Department of Planning, Housing and Infrastructure

Our ref: MP07_0143-PA-30

Kiara Crook
Environment and Compliance Superintendent
Tarago Operations Pty Ltd
507 Collector Road
Tarago, NSW, 2580

13/10/2025

Woodlawn Copper Mine – Water Management Plan

Dear Ms. Crook

Thank you for submitting the Water Management Plan in accordance with Condition 4, Schedule 4 of the consent for the Woodlawn Copper Mine (MP07_0143-PA-30). I also acknowledge your response to the Department's review comments and request for additional information.

I note the Water Management Plan has been prepared in consultation with the EPA, DCCEW Water, Water NSW, Iberdrola and Veolia; and contains the information required by the conditions of approval.

Accordingly, as nominee of the Planning Secretary, I approve the revised Water Management Plan (Rev. 15, October 2025).

You are reminded that if there are any inconsistencies between the Plan and the conditions of approval, the conditions prevail.

Please ensure you make the document publicly available on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact Charissa Pillay on 02 99955944.

Yours sincerely

Stephen O'Donoghue
Director
Resource Assessments

As nominee of the Planning Secretary

Water Management Plan

Woodlawn Zinc Copper Project

Document Review/Change History

Date	Summary of review and changes	Revision No.	Authors	
			Drafted by	Reviewed by
10/01/2015	Initial draft	1	HS	HS
18/11/2015	Issue to WaterNSW	2	HS	HS
18/12/2015	Issue to DPE water	3	RB	AL/HS
23/03/2015	Update with DPI comments	4	RB	AL
6/05/2016	Issue to EPA, WaterNSW, SPI-Water, DRE, Infigen (now Iberdrola) and Veolia	5	RB	AL
12/09/2016	Issue to Department of Planning and Environment	6	RB	AL
20/02/2017	Incorporation of agency comments	7	RB	AL
11/04/2017	Further DPE comments	8	RB	AL
11/05/2017	Operational plan	9	RB	AL
02/08/2017	Amendments for MOD2, annual update	10	RB	AL
06/11/2018	2018 annual update	11	RB	AL
22/05/2024	Amend company details, refine plan, updates following revised company strategy	12	KC	AVN
08/04/2025	Updates following consultation, EPA response to dewatering proposal and inputs from endorsed hydrogeologist. For submission to portal.	13	KC	RB
27/06/2025	Updates following comments received from WaterNSW, EPA and DCCEW. For submission to DPHI through portal.	14	KC	KC
04/10/2025	Updates in response to DPHI RFI (MP07_0143-PA-30)	15	KC	KC

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Glossary

Acronym	Definition	Acronym	Definition
ANZECC	Australian and New Zealand Environment and Conservation Council	OMP	Operation and Maintenance Plan
ANZG	Australian & New Zealand Guidelines	PAF	Potential Acid Forming
BOD	Biochemical Oxygen Demand	PCD	Pollution Control Dam
DEVLEOP	Develop Global Limited	PIRMP	Pollution Incident Response Management Plan
DPI Water	Department of Primary Industries - Water	POEO Act	Protection of the Environment Operations Act 1997
DPE	Department of Planning and Environment	ppm	Parts per million
DSNSW	Dam Safety New South Wales	Project	Woodlawn Zinc-Copper Mine
EA	Environmental Assessment	ROM	Run-Of-Mine
EC	Electrical conductivity	RWRD	Rehabilitated Waste Rock Dump
ED	Evaporation Dams	SOC	Statement of Commitments
EMS	Environmental Management Strategy	SML20	Special Mining Lease 20
EPA	Environment Protection Authority	TARP	Trigger Action Response Plan
EPL	Environmental Protection Licence	TDN	Tailings Dam North
HDPE	High Density Polyethylene	TDS	Tailings Dam South
Iberdrola	Woodlawn Windfarm (previously operated by Infigen)	TDW	Tailings Dam West
LTP	Leachate Treatment Plant	TSF4	Tailings Storage Facility 4
MB	Monitoring Bore	Veolia	Owner of the Woodlawn Bioreactor
MBT	Mechanical and Biological Treatment	WAL	Water Access License
mg/L	Milligrams per litre	WMP	Water Management Plan
ML	Mega Litre	WRDam	Waste Rock Dam
MOD2	Modification 2		
NAF	Non-Acid Forming		
NSW	New South Wales		

1. INTRODUCTION

1.1. Background

The Woodlawn Zinc-Copper mine (the Project) is located approximately 7 km northwest of Tarago in New South Wales (NSW) within Special (Crown and Private Land) Mining Lease 20 (SML20) as shown in Plan 1, Appendix 1. The original Woodlawn mine operated from 1978 to 1998 and processed 13.8Mt of ore from the Woodlawn open pit, underground and minor satellite deposits. Following its prolonged closure, the Project was acquired by ASX-listed Heron Resources who secured Project Approval in July 2013 following the public exhibition of an Environmental Assessment (EA). Heron completed the construction of the project and developed the new underground mine in accordance with the Project Approval before it was put on care and maintenance in March 2020. Heron was placed in administration in July 2021. Develop Global Limited (DEVELOP) completed its acquisition of the Project in May 2022 and Tarago Operations Pty Limited which holds Special Mining Lease (SML) 20 and (EPL) 20821. Veolia operates an eco-precinct, including a licensed landfill, within SML20 but separated from the project and has separate EPL's as shown in Plan 1, Appendix 1.

The existing surface and ground water environment for the Project was described in detail in the Project EA (Parsons Brinkerhoff 2012). The WMP was previously authored and issued by Heron which included specific issues relevant to the construction phase, development of the box cut and portal, underground decline, and refurbishment of the existing underground roadways. Versions 2 to 8 incorporated comments made by government agencies (WaterNSW, Department of Primary Industries - Water (DPI Water), Department of Planning and Environment (DPE), Environment Protection Agency (EPA) and the Resources Regulator) during the initial review process. Version 9 represented the approved operational WMP which was amended in August 2017 to include Modification 2 (MOD2). This version includes significant updates based on an enhanced understanding of the site and additional data collected across the site since the initial plan was approved in 2017.

This WMP forms one component of the of the Projects overall Environmental Management Strategy (EMS). The EMS includes several commitments and associated management plans which together form the basis for the ongoing operation of the Project. The EMS and associated management plans will continue to be updated as required to reflect any changes to the Project.

1.2. Scope and objectives

This WMP has been prepared for DEVELOPs Woodlawn Zinc-Copper mine in accordance with Schedule 4, Condition 4, of the Project Approval 07_0143MOD2. The objectives of this WMP are to:

- Implement the commitments made in the EA including specific conditions of approval and the Statement of Commitments.
- Ensure compliance with relevant environmental legislation.
- Manage water related risks associated with the Project.
- Provide for continuous improvement in water management performance.
- Provide a mechanism to identify and correct areas of non-compliance.

The design objective of the water management system, as a whole, is to manage water on site so that no offsite contamination or implications occur. For each sub-section of this WMP the performance criteria to verify achievement of this is summarised in Table 1-1.

Table 1-1 Performance criteria for the sites WMP design objective

WMP section no. and name	Performance criteria
2: Site water balance	Sufficient water is available for all Project-related purposes with raw water quantities in accordance with licenses. Tailings and evaporation are suitably managed.
3: Erosion and sediment controls	All water management structures constructed and maintained in accordance with Landcom (2004).
4: Existing contamination	Water monitoring programs confirm impacts are localised and being sufficiently managed with no off-site impacts.
5: Surface water management plan	Water monitoring programs are sufficiently robust to detect any adverse water quality or quantity impacts associated with the Project to allow appropriate adaptive management measures to be implemented.
6: Groundwater management plan	Water monitoring programs are sufficiently robust to detect any adverse water quality or quantity impacts associated with the Project to allow appropriate adaptive management measures to be implemented.
7: Surface and groundwater response plan	Any quality or quantity impacts associated with the project are managed appropriately with corrective or adaptive measures implemented.
8: Dewatering of the old workings	Ensure any dewatering activities and monitoring are conducted in accordance with the EPL.
9: Pollution prevention	All chemicals and hydrocarbons stored and used in accordance with manufactures instructions, Material Data Safety Sheet requirements and Australian Standards in a manner that reduces the risk of water contamination to an acceptable level.
10: Communication, reporting and reviews	All water-related information is available in a timely manner on the Project website.

1.3. Consultation

This plan was originally drafted by Heron following consultation with government and non-government organisations. DEVELOP has since revised the plan with additional consultation where required and applicable depending on the update. In 2024 approval was also gained for endorsed experts including a hydrogeologist for this plan's revision. A consultation log is provided in Appendix 2 which will be updated as required during the ongoing operation of the Project. The WMP was originally approved in 2017 (Appendix 3).

1.3.1. Interaction with Veolia

A cooperation agreement exists between both the operators of the mine and bioreactor which guides the management of operational impacts including water. The agreement also acknowledges that each party is entitled to carry out their activities in each respective area of operations which may cause nuisance. DEVELOP also acknowledges there may be additional obligations on Veolia in regard to water use and management as detailed in this agreement which are not detailed in this WMP.

1.4. Legislation

Legislation relevant to the WMP includes:

- Protection of the Environment Operations Act 1997 (POEO Act)
- Environmental Planning and Assessment Act 1979
- Protection of the Environment Legislation Amendment Act 2011
- Contaminated Land Management Amendment Act 2008
- Waste Avoidance and Resource Recovery Act 2001
- Environmentally Hazardous Chemicals Act 1985 and Regulation 2008
- Mining Act 1992
- Water Management Act 2000
- Dams Safety Act 2015

The Project is governed by the following:

- Project Approval: as issued in 2013 and amended in 2016 and 2017. Document ID: 07_0143MOD2
- Environment Protection License (EPL): 20821 as issued by the NSW Environmental Protection Agency (EPA)
- Special Mining Lease (SML): 20
- Water licenses as detailed in Section 1.7

1.5. Guidelines and standards

The NSW and Australian government provide a range of guidelines, standards and policies on regarding chemical use, management and storage and erosion and sediment controls. These guidelines provide general information on the control systems as well as methods to achieve current best practice. These sources are presented included in Section 11 and have been referred to in the preparation of this plan where applicable.

In addition, there are a range of guidelines and standards regarding water management and default water quality criteria. These guidelines provide general information on the control systems as well as methods to achieve current best practice. These references are listed in Section 11 and have been referred to in the preparation of this plan where applicable. However, given the complexity of the site and its unique but natural metal rich water quality, standard water quality guideline values are not applicable as further detailed in Section 7.1.

1.6. Project Approval

This WMP has been developed in accordance with the Project Approval and Statement of Commitments (SOC). Table 1-2 outlines these including reference to where each of the relevant conditions and commitments are addressed.

Table 1-2 Consent conditions relating to the WMP

Condition	Condition description	Where addressed
Schedule 4	Under the Water Act 1912 and/or the Water Management Act 2000, the Proponent is required to obtain all necessary water licences for the project.	Section 1.7
Schedule 4 Condition 1	The Proponent shall ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of mining operations to match its available water supply, to the satisfaction of the Secretary.	Section 2
Schedule 4 Condition 2	Except as may be expressly provided by an EPL, the Proponent shall comply with Section 120 of the POEO Act during the carrying out of the project.	Section 3.1
Schedule 4 Condition 3	Within 5 years of the date of this approval, the Proponent shall identify the passive system to treat seepage from the existing Waste Rock Dump in consultation with DRG, and implement the preferred system to the satisfaction of the Secretary.	Section 4.4.1
Schedule 4 Condition 4	The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Secretary. This plan must be prepared in consultation with EPA, DPI – Water, WaterNSW, Infigen Energy (now Iberdrola) and Veolia, by suitably qualified and experienced persons whose appointment has been approved by the Secretary, and submitted to the Secretary for approval prior to the commencement of mining operations under this approval. This plan must include:	This Plan
Schedule 4 Condition 4	(a) a Site Water Balance that includes details of: • sources of water supply' • water use on site, including any potable water use; • water transfers to/from the site; and • any off-site water discharges.	Section 2
Schedule 4 Condition 4	(b) a Surface Water Management Plan which includes: • baseline data on surface water flow and quality in natural waterbodies that could be affected by the project; • a detailed description of the surface water management system on the site, including the: o clean water diversions; o erosion and sediment controls; o water storage structures; and o tailings and evaporation dams.	Section 5
Schedule 4 Condition 4	(c) design objectives and performance criteria for the following: • the surface water management system; • tailings and evaporation dams; and • waterbodies that could be affected by the project; • a program to monitor: o the effectiveness of the water manapgement system; o surface water flows, quality, and impacts on other water users; o potential acid rock drainage from the waste rock dumps;	Section 1.2 Section 5 & 6

Condition	Condition description	Where addressed
	○ potential seepage from tailings and evaporation dams; and ○ post-closure water quality;	
Schedule 4 Condition 4	(d) a groundwater Management Plan, which includes: • baseline data of all groundwater levels, yield and quality of any privately-owned groundwater bores that could be affected by the project; • groundwater assessment criteria; • definition of areas of existing groundwater contamination; • a program to monitor: ○ existing groundwater contamination identified on the site; ○ impacts on the groundwater supply of potentially affected landowners; ○ the volume of groundwater inflow into the underground workings; ○ regional groundwater levels and quality in potentially affected aquifers; ○ potential groundwater quality impacts from paste fill operations; ○ potential acid rock drainage; ○ potential seepage from tailings and evaporation dams; and ○ the effectiveness of the seepage collection, treatment and storage system associated with the tailings dams, waste rock dumps, evaporation dams and all other water storages that receive contaminated or salt-laden water;	Section 6 Section 6.2 Section 7.1.2 Section 4 Section 6
Schedule 4 Condition 4	(e) a Surface and Ground Water Response Plan that includes: • trigger levels for investigating any potential adverse surface water and groundwater impacts of the project, including but not limited to seepage of contaminated water from the tailings dams, waste rock dumps, evaporation dams and the Woodlawn Landfill (VES Bioreactor); • a protocol for the investigation, notification and mitigation of existing groundwater contamination on the site and any exceedances of the surface water and groundwater assessment criteria; • measures to mitigate and/or compensate potentially affected landowners (including compensatory water supply if required); • the procedures that would be followed to determine any appropriate action to be taken to mitigate or offset any surface or groundwater impacts caused by the project that constitute material harm to the environment.	Section 7
Schedule 4 Condition 4	Note: The effectiveness of the Water Management Plan is to be reviewed and audited in accordance with the requirements in Schedule 6. Following this review and audit the plan is to be revised to ensure it remains up to date (see Condition 5 of Schedule 6).	Section 10.5

Condition	Condition description	Where addressed
Schedule 4 Condition 4A	The Proponent shall comply with the performance measures in Table 3 to the satisfaction of the Secretary *Table 3: Water Management Performance Measures* **Feature** / **Performance Measure** Erosion and Sediment - General: • Design, install and maintain erosion and sediment controls generally in accordance with the series *Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries* Paste Fill Plant: • Design, install and maintain the paste fill plant to minimise potential for uncontrolled flows of tailings, materials, chemicals or waters (including but not limited to bunding of the tailings storage tanks) in accordance with the relevant Australian Standards.	Section 3 Section 9.3
Schedule 6 Condition 3	The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:	
	(a) a description of: • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;	Section 1.4 Section 7.1 Section 6.6
	(b) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria	Entire Plan
	(c) a program to monitor and report on the • impacts and environmental performance of the project; • effectiveness of any management measures (see b above);	Entire Plan
	(d) 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	Section 7.2
	(e) a protocol for managing and reporting any: • incidents and complaints; • non-compliances with statutory requirements and exceedances of the impact assessment criteria and/or performance criteria;	Section 10
	(f) a protocol for periodic review of the plan.	Section 10.5
Schedule 6, Condition 7	The Proponent shall notify the Secretary and any other relevant agencies of any incident associated with the project as soon as practicable after the Proponent becomes aware of the incident. Within seven days of the date of the incident, the Proponent shall provide the Secretary and any relevant agencies with a detailed report on the incident.	Section 10.4
Statement of Commitments Item 3A	The water management strategy described in this EA would be further developed and implemented to control potential sources and pathways for water pollution to the receiving environment. The strategy would relate to the entire Project Site and would be integrated with Veolia's current water management strategy. The objectives of the strategy would be to: • Meet the water supply needs of the Project	This plan

Condition	Condition description	Where addressed
	• Protect the safety of workers and equipment in the mine by minimising the risk of large uncontrolled inflows of water into the mine from overlying waterbodies. • Minimise the risk of off-site discharge of dirty or saline water. • Minimise cumulative impacts on water sources and dependent ecosystems. • Minimise impacts on downstream users of water sources. The water management strategy would be used as a basis to define the specific actions within the water management plan for the Project.	
Statement of Commitments Item 3B	A Water Management Plan (WMP) would be developed for the Project. This would include a surface water management plan, and groundwater management plan. It would also include details on existing conditions, predicted impacts, baseline and model validation monitoring, appropriate trigger levels and responses and a contingency plan in the event of impacts greater than those predicted. Measures in the WMP would include those to: • minimise surface disturbance • reuse sediment laden water where possible • collect and contain all potentially contaminated water for re-use on-site (including collecting and containing water in Evaporation Dams (ED1, ED2, ED3S),and water from underground workings for re-use) • provide settling ponds allowing suspended particles in sediment laden water to settle. The WMP would fully integrate with Veolia's Woodlawn Site Water Management Plan, with the following features: • Drainage from the proposed processing facility and associated areas would be directed to the process water dam to ensure potentially contaminated water is contained. • Diversion embankments and drains would be constructed around the proposed processing facility to divert clean, uncontaminated surface water run-off back to the Hickorys Paddock drainage. • Any saline water dewatered from the Woodlawn Underground Project (WUP) would be contained within evaporation dams (ED1 and ED2). • The surface water run-off from the local catchments of the Tailings Dam South (TDS), Tailings Dam North (TDN) and Tailings Dam West (TDW) would be contained within these dams.	This plan
Statement of Commitments Item 3C	Surface water monitoring would be conducted at the existing Crisps Creek stations. Parameters of the monitoring would be in accordance with Veolia's existing monitoring program.	Section 5.4
Statement of Commitments Item 3D	Additional surface water monitoring locations would be installed at the new tailings dam (TSF4) and the lowest drainage point north of the Project Site (north of the proposed processing facility). Parameters of the monitoring would be in accordance with Veolia's existing monitoring program.	Section 5.4
Statement of Commitments Item 3E	A seepage collection dam would be constructed for the proposed new tailings dam (TSF4). This would enable the capture of potential seepage from the TDN, which would then be pumped back into the tailings area.	Completed, see section 4.2

Condition	Condition description	Where addressed
Statement of Commitments Item 3F	Sufficient free board allowance (the height of the dams above the water level) would be maintained throughout the operational life of the Project to prevent overflows during a 1:100 annual recurrence interval (ARI) event of 72 hours duration.	Section 9.4
Statement of Commitments Item 3G	All hydrocarbon and chemical handling facilities would have impermeable surfaces and bunding capable of containing 110% of the largest tank's capacity.	Section 9.1
Statement of Commitments Item 3H	All processing related reagents and hydrocarbon products would be securely stored.	Section 9.1
Statement of Commitments Item 3I	In the case of a major hydrocarbon spill on an unsealed area, the contaminated soil at the site of the spill would be collected and transported to an approved waste depot or remediated safely on-site. Pits would be constructed downstream of any spill with sufficient hydraulic gradient to capture seepage water and contaminated material, enabling the pits to be pumped out.	Section 9.2
Statement of Commitments Item 3J	Existing groundwater bores would continue to be monitored for signs of contamination. New groundwater monitoring bores would be installed south and downstream of the TDS, north of Tailings Storage Facility 4 (TSF4) and south-west of the waste rock dump, as identified in Chapter 6 of the EA. This monitoring would be undertaken in conjunction with Veolia.	Completed, see Section 6
Statement of Commitments Item 3K	Monitoring and investigations would be undertaken progressively to confirm (and if needed) manage the contaminated plume that is potentially emanating from existing ED1 and ED2. Investigations would identify and/or clarify leakages within these evaporation dams. Any leakages from these dams with potential to cause remobilisation of contaminated plumes in shallow subsurface aquifers or Crisps Creek would be repaired as soon as practicable.	Section 4.3
Statement of Commitments Item 3M	Water sources for the Project would be limited to the use of water from: • Priority source: reuse of stored water within storage dams on-site • secondary source: the existing water licence held by Veolia (under the Water Act 1912) for use of water from the Willeroo Borefield.	Section 2.7
Statement of Commitments Item 3O	Water usage from the borefield would be monitored to ensure licence limits are not exceeded.	Section 2.7.1
Statement of Commitments Item 3P	If extraction from the borefield results in reduced aquifer yields for surrounding users, Heron would investigate the options of: • supplying affected groundwater users in the surrounding borefield with the Proponent's groundwater extraction, and / or • deepening existing bores to intercept groundwater lower in the aquifer to re-instate the previous yield.	Section 7.1.4 Section 7.2

1.7. Water licenses

WaterNSW issues Water Access Licenses (WAL) which is a title for a water entitlement and allows the license holder to extract water from rivers or aquifers in accordance with the entitlement and any conditions. A nominated Works Approval authorises the use of specified works (like a bore pump) to take water under the WAL. Tarago Operations holds two WALs associated with dewatering operations. As per the Veolia/Tarago Operations Co-operation Deed, the project also has access to a portion of Veolia's 600 ML allocation from the Willeroo Borefield (further discussed in Section 2.5). The project water licenses are summarised in Table 1-3.

Water use according to the entitlement is reported in each years Annual Review for the site.

Table 1-3 Water licenses summary

License holder	Water License	Water source	Current entitlement (ML)	Nominated Work Approvals
Veolia	WAL28983	Lachlan Ford Belt Mdb [Murray Darling Basin] Groundwater Source	600	40WA411642
Tarago Operations	WAL42034	Lachlan Ford Belt Greater Metropolitan Groundwater Source	0	None
Tarago Operations	WAL42366	Lachlan Ford Belt Greater Metropolitan Groundwater Source	400	40WA417428

2. SITE WATER BALANCE

2.1. Overview

The project does not have a connection to the town water supply and therefore needs to remain fully self-sufficient. In addition, the site operates as a nil discharge site. Each water source has specific uses and appropriate treatment options suitable for the intended use. Water can be categorised according to its intended use and initial water quality. The Projects water balance is dynamic and draws on numerous data sources to aid operational decisions including:

- The adjacent Veolia weather station which provides rainfall data in 1 hour intervals and daily evaporation rates.
- Historical rainfall data from the Veolia weather station which is available from 2018.
- Historical rainfall data from Lake Bathurst between 1960 and 2017.
- Flow meter data documenting water transfers and usages which have occurred across the site and between licensed premises.
- Water type or quality (refer to Section 2.3).

2.2. Rainfall and evaporation

A review of available historical rainfall and evaporation data summarised in Figure 2-1 and Figure 2-2 indicates that:

- Average annual evaporation of 934 mm exceeds annual average rainfall of 674 mm.
- Rainfall can fluctuate considerable with annual totals as low as 318 mm (in 1982) to as high as 1178 mm (in 1974) being recorded.
- Average evaporation exceeds average rainfall for most of the year. The only exception to this is the winter months of June, July and August.
- May is the driest month on average followed closely by July.
- November is the wettest month on average.

DEVEOP currently has a working understanding of catchment sizes and pond surface areas for each operated dam as applicable to the water balance. However, due to the size of the site, legacy aspects and associated complexities these values require further refining.

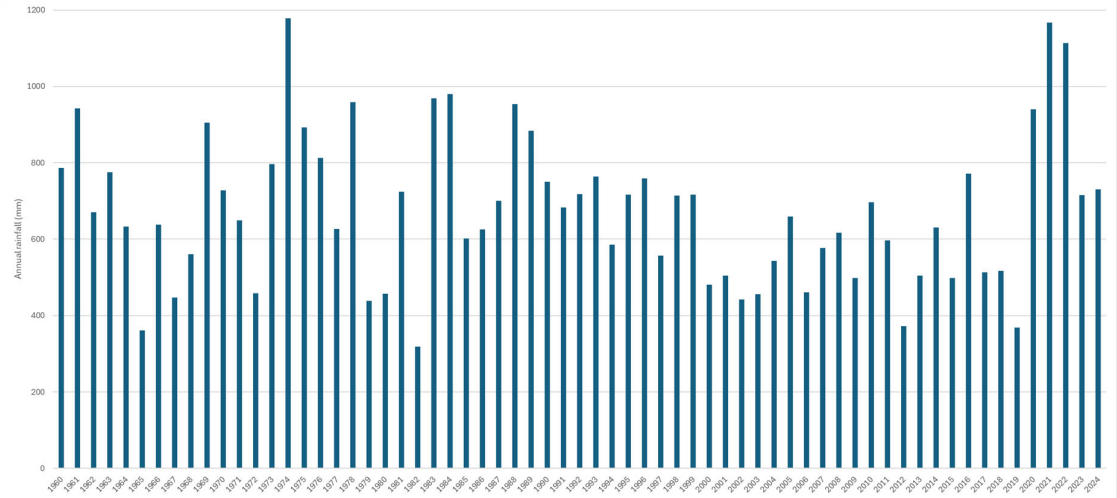


Figure 2-1 Lake Bathurst and Woodlawn annual rainfall totals 1960-2024

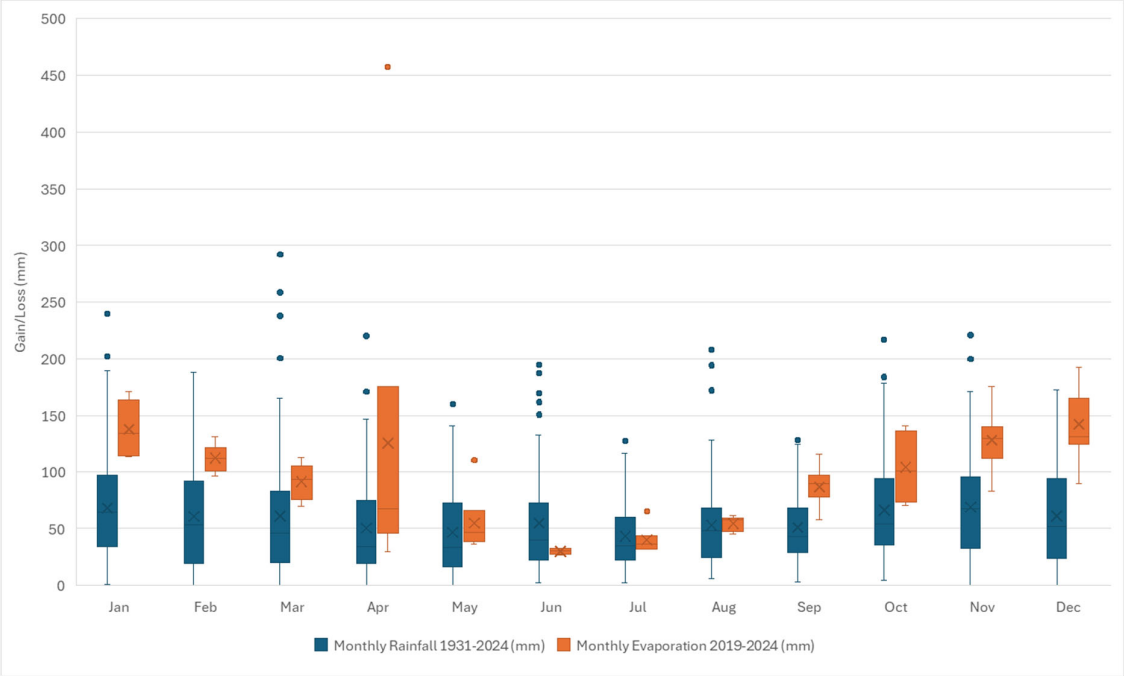


Figure 2-2 Woodlawn monthly evaporation (2019-2024) and average rainfall (1960-2024)

2.3. Water types on site

The complex nature of the site with its long history of mining, a licensed waste disposal facility and now the new mining operation has resulted in distinct water types which co-exist within the mining lease at times in close proximity. This necessitates the defining of these different known water types which require different management strategies and limitations on re-use. The water types are currently categorised as: clean water, mine or process water and leachate water.

2.3.1. Clean water

Surface water runoff from areas where water quality is not affected by current or historical mining operations is considered 'clean' water. Only clean surface water from undisturbed or rehabilitated areas will be allowed to drain into Crisps Creek and Lake George catchments. Generally, this water is relatively neutral with low concentrations of metals, however, given the site geology, the natural concentrations of metals and mineral salts particularly sulfate can be highly variable and often above general water quality default criteria. Therefore, classification of this water type requires understanding it's origin and using that in addition to analytical results and comparison to the other water types as identified in Section 2.3.2 and Section 2.3.3.

As the site is located on a ridge line representing a catchment divide, there are limited clean water catchments within the site. These are generally located around the periphery of the site such as ephemeral drainage lines on the western side of the mine lease which drain the vegetation offset area. There is also a small natural woodland area above Tailings Dam West which is diverted around the dam and ultimately allowed to discharge below Tailings Dam South.

Water collected in the new Tailings Storage Facility (TSF4) seepage collection trench has been sampled regularly since installation in 2019. The results indicate that this water is often stormwater run-off from the side of the dam rather than seepage. This water will continue to be characterised as either clean or mine/process water (refer to Section 2.3.2) depending on its water quality characteristics.

2.3.2. Mine/process water

Given the high sulfur content of the mine's ore body, some of the waste rock and tailings are prone to acid generation. This includes tailings and waste rock from the pre-2000's open cut and underground mining operation and the new underground mine covered by the more recent project approval. These rocks and tailings are recognised as being Potentially Acid Forming (PAF) material, therefore, water that has come in contact with PAF material on the surface is considered as 'mine' water. During the project this includes:

- Water stored within the legacy and new tailings dams.
- Water stored in other dams depending on its origin (i.e evaporation dams or pollution control infrastructure).
- Water collected or stored from the active underground mining areas.
- Surface run off from the Run-Of-Mine (ROM) pad and associated processing plant.
- Other water or runoff that meets the chemical profile and definition.

As there is also the potential for Non Acidic Forming (NAF) material to exist this water type is also important to define, analytically, which can be characterised by:

- Acidic pH (<4)
- Elevated aluminium, zinc and iron
- Low in ammonia
- Low chemical oxygen demand.

A key feature of the mines water management system is to minimise the use of clean water onsite and minimise the generation of mine water while maximising the use of recycled water. Therefore, there are various clean water drains and diversion channels installed across the mine site which diverts clean water away from disturbed areas and minimises the generation of mine water.

2.3.3. Leachate water

The water contained within putrescible waste or that otherwise leaches through high organic content wastes such as found in landfills contains a different chemical profile compared to mine water or clean water. Given the mine is located adjacent to a licensed landfill with existing mine workings located beneath the landfill, the consent (Sch 4 Condition 4(e)) specifically required the mine to establish trigger levels to detect seepage of contaminated water from the bioreactor into the mine workings, groundwater and surface water systems. Leachate water can be characterised by:

- Relatively neutral pH (6-8)
- Low iron and aluminium
- Elevated ammonia
- Elevated chemical oxygen demand

The chemical properties of this water type have been independently determined through investigations and subsequent reporting to fulfill an EPL condition as detailed in Section 4.5. The unique chemical properties of leachate also allow determination of the level of mixing with other water systems on site.

2.4. Water sources and storages

There are numerous water management structures which have either been historically installed or built specifically for the Project. These include pollution control structures, tailings dams and evaporation dams. These are summarised in Table 2-4 and shown on Plan 1, Appendix 1. Six of these water management structures are classified as declared dams under the Dams Safety Act and are subject to additional requirements and governance under the Dam Safety New South Wales (DSNSW) independent regulator. These are:

- Tailings Dam North (TDN)
- Tailings Dam South (TDS)
- Tailings Dam West (TDW)
- Tailings Storage Facility 4 (TSF4)
- Evaporation Dam 1 (ED1) [Veolia responsibility under Dam Safety Act]
- Evaporation Dam 2 (ED2)

Prescribed dams are the subject of a formal safety inspection program and dam surveillance reporting which DEVELOP completes for TDN, TDS, TDW, TSF4 and ED2. These programs are described in each dams corresponding Operation and Maintenance Plan (OMP). Veolia has exclusive use and responsibility for ED1 and the (former pre-2000's mines) plant collection dam, however, these are still able to be used by DEVELOP if required (refer to Section 2.7.1).

Table 2-4 are pollution control structures with the exception of Woodlawn Dam which is merely the holding dam for water transferred from the bore field. Therefore, these are excluded from the Water Management (General) Regulation 2018.

Table 2-4 Overview of water storage features

	Catchment	Water category	Name	ID	Spillway capacity (ML)[1]	1m below spillway capacity (ML)[3]
DEVLEOP	Crisps Creek	Mine	Tailings Dam North	TDN	423[2]	289
	Crisps Creek	Mine	Tailings Dam South	TDS	2,1687	1,793
	Crisps Creek	Mine	Tailings Dam South Return Water Dam	TDS-RWD	2	NA
	Crisps Creek	Mine	Tailings Dam West	TDW	129	26
	Crisps Creek	Mine	Tailings Storage Facility 4	TSF4	NA[4]	NA[4]
	Crisps Creek	Clean OR mine	Tailings Storage Facility 4 Return Water Dam	TSF4-RWD	NA	NA
DEVLEOP	Crisps Creek	Mine	Pollution Control Dam	PCD/ WM300	37	NA
	Crisps Creek	Mine	Process Water Dam	PWD	5	NA
	Lake George	Mine	Evaporation Dam 2	ED2	875	617

	Catchment	Water category	Name	ID	Spillway capacity (ML)[1]	1m below spillway capacity (ML)[3]
	Lake George	Mine	Waste Rock Dam	WRD	45	33
Veolia	Lake George	Clean	Woodlawn Dam	WM200	54 ML	NA
	Lake George	Mine OR leachate	Evaporation Dam 1	ED1	Unknown	1,338[5]

[1] Based on bathymetric survey completed in May 2025

[2] Sum of all cells

[3] Conservative value of 1 m applied in lieu of dam specific modelling

[4] Not applicable to detail as the projects operational dam which receives tailings and is constantly changing

[5] Freeboard value provided by Veolia

2.5. Site drainage network

Segregation and management of clean and mine/process water on-site relies on a network of drains, diversions and pipelines which have been established as part of the original mining operation pre 2000's. Due the site complexity and legacy nature of the site these have never been fully documented to date although DEVELOP has acquired an intricate knowledge of the drainage system since acquisition. As DEVELOP is committed to improving the transparency of site operations and these complicated systems there are plans to have some maps created to clearly portray these. An initial draft map has been created and is presented in Plan 2, Appendix 1 as applicable for the Tarago Operations site. Plan 2 depicts the established clean water (refer to Section 2.3.1) and mine/process water (refer to Section 2.3.2) drainage pathways that exist on site. Due to the large resolution not all drainage lines can be accurately depicted on this single plan at this time. All clean water drainage channels are routinely sampled and included in the surface water management plan (refer to Section 5) to ensure no impacts from site activities are occurring. It should be noted that there is a drainage divide that bisects the site (refer to Plan 1, Appendix 1) which means half of the haul road slopes west and the half to the east.

2.6. Raw water use and distribution

Raw water for the project is sourced from the Willeroo Borefield located 6 km west of the Project on a gently west-facing slope draining to Lake George. The distribution of this raw water and its associated users are presented in Figure 2-3 with reference to the flow meters DEVELOP is responsible for. Each flow meter is represented in Figure 2-3 as an "F" and its unique ID. There are numerous flow meters which monitor water usage and movement around site and assist in identifying leaks in the network. Addition of key meters readings together determine overall site bore water usage.

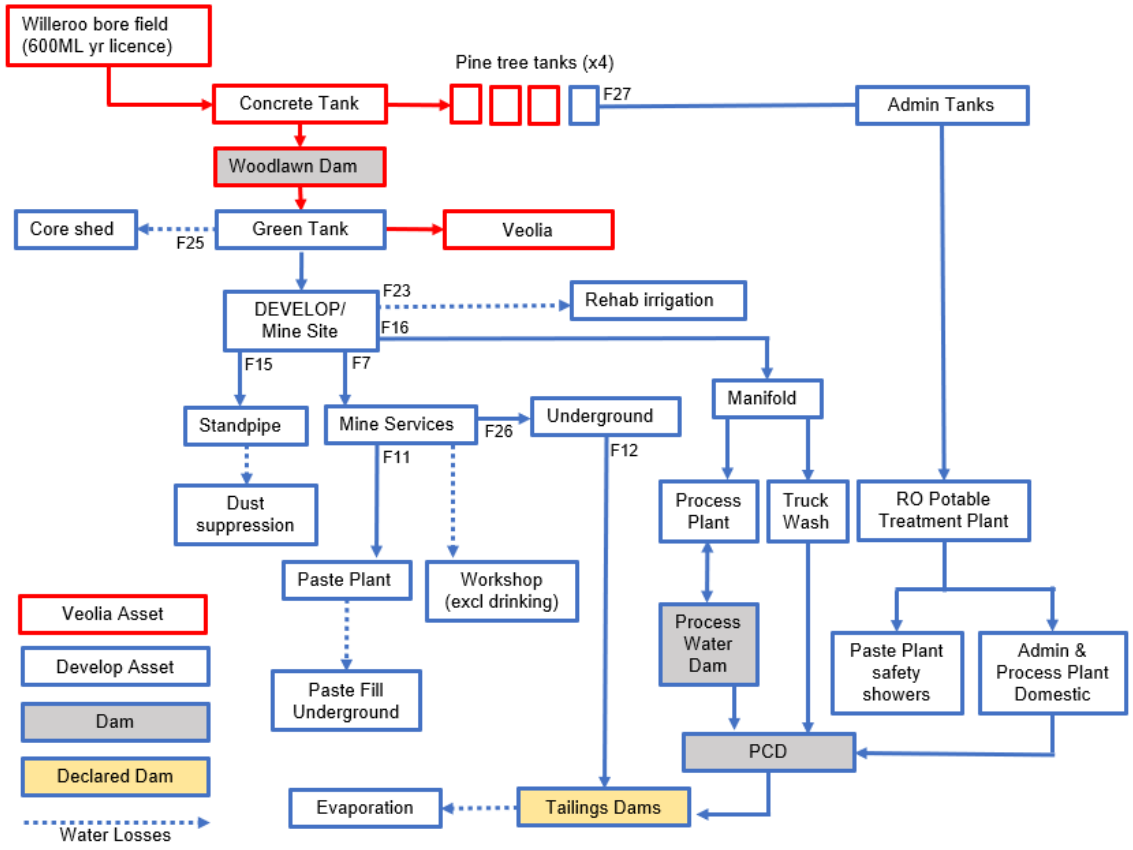


Figure 2-3 Raw water distribution overview and key flow meters

2.7. Total water demand

A typical annual summary of the total water demand during the operational phase is provided in Table 2-5. As the site is currently not operational and there is limited data available during the plant commissioning phase, the numbers provided are considered best estimates based on modelling and water use records available. Table 2-5 includes both the underground and the processing plant at full production. Given the contents of many of the sites surface dams (refer to Table 2-4) there is limited availability of “clean” water in surface dams. DEVELOP will therefore ensure raw/bore field water is used for usages which require it and other uses instead use treated and recycled water where suitable and available.

To supplement this, DEVELOP is considering using a number of water recycling options where suitable. This includes re-circulation of underground water, larger scale treatment of tailings dams water and the use of treated leachate from Veolia as currently approved (refer to Section 2.7.1). The timing and scale of implementation is dependent on necessity and availability. The aim of these improvements would be a reduction in raw water use; no other parts of the water management system would require modification. Further comments on the management of water is included in Section 2.7.1.

Table 2-5 Water use summary – full production (year 2)

Usage	Water usage (ML/month)		Comment on supply source
	Recycled	Raw	
Underground: equipment, drilling, watering down	30		Recycled water (primarily from underground) supplemented with other recycled water depending on quality.
Paste plant	3.1	3.1	Assumes 50% of forecasted supply can be obtained from recycled water options.
Process plant: dust suppression and primary mill seal	6.6		Recycled water (primarily from the process plant / process water dam)
Process plant: gland water		30	Current worst-case estimate, forecasted to be significantly less
Process plant remaining users: flush water, floc, mixing etc		13	Recycled water may be an option for some components depending on quality
RO plant: domestic supply including drinking, showers and safety showers		0.2	Must be raw water supplied but could also be trucked in if required
Surface dust suppression	3		Based on measurements taken to date. Recycled water options will be considered depending on quality
Total estimated maximum demand per month	**42.7**	**48.3**	

2.7.1. Management of water usage and storages

There have been several water balance studies undertaken for the Project over the past 15 years however, as the Project has yet to fully commence, there is limited actual data available on water demand. Water balance modelling necessarily makes assumptions in regard to:

- Rainfall patterns, including above and below average rainfall plus drought and high rainfall years
- Water storage capacity at given stages, including storage capacity at start up
- Production rate and associated water demand
- Water losses due to evaporation both natural and active
- Recycling initiatives based on anticipated water quality and treatment capabilities

Previous modelling has suggested that during extended drought conditions the operation could be constrained by a lack of water, even with extensive recycling of water from all available sources and full use of the borefield allocation. Conversely, during high rainfall years, an excess of water could occur requiring additional site storage, active evaporation or treatment.

A further complication has arisen over recent years with the discovery of organic rich leachate within the mine workings below the Bioreactor. This water is unsuitable for use as a raw water supply for the mine. Organic rich water cannot be used in the processing plant has it significantly reduces the efficiency of flotation reactions needed for the separation of target metals. It is also unsuitable for use in underground mining equipment cooling, paste production and dust suppression.

It is currently expected that water recycling in the early years of the operation will be limited to the output of Veolia's leachate treatment plant and water storages unaffected by leachate contamination. Over time, additional water recycling initiatives will be developed which will likely include recirculating underground water, treatment and reuse of process water and greater use of recycled water for dust suppression, processing and paste production.

The site will continue its closed loop water management system whereby:

- Water used to pump tailings to TSF4 will be returned to the processing plant.
- The existing tailings dams will continue to transfer water between one another to maximise evaporation while maintaining adequate freeboard.
- Water generated from the new underground workings will be transferred directly to TSF4 for reuse or transfer to TDS.
- Water contained in the Process Water Dam and the Plant Control Dam will be transferred and reused as a priority in order to maximise rainfall runoff control.
- Regular monitoring and checks of the water storage situation of the site and whether additional controls are required in order to limit excessive water storage.
- Mechanical evaporators are utilised in to maximise the sites natural evaporation (refer to Section 2.2). Currently DEVLEOP have a fleet of 10 evaporators which are installed and operable. These are operated weather dependently to ensure any spray drift does not leave the dam footprints.
- Drainage lines are inspected and maintained to ensure adequate division of clean and water catchments.

DEVELOP is confident that recycling initiatives will improve over time, particularly once the old workings have been dewatered and ED2 becomes available to store water suitable for reuse in the processing plant. However, it is also possible that circumstances may arise which will result in other modifications to the water management system to be required.

2.8. Internal transfers

The Environment Protection Licence currently allows for transfers of water between Veolia and the mine operations. These are nominated as:

- Between ED1 and ED2
- From ED1 to the Processing Site
- From Old Plant Runoff Dam[1] to the Processing Site
- From Woodlawn Dam to the Processing Site
- Between tailings dams and ED1
- From Waste Rock Dam to ED1
- From Veolia treated leachate / storm water to ED2 / process plant
- Underground water to evaporation dams

Similarly to the raw water network these transfers and movements are monitored by a network of flow meters. There are numerous fixed and relocatable pumps and pipe lines across the site that are used as needed to facilitate these transfers and maintain water levels across all water storage assets.

[1] NO LONGER OPERATIONALLY USED AND LOCATED WITHIN THE CURRENT VEOLIA EPL

3. EROSION AND SEDIMENT CONTROLS

3.1. Overview

Condition L1.1 of EPL20821 requires compliance with Section 120 of the POEO Act, which prohibits pollution of waters. This includes the minimisation of sediment generation and transportation to downstream waterways.

3.2. Site soils

Understanding the soils on site is an important aspect in the design and management of soil and erosion controls. For erosion and sediment control, the soils of the project area are determined to be:

- Yellow duplex soils, most evident on the slopes and drainage lines
- Highly erodible
- Exhibit surface sealing, where the surface soil has become compacted and resistant to water filtration
- Commonly affected by sheet erosion of the topsoil, with stripping of the A-horizon resulting from clearing and over grazing

The combination of past poor land management practices and the dispersive nature of the soil have resulted in extensive sheet and gully erosion even in areas of the mining lease which have not been subjected to any recent operational activity.

The chemistry of the soils is also relevant with the average heavy metal concentrations measured in soils approximately 500 m from the ore zone were 200 parts per million (ppm) copper, 800 ppm lead and 300 ppm zinc. In comparison, chip samples taken from over the ore zone indicated average heavy metal concentrations of 2,000 ppm copper, 8,000 ppm lead and 2,000 ppm zinc. The naturally high metal content in the soils was the original mechanism used to determine the location of the ore body.

3.3. Activities with the potential to cause erosion and sedimentation

With constructure activities now largely finalised the activities with the potential to cause future erosion and sedimentation include:

- Ongoing use of unsealed and un-vegetated areas of the project
- Ongoing activities that result in loss of ground cover such as weed management and drainage line works
- Regulator notices which require earthworks to address
- Stockpiling of material required for site and rehabilitation activities

3.4. Erosion control structures

All erosion control measures will be maintained in accordance with the principles specified in the publication series Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries. General sediment controls will also adhere to the publication “Managing Urban Stormwater: Soils and Construction – 4th Edition”, Landcom 2004 (Blue Book).

The following will be implemented and maintained across the project:

- Sediment fences: used to filter surface runoff from disturbed areas prior to them being stabilised by vegetation. Sediment fences have also been installed in some drainage lines to assist with sediment collection as well as around temporary disturbed areas which will be subject to revegetation work.
- Contour and graded banks: have been constructed in areas where there are steep unbenched slopes. These channels were designed to convey water back to pollution control ponds and include roadside and hardstand drains. Depending on the overall length and profile of the slope, a contour bank was constructed every 10 m of vertical height.
- Diversion bank and channel: Constructing the contour and graded banks with an associated channel allows for greater stability during high flows and therefore used on steeper slopes while a constructed embankment alone can be used on gentler slopes. Where the calculated runoff velocity of the design storm is greater than 2.5 m/s^2 using runoff modelling, rock lining will be provided for energy dissipation and stability.
- Absorption banks and level spreaders: The same as a contour bank but is constructed along the contour and then tapered up at each end. Runoff from the slope is therefore contained within the bank with no discharge at either end. These were used in selected areas to retain as much water as possible within areas to be rehabilitated. They may also be useful along the surface of the completed tailings dams. In some cases level spreaders can be added to one or both ends of the diversion banks. These prevent build-up of water and subsequent blow out of the bank. They essentially act as a spillway for each absorption bank.
- Sediment ponds: used for the control and settlement of solids. These are located below disturbed areas and exist within the mine water system. The primary purpose of these basins is to contain sediment from normal rainfall events as well as reduce flow velocity during high rainfall events. All sediment ponds will be designed in accordance with “Blue Book” criteria and methods.
- Energy dissipaters: for example rock rubble which are located and can be placed into high flow systems to provide additional erosion protection. The rock rubble will be sourced from the dolerite stockpile area or otherwise verified as non-acid producing prior to installing in the drains.
- Check dams: Used to reduce flow velocity as well as channel grade. Have been constructed along drains longer than 100 m and where slope exceeds 2% using rock rubble and silt fencing. Sediment is collected behind the check dams which will be regularly cleaned and inspected for scour, particularly immediately down stream.

The water management network and erosion control structures for the project are presented in Plan 3, Appendix 1. Although structures may have been installed previously across the site in the 80’s and 90‘s before the current project approval these were not documented in the projects EA and DEVLEOP has no records or documentation of them. Appropriately engineered and installed erosion control structures are limited to those presented in in Plan 3, Appendix 1.

4. EXISTING CONTAMINATION

4.1. Background

The project is located within a historical mining lease which has been mined by numerous companies over intermittent periods since 1978. Given the age and lack of remediation having been historically completed, DEVELOP is aware of the following areas of contamination (either groundwater or soil/rock related) across the site which are not related to activities under the current mines project approval:

- Seepage from TDS
- Potential historical seepage from ED1/ED2
- Water contained within the old underground workings
- The Rehabilitated Waste Rock Dump (RWRD) associated with the pre 2000's mine

Each of these areas continue to be monitored and assessed as part of the revised surface water and groundwater ongoing monitoring programs (refer to Section 5.4 and 6.5) and are considered as part of the response plan, associated triggers (refer to Section 7) and reporting protocols (refer to Section 10).

Location of these areas are associated referenced monitoring sites are labelled on Plan 4 in Appendix 1 with the exception of the old underground workings which exist beneath Veolia Bioreactor surface feature.

4.2. TDS seepage

Seepage from TDS has been addressed by a Notice issued by the Resources Regulator under Section 240 of the Mining Act 1992 (NTCE0009097). This was issued in October 2021 and was finalised in 2024. The remediation design ensures that any seepage from the southern embankment of TDS is captured by High Density Polyethylene (HDPE) lined drains and channelled into a series of concrete lined pits. Pits which accept water which have been verified through field observations and sampling as not representing seepage from TDS are allowed to discharge as stormwater (clean water as defined in Section 2.3.1) while the single pit which has been verified as receiving seepage water reports to a 2 ML HDPE lined dam. Water in this dam is then pumped back into TDS and remains on site to be evaporated.

The improvement works necessitated the removal of some of the historical groundwater bores which DEVELOP has subsequently replaced as part of the monitoring network review of this area. The EA identified that slightly elevated concentrations of zinc and other solutes indicated localised impacts in the vicinity of Bore X2 which is on the eastern embankment of TDS. DEVELOP continues sampling this bore and numerous other bores downgradient from this dam as per the groundwater management plan (refer to Section 6).

4.3. ED1/ED2 seepage

During the preparation of the Woodlawn Mine Project EA, the then Sydney Catchment Authority raised the issue of potential leakage from the Evaporation Dams. Denehurst, a previous mine owner, provided some initial advice in relation to potential leakage from the Evaporation Dams in 1998 but there was insufficient monitoring data to confirm the dams integrity, or whether there were any downstream surface or groundwater quality impacts.

As the mine site and now DEVELOP do not use and have no ownership or operational obligations on ED1, further comment cannot be made on this feature which remains the responsibility of Veolia. Veolia's Water Management Plan is available on their website.

An investigation of both ED1 and ED2 was undertaken by AECOM in 2017. Conclusions drawn in relation to ED2 included that:

- Available surface water results did not indicate seepage or affected groundwater entering Crips or Allianoyonyiga creeks.
- The floors and walls of the dam were found to be adequate and not conducive to seepage from the dams suggesting the only pathway to be through preferential cracks or zones of lower porosity.
- The spatial variation of sulfate and hydrochemistry results in the monitoring bores sampled adjacent to ED2 indicate limited seepage migration. Seepage migration is restricted due to the low permeability and transmissivity of the groundwater system.
- Seepage is restricted to areas immediately adjacent the dams with the groundwater conditions resulting in the groundwater returning to ambient conditions between 300 and 900 m from ED2 (between MB24 and MB13) in the 30 years since they were constructed.

A recommendation was made to line the dams with HDPE to reduce possible future seepage which was completed by Heron for ED2 in 2019. With ED2 lined and regularly monitored via down gradient groundwater bores, surface water locations and the seepage collection trench have not been detecting seepage. Downgradient locations continue to be included in the routine surface water (Section 5.4) and groundwater (Section 6.5) monitoring programs.

4.4. Rehabilitated Waste Rock Dump (RWRD)

During previous mining of the Woodlawn open cut, more than 80 million tonnes of waste rock was placed in an out of pit waste dump between 1978 and ~1987. This waste comprised primarily rhyolite, welded tuff, tuffaceous shale and dolerite which are characteristically non-acid forming (NAF). However, high concentrations of pyrite were also present in certain rock units, with sulfur levels of up to 7% which have a high propensity to form acid drainage. As the waste was dumped as mined and not adequately mixed with materials with higher acid neutralisation capacity, there is some acidic metal rich water that appears at the toe of this historical feature. This water is successfully captured in a purpose-built dam referred to as the Waste Rock Dam (WRDam). Collected water is pumped to evaporation dams via a dedicated pump and delivery pipeline. The dam does not discharge and has been successful in managing acid leachate from the RWRD for more than 30 years.

The EA indicated that the dump is underlain by weathered bedrock, however, the source of this was not identified. Modelling within the EA indicates that contaminated seepage, if present, would move in a southerly direction to the drainage line south-west of the dump where MB5, MB15, MB16 and MB17 are located. MB5 has recorded elevated concentrations of zinc and other solutes as far back as records are available (1996), however, this location has also been identified as being influenced by the ore body the mine is targeting (refer to Section 6.1). Heron installed additional groundwater bores on the south-western side of the dump (HMB6 and HMB7) which have been added into the groundwater monitoring program. DEVELOP also installed another bore in 2022 (MW007). Data collection and review is ongoing to ensure all leachate from the RWRD is being captured by the WRDam.

4.4.1. WRDam

The WRDam currently collects the seepage from the Waste Rock Dump. Schedule 4, Condition 3 of MP 07_0143 required the Proponent within 5 years of the date of the 2012 approval to identify the passive treatment system to treat seepage from the existing Waste Rock Dump in consultation with the then Division of Resources and Geoscience (DRG), and to implement the system to the satisfaction of the Secretary.

Following investigations started by the previous operator, DEVELOP has determined that a passive treatment system would not be suitable given the proximity of this feature to the mining lease boundary, the variability of inflows with evaporation often exceeding rainfall and the fact that the site does not currently have an approved discharge license or associated discharge point. The NSW Resources Regulator also raised concerns in July 2019 with the previous operator on the effectiveness and the long-term maintenance regime for the passive treatment system which had been previously proposed.

As such, alternative management options need to be pursued and a modification to amend the text accordingly.

4.5. Old underground workings

In August 2019 the previous site operator, Heron Resources estimated there was 1.4 million m^3 of water in the old workings which required dewatering in order to progress with their mining plan. At the time groundwater ingress was estimated to be ~4.5 l/s (or 389 m^3/day) which, when extrapolated means there is estimated to be approximately 2 GL of water in the old workings. It was assumed that this water would be of similar quality to groundwater encountered when the mine was operational which would have been suitable for use in the processing plant. Heron was due to commence dewatering of the old underground workings in July 2016, however an initial round of sampling identified that the mine water contained elevated levels of organics. Following subsequent discussions with the EPA and updates to the EPL an approved dewatering strategy was approved by the EPA in April 2017. Subsequent data was obtained and regular dewatering reports issued up until May 2019 when the last dewatering progress report under Stage 3 was issued. The site was placed into care and maintenance in March 2020 until DEVELOP acquired the site in May 2022. No dewatering was undertaken during this period.

Resolving the issue of dewatering and disposing of 2,000 megalitres of leachate affected water has been complex. The current mine plan delays the interaction with the flooded mine workings but does not preclude the need to dewater them in future for both safety and environmental reasons. DEVELOP advised the EPA of their intent to re-commence dewatering on 9 August 2023 which triggered an update to the EPL with condition U1. Resulting investigations and reporting identified that the former strategy was outdated and warranted a revised plan. This was not approved by the EPA so the original approved strategy as document in Section 8 currently remains. DEVELOP will continue to work with the EPA to determine a revised strategy for this water.

In the meantime the old workings with its contaminated water remain sealed off and segregated from the new underground workings. This can be achieved with only a minor change to underground access roads. The overall mine plan, its lateral and depth extents, ore extraction areas and surface expression remain unchanged.

5. SURFACE WATER MANAGEMENT PLAN

5.1. Surface water environment

Due to the Projects location on the Great Dividing Range clean surface water from the site and associated infrastructure is either directed east towards Crisps Creek which joins the Mulwaree River in the Wollondilly River Catchment or west towards Allianoyonyiga creek which contributes to Lake George (refer to Plan 1, Appendix 1). Both catchments within the extent of SML20 are ephemeral. The enclosed water management system which represents the disturbed footprint of the entire mine (including Veolia's facilities) is approximately 600 ha, of which approximately 390 ha would drain into the Wollondilly River catchment and approximately 210 ha to the Lake George catchment. The 390 ha represents approximately 0.04% of Warragamba Dam catchment area of approximately 905,100 ha.

Due to the ephemeral nature of the creeks within and immediately adjacent to the mine site there are no known surface water site users. Although there are further downstream users of surface water these are at a great distance from the mine site. Nonetheless, the surface water monitoring program has been designed to monitor for and detect any changes in water quality or flow caused by the project noting the downstream users.

The site has been historically operated as a mine since 1978. The original operation consisted of an initial open cut which was followed by underground mining using the open cut void for access. Excess mine water was stored in three evaporation dams while tailings were stored in three separate tailings dams. Water was transferable between all dam structures to regulate dam levels and satisfy process water demands. Records from historical monitoring programs date back to 1985 as part of the original mining operation. This program was taken over by Veolia as the site owner until TriAusMin, Heron and now DEVELOP occupied a portion of the site for the purposes of extracting the remaining resource which lies beneath the open cut void. Given the history of the site and associated surface water monitoring program, there has been a significant amount of historical data collected. Baseline data, before the site was initially mined however, is not available.

5.2. Management of surface water

Management of surface water is complex as a result of dividing a once homogenous system operated by the original mine owner into two separate, but interconnected systems managed by two separate operators. The EPL held by DEVELOP identifies the area and surface water structures that fall within its responsibilities but also identifies the flow of water between these structures and Veolia's licensed facilities.

The structures which make up the surface water management system are described in Section 2, while the proposed management of the system is summarised as follows:

- Clean water which has not been in contact with disturbed mine areas or otherwise contaminated will continue to be discharged off site.
- Water pumped from the old underground mine workings that is contaminated with leachate to remain in ED2 and actively evaporated.
- Water supplied to the processing plant will be supplied from the Willeroo Borefield. The use of recycled water will be further explored and where possible will also include treated water from Veolia's LTP, Process Water Dam and tailings dams.
- Continuation of the surface water monitoring program as described in the following sections.

5.2.1. Waste water management

Sewage is treated on-site in the sewage treatment plant which has a capacity of 15kL. The plant separates effluent and treats remaining water. Effluent is removed from site by a licensed contractor. Treated water is discharged to the pollution control dam. This dam is defined as mine water, therefore, the contents of which remain on-site being pumped to the tailings dam for evaporation.

5.2.2. Clean-Up Notice 3501608 (before DEVELOP acquisition)

Between Wednesday 8 and Friday 10 December 2021, the Woodlawn mine site experienced 107 mm rainfall. This was combined with a later realisation that the stormwater diversion drain had been compromised by wombat borrows. This meant that during the rainfall event instead of the clean water running off from the hills upgradient being diverted around the dam the water passed through the wombat burrows and entered TDW instead. Given the amount of rainfall experienced this caused the water level in TDW to rise and spill from the dam's engineered spillway. Following notification to the EPA and an inspection a clean-up notice was issued. All of the actions were promptly completed including:

- Installation of pH buffer (limestone rock) in the downstream drainage line to neutralise the water,
- Daily water quality sampling which showed the drainage channels and Crisps Creek returning to pre-spill water quality,
- Completion of a risk assessment of the stormwater diversion drain breach, and
- Reinstatement of the stormwater diversion channel.

The risk assessment resulted in the review of the stormwater diversion channel and identification of any at-risk sites that may trigger a subsequent event. All at risk locations were subsequently re-enforced with material. From this, an inspection item has been added to all the sites ongoing dam inspection checklists to ensure any compromises and borrows evident in the stormwater diversion network are noted and subsequently corrected to prevent event re-occurrence.

5.3. Baseline surface water quality

The site is situated at an elevated location at the top of an ephemeral catchment, therefore, there are no sufficient upgradient locates that could be used as baseline sites. Instead, baseline sites have been established which are located downstream from the key site operational areas and infrastructure whereby changes will be able to be detected. Baseline monitoring sites summarised in Table 5-6 considers both the Crisps Creek and Allianoyonyiga Creek catchments which are the key water bodies that could be affected by the project. These locations are also representative of the projects closest identified groundwater dependent ecosystems (refer to Section 6.3) and, therefore, are also considered to be the projects most sensitive receptors.

Stream order is also included as an indicator for the potential for other land users to influence the water quality. Under the Stahler system a first order stream has no other streams flowing into it and as streams join the order number increases, therefore, depending on the monitoring point, the lower the stream order the more likely water quality reflects the Projects activities rather than adjacent activities. Similarly, as identified in Section 7.2, responses to surface water triggers may consider additional sampling of lower order streams to investigate elevated results and their associated causes. A map of the stream order for the site is included in Appendix 4. However, it is noted that the lower the stream order the quicker rainfall moves through them following rainfall events and the more difficult it is to obtain a sample. All baseline monitoring sites are known to be ephemeral which can limit sampling opportunities and also cause variability in the results depending on climatic factors at the time of sampling.

The EA identified there may be some surface water quality impacts on creeks due to previous operations in the Project area, however, the main cause for high metal concentrations is the natural sulfide ore body these creeks flow through. The natural presence of high metal concentrations in these creeks led to the original discovery of the minable metalliferous ore body.

Table 5-6 Summary of surface water baseline monitoring sites

Catchment	Site ID	Location	Downgradient from	Stream order
Crisps Creek	105	Crisps creek, outside of the eastern perimeter of the mining lease	New processing and admin site, TSF4, TDN and Pollution Control Dam	Fourth
	109	Eastern perimeter of the mining lease	TDS and TDW	Second
Lake George	100	Western perimeter of the mining lease	Waste Rock Dam and Rehabilitated Waste Rock Dump	Third
	115	Western perimeter of the mining lease	ED2	Second

A summary of baseline surface water quality results collected by the various mine operators since 1985 are presented as graphs in Appendix 5. It is noted that total metals in surface water were only recorded up until 2020 when both dissolved and totals have been analysed and recorded. Therefore, using total zinc is more beneficial in this case. The ongoing surface water monitoring program presented in Section 5.4 specifies that both total and dissolved metals will be analysed. Key observations from the historical results from the baseline monitoring sites include:

- The low pH and elevated EC, sulfate and total zinc readings recorded recently for site 109 are as a result of a spill from one of the tailings dams which occurred in late 2021. This was subsequently reported, remediated and investigated with levels having now returned to pre spill values.
- Electrical conductivity (or salt) is elevated across the catchment and always has been. Site 100 generally has the lowest levels.
- There appears to be no long-term trends in water quality (zinc and sulfate) within the baseline sites. Fluctuations are evident in the readings pre-1990, however, due to their age and lack of any other data further comments cannot be made regarding this.
- Variability occurs during periods of high rainfall and low flow. When water inflow is near high there is relatively low salt and metal content in the samples. As inflow declines the concentration of salts and metals then progressively increases, and the pH falls as a result of evaporation.

5.4. Surface water monitoring program

The surface water monitoring program summarised in Table 5-7 and presented on Plan 4, Appendix 1 is designed to:

- Ensure compliance with the EPL
- Monitor for potential acid rock drainage
- Monitor for potential seepage from tailings dams, evaporation dams, seepage collection structures and waste rock dumps including acid mine drainage

- Ensure the effectiveness of seepage collection, treatment and storage systems associate with the with the tailings dams, waste rock dumps, evaporation dams and all other water storages that receive contaminated or salt-laden water
- Gather data on water quality across the site to allow comparison to historical and baseline sites
- Provide an indication of the management and containment of contaminated land, runoff and potential for seepage
- Ensure downgradient sensitive receptors are not being affected by Project activities and features
- Detect changes to the water quality being observed in the active underground mine workings
- Be in place post-closure in order to monitor for rehabilitation success and any changes until relinquishment

Triggers for the surface water monitoring program are presented in Section 7.1.1 with the required action or response to be taken in Section 7.2. The process for the reporting of any exceedances of the monitoring program is detailed in Section 10.4.

Table 5-7 Surface water sampling program analytical summary

	ID	Location	Quarterly
EPL Required	100	Western perimeter of the mining lease	SW-Suite 1
	105	Crisps creek, outside of the eastern perimeter of the mining lease	SW-Suite 1
	109	Eastern perimeter of the mining lease	SW-Suite 1
	115	Western perimeter of the mining lease	SW-Suite 1
	WM300	Pollution Control Dam	SW-Suite 1
	TSF4	Tailings Storage Facility 4 (TSF4)	SW-Suite 1
General water quality	507	Project entrance culvert (507 Collector Rd) - south side	SW-Suite 1
	ED2-SCT	ED2 seepage collection trench	SW-Suite 1
	PYLARA	Pylara farm stream near HVAS	SW-Suite 1
	TSF4-RWD	TSF4 Return Water dam (seepage collection trench)	SW-Suite 1
	SW002	Drain downgradient from project activities	SW-Suite 1
	WM200	Woodlawn Dam	SW-Suite 1
	UG-MONO-01	Underground water being pumped out of the new workings	SW-Suite 1

SW-Suite 1: Biochemical Oxygen Demand (BOD) (mg/L), electrical conductivity (µS /cm), alkalinity, dissolved oxygen (mg/L), nitrogen (ammonia) (mg/L), pH, redox potential (mv), TDS (mg/L), TOC (mg/L) DO (mg/L), ionic balance[2], nitrite (mg/L), nitrate (mg/L), total and dissolved metals (mg/L)[3]

All samples will be collected by suitably experienced personnel and stored according to the NSW EPA approved methods (NSW EPA 2022). Comments are also made about the flow where applicable to the monitoring locations that are located within creek lines. Chain of Custody records are kept along with field recorded results and laboratory issued Certificates

[2] IONIC BALANCE INCLUDES: CALCIUM, POTASSIUM, MAGNESIUM, SODIUM, HARDNESS, ALKALINITY, CHLORIDE, SULFATE

[3] METALS INCLUDE: ALUMINUM, ARSENIC, CADMIUM, COPPER, IRON, LEAD, MAGNESIUM, POTASSIUM, SODIUM, ZINC

of Analysis which are all stored by DEVELOP in internal file structures. Previously, laboratory results were manually transferred to a master record file held by DEVELOP. Since February 2023 laboratory data is now automatically imported into an online database referred to as EQuIS which DEVELOP is in the process of implementing. This is a powerful data storage, processing, reporting and visualisation tool used by other companies and regulatory bodies in Australia which DEVELOP is implementing to better manage and automate environmental data collected on site.

All environmental data collected is reviewed by internal environmental staff when received and any outlier results raised with the laboratory and may be subject to retesting. This process ensures the integrity and validity of the data set.

6. GROUNDWATER MANAGEMENT PLAN

6.1. Groundwater system

The EA identified three aquifer systems within the Project area:

- A perched aquifer situated above the interface of the underlying bedrock
- The weathered zone of the bedrock
- Fractured volcanic bedrock

Groundwater flow in the region is generally reflective of the surface topography with the Great Dividing Range and Rehabilitated Waste Rock Dump creating a groundwater divide through the site (refer to Plan 1, Appendix 1) with groundwater flowing away from these features. The conceptual model created for the EA is included in Figure 6-4. Note that MB6 included in Figure 6-4 measured groundwater levels adjacent to the Bioreactor (250 m to the east), ED3 (150 m to the west) and the mine entry box cut (50 m to the south). MB6 is also located above the underground workings and as expected has been observed as being dry since 2022 so has since been removed from the ongoing monitoring program. Following a review of the updated groundwater monitoring program for this management plan completed by an engaged hydrogeologist in 2025 the network is considered sufficient and does not require a replacement bore for MB6 at this time.

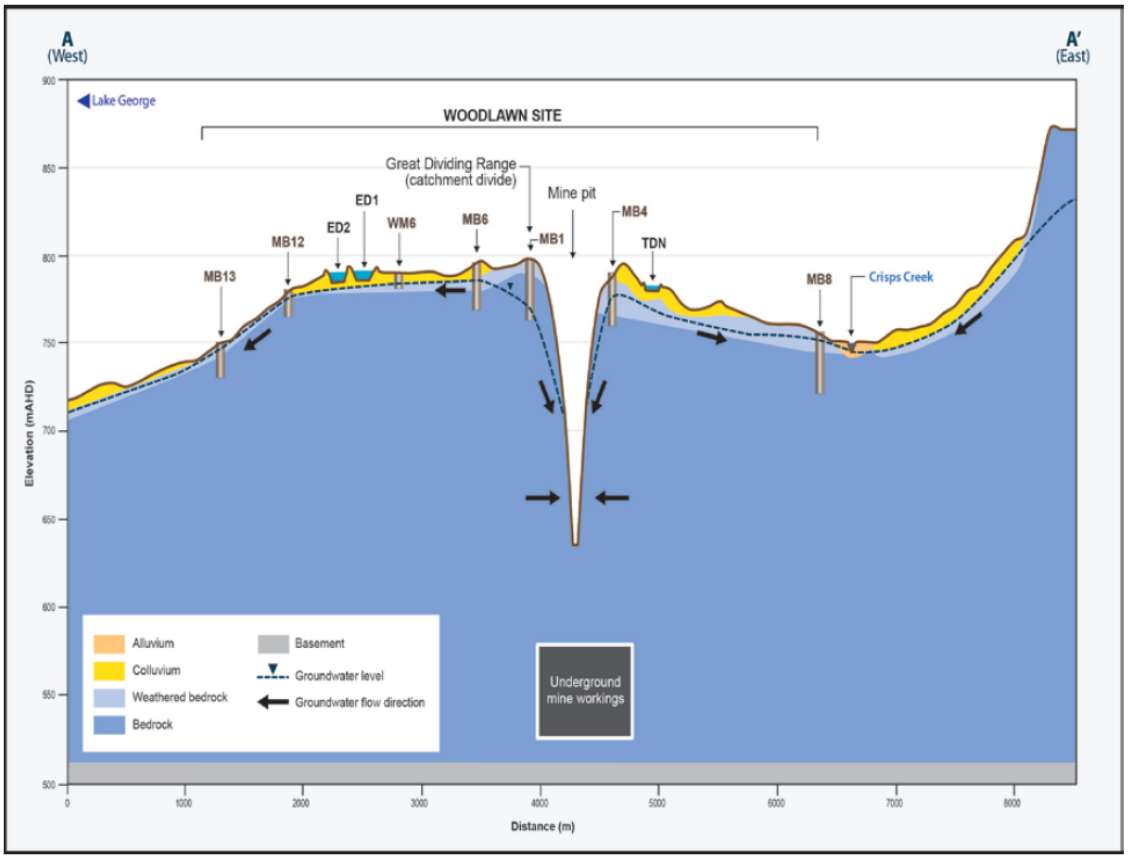


Figure 6-4 Conceptual Project groundwater conditions (Parsons Brinkerhoff 2012)

Groundwater is typically not present in significant quantities within the project area because the shallow soil profile and volcanic bedrock sequence limits the capacity to host significant

amounts of groundwater. Most groundwater is present in the permeable and porous weathered zone which caps the weather ore body.

The Project area bedrock has low to very low permeability, although fractures, joints and faults, where interconnected, create enhanced porosity storage and secondary permeability flow paths, with very small inflows to the underground workings of approximately 2.22 ML/month (Parsons Brinckerhoff 2012), predominantly in association with exposed faults. This rate is anticipated to occur as part of the ongoing underground mine development, likely increasing as a function of mining progressing. As the EA and previous investigations (refer to Section 4.5) have indicated differing values DEVELOP will continue to assess groundwater inflow rates by utilising the network of flow meters discussed in Section 2.5. Groundwater infiltration equals water pumped out of the mine minus water pumped into the mine. Based on the EA prediction of 2.22 ML/month this equates to 26.64 ML per year which is well within the current allocation of 400 ML and allows for any potential increases as mining progresses. A “water year” for reporting purposes aligns with the financial year which is equivalent to the sites Annual Review where this usage will be reported.

The EA determined two distinct natural groundwater chemical types exist around the Project area for the shallow and deeper groundwater.

- Shallow: located within the upper weather zone, low salinity, higher concentrations of chloride and part of the active hydrological cycle (i.e MB19 and water from the Willeroo Borefield). Some bores in this category had slightly elevated concentrations of sulfate and magnesium indicative of the naturally mineralised groundwater type.
- Deeper: is in chemical equilibrium with the base metal ore body, volcanics, dolerites and metasediments and is effectively stagnant due to poor permeability. Quality is variable depending on the bore’s location in relation to the ore body. Groundwater not influenced by the ore body or other mineralised material is of reasonable quality with near neutral pH, salinity levels above potable and dominated by chloride. However, groundwater influenced by the ore body generally has elevated sulfate concentrations with very low chloride concentrations relative to sulfate (MB5, MB15 and MB17).

DEVELOP have completed a subsequent assessment of all available groundwater results from samples collected between 2014 and 2023 which verified that there are different water quality types across the Project which reflect the distinct host rock type these are installed in as summarised in Table 6-8.

Table 6-8 Water quality types and example bores

Type	Cation	Anion	Conclusion	Example bore
Sedimentary	Borderline magnesium and sodium/potassium	Chloride	Sodium chloride to mixed type	MB4
Metamorphic	Borderline magnesium and no dominant type	Chloride	Calcium chloride to mixed type	MB7
Ore body	Magnesium dominated	Sulfate dominate	Magnesium sulfate	MB16
Sulfide volcanics	Lesser magnesium swinging to no dominant type	Sulfate although lesser than ore body	Magnesium sulfate to mixed type	MB19

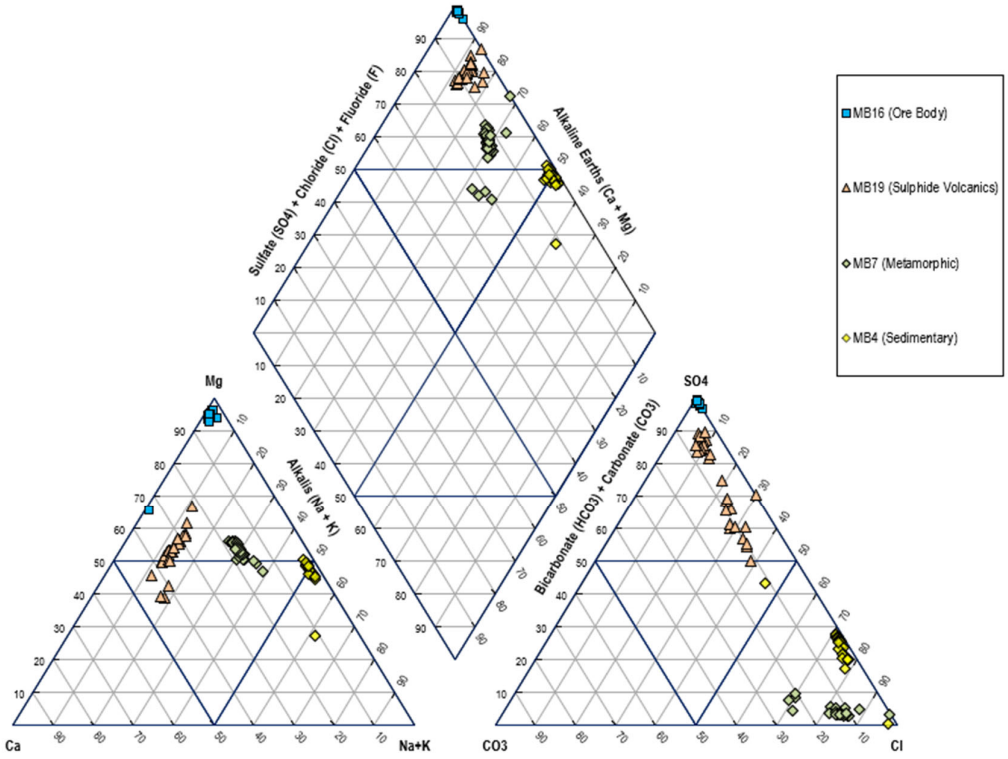


Figure 6-5 Piper plot depicting the four distinct host rock types

6.2. Groundwater users

As mentioned in Section 6.1 groundwater is not present in significant quantities due to the geological conditions. A review of the registered bore database indicates that there are five bores within 5 km of the site that are registered for water supply or stock use. These are summarised in Table 6-9. As these bores occur on private property outside of the mining lease no additional data is known. Other registered bores within 5 km are limited to monitoring bores associated with the Projects and adjacent users sampling network. Due to the geology and distance no impacts to groundwater users are expected to occur, however, there is a management plan (refer to Section 6.6) and associated triggers (refer to Section 7.1.4) to monitor for this at locations closer to the mine than the registered bores detailed in Table 6-9 as a precaution.

Table 6-9 Registered bore users within 5 km of the site

Bore ID	Drilled date	Registered purpose	Approximate distance from the mine
GW056642	1/09/1987	Water Supply	4.9 km
GW056641	1/08/1982	Stock and Domestic	4.4 km
GW403665	6/092006	Water Supply	4.8 km
GW405046	26/04/2009	Stock and Domestic	2.1 km
GW063975	1/02/1987	Water Supply	4.6 km

6.3. Groundwater dependent ecosystems

The EA inferred that there are no groundwater dependent ecosystems (GDE) present due to the lack of groundwater discharge zones identified across the project area. Geological conditions within the Project mean that groundwater is generally a poor local resource. This was again reviewed in 2025 using the updated GDE mapping tools available on the Bureau of Meteorology Groundwater Dependent Ecosystems Atlas. The review indicated that Allianoyonyiga and Crisps creek are classified as having a moderate to high GDE potential. These creeks are both located within the mining lease but north of the project area as indicated on Plan 1, Appendix 1 and are included in the surface water monitoring program and assigned triggers. There are no other aquatic GDE's within the extent of Plan 1.

6.4. Baseline groundwater quality

The overall Woodlawn mine and Veolia's Bioreactor landfill site has a network of over 90 monitoring bores, which, either currently or historically, have been used to monitor the operations activities and associated assets. Some of these bores in the network have since been removed, destroyed or blocked and installation details are often not locatable for many of them. As with surface water monitoring, the groundwater monitoring program has been undertaken in various forms since 1996 and includes components specific to both the mining operation and Bioreactor site. DEVELOP has taken over the existing monitoring network within its EPL boundary while Veolia remains responsible for monitoring bores within its EPL boundary.

Historical records indicate that, where groundwater is unaffected by contact with mineralised basement or waste material, it is near neutral with moderate to slightly elevated salinity. However, variable quality exists where seepage occurs through the waste rock, tailings and storage dams and through contact with basement sulfides. Furthermore, a wide range of conductivities is evident across the Project, suggesting a heterogeneous aquifer with a general lack of connectivity.

Baseline sites for each catchment are summarised in Table 6-10. These are considered to be representative of regional groundwater quality as part of the ongoing monitoring program.

Table 6-10 Summary of groundwater baseline monitoring sites

Catchment	Site ID	Location	Downgradient from
Crisps Creek	MB3	Woodlawn Farm, North of main project area	ED2 and ED1
	MB8	Adjacent to collector road, outside of the project site approval area	Processing plant, TSF4, TDN and Pollution Control Dam
Lake George	MB13	Western perimeter of the mining lease	ED2 and ED1
	HMB6	Western perimeter of the mining lease	Rehabilitated waste rock dump

The baseline sites have been selected due to their distance from the site and the fact they do not appear to have been affected by previous mining activities. DEVELOP has included HMB6, although installed relatively recently, as there were previously no other suitable baseline bores to the south-west of the rehabilitated waste rock dump. Key observations from the historical results from the baseline monitoring groundwater sites include:

- pH is neutral across all sites and appears to be increasing, however this may also be due to differing sampling or analysis practices. Results from 2007 appear much more consistent.
- Similar to pH electrical conductivity across all sites appears to be decreasing, however, similar to pH, results from 2007 appear much more consistent.

- Dissolved zinc has always been low (below 2 mg/L) across all bores but is particularly low in MB3 and MB8 (generally below 0.7 mg/L).
- Sulfate is low across all historical bores. HMB6 is slightly elevated in comparison but still similar to MB8 noting that HMB6 has a limited dataset compared to MB8.

6.5. Groundwater monitoring program

The groundwater monitoring program has been designed largely around determining whether the Project is influencing groundwater quality or quantity. The results of the program are reported each year in the Annual Review. DEVELOP has undertaken a review of the groundwater monitoring program including the addition of wells to the network which warrants an update and rationalisation to the monitoring program.

The groundwater monitoring program summarised in Table 6-11 and presented in Plan 4, Appendix 1 is designed to:

- Ensure compliance with the EPL and WAL
- Ensure dam integrity: Monitoring of groundwater bores provides an indication of the hydraulic pressures associated with onsite dams. These readings, in conjunction with groundwater quality data, contribute to assessing the integrity and stability of the large storage dams and the potential for offsite impacts to be occurring.
- Monitor groundwater levels
- Monitor for potential seepage from tailings dams, evaporation dams and waste rock dumps including acid mine drainage
- Ensure the effectiveness of seepage collection, treatment and storage systems associate with the with the tailings dams, waste rock dumps, evaporation dams and all other water storages that receive contaminated or salt-laden water
- Gather data on water quality across the site to allow comparison to historical and baseline sites and provide an indication of the management and containment of contaminated land, runoff and potential for seepage.
- Ensure any downgradient surface water receptors are not being affected by Project activities and features
- Be in place post-closure in order to monitor for rehabilitation success and any changes until relinquishment

Triggers for the groundwater monitoring program are presented in Section 7.1.2 with the required action or response to be taken in Section 7.2. The process for the reporting of any exceedances of the monitoring program is detailed in Section 10.4.

The location described in Table 6-11 is also the closest feature to which each monitoring point would detect any potential seepage from.

Table 6-11 Ground water sampling program analytical summary

	Location	ID	Quarterly	Biannually	Annually
EPL Required	E side of void	MB4	GW-Suite 1		GW-Suite 2
	S face of RWRD	MB5	GW-Suite 1		GW-Suite 2
	E of Collector Rd	MB8	GW-Suite 1		GW-Suite 2
	W of ED2 embankment	MB11	GW-Suite 1		GW-Suite 2
	W of ED2 embankment	MB12	GW-Suite 1		GW-Suite 2
	W SML boundary	MB13	GW-Suite 1		GW-Suite 2
	N of ED2	MB14	GW-Suite 1		GW-Suite 2
	W of RWRD	MB15	GW-Suite 1		GW-Suite 2
	W of RWRD	MB16	GW-Suite 1		GW-Suite 2
	W of RWRD	MB17	GW-Suite 1		GW-Suite 2
General water quality	W of ED2 embankment	MB23		GW-Suite 1	
	W of ED2 embankment	MB24		GW-Suite 1	
	W of ED2 embankment	MB25		GW-Suite 1	
	Downstream of TSF4	HMB2		GW-Suite 1	
	Downstream of TSF4	HMB4		GW-Suite 1	
	Downstream of TSF4	HMB5		GW-Suite 1	
	S face of WR Dump	HMB6	GW-Suite 1		
	S face of WR Dump	HMB7		GW-Suite 1	
	Woodlawn Farm	MB3	GW-Suite 1		
	Adjacent to underground workings	MB7		GW-Suite 1	
	W of ED2 embankment	MB19		GW-Suite 1	
	W of TD embankment	ETP8		GW-Suite 1	
	TDS in paddock	MB21		GW-Suite 1	
	TDS in paddock	MB22		GW-Suite 1	
	TDN E embankment	X2		GW-Suite 1	
	TDS S embankment	MW001		GW-Suite 1	
	TDS S embankment	MW002		GW-Suite 1	
	TDS S embankment	MW003		GW-Suite 1	
	TDS S embankment	MW004		GW-Suite 1	
	Downgradient of WRD	MW005		GW-Suite 1	

GW-Suite 1: pH, electrical conductivity (µS/cm), alkalinity, ammonia (mg/L), ionic balance[4], total and dissolved metals (mg/L)[5], TOC (mg/L), nitrite (mg/L), nitrate (mg/L)
GW-Suite 2: Benzene, hexavalent chromium, ethyl benzene, organochlorine pesticides, organophosphate pesticides, polycyclic aromatic hydrocarbons, toluene, total petroleum hydrocarbons, total phenolics, xylene

[4] IONIC BALANCE INCLUDES: CALCIUM, POTASSIUM, MAGNESIUM, SODIUM, HARDNESS, ALKALINITY, CHLORIDE, SULFATE, FLUORIDE
[5] METALS INCLUDE: ALUMINUM, ARSENIC, BARIUM, CADMIUM, CHROMIUM, COBALT, COPPER, IRON, LEAD, MAGNESIUM, MANGANESE, MERCURY, POTASSIUM, SODIUM, ZINC

All samples will be collected by suitably experienced personnel and stored according to the NSW EPA approved methods (NSW EPA 2022). Chain of Custody records are kept along with field recorded results and laboratory issued Certificates of Analysis which are all stored by DEVELOP in internal file structures. Previously, laboratory results were manually transferred to a master record file held by DEVELOP. Since February 2023 laboratory data is now automatically imported into an online database referred to as EQuIS which DEVELOP is in the process of implementing. This is a powerful data storage, processing, reporting and visualisation tool used by other companies and regulatory bodies in Australia which DEVELOP is implementing to better manage and automate environmental data collected on site.

All environmental data collected is reviewed by internal environmental staff when received and any outlier results raised with the laboratory and may be subject to retesting. This process ensures the integrity and validity of the data set.

6.6. Groundwater levels

Groundwater levels are monitored across the site to ensure compliance with water access licenses and dam safety requirements. The data is also used to verify the groundwater impact predictions made in the EA. The locations and monitoring frequency for this are presented in Table 6-12. The locations are presented on Plan 4, Appendix 1.

Table 6-12 Ground water level monitoring summary

Location	Monitoring frequency	Comment
MB3, MB8, MB17 and MB13	Monthly	In accordance with water access license conditions (refer to Section 7.1.4).
NTP2, SP3C, ETP8, SP11B	As per TARPs in OMP	Dam safety monitoring for TDN, further details within the TDN Operations and Maintenance Plan (OMP).
MW001, MW002, MW003, MW004, X1, X2, Y1	As per TARPs in OMP	Dam safety monitoring for TDS, further details within the TDS OMP.
MB11, MB12	As per TARPs in OMP	Dam safety monitoring for ED2, further details within the ED2 OMP.
HMB1, HMB2, HMB3	As per TARPs in OMP	Dam safety monitoring for TSF4, further details within the TSF4 OMP.
MW006	As per TARPs in OMP	Dam safety monitoring for TDW, further details within the TDW OMP.

7. SURFACE AND GROUNDWATER RESPONSE PLAN

7.1. Trigger values

The development of triggers considers that surface water and groundwater quality can be heavily influenced by local geology and soils which reflect the chemistry of the underlying sulfide ore body. In addition, the considerable amount of time that has elapsed between the projects original EA has justified re-consideration of triggers given the additional data that has been acquired, updated laboratory testing and updated environmental guidelines which place more value on receptor risk. Therefore, DEVELOP considered the following when establishing trigger values:

- The location of the Project on the ridgeline dividing two separate catchments.
- The significant baseline water quality data set available as indicated in Section 5.2.2 and Section 6.4 and their corresponding water quality. This includes the naturally elevated metal concentrations in downgradient surface water features.
- The distinct host rock types that groundwater bores are installed in.
- Natural variability within the same bore due to climatic conditions linked with saturation levels of the surrounding strata
- Climatic conditions which result in natural variability in creeks
- Consent and approval conditions
- Feedback received from previous Annual Reviews
- The designation of Allianoyonyiga and Crisps creeks as GDE's and lack of any other GDE's within the mining lease
- The lack of any registered groundwater users within 2 km of the project
- Ability and ease of trigger integration and maintenance within the environmental database in order to create more automated work flows

The target analytes for the triggers have been selected based on the:

- Analytical definition assigned to the water types identified in Section 2.3
- Dominant geological minerals being mined and present in the ore body
- Relationship and effects of PAF material on water
- Potential toxicity of cadmium in addition to zinc and sulfate which are already included in other categories

The trigger values have therefore been determined based on the 80th percentile for the target analytes and the 5th to 95th percentile for pH in line with the Australian and New Zealand (ANZG) guidelines for fresh and marine water quality (ANZG 2018) from consecutive water quality results obtained between the beginning of 2010 and the end of 2019. This date range was selected due to the availability of continuous reliable data, and the rainfall conditions during the period being evenly split between slightly above average and below average annual rainfall.

As there is considerable variability across the projects monitoring bores and numerous areas of known existing contamination triggers have only been applied to the baseline monitoring sites. However, all data is reviewed to determine and investigate trends in accordance with the Trigger, Action and Response Plan (TARP) which specifies when the setting of additional triggers for additional locations may be warranted.

7.1.1. Surface water

Surface water trigger values have been developed for each baseline location and are presented in Table 7-13. Due to differing sample analysis during this period only total metals were available.

Table 7-13 Trigger values for baseline surface water

Analytes	Units	100	105	109[6]	115
pH (5th percentile)	-	≤ 6.40	≤ 6.73	≤ 6.8	≤ 7.39
pH (95th percentile)		≥ 7.76	≥ 8.05	≥ 8.23	≥ 8.23
EC	µs/cm	1164	2700	1400	3432
Total aluminium[7]	mg/L	1.03	0.132	0.864	0.242
Total cadmium[7]	mg/L	0.0158	0.0016	0.0294	0.0008
Total copper	mg/L	0.0524	0.0250	0.1248	0.011
Total iron	mg/L	1.112	0.9100	1.3880	0.668
Total lead	mg/L	0.0073	0.0068	0.0132	0.0019
Sulfate	mg/L	257	175.8	284.8	1040.4
Total zinc	mg/L	3.554	0.4206	10.10	0.1024
Nitrogen (ammonia)	mg/L	0.1	0.1	0.1	0.1

7.1.2. Groundwater

Groundwater trigger values have been developed for the four identified baseline bores and are presented in Table 7-14. HMB6, being installed in 2020 has limited data, therefore, triggers have been calculated from a lower number (11) sample events compared to the other three bores.

It is noted that ANZG (2018) requires groundwater heavy metal trigger values to be adjusted for hardness. Although most groundwater bores included in the monitoring plan do typically have hard water this has not been adopted for these triggers in consideration for the creeks which are also likely GDE's and typically have soft water.

Table 7-14 Trigger values for baseline bores

Analytes	Units	MB3	MB8	MB13	HMB6
pH (5th percentile)	-	≤ 6.73	≤ 7.18	≤ 7.10	≤ 7.14
pH (95th percentile)		≥ 7.61	≥ 7.91	≥ 7.95	≥ 7.88
EC	µs/cm	2100	3700	3434	4248
Dissolved aluminium	mg/L	0.02	0.025	0.088	0.232
Dissolved cadmium	mg/L	0.0004	0.0005	0.0064	0.00548
Dissolved copper	mg/L	0.0028	0.0051	0.0420	0.0208
Dissolved iron	mg/L	0.01	0.024	0.03	-[8]

[6] RESULTS BETWEEN 10/12/2021 AND 05/01/2022 OMITTED DUE TO A SPILL EVENT EXPERIENCED ON SITE
[7] LACK OF CONSISTENT ANALYSIS PRIOR TO 2018, THEREFORE TRIGGER VALUES CALCULATED BASED ON 2010 – 2025 AVAILABLE RESULTS
[8] INSUFFICIENT RESULTS TO CALCULATE, TO BE DETERMINED IN SUBSEQUENT UPDATES FOLLOWING ADDITIONAL DATA ACQUISITION

Analytes	Units	MB3	MB8	MB13	HMB6
Dissolved lead	mg/L	0.0003	0.0006	0.0005	0.01856
Sulfate	mg/L	37.94	120.0	93.30	421.8
Dissolved zinc	mg/L	0.1008	0.0742	0.5996	0.211
Nitrogen (ammonia)	mg/L	0.1	0.1	0.1	0.1

7.1.3. Paste fill trigger values

In 2018 DPE requested that Heron develop a set of Site-Specific Trigger Values based on ANZECC Guidelines to assist in assessing groundwater systems and to determine if there is any influence caused by the use of paste fill within the underground workings. These triggers have proven to not be effective, often, being exceeded even though paste was only minimally used underground by Heron. It is also anticipated that as the mine plan progresses it is possible that these bores could become dry or be installed at an insufficient depth for the life of mine. Considering the depth of the underground workings, surrounding site users and the natural geology DEVLOP will instead analyse the water being pumped out from the underground workings as this water would be either the first to be in contact with or have the most contact with any paste backfill being used. This location (UG-MONO-01) is included as part of the sites surface water monitoring program (refer to Section 5.4). Although this location is sampled on the surface it represents the groundwater that enters the new mine workings and due to the depth of the life of mine (100's of meters) this sample point is considered to be more representative and in closer contact with paste compared to any monitoring bore. Paste will also be verified as being suitable as described in the Paste Fill Management plan.

7.1.4. Acid mine drainage

The groundwater and surface water management plans have both been designed to monitor for potential seepage from dams and waste rock dumps including acid mine drainage. Due to the natural geology, known existing contamination and legacy nature of the site reference in regards to this is often inferred by comparison to previous results and trends in the monitoring program. Water quality indicators specifically related to acid mine drainage that would be investigated include:

- Decreasing alkalinity
- Declining pH
- Increase in soluble metals
- Increasing sulfate to alkalinity ratios
- Increasing sulfate to chloride rations

7.1.5. Interim Bore Management Plan

Works approval 40WA417428 was issued with a condition that the Trigger Action Plans (TARPs) specified in the DPI-Water Approved Interim Bore Management Plan (August 2018) were incorporated into a revision of the WMP. The triggers presented in Table 7-15 are reflective of that plan with the required responses included in Table 7-16.

Table 7-15 Standing water level triggers for MB3, MB8, MB13 and MB17

Bore	Response Action 1 (Level 2)	Response Action 2 (Level 3)
MB3	between 5 – 6 mbgl for 3 consecutive quarterly periods	greater than 6 mbgl during the monthly monitoring period
MB8	between 7.5 – 8.5 mbgl during a quarterly period for 3 consecutive quarterly periods	greater than 8.5 mbgl during the monthly monitoring period
MB17	between 7 – 8 mbgl during a quarterly period for 3 consecutive quarterly periods	greater than 8 mbgl during the monthly monitoring period
MB13	between 6 – 7 mbgl during a quarterly period for 3 consecutive period	greater than 7 mbgl during the monthly monitoring period

7.2. Action / response

The TARP for water management is presented in Table 7-16. This table excludes prescribed dams and any of their associated water storage structures (such as return water dams). TARPs for these are included in the associated Operations and Maintenance Plans.

Table 7-16 Trigger, Action and Response Plan

Event level	Trigger	Action	Response
Level 1	Water quality: sampling results equal to or less than prescribed trigger values	No action required, continue monitoring	None required
Level 2	Water quality: sampling results exceed trigger values over three consecutive monitoring rounds	Review of data and conditions including: • Comparison of the results to historical sampling data • Review of current climatic data considering the above • Identification of any changes to internal project activities • Review of sampling technique and equipment for any cross-contamination or integrity issues • Check laboratory results to ensure correct analysis and chain of custody conformance • Comparison and review of adjacent or upgradient locations especially the nearest identified sensitive receptor.	Continue monitoring and reporting. Implement remedial actions if site activities are identified to be the cause. If data review cannot rule out an impact from site activities but the cause is unknown, progress to level 3 trigger.
Level 2	Water quality: sampling results indicate a declining water quality trend (more than 20% change) over three consecutive monitoring rounds in locations that do not have specific triggers	Review of data and conditions as above. In addition: • Identification and interrogation of breadth of impacts (in terms of adjacent locations and number of analytes) • Determine if it is appropriate to back-calculate trigger values using historical data before the declining trend and the same method applied for baseline locations in order to facilitate closer monitoring • Add the calculated trigger into the database to assist with automation of exceedances rather than relying on manual checking	Continue monitoring and reporting. Implement remedial actions if site activities are identified to be the cause. If data review cannot rule out an impact from site activities but the cause is unknown, progress to level 3 trigger.
Level 2	Works approval: Standing water level outside of the monthly range specified in the works approval	Response action 1: Investigation. Review of data and conditions as per above.	Advise Department of Industry - Water and the Natural Resources Access Regulator within 5 business days of detection
Level 3	Water quality: sampling results not comparable to historical data or site activities	Continue lines of investigation in order to attribute cause and plan rectification works including: • Complete additional sampling rounds more frequently ensuring adequate data collection in terms of equipment, technique and laboratory procedures	Increased monitoring, data review and reporting as necessary Rectification works or operational amendments in order to ensure return to standard results and reporting.

Event level	Trigger	Action	Response
		• Review adjacent bores for similar trends including completing additional sampling rounds. • Consider sampling additional bores not included in this management plan where available and applicable. • Consider sampling registered bores outside of the project if results indicate these may be affected. • Consider sampling additional lower order streams in order to determine the origin. • Contact and review adjacent land users activities and any available results of the same or similar location.	If data review cannot rule out an impact from site activities but the cause is unknown, progress to level 3 trigger.
Level 3	Works approval: Standing water level outside of the monthly range as specified in the works approval for 3 consecutive quarterly periods	As per level 2 trigger (investigate and report to regulator within 5 business days of exceedance)	Complete remedial measures such as: the lowering of pumps, reconstruction of existing bores, construction of new bores, monetary compensation for increased pumping costs and/or for securing water from alternative sources.
Level 4	Water quality: Additional sampling and review cannot identify the cause and/or the cause has been identified but remedial works have not been successful in mitigating (for on site impacts). OR The review of data and subsequent investigation indicate there is an unacceptable risk to private groundwater users or sensitive ecological receptors (for off-site impacts).	Continue lines of investigation. Engagement of an external consultant (if not already engaged) to review internal investigation, provide additional recommendations and remedial actions and/or confirm the risk posed to private groundwater users or sensitive ecological receptors. Development and implementation of a remedial action plan to address the investigation findings.	Increased monitoring, data review and reporting as necessary. Reporting in accordance with the PIRMP (if not already enacted) with follow up information and reports provided to regulators and applicable parties as required.

8. DEWATERING OF THE OLD WORKINGS

8.1. Background

As discussed in Section 4.5 this section only applies to the old underground mine workings which sit adjacent and distinctly separated from the new underground mine where DEVELOP are currently operating in. As this water is defined as leachate affected, different management and approvals are required which are subsequently detailed. Currently due to the high water levels across site and a regulatory investigation into the cause of this dewatering of the old workings is currently on hold and no further details are necessary to provide at this time. Any future dewatering strategy of the old workings water would include consultation with Water NSW where dewatering may impact water quality within the Sydney Drinking Water Catchment. This includes proposed methodology and any future proposed monitoring program.

The proposed updates to the old workings dewatering strategy and associated monitoring program as drafted under condition U1 of the EPL is currently with the EPA for review. The below represents the currently approved dewatering strategy as approved April 2017. This plan will be updated if this strategy and associated approval conditions are modified.

8.2. Methodology

A dewatering bore (Bore1) previously existed on the western embankment of the Bioreactor which was used previously by Heron has since been enveloped by landfilling activities and is no longer accessible. A second dewatering bore (Bore2) exists next to the Mechanical Biological Treatment (MBT) road which is connected to an overland pipeline to ED2. These bores are covered by Works Approvals under the Water Access Licence 40WA411642 with the volume dewatered being accounted for within the existing 400ML/a allocation.

DEVELOP is required to notify the EPA if dewatering activities will be recommencing.

8.3. Dewatering monitoring program

In addition to the standard surface water and ground monitoring programs described previously dewatering of the old workings requires additional monitoring as summarised in Table 8-17. Note that this monitoring is only required if there are dewatering activities occurring.

Table 8-17 Dewatering monitoring program summary

Parameter	ID	Monitoring parameters	Frequency
Dewatering Bores	Bore 2	Water level, pumping rate, total volume pumped	Weekly
Discharge point into the holding dam being used at the time of monitoring	24	SW-Suite 1	Monthly

SW-Suite 1: BOD (mg/L), electrical conductivity (µS /cm), dissolved oxygen (mg/L), nitrogen (ammonia) (mg/L), pH, redox potential (mv), TDS (mg/L), TOC (mg/L) DO (mg/L), ionic balance[9], nitrite (mg/L), nitrate (mg/L), total and dissolved metals (mg/L)[10]

[9] IONIC BALANCE INCLUDES: CALCIUM, POTASSIUM, MAGNESIUM, SODIUM, HARDNESS, ALKALINITY, CHLORIDE, SULFATE
[10] METALS INCLUDE: ARSENIC, CADMIUM, COPPER, IRON, LEAD, MAGNESIUM, POTASSIUM, SODIUM, ZINC

9. POLLUTION PREVENTION

9.1. Storage

Chemical (including processing related reagents) and hydrocarbon products are stored in bunded areas in accordance with the relevant Australian Standards. All bunding systems have been designed in accordance with Australian Standard AS 1940:2017 *Storage and Handling of Flammable and Combustible Liquids* (and subsequent amendments) and AS 3780:2008 *Storage and Handling or Corrosive Substances* (and subsequent amendments). Specifically, the processing plant has been constructed to satisfy the following requirements:

- Bund walls and floors constructed from materials impervious to the liquid or toxic substances stored.
- Bund walls and floors are strong enough to withhold any spillage from the storage facilities.
- Wall bunds at tank storages are 0.5m to 1.5m high depending on the required containment capacity and the distance from the tank (the closer the tank to the wall, the higher the wall because of the decreased surface area available. The distance between the tank and the bund wall must be at least 1m.
- Bund floors have a collection sump and a graded floor for the collection of liquids. There is no access to the stormwater system within the bund.
- Permanent bunded area contain pipes and pumps for the removal of liquids. The pipe and pump facilities are arranged within the areas so that the bund can't leak and that the pumps can still operate when the bund is full.
- Bunded areas within the processing plant are adequately ventilated ensuring so build of gases and that it does not restrict firefighting access.
- Contaminated water spill prevention measures, such as double-walled fuel tanks and lined or bunded containment cells.
- All bunding will be capable of containing 110% of the largest tank’s capacity.

9.2. Spill response

The Pollution Incident Response Management Plan (PIRMP) (ENW-012-PL) details actions in response to a pollution incident. In the case of a major hydrocarbon spill on an unsealed area, the contaminated soil at the site of the spill would be collected and transported to an approved waste depot or remediated safely on-site. Pits would be constructed downstream of any spill with sufficient hydraulic gradient to capture seepage water and contaminated material, enabling the pits to be pumped out.

9.3. Paste fill plant

As detailed in the Mine Extraction Management Plan (ENW-005-PL) the mining sequence uses paste fill in order to backfill voids generated during mining. Paste is a semi-solid mixture of tailings from the processing plant, water and binding materials like cement which is produced by the paste fill plant and sent underground. The paste fille plant has been designed, constructed and maintained to minimise potential for uncontrolled flows of tailings, materials, chemicals and waters. Further information on this plant and its operation is within the Paste Fill Management Plan (ENW-007-PL). Estimated water usage for this plant is detailed in Section 2.7.

9.4. Tailings dams

The tailings dams are maintained in order to minimise the amount of stormwater run-off entering the dams via a series of diversion drains, sumps and bunds which direct clean water away from these features. Excess water is moved between dams in order to maintain freeboard and increase evaporation naturally or via the sites mechanical evaporator fleet. DEVELOP initially established a fleet of mechanical evaporators to assist in evaporation in early 2023. This network is primarily located on TDS as the site's largest dam (in terms of footprint and freeboard volume) and are connected to a weather station which automatically starts/stops the evaporators when wind speeds, direction and humidity are suitable. Each evaporator is capable of evaporating between 0.02 and 0.98 ML per 12 hour day each depending on the evaporator type and environmental conditions. The fleet is able to be expanded or reduced as needed in response to climatic conditions.

Prescribed dams are also the subject of a formal safety and water level inspection program and dam surveillance reporting. These programs are described in each dams corresponding Operation and Maintenance Plan (OMP) which also detail key management measures and features which ensure a sufficient freeboard is maintained and the integrity of the dam preserved.

10. COMMUNICATION, REPORTING AND REVIEWS

10.1. Communication

Effective communication with government agencies, the workforce and the community are important features of the overall Environmental Management Strategy (EMS) for Woodlawn mine and therefore a key component of each environmental Management Plan.

DEVELOP is committed to consulting with the wider community and strives to achieve a high standard of community awareness and communication. A Community Consultation Committee (CCC) was established in 2015 as part of the construction phase of the Project and continues to meet regularly to discuss the Project. Further detail regarding stakeholder liaison in included in the Project EMS.

10.2. Reporting

All environmental monitoring requirements specified in EPA licences and approvals are undertaken and the data maintained on site in data management systems. Copies are provided for internal review as required by the General Manager. A summary of the data is provided to regulatory authorities as required by statutory approvals. Other data collected as part of projects or auditing procedures are reported internally and externally in accordance with the Environmental Management Strategy verification procedures.

In accordance with Project Approval Schedule 6 Condition 4 an Annual Review will be prepared in accordance with the Department of Planning *Post Approval requirements for state significant mining development Annual Review Guideline* dated October 2015 (or more recent edition if appropriate). A copy of the Annual Review will be made available on the DEVELOP web site as follows: http://develop.com.au/Woodlawn-sustainability/. The annual review will include known volumes of dams and reporting on water access allocations.

Monitoring data required by the EPL will be reported on the company's web page in accordance with EPA requirements for public disclosure, and as per Schedule 6 Condition 11 of the Project Approval http://develop.com.au/Woodlawn-sustainability/.

10.3. Complaints

Operational related complaints may be received:

- Directly via the Community Hotline (available 24/7): 1800 371 124
- Directly via the website: https://www.develop.com.au/contact-us/
- Directly via the CCC
- Indirectly via government agencies

Following receipt of water quality related complaint DEVELOP would investigate and respond as detailed in the Environmental Management System. A complaints register is updated monthly and is publicly available on the DEVELOP website.

10.4. Incident reporting

DEVELOP will notify the Secretary and any other relevant agencies of any incident associated with the project as soon as practicable after becoming aware of the incident. For water quality reality aspects this includes reporting to the EPA, Resources Regulator and DPHI within 24 hours of the completion of the investigation. If the incident is within the Crisps Creek / Sydney Water Drinking Catchment Water NSW will also be notified. A detailed report will be subsequently provided within 7 days. In accordance with Processes and procedures for pollution events are detailed in the PIRMP available on DEVELOPs website. Any corrective and/or preventative actions required will be assigned to relevant Company personnel. It is noted that in the case of surface or groundwater impacts caused by the project that mitigation or offsetting works would be site and contaminant specific. When actions are being assigned to relevant Company personnel this may include an investigation into mitigation actions which may require additional external resourcing.

Actions will be communicated internally through planning meetings and toolbox talks and outstanding actions will be monitored for their effectiveness upon completion. A copy of the investigation report and regular updates on the status of the identified corrective and/or preventative actions will be provided to the relevant government agencies and, if required, the complainant.

10.5. Review and continuous Improvement

The WMP will be reviewed and updated annually or in the case of a significant operational change. The review will include an assessment of the effectiveness of control measures and performance against the Plan's objectives. The objectives of a review are to:

- Maintain compliance with statutory requirements.
- Identify opportunities for improvement in the management plan.
- Incorporate community considerations.

The WMP review will include:

- This document.
- Legislation, approval, license changes.
- Community complaints and enquiries.

As per Schedule 6 Condition 5, DEVELOP will review, and if necessary, revise the WMP within 3 months of:

- the submission of an annual review;
- the submission of an incident report;
- the submission of an audit report; or
- any modification to the conditions of this approval.

Where the review leads to revisions in the WMP, then within 4 weeks of the review the revised document will be submitted to the Secretary for approval.

11. REFERENCES

AECOM (2017), Woodlawn Evaporation Dams ED1 and ED2 Seepage Investigation

Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (NSW EPA, 2022)

Australian and New Zealand Environment and Conservation Council (ANZECC) & ARMCANZ (2000) water quality monitoring guidelines

Australian and New Zealand Water Quality Guidelines (ANZECC 2000) as modified by the current Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018)

Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018)

ANZG (2023). Livestock drinking water guidelines. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra.

ANZG (2023). Water Quality for Irrigation and General Water Uses: Background information. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand governments and Australian state and territory governments, Canberra.

AS 1940-2017 - The storage and handling of flammable and combustible liquids

AS 3780-2008 - The Storage and Handling of Corrosive Substances

Bunding and Spill Management Guidelines (EPA)

Commonwealth of Australia (2013), Guidelines for Groundwater Quality Protection in Australia; National Water Quality Management Strategy

Dams Safety Act (2015)

Dams Safety Regulation (2019)

Managing Urban Stormwater: Soils and construction - Volume 1 (Department of Housing, 2004)

Managing Urban Stormwater: Soils and construction - Volume 2E – Mines and Quarries (Dept of Environment and Climate Change, 2008)

Managing Urban Stormwater: Soils and construction - Volume 2C – Unsealed Roads (Dept of Environment and Climate Change, 2008)

NSW EPA approved methods for the sampling and analysis of water pollutants in NSW (2022)

Parsons Brinckerhoff (2012) Environmental Assessment: TriAusMin Woodlawn Project, available on the NSW major projects portal or DEVELOP website

State and Environmental Planning Policy (Biodiversity and Conservation) 2021 incorporating the 2011 the Sydney Drinking Water Catchment SEPP

11.1. Applicable related plans available on the DEVELOP website

https://www.develop.com.au/woodlawn-sustainability/

Mine Extraction Management Plan (ENW-005-PL)

Paste Fill Management Plan (ENW-007-PL)

Rehabilitation Management Plan (ENW-009-PL)

Appendix 1 Plans

732000 736000 740000

6120000

6116000

SML20 (Woodlawn Mine Site)
Drainage Catchment Boundary
Revegetation Area
Underground Workings
Railways
WindfarmTurbines
EPL20436 (Infigen Energy)
EPL 20821 (Tarago Operations)
EPL 20476 (Veolia MBT)
EPL 11436 (Veolia Bioreactor)
GOULBURN MULWAREE COUNCIL
QUEANBEYAN-PALERANG REGIONAL COUNCIL

ALLIANCE/NYIGA CREEK
COULBURN MULWAREE LGA
LAKE GEORGE CATHMENT
QUEANBEYAN-PALERANG REGIONAL LGA
EVAP. DAM 2 (ED2)
EVAP. DAM 1 (ED1)
COLLECTOR ROAD
Woodlawn Farm
CRISPS CREEK
Paste Plant
Veolia Bioreactor
Box Cut
Rehabilitated Waste Rock Dump
Processing Plant
Tailings Dam (TSF 4)
Tailings Dam North (TDN)
Tailings Dam West (TDW)
Tailings Dam South (TDS)
Cowley Hills
HAWKESBURY CATHMENT
BONGARALAB
BRAIDWOOD ROAD
Tarago
GOULBURN STREET
MULWAREE
Pylara Homestead
CRISPS CREEK
BUNGENDORE ROAD
MULWAREE RIVER

SYDNEY
SML20
CANBERRA

1 2 km

Scale: 1:32,000 MGA94 (Zone 55)

VTX-JOB-0473-MAP-02

Date: 2025-6-26 | Rev: 02 | @A3

DEVELOP

Author: C Hobbs | Requested By: K Crook

WOODLAWN ZINC COPPER PROJECT

Site Plan

732000

736000

6116000

6116000

732000

736000

Drainage Lines - Clean (including flow direction arrows)

Drainage Lines- Mine/Process (including flow direction arrows)

SML20_Boundary_20241107

WindfarmTurbines

Infigen Energy - Woodlawn Wind Farm

Tarago Operations

Veolia Environmental Services - Veolia MBT

Veolia Environmental Services - Woodlawn Bioreactor

Evap. Dam 2 (ED2)

Evap. Dam 1 (ED1)

Pollution Control Dam

Tailings Dam (TSF 4)

Tailings Dam North (TDN)

Tailings Dam West (TDW)

Tailings Dam South (TDS)

0.5 1 km

Scale: 1:20,000 MGA94 (Zone 55)

VTX-JOB-0503-MAP-01

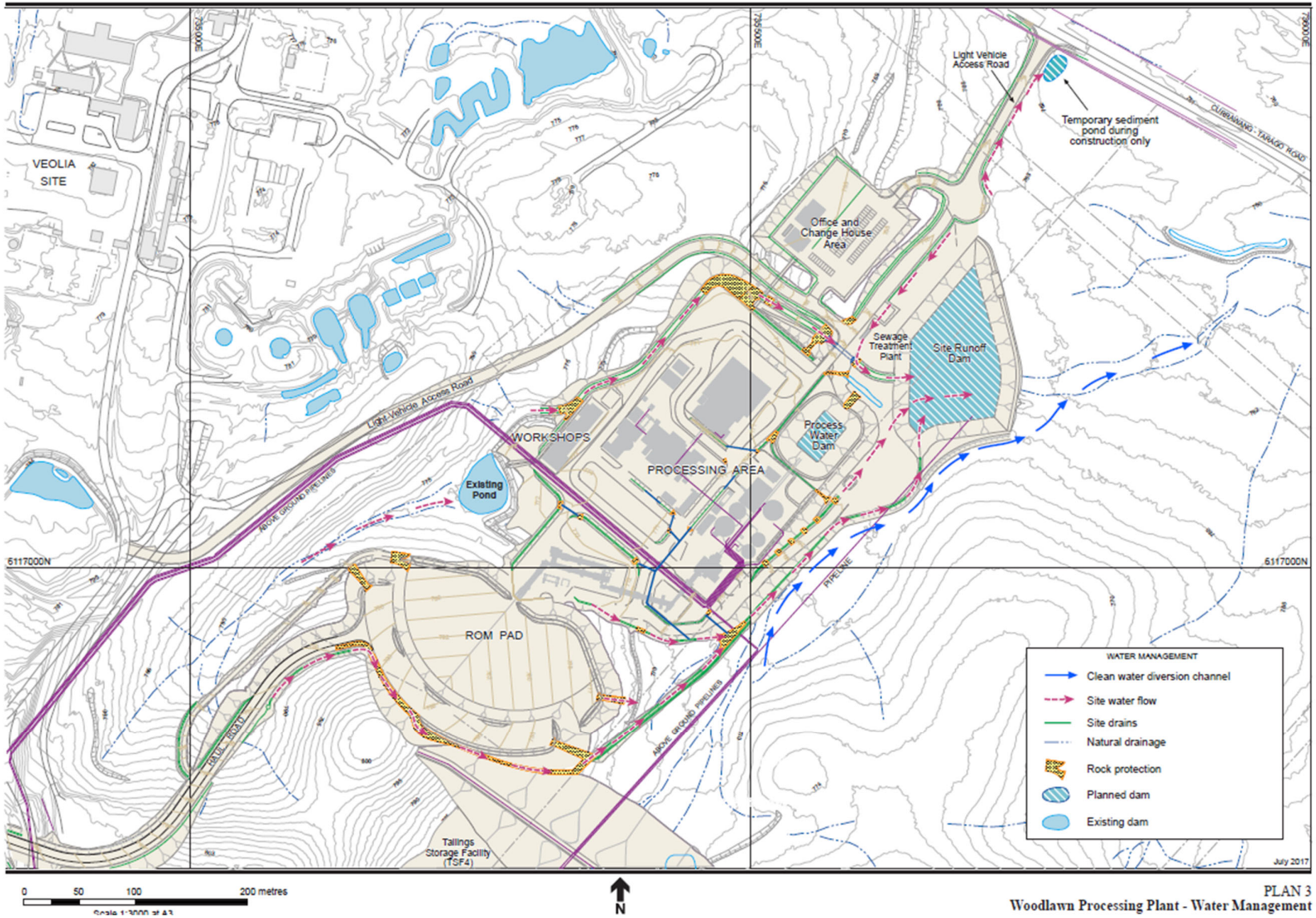
Date: 2025-8-26 | Rev: 02 | @A3

DEVELOP

Author: C Hobbs | Requested By: K Crook

WOODLAWN ZINC COPPER PROJECT

Drainage Network



Plan 3 Woodlawn Site Layout

732000 733000 734000 735000 736000 737000

6118000 6117000 6116000 6115000

MB13 115 MB23 ED2-SCT MB14 MB24 MB12 MB11 MB19 MB25 EVAP. DAMS 2 (ED2) MB3 Woodlawn Farm EVAP. DAMS 1 (ED1) EVAP. DAMS 3 - NORTH (ED3N) Weather Station 507 COLLECTOR ROAD Cowley Hills MB7 EVAP. DAMS 3 - SOUTH (ED3S) Bore2 PASTE PLANT HMB5 WM300 PROCESSING PLANT SW002 WM200 BOX CUT AND UG MINE ENTRY VEOLIA BIOREACTOR MB4 HMB1 TSF4-RWD HMB2 HMB3 HMB4 TSF4 HAWKESBURY CATCHMENT MB8 100 MB17 MB16 LAKE GEORGE CATCHMENT MB15 TAILINGS DAM (TSF4) SP3C NTP2 MW005 HMB6 HMB7 MB5 WASTE ROCK DAM TAILINGS DAM NORTH (TDN) ETP8 SP11B 105 TAILINGS DAM WEST (TDW) MW006 X1 TAILINGS DAM SOUTH (TDS) X2 Y1 MW004 MW003 109 MB22 MB21 MW001 MW002 Pylara Pylara Homestead

CRISPS CREEK

- Surface Water Locations
- Weather Station

Groundwater Locations

- Sampling
- Standing Water Levels
- Windfarm Turbines
- SML20 Boundary

Environment Protection Licences

- Infigen Energy - Woodlawn Wind Farm
- Tarago Operations
- Veolia Environmental Services - Veolia MBT
- Veolia Environmental Services - Woodlawn Bioreactor

500 1,000 m

Scale: 1:16,000 MGA94 (Zone 55)

VTX-JOB-0415-MAP-01

Date: 2025-1-13 | Rev: 02 | @A3

DEVELOP

Author: M Hinton | Requested By: K Crook

WOODLAWN ZINC COPPER PROJECT

Water Sampling Locations

Appendix 2 Consultation log – water management plan

Date	Form/Agency	Comments and Outcomes	Response
24/09/2025	Iberdrola	Email request sent to Michael Johnson requesting feedback on the WMP (V15) and the BMP (V3)	Email response received on 04/10/2025 with 2 comments. In response (now Iberdrola) has been added to everywhere Infigen is mentioned. A comment has also been added to Section 2.7.1 specifying that evaporator spray drift needs to remain within the dam footprints.
28/05/2025	EPA	Water Management Plan assigned to EPA requesting consultation	Response received 16/06/2025 (DOC25 495088), with comments considered in V14 updates
8/04/2025	DCCEW	Water Management Plan uploaded to portal with consultation assigned	Comments received 19 May, plan updated to V14 in response
8/04/2025	WaterNSW	Water Management Plan uploaded to portal with consultation assigned	Comments received 12 May, plan updated to V14 in response
6/04/2025	Veolia	Copy of Water Management Plan sent as requested to Veolia with request that any comments to be received before the final version plans to be uploaded in early May	No response received
14/01/2025	DPHI	Letter received via the major projects portal that endorsed experts are approved by the secretary.	None required
18/12/2024	DPHI	Letter for approval request of endorsed persons submitted via the major projects portal for Water, Mine Extraction and Paste Fill Management Plans.	None required
17/12/2024	Iberdrola	Briefing the Iberdrola representative for the Capital Renewable Energy Precinct	Copy of presentation sent. No comments requiring action.
17/12/2024	Veolia	Briefing Woodlawn Veolia environment manager on project re-start and updates being proposed for management plans.	Copy of presentation sent. Draft plans which require consultation under the approval (blast and water) to be sent once drafted.
9/12/2024	Online meeting with EPA Queanbeyan	Briefing with EPA to outline updates being proposed for management plans. Included: air quality, water, noise, waste rock and rehabilitation.	No comments / noted. Recommendation to re-engage with EPA if technical input or advice is required for any of the plans at any point.

Date	Form/Agency	Comments and Outcomes	Response
15/11/2024	DPHI	Briefing DPHI on complex site historical context and re-start timeline with high level discussion on timing and process of management plan submission and approval.	Agreed with approach to re-draft and re-submit management plans.
23/08/2018	DPI-Water	Confirmation of acceptance of groundwater TARPs	Confirmed TARPs including in Water Management Plan
16/08/2018	DPI-Water	Email received with comments on groundwater TARPs	Amendments made
21/06/2018	DPI-Water	Teleconference with DPI-Water Wagga Office to discuss groundwater TARPs	Draft new TARPs provided to DPI Water 25 June 2018
19/04/2017	Email from DPE	Comments provided on version 8 of the WMP	Comments and requests addressed and management plan updated
10/04/2017	Letter to EPA	Final Dewatering Strategy provided to EPA.	Incorporated into an update to the water management plan
30/03/2017	Email from EPA with final EPL 20821	Final EPL issued to Heron Resources	Noted
15/03/2017	Email from EPA re EPL	Updated Woodlawn Mine EPL for comment	Various emails and calls to finalise EPL and attachments
21/02/2017	Letter to EPA	Provision of dewatering strategy and details of monitoring breakdown between Veolia and Heron	Noted
20/01/2017	Email from EPA	Draft letter to amend EPL 11436 to allow dewatering to commence	Noted
17/01/2017	Email to DPE	Copies of consultation letters and correspondence in relation to the management plans provided to DPE	Noted
13/01/2017	Meeting with EPA Queanbeyan	Meeting with EPA to discuss licence finalisation and amendments to allow dewatering of the underground workings to commence. Advice received to seek an amendment to the existing Veolia EPL 114336 and to include details of staged dewatering and treatment	Additional consultants commissioned and dewatering strategy developed.
2/11/2016	Email from Ravi Sundaram SCA	Comments provided on draft WMP	Comments and requests addressed and management plan updated. Note that the water balance provided could only be preliminary since operation was yet to comments with no actual data available.

Date	Form/Agency	Comments and Outcomes	Response
20/10/2016	Letter from EPA re draft EPL	Provision of second draft EPL 20821 for the Heron operation	Noted
12/10/2016	Letter to DPE re additional Experts	Letter from Heron Resources requesting approval of additional experts engaged in management plan preparation	Noted and approved by DPE
12/10/2016	Email from EPA re licence application	First draft EPL provided for comment with request for additional plans	6 emails to and from EPA and various phone calls in relation to comments on draft EPL
12/10/2016	Letter to DPE re additional Experts	Letter from Heron Resources requesting approval of additional experts engaged in management plan preparation	Noted and approved by DPE
12/09/2016	Issue of updated WMP vs 6 to DPE	Copy of WMP provided to DPE	Noted
10/08/2016	EPL Application to EPA	Application for new EPL covering Woodlawn Mine construction and operation	Noted
9/08/2016	Email from Ravi Sundaram SCA	Provision of historical data on groundwater and surface water quality and previous SCA reports on Woodlawn including leakage concerns from ED1/2	Noted
20/07/2016	Site meeting with SCA	Site meeting with Ravi Sundaram and James Caddey to discuss previous draft WMP and Construction Management Plan. Issues raised in relation to dam leakage, surface water management, soil and water management and environmental monitoring	Provision of addition soil and water management provisions in Section 3.4
26/05/2016	Issue of revised WMP vs 5 to EPA, WaterNSW, DPI-Water, DRE, Infigen (now Iberdrola) and Veolia	General email with copy of revised WMP	None required
12/04/2016	Letter from DPI Water	Issue of Works Approval under Water Management Act 40WA411642	Included in WMP
9/03/2016	Meeting with Community Consultation Committee	Presentation to Woodlawn Community Consultation Committee which included overview of project, monitoring program, construction program, workforce	Draft EMPs provided on web page for download by committee members

Date	Form/Agency	Comments and Outcomes	Response
		numbers, exploration and environmental management plan preparation and content.	
29/01/2016	Letter from DPI Water	Review of draft water management plan with additional information requested.	Comments and requests addressed and management plan updated
18/11/2015	Application report to DPI-Water	Application to Water Management Act Works Approval for dewatering mine workings	WMP updated with volume of underground water requiring removal
18/11/2015	Draft WMP emailed to WaterNSW	Draft WMP emailed to WaterNSW	Noted
18/11/2015	Draft WMP emailed to DPI-Water	Draft WMP emailed to DPI Water	Noted
3/11/2015	Email to David Stephens DPI Water	Seeking advice on dewatering strategy and required licensing	Additional information provided separate to the water management plan
21/01/2015	Meeting with SCA	Site meeting with Fran Kelly and James Caddey from SCA. Meeting discussed construction details, soil and water management during construction, reprocessing of tailings, mine dewatering, acid mine drainage, potential leakages from surface dams, groundwater management, acid mine drainage	Additional section on Acid Mine Drainage included in the management plan
8/11/2014	Phone meeting with SCA	Phone discussion with Fran Kelly from SCA. General project briefing on water management issues, acid drainage, dam containment, soil and water management and construction details	Additional drawings from Landcom Blue Book inserted into the management plan
16/10/2014	Email to Fran Kelly SCA	Provision of MOP plans, details of water management structures, history of operation and copy of planning approval	Noted
16/10/2014	Email to Rohan Macdonald DPI	Confirmation of telephone conversation with R Byrnes, provision of plans and project details	Noted
13/10/2014	Meeting with EPA and OEH Queanbeyan Office	General project briefing, need for EPL separation with Veolia EPL, monitoring conditions, lack of archaeology sites and impact, need to define vegetation offset area and outcomes	Ongoing negotiation with EPA in relation to licensing requirements

Date	Form/Agency	Comments and Outcomes	Response
9/10/2014	Email to Sandie Jones OEH	Copy of Planning Approval and plans of development area	Noted
11/09/2014	Letter to DPE (Department of Planning and Environment)	Seeking approval of Experts engaged in relevant management Plan	Approval provided
29/07/2014	Letter from NSW Office of Water	Comments received on water management plan to ensure inclusion of: site water balance info, surface water licensing, groundwater licensing, surface water management, groundwater management and reporting.	Comments addressed and management plan updated
23/07/2014	Meeting with Goulburn City Council	General Management and Planning Manager, general briefing no specific feedback	Noted
10/07/2014	Letter from Sydney Catchment Authority	Providing contact details for consultation and requesting meeting	Phone follow-up and on site meeting held
7/07/2014	Letter from Trade and Investment	Requested meeting and briefing on site and staged approach to preparation and approval of management plans	On site meeting held
3/07/2014	Initial consultation letter to: • NSW Trade and Investment • Environment Protection Authority • NSW Office of Water • Sydney Catchment Authority • Office of Environment and Heritage • Department of Planning and Environment (DPE)	These letters were the initial consultation and sought specific advice from each agency according to the respective relevant management plan.	None required
19/01/2014	Email to Fran Kelly and James Caddey SCA	Copy of Woodlawn EMS provided, Project Approval, and Construction Environmental Management Plan (EMP)	None required

Appendix 3 Plan Approval

Resource Assessments
Contact: Stephen Shoesmith
Phone: 9274 6164
Email: stephen.shoesmith@planning.nsw.gov.au

Mr Andrew Lawry
Chief Operating Officer
Heron Resources Limited
WOODLAWN MINE PROJECT

By email to: ALawry@HeronResources.com.au

Dear Mr Lawry

Woodlawn Mine Project (07_0143)
Approval of Environmental Management Plans

I refer to your letter dated 30 March 2017 seeking the Secretary's review and approval of the:

- Vegetation and Rehabilitation Management Plan (incorporating the Tailings Management Strategy, Vegetation Management Plan and Rehabilitation Management Plan);
- Noise and Blast Management Plan;
- Water Management Plan;
- Heritage Management Plan; and
- Air Quality Management Plan.

The Department has reviewed the revised versions of these documents, dated May 2017 and is satisfied that they address the requirements of Condition 2 in Schedule 3 and Conditions 4, 7, 12, 17, 20, 22, and 27 in Schedule 4 of project approval 07_0143. Accordingly, the Secretary approves the revised management plans.

Please ensure that a copy of the approved plans is placed on your website as soon as possible.

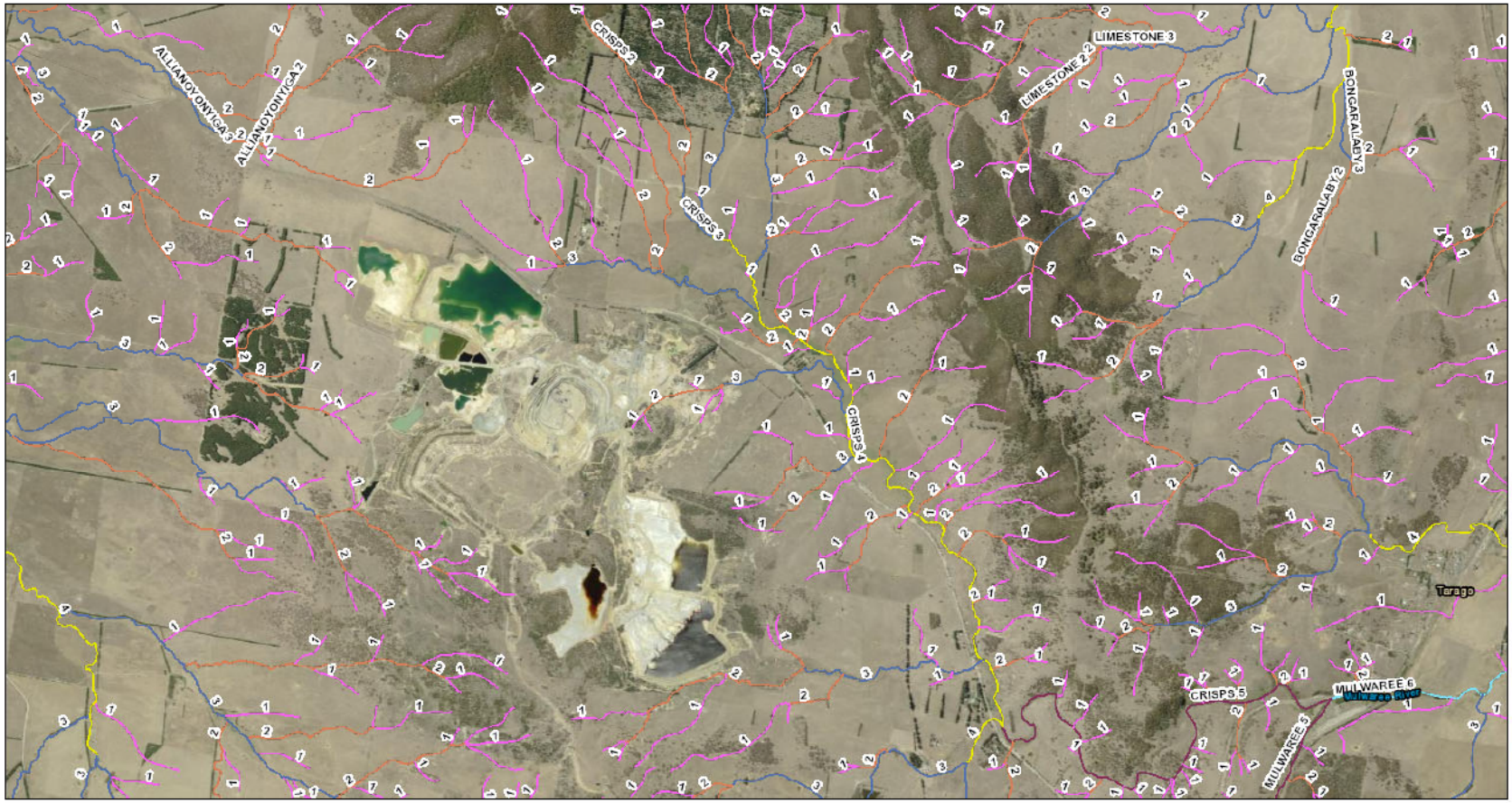
If you require further information, please contact Stephen Shoesmith on 9274 6164 or by email to stephen.shoesmith@planning.nsw.gov.au.

Yours sincerely

Preshaw 12/5/17

Clay Preshaw
A/Director
Resource Assessments
As nominee of the Secretary

Appendix 4 Project stream order map

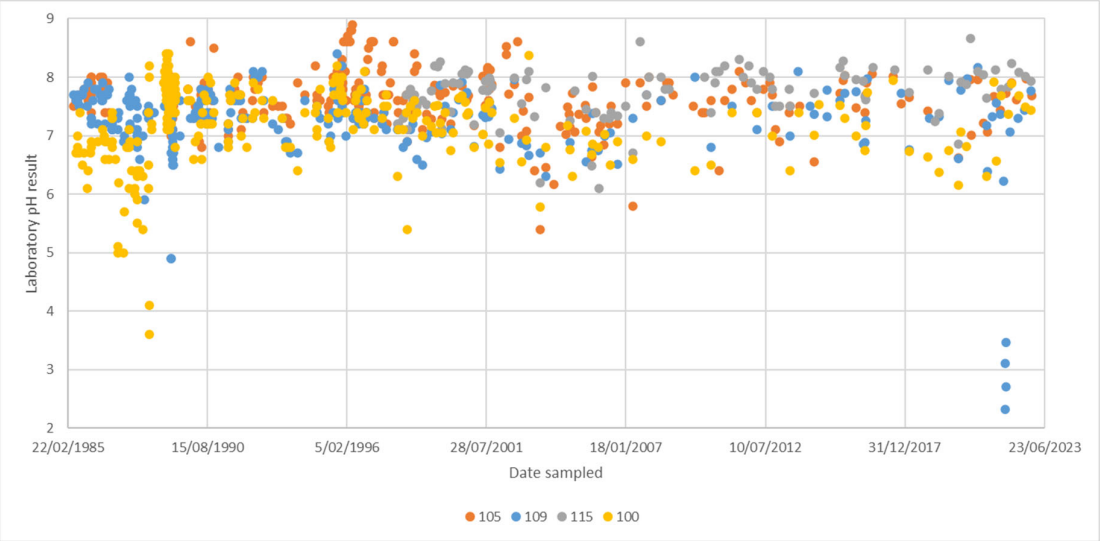


December 28, 2023

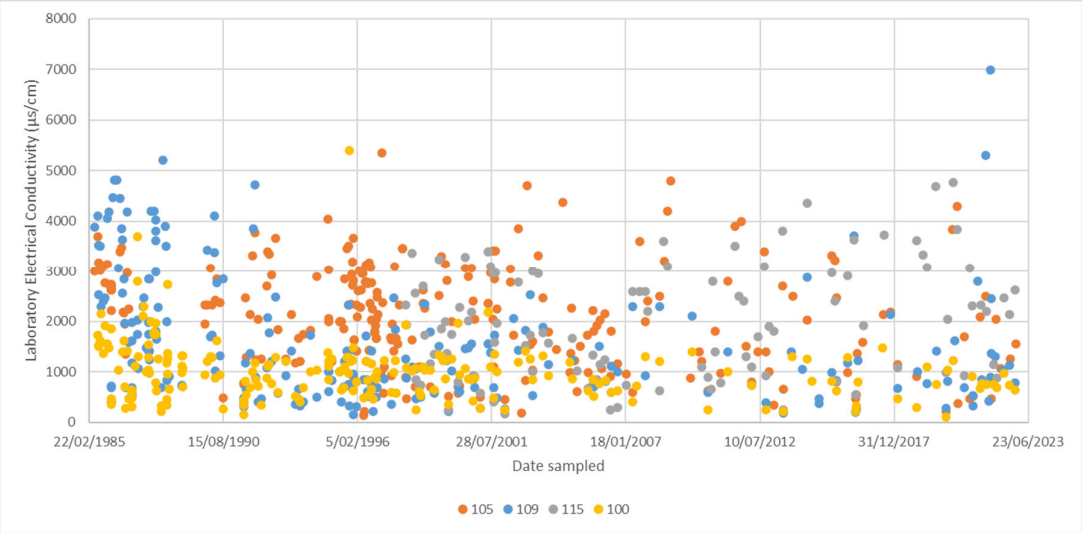
1:36,112

0 0.38 0.75 1.5 mi
0 0.5 1 2 km

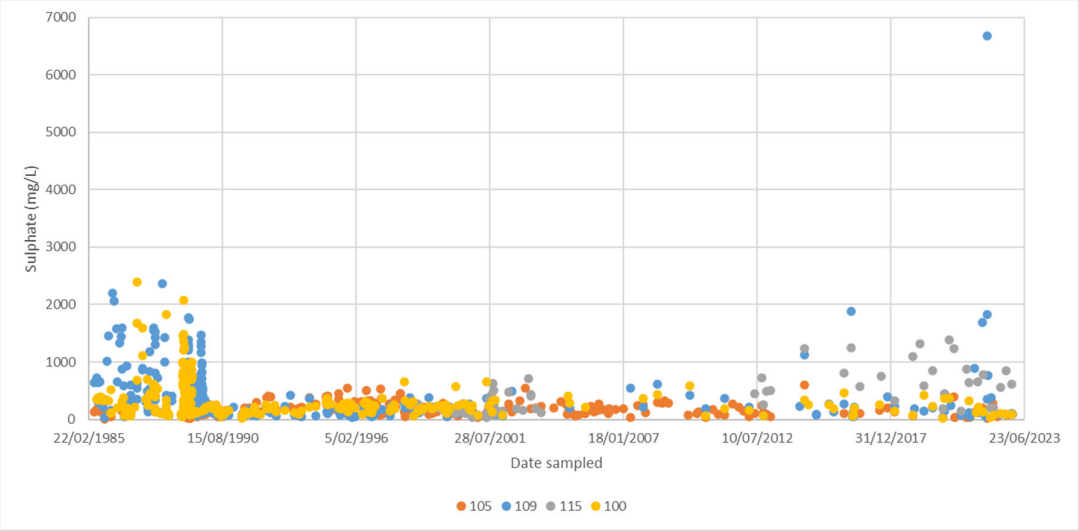
Appendix 5 Baseline surface and ground water quality graphs



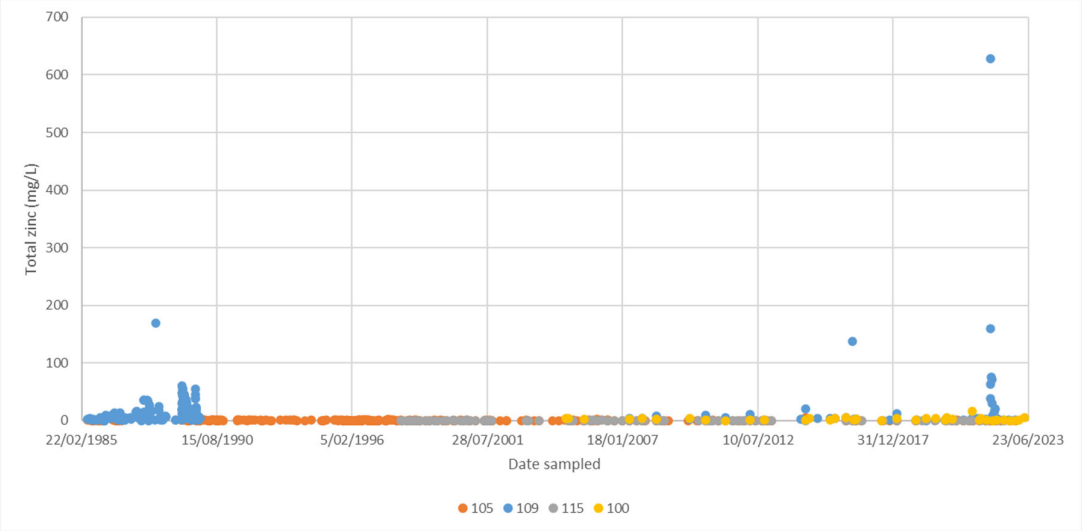
Graph 11-1 **Surface water baseline monitoring sites pH results 1985 to 2022**



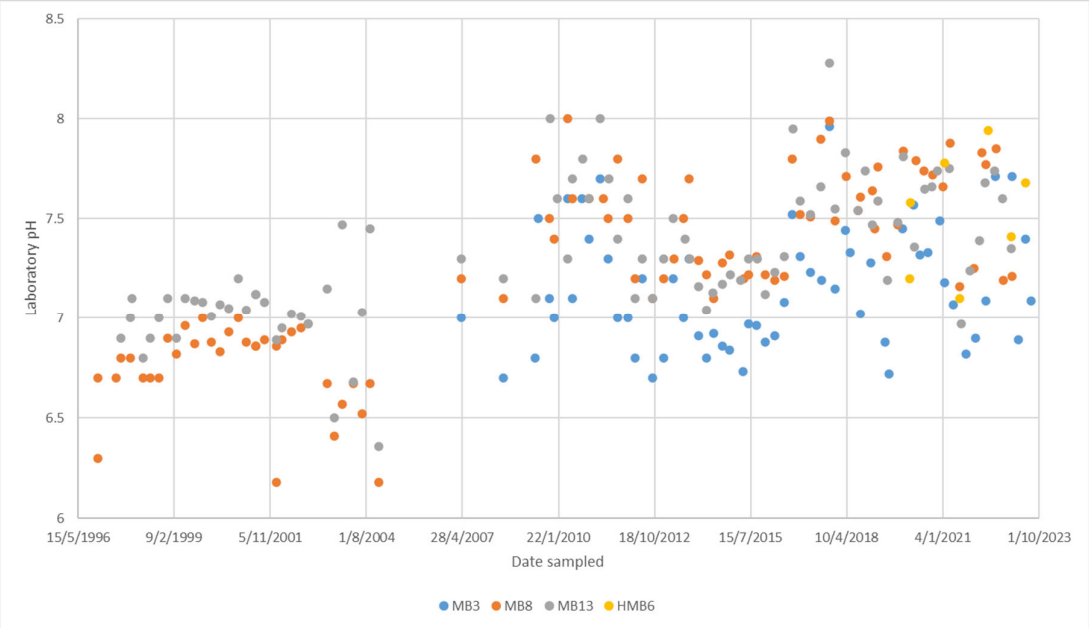
Graph 11-2 **Surface water baseline monitoring sites electrical conductivity results 1985 to 2023**



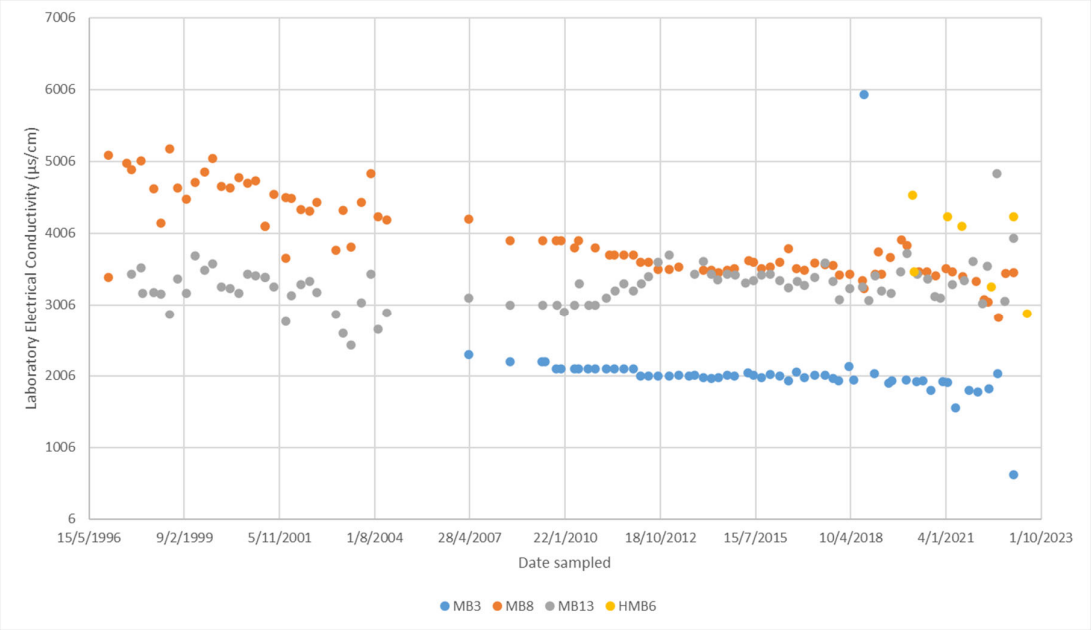
Graph 11-3 Surface water baseline monitoring sites sulfate results 1985 to 2023



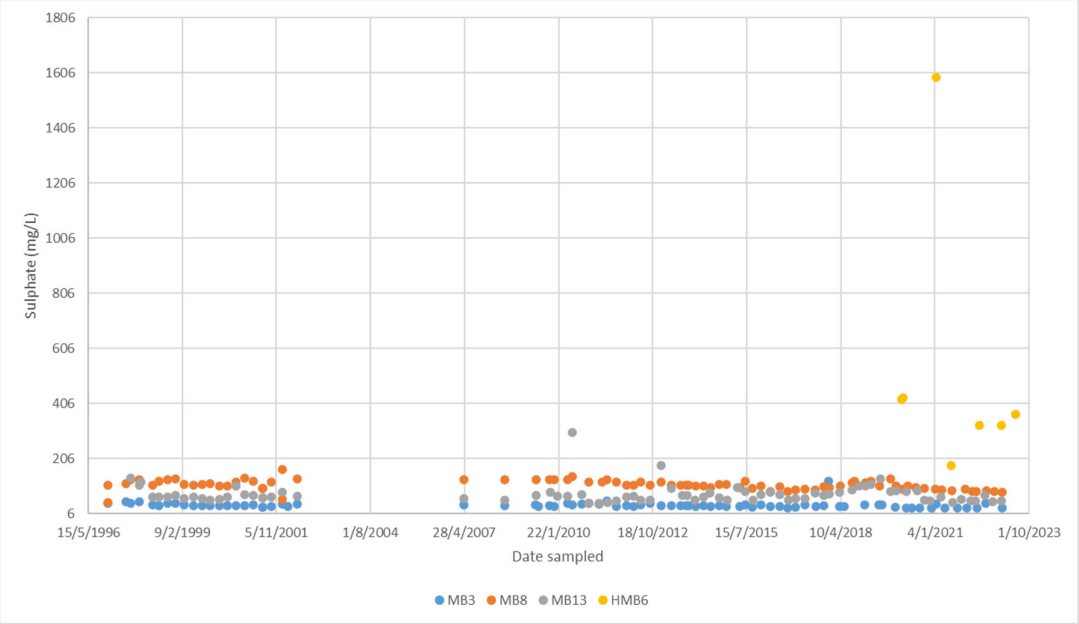
Graph 11-4 Surface water baseline monitoring sites total zinc results 1985 to 2023



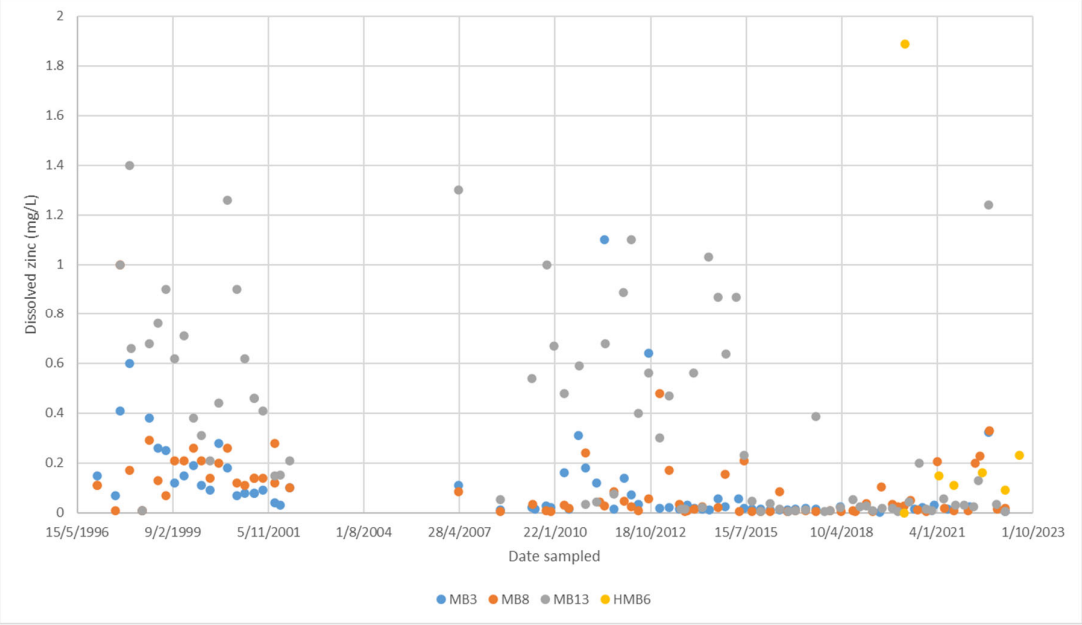
Graph 11-5 **Ground water baseline monitoring sites pH results 1996 to 2023**



Graph 11-6 **Ground water baseline monitoring sites electrical conductivity results 1996 to 2023**



Graph 11-7 Ground water baseline monitoring sites sulfate results 1996 to 2023



Graph 11-8 Ground water baseline monitoring sites dissolved zinc results 1996 to 2022