Constellation Project - Water Management Plan

Document Control

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DEFINITIONS

The following definitions and acronyms are used throughout this Management Plan.

Approved disturbance area	The disturbance shown in Figures 1 to 8 in Appendix 2 and areas identified under condition A9 (of the Constellation Project Development Consent (SSD-41579871)
AS/NZS	Australian Standards/New Zealand Standards
AMD	Acid and Metalliferous Drainage, Acidic water containing metals, generated from the oxidation of sulphide minerals.
AS/NZS	Australian Standards/New Zealand Standards, Established guidelines for various environmental and safety practices.
ATP	Avoca Tank Project, A Tritton Resources mining project.
Bogan River	The ultimate receiving environment for runoff waters from the catchment in which the TRL mining operations are located.
Competent manner	Possessing the requisite knowledge, skill, and judgment for the task or duty; exercising those attributes appropriately in the particular circumstances; performing the task with reasonable care, diligence, and timeliness; meeting the standard that a reasonable person in that role would expect.
COS	Coarse Ore Stockpile
CPWMP	Constellation Project Water Management Plan, Document outlining management practices for water resources, ensuring compliance and sustainability.
CRD	Cumulative Rainfall Departure; a means of identifying longer term drying or wetting trends.
DA	Development Application, formal application for permission to undertake mining or other development activities.
DCCEEW Water	Water Group within the NSW Department of Climate Change, Energy, the Environment and Water.
DPHI	Department of Planning, Housing and Infrastructure, NSW agency overseeing regulatory approvals and compliance.
EIS	Environmental Impact Statement – document assessing environmental impacts and proposing mitigation measures.
Environment	Includes all aspects of the surroundings of humans, whether affecting any human as an individual or in his or her social groupings. Environment means components of the earth, including— (a) land, air and water, and (b) any layer of the atmosphere, and (c) any organic or inorganic matter and any living organism, and (d) human-made or modified structures and areas, and includes interacting natural ecosystems that include components referred to in paragraphs (a)–(c).
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence, Licence establishing limits for pollutant discharge and other environmental controls.

ESID	Extraction Site Identification, Unique identification number for extraction sites used in reporting and compliance.
GDE	Groundwater Dependent Ecosystem, Ecosystems that rely on groundwater sources for survival.
Harm	Harm to the environment includes any direct or indirect alteration of the environment that has the effect of degrading the environment and, without limiting the generality of the above, includes any act or omission that results in pollution.
Incident	An occurrence or set of circumstances that causes, or threatens to cause material harm and which may or may not be or cause a non-compliance.
INX	A commercial document control, incident investigation and action management system adopted and used by TRL.
JHA	Job Hazard Analysis - a systematic process that identifies potential hazards associated with specific job tasks or activities to improve workplace safety and environmental management.
K-Factor	Erodibility Factor, A parameter representing soil erodibility used in erosion and sediment control soil loss/erosion estimation calculations.
Lachlan Fold Belt MDB	Murray Darling Basin Groundwater Source, A regional groundwater source under the Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources (2020).
Material harm	Harm to the environment is material if— • it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or • it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (or such other amount as is prescribed by the regulations), and • loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment. For the purposes of this Part, it does not matter that harm to the environment is caused only in the premises where the pollution incident occurs.
Mbgl	Metres below ground level
MCM	Murrawombie Copper Mine, An operational mine under Tritton Resources.
Minimise	Implement all reasonable and feasible mitigation measures to reduce the impacts of the development
ML	Mining Lease – a legal right to extract minerals within a specified area.
NAF	Non-Acid Forming, used to describe materials (rock or waste from mining) that do not generate acid when exposed to air and water.
NAF_{LC}	NAF_{LC} (Non-Acid Forming – Low Capacity) - will not produce acid but may leach salts and some metals due to the presence of low sulfide bearing material;
NECM	North East Copper Mine, A part of Tritton Resources' mining operations.
PAF	Potentially Acid Forming, used to describe materials (rock or waste from mining) that may generate acid when exposed to air and water.

PAF_{HC}	PAF_{HC} (Potentially Acid Forming-High Capacity) - will produce acid within days or weeks of exposure;
PAF_{LC}	PAF_{LC} (Potentially Acid Forming - Low Capacity) - has the potential to produce minor acid
POEO Act	Protection of the Environment Operations Act 1997, NSW legislation focused on environmental protection and pollution control.
Sensitive Receiver	Refers to a location or area that is particularly vulnerable to the impact of noise, pollution, or other environmental disturbances.
Surface Water Source	The Constellation project site is within the Lower Nyngan Weir Pool Management Zone, part of the Lower Bogan River Water Source.
TCM	Tritton Copper Mine, A primary copper mine within the Tritton Resources operation.
TRL	Tritton Resources Pty Ltd, The company responsible for the Water Management Plan and mine operations.
TSF	Tailings Storage Facility, storage area for processed (fine grained) mining waste products, typically a dam or pond.
TARP	Trigger Action Response Plan, a risk management tool that defines specific, pre-determined actions to be taken when monitored conditions deviate from normal, indicating an increased hazard / risk..
WAL	Water Access Licence, Licence permitting water extraction from a surface water or groundwater source under conditions set out in the Water Management Act (2000), Water Management (General) Regulation 2025 and water sharing plans applicable to the water source from which extraction occurs.
Water Balance	Water Balance, Analysis of site water inputs, outputs and the change in water inventory used to inform site water management requirements.
Waterfront Land	Waterfront land includes: • the bed of rivers, lakes, or estuaries • land on each side within 40 metres of a riverbank. A river is identified as a blue line (first Order stream) on the NSW Hydroline map (https://trade.maps.arcgis.com/apps/webappviewer)
WM Act	Water Management Act 2000
WM Regulation	Water Management (General) Regulation 2025.
WSP	Water Sharing Plan, Rules governing water usage in specific regions to ensure ecological sustainability.

1. INTRODUCTION

Tritton Resources Limited (TRL), a wholly owned subsidiary of Aeris Resources Limited owns and operates five mining operations in the vicinity of Nyngan, NSW, including:

- the Tritton Copper Mine (Mining Lease (ML) 1544);
- Girilambone Copper Mine complex, including the Murrawombie Copper Mine (ML 1280), North East Copper Mine (ML 1383) and the Avoca Tank Project (ML 1818); and
- the Constellation Project (CP) (the Project).

These sites are collectively referred to as 'Tritton Copper Operations'.

Tritton Copper Operations functions as a 'hub and spoke' model, with the Tritton Copper Mine serving as the centralised hub (where the processing facility is located), with other surrounding deposits (spokes) supplying ore for processing.

The Mines are located west and north-west of Nyngan, in the Bogan Shire Council Local Government Area (LGA) within the central west region of New South Wales. The location of the five mining operations is provided in Figure 1.

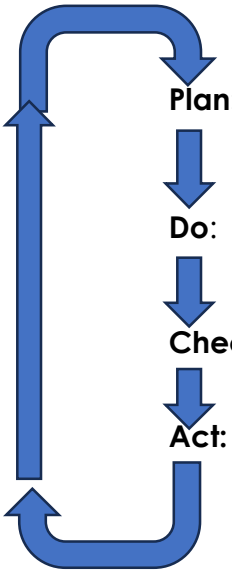
This plan relates to the TRL Constellation Project which was approved as a State Significant Development by the NSW Department of Planning, Housing and Infrastructure (DPHI) on 24 December 2025 (SSD-41579871).

1.1. Purpose

The purpose of the Constellation Project Water Management Plan (CPWMP) is to describe the key risks and compliance requirements as they relate to the extraction and management of water and potential impacts on receiving environments including surface waters and groundwater in the vicinity of the CP. The CPWMP outlines the key management strategies and actions to meet legal requirements and mitigate and manage potential risks.

1.2. Relationship to Environmental Management System

The CPWMP forms part of the overall Environmental Management Framework at TRL. The Environmental Management Framework is further described in the Environmental Management Strategy (TRL-HSET-PLN-0023) which includes alignment with the AS/NZS ISO 14001:2016 - Environmental Management Systems. The EMS broadly includes the following key aspects:



Plan: Identify legal requirements, commitments and risks, and develop plans to address / manage. Establish performance criteria. Ensure clear roles and responsibilities (this Plan).

Do: Implement the plan and operational controls.

Check: Track performance. Assess whether objectives, targets and performance criteria were met (monitoring, audit, reporting).

Act: Develop actions to address any non-compliances (with legal requirements, objectives or targets) and to continually improve the environmental performance of the TRL. Update documents (including this Plan) for approval by management.

The CPWMP includes an Erosion and Sediment Control Plan (ESCP) (Section 7.4) that is staged to provide controls for the construction and operational phases of the project. The ESCP applies to all aspects of the CP where vegetation and soil will be disturbed, including:

- construction of the CP mine site;
- operation of the CP mine site;
- haul road construction; and
- construction of the infrastructure corridor.

Further detail is provided in (Section 7.4).

1.3. Scope

The scope of the CPWMP primarily includes water related risks associated with the CP as outlined in the Constellation Environmental Impact Statement[1] (EIS) (AARC 2024) and includes potential receiving environments surrounding the project boundary.

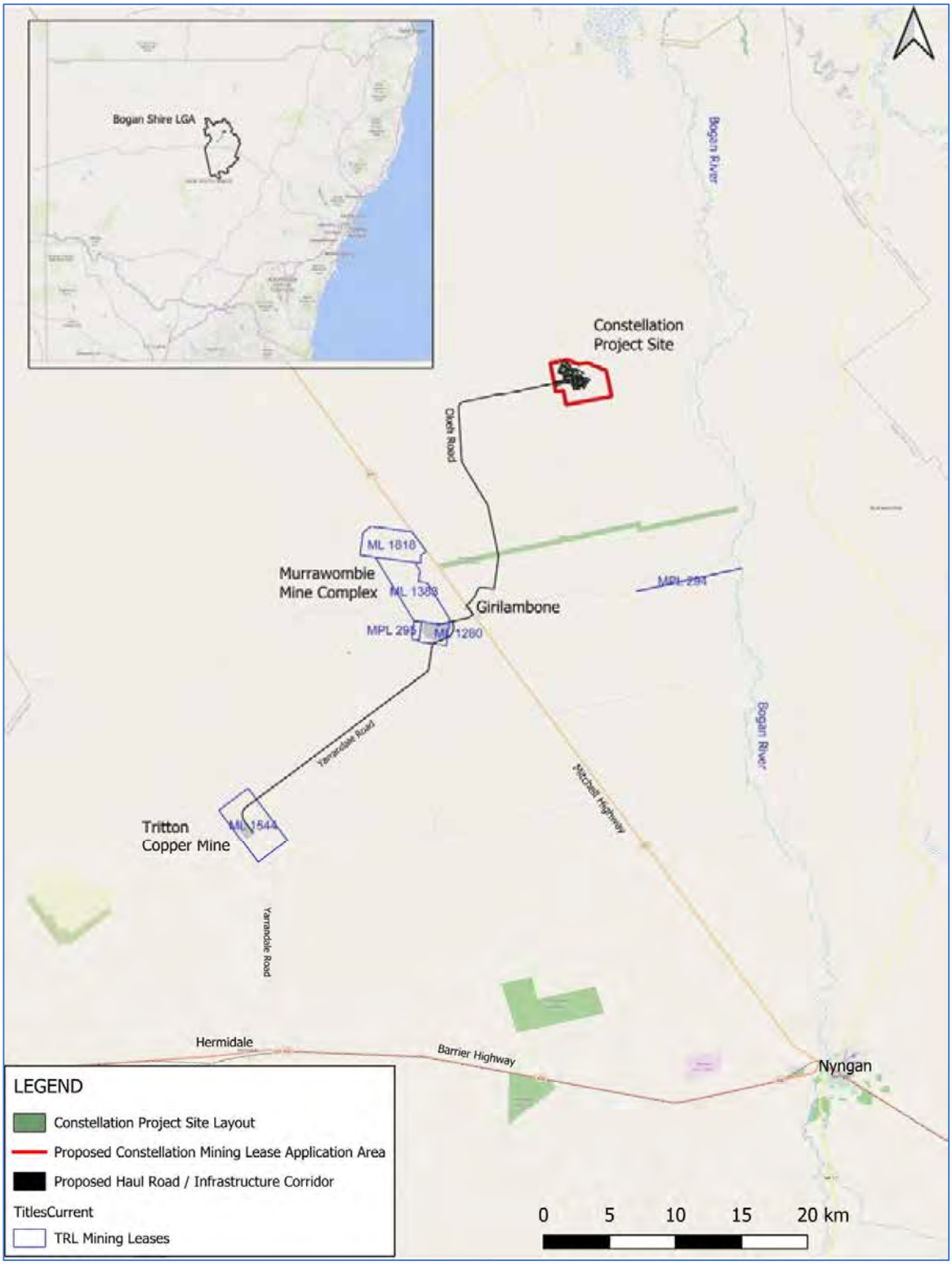
As the CP shares water sources (including licence entitlements) and infrastructure with other TRL mines and projects, water extraction and use (i.e. water balance aspects as presented in Section 7.1) is intrinsically linked to the other mine sites in the TRL hub and spoke model, including:

- Tritton Copper Mine (TCM) (DA 41/98 (including Modification 9) and Mining Lease 1544).
- Murrawombie Copper Mine (MCM) (DA 1/91 (including Modification 5 (DA 2015/010/4) and Mining Lease 1280))
- North East Copper Mine (NECM) (DA 6/95 (including Modifications) and Mining Lease 1383)
- Avoca Tank Project (ATP) (DA 10/2015/004/003 (including Modification 2) and Mining Lease 1818).

Water management at the above four sites is documented in the TRL Water Management Plan (TRL-HSET-PLN-0032).

[1] Including any additional commitments as contained in the Constellation Project Response to Submissions (AARC 2025) and Amendment Report (AARC 2025a).

Figure 1 Site Locality



1.3.1. *Extent of this CPWMP*

This CPWMP includes management measures to address all regulatory requirements (Consent Conditions), EIS phase commitments and water related risks with respect to the following aspects:

- water extraction;
- water management (including Water Balance);
- surface water impacts;
- groundwater impacts;
- erosion and sediment control; and
- acid and metalliferous drainage (AMD)[2]

This plan has been prepared by suitably qualified and experienced persons; Jeff Burton of Burton Environmental with technical and peer review by Chris Bonomini, Discipline Leader - Water, Engeny Australia Pty Ltd who have been endorsed by DPHI (Letter dated 13 January 2026). The plan has also been reviewed by Aeris Resources environmental discipline leads.

Several aspects that may be related to water management have been excluded from this CPWMP where they are required to be addressed by other planning documents as per the various TRL approvals or environmental management system framework. These aspects and relevant plans (where addressed) are presented below in Table 1.

One of the objectives of the TRL EMS is to provide a clear document structure for the combined management of the five TRL mining sites, as such, where possible, management measures for each operation have been combined into relevant plans to reduce duplication of material and provide a single plan to simplify operational management. This structure is further described in the EMS (TRL-HSET-PLN-0023).

[2] This CPWMP presents general AMD management concepts as they relate to the management of surface water and groundwater pollution risks. Detailed information, including AMD characterisation, segregation and management are contained in the TRL Waste Management Plan (TRL-HSET-PLN-0031).

Table 1 Aspects excluded from this CPWMP

Aspect	Management Plan (where addressed)
Post closure water management and monitoring.	Constellation Project Rehabilitation Management Plan (TRL-HSET-PLN-0045).
Design and construction of waste rock emplacements, Heap Leach Pads etc for the management of AMD risks.	
The management of water associated with the TCM Tailings Storage Facility (TSF) including waters received in the facility, seepage and leakage. Noting that the TCM TSF receives tailings generated from the processing of CP ores.	TRL Water Management Plan (TRL-HSET-PLN-0032). TRL Waste Management Plan (TRL-HSET-PLN-0031) Tailings Dam 1 Operation and Maintenance Manual (TRL-PRO-OMG-0001), or its latest version.
Waste rock material classification, segregation and management to manage AMD risks.	TRL Waste Management Plan (TRL-HSET-PLN-0031)

1.4. Objectives

The overarching aim of this CPWMP is to ensure that sufficient water is available to sustainably support mining operations and processes, and to avoid, minimise or mitigate potential impacts on water resources (surface water and groundwater) and other water users in the vicinity of the CP.

Key objectives with regards to the management of water at the CP include the following:

- Meet the requirements of the Constellation Project Development Consent (SSD-41579871).
- Achieving performance measures as contained in Condition C21 of the Constellation Project Development Consent (SSD-41579871).
- Identify water related risks to receiving environments and landholders surrounding the CP and describe measures to avoid, minimise or mitigate potential impacts.
- Minimise the use of fresh water sources and potential impacts on other water users.
- Ensure applicable best practice water management tools are employed to prevent and minimise pollution.
- Provide an adaptive environmental management framework to monitor, evaluate and rectify potential environmental impacts outside of those approved for the development.

2. STATUTORY REQUIREMENTS

2.1. Legislation

Regulatory requirements apply to the management of water resources and the prevention of pollution. Key legislation as it applies to this CPWMP is presented in the following sections:

2.1.1. Environmental Planning and Assessment Act 1997 (NSW)

The Environmental Planning and Assessment Act (EP&A Act) is the core legislation relating to planning and development activities in NSW and provides the statutory framework under which development proposals are assessed and approved. The EP&A Act aims to encourage the proper management, development and conservation of resources, environmental protection and ecologically sustainable development. Part 4 of the Act details how authorities are to determine development applications, as well as identifying whether projects require an EIS.

The five TRL mining operations / project sites have been approved under Part 4 of the EP&A Act.

2.1.2. Water Act 1912 (NSW)

The Water Act 1912 requires the licensing of surface water extraction and groundwater extraction outside areas covered by water management plans under the Water Management Act 2000. This affects potential surface water harvesting around the mines and the extraction and use of the water from the underground operations. In addition, all monitoring bores are required to be licensed.

2.1.3. Water Management (WM) Act 2000 (NSW)

The aim of the Water Management Act 2000 (WM Act) is to ensure that water resources are conserved and properly managed for sustainable use benefiting both present and future generations. It is also intended to provide formal means for the protection and enhancement of the environmental qualities of waterways and in-stream uses as well as to provide for protection of catchment conditions.

Historically, the Water Act 1912 was the main legislation for managing water resources in NSW, however, this Act has been progressively phased out and replaced by water sharing plans (WSPs) under the WM Act. Once a WSP commenced, existing licences under the Water Act 1912 were progressively converted to water access licences (WALs), water supply works and use approvals under the WM Act. All new WALs and controlled activity approvals are also issued under the WM Act. TCM holds a number of monitoring bore licences under the Water Act 1912.

2.1.3.1. Water Management (General) Regulation 2025 (NSW)

The Water Management (General) Regulation 2025 (WM Regulation) outline the procedures, technical requirements, licencing requirements, and water supply authority powers under the WM Act. The WM Regulations define the overall conditions governing water access licences, approvals and exemptions, that are relevant to this plan.

Under the WM Regulation, certain works may be excluded from licencing requirements. Excluded works, or those exempt from licensing are defined by Schedule 1 of the WM Regulation. Relevant excluded works for the Project include:

- Dams solely for the control or prevention of soil erosion that are located on a minor stream.

No dams at the CP are for this purpose.

- Dams solely for the capture, containment and recirculation of drainage and / or effluent, consistent with best management practice or required by a public authority to prevent the contamination of a water source, that are located on a minor stream.

Proposed dams at the CP are considered excluded from licencing requirements based on preventing contamination of a water source.

- Rainwater tanks collecting water from roofs only.

TRL may install tanks to capture rainfall from the roofs of suitable infrastructure. Proposed rainwater tanks are excluded from licencing based on this clause of the WM Regulation.

Controlled Activity Approvals

Controlled activity approvals are required prior to the undertaking of works on 'waterfront land'. Under Section 4.41 of the EP&A Act, as a state significant development, controlled activity approvals for works on waterfront land are not required for the CP.

2.1.3.2. Water Sharing Plans

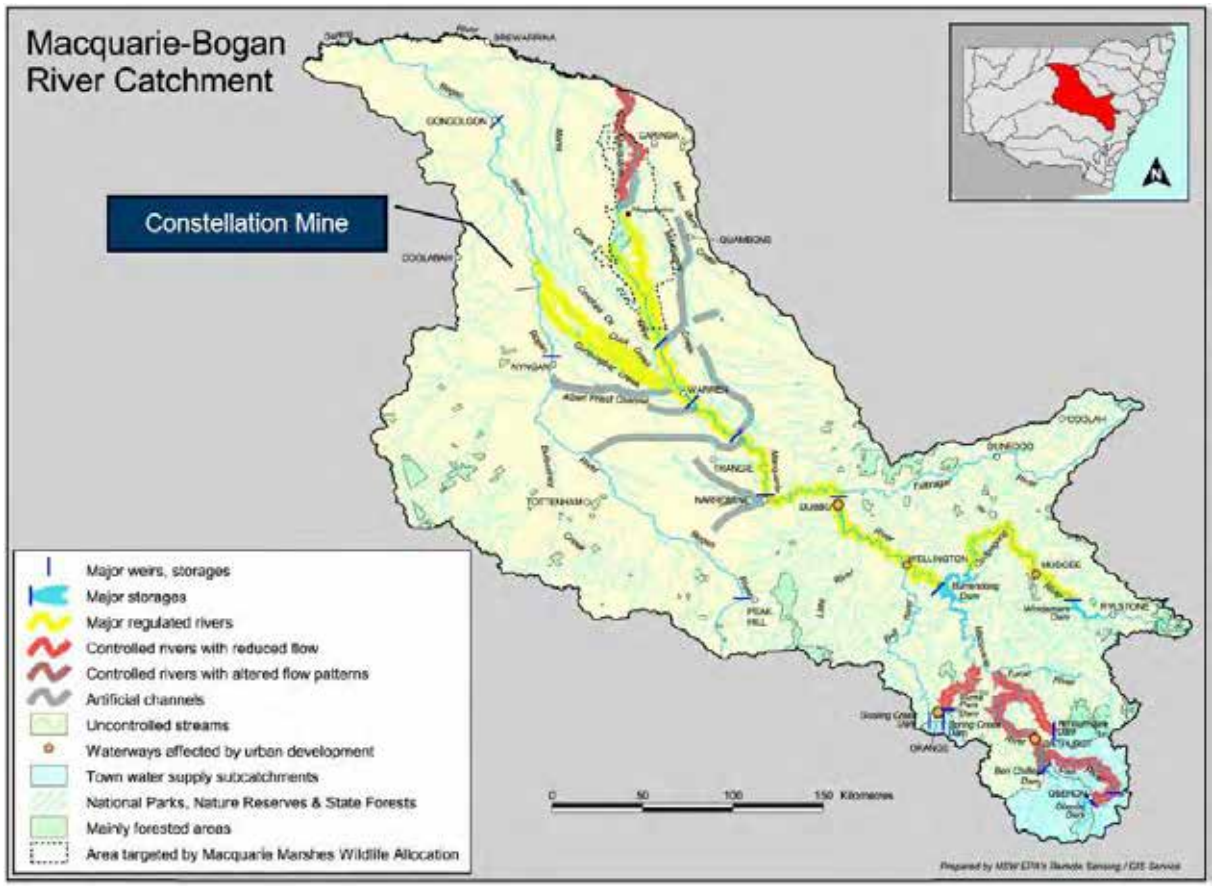
Water sources in NSW are managed via WSPs under the WM Act. Provisions outlined within WSPs exist to ensure water is provided to support the ecological processes and environmental needs of groundwater dependent ecosystems and waterways. WSPs also regulate how the water available for extraction is shared between the environment, basic landholder rights, town water supplies and commercial uses. Key rules within the WSPs specify when licence holders can access water and how water can be traded.

WALs entitle licence holders to a share component in the available water that may be sustainably extracted from a particular water source. The actual volume of water available to be extracted may vary, dependent on available water determinations (as a percentage of unit share) made under the WM Act. Available water determinations are made for each WAL category in each water source and are generally made at the start of a water year, although may be altered at any time.

The CP is located within the area regulated by the WSP for the Macquarie Bogan Unregulated River Water Sources 2012 (Macquarie Bogan Unregulated WSP). The Project is located within the Lower Nyngan Weir Pool Management Zone, part of the Lower Bogan River Water Source. The Project is also located immediately downstream of the area regulated by the Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016 (Macquarie Cudgegong Regulated WSP). The Project is located downstream of the Lower Bogan Backwater Management Zone, part of the Macquarie and Cudgegong Regulated Rivers Water Source. An overview of the Macquarie / Bogan River Catchments is presented in Figure 2.

Groundwater in the vicinity of the Project occurs within the Lachlan Fold Belt Murray Darling Basin (MDB) Groundwater Source managed by the Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020 (MDB Fractured Rock WSP). This WSP commenced in 2011 and was updated in June 2020 and regulates the interception and extraction of groundwater within the defined WSP area.

Figure 2 Macquarie / Bogan River Catchments (Source GHD 2024)



2.1.3.3. *Basic landholder Rights*

Under the WM Act, extraction of water for basic landholder rights is protected by allocating and prioritising water resources. There are three types of basic landholder rights in NSW under the WM Act:

- Domestic and stock rights

  Landholders are entitled to take water from a river, estuary or lake which fronts their land or from an aquifer which is underlying their land for domestic consumption and stock watering, without the need for a licence. However, a water supply work approval is generally required to construct a dam, or a groundwater bore, unless an exemption applies.

- Native title rights

  Anyone who holds native title with respect to water, as determined by the Native Title Act 1993 (NT Act), can take and use water for a range of purposes, including personal, domestic and non-commercial communal purposes.

- Harvestable rights

  Landholders are entitled to collect a portion of runoff from their property and store it in one or more dams up to a certain size, known as a 'harvestable right', which is determined from the total contiguous area of land ownership. As a landholder, Aeris hold conditional entitlement to capture, store and use a proportion of the rainfall runoff from their landholding under 'harvestable rights'. The Project is located within the Central Inland Draining Harvestable rights area and is therefore subject to the rules outlined in the Harvestable Rights (central inland-draining catchments) Order 2023 under the WM Act 2000.

2.1.4. Protection of the Environment Operations Act 1997 (NSW)

The Protection of the Environment Operations Act 1997 (POEO Act) is administered by the NSW Environment Protection Authority (EPA), which is an independent statutory authority and the primary environmental regulator for NSW. The objectives of the POEO Act are to protect, restore and enhance the quality of the environment. Some of the mechanisms that can be applied under the POEO Act to achieve these objectives include programs to reduce pollution at the source and monitoring and reporting on environmental quality. The POEO Act regulates and requires licensing for environmental protection, including for waste generation and disposal and for water, air, land and noise pollution.

Section 120 of the Protection of the Environment Operations Act 1997 (POEO Act), prohibits the pollution of waters, except where a regulation permits an activity that may or does cause pollution (Section 121 POEO Act); or an activity that does or may cause pollution is licensed under the Act (i.e as relevant to this CPWMP, an Environment Protection Licence under Section 122 POEO Act).

Under the POEO Act, an Environment Protection Licence (EPL) is required for premises at which a 'scheduled activity' is conducted. As such the CP is required to have an EPL (Refer to Section 2.5).

2.1.5. Mining Act 1992 (NSW)

The Mining Act 1992 incorporates a number of sections that regulate water polluting activities. Mining Amendment (Standard Conditions of Mining Leases—Rehabilitation) Regulation 2021 requires TRL to develop a Rehabilitation Management Plan which considers post-closure water management.

2.2. Policies

2.2.1. NSW Aquifer Interference Policy

The NSW Aquifer Interference Policy (AIP) was finalised in September 2012 and clarifies the water licensing and approval requirements for aquifer interference activities in NSW, including the taking of water from an aquifer in the course of carrying out mining.

The Policy outlines the water licensing requirements under the WM Act. A water licence is required whether water is taken for consumptive use or whether it is taken incidentally by the aquifer interference activity (such as groundwater seepage into an active mine extraction pit), even where that water is not being used consumptively as part of the activity's operation. Under the WM Act, a water licence gives its holder a share of the total entitlement available for extraction from the groundwater source.

The WAL must include sufficient share entitlement in the relevant groundwater source to account for the take of water at all times.

Sufficient access licences must be held to account for all water taken from a groundwater source as a result of an aquifer interference activity, both for the life of the activity and after the activity has ceased. Many mining operations continue to take water from groundwater sources after operations have ceased, e.g. continuing seepage into extraction pit voids. This take of water continues until an aquifer system reaches equilibrium and must be licensed.

The NSW AIP requires that potential impacts on groundwater sources, including their users and GDEs, be assessed against minimal impact considerations, outlined in Table 1 of the Policy. If the predicted impacts meet the Level 1 minimal impact considerations, then these impacts will be considered as acceptable. The adopted Level 1 minimal impact considerations for the Project are discussed in Section 7.3.

2.2.2. NSW Groundwater Dependent Ecosystems Policy

This policy was designed to protect ecosystems that are dependent on groundwater as a primary water source so that the ecological processes and biodiversity of these ecosystems are maintained or restored for the benefit of present and future generations. It provides guidance on how to protect and manage groundwater dependent ecosystems in a practical sense.

2.3. Conditions of Consent

Water management subject to this CPWMP is regulated by the Constellation Project Development Consent (SSD-41579871) as issued by the NSW Department of Planning, Housing and Infrastructure (DPHI) (DPHI 2025). Specific conditions, as they relate to water management and this CPWMP are replicated below (Table 2).

Table 2 Compliance Conditions of Consent

Condition No.	Condition	Section Where Addressed
Constellation Project Development Consent (SSD-41579871) approved 24 December 2025		
C18	**Water Supply** The Applicant must ensure that it has sufficient water for all stages of the development and, if necessary, adjust the scale of the development to match its available water supply.	Section 7.1
C19	Water extracted from the site each year (direct and indirect), including water taken under each water licence, must be reported in the annual review. Note: Under the Water Act 1912 and/or the Water Management Act 2000, the applicant is required to obtain all necessary water licences for the development, including during rehabilitation and post mine closure.	Section 7.1.5, Section 11.3.1
C20	**Water Discharges**	
	All surface discharges from the site must comply with: (a) discharge limits (both volume and quality) set for the development in any EPL; and (b) all relevant provisions of the POEO Act.	Section 2.5.1
C21	**Water Management Performance Measures** C21. The development must comply with the performance measures in Table 4. *[Table 4 has not been replicated in this section. Performance measures are contained at the beginning of the relevant sections of this plan.]*	Sections 7.1.1, 7.2.1, 7.3.1 and 7.4.1
C22	**Water Management Plan**	
	A water management plan must be prepared for the development to the satisfaction of the Planning Secretary. This plan must:	This CPWMP
	(a) be prepared: (i) by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary; (ii) in consultation with Water Group and the EPA; and (iii) in accordance with the requirements of condition B4.	Section 1.3.1 Section 5 Section 2.3
	(b) consider the Guidelines for Groundwater Documentation for SSD/SSI Projects. Technical guideline (DPE, 2022);	Section 2.3

Condition No.	Condition	Section Where Addressed
	(c) describe the measures to be implemented to ensure that the development complies with the water management performance measures (see Table 4);	Sections 7, 8 and 10.
	(d) include a	
	(i) site water balance that includes details of: • predicted annual inflows to and outflows from the site; • sources and security of water supply for the life of the development (including authorised entitlements and licences); • water storage capacity; • water use and management on the site; • licensed discharge points and limits; and • reporting procedures, including the annual preparation of an updated site water balance;	Section 7.1

	(ii) surface water management plan that includes:
	• detailed baseline data on surface water flows and quality of watercourses and/or water bodies potentially impacted by the development;
	• details of the water licensing requirements for all water storages (i.e. exempt, harvestable rights and licenced);
	• detailed plans, design objectives and performance criteria for water management infrastructure;
	• surface water performance criteria, including trigger levels for identifying and investigating any potentially adverse impacts (or trends) associated with the development, for:
	  o water supply for other water users;
	  o downstream surface water flows, water quality and flooding impacts; and
	  o lake, stream and riparian vegetation heath;
	• a program to monitor and evaluate compliance with the relevant performance measures listed in Table 4 and the performance criteria in this plan;
	• reporting procedures for the results of the monitoring program, including notifying other water users of any exceedance of relevant performance measures or performance criteria; and
	• a trigger action response plan to respond to any exceedances of the relevant performance measures or performance criteria, and repair, mitigate and/or offset any adverse surface water impacts of the development; and
		Section 7.2
		
		Section 8.1
		
		Section 10

Condition No.	Condition	Section Where Addressed
	(iii) groundwater management plan that includes: • detailed baseline data of groundwater levels, yield and quality for groundwater resources and groundwater dependent ecosystems potentially impacted by the development, including groundwater supply for other water users; • a detailed description of the groundwater management system, including measures to minimise acid mine drainage from potentially acid forming material; • groundwater performance criteria, including trigger levels for identifying and investigating any potentially adverse groundwater impacts (or trends) associated with the development, on: o regional and local aquifers (alluvial and hardrock); o groundwater supply for other water users such as licensed privately-owned groundwater bores; o groundwater inflows to the mining operations; o seepage/leachate from water storages, waste rock emplacements, infrastructure and processing areas, and the final voids; and o groundwater dependent ecosystems;	Section 7.3
	• a program to monitor and evaluate: o compliance with the relevant performance measures listed in Table 4 and the performance criteria in this plan; o groundwater inflows to the mining operations; o seepage/leachate from water storages, waste rock emplacements, infrastructure and processing areas, and the final voids, including migration over the short and long term; o groundwater inflows, outflows and storage volumes, to inform the site water balance; o any localised enhanced groundwater inflows associated with faults or other structures; o impacts on groundwater dependent ecosystems; o impacts on groundwater supply for other water users; and o the effectiveness of the groundwater management system; • reporting procedures for the results of the monitoring program, including notifying other water users of any elevated results; and	Section 8.2
	• a trigger action response plan to respond to any exceedances of the relevant performance measures and groundwater performance criteria, and repair, mitigate and/or offset any adverse groundwater impacts of the development; and	Section 10

Condition No.	Condition	Section Where Addressed
	(iv) a program to periodically validate the groundwater model for the development, including an independent review of the model every 3 years (unless otherwise agreed by the Planning Secretary), and comparison of monitoring results with modelled predictions; and a protocol to report on the measures, monitoring results and performance criteria identified above, in the annual review referred to in condition D4. The modelling program must also include a review and updated model predictions of post mining drawdown to determine whether any impacts on water supply works would require compensatory water to be provided for predicted future impacts following mine closure.	Section 7.3.8
C23	Development under this consent must not commence until the water management plan is approved by the Planning Secretary.	Section 5
C24	The water management plan as approved by the Planning Secretary must be implemented for the development.	Section 5

This CPWMP has also been prepared in accordance with the standard requirements for management plans listed in Condition B4, of the Constellation Project Development Consent (SSD-41579871). Appendix A presents these requirements and indicates where each is addressed within this CPWMP.

In accordance with Condition C22(b) of the Constellation Project Development Consent (SSD-41579871), this CPWMP contains the general prescribed content as required by Part C of the Guidelines for Groundwater Documentation for SSD/SSI Projects (DPIE 2022) including:

- Context and Project Setting (Sections 1.3 and Section 3)
- Purpose and Objectives (Section 1.1 and Section 0)
- Environmental Requirements (Section 2)
- Existing Environment (Section 3.3)
- Site Water Management and Water Balance (Section 7.1 and Section 7.3)
- Environmental Aspects and Impacts (Section 6)
- Environmental Control measures (Section 7.3)
- Compliance Management (Section 7.3, Section 8.2, Section 11 and Section 14)
- Continuous Improvement and Review (Section 15 and Section 16)

2.4. Commitments

Appendix B summarises commitments that relate to Water Management arising from the Constellation Project EIS (AARC 2024), Response to Submissions (AARC 2025) and Amendment Report (AARC 2025a). Appendix B includes reference to the relevant section of this CPWMP where the commitment is addressed.

2.5. Licenses and Permits

2.5.1. Environment Protection Licences (EPL)

TRL hold two Environment Protection Licences (EPL) issued under the NSW *Protection of the Environment Operations Act 1997*(POEO Act).

- EPL 4501 – Applies to Mining Leases associated with the MCM (ML 1280), NECM (ML 1383), ATP (ML 1818) and Mining Purpose Lease (MPL) 295.
- EPL 11254 Applies to stated Lots and Deposited Plans (DP) associated with the TCM Mining Lease (ML 1544).

In accordance with the POEO Act, TRL will obtain an Environmental Protection Licence, or include the CP into an existing licence held by TRL. Future revisions of this CPWMP will include relevant EPL conditions and commitments.

Upon granting of an Environmental Protection Licence for the Project, TRL will comply with any discharge limits (both volume and quality) set for the development and all other provisions of the POEO Act, including Section 120 of the Act which prohibits the pollution of waters.

2.5.2. Water Access Licences (WAL) and Works Approvals

TRL holds three water access licences (WALs) enabling the extraction of water from the Macquarie and Cudgegong Regulated Rivers Water Source (fed from Burrendong Dam) and Lower Bogan River Water Source which is within the area governed by the WSP for the Macquarie-Bogan Unregulated Rivers Water Sources 2012. Including supplementary water, Tritton has a combined allocation of 931 ML of surface water entitlement. TRL also holds a WAL for extraction of groundwater from the Lachlan Fold Belt MDB Groundwater Source. WALs are listed in Table 3.

To supplement Tritton's entitlement holdings, Tritton may occasionally trade for additional temporary share entitlement via water allocation assignments as needed on the open water market. All trading is conducted in accordance with relevant rules in the Macquarie and Cudgegong Regulated Rivers Water Source 2016, or the Murray-Darling Basin Fractured Rock Groundwater Sources Water Sharing Plans (WSP) and via a licenced water broker.

TRL holds (and operates under) numerous Water Supply Works Approvals under the Water Management Act (2000). Water Supply Works Approvals are presented in Table 4.

Prior to the extraction of groundwater from the Constellation open pit or underground mine, TRL will either obtain a new works approval, or amend the relevant works approval (80WA716055) to allow the extraction of water from groundwater source.

Table 3 TRL Water Access Licences

WAL	Water Type	Water Source	Share	Corresponding Works Approvals
9374	High Security	Macquarie and Cudgegong Regulated Rivers Water Source	705 ML	80WA702816 80WA704315
9375	General Security		210 ML	80WA702816
9940	Supplementary		16 ML	80WA702816
43405	Unregulated Water	Lower Bogan River Water Source	0 ML	80WA719370
34407	Unregulated River (Regulated Supply)		931 ML	80WA719370
31090	Groundwater	Lachlan Fold Belt MDB Groundwater Source	30 Units (ML)	80WA716044
31041	Groundwater		304 Units (ML)	80WA716044 80WA716055
31049	Groundwater		10 Units (ML)	80WA716017

Table 4 TRL Works Approvals

Number	Date of Approval	Date of expiry	Description
80WA702816	24/02/2005	23/02/2030	Gunningbar Creek and Bogan River Pumps
80WA716044	16/01/2012	28/05/2027	Dewatering Tritton U/G Mine
80WA716055	16/1/2012	24/11/2026	Dewatering of groundwater from pits and underground workings Murray Darling Basin Fractured Rock Groundwater Source. Murrawombie, North East and Avoca Tank Project.
80WA714556	16/1/2012	15/1/2032	TSF Groundwater Dewatering Bore (PB001).
80WA719370	4/10/2012	3/10/2035	Joint Water Supply Scheme
80WA704315	20/05/2009	30/06/2027	Offtake from Nyngan-Cobar pipeline
80WA717157	4/10/2012	4/12/2026	Gunningbar Creek Weir

3. OPERATIONS DESCRIPTION

3.1. Site Overview

The Girilambone copper deposits were first discovered in 1879 with mining commencing in 1881. At the time of preparing this CBLMP, Tritton Resources Pty Ltd owns and operates five mines in the vicinity of Hermidale and Girilambone;

- The Tritton Copper Mine (TCM) was approved as a State Significant Development on 1 September 1999 (DA 41/98). The TCM Development consent has been subject to 9 modifications. Ore extracted from the Constellation Mine site is transported to the TCM for processing with residual waste products (tailings) placed in the TCM Tailings Storage Facility. Tailings material is exported from the TCM to the Constellation Mine site for the backfilling of underground stopes.
- The Murrawombie Copper Mine (MCM) was approved under Development Application (DA) 1/91 by Bogan Shire Council in March 1991. Since that time, DA 1/91 has been modified five times, with the most recent being Modification 5, approved on 4 July 2024 (DA 2015/010/4). Water extracted from the Bogan River is initially received at the MCM; some water is used for the MCM and ATP, however most water is pumped to the TCM primarily for ore processing purposes. A new bi-directional water supply pipeline from the MCM to the Project site will be constructed as part of the CP.
- The North East Copper Mine (NECM) is located approximately 6km northwest of the village of Girilambone and operates under Development Application (DA) 6/95, approved by Bogan Shire Council in October 1995.
- The Avoca Tank Project (ATP) is located approximately 2km north of the NECM and operates under DA 10/2015/004/003. DA 2015/004 was granted by Bogan Shire Council in September 2016 and has been modified twice since its original approval, with Modification 2 approved on 15 May 2025.
- The CP is located approximately 20 km north-east of the township of Girilambone. The Project was approved as a State Significant Development Consent (SSD-41579871) on 24 December 2025.

To avoid duplication, only the CP is described in this section; further detail regarding the other operations and associated water management are provided in the TRL Water Management Plan (TRL-HSET-PLN-0032).

3.2. Constellation Project

The CP is located in the 'Bogan Shire' local government area (LGA) of central-western NSW. The Project site is located approximately 20 km north-east of the township of Girilambone and approximately 55 km north-west of Nyngan.

The Project includes the mining of copper ore, through the development of an open cut pit and underground mine. Mined sulphide ore is transported via road to the TCM processing plant for processing, with lower grade oxide ore processed by heap leaching at the CP site. Transport of dewatered tailings material from Tritton Mine (back to the Project site for use in cemented paste fill) will support the underground mining activities.

The Project mines an average of 500,000 tonnes of copper ore per annum with peak production volumes of up to 1Mtpa. The mine life is approximately 16 years, inclusive of a Project construction period and rehabilitation/closure period. There is potential for mine life extensions as the deposit is developed down plunge.

Supporting infrastructure for the proposed Project includes:

- a road upgrade between the Project site and the Mitchell Highway (to support haulage activity);
- a new T intersection to link the proposed haul road with the eastern side of the Mitchell Hwy (north of Girilambone);
- an upgrade to the intersection of the Mitchell Highway with Railway Road (west of Girilambone);
- a waste rock emplacement at the Project site;
- a run of mine stockpile to support the handling of mined ore;
- a mine laydown area and workshop;
- a heap leach pad and associated processing facility;
- a paste plant, emulsion storage and shotcrete batch plant;
- topsoil stockpiles;
- a solar farm and on-site power station;
- water management and storage infrastructure, including a bi-directional water pipeline between the Project site and MCM; and
- administrative facilities including offices, amenities, and car park.

Figure 3 presents the approved CP site layout and Figure 4 shows the approved haul road route / infrastructure corridor from the project site to Murrawombie and Tritton Copper Mines.

Figure 3 Constellation site Layout

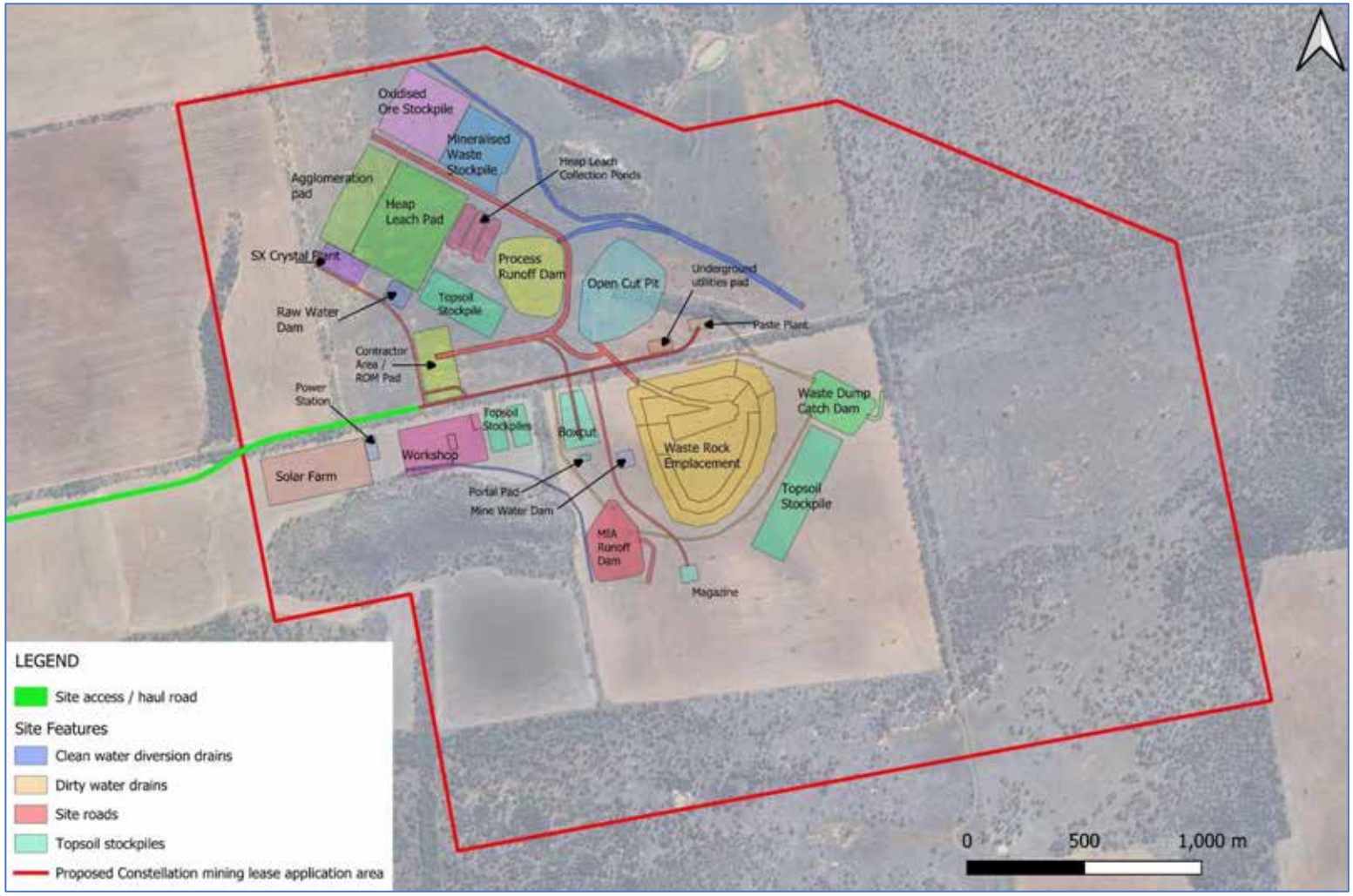
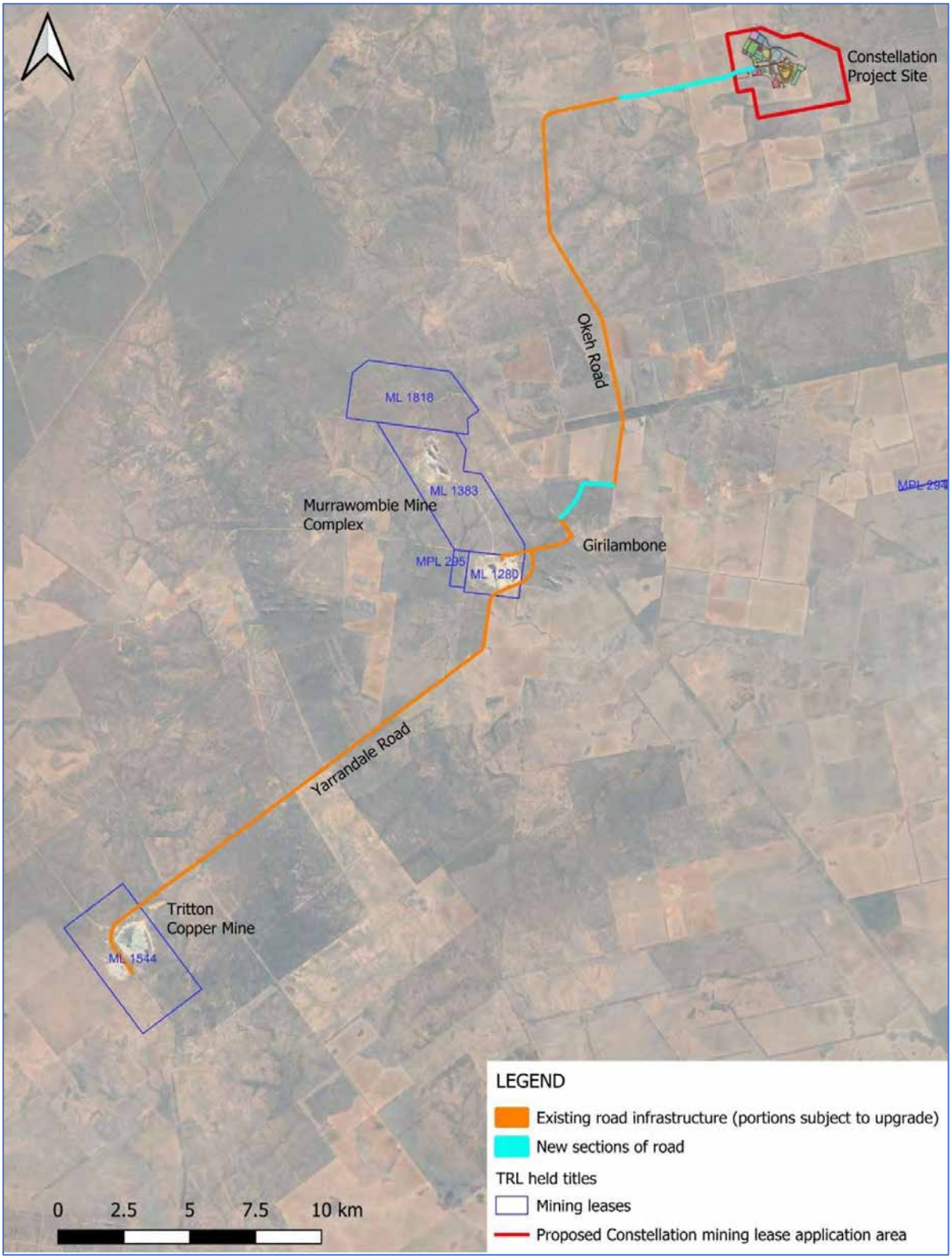


Figure 4 Constellation haul road / infrastructure corridor



3.3. Baseline Information

Baseline information relevant to this CPWMP is presented in the following sections.

3.3.1. Topography and Hydrology

The CP site is located within the central west of NSW. The site elevation undulates gently from approximately 160 m Australian Height Datum (AHD) in the southeast to 170 m AHD in the northwest. A small hill is located less than 1 km north of the site, at approximately 220 m AHD.

Some first order watercourses are located within the Project Area, however these are ephemeral and appear to be disconnected from defined and continuous creek lines.

The Project is located in the Bogan River catchment. The Bogan River starts in the Hervey Range near Peak Hill, and flows northwest to Nyngan, parallel to the Macquarie River. The Bogan River and associated ephemeral tributary creeks characterise the surface water environment in the locality of the Project site. The Bogan River is located approximately 8 km to the east of the Project site. The Project is near the lower reaches of Gunningbar Creek and Duck Creek. These creeks are major tributaries to the Bogan River and are regulated by the Warren Weir on the Macquarie River. The Macquarie River receives regulated releases from Burrendong Dam, located near Wellington, NSW. Gunningbar Creek and Duck Creek join the Bogan River south east and east of the project site respectively. Downstream, the Bogan River is met by Turners Creek, before ultimately joining the Barwon River between Brewarrina and Bourke.

The location of the site in relation to the regional watercourses is shown in Figure 5, while the local topography and drainage lines are shown in Figure 6. Close to the project site and due to the generally flat topography and absence of well-defined drainage lines or channels, the likely flow of surface water from the project site to the Bogan River is difficult to confidently determine[3]. The downstream hydrological environment includes the Goldbiddie-Cowal, an anabranch of the Bogan River. The Goldbiddie Cowal is located approximately 8 km northeast of the Project and appears likely to be the first formal defined creek channel / semi-permanent waterbody that would receive any runoff or emergency discharge from the mine site.

[3] TRL will undertake further ground-truthing during rainfall to confirm water flow paths from the mine site and the nearest semi-permanent receiving body.

Figure 5 Regional hydrology

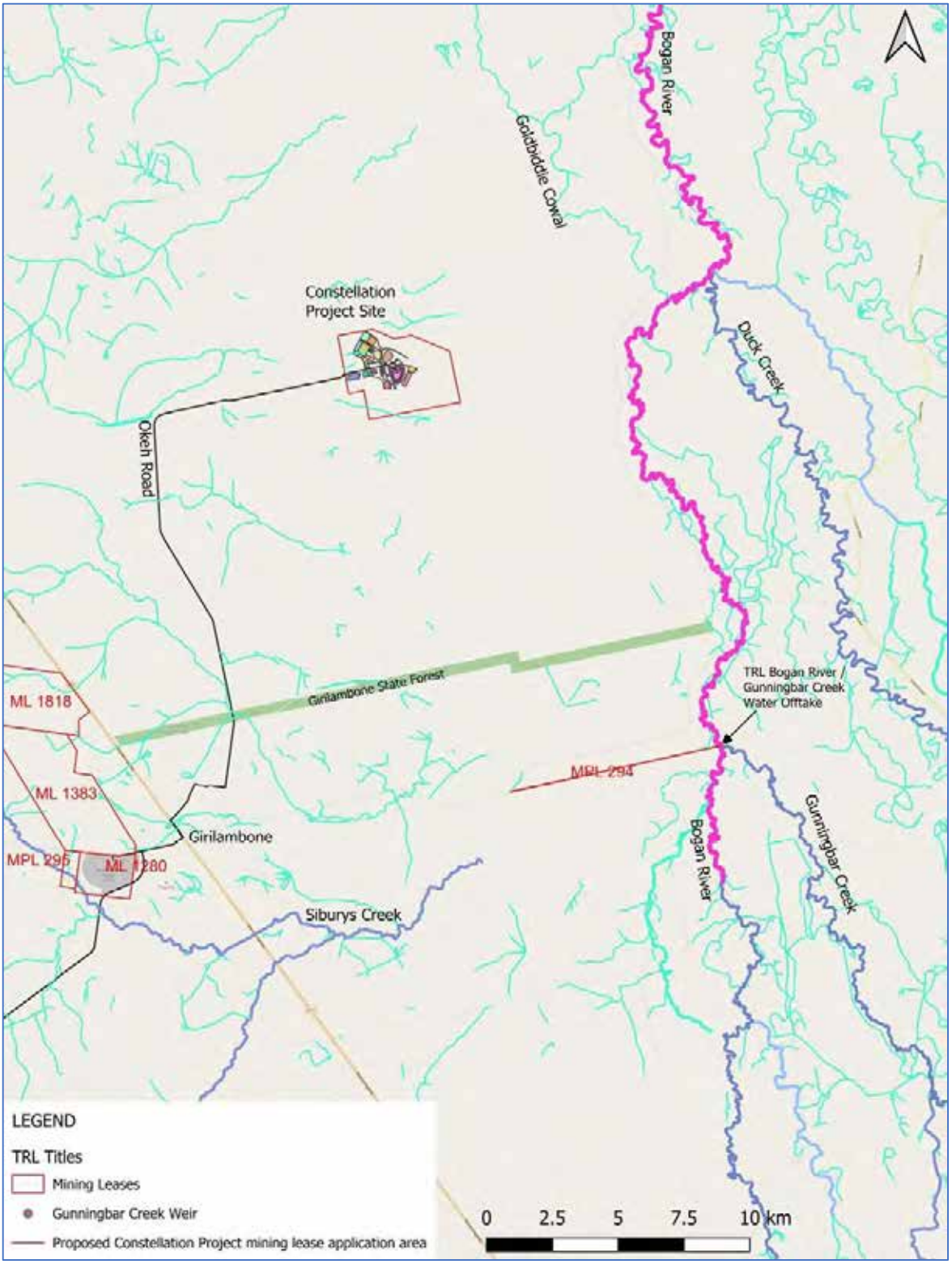
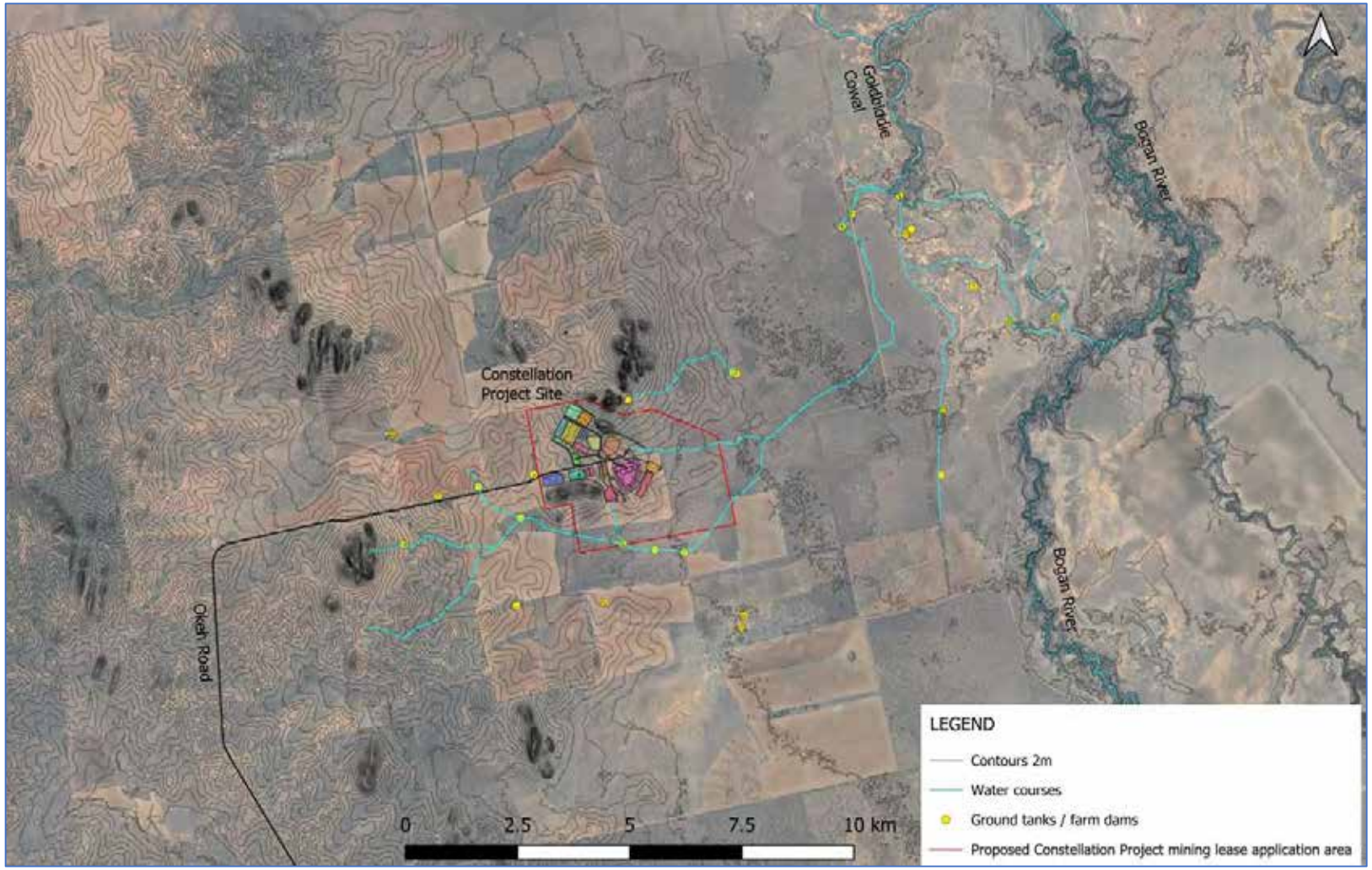


Figure 6 Local hydrology



3.3.2. *Land Uses*

Land uses surrounding the mine site include:

- Agriculture - low intensity sheep and cattle grazing and seasonal cropping (mainly cereals). Associated sparse rural residences are located throughout the area.
- Nature conservation - substantial areas of native vegetation exist in the vicinity of the mine site.
- Native vegetation – forestry. The Girilambone State Forest occupies an area to the south of the mine site (and east of the Micthell Highway).
- Transportation - a range of State and local roads exist in the vicinity of the mine sites, including the Mitchell Highway, Booramugga Road and Okeh Road. The disused Main Western Railway is located to the west, and runs parallel with the Mitchell Highway.

3.3.3. *Geology and Soils*

3.3.3.1. Geology

The surface geology of the area consists of the unconsolidated colluvial and residual sedimentary deposits of the Cenozoic that formed from Quaternary to the present and comprises silty clay, mud, and fine medium grained quartz, sand, polymictic pebble, to cobble gravel.

The unconsolidated residual sedimentary deposits overlay the deformed and metamorphosed Girilambone Group, a highly prospective ground for base metal deposits in NSW. The Girilambone Group comprises fine-grained quartzose quartz-lithic sandstone, micaceous minor intercalations of polymictic conglomerate, siltstone, quartzite, and mafic and intermediate volcanics (Watkins 1996).

Budgery Sandstone (member of the Girilambone Group) outcrops approximately 1 km to the southwest of the Project site. Budgery Sandstone comprises the massive well-foliated fine to medium-grained quartz rich metasandstone to quartzite (Colquhoun et al. 2020).

Great Artesian Basin (GAB) sedimentary rocks underlie the alluvium of the Macquarie-Bogan Catchment to the east of the Project site. The rocks are Early to Middle Mesozoic and are overlain by Late Mesozoic age rocks which form a confining layer over the GAB rocks (Giambastiani and Kelly 2010). These rocks are overlain by the Cenozoic (Neogene-Quaternary) unconsolidated sediments which form the alluvial aquifer (Skelt et al., 2004).

3.3.3.2. Soils

The Land and Soil Capability Assessment (AARC 2024) conducted for the CP included field assessments of the Soil Management Units (SMUs) occurring in the vicinity of the project. The soil survey identified that the majority of the project area is composed of the Colluvial SMU (61.4 %), located on subdued undulating plains. The survey area is interspersed with low hills, comprised of the Sandstone SMU (16.5 %). The Alluvial SMU occurs in low relief areas and forms a minor distribution within the survey area (3.4 %).

The colluvial SMU is described by AARC (2024) as shallow red loams occurring on the gently inclined or level landforms across the majority of the survey area. Soil texture is described as loamy throughout, without a strong texture contrast and has a weakly structured B horizon. The profile is alkaline to slightly acidic-to-neutral throughout. Landform pattern is described as level plains (< 1% slope and extremely low relief), contributing to slow runoff. Soil structure is described as massive, coarse textured and shallow, suggesting a moderately permeable and rapidly drained profile. The corresponding Australian Soil Classification is Red Kandosol.

The alluvial SMU is described by AARC (2024) to be comprised of red loamy soil with a relatively deeper profile than other SMUs, and it is associated with underlying alluvial deposits and Poplar box woodland vegetation. The soil profile is slightly acidic throughout, with no strong texture contrasts and massive B horizons. The landform pattern is described as level plains (<1% slope and extremely low relief), contributing to slow runoff. Soil structure is described as massive, medium textured and moderately shallow, suggesting a highly permeable profile. The profile is considered well-drained due to the relatively deeper profile. The corresponding Australian Soil Classification is Red Kandosol. The corresponding Australian Soil Classification is Red Kandosol.

The sandstone SMU is described by AARC (2024) as being comprised of brown sandy loam soil unit is associated with Green/Grey Mallee vegetation on rounded stony hills. The profile is generally slightly- to moderately acid, and coarse fragments may be present throughout the shallow profile. The landform pattern is described as rolling low hills (25 – 50 % slope and low relief), indicating moderate run off. Soil structure is described as massive, coarse textured and shallow, suggesting a moderately permeable and rapidly drained profile. The corresponding Australian Soil Classification is Brown Rudosol.

3.3.3.3. Erosion Potential

The AARC (2024) assessment also included the potential for water and wind erosion of the project area. Colluvial and sandstone SMUs are composed of fragile, light textured soils, while the alluvial SMU is of fragile, medium textured soils. Due to slope steepness, the sandstone SMUs pose the highest erosion risk where the ability of soil to store water and nutrients is poor, resulting in the deposition of eroded soils in low-lying areas. The sandstone SMU is not proposed to be disturbed by the Project.

Colluvial and alluvial soils are less prone to erosion due mostly to flat topography associated with these SMUs, however, the loss of vegetation cover, soil disturbance and the local altering of internal site drainage patterns associated with the Project increases the risk of erosion. Further information on the erodibility of these SMUs can be obtained from AARC 2024.

Based on the characterising of soil units, the main impact from the Project (from a soil perspective) is soil erosion, defined as the destruction or loss of protective cover resulting from the development's influence on the soil, vegetation or landform. Relevant types of soil erosion that may impact the Project area include sheet and rill/channel erosion, as well as wind erosion. Sedimentation may also occur, as a result of erosion, where eroded material that is being transported by runoff and deposited on other ground surfaces or within drainage lines / watercourses.

The risk of soil erosion and sedimentation may be exacerbated by the following activities associated with the development:

- clearing vegetation and disturbing stable topsoil;
- constructing roads and vehicle tracks;
- constructing infrastructure (including drainage to divert surface water);
- soil stripping and stockpiling;
- constructing elevated landforms; and
- inappropriate rehabilitation methodologies (e.g. insufficient ground cover).

AARC (2024) made a number of recommendations to minimise and manage erosions risks, where relevant, these measures are included in Section 7.4.

3.3.4. Climate

The climate of the Tritton Copper Operations area is semi-arid, with very hot summers and cool winters. Rainfall at Nyngan Airport (Station Number 051039) and Okeh (Station Number 051164) weather stations (Bureau of Meteorology 2025) is characterised by a discernible annual cycle distribution, with higher rainfall trends in the October to March period and decreasing during the April to September period. Average monthly rainfall calculated[4] between 1884 and 2025 varies between 27 mm in September and August to 50 mm in January. The average annual rainfall between 1884 and 2025 is 444.5 mm. Maximum daily rainfall can be more than double the average monthly rainfall, particularly in late summer and autumn, indicating that intense storms can occur.

The average annual pan evaporation total of 2,397 mm was obtained from the BoM Nyngan Airport (Station Number 051039). This corresponds to an average annual moisture deficit (the difference between average annual rainfall and average annual evaporation) of 1,952 mm.

Average monthly pan evaporation is compared to average monthly rainfall calculated from the historical rainfall record in Figure 7, which shows a strong seasonal variation in evaporation. The site has an average monthly net rainfall deficit throughout the year.

The monthly rainfall dataset was used to generate a Cumulative Rainfall Departure (CRD) curve. CRD is the monthly accumulation of the difference between the observed monthly rainfall and the long-term average monthly rainfall. Any increase in the CRD reflects above average rainfall while a decrease in CRD reflects below average rainfall. A constant or steady CRD curve represents average rainfall. The CRD curve only deviates from zero due to atypical (above and below average) rainfall. The CRD over the period 2015 to 2025 is shown in Figure 8.

As shown in Figure 8, the CRD curve was generally decreasing between mid-2016 and early 2020 indicating below average rainfall conditions and reflecting the severe drought conditions in western NSW. The CRD curve increased in early 2020 reflecting a period of above average rainfall.

Extreme storm events have occurred on several occasions throughout the recorded data. The 1% AEP, 72-hour storm event equates to 2.87 mm/hr or a total rainfall of 207 mm. An analysis of rainfall data for Nyngan between 1896 and 2016 shows that the design storm event was exceeded three times (Table 5).

[4] Using data obtained from the Nyngan Airport (Station Number 051039) from February 1884 to December 2018) and Okeh (Station Number 051164) from January 2019 to April 2025.

Figure 7 Monthly rainfall and evaporation at Nyngan Airport and Okeh Weather Stations

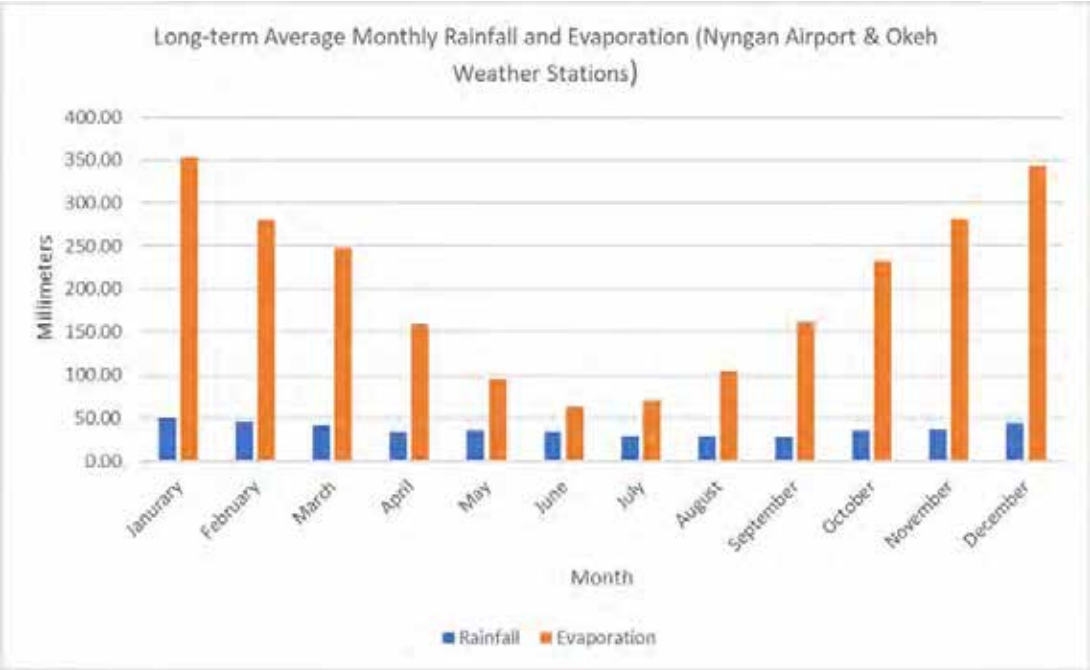


Figure 8 Cumulative Rainfall Departure

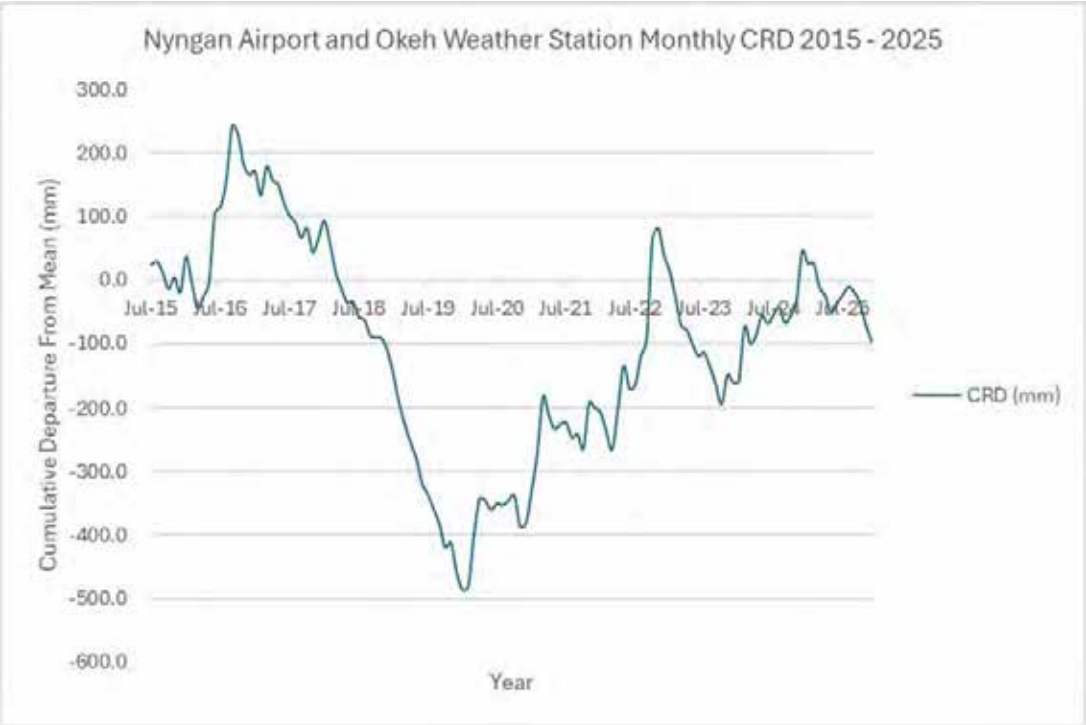


Table 5 Storm events in excess of 3 mm/hr intensity, at Nyngan

Period	Total (mm)	Intensity (mm/hr)
28.02.1906 – 02.03.1906	251.3	3.49
23.02.1955 – 25.02.1955	232.4	3.23
31.03.1989 – 02.04.1989	222.2	3.09

3.3.5. Hydrogeology

Groundwater at the Project site occurs predominantly in fractured rock aquifers (i.e. faults and fractures) within the Lachlan Fold Belt. The groundwater is managed under the NSW Murray-Darling Basin Fractured Rock Groundwater Sources WSP. Groundwater within the fractured rock aquifer is stored and moves through fractures, joints, bedding plains, faults and cavities within the rock mass.

Baseline groundwater monitoring conducted at the Project site, identifies that the depth to the water table ranges from approximately 10 m to 25 m below ground level (bgl). Based on exploration drill logs and the drilling of baseline monitoring bores:

- the fractured rock groundwater source underlaying the Project site is low yielding (estimated at less than 2 L/s) and brackish to saline (salinity greater than 10,000 mg/L).
- no shallow water strikes have been observed suggesting there is no shallow or perched groundwater at the Project site.

Further details on baseline groundwater monitoring at the Project site are provided in Section 7.3.

GHD (2024) found, that in general, it is expected that the groundwater flow would replicate the topography and hence would flow east towards the Bogan River. However, due to the fractured nature of the rocks, it would be restricted and controlled by both the localised fracture systems and regional structural features.

To the east of the Project site, east of the Bogan River, the fractured rock aquifer is generally overlain by the Great Artesian Basin which is overlain by alluvial aquifers. The Bogan River catchment is generally unfavourable for the development of groundwater resources, with aquifers in the alluvium being relatively thin and low yielding, and the groundwater being brackish to saline.

3.3.6. *Sensitive Receptors*

3.3.6.1. Surface Water

Licenced water users

GHD as part of their Water Impact Assessment, GHD (2024), conducted a search of licensed surface water users (licences and works approvals) within 10 km downstream of the CP (NSW Water Register (WaterNSW 2023)). The identified downstream water users with associated works and water use approvals are shown in Table 6. As shown in Table 6, four water access licences (and associated works approvals) are for irrigation purposes from the Bogan River, within the Lower Bogan River water source. The remaining approvals are associated with water storages. In general, licenced water users adjoin the Bogan River, with one adjoining the Goldbiddie-Cowal (lots 3 and 20 DP751354 (shaded)) which is the closest to the Project site (Figure 9).

Table 6 Downstream licensed surface water users (Source GHD 2024)

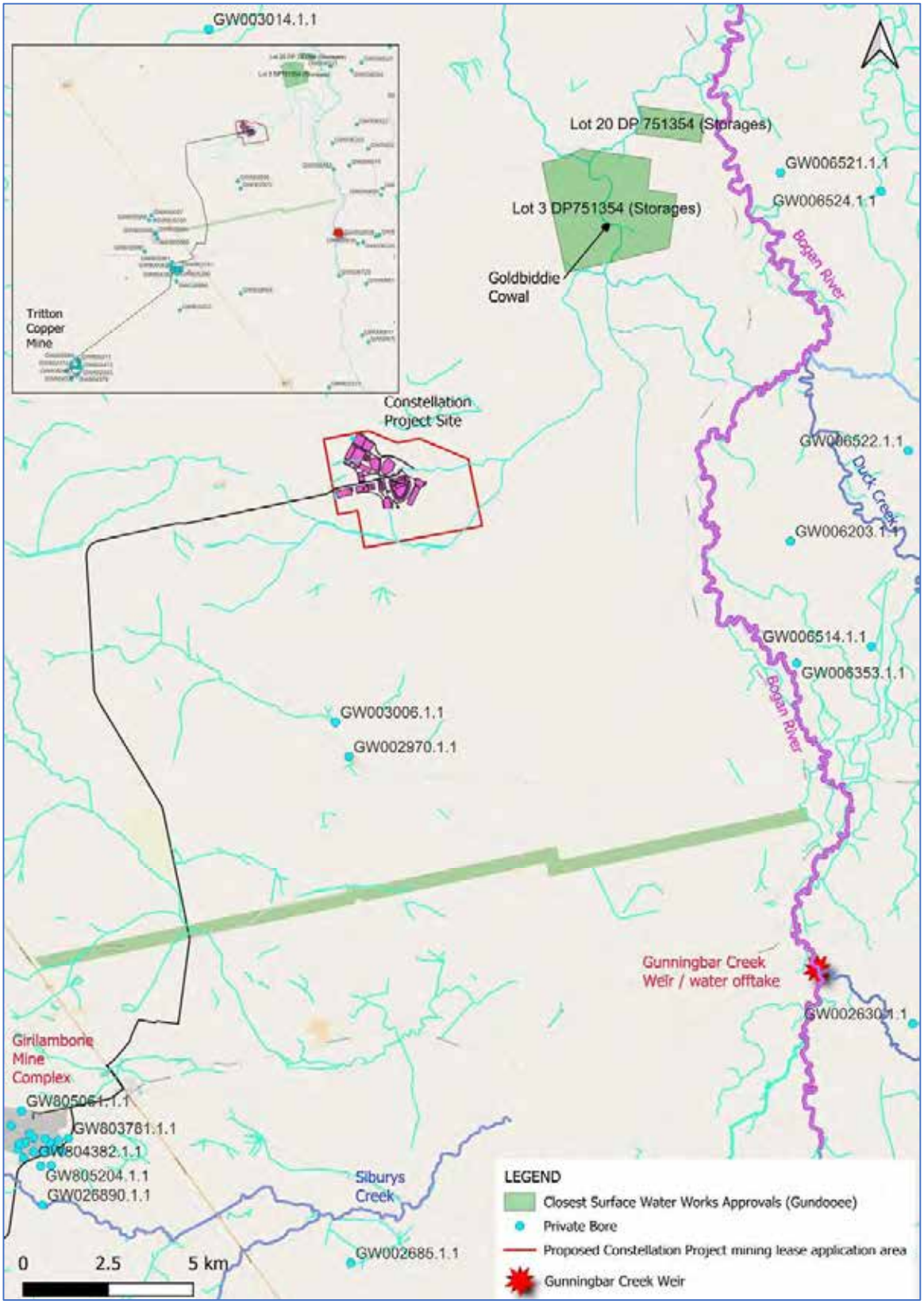
Lot	DP	WAL	Works Approval	Work Type	Use / Purpose
5063	705010	34388	80CA717256	Diversion Works - Pumps	Irrigation
5063	705010			Storages	-
7	751321	34402	80CA717137	Diversion Works-Pumps	Irrigation
17	751321			Diversion Works - Pumps	Irrigation
3	751321	34402	80CA717137	Diversion Works - Pumps	Irrigation
3	751321			Diversion Works - Pumps	Irrigation
3	751354			Storages	
20	751354			Storages	
35	751354	34376		Diversion Works - Pumps	Irrigation

Other Private Landholders

A number of downstream surface water assets are located within close proximity to the Project site and include a number of farm dams and shallow, ephemeral water courses which are used for the watering of livestock (Figure 6).

The closest defined channel / waterbody is the Goldbiddie-Cowal which is located approximately 8 km east-north east of the mine site and would likely (ultimately) receive any surface runoff or emergency discharge from the Project site. The Goldbiddie-Cowal is considered ephemeral in nature, however appears (from aerial photography) to retain permanent / semi permanent pools (and instream storages). The Bogan River likely interacts with the Goldbiddie-Cowal where during high flow events water is deposited into the Cowal and later received further downstream. The Goldbiddie-Cowal is used for the watering of livestock and domestic purposes, with established storages (dams) located on Lots 3 and 20 DP751354 as shown in Table 6 and on Figure 9 (Gundooee Property).

Figure 9 Landholder Bore locations and Gundooee Surface Water licence areas



3.3.6.2. *Groundwater*

GHD as part of their Water Impact Assessment (GHD 2024) conducted a search of the Australian Groundwater Explorer (BoM 2023), Water NSW Real-Time Data (Water NSW 2023) and MinView Groundwater borehole data (MinView 2023) to identify registered bores, including basic landholder rights bores, near the Project site. The search identified 20 bores within an approximate 20 km radius. Registered bores in close proximity to the Project site are shown on Figure 9 and bore details are summarised in Table 7.

Table 7 Landholder Bore Details (Source GHD 2024)

Bore	Bore Depth (mbgl)*	Drilled Date	Purpose	Status	Latitude	Longitude
GW006524.1.1	27.4	1/06/1938	Water Supply	Unknown	147.1362	-31.0101
GW006520.1.1	35. 1	1/05/1938	Water Supply	Unknown	147.1509	-30.9996
GW006521.1.1	38.1	1/11/1938	Water Supply	Unknown	147.1051	-31.0051
GW003014.1.1	123.1	1/02/1931	Stock and Domestic	Unknown	146.9284	-30.9671
GW011818.1.1	10.4	1/01/1950	Water Supply	Functioning	147.0365	-30.8968
GW006203.1.1	49.4	1/08/1937	Stock and Domestic	Unknown	147.1081	-31.1026
GW006650.1.1	164.6	1/09/1940	Unknown	Unknown	147.1801	-31.1682
GW006514.1.1	82.6	1/11/1937	Water Supply	Unknown	147.1331	31.1304
GW006522.1.1	42.7	1/08/1937	Stock and Domestic	Unknown	147.14452	-31.0787
GW006338.1.1	76.2	1/08/1937	Water Supply	Non-functional	147.1609	-31.1093
GW006353.1.1	57.9	1/10/1937	Water Supply	Unknown	147.1101	-31.1348
GW006694.1.1	130.2	1/02/1941	Stock and Domestic	Unknown	147.18230	-31.1598
GW003006.1.1	86	1/01/1931	Unknown	Unknown	146.9676	-31.1504
GW002970.1.1	61.3	1/11/1930	Stock and Domestic	Unknown	146.9718	-31.1596
GW805057.1.1	54	23/07/2012	Exploration	Functional	146.8395	-31.1941
GW805065.1.1	87	28/06/2012	Exploration	Functional	146.8446	-31.2172
GW805058.1.1	48	24/07/2012	Exploration	Functional	146.8442	-31.2003
GW805066.1.1	132	27/06/2012	Exploration	Functional	146.8488	-31.2231
GW805056.1.1	66	24/07/2012	Exploration	Functional	146.8363	-31.2003
GW805064.1.1	82	28/06/2012	Exploration	Functional	146.8471	-31.216
*metres below ground level (mbgl)						

Bore depths range between 10 and 165 mbgl, with the majority of bores installed to depths greater than 60 m. Seven bores are registered as water supply, seven for exploration, five for stock and domestic, and two landholder bores with an unknown purpose. The majority of the bores are located to the east of the Project site and east of the Bogan River.

GW3006.1.1 is the closest landholder bore to the Project site and was drilled in 1931 to a depth of 86m. It is located approximately eight km to the south. The work summary for this bore suggests it encountered unconsolidated sediment (clay) to a depth of approximately 30 m which was underlain by slate and quartz.

The majority of water supply bores identified in the search (refer to Figure 9) are located to the east of the Bogan River and are associated with the Great Artesian Basin and/or overlaying alluvium.

3.3.7. Groundwater Dependent Ecosystems

Groundwater dependent ecosystems (GDEs) are defined as '*ecosystems that require access to groundwater to meet all or some of their water requirements so as to maintain their communities of plants and animals, ecological processes and ecosystem services*' (Richardson et al. 2011; NSW DPIW 2019). Potential GDEs are identified based on regional assessments of groundwater levels, remote sensing of vegetation and surface topography.

As part of the Water Impact Assessment (GHD 2024), a search of GDEs through Sharing and Enabling Environmental Data (SEED) NSW (SEED 2023) was undertaken to identify GDEs within 20 km of the Project site. A map of the potential terrestrial and aquatic GDEs, classified as high, moderate or low potential GDEs, is contained in Figure 4.7 within the Water Impact Assessment (GHD 2024) and has not been replicated in this CPWMP. Based on the lack of observed shallow groundwater within 10 m of ground surface, and the likelihood of confinement of the groundwater source, the level of dependence of the potential terrestrial GDEs on groundwater is likely to be low.

The Bogan River is located nine km east of the Project site. Parts of the Bogan River were identified as being high potential aquatic GDE. The Bogan River supports a variety of aquatic ecosystems, including eel-tailed catfish and riparian vegetation occurring along the Bogan River (DPI Water 2017). Bogan River also provides habitat for threatened biota, including the Olive Perchlet (Water NSW 2019). Given the lack of shallow groundwater resources and that the potential aquatic GDEs are primarily dependent on surface water flows of the Bogan River and its associated ephemeral flow channels, the potential aquatic GDEs are considered unlikely to be dependent on groundwater resource with potential to be impacted by groundwater level changes in the Project area.

The majority of the GDEs around the Project site are classified as low potential terrestrial GDEs and include *Eucalyptus populnea* subsp. *Bimbil*, *Callitris glaucophylla/Acacia aneura* var. *latifolia,* as well as non-native GDE areas surrounding. The closest high potential terrestrial GDEs are situated to the northwest of the Project site and include *Eucalyptus populnea* subsp. *Bimbil, Eucalyptus intertexta,* and *Callitris glaucophylla/Geijera parvifl.* Based on the depth of groundwater sources (10-25 m), the likely rooting depth of vegetation and water quality being primarily saline, it is unlikely that the Project would impact potential terrestrial or aquatic GDEs in the vicinity of the project area (GHD 2024).

A review of high priority GDEs listed in the MDB Fractured Rock WSP for the Lachlan Fold Belt MDB Groundwater Source indicates that the closest high priority GDE to the Project site is the Pulpulla Spring located approximately 160 km to the west of the Project site.

4. RESPONSIBILITIES

Personnel, contractors and visitors at TRL all have responsibility for minimising the use of water and for identifying and reporting any water related incidents or emerging risks by complying with relevant aspects (as applicable to their role) of this CPWMP. Specific roles (Table 8) at TRL have key responsibilities in the approval, maintenance and implementation of this CPWMP.

Table 8 CPWMP Roles and Responsibilities

TRL Role	Responsibility
Site General Manager – Tritton Copper Operations.	Overall accountability for the environmental performance of the Tritton Copper Operations. Ensure adequate resources are available for implementation of the CPWMP. Approve continuous improvement initiatives. Chair the TRL Senior Leadership Team (SLT) meetings (which functions as 'Management Review' of the EMS). Promote a culture of environmental stewardship across the site.
Health, Safety & Environment Manager.	Overall responsibility for the development and implementation of this CPWMP and the environmental performance of the Tritton Copper Operations. Responsible for the site safety management system, emergency response and environmental performance of the Tritton Copper Operations (including implementation of the EMS). Ensure compliance with legal and other requirements. Provides relevant information to the TRL SLT Meeting regarding environmental performance and facilitates 'Management Review' of the EMS.
Department Managers	Responsible for the implementation of environmental risk controls, as they apply to their specific area(s) of responsibility. Ensure staff are trained in relevant environmental procedures. Incorporate environmental considerations into operational planning. Report environmental incidents and non-conformances immediately.

TRL Role	Responsibility
Environmental Superintendent.	Develop, approve, implement, and maintain this CPWMP. Ensure compliance with legal and other requirements. Responsible for the assessment and issuing of Surface Disturbance Permits Responsible for the identification of environmental risks and tracking the implementation of risk controls. Undertake consultation as it relates to the content of the CPWMP as required by development consents and other commitments. Responsible for the identification, reporting, investigation and corrective actions associated with environmental incidents and non- compliances. Identify opportunities for continuous improvement. Overall accountability for implementing monitoring programs and associated reporting. Provide environmental training and advice to all departments. Liaise with regulatory authorities on environmental matters. Prepare internal and external environmental reports.
Senior Environmental Advisors / Environmental Advisors / Environmental Technicians.	Responsible for implementing: • environmental monitoring programs; • undertaking environmental inspections; • implementing environmental awareness programs; • implementing other environmental programs; and • other tasks as directed by the Environmental Superintendent.
Community Relations Officer.	Responsible for the development, coordination and dissemination of information to community stakeholders.
Water Management Committee	Responsible for the tracking of water use and making key decisions regarding water supply. Implements continuous improvement initiatives to the water management system, to deliver water efficiency and reliability projects. Reviews and assists in devising corrective measures following any water related incidents or community complaints.

5. COMMUNITY AND STAKEHOLDER ENGAGEMENT

TRL maintains an open-door policy regarding complaints, questions and feedback to the local community. As such, surrounding landholders are regularly consulted through informal telephone conversations and correspondence.

The Tritton Community Consultative Committee was established on 22 February 2013 as a means to share information and maintain relationships with the various stakeholders (and is also required as per Condition C6 of the Avoca Tank Project Development Consent (DA 10/2015/004/003)). Invitees consist of representatives from local business, farmers, Bogan Shire Council, the Ngemba Ngiyampaa, Wangaaypuwan and Wayilwan (NNWW) people, the Bogan Aboriginal Corporation (BAC) and the Nyngan Local Aboriginal Land Council (NLALC). The CCC meets on a quarterly basis to discuss issues related to the company's operation and the community.

In accordance with the Constellation Project Development Consent (SSD-41579871):

- Condition C22 requires that the water management plan must be prepared for the development to the satisfaction of the Planning Secretary; and
- In accordance with Condition C22(a)(ii), this CPWMP must be prepared in consultation with the Water Group (within the New South Wales Department of Climate Change, Energy, the Environment and Water (DCCEEW)) and the EPA.

The draft CPWMP was referred to the Water Group and EPA when uploaded to the NSW Major Projects Portal. Feedback and recommendations from the Water Group (letter dated 12 March 2026) have been incorporated into this CPWMP. The EPA declined to review or provide comment (Letter dated 10 March 2026). In accordance with Condition B5 of the Constellation Project Development Consent (SSD-41579871), dates of consultation and a summary of comments received and actions taken to address the comments have been provided to DPHI. All comments have been addressed and there are no remaining matters of disagreement between TRL and the parties consulted.

Following consultation with the Water Group, a revised version of the CPWMP was submitted to DPHI for review and approval. Following their review, DPHI requested further information (letter dated 29/04/2026) and clarification of a number of points related to alignment with the Constellation Project Development Consent (SSD-41579871). A table of comments received, and actions taken to address the comments has been provided to the DPHI. The CPWMP was subsequently approved by a nominee of the Planning Secretary (letter dated 01/05/2026).

TRL will not commence construction of the mine site or mine access road until this CPWMP has been approved by the Planning Secretary in accordance with Conditions C22 and C23 of the Constellation Project Development Consent (SSD-41579871).

In accordance with Condition C24 of the Constellation Project Development Consent (SSD-41579871) TRL will implement the approved CPWMP.

6. RISK ASSESSMENT

TRL maintain an Environmental Risk Register (TRL-HSET-RAS-0006) which is reviewed and updated at least on an annual basis. The Risk Register is further described in the EMS (TRL-HSET-PLN-0023) and includes triggers for the review and update of the risk register (for example, following changes to site operations or processes, significant incidents, changes to legislation, new knowledge regarding environmental best practice etc). In addition, as part of the Constellation Project EIS, a risk assessment was conducted regarding the Project (AARC 2024). The TRL Environmental Risk Register (TRL-HSET-RAS-0006) will be updated to include risks related to the Project.

During the preparation of this CPWMP, the existing TRL risk register, and Constellation Project EIS (AARC 2024) risk assessment were used to identify key risks as they relate to water management aspects. Key risks and proposed primary[5] control measures are contained below in Table 9; risk rankings are based on the TRL risk assessment matrix (Appendix C). Table 9 also references the relevant section of the CPWMP where controls are further described. Section 7 further describes management measures to control and mitigate identified risks.

[5] Controls presented in Table 9 are considered the most effective controls, other controls are included in Section 7

Table 9 CPWMP Risk Assessment

Risk	Inherent risk ranking	Primary Controls*	Residual risk ranking	Section
Extraction of water results in the loss of water resources for other water users.	High 13	Water extracted in strict compliance with water sharing plans and licence entitlements.	Moderate 20	Section 7.1 Section 7.2
		Active tracking of water use vs licence entitlements.		
		Maximise water re-use and recycling		
Capture and use of rainwater and overland flow leading to a loss of downstream flows and potential impact on aquatic ecosystem values and landholders for use in agricultural activities.	Low 21	Water captured in accordance with basic landholder rights and / or licenced entitlements.	Low 24	Section 7.2
		Clean water diversion drains.		
Changes in local hydrology resulting in the concentration of flows leading to flooding and erosion risks.	Low 22	Clean water diversion drains.	Low 24	Section 7.2 Section 7.4
		Erosion and sediment control plan.		
		Drain and emergency spillways points designed in accordance with Landcom 2004.		
Uncontrolled release of contaminated water from site resulting in impacts to downstream aquatic ecosystems or other downstream water users.	Critical 8	Erosion and sediment control plan.	Moderate 20	Section 7.2 Section 7.4
		Review and update (calibration) of site water balance.		
		Site storage designed and constructed to capture defined rainfall events.		
		Chemicals and hydrocarbons stored in accordance with industry and Australian standards.		
		Site water management and transfers to manage storage levels and volumes.		
		Pumping of excess water from the Constellation mine site to Murrawombie.		

Risk	Inherent risk ranking	Primary Controls*	Residual risk ranking	Section
Uncontrolled release of contaminated water from site resulting in impacts to downstream aquatic ecosystems or other downstream water users (Continued).		AMD measures including: • the ongoing identification and selective handling of PAF materials. • Prioritising the use of PAF materials for underground backfilling. • Following the cessation of open pit mining, the placement of PAF materials at the base of the pit (for long term sub-aqueous storage) • Encapsulation of PAF materials within the Waste Rock Emplacement with a suitable cover design. • The capture and re-use of seepage and runoff during operational phases. • The containment of seepage post closure within the open pit void.	Moderate 20	Section 7.2
Uncontrolled release of sediment laden water from site resulting in impacts to downstream aquatic ecosystems or other downstream water users.	Critical 8	Erosion and sediment control plan. Site storage designed and constructed to capture defined rainfall events (Landcom 2004). Site water management and transfers to manage storage levels and volumes. Pumping of excess water from the mine site to Murrawombie.	Moderate 20	Section 7.2 Section 7.4
Drawdown of groundwater (due to open pit and Underground mining operations) resulting in a loss of water resources for agricultural activities.	Low 23	Review and update (calibration) of groundwater model. Monitoring of groundwater levels. Landholder compensatory measures	Low 25	Section 7.3

Risk	Inherent risk ranking	Primary Controls*	Residual risk ranking	Section
Contamination of groundwater resources resulting in potential impact on aquatic ecosystem values and landholders for use in agricultural activities.	Moderate 17	Heap Leach Pad under-liner QA/QC during construction.	Moderate 20	Section 7.3
		HDPE liner used for high risk storage dams and drains (QA/QC during construction).		
		Groundwater monitoring (including to monitor the performance of the HLP liner)		
		AMD cover design (Heap Leach pad and Waste Rock Emplacement)		
*Controls presented above are considered the most effective controls, other controls are included in Section 7				

7. MANAGEMENT MEASURES

The following subsections describe the management measures and controls that will be implemented to meet water related compliance requirements, commitments and to manage identified risks.

Measures have been devised to generally meet Condition A1 of the Constellation Project Development Consent (SSD-41579871) where TRL will implement all reasonable and feasible measures to prevent, and if prevention is not reasonable and feasible, minimise any material harm to the environment that may result from the project.

The following sections describe the Water Management Systems for the CP and to specifically meet the requirements of Condition C22 of the Constellation Project Development Consent (SSD-41579871) for the project.

7.1. Site Water Balance

7.1.1. Performance Measures

Condition C21 of the Constellation Project Development Consent (SSD-41579871) contains performance measures that must be achieved during the construction and operation of the CP. Performance measures as they relate to water use and efficiency are presented below in Table 10. Table 10 provides a reference to the relevant section of this CPWMP where actions to achieve the measure are described.

Table 10 Water Balance performance measures

Feature	Performance Measure	Relevant Section
Water management – General	Minimise the use of clean and potable water on the site.	Section 7.1.3
	Maximise water recycling, reuse and sharing opportunities.	
	Minimise the use of make-up water from external sources.	
	Design, install, operate and maintain water management systems in a proper and efficient manner.	
Surface water resources	Negligible impacts to surface water resources caused by the development beyond those predicted in the EIS.	

7.1.2. Overview

GHD, as part of their Constellation Project Water Impact Assessment, (GHD 2024) developed a site water balance model to quantify water demands for the project under a range of rainfall and climate conditions.

GHD (2024) obtained point data from the Scientific Information for Land Owners (SILO) database operated by Queensland Government's Department of Environment and Science. SILO point data consist of interpolated estimates based on historically observed data from Bureau of Meteorology (BOM) climate stations.

For this assessment, SILO data was obtained for the grid point centred at -31.1 N, 148.00 E, which is near the Project site. Comparison of this dataset to the nearby sites including, Warren (Mumblebone) (station 51034), Hermidale Tank (station 51026) and Brewarrina Hospital (station 48015), respectively located 81 km, 58 km and 125 km of the Project site. The datasets span the period from 1 January 1889 to 14 March 2023.

7.1.2.1. Water supply infrastructure

Off-site water supply is required to meet operational water demands when a water deficit occurs on-site; such as when rainfall, runoff or groundwater inflows cannot meet site demands. Off-site water supply would be via a new bidirectional buried pipeline connecting the CP with the MCM.

The bidirectional pipeline would also be used to transfer excess water from the Project site to the MCM to minimise both water use and potential for off-site emergency discharges.

7.1.2.2. Water Balance Inputs

Inputs into the Water Balance Model include:

- direct rainfall;
- catchment runoff;
- groundwater inflows (into the Constellation open cut pit and underground operations); and
- transfers via pipeline from the MCM.

The primary source of water, available from the MCM is from the Burrendong Dam which is distributed to the site via a buried pipeline that extracts water from the Macquarie River via Gunningbar Creek. At the confluence of Gunningbar Creek and the Bogan River a small weir and metered off-take has been constructed for the extraction of water (Figure 5). This water is pumped to the MCM Raw Water Dam using an electric pump station incorporating two booster pumps along the pipeline. The pumps are able to be operated remotely from the TCM site and have the capacity to pump water at approximately 135 m^3 per hour (3.24 ML/day). From the MCM Raw Water Dam, the water is pumped to the TCM Raw Water Dam or to the Constellation Mine Dam (following the construction of the Constellation Mine Site and pipeline).

7.1.2.3. Operational water demands

Operational water demands at Constellation include:

- water for staff amenities;
- underground mining operations;
- dust suppression;
- on-site ore processing, including operation of the heap leach facility and pre-concentrator;
- paste fill/concrete batch plants; and
- vehicle washdown.

Operational water demands are proposed to be supplied by a combination of sources, including rainfall, runoff, groundwater inflows into the mine workings and a bidirectional water pipeline between MCM and the Project site.

7.1.2.4. Construction water demands

Construction water demands include uses such as dust suppression, moisture conditioning of materials used in construction (eg roads / foundation materials), vehicle washdown and water required for materials (such as concrete).

Construction water will be supplied via tanker from the MCM (from TRLs existing licence entitlements), until the bidirectional pipeline has been installed and commissioned.

No production bores have been planned for construction or operations at this stage, given local groundwater sources are expected to be low yielding and saline near the Constellation orebody. However, production bores are an option for supplementing water supply and will be investigated in the future if required. If utilised, TRL will apply for and obtain necessary water supply work approvals prior to the construction of any production bores.

If required, TRL may consider the supply of construction water via an alternate temporary overland pipeline from the Bogan River (subject to landholder agreement). Water would be extracted under the existing WAL and either a new or amended works approval. TRL will comply with any direction from the NSW Water Group as related to the licencing of this construction water source option.

TRL will track water extraction and use from their existing operations and the Project (construction and operational phases) to ensure that extraction remains within licence entitlements. If required TRL may purchase or trade additional share components to ensure sufficient water allocation is available, or scale construction and operational activities to meet available water supplies.

7.1.3. Water Balance Modelling Results

GHD (2024) simulated the site water demands for a nominal 10-year period from the commencement of open cut mining operations. Open cut mining operations are staged between years 1 and 2, while underground mining operations are proposed between years 3 and 10.

The annual average water balance for both the minimum water demand year (year 1) and peak water demand year (year 4) are presented in Table 11 and shown schematically in Figure 10 and Figure 11 respectively (GHD 2024).

The estimated volume of water required throughout the life of the Project for surface operations and underground operations for each year of the simulated water balance was developed. The results represent the average volume of water used in surface operations or underground operations, relative to the proportion of water supplied by MCM in the context of all inflows (including rainfall, runoff and groundwater inflows). This estimate throughout the Project life is presented in Table 12.

The import proportion required to be supplied by the pipeline from MCM is greatest in years 4 to 7. Following this period, the import proportion decreases due to the modelled increases in groundwater inflows. As the groundwater modelled inflows are conservatively high, the amount of 'makeup' water required to be delivered by the bi-directional pipeline may be more than predicted in the model.

Table 12 also demonstrates that the inherent surface water and groundwater sources at the Project site alone are not sufficient to meet the Project water demands and demonstrates the requirement for the bidirectional pipeline from MCM to supplement the water inherently available at the Project site.

The water management system has been designed to prioritise the re-use of site captured waters to satisfy the majority of site water demands, such as the re-use of contaminated water for heap leach irrigation and paste fill plant usage. As a result of prioritising and maximising the re-use of site captured waters, the demand for externally sourced clean water has been minimised as far as practicable.

The site water balance model was used to estimate the likelihood of off-site discharge from the MIA Runoff Dam, the Waste Dump Dam and the Process Runoff Dam. While each storage has been designed to the 1% AEP 72 hour duration storm design criteria, in rare rainfall events (exceeding the nominated design criteria) each of these storages may still have the potential to discharge off-site.

Off-site discharge potential was assessed for each year of operations. The peak year for off-site discharge corresponded to year 3 of operations, when simulated rainfall was greatest for all years of operation and site water demands remain relatively low.

Table 11 Annual Average Water Balance (Source GHD 2024)

Water Management Element	Year 1 Annual Transfers (ML/year)	Year 4 Annual Transfers (ML/year)
INPUTS		
Direct Rainfall	46	34
Catchment Runoff	127	127
Groundwater Inflows	105	194
Transfer from Murrawombie Copper Mine	66	258
TOTAL INPUTS	**344**	**613**
OUTPUTS		
Evaporation	97	95
Uncontrolled off-site discharge	0	0
Dust suppression	58	57
Irrigated treated sewage effluent from amenities	5	5
Transfers to Murrawombie Copper Mine	5	0
Paste Fill Plant	0	311
Pre-concentrator use	0	75
Heap leach net loss	90	0
Vehicle washdown	10	10
Ore moisture loss	23	22
Underground ventilation losses	0	32
Underground seepage losses	0	32
TOTAL OUTPUTS	**288**	**640**
CHANGE IN STORAGE		
Surface Water Storages	56	-27
TOTAL CHANGE IN STORAGE	**56**	**-27**
BALANCE		
Inputs – Outputs – change in storage	0	0

GHD (2024) assessed the cumulative annual total probability of the transfer demand from MCM for the peak demand year (Year 4) and concluded that the cumulative volume required in the peak water demand year is unlikely to exceed 359 ML.

Modelled groundwater inputs make up approximately 30 % of total inputs to the water balance. If groundwater inflows are less than predicted the required volume to be transferred from MCM may be greater.

Table 12 Annual Average Water Input Volumes

Year of Operations	Import proportion from MCM	Volume Imported (ML)	Surface Operations (ML/Year)	Underground Operations (ML/Year)
Year 1	19 %	66	56	0
Year 2	8 %	29	28	0
Year 3	16 %	63	44	21
Year 4	42 %	258	71	199
Year 5	37 %	217	40	177
Year 6	33 %	194	36	157
Year 7	30 %	180	34	146
Year 8	27 %	163	31	132
Year 9	22 %	136	26	109
Year 10	25 %	147	29	119

Figure 10 Annual Water Balance (Year 1) (Source GHD 2024)

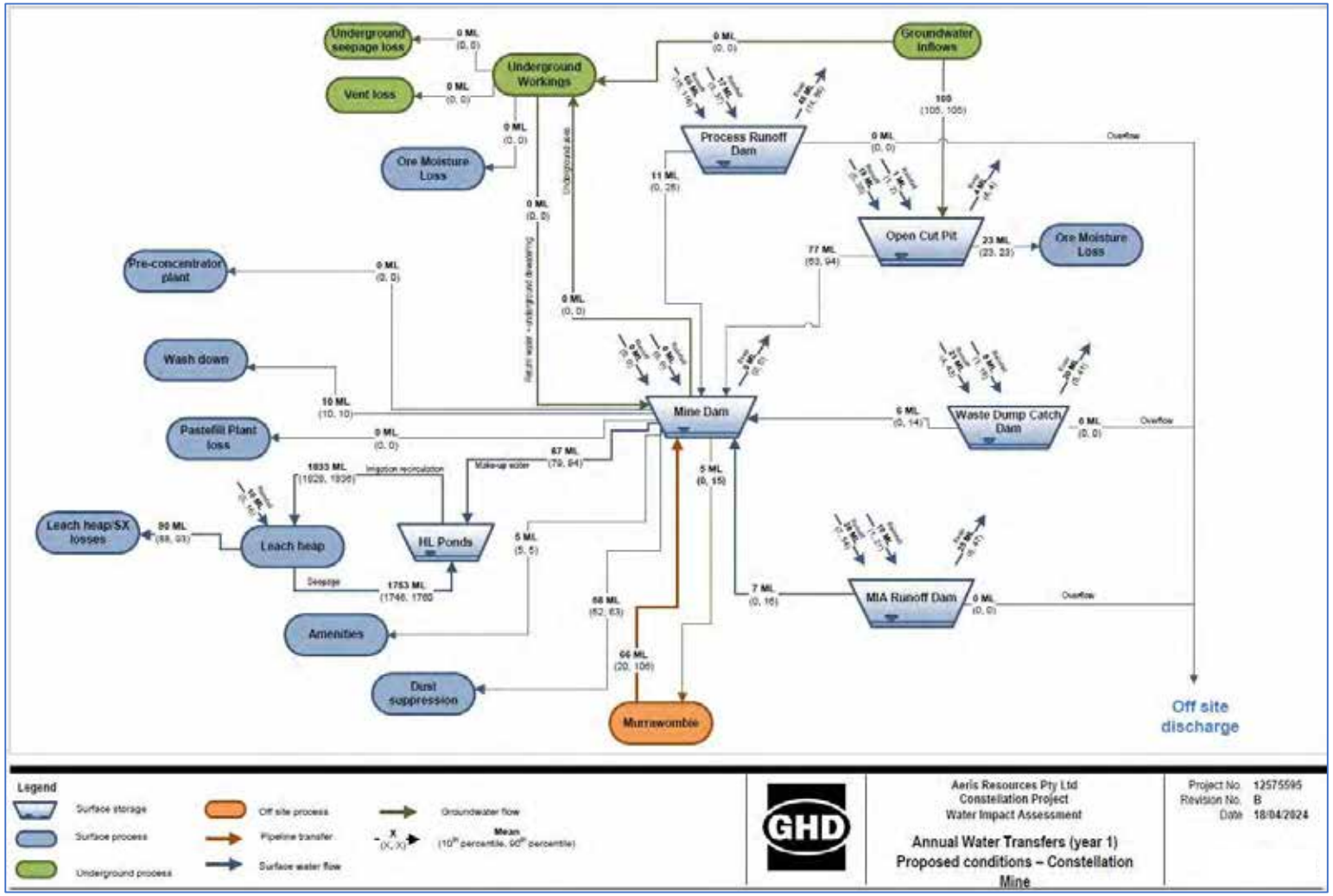
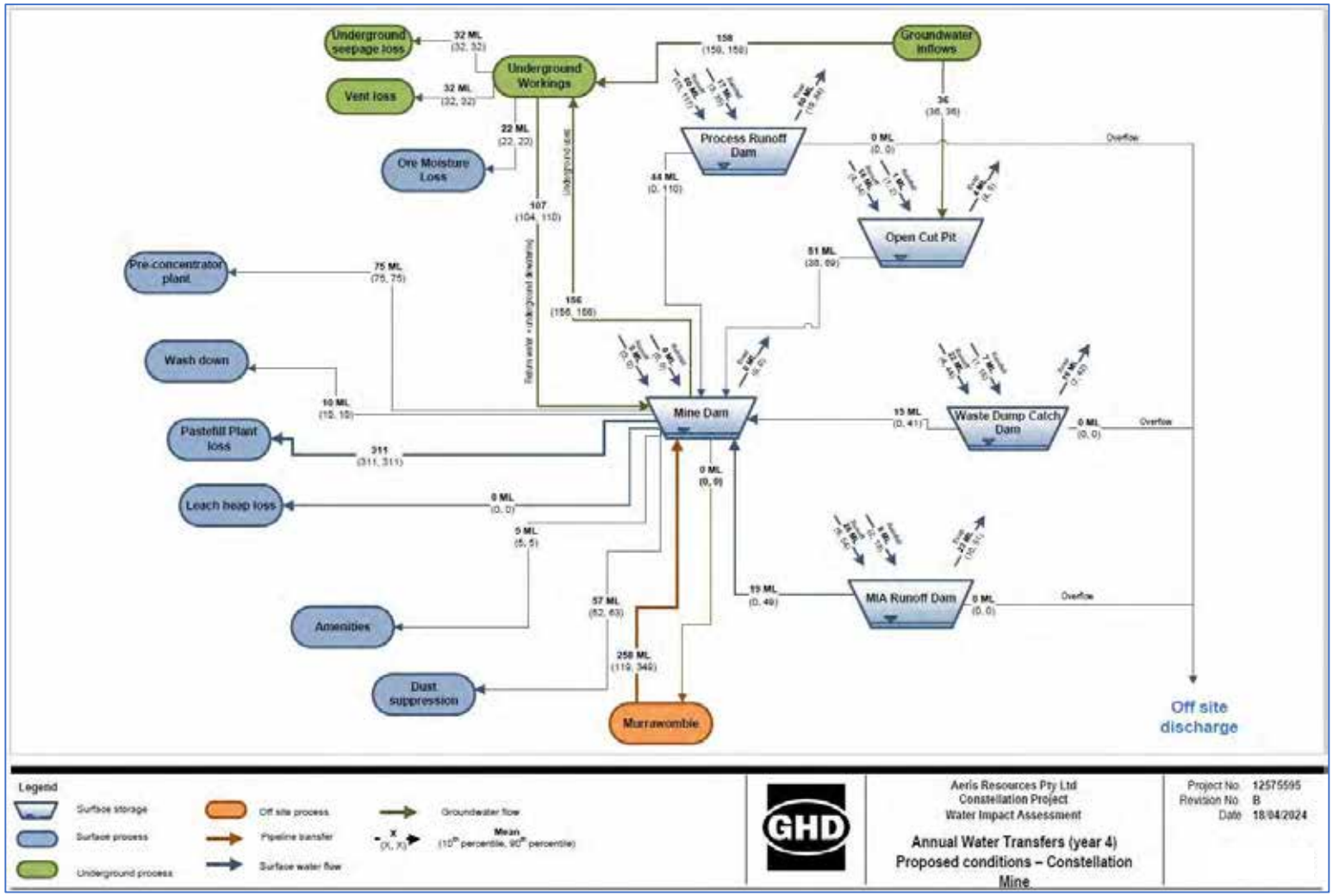


Figure 11 Annual Water Balance (Year 4) (Source GHD 2024)



7.1.3.1. Water security

Water required for the Project will be sourced from existing licences held by TRL (Section 2.5.2). Water will be transferred from MCM to the Project via the bidirectional pipeline. Water from MCM is sourced from Gunningbar Creek Weir and extracted under existing WALs.

The total share components in surface water sources currently held by TRL totals 931.0 ML, comprised of Regulated River (high security, general security and supplementary water). As discussed in Section 7.1.3, the peak volume required to be sourced externally (from Constellation) for the Project over the modelled period is unlikely to exceed 359 ML/year.

The CP is intended to replace depleting resource at other TRL operations. Therefore, it is likely that water demands at other mine sites would decrease or cease as water demands at the CP increase. However, the ore throughput at Tritton Mill (with associated water demands) would likely stay the same or increase.

The maximum required annual volume of water (359 ML) for the Project may be sourced from the existing licensing held by TRL in the Macquarie and Cudgegong regulated rivers water source. However, if water security cannot be achieved within the limits of the existing licences, TRL will purchase or trade additional share components and / or may scale production to the match water availability if required.

The peak annual groundwater take, based on modelled groundwater inflows, is predicted to be 309 ML/year (year nine of mining (Table 21). Aeris currently holds 334 ML/year share components within the Lachlan Fold Belt MDB Groundwater Source. Reported groundwater take for the 2024-25 reporting year at the existing Tritton Copper Operations is 212.9ML; made up by 173.9ML at the MCM, NECM and ATP sites and 39ML at the TCM site. On the assumption that existing groundwater take at the existing Tritton Copper Operations would remain the same, and in consideration of the modelled groundwater inflow at the CP (Table 21), it is likely that existing groundwater entitlements may be exceeded from year two of mining operations (361.3ML) with maximum combined groundwater take predicted in year nine of mining operations (522.1ML). Under this scenario the maximum additional groundwater entitlement of 189ML (in year nine) may be required to account for groundwater take at all TRL operations. TRL has made enquiries through a water broker who has confirmed that sufficient groundwater entitlement within the Lachlan Fold belt fractured rock aquifer, is available for trade / purchase. TRL will continually track groundwater take during the life of all operations to ensure sufficient licence entitlement is held to account for all groundwater extraction. There is sufficient market depth within the groundwater source to obtain these licences based on review of historical water trading statistics (refer to Section 6.6 of GHD 2024)

TRL will obtain and / or modify required works approvals to include groundwater extraction from the Constellation open pit and underground operations.

7.1.3.2. Management of excess waters

Accumulated excess waters at the Project site would be managed to prevent the emergency discharge of any contaminated waters. The key mechanisms for managing excess water at the Project include:

- Track rainfall and weather forecasts that may indicate a higher likelihood of accumulating excess rainfall.
- Track the accumulation of water at the CP and reduce / cease the pumping of water from Murrawombie to avoid the accumulation of excess water;
- Commence the early removal of excess water from the mine site by pumping excess water to the Murrawombie Mine, via the bidirectional pipeline.

Transfers of excess water may occur at a greater frequency during wet weather events and will depend on the site storage capacity, both at the CP and at Murrawombie at the time of rainfall. In the case that storages at both sites are full, as a further contingency to prevent emergency discharge, excess water:

- At the CP, excess waters may be directed to the open pit void (following the cessation of open pit mining (if deemed safe to do so).
- At Murrawombie, excess waters may be:
    - transferred to the Tritton Copper Mine (if there is sufficient capacity at TCM);
    - directed to the Murrawombie open pit void (if safe to do so); or
    - transferred to the North East Copper Mine (open voids) using an existing pipeline.

7.1.3.3. Water Storage

The CP has a combined water storage capacity of approximately 465.8 ML. Further detail regarding the site dams and designed storage are contained in Section 7.2.3 and Table 15.

Water is stored temporarily in the containment dams and/or sediment control dams following rainfall events and dewatered (re-used or pumped to Murrawombie) as soon as practicably possible to restore the design storage capacity.

TRL track weather forecasts including potential large or prolonged rainfall events. Where such events are forecast, TRL will minimise or cease pumping from the MCM and reduce storage volumes at Constellation to maximise available site storage capacity. This will reduce the likelihood of an emergency discharge and reduce energy use associated with pumping excess waters to Murrawombie.

7.1.4. Water Efficiency

TRL will maximise the re-use of water in order to minimise the amount of new water required to be extracted from natural systems and imported to site. Water efficiency initiatives will be further described and reported in the Annual Review.

7.1.5. Water Balance Monitoring and Reporting

Flow meters will be installed at key locations to quantify external inflows and internal transfers that are material to the site water balance. Flow meter locations include:

- Water input and output via the bi-directional pipeline from MCM
- Transfers from MIA Runoff dam to the Mine Dam
- Transfers from Waste Dump Catch dam to the Mine Dam
- Transfers from open cut pit to the Mine Dam
- Transfers from Process Runoff Dam to the Mine Dam
- Transfer of groundwater from underground operations to the open cut pit
- Transfer from the Mine Dam to underground operations
- Transfer from the Mine Dam to Heap leach pad for irrigation.
- Transfer from the Mine Dam to standpipe / outlet for dust suppression.

In addition to the above flow meters, TRL will record the site water storage volumes for input into the site water balance. Water storages volumes may be continually recorded using water level / pressure sensors, or manually recorded at the start and end of the water balance review period using installed staff gauges; where dam water levels are compared against formal surveyed dam rating curves. Dams are surveyed on a periodic basis to ensure stored volumes remain accurate.

All required licensed water inflows linked with a WAL (Table 13) are fitted with a pattern approved flow meter in accordance with the Water Management (General) Regulation 2025 and the DPE-Water Non-Urban Metering Framework. In accordance with the framework, these meters will be calibrated by a Duly Qualified Person (DQP) every 5 years. Other works linked to WALs are exempt from metering by DPE on the basis that the works are inactive, or where works represent a groundwater excavation where directly metering the groundwater inflows is not possible (e.g. underground mining).

Table 13 Meters installed in compliance with DPE Non-Urban Metering Framework

Work Approval	Location (ESID)	Installed Meter
80WA719370	Gunningbar Creek pump station (29772)	250mm Pattern approved meter with Local Intelligence Device
ESID = Extraction Site Identification Number		

Following the commencement of operations, the water balance model will be updated and run on an annual basis and revised (and calibrated) every three years.

A site AWS meteorological station will be installed to further inform the site water balance model (location shown in Figure 13).

The water balance will be presented annually in the Annual Review for the project. The annual review will also include:

- All licenced water extraction (surface water and groundwater) compared to licence entitlements;
- The annual site water consumption;
- Details on any emergency discharges of site water (including cause(s) and corrective measures); and
- Initiatives undertaken to improve water efficiency / reduce reliance of clean water sources

7.2. Surface Water Management Plan

7.2.1. Performance Measures

Table 14 below provides performance measures as stated in Condition C21 of the Constellation Project Development Consent (SSD-41579871) and apply to surface water management aspects. Table 14 provides a reference to the relevant section of this CPWMP where actions to achieve the measure are described.

Table 14 Surface Water performance measures

Feature	Performance Measure	Relevant Section
Water management – General	Maintain separation between clean, dirty (i.e. sediment-laden) and mine water management systems.	Section 7.2.3
	Design, install, operate and maintain water management systems in a proper and efficient manner.	Section 7.2
	Minimise risks to the receiving environment and downstream water users.	Section 7.2.3 Section 8.1.3.2
Surface water resources	Negligible impacts to surface water resources caused by the development beyond those predicted in the EIS.	Section 7.2 Section 8.1
	Maximise, as far as reasonable and feasible, the diversion of all clean water around disturbed areas.	Section 7.2.3.1
Waste Rock Emplacement Area	Minimise, as far as reasonable and feasible, the potential for acid mine drainage.	Section 7.2.3.8
Flood Mitigation	Negligible change to off-site flood regime, including flows, levels, storage capacity or velocities.	Section 0
Chemical and Hydrocarbon Storage	Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard.	Section 7.2.3.9

7.2.2. *Site Water Management Plan*

The following aspects comprise the Site Water Management Plan for the CP. Further detail regarding these aspects is included below in Section 7.2.3.

- The proposed water management system includes drains, dams and pumps to capture, contain and recirculate potentially contaminated waters which aim to minimise the use of fresh water sources.
- The construction of the off-site bidirectional water supply pipeline will:
    - provide contingency water supply to the Project site when required to meet site water demands; and
    - allow the management of excess contaminated water, via transfers to Murrawombie Mine throughout the life of the Project.
- The site water management system has been designed to mitigate (as far as practicable) off-site emergency discharges due to high or prolonged rainfall events. The dirty and contaminated water management system has been sized to contain a 1% AEP design rainfall event for drains and a 72 hour duration 1% AEP for storages. Each dam with the potential to discharge off-site will be regularly inspected (Section 9), with water levels managed to prevent emergency discharges via on-site and off-site water transfers. After rainfall, design storage capacity will be returned as soon as practicable through the on-site transfer and re-use of water, or via pumping excess water to Murrawombie (Section 7.1.3).
- Wastewater generated on site from staff facilities and construction activities would be collected for treatment and on site disposal (through methods such as irrigation, absorption trenches etc) or reuse to prevent potentially nutrient rich discharges occurring from site.

7.2.3. *Surface Water Management*

Surface water is classified into clean, dirty, raw and contaminated waters. The proposed water management plan for the Project seeks to minimise the incidental capture of clean water through clean water diversions upgradient of the mine disturbance area, while collecting dirty and contaminated water from disturbed or mining process areas through contaminated water capture drains and storages to prevent emergency discharge of this water from the Project site. Site drainage and catchments are shown on Figure 12.

7.2.3.1. Clean Water Management

Clean water is defined as surface runoff from catchment areas located upgradient of the mine disturbance area. Where practicable, clean water will be diverted around the disturbance area to re-join the natural catchments downslope of the Project area. No harvesting of clean surface water for construction or operational usage is proposed.

Two open clean water diversions are proposed to the north and south of the site (as shown on Figure 12) to divert clean water around the disturbance area. These clean water diversions would be developed during the construction phase and maintained throughout the operational life of the project. These clean water diversion drains will:

- prevent upland flows impacting disturbed / construction areas and becoming contaminated with sediment;
- reducing the catchment size where disturbed areas are present and therefore reducing the volumes of water that require capture and retention; and
- Minimise water taken from the local surface water source.

One additional diversion dam (DD1) is proposed to be built at the commencement of construction and will be maintained throughout the operational life of the project. The sole purpose of DD1 is to capture upslope flows and direct them to the northern clean water diversion drain; water from this dam will not be used for any construction or operational purposes. Due to the relatively small catchment, DD1 is expected to be predominantly dry. The location of DD1 is shown on Figure 12.

7.2.3.2. Dirty Water Management

Dirty water is defined as surface runoff from areas of disturbance, generally occurring during construction activities and will likely contain elevated levels of turbidity / sediment. Five dirty water drains (Figure 12) are proposed within the site which would divert dirty water during the late construction period to the proposed site water storages which would act as dirty water or sediment basins during this phase. Drains would be constructed progressively as the site is developed; initial (pre-construction erosion and sediment controls are presented in Section 7.4.5.2). Suitable water re-use options during construction include; dust suppression, moisture conditioning of materials, drilling activities, vehicle washdown and the manufacture of concrete (following settling / treatment to remove sediment).

During the operational period, these drains would intercept both dirty and contaminated water flows and divert these to the site contaminated water storages.

One additional sediment basin (SB1) is proposed to be built at the commencement of construction and will be maintained throughout the operational life of the project. The purpose of SB1 is to capture upslope flows from the solar farm / power station area and (part of) the workshop area. While the primary purpose of SB1 is to capture sediment during construction and operations, SB1 would also ultimately capture any unlikely hydrocarbon spills from the workshop or power station. The location of SB1 is shown on Figure 12.

7.2.3.3. Water Diversion Structure Design Criteria

Clean and dirty water diversion bunds and drains are constructed within the mine site to define internal catchments as relevant to the location and sizing of containment dams. Bunds and drains will be maintained throughout the late construction and operational phases of the mine to ensure that only defined catchments report to the appropriately designed containment dam. Drains will be constructed in accordance with Standard Drawing SD 5-6 from Managing Urban Stormwater: Soils and Construction – Volume 1 (the 'Blue Book') (Landcom 2004) (relevant figures included in Appendix D). These diversion drains are required to be stable, non-erosive, and appropriately sized for their catchment.

All proposed permanent drainage controls and drainage controls for contaminated runoff will be designed with a non-erosive hydraulic capacity, suitable for conveying peak flows from the critical duration 1% Annual Exceedance Probability (AEP) storm event, equivalent to a 100-year Average Recurrence Interval (ARI).

Key design parameters for drainage controls are as followed:

- Designed to convey runoff from a 1% AEP with 150 mm freeboard.
- Maximum slopes (of bund / drain embankments) – 1:3 (vertical : horizontal).
- The discharge point of each drain will be constructed and maintained as a Level Spreader with dimensions meeting the design standards of SD 5-6, namely: − drain slope of 6m on approach to discharge; − sill width of >4m; − sill grade of 0%; and − sill to be maintained with grass cover or lined with rip rap / rock armouring.
- The channel will contain rock check dams and be suitably lined (for example vegetated or rock armoured) where required to minimise the likelihood of erosion and scour for predicted peak flow velocities during the design storm.
- Maintained (sediment removed, bunds re-established, erosion repaired etc).

7.2.3.4. Raw Water

For the purpose of this CPWMP, raw water is defined as clean river water as initially imported from the MCM and stored within the Raw Water Dam. From the Raw Water Dam, raw water is used as 'top-up' water (via the Mine Dam) to supplement the prioritised re-use of captured and contained dirty or contaminated waters to meet site water demands. Raw water is also used for dust suppression, non-potable use in ablution facilities, mixing reagents (where high quality water is required) and to dilute any contaminants (in other water sources) to make them suitable for re-use where required (i.e. via the Mine Dam).

Following the use of the bidirectional pipeline to remove excess (likely contaminated) waters from the Project site, it is likely that some contaminants may remain within the pipeline and returned to the Project site following the re-commencement of pumping of raw water; it is however expected that any contaminants will be suitably diluted to not restrict the proposed uses of raw water. Raw water use options (e.g. potential limitations to use due to contamination from use of the bidirectional pipeline to transfer contaminated water to MCM) will be verified on an ongoing basis through surface water quality monitoring (Section 8.1).

7.2.3.5. Contaminated Water Management

Contaminated (or process) water is categorised by the increased likelihood of elevated concentrations of dissolved metals and salts from contact with ore and waste rock. Contaminated water includes water that is potentially impacted by acid from the ore extraction process (heap leach facility), acid and metalliferous drainage (AMD), the spill or loss of site chemicals or hydrocarbons, groundwater extracted from underground or open cut operations and surface runoff from processing, stockpile and extraction areas. As shown in Figure 12, the contaminated water management system has been designed with the aim of mitigating the risk of contaminated water discharging from site.

The contaminated water management system includes capture of contaminated water in contaminated drains and directing these flows to the contaminated water storages. During operational phases, contaminated site water storages include the Mine Dam, Process Runoff Dam, Waste Dump Catch Dam, MIA Runoff Dam and Heap Leach Ponds (Table 15). During operational phases, suitable water re-use options (generally via the Mine Dam) include; heap leach pad irrigation, SX plant operation, vehicle washdown facilities, dust suppression within contaminated catchment areas (i.e open cut pit, underground area) and the manufacture of concrete / paste fill. Re-use options will be further considered based on a review of water quality monitoring results following commencement of operations (Section 8.1) and may be extended to include (for example) dust suppression within clean / uncontaminated areas (most likely from the MIA Runoff Dam and / or Waste Dump Catch Dam).

The developed water balance model (GHD 2024) indicates that the probability of site discharge is low, nonetheless, following large or prolonged rainfall events (that exceed the design storage capacity of site containment dams) emergency discharge remains possible. The following measures are incorporated into the surface water management system to minimise the potential for emergency discharge:

- Hydraulic capacity for clean water diversion drains and dirty water capture drains to convey the design peak flow for the 1% AEP design rainfall event.
- Environmental containment freeboard to contain the design runoff volume for the 1% AEP, 72 hour duration design rainfall event. The Process Runoff Dam, Waste Dump Dam and the MIA Runoff Dam are each sized and managed to enable containment of this design rainfall event.
- The Mine Dam is a turkeys nest dam with a nominal capacity of 10 ML, for operational purposes. The Mine Dam will be operated with a freeboard to contain direct rainfall from the design storm (72 h 1%AEP).
- Pumps would recirculate contaminated water for reuse from contaminated water storages which intends to reduce the likelihood of off-site emergency discharges.
- Pumping of excess water to MCM or into the Constellation Open Cut pit (following the cessation of mining (and if deemed safe to do so)).

The characteristics of each contaminated site water storage are presented in Table 15.

The MIA Runoff Dam, Process Runoff Dam and Waste Dump Dam would each have a peg / staff gauge installed (or alternatively an automated level sensor) to indicate the required storage volume (Table 15). Following runoff into the dam, and water levels being higher than the installed peg, dewatering activities will be implemented to return the dam to its required storage volume as soon as practicable.

Dams are inspected on a regular basis, nominally after 20mm of rainfall in a 24 hour period, to assess water levels and periodically surveyed to ensure that the collection of silt has not diminished the storage capacity to below required volumes. Where required dams are de-silted to reinstate the required storage volume.

Figure 12 Site Drainage

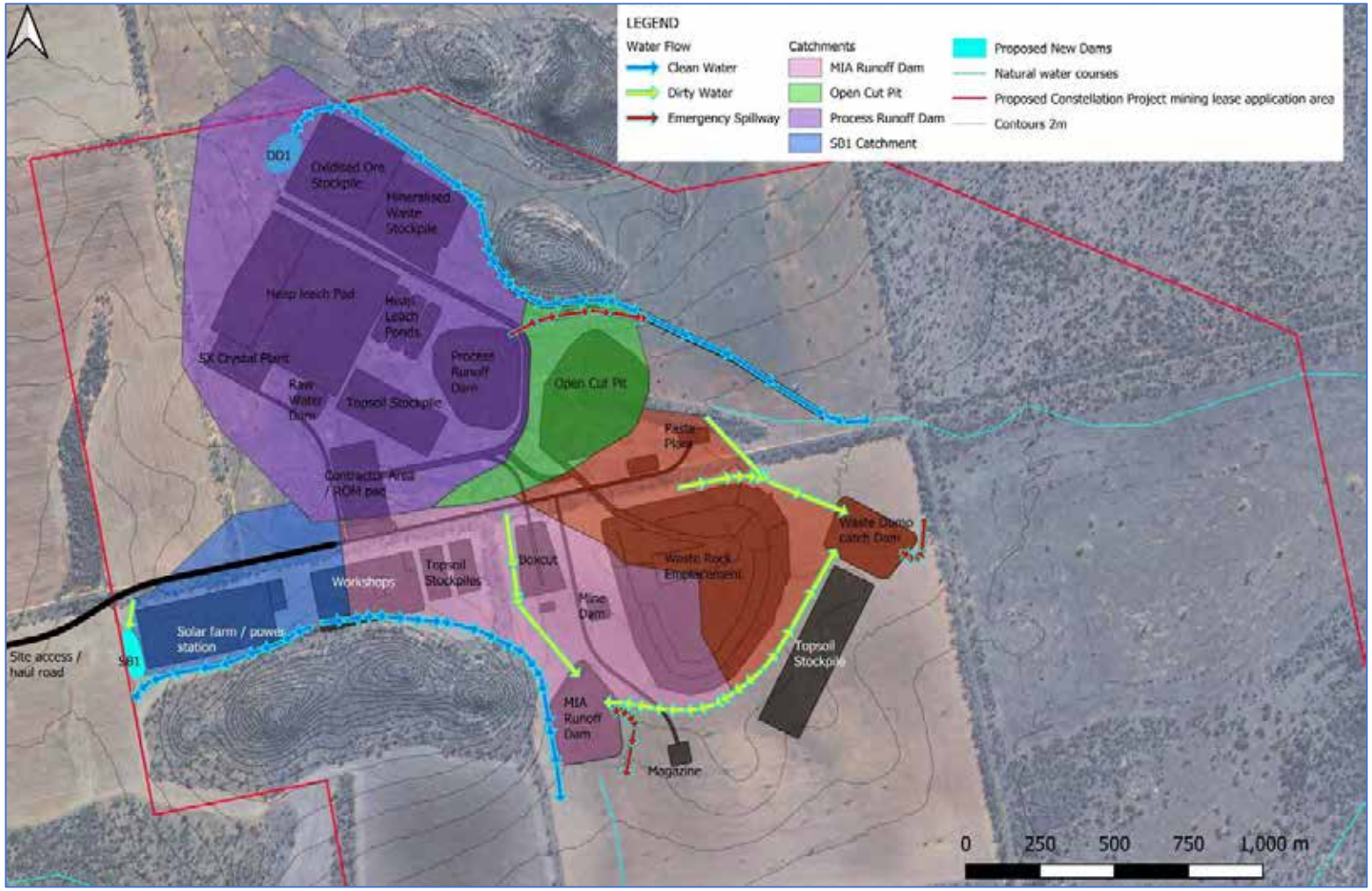


Table 15 Site Water Storages

Storage	Capacity (ML)	Catchment Area (ha)
MIA Runoff Dam[1]	116.5	63.4
Process Runoff Dam	249.1	124.6
Waste Dump Dam[1]	90.2	50.7
Mine Dam	10 ML (nominal)	Direct Rainfall Only
[1]The MIA Runoff Dam and Waste Dump Dam are located down-gradient of the mine disturbance area and are the likely emergency discharge points from the site where rainfall exceeds the design storage capacity of containment structures (Figure 12).		

As shown in Figure 12 contaminated runoff from the following areas would divert to the site water storages:

- Runoff from the mine infrastructure area would be directed to the MIA Runoff Dam, including surface flows from the workshop (and associated infrastructure including washdown bay, laydown area, carpark etc) underground laydown areas and topsoil stockpiles.
- Runoff from the waste rock emplacement (WRE) would report to either the Waste Dump Catch Dam or the MIA Runoff Dam via a contaminated water drain.
- Runoff from the processing area may be potentially contaminated by interaction with ore stockpiles and heap leach piles. These flows would be directed to the Process Runoff Dam. Following the cessation of open pit mining, any overflow / emergency discharge from the Process Runoff Dam may be directed to the open cut pit, rather than discharged into the northern clean water drain.
- Runoff from the box cut would report down the decline and be dewatered as part of the underground dewatering system to the Mine Dam. An internal contaminated water drain directs catchment runoff to the MIA Runoff Dam to minimise the volume of water intercepted by the box cut.

Contaminated process water leached from the heap leaching processes would be captured within the heap leach ponds. If wet weather conditions arise which cause the heap leach ponds to overflow, this overflow would be captured by the Process Runoff Dam.

Excess water is expected to be transferred off-site via the bidirectional pipeline and sent to MCM when required. This would be triggered when site water management structures are at a triggering threshold (i.e. 80% full or some other site defined value[6]).

The developed water balance model (GHD 2024) did not predict any spills / uncontrolled discharges from the contaminated water storage dams for the modelled historical climate data set; nonetheless, following large or prolonged rainfall events (that exceed the design storage capacity of site containment dams) discharge remains possible. A water quality monitoring program and discharge water quality triggers are proposed in Section 8. The Process Runoff Dam, MIA Runoff Dam and Waste Dump Catch Dam will each contain an emergency spillway as shown on Figure 12.

[6] Once the site is operational, water management procedures will be developed to manage water volumes held on site. Procedures will include triggers (TARP) to cease pumping water to site, commence return pumping to MCM and other internal transfer options such as commencing pumping to the open cut pit. Once developed, the TARP will be included in future revisions of this CPWMP.

Under extreme rainfall events, where contaminated waters continue to accumulate on site despite efforts to pump excess waters to Murrawombie, TRL will consider diverting excess surface water to the open pit with the decision to divert water to the pit based on workforce safety and the likelihood of an emergency discharge occurring if water is not diverted. The site design includes the strategic placement of potential contamination sources (ie heap leach pad, SX/Crysal Plant, pre concentrator, ore and waste stockpiles) upgradient of the pit to enable this option if required.

7.2.3.6. Wastewater management

Wastewater would be generated from staff ablution facilities during construction and operational activities. Release of wastewater off-site would potentially result in elevated nutrient levels; therefore wastewater will be collected for treatment and onsite disposal or reuse. Sewage from the ablution facilities will be conveyed by gravity to an Aerated Wastewater Treatment System. Wastewater would be treated through several phases with treated effluent being disposed of on-site via irrigation or to an evaporation trench (rubble drain). The effluent management system will be approved as required by Bogan Shire Council prior to implementation. Effluent disposal and water quality monitoring is discussed in Section 8.1.1.

7.2.3.7. Heap leach pad

Surface and leach waters from the heap leach pad / facility will be captured in a series of HDPE lined drains and containment ponds (designed to contain a 12 hr 5% AEP event), from where water will be transferred to the SX Crystal Plant for processing.

If wet weather conditions arise which cause the heap leach ponds to overflow, this overflow would be captured by the Process Runoff Dam.

7.2.3.8. Waste Rock Emplacement and AMD Management

The Waste Rock Emplacement (WRE) is proposed to be constructed to a maximum height of approximately 45 m (205mAHD), be composed of up to 5 lifts and have a footprint of approximately 33 ha (RGS (2024).

A materials assessment has been undertaken (*Mine Material and Soil capping Assessment and Management and Final Void Water Balance and Water Quality Assessment* (RGS 2024)). Geochemical analysis results indicate that 83% of waste rock generated from the open pit and underground operations is classified as either acid consuming, non-acid forming (NAF) or NAF low capacity (NAFLC)[7]. Approximately 17% of waste generated from the open pit and underground operations is identified as Potentially Acid Forming (PAF) material (PAF_{LC}, PAF or PAF_{HC}[8]).

During the operation of the mine, any seepage or runoff from the WRE will likely be unsuitable for direct release to the wider environment due to likely elevated metals and salts, as such runoff will be captured either in the Waste Dump Catch Dam or the MIA Runoff Dam (Figure 12). Captured waters will be returned for re-use as described in the previous sections.

[7] NAF_{LC} (Non-Acid Forming – Low Capacity) - will not produce acid but may leach salts and some metals due to the presence of low sulfide bearing material;
[8] PAF_{HC} (Potentially Acid Forming-High Capacity) - will produce acid within days or weeks of exposure;
PAF (Potentially Acid Forming) - has the potential to produce acid;
PAF_{LC} (Potentially Acid Forming - Low Capacity) - has the potential to produce minor acid;

Key measures to reduce potential AMD related impacts include:

- The placement of a 5m layer of NAF material at the base of the Waste Rock Emplacement.
- The ongoing identification and selective handing of PAF materials. Waste rock material excavated from the open pit and underground operations will be assessed by site geologists as either PAF or NAF material and selectively handled to minimise any cross contamination. Site geologists will establish a 'sulphur cutoff' which will be revised throughout operational phases and used to define PAF or NAF material. Periodic assays and assessment will be conducted to ensure the sulphur cutoff' remains suitable to manage AMD risks. The identification and management of PAF material will be documented in internal TRL procedures.
- Waste rock and / or paste tailings will be used for the backfill of underground stopes. TRL will prioritise the use of PAF materials for this purpose, which will reduce the volume of PAF material that is required to be managed / stored on the surface.
- Following the cessation of open pit mining, PAF materials may be placed at the base of the pit (and not tipped from the crest or lower benches). Placement at the base of the pit will result in PAF material being ultimately stored sub-aqueously, reducing oxidation and AMD generation. This strategy also reduces the volume of PAF storage that is required to be managed / stored on the surface within the Waste Rock Emplacement (WRE). Storing this material at the base of the pit is below the groundwater table and as such will not contaminate groundwater resources (i.e the open cut pit will function as a terminal sink (further described in Section 7.3.9.3).
- Any PAF material that is required to be stored within the WRE will be placed in discrete cells and encapsulated with a 0.9m deep low permeability cover, followed by 3m of NAF material.
- The capture and re-use of seepage and runoff during operational phases.
- The containment of seepage post closure within the open pit void.

Further detail regarding AMD management at the CP is included in the TRL Waste Management Plan (TRL-HSET-PLN-0031).

The design of the Waste Rock Emplacement and PAF encapsulation cells is further described in the Constellation Project Rehabilitation Management Plan (TRL-HSET-PLN-0045).

Post closure surface water management is described in the Constellation Project Rehabilitation Management Plan (TRL-HSET-PLN-0045).

7.2.3.9. Hydrocarbon and Chemical Storage

Where relevant, all hydrocarbon and chemical storage will be in general accordance with relevant Australian Standards (including for example, *Australian Standard (AS) AS1940-2004 The storage and handling of flammable and combustible liquids and AS 3780:2023 The storage and handling of corrosive substances)*. Hydrocarbon and chemical storage is described in detail, in the TRL Hydrocarbon and Chemical Management Plan (TRL-HSET-PLN-0027). A summary of key storage requirements is included below:

- All packaged goods must be stored in their original packaging with intact product label.
- The storage of bulk products (such as diesel, oil or process reagents) must be within suitably designed bulk vessels and clearly labelled.

All storage locations must meet the following criteria:

- Be within the overall site water / runoff containment systems.
- Bunded within impermeable containment areas, or stored in self-bunded bulk vessels:
    - The bund must be capable of containing 110% of the storage volume of single vessels or 110% of the largest vessel within a storage compound (for bulk storage).
    - For packaged goods, the bund must be able to contain 110% of the largest container or 25% of the total stored volume (whichever is the largest).
    - Bunds must be a minimum of 250mm in height.
- Under cover (to prevent rainfall impacting bund storage volumes). Where under-cover storage is not feasible, the bund must be inspected and emptied periodically during, and after every rainfall event.
- A SDS register must be located in close proximity to the storage location and contain the current SDS (currency < 5 years) for every product stored in that location.
- Spill kits must be located nearby to storage, handling and use areas and be relevant to the types of products being stored / used.

7.2.4. Baseline Surface Water Quality

No baseline surface water quality monitoring has been conducted due to the general absence of suitable sampling sites in close proximity to the Project site. However, TRL has commenced collecting surface water samples for the purpose of establishing baseline conditions as stated in Section 8.1. Samples collected from upstream and downstream locations (from the project site) will be used to establish site specific guideline values (SSGVs) for the purposes of investigating the impact of (unlikely) uncontrolled / emergency discharges on downstream sensitive receptors, namely agricultural domestic (non-potable) uses associated with farm dams and the Goldbiddie Cowal. SSGV's will be included in future amendments of this CPWMP once baseline conditions are established.

TRL currently monitor several surface water sites in the vicinity of the MCM including two monitoring sites located on Siburys Creek; GSW11 (upstream) and GSW12 (downstream) which are both unimpacted by mining operations (Figure 13). The location of these monitoring sites, surrounding land uses and ephemeral nature are considered the closest and most representative available surface water quality data applicable to the Project site. With reference to Table 16 the lowest 5th (for pH) and highest 95th percentile values from either GSW11 or GSW12 will be used as interim guideline values to identify potential impacts until site based guideline values are developed (denoted by bold text in Table 16). Where proposed guideline values are outside agricultural (livestock) ANZECC (ANZECC & ARMCANZ (ANZECC) 2000) values, default ANZECC guidelines will be used (refer to Section 8.1.2).

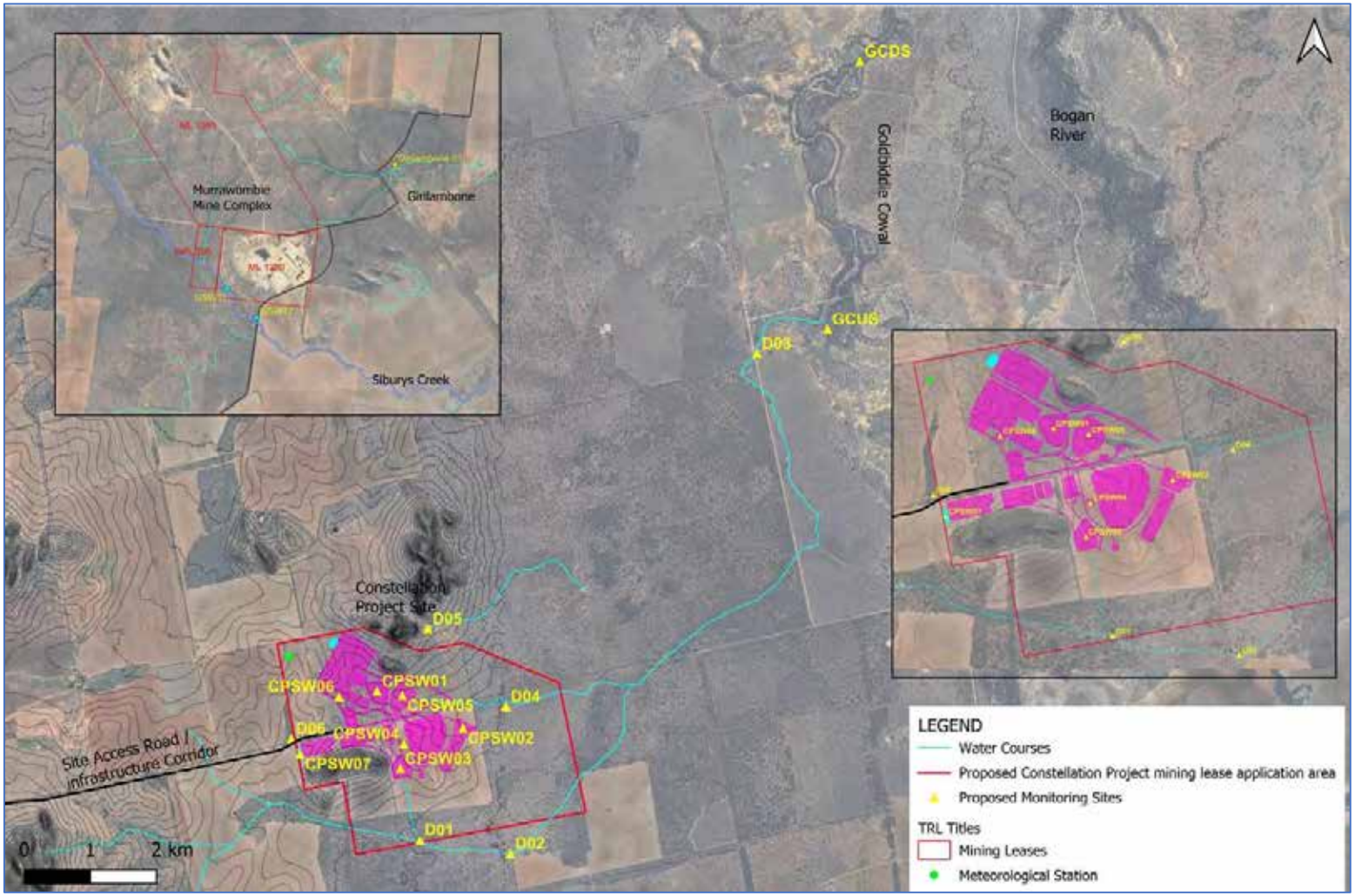
A summary of representative baseline data collected from GSW11 and GSW12 between 2005 and 2025 (from approximately 200 sample results) is presented below in Table 16.

Table 16 Representative Baseline Surface Water Quality

Parameter	Unit	GSW11 (Upstream - Sibury's Creek)					GSW12 (Downstream - Sibury's Creek)				
		Min	Mean	Max	5th Percentile	95th Percentile	Min	Mean	Max	5th Percentile	95th Percentile
EC	µS/cm	40	151.38	685		**303.75**	43	131.31	3050		210.35
pH	pH units	5.21	7.17	8.37	**6.4**	7.8	2.47	9.01	350	6.47	**8.06**
TDS	mg/L	48	147.29	1010		**253.9**	25	110.73	850		174.4
Aluminium	mg/L	0.1	0.21	0.4		0.37	0.02	0.192	0.54		**0.488**
Arsenic	mg/L	0.001	0.002	0.02		0.004	0.001	0.002	0.004		**0.004**
Beryllium	mg/L	0.01	0.04	0.066		**0.063**	0.001	0.0304	0.052		0.053
Boron	mg/L	0.05	0.098	0.39		**0.165**	0.05	0.084	0.36		0.16
Cadmium	mg/L	0.0001	0.0047	0.148		**0.008**	0.0001	0.003	0.103		0.008
Calcium	mg/L	0.08	11.07	27		**24**	1	8.46	25		18.05
Chloride	mg/L	1	5.189	51		**13**	0.36	3.758	24		7
Chromium	mg/L	0.001	0.002	0.012		0.005	0.0003	0.003	0.012		**0.012**
Cobalt	mg/L	0.001	0.011	0.787		**0.025**	0.0002	0.0259	1.49		0.018
Copper	mg/L	0.001	0.137	19.2		**0.132**	0.001	0.062	6.04		0.075
Iron	mg/L	0.06	2.511	17.9		**5.82**	0.06	1.332	11.6		5.17
Lead	mg/L	0.001	0.003	0.028		0.008	0.001	0.051	1.13		**0.039**
Magnesium	mg/L	0.11	4.71	13		**10**	1	5.051	123		8
Manganese	mg/L	0.002	0.457	11.1		**1.035**	0.001	0.13	4.61		0.561

Parameter	Unit	GSW11 (Upstream - Sibury's Creek)					GSW12 (Downstream - Sibury's Creek)				
		Min	Mean	Max	5th Percentile	95th Percentile	Min	Mean	Max	5th Percentile	95th Percentile
Mercury	mg/L	0.0001	0.001	0.003		0.003	0.0001	0.004	0.016		**0.014**
Nickel	mg/L	0.001	0.007	0.323		**0.013**	0.001	0.0067	0.494		0.008
Potassium	mg/L	1.86	13.14	45		**22**	0.71	12.91	29		19
Selenium*	mg/L			<0.01*		<0.01*			<0.01*		<0.01*
Sulfate	mg/L	0.86	9.55	97		25.6	0.62	31.17	1650		**47.5**
Vandium	mg/L	0.01	0.025	0.04		**0.039**	0.01	0.013	0.02		0.019
Zinc	mg/L	0.005	0.082	4.17		**0.258**	0.005	0.132	10.1		0.164
*All data below detection limits											

Figure 13 Surface Water Monitoring Sites



7.3. Groundwater Management Plan

7.3.1. Performance Measures

Table 17 below provides performance measures as stated in Condition C22 of the Constellation Project Development Consent (SSD-41579871) and apply to groundwater management aspects. Table 17 provides a reference to the relevant section of this CPWMP where actions to achieve the measure are described.

Table 17 Groundwater performance measures

Feature	Performance Measure	Relevant Section
Water management – General	Minimise risks to the receiving environment and downstream water users.	Section 7.3 Section 8.2
Aquifers	Negligible impacts to alluvial and fractured rock aquifers caused by the development beyond those predicted in the EIS, including: - negligible change in groundwater levels beyond those predicted; - negligible change in water quality beyond those predicted; - negligible impact to other groundwater users; and - no exceedance of the minimal impact considerations in the NSW Aquifer Interference Policy	

7.3.2. Potential Groundwater Impacts

GHD (2024) identified the following potential impacts to ground water resources in the vicinity of the CP (Table 18). Management measures associated with these potential impacts are included in the stated section where relevant.

Table 18 Potential Groundwater impacts

Potential Impact	Section where addressed
Dewatering of the open pit / underground workings resulting in groundwater drawdown and potential impacts on groundwater receptors including registered bores, GDEs and watercourses.	Section 7.3.7.1
Potential for leaks and spills (such as diesel tanks, acid tanks, potentially contaminated water in the off-site transfer system) during construction and operations.	Section 7.2.3.9
Acidic seepage from the WRE and heap leach pad to groundwater, resulting in potential impacts to groundwater quality and beneficial use.	Section 7.2.3.8 Section 7.3.9.3
Oxidation of tailings transferred from Tritton Mine prior to processing into a paste, for the purpose of backfilling voids in underground workings, and seepage of leachate to groundwater.	Section 7.3.9.3
Higher than predicted water levels within the pit lake and migration of polluted water from the pit lake to groundwater, resulting in potential impacts to groundwater quality and beneficial use.	Section 7.3.9.3 Section 7.3.8

7.3.3. *Baseline Groundwater Information*

Aeris installed five monitoring bores near the Project site in 2022 for the purpose of establishing baseline groundwater level and groundwater quality conditions. The bores were monitored approximately monthly between February 2022 and May 2024, followed by on a quarterly basis. A summary of the monitoring bore details is provided in Table 19; the location of baseline monitoring bores are shown on Figure 14.

Table 19 Constellation Groundwater Baseline Information

Bore	Easting MGA Zone 55	Northing MGA Zone 55	Bore elevation (m AHD)	Hole Depth	Screened elevation (m AHD)	Screened lithology
BH005	498338	6561110	165.0	75.7	115-103	Unknown
BH013	499536	6561171	159.5	102.5	129.5-126.5 69.5-63.5	Soft Green Volcanic
BH015	501195.4	6562698	155.0	54.4	128-119	Light brown siltstone and weathered grey volcanics
BH016	495180	6562834	167.0	72.5	116-113	Grey weathered volcanics
					113-107	Grey blue volcanics
BH017	497328.5	6557965	161.0	69.5	140-137	Bands of sandstone siltstone and quartz
					113-107	Grey volcanics

7.3.4. Groundwater Levels

Groundwater levels observed between February 2022 and November 2025 have been compared to the cumulative rainfall departure (CRD) from average observed rainfall totals during the period. An increasing trend in CRD indicates that above average monthly rainfall has been received, while a decreasing trend in CRD indicates that below average monthly rainfall has been received. Groundwater hydrographs, showing the depth of groundwater for the five Constellation bores, plotted with CRD are shown in Figure 15. Groundwater levels at each monitoring bore have generally remained stable since installation. There is only a slight and mostly delayed response to CRD trends indicating that the aquifer is not strongly connected to incident rainfall, and there is confinement of the aquifer.

Based on review of the groundwater data at BH005, BH013, BH015, BH016 and BH017, groundwater levels within the vicinity of the Project were approximately 10 to 25 mbgl. Table 19 shows the screened elevations for each monitoring bore, which were established based on water strike during drilling. Groundwater levels are consistently above the level of water strike, which also suggests there is some confinement of the groundwater source.

Review of groundwater contours generated by Energy and Water (2023) indicates a groundwater flow gradient in the north east direction towards the Bogan River (model findings replicated in Figure 16.

Figure 14 Groundwater Monitoring Sites

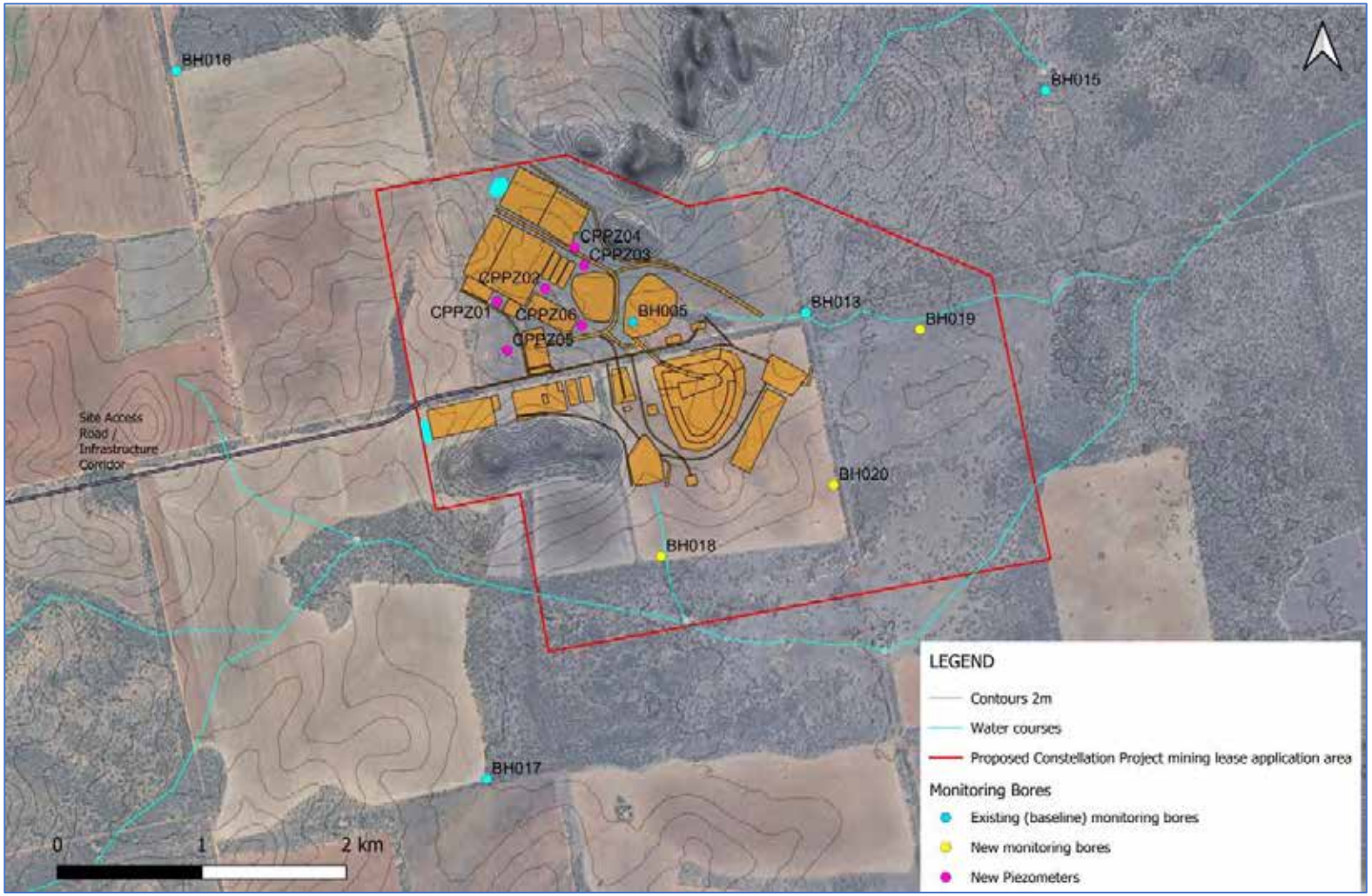


Figure 15 Groundwater hydrograph and CRD

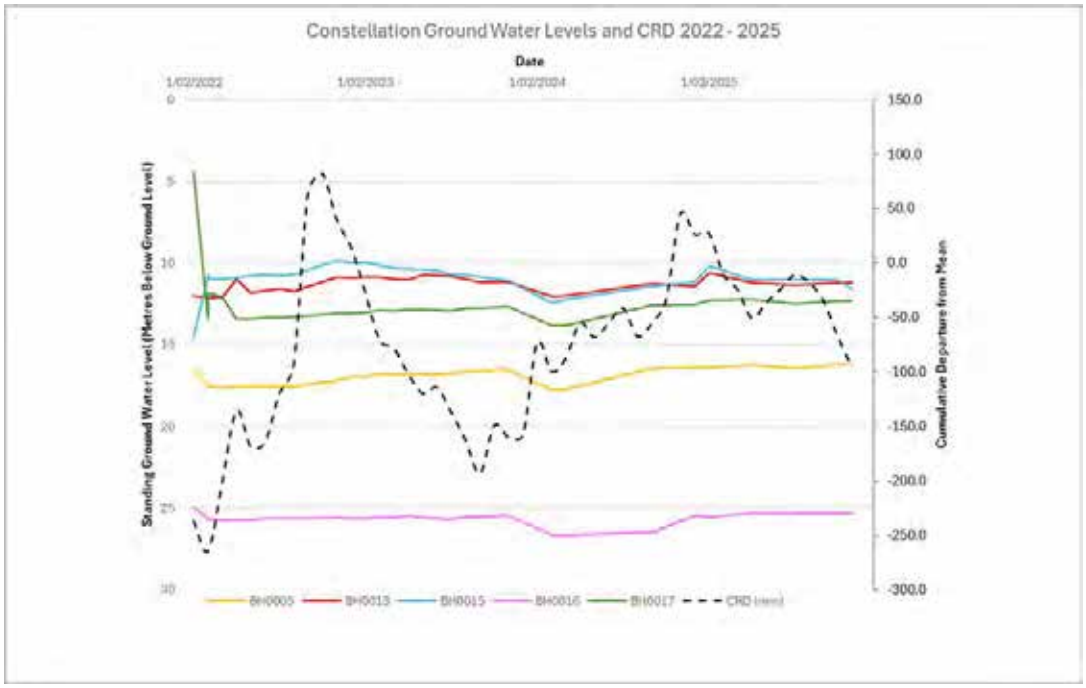
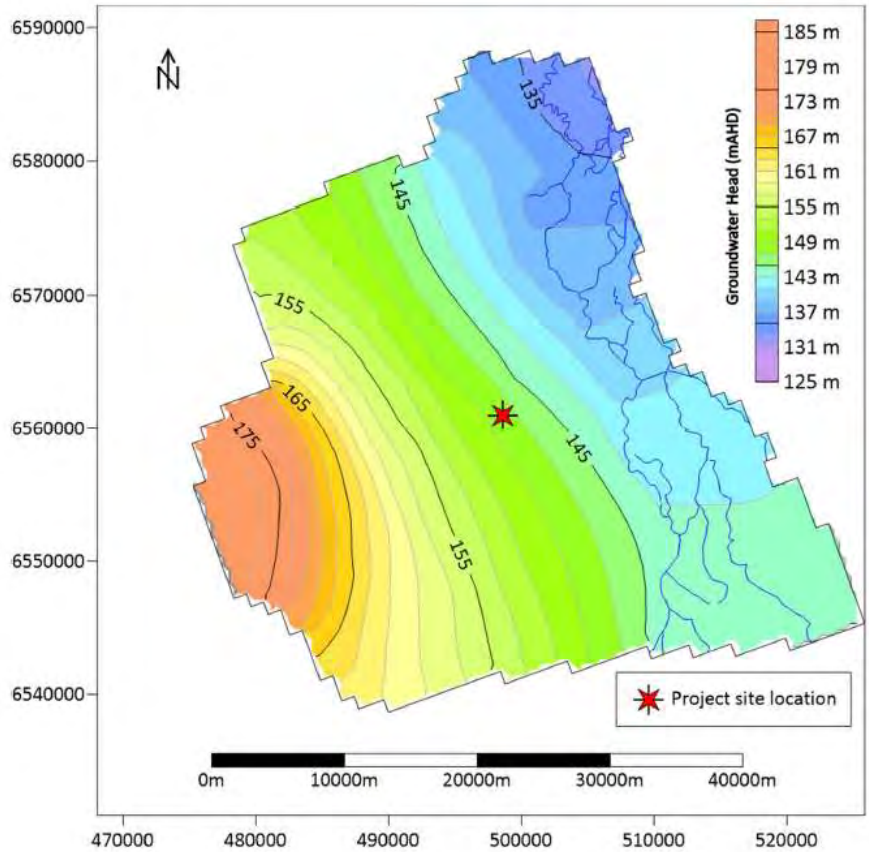


Figure 16 Steady-state model generated elevations of groundwater table (Source Energy and Water (2023))



7.3.5. Groundwater Quality

Baseline groundwater quality data have been reported at the five monitoring bores for the period of March 2022 to November 2025. The mean water quality data for monitoring bores BH005, BH013, BH015, BH016, and BH017 are shown in Table 20.

As shown in Table 20, groundwater at BH013, BH015, BH016 and BH017 is slightly alkaline and saline. At BH005, groundwater is circumneutral and fresh to brackish. Overall, the beneficial use of the groundwater is limited due to the high salinity, which is generally above recommended levels for livestock[9].

Table 20 Baseline Groundwater Quality

Parameter	Units	BH005	BH013	BH015	BH016	BH017
Physical Parameters						
Electrical Conductivity (EC)	µS/cm	13241	31053	42400	15559	39689
pH	pH units	7.58	7.7	7.52	7.88	7.75
Total Dissolved Solids	mg/L	9911	23212	31650	10150	30589
Dissolved Metals						
Arsenic	mg/L	0.0015	0.0031	0.0045	0.003	0.01
Barium	mg/L	0.089	0.071	0.0129	0.057	0.052
Beryllium	mg/L	<0.001	<0.010	<0.010	<0.001	<0.010
Boron	mg/L	0.617	2.58	2.72	1.28	3.34
Cadmium	mg/L	0.00018	0.00037	0.0005	0.0001	0.00085
Chromium	mg/L	0.001	0.0073	0.023*	0.0031	0.021*
Cobalt	mg/L	0.0015	0.0085	0.0065	0.0023	0.0105
Copper	mg/L	0.018	0.019	0.013	0.005	0.017
Iron	mg/L	2.31	0.95	0.16	0.2	0.25
Lead	mg/L	<0.001	0.079*	0.083*	<0.001	0.08*
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	mg/L	0.007	0.007	0.008	0.006	0.019
Selenium	mg/L	<0.10	0.01*	<0.1	0.01*	<0.1
Vanadium	mg/L	<0.01	0.03	<0.1	<0.01	<0.1
Zinc	mg/L	0.205	0.165	0.132	0.087	0.217

[9] TDS values below 4,000mg/L are suitable for beef cattle, sheep , pigs and horses, loss of production can occur where TDS values are above 6,000 mg/L (10,000 mg/L for sheep) (ANZECC & ARMCANZ (2000)

Parameter	Units	BH005	BH013	BH015	BH016	BH017
Nutrients						
Nitrate as N	mg/L	0.18	0.40	0.79	0.13	0.22
Nitrite + Nitrate as N	mg/L	0.18	0.4	0.82	0.16	0.22
Alkalinity						
Bicarbonate Alkalinity as CaCO3	mg/L	364.43	708.87	626.55	611.9	832.45
Major Ions						
Calcium	mg/L	390.1	497.3	567	330	167.6
Magnesium	mg/L	527	1208	1484	401	1493
Potassium	mg/L	19.1	32.33	26.45	44.45	57.27
Sodium	mg/L	2074	6126	8468	2575	8123
Sulfate	mg/L	1208	2999	3940	1020	3857
*only 1 sample recorded above detection limits						

7.3.6. Conceptual Groundwater Model

A conceptual hydrogeological model and the spatial relationships of the Project site in relation to the surrounding hydrological and hydrogeological environment has been developed (GHD 2024). A conceptual model is a tool used to formalise an understanding of the major components of a groundwater system, their interactions, and how external changes may modify the system. They can often be a highly simplified way of expressing what is known about a system and can assist in defining and/or testing hypotheses regarding the critical components that make up the structures, processes and interactions, the relationships of cause and effect, and more generally, how a system works.

The conceptual model is shown in Figure 17 (sourced from GHD 2024). The cross section is orientated from southwest to northeast from the Girilambone Mine, through the Project site and passing through the Bogan River and unconsolidated alluvial sediments to the east.

Based on the conceptual model, the water table (based on groundwater level measurements) occurs within the fractured rock groundwater source at a depth of between 10 and 50 m bgl and groundwater flows east towards the Bogan River. Groundwater monitoring bores suggest there is some confinement of the groundwater source, so interception of groundwater during mining may not occur until below the level of the water table. Rainfall recharge to the fractured rock aquifer is likely to be minimal. Rainfall recharge and river leakage likely occurs within the alluvium to the east of the Project site.

Within this area there may also be inflow to fractured rock aquifers from downward percolation of groundwater from overlying alluvium. Discharge from aquifers occurs at the break of slope, in drainage lines, via production bores or where structural or stratigraphic conditions allow.

Interception of direct rainfall by the open cut pit would require dewatering to the site water management dams. Groundwater inflows would be partially intercepted by the open cut pit and the underground workings. Inflows have been quantified in the Groundwater Modelling Assessment (Energy and Water, 2023) as described in Section 7.3.7.

7.3.7. Groundwater modelling

A numerical groundwater flow model of the Project was developed by Energy and Water (2023).

Model development methodologies, model boundary conditions, assumption and sensitivity analysis can be found in GHD 2024.

7.3.7.1. Model prediction and results

The calibrated model has been used to make groundwater predictions for 600 years (considered enough time to reach post-mining equilibrium) covering both active mining (10-year period) and recovery periods post-mining. Stress periods applied in the model prediction range from monthly during mining, quarterly for the first five years into the recovery period, to 10 yearly towards the end of recovery period. A stress period is a period of time where hydraulic conditions (such as flow and level) within the model are held constant. Each stress period has been divided into 10-time steps.

Active mining has been simulated using the drain (DRN) boundary condition. Change in hydraulic properties during progressive backfill has been simulated using the time varying material package (TVM). Pit void recovery has been simulated by using a head boundary condition derived from water balance modelling (RGS, 2024).

Predicted groundwater inflow rates into the proposed mines (both open cut and underground) derived from the base case modelling scenario are presented in Table 21.

As presented in Table 21, the model predicted combined (open cut and underground) mine inflow rate increases from 104.6 ML/year in the first year into the mining to a maximum of 309.2 ML/year after nine years. The average mine inflow rate over the active mining period is 218 ML/year.

Post mining (during recovery) inflow rate is predicted to gradually decrease from 170 m^3/d (62ML/year) (at the start of the recovery) to 45 m^3/d (16.5 ML/year) (at end of the recovery).

Figure 17 Conceptual Groundwater Model (Source GHD 2024)

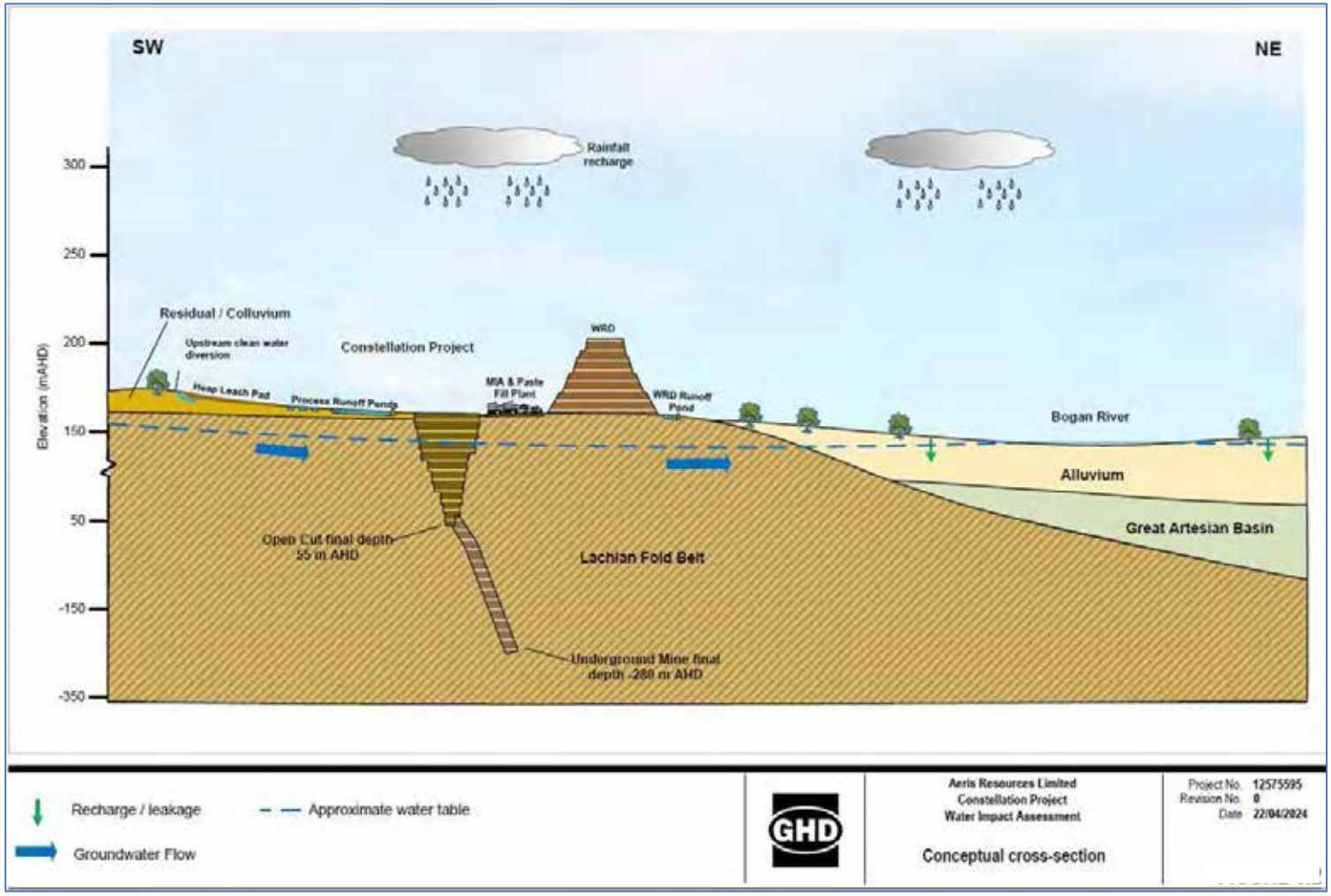


Table 21 Predicted Groundwater Inflows.

Year of Mining	Open Cut (ML/year)	Underground (ML/year)	Total (ML/Year)
1	104.6	0	104.6
2	148.4	0	148.4
3	59.8	105	164.8
4	36.4	157.5	193.9
5	29.2	178.2	207.4
6	25	209.6	234.6
7	22.1	229.7	251.8
8	19.7	252.7	272.3
9	17.8	291.4	309.2
10	15.1	275.8	290.9

The groundwater drawdown contours (Energy and Water 2023) for the base case scenario at end of mining are presented in Appendix E, while the groundwater drawdown contours 600 years after the end of mining are presented in Appendix F. As presented in these figures, the model predicted drawdown of 1 m is expected to reach approximately 1,700 m and 6,500 m away from the open pit at the end mining (10 years of mining) and 600 years after the end of mining, respectively. Post-mining long-term residual drawdown in close proximity to the pit is approximately 10 m. These figures do not show the maximum drawdown which occurs within the mine workings.

The model predicted drawdown at the potential aquatic and terrestrial GDEs and landholder bores is presented in Table 22 for the end mining, 100 years and 600 years after the end of mining period. Potential GDEs have been represented by Energy and Water (2023) as points GDE0 – GDE5. As presented in Table 22, there is no drawdown at the potential GDEs and landholder bores at the end of mining. However, long-term (600-year post mining) drawdown at the potential GDEs range from 0.33 m (at GDE5) to 0.66 m (at GDE1). Three landholder bores are predicted to record some drawdown with maximum drawdown of 1.03 m at (GW0031014). Other landholder bores recorded less than 1 m drawdown.

The results of modelling show baseflow to the Bogan River decreases by 9 m^3/d (or by approximately 1%) (from 871 m^3/d to 862 m^3/d) due to mining in the long-term and is considered by Energy and Water (2023) to be negligible.

Table 22 Predicted Impacts to Groundwater Users and Dependent Ecosystems (Energy and Water 2023).

Monitoring Point	Drawdown at the end of mining (m)	Drawdown 100 years after mining (m)	Drawdown 600 years after mining (m)
GDE0		0.14	0.55
GDE1		0.2	0.56
GDE2		0.3	0.66
GDE3	0	0.27	0.57
GDE4		0.21	0.56
GDE5		0.02	0.33
GW002970		0.12	0.86
GW003006		0.2	1.03
GW003014			0.12
GW004112	0	0	0
GW006203	0	0	0
GW006326	0	0	0
GW006337	0	0	0
GW006522	0	0	0
GW006694	0	0	0
GW024413	0	0	0
GW026890	0	0	0

7.3.8. Groundwater Model Review and Update

The predictions of the groundwater model will be verified, reviewed and updated:

- following two years of mining; and
- then on a three-yearly basis (until the monitoring and modelling results show no need for further updates as agreed by DPHI); and
- at the end of mining operations to inform the rehabilitation and post-closure activities.

The groundwater model review will include a comparison between the modelling results and groundwater monitoring data and mine dewatering volumes.

7.3.9. Predicted impacts to Groundwater

7.3.9.1. Groundwater Drawdown

At the end of mining, drawdown in the groundwater table of 1 m is predicted to extend for a distance of approximately 1,700 m away from the mine workings. Since the closest registered bore to the Project site (GW3006.1.1) is located approximately eight km to the south, there is no predicted groundwater drawdown at any registered bore at end of mining.

At 600 years after the end of mining, drawdown in the groundwater table of 1 m is predicted to extend approximately 6,500 m away from the mine workings. Three registered bores are predicted to record some groundwater drawdown at that point in time, although the predicted drawdown at each location is less than 1.2 m.

Since modelled groundwater drawdown is less than 2 m at all registered bores, the NSW AIP Level 1 minimal impact considerations for water table/water pressure decline at a water supply work are met and the impact is considered to be acceptable.

7.3.9.2. Groundwater Dependent Ecosystems

A review of high priority GDEs listed in the MDB Fractured Rock WSP for the Lachlan Fold Belt MDB Groundwater Source indicates that the closest high priority GDE to the Project site is the Pulpulla Spring located approximately 160 km to the west of the Project site. Therefore there are no high priority GDEs within the area of predicted groundwater drawdown from the Project, and the NSW AIP Level 1 minimal impact considerations for water table are met (GHD 2024).

It is noted that potential GDEs are located to the east of the Project site and groundwater drawdown of up to 0.66 m is predicted at 600 years post mining. However, given the relatively deep groundwater levels and likelihood of aquifer confinement, it is considered unlikely that these terrestrial and aquatic communities are GDEs (GHD 2024).

7.3.9.3. Groundwater Quality

RGS (2024) considers that, based on the testwork undertaken, the overall risk of groundwater quality impact associated with the development of the Project is low because there is low potential for the open pit and WRE to generate Acid and Metalliferous Drainage (AMD) post mining. Potential sources of groundwater quality impact from the Project are as follows:

Waste Rock Emplacement (WRE)

Small volumes of Potentially Acid Forming (PAF) waste will be stored within the WRE. This material will be emplaced in PAF cells within the WRE and covered with a low permeability seal and store and release cover to minimise the exposure of sulfide bearing mine waste to oxygen and water and minimise the potential for seepage of AMD to the receiving environment. Therefore, it is considered that any AMD from the WRE is contained within the WRE or will report to the open pit (post closure). Further information is contained in RGS (2024) and Burton Environmental (2024) and the TRL Waste Management Plan (TRL-HSET-PLN-0031).

Tailings Material

Tailings material is proposed to be transported to the Project site from Tritton for the purpose of backfilling underground stopes with cemented tailings material (classified as PAF-High Capacity). The tailings will be stored on a lined pad and processed into a paste as soon as practicable and emplaced underground to minimise oxidation. The location of the lined pad is within the overall site water containment system. Being close to the open cut pit, any groundwater impacted by the pad will report to the pit and be contained. Paste tailings will eventually be below the groundwater table as groundwater levels recover post mining. Therefore, the implementation of this processing and disposal strategy will minimise the generation of AMD and will not affect groundwater resources.

Heap Leach Pad (HLP) Facility

The oxide ore (no sulfide and low AMD risk) will be processed on the lined Heap Leach Pad by addition of acid. Acidic seepage (with elevated copper) from the Heap Leach Pad will report to the HDPE lined liquor ponds. During operations, captured liquids will be processed via the SX Crystal Plant. Post closure the HLP will be rehabilitated by installing a 'store and release' cover system to prevent the ingress of oxygen and water, therefore reducing long term seepage volumes. Any post closure seepage from the HLP, that is not readily evaporated will passively flow to the open pit void, where it will be captured and retained below the groundwater table, in a terminal sink. As such seepage water will not pose a risk to groundwater quality in the vicinity of the Project.

HLP Under-liner

Prior to the construction of the HLP, low permeability base layers will be prepared to allow capture of leachate and prevent contamination of soils and groundwater. Design of the base layer has been undertaken by Moroney Hydrometallurgy (Constellation – Oxide Leach Pad Construction (Moroney Hydrometallurgy (2023))). Key features of the low permeability base layers are provided below and presented in Figure 18

Under-liner material

The under-liner material, consisting of local natural soils / clays or imported clay, will be prepared to the following specifications:

- rolled (compacted) to between 10^{-6} to 10^{-7} cm/sec hydraulic conductivity;
- a thickness that prevents puncture from base-rock, typically between 100 to 200 mm deep;
- graded to the drainage slope (to allow capture of leachate);
- prefer less than 38 mm maximum particle size, moderate to high fines (200 mesh) content (20% or more), and moderate plasticity; and
- the under-liner material must undergo Geotechnical testing by a qualified engineer from a reputable company.

Liner Material

Liner material will consist of:

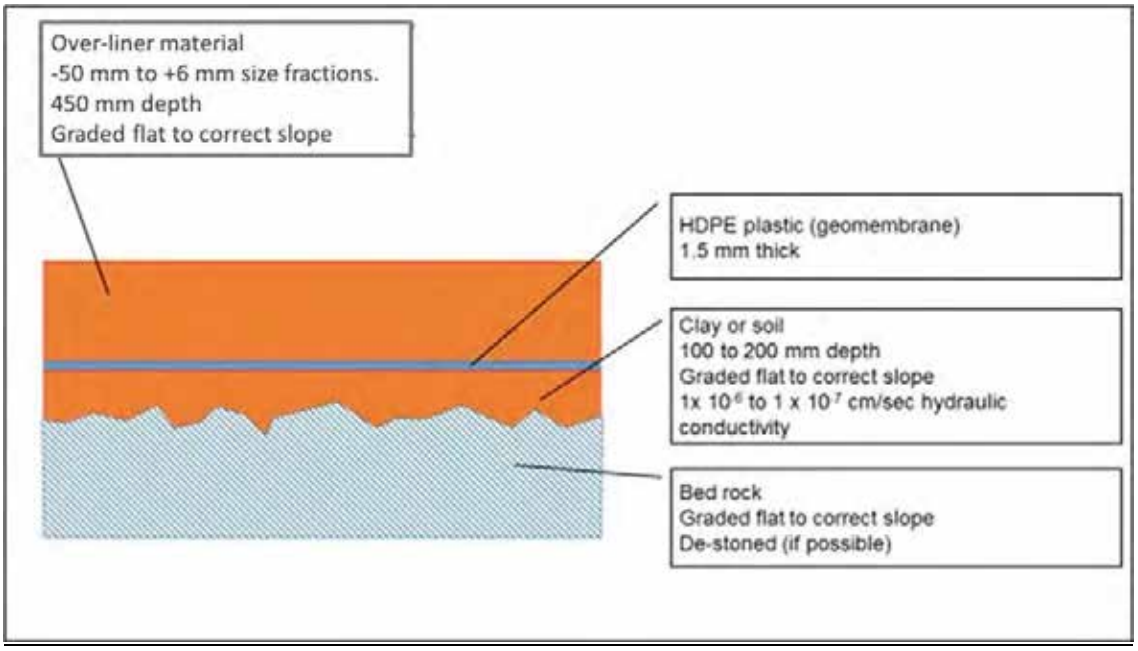
- an impermeable 1.5 mm thick HDPE plastic liner placed on top of the under-liner material (Figure 18); and
- on completion of liner installation, the Installer will conduct mandatory liner QA/QC tests, including welding quality, puncture locations and repairs.

Over-liner material

The design must incorporate 450 mm deep over-liner material, placed on top of the impermeable HDPE plastic liner. The over-liner material should contain -50 mm +6 mm size fractions and may take one of two forms:

- crushed waste or low-grade Constellation ore with good drainage characteristics; or
- spent ore from the Girilambone stony (not clayey) leach heaps.

Figure 18 Heap Leach pad Liner Schematic (Source Moroney Hydrometallurgy (2023))



Leak Detection

Leak detection piezometers will be installed about the downhill sides of the leach pad (especially along the sump side) and process ponds at regular intervals. The leak detection monitoring program is further described in Section 8.2.3.

Pit lake

The final pit lake will receive direct rainfall, long term groundwater inflows, surface water runoff and seepage from the WRE and HLP. Diversion drains will minimise the input of surface water runoff into the pit lake. The main output from the pit lake is evaporation.

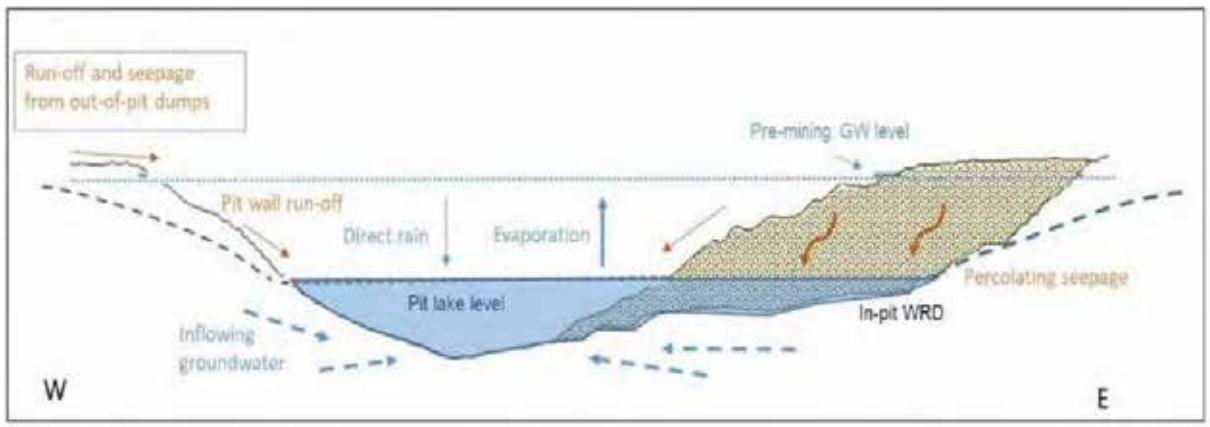
The water and mass balance for the pit lake developed by RGS (2024) using GoldSim modelling indicates that the water level in the pit lake is predicted to rise over time as groundwater levels recover. Over the 600 year post mining modelling period, the average pit lake water level is predicted to remain approximately 10 m below the existing pre-mining groundwater level (approximately 135mAHD). Therefore, as represented in Figure 19, the pit lake will operate as a permanent hydraulic sink, or terminal sink. Under very wet conditions, the pit lake may temporarily reach a level of up to approximately 143 m AHD which may reduce the hydraulic gradient towards the pit lake, however it is still likely to remain a sink.

The modelling undertaken RGS (2024) predicts that the water level within the pit lake will be at a lower elevation than the surrounding groundwater table under the majority of climatic conditions and therefore groundwater flow towards the pit lake will be maintained. Therefore, seepage from the pit lake to the adjacent aquifer is not expected.

RGS (2024) assessed the likely water quality in the final pit lake and found that it is unlikely to be of any local beneficial use. The pit lake model suggested that:

- pH of the pit lake water would be in the order of pH 4.3 at 100 years.
- The total dissolved solids (TDS) concentration would be in the order of 7,000 to 10,000 mg/L at 100 years.
- Because there is no loss of major ions or metals the TDS will increase through evapo-concentration and be in the order of 25,000 to 44,000 at 600 years.
- At 100 years, mass balance concentrations of arsenic, copper and zinc are:
    - 0.206 to 0.280 mg/L for arsenic
    - 1.2 to 1.6 mg/L for copper; and
    - 1.8 to 2.4 mg/L for zinc.

Figure 19 Pit Lake Model Schematic (Source GHD (2024))



Conclusion

Mitigation measures detailed in this section are designed to contain AMD and acidic seepage on site so there will be minimal interaction between acidic water and groundwater and no migration off site during or post mining. The existing beneficial use of groundwater is also limited due to high salinity. Therefore, it is considered that the Project will not lower the beneficial use category of the groundwater source, and the impacts on groundwater quality will meet the NSW AIP Level 1 minimal impact considerations for groundwater quality.

7.3.10. Licencing Requirements

The total WAL entitlement held by Aeris for the Lachlan Fold Belt MDB groundwater source is 334 ML/year. An assessment has been undertaken to determine if Aeris holds sufficient WAL entitlement for extracting groundwater that is encountered by the Project (Section 7.1.3.1).

As shown in Table 21, total groundwater take in the year of maximum modelled groundwater inflow (Year 9) to the Project is 309.2 ML/year. Section 7.1.3.1 has identified that additional groundwater entitlement from the Lachlan Fold Belt MDB groundwater source is required as the projected groundwater take is likely to exceed current WAL in combination with groundwater take at other Aeris operations.

Actual groundwater inflows may be less than the predicted base case modelled inflows to the pit, in which case the additional entitlements required will be lower. In addition, groundwater inflow / take at the other TRL operations may decrease over time, again reducing the amount of additional entitlement that may be required.

Notwithstanding, there is sufficient market depth in the Lachlan Fold Belt MDB groundwater source to secure additional WAL entitlement. During the 2021/2022 water year, groundwater trades of up to 400 ML occurred within the water source, with the median trade between 2015 and 2022 being 333 ML/year.

TRL will continually track groundwater take during the life of all operations to ensure sufficient licence entitlement is held to account for all groundwater extraction.

7.4. Erosion and Sediment Control Plan (ESCP)

7.4.1. Performance Measures

Condition C21 of the Constellation Development Consent (SSD-41579871) contains performance measures that must be achieved during the construction and operation of the CP. Performance measures as they relate to the control of erosion and sedimentation risks are presented below in Table 23. Table 23 provides a reference to the relevant section of this CPWMP where actions to achieve the measure are described.

This section describes the activities that may cause soil erosion and associated sedimentation, and measures proposed by TRL to avoid, minimise or mitigate erosion risks.

Table 23 Erosion and sediment control performance measures

Feature	Performance Measure	Relevant Section
Water management – General	Design, install, operate and maintain water management systems in a proper and efficient manner	Section 7.4.3
Erosion and Sediment Control Works	Designed, installed and maintained in accordance with the guidance series Managing Urban Stormwater: Soils and Construction including Volume 1: Blue Book (Landcom, 2004) and Volume 2E: Mines and Quarries (DECC, 2008).	
Any works within waterfront land	Undertaken generally in accordance with the Guidelines for Controlled Activities on Waterfront Land (DCCEEW 2025)	Section 7.4.7.4

7.4.2. *Erosion causing activities*

Mining activities require the removal of vegetation and disturbance of soil to access ore bodies and create an operational mine site. Key activities which involve the exposure of soil and may allow for soil erosion or sedimentation to occur during construction and operational activities at the Project site include:

- clearing of vegetation in preparation for construction related activities;
- the stripping and salvage of soils and the creation of topsoil / subsoil stockpiles;
- changes to drainage lines and/or catchments, including upslope clean water diversions;
- the creation of water management structures including drains, bunds and dams, that ultimately (once stabilised) provide erosion and sedimentation protection to surrounding environments;
- disturbance associated with the construction of mining and related infrastructure including roads, buried pipelines, mining landforms (Waste Rock Emplacements, Heap Leach Pads etc), water management structures, laydown yards etc.
- runoff from haul roads and access roads;
- vehicle and equipment movements;
- road upgrades and the construction of new sections of road; and
- the installation of infrastructure within the approved corridor (buried pipeline, power conduit and communication systems etc); including where trenches cross gazetted watercourses.

7.4.3. *Key Principles - Erosion and Sediment Control*

The following key principles are incorporated into the Erosion and Sediment Control Plan (ESCP) for the CP:

- clean (up catchment) water will be diverted around disturbed areas;
- sediment and erosion controls are established prior to the removal of vegetation and disturbance of soil (except for the disturbance required to install the controls);
- limiting the extent of disturbance to the practical minimum;
- reducing the flow rate of water across the ground, particularly on exposed surfaces and in areas where water concentrates;
- sediment and erosion controls will remain in place until suitable groundcover is established, either through the use of temporary vegetation cover or progressive permanent rehabilitation;
- sediment is controlled / retained as close to the source area as reasonably practicable;
- construction of surface drains to control and manage surface runoff;
- protecting natural drainage lines and watercourses by the construction of erosion control devices such as diversion banks, channels and sediment retention dams;

- sediment control structures are appropriately sized (and the size / storage volume maintained) as stated in Section 7.2;
- temporary vegetation (including cover crops) established on soil stockpiles as required; and
- rehabilitation will be undertaken progressively as described in the Constellation Rehabilitation Management Plan and Forward Programs (required by mining lease conditions).

The Constellation ESCP has been prepared according to the following guideline documents, collectively referred to as 'the Blue Book':

- Managing Urban Stormwater: Soils and Construction, Volume 1 Second ed., Landcom, NSW, Sydney (Landcom 2004).
- Managing Urban Stormwater: Soils and Construction, Volume 2C (unsealed Roads) (DECC 2008).
- Managing Urban Stormwater: Soils and Construction, Volume 2E (Mines and Quarries (DECC 2008a).

Appendix D includes standard drawings of general sediment controls that are applicable to this section of the CPWMP (derived from Landcom 2004) and include:

- Figure SD-5-6 Earth Bank (High Flow)
- Figure SD 6-4 Earth basin (wet)
- Figure SD 6-1 Rock Sediment Basin
- Figure SD 5-5 Earth bank (Low Flow)
- Figure SD 5-4 Rock Check Dam
- Figure SD 6-8 Sediment Fence
- Figure SD 6-7 Straw Bale Filter
- Figure SD 4-1 Stockpiles

7.4.4. Design Parameters

7.4.4.1. Dams

Four site dams (Process Runoff Dam, Waste Dump Dam, MIA Runoff Dam and SB1) will capture and contain runoff (and associated sediment) from mine disturbed areas, and potential mine related contaminants. Each dam is designed to contain the design runoff volume for the 1% AEP, 72 hour duration design rainfall event. Dam volumes are presented in Table 15. Dam locations and associated catchments and drainage controls are shown in Figure 12.

7.4.4.2. Drains

Clean and dirty water drains will be installed to:

- divert clean water around the mine site (from up-gradient catchments) (Figure 12 and Figure 20).
- define internal catchments and divert dirty water within the mine disturbed areas to the relevant site dam (Figure 12).

Key design parameters for bunds and drains are as followed:

- Designed to contain critical duration 1% AEP with 150mm freeboard[10].
- Maximum slopes (of bund / drain embankments) - 1:3 (vertical:horizontal).
- The discharge point of each drain will be constructed and maintained as a Level Spreader with dimensions meeting the design standards of SD 5-6, namely: − drain slope of 1% for last 6m on approach to discharge; − sill width of >4m; − sill grade of 0%; and − sill to be maintained with grass cover or lined with rip rap / rock armouring.
- The channel will contain rock check dams and be suitably lined (for example vegetated or rock armour) where required to minimise the likelihood of erosion and scour for predicted peak flow velocities during the design storm.
- Maintained (sediment removed, bunds re-established, erosion repaired etc).

Blue Book (Landcom 2004) conceptual figures (namely Figure SD 5-6) will be followed when undertaking detailed design and construction of diversion drains. Figures are included in Appendix D.

7.4.5. ESCP - Constellation Mine Site

The ESCP at the mine site will be staged to allow for initial site development and construction, followed by operations where the full ESCP will be implemented:

- Stage 1 – installation of temporary controls for initial ground disturbance activities while permanent water management infrastructure is established.
- Stage 2 – establishment of the Construction Phase ESCP
- Stage 3 – establishment of the Operational Phase ESCP

Relative to the construction phase of the project (i.e the below Sections 7.4.5.2, Section 7.4.6 and Section 7.4.7), the above principles and high level design considerations will be further described and detailed in a Construction Management Plan (CMP). The CMP will require the preparation of progressive ESCPs throughout construction phase and include sufficient site specific detail to enable the implementation of the ESCP by construction contract personnel. The CMP will align with the guideline documents as noted above and also the *Best Practice Erosion and Sediment Control Document* (IECA 2025).

[10] Pending detailed project design, TRL may consider the use of temporary drains during construction. Drains would be designed to a lower criteria and comply with Table 6.1 of Blue Book Vol 2e (DECC 2008a)

7.4.5.1. Stage 1 - Installation of Temporary Controls

Prior to the construction of basins and drains, temporary controls will be installed downgradient of proposed disturbance areas (for example where dams and drains are proposed to be installed as part of the Stage 2 Construction ESCP). Controls will include

- Minimise any soil disturbance to only what is essentially required to undertake the works. Groundcover vegetation should be retained wherever possible.
- The installation of sediment controls, prior to soil disturbance including (for example):
    - Sediment fencing .
    - Jute / Coir logs.
    - Rip Rap bunds (lined / covered with geotextile fabric).
- Installation of sediment fencing downslope of any stockpiled erodible materials and diversion of upslope clean runoff using a bund.
- Erosion and sediment controls are to be checked and maintained on a regular basis to ensure they remain effective throughout the project.

7.4.5.2. Stage 2 - Construction Phase ESCP

Prior to the commencement of clearing of the majority of the project site, an interim Construction ESCP will be implemented. Key aspects of the Construction ESCP include:

- Temporary (Stage 1) sediment controls will be installed down gradient of proposed disturbance areas (Section 7.4.5.1).
- Clean water diversion drains (including containment pond DD1) will be installed in accordance with detailed (final) design parameters.
- The Waste Dump Catch Dam, MIA Runoff Dam and Sediment Basin SB1 will be constructed to their detailed (final) design parameters.
- Associated drains, to divert runoff into the Waste Dump Catch Dam and MIA Runoff Dam will be constructed to their detailed (final) design parameters (Figure 20).
- An interim (smaller) Process Runoff Dam (designed to contain a 12hr 5% AEP event) will be constructed and used to capture runoff; the purpose of which is reduce volumes reporting to the Waste Dump Catch Dam, MIA Runoff Dam and open pit (once commenced).
- Temporary (construction) access tracks will include (in alignment with DECC 2008):
    - diverting upslope 'clean' water away from the unsealed road (e.g. through use of catch drains and berm drains);
    - ensuring any concentrated flows within the road corridor are below erosive levels;
    - tracks should be constructed with adequate drainage (including cross drainage, table drains, mitre drains etc); and
    - gravel sheeted.

- Spreading of topsoil, seeding and / or hydromulching to stabilise embankments, drains etc where constructed to meet final design parameters (aiming to achieve minimum 60% groundcover which is consistent with the existing level of groundcover at the Project site (AARC 2024)).
- Water captured in dams will preferentially be utilised for construction activities including dust suppression and moisture conditioning of materials (for road and civil construction activities).
- Regular inspections will track the accumulation of water and sediment in established dams. Water will be primarily removed through re-use for construction purposes; should sediment reach 30% of the dam volume, sediment will be removed as soon as practical thereafter.
- Should water accumulate to the point that emergency discharge is likely, water may either be pumped to an alternate storage dam (with capacity) flocculated (gypsum) prior to release, or otherwise irrigated across available flat and vegetated land within the project boundary area. Due to the flat topography and distance to defined watercourses, any impacts from this activity are expected to be negligible, as under a high or prolonged rainfall events, receiving environments are likely to be equally subject to runoff and elevated turbidity.

The staged conceptual construction ESCP is shown below in Figure 20. Detailed progressive ESCP drawings will be prepared throughout the construction phase and included in the CMP.

7.4.5.3. Stage 3 Operational ESCP

The operational ESCP will include (in addition to the above items, where constructed to meet final design parameters):

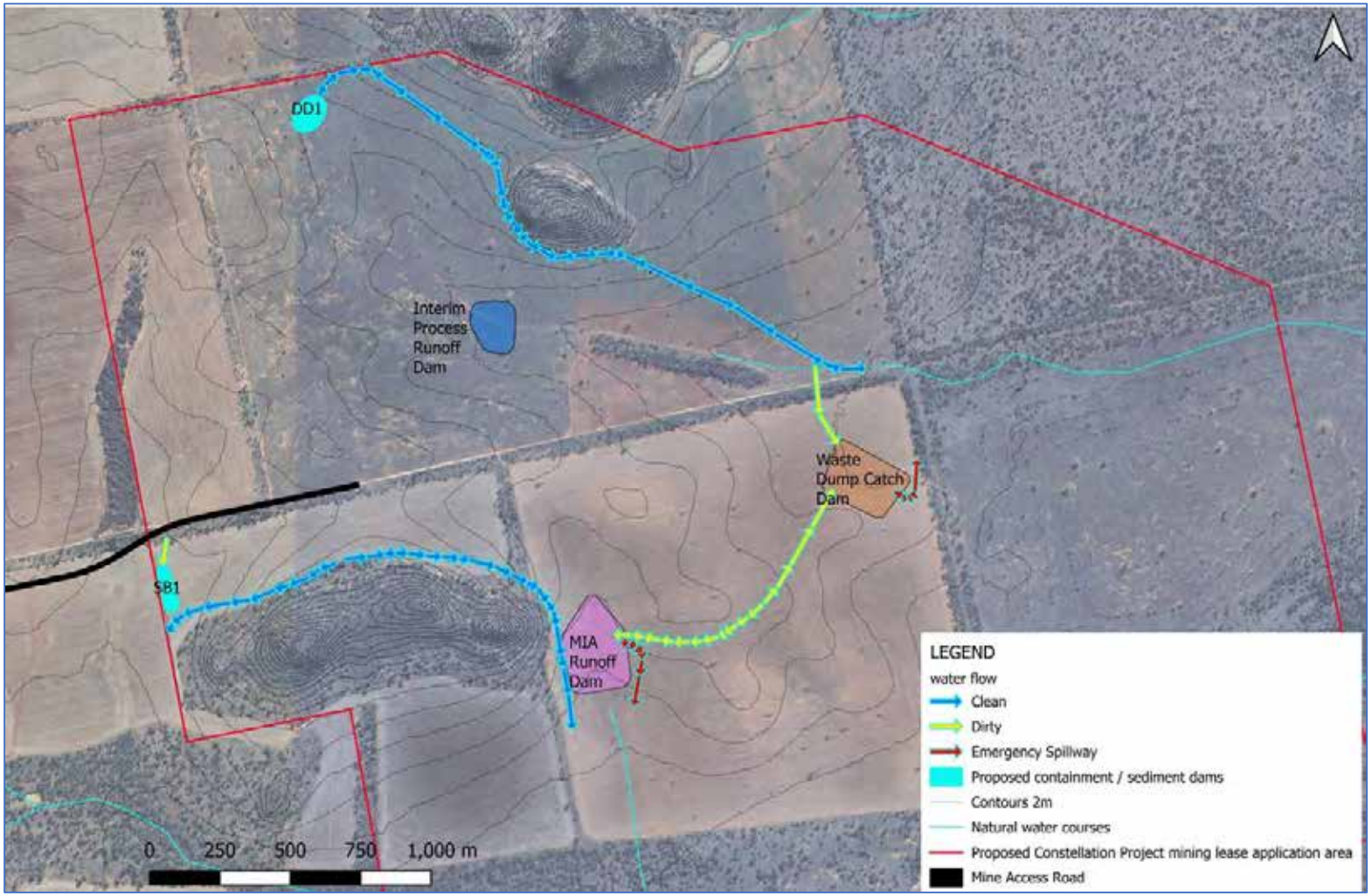
- The construction of the Process Runoff Dam to its detailed (final) design parameters.
- The progressive construction of internal diversion drains (to their) detailed (final) design parameters.
- Spreading of topsoil, seeding and / or hydromulching to stabilise embankments, drains, stockpiles etc (aiming to achieve 60% groundcover which is consistent with the existing level of groundcover at the Project site (AARC 2024)).
- The removal of temporary sediment controls, once groundcover targets are achieved.

The MIA Runoff Dam, Process Runoff Dam and Waste Dump Catch Dam would each have a peg / staff gauge installed (or alternatively an automated level sensor) to indicate the required storage volume. Following rainfall where runoff into the dam may be higher than the installed peg, dewatering activities will be implemented to return the dam to its required storage volume as soon as practicable.

Routine inspections of clean and dirty water drains will occur as described in Section 9. Any required corrective measures to ensure the effectiveness of the drains and compliance with design criteria will be implemented by TRL.

The conceptual operational ESCP is shown in Figure 12.

Figure 20 Conceptual Stage 2 Construction ESCP



7.4.6. ESCP – Okeh Road / Access Road Construction

The upgrade of the existing Okeh Road and construction of the site access road portions will require vegetation removal, the stripping of topsoil and the import of gravel road base materials. Each phase of the road construction process has the potential to cause erosion and generate sediment.

Due to the general flat topography, surrounding vegetation cover and relatively small surface area of exposed soils / gravel etc, risks are considered generally low and unlikely to impact any local ephemeral waterways or drains. Any deposited sediment will likely remain within the immediate road shoulder area. Nonetheless, TRL will implement sediment and erosion control measures consistent with Landcom (2004) and *Managing Urban Stormwater: Soils and Construction, Volumes 2C (unsealed Roads)* (DECC 2008) for the design and implementation of control measures. As noted above, the following principles will be further described and detailed in a CMP.

Controls may include (but not limited to):

- Minimise any soil disturbance to only what is essentially required to undertake the works.
- The installation of sediment controls where practicable, prior to soil disturbance including (for example):
    - Sediment fencing .
    - Jute / Coir logs.
    - Rip Rap bunds (lined / covered with geotextile fabric).
- Installation of sediment fencing downslope of any stockpiled erodible materials and diversion of upslope clean runoff with bund.
- Groundcover vegetation should be retained wherever possible.
- Topsoil must be salvaged and stored separately. At the completion of works, topsoil must be re-spread over the disturbed area to facilitate revegetation.
- Scour protection as per engineering specifications (such as rip rap / rock armouring) installed around any culvert entry and discharge points.
- Attempt to undertake works during periods of low rainfall erosivity.
- Erosion and sediment controls are to be checked and maintained on a regular basis to ensure they remain effective throughout the project.
- Undertake revegetation where required to stabilise exposed soils, revegetation species should align with the surrounding / pre-project land use.
- Sediment and erosion controls are to be kept in place and maintained until works are complete and soils stabilised.

7.4.7. ESCP – Infrastructure Corridor / Buried Water Supply Pipeline

Aeris Resources propose to create an infrastructure corridor which will deliver key services from the existing Murrawombie mine site to the CP. The infrastructure corridor generally follows the proposed haul road route, including along Railway Road, the Mitchell Highway, Okeh Road and private portions of the haul road / site access road routes (Figure 4). Soil disturbance within the infrastructure corridor is primarily related to installing a buried water supply pipeline. The pipeline trench will also include fibre optic cabling and other services as required. The buried pipeline will be required to pass through several ephemeral (gazetted) watercourses and public roads.

The water supply pipeline will be constructed using open trenching techniques, however under-boring may be utilised where required, for example where crossing the Mitchell Highway. The process for pipeline installation includes the following steps:

- establishing site environmental controls;
- creating temporary access tracks, where required;
- clearing vegetation and removing and stockpiling topsoil;
- trench excavation;
- stringing of pipes along the route;
- placing bedding material;
- installing pipework and other required services;
- casting and pouring of concrete thrust blocks where required;
- installing valves (e.g. scour valves, air valves and pits);
- commissioning (including pressure testing);
- backfilling the trench (subsoil materials, followed by the spreading of salvaged topsoil); and
- site restoration.
-

7.4.7.1. General Soil Handling Measures

TRL will implement the following general measures to manage soil resources during construction activities along the infrastructure corridor.

- stockpiling excavated topsoil (excavated to a depth of approximately 200 mm) separately from subsoil (generally >200 mm below ground level);
- avoiding soil handling when the soils are excessively wet or dry, where practicable;
- minimising the handling of soil resources by having a dedicated area for stockpiling the soil resources;
- backfilling the trench as soon as practicable;
- backfilling subsoil in the trench prior to backfilling topsoil; and
- Revegetation.

7.4.7.2. General ESCP Measures

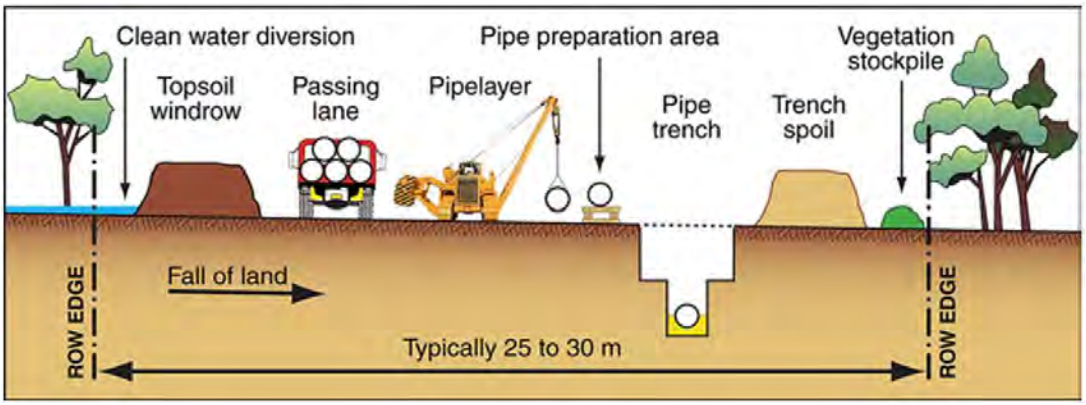
Erosion and sediment controls will be implemented when installing the water supply pipeline in accordance with the requirements of Landcom (2004) and *Managing Urban Stormwater Soils and Construction Volume 2A Installation of services* (DECC, 2008b). As noted above, the following principles will be further described and detailed in a CMP.

General measures to control erosion and sediment mobilisation during construction activities at the water supply pipeline will include:

- installing appropriate erosion and sediment controls prior to vegetation and soil disturbance including:
    - clean water diversions / prevent overland water flows from entering disturbed areas / trenches;
    - sediment fencing, or coir logs (including around stockpiled soils);
- limiting the extent of the disturbance from construction activities to the practical minimum;
- minimising the duration that trenches are open;
- storing soil stockpiles at appropriate distances from watercourses and dams;
- minimising soil stockpiling times during construction activities;
- replacing stripped topsoil and seeding and stabilisation of the disturbed area as soon as practicable after backfill (revegetation species to be selected to align with pre-disturbance vegetation communities).
- weekly (or after 20mm of rainfall) inspections of erosion and sediment control measures to assess performance and operability, and implementation of corrective measures to maintain functionality (if required).
- Any rainwater captured within the trench will be pumped out for re-use and not discharged to the environment.

Conceptual trenching layout / methods are shown in Figure 21.

Figure 21 Conceptual Trenching Site Layout (Source: Catchments and Creeks Pty Ltd (2017))



7.4.7.3. Road Crossings

Trenched road crossings will be carried out in two stages, trenching and backfilling half of the road width, and then completion of the remaining half of the road crossing, to enable traffic movements in a single lane to be maintained. TRL will consider alternate installation methods where necessary, such as under-boring to avoid traffic interruptions on the Mitchell Highway or where required to minimise environmental and safety risks.

7.4.7.4. Watercourse Crossings

Approximately five (first order) watercourses (NSW Hydroline 2025) are required to be crossed. All watercourses are generally dry and ephemeral in nature, only flowing following significant rainfall events. Watercourses within the project area are generally undefined and comprise a shallow depression in the landscape; therefore trenching through the watercourse is not expected to result in any significant damage to creek banks, vegetation nor alter local hydrologic, geomorphic or ecological functions. Trenched watercourse crossings will be scheduled to occur during dry (no flow) conditions, where practicable. Where this cannot be achieved, coffer dams (Figure 22) will be used, as required, to enable trenching of these watercourses during low flow conditions. Trenching will not be attempted during moderate to high flow events, or where large rainfall events are forecast.

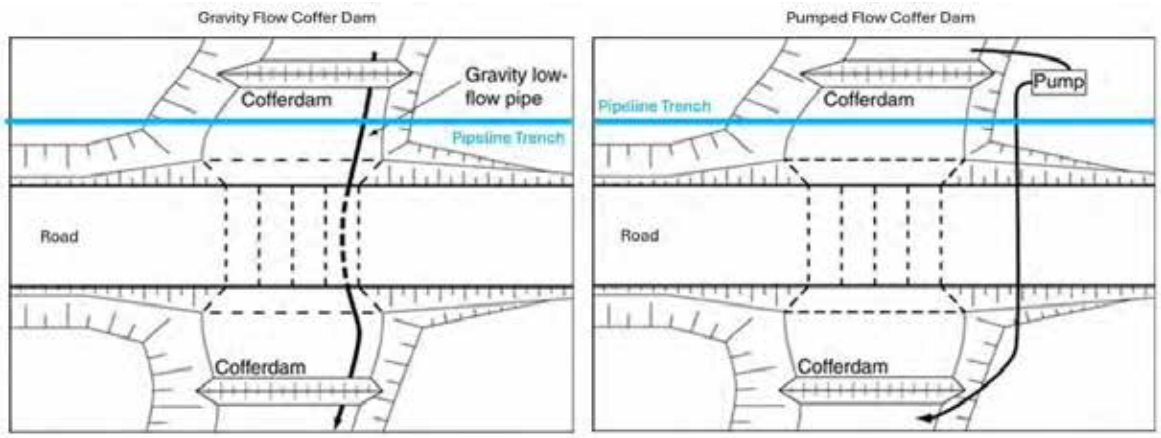
Under Section 4.41 of the EP&A Act, as a state significant development, a controlled activity permit is not required for the CP; nonetheless, the water supply pipeline watercourse crossings will be designed, constructed and maintained in accordance with the following:

- *Controlled activities – Guidelines for laying pipes and cables in watercourses on waterfront land* (DPE, 2022);
- *Controlled activities – Guidelines for riparian corridors on waterfront land* (DPE, 2022a);

TRL will implement the following general management measures to manage soil and water resources during trenching of watercourses:

- avoid outside bends; choose a straight section of the watercourse to cross;
- avoiding concrete caps and casings at shallow depths which may become exposed by bed lowering;
- ensure backfilling restores the channel shape and bed level to preconstruction condition;
- placement of clean rock / rip rap over the trench line and where required on embankments to prevent erosion;
- scheduling trenching activities during nil or low flow conditions where practicable;
- minimising the length of time that trenches are left open; and
- undertake revegetation works.

Figure 22 Schematic – Use of Coffer Dams for Trenched Creek Crossings (modified from Catchments and Creeks Pty Ltd (2017))



7.5. Management Measures Summary

The following table (Table 24) provides a summary of management measures to manage surface water and groundwater risks associated with the CP.

Table 24 Management measures summary

Management / Mitigation Measure		Accountability
Ref	**Description**	
Water Balance		
WB-01	TRL will track surface and ground water extraction and compare against entitlements. If required, TRL will purchase or trade additional share components and / or may scale production to the match water availability if required.	Process Manager
WB-02	TRL will obtain and / or modify required works approvals to allow the extraction and use of groundwater from the Constellation open pit and underground operations.	HSET Manager
WB-03	Operational procedures will be developed and implemented for the management of water volumes on site. Procedures will include (as a minimum) triggers for: • Ceasing extraction and import of water from Murrawombie • Commencing pumping from Constellation to Murrawombie (based on site water storage and / or dam levels). • Commencing the pumping (or gravity flow) of water to the Constellation open pit.	Process Manager
WB-04	Install flow metres (as stated in Section 7.1.5) to track water use and improve the accuracy of the site water balance.	Construction Manager
WB-05	The water balance model will be run on an annual basis and revised (and calibrated) every three years.	HSET Manager
WB-06	Water use and efficiency will be reported in the annual review, including: • All licenced water extraction compared to licence entitlements; • The annual site water consumption; • Water efficiency; • Details of any emergency discharges of site water, including cause(s) and corrective measures; • Initiatives to improve water efficiency / reduce requirements for fresh water imports.	HSET Manager
Surface Water Management Plan		
SW-01	Containment dams will be inspected on a regular basis and dewatered or de-silted to as needed to retain the design storage capacity.	HSET Manager
SW-02	Site drains will be inspected on a regular basis and maintained as needed to ensure waters flow to the intended storage basin (ie design catchments are maintained).	HSET Manager
SW-03	Septic systems will be approved and operated in accordance with Bogan Shire Council requirements.	Construction Manager / Maintenance Manager

Management / Mitigation Measure		Accountability
Ref	**Description**	
SW-04	Sleeving within the bi-directional water supply pipeline would be used to prevent leakage at watercourses crossings.	Construction Manager
SW-05	Chemicals and Hydrocarbons will be transported as per Dangerous Goods Code (where applicable).	HSET Manager
SW-06	Chemicals and Hydrocarbons will be stored as per relevant Australian Standards including for example AS1940.2004 *The storage and handling of flammable and combustible liquids and AS 3780:2023 The storage and handling of corrosive substances.*	HSET Manager
SW-07	Surface water monitoring will be conducted and reported annually. TARPS will be implemented as triggered.	HSET Manager
Groundwater management Plan		
GW-01	The predictions of the groundwater model will be verified, reviewed and updated following two years of mining, followed by on a three-yearly basis.	HSET Manager
GW-02	Groundwater monitoring will be conducted and reported annually. TARPS will be implemented as triggered	HSET Manager
GW-03	Following the collection of additional baseline (pre-mining) data from proposed new bores and piezometers, TRL will update the CPWMP to include: • An updated conceptual model and revised predictions using the extended groundwater monitoring data. • Revised Trigger Action Response Plan (TARP) criteria for groundwater level and quality impacts using site specific criteria. • Contingency in the TARP for unexpected occurrences eg. excessive unexpected groundwater take/inflow, or storm events. • Updated details for expanded groundwater monitoring network plus all heap leach pad piezometers.	HSET Manager
Erosion and Sediment Control Plan		
ESCP-01	A Construction Management Plan (CMP) will be developed for the construction phase of the project. The CMP will include sufficient site specific detail to enable the implementation of the ESCP by construction contract personnel.	Construction Manager

8. MONITORING PROGRAM

The following subsections describe the surface water and groundwater monitoring programs that are implemented to assess whether any of the potential impacts as described in Section 7 are being realised. Where required by consent conditions, Trigger Actions Response Plans (TARP) are stated that describe the required response where monitoring data may indicate that an impact has occurred or trends in data indicating an increasing likelihood of an impact occurring.

8.1. Surface Water Monitoring

8.1.1. Surface Water Quantity

Monitoring of water transfers to and from the Project site, and internal water transfers will be undertaken as described in Section 7.1 and are used to:

- Report on annual water take against licence entitlements; and
- Inform (and update / calibrate) the site water balance and associated reporting mechanisms.

Due to the absence of permanent streams or watercourses in the vicinity of the Project site, no monitoring of streamflow within watercourses is proposed.

8.1.1.1. Flow meters

Mechanical flow meters (described in Section 7.1) will be recorded on a monthly basis. Data will be retained and used in the presentation of the annual water balance and for the proposed three-yearly calibration and revision of the water balance model.

8.1.1.2. Dam levels

TRL will install automated level sensors and / or a physical marker / staff gauge that indicates the required storage volume of each containment dam. Site storage dams are monitored:

- on a monthly basis (or continuously if automated sensors are used); or
- following a site rainfall event of >20mm in a 24 hour period.

Where the monitoring indicates that the required storage volume is not available, pumping of water will be initiated to the Mine Dam. Periodic survey will also assess any buildup of sediment, requiring de-silting, and any other maintenance or repair requirements to ensure the required storage volume is maintained.

In addition to the tracking of dam water levels, TRL will record the site water storage volumes for input into the site water balance. Water storages volumes may be continually recorded using water level / pressure sensors, or manually recorded at the start and end of the water balance review period using installed staff gauges; where dam water levels are compared against formal surveyed dam rating curves. Dams are surveyed on a periodic basis to ensure stored volumes remain accurate.

8.1.2. *Surface Water Quality*

As described in Section 7.2, baseline surface water quality monitoring of downstream water bodies has commenced to establish baseline conditions and develop site specific guideline values (SSGV) to ultimately assess potential impacts from the mining operations (for example, following an unlikely emergency discharge event).

Surface water quality monitoring is undertaken at nine locations on a monthly basis, until baseline conditions are established (i.e from at least 12 monthly samples[11]) following which the frequency may be revised to quarterly.

Water sampling is also conducted from on-site water storages and containment dams to assess the degree of contamination and inform;

- re-use of contaminated water;
- priorities for pumping / reuse; and
- mine closure designs, including post closure water management.

Nominated analysis parameters are based on potential mine pollutants as described in Appendix 15 of the EIS '*Mine material and soil capping assessment and management and final void water balance and water quality model*' (RGS 2024).

Surface water monitoring locations are shown on Figure 13 and presented in Table 25 below

Upon granting an Environmental Protection Licence for the CP, the CPWMP will be updated to include any licenced discharge points and limits.

8.1.2.1. Monitoring Methods, Data Management and Quality Control

Surface water monitoring is conducted according to procedure TRL-ENV-SWI-003.

In accordance with the TRL Environment Protection Licences, laboratories engaged by TRL will use the EPA Approved Methods Publication (EPA, 2022) (unless another method has been approved by the EPA in writing before any tests are conducted).

Water quality samples will only be collected when safe and practicable to do so (e.g. samples will not be collected if safe access cannot be obtained to the relevant water storage or receiving water location).

Quality control measures that will be implemented in the surface water monitoring program include:

- Field water quality parameters are measured with a calibrated multiparameter instrument and calibration results stored in the field calibration form (TRL-ENV-FRM-022). Sample details and field data are recorded into the water data collection form (TRL-ENV-FRM-011).
- Collection of field blank (minimum 1 per month) and duplicate samples (minimum 2 per month) for all parameters.
- Data quality checks including ionic balance.

[11] Due to the semi-arid environment at the Project site, it is likely that sufficient water may not always be available to obtain samples, as such 12 samples have been proposed as the minimum required to establish baseline conditions, rather that the industry accepted 24 months of data.

All water samples will be dispatched to an external National Association of Testing Authorities (NATA) accredited laboratory. Field and laboratory results will be entered and stored in an environmental database.

Table 25 Constellation Project Surface Water Monitoring Locations

Site ID	Name	Monitoring Purpose	Easting	Northing	Monitoring Frequency	Analyses
GCUS	Goldbiddie Cowal - Upstream	Background information for comparison against downstream data / changes in water quality following discharge.	504893	6566748	Monthly*	Physicochemical parameters (Field) Physicochemical parameters Acidity/alkalinity Major ions Metals (dissolved and total) Nutrients (Refer to Table 26)
GCDS	Goldbiddie Cowal - Downstream	Baseline information and to assess potential water quality changes following discharge	505381	6570791	Monthly*	
D01	Ground Tank / Farm Dam. Southern site boundary.	Baseline information and to assess potential water quality changes following discharge	498721	6559055	Monthly*	
D02	Ground Tank / Farm Dam. Southern site boundary.	Baseline information and to assess potential water quality changes following discharge	500093	6558850	Monthly*	
D03	Ground Tank / Farm Dam. Southern site boundary.	Baseline information and to assess potential water quality changes following discharge	503823	6566382	Monthly*	
D04**	Eastern site boundary - downstream.	Baseline information and to assess potential water quality changes following discharge	500024	6561066	Monthly*	
D05	Okeh Dam east	Baseline information and to provide upgradient (of the mine) water quality information.	498842	6562235	Monthly*	
D06	Okeh Dam west	Baseline information and to provide upgradient (of the mine) water quality information.	496775	6560580	Monthly*	
CPSW01	Process Runoff Dam	Degree of contamination, re-use options and priorities.	498074	6561298	Monthly	
CPSW02	Waste Dump catch Dam	AMD generation. Degree of contamination, re-use options and priorities. Inform cover design.	499373	6560743	Monthly	

Site ID	Name	Monitoring Purpose	Easting	Northing	Monitoring Frequency	Analyses
CPSW03	MIA Runoff Dam	AMD generation. Degree of contamination, re-use options and priorities. Inform cover design.	498426	6560129	Monthly	
CPSW04	Mine Dam	Degree of contamination, re-use options and priorities.	498478	6560502	Monthly	
CPSW05	Constellation Open Cut Pit	Degree of contamination, re-use options and priorities. Inform post closure risks.	498456	6561232	Monthly	
CPSW06	Raw Water Dam	Degree of contamination, re-use options and priorities.	497496	6561215	Monthly	
CPSW07	SB1	Degree of contamination, re-use options and priorities.	496909	6560351	Monthly	
Girilambone 01	Girilambone Water supply Dam	Baseline information and to assess potential water quality changes from haul road construction and operation.	490609	6543837	Monthly	

*Only where sufficient water is available for sampling. Where water is not present or flowing, a note will be recorded and the monitoring event will be recorded as completed for the purposes of compliance with this CPWMP
**At sampling location D04, there is no actual sampling pool / water body. TRL will install a ground tank or other suitable sampling location to increase the likelihood of being able to collect a suitable water sample.

Table 26 Surface Water Field and Laboratory Analytical Suites

Suite	Parameters
Physicochemical parameters (Field)	EC (field), pH (field), Dissolved Oxygen (field)
Physicochemical parameters	EC, pH, Salinity, Total Suspended Solids (TSS), Total Hardness, Turbidity.
Acidity/alkalinity	Acidity (mg/L), Alkalinity (Carbonate, Bicarbonate, Hydroxide and Total Anions/Cations)
Major ions	Calcium, Magnesium, Sodium, Potassium, Sulphate, Chloride
Metals (dissolved and total)	Antimony, Aluminium, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Lead, Iron, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Vanadium, Zinc
Nutrients	Total Nitrogen (TN), Nitrate and Nitrite (NOx), Total Kjeldahl Nitrogen (TKN), Total Phosphorus (TP)
Oil & grease (discharge only)	Oil & Grease

8.1.3. Water Discharge

Uncontrolled emergency discharge may occur if the design storage capacity of dams is exceeded. Dams are managed to prevent and minimise uncontrolled discharge by maintaining their design storage freeboard at all times. Following rainfall events, dams are dewatered as soon as practicably possible. In the event of uncontrolled discharge, the following protocol is undertaken:

- Environment Superintendent and HSET Manager are notified.
- Water sampling is conducted in accordance with Table 27. Noting that only the active discharge dam / point and potential receiving point(s) are sampled (to be determined by the Environmental Superintendent).

During large rainfall events, access to some external sampling sites is likely restricted due to local road closures and / or ground conditions. As such, sampling would be undertaken as soon as practicable following the discharge event when safe to do so.

The emergency discharge locations for site storage dams are shown on Figure 12.

Table 27 Uncontrolled discharge monitoring program

Site ID	Monitoring Frequency	Analyses	Notification protocols
Relevant discharge point(s) only: • Process Runoff Dam (CPSW01) • Waste Dump Catch Dam (CPSW02) • MIA Runoff Dam (CPSW03) • SB1 (CPSW07)	Daily during uncontrolled discharge	Physicochemical parameters (Field) Physicochemical parameters Acidity/alkalinity Major ions Metals (dissolved and total) Nutrients Oil & grease (Refer to Table 26) Estimate of volume released (L, m^3 or ML)	Notify neighbouring landholders. Notify DPHI, EPA. Activate PIRMP if required.
Relevant receiving environments point(s) only: • GCUS • GCDS • D01 • D02 • D03 • D04 Upgradient (of the mine site): • D05 • D06			

8.1.3.1. Treated Effluent

Treated effluent is intended to be disposed of on site, either through on site irrigation / evaporation or via an absorption trench (rubble drain). Risks associated with the onsite disposal of treated effluent primarily relate to human exposure to pathogens. TRL, in accordance with the established Safety Management System, will consider the implementation of a water sampling and analysis program based on a risk assessment of human exposure to treated waters. The risk assessment will be conducted following detailed design and approval of the effluent management system by Bogan Shire Council.

8.1.3.2. Performance Criteria and TARP

Performance criteria are established to investigate the effectiveness of the surface water management system in separating clean, dirty and contaminated water. Performance criteria are established for:

- The Process Runoff Dam (CPSW01), Waste Dump Catch Dam (CPSW02), MIA Runoff Dam (CPSW03) and SB1 to ensure that water is not contaminated in the unlikely event of uncontrolled emergency discharge and use of receiving waters by livestock.
- Downstream surface water quality monitoring points (GCUS, GCDS, D01, D02, D03, D04)
- The Girilambone Water Supply Dam (Girilambone01) to ensure that water is not contaminated from road construction or mining related (ie transport) activities.
- Operational capacities of sediment and containment dams.

The *Australian & New Zealand Guidelines for Fresh & Marine Water Quality Guidelines* (Australian Government 2018) recommend that wherever possible, site-specific data is used to define guideline values for physical and chemical factors which can adversely impact the environment. Guideline values provide a 'trigger' for assessment and further investigation. Triggers are not prescribed limits or discharge standards, nor do they necessarily provide a limit which, if exceeded, is indicative of an impact.

TRL will ultimately develop their own site specific guideline values (SSGV's), following the collection of adequate baseline data (i.e. from at least 12 monthly samples) from monitoring sites GCUS, GCDS, D01, D02, D03, D04, D05, D06 and Girilambone01.

Should a discharge incident occur during the collection of baseline data, which impacts water quality at one or more of the above sites (and therefore impacts the validity of baseline data), the development of SSGV's will be based on unaffected sites, such as GCUS, D05 or D06 or other suitable location(s).

Once developed, SSGV's will be used to assess potential impacts on downstream receptors and beneficial uses of water.

Interim Guideline Values

Interim guideline values have been obtained from two surface water monitoring sites near the Murrawombie Mine site (as described in Section 7.2.4 and presented in Table 16) and default livestock guidelines from ANZECC (2000) and will be used until the development of SSGV's.

Interim guideline values are presented below in Table 28 and apply the most conservative value from the interim SSGVs derived from surface water monitoring sites near the Murrawombie Mine site or ANZECC (2000) agricultural[12] guideline values.

[12] Agriculture and the watering of livestock is the dominant land (and water) use in the vicinity of the Project site. As such the use of agriculture / livestock ANZECC default values are considered the most suitable and representative values for potential impacts to downstream waters.

Table 28 Interim Water Quality Investigation Levels

Parameter	ANZECC/ARMCANZ (2000) guideline value	SSGV's from Representative Surface Water baseline values (GSW11 and GSW12 (Section 7.2.4)*
	Livestock	
pH	6-9	**6.4 –8.06**
Electrical Conductivity (uS/cm)	See TDS	**303.75**
Total Dissolved Solids (mg/L)	4,000 (cattle) 10,000 (sheep)	**253.9**
Aluminum (mg/L)	5	**0.488**
Arsenic (mg/L)	0.5	**0.004**
Beryllium (mg/L)	-	**0.063**
Boron (mg/L)	5	**0.165**
Cadmium (mg/L)	0.01	**0.008**
Calcium (mg/L)	1000	**24**
Chloride (mg/L)	-	**13**
Chromium (III) (mg/L)	1	**0.012**
Cobalt (mg/L)	1	**0.025**
Copper (mg/L)	1 (cattle) / 0.4 (Sheep)	**0.132**
Iron (mg/L)	-	**5.82**
Lead (mg/L)	0.1	**0.039**
Magnesium		**10**
Manganese (mg/L)	-	**1.035**
Mercury (mg/L)	**0.002**	0.014
Nickel (mg/L)	1	**0.013**
Selenium (mg/L)	0.02	**0.01**
Sulphate (mg/L)	1000	**25.6**
Vanadium (mg/L)	-	**0.039**
Zinc (mg/L)	20	**0.258**
* Based on the 5th for pH) and 95th percentile (for all) values from collected datasets. Metals represent dissolved concentrations		

In accordance with Condition C22 (d)(ii) of the Constellation Project Development Consent (SSD-41579871) a TARP has been established to investigate and develop corrective actions for any exceedance of the performance criteria.

As livestock access is restricted from site based dams, no TARP criteria have been selected for these storages. For site based storages, monitoring results are tracked on a monthly basis for any significant deviations from previous results or emerging trends and where required, investigated to inform priorities for surface pumping (recovery and re-use) and the development of mine closure designs, including post closure water management systems. In the unlikely event of discharge from these dams to off-site environments, discharge sampling (Table 27) and TARPs (Table 29) will be used to assess potential impacts.

TARPS have been established for:

- Surface Water Quality (Table 28 and Table 29)
- Containment dam freeboard / maintenance of containment dams and sediment dam water level (Table 30)

Table 29 Surface Water Quality Trigger Action Response Plan (TARP)

Trigger Action Response Plan (TARP)				
No:	**Title:**		**Department:**	**Date of Review:**
SW-01	**Surface Water Quality TARP**		**HSET**	**1/12/2025**
Scope of TARP (What does the TARP apply to? What is the intent?):				
Response to Surface Water discharge from the Constellation Project Site.				
LEVEL 1 SITUATION (Normal Conditions)	***Trigger***	***Action***	***Response***	***Responsible Person***
	Normal Operations: Water quality results at D01, D02, D03, D04, GCDS < or within range for applicable criteria (Table 28).	Review monitoring results	Report on monitoring results in the Annual Review.	HSET Manager
LEVEL 2 SITUATION (Minor /Major Risk Potential)	***Trigger***	***Action***	***Response***	***Responsible Person***

	Level 2(alert/preliminary investigation):
	Exceedance of the performance criteria in Table 28 (at D01, D02, D03, D04 or GCDS)
		• Check and validate results
		• Consider additional monitoring if required.
		• Undertake preliminary investigation to confirm if exceedance is mine related including:
		  ○ any discharges
		  ○ obvious non-mining related sources.
		  ○ any catchment related changes (disturbance, surface flows, land use activities etc)
		• If required, engage specialist assistance.
		• Assess risk of material harm and Escalate to Level 3 (below) if required.
			• Report exceedance and commencement of preliminary investigation to TRL Management.
			• Notify (on a precautionary basis) downstream / affected landholders.
			• Document findings of preliminary investigation.
			• If mining related, record as incident and investigate as per TRL procedures.
			• Implement corrective measures.
			• Results presented in Annual Review.
				HSET Manager

Trigger Action Response Plan (TARP)			
No:	**Title:**	**Department:**	**Date of Review:**
SW-01	**Surface Water Quality TARP**	**HSET**	**1/12/2025**
Scope of TARP (What does the TARP apply to? What is the intent?):			
Response to Surface Water discharge from the Constellation Project Site.			

	Trigger	***Action***	***Response***	***Responsible Person***
LEVEL 3 SITUATION (Major / Critical Risk Potential)	**Level 3 (high alert/rectify):** Determine whether a change in water quality has caused, or threatens to cause material harm to the environment (i.e. loss of beneficial use such as use for downstream irrigation, livestock or aquatic ecology values).	• Consider additional monitoring if required. • Engage a suitably qualified technical consultant(s) to assess potential impacts on the downstream receiving environment.. • Identify whether the change in water quality may impact on downstream use of water for livestock, irrigation or domestic use. • Implement PIRMP if required.	• External reporting of material harm (if required) to regulatory agencies. • Notify (cease uses of water) downstream / affected landholders. • Provide alternate water sources if required. • Investigate as per TRL procedures. • Implement corrective measures. • Incident reports provided to regulatory agencies (as per development consent or licence conditions). • Results presented in Annual Review	HSET Manager

Table 30 Containment Dam Trigger Action Response Plan (TARP)

Trigger Action Response Plan (TARP)			
No:	**Title:**	**Department:**	**Date of Review:**
SW-02	**Containment Dam Trigger Action Response Plan**	**HSET**	**1/12/2025**
Scope of TARP (What does the TARP apply to? What is the intent?):			
Manage / maintain required storage capacity in site storage dams.			

	Trigger	Action	Response	Responsible Person
LEVEL 1 SITUATION (Normal Conditions)	**Normal Operations:** Inspect site storages monthly or following >20 mm rainfall in a 24 hour period. Water level is below the marker peg (which indicates the required storage volume.	Continue routine monitoring and inspection.	None required.	HSET Manager
LEVEL 2 SITUATION (Minor /Major Risk Potential)	***Trigger***	***Action***	***Response***	***Responsible Person***
	Level 2(alert/preliminary investigation): Inspect site storages monthly or following >20 mm rainfall in a 24 hour period. Water level is above marker peg (Process Runoff Dam, Waste Dump Catch Dam, MIA Runoff Dam, SB1)	• Cease import of water • Dewater the dam to below the marker peg level as soon as practicable. • De-silt the dam if required.	Track water accumulation on site. Check rainfall forecast and if significant rainfall is likely to continue: • commence site dewatering (via the bidirectional pipeline or to open pit) • Utilise existing pumps and / or deploy additional pumps (if required) to prevent or minimise discharge by pumping to alternate site storage dam, or to the Constellation Open Pit if safe to do so). • Prepare for uncontrolled emergency discharge if rainfall event is likely to exceed the dam design capacity.	HSET Manager

Trigger Action Response Plan (TARP)			
No:	**Title:**	**Department:**	**Date of Review:**
SW-02	**Containment Dam Trigger Action Response Plan**	**HSET**	**1/12/2025**
Scope of TARP (What does the TARP apply to? What is the intent?):			
Manage / maintain required storage capacity in site storage dams.			

	Trigger	***Action***	***Response***	***Responsible Person***
LEVEL 3 SITUATION (Major / Critical Risk Potential)	**Level 3 (high alert/rectify):** - Uncontrolled discharge occurring. (Process Runoff Dam, Waste Dump Catch Dam, MIA Runoff Dam, SB1)	• Daily during discharge: ○ estimate the discharge flow rate and collect a water sample (Section 8.1.3). • Activate the PIRMP if required • Continue to utilise existing pumps and deploy additional pumps if required to prevent or minimise further discharge (return pumping to Murrawombie or to the Constellation Open Pit if safe to do so).	• Report any uncontrolled discharge and monitoring results in the Annual Review. • Uncontrolled discharge containment dams off the lease is considered an environmental incident and will be reported in accordance with TRL procedures. • Based on water quality data implement TARP (Table 29) as required	HSET Manager

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8.1.4. *Data Assessment and Reporting*

In accordance with Conditions C22(d)(ii) of the Constellation Project Development Consent (SSD-41579871) the following protocols are established for data interpretation and reporting:

- Monthly review of all surface water quality data and identify any notable changes in water quality or significant trends.
- Comparison of surface water quality against performance criteria established in Section 8.1.3.2, including commentary and investigation and corrective actions undertaken for any exceedances.
- Details of any uncontrolled discharges that occurred and any associated water quality results.

The items above will be reported in the Annual Review (Section 12.3).

8.2. Groundwater Monitoring

The objectives of the groundwater monitoring program are to:

- monitor background groundwater levels and quality;
- assess any potential drawdown from mining operations;
- assess any potential for groundwater contamination from mining infrastructure including the Heap Leach Pad facility, site water storages, Waste Rock Emplacement, ROM Stockpiles etc; and
- provide ongoing data to validate the conceptual hydrogeological model for the site.

Upon granting an Environmental Protection Licence for the CP, the CPWMP will be updated to include any licenced discharge points and limits.

8.2.1. *Groundwater Take*

Metering of water transfers into and out of the mine workings during operations is required to allow the actual rate of groundwater inflow into the mine workings to be calculated and compared to the modelled inflow and licence entitlements. With consideration of rainfall and evaporation, and moisture lost to ore removal and underground ventilation, the rate of groundwater inflow (from groundwater aquifers) into the mine workings will be approximately equal to the difference between the water transferred out and water transferred into the workings.

8.2.2. *Groundwater levels*

Monthly monitoring of groundwater levels at the monitoring bores shown in Table 31 is required. Levels may be either manually gauged or automatically recorded with a datalogger. Monitoring bore locations are shown on Figure 14.

8.2.3. *Groundwater quality*

Monthly groundwater sampling is required at the monitoring bores in Table 31. Monitoring bore locations are shown on Figure 14. Nominated analysis parameters are based on potential mine pollutants as described in Appendix 15 of the EIS '*Mine material and soil capping assessment and management and final void water balance and water quality model*' (RGS 2024) and are presented in Table 32.

In accordance with the TRL Environment Protection Licences, laboratories engaged by TRL will use the EPA Approved Methods Publication (unless another method has been approved by the EPA in writing before any tests are conducted).

8.2.3.1. Monitoring Methods and Quality Control

Monitoring procedures, including quality control are documented in TRL-ENV-SWI-009. Field data are recorded in form TRL-ENV-FRM-012.

Groundwater monitoring will only be conducted when safe and practicable to do so (e.g. samples will not be collected if safe access cannot be obtained to the relevant monitoring bore).

Groundwater levels will be measured manually using a decontaminated electronic water level meter dipper or automatically with pressure transducers and loggers at selected groundwater monitoring bores.

Groundwater quality monitoring will be undertaken in accordance with the following guidelines and standards:

- *Approved methods for the sampling and analysis of water pollutants in New South Wales* (EPA, 2022);
- AS/New Zealand Standards (NZS) 5667.1:1998 *Water quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*; and
- AS/NZS 5667.11:2009 *Water quality – Sampling, Part 11: Guidance on sampling of groundwaters*.

All samples will be sent under chain of custody documentation to a NATA accredited laboratory.

Quality control measures that will be implemented in the surface water monitoring program include:

- Field measurements will be collected using a maintained and calibrated water quality meter.
- Collection of field blank (minimum 1 per month) and duplicate samples (minimum 2 per month) for all parameters.
- Data quality checks including ionic balance.

8.2.3.2. New Bores

While the EIS predicted no off-site impacts to groundwater quality and only minor predicted drawdown; to validate EIS predictions, three new / additional groundwater monitoring bores (BH018, BH019, BH020) are proposed to monitor potential drawdown and to identify any changes or impacts to groundwater quality. The location of proposed bores is included in Table 31 and shown on Figure 14. Proposed bores will be drilled to enable the collection of as much data as possible prior to construction of key mine infrastructure.

Following the installation of the three additional bores, a total of four bores will be used to assess potential groundwater level and quality impacts (BH013, BH018, BH019, BH020); noting than an existing bore (BH005) will be lost to the development of the Constellation open cut pit. Observations from these bores will be compared against established trigger values (Section 8.2.3.4) and also the observations from the remaining three monitoring bores which are considered 'regional bores' (BH015, BH016, BH017), being generally outside of predicted impact zones. Regional bores provide data on background conditions, including the natural variation in groundwater level and quality (noting that these bores are predicted to experience <1m drawdown (up to the end of mining).

8.2.3.3. HLP Piezometers

Section 7.3.9.3 described the proposed under-liner that will be installed to allow the capture of leachate from the HLP facility and prevent the contamination of underlying soils and groundwater. A total of six piezometers will be installed to monitor the performance of the under-liner. The proposed location of the piezometers is shown in Table 31 and shown on Figure 14. Note that the final location of piezometers may be micro-adjusted as required to avoid restrictions on mine site infrastructure and construction activities.

Proposed piezometers will be drilled to enable the collection of at least 12 months of baseline data prior to construction of key mine infrastructure, namely prior to the irrigation of oxide material on the HLP. Piezometers will be drilled to access and monitor the upper groundwater aquifer, likely indicating the first signs of contamination, though drilled to a sufficient depth to allow for predicted drawdown.

Table 31 Groundwater Monitoring Program

Site ID	Monitoring Purpose	Bore Depth	Easting	Northing	Monitoring Frequency		Analyses
		m	GDA94 Zone 55		Depth	Quality	
BH005*	N/A – will be lost to the open cut pit development	75.7	498338	6561110	Monthly*	Monthly*	Physicochemical parameters (Field) Physicochemical parameters Acidity/alkalinity Major ions Metals (dissolved and total) Nutrients (Refer to Table 26)
BH013	Monitoring of drawdown. Identification of potential pollution from HLP, WRE, Waste dump catch dam. Likely impacted by drawdown (>10m predicted).	102.5	499536	6561171	Monthly	Monthly	
BH015	A 'regional bore' used to track / compare other bores against natural level and quality variations.	155	501195	6562698	Monthly	Monthly	
BH016	A 'regional bore' used to track / compare other bores against natural level and quality variations.	167	495180	6562834	Monthly	Monthly	
BH017	A 'regional bore' used to track / compare other bores against natural level and quality variations.	161	497328	6557965	Monthly	Monthly	
BH018	Track groundwater drawdown (5m predicted) Identify potential groundwater contamination – downgradient of mine site	TBA	498534	6559495	Monthly	Monthly	
BH019		TBA	500328	6561057	Monthly	Monthly	
BH020		TBA	499729	6559985	Monthly	Monthly	
CPPZ01	Monitor potential leaks from HLP under-liner	TBA	497399	6561246	Monthly	Monthly	
CPPZ02		TBA	497734	6561338	Monthly	Monthly	
CPPZ03		TBA	498001	6561495	Monthly	Monthly	
CPPZ04		TBA	497935	6561622	Monthly	Monthly	
CPPZ05		TBA	497469	6560911	Monthly	Monthly	
CPPZ06		TBA	497987	6561082	Monthly	Monthly	
*monitored until lost to mine site development (open cut pit)							

Table 32 Groundwater Field and Laboratory Analytical Suites

Suite	Parameters
Physicochemical parameters (Field)	EC (field), pH (field), Dissolved Oxygen (field)
Physicochemical parameters	EC, pH, Salinity, Total Hardness.
Acidity/alkalinity	Acidity (mg/L), Alkalinity (Carbonate, Bicarbonate, Hydroxide and Total Anions / Cations).
Major ions	Calcium, Magnesium, Sodium, Potassium, Sulphate, Chloride.
Metals (dissolved and total)	Antimony, Aluminium, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Lead, Iron, Manganese, Mercury, Molybdenum, Nickel, Selenium, Silver, Vanadium, Zinc.
Nutrients	Total Nitrogen (TN), Nitrate and Nitrite (NOx), Total Kjeldahl Nitrogen (TKN), Total Phosphorus (TP)

8.2.3.4. Trigger Action Response Plans

Groundwater Drawdown Assessment and TARP

The open cut pit and underground mine water balance is described in Section 7.1. Potential drawdown impacts to private landholder bores are assessed via the following measures:

- a groundwater monitoring program to monitor levels in representative bores to detect mine-induced drawdown.
- Data review and TARP to investigate any potential drawdown outside of that predicted in the Constellation EIS (Table 34).

Monitoring bores located in areas representative of where drawdown is predicted to occur have a trigger value applied that is based on the predictions of groundwater modelling (Table 33). The trigger threshold is an absolute value based on the lowest predicted groundwater level elevation in m AHD. Bore BH005 is not included in the TARP due to being lost to mine site development; and BH013 is not included in the TARP due to its close proximity to mining infrastructure (open pit and underground workings) and predicted drawdown being >10m.

Table 33 Groundwater Triggers

Bore	Trigger***	Notes:
	mAHD	
BH015*	>5m (139m)	*Monitoring is subject to landholder agreement and access. **Initial standing water level to be determined following drilling. Trigger values may be amended as additional baseline data has been collected and / or following revision of the Groundwater Model.
BH016	>1m (140m)	
BH017*	>1m (147.5m)	
BH018	>5m (TBA)**	
BH019	>5m (TBA)**	
BH020	>5m (TBA)**	

Table 34 Groundwater Level TARP

Trigger Action Response Plan (TARP)				
No:	**Title:**		**Department:**	**Date of Review:**
GW-01	**Groundwater Drawdown**		**HSET**	**1/12/2025**
Scope of TARP (What does the TARP apply to? What is the intent?):				
Assess and respond to potential groundwater drawdown / impact o other groundwater users				
LEVEL 1 SITUATION (Normal Conditions)	***Trigger***	***Action***	***Response***	***Responsible Person***
	Normal Operations: Drawdown < than trigger (Table 33)	No action required	Continue to monitor	HSET Manager
LEVEL 2 SITUATION (Minor /Major Risk Potential)	***Trigger***	***Action***	***Response***	***Responsible Person***
	Level 2 (alert/preliminary investigation): Drawdown > than trigger (Table 33)(predicted in the Constellation EIS (beyond natural variation) assessed annually). OR Landholder complaint of water supply impact.	Within 90 days of the submission of the Annual Review where a trigger exceedance has been identified, or community complaint: Engage a specialist hydrogeologist to investigate the cause of the drawdown and, if required, update the conceptual hydrogeological model and groundwater impact assessment.	• If investigation finds that drawdown is related to mining activities and there are potential impacts to private bores – initiate Level 3 response (below) • Any investigation conducted will be detailed in the Annual Review.	HSET Manager
LEVEL 3 SITUATION (Major / Critical Risk Potential)	***Trigger***	***Action***	***Response***	***Responsible Person***
	Level 3 (high alert/rectify): Investigation finds that drawdown is related to mining operations and private bores may be impacted.	DPHI and the landholder will be notified within 30 days of the receipt of the investigation report, and compensation and/or an alternative water supply will be provided to the landholder, in consultation with the landholder and DPHI.	• Record / report as incident. • Notify regulatory agencies • Report in Annual Review.	HSET Manager

Groundwater Quality TARP

Impact assessment criteria can be described as trigger levels, which, if exceeded, will lead to a response in terms of more intensive monitoring, investigation and ultimately, if required, remedial action before an impact occurs.

The proposed groundwater quality investigation triggers have been developed for the monitoring bores outlined in Table 35. These groundwater quality investigation triggers are based on the 5th (for pH lower value) and 95th percentiles (all parameters) of the baseline monitoring data that was collected between February 2022 and November 2025.

For established bores, trigger values are based on monitoring results for each individual bore. Interim guideline values for new bores and piezometers are based on the average 5th (pH) and 95th percentile values from all established bores (i.e. bores BH005, BH013, BH015, BH016, BH017). Once sufficient baseline data is obtained from new bores and piezometers, trigger values will be updated and based on monitoring results for each individual bore piezometer. The collection of baseline data will occur up to when mine related impacts may be possible.

A specific set of analytes are proposed as investigation triggers and are based on the potential contaminants identified in Appendix 15 of the EIS '*Mine material and soil capping assessment and management and final void water balance and water quality model*' (RGS 2024) (Table 32).

Table 36 presents the groundwater quality TARP for the CP.

Table 35 TARP Trigger values (5th and 95th percentile of baseline data)

Monitoring Bore	EC	pH (pH units)		Antimony	Arsenic	Copper	Cobalt	Iron	Manganese	Molybdenum	Nickel	Sulfate	Zinc
	(us/cm)	Lower	Upper	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BH005	28310	6.99	8.08	TBD	0.002	0.045	0.0026	0.53	3.71	TBD	0.016	2883	0.485
BH013	39410	7.2	8.3	TBD	0.008	0.050	0.017	1.74	1.91	TBD	0.013	3981	0.288
BH015	44400	7.1	7.9	TBD	0.008	0.018	0.011	0.27	0.1	TBD	0.012	4210	0.209
BH016	17200	7.6	8.2	TBD	0.001	0.011	0.003	0.87	1.26	TBD	0.010	1372	0.175
BH017	42120	7.2	8.0	TBD	0.01	0.026	0.011	0.67	0.2	TBD	0.024	4102	0.327
BH018	34288	7.21	8.1	TBD	0.007	0.029	0.009	0.826	1.44	TBD	0.015	3309	0.297
BH019	34288	7.21	8.1	TBD	0.007	0.029	0.009	0.826	1.44	TBD	0.015	3309	0.297
BH020	34288	7.21	8.1	TBD	0.007	0.029	0.009	0.826	1.44	TBD	0.015	3309	0.297
CPPZ01	34288	7.21	8.1	TBD	0.007	0.029	0.009	0.826	1.44	TBD	0.015	3309	0.297
CPPZ02	34288	7.21	8.1	TBD	0.007	0.029	0.009	0.826	1.44	TBD	0.015	3309	0.297
CPPZ03	34288	7.21	8.1	TBD	0.007	0.029	0.009	0.826	1.44	TBD	0.015	3309	0.297
CPPZ04	34288	7.21	8.1	TBD	0.007	0.029	0.009	0.826	1.44	TBD	0.015	3309	0.297
CPPZ05	34288	7.21	8.1	TBD	0.007	0.029	0.009	0.826	1.44	TBD	0.015	3309	0.297
CPPZ06	34288	7.21	8.1	TBD	0.007	0.029	0.009	0.826	1.44	TBD	0.015	3309	0.297
TBD= Antimony and Molybdenum will be added to the groundwater monitoring suite. Trigger levels will be developed once sufficient baseline data is available (i.e. two years of data).													

Table 36 Groundwater Quality TARP

Trigger Action Response Plan (TARP)			
No:	**Title:**	**Department:**	**Date of Review:**
GW-02	**Groundwater Quality TARP**	**HSET**	**1/12/2025**
Scope of TARP (What does the TARP apply to? What is the intent?):			
Assess and respond to potential groundwater contamination			

	Trigger	Action	Response	Responsible Person
LEVEL 1 SITUATION (Normal Conditions)	**Normal Operations:** Water quality results < or within range for applicable criteria (Table 35)	Review monitoring results	Report on monitoring results in the Annual Review.	HSET Manager
LEVEL 2 SITUATION (Minor /Major Risk Potential)	***Trigger***	***Action***	***Response***	***Responsible Person***
	Level 2 (alert/preliminary investigation): Exceedance of the performance criteria in Table 35.	• Check and validate results • Consider additional monitoring / repeat sampling if required. • Undertake preliminary investigation to whether the exceedance may be mine related including consideration of: o any discharges o obvious non-mining related sources. o results from other monitoring bores. • If required, engage specialist assistance. • Assess risk of material harm and Escalate to Level 3 (below) if required.	• Report exceedance to TRL Management and commence preliminary investigation. • Document findings of preliminary investigation. • If mining related, record as incident and investigate as per TRL procedures. Commence Level 3 (below) investigation. • If not mining related – record investigation outcomes. • Update Groundwater Model • Results presented in Annual Review.	HSET Manager

Trigger Action Response Plan (TARP)			
No:	**Title:**	**Department:**	**Date of Review:**
GW-02	**Groundwater Quality TARP**	**HSET**	**1/12/2025**

Scope of TARP (What does the TARP apply to? What is the intent?):

Assess and respond to potential groundwater contamination

	Trigger	***Action***	***Response***	***Responsible Person***
LEVEL 3 SITUATION (Major / Critical Risk Potential)	**Level 3 (high alert/rectify):** Results of preliminary investigation (level 2 above) indicate that the exceedance is likely a result of mine related activities or material harm may occur.	• Consider additional monitoring if required. • If required, engage a suitably qualified technical consultant(s) to assess potential impacts on the groundwater quality / groundwater users. • Identify whether material harm has occurred. • Implement PIRMP if required.	• External reporting of material harm (if required) to regulatory agencies (follow all reporting requirements as per EMS). • Notify potentially affected downstream / affected landholders. (cease uses of groundwater) • Provide alternate water sources if required. • Investigate as per TRL procedures. • Implement corrective measures. • Results presented in Annual Review	HSET Manager

8.2.4. *Data Assessment and Reporting*

In accordance with Conditions C22(d)(iii)) of the Constellation Project Development Consent (SSD-41579871), the following protocols are established for data interpretation and reporting:

- Annual groundwater inflows into workings and comparison against model predictions and licence entitlements.
- Comparison of water levels against performance criteria for monitoring bores and the estimated rate of drawdown predicted in the Water Impact Assessment.
- Comparison of groundwater quality data against the performance criteria established in Table 35.
- Review of all groundwater level and water quality data and comment on any notable or significant trends.

The items above will be reported in the Annual Review.

8.3. Data Assessment and Response

For each of the monitoring sites in Table 25 and Table 31, the Environmental Superintendent (or delegate) will:

- review laboratory results as they are received from the nominated provider, the purpose of which is to identify any results that are materially different from previous samples (historic ranges) and baseline conditions;
- on a quarterly basis, plot key (indicator) parameters for each of the sites to identify any trends in surface water quality, groundwater quality or groundwater level.

Elevated results and or increasing / decreasing trends may indicate:

- laboratory error;
- field error;
- contamination of surface or ground water (an incident);
- groundwater drawdown or a perched water table;
- failure of the surface water management system (bunds/ drains etc) or groundwater measures (such as the HLP under-liner); or
- an increasing likelihood of surface water or ground water impacts.

Where such results are identified, the Environment Superintendent will implement the relevant TARP (where triggered) or commencement of an investigation in accordance with TRL procedures which may include, for example; a site inspection, re-sampling, detailed data interrogation (to identify longer term trends / statistical significance, changes in water quality (piper plots) etc), the development of corrective measures and further sampling to verify that corrective measures have been effective.

Results of investigations, including following the initiation of a TARP will be reported in the Annual Review.

9. ENVIRONMENTAL INSPECTIONS

A range of environmental and operational inspections are undertaken to assess the status of water management infrastructure including containment dams, sediment dams and diversion structures. Inspections are itemised in Table 37. All inspections are documented on approved forms, and any corrective measures are assigned to the area owner in accordance with TRL procedures.

Table 37 Constellation Water Management Inspection Regime

Inspection Type	Frequency	Reporting of Results
Containment Dams (Process Runoff Dam, Waste Dump catch Dam, MIA Runoff Dam, Mine Dam, SB1). • Water level / freeboard. • silt accumulation. • Embankment stability / erosion.	After every 20mm of rainfall (in a 24 hour period) Otherwise Monthly	Recorded on approved form (relevant to inspection area). Sediment dams requiring dewatering or desilting are reported to the Processing Manager.
Diversion Drains • Water flow • Silt accumulation • Erosion • Required maintenance.		
Erosion and sediment control measures (functional and / or require maintenance)	Weekly or post >20mm rain event during construction; otherwise quarterly or post >20mm rain event	Recorded on approved form (relevant to inspection area). Corrective measures are escalated to Environmental Superintendent
Water Supply Pipeline route: • Leaks • Unauthorised access • Local excavation • Erosion (creek crossings)	Weekly during construction, otherwise monthly.	Recorded on approved form (relevant to inspection area). Corrective measures are reported to the Processing Manager
Enhanced groundwater inflows into the open cut pit via faults or other geotechnical structures.	Daily (when visible seeps are present)	Recorded on approved inspection form. Any observed enhanced groundwater inflow reported to Geotechnical Engineer and Environmental Superintendent.

10. PERFORMANCE MEASURE ADAPTIVE MANAGEMENT FRAMEWORK

In accordance with Condition C22, of the Constellation Project Development Consent (SSD-41579871) the CPWMP must include a trigger action response plan to respond to any exceedances of the relevant performance measures, and repair, mitigate and/or offset any adverse surface water or groundwater impacts of the development. Table 38 below replicates performance measures from Condition C21 of the Constellation Project Development Consent (SSD-41579871), and summarises main controls / management measures, and includes a TARP to respond where performance measures have not been met. To avoid duplication, references are included to other sections of this CPWMP and TARPS where relevant.

Table 38 Performance measure TARP.

Feature	Performance measure	Controls	Trigger	Action	Response
Water Management General / Surface water resources	Maintain separation between clean, dirty (i.e. sediment-laden) and mine water management systems	Clean Water Diversions. Site containment systems and ESCP. Dam design storage capacity. Drain design. AMD cover system. Inspections and maintenance of drains and storages. Surface Water Quality monitoring. Discharge monitoring.	Surface Water Quality TARP (Table 29) Containment Dam TARP (Table 30)		
	Minimise risks to the receiving environment and downstream water users				
	Design, install, operate and maintain water management systems in a proper and efficient manner				
	Maximise, as far as reasonable and feasible, the diversion of all clean water around disturbed areas				
	Minimise the use of clean and potable water on the site	Prioritising the use of captured and recycled water and extracted groundwater. All water extracted in accordance with Water Sharing Plan rules and restrictions (including licence entitlements). Tracking and reporting on surface water extraction vs licence entitlements.	Surface Water Quality TARP (Table 29) Containment Dam TARP (Table 30)		
	Maximise water recycling, reuse and sharing opportunities		Increasing trend in annual water take and / or reductions in water efficiency (reported in Annual Review). Increased incidence of discharge / water accumulation on site.	Notify TRL Management and Water Management Committee. Review Water management system and revise the site water balance. Establish and implement targets and corrective measures. Track and report on improvements. Seek independent expert advice if required.	Externally report if a non-compliance has occurred or if material harm has or may have occurred. Implement any required corrective measures from review. Report in Annual Review.
	Minimise the use of make-up water from external sources				
	Design, install, operate and maintain water management systems in a proper and efficient manner				
	Negligible impacts to surface water resources caused by the development beyond those predicted in the EIS				

Feature	Performance measure	Controls	Trigger	Action	Response
Aquifers	Negligible impacts to alluvial and fractured rock aquifers caused by the development beyond those predicted in the EIS, including: • negligible change in groundwater levels beyond those predicted; • negligible change in water quality beyond those predicted; • negligible impact to other groundwater users; and • no exceedance of the minimal impact considerations in the NSW Aquifer Interference Policy	HLP Under-liner including QA/QC controls. NAF base of Waste Rock Emplacement. AMD Cover system. HLP liner leak detection (piezometers). Groundwater monitoring network.	Groundwater Quality TARP (Table 36) Groundwater Level TARP (Table 34)		
Waste Rock Emplacement	Minimise, as far as reasonable and feasible, the potential for acid mine drainage.	Controls as stated in Section 7.2.3.8	Surface Water Quality TARP (Table 29) Groundwater Quality TARP (Table 36)		
Flood Mitigation	Negligible change to off-site flood regime, including flows, levels, storage capacity or velocities	Clean Water Diversions. Site containment systems and ESCP. Dam design storage capacity. Drain design. Inspections and maintenance of drains and storages.	Increased incidence of local flooding identified through site inspections and landholder feedback.	Notify TRL Management and Water Management Committee. Engage hydrologist to investigate: • the performance of clean water diversion and site containment systems. • site contributions to local flooding.	Externally report if material harm has or may have occurred. Implement any required corrective measures from investigation. Report in Annual Review.

Feature	Performance measure	Controls	Trigger	Action	Response
Erosion and sediment control works	Designed, installed and maintained in accordance with the guidance series Managing Urban Stormwater: Soils and Construction including Volume 1: Blue Book (Landcom, 2004) and Volume 2E: Mines and Quarries (DECC, 2008)	Clean Water Diversions. Site containment systems and ESCP. Dam design storage capacity. Drain design. Inspections and maintenance of drains and storages. Surface Water Quality monitoring. Discharge monitoring. Construction Environmental Management Plan (CEMP)	Surface Water Quality TARP (Table 29) Containment Dam TARP (Table 30)		
			Inspections (Section 9) identify required corrective measures.	Relevant area manager notified. Inspection entered into Site compliance system (INX) and action assigned to manager.	Externally report if material harm has or may have occurred. Manager implements corrective action. Verified through future inspections
Chemical and hydrocarbon storage	Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard	Controls as stated in Section 7.2.3.9	Surface Water Quality TARP (Table 29)		
			Inspections identify required corrective measures.	Relevant area manager notified. Inspection entered into Site compliance system (INX) and action assigned to manager.	Externally report if material harm has or may have occurred. Manager implements corrective action. Verified through future inspections

11. TRACKING OF ACTIONS AND ACTIVITIES

The Environmental Management Strategy (TRL-HSET-PLN-0023) outlines the process for assigning, scheduling and tracking the completion of key tasks, including those arising from this management plan. The TRL Environment Superintendent maintains a 'Works Program Schedule' (register of tasks) that is aligned with the life of mine plan and TRL budget cycles. This register is reviewed and updated on a periodic basis by the Environmental Superintendent. The completion of tasks is tracked on a regular basis; any lagging or at risk tasks are escalated to relevant manager or to the Health, Safety, Environment and Training (HSET) Manager for tabling at the TRL Senior Leadership Team (SLT) Meeting (as per the Environmental Management Strategy (TRL-HSET-PLN-0023)).

12. COMPLIANCE, AUDITING AND REPORTING

12.1. Assessing Compliance

Compliance requirements and any key obligations or commitments as they relate to water management are contained in the TRL Legal and Other Obligations Register (TRL-HSET-REG-0002). The Environmental Superintendent is responsible for the implementation of this CPWMP and will undertake periodic assessments of compliance against the requirements of the TRL Legal and Other Obligations Register and this CPWMP. Any findings indicating misalignment with the aims, objectives or specific requirements of this plan will be managed as per the EMS (TRL-HSET-PLN-0023) as either an incident, non-compliance or opportunity for continuous improvement.

12.2. Independent Environmental Audit

Condition D5 of the Constellation Project Development Consent (SSD-41579871) requires the undertaking of an independent environmental audit. The audit will assess the Company's performance against consent conditions, licences, permits and the implementation of this CPWMP.

Further detail regarding the conducting of the required independent environmental audits are contained in the EMS (TRL-HSET-PLN-0023) and applies to this CPWMP.

12.3. Reporting

12.3.1. Constellation Development Consent

The EMS (TRL-HSET-PLN-0023) includes details on the required reporting mechanisms as they apply to the various TRL Operations. Formal annual reporting mechanisms (Annual Review) are required to meet Condition D4 of the Constellation Project Development Consent (SSD-41579871). For each annual report produced (as relevant to this CPWMP), the report will include a summary of:

- The site water balance including water extracted vs licence entitlements and annual site water consumption.
- Long-term trends in water use and consumption.
- Review of all surface water quality data and commentary on any notable or significant trends, exceedance of performance measures, triggered TARPS and investigation outcomes etc.

- Details of any uncontrolled discharges that occurred, any associated water quality results and corrective measures to prevent reoccurrence.
- Annual groundwater inflows into mine workings and comparison against baseline data / EIS predictions and comparison against licence entitlements.
- Comparison of Constellation groundwater levels against drawdown predicted in the EIS / Groundwater Assessment and commentary on any notable or significant trends.
- Comparison of groundwater quality data against the performance criteria where established and commentary on any notable or significant trends.
- Updates of the groundwater model where undertaken during the reporting year.
- The external reporting of any 'reportable incidents' and non-compliances to regulatory authorities and relevant stakeholders will be undertaken as stated in the EMS (TRL-HSET-PLN-0023).
- A summary of any community complaints received regarding water management or the loss of private water supplies and corrective measures implemented.
- Proposed improvement measures and timeframes for completion.

12.3.2. Environment Protection Licence

The EPLs held by Tritton Resources Limited require the completion of an annual return. The annual return will be submitted, via the EPA's 'EConnect' portal in accordance with conditions and within 60 days after the licence anniversary date. The completion of the EPL annual return is included in the TRL Legal and Other Obligations Register (TRL-HSET-REG-0002) to ensure completion

13. ENVIRONMENTAL INCIDENT AND EMERGENCY PLANNING, PREPAREDNESS AND RESPONSE

All incidents where there is actual, or a risk of potential environmental harm are externally reported to the respective regulatory authority.

- DPHI – as per *Condition D2* of the of the Constellation Project Development Consent (SSD-41579871). TRL will notify DPHI within 24 hours of becoming aware of an incident. The notification will be made via the NSW planning portal (Major Projects) and include details about the incident including:
    - the date, time and location;
    - a brief description of what occurred and why it has been classified as an incident;
    - a description of what immediate steps were taken in relation to the incident; and
    - identifying a contact person for further communication regarding the incident.
- Water Group (within the NSW Department of Climate Change, Energy, the Environment and Water)
- NSW EPA (Condition R2 of EPL (once issued)).

- Bogan Shire Council.
- Other agencies depending on the location and nature of the incident.

Any incident reported will require an investigation to be conducted as soon as practical (noting that a report must be provided to DPHI within seven days of the initial incident notification). The investigation will be undertaken to determine the root cause(s) of the incident and to devise corrective and preventative measures.

In accordance with Condition D3 and Appendix 7 of the Constellation Project Development Consent (SSD-41579871), TRL will provide an incident report to DPHI within seven days of making an incident notification (or otherwise agreed by the Planning Secretary). The incident report will include the specific detail as required by Appendix 7 of the Constellation Project Development Consent (SSD-41579871).

TRL maintains a register of any complaints received in relation to any environmental performance issues. The register includes the date and nature of complaint, and actions taken to mitigate or prevent reoccurrence.

Further detail regarding the identification, reporting and management of incidents, and TRL's emergency response procedures are contained in the EMS (TRL-HSET-PLN-0023) and apply to this CPWMP.

13.1. Pollution Incident Response Management Plan

TRL have established and maintain a Pollution Incident Response Management Plan (PIRMP) (TRL-HSET-MP-ENV-006) which is a requirement of the *Protection of the Environment Operations Act 1997*.

The purpose of the PIRMP is to ensure that in the event of a reportable pollution event; TRL employees manage the situation quickly and effectively, limiting the impact on employees, the environment, landholders, reputation and assets.

The PIRMP:

- defines the types of incidents that may be managed as per the plan;
- defines key responsibilities;
- defines potential hazards (risk register);
- provides an inventory of potential pollutants;
- outlines training requirements;
- describes the testing of the PIRMP to ensure it remains effective; and
- includes a pollution incident notification procedure (TRL-ENV-PRO-003).

Incidents relating to water pollution may result in the initiation of the PIRMP and are documented in the PIRMP Risk Register and include (for example):

- Groundwater contamination from heap leach pads.
- Contamination from water runoff from Waste Rock Emplacements.
- Contamination of a local waterway or off-site water storage dam.

Events covered by the PIRMP may also be considered 'emergencies' and addressed as per the TRL Emergency Management Plan (TRL-HSET-MP-004). In these circumstances, the 'highest level' of response (and notification) will be applied by TRL.

14. TRAINING AND AWARENESS

All personnel involved in on-site operations at each of the Tritton Copper Operations will receive training on water management and required mitigation measures (as applicable to the general workforce). The training will provide information relating to the following.

- A summary of legal obligations (in accordance with Condition A18 of the of the Constellation Project Development Consent (SSD-41579871);
- Required water management measures as applicable to the general workforce, such as the reporting of leaks, high water levels, water discharges, water conservation measures etc (in accordance with this CPWMP);
- incident reporting; and
- the general contents and location of this CPWMP.

Training will be undertaken through the completion of the site general induction.

Additional instruction will be provided to key personnel whose role requires the consideration or implementation of specific water management related management / mitigation measures (Section 4). Instruction will be provided by the Site Environmental Superintendent or delegate, including the provision of operational control documentation (for example, Environmental Operating Procedures).

Awareness covering relevant topics, such as water management will be provided throughout the year through daily pre-starts, posters and safety meetings.

15. CORRECTIVE AND PREVENTATIVE ACTIONS

Any corrective or preventive actions, or opportunities for improvement identified through environmental inspections, audits, incident investigations or non-compliances are assigned and tracked through the site's compliance management system. Where required, management plans, procedures, templates and schedules are updated, approved by management and implemented as per the EMS framework (Section 1.2). These aspects are further described the EMS (TRL-HSET-PLN-0023).

16. REVIEW AND IMPROVEMENT

The EMS (TRL-HSET-PLN-0023) contains details regarding the review of strategies and management plans including this CPWMP.

In accordance with Condition B12 of the of the Constellation Project Development Consent (SSD-41579871), this CPWMP will be reviewed within three months of the following events:

(a) The submission of an incident report under Condition D3;

(b) The submission of an Independent Environmental Audit under condition D5

(c) The approval of any modification of the conditions of this consent; and

(d) Notification of a change in the development phase required under condition A11.

In accordance with Condition B12 of the of the Constellation Project Development Consent (SSD-41579871), TRL will review and, if necessary, revise the strategies, plans and programs required under this approval to the satisfaction of the Planning Secretary. Where this review leads to revisions in any such document, the revised document must be submitted to the Planning Secretary for approval within four weeks of the review.

The revision will include, where relevant, any corrective or preventive actions, or opportunities for improvement identified through environmental inspections, audits, incident investigations or non-compliances (Section 15). Revised management plans are approved as per the TRL delegation of authority.

17. ACCESS TO INFORMATION

Condition D9 of the Constellation Project Development Consent (SSD-41579871) requires that within 12 months of the commencement of development, the following information and documents must be publicly available on the company website as they are obtained, approved or as otherwise stipulated within the conditions of the consent. In addition, Section 66(6) of the POEO Act requires the publishing of monitoring data, where required to be collected by any Environmental Protection Licence.

To meet the above requirements, TRL will publish the following information on the Company website and keep it up to date:

- the EIS;
- all current statutory approvals for the development;
- all approved environmental management documents required under the conditions of this consent;
- the proposed staging plans for the development if the construction, operation or decommissioning of the development is to be staged;
- regular reporting on the environmental performance of the development in accordance with the reporting requirements in any environmental management documents approved under the conditions of this consent;

- a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved environmental management documents or EPL;
- a summary of the current phase and progress of the development;
- contact details to enquire about the development or to make a complaint;
- complaints register, updated monthly;
- audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations in any audit report;
- any other matter required by the Planning Secretary.

18. RELATED DOCUMENTS

Internal documents referenced within this CPWMP are presented in Table 39.

Table 39 Internal Documents Relevant to this WMP

Doc No.	Document Name	Author
TRL-HSET-PLN-0023	Environmental Management Strategy	TRL
TRL-HSET-RAS-0006	Environmental Risk Register	TRL
TRL-HSET-PLN-0031	TRL Waste Management Plan	TRL
TRL-HSET-PLN-0027	Hydrocarbon and Chemical Management Plan	TRL
TRL-HSET-REG-0002	TRL Legal and Other Obligations Register	TRL
TRL-HSET-PLN-0045	Constellation Rehabilitation Management Plan	TRL
TRL-HSET-MP-004	TRL Emergency Management Plan.	TRL
TRL-HSET-MP-ENV-006	Pollution Incident Response Management Plan (PIRMP)	TRL
TRL-ENV-PRO-003	Pollution incident notification procedure	TRL
TRL-ENV-SWI-003.	Surface water monitoring procedure	TRL
TRL-ENV-FRM-022	Water meter field calibration form.	TRL
TRL-ENV-FRM-011	Surface water sampling field data collection sheet	TRL
TRL-ENV-SWI-009	Groundwater monitoring procedures.	TRL
TRL-ENV-FRM-012	Groundwater sampling field data collection sheet	TRL

19. REFERENCES

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20. APPENDICES

20.1. APPENDIX A General Management Plan Requirements

Condition B4, of the Constellation Project Development Consent (SSD-41579871)	**Relevant CPWMP Section**
B4 Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	-
(a) quality control information including document version control details and the management plan author(s);	Title Page
(b) summary of the environmental management context, including: *(i) a brief project description, including visual representation of any project staging; and* *(ii) the purpose and scope of the management plan.*	Section 3 Section 1.1 Section 1.3
(c) The relationship of the management plan with other environmental management documents or systems;	Section 1.2
(d) a site location plan identifying the project boundary, disturbance area and related environmental aspects;	Figure 1 Figure 3
(e) a brief summary of background or baseline data, where relevant; *Note: If detailed baseline data must be included in a management plan, it must be appended and summarised in the main text of the management plan.*	Section 3.3
(f) a summary of consultation undertaken during the preparation of the management plan that includes when and how consultation was undertaken and the outcomes of the consultation;	Section 5
(g) details of the statutory requirements, limits or performance measures and any specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 2 Section 7.1.1 Section 7.2.1 Section 7.3.1 Section 7.4.1
(h) a description of the measures to be implemented to comply with statutory requirements, and the limits, performance measures, criteria and operational requirements of conditions of this consent;	Section 7

Condition B4, of the Constellation Project Development Consent (SSD-41579871)	**Relevant CPWMP Section**
a program to monitor and report on the: *(i) impacts and environmental performance of the development; and* *(ii) effectiveness of the management measures implemented for the development;*	Section 8
(i) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; and	Section 7 (TARPS) Section 10
(j) a protocol for periodic review of the plan. *Note: The Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.*	Section 16

20.2. Appendix B Commitments Arising from the Constellation Project Environmental Assessment.

Section	Commitment	Section Where Addressed
Mitigation measures (Source: Constellation Project Response to Submissions (AARC 2025)		
General		
G1	A Construction Environmental Management Plan will be prepared for the construction phase of the Project to mitigate impacts on soil and water.	Section 7.4 Section 0
Land management, soil management, erosion and sediment control		
LM2	A detailed Erosion and Sediment Control Plan will be developed in accordance with the	Section 7.4
	Best Practice Erosion and Sediment Control Guideline (IECA 2008),	
	Australian Standards AS 1289 Methods of testing soils for engineering purposes (as required by Capelin 2008) and Landcom (2004) for managing urban stormwater–soils and construction, and	
	Managing Urban Stormwater–Soils and Construction Volume 2E (DECC 2008), including the consideration of soil binders, revegetation (re-seeding), light mulching, heavy mulching and rock mulching.	
	Where appropriate, the Erosion and Sediment Control Plan for the Project will include the following criteria:	
	Limit land clearing to the minimum amount of land required for the safe operation of the Project.	
	When possible, carry out rehabilitation as mining operations are completed and land becomes available.	
	Place soil stockpiles away from drainage areas, roads, machinery, transport corridors, stock grazing areas and areas where they may be susceptible to wind erosion.	
	Divert overland flow/runoff around disturbed areas.	
	Identify activities that could cause erosion and generate sediment.	
	Identify location, function and capacity of erosion and sediment control structures to minimise soil erosion and the potential for transport of sediment downstream.	

Section	Commitment	Section Where Addressed
	Manage impacts of construction on identified areas (such as existing erosion, erodible soil types, saline soils or acid sulphate risk).	
	Ensure erosion and sediment control structures are appropriately maintained	
	Deposit soil material directly on to areas to be rehabilitated to facilitate revegetation and maximise the use of the available seed bank.	
	Seed soil material as soon as possible after depositing on to rehabilitated areas if required.	
LM4	Stockpile management measures will be developed that are site-specific for the Project; specifically:	Section 7.4
	Stockpiles will be managed, taking in account locations, separation of waste types, sediment controls and stabilisation	
	Stockpiles will be stabilised, establishing appropriate sediment controls and suppressing dust as required.	
	Stockpiles will be located away from drainage lines, waterways and areas where they may be susceptible to wind erosion.	
LM8	Measures for controlling sediment and soil erosion in stockpiles will include the following where appropriate:	Section 7.4
	Suitable non-erosive drainage conditions will be established during stockpile construction (e.g. diversion of up-slope stormwater runoff);	
	A vegetation and/or mulch cover (e.g. hydro-mulching, rock mulching) will be laid on established stockpiles;	
	Erosion control blankets, mats and mesh (e.g. geofabric, jute matting, coir blanket) may be used where necessary; and	
	Chemical stabilisers, such as soil binders (e.g. lime, polymer soil stabilisation solutions), may be used where necessary.	
LM16	Sediment control structures will be used to minimise the release of water with elevated suspended sediments into the receiving environment.	Section 7.2
Water and surface water management		
W1	Site water management storages will be dewatered to the pit sump prior to forecast rainfall events.	Section 7.2.3.5

Section	Commitment	Section Where Addressed
W2	A baseline and operational water quality monitoring program will be implemented. The program will be event-based and compliant with the relevant water monitoring plan for the Project, specifically: • Transfers to and from the Project will be via the off-site water supply pipeline. • Transfers in and out of the open cut pit and underground mine will be compliant with groundwater licensing. • Internal site transfers and individual storage inventory will be monitored for an annual review of the site water balance. • Surface water quality will be monitored quarterly at the monitoring locations and parameters identified in the Water Impact Assessment. When proposed monitoring locations are inaccessible due to landholder access agreements, suitable alternative monitoring locations will be investigated. Baseline surface water quality data will be used to derive site-specific trigger values. Construction and operational surface water quality monitoring will be conducted on a discharge event basis.	Section 8.1
W3	Treated effluent disposal will be monitored in accordance with the: • Managing Urban Stormwater: Treatment techniques guideline (EPA 2004), and • Australian Guidelines for Sewerage Systems: Effluent Management ARMCANZ (1997).	Section 7.2.3.6
W4	A Water Management Plan will be prepared that includes site-specific requirements for the Project to demonstrate compliance with water related, regulatory requirements.	This CPWMP
W5	The water balance model will be run annually with recent site data and revised every three years. The average predicted water balance for the Project will be included in the Water Management Plan and the results for each year will be reported in the annual review for the Project.	Section 7.1.5
Groundwater		
W6	Tailings transported to site from the Tritton Copper Mine will be processed into a paste on a lined pad as soon as practicable and emplaced underground to minimise oxidation.	Section 7.3.9.3

Section	Commitment	Section Where Addressed
W7	The existing groundwater monitoring network will continue to be monitored during mining operations including: • Annual review of the monitoring program, including assessing whether additional monitoring bores are required; • Installing meters to transfer water into and out of the mine workings during operations to allow modelled and actual inflow to be compared; • Quarterly monitoring of groundwater levels at the existing monitoring bore network; • Quarterly monitoring of groundwater quality for the parameters used for the baseline monitoring program (with the exception of total suspended solids and turbidity) at the existing monitoring bore network.	Section 8.2
W8	Climate will be monitored by an automated on-site weather station to support site water management and implement the site water balance.	Section 7.1.5
W9	The predictions of the groundwater model will be verified, reviewed and updated following two years of mining and once in a three-year period until the monitoring and modelling results show no need for further updates, and at the end of mining operations to inform the rehabilitation and post-closure activities. The groundwater model review will include a comparison between the modelling results and groundwater monitoring data and mine dewatering volumes. Data collected during monitoring programs may be incorporated to improve the model, and if required, the model will be revised to improve the fit between observed and modelled dewatering volumes and groundwater levels.	Section 7.3.8
Waste Management		
WM13	Wastewater will be treated in the on-site sewage treatment plant.	Section 7.2.3.6
WM14	A sewage treatment plant of appropriate scale to cater for the size of the peak workforce will be established on the Project site to treat effluent. The treated effluent will be used for sub-surface irrigation	Section 7.2.3.6
Mineralised Waste		
WM1	During the operational phase, geochemical sampling and analysis will be completed for representative samples from exploration, resource drilling and drill and blast holes in any areas	Section 7.2.3.8

Section	Commitment	Section Where Addressed
	(such as the proposed decline and final pit wall when additional information is required to verify acid and metalliferous drainage (AMD) potential).	
MW2	The geochemical data from this waste rock will be added to the resource/mine waste block model to increase the understanding of the mine waste breakdown for each mine waste class.	Section 7.2.3.8
MW3	Development waste and mine waste from the open pit and underground deposit will be analysed and classified before this material is placed into the WRE	Section 7.2.3.8
MW4	The WRE will be designed to enable all potentially acid forming (PAF) waste to be emplaced in PAF cells within the WRE to minimise the potential for sulphide bearing mine waste to be exposed to oxygen and water. This will minimise long-term AMD issues to the extent possible.	Section 7.2.3.8
MW5	Surface water, groundwater and process water sources will be monitored over the mine life to track changes in water chemistry. If changes occur this will trigger additional monitoring to verify the cause of the AMD so mitigation measures can be implemented.	Section 8
Hazards and Safety		
HS11	Water management structures will be constructed to separate clean and mine-affected water. Runoff from disturbed areas will be captured in the site's water management system, while runoff from undisturbed areas will be directed around the mine site.	Section 7.2
Social		
S36	Water access licences will meet water sharing requirements of regional water sharing plans.	Section 7.1
Rehabilitation		
R23	Regular inspections of the heap leach facility will be conducted, including regular monitoring of piezometers installed to monitor the performance the HLP underliner.	Section 9 Section 8.2

20.3. Appendix C – TRL Risk Assessment Matrix

Step 1. Determine the consequence				
TRITTON CONSEQUENCE TABLE (What is the maximum reasonable consequence)				
5. Insignificant	4. MINOR	3. MODERATE	2. MAJOR	1. CRITICAL
Health and Safety				
• First aid treatment or injury only;	• Medical Treatment Injury (MTI);	• Single Lost Time Injury (LTI);	• Multiple Lost Time Injuries;	• Permanent disability > 30%;
• Low level soreness or small amount of pain.	• Restricted Work Injury (RWI).	• Short term hospitalisation (< 7 days);	• Extended hospital treatment (> 7 days);	• One or more fatalities.
	• Presented to hospital (no overnight stay).	• Reversible impairment to human health.	• Permanent disability < 30%;	
			• Serious long-term health issue.	
Environment				
• No or very low environmental impact;	• Low environmental impact;	• Moderate environmental impact;	• Major environmental impact;	• Severe environmental impact;
• Impact confined to a small area.	• Rapid clean-up by internal staff or contractors;	• Clean-up by internal staff or contractors;	• Considerable clean-up effort required by internal staff and external contractors;	• Likely species destruction and long recovery period;
	• Impact contained to area already impacted by operations.	• Impact confined within lease boundary.	• Impact may extend across lease boundary.	• Extensive clean-up using external resources;
				• Impact on a regional scale.
Community/External Relations				
• Isolated complaint received;	• Multiple or sporadic complaints received;	• Repeated or serious rate of complaints;	• Ongoing complaints from local groups, NGO's or regulators;	• High level concern from community, regulators, stakeholders and /or stakeholders;
• No media coverage;	• No media coverage	• Local media interest and coverage;	• Regional/national media interests;	• Adverse national or international media coverage;
• No damage to reputation or relationships with stakeholders.	• Short-term damage with relationship with one or more stakeholders but no damage to reputation.	• Reversible damage with stakeholders and to reputation.	• Protests by external stakeholders;	• International damage to reputation.
			• Local or regional damage to reputation.	
Legal				
• Questionable or minor non-conformance with operating condition;	• Non-compliance with operating conditions;	• Breach of local or national law with potential prosecution by regulator;	• Major breach of local or national law;	• Significant breach of national or international law with potential jail sentence;
• No fine or prosecution;	• Could attach low level administrative response from regulator;	• Continuing occurrence of minor breach.	• Prosecution or penalties by regulator likely;	• Operations suspended or cease (short term or long term);
• Unlikely to attract regulatry interest;	• No court appearance required		• Short term treat to operations continuing	• Licenses withdrawn or revoked;
• Easy to resolve.			• Civil action initiated.	• Class action initiated.
Operational/Cost				
• Minor impact, easily corrected with insignificant cost to the operation.	• Minor damage/failure to equipment or infrastructure with minimal associated cost.	• Damage/failure to equipment or infrastructure marginal cost to the operation.	• Damage/failure to equipment or infrastructure resulting in significant cost to the operation.	• Damage/failure to equipment or infrastructure resulting in a detrimental cost to the operation.
• <$5,000	• $5,000 - $50,000	• $50,000 - $100,000	$100,000 - $500,000	• > $500,000
Business Interuption				
Minimal disruption to concentrate production (<4hrs).	Minor loss of concentrate production (< 1 day).	Significant loss of concentrate production (1 - 3 days).	Major disruption to concentrate production (3 - 7 days).	Critical loss of revenue from extended disruption to concentrate production (> 1 week).
< 100,000	$100, 000 to $500, 000	$500,000 - 1,500,000	$1,500,000 - $4,500,000	> $4,500,000

TRITTON LIKELIHOOD TABLE

(What is the expeced frequency of the consequence given the current controls)

What is the likelihood of the selected consequences occurring?

Rating	Description in terms of full operating life of the site	Description in terms of frequency
Almost Certain	• Consequences expected to occur in most circumstances	• Daily or continuous
Likely	• Consequences will probably occur in most circumstances	• Weekly or monthly
Possible	• Consequences could occur at some time	• Annually
Unlikely	• Consequence will probably NOT occur in most circumstances	• Within the life of the operation
Rare	• Consequence may occur in exceptional circumstances	• >100 years

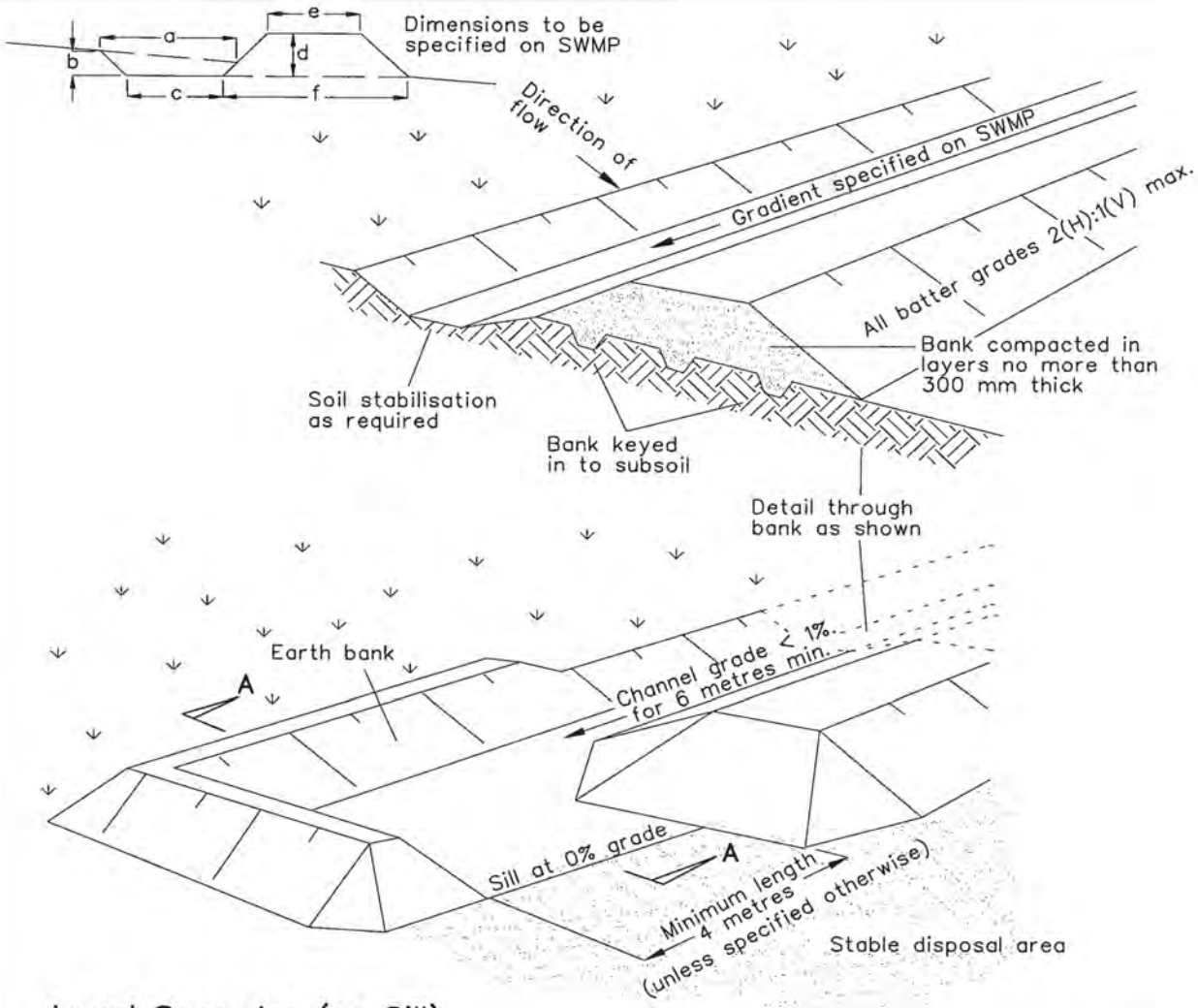
TRITTON RISK / OPPORTUNITY MATRIX

(Risk = Consequence x Liklihood)

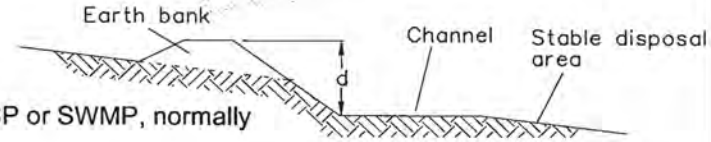
		Consequence				
	Likelihood	5	4	3	2	1
		Insignificant	Minor	Moderate	Major	Critical
A	Certain	15	10	6	3	1
B	Likely	19	14	9	5	2
C	Possible	22	18	13	8	4
D	Unlikely	24	21	17	12	7
E	Rare	25	23	20	16	11

Critical
High
Moderate
Low

20.4. Appendix D – Standard Drawings – Erosion and Sediment Control designs



Level Spreader (or Sill)



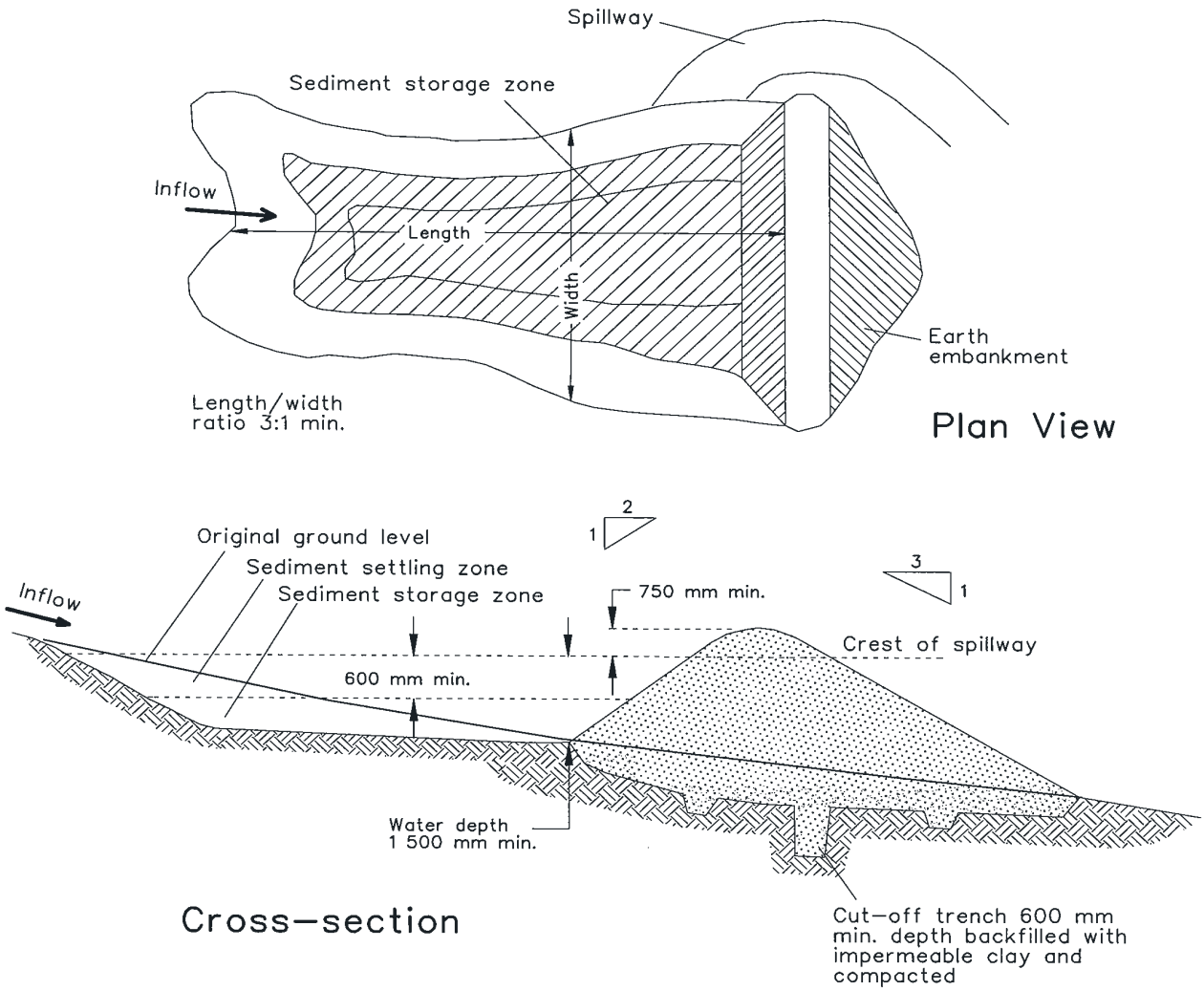
Section AA

Construction Notes

1. Construct at the gradient specified on the ESCP or SWMP, normally between 1 and 5 percent
2. Avoid removing trees and shrubs if possible - work around them.
3. Ensure the structures are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V-shaped, at the dimensions shown on the SWMP.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction following Table 5.2 in Landcom (2004).
7. Where discharging to erodible lands, ensure they outlet through a properly constructed level spreader.
8. Construct the level spreader at the gradient specified on the ESCP or SWMP, normally less than 1 percent or level.
9. Where possible, ensure they discharge waters onto either stabilised or undisturbed disposal sites within the same subcatchment area from which the water originated. Approval might be required to discharge into other subcatchments.

EARTH BANK (HIGH FLOWS)

SD 5-6



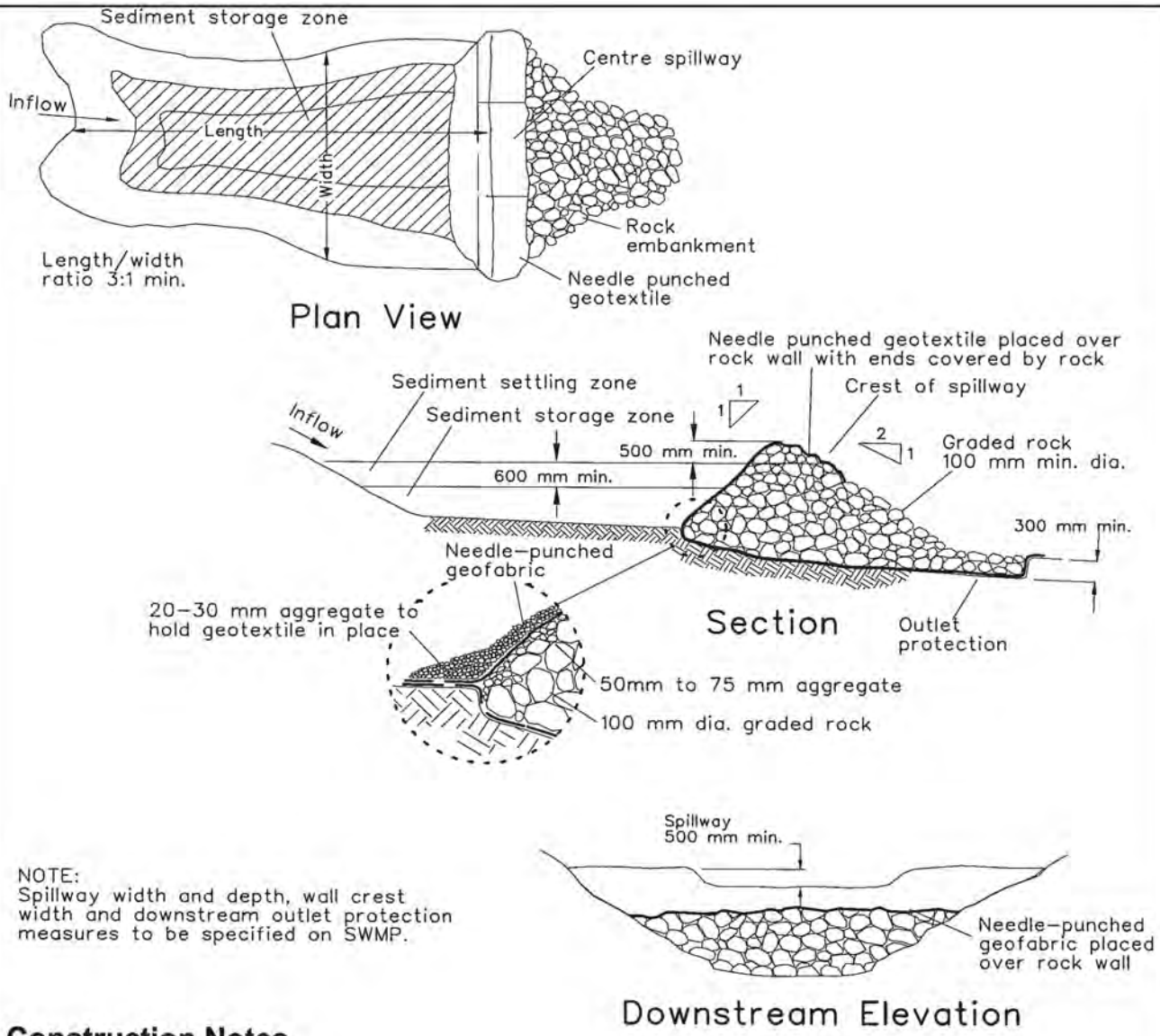
Construction Notes

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Construct a cut-off trench 500 mm deep and 1,200 mm wide along the centreline of the embankment extending to a point on the gully wall level with the riser crest.
3. Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density.
4. Select fill following the SWMP that is free of roots, wood, rock, large stone or foreign material.
5. Prepare the site under the embankment by ripping to at least 100 mm to help bond compacted fill to the existing substrate.
6. Spread the fill in 100 mm to 150 mm layers and compact it at optimum moisture content following the SWMP.
7. Construct the emergency spillway.
8. Rehabilitate the structure following the SWMP.

EARTH BASIN - WET

(APPLIES TO 'TYPE D' AND 'TYPE F' SOILS ONLY)

SD 6-4



NOTE:
Spillway width and depth, wall crest width and downstream outlet protection measures to be specified on SWMP.

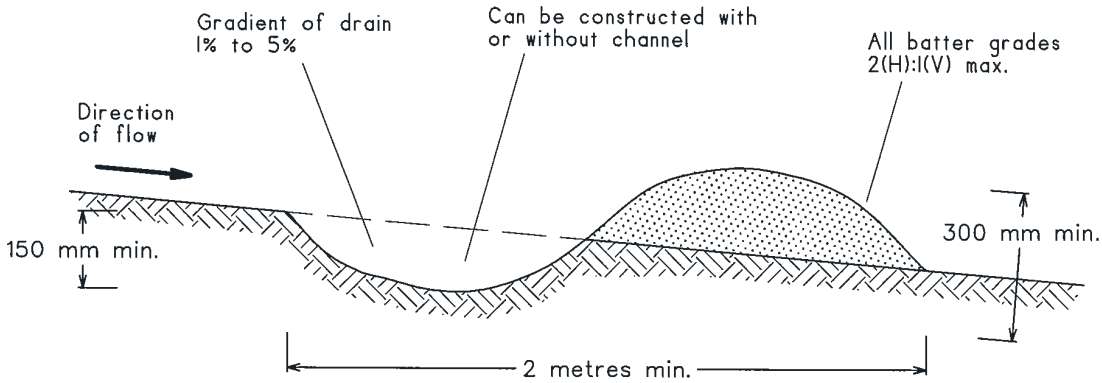
Construction Notes

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Excavate to 300 mm depth for base of the dam wall.
3. Line the excavation with a needle-punched geotextile allowing sufficient to line below the wall, and over the upstream rock and the spillway to 500 mm below the spillway exit on the downstream face.
4. Make up the wall profile and outlet protection with100 mm (min.) diameter graded rock. Spread a layer of 50 mm to 75 mm diameter aggregate over the upstream batter for a more even surface, and add 100 mm to 150 mm of 20 mm to 30 mm gravel over the 50 mm to 75 mm diameter aggregate.
5. Lay geotextile over the upstream batter and through the spillway, fixing in place with 100 mm rock.
6. Place a "Full of Sediment" marker to show when less than design capacity occurs and sediment removal is required.
7. Replace the upstream geotextile layer each time sediment is removed

ROCK SEDIMENT BASIN

(APPLIES TO 'TYPE C' SOILS ONLY)

SD 6-1

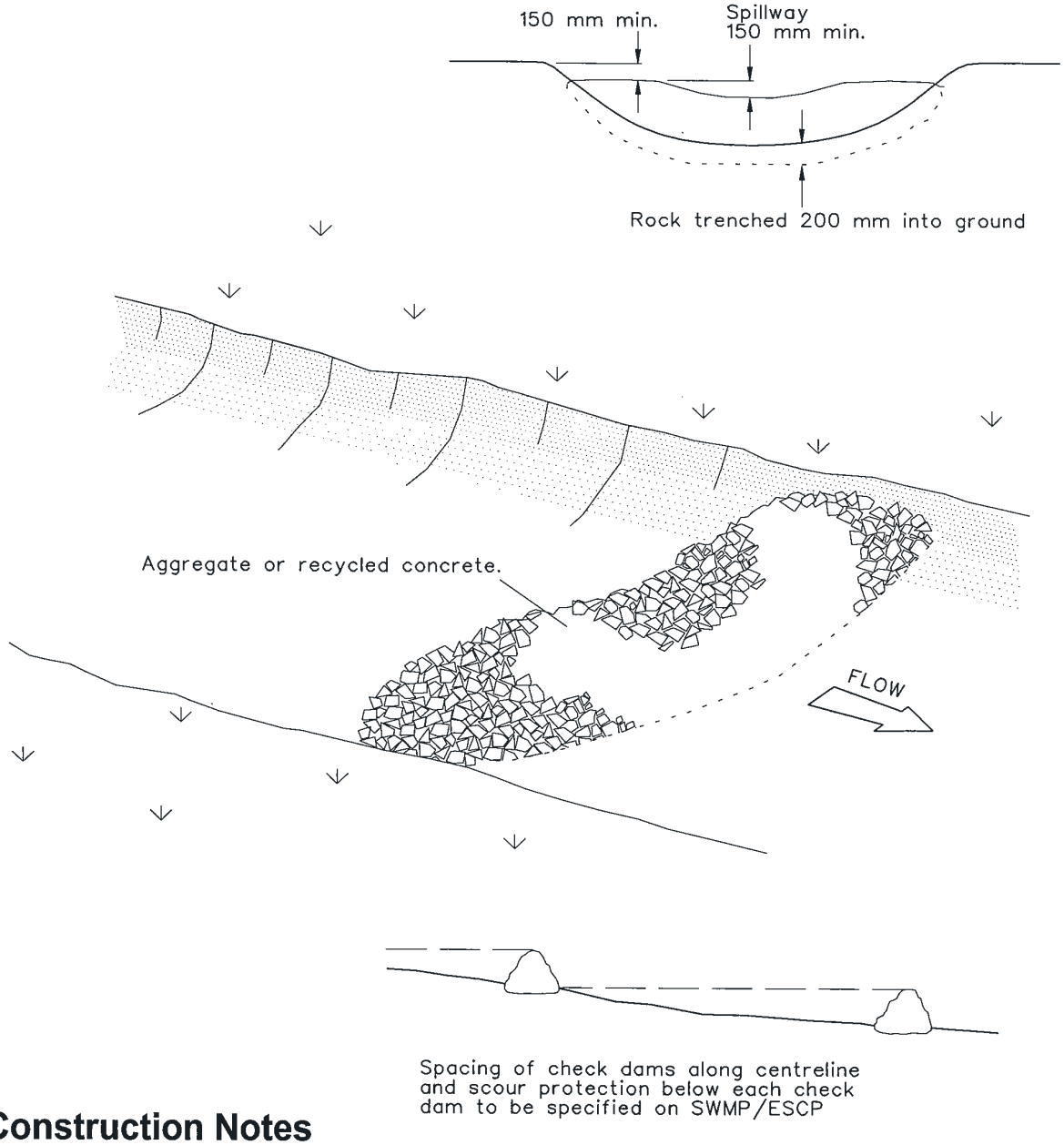


NOTE: Only to be used as temporary bank where maximum upslope length is 80 metres.

Construction Notes

1. Build with gradients between 1 percent and 5 percent.
2. Avoid removing trees and shrubs if possible - work around them.
3. Ensure the structures are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V shaped.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction.

EARTH BANK (LOW FLOW) SD 5-5



Construction Notes

1. Check dams can be built with various materials, including rocks, logs, sandbags and straw bales. The maintenance program should ensure their integrity is retained, especially where constructed with straw bales. In the case of bales, this might require their replacement each two to four months.

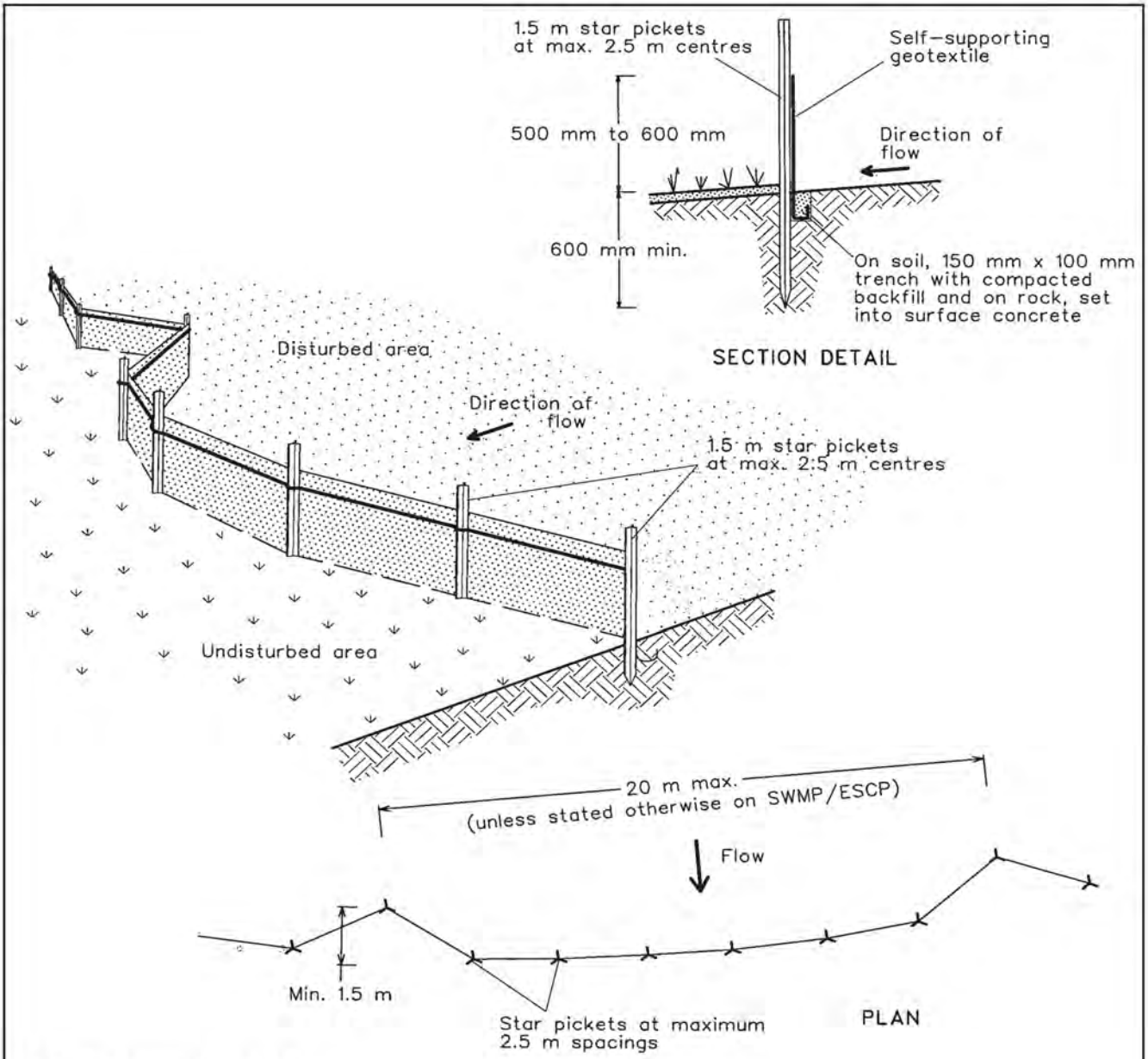
2. Trench the check dam 200 mm into the ground across its whole width. Where rock is used, fill the trenches to at least 100 mm above the ground surface to reduce the risk of undercutting.

3. Normally, their maximum height should not exceed 600 mm above the gully floor. The centre should act as a spillway, being at least 150 mm lower than the outer edges.

4. Space the dams so the toe of the upstream dam is level with the spillway of the next downstream dam.

ROCK CHECK DAM

SD 5-4

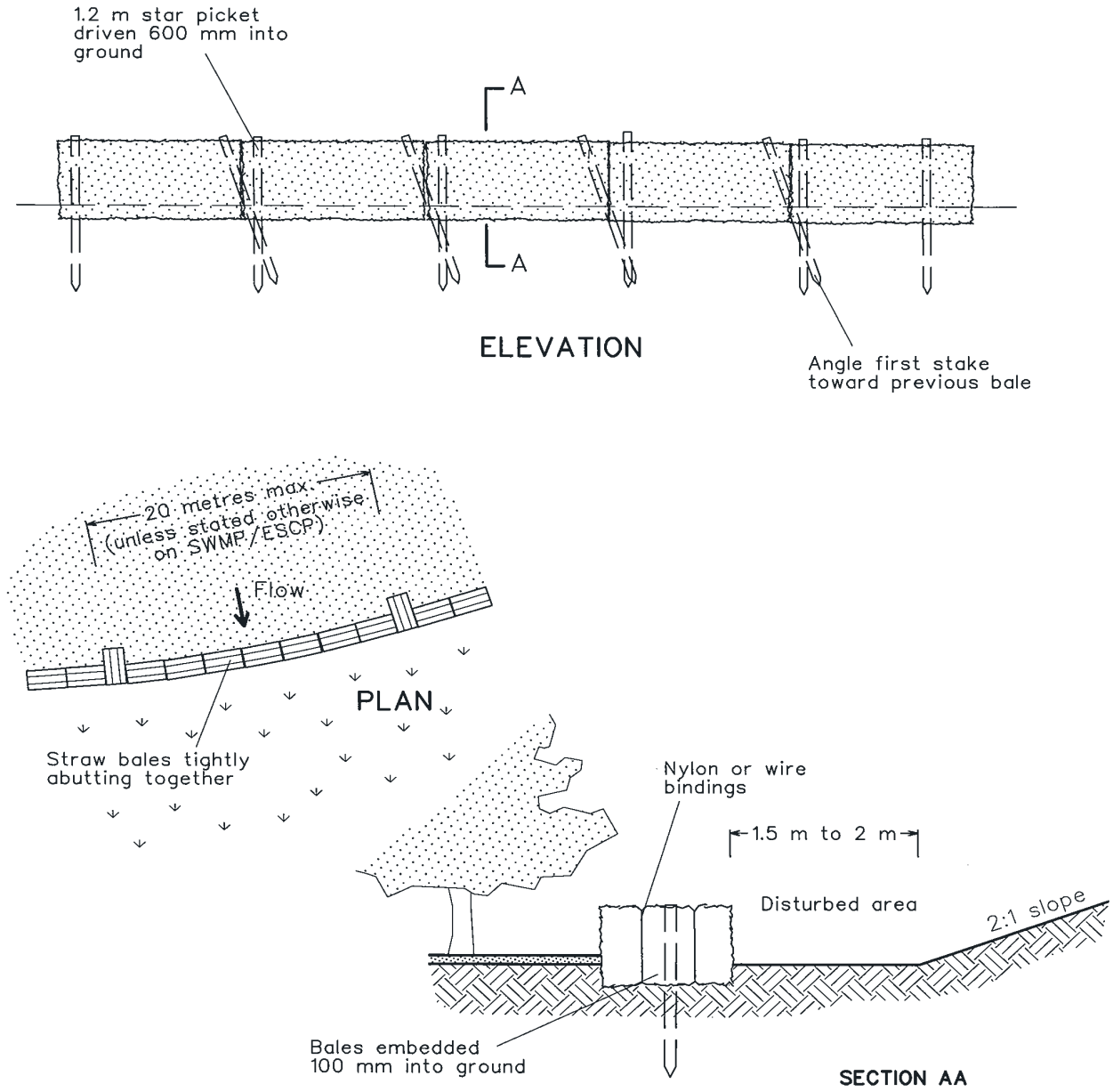


Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

SEDIMENT FENCE

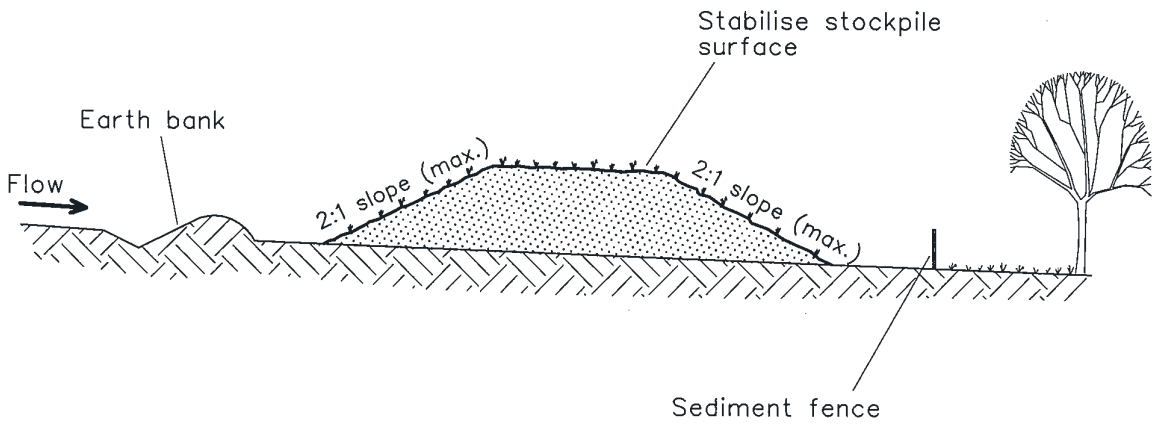
SD 6-8



Construction Notes

1. Construct the straw bale filter as close as possible to being parallel to the contours of the site.
2. Place bales lengthwise in a row with ends tightly abutting. Use straw to fill any gaps between bales. Straws are to be placed parallel to ground.
3. Ensure that the maximum height of the filter is one bale.
4. Embed each bale in the ground 75 mm to 100 mm and anchor with two 1.2 metre star pickets or stakes. Angle the first star picket or stake in each bale towards the previously laid bale. Drive them 600 mm into the ground and, if possible, flush with the top of the bales. Where star pickets are used and they protrude above the bales, ensure they are fitted with safety caps.
5. Where a straw bale filter is constructed downslope from a disturbed batter, ensure the bales are placed 1 to 2 metres downslope from the toe.
6. Establish a maintenance program that ensures the integrity of the bales is retained - they could require replacement each two to four months.

STRAW BALE FILTER — SD 6-7

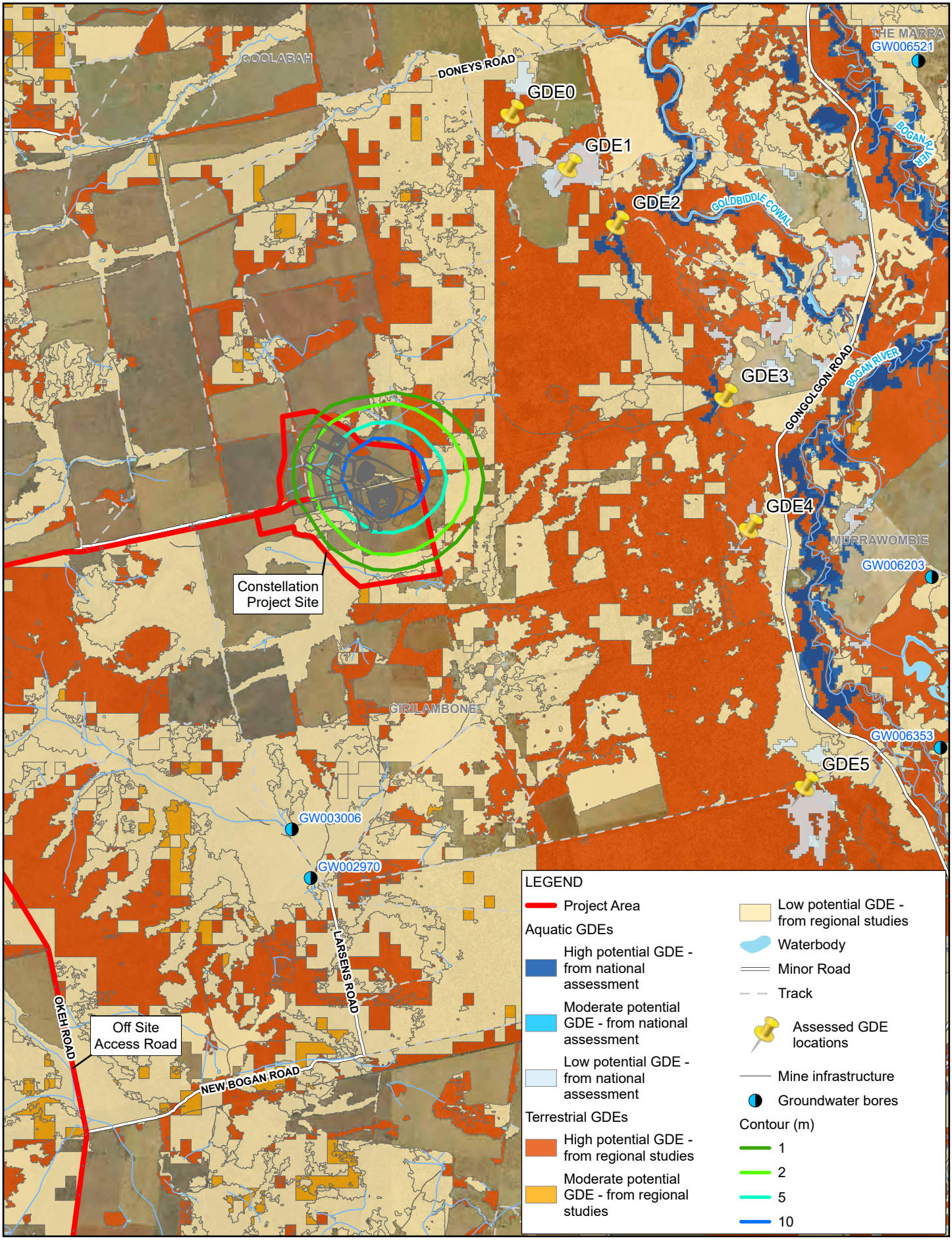


Construction Notes

1. Place stockpiles more than 2 (preferably 5) metres from existing vegetation, concentrated water flow, roads and hazard areas.
2. Construct on the contour as low, flat, elongated mounds.
3. Where there is sufficient area, topsoil stockpiles shall be less than 2 metres in height.
4. Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Standard Drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (Standard Drawing 6-8) 1 to 2 metres downslope.

STOCKPILES **SD 4-1**

20.5. Appendix E Groundwater Drawdown Contours (end of mining) (Energy and Water 2023)



Paper Size ISO A4

0 0.75 1.5 2.25 3

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Aeris Resources Limited
Constellation Project - Feasibility study
Water Impact Assessment

Groundwater drawdown - End of mining

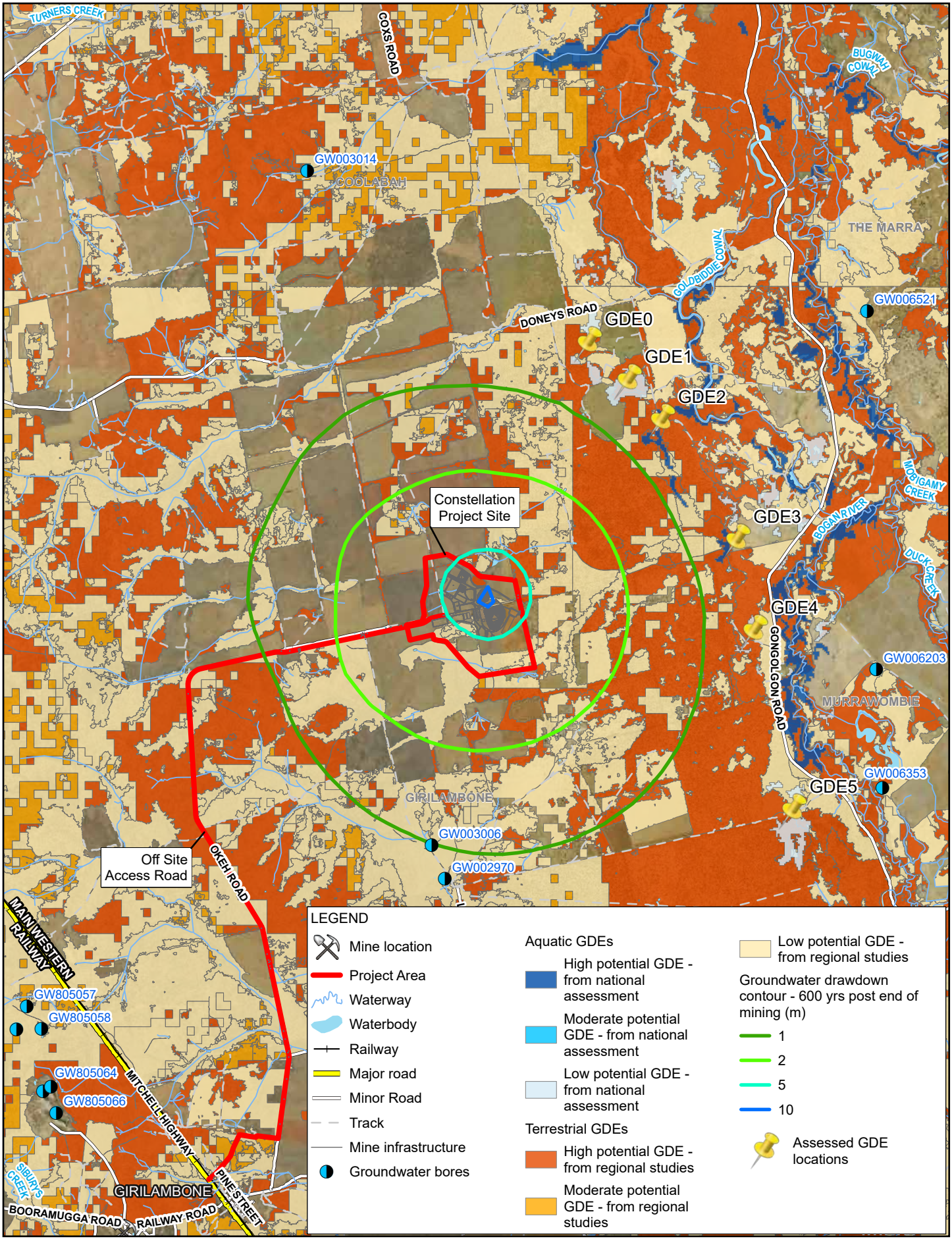
Project No. **12575595**
Revision No. **0**
Date **22/04/2024**

FIGURE 6.3

G:\22\12575595\GIS\Maps\Deliverables\12575595_WIA_0.aprx
Print date: 22 Apr 2024 - 15:06

Data source: GDEs - BOM 2012. Project boundary: Aeris Resources, Mine location & Drawdown Contours: GHD, All other layers: DPE. public/NSW_Imagery: © Department of Customer Service 2020. Created by: pfield

20.6. Appendix F Groundwater Drawdown Contours (600 years) (Energy and Water 2023)



Paper Size ISO A4

0 1 2 3 4

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Aeris Resources Limited
Constellation Project - Feasibility study
Water Impact Assessment

Groundwater drawdown - 600 years after end of mining

Project No. **12575595**
Revision No. **0**
Date **22/04/2024**

FIGURE 6.4

G:\22\12575595\GIS\Maps\Deliverables\12575595_WIA_0.aprx
Print date: 22 Apr 2024 - 15:00

Data source: GDEs - BOM 2012. Project boundary: Aeris Resources, Mine location & Drawdown Contours: GHD, All other layers: DPE. public/NSW_Imagery: © Department of Customer Service 2020. Created by: pfield