) Ngakawau Rail Loadout • Diesel MFS • Diesel • pH modifiers in water treatment (calcium oxide, sulphuric acid) UWHR • Not applicable	Independently certifies that the tank or process container and associated equipment is safe and complies with the standards for tank design, such as providing secondary containment, pressure relief and overfill protections. Generally required for tanks containing hazardous liquids with more than 5,000 L capacity.
Separation from land use activities according to potential overpressure levels (controlled zones) (Section 8)	Stockton and ESE • Class 1 explosives Ngakawau Rail Loadout • Not applicable MFS • Not applicable UWHR • Not applicable	Minimum separation distances for blast overpressure levels are specified to ensure that people and structures are located at a suitable distance from the explosive hazard for protection from adverse effects in the event of an unplanned initiation in the storage area.
Hazardous areas (ignition source restrictions)	Stockton and ESE • LPG and acetylene • Class 3 flammable liquid package storage • Jet-A1 Ngakawau Rail Loadout • LPG and acetylene • Class 3 flammable liquid package storage MFS • Not applicable UWHR Not applicable	Prohibits ignition sources from areas where substances with flammable vapour or gas are stored to minimise the risk of a fire.

6.3 Signage

Signage is required for the hazardous substances identified in **Table 6.1**, triggered under the HSW-HS by the substance's hazard classification and the quantity stored on-site.

Under regulation 2.6 of the HSW-HS, signage must be located at the entrance to a site and at the specific building or tank in which the substance is located. The information displayed at the specific storage areas must include hazard pictograms and statements, precautionary statements (such as "Keep away from heat, hot surfaces, sparks, open flames and other ignition sources" for flammable substances) and immediate emergency response actions. Signage enables emergency responders to identify the hazards at each location and alerts individuals to the potential dangers.

The following locations will display specific hazardous substances signage:

- Site entrances to Ngakawau Rail Loadout, and at each BPCP Project sub-area gatehouse.
- Ngakawau Rail Loadout:
  - Diesel tank; and
  - The DG storage containers for Class 3 flammable liquids and Class 2 flammable aerosols.
- Water treatment facility (corrosive liquids or solids for pH adjustment).
- Stockton and ESE areas:
  - Diesel tanks;
  - LPG storage at the workshop;
  - Class 5 compound (explosives mixing and preparation);
  - Class 1 magazine;
  - Workshop buildings; and
  - Water treatment facilities (corrosive liquids for pH adjustment).
- MFS:
  - Diesel tank; and
  - Water treatment plant (corrosive liquids for pH adjustment).
- UWHR (during construction):
  - Temporary water treatment dosing systems (corrosive liquids for pH adjustment).

An example of signage provided at the Class 5 storage facility is provided in **Figure 6.1** below.

Figure 6.1: Signage signalling oxidising substance hazard at the AN prill storage building within the Class 5 explosives mixing and preparation compound.

6.4 Secondary containment

The HSW-HS contains specifications for minimum secondary containment volumes for pooling hazardous substances.

Secondary containment is provided for the following environmentally hazardous liquids stored as part of the BPCP:

- All diesel tanks are double-skinned to prevent leaks.
- Tanks containing corrosive liquids associated with new water treatment facilities (sulphuric acid) will be double skinned, with the exception of new lime slurry tanks which are proposed to be located within concrete bunding with capacity for at least 110% of the tank volume (see Section 6.14).
- Packages of corrosive substances used in temporary water treatment dosing systems during construction of any of the new sub-areas, [redacted] or installed to supplement the mussel shell reactors in the closure phase will be stored on covered pallet bunds (or provided with equivalent secondary containment). Non-hazardous flocculants and coagulants will be stored in areas that drain back to the treatment sumps.
- Existing corrosive storage tanks include tanks a[redacted] which are single skinned and located within an uncovered concrete bunded area with capacity for twice the volume of the largest tank, and lime slurry tanks at each LDP which are single-skinned only. Proposed realignment of drainage systems around the existing LDP are discussed further in Section 6.14.
- Packages of hazardous substances such as flammable liquids and cleaning products are stored in dedicated storage containers or cabinets which have secondary containment sumps.

- The majority of bulk oils stored at the sub-areas are not classified as hazardous, however, secondary containment is provided as follows:
  - Bulk oil tanks at the workshop are within two covered bunded enclosures with one open side, as shown in **Figure 6.2** for the existing facility at Stockton. The bund volume for the enclosure is 16,000 L, in excess of the largest tank (15,000 L). The bund is emptied of any incidental rainwater every two months. Bulk oils proposed at ESE will be in a similar bunded enclosed area.
  - Packages of oil (drums and Intermediate Bulk Containers (IBC)) are stored in a bunded container near the workshop. Similar bunded storage will be provided for oil storage established at the ESE workshops.
  - IBCs of non-hazardous oils are stored in the yard near the workshop in Stockton. This area drains to a shut-off valve for use in the event that an IBC is damaged during transfer or delivery.
  - Oils at the Ngakawau Rail Loadout workshop are kept indoors in a dedicated store and are placed on portable bunds both in storage and when in use.

Figure 6.2: Bulk oil tanks and packages of oils at the workshop, undercover and within a bund.

6.5 Segregation of incompatible materials

Under the HSW-HS regulations, substances with physical hazard classifications (Classes 1 – 5) are incompatible and must not be stored together, i.e., Class 3.1 (flammable liquid) must not be stored with Class 1 (explosive), Class 2 (flammable gas or aerosol), Class 3.2 (desensitised explosive), Class 4 (flammable solids) or Class 5 (oxidising) substances.

Class 8 substances include corrosive acids and alkalis that are incompatible with each other and must not be stored in the same bunded area. Class 8 substances are also incompatible with Class 1 (explosive) and Class 5 (oxidising) substances.

Hazard classifications and segregation requirements are identified in the ChemAlert System used by Bathurst to maintain its inventory records. More detail is provided on this system in Section 6.15.

Dedicated storage areas, containers and cabinets segregated by hazard class are provided at all Bathurst facilities in accordance with Bathurst procedures for safe storage of hazardous substances[4], to prevent adverse reactions in the event of a spill or fire. This approach will be adopted in the new facilities established as part of the BPCP.

Specific separation distances that apply to hazardous substances storage areas are detailed in the following section.

6.6 Separation distances

The HSW-HS regulations require separation distances between substances with hazards to human health or property from potentially sensitive locations within the boundary ("protected places"), such as worker lunchrooms or offices, and from any areas off-site where members of the public may be present ("public places"). The minimum separation distances to protected and public places (including the site boundary) specified in the HSW-HS regulations are designed to mitigate[5] the risk of:

- Any adverse event in the store impacting on public places or protected places.
- Any adverse event at public places or protected places impacting on the store.

The separation distances provided to off-site locations are detailed in Table 6.2 below.

Separation requirements for Class 1 explosives to sensitive activities are applied by calculation of the overpressure zones. These are described in Section 8.

Table 6.2: Separation requirements under the HSW-HS for hazardous substances

Substance name (volume)	Identified separation requirements	Comments
Sulphuric acid	Segregated from all Class 1 substances, Class 4, Class 5, Class 6.1A, Class 6.1B and Class 6.1C toxic cyanides, and Class 8.2A and 8.2B corrosive alkalis/acids. Separation for Class 8 liquids: • 5 m to protected places or the boundary.	These corrosive liquids are stored in tanks or IBCs within CHPP or the WTP at each area. Distances to the boundary or on-site offices for all corrosive liquids meet the requirements for separation from protected and public places.
Caustic soda		
Lime slurry		

[4] Section 4.5 Storage, Chemical and Hydrocarbon Spill Procedure, January 2024. STO-HST-PRO-098.
[5] Policy Clarification, Storing class 6 and 8 hazardous substances, WorkSafe NZ, November 2019.

Substance name (volume)	Identified separation requirements	Comments
Oxygen gas	Oxygen gas should be separated from incompatible substances, specifically Class 1, 2, 3, 4, 5.2, 6.1A-C, or 8, zinc, magnesium, any metal in powdered form, and combustible materials. Each workshop has at most 100 m^3 of Class 5.1.2A oxidising gas, for which the following separation requirement apply: • 3 m away from incompatible substances or other hazardous substances locations. • 3 m from ignition sources.	Oxygen gas is stored in cylinders the dedicated gas store areas of each workshop, significantly separated from the site boundaries or protected places on site. Oxygen gas is stored at least 3 m from incompatible substances, such as flammable gases.
LPG	Segregation from all Class 1, Class 2.1.2, Class 3, Class 4 and Class 5 substances. The separation distances specified for 225 kg at Ngakawau Rail Loadout and ESE workshops are: • 1.25 m to protected places. For 360 kg of LPG at the Stockton workshops: • 0.6 m away from public areas. • 2 m to protected places.	LPG storage at each site is in a dedicated gas store at the workshops. These are all significantly separated from public areas or protected places.
Diesel	Segregation from all Class 1, Class 2, Class 3.2, Class 4 and Class 5 substances. A minimum separation of 1 m between tanks is required. Separation requirements for the tank farms proposed (60,000 – 285,000 L) are 5 – 8 m from protected places or the boundary. The two tanks at the Ngakawau Rail Loadout (10,450 L and 5,283 L) are required to be 3 – 3.25 m from protected places or the boundary. Tanks associated with supply to generators at the MFS and ESE WTP (10,000 L and 15,000 L respectively) must also be 3.25 – 3.5 m from protected places or the boundary.	Diesel will be stored in dedicated tanks. These will be located to comply with all identified segregation and separation requirements.

Substance name (volume)	Identified separation requirements	Comments
ANE and AN prill	5.1.1B and 5.1.1C substances should be separated from incompatible substances, specifically Class 1, 2, 3, 4, 5.2, 6.1A-C, or 8, zinc, magnesium, any metal in powdered form, and combustible materials. Separation distances ANE: • 8 m away from incompatible substances. • 5 m from ignition sources. Separation distances AN prill: • 5 m away from incompatible substances. 5 m from ignition sources.	The Class 5 substances at Stockton and ESE are segregated from other hazardous substances in a dedicated storage compound. Where diesel, paraffin oil or aerosols are stored within each compound for use in the Mobile Manufacturing Unit (MMU), they are kept in dedicated storage containers separated from the oxidisers by at least the minimum required distances. At Stockton, the Class 5 compound is over 1.6 km from the Class 1 magazine and over 1 km from the workshop or bulk fuel storage. Similarly at the ESE sub-area, the Class 5 compound and Class 1 magazine will be separated by more than 3 km and the nearest part of the Central Infrastructure Area will be approximately 1.2 km from the Class 5 compound.

6.7 Tank certification

Bulk hazardous substances storage tanks must hold stationary container compliance certification under Part 17 of the HSW-HS. This verifies that the design and installation meet requirements for foundation stability, secondary containment, pressure management, liquid fill level management and monitoring of the interstitial space (for double skinned tanks) to detect any leaks. The five bulk diesel tanks [redacted] each hold a stationary container compliance certificate. All new diesel storage tanks proposed to be installed at the ESE Project sub-area or MFS Project sub-area will also be required to have stationary container compliance certificates.

The existing fuel tanks have electronic level monitors and dipsticks for manual level confirmation. The tanks are inspected on a two-monthly schedule by specialist contractors.

The current compliance certificates for the tanks in Stockton were granted in November 2023 and expire November 2026. The certificates for the two tanks at Ngakawau were granted in December 2025 expiring December 2028 (for the small tank associated with the space heater) and granted January 2024 expiring January 2029 (for the refuelling tank).

Compliance certificates will be renewed over the life of the BPCP as part of Bathurst's compliance obligations under the HSW-HS regulations.

6.8 Refuelling bays

6.8.1 Ngakawau Rail Loadout

The refuelling bay at Ngakawau is a sealed area adjacent to the tank. This area drains to the lamella plant and settling ponds.

In the event of a spill during refuelling, a spill kit is available for immediate emergency response.

Figure 6.3: Covered diesel tank and fuel dispenser (left), close up of fuel dispenser (right).

6.8.2 Stockton

The main refuelling area in Stockton is unsealed and surfaced in compacted metal. Diesel is stored in five double skinned above-ground bulk tanks (four 40,000 L tanks and one 30,000 L tank). The tanks and dispensing pump connection are shown in **Figure 6.4** and **Figure 6.5** below. Mobile refuelling trucks are filled here before distributing diesel to equipment around the mine in-situ (see Section 6.8.4).

[redacted]

An overfill prevention system (Compac M400) is used when refilling the mine's mobile refuelling carts, which detects when the receiving tank is reaching capacity and automatically stops the pump. The bulk tanks are filled by gravity feed, with float cut off valves to isolate the tank from the delivery tanker once full, and liquid level gauge displays monitored by the staff undertaking refuelling.

The main refuelling bay drains to a pond, which enables settling of solids before being piped to the mine treatment sump.

The tanks and refuelling areas are equipped with fire extinguishers and spills kits for emergency response.

Figure 6.4: Dispensing station.

Figure 6.5: Bulk diesel tanks (right).

6.8.3 Proposed refuelling at ESE

The main fuel farm at ESE will [redacted](see **Figure 4.3**). It will contain up to five above-ground self-bunded tanks: three or four 75,000 L tanks, and one 60,000 L tank (safe fill capacity of 70,000 L and 56,000 L each). The fuel farm will also contain a bulk grease storage and delivery system for supplying grease to the fuel trucks used to service large mobile plant (e.g. excavators, bulldozers and large haul truck) in-situ.

The refuelling area in the fuel farm will drain toward a containment sump and hydrocarbon separator system as shown in the conceptual plan in **Figure 6.6**, before discharge to the main water treatment network for the ESE sub-area.

In addition to the [redacted] is proposed to have one above ground, self-bunded 60,000 L diesel tank and one 5,000 L diesel exhaust fluid (DEF) tank. DEF is a fuel additive used to reduce nitrogen oxide emissions from diesel combustion engines. A conceptual plan for this area is shown in **Figure 6.7**.

Provisionally, the tank models selected are Fuelco LTKKL75 and Fuelco LTKKL60 double-skinned tanks, which will have high and low flow dispensers. These will have dipsticks and level monitoring and be fob-controlled to track fuel usage. The fuel dispensing nozzles will have automatic stop systems to prevent accidental overfilling/spillage from tanks during refuelling.

The refuelling areas and tanks will each be equipped with fire extinguishers and spills kits for emergency response.

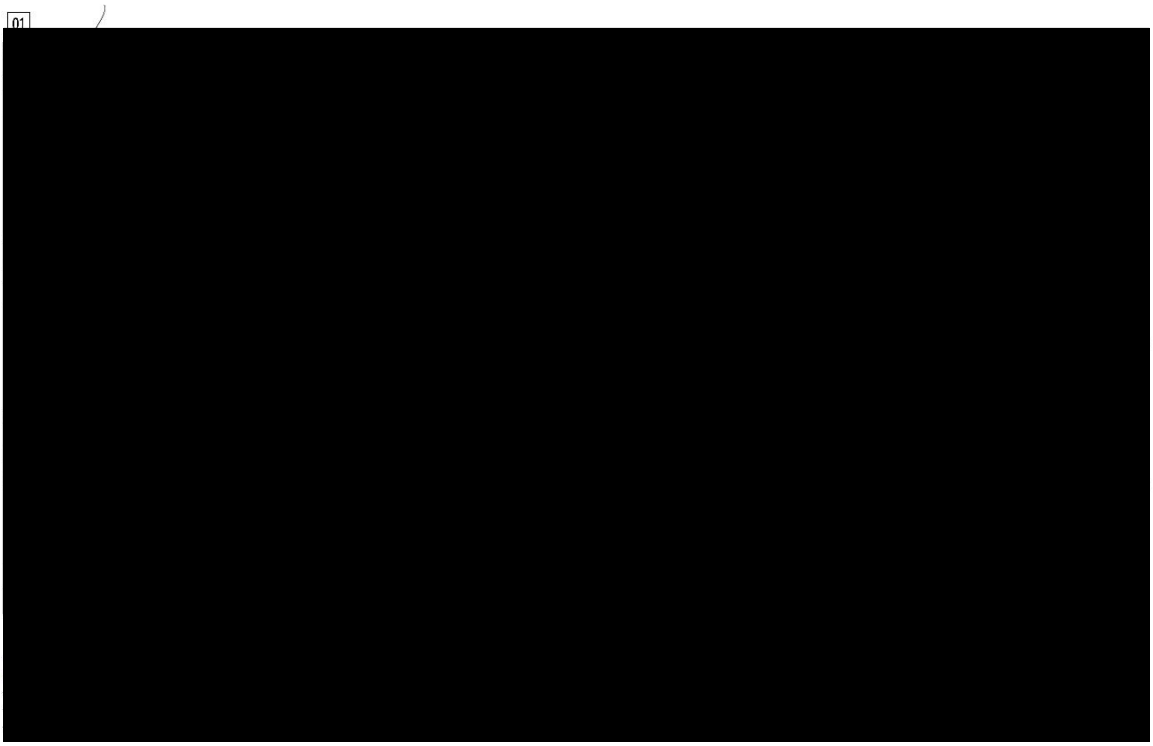


Figure 6.6: Proposed Layout of the Fuel Farm in the [redacted] Source: Bathurst, October 2025.

Figure 6.7: Proposed Layout of the Fuel Farm in the [redacted]. Source: Bathurst, October 2025.

6.8.4 Refuelling equipment in-situ

Mining equipment requires fuelling in-situ by mobile fuel trucks. Servicing is undertaken in accordance with Bathurst's Standard Work Procedure for Servicing Mobile Plant and Equipment in the Field[6].This includes the following requirements:

- Two (2) 9 L Fire Extinguishers shall be on hand on the service truck at all times.
- No smoking or naked lights are permitted within 20 m of the service area, or near the fuel supply vehicle.
- All Service Trucks shall be equipped with radio communication, an activated flashing orange hazard light and an emergency stop at the fuel module.
- Report all fuel or oil spills to the Shift Supervisor immediately.
- Check fuel and oil attachments are competent, clean and safe to operate.

After refuelling, the operator completes an inspection of the equipment and all fittings and hoses to identify any leaks or faults. A record is kept of the volume of fuel and other fluids (oil, coolant) that have been dispensed.

The current consent conditions for operation of Stockton and Cypress sites include conditions that require equipment refuelling, lubrication or mechanical repairs to be undertaken in an area that provides sufficient mitigation controls to ensure that a spill of hazardous substances into a

[6] Bathurst. Standard Work Procedure for Servicing Mobile Plant and Equipment in the Field (STO-MPL-SOP-058) Version 1.2. December 2025.

waterbody does not occur. Bathurst proposes to adopt equivalent conditions for any new consents under the BPCP.

6.8.5 Helicopter refuelling

Bathurst will continue to operate helipads across the wider Stockton Plateau, including at Ngakawau, Granity, the Stockton Bath House and the SN14 Haul Road for movement of exploration drill rigs to inaccessible areas. Helicopter movements may also be used in response to emergencies. New helipads are proposed within the MFS sub-area and at the ESE sub-area gatehouse.

There is no storage of fuel (Jet-A1) overnight at the helipads. Additional fuel may be brought to a helipad to reduce the need for return trips for refuelling during scheduled helicopter movements. Helicopter fuel is stored and used in the bunded area of the helipad and is removed from site at the end of each day's flying, if not consumed. Refuelling is undertaken by staff train in emergency response procedures, and the helicopters are equipped with spill kits.

6.9 Specific controls for Class 1 explosives

6.9.1 Facility location

The existing Class 1 explosives magazines [redacted] It is managed by specialist explosive suppliers Orica.

The total aggregate quantity of stored 'high explosives' product (blasting explosive and boosters) is [redacted]. The two magazines are visible on the aerial view in **Figure 6.8** separated by mounded earth.

[redacted]

Figure 6.8: Layout of the two Class 1 explosives magazines.

A similarly isolated magazine compound is proposed for the ESE sub-area. [redacted].

6.9.2 Class 1 magazine certification

The HSW-HS regulations require any storage of Class 1.1D explosives in excess of 2.5 kg to be secured in a magazine designed and certified to meet requirements for the material of construction, the design of the locking mechanism and arrangements to prevent removal.

Each magazine is also required to have an earthing system between the atmosphere above the hazardous substance location and earth to dissipate any build-up of electrostatic charge. The magazines must also have a lightning interceptor designed in accordance with section 4 in AS/NZS 1768 : 2007—Lightning protection. These features are required to minimise the risk of an inadvertent ignition of the explosives.

The magazines used by Bathurst are designed to standard AS 2187.1 1998 for relocatable magazines and hold design compliance certificates to demonstrate that the requirements set in the HSW-HS regulations as described above are met.

6.9.3 Security

[redacted]

6.9.4 Certified handlers and designated use zones

Blasting is carried out by staff that hold the required qualifications for handling and use of the Class 1 explosives, including holding a controlled substance licence (detail in Section 6.9.5) issued by a compliance certifier.

The handler is required to notify WorkSafe of any planned detonations or deflagrations under regulation 9.28 of the HSW-HS at least three days before regular firing commences. The notification includes the place, date, likely frequency of firings planned, and must provide sufficient information to enable an inspector to contact the contractor during business hours.

Signage must be displayed to warn that a substance is being detonated and that entry is prohibited, and a warning sound must be generated one minute before the firing, as well as a visual check immediately prior to firing that all people not directly involved in the activity have been excluded from the designated use zone.

As part of preparing for blasting in areas within 750 m of off-site areas accessible to the public (such as walking tracks), the blasting contractor undertakes ‘clearing runs’ of surrounding accessways and posts advance warning notices at track entrances. Clearing runs may be undertaken using drones.

The certified handler must also ensure that:

- Any Class 1 substance is kept packaged until the point where the explosive charge is to be made up; and

- Any container from which any Class 1 substance is being taken is closed as soon as the quantity needed to make up the explosive charge or charges for immediate use has been removed; and
- The making up of any explosive charge is sufficiently segregated from any container holding Class 1 substances so that unintended initiation of the charge could not cause a blast overpressure on the container exceeding 180 kiloPascals (kPa); and
- The system for firing an explosive charge is not readied to the point that only the 1 final action needs to be taken to fire the charge, until the requirements of regulation 9.28(3) have been complied with; and
- The firing is monitored and any misfired charge is identified.

Blast overpressure restrictions apply in-situ, which the handler manages through limiting the charge masses, stem heights, and blast patterns.

6.9.5 Controlled substance licence

The staff member carrying out blasting must also hold a controlled substance licence (CSL) granted by WorkSafe for the Class 1 substances. The criteria for a CSL includes:

- A current compliance certificate as a certified handler for the substance concerned; and
- A current dangerous goods endorsement on his or her driver licence under the Land Transport Rule: Dangerous Goods 2005.

The specific competency requirements[7] for a certified handler are that the person must know and be able to describe the following matters:

- The hazard classifications, properties, and adverse effects of those hazardous substances for which the person is to be a certified handler;
- The requirements that are imposed by these regulations in relation to those hazardous substances;
- The requirements that are imposed under HSNO in relation to those hazardous substances;
- Any proposed conditions of the person's compliance certificate as a certified handler;
- The precautions required to prevent injury or illness to any person at the workplace caused by any of those substances;
- The procedures to adopt in an emergency involving those substances; and
- Any variations of requirements, alternative means of compliance with requirements, or additional requirements specified in a relevant safe work instrument.

6.10 Tracking and certified handlers

Tracking is required for highly hazardous properties as identified in **Table 6.3** below. Tracking requirements mean that BRL must record:

- The name, position within the company, and physical address of the competent person who is in charge of the product and details of their Certified Handler certificate;
- The name of the product (its trade name or common name);
- How much is held and where it is held;
- Usage of the product, including where it was used, and how much was used;

[7] Clause 4.3 of the HSW-HS.

- Whether the product was transferred to another place (e.g. an orchard) or person (you must ensure the person taking control of the product is a "competent person", i.e. has a Certified Handler certificate); and
- If the product was disposed of, the quantity, how, when and where it was disposed of.

Table 6.3: Classifications that must be tracked

Class		Comment
1.1	Substances and articles will mass explosion hazard	Applicable to Class 1 explosives storage at the Stockton and ESE sub-areas.
3.1A	Flammable liquid Category 1	Not anticipated at the Project sites, other than petrol (3.1A) which is exempt from tracking requirements.
3.2A	desensitised explosive (liquid) Category 1	
4.1.2A, 4.1.2B	Self-reactive substances and mixtures Type A or B	
4.1.3A	Desensitised explosive (solid) Category 1	
4.2A	Pyrophoric liquids or solids Category 1	
4.3A	Substances and mixtures which, in contact with water, emit flammable gases Category 1	Not anticipated at the Project sites.
5.1.1A	Oxidizing liquid or solid Category 1	
5.2A, 5.2B	Organic peroxide Type A or B	
6.1A, 6.1B[A]	Acute toxicity (oral, inhalation or skin) Category 1 or 2	Applicable to sulphuric acid proposed to be used in water treatment at ESE and MFS.

6.11 Specific controls for Class 5 oxidising substances

Orica (or an alternate qualified and experienced contractor) will continue to operate a compound in Stockton for bulk storage of the Class 5 oxidising substances, which are used for preparation of explosives in-situ at the Stockton mine areas. This compound is secured from access by unauthorised personnel and contains:

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

The key storage activities are shown on **Figure 6.9**. An MMU is shown on **Figure 6.10**.

The Class 5 substances are not flammable, but will accelerate a fire and will generate an explosion when mixed with combustible material and ignited within a confined space. As a result, the key control for management of fire and explosion risk at the site is to eliminate combustible materials from the Class 5 bulk storage locations.

The HSW-HS sets a minimum separation distance of 8 m between combustible materials and the Class 5 oxidising substances (ANE tank or AN prill). The closest combustible storage activities are located within the same compound and include the gasser solution located 8 m south of the ANE tank, the 3,000 L paraffin oil store approximately 14 m west of the ANE tank, and the 1,000 L diesel store approximately 27 m east of the AN prill building.

The separation provided to the Stockton Class 1 explosives magazine is approximately 1.7 km, and over 12 km to the proposed ESE magazine. At this distance an emergency at either storage area is not expected to impact the other.

Figure 6.9: Key storage locations in the Class 5 compound at Stockton.

Figure 6.10: MMU parked in the Class 5 compound at Stockton.

The ANE is a highly viscous emulsion that is solid at ambient temperatures, and therefore secondary containment is not required. However, the storage compound and any movement of the ANE is subject to site-wide spill response protocols. The location is certified to meet the relevant controls specified in the HSW-HS regulations as set out in **Table 6.1.**

A similar compound to that existing at the Stockton Mine is proposed to be established at the ESE Project sub-area, [redacted] This location has been selected to be [redacted]. The proposed storage of oxidisers is greater in volume at the ESE sub-area than currently required for Stockton. The following storage capacities will be required for ESE:

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

The ground conditions at ESE mean that paraffin oil will not be required.

The ESE Class 5 compound will be subject to the same controls, certifications and licences as required for the Stockton Class 5 compound and will be operated and managed be a suitably qualified and experienced contractor.

6.12 Lightning strike protection

The existing and proposed facilities on the Buller Plateaux are vulnerable to lightning strike, due to the high elevation and increased frequency of storms around the mountainous terrain. Lightning strike poses a risk to workers on the Plateaux and is a potential ignition source that must be managed around the explosive, flammable and oxidising substance storage facilities.

Lightning interceptors are required at the explosives magazine under Clause 9.25 of the HSW-HS, which is verified annually as part of its compliance certification renewal. Additionally, all site buildings where workforce is present are fitted with roof mounted lightning arrestor devices, and the aerial ropeway to Ngakawau has lightning protection drives on all towers.

Bathurst's facilities are compliant with the AS/NZS 1768:2007 standard for lightning protection and the site has a proximity-based process lightning alert system with activity restrictions at increasing alert levels that ultimately result in site shutdown where lightning is imminent. Proposed facilities will comply with AS/NZS 1768:2007 standard for lightning protection and will follow the same compliance requirements as those currently in place at Stockton.

6.13 Lime silo dust control

Corrosive powder (calcium oxide also referred to as quicklime) is stored in bulk silos associated with the LDP in Stockton and will be established at the new water treatment facilities in ESE and MFS. Calcium oxide powder is corrosive to eye tissue and irritating to the skin. Depending on the source of the limestone, the powder may contain crystalline silica, which is a known carcinogen.

In the short to medium term, the LDPs at Stockton are proposed to be converted from quicklime and lime slurry dosing systems to magnesium oxide and slurry dosing. This is driven by sludge removal performance, as described in the AMD Overview report (Mine Waste Management, 2026).

The silos are fitted level sensors to prevent overfilling. Each silo is fitted with dust filtration to remove particulate from the displaced air released during filling. New silos installed at the WTP at ESE and MFS will have equivalent systems for dust control.

6.14 Corrosive liquid storage

Acids and alkalis are used in the water treatment plants and in the CHPP.

In the Stockton sub-area, the alkali solutions used are primarily lime slurry. This is prepared within the tanks on site by dissolving calcium oxide (quicklime) into water to form calcium hydroxide. This process is exothermic (releases heat), and therefore it is not recommended that the tanks be double-skinned, as the double-walled construction can prevent heat dissipation. As noted in Section 6.4, the lime slurry tanks at the CHPP are within a concrete bund with containment capacity for twice the volume of the largest tank. The new lime slurry tanks at the MFS and ESE WTP are also proposed to be located within concrete bunding with capacity for at least 110% of the tank volume.

The lime slurry tanks in the two LDP at Stockton are single skinned and any tank failure could report to local waterways Fly Creek or Mangatini Stream. As part of the BPCP, Bathurst proposes to recontour the areas adjacent to each LDP to direct any tank leakage back into the Stockton water treatment network. The levels within the tanks are monitored and alarms are activated if the tank contents fall below a set point, which would alert operators of a leak and enable spill response procedures to be enacted.

The Ngakawau Rail Loadout uses a 1,000 L IBC of caustic soda (a strong alkali solution) on a portable bund stored undercover. [redacted] will have an IBC (i.e. 1,000 L) of caustic soda for AMD treatment, also to be installed in covered bunded areas.

Acid storage (sulphuric acid) is proposed for the new WTP at the ESE and MFS sub-areas. These new tanks will be double skinned to prevent leaks.

During construction of new infrastructure and facilities in ESE, MFS and UWHR, temporary water treatment systems will be installed to manage runoff from the disturbed areas as described in Section 5.2 and the related specialist reports. These may require dosing of alkali solutions such as caustic soda or lime slurry to manage disturbance of potentially acid-forming rock. Where required,

storage of corrosive liquid will be in a bunded area that drains back to the temporary treatment sumps. It is anticipated that approximately two IBCs of caustic soda or lime slurry would be used at each temporary water treatment system, which would be installed with secondary containment, such as a covered portable pallet bund. Up to two temporary water treatment systems are likely to be operational at any one time during construction works associated with the Project in each sub-area.

Following closure, use of passive water treatment mussel shell reactors may be supplemented with dosing of acidified ferric chloride. Where installed, the packages of ferric chloride will be kept on covered portable bunds with capacity for at least 100% of the largest package.

6.15 Hazardous substances management plans

The Environment Protection and Response (Hazardous Substances) Environment Management Sub Plan[8] outlines the objectives, risks, management controls, responsibilities, and training requirements to effectively manage impacts on the environment from the use of hazardous substances.

Bathurst use the ChemAlert system to maintain a record all hazardous substances stored and used on site, including a database of Safety Data Sheets (SDS).

The Stockton Mine Chemical & Hydrocarbon Spill Procedure[9] contains further hazardous substances management guidance for Bathurst staff and operators.

It provides a definition of hazardous substances and the classification system used in New Zealand. It also sets out the procedure for seeking approval to utilise a new hazardous substance via the following process:

- Check the ChemAlert Hazardous Substances database to confirm whether the substance is a new addition to the site operations or if an alternative substance has already been approved.
- Complete a risk assessment by completing the Hazardous Substance Approval Form (BRL-HST-STD-045.01) and attach the SDS.
- If approved, add the substance details and SDS to the ChemAlert inventory.

The procedure sets out the requirements for transportation, storage, and labelling of substances, use of Personal Protective Equipment (PPE), spill response and safe disposal of hazardous substances as part of Bathurst's operations.

These procedures will be adopted as the hazardous substances management plans for the duration of the BPCP, and will be updated as appropriate to include activities in the MFS and ESE sub-areas.

6.16 Emergency management plan

6.16.1 Stockton Mine Emergency Management Principal Control Plan

Bathurst has provided a copy of its Emergency Management Principal Control Plan[10] (EM-PCP) for the Stockton Mine, which documents the systems, processes and measures in place at the mining operation to manage emergency events, including the roles and responsibilities of all mine personnel. This plan will be updated to incorporate the operations established as part of the BPCP, including the use of the UWHR and facilities at MFS and ESE as these are commissioned.

[8] Bathurst. Environment Protection and Response (Hazardous Substances) Environment Management Sub Plan (STO-ENV-PLN-005) Version 2.0. May 2025.
[9] Bathurst. Stockton Mine Chemical & Hydrocarbon Spill Procedure (STO-HST-PRO-098) Version 2.1. January 2024.
[10] Bathurst. Stockton Mine Emergency Principal Control Plan (STO-HST-PCP-002) Version 5.2. February 2025.

The EM-PCP has been developed in consultation with the New Zealand Mines Rescue Trust, NZ Police, New Zealand Fire Service and St. Johns Ambulance Service with consideration of the site location, access road, wet weather entry requirements, egress, site layout, water storage, hazardous good storage, location and fittings on firefighting equipment, muster areas, emergency services escort location and support capabilities at the mine.

Trigger Action Response Plans (TARPS) are prepared for specific emergency scenarios, and include the following relevant to hazardous substances:

- Hazardous substance spill to ground, water or air;
- Fire at the Class 2 – 9 storage or use areas or in the mobile plant;
- Fire at the reload area or magazine;
- Fire on vehicle carrying explosives or explosive initiation material; and
- Electrical storms.

The EM-PCP will be reviewed and revised with any site-specific considerations for the ESE and MFS areas should the BPCP be approved. Staff will be trained in the emergency response procedures and drills for potential scenarios will be held periodically to test these.

Spill kits and fire extinguishers are provided on site at all times for emergency response, and any clean-up material will be removed from site to a facility authorised for the disposal of hazardous substances.

6.16.2 Class 5 emergency plan

Orica (operator of the Class 5 explosives mixing and preparation compound) has provided a copy of the Orica Stockton Site Emergency Plan[11]. It details emergency response procedures for scenarios including loss of containment, fire, explosion, dangerous reactions, overheating pump, thunderstorms, vehicle accidents, bomb threats and natural disasters. This plan will continue to be used for the Stockton facility and would apply to the ESE facility in the event that Orica are the specialist contractor selected to operate the new site.

6.16.3 Fire-fighting facilities

The location of fire-fighting facilities [redacted]

The mine water carts (120,000 L or 75,000 L) are primarily used for dust suppression. However, in an emergency, their water cannons can also be deployed for fire-suppression. These carts can be refilled using mine standpipes located adjacent to ponds. They are both fitted with 100 L of fire-fighting foam concentrate (SOLBERG® VERSAGARD™ AS-100), which is classified as a skin irritant and corrosive to eye tissue. It is fluorine free (does not contain per- and polyfluoroalkyl substances (PFAS)) and is biodegradable and non-persistent[12]. The Emergency Response Team's fire-fighting appliance also carries 80 L of foam concentrate.

The Stockton workshops use a [redacted], which comprises a small tank with automated fire detection and extinguishing agent dispensing system attached to approximately 65 different fixed and mobile plant equipment. Each tank is approximately 34 L and contains 4 L of '[redacted] mixed into water. This foam is not classified as hazardous, is

[11] Orica. Orica Stockton Site Emergency Plan (SHEC-AUS-FOR-EMG-001) Version v10. January 2024.
[12] SOLBERG® VERSAGARD™ AS-100 safety data sheet, version 2. Revision dated 25 May 2021.

fluorine free, biodegradable and non-persistent[13]. It is proposed that a similar system will be used at the new facilities in ESE. The system is tested in the workshop yard annually.

The mine water carts will be used for fire-fighting purposes in the proposed new areas of the BPCP. Over time, fire-water supply standpipes will be installed at ESE. Other firefighting equipment and resources will be located at the Emergency Response Team building at the Gatehouse Infrastructure Area.

6.17 Waste management

Bathurst has an Operational Waste Management Procedure[14] (STO-ENV-PRO-028, May 2025) in place for all its activities, which will apply to the BPCP sub-areas, with revisions to reflect updated disposal methods where required. It forms part of the Stockton mine Health, Safety, Environment and Community Management System (HSECMS), which meets the requirements of the New Zealand Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2016 (HSW (MOQO) Regs) – Part 3 Health and Safety Management System.

The Operational Waste Management Procedure specifies a hierarchy for waste management of reducing, reusing, recycling and lastly, disposal. Operational waste has been split into two waste streams as follows:

- Hydrocarbon and vehicle waste (oil spill clean-up material, batteries, filters, waste oil, hydraulic hoses, and drums); and
- General site waste (scrap metal, electrical and blasting cable, rubber products, plastic products, wood products, damaged hand tools, spray cans and used material products).

The procedure details the disposal requirements for different waste types relevant to hazardous substances used on site and are presented in **Table 6.4** below. [redacted] annotated on **Figure 4.2**. A new waste storage area will be established within the ESE Project sub-area for management of materials generated at the site. There is no waste storage proposed at MFS Project sub-area.

All wastes will ultimately be disposed of (or recycled, if appropriate) at authorised facilities off-site.

Table 6.4: Waste disposal requirements for hazardous substances

Waste type	Procedure requirements
Oil spill clean-up products	Oil spill clean-up products include adsorbent granules e.g. Enviropeat and mineral sponges, and absorbent pads, booms, and pillows. All contaminated clean-up materials are to be disposed at the dedicated hydrocarbon skips, [redacted]. All hydrocarbon contaminated products are sent off-site for disposal by an external approved handler.
Hydrocarbon contaminated products (gloves, overalls, rags)	Hydrocarbon contaminated material should be disposed with other hydrocarbon contaminated products at the dedicated hydrocarbon skips in the waste management areas. All hydrocarbon contaminated products are sent off-site for disposal by an external approved handler.
Hydrocarbon contaminated soils	Soil around workshops and along roads and road edges can become contaminated with hydrocarbons as a result of spills. The procedure includes:

[13] SANDVIK Eclipse™ SUSTAIN safety data sheet V4, revision dated 14 April 2023.
[14] Bathurst. Operational Waste Management Procedure (STO-ENV-PRO-028). Version 2.0. May 2025.

Waste type	Procedure requirements
	• All operations crews including contractors are to organise for the removal and stockpiling of hydrocarbon contaminated soils. • Hydrocarbon contaminated soil is to be stored in containment cells (to exclude water ingress) and periodically sent off-site to an authorised disposal facility.
Batteries (not technically hazardous substances)	Vehicle batteries (excluding any dry cell). All contractors are to recycle used vehicle batteries as follows: • Batteries are to be stored upright in covered labelled containers to prevent leakages and batteries being exposed to the elements. • Batteries can be recycled through Resource Recycling Technologies (Christchurch) or other approved disposal contractors.
Oil filters	Oil filters are a waste stream arising from vehicle maintenance. All contractors are to recycle oil filters as follows: • Oil filters are to be stored in a covered and labelled bin at Jurassic Park. • Oil filters can be collected by Ben's Oil or other approved disposal contractors.
Waste oil	Used oil from any vehicles and machinery on site. Contractors are to recycle all waste oil as follows: • Waste oil is to be collected in labelled and covered metal drums and stored in an allocated bund-protected area at each workshop. • Waste oil is to be recycled through Ben's Oil (Nelson) or another approved disposal contractor.
Hydraulic hoses	Hydraulic hose waste arises from vehicle maintenance. All contractors are to recycle all hydraulic hoses. • Hydraulic hoses should be placed in labelled bins located at the designated waste collection areas. Bins will be collected on an as-required basis. • The rubber from the hoses can be dropped off for recycling at the Westport Transfer Station but will incur a charge. • The metal can be removed from the hoses and dropped off free of charge at the Westport Transfer Station.
Drums	All contractors are to reuse or recycle all plastic and metal drums: • Drums need to be cleaned and can be stored in the allocated waste collection area, upright and with bungs in. • Metal drums can be recycled off-site by approved waste contractors.
Cables	All electrical cable is to be recycled. Electrical cable should be placed in labelled bins at [redacted] for recycling by approved contractors off-site.
Spray cans	Spray cans should be collected and recycled. • All spray cans should be stored in a labelled bin at the waste storage area and recycled at the Transfer Station. • If these are mostly empty, they can be dropped off free of charge at the Transfer Station for recycling (as the cans are aluminium or steel).

6.18 Transport of hazardous substances

[redacted]

Any transport of hazardous substances via road freight will be in accordance with the Land Transport Rule: Dangerous Goods 2005. Furthermore, the substances will be handled in accordance with the label and SDS directions where applicable. Transport regulations require:

- Goods to be clearly labelled and in transport-approved packaging;
- Class placards must be displayed when transporting dangerous goods above specified thresholds;
- Documentation to be held by the driver that includes the Dangerous Goods Declaration stating UN number, proper shipping name, class/division, packing group, quantity, consignor/consignee details, and signatures;
- Incompatible substances must be segregated;
- Emergency equipment (spill kits, fire extinguishers, PPE, first aid materials), along with written emergency response information, must be available at all times when dangerous goods are transported;
- Dangerous goods endorsements are held by the driver, where applicable, and drivers must be trained in safe handling practices and emergency response; and
- Appropriate licence classes must be held by the driver for the weight/class of vehicle used in transport.

Any transport of hazardous substances via helicopter will adhere to the Civil Aviation Rule Part 92 – Carriage of Dangerous Goods, with requirements for packaging, labelling, loading restrictions, segregation of incompatibles, unloading inspections and recurrent training.

7 Resource consent requirements

7.1 Operative Buller District Plan

The Operative Buller District Plan (OBDP) includes Part 6 – Infrastructure, Services and Other Activities District Wide, which contains the rules that currently apply to activities involving hazardous substances storage and use in the Buller District.

There are no permitted thresholds specified. Section 6.3.1 of the OBDP sets the controlled activities involving hazardous substances. Comment against each controlled activity is provided in **Table 7.1** below. The BPCP complies with most of the matters of control, however, Rule 6.3.1.2 requires that all hazardous substances are stored and used on sealed, roofed and bunded areas, which may not be met in all circumstances.

Overall, the BPCP has discretionary activity status for use of hazardous substances under Rule 6.4.2.7: *Activities involving hazardous substances which do not meet all the performance standards for controlled activities.*

There are no objectives or policies in Part 6 of the OBDP.

Table 7.1: Section 6.3.1 Controlled activities involving hazardous substances

Rule	Details	Comment
6.3.1.1	The hazardous substances to be stored in underground tanks comply with the "Code of Practice for Design, Installation and Operation of Underground Petroleum Storage Systems" (Department of Labour, OSH, 1992), OR where other methods are adopted such as current industry codes of practice, which will ensure that standards 6.3.1.3 and 6.3.1.4 below are met.	There are no underground tanks associated with the BPCP. **Not applicable.**
6.3.1.2	All sites (or part thereof) where hazardous substances are stored, used, loaded or unloaded are sealed, bunded and roofed or covered. Such bunds are to be of impervious material and be capable of containing the total volume of material sorted or used on the site (in the event of a spill).	Liquid hazardous substances are proposed to be stored in bunded areas. However, not all areas of the BPCP where substances are used are sealed. In particular, refuelling areas adjacent to the bulk diesel tanks are unsealed, and in-situ refuelling of mining machinery occurs. **Discretionary.**
6.3.1.3	Drainage from sealed areas is to an appropriate waste treatment system and there is no direct discharge of contaminated stormwater or waste to natural waters, land or air.	Water from the BPCP areas is directed to treatment sumps. As noted above, many areas are not sealed. Temporary treatment systems are proposed for new areas (UWHR, MFS and ESE). **Controlled.**

Rule	Details	Comment
6.3.1.4	No hazardous substance is discharged into or onto water, land or air except where this is provided for within a regional plan, or other rule or regulation.	Hazardous substances (e.g. sulphuric acid, lime, caustic soda and polyaluminium chloride) are used in the water treatment processes to adjust pH, as a flocculant or chelating agent to remove metals. Discharge consents are being sought for the proposed BPCP activities. Explosives including Class 1 and Class 5 substances are used in the ground as part of the mining activity. These are consumed in the detonation and otherwise excavated once used. Other than the water treatment substances, hazardous substances are not proposed to be discharged to water or land with the exception of the Solberg Versguard fire-fighting foam, which may be used in response to a fire. Procedures are in place for spill response in the event of an emergency and waste management following clean up of spilled material. **Controlled**
6.3.1.5	A management plan for all sites where hazardous substances are stored, used or transported is prepared.	The BPCP operations will be carried out in accordance with Bathurst's existing emergency management and waste management procedures, which include provisions for hazardous substances. **Controlled**
6.3.1.6	A spill response contingency plan is prepared.	The Stockton Mine Emergency Principal Control Plan STO-HST-PCP-002 v3.0 contains the Trigger Action Response Plan for *Chemical /Hazardous Material Spill – Ground or Waterway.* This includes instructions to secure the area, use spill kit materials to contain the spill, consult the safety data sheet for the spilled material, seek advice on suitable disposal methods and reporting to the relevant authorities. **Controlled**

7.2 Te Tai o Poutini Plan

The Te Tai o Poutini Plan (TTPP) is a combined District Plan for the Buller, Grey and Westland District Councils, which will replace the current individual district plans once any appeals have been resolved. Decisions on the TTPP were released in October 2025.

The TTPP contains a chapter on hazardous substances (Ngā Matū Mōrearea). This chapter contains objectives and policies, but no specific rules or standards for the control of hazardous substances. The Recommendation Report of the Hearing Panel notes that controls for hazardous substances are managed under other regulations administered by other agencies, but that objectives and policies are specified to be used where a resource consent is triggered for another reason.

A comment on the BPCP with regards to the hazardous substances objectives and policies is provided in **Table 7.2**.

Table 7.2: TTPP hazardous substances objectives and policies

Ref	Objective or policy	Comment
HS - O1	The benefits associated with the use of hazardous substances are recognised while ensuring that risks to the environment and human health arising from subdivision use and development activities involving hazardous substances are minimised.	The Economic Impact Assessment (Aigis Group, 2025) prepared for the BPCP concludes that: *…the BPCP would produce definitively positive economic outcomes, and support the continued economic performance and stability of the Buller District, West Coast Region and New Zealand.* Section 9 of this report describes the risks associated with the BPCP and describes the controls in place to minimise the consequence or likelihood of the identified risks to the environment and human health. Hazardous substances stored and used as part of the BPCP are essential for fuelling and maintaining mining equipment, providing treatment to improve water quality and for extracting and processing the coal, among other uses. Hazardous substances storage and use are therefore intrinsic to the BPCP and contribute to the economic benefits identified in the EIA.
HS - P1	Activities and facilities involving the use and storage of hazardous substances shall be designed, located, constructed and operated so as to minimise residual risk to people and the environment.	The facilities must be designed and handled in accordance with the HSW-HS regulations as detailed in Section 6 of this report. The controls are specified to minimise risk to workers on site and to people and ecosystems off-site.
HS – P2	Ensure that new or expanded major hazard facilities are located away from natural, historic and cultural overlay areas and away from locations that are subject to significant natural hazards, where practicable, taking into account the operational and functional needs of activities to locate in these areas.	The BPCP is not a major hazard facility as defined by the TTPP[15]. None of the hazardous substance storage areas are within the Outstanding Natural Landscapes, Significant Natural Area or Outstanding Natural Features overlays of the TTPP. Considerable separation distances are provided to the boundary for the proposed hazardous substances storage areas, as discussed in Section 6.6.

[15] **Major hazard facility** means any facility deemed a Major Hazard Facility under the Health and Safety at Work (Major Hazardous Facilities) Regulations 2016. Under Clause 3(2)(b), these regulations specifically exclude mining operations to which the Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2016 apply.

Ref	Objective or policy	Comment
HS – P3	Provide for the establishment and expansion of major hazard facilities within the Industrial, Port and General Rural Zones, where adequate separation distances are maintained from sensitive activities and valued natural, cultural and historic heritage features.	Not applicable – activities proposed are within the Special Purpose – Buller Coalfield zone and Open Space zone.
HS – P4	Avoid locating sensitive activities adjacent to major hazard facilities unless it can be demonstrated that any reverse sensitivity effects and residual risks are avoided	Not applicable – establishment of new sensitive activities is not proposed.

8 Overpressure offset distances assessment

The HSW-HS regulations specify minimum offset distances around Class 1 explosive magazine locations such that, in the event of an unintended detonation, specified activities are not subject to stated blast overpressures. The blast overpressure is the sudden onset of a pressure wave after an explosion. The areas within these overpressure radii are referred to as 'controlled zones' and under regulation 9.27 of the HSW-HS ("Person Conducting Business or Undertaking to control adverse effects of unintended initiation"), certain activities must be excluded.

The regulations specify these minimum offset distances to "ensure that any potential adverse effects are managed and minimised. This includes making sure that people and structures are well protected and are located at a suitable distance from the explosives."[16]

The minimum offset distances that constitute the controlled zones for the Class 1 storage facility are provided by Bathurst, shown on **Figure 8.1** and **Figure 8.2**. The Stockton offset distances for each overpressure level have been calculated by Orica using the WorkSafe NZ method for each high explosives magazine and initiating explosives magazine combined: [redacted] The NEQ is the standardised way for expressing the mass of explosive material excluding any non-explosive casings.

Overpressure radii for the trinitrotoluene (TNT) equivalent NEQ of the Class 5 substances (ANE and AN prill) at the bulk oxidiser storage facilities are also shown. The TNT equivalent is a conversion factor for each substance that expresses the mass in terms of the quantity of TNT that would release the same explosive energy. It is used to compare the explosive energy associated with different materials. The TNT equivalent factors for ANE (0.68 kg/kg) and AN prill (0.28 kg/kg) are lower than the Class 1 explosives (1.0 kg/kg). We note that the Class 5 substances are not explosive as stored, they require preparation with a combustible material for fuel. In storage, the Class 5 substances are separated from all combustible material. Overpressure radii are therefore not presented for the Class 5 explosives mixing and preparation compound at either sub-area.

The offset distances for each overpressure level calculated for both the existing Stockton Class 1 magazine and the proposed ESE Class 1 magazine are summarised in **Table 8.1** below. All relevant activities are outside of the minimum offset distances.

Table 8.1: Summary of minimum offset requirements for the Class 1 explosives storage facilities

Ref	Exclusion from zone	Blast overpressure level	Minimum offset distance	Comment
r 9.27 (2)(a)(i)	Public traffic routes of low density and places where people may occasionally be present in numbers up to 200 persons on average in any 24-hour period.	13 kPa	Stockton: 224 m ESE: 238 m	[redacted]
r 9.27 (2)(b)(i)	Public traffic routes of medium density, places where people may occasionally be present in numbers up to 900 persons on average in any 24- hour period, and the interior of any proximate building within the boundary	9 kPa	Stockton: 296 m ESE: 314 m	[redacted]

[16] Explosives (including pyrotechnics) - Blast Overpressure. https://www.worksafe.govt.nz/topic-and-industry/hazardous-substances/guidance/substances/explosives/ Retrieved 20 June 2025.

Ref	Exclusion from zone	Blast overpressure level	Minimum offset distance	Comment
	of the place where people not directly handling explosive substances.			[redacted]
r 9.27 (2)(c)(i)	Public traffic routes of high density, areas of high intensity land use, or any area where a person may be legally present inside the boundary of the place where the hazardous substance location is located.	5 kPa	Stockton: 444 m ESE: 471 m	
r 9.27 (2)(d)	Vulnerable facilities defined in the HSW-HS regulations as: a) Buildings of 4 storeys or more, of curtain wall construction with panels more than 1 500 mm square: b) Buildings of 4 storeys or more with more than 50% of the wall area glazed: c) A hospital care institution, residential disability care institution, or rest home (as defined in section 58(4) of the Health and Disability Services (Safety) Act 2001), early childhood education and care centre (as defined in section 310 of the Education Act 1989), or school (as established under section 146 of the Education Act 1989): d) Public buildings or structures of historic value: e) Major transport and traffic terminals such as railway stations and airports handling more than 1 800 people in 24 hours: f) Major public utilities whose service could be disrupted by a blast of 5 kPa: g) Any similar facilities.	2 kPa	Stockton: 888 m ESE: 943 m	[redacted]
r 9.27 (4)(a)	A PCBU with management or control of a hazardous substance location that is used solely for securing and holding a class 1 substance must limit the quantities of any class 1 substance at the location to ensure that, in the event of an unintended initiation - the interior of any proximate building where a class 1 substance is manufactured would not be subject to a blast overpressure of more than 24 kPa.	24 kPa	NA	[redacted]

These overpressure radii are used to quantify the consequence of an unplanned detonation in the partial quantitative risk analysis in Section 9.3.2 of this report.

The overpressure radii do not overlap any of the hazardous substance storage associated with the BPCP (such as the workshops). At this distance, there are unlikely to be any cumulative impacts on these activities from an unintended detonation at the Class 1 magazine locations.

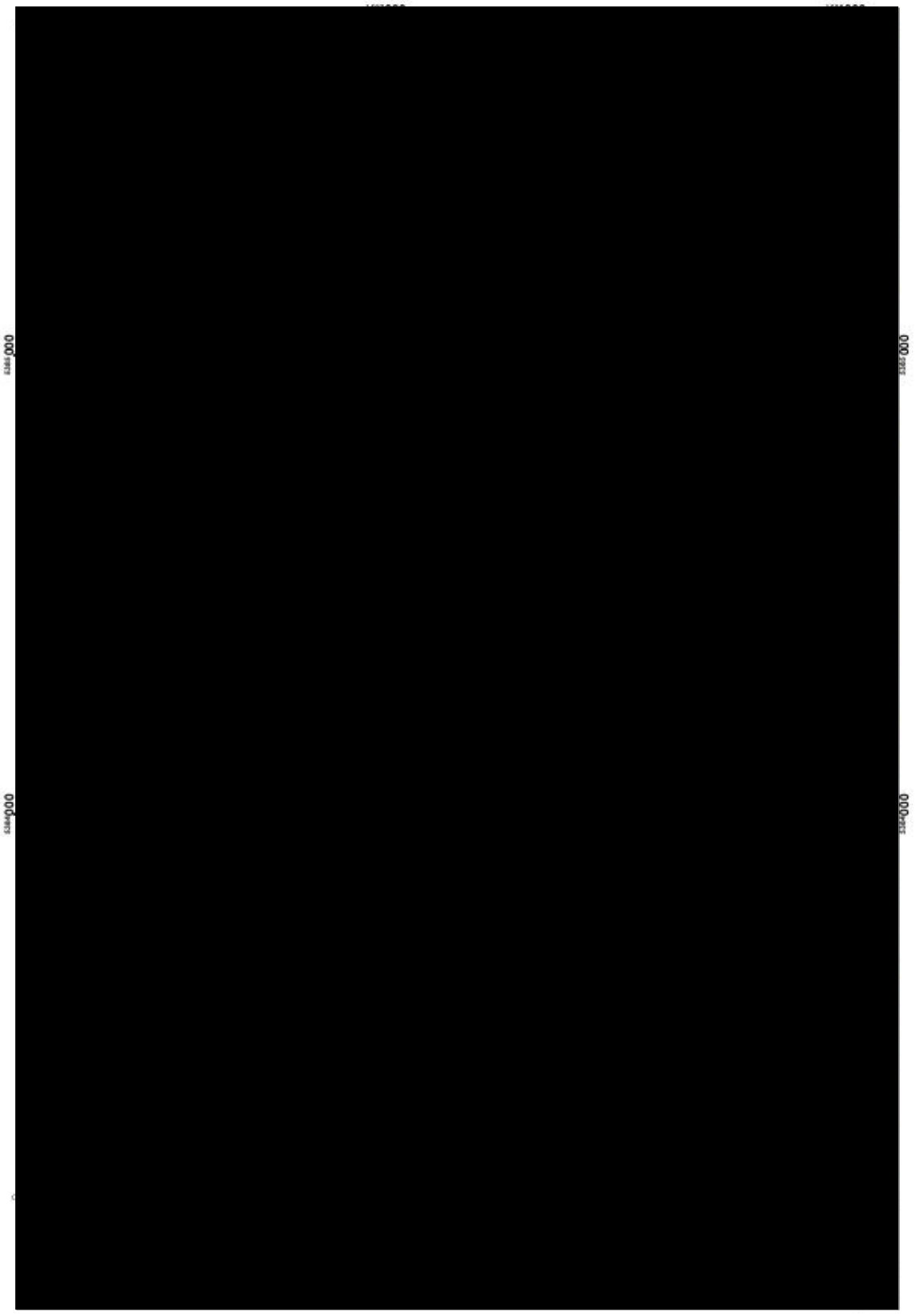


Figure 8.1: Overpressure zones offset distances from storage facilities in Stockton.

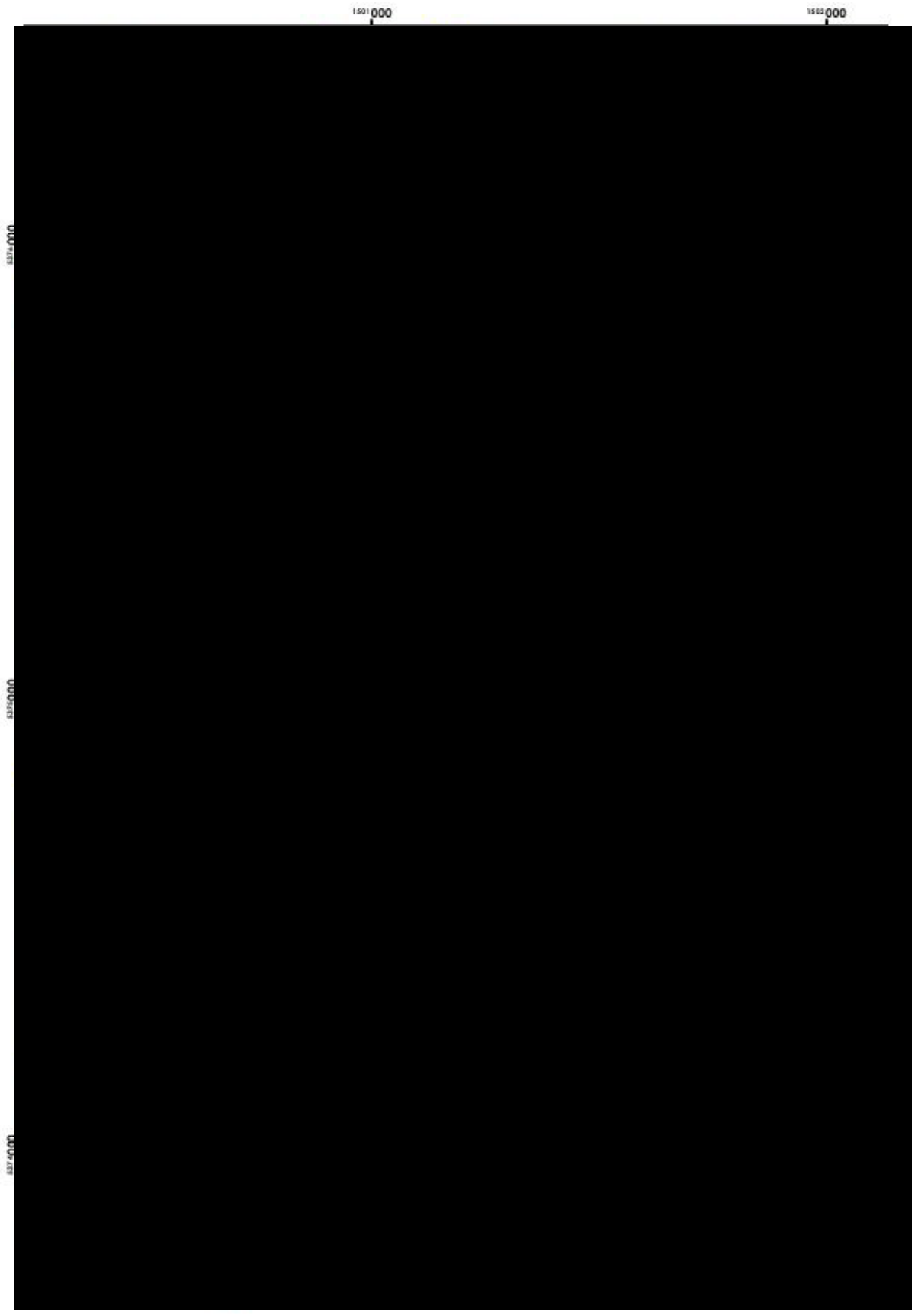


Figure 8.2: Overpressure zones offset distances from storage facilities in ESE.

9 Risk Assessment for Hazardous Substances

9.1 Introduction

The following sub-sections set out a risk assessment of the proposed storage, handling and use of hazardous substances required as part of the BPCP.

The risk assessment involves consideration of:

- Identification of potential hazards, failure modes and exposure pathways;
- The sensitivity of the surrounding environment;
- The separation distances from neighbouring activities and the number of people potentially at risk from the facility;
- Cumulative risks of hazardous facilities in the area; and
- Transport of hazardous substances on and off the site to ensure safe access and appropriate routes for delivery vehicles on site to minimise risk of spillage.

9.2 Assessment method

In the absence of New Zealand specific guidance, the New South Wales Department of Planning (NSW DoPI) Multi-Level Risk Assessment[17] approach was considered in development of the methodology for this assessment.

The Multi-Level Risk Assessment approach is summarised in **Figure 9.1**. There are three levels of assessment, which are:

- Level 1 – Qualitative Analysis, primarily based on the hazard identification techniques and qualitative risk assessment of consequences;
- Level 2 – Partially Quantitative Analysis, using hazard identification and the focused quantification of key potential off-site risks; and
- Level 3 – Quantitative Risk Analysis (QRA) based on the full detailed quantification of risks, consistent with Hazardous Industry Planning Advisory paper No.6 – Guidelines for Hazard Analysis.

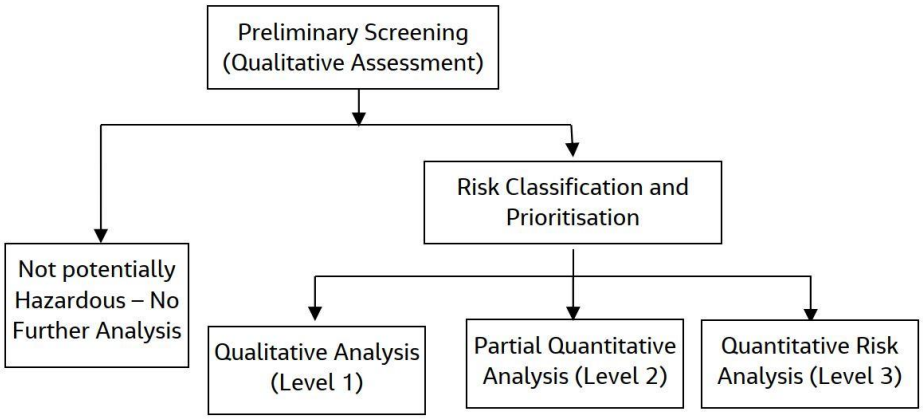


Figure 9.1: Multi-Level Risk Assessment flow diagram. *Source: NSW-DoPI*

[17] Assessment Guideline Multi-Level Risk Assessment, New South Wales Department of Planning, 2011.

The risk assessment provides a screening level assessment, where all hazards in terms of their risk to people beyond the site boundary are assessed to identify any significant risks to off-site environments. Where these are limited to specific individual hazards, partial quantification is applied for potentially high consequence events with a low frequency of occurrence beyond the site boundary.

A detonation in the explosives store is identified in the HSW-HS as a potentially high consequence event that requires assessment using empirical calculations. This is expanded upon for the existing and proposed Class 1 explosives storage in Section 9.3.2.

9.3 Risk assessment

9.3.1 Hazard analysis

The effects associated with hazardous substances are generally classified as follows:

- Fire/Explosion Effects: concerned with damage to property, the built environment and safety of people;
- Human Health Effects: concerned with the well-being, health and safety of people; and
- Environmental Effects: concerned with damage to ecosystems and natural resources.

These hazards are based on the intrinsic characteristics of the substance, for example the flashpoint of a flammable substance. As noted in Section 4.1, New Zealand's hazardous substances classification system was originally developed under the HSNO Act but has now been aligned with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), specifically GHS 7 (introduced in 2021). Substances are classified based on their hazard properties, which align with the effects categories as follows:

- Physical hazards —flammable, explosive, oxidizing substances (Classes 1 – 5).
- Health hazards — toxic, corrosive, sensitizing, carcinogenic substances (Classes 6 and 8).
- Environmental hazards — aquatic toxicity, ecotoxicity to soil or air organisms (Class 9).

The purpose of the hazard analysis is to undertake a preliminary scaling and ranking of hazards and to identify risks that should be considered in greater detail.

Table Appendix C.1 sets out the detailed hazard analysis for the BPCP, identifying and rating potential hazards associated with each substance or storage activity, with reference to the hazard level assigned to each classification in the Land Use Planning Guide for Hazardous Facilities (Ministry for the Environment, 2000).

Substances that, in the absence of controls, have hazards that could have off-site effects are evaluated in the qualitative risk assessment in Section 9.3.4. In summary:

- The Class 1 explosives (boosters, packaged explosives and detonators) [redacted] have a high hazard to people, property and ecosystems in the event of an unplanned detonation at the storage magazines. The residual risk may be significant, so a partial quantitative review of the consequence using the blast overpressure levels is undertaken in Section 9.3.2.
- The bulk storage of Class 5 oxidisers (ANE, AN prill) in d[redacted] have a high fire/explosion hazard, noting that this requires combustible materials to be present in order for a fire to be accelerated.
- Bulk diesel has a low flammability hazard and does not produce a flammable vapour. The health hazard from diesel is also low, requiring chronic direct exposure to have effect. The key

hazard associated with diesel is its chronic ecotoxicity, which presents a moderate risk to ecosystems in the event of a spill.

- Other flammable substances used as part of the BPCP include flammable or oxidising gases and flammable aerosols, and packages of flammable fuels or cleaning/maintenance products. These pose a low hazard to off-site people and property due to the large separation of storage to off-site buildings.
- There are no substances stored or used across the BPCP that have acute toxicity hazard level higher than low (Class 6.1D. Many of the substances used as fuels, treatment chemicals or workshop substances have chronic health hazards such as carcinogenicity, skin or eye irritancy, target organ toxicity, which require direct contact via inhalation, ingestion or skin contact and are principally hazards to worker on site. These hazards do not have a pathway to impact off-site people.
- Corrosive substances are used [redacted] (lime slurry), and water treatment systems (lime slurry, sulphuric acid, caustic soda). The hazard from these substances to off-site people and property are low, as they require direct skin contact and have limited pathways to impact people due to the isolation of the activities. They may have impacts on the sensitive aquatic ecosystems if large quantities of concentrated corrosive liquids are released to downstream ecosystems in a spill event.
- Many of the packaged liquids used at the BPCP have low to moderate ecotoxicity hazards to ecosystems in the event of a spill. Substances with Class 9.1A classifications for high acute ecotoxicity include the pelletised solid explosives (easily managed in a spill), petrol (kept in small containers in bunded areas) and the gasser stored in a bunded 1,000 L tank within the Class 5 bulk oxidiser compound.

9.3.2 Partial quantitative analysis of Class 1 explosion

Partial quantitative analysis has been undertaken for the consequence of a detonation at the Class 1 explosives stores by considering the level of damage expected at specific overpressure values provided by the Hazardous Industry Planning Advisory Paper No.4 (HIPAP-4[18]) Risk Criteria for Land Use Safety Planning, published by the State of New South Wales through the Department of Planning in 2011.

The maximum overpressure levels anticipated in the event of a detonation at the existing Class 1 explosives store has been provided by the specialist contractor Orica in accordance with WorkSafe's blast overpressure calculations as shown in **Figure 8.1** and **Figure 8.2**.

The predicted overpressure levels at off-site locations are considered in terms of the expected effect provided in Table 7 Appendix 1 of HIPAP-4. This table is reproduced as **Figure 9.2** below.

[18] Hazardous Industry Planning Advisory Paper No.4 (HIPAP-4), Risk Criteria for Land Use Safety Planning. State of New South Wales through the Department of Planning, 2011.

Explosion Overpressure	Effect
3.5 kPa (0.5 psi)	• 90% glass breakage • No fatality and very low probability of injury
7 kPa (1 psi)	• Damage to internal partitions and joinery but can be repaired • Probability of injury is 10%. No fatality
14 kPa (2 psi)	• House uninhabitable and badly cracked
21 kPa (3 psi)	• Reinforced structures distort • Storage tanks fail • 20% chance of fatality to a person in a building
35 kPa (5 psi)	• House uninhabitable • Wagons and plants items overturned • Threshold of eardrum damage • 50% chance of fatality for a person in a building and 1 5% chance of fatality for a person in the open
70 kPa (10 psi)	• Threshold of lung damage • 100% chance of fatality for a person in a building or in the open • Complete demolition of houses

Figure 9.2: Effects of explosion overpressure. *Source: HIPAP-4*

Overpressure levels below 3.5 kPa are not discussed in HIPAP-4, and are presumed to be negligible. At 3.5 kPa, brittle material like glass is expected to crack or break, but the potential for injury to individuals is described as 'very low'. For Stockton, all areas exposed to overpressure levels of more than 2 kPa are restricted to employee access within the operational areas of the existing site.

For the ESE sub-area, there are some [redacted].

With consideration of the level of impact at the maximum overpressure level, the consequence of a detonation in the Class 1 explosives store to human health and property is insignificant for Stockton and minor for ESE.

9.3.3 Consideration of known industry events

A detonation in an explosives store managed in accordance with the HSW-HS is considered unlikely. Detonations in Class 1 explosives stores are not common in the mining industry. T+T is aware of only one known occurrence associated with mining in the Oceania region, which was a detonation underground in the Telfer Mine in Western Australia in 2005.

[19] The 3.5 kPa over pressure radius is 643 m, calculated using the International Ammunition Technical Guidelines (IATG) Kingery-Bulmash Blast Perimeter Calculator by Craig Pledger of Orica (email dated 18 November 2025).

The Mines Safety Bulletin detailing the causes and consequence of this detonation is attached as **Appendix D** and summarised as follows:

- The detonation occurred in a store that was not designed for high volumes of explosives. It occurred in a 'working party magazine', a term for a small temporary store of explosives and detonators (typically < 200 kg NEQ) for use by a group working in a particular area in an underground mine. In this case the temporary store was established with more than 6,000 kg NEQ of high explosives and up to 3,000 detonators all in the one chamber. Additionally, the store contained waste packaging debris from the spent explosives and had been the site of a spill of ANFO in an environment with reactive sulphide-containing minerals.
- When a fire started in the store, it burned for two hours before the detonation occurred. Efforts to put out the fire were hampered by the lack of a water deluge system within the underground mine and fire hoses for firefighting, the unsuitable class of fire extinguisher available, and inappropriate forced ventilation.
- The consequence of this 6,000 kg class 1 explosive detonation to human life was limited due to timely worker evacuation, however it did cause significant damage to mine underground services, ventilation doors and machinery.

The contributing factors in this event would not lead to a detonation at the proposed operation. The two stores [redacted] will be designed to meet the standard AS 2187.1. for Explosives Storage Transport and Use, including systems for waste management and segregation of incompatible substances.

Bathurst has not had any such incidents in any of its existing explosive stores and has a number of controls to prevent such an incident. A likelihood rating of 'unlikely' is considered appropriate for the event.

Additionally, the long delay (two hours) between ignition of the fire in the Telfer mine working magazine and the detonation of the explosives illustrates how explosives in storage are less volatile than explosives that have been properly prepared and densely packed into a blast hole for firing. This example illustrates that instantaneous and complete detonation of the contents of a magazine is an unlikely scenario.

9.3.4 Risk analysis

A qualitative risk assessment of the identified hazards and failure modes has been undertaken in **Appendix E** for all of the scenarios identified in Section 9.3.1 where there is the potential for off-site effects.

The qualitative risk assessment has been carried out in accordance with the method described in the MfE Guidance for Hazardous Facilities (2000) by applying a qualitative rating to the frequency (likelihood) of the failure occurring and the consequence (severity) of impacts if the event were to occur. The likelihood and consequence ratings take into account the controls (mitigation and management measures) that will be in place.

The qualitative risk analysis serves as a screening assessment to identify events where the residual risk may be significant and require further quantitative assessment. Where risks are identified that can be managed and are acceptable in terms of a qualitative assessment, no further evaluation is considered necessary. The assessment has been based on information from Bathurst from their own and similar mining operations elsewhere, and professional judgement.

There is one residual risk associated with the proposed activities as identified in **Appendix E Table 4** that is assessed as moderate as follows:

- Moderate residual risk to the ecosystems from a spill of diesel during in-situ equipment refuelling, which is managed through physical controls including automatic shut-offs on fuel nozzles, and management provisions including refuelling procedures, emergency response planning, spill kits and staff training.

All other risks were assessed as low including:

- Low residual risk to ecosystems from a spill of diesel from a tank leak or rupture, managed by use of double-skinned tanks which have monitoring systems to identify leaks from the internal tank.
- Low residual risk to ecosystems from a spill of corrosive liquid from a tank leak or rupture at the [redacted] facilities. For the new facilities at ESE and MFS, this is principally managed by use of double-skinned tanks. For the existing tanks at the Stockton sub-area, the risk of tank failure is managed by locating the tank in a bunded area [redacted] or ensuring that the area around the tank is drained to the network of sumps on site [redacted] In all cases, each tank is monitored to raise alarm in the event of an abnormal fill level change and staff supervising these operations are trained in the emergency response procedures.
- Low residual risk to ecosystems from a spill of packaged hazardous substances such as petrol, coolant, caustic soda, maintenance oils and greases during unloading to site or during storage. This is managed through physical controls including secondary containment in storage to prevent discharges to the off-site environment. Small spills are primarily managed through the use of packaged goods within covered workshops, staff training and emergency response planning including spill kits at the unloading and storage areas and in the workshops.
- Low residual risk of fire at the diesel, LPG, acetylene, oxygen, ANE and AN prill storage areas impacting off-site locations. The likelihood of a fire at these storage areas is minimised through prevention measures such as access restrictions, exclusion of ignition sources and segregation of incompatible or reactive substances. The consequence of a fire is minimised by the separation distances to buildings and the site boundary, as well as emergency management measures including fire-fighting facilities and staff emergency response training.
- Low residual risk to occupants of off-site properties or recreational users of the Plateaux from an unplanned detonation in the existing and proposed Class 1 explosives storage areas. The likelihood of this event is minimised through restricted access to externally certified handlers only, storage in certified magazine units with lightning strike protection, availability of fire protection systems and emergency response management measures. The consequence of this event is evaluated quantitatively using the calculated overpressure level at off-site locations in Section 9.3.2 and determined to be negligible for the Stockton magazine and minor for the ESE magazine. The consequence to the public is limited through provision of a large separation distance to incompatible substances and the boundary. The overall risk for both sites is assessed as low.

10 Assessment of effects on the environment

10.1 Introduction

The following assessment identifies and assesses the actual and potential effects of the proposed activities. This assessment also outlines the measures that Bathurst proposes to avoid, remedy or mitigate any potential adverse effects on the environment.

10.2 Hazardous substances

In accordance with the Objectives and Policies of the TTPP, the assessment has particular regard to the following aspects:

- Ensuring that facilities storing and using hazardous substances are designed, located, constructed and operated so as to minimise residual risk to people and the environment.
- New or expanded hazardous facilities are located away from natural, historic and cultural overlay areas and away from locations that are subject to significant natural hazards, where practicable, taking into account the operational and functional needs of activities to locate in these areas.

10.2.1 Effects on people and property

Fire risk

The risk to people from a fire at the flammable or oxidiser storage locations associated with the infrastructure at Ngakawau, Stockton and proposed at ESE and MFS has been assessed as low. The risk will be managed through controls including certification of storage areas, provision of fire extinguishers and fire-fighting systems (hydrants and water carts), segregation of reactive substances and separation of flammable or oxidising substances from buildings. Bathurst (and its specialist contractors for the bulk oxidisers) will have emergency response procedures and management plan in place to respond in the event of a fire.

[redacted]

Based on the emergency management plan, controls that will be in place at the BPCP sub-areas, and the separation distances to the closest dwellings, the effect on people and property from a fire at the flammable or oxidising substance locations has been assessed as less than minor.

Unplanned explosives detonations risk

Overpressure zones have been determined for the Class 1 explosives storage at Stockton and proposed for ESE, for the purpose of selecting a magazine location that complies with the offset distances required in the HSW-HS regulations for the protection of the public. These overpressure zones enable consequence analysis for the impact of an unintended initiation.

[redacted]

The New South Wales Department of Planning HIPAP-4 provides the expected effect of various levels of explosion overpressure as reproduced in Figure 9.2 in Section 9.3.2. These public recreation tracks are all located beyond the 3.5 kPa overpressure radius, beyond which the HIPAP-4 guidance shows there is very low probability of injury. The only restrictions that apply in the 2 – 5 kPa radius pertain to "vulnerable facilities"[20]. The off-site risk to people or property from an accidental detonation associated with the storage of explosives has been assessed as low for both locations.

The measures in place to mitigate the detonation risk include the design, testing, regular certification auditing and maintenance of the explosives magazine locations in accordance with the HSW-HS requirements (including for security, lightning strike protection), access restricted to trained Certified Handlers, segregated storage areas and loading zones away from other flammable or explosive substances storage and away from buildings. Workers on-site are trained in emergency response per the Emergency Management Plan, which includes procedures for sitewide evacuation.

Taking into consideration the proposed controls to manage the hazards, the isolation of the activity and the separation distances to the closest dwelling, the effect on people or property from an accidental detonation at the explosives storage facilities has been assessed as less than minor.

Health risk

All of the substances stored and used as part of the BPCP have been identified as having a low to moderate hazard to human health, generally by direct exposure pathways such as ingestion, skin or eye contact. These risks are managed by site security and spill response procedures described for ecosystems described below. The effect on human health from the storage and use of hazardous substances proposed is assessed as less than minor.

10.2.2 Effects on ecosystems

The Buller Plateaux contains habitat for highly sensitive endemic species and is subject to specialist ecological management undertaken by Bathurst to manage pests, relocate vegetation and monitor species populations. The highly modified areas of existing mine and proposed infrastructure areas where hazardous substances will be stored and used are not considered sensitive to the ecotoxicity effects of hazardous substances, but waterways and terrestrial habitat off-site are considered sensitive to the effects of a spill.

The main risk that has been identified which could result in an off-site ecotoxic effect is an accidental release of diesel during the refueling of equipment in-situ, which has a moderate risk. Other risks identified include risk of tank failure for diesel or corrosive liquids, accidental release during storage or unloading of the packaged substances to the sites or during refilling bulk fuel tanks, which have been assessed as low. These risks are managed through the following controls.

All package unloading activities will be supervised by trained staff prepared to carry out emergency response measures in the unlikely event of a small spill or discovery of a package damaged during transport. All hazardous substances will be transferred to their storage locations upon their delivery to site.

Tanks used for ecotoxic fuel storage associated with generators and refuelling facilities or new corrosive water treatment chemicals in the BPCP will be double-skinned or located within concrete bunds (lime slurry only) to prevent tank leaks and discharges when the facilities are unattended. Packages of corrosive water treatment substances installed as part of temporary water treatment facilities during construction will be bunded and located in areas the drain back to the treatment sumps. Drainage around the existing un-bunded lime slurry tanks at the LDP are proposed to be upgraded to divert any accidental releases back to the network of sumps on site. All storage tanks

[20] Defined in the HSW-HS as buildings over 4 storeys, transport terminals handing over 1,800 people per day, hospitals, schools, rest-homes, childcare centres, public buildings of historic value or major public utilities.

must meet design standards for foundation stability, secondary containment, pressure management, liquid fill level management and material compatibility with the substances contained.

The refuelling of equipment will be undertaken under the supervision of trained staff, with access to spill kits for spill response. Where used, pumping equipment for refuelling will have automatic shut off nozzles to prevent overfilling and emergency stop functions to limit the potential volume of spill in the event of a catastrophic failure of the delivery hose. The procedure for management of soils contaminated with hydrocarbons in the event of a spill will be to excavate the contaminated material, enclose it in containment cells and ultimately remove it from the site to an authorised disposal facility.

Minor residual contamination may arise as a result of regular refuelling at the diesel tank facilities established to service the mining equipment. At the proposed large-scale diesel tank farm at ESE, the refuelling area will drain to an oil-water separator to remove hydrocarbons prior to discharge to the wider water management network servicing the mine area. For other refuelling at the other tanks such as that existing at Ngakawau Rail Loadout, [redacted]Stockton or proposed to be established at MFS and for all refuelling of equipment in-situ (during both construction activities and mine operations), staff follow the *Servicing Mobile Plant and Equipment in the Field Standard Work Procedure* to minimise risk of a spill and minimise residual contamination.

Though many are not classified as hazardous, some of the packaged substances stored and used in the infrastructure areas, including coolants, detergents, maintenance oils and greases, have ecotoxicity hazards. The risk of a spill of the packaged substances is managed through provision of enclosed workshops, dedicated bunded storage locations for tanks and packages of these substances to provide containment in the event of a leak, and unloading and handling of these substances by staff trained in spill response procedures should damage to a container occur. The mine areas and infrastructure areas drain to the water treatment systems and sumps on site, providing a buffer between the on-site use of hazardous substances and the off-site environment in a spill.

Provided the controls and mitigations are in place as outlined above, the effects on the environment are expected to be low and do not require further consideration as part of the BPCP ecotoxicity effects assessment.

10.2.3 Cumulative effects

The BPCP activities are the only activities within the immediate area on the Buller Plateaux and in Ngakawau which are known to involve the storage and use of hazardous substances.

There is a risk of spills of ecotoxic liquids across the operational areas of the BPCP. These are managed via the spill response and waste management processes; the chance of simultaneous failures and cumulative effects is low.

The risk of cumulative effects of fire between flammable or oxidising substance storage at the BPCP sites is managed through separation between storage areas, so that a fire cannot spread from one area to another. In addition, firefighting controls, such as water pumps and firefighting equipment, are available on-site to prevent a fire spreading beyond the boundary. These controls will also minimise the risk of a fire spreading to adjacent properties. [redacted]

Cumulative effects from the storage of hazardous substances at the BPCP areas are considered less than minor and can be managed.

10.2.4 Transport

[redacted]

[redacted]r.

These measures are considered sufficient to ensure that the environmental effects arising from the transport of hazardous substances will be less than minor.

11 Recommendations

Hazardous substances storage and use proposed as part of the BPCP are generally appropriately managed in accordance with the HSW-HS controls. Recommended ongoing voluntary controls include:

- Upgrade to the drainage provided for the lime slurry tanks at the LDP in Stockton to provide diversions to the on-site sumps.
- All new tanks to be double-skinned.
- Require all areas where packages of hazardous liquids are stored or used to include secondary containment sufficient to contain at least 110% of the largest package.
- Equipment refuelling, lubrication or mechanical repairs must be undertaken with appropriate controls to ensure that a spill of hazardous substances into a waterbody does not occur, including that refuelling must not occur within 20 m of a waterway.

12 Conclusions

The key risks related to the proposed storage and use of hazardous substances associated with the BPCP include:

- Risk of ecotoxic or human health effects from a spill of corrosives, oxidizers, diesel, oils or other packaged maintenance or cleaning substances at the infrastructure areas of Stockton, ESE, MFS, or Ngakawau Rail Loadout during delivery, storage or use.
- Fire risk at a flammable liquid or gas storage area at substances at the infrastructure areas of Stockton, ESE, MFS, or Ngakawau Rail Loadout.
- Risk of an unintended detonation at the existing Class 1 explosives storage facility at Stockton or the proposed Class 1 explosives storage facility at ESE.
- Fire risk in the existing Class 5 storage compound in Stockton or the proposed Class 5 storage compound in ESE.

The risks to people and property from an unintended detonation at the proposed or existing Class 1 explosives storage locations is assessed as low and will be managed through site and equipment design (e.g. separation distances to off-site locations and other explosives stores, provision of fire protection systems and certification of the explosives storage magazines) and management controls (personnel access restrictions, security monitoring, staff training and handler certification, and emergency response plans).

The risk to people and property from a fire at the flammable or oxidising substance locations at the BPCP areas has been assessed as low and the effect less than minor. Hydrocarbons and oxidising substances stored and used in the BPCP areas are managed through controls (security monitoring, training and handler certifications, emergency response plans, mine emergency response team) and equipment design (e.g. separation distances to the site boundary, separation from ignition sources, certification of storage areas to comply with safety regulations, provision of firefighting infrastructure at storage compounds). The storage locations are isolated from public access and are within the BPCP area boundaries.

The environment is considered sensitive to the effects of a spill of diesel, corrosive liquids or packaged ecotoxic liquids. The risk to the environment will be managed through the site design (e.g. proposed spill containment measures including double-skinned tanks, bunded package storage areas and provision of water treatment for run-off arising from the proposed fuel farm) and operational procedures (e.g. spill response plan, unloading and safe handling procedures and procedures for managing contaminated soils). Taking into account these controls, the effects on the environment from the use and storage of hazardous substances have been assessed as less than minor.

13 Applicability

This report has been prepared for the exclusive use of our client Bathurst Resources Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application under the Fast-track Approvals Act 2024 and that an Expert Panel as the consenting authority will use this report for the purpose of assessing that application. We understand and agree that this report will be used by the Expert Panel in undertaking its regulatory functions in connection with Buller Plateaux Continuation Project.

Compliance with the Environment Court Practice Note 2023

We confirm that, in our capacity as authors of this report, we have read and abided by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses contained in the Practice Note 2023.

[redacted]

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:

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Report reviewed by

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Authorised for Tonkin & Taylor Ltd by:

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Project Director

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Appendix A Hazardous substances inventory

Table Appendix A.1: Hazardous substance inventory – [redacted]

Substance	State	Classification (HSNO and GHS7)		Maximum quantity	Location
Operational Phase					
Diesel (UN 3082)	Liquid	3.1D 6.7B 6.1E 9.1B	Flammable liquids Category 4 Carcinogenicity Category 2 Aspiration hazard Category 1 Chronic aquatic toxicity Category 2	10,900 L 5,283 L	[redacted]
Flammable liquids (paints, cleaning products) [A]	Liquid	3.1A – 3.1C 9.1B	Flammable liquids Category 1 – 3 Chronic aquatic toxicity Category 2	700 L 100 L	
Flammable aerosols	Aerosol	2.1.2A	Flammable aerosol Category 1	300 L	
Maintenance oils	Liquid	NH	Not classified as hazardous	400 L 1,050 L	
Oxygen (UN 1072)	Gas	5.1.2A	Oxidising gases Category 1	100 m^3	
LPG (UN 1075)	Gas	2.1.1A	Flammable gas Category 1A	225 kg	
Acetylene (UN 1001)	Gas	2.1.1A	Flammable gas Category 1A	28 m^3	
Argon or argoshield (UN 1006)	Gas	NH	Gas under pressure (not classified as hazardous)	12 m^3	
Carbon dioxide (UN 1013)	Gas	NH	Gas under pressure (not classified as hazardous)	60 m^3	
Caustic soda (sodium hydroxide 30%) (UN 1824)	Liquid	8.1A 8.2B 8.3A	Corrosive to metals Skin corrosion Category 1B Serious eye damage Category 1	2,000 L	

Substance	State	Classification (HSNO and GHS7)		Maximum quantity	Location
Polyaluminium chloride (flocculant)	Liquid	6.1D 6.3A 6.4A	Acute oral toxicity Category 4 Eye irritation Category 2A Skin irritation Category 2	2,408 L	[redacted]

Notes:
A. Not all products in this group have all the classifications listed, however, for conservatism these hazards are assessed as applying to all items in the group.

Table Appendix A.2: Hazardous substance inventory – [redacted]

Substance (UN number if known)	State	Classification (HSNO and GHS7)		Maximum quantity	Location
Operational Phase					[redacted]
Blasting explosives (UN 0241)	Packaged solid	1.1D 6.1D 6.3A 6.4A 6.8C 6.9B 9.1A	1.1D – Substances and articles that have a mass explosion hazard Acute oral toxicity Category 4 Eye irritation Category 2A Skin irritation Category 2 Effects on or via lactation Specific Target Organ Toxicity (repeated exposure) Category 2 Acute aquatic toxicity Category 1	8,000 kg NEQ	
Boosters (UN 0042)	Packaged solid	1.1D 6.1C 6.9B 9.1B	1.1D – Substances and articles that have a mass explosion hazard Acute oral/dermal/inhalation toxicity Category 3 Specific Target Organ Toxicity (single or repeated exposure) Category 2 Chronic aquatic toxicity Category 2		
Detonators (UN 0065, UN 0360)	Manufactured item	1.1B 1.4B 1.4S	1.1B – Substances and articles that have a mass explosion hazard 1.4 – Substances and articles that have a fire or projectile hazard	10 kg	

Substance (UN number if known)	State	Classification (HSNO and GHS7)		Maximum quantity	Location
Ammonium nitrate emulsion (ANE) (UN 3375)	Solid	5.1.1B 6.4A 6.7B 9.1C	Oxidizing solids Category 2 Eye irritation Category 2 Carcinogenicity Category 2 Chronic aquatic toxicity Category 3	40,000 kg	[redacted]
Ammonium nitrate prill (AN prill) (UN 1942)	Solid	5.1.1C 6.4A	Oxidizing solids Category 3 Eye irritation Category 2	200,000 kg	
Sodium nitrate (Gasser)	Liquid	6.1D 6.4A 6.6B 6.9B 9.1A 9.1C	Acute oral toxicity Category 4 Eye irritation Category 2 Germ cell mutagenicity Category 2 Specific target organ toxicity (repeated exposure) Category 2 Acute aquatic toxicity Category 1 Chronic aquatic toxicity Category 3	1,000 L	
Paraffin oil	Liquid	9.1D	Chronic aquatic toxicity Category 4	3,000 L	
Diesel (UN 3082)	Liquid	3.1D 6.7B 6.1E 9.1B	Flammable liquids Category 4 Carcinogenicity Category 2 Aspiration hazard Category 1 Chronic aquatic toxicity Category 2	1,000 L	
ANE + AN prill mobile manufacturing unit	Liquid and solid	Classifications for ANE, AN prill, gasser and paraffin oil above.		2 x 10,000 L	
Jet-A1 fuel	Liquid	3.1C 6.1E 9.1B	Flammable liquids Category 3 Aspiration hazard Category 1 Chronic aquatic toxicity Category 3	300 L	
Diesel (UN 3082)	Liquid	3.1D 6.7B 6.1E	Flammable liquids Category 4 Carcinogenicity Category 2 Aspiration hazard Category 1	190,000 L total across five tanks 60,000 L	

Substance (UN number if known)	State	Classification (HSNO and GHS7)		Maximum quantity	Location
		9.1B	Chronic aquatic toxicity Category 2	40,000 L (indicative)	[redacted]
				80 L	
High calcium hydrated lime ($Ca(OH)_2$)	Slurry	8.2C 8.3A	Skin corrosion Category 1C Serious eye damage Category 1	2 x 10,000 L	
				101,000 L	
Quicklime (CaO)	Solid	8.2C 8.3A	Skin corrosion Category 1C Serious eye damage Category 1	120,000 kg	
				90,000 kg	
Magnesium oxide (MgO)	Solid	NH	Not classified as hazardous	120,000 kg	
				90,000 kg	
Magnesium hydroxide ($Mg(OH)_2$)	Slurry	6.4A	Eye irritation Category 2	2 x 10,000 L	
Caustic soda (sodium hydroxide 30%) (UN 1824)	Liquid	8.1A 8.2B 8.3A	Corrosive to metals Skin corrosion Category 1B Serious eye damage Category 1	1,000 L	
Flocculants (Rheomax 9030, Magnafloc 800 HP)	Solid	NH	Not classified as hazardous	7 tonnes	
				2 tonnes	
Maintenance oils and waste oil	Liquid	NH	Not classified as hazardous	60,000 L	
		9.1C	Chronic aquatic toxicity Category 3	8,250 L	

Substance (UN number if known)	State	Classification (HSNO and GHS7)		Maximum quantity	Location
Maintenance oils	Liquid	NH	Not classified as hazardous	37,000 L	[redacted]
		9.1C	Chronic aquatic toxicity Category 3	4,000 L	
Maintenance oils	Liquid	NH	Not classified as hazardous	4,000 L	
Flammable liquids (paints, solvents, fuels)[A]	Liquid	3.1A – 3.1C 6.1D 6.4A/ 8.3A 6.7B 6.9B 9.1A 9.1B	Flammable liquids Category 1 – 3 Acute toxicity Category 4 Serious eye damage Category 1 – 2A Carcinogenicity Category 2 Specific target organ toxicity Category 2 Acute aquatic toxicity Category 1 Chronic aquatic toxicity Category 2	500 L	
Coolant[A]	Liquid	6.1D 6.4A 6.8B 6.9B	Acute oral toxicity Category 4 Eye irritation Category 2A Reproductive toxicity Category 2 Specific target organ toxicity Category 2	2,000 L	
				250 L	
				4,000 L	
Greases, sealants, adhesive (chronic contact hazards)[A]	Liquids and solids	6.3A 6.4A / 8.3A 6.5B 6.7B 6.9B 9.1C	Skin irritation Category 2 Eye irritation Category 2A / Serious eye damage Category 1 Skin sensitization Category 1 Carcinogenicity Category 2 Specific target organ toxicity, repeated exposure Category 2 Chronic aquatic toxicity Category 3	30 L	
				35 L	
Cleaning products (hand sanitiser, toilet cleaner, surface sanitisers)	Liquid	6.3A 6.4A	Skin irritation Category 2 Eye irritation Category 2A	100 L	
		6.3A 6.4A 6.7B 6.9B	Skin irritation Category 2 Eye irritation Category 2A Carcinogenicity Category 2 Specific target organ toxicity, repeated exposure Category 2	5 L	
		6.3A	Skin irritation Category 2	60 L	

Substance (UN number if known)	State	Classification (HSNO and GHS7)		Maximum quantity	Location
		6.5B 8.3A	Skin sensitization Category 1 Serious eye damage Category 1		[redacted]
		3.1B – 3.1D 6.4A	Flammable liquids Category 2 – 4 Eye irritation Category 2A	110 L	
Degreaser	Liquid	NH	Not classified as hazardous	624 L	
Detergent	Liquid	6.3A 8.3A 6.7A	Skin irritation Category 2 Serious eye damage Category 1 Carcinogenicity Category 1	40 L	
		NH	Not classified as hazardous	40 L	
Diesel (UN 3082)	Liquid	3.1D 6.7B 6.1E 9.1B	Flammable liquids Category 4 Carcinogenicity Category 2 Aspiration hazard Category 1 Chronic aquatic toxicity Category 2	80 L	
Aerosols (adhesives, paints lubricants, sealants)	Aerosol	2.1.2A	Flammable aerosol Category 1	100 L	
				100 L	
				200 L	
				100 L	
Petrol (UN 1203)	Liquid	3.1A 6.7B 6.1E 9.1B	Flammable liquid Category 1 Carcinogenicity Category 2 Aspiration hazard Category 1 Aquatic ecotoxicity Category 2	100 L	
				20 L	
LPG (UN 1075)	Liquefied gas	2.1.1A	Flammable gas Category 1A	360 kg (eight cylinders)	

Substance (UN number if known)	State	Classification (HSNO and GHS7)		Maximum quantity	Location
Acetylene (UN 1001)	Gas	2.1.1A	Flammable gas Category 1A	28 m^3 (four cylinders)	[redacted]
Oxygen (UN 1072)	Gas	5.1.2A	Oxidising gas Category 1	100 m^3 (ten cylinders)	
Nitrogen (UN 1066)	Gas	NH	Gas under pressure (not classified as hazardous)	420 m^3 (six cylinders)	
Carbon dioxide (UN 1013)	Gas	NH	Gas under pressure (not classified as hazardous)	198 m^3 (six cylinders)	
Argon (UN 1006)	Gas	NH	Gas under pressure (not classified as hazardous)	70 m^3 (eight cylinders)	
Fire-fighting foam (SOLBERG® VERSAGARD™ AS-100)	Liquid	6.3A 8.3A	Skin irritation Category 2 Serious eye damage Category 1	300 L	
Fire-fighting foam (Sandvik Eclipse)	Liquid	NH	Not classified as hazardous	2,500 L split across 65 pieces of plant equipment	

Notes:
A. Not all products in this group have all the classifications listed, however, for conservatism and operational flexibility these hazards are assessed as applying to all items in the group.

Table Appendix A.3: Hazardous substance inventory – [redacted]

Substance (UN number if known)	State	Classification (HSNO and GHS7)		Maximum quantity	Location
Construction phase					[redacted]
Caustic soda (sodium hydroxide 30%) (UN 1824)	Liquid	8.1A 8.2B 8.3A	Corrosive to metals Skin corrosion Category 1B Serious eye damage Category 1	2,000 L	
Quicklime (CaO)	Solid	8.2C 8.3A	Skin corrosion Category 1C Serious eye damage Category 1	2 tonnes	
High calcium hydrated lime ($Ca(OH)_2$)	Slurry			2,000 L	
Flocculants	Solid or liquid	NH	Not classified as hazardous	5,000 L	
Diesel (UN 3082)	Liquid	3.1D 6.7B 6.1E 9.1B	Flammable liquids Category 4 Carcinogenicity Category 2 Aspiration hazard Category 1 Chronic aquatic toxicity Category 2	5,000 L	
Operational phase					
Blasting explosives (UN 0241)	Packaged solid	1.1D 6.1D 6.3A 6.4A 6.8C	1.1D – Substances and articles that have a mass explosion hazard Acute oral toxicity Category 4 Skin irritation Category 2 Eye irritation Category 2A Effects on or via lactation	9,500 kg	

Substance (UN number if known)	State	Classification (HSNO and GHS7)		Maximum quantity	Location
		6.9B 9.1A	Specific Target Organ Toxicity (repeated exposure) Category 2 Acute aquatic toxicity Category 1		[redacted]
Boosters (UN 0042)	Packaged solid	1.1D 6.1C 6.9B 9.1B	1.1D – Substances and articles that have a mass explosion hazard Acute oral/dermal/inhalation toxicity Category 3 Specific Target Organ Toxicity (single or repeated exposure) Category 2 Chronic aquatic toxicity Category 2		
Detonators (UN 0065, UN 0360)	Manufactured item	1.1B 1.4B 1.4S	1.1B – Substances and articles that have a mass explosion hazard 1.4 – Substances and articles that have a fire or projectile hazard	20 kg	
Ammonium nitrate emulsion (ANE) (UN 3375)	Solid	5.1.1B 6.4A 6.7B 9.1C	Oxidizing solids Category 2 Eye irritation Category 2 Carcinogenicity Category 2 Chronic aquatic toxicity Category 3	100,000 kg	
Ammonium nitrate prill (AN prill) (UN 1942)	Solid	5.1.1C 6.4A	Oxidizing solids Category 3 Eye irritation Category 2	400,000 kg	
Sodium nitrate (Gasser)	Liquid	6.1D 6.4A 6.6B 6.9B 9.1A 9.1C	Acute oral toxicity Category 4 Eye irritation Category 2 Germ cell mutagenicity Category 2 Specific target organ toxicity (repeated exposure) Category 2 Acute aquatic toxicity Category 1 Chronic aquatic toxicity Category 3	2,000 L	
Diesel (UN 3082)	Liquid	3.1D 6.7B 6.1E 9.1B	Flammable liquids Category 4 Carcinogenicity Category 2 Aspiration hazard Category 1 Chronic aquatic toxicity Category 2	2,000 L	

Substance (UN number if known)	State	Classification (HSNO and GHS7)		Maximum quantity	Location
ANE + AN Pril mobile manufacturing unit	Liquid and solid	Classifications for ANE, AN prill, gasser and paraffin oil above.		2 x 10,000 L	[redacted]
Diesel (UN 1068)	Liquid	3.1D 6.7B 6.1E 9.1B	Flammable liquids Category 4 Carcinogenicity Category 2 Aspiration hazard Category 1 Chronic aquatic toxicity Category 2	360,000 L across up to five tanks (1 x 60,000 L and 3 or 4x 75,000 L)	
				60,000 L tank	
				20,000 L	
				40,000 L (indicative)	
Diesel Exhaust Fluid – AdBlue	Liquid	6.3A	Skin irritation Category 2	5,000 L tank	
Oils and greases	Liquid	NH	Not classified as hazardous	10,000 L	
				84,000 L	
		9.1C	Chronic aquatic toxicity Category 3	12,000 L	
Coolant[A]	Liquid	6.1D 6.4A 6.8B 6.9B	Acute oral toxicity Category 4 Eye irritation Category 2A Reproductive toxicity Category 2 Specific target organ toxicity, Category 2	4,000 L	
Flammable liquids (paints, solvents, fuels)[A]	Liquid	3.1A – 3.1C 6.1D 6.4A/ 8.3A 6.7B 6.9B	Flammable liquids Category 1 – 3 Acute toxicity Category 4 Serious eye damage Category 1 – 2A Carcinogenicity Category 2 Specific target organ toxicity Category 2	1,000 L	
				250 L	
				250 L	
				250 L	

Substance (UN number if known)	State	Classification (HSNO and GHS7)		Maximum quantity	Location
		9.1A 9.1B	Acute aquatic toxicity Category 1 Chronic aquatic toxicity Category 2	250 L	[redacted]
Aerosols (adhesives, paints lubricants, sealants)	Aerosol	2.1.2A	Flammable aerosol Category 1	300 L	
				200 L	
Greases, sealants, adhesive (chronic contact hazards)[A]	Liquids and solids	6.3A 6.4A/8.3A 6.5B 6.7B 6.9B 9.1C	Skin irritation Category 2 Eye irritation Category 2A – Serious eye damage Category 1 Serious eye damage Category 1 Skin sensitization Category 1 Carcinogenicity Category 2 Specific target organ toxicity, repeated exposure Category 2 Chronic aquatic toxicity Category 3	100 L	
				100 L	
Cleaning products (hand sanitiser, toilet cleaner, surface sanitisers) [A]	Liquid	6.3A 6.4A/8.3A 6.5B 6.7B 6.9B	Skin irritation Category 2 Eye irritation Category 2A/Serious eye damage Category 1 Skin sensitization Category 1 Carcinogenicity Category 2 Specific target organ toxicity, repeated exposure Category 2	250 L	
Degreaser	Liquid	NH	Not classified as hazardous	800 L	
Detergent	Liquid	6.3A 8.3A 6.7A	Skin irritation Category 2 Serious eye damage Category 1 Carcinogenicity Category 1	40 L	
		NH	Not classified as hazardous	40 L	

Substance (UN number if known)	State	Classification (HSNO and GHS7)		Maximum quantity	Location
Petrol (UN 1203)	Liquid	3.1A 6.7B 6.1E 9.1B	Flammable liquid Category 1 Carcinogenicity Category 2 Aspiration hazard Category 1 Aquatic ecotoxicity Category 2	100 L	[redacted]
LPG (UN 1075)	Liquefied gas	2.1.1A	Flammable gas Category 1A	225 kg (five cylinders)	
Acetylene (UN 1001)	Gas	2.1.1A	Flammable gas Category 1A	28 m^3 (four cylinders)	
Oxygen (UN 1072)	Gas	5.1.2A	Oxidising gas Category 1	100 m^3 (ten cylinders)	
Nitrogen (UN 1066)	Gas	NH	Gas under pressure (not classified as hazardous)	420 m^3 (six cylinders)	
Carbon dioxide (UN 1013)	Gas	NH	Gas under pressure (not classified as hazardous)	198 m^3 (six cylinders)	
Argon (UN 1006)	Gas	NH	Gas under pressure (not classified as hazardous)	70 m^3 (eight cylinders)	
Quicklime (CaO)	Solid	8.2C 8.3A	Skin corrosion Category 1C Serious eye damage Category 1	150 m^3 silo	
High calcium hydrated lime ($Ca(OH)_2$)	Slurry			25,000 L slurry	
Flocculant (Rheomax 1030, Rheomax 1050)	Solid	NH	Not classified as hazardous	7 tonnes	
	Liquid			15,000 L slurry	
Chelating agents (Metalzorb FZ)	Liquid	NH	Not classified as hazardous	30,000 L	

Substance (UN number if known)	State	Classification (HSNO and GHS7)		Maximum quantity	Location
Sulphuric acid 98% (UN 1830)	Liquid	8.1A 6.1D 8.2B 8.3A 6.7A 6.9A	Corrosive to metals Category 1 Acute toxicity (inhalation) Category 4 Skin corrosion Category 1B Serious eye damage Category 1 Carcinogenicity Category 1 Specific target organ toxicity – single exposure Category 3 Specific target organ toxicity – repeated exposure Category 1.	20,000 L	[redacted]
Fire-fighting foam (SOLBERG® VERSAGARD™ AS-100)	Liquid	6.3A 8.3A	Skin irritation Category 2 Serious eye damage Category 1	300 L	
Fire-fighting foam (Sandvik Eclipse)	Liquid	NH	Not classified as hazardous	2,500 L split across 65 pieces of plant equipment (estimate based on existing Stockton system)	
Closure phase					
Acidified ferric chloride	Liquid	6.1D 8.1A 8.2C 8.3A 9.1C	Acute toxicity (ingestion) Category 4 Corrosive to metals Category 1 Skin corrosion Category 1c Serious eye damage Category 1 Aquatic ecotoxicity Category 3	20,000 L (1,000 L unit per MSR)	

Table Appendix A.4: Hazardous substance inventory – [redacted]

Substance (UN number if known)	State	Classification (HSNO and GHS7)		Maximum quantity	Location
Construction phase					[redacted]
Caustic soda (sodium hydroxide 30%) (UN 1824)	Liquid	8.1A 8.2B 8.3A	Corrosive to metals Skin corrosion Category 1B Serious eye damage Category 1	2,000 L	
Quicklime (CaO)	Solid	8.2C 8.3A	Skin corrosion Category 1C Serious eye damage Category 1	2 tonnes	
	Slurry			2,000 L	
Flocculants	Solid or liquid	NH	Not classified as hazardous	5,000 L	
Diesel (UN 3082)	Liquid	3.1D 6.7B 6.1E 9.1B	Flammable liquids Category 4 Carcinogenicity Category 2 Aspiration hazard Category 1 Chronic aquatic toxicity Category 2	5,000 L	
Operational phase					
Diesel (UN 3082)	Liquid	3.1D 6.7B 6.1E 9.1B	Flammable liquids Category 4 Carcinogenicity Category 2 Aspiration hazard Category 1 Chronic aquatic toxicity Category 2	60,000 L	
				15,000 L	
				40,000 L (indicative)	
Quicklime (CaO))	Solid	8.2C 8.3A	Skin corrosion Category 1C Serious eye damage Category 1	120 tonnes	
High calcium hydrated lime ($Ca(OH)_2$	Liquid			25,000 L slurry	

Substance (UN number if known)	State	Classification (HSNO and GHS7)		Maximum quantity	Location
Flocculant (Rheomax 1030)	Solid	NH	Not classified as hazardous	7 tonnes 15,000 L slurry	[redacted]
Chelating agents (Metalzorb FZ)	Liquid	NH	Not classified as hazardous	30,000 L	
Sulphuric acid 98% (UN 1830)	Liquid	8.1A 6.1D 8.2B 8.3A 6.7A 6.9A	Corrosive to metals Category 1 Acute toxicity (inhalation) Category 4 Skin corrosion Category 1B Serious eye damage Category 1 Carcinogenicity Category 1 Specific target organ toxicity – single exposure Category 3 Specific target organ toxicity – repeated exposure Category 1	20,000 L	
Closure phase					
Acidified ferric chloride	Liquid	6.1D 8.1A 8.2C 8.3A 9.1C	Acute toxicity (ingestion) Category 4 Corrosive to metals Category 1 Skin corrosion Category 1c Serious eye damage Category 1 Aquatic ecotoxicity Category 3	20,000 L (1,000 L unit per MSR)	

Appendix B Site plans

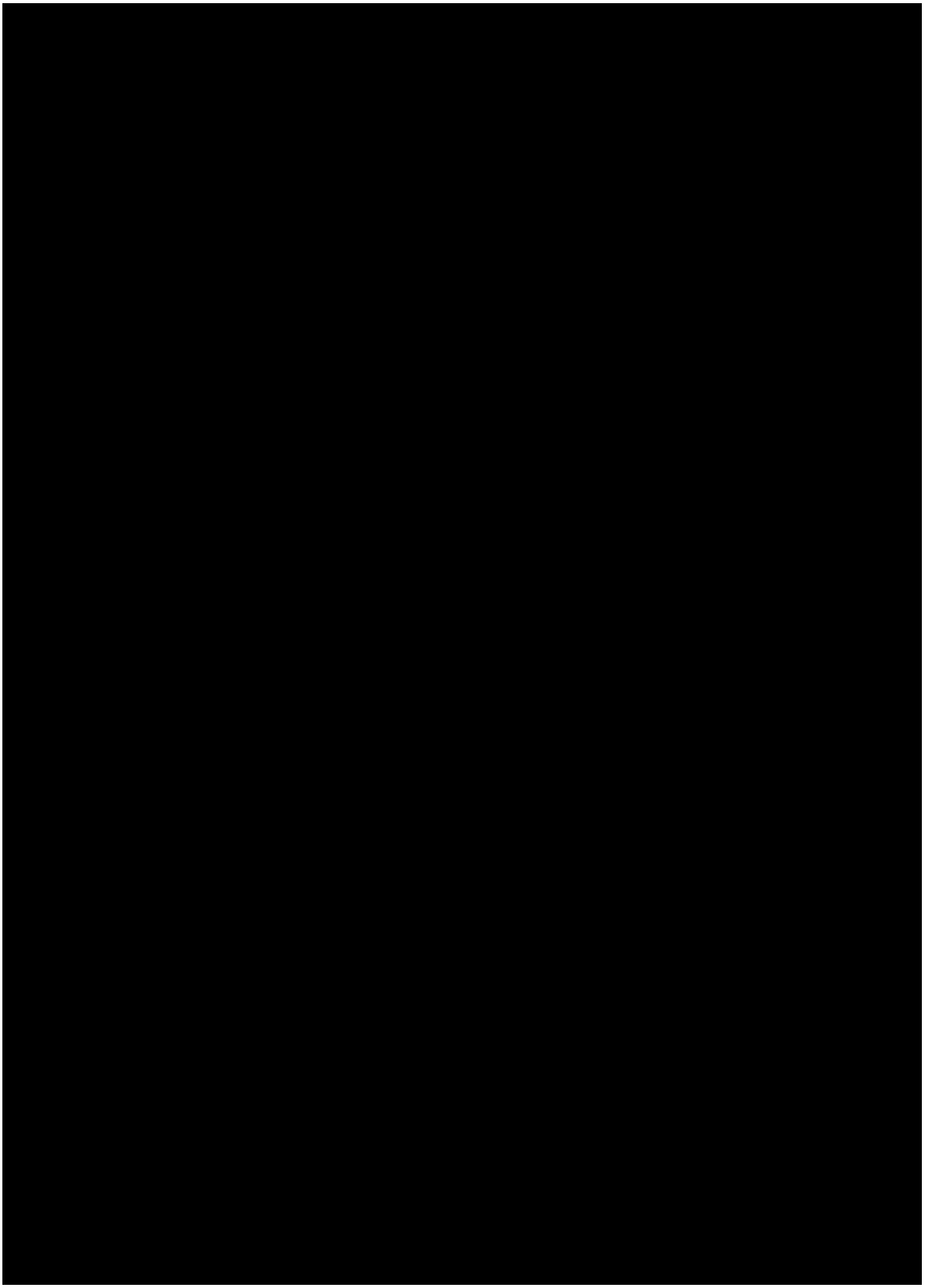

Figure Appendix B.1: Stockton emergency facilities

Appendix C Hazard analysis

Table Appendix C.1: Hazard analysis

Hazardous substance	Location and maximum storage	Identification of potential hazard properties (Hazard level[A])	Failure Modes	Exposure pathways / affected part of environment	Indicative hazard rating	Potential for off-site effects	
Blasting explosives or boosters	[redacted]	Fire/Explosion effects (high) Human health (low to moderate) Ecotoxicity (high)	Fire in storage area; Spill during delivery or movement	People, property, ecosystems	Low hazard to ecosystems as substance is packed into small individual cardboard or plastic units. High explosion hazard.	Yes	Effects due to fire/explosion to be considered further in risk analysis.
Detonators		Fire/Explosion effects (high)	Fire in storage area	People, property	High explosion hazard	Yes	Effects due to fire/explosion to be considered further in risk analysis.
ANE		Fire/Explosion effects (high) Ecotoxicity (moderate)	Fire in storage area; Spill during delivery or movement	People, property, ecosystems	Low hazard to the environment as substance is a highly viscous emulsion, considered a solid for storage and transport purposes. High fire hazard.	Yes	Effects due to fire/explosion to be considered further in risk analysis.
AN prill		Fire/Explosion effects (moderate) Ecotoxicity (moderate)	Fire in storage area; Spill during delivery or movement	People, property, ecosystems	Low hazard to the environment as substance is a granular solid that is easily managed in a spill. Moderate fire hazard.	Yes	Effects due to fire/explosion to be considered further in risk analysis.
Gasser (sodium nitrate)		Human health (low) Ecotoxicity (high)	Spill during delivery or movement	People, ecosystems	Low hazard to human health, substance would need to come into direct contact with a person off-site. Moderate hazard to ecosystems in a spill due to secondary containment and emergency response procedures.	Yes	Effects on ecosystems due to a spill to be considered further in risk analysis.

Hazardous substance	Location and maximum storage	Identification of potential hazard properties (Hazard level[A])	Failure Modes	Exposure pathways / affected part of environment	Indicative hazard rating	Potential for off-site effects	
Paraffin oil	[redacted]	Ecotoxicity (low)	Spill during delivery or movement	People, ecosystems	Low hazard to ecosystems in a spill due to secondary containment and emergency response procedures.	Yes	Effects on ecosystems due to a spill to be considered further in risk analysis.
Jet-A1 fuel		Fire/Explosion effects (moderate) Ecotoxicity (moderate)	Fire in storage area; Spill during delivery or movement Package leak	People, property, ecosystems	Low fire hazard due to small total volume at each location and segregation from ignition sources. Low hazard to ecosystems in a spill due to secondary containment and emergency response procedures.	Yes	Effects due to a fire or a spill to be considered further in risk analysis.
Fire-fighting foam (SOLBERG® VERSAGARD™ AS-100)		Human health (low) Ecotoxicity (low[B])	Spill during delivery or movement	Ecosystems	Mild chronic health hazards to workers handling the substance (skin irritant and eye corrosive). Negligible hazard to off-site people. Low hazard to ecosystems in the event of a spill	Yes	Effects on ecosystems due to a spill to be considered further in risk analysis.
Fire-fighting foam (SOLBERG® VERSAGARD™ AS-100)		Not classified as hazardous	-	-	-	No	Effects not considered further in risk analysis.
Calcium oxide or quicklime (silo storage)		Human health (low) Ecotoxicity (moderate[B])	Spill during delivery or movement Rupture of silo	People, ecosystems	Low hazard to human health, substance would need to come into direct skin contact with a person off site. Substance is a solid stored in silos that is fitted with fabric filters for dust emission control. These facilities are located within the mining sites with separation to the	No	Effects not considered further in risk analysis.

Hazardous substance	Location and maximum storage	Identification of potential hazard properties (Hazard level[A])	Failure Modes	Exposure pathways / affected part of environment	Indicative hazard rating	Potential for off-site effects	
	[redacted]				nearest boundary. Negligible hazard to off-site people. High pH substance considered a moderate hazard to aquatic ecosystems in a spill, limited by solid state.		
High calcium hydrated lime (20% slurry make up tanks)		Human health (low) Ecotoxicity (moderate[B])	Spill during delivery or movement Rupture of tank	People, ecosystems	Low hazard to human health, substance would need to come into direct skin contact with a person off-site. The WTP facilities are located within the mining sites with separation to the nearest boundary. Negligible hazard to off-site people. High pH liquid considered a moderate hazard to aquatic ecosystems in a spill.	Yes	Effects on ecosystems due to a spill to be considered further in risk analysis.
Flocculant (Rheomax 1030, 1050 or Magnafloc 10, etc)		Not classified as hazardous	-	-	-	No	Effects not considered further in risk analysis.

Hazardous substance	Location and maximum storage	Identification of potential hazard properties (Hazard level[A])	Failure Modes	Exposure pathways / affected part of environment	Indicative hazard rating	Potential for off-site effects	
Chelating agents (Metalzorb FZ)	[redacted]	Not classified as hazardous	-	-	-	No	Effects not considered further in risk analysis.
Sulphuric acid 98%		Human health (moderate) Ecotoxicity (moderate)	Spill during delivery Rupture of tank	People, ecosystems	Moderate hazard to human health from corrosivity via direct skin contact, hazard limited to workers on site. The water treatment facilities are located central to the mining site with significant separation to the nearest sensitive receptors. Low acute toxicity via inhalation, and confirmed carcinogenic hazard also via inhalation of mists, along with specific target organ toxicity via repeated exposure. These hazards concern workers that regularly handle the substance. In a spill, the remote location of the WTP facilities minimises the hazard to people that are not working at the sites. While not classified as ecotoxic, the low pH of this substance would be hazardous to ecosystems in a major release off-site.	Yes	Effects due to a spill to be considered further in risk analysis.
Caustic soda		Human health (high) Ecotoxicity (high)	Container leak or rupture, Package damage during delivery to site	People, ecosystems	Hazard to human health by direct skin contact or ingestion, which presents a hazard to operators only.	Yes	Potential off-site ecotoxic effects from spill during package delivery to be

Hazardous substance	Location and maximum storage	Identification of potential hazard properties (Hazard level[A])	Failure Modes	Exposure pathways / affected part of environment	Indicative hazard rating	Potential for off-site effects	
	[redacted]				Moderate hazard to ecosystems minimised by secondary containment, spill response procedures.		considered further in risk analysis.
Polyaluminium chloride		Human health (low)	Container leak or rupture, Package damage during delivery to site	People, ecosystems	Hazard to human health is by ingestion, which is not a hazard to off-site people.	No	Effects not considered further in risk analysis.
Acidified ferric chloride		Human health (low) Ecotoxicity (low)	Container leak or rupture, Package damage during delivery to site	People, ecosystems	Hazard to human health by direct skin contact or ingestion, which presents a hazard to operators only. Moderate hazard to ecosystems minimised by secondary containment, spill response procedures.	Yes	Potential off-site ecotoxic effects from spill during package delivery to be considered further in risk analysis.
Diesel		Fire/Explosion effects (low) Ecotoxicity (moderate)	Fire in storage area; Spill during delivery or movement	People, property, ecosystems	Low fire hazard as diesel has low flammability and will be stored in dedicated areas segregated from ignition sources. Moderate hazard to the ecosystems in a spill, limited by secondary containment and spill response procedures.	Yes	Effects due to a fire or a spill to be considered further in risk analysis.
Diesel Exhaust Fluid (Adblue)		Ecotoxicity (low[B])	Tank leak Spill during delivery or movement	Ecosystems	Low hazard to ecosystems in a spill, limited by secondary containment and emergency response procedures.	Yes	Effects due to a spill to be considered further in risk analysis.

Hazardous substance	Location and maximum storage	Identification of potential hazard properties (Hazard level[A])	Failure Modes	Exposure pathways / affected part of environment	Indicative hazard rating	Potential for off-site effects	
Maintenance oils	[redacted]	Ecotoxicity (low)	Tank leak Spill during delivery or movement	Ecosystems	Low hazard to ecosystems in a spill, limited by secondary containment and emergency response procedures.	Yes	Effects due to a spill to be considered further in risk analysis.
Greases, sealants, adhesive		Ecotoxicity (moderate)	Package leak Spill during delivery or movement	Ecosystems	Low hazard to ecosystems in a spill due to small packages, secondary containment and emergency response procedures.	Yes	Effects due to a spill to be considered further in risk analysis.
Coolant		Human health (low) Ecotoxicity (low[B])	Package leak Spill during delivery or movement	People	Low hazard to human health (harmful if swallowed or chronic direct contact hazards). Health hazard limited to on-site staff. Low hazard to ecosystems in a spill to the environment. Spill risk managed in accordance with site-wide emergency response procedures.	Yes	Effects due to a spill to be considered further in risk analysis.
Packaged cleaning products (non-flammable)		Ecotoxicity (low[B])	Package leak Spill during delivery or movement	Ecosystems	Low hazard to ecosystems in a spill due to small packages, secondary containment and emergency response procedures.	Yes	Effects due to a spill to be considered further in risk analysis.

Hazardous substance	Location and maximum storage	Identification of potential hazard properties (Hazard level[A])	Failure Modes	Exposure pathways / affected part of environment	Indicative hazard rating	Potential for off-site effects	
Packaged cleaning products – flammable cabinet	[redacted]	Fire/Explosion effects (high) Human health (low) Ecotoxicity (low[B])	Fire in the storage area Package leak Spill during delivery or movement	People, property, ecosystems	Low fire hazard due to low volume and storage in fire rated cabinets. Low hazard to human health (chronic direct contact hazards) and small package volumes. Health hazard limited to on-site staff. Low hazard to ecosystems in a spill due to secondary containment and emergency response procedures.	Yes	Effects due to a spill to be considered further in risk analysis.
Degreaser		Ecotoxicity (low[B])	Package leak Spill during delivery or movement	Ecosystems	Low hazard to ecosystems in a spill due to secondary containment and emergency response procedures.	Yes	Effects due to a spill to be considered further in risk analysis.
Detergent		Ecotoxicity (low[B])	Package leak Spill during delivery or movement	Ecosystems	Low hazard to ecosystems in a spill due to secondary containment and emergency response procedures.	Yes	Effects due to a spill to be considered further in risk analysis.
Packaged flammable liquids – DG stores		Fire/Explosion effects (high) Human health (low) Ecotoxicity (moderate)	Package leak Spill during delivery or movement	People, property, ecosystems	High fire hazard. Low hazard to human health (chronic direct contact hazards) and small package volumes. Health hazard limited to on-site staff. Low hazard to ecosystems in a spill due to small packages, secondary containment and emergency response procedures.	Yes	Effects due to fire or spill to be considered further in risk analysis.

Hazardous substance	Location and maximum storage	Identification of potential hazard properties (Hazard level[A])	Failure Modes	Exposure pathways / affected part of environment	Indicative hazard rating	Potential for off-site effects	
Aerosols	[redacted]	Fire/Explosion effects (high)	Fire in storage area	People, property	Moderate fire hazard, limited by small distributed aerosol storage segregated from incompatibles.	Yes	Effects due to fire to be considered further in risk analysis.
Petrol		Fire/Explosion effects (high) Ecotoxicity (high)	Package leak Spill during delivery or movement	People, ecosystems	High fire hazard. Low hazard to human health (chronic direct contact hazards) and small package units. Health hazard limited to on-site staff. High hazard to ecosystems in a spill managed through use of small package units, secondary containment and emergency response procedures.	Yes	Effects due to fire and spills to be considered further in risk analysis.
LPG		Fire/Explosion effects (high)	Fire in storage area	People, property	Moderate fire hazard due to storage of cylinders in certified hazardous substances location separated from buildings and the boundary.	Yes	Effects of fire considered further in the risk analysis.
Oxygen		Fire/Explosion effects (high)	Fire in storage area	People, property	Low fire hazard due to use of certified pressure cylinders and segregation from flammable gases.	Yes	Effects of fire considered further in the risk analysis.

Hazardous substance	Location and maximum storage	Identification of potential hazard properties (Hazard level[A])	Failure Modes	Exposure pathways / affected part of environment	Indicative hazard rating	Potential for off-site effects	
Acetylene	[redacted]	Fire/Explosion effects (high)	Fire in storage area	People, property	Low fire hazard due to use of certified pressure cylinders in certified hazardous substances location.	Yes	Effects of fire considered further in the risk analysis.
Nitrogen		Not classified as hazardous	-	-	-	No	Effects not considered further in risk analysis.
Argon		Not classified as hazardous	-	-	-	No	Effects not considered further in risk analysis.
Carbon dioxide		Not classified as hazardous	-	-	-	No	Effects not considered further in risk analysis.

Table note:

A. A hazard level is assigned to each hazard class in the Land Use Planning Guide for Hazardous Facilities, MfE 2000

B. While many of these substances not classified as ecotoxic under HSNO or the GHS7, they have conservatively been assessed as having low ecotoxicity (for oils, coolants, cleaning products and similar) and moderate ecotoxic effects (for pH modifying agents like calcium hydroxide).

Appendix D Mine safety bulletin

Department of Consumer and Employment Protection
Government of Western Australia

Resources Safety

Mines Safety Bulletin No. 75

Date: 10 January 2006

Subject: Fire and explosion in a working party magazine

This bulletin is issued following extensive investigation, technical review and test-work relating to a fire and subsequent explosion that occurred in a working party explosives magazine underground at a mine with sulphide mineralisation during 2005.

Incident

At about 5.45 am, a fire behind the locked gates of a working party magazine was observed by underground personnel who were passing the area. Attempts were made to put out the fire using Dry Chemical Powder (DCP) fire extinguishers, but these attempts were unsuccessful.

It was estimated that in excess of six tonnes of explosives and between 1,500 and 3,000 detonators were stored in the working party magazine at the time of the fire.

Five people were able to escape from the mine through the decline portal entrance while a further 22 personnel, who were unable to use this means of egress, travelled to fresh-air bases and refuge chambers underground where they were all accounted for. Once accounted for, the personnel were moved to the shaft plat in preparation for evacuation from the mine.

Delays occurred in evacuating personnel through the shaft, as it was in transition from shaft sinking to equipping the production winding system. This necessitated the completion of a risk analysis so that the sinking kibble could be safely used for the evacuation of personnel.

About two hours after the fire was identified an explosion occurred which knocked out the underground communications. The explosion also stopped two surface fans for a brief period until they could be restarted.

Injuries

Four people in the vicinity of the working party magazine, who attempted to fight the fire, suffered smoke inhalation. No personnel suffered any serious injuries during the emergency evacuation from underground. The potential for serious consequences is, however, obvious.

Causes

The cause of the ignition in the magazine was not determined with certainty due to the damage sustained. However, the following contributory factors were evident as a result of investigation, technical review and testing:

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- Reactive mineralisation, containing sulphide material including pyrite and chalcopyrite, was present in the rock in which the magazine was excavated. Marcasite was also identified — a material that could react with ammonium nitrate in the explosive stored in the magazine and cause self-ignition as a result of the chemical reaction.
- ANFO was known to have spilled in the magazine prior to the incident. ANFO is known to interact with sulphides to cause an exothermic reaction. The chemical reaction may have a long induction period with little observable temperature increase. However, once sufficient catalysing species have built up, the reaction rate increases rapidly, generating sufficient heat to cause self-ignition.
- Ammonium nitrate is also an oxidising agent, which evolves its own oxygen during chemical reaction. This made it impossible for the dry powder fire extinguishers to smother the fire. Water application is the primary suppression method recommended in explosives manufacturers' material safety data sheets.
- A number of empty 500 kg bulk ANFO bags were allowed to accumulate in the magazine, stacked in close proximity to full ANFO bags. This would have provided an additional fuel source and assisted in the propagation of the fire.
- A number of personnel authorised to enter the working party magazine were found to be smokers and routinely carried cigarettes and lighters into the magazine. However, there was no evidence from witness statements or previous inspections and audits that personnel had been smoking inside or in the vicinity of the magazine immediately prior to the incident.
- The working party magazine was being utilised to supply several jumbo development headings concurrently. Consequently, a quantity of explosives in excess of six tonnes was being stored in one area for this purpose.
- There was no regular shift supervisory inspection carried out in the working party magazine on the shift the incident took place or on the shifts immediately prior to the incident.
- The explosives management plan for the mine did not detail the storage requirements mandated by legislation and regulation.
- The explosive management plan required weekly contractor inspections and monthly principal employer audits of magazines. Records revealed that the inspections and audits were not being carried out at this frequency.
- Dry chemical powder fire extinguishers were provided both inside and outside of the locked gates of the magazine. Personnel were not able to use these extinguishers due to their proximity to the fire. Fire extinguishers were sourced from mobile equipment to fight the fire.
- There was no water hose provided outside the locked magazine. The water hose inside the magazine could not be utilised when fighting the fire as the smoke had become too intense by the time the gate was unlocked.
- The area was force ventilated using a compressed air fan. The direction of the ventilation hampered attempts to put out the fire.

Consequences

- Personnel involved in fighting the fire suffered from smoke inhalation. They did not don their self rescuers but were able to quickly reach fresh air in the main decline after their attempts to extinguish the fire failed.
- The fire and subsequent explosion caused significant damage to services, ventilation doors and machinery up to a kilometre away. Communications were lost underground as a result of damage to the leaky feeder during the explosion. Communications were re-established after half an hour using hand held line-of-sight two way radios, which were brought down the shaft.
- The location of the working party magazine and the siting of force ventilation fans serving an adjacent, blind incline development heading were such that a jumbo operator wearing a self-rescuer had to

retreat about one kilometre through smoke towards the entrance to the heading, which was directly opposite the magazine where the fire and subsequent explosion took place. The person was retrieved by the brave action of a fitter who returned underground in a light vehicle and had to pass close by the magazine on two occasions to effect the rescue.

Comment

- The working party magazine concept, historically, was created to provide for local storage of small quantities of explosives and detonators for the use of one airleg miner or a small group working in a particular area.
- With the advent of jumbo development, the quantities stored in working party magazines have generally increased from a nominal quantity of about 100–200 kg up to quantities in excess of one tonne. Where dedicated jumbo development crews and charge up crews are established, the quantities of explosives and detonators required to serve the multiple areas being developed, can lead (without appropriate controls) to even greater tonnages being stored in a so-called working party magazine. The regulatory provisions, as they were originally developed, did not envisage catering for the levels of usage occurring today.
- A working party magazine should only be utilised to provide small quantities of explosive for an individual or a small work group, and the concept should not be used for the large-scale storage and supply of explosives to service extensive jumbo development or multiple stope face blasting. Large quantities of explosives needed for such working methods should be supplied from a main magazine underground or directly from a surface magazine if this is feasible.

Preventative action

- Mines with reactive sulphide orebodies or stringers should develop a comprehensive management plan to adequately deal with the hazards potentially associated with reactive ground:
  - The geology should be examined on a regular basis to determine the potential for the presence of reactive ground.
  - A geological plan should be maintained identifying areas where sulphides or reactive ground is present.
  - Explosives sensitive to reactive ground should not be used or stored in those areas identified as having reactive ground present. Comprehensive inspections and risk assessments should be completed to affirm that explosive storage areas are free from the presence of sulphide material or reactive ground.
  - Specialised inhibited explosives designed for use in reactive ground should be sourced and appropriately used where sulphide material or reactive ground may present a hazard.
  - Inspection, monitoring and suppression methods should be implemented to mitigate or remove the potential hazards associated with reactive ground, such as sulphide dust explosions or spontaneous combustion catalysed by extraneous materials such as explosives or fuels.
- A comprehensive procedure for the storage, transport and usage of explosives needs to be developed for each operation, in accordance with legislation, regulatory provisions and applicable standards.
- The statutorily appointed managers who have the daily control and supervision of the mine (Registered Manager and Underground Manager) need to ensure that a system is established to verify that shift inspections are being completed by supervisory staff in all working areas underground, including explosive magazines in accordance with regulations 3.18 and 3.21.
- The statutorily appointed managers who have the daily control and supervision of the mine (Registered Manager and Underground Manager) need to ensure that a system is in place to verify that inspections and audits laid down in company procedures are being completed at the prescribed frequency.

- A procedure to deal with the accumulation and removal of empty ANFO bags or spillage in an explosives magazine needs to be included as part of the storage requirements in any explosives management plan. Prior to removal from the mine once empty, the ANFO bags should be cleaned and stored outside the magazine and a safe distance from the explosives to reduce the fire risk hazard. All spillage should be cleaned up and removed immediately.
- Procedures should be developed to ensure that no personnel smoke or take contraband (e.g. lighters, matches, mobile phones, radio transmitters) inside the detonator or explosive magazines. This should be reinforced at periodic retraining sessions for personnel with access to explosives.
- A water deluge system and fire hoses should be provided at all storage areas where large quantities of explosives, in particular ANFO, are stored. The activation mechanism for the water deluge system should preferably be automatic or otherwise should be accessible from outside the locked magazine. Fire hoses and water should also be similarly installed outside the entrance to magazines.
- Fire extinguishers need to be placed a safe distance from the explosive storage area so they can be safely utilised in an emergency.
- Working party magazines need to be sited clear of entrances to currently working development headings and their air intakes so that, in the event of a fire, personnel can retreat to safety without being exposed to the hazards potentially arising from a fire or explosion associated with the magazine.
- Back up communications in the form of a direct telephone system underground should be considered in addition to any leaky feeder system. The installation of the back up communication should be such that it is connected via a separate route to avoid both sets of communications being damaged by a fire or explosion in any one area.
- Personnel need to be adequately trained, retrained and regularly reminded of the importance of donning self-rescuers where a fire is evident underground. Once donned, personnel should not attempt to fight the fire but should immediately evacuate the area and proceed to a fresh-air base or refuge.

Further guidance

The Department has previously issued *Safety Bulletin No. 1: Sulphide Dust Explosion Hazard* and a *Guideline on the Safety Management of Underground Combustible Sulphide Dust*, which mine operators should review and implement where a similar hazard is evident. Both documents are available on the Department's website at www.docep.wa.gov.au/ResourcesSafety in the mining section, under guidance material and publications.

Mines should also conform to Australian Standard AS 2187.1:1998 — Explosives Storage Transport and Use — Part 1 in Appendix H, which recommends in part that magazines should be located clear of sources of sulphide dust.

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Appendix E Qualitative risk analysis

The qualitative rating of likelihood and consequence are presented in **Appendix E Table 1** and **Appendix E Table 2** below.

Appendix E Table 1: Qualitative rating of likelihood[A]

Frequency rating	Descriptor	Explanation
A	Very Likely	Almost certain or expected to occur.
B	Likely	Good chance that it might occur under normal operating conditions.
C	As likely as not	Might or might not occur depending on conditions.
D	Unlikely	Could occur but is not expected to occur under normal operating conditions.
E	Improbable	Theoretically possible, but extremely remote chance of occurrence.

A. Adapted from AS/NZS 4360:1999 and Table 3 "Likelihood qualitative descriptors", Risk Assessment Methodology for Hazardous Substances, EPA, December 2022

Appendix E Table 2: Qualitative rating of consequence[A]

Effect rating	Descriptor	Spill to environment	Human health or property
1	Insignificant	Negligible environmental damage	No injuries.
2	Minor	On-site release contained	First aid treatment required, minor damage to property.
3	Moderate	Minor environmental damage	Medical treatment required, damage to off-site property.
4	Major	Major environmental damage to immediate environment	Extensive injuries, moderate damage to off-site property.
5	Catastrophic	Widespread environmental damage.	Fatalities both on and off-site, major exposure to toxic release by numerous people.

A. From AS/NZS 4360:1999

The likelihood and consequence ratings for each event are selected based on experience and judgement. These ratings are then combined to assess the overall level of risk associated with each hazard. The risk assessment matrix is shown in **Appendix E Table 3**.

Appendix E Table 3: Risk matrix[A]

Consequence / Likelihood	Severity				
	Insignificant	Minor	Moderate	Major	Catastrophic
	(1)	(2)	(3)	(4)	(5)
Almost certain (A)	Significant	Significant	High	High	High
Likely (B)	Moderate	Significant	Significant	High	High
Moderate (C)	Low	Moderate	Significant	High	High
Unlikely (D)	Low	Low	Moderate	Significant	High
Improbable (E)	Low	Low	Moderate	Significant	Significant

A. From AS/NZS 4360:1999

Appendix E Table 4: Risk Assessment

Event	Controls (Mitigation/ Management Measures)	Residual risk		
		Likelihood	Consequence	Risk
Container leak or rupture during unloading to site – Moderate to highly ecotoxic container (e.g. petrol, caustic soda)	Transport of hazardous substances via truck in accordance with the Land Transport Rule: Dangerous Goods 2005, meeting requirements for packaging, labelling, loading restrictions, segregation of incompatibles, unloading inspections and recurrent training. Swift movement of goods into dedicated bunded storage. Emergency Response Plan will be in place, including provision of spill kits and staff trained in spill response.	Unlikely – Package failures or damage during transit are not uncommon, but requires failure of procedures and secondary containment to result in release to the environment.	Minor – any release cleaned up and removed from on-site systems.	Low
Container leak or rupture of packaged goods in storage (any liquid)	Storage locations for packages of hazardous liquids are provided with bunding to contain any leaked material. Emergency Response Plan will be in place, including provision of spill kits and staff trained in spill response.	Unlikely – Package failures or damage during transit are not uncommon, but requires failure of procedures and secondary containment to result in release to the environment.	Minor – any release cleaned up and removed from on-site systems.	Low
Spill during refuelling of equipment	Design, testing, certification and maintenance of the refuelling equipment in accordance with the HSW-HS regulations. Refuelling procedures requiring pre-start checking of fuel and oil attachments and requiring the equipment to be located in area that drains to the on-site network. Emergency Response Plan will be in place, including provision of spill kit adjacent to tank and staff trained in spill response. Procedure for handling and disposing of hydrocarbon contaminated soil to an authorised off-site facility.	As likely as not – small fuel spills during equipment refuelling are not uncommon, but require failure of procedures to result in release to the environment.	Minor – refuelling spills are expected to be small in volume, limited by overfill cut offs, ability to immediately stop pumping equipment and all refuelling being supervised by trained staff. Refuelling must be undertaken in areas that drain to the water treatment network.	Moderate

Event	Controls (Mitigation/ Management Measures)	Residual risk		
		Likelihood	Consequence	Risk
Spill during refuelling of diesel tanks	Design, testing, certification and maintenance of the tank and refuelling equipment in accordance with the HSW-HS regulations. Emergency Response Plan will be in place, including provision of spill kit adjacent to tank and staff trained in spill response. Refuelling area drains to on-site treatment network as a final containment control in the event of a spill. Dry break couplings used for tank refilling. Overfill prevention systems and interlocks to prevent spills. Procedure for handling and disposing of hydrocarbon contaminated soil to an authorised off-site facility.	Unlikely – multiple failures of physical controls required to result a spill during tank refilling.	Minor – tank refilling spills are limited by overfill cut offs, dry-break couplings, ability to immediately stop pumping equipment and tank refilling being supervised by trained staff. The refuelling area drains to containment ponds for retention and remediation.	Low
Diesel tank leak or rupture at storage locations	Design, testing, certification and maintenance of the diesel storage in accordance with the HSW-HS regulations. Double-skinned secondary containment provided for all diesel tanks, with monitoring of the interstitial space. Emergency Response Plan will be in place, including provision of spill kits and staff trained in spill response.	Improbable – multiple failures of structural controls required to result in leak from double-skinned tank.	Minor – spill contained to tank secondary containment system.	Low
Fire in the diesel tank areas	Design, testing, certification and maintenance of the tanks, pumps and systems in accordance with the HSW-HS regulations for flammable liquid tanks. Prohibition of ignition sources and incompatible substances at the tank locations. Separation distances to other buildings, other hazardous substances, sensitive locations or the boundary. Emergency Management Plan in place, including fire fighting provisions (extinguishers, water carts and hydrant systems) and evacuation plans.	Unlikely – multiple failures of structural controls required to result in fire at the tank location.	Minor – damage to on-site property only.	Low

Event	Controls (Mitigation/ Management Measures)	Residual risk		
		Likelihood	Consequence	Risk
Fire in flammable goods storage (gas stores, aerosol store, flammable liquids storage)	Design, testing, certification and maintenance of the storage areas in accordance with standards set out in the HSW-HS for flammable liquids. Prohibition of ignition sources and incompatible substances at the flammable goods storage areas. Separation of flammable goods stores from other buildings and incompatible substances. Small inventory of highly flammable substances (LPG, petrol) maintained. Emergency Management Plan in place, including fire fighting provisions (extinguishers, water carts and hydrant systems) and evacuation plans.	Unlikely – multiple failures of structural controls required to result in fire at the sites.	Minor – minor damage to Bathurst property.	Low
Spill during refilling of corrosive liquid tanks (sulphuric acid, CaOH)	Design, testing, certification and maintenance of the tanks in accordance with the HSW-HS regulations. Emergency Response Plan will be in place, including provision of spill kits and staff trained in spill response. Tanks are located in areas that drain to treatment sumps, enabling containment of hazardous liquid spills in on-site systems.	Unlikely – multiple failures of physical controls required.	Minor – damage to on-site property only.	Low
Leak of corrosive liquid tank (sulphuric acid, lime slurry)) – CHPP and new operational WTP at ESE and MFS	Design, testing, certification and maintenance of the tanks in accordance with the HSW-HS regulations. Secondary containment provided for the tanks. Tanks are located in areas that drain to treatment sumps, enabling containment of hazardous liquid spills in on-site systems.	Unlikely – multiple failures of physical controls required.	Minor – spill contained to tank secondary containment system.	Low

Event	Controls (Mitigation/ Management Measures)	Residual risk		
		Likelihood	Consequence	Risk
Leak of corrosive liquid tank (lime slurry) – Stockton LDPs	Design, testing, certification and maintenance of the tanks in accordance with the HSW-HS regulations. Drainage system design to divert area around the LDP back to the on site network. Tank monitoring to detect abnormal conditions and raise alarm. Emergency Response Plan will be in place, including provision of spill kits and staff trained in spill response.	Unlikely – multiple failures of physical controls required.	Minor – spill diverted to on-site treatment network.	Low
Fire in the Class 5 oxidiser facility (ANE, AN prill)	Design, testing, certification and maintenance of the compound in accordance with standards set out in the HSW-HS. Prohibition of ignition sources and combustible materials in proximity to the oxidiser storage. Strict security measures and restricted access to licenced staff. Emergency Management Plan will be in place, including fire fighting provisions and evacuation plans. Incompatible substances (diesel, paraffin) are kept in low quantities and well segregated within the compound from the oxidising substances.	Unlikely – multiple failures of structural controls required to result in fire at the sites.	Minor –Damage to Bathurst facilities or buildings.	Low

Event	Controls (Mitigation/ Management Measures)	Residual risk		
		Likelihood	Consequence	Risk
Unplanned detonation in explosives store	Design, testing, inspection, certification and maintenance of the explosives storage magazines in accordance with standards set out in the HSW-HS, including provisions for lightning interception. Adherence to WorkSafe requirements including the establishment of a certified Hazardous Substance Location prohibiting ignition sources and incompatible substances and ensuring the appropriate separation distances and fire protection systems are available. Strict security, access restriction and inventory monitoring for storage area. Store location selected for internal separation distance to off-site areas and other BPCP activities. Segregated storage area for explosive substances, away from other hazardous substances and buildings. Emergency Management Plan will be in place including firefighting provisions and evacuation plans.	Unlikely – storage site has high security, multiple ignition prevention and fire suppression systems in place.	Insignificant (Stockton) to minor (ESE) – see partial quantitative assessment in Section 9.3.2 of this report.	Low