



Oceana Gold (New Zealand) Ltd

Macraes Phase 4 Water Quality Management Plan - DRAFT

MANAGEMENT PLAN

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CONTENTS

1	INTRODUCTION	1
1.1	Background	1
1.2	Purpose of the Plan.....	1
1.3	Regulatory Framework.....	1
1.4	Relationship to Other Site Management Plans and Documents	2
1.5	Exclusions	2
2	DESCRIPTION OF ACTIVITY	3
2.1	Key Mine Components.....	3
2.2	MP4 Components	3
2.3	Operational Schedule	4
3	MARE BURN CATCHMENT	8
3.1	Catchment Elements.....	8
3.1.1	Coronation Area	8
3.1.2	Coronation North Area:	9
3.2	Water Quality Management Measures	9
3.2.1	WRS – Source Water Quality and Contaminant Load Management	9
3.2.2	Pit Lakes – Source Water Quality Management.....	10
3.2.3	Diversion Channels – Source Water Contaminant Load Management.....	11
3.2.4	Silt Ponds – Hydraulic Management.....	11
3.2.5	Capture Drains and Sumps – Hydraulic Management	11
3.2.6	Coal Creek Freshwater Dam – Hydraulic Management.....	12
3.2.7	WTP Return Flows – Hydraulic Management	15
3.2.8	Implementation Schedule	15
3.3	Monitoring	16
3.3.1	Surface Water – Flow Monitoring	16
3.3.2	Pit Lake Level Monitoring	17
3.3.3	Surface Water Quality – Compliance Monitoring.....	17
3.3.4	Surface Water Quality – Other Monitoring.....	17
3.3.5	WRS Seepage Monitoring	19
3.3.6	Pit Lake Monitoring	20
3.3.7	Groundwater Monitoring	20
3.4	Compliance Criteria.....	20
3.4.1	Narrative Standard for Receiving Waters	20
3.4.2	Numerical Compliance Criteria	20
4	SHAG RIVER/WAIHEMO CATCHMENT	21
4.1	Catchment Elements.....	21
4.1.1	Coronation Area.....	21
4.1.2	Deepdell Area	22
4.1.3	Central Area	22
4.1.4	Tipperary Creek Area	24

4.1.5	Golden Point Underground (GPUG).....	25
4.1.6	Frasers Underground (FRUG).....	25
4.2	Water Quality Management Measures	27
4.2.1	Frasers TSF – Source Water Quality and Contaminant Load Management.....	27
4.2.2	WRS – Source Water Quality and Contaminant Load Management	27
4.2.3	Pit Lakes – Source Water Quality Management.....	28
4.2.4	Silt Ponds – Hydraulic Management.....	28
4.2.5	Capture Drains and Sumps – Hydraulic Management	29
4.2.6	Camp Creek Freshwater Dam – Hydraulic Management.....	29
4.2.7	Round Hill Pit/Golden Point Pit Dewatering.....	32
4.2.8	WTP Return Flows –Water Quality and Hydraulic Management	32
4.2.9	Implementation Schedule	33
4.3	Monitoring	33
4.3.1	Surface Water – Flow Monitoring	33
4.3.2	Pit Lake Level Monitoring	34
4.3.3	Surface Water Quality – Compliance Monitoring.....	35
4.3.4	Surface Water Quality – Other Monitoring.....	35
4.3.5	WRS Seepage Monitoring	36
4.3.6	TSF Seepage Monitoring.....	37
4.3.7	Pit Lake Monitoring	41
4.3.8	Groundwater Monitoring	41
4.4	Compliance Criteria.....	44
4.4.1	Narrative Standard for Receiving Waters	44
4.4.2	Numerical Compliance Criteria	44
5	NORTH BRANCH WAIKAOUAITI RIVER.....	45
5.1	Catchment Elements.....	45
5.1.1	Central Area.....	46
5.1.2	Golden Bar Area	47
5.2	Water Quality Management Measures	48
5.2.1	WRS – Source Water Quality and Contaminant Load Management	48
5.2.2	Pit Lake – Source Water Quality Management	49
5.2.3	Silt Ponds – Hydraulic Management.....	49
5.2.4	Capture Drains and Sumps – Hydraulic Management	49
5.2.5	WTP Return Flows –Water Quality and Hydraulic Management	50
5.3	Monitoring	51
5.3.1	Surface Water – Flow Monitoring	51
5.3.2	Pit Lake Level Monitoring	52
5.3.3	Surface Water Quality – Compliance Monitoring.....	52
5.3.4	Surface Water Quality – Other Monitoring.....	53
5.3.5	WRS Seepage Monitoring	54
5.3.6	TSF Seepage Monitoring.....	55
5.3.7	Pit Lake Monitoring	55
5.3.8	Groundwater Monitoring	55

6	MINE WATER TREATMENT PLANT	57
6.1	Introduction	57
6.2	Treatment Flows	57
6.3	Return Flows	58
6.4	WTP Brine Disposal	58
6.5	Brine Disposal System Installation.....	59
6.6	Monitoring	59
6.7	Effects Management	59
7	MONITORING	61
7.1	Monitoring Plans	61
7.2	Monitoring Types.....	61
7.2.1	Climate Monitoring	61
7.3	Water Quality Monitoring Parameters.....	63
7.4	Top Tipperary Tailings Storage Facility Surface Water Monitoring	64
8	WATER QUALITY TRIGGERS AND COMPLIANCE CRITERIA.....	66
8.1	Water Quality Management Philosophy.....	66
8.2	Compliance Philosophy	66
8.3	Compliance Monitoring Sites	66
8.4	Water Quality Compliance Criteria.....	67
8.4.1	Narrative Standard	67
8.4.2	Numerical Standards for Compliance	67
8.4.3	Standard for the Management of Eutrophication	77
9	KEY WATER QUALITY RISKS	78
10	RISK MANAGEMENT AND CONTINGENCY PLANNING	80
10.1	Introduction	80
10.2	Risk Management.....	80
10.3	Water Management Risk Assessment	80
10.4	Contingency Management Process.....	81
10.5	Contingency Management Options	81
10.6	Trigger Action Response Plans (TARPs)	82
10.7	Incident Reporting.....	82
11	COMPLIANCE TRACKING	83
11.1	Compliance Tracking	83
11.2	Process Tracking	83
11.3	Non-Compliance Register.....	83
12	RECORDS AND DOCUMENTATION	84
12.1	Data Management	84
12.2	Reporting	84
12.2.1	ORC Quarterly Monitoring Reports.....	84
12.2.2	Sustainability Reporting	84
12.2.3	Brine Disposal.....	85
13	WQ MANAGEMENT REVIEW AND AUDIT	86
13.1	WQMP Updates	86

13.2	Sustainability Reporting	86
13.3	Compliance Review	86
13.4	Non-Compliance Register	87
13.5	Internal Reviews	87
13.5.1	Corporate Water Management Standard Audit	87
13.5.2	Communications Register Review	87
13.5.3	Review of Water Management Records and Data	88
13.6	External Reviews	88
13.6.1	Otago Regional Council Reviews and Compliance Audits	88
13.6.2	External/Third Party Feedback	88
14	REFERENCES	89

Figures

Figure 1: Macraes Operation Existing Layout	5
Figure 2: MP4 Components Overview	6
Figure 3: Seepage Capture Drains and Sumps – Coronation Area – Conceptual Layout.....	12
Figure 4: Location of Coal Creek Freshwater Dam.....	14
Figure 5: Coal Creek Freshwater Dam Discharge Curves	15
Figure 6: MP4 Golden Point Underground Mine Envelope.....	26
Figure 7: Location of Camp Creek Freshwater Dam	31
Figure 8: Camp Creek Freshwater Dam Discharge Curve	32
Figure 9: MTI Groundwater Monitoring Bore Locations	42
Figure 10: TTTSF Compliance and Detection Groundwater Monitoring Sites	43
Figure 11: Seepage Capture Drains and Sumps – Central Area – Conceptual Layout.....	50
Figure 12: Frasers West WRS Groundwater Monitoring Sites	56
Figure 13: Key FRUG Features for Brine Management	60
Figure 14: Macraes Operation Climate and Surface Water Flow Monitoring Locations.	62
Figure 15: TTTSF Surface Water Quality Monitoring Sites.....	65
Figure 16: Macraes Operation Key Surface Water Quality Monitoring Site Sites	69
Figure 17: Macraes Operation Compliance Risks from Water Balance Modelling (GHD 2026a)	79

Tables

Table 1: Anticipated Sequencing of MP4 Activities	7
Table 2: Water Quality Compliance Monitoring Sites – Mare Burn	17
Table 3: Aquatic Biological Compliance Monitoring Components and Frequency – Mare Burn	17
Table 4: Water Quality Control Monitoring Sites – Mare Burn	18
Table 5: Water Quality Additional Monitoring Sites – Mare Burn	18
Table 6: Water Quality WRS Monitoring Sites – Mare Burn	19
Table 7: Water Quality Monitoring Sites – Pit Lakes	20
Table 8: Surface Water Flow Monitoring Sites – Shag River Catchment	34
Table 9: Water Quality Compliance Monitoring Sites – Mare Burn	35
Table 10: Aquatic Biological Compliance Monitoring – Shag River Catchment	35
Table 11: Water Quality Control Monitoring Sites – Shag River Catchment	36
Table 12: Water Quality Additional Monitoring Sites – Shag River Catchment	37
Table 13: Water Quality WRS Monitoring Sites – Shag River Catchment	38
Table 14: Water Quality TSF Monitoring Sites – Shag River Catchment	39
Table 15: Water Quality Monitoring Sites – Pit Lakes	41
Table 16: Surface Water Flow Monitoring Sites – NBWR Catchment	51
Table 17: Water Quality Compliance Monitoring Sites – Mare Burn	52
Table 18: Aquatic Biological Compliance Monitoring – Shag River Catchment	52
Table 19: Water Quality Control Monitoring Sites – Shag River Catchment	53
Table 20: Water Quality Additional Monitoring Sites – Shag River Catchment	54
Table 21: Water Quality WRS Monitoring Sites – Shag River Catchment	55
Table 22: Water Quality Monitoring Sites – Pit Lakes	55
Table 23: RO Plant Throughflow.	58
Table 24: Climate Monitoring Sites	61
Table 25: Water Quality Sampling Parameters	63
Table 26: Top Tipperary Tailings Storage Facility Surface Water Monitoring Parameters	64
Table 27: Surface Water Quality Control and Compliance Monitoring Sites	68
Table 28: Existing and Mining Phase A - Water Quality Compliance Limits at Macraes Operation Listed by Parameter	70
Table 29: Existing and Mining Phase A - Water Quality Compliance Limits at Macraes Operation – Mare Burn Catchment	72
Table 30: Existing and Mining Phase A - Water Quality Compliance Limits at Macraes Operation – Shag River Catchment	73
Table 31: Existing and Mining Phase A - Water Quality Compliance Limits at Macraes Operation – North Branch Waikouaiti River	74
Table 32: Mining Phase B and Closure Water Quality Compliance Limits at Macraes Operation (Viridis 2026).	75
Table 33: Summary of material water quality related risks for Macraes Operation	81
Table 34: Records Summary	88

Appendices

APPENDIX A LEGISLATIVE REFERENCES AND RELEVANT RESOURCE CONSENTS

APPENDIX B CONSENT TRIGGER LOOK-UP TABLES

APPENDIX C SITE PERSONNEL CONTACT DETAILS

1 INTRODUCTION

1.1 Background

OceanaGold (New Zealand) Limited (“OGNZL”) undertakes open pit and underground gold mining operations at the Macraes Operation located at Golden Point Road, Macraes Flat, East Otago. As part of ongoing operations, OGNZL continually reviews the Life of Mine design in light of updated knowledge of the gold resource and the economics of mining. The Macraes Phase Four Project (MP4) is designed to extend the life of mining at the Macraes Operation through to 2036. The MP4 has the potential to add more than 890,000 ounces of gold production.

One aspect of the MP4 consenting process has been a clear need to improve environmental performance at the with regards to water quality outcomes. Surface water quality criteria linked to existing resource consents enabling the Macraes Operation have been overtaken by research into the environmental toxicity of metals and other contaminants released by the minesite. Consequently, a new more intensive and demanding compliance regime has been developed to support environmental management at the site. Initially this regime will apply to the areas of the site and compliance monitoring points relevant to the MP4 operations. Over time, the regime will be expanded to encompass operations at the remaining areas of the Macraes Operation.

This Water Quality Management Plan (WQMP) has been developed during the MP4 consenting process under the Fast-track Approvals Act 2024. Consequently, this version of the WQMP is a draft, to be updated once the MP4 consents have been approved and the conditions of consent finalised.

The currently approved WQMP, document MAC-207-EMP-000, approved date April 2025, is to remain active until resource consents authorising MP4 have been awarded, the conditions of consent have been finalised, and these conditions incorporated in this WQMP. Until that time this WQMP is to remain a draft document.

1.2 Purpose of the Plan

The purpose of this WQMP is to outline surface water and groundwater management provisions for the Macraes Operation. This includes the existing water quality management framework and an updated water quality management framework linked to the MP4 resource consents.

The intent of this plan is to document:

1. Progressive changes to the existing water quality management framework required to enable OGNZL to comply with the conditions attached to the MP4 resource consents and previously approved resource consents.
2. The planned implementation of mitigation measures designed to enable OGNZL to comply with the conditions attached to the MP4 resource consents.

1.3 Regulatory Framework

This WQMP has been prepared to support implementation of the updated water quality management framework for the Macraes Operation that is required as a condition to the MP4 resource consents. This WQMP also incorporates the existing water quality management framework developed to meet the requirements of previously approved permits linked to environmental water quality at the Macraes Operation.

OGNZL currently holds a suite of resource consents (e.g., 96808, 2002.491, 2002.759, 2002.763, 2003.640, 2004.359, 2006.303-308, RM10.351, RM12.378, RM16.138, RM19.085, RM20.024, RM20.130 and RM20.424) issued by Otago Regional Council (ORC), which authorise discharges to surface water bodies within three key receiving catchments: Shag/Waihemo, Waikouaiti and Taieri River catchments.

Under these consents, water quality compliance is assessed at prescribed monitoring sites in accordance with specified compliance and monitoring schedules. These schedules define site locations, parameters, sampling frequency, applicable consent limits, and the conditions under which compliance is assessed. OGNZL also undertakes water quality monitoring at supplementary sites to support interpretation of water quality conditions within the wider receiving environment.

Consents authorising the MP4 development are being applied for under a Fast Track Application process. Consents granted under the application that are relevant to this WQMP are to be added to the list above. The finalised consent list will be provided in Appendix A.

1.4 Relationship to Other Site Management Plans and Documents

This WQMP is to be considered and understood in conjunction with the following documents submitted in support of the application for resource consents enabling the MP4:

- Recommended Surface Water Quality Compliance Framework (Viridis 2026a)
- Macraes Phase 4 FTA Surface and Groundwater Assessment (GHD, 2026a)
- Macraes Phase 4 FTA Assessment of Environmental Effects (Viridis, 2026b)
- Macraes Phase 4 Project Active Water Treatment Study (Process Flow 2026)

This WQMP should be read in conjunction with the following Macraes Operation plans:

- The MP4 Site Plan.
- Macraes Phase 4 Water Monitoring Plan (GHD 2026b).
- Macraes Phase 4 FTA surface water quality and aquatic ecology compliance and monitoring schedule (Viridis 2026c).
- Macraes Phase 4 FTA Erosion and Sediment Control Plans (SouthernSkies, 2026).
- The Waste Rock Stack Capping and Closure Plan.
- The Macraes Mine Water Management Plan.

This WQMP should be read in conjunction with the following design documents:

- The design and operations documents for Camp Creek and Coal Creek dams
- The design and operations documents for the silt ponds
- The design and operations documents for the Water Treatment Plant
- The design documents for the cut-off drains and sumps

1.5 Exclusions

This WQMP is applicable to water management at the Macraes Operation for environmental protection purposes. It does not address:

- Water management requirements for on-site operational purposes.
- Water management within the process circuit.
- Erosion and sediment control.
- Operations of the Water Treatment Plant.
- Groundwater quality compliance management measures (Maori Tommy Gully compliance monitoring bores).
- Design measures for the Golden Point Underground Mine to manage any risks of hydraulic breakthrough to the bed of Deepdell Creek and consequent loss of flows in Deepdell Creek.

This WQMP is not a detailed mine water management plan for on-site operations. i.e. It excludes detailed descriptions of how water management operations at the Macraes Operation are to be undertaken. This information is documented in a separate internal Mine Water Management Plan.

2 DESCRIPTION OF ACTIVITY

2.1 Key Mine Components

The Macraes Operation consists of:

- Numerous open pits (operational, non-operational and backfilled).
- Two underground mines (Frasers Underground Mine (FRUG), now closed, and Golden Point Underground Mine (GPUG), currently actively mined).
- Waste rock stacks at various stages of operation and rehabilitation.
- A network of haul roads and general mine service tracks.
- A Processing Plant.
- Five tailings storage facilities (three inactive, one active but nearing capacity and one active).
- An extensive network of water management infrastructure, including diversion drains, silt ponds, sumps, pit lakes, and water storage reservoirs.
- Two consented but not yet constructed water storage reservoirs (Camp Creek Dam and Coal Creek Dam).
- Associated infrastructure supporting ongoing operations, including district roads, powerlines, workshops, offices, and associated water and amenity facilities.

2.2 MP4 Components

MP4 broadly consists of the following activities:

- Extensions to the existing Golden Bar, Coronation, Coronation North and Innes Mills Pits.
- Extension to the Golden Point Underground Mine
- Expansion and the dry capped closure of the in-pit Frasers TSF.
- Waste rock storage in or near open pits or existing rock stacks at Coronation, Coronation North, Innes Mills, Golden Bar, Golden Point and Frasers Pits.
- Associated water management including transfer and re-use within and across the various mining landforms at the Macraes Operation.
- Re-location of all tailings stored in Southern Pit TSF and the upper 30 m of the Mixed Tailings Impoundment. The recovered tailings are to be stored in Frasers TSF.
- Realignment of Macraes Road in two stages.
- Construction of Camp Creek and Coal Creek water storage dams, and the associated use and discharge of the stored water.
- Construction and operation of other water management infrastructure to capture, treat and discharge seepage water from pits and waste areas.

2.3 Operational Schedule

The following refers to timing of mining phases and implementation of mitigation measures:

- Consent commencement = The start of MP4 operations.
- Mining Phase A: Phase of mining activities from the commencement of MP4 consents to a period no later than 7 years following the commencement of consent.
- Mining Phase B: Phase of mining activities following the implementation of operational water quality mitigation measures (dams, active treatment, etc) and the completion of the Mining Phase B Water Quality Report. This phase commences no later than seven years following consent commencement and ends following site decommissioning and the completion of all rehabilitation at the site.

Mining operations under the current mine plan and the proposed MP4 mine plan are summarised in Table 1, with the layout summarised in Figure 2. The schedule from 2027 onward is subject to adjustment in accordance with updates in the current mine plan. The indicative MP4 mining schedule involves the following sequence:

- The continuation of Innes Mills Open Pit mining from 2027 (Year 1) to 2035 (Year 9).
- Relocation of tailings from SP11 and MTI from Year 2 to Year 8 to facilitate mining of Innes Mills Stage 13 (IM13).
- The continuation of Coronation Open Pit mining from Year 1 to Year 6.
- The continuation of Golden Bar Open Pit mining from Year 2 to Year 7.
- The continuation of Golden Point Underground mining after Year 4.
- The continuation of Coronation North mining from Year 7 to Year 9.
- Associated replenishment of stockpiles throughout MP4.

In terms of the timing of key water quality mitigation measures, to ensure these are in place and operational at the commencement of Mining Phase B, the draft MP4 conditions use the following timeframes:

- Commissioning of the Stage 1 WTP – No later than 30 months following the start of MP4.
- Commissioning of the Stage 2 WTP – No later than 66 months following the start of MP4.
- Commencement of augmentation from Camp and Coal Creek Dams: No later than 42 months following the start of MP4.
- Construction and implementation of seepage capture drains and sumps: No later than 30 months following the start of MP4.

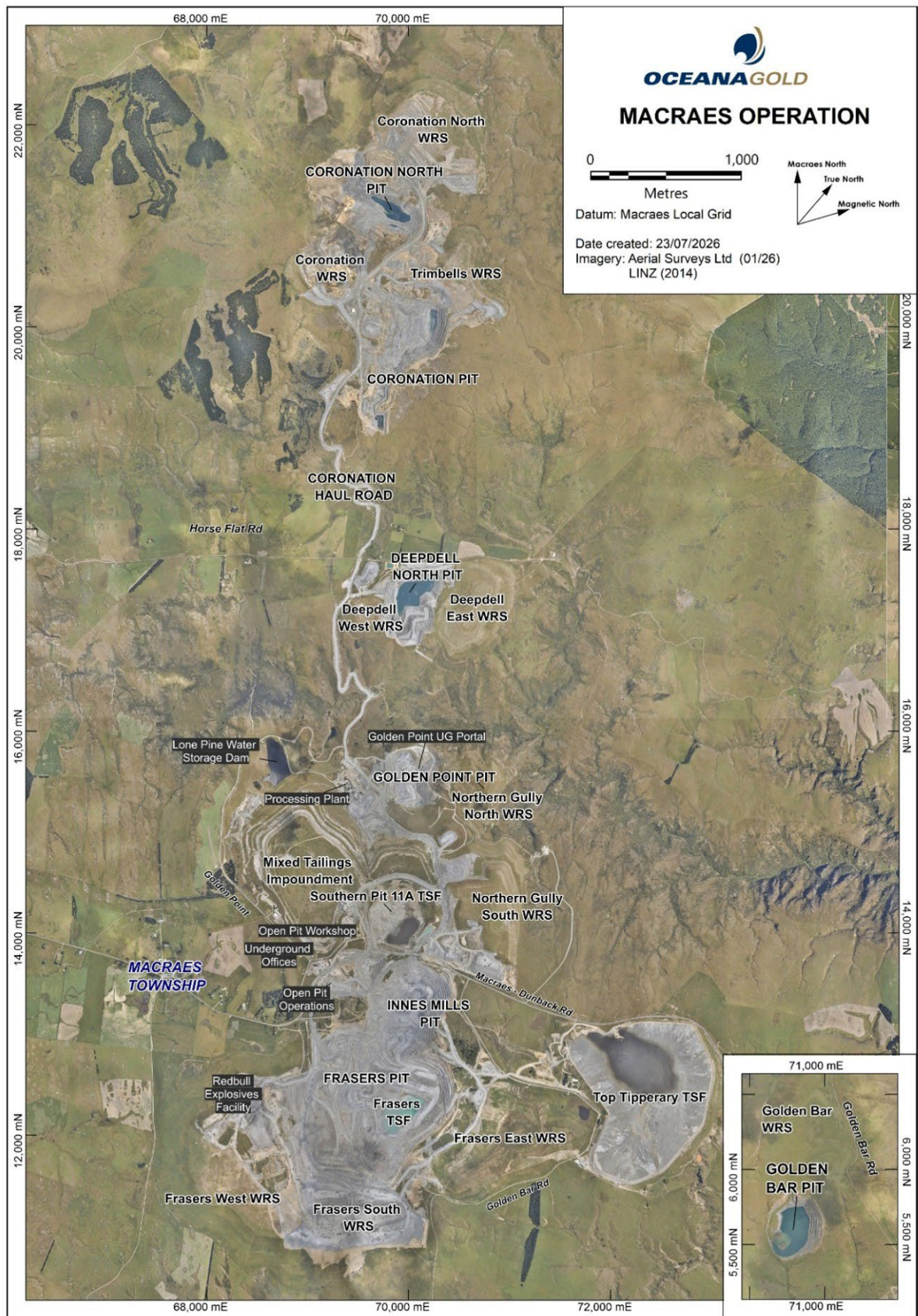


Figure 1: Macraes Operation Existing Layout

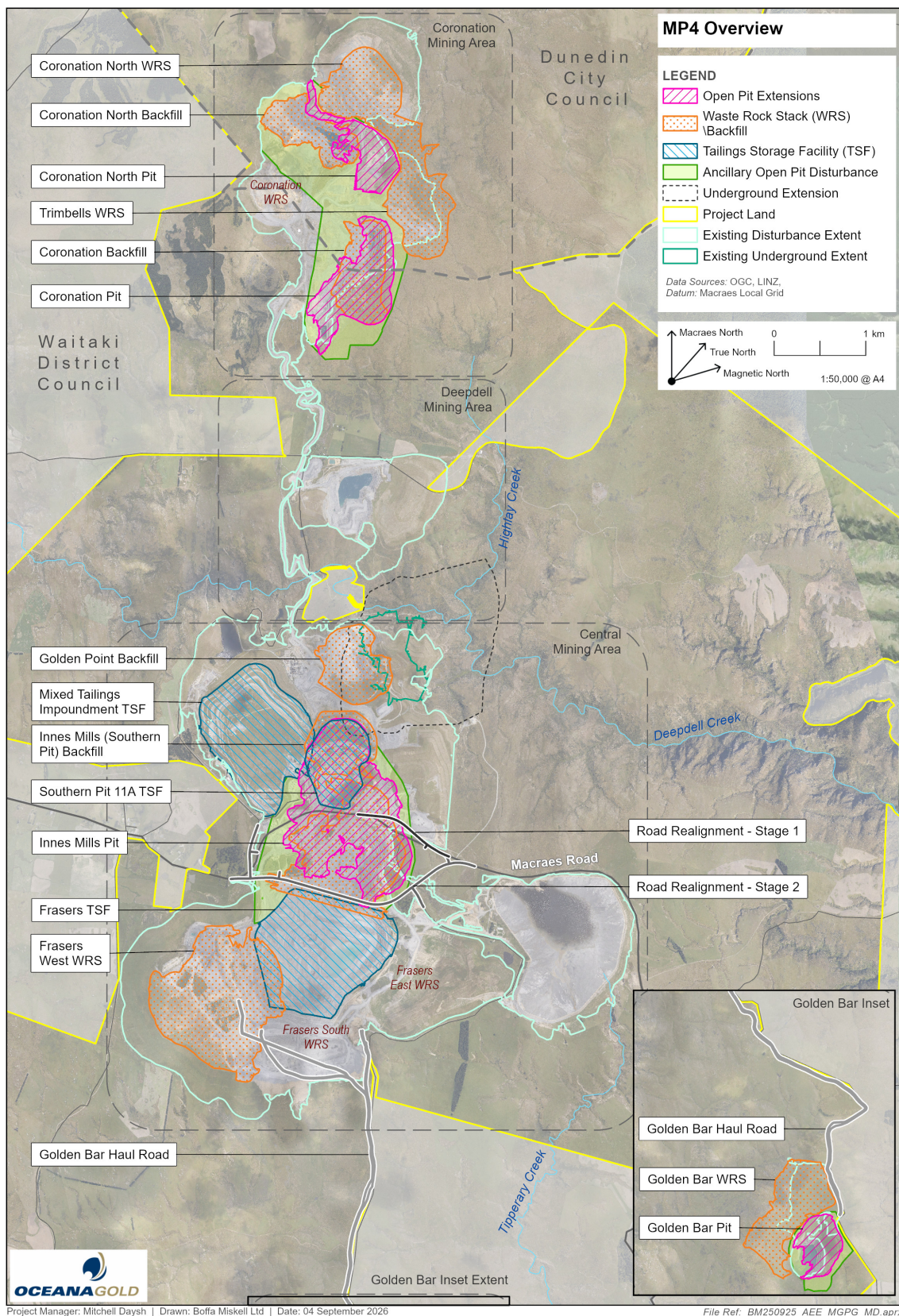


Figure 2: MP4 Components Overview

Table 1: Anticipated Sequencing of MP4 Activities

Element	Stage	2026	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Gay Tan	GT5													
Innes Mills	IM7													
	IM8													
	IM9													
	IM10													
	IM11													
	IM12													
	IM13													
Coronation	CO6													
	CO7													
	CO8													
Coronation North	CN5													
	CN6													
Golden Bar	GB2													
	GB3													
GPUG														
Stockpiles														

Note:

Activities which are consented or anticipated to be consented are shown as dark tan without an outline.

MP4 activities as outlined dark tan.

Underground potential as outlined light tan.

Year 1 refers to the starting year of MP4.

3 MARE BURN CATCHMENT

3.1 Catchment Elements

3.1.1 Coronation Area

Key features relevant to this WQMP are:

- The Coronation Area is located on the ridgeline to the north of Horse Flat Road along the catchment divide between the Shag River and the Taieri River, and is situated between Sister Peaks and Highlay Hill.
- Waterways influenced by Coronation Area operations within the Taieri River catchment are Trimbells Gully Creek and Mare Burn. Waterways influenced by Coronation Area operations within the Shag River catchment are Camp Creek, Deepdell Creek and the Shag River (refer Section 4).
- Ore is hauled to the Macraes Processing Plant via a haul road from the Coronation Area to Horse Flat Road and then via the haul road extension along Golden Point Road alignment.

3.1.1.1 Coronation Pit

- Mining of the Coronation Pit ceased in 2021. There are currently no mining activities in Coronation Pit.
- Mining operations in Coronation Pit under MP4 are to recommence as per the schedule summarised in Table 1.
- The Coronation Stage 5 (CO5) Pit as currently mined has a footprint of approximately 48 ha. The MP4 extension to Coronation Pit (CO6 to CO8) will result in a pit footprint expansion of approximately 560 m toward the southeast. The MP4 extension to Coronation Pit will result in an overall increase to the pit footprint of 38 ha, to total approximately 86 ha.
- Accumulated water in Coronation Pit is to be pumped to the MWM system for use on-site.
- Upon closure of mining and dewatering operations, Coronation Pit Lake will progressively develop. Coronation Pit Lake will reach an eventual maximum depth of 90 m. Coronation Pit Lake will overflow to the south, at a spill elevation of 625 mRL and discharge into the upper catchment of Camp Creek upstream from the planned Camp Creek Dam. The median projected fill time is 23 years, reaching the overflow elevation in approximately 2055 (GHD 2026).

3.1.1.2 Coronation WRS

- Coronation WRS is located to the west of Coronation Pit and forms a section of the catchment divide between the Mare Burn catchment and Deepdell Creek catchment.
- Coronation WRS is currently not active. The batter slopes of the WRS have been capped and rehabilitated. The upper surface has not yet been capped and rehabilitated. The current WRS top surface is not designed to minimise rainfall infiltration.
- The WRS is to be shaped to blend into the surrounding landscape, capped and progressively rehabilitated.
- Coronation Silt Pond is located in the upper catchment of Camp Creek. This silt pond captures runoff and seepage water from Coronation WRS discharging toward the south.

3.1.1.3 Trimbell's WRS

- Trimbell's WRS is located to the east of Coronation Pit and forms a topographic divide between the Trimbell's Gully Creek and Coronation Pit.
- Trimbell's WRS is currently active, intermittently receiving waste rock from Coronation North Pit.
- The batter slopes of the WRS have been capped and rehabilitated. The current temporary WRS top surface is not designed to minimise rainfall infiltration.
- Upon completion of the MP4 mining operations in Coronation Pit, the WRS is to be shaped to blend into the surrounding landscape, capped and progressively rehabilitated.
- Trimbell's Silt Pond is located in the catchment of Trimbell's Gully Creek, at the eastern toe of Trimbell's WRS. This silt pond captures runoff and seepage water from Trimbell's WRS, and an area of undisturbed terrain, discharging toward the east.

3.1.2 Coronation North Area:

Key features relevant to this WQMP are:

- Coronation North is situated in the Taieri River catchment between Sister Peaks, Trimbell's Gully Creek and Coal Creek.
- Waterways influenced by Coronation North operations are Coal Creek, Maori Hen Creek, Trimbell's Gully Creek and Mare Burn.

3.1.2.1 Coronation North Pit

- Mining operations are currently active in Coronation North Pit. Currently consented mining operations will be completed in 2028 (Table 1) and a pause in operations will ensue.
- The Coronation North Stage 5 (CN5) Pit as currently mined has a footprint of 89 ha. The MP4 extension to the Coronation North Pit (CN6) will result in an overall increase to the pit footprint increase of approximately 14 ha, to a total of approximately 103 ha.
- Accumulated water in Coronation North Pit is to be pumped to the MWM system for use on-site.
- Upon closure of mining and dewatering operations, Coronation North Pit Lake will progressively develop. Coronation North Pit Lake will reach an eventual maximum depth of 117.5 m. Coronation North Pit Lake will overflow to the northwest, at a spill elevation of 562.5 mRL and discharge into the upper catchment of Coal Creek, upstream from the planned Coal Creek Dam. The median projected filling time is approximately 64 years, reaching the overflow in approximately 2099.

3.1.2.2 Coronation North WRS

- Coronation WRS is located to the east of Coronation North Pit.
- Coronation WRS is currently active, receiving waste rock from Coronation North Pit.
- The batter slopes of the WRS have been partially capped and rehabilitated. The current temporary WRS top surface is not designed to minimise rainfall infiltration.
- The WRS is to be shaped to blend into the surrounding landscape, capped and progressively rehabilitated.

3.2 Water Quality Management Measures

3.2.1 WRS – Source Water Quality and Contaminant Load Management

A key objective of WRS capping and rehabilitation is the reduction in long-term mean infiltration rates to approximately 5% of mean annual rainfall (approximately 32 mm/year).

Existing WRS construction practice at the Macraes Operation has focused on creating water retaining structures (i.e. restricting rainfall runoff and thereby promoting infiltration of rainfall). The purpose of this practice has been to prioritise erosion and sediment control, protecting receiving waters from sediment laden runoff prior to establishment of surface cover systems. The draw-back of this approach is that it increases infiltration rates and contaminant loads generated within the WRSs.

Currently, design features of WRS construction that contribute to increasing infiltration rates include:

- Capping being left incomplete, with the expectation that further wastes may be stored on top in the future.
- Top areas being reinstated while maintaining flat or dished surfaces, causing localised surface ponding.
- Windrows being retained preventing water shedding.
- Construction benches with reverse slopes retaining runoff from slopes as seen on Northern Gully WRS, Frasers West WRS and a localised area on Frasers East WRS.

Where the above features are retained, elevated infiltration rates can persist.

Future WRS designs are to incorporate the following water management features targeted at reducing infiltration and thereby reducing contaminant loads discharging from the WRS:

- WRS surfaces must be progressively rehabilitated during mining and as soon as practicable after each lift, surface, batter, bench or area of a WRS is no longer required for active placement, access, drainage, safety or operational purposes.
- Construction of each WRS is to be undertaken as set out in the WRS Management Plan. Specifically:
 - WRS lifts are to be as per construction zones set out in the WRS Management Plan. Each lift is to be constructed with a compacted upper surface that has a slope and layout designed to enhance runoff and reduce oxygen flux between lifts.
 - Engineered toe bunds are to be established to seal off underdrains discharging from the toe of the Coronation WRS, Coronation North WRS and Trimbells WRS. The objective of the toe bunds is to minimise oxygen flux entering the base of the WRS via underdrains. Specifically, toe bunds are to be constructed:
 - Into Coronation WRS above Coronation Silt Pond
 - Into Coronation North WRS above Māori Hen Silt Pond
 - Into Trimbells WRS above the proposed Trimbells Gully Silt Pond
 - In 3 minor tributaries contributing seepage from Trimbells WRS to Trimbells Gully
 - The final cap is to be designed and installed to maximise rainfall runoff, minimise infiltration and minimise erosion risk. The final cap is to be installed and the WRS rehabilitated as soon as possible following completion of the WRS.
- Existing completed WRSs shall be evaluated and where appropriate to promote runoff and reduce infiltration:
 - Where existing WRS caps have been constructed to reduce runoff, site-specific designs will be developed and implemented to enhance runoff and reduce infiltration.
 - Where existing benches have reverse slopes, retaining runoff from higher slopes, targeted shallow drains or regrading of the bench slope is to be investigated as a measure of reducing infiltration.

References

- WRS Management Plan
- WRS Capping Management Plan

3.2.2 Pit Lakes – Source Water Quality Management

Arsenic concentrations in water accumulating in Coronation Pit lake and Coronation North Pit lake following the close of mining operations are to be managed through dosing of the lakes with ferric chloride solution. It is projected that ferric chloride dosing could achieve dissolved arsenic removal rates of up to 88%.

The maximum pit lake arsenic concentration triggering the need for treatment is 0.042 g/m³. This is a maximum trigger as measured from surface sampling close to the pit lake overflow point. However, the decision made to instigate a dosing round should take into account arsenic trends in the pit lake water. Dosing to manage arsenic concentrations should occur before the concentration reaches the trigger level. Ferric chloride dosing frequency is to be determined through monitoring of pit lake water quality, as set out in Section 4.3.7.

Each ferric chloride treatment is expected to result in a sharp decrease in lake water concentration followed by a slow subsequent increase, leading to a sawtooth pattern in concentrations. It is expected multiple and ongoing treatments will be required to maintain the pit lakes below the targeted maximum concentration. Following dosing, arsenic concentrations in the pit lake may temporarily drop below 0.01 g/m³.

3.2.3 Diversion Channels – Source Water Contaminant Load Management

The key objective of installing WRS diversion channels is to minimise potential seepage through the WRS that could have been generated by ponding against the stack, and thereby reduce the volumes of WRS seepage water required to be caught and treated under Section 3.2.5.

Trimbells Gully Silt Pond currently receives runoff from both Trimbells WRS and adjacent natural ground. At present the flows entering Trimbells Gully Silt Pond are discharged to surface downstream from the pond.

A diversion channel around the southern side of Trimbells WRS is to be installed, to capture runoff from the undisturbed area to the south of the WRS. Water captured by this diversion drain is to be discharged to Trimbells Gully Creek, downstream from Trimbells Gully Silt Pond.

3.2.4 Silt Ponds – Hydraulic Management

Silt ponds are required by consent to be installed close downstream from the toe of each WRS to reduce silt loads discharging to surface receiving waters through the construction and immediate post-closure periods of WRs operations.

The primary function of each silt pond is to provide sufficient water storage capacity to slow runoff flows from the upstream WRS and thereby enable suspended sediment to settle to the base of the pond.

Silt ponds have been installed on:

- Maori Hen Creek, below Coronation North WRS
- Trimbells Gully, below Trimbells WRS

The planned expansion of Trimbells WRS under MP4 requires the downstream relocation of the Trimbells Gully silt pond.

3.2.5 Capture Drains and Sumps – Hydraulic Management

The key objective of installing WRS seepage capture drains and sumps is to minimise the contaminant mass loads discharging from WRSs in the catchment to Mare Burn.

Prior to application for the MP4 consents, no WRS seepage capture drains or sumps were required, or have been installed, in the Mare Burn catchment.

Following authorisation of the MP4 consents the following seepage capture drains and sumps are to be installed:

- Coronation North WRS:
 - A seepage capture drain around the northern toe of Coronation North WRS, linked to seepage collection sumps in each of the gullies intersected by the drain, as presented in Figure 3.
 - A seepage collection sump to receive water discharging from the toe of Coronation North WRS through the engineered toe bund to be established to seal off the underdrains discharging to the toe of Coronation North WRS.
 - Pumps are to be installed in each of the sumps, with the collected water to be discharged to the break tank identified in Figure 3, or an equivalent reservoir.
- Trimbells WRS:
 - Seepage collection sumps are to be installed to receive water discharging through the engineered toe bunds to be established in the toe of Trimbells WRS as presented in Figure 3.
 - Pumps are to be installed in each of the sumps, with the collected water to be discharged to the break tank identified in Figure 3, or an equivalent reservoir.
- All water collected from the sumps and seepage capture drains is to be pumped to the MWM system until the WTP is operational. Once the WTP is operational, all water collected from the sumps and seepage capture drains is to be pumped to the WTP.

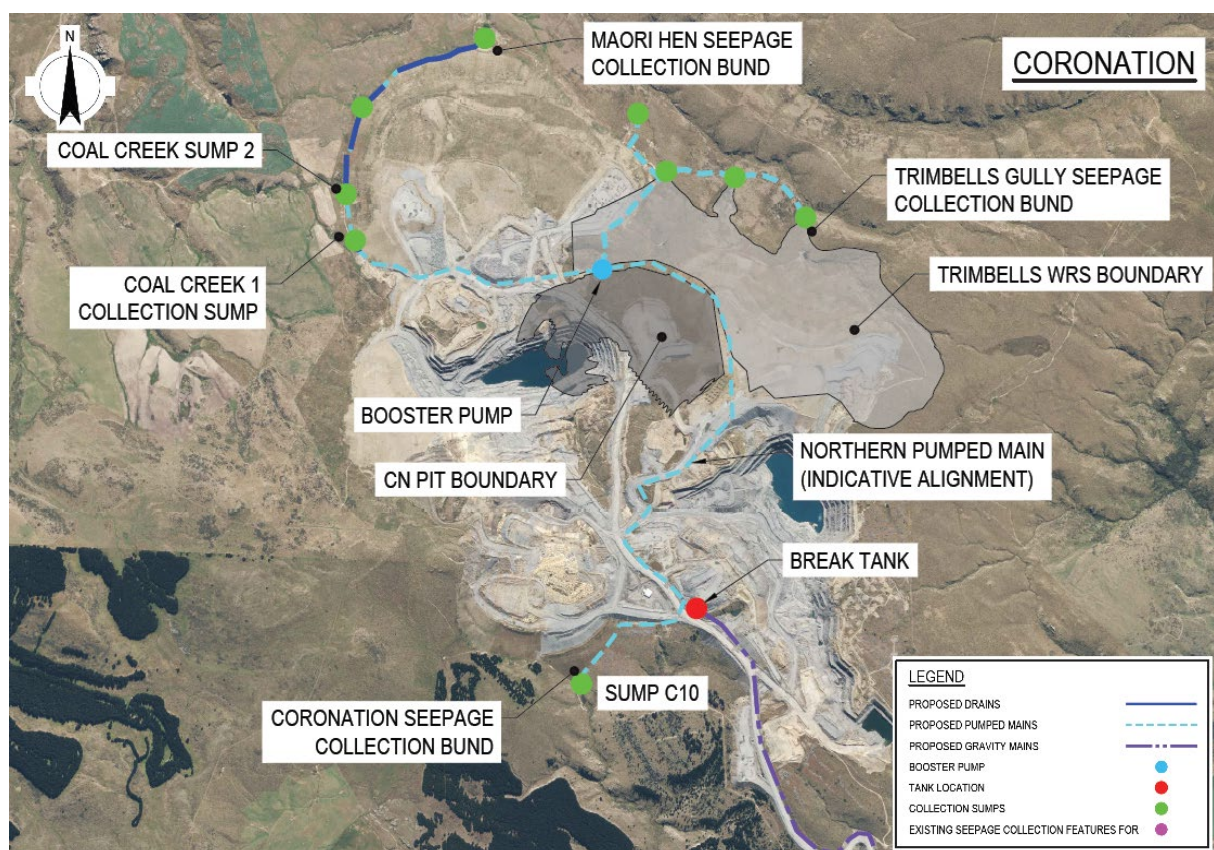


Figure 3: Seepage Capture Drains and Sumps – Coronation Area – Conceptual Layout

3.2.6 Coal Creek Freshwater Dam – Hydraulic Management

The consented Coal Creek Dam consists of an embankment with an approximate height of 27 m behind which approximately 0.67 million m³ of water can be stored when at full capacity, with a reservoir footprint of approximately 9.3 ha.

The objective of the installation and operation of Coal Creek Freshwater Dam is to help manage contaminant concentrations in Mare Burn during low flow periods, to comply with existing compliance criteria presented in Table 29 and ecological triggers identified in Table 32.

The purpose of the dam is to retain and discharge clean water into Coal Creek and Mare Burn to augment flows during dry periods so that acceptable water quality standards are maintained.

The consents that authorise the construction, operation and maintenance of Coal Creek Dam do not lapse and may be implemented at any time prior to their expiry on 24 April 2052.

The Coal Creek Freshwater Dam (Figure 4) is to provide a permanent flow of water to supplement naturally occurring low flows in Coal Creek and Mare Burn for water quality management purposes. The supplementary flows required are as follows:

- A minimum discharge to Coal Creek of 3 L/s from a floating decant, unless incoming flows to the dam are lower in which case the discharges can be reduced to correspond to the natural inflow rates.
- A variable discharge rate is to be pumped to a discharge point on Māori Hen Creek or the Mare Burn above MB01. The discharge is to be flow matched to flows at MB02 on Mare Burn as per Figure 5.
- Where the dam is at or above capacity, free discharge is to occur via a spillway to Coal Creek downstream from the dam.

Leakage through or under Coal Creek Freshwater Dam may be significant in term of contributing to the minimum discharge to Coal Creek of 3 L/s. Leakage rates may be determined through undertaking seepage flow measurements under a range of water level conditions in Coal Creek Freshwater Dam and deriving a flow to water level rating curve. Should the leakage losses be significant in terms of the constant discharge required, they can be deducted from the baseflow discharge requirement of 3 L/s. The release rate control system may be adjusted to be linked to water level in the lake. Any adjustment to the consented discharge rate would need to be reviewed and approved by ORC.

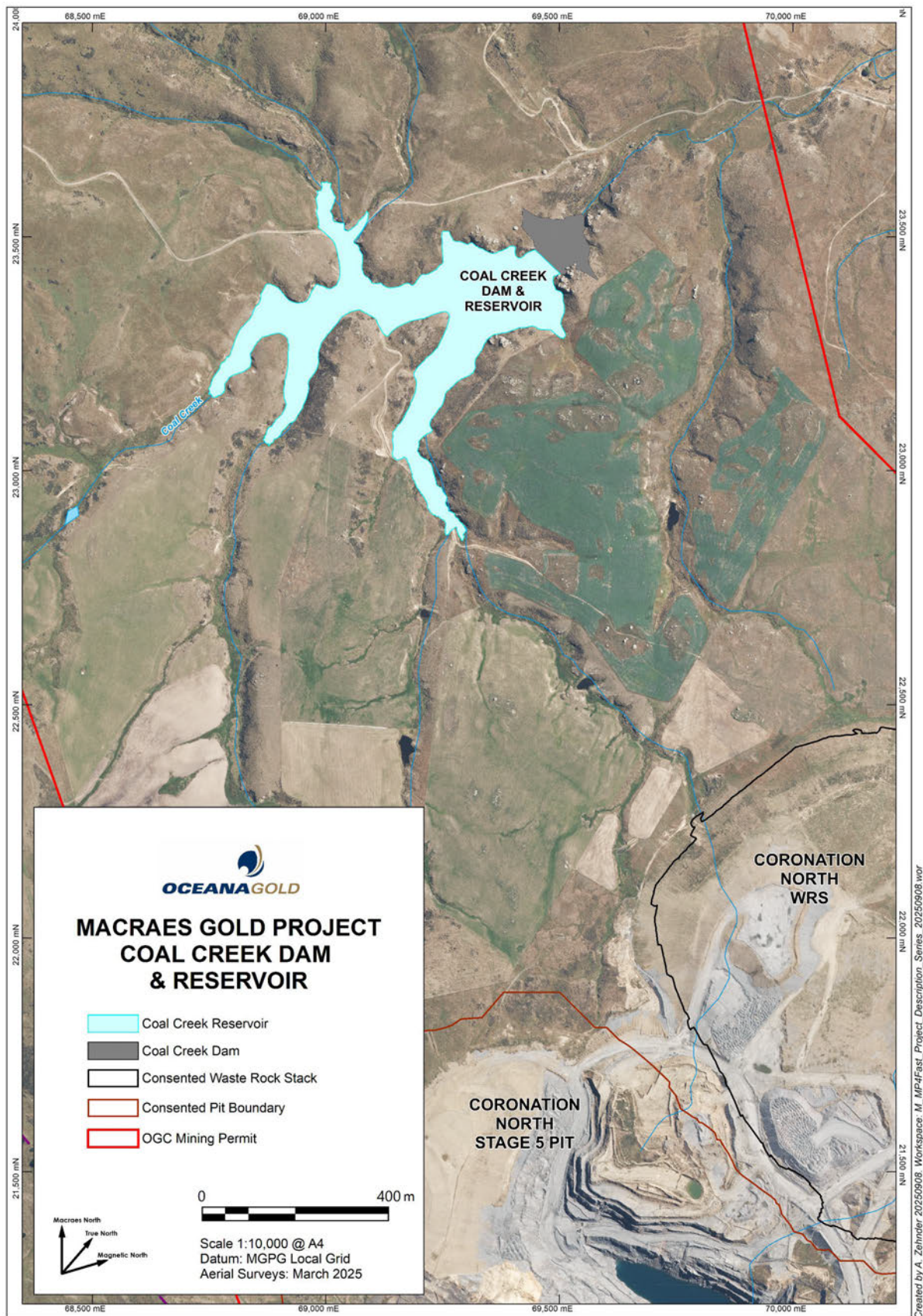


Figure 4: Location of Coal Creek Freshwater Dam

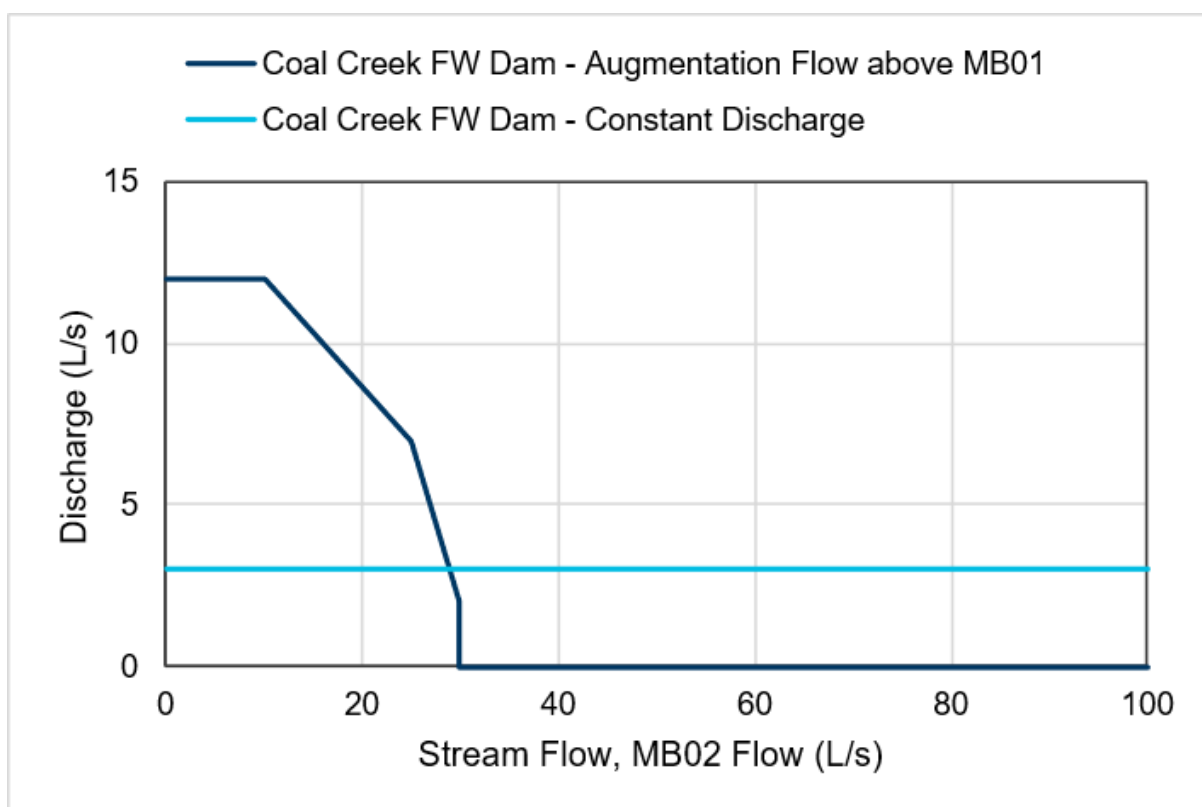


Figure 5: Coal Creek Freshwater Dam Discharge Curves

3.2.7 WTP Return Flows – Hydraulic Management

- Silt ponds for sediment control are installed prior to any disturbance within each catchment area. Upon closure silt ponds are to be decommissioned and may become stock water ponds.
- Surface water and groundwater collected in Coronation Pit is to be pumped out to a water sump adjacent to the pit. Water from this sump is to be used for dust control. Surplus water will be discharged via the closest silt pond.

Captured WRS seepage water from the Mare Burn catchment (Section 3.2.5) is to be treated at the WTP (Section 6) and returned to Mare Burn upstream from MB01. The return flows are less the portion of water lost in the treatment process.

The rates of return flow to Mare Burn have a degree of flexibility to help OceanaGold to address operational and environmental outcomes, as documented in Section 6.3.

3.2.8 Implementation Schedule

The downstream relocation of the Trimbells Gully silt pond is to be completed prior to the increase in the size of Trimbells WRS as authorised under MP4.

The Coal Creek Freshwater Dam is to be structurally complete no later than 42 months following the commencement of the MP4 consents.

The release of flushing flows from the freshwater dams and WTP discharges to manage eutrophication effects and periphyton growth through dry summers shall be initiated, if required, as soon as sufficient stored water is available in the Coal Creek Freshwater Dam.

Within 30 months of commencement of the MP4 consents, the capture drains and sumps are to have been constructed and seepage capture implemented at the locations identified in Figure 3.

Within 30 months of commencement of the MP4 consents the engineered toe bunds are to have been installed on Coronation WRS, Coronation North WRS and Trimbells WRS and the captured seepage delivered to capture sumps for pumping to the WTP.

3.3 Monitoring

All environmental monitoring for water flows and water quality are to be undertaken in accordance with the Water Monitoring Plan.

3.3.1 Surface Water – Flow Monitoring

3.3.1.1 Stream Flows

An automated surface water flow gauging site is to be installed at an appropriate physical location on Mare Burn, downstream from the confluence with Coal Creek and MB02, such that ongoing flow rates may be measured. The water levels and flows shall be recorded at intervals of 10 minutes, with the data transmitted using telemetry to the OceanaGold site office.

At least three manual flow gaugings shall be undertaken within six months of the surface water flow gauging site installation on Mare Burn at different flow rates to provide an accurate flow rating curve for the site.

Every two years an inspection of the flow gauging site shall be conducted to confirm the rating curve remains valid. Additionally, an inspection shall be made of the site if the flow data suggests there may have been a physical change at the site.

The objectives of monitoring at this site are to:

- Act as a flow monitoring point controlling the release of supplementary water to Mare Burn from the Coal Creek Freshwater Dam (Section 3.2.6).
- Verify the effectiveness of provision of supplementary flows to Mare Burn as a water quality mitigation measure.
- Enable the cumulative contaminant mass loads entering Mare Burn from mining operations in this catchment to be calculated for the compliance monitoring site at MB02.
- Verify the flows achieved at MB02 as a result of the targeted release of water from Coal Creek Freshwater Dam and other storages for stream eutrophication management purposes.

3.3.1.2 Pit Lake Overflows

Where the Coronation Pit lake and Coronation North Pit lake are nearing their respective long-term overflow levels, discharge weirs are to be constructed at their outlets and automated water level monitoring installed, such that ongoing flow rates may be measured. The water levels and flows shall be recorded at intervals of 10 minutes, with the data transmitted using telemetry to the OceanaGold site office.

At least three manual flow gaugings shall be undertaken at each of the pit lake discharge weirs as soon as possible following the start of overflow, at different discharge flow rates, to provide an accurate flow rating curve for each pit lake overflow monitoring site.

Every 2 years an inspection of the flow gauging sites shall be conducted to confirm the rating curve remains valid. Additionally, an inspection shall be made of the site if the flow data suggests there may have been a physical change at the site.

The objective of monitoring at these sites is to enable the contaminant mass loads entering Deepdell Creek through overflows from Coronation Pit lake and Coronation North Pit lake to be calculated.

3.3.2 Pit Lake Level Monitoring

Once pit dewatering ceases and pit lakes begin to form, development rates for the Coronation Pit lake and Coronation North Pit lake are to be monitored by taking manual water level readings at monthly intervals (or more frequently). As an option, automated water level monitoring sensors may be utilised.

The objectives of monitoring pit lake levels are:

- To enable the contaminant mass load accumulating in the pit lake over time to be calculated
- To enable the accuracy of the projected pit lake overflow date to be improved
- To confirm likely overflow rates in advance of the pit lakes reaching overflow

3.3.3 Surface Water Quality – Compliance Monitoring

Surface water samples shall be obtained for compliance monitoring purposes at the sites and frequency listed in Table 2. Sample parameters are to be Type A as presented in Table 25.

Table 2: Water Quality Compliance Monitoring Sites – Mare Burn

SITE	FREQUENCY	DESCRIPTION	NZTM (NORTHING)	NZTM (EASTING)
MB01	Monthly	Mare Burn between Māori Hen and Coal Creek confluences	4980418	1393885
MB02	Monthly	Mare Burn below Coal Creek confluence	4980552	1392955

Table 3: Aquatic Biological Compliance Monitoring Components and Frequency – Mare Burn

SAMPLE TYPE	FREQUENCY	SITES	METHODS
Aquatic flora ⁽¹⁾	Summer (Dec-Feb) Autumn (Mar-May) Spring (Sep-Nov)	MB01, MB02	Visual assessment of percentage cover of filamentous algae, mat-forming algae, macrophytes and moss.
Benthic macroinvertebrates	Summer (Dec-Feb) Autumn (Mar-May) Winter (Jun-Aug) Spring (Sep-Nov)	MB01, MB02	Taxonomic composition and abundance. Sampling shall include calculation of the macroinvertebrate community index (MCI) and the quantitative MCI (QMCI).
Fish	Late summer (Feb-Mar)	MB01, MB02	Taxonomic composition and abundance, by electric fishing survey.

Notes:

⁽¹⁾ Aquatic flora monitoring supports the ecological response trigger assessment described in Viridis (2026a). The visual cover-based method is consistent with monitoring undertaken under existing Macraes Operation consents and is proposed for MP4.

3.3.4 Surface Water Quality – Other Monitoring

The objectives of undertaking additional surface water quality monitoring in the Mare Burn catchment are:

1. To provide control site data for comparison with Compliance Monitoring site results, in case trigger value exceedances at the Compliance Monitoring site are a result of upstream or background water quality trends.
2. To enable the development of correlations between Electrical Conductivity (EC) monitoring results and contaminant concentrations, where possible. If such correlations can be developed, the automated monitoring system may provide more detailed indications of contaminant concentration trends than are possible using manual sampling alone.

Automated Monitoring Sites

An automated surface water quality monitoring site is to be established at the same location as the automated flow monitoring station described in Section 3.3.1. The following parameters shall be recorded at intervals of 10 minutes, aligned with the flow recording frequency, with the data transmitted using telemetry to the OceanaGold site office. The parameters to be measured are:

- EC
- pH
- Temperature
- Turbidity

Control Monitoring Sites

One water quality control monitoring site is proposed for the Mare Burn catchment. Surface water samples shall be obtained for control monitoring purposes at the site and frequency listed in Table 4. Sample parameters are to be Type A as presented in Table 25.

Table 4: Water Quality Control Monitoring Sites – Mare Burn

SITE	FREQUENCY	DESCRIPTION	NZTM (NORTHING)	NZTM (EASTING)
MB00	Monthly	Mare Burn upstream of confluence with Māori Hen Creek	4980498	1394306
WD01	Monthly	Wild Dog Creek upstream of confluence with Mare Burn	4980429	1393616

Additional Monitoring Sites

Additional monitoring sites are defined and used to provide early indication of water quality trends, inform the development of new water quality management and mitigation measures, and inform environmental effects assessments. These sites are monitored voluntarily by OceanaGold and are subject to change as required to meet OceanaGold's purposes.

Two additional surface water quality monitoring sites are currently designated in the Mare Burn catchment (Table 5). Sample parameters are to be Type A as presented in Table 25.

Table 5: Water Quality Additional Monitoring Sites – Mare Burn

SITE	FREQUENCY	DESCRIPTION	NZTM (NORTHING)	NZTM (EASTING)
TG02	Monthly	Trimbells Gully	4979511	1395142
CCMP01	Monthly	Coal Creek	4980236	1392985

3.3.5 WRS Seepage Monitoring

3.3.5.1 Flows

Flow monitoring stations are currently installed on the discharge points from Maori Hen Silt Pond and Trimbells Gully Silt Pond. The flow data is to be recorded at intervals of 10 minutes, with the data transmitted using telemetry to the OceanaGold site office.

Automated cumulative volume monitoring systems are to be installed on the following mine water riser pipes:

1. From the Coal Creek sumps and Coronation North WRS seepage collection drains to the booster pump (Figure 3).
2. From the Trimbells WRS seepage collection sumps to the booster pump (Figure 3).

Water volumes shall be recorded at intervals of 10 minutes, with the data transmitted using telemetry to the OceanaGold site office.

3.3.5.2 Water Quality

Water quality monitoring site for mine water discharging from WRSs are proposed at the sites and sampling frequency listed in Table 6. The site locations are presented in Figure 3. Sample analysis parameters are to be Type C as presented in Table 25.

Table 6: Water Quality WRS Monitoring Sites – Mare Burn

SITE	FREQUENCY	DESCRIPTION	NZTM (NORTHING)	NZTM (EASTING)
Maori Hen Gully Seepage	Monthly	Coronation North WRS Seepage.	4979604	1394528
Coal Creek Seepage 2	Monthly	To be replaced by a measurement in the Māori Hen silt pond once the seepage capture system is implemented.	4978992	1393807
Coal Creek Seepage 1	Monthly	Northern seep from western aspect of Coronation North WRS	4978784	1393874
Trimbells Gully Silt Pond	Monthly	Southern seep from western aspect of Coronation North WRS	4978697	1395886
Trimbells Gully Drain	Monthly	To be relocated as WRS is expanded	4978697	1395886

Continuous EC measurements are to be recorded at each flow monitoring location associated with the WRS seepage capture systems, as listed in Section 3.2.5. The objective is to enable the development of correlations between EC monitoring results and contaminant concentrations, where possible. If such correlations can be developed, the automated monitoring system may provide more detailed indications of contaminant concentration trends in WRS discharges than are possible using manual sampling alone.

3.3.6 Pit Lake Monitoring

Following the close of mining and dewatering operations in Coronation Pit and Coronation North Pit, and the start of pit lake development in each of these pits, lake water quality monitoring shall be undertaken at the site and frequency listed in Table 7. Sampling as set out in Table 7 shall continue until the pit lake reaches overflow and then into the future. Sample parameters are to be Type B as presented in Table 25.

The objectives of the monitoring are to:

- Confirm the validity of the predictive water quality modelling undertaken in support of the MP4 consents.
- Enable decisions to be made regarding the frequency and timing of ferric chloride dosing to manage arsenic concentrations in the lake water (Section 3.2.2).

Table 7: Water Quality Monitoring Sites – Pit Lakes

SITE	FREQUENCY	DESCRIPTION	SAPLE TYPE
CO01	Monthly	Coronation Pit lake	Grab sample of shallow water in pit lake
CN01	Monthly	Coronation North Pit lake	Grab sample of shallow water in pit lake

In addition to the monthly sampling of lake surface waters, vertical lake water quality profiles are to be obtained once the pit lakes have exceeded a depth of 20 m. These profiles are to be sampled quarterly, with the profile targeting the deepest point in the lake. The profiles are to be obtained through depth-specific water sampling at 5 m depth intervals through the full depth of the pit lake water column.

3.3.7 Groundwater Monitoring

The groundwater monitoring programme incorporates both existing monitoring wells and new groundwater monitoring wells to allow for characterisation of groundwater influenced by the MP4 project.

3.4 Compliance Criteria

3.4.1 Narrative Standard for Receiving Waters

The waters of the Mare Burn shall at all times be free of contaminants attributable to mineral processing and associated activities in concentrations which adversely affect directly or indirectly water uses or which adversely affect humans, animals, plants and/or aquatic life.

3.4.2 Numerical Compliance Criteria

Prior to Completion of Mining Phase A

Surface water within the Mare Burn at the Compliance Points MB01 and MB02 shall not exceed the water quality compliance criteria shown in Table 29 unless infallible evidence can be provided that the level of a parameter is either naturally occurring or unrelated to mining activities.

Following Completion of Mining Phase A

Surface water within the Mare Burn at the Compliance Point MB01 and MB02 shall not exceed the water quality compliance criteria shown in Table 32 unless infallible evidence can be provided that the level of a parameter is either naturally occurring or unrelated to mining activities.

4 SHAG RIVER/WAIHEMO CATCHMENT

4.1 Catchment Elements

Much of the central area of the Macraes Operation is located within the Waihemo (Shag) River Catchment, including:

- Tailings Storage Facilities (TSFs):
 - The Mixed Tailings Impoundment (closed, to be partially removed through hydromining).
 - Southern Pit SP10 and SP11 TSFs (closed, to be removed through hydromining).
 - Top Tipperary TSF (TTTSF, active approaching closure).
 - Frasers TSF (operational).
- Opencast Pits:
 - Innes Mills Pit (backfilled, to be reopened and actively mined).
 - Southern Pit (closed and filled by SP10 and SP11 TSFs).
 - Golden Point Pit (actively dewatered, partly backfilled).
 - Deepdell South Pit (backfilled and rehabilitated).
 - Deepdell North Pit (under interim management, actively used as a pit sump for MWM system transfers between Coronation Area and the Process Plant, and in relation to the Deepdell WRS seepage collection).
- Waste Rock Stacks (WRSs):
 - Northern Gully WRS (closed and rehabilitated).
 - Deepdell West WRS (backfill into a section of Deepdell North Pit, closed and rehabilitated).
 - Deepdell East WRS (backfilled Deepdell South Pit, closed and rehabilitated).
 - Coronation WRS (closed and undergoing rehabilitation).
- Underground Mines:
 - The Golden Point Underground Mine (GPUG) (active).
 - The Frasers Underground Mine (FRUG) (closed and filling with water).
- The Processing Plant.
- The Lone Pine water reservoir.

Key features of the Shag River/Waihemo catchment relevant to this WQMP are:

- The Shag River/Waihemo catchment includes the Camp Creek, Deepdell Creek, Cranky Jims Creek and McCormicks Creek and Tipperary Creek sub-catchments, all of which are influenced the Macraes Operation. Additionally, water quality in the Shag River/Waihemo catchment upstream from the confluence with McCormicks is influenced by land uses outside the Macraes Operation. A key additional catchment area is Shag River/Waihem catchment upstream from the confluence with Deepdell Creek.
- Surface water takes for private potable water supplies are located on the Shag River/Waihemo between the Loop Road and McCormicks compliance monitoring points (Figure 16) and downstream from the McCormicks Creek confluence.

4.1.1 Coronation Area

4.1.1.1 Coronation Pit

- Mining of the Coronation Pit ceased in 2021. There are currently no mining activities in Coronation Pit.
- Mining operations in Coronation Pit under MP4 are to recommence as per the schedule summarised in Table 1.

- The currently authorised Coronation Stage 5 (CO5) Pit has a footprint of 85 ha. The MP4 extension to Coronation Pit (CO6 to CO8) will result in a pit footprint increase of approximately 40 ha, to total approximately 125 ha.
- Accumulated water in Coronation Pit is to be pumped to the MWM system for use on-site.
- Upon closure of mining and dewatering operations, Coronation Pit Lake will progressively develop. Coronation Pit Lake will reach a maximum depth of 90 m. Coronation Pit Lake will overflow to the south, at a spill elevation of 625 mRL and discharge into the upper catchment of Camp Creek upstream from the planned Camp Creek Dam. The median projected fill time is 23 years, reaching the overflow elevation in approximately 2055 (GHD 2026).

4.1.1.2 Coronation WRS

- Coronation WRS is located to the west of Coronation Pit and forms a section of the catchment divide between the Mare Burn catchment and Deepdell Creek catchment.
- Coronation WRS is currently not active. The batter slopes of the WRS have been capped and rehabilitated. The upper surface has not yet been capped and rehabilitated. The current WRS top surface is not designed to minimise rainfall infiltration.
- The WRS is to be shaped to blend into the surrounding landscape, capped and progressively rehabilitated.
- Coronation Silt Pond is located in the upper catchment of Camp Creek. This silt pond captures runoff and seepage water from Coronation WRS discharging toward the south.

4.1.2 Deepdell Area

4.1.2.1 Deepdell North Pit

Deepdell North Pit (DN3) was constructed under existing consents and is not part of the MP4 consents package. The western section of the pit was previously constructed to an area of 18.7 ha and completely backfilled prior to construction of the DN3 pit form. The current pit has an area of approximately 38 ha. Ore extraction operations in the pit have been completed. The older backfilled areas of Deepdell North Pit have been capped and rehabilitated.

The pit is currently managed as an active pit sump. In addition to direct rainfall and runoff from the immediate catchment, the pit receives mine water pumped from the Coronation Area, including water derived from dewatering of Coronation North Pit. Water from Deepdell North Pit is pumped to the Process Plant for use on site. Therefore, both the rate of pit lake water level rise and the lake water quality are not representative of natural pit lake development.

4.1.2.2 Deepdell East WRS

Deepdell East WRS was constructed under existing consents, with no further waste rock storage planned for this area. The WRS has a footprint of approximately 70.6 ha and a total storage of 59.5 Mt. The WRS is currently partially rehabilitated.

4.1.2.3 Deepdell West WRS

Deepdell West WRS was constructed under existing consents, with no further waste rock storage planned for this area. The WRS has a footprint of approximately 70.6 ha and a total storage of 59.5 Mt. The WRS is currently partially rehabilitated.

4.1.3 Central Area

4.1.3.1 Tailings Impoundments

Mixed Tailings Impoundment (MTI)

The MTI embankment has been raised to 551 mRL and the tailings storage capacity filled to an approximate elevation of 548 mRL. No tailings are currently being deposited to the MTI. The tailings surface is currently partially rehabilitated.

Under MP4, tailings from MTI will be relocated using a hydromining process to facilitate full mining of IM13, reducing the height of the MTI embankment to 515 mRL, and reducing the tailings material height to 512 mRL. The remaining MTI below 515 mRL will remain in place. The MTI will then be closed again and rehabilitated.

Mine water discharging from the MTI drainage systems is currently collected and returned to the MWM system. This management of the drainage water is to continue through the hydromining period and until the end of Mining Phase B, after which time the drainage water is to be pumped to the WTP.

Southern Pit Impoundment (SP10 and SP11 TSF)

The SP11 TSF embankment was completed to an elevation of 544RL in May 2011 and the tailings storage capacity filled. There has been no further embankment construction on SP11 and no tailings are currently being deposited to SP11. The SP10 TSF, including its embankment, is completely subsumed within the SP11 TSF. The tailings surface is partially rehabilitated.

Under MP4 all tailings stored within SP11 and SP10 will be relocated to Frasers TSF using a hydromining process. The embankments for both TSFs will be removed and both SP11 and SP10 TSFs will cease to exist.

The SP10 and SP11 TSFs together hold approximately 26 Mt of tailings. All tailings contained within SP10 and SP11 TSF will be relocated to Frasers TSF using a hydromining process, to facilitate full mining of IM13. Hydraulic mining will source water from within the MWM system. The SP11 embankment will remain in place unless removal is required to facilitate safe pit lake development and drainage.

Frasers TSF

Frasers TSF Stage 1 was consented as part of the initial Continuity Consent Project (CCP1) in 2024 and started receiving tailings in March 2025. Frasers TSF Stage 2 was consented as part of the CCP2, providing a currently consented tailings storage capacity of 35 Mt.

The MP4 project includes construction of Frasers TSF Stage 3 to accommodate an additional 88 Mt of tailings storage. This capacity provides for the full MP4 LOMP, including receipt of tailings relocated from SP10/11 and MTI. This will bring the total tailings storage capacity of Frasers TSF to 123 Mt of tailings. As per Frasers TSF Stage 2, Stage 3 involves increasing the height of the existing waste rock embankment backfill between Frasers Pit and Innes Mills Pit. Constructing Frasers TSF Stage 3 includes increasing the height of the embankment from 480 mRL to 520 mRL. The final embankment will accommodate Stage 2 of the Macraes Road realignment.

During operational deposition of tailings in Frasers TSF, the decant pond is to be located toward the south-west side of Frasers Pit. As tailings surpass approximately 500 mRL, deposition will be changed to progressively form the proposed closure landform. This will require repositioning of spigots and the decant pond to develop a final tailings surface falling from the south-east toward the north-west. The decant pond will be relocated to the northwestern corner of the impoundment. The final tailings surface will be at approximately 519.5 mRL on the eastern side of the facility, grading down towards the north-west to approximately 509 mRL at the western extent.

At closure the Frasers TSF is to be dry capped. It is not necessary to restrict infiltration through the cap in the manner required for the WRS caps. However, the general cap design is likely to be similar to WRS cap designs in terms of the use of drainage systems and cap form to discharge runoff to the spillway without incurring significant erosion. The spillway to discharge runoff from Frasers TSF to the NBWR will ultimately be cut through the western embankment with an invert set to the tailings level of 509 mRL.

Although Frasers TSF is located within the NBWR catchment rather than the catchment of the Shag River, pore water from the tailings mass stored in Frasers TSF is expected to seep through the embankment between the TSF and Innes Mills Pit. Therefore, Frasers TSF needs to be taken into account when considering the eventual water quality in Deepdell Creek and the Shag River/Waihemo.

4.1.3.2 Opencast Pits

Innes Mills Pit

Following the relocation of the SP11 and SP10 tailings, MP4 incorporates an extension of Innes Mills Pit toward the north, east and west into the Southern Pit area (IM11 to IM13). The proposed extensions will result in an overall increase to the Innes Mills Pit footprint of approximately 49 ha.

Approximate additional material quantities expected from the mining of the extended Innes Mills Stages 11 to 13 pits are 36.3 Mt ore; 276.1 Mt waste rock and 59.2 Mt relocated tailings.

On closure of the pit, a pit lake will start to develop. The developing pit lake will submerge the lower levels of the Innes Mills WRS, the lower levels of which are emplaced as backfill within the Innes Mills Pit. The median pit lake filling time is predicted to be approximately 62 years, with the pit lake overflow level of 473 mRL being reached in approximately 2098.

The Innes Mills Pit lake spillway is to discharge from the northern edge of the pit rim, along the western side of Round Hill Pit and discharging into Battery Creek upstream from Battery Creek Silt Pond. As the water level in the pit lake rises, groundwater seepage will start to flow northward out of Innes Mills Pit lake and report to Round Hill Pit.

4.1.4 Tipperary Creek Area

4.1.4.1 Top Tipperary TSF (TTTSF)

The TTTSF is located within the Tipperary Creek catchment. TTTSF was constructed and operated under existing consents and does not form part of the MP4 consents package.

OceanaGold currently holds Discharge Permits RM10.351.16_V3 and RM10.351.17_V3 covering discharge of mine tailings and contaminants from mine tailings to land and water, respectively, for the purpose of disposing of mine process tailings in the Top Tipperary Tailings Storage Facility (part of the Macraes Phase III Expansion Project).

Water quality details relating to the management of sediment (pursuant to Discharge Permit Consents numbered RM10.351.13, RM10.351.20 and RM10.351.23) are contained in the Oceana Gold (NZ) Ltd, Erosion and Sediment Control Plan (ESCP).

TTTSF is currently intermittently operational, with tailings being locally deposited to produce a base for the final landform prior to capping.

Water from the decant pond on top of TTTSF is pumped back to the MWM system for use in the Processing Plant. Water discharging from drains installed along the TTTSF embankment and under the tailings mass is captured in the TTTSF Sump and pumped back to the MWM system.

Consents are in place authorising the post-closure injection of tailings seepage water captured from the TTTSF drainage systems to be injected into the FRUG workings. These consents predate the conversion of Frasers Pit into a TSF. Although these consents have not been relinquished to date, there is no current plan to inject captured tailings drainage water into FRUG.

4.1.4.2 Frasers East WRS

The construction of Frasers East WRS was authorised under existing resource consents and this WRS does not form part of the MP4 consents package. Frasers East WRS has been closed, capped and rehabilitated. No further waste rock storage planned for this area.

Although Frasers East WRS forms part of the physical catchment divide between the Shag River/Waihemo catchment and the NBWR catchment, hydraulically seepage water from the Frasers East WRS discharges westward into the NBWR catchment.

4.1.5 Golden Point Underground (GPUG)

GPUG is an established underground mine with surface access via two portals on the eastern highwall of Golden Point Pit. One portal accesses the haulage decline, which is used for the intake for fresh air, and facilitates movement of personnel and materials, including ore and waste in and out of GPUG. The other is the ventilation return discharge point with the ventilation fans at the portal.

Resource consents for GPUG were first obtained in 2020 and in 2023 new/varied consents were obtained to authorise an underground expansion of GPUG. The proposed GPUG envelope under MP4 is identified in Figure 6. The eastern extent of the proposed envelope has not yet been explored (drilled), meaning there is a level of uncertainty regarding the resource that exists in this area.

Mining in the area of GPUG that extends toward and below Deepdell Creek is subject to a Deepdell Creek Flow and Water Quality Management Plan, which requires a source of water be available to augment flows in Deepdell Creek. This is one of the reasons for the planned construction of the Camp Creek Dam (Section 4.2.6).

The proposed expansion of GPUG is anticipated to generate 256,000 m³ of waste rock. OGNZL holds existing resource consents authorising four small waste rock stacks associated with GPUG (with measurements shown as approximate values):

- Two waste rock stacks (backfilling) located at the north and south ends of the now defunct Golden Point Pit.
 - Waste rock stack 1 was consented to have a footprint of 1.7 ha, height of 40 m and volume of 600,000 m³.
 - Waste rock stack 2 was consented with a footprint of 2.5 ha, height of 30 m and volume of 300,000 m³.
- Waste rock stack 3 to the immediate west of Golden Point Pit on a previously worked site was consented with a footprint of 1.5 ha, height of 15 m and a volume of 200,000 m³.
- Waste rock stack 4 to the immediate west of the Coronation Haul Road and adjacent to the Processing Plant was consented with a footprint of approximately 2.3 ha, height of 30 m and 400,000 m³

These waste rock stacks contain sufficient residual capacity to support the proposed GPUG extension.

The GPUG extension will require ongoing use of operational water. This operational water will be sourced from the MWM system, likely the existing Golden Point Pit sump. The water demand for GPUG is expected to be around 5 to 10 L/s (430 m³/day to 860 m³/day) as per the existing operation. Once used, this operational water mixes with groundwater seepages from the surrounding rock mass.

Accumulated water GPUG flows back to the haulage decline under gravity, where it is collected in underground sumps. The water is then pumped to the surface via a series of pumps to the Round Hill in-pit sump, from here it is pumped to the MWM system.

Seepage water from the two WRSs located inside the Golden Point Pit collects in the Round Hill Pit sump. Seepage water from the two WRSs located outside the Golden Point Pit is directed to the Battery Creek Silt Dam.

4.1.6 Frasers Underground (FRUG)

FRUG extends eastward from Frasers Pit underneath the Frasers East WRS and the western section of TTTSF. The underground extractive workings extend from a depth of approximately 210 m to 910 m bgl (approximately 350 mRL down to -355 mRL) and cover an area of 180 ha. There is no expression of FRUG workings within the Tipperary catchment and no indication of environmental effects arising from FRUG in the Tipperary Creek catchment.

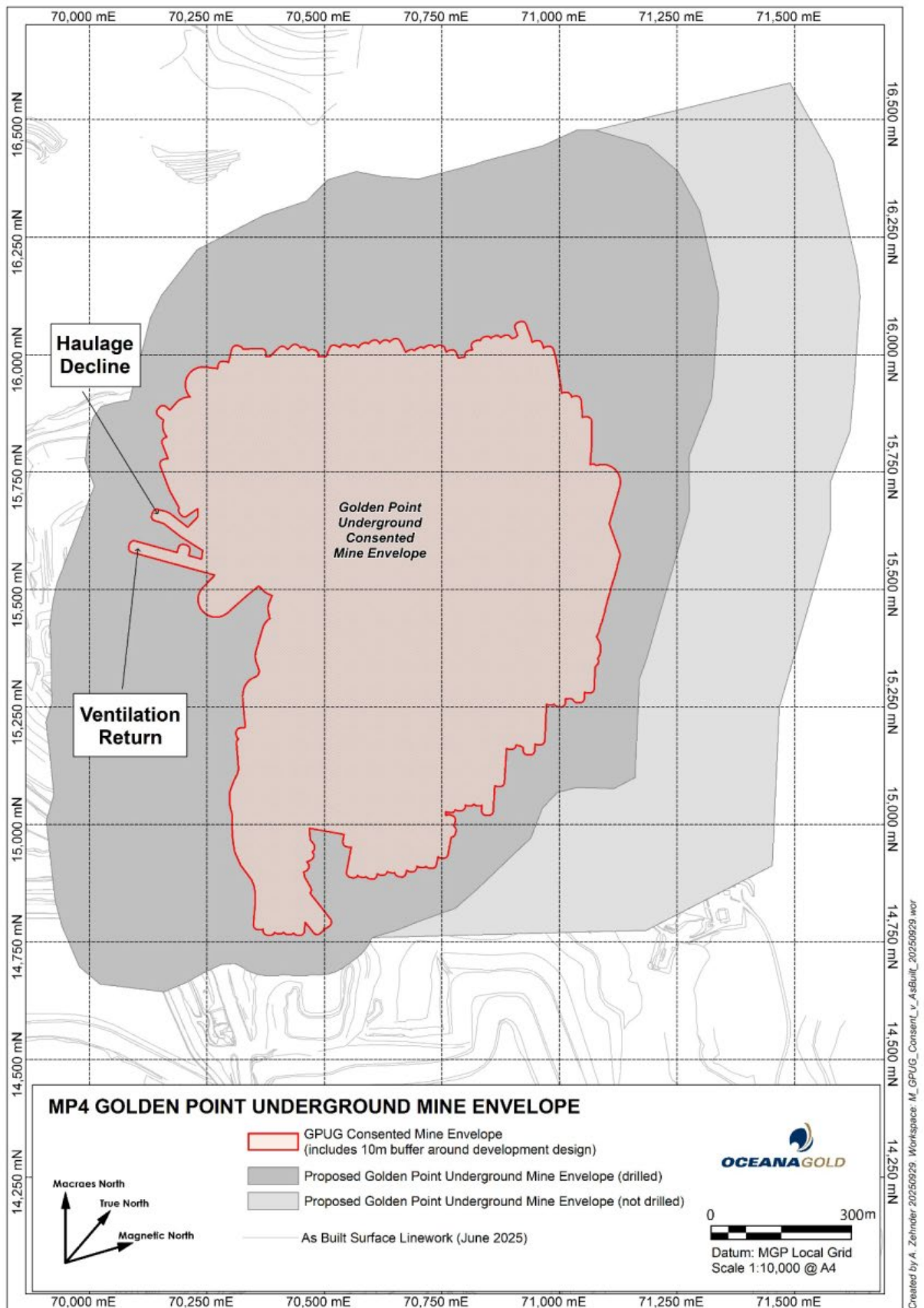


Figure 6: MP4 Golden Point Underground Mine Envelope

4.2 Water Quality Management Measures

4.2.1 Frasers TSF – Source Water Quality and Contaminant Load Management

Frasers TSF is outside the surface water catchment for the Shag River. to be closed as a dry capped TSF, with the expectation that groundwater within the stored tailings will be at shallow depth below the tailings cap surface.

The tailings mass stored in Frasers TSF is not expected to generate contaminant loads equivalent to those produced by the drainage systems installed in the MTI and TTTSF.

Under MP4, tailings levels are to rise within Frasers TSF while tailings in the SP10 and SP11 TSFs are being relocated and mining operations in Innes Mills Pit are underway. Hydrodynamic pore water pressures are likely to develop within the tailings, with tailings pore water being forced upward to discharge to surface in the decant pond. A groundwater hydraulic gradient will develop within the backfill embankment between Frasers TSF and Innes Mills Pit, with the flow being toward Innes Mills Pit. Hydrodynamic pore water pressures will accentuate this gradient. Prior to closure of the Macraes Operation the consequent seepage does not represent an issue as such seepage flows are managed within the MWM system. However, following closure, pumping from Innes Mills Pit will cease and the pit lake will start to develop. Contaminants from Frasers TSF will contribute to changing water quality in Innes Mills Pit.

Drainage systems are to be installed within the upper tailings mass along the northern edge of Frasers TSF to enable tailings pore water overpressures to discharge to surface. These drainage systems are to be incorporated in the Frasers TSF design. The objective of this drainage system is to help manage contaminant loads entering Innes Mills Pie lake.

4.2.2 WRS – Source Water Quality and Contaminant Load Management

A key objective of WRS capping and rehabilitation is the reduction in long-term mean infiltration rates to approximately 5% of mean annual rainfall (approximately 32 mm/year).

Existing WRS construction practice at the Macraes Operation has focused on creating water retaining structures (i.e. restricting rainfall runoff and thereby promoting infiltration of rainfall). The purpose of this practice has been to prioritise erosion and sediment control, protecting receiving waters from sediment laden runoff prior to establishment of surface cover systems. The draw-back of this approach is that it increases infiltration rates and contaminant loads generated within the WRSs.

Currently, design features of WRS construction that contribute to increasing infiltration rates include:

- Capping being left incomplete, with the expectation that further wastes may be stored on top in the future.
- Top areas being reinstated while maintaining flat or dished surfaces, causing localised surface ponding.
- Windrows being retained, preventing water shedding.
- Construction benches with reverse slopes retaining runoff from slopes as seen on Northern Gully WRS, Frasers West WRS and a localised area on Frasers East WRS.

Where these features are retained, it is expected that elevated infiltration rates are likely to persist.

Frasers East WRS and Deepdell East WRS have been capped with rounded profiles and a generally more water shedding profile. Infiltration rates to these WRSs are expected to be lower on these stacks. To date there is no performance monitoring to verify the outcomes of this capping.

Future WRS designs are to incorporate the following water management features targeted at reducing infiltration and thereby reducing contaminant loads discharging from the WRS:

- WRS surfaces must be progressively rehabilitated during mining and as soon as practicable after each lift, surface, batter, bench or area of a WRS is no longer required for active placement, access, drainage, safety or operational purposes.
- Construction of each WRS is to be undertaken as set out in the WRS Management Plan. Specifically:
 - WRS lifts are to be as per construction zones set out in the WRS Management Plan. Each lift is to be constructed with a compacted upper surface that has a slope and layout designed to enhance runoff and reduce oxygen flux between lifts.
 - Engineered toe bunds are to be established to seal off the underdrains discharging to the toe of the Coronation WRS, Coronation North WRS and Trimbells WRS. The objective of the toe bunds is to minimise oxygen flux entering the base of the WRS via underdrains.
 - The final cap is to be designed and installed to maximise rainfall runoff, minimise infiltration and minimise erosion risk. The final cap is to be installed and the WRS rehabilitated as soon as possible following completion of the WRS.
- Existing WRSs shall be evaluated and where appropriate to promote runoff and reduce infiltration:
 - Where existing WRS caps have been constructed to reduce runoff, site-specific designs will be developed and implemented to enhance runoff and reduce infiltration.
 - Where existing benches have reverse slopes, retaining runoff from higher slopes, targeted shallow drains or regrading of the bench slope is to be investigated as a measure of reducing infiltration.

References:

- WRS Management Plan
- WRS Capping Management Plan

4.2.3 Pit Lakes – Source Water Quality Management

Arsenic concentrations in water accumulating in Innes Mills Pit lake following the close of mining operations are to be managed through dosing of the lakes with ferric chloride solution. It is projected that ferric chloride dosing could achieve dissolved arsenic removal rates of up to 88%.

The maximum pit lake arsenic concentration triggering the need for treatment is 0.042 g/m³. This is a maximum trigger as measured from surface sampling close to the pit lake overflow point. However, the decision made to instigate a dosing round should take into account arsenic trends in the pit lake water. Dosing to manage arsenic concentrations should occur before the concentration reaches the trigger level. Ferric chloride dosing frequency is to be determined through monitoring of pit lake water quality, as set out in Section 4.3.7.

Each ferric chloride treatment is expected to result in a sharp decrease in lake water concentration followed by a slow subsequent increase, leading to a sawtooth pattern in concentrations. It is expected multiple and ongoing treatments will be required to maintain the pit lakes below the targeted maximum concentration. Following dosing, arsenic concentrations in the pit lake may temporarily drop below 0.01 g/m³.

Although not subject to the conditions of MP4, the same water quality management measures should apply to Deepdell North Pit lake.

4.2.4 Silt Ponds – Hydraulic Management

Silt ponds are required by consent to be installed close downstream from the toe of each WRS to reduce silt loads discharging to surface receiving waters through the construction and immediate post-closure periods of WRS operations. The primary function of each silt pond is to provide sufficient water storage capacity to slow runoff flows from the upstream WRS and thereby enable suspended sediment to settle to the base of the pond.

4.2.5 Capture Drains and Sumps – Hydraulic Management

The key objective of installing WRS seepage capture drains and sumps is to minimise the contaminant mass loads discharging from WRSs in the catchment to surface waters in the Shag River catchment.

No WRS seepage capture drains or sumps are required for installation within the Shag River catchment under MP4.

Consideration is being given to the installation of a seepage capture drain and associated sumps along the eastern edge of the TTTSF embankment, to reduce tailings water seepage flows toward Cranky Jims Creek.

4.2.6 Camp Creek Freshwater Dam – Hydraulic Management

The objectives of the installation and operation of Camp Creek Freshwater Dam are to help manage:

1. Contaminant concentrations in Deepdell Creek during low flow periods, to comply with existing compliance criteria presented in Table 30 and ecological triggers identified in Table 32.
2. Potential flow depletion effects linked to GPUG operations.

The consented Camp Creek dam consists of an embankment with an approximate height of 29 m behind which approximately 1.4 million m³ of water can be stored when at full capacity, with a reservoir footprint of approximately 13.7 ha.

The consents that authorise the construction, operation and maintenance of Camp Creek Dam do not lapse and may be implemented at any time prior to their expiry on 1 October 2046.

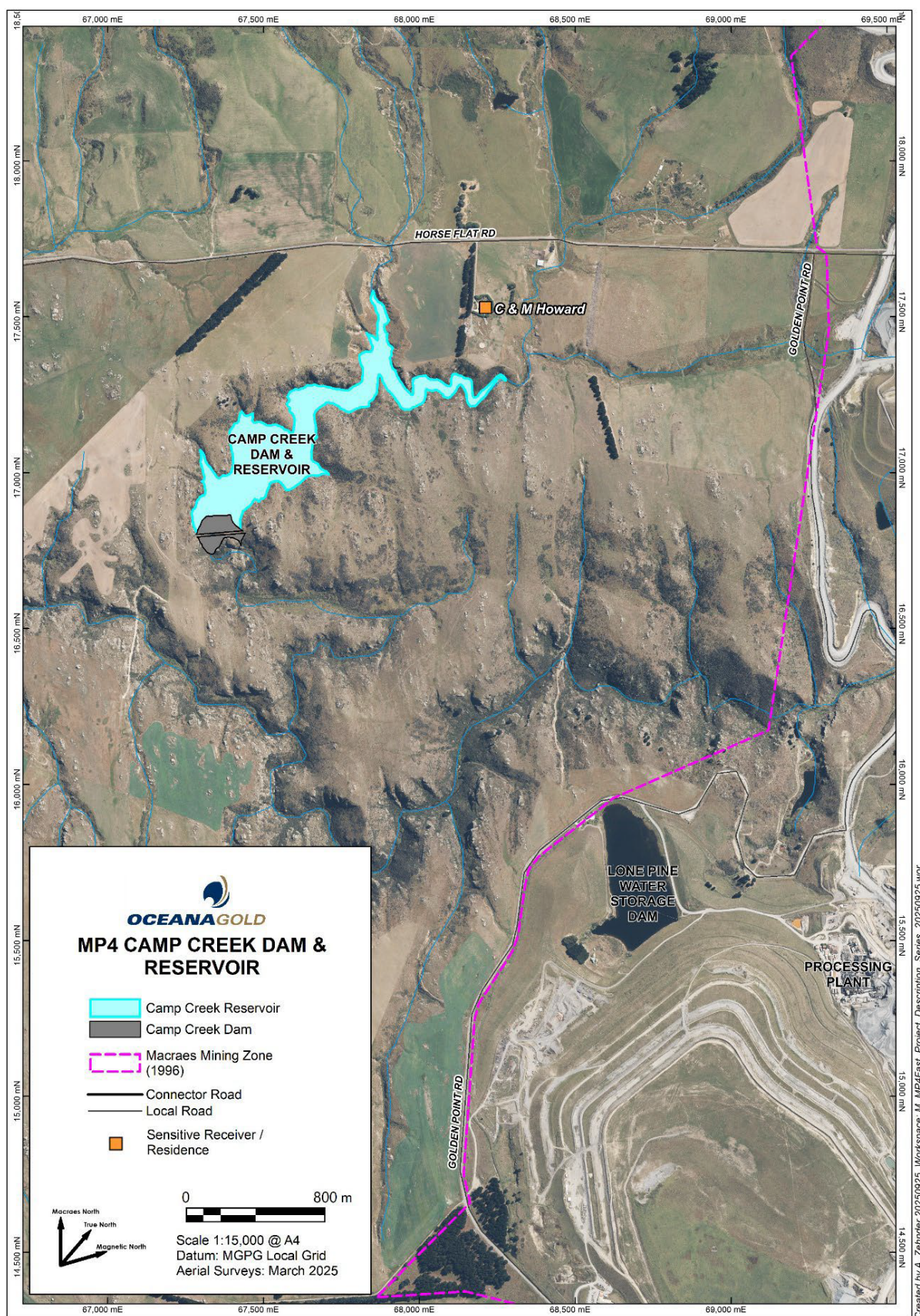
The purposes of the dam are to:

- Augment flows in Deepdell Creek during dry periods so that acceptable water quality standards are maintained.
- Augment flows in Deepdell Creek during dry periods to ensure any stream depletion that may arise through the construction and operation of GPUG does not have an ecological effect on Deepdell Creek.
- Provide water for flushing flows to help manage potential eutrophication in Deepdell Creek.

The Camp Creek Freshwater Dam (Figure 7) is to provide a permanent flow of water to supplement naturally occurring low flows in Camp Creek and Deepdell Creek. The supplementary flows required are as follows:

- A minimum discharge to Camp Creek of 2 L/s from a floating decant, unless incoming flows to the dam are lower in which case the discharges can be reduced to correspond to the natural inflow rates.
- A variable discharge above the minimum discharge is to be released to Camp Creek, providing increased flow augmentation matched to flows at the Golden Point flow monitoring station on Deepdell Creek, as per Figure 5.
- Where the dam is at or above capacity, free discharge is to occur via a spillway to Coal Creek downstream from the dam.
- A flushing flow of at least 58 L/s with a duration of three hours shall be released from the Camp Creek Freshwater Dam downstream into Camp Creek. This shall occur:
 - At least three times per year for the first two years following completion of the construction of the Camp Creek dam embankment, between the months of January and April inclusive.
 - At least two times per year from three to eight years following the completion of the construction of the Camp Creek Dam embankment, between the months of January and April inclusive.

Leakage through or under Camp Creek Freshwater Dam may be significant in term of contributing to the minimum discharge to Camp Creek of 2 L/s. Leakage rates may be determined through undertaking seepage flow measurements under a range of water level conditions in Camp Creek Freshwater Dam and deriving a flow to water level rating curve. Should the leakage losses be significant in terms of the constant discharge required, they can be deducted from the baseflow discharge requirement of 2 L/s. The release rate control system may be adjusted to be linked to water level in the lake. Any adjustment to the consented discharge rate would need to be reviewed and approved by ORC.



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Figure 7: Location of Camp Creek Freshwater Dam

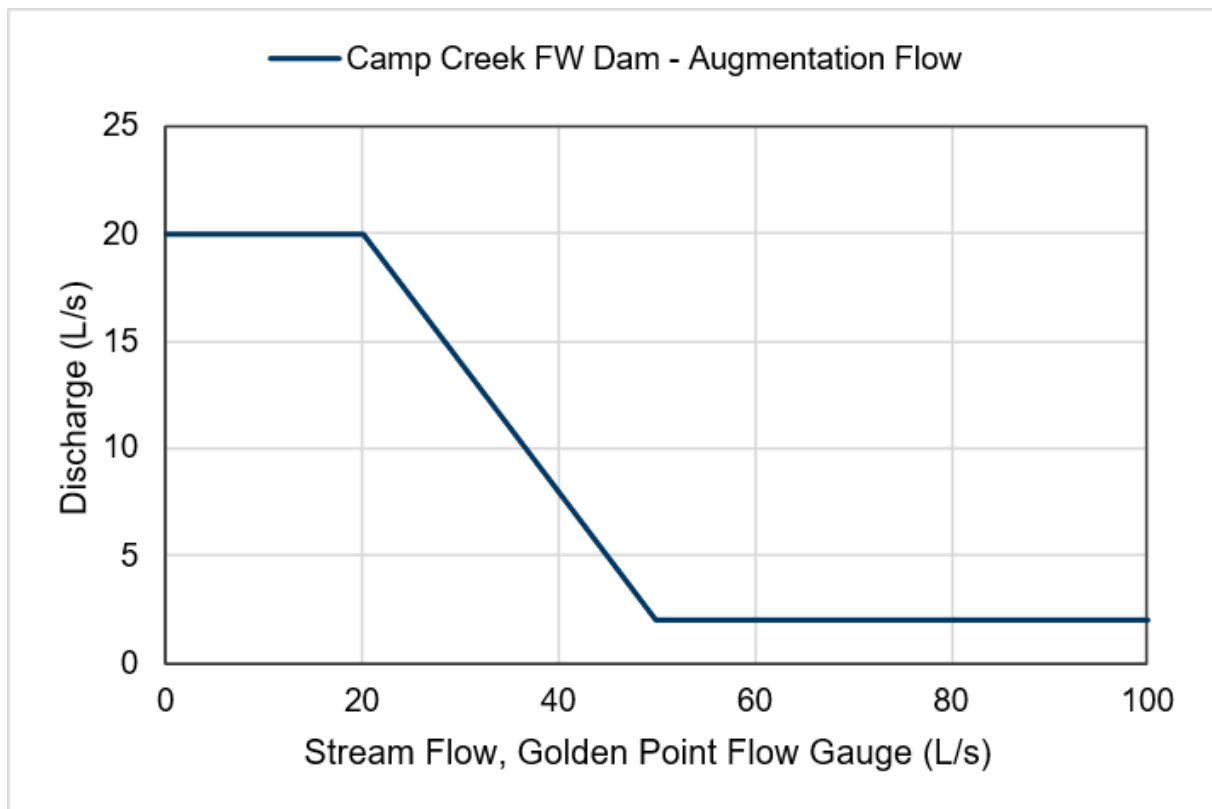


Figure 8: Camp Creek Freshwater Dam Discharge Curve

4.2.7 Round Hill Pit/Golden Point Pit Dewatering

Uncontrolled mine water flows through the historical underground workings that connect Golden Point Pit and the Deepdell Creek valley have in the past resulted in exceedance of water quality compliance criteria at DC07.

To prevent uncontrolled mine water flows discharging through the historical workings, a pumping system currently maintains the water level in Round Hill Pit sump at a level below the overflow level to the historical workings. The pumped water is returned to the MWM system.

To manage the risk of future uncontrolled mine water flows discharging through the historical workings, the pumping system in Round Hill Pit sump is to be maintained operational until such time as can be shown that the accumulating water in the pit backfill does not represent a risk to the environment if discharged. At least one dewatering bore with associated pumping system is to be installed within the Golden Point backfill, to support the dewatering process.

Water discharged from the Round Hill Pit and Golden Point Pit dewatering systems is to be discharged to the MWM system through to closure of Macraes mining operations. Following that time, the pumped water is to be sent to the WTP for treatment prior to discharge.

4.2.8 WTP Return Flows –Water Quality and Hydraulic Management

Captured WRS seepage water from the Deepdell catchment and water from the Round Hill/Golden Point Pit dewatering system (Section 3.2.5) is to be treated at the WTP (Section 6) and returned to Deepdell Creek upstream from the area potentially affected by stream depletion arising from the GPUG operations.

The return flows are less the portion of water lost in the treatment process. The rates of return flow to Deepdell Creek have a degree of flexibility to help OceanaGold to address operational and environmental outcomes, as documented in Section 6.3.

Refer to Section 6.3 for further details.

4.2.9 Implementation Schedule

The capture and return pumping of water from the drainage systems installed in the MTI, SP11 and TTTSF TSFs to the MWM system is ongoing and will continue post-closure.

The capture and pumping of water from the Northern Gully Silt Pond and the Battery Creek silt pond to the MWM system will continue until the close of Mining Phase B. After this time, the captured water will be pumped to the WTP.

The Camp Creek Freshwater Dam is to be structurally complete no later than 42 months following the commencement of the MP4 consents.

The release of flushing flows from the freshwater dams and WTP discharges to manage eutrophication effects and periphyton growth through dry summers shall be initiated, if required, as soon as sufficient stored water is available in the Camp Creek Freshwater Dam.

Within 30 months of commencement of the MP4 consents the engineered toe bunds are to have been installed on Northern Gully WRS upstream from the Northern Gully Silt Pond and the captured seepage delivered to capture sumps for pumping to the WTP.

4.3 Monitoring

All environmental monitoring for water flows and water quality are to be undertaken in accordance with the Water Monitoring Plan.

4.3.1 Surface Water – Flow Monitoring

4.3.1.1 Stream Flows

An automated surface water flow gauging site has been operating for a long time at Golden Point Weir (Table 1). Flow monitoring at this site provides baseline flow data for Deepdell Creek, with reductions in the upstream catchment area as a result of mining operations to be taken into account when assessing the flow record.

An automated surface water flow gauging site was installed during 2026 at AHC (Table 1). This monitoring site was installed to detect potential depletion of flows in Deepdell Creek arising from mining operations in GPUG. Flow monitoring at this site provides temporary baseline flow data for Deepdell Creek, with reductions in the upstream catchment area as a result of mining operations to be taken into account when assessing the flow record.

At least three manual flow gaugings shall be undertaken within six months of the surface water flow gauging site installation at DC08 at different flow rates to provide an accurate flow rating curve for the site.

At least three manual flow gaugings shall be undertaken at the discharge weir to be installed on the Innes Mills Pit Lake spillway as soon as possible following the start of overflow, at different discharge flow rates to provide an accurate flow rating curve for each pit lake overflow monitoring site.

Every two years an inspection of the flow gauging sites shall be conducted to confirm the rating curve remains valid. Additionally, an inspection shall be made of the site if the flow data suggests there may have been a physical change at the site.

Table 8: Surface Water Flow Monitoring Sites – Shag River Catchment

SITE	LOCATION	OBJECTIVE	STATUS
Deepdell Creek at Golden Point weir	DC03	Maintain a long-term continuous flow record for the site.	Existing
Deepdell Creek at AHC	Between DC06 and DC07 Above Highlay Creek confluence (AHC)	Detect potential stream depletion as a result of GPUG operations. Verify effectiveness of provision of supplementary flows to Deepdell Creek as a stream depletion mitigation measure ⁽¹⁾	Existing
Deepdell Creek Flow Gauge (DC08)	Appropriate site near DC08, downstream of all mine influences to Deepdell Creek	Provide flow measurements contiguous with key water quality compliance location (DC08). Verify effectiveness of provision of supplementary flows to Deepdell Creek as a stream depletion mitigation measure.	Proposed
Top Tipperary Creek at Rock Weir	Above TC01	Tipperary Creek near TC01	Existing

Note:

⁽¹⁾ Flow monitoring at this site is to be undertaken for one year following implementation of the upgradient/upstream monitoring programme, then assessed for removal from the monitoring programme.

4.3.1.2 Pit Lake Overflows

When the Innes Mills Pit lake is nearing its long-term overflow level, a weir is to be constructed in the spillway and automated water level monitoring installed, such that ongoing flow rates may be recorded. The water levels and flows shall be recorded at intervals of 10 minutes, with the data transmitted using telemetry to the OceanaGold site office.

At least three manual flow gaugings shall be undertaken at the pit lake discharge weir as soon as possible following the start of overflow, at different discharge flow rates, to provide an accurate flow rating curve for each pit lake overflow monitoring site.

Every two years an inspection of the flow gauging sites shall be conducted to confirm the rating curve remains valid. Additionally, an inspection shall be made of the site if the flow data suggests there may have been a physical change at the site.

The objective of monitoring at this site is to enable the contaminant mass load entering Deepdell Creek from Innes Mills Pit lake to be calculated.

4.3.2 Pit Lake Level Monitoring

Once pit dewatering ceases and the lake starts to form in Innes Mills Pit pit, the development rate for the pit lake is to be monitored by taking manual water level readings at monthly intervals (or more frequently). As an option, automated water level monitoring sensors may be utilised.

The objectives of monitoring the pit lake level is:

- To enable the contaminant mass load accumulating in the pit lake over time to be calculated
- To enable the accuracy of the projected pit lake overflow date to be improved
- To confirm likely overflow rates in advance of the pit lake overflow

4.3.3 Surface Water Quality – Compliance Monitoring

Surface water samples shall be obtained for compliance monitoring purposes at the sites and frequency listed in Table 9. Sample parameters are to be **Type A** as presented in Table 25.

Table 9: Water Quality Compliance Monitoring Sites – Mare Burn

SITE	FREQUENCY	DESCRIPTION	NZTM (NORTHING)	NZTM (EASTING)
DC08	Monthly	Lower Deepdell Creek surface water sample	4975887	1401178
HC02	Monthly	Highlay Creek upstream of confluence with Deepdell Creek	4975772	1399487
CJ01	Monthly	Cranky Jims Creek	4976074	1404232
Shag at Loop Road	Monthly	Shag River at Loop Road - immediately upstream of the ford	4978310	1409432
TC01	Monthly	Tipperary Creek	4972414	1404388
Shag River at McCormicks	Monthly	Shag River, 5 m downstream of McCormicks Creek confluence	4970733	1415078

Table 10: Aquatic Biological Compliance Monitoring – Shag River Catchment

SAMPLE TYPE	FREQUENCY	SITES	METHODS
Aquatic flora ⁽¹⁾	Summer (Dec-Feb) Autumn (Mar-May) Spring (Sep-Nov)	DC08	Visual assessment of percentage cover of filamentous algae, mat-forming algae, macrophytes and moss.
Benthic macroinvertebrates	Summer (Dec-Feb) Autumn (Mar-May) Winter (Jun-Aug) Spring (Sep-Nov)	DC08	Taxonomic composition and abundance. Sampling shall include calculation of the macroinvertebrate community index (MCI) and the quantitative MCI (QMCI)
Fish	Late summer (Feb-Mar)	DC08	Taxonomic composition and abundance, by electric fishing survey.

Notes:

⁽¹⁾ Aquatic flora monitoring supports the ecological response trigger assessment described in Viridis (2026a). The visual cover-based method is consistent with monitoring undertaken under existing Macraes Operation consents and is proposed for MP4.

4.3.4 Surface Water Quality – Other Monitoring

The objectives of undertaking additional surface water quality monitoring in the Shag River catchment are:

1. To provide control site data for comparison with Compliance Monitoring site results, in case trigger value exceedances at the Compliance Monitoring site are a result of upstream or background water quality trends.
2. To enable the development of correlations between Electrical Conductivity (EC) monitoring results and contaminant concentrations, where possible. If such correlations can be developed, the automated monitoring system may provide more detailed indications of contaminant concentration trends than are possible using manual sampling alone.
3. To maintain an ongoing record of the effects of the Macraes Operation at various points Deepdell Creek.

Automated Monitoring Sites

An automated surface water quality monitoring site is to be established at the same location as the automated flow monitoring station described in Section 3.3.1. The following parameters shall be recorded at intervals of 10 minutes, aligned with the flow recording frequency, with the data transmitted using telemetry to the OceanaGold site office. The parameters to be measured are:

- EC
- pH
- Temperature
- Turbidity

Control Monitoring Sites

One water quality control monitoring site is proposed for the Mare Burn catchment. Surface water samples shall be obtained for control monitoring purposes at the site and frequency listed in Table 4. Sample parameters are to be Type A as presented in Table 25.

Table 11: Water Quality Control Monitoring Sites – Shag River Catchment

SITE	FREQUENCY	DESCRIPTION	NZTM (NORTHING)	NZTM (EASTING)
DC00C	Monthly	Deepdell Creek upstream of confluence with Camp Creek	4973083	1396661
Shag Control	Monthly	Shag River upstream of confluence with Deepdell Creek	4980606	1402803

Additional Monitoring Sites

Additional monitoring sites are defined and used to provide early indication of water quality trends, inform the development of new water quality management and mitigation measures, and inform environmental effects assessments. These sites are monitored voluntarily by OceanaGold and are subject to change as required to meet OceanaGold's purposes.

Monitoring of water quality at the Camp Creek Freshwater Dam site will inform future understanding of water quality in Deepdell Creek under very low flow conditions, when most of the water in the creek at the DC08 compliance monitoring point will be sourced from water stored in the dam.

Eleven additional surface water quality monitoring sites are currently designated in the Shag River catchment (Table 12). Sample parameters are to be Type A as presented in Table 25.

4.3.5 WRS Seepage Monitoring

4.3.5.1 Flows

Flow monitoring stations are not currently installed or operational on any of the WRS seepage discharge points WRSs in the Shag River catchment.

Automated cumulative volume monitoring systems are to be installed on the following mine water riser pipes:

1. From the Northern Gully WRS seepage collection sumps to the MWM system

Water volumes shall be recorded at intervals of 10 minutes, with the data transmitted using telemetry to the OceanaGold site office.

Table 12: Water Quality Additional Monitoring Sites – Shag River Catchment

SITE	FREQUENCY	DESCRIPTION	NZTM (NORTHING)	NZTM (EASTING)
CC03	Monthly	Camp Creek below the Coronation Haul Road	4976936	1395342
CC04	Monthly	Camp Creek below the Coronation WRS Silt Pond	4976771	1394983
DC01	Monthly	Deepdell Creek, 1,500 m upstream of Deepdell culvert	4973770	1397275
DC02	Monthly	Deepdell Creek, 450 m upstream of Deepdell Culvert	4973962	1397299
DC03	Monthly	Deepdell Creek, 150 m upstream of Deepdell Culvert	4974679	1398036
DC04	Monthly	Deepdell Creek, 40 m downstream of Deepdell Culvert	4974842	1398079
DC05	Monthly	Deepdell Creek, downstream of bridge by historic battery and Battery Creek confluence	4974889	1398456
DC06	Monthly	Deepdell Creek, 600 m downstream of historic reserve and where DDSSP outlet enters DDC	4975304	1399018
DC07	Monthly	Deepdell Creek, 1,400 m downstream of historic reserve	4975529	1400210
HC01	Monthly	Highlay Creek	4977154	1398583
Camp Creek Dam	Monthly	At the proposed location of Camp Creek Dam, then at the dam outlet once commissioned	TBC	TBC

4.3.5.2 Water Quality

Water quality monitoring site for mine water discharging from WRSs are proposed at the sites and sampling frequency listed in Table 13. The site locations are presented in Figure 3. Sample analysis parameters are to be Type C as presented in Table 25.

4.3.6 TSF Seepage Monitoring

Water quality monitoring site for mine water discharging from TSFs is to be undertaken at the sites listed in Table 14. Sampling frequency is to be monthly. Sample analysis parameters are to be Type D as presented in Table 25.

The objective of TSF water quality monitoring is to ensure the currently observed trends in water quality continue into the future. The TSFs represent a substantial component of the contaminant loads generated by the Macraes Operation. A key factor in managing water quality on site is a good understanding of the water quality trends linked to seepage water discharges from the TSFs.

Table 13: Water Quality WRS Monitoring Sites – Shag River Catchment

SITE	FREQUENCY	DESCRIPTION	NZTM (NORTHING)	NZTM (EASTING)
Deepdell East WRS Silt Pond	Monthly		4976716	1398193
Deepdell North Silt Pond	Monthly		4974986	1397675
Coal Creek Seepage 1	Monthly		4978784	1393874
Deepdell South Silt Pond			4975296	1398755
N Gully Seep West			4974757	1399654
N Gully Seep East			4974717	1399908
Battery Creek Silt Pond			4974531	1398057
Battery Creek Drain		Pipe coming out of hillside across dam at Battery Creek silt pond	4974526	1398515
GPUG Discharge		Discharge from underground dewatering	4974470	1399066
Round Hill Pit Sump		Round Hill pit sump or dewatering bores	4974339	1399210
MTSP Sump	Monthly	Māori Tommy Silt Pond Sump	4974337	1398008
Maori Tommy Silt Pond	Monthly	To be relocated as WRS is expanded	4978697	1395886

Table 14: Water Quality TSF Monitoring Sites – Shag River Catchment

SITE	DESCRIPTION	NZTM (NORTHING)	NZTM (EASTING)
Mixed Tailings Impoundment			
Mixed Tailings Impoundment	Mixed Tailings Dam - previously called Floatation Tailings (Flot_Dec_Pd)	4973469	1399162
Sump B - CDE	Chimney Drain East discharging into Sump B	4974043	1398205
Sump B - CDW	Chimney Drain West discharging into Sump B	4974043	1398205
Sump B - SSF	Sub Surface Flow discharging into Sump B	4974043	1398205
Western UD/USCO	Western underdrain/upstream cut-off drain outlet reporting to western manhole	4973383	1398126
Western CDBC	Western chimney drain base collector outlet reporting to western manhole	4973383	1398126
Far Eastern UD/USCO	Far eastern underdrain/upstream cut-off drain outlet reporting to far eastern manhole	4973737	1399211
SP11 Tailings Impoundment			
Southern Pit Impoundment	SP11 Tailings Impoundment	4973653	1399575
CDBC Eastern Outlet	Eastern chimney drain base collector outlet reporting to SP11 manhole	4974026	1399187
UD/USCO Eastern Outlet	Eastern underdrain/upstream cut-off drain outlet reporting to SP11 manhole	4974026	1399187
UD/USCO Western Outlet	Western underdrain/upstream cut-off drain outlet reporting to SP11 manhole	4974026	1399187
TTTSF Impoundment			
TTTSF Impoundment	TTTSF Impoundment	4974259	1402254
TTTSF Seepage Collection Sump	Sample collected by opening valve from blue pump pipeline immediately past flow meter.	4973973	1403699
TTTSF Surface Runoff Drain	Reports to TTTSF eastern manhole	4974011	1403635
TTTSF Base Sump	Sump downstream of the seepage collection sump	4973926	1403696
TTTSF Sub-Soil Drain/Bore	Sample collected by opening valve on pipeline immediately below seepage collection sump crest on downstream shoulder.	4973962	1403678

SITE	DESCRIPTION	NZTM (NORTHING)	NZTM (EASTING)
TTCDN	North chimney drain base collector outlet reporting to TTTSF eastern manhole	4973987	1403634
TTCDN	South chimney drain base collector outlet reporting to TTTSF western manhole	4973983	1403634
TTTSF South USCO	Southeast upstream cut-off drain outlet reporting to TTTSF western manhole	4973983	1403633
TTTSF North USCO	North upstream cut-off drain outlet reporting to TTTSF eastern manhole	4973987	1403633
TTTSF South Seepage	Sample from sump located in the gully between groundwater bores TT13 and TT14	4973377	1403536
Cattleyard Seepage	Sample from Cattleyard sump located at western side of TTTSF off Golden Bar Road	4973613	1402401
New Surface Drain	Sample from pipe reporting to open drain south west of seepage collection sump	4973977	1403642
South USCO and CBCD	South upstream cut-off and chimney drain base collector outlet	4973984	1403633
TTTSF Central/North UD	Central/North underdrain outlet reporting to TTTSF eastern manhole	4973986	1403633
TTTSF South UD	South underdrain outlet reporting to TTTSF western manhole	4973984	1403634
Cranky Jims Seepage	Sample from the pipe labelled east seep reporting to the tank next to the eastern manhole if pump operating otherwise from Cranky Jims Sump at eastern side of TTTSF next to Macraes Road.	4974734	1403235
West US and CBCD	West upstream cut-off and chimney drain base collector reporting to TTTSF eastern manhole	4973986	1403633

4.3.7 Pit Lake Monitoring

Following the close of mining and dewatering operations in Innes Mills Pit, and the start of pit lake development in this pit, lake water quality monitoring shall be undertaken at the site and frequency listed in Table 15. Sampling as set out in Table 7 shall continue until the pit lake reaches overflow and then into the future. Sample parameters are to be Type B as presented in Table 25.

The objectives of the monitoring are to:

- Confirm the validity of the predictive water quality modelling undertaken in support of the MP4 consents.
- Enable decisions to be made regarding the frequency and timing of ferric chloride dosing to manage arsenic concentrations in the lake water (Section 3.2.2).

Table 15: Water Quality Monitoring Sites – Pit Lakes

SITE	FREQUENCY	DESCRIPTION	SAPLE TYPE
IM01	Monthly	Innes Mills Pit lake	Grab sample of shallow water in pit lake

4.3.8 Groundwater Monitoring

4.3.8.1 MTI Groundwater Monitoring

Under the Compliance and Monitoring Schedule attached to resource consents 2006.303 – 305_V4, groundwater monitoring is required of compliance bores, detection bores, surrounding groundwater bores and the phreatic surface surrounding the MTI. The water level in each bore is to be recorded prior to sampling.

Representative samples of groundwater shall be obtained from the following points for compliance bore monitoring:

- GW 18-GW 25, located in Maori Tommy Gully
- GW 3, and GW38 northwest of Mixed Tailings Impoundment
- GP01 northeast of Mixed Tailings Impoundment
- P1 southwest of the Mixed Tailings Impoundment

These samples should be analysed for the following parameters at monthly and quarterly intervals, as presented in

4.3.8.2 SP11 Groundwater Monitoring

Monitoring of groundwater around the SP11 TSF is required under consents authorising the storage of tailings in the TSF. Removal of these tailings under MP4 will negate the need to continue monitoring of these bores. Consequently, Implementation of this MWMP under MP4 is expected to negate the need.



Figure 9: MTI Groundwater Monitoring Bore Locations

4.3.8.3 TTTSF Groundwater Monitoring

Under the Compliance and Monitoring Schedule attached to Discharge Permit RM10.351.16 V3, RM10.378.17 and RM10.378.20 groundwater monitoring is required of compliance bores, detection bores and the phreatic surface.

TTTSF Compliance Bores

Monthly representative samples of groundwater are required from no fewer than four compliance monitoring bores (TT01 to TT04 as shown on Figure 4.1) with additional parameters required at quarterly intervals. Table 25 lists the parameters that are required to be analysed for at monthly and quarterly intervals.

TTTSF Detection Bores

Monthly representative samples of groundwater are required from no fewer than eleven monitoring bores (TT05 to TT15 as shown on Figure 10) with additional parameters to be analysed at quarterly intervals. Table 25 lists the parameters that are required to be analysed for at monthly and quarterly intervals.

Phreatic Surface

The groundwater level in the compliance bores, detection bores and any other bores surrounding the TTTSF will be recorded at monthly intervals. The water level shall be recorded prior to sampling.



Figure 10: TTTSF Compliance and Detection Groundwater Monitoring Sites

4.4 Compliance Criteria

4.4.1 Narrative Standard for Receiving Waters

The waters of the Deepdell Creek and the Shag River, shall at all times be free of contaminants attributable to mineral processing and associated activities in concentrations which adversely affect directly or indirectly water uses or which adversely affect humans, animals, plants and/or aquatic life.

4.4.2 Numerical Compliance Criteria

Prior to Completion of Mining Phase A

Surface water within the Deepdell Creek at the Compliance Point DC08 shall not exceed the water quality compliance criteria shown in Table 29 unless infallible evidence can be provided that the level of a parameter is either naturally occurring or unrelated to mining activities.

Surface water within the Shag River at the Compliance Points Shag River at Loop Road and Shag River at McCormicks shall not exceed the water quality compliance criteria shown in Table 29 unless infallible evidence can be provided that the level of a parameter is either naturally occurring or unrelated to mining activities.

Surface water within Tipperary Creek at Compliance Point TC01 shall not exceed the water quality compliance criteria shown in Table 30.

Following Completion of Mining Phase A

Surface water within the Deepdell Creek at the Compliance Point DC08 shall not exceed the water quality compliance criteria shown in Table 32 unless infallible evidence can be provided that the level of a parameter is either naturally occurring or unrelated to mining activities.

Surface water within the Shag River at the Compliance Points Shag River at Loop Road and Shag River at McCormicks shall not exceed the water quality compliance criteria shown in **Table 32** unless infallible evidence can be provided that the level of a parameter is either naturally occurring or unrelated to mining activities.

Surface water within Tipperary Creek at Compliance Point TC01 shall not exceed the water quality compliance criteria shown in Table 30.

5 NORTH BRANCH WAIKAOUAITI RIVER

5.1 Catchment Elements

Part of the central area of the Macraes Operation, together with the Golden Bar area, is located within the North Branch of the Waikouaiti River Catchment, including:

- Tailings Storage Facilities (TSFs):
 - Frasers TSF (active).
- Opencast Pits:
 - Frasers Pit (being converted to a TSF).
 - Golden Bar Pit (closed and filled with pit lake, to be reopened and actively mined).
- Waste Rock Stacks (WRSs):
 - Frasers East WRS (closed and rehabilitated).
 - Frasers South WRS (closed and rehabilitated).
 - Frasers West WRS (inactive, to be reactivated to accept waste rock from Innes Mills Pit expansion).

Key features within the NBWR catchment relevant to this WQMP are:

- The Coronation Area is located on the ridgeline to the north of Horse Flat Road along the catchment divide between the Shag River and the Taieri River, and is situated between Sister Peaks and Highlay Hill.
- Waterways influenced by Coronation Area operations within the Taieri River catchment are Trimbells Gully Creek and Mare Burn. Waterways influenced by Coronation Area operations within the Shag River catchment are Camp Creek, Deepdell Creek and the Shag River.
- Coronation Pit:
 - Mining of the Coronation Pit ceased in 2021. There are currently no ongoing mining activities in Coronation Pit.
 - Mining operations in Coronation Pit under MP4 are to recommence as per the schedule summarised in Table 1. Under MP4, the area of Coronation Pit is to extend from about 62 ha to about 85 ha.
 - Accumulated water in Coronation Pit is to be pumped to the MWMS for use on-site.
 - Upon closure of mining and dewatering operations, Coronation Pit Lake will progressively develop and discharge into the upper catchment of Camp Creek upstream from the planned Camp Creek Dam.
- Waste Rock Stacks:
 - Coronation WRS:
 - Coronation WRS is located to the west of Coronation Pit and forms a section of the catchment divide between the Mare Burn catchment and Deepdell Creek catchment.
 - Coronation WRS is currently not active. The batter slopes of the WRS have been capped and rehabilitated. The upper surface has not yet been capped and rehabilitated. The current WRS top surface is not designed to minimise rainfall infiltration.
 - The WRS is to be shaped to blend into the surrounding landscape, capped and progressively rehabilitated;
 - Coronation Silt Pond is located in the upper catchment of Camp Creek. This silt pond captures runoff and seepage water from Coronation WRS discharging toward the south.

5.1.1 Central Area

5.1.1.1 Frasers Pit

Frasers Pit is situated in the headwaters of the NBWR and has intersected this waterway. Upstream water is collected in the Frasers East sump.

Water from Frasers East sump was previously pumped around Frasers Pit and discharged downstream into the NBWR without adding any contaminants. However, the modified nature and flow regime of the upstream catchment has resulted in Frasers East sump being used to store captured runoff and seepage water from Frasers West WRS. This water is pumped to Frasers East sump from Murphy's Creek Silt Pond. Water from Frasers East sump is used for dust suppression or is pumped to the MWM system.

The base of Frasers Pit has been converted into Frasers TSF which has changed the operational water management within the pit.

Rainfall and intercepted groundwater that collects within the Frasers Pit footprint is collected in Frasers TSF or in a sump in the floor of the Gay Tan Pit. Water collected in the Gay Tan Pit is pumped to storage areas such as the workshop turkey's nest before being directed to infrastructure such as the watercart standpipe.

The currently consented closure plan for Frasers TSF is for the stored tailings to become fully submerged in a pit lake, which will reduce potential oxidation of the stored tailings and therefore mobilisation of dissolved metals from the tailings. This closure plan is to change to dry capping of the Frasers TSF under the MP4 consents package.

5.1.1.2 Frasers TSF

Frasers TSF Stage 1 was consented as part of the initial Continuity Consent Project (CCP1) in 2024 and started receiving tailings in March 2025. Frasers TSF Stage 2 was consented as part of the CCP2, providing a currently consented tailings storage capacity of 35 Mt.

The MP4 project includes construction of Frasers TSF Stage 3 to accommodate an additional 88 Mt of tailings storage. This capacity provides for the full MP4 LOMP, including receipt of tailings relocated from SP10/11 and MTI. This will bring the total tailings storage capacity of Frasers TSF to 123 Mt of tailings. As per Frasers TSF Stage 2, Stage 3 involves increasing the height of the existing waste rock embankment backfill between Frasers Pit and Innes Mills Pit. Constructing Frasers TSF Stage 3 includes increasing the height of the embankment from 480 mRL to 520 mRL. The final embankment will accommodate Stage 2 of the Macraes Road realignment.

During operational deposition of tailings in Frasers TSF, the decant pond is to be located toward the south-west side of Frasers Pit. As tailings surpass approximately 500 mRL, deposition will be changed to progressively form the proposed closure landform. This will require repositioning of spigots and the decant pond to develop a final tailings surface falling from the south-east toward the north-west. The decant pond will be relocated to the northwestern corner of the impoundment. The final tailings surface will be at approximately 519.5 mRL on the eastern side of the facility, grading down towards the north-west to approximately 509 mRL at the western extent.

At closure the Frasers TSF is to be dry capped. It is not necessary to restrict infiltration through the cap in the manner required for the WRS caps. However, the general cap design is likely to be similar to WRS cap designs in terms of the use of drainage systems and cap form to discharge runoff to the spillway without incurring significant erosion. The spillway to discharge runoff from Frasers TSF to the NBWR will ultimately be cut through the western embankment with an invert set to the tailings level of 509 mRL.

Tailings and process water are pumped into Frasers TSF. Return water is pumped back from a pontoon floating in the decant pond to the MWM system. The decant pond is to have been pumped away to the MWM system before Frasers TSF is capped and rehabilitated. The final spillway to the NBWR will be connected to Frasers TSF once the rehabilitation is complete and the quality of cap runoff water is suitable for release to the environment.

There will be no risk of overflow to offsite water bodies until the spillway has been constructed.

5.1.1.3 Frasers East WRS

The construction of Frasers East WRS was authorised under existing resource consents and this WRS does not form part of the MP4 consents package. Frasers East WRS has been closed, capped and rehabilitated. No further waste rock storage planned for this area.

The WRS has a footprint of approximately 70.6 ha and a total storage of 59.5 Mt.

5.1.1.4 Frasers West WRS (in care and maintenance pending reactivation)

The construction of Frasers West WRS was authorised under existing resource consents. The existing design capacity is 154.93 Mm³ (337.75 Mt). Under MP4 the design capacity is to be increased to 198.25 Mm³ (432.19 Mt). The design height of the WRS is to be increased from 570 mRL to 610 mRL, an addition of 40 m.

5.1.1.5 FRUG, closed and sealed, to be used for brine storage)

FRUG extends eastward from Frasers Pit underneath the Frasers East WRS and the western section of TTTSF. The underground extractive workings extend from a depth of approximately 210 m to 910 m bgl (approximately 350 mRL down to -355 mRL) and cover an area of 180 ha.

FRUG is to be utilised for the storage of brine waste from the planned WTP.

5.1.2 Golden Bar Area

5.1.2.1 Golden Bar Pit

Mining of the Coronation Pit ceased in 2021 and there are currently no mining activities in Coronation Pit. Mining operations in Coronation Pit under MP4 are to recommence as per the schedule summarised in Table 1.

The currently authorised Coronation Stage 5 (CO5) Pit has a footprint of 85 ha. The MP4 extension to Coronation Pit (CO6 to CO8) will result in a pit footprint increase of approximately 40 ha, to total approximately 125 ha.

Accumulated water in Coronation Pit is to be pumped to the MWM system for use on-site.

Upon closure of mining and dewatering operations, Coronation Pit Lake will progressively develop. Coronation Pit Lake will reach a maximum depth of 90 m. Coronation Pit Lake will overflow to the south, at a spill elevation of 625 mRL and discharge into the upper catchment of Camp Creek upstream from the planned Camp Creek Dam. The median projected fill time is 23 years, reaching the overflow elevation in approximately 2055 (GHD 2026).

5.1.2.2 Golden Bar (Clydesdale) WRS (closed and rehabilitated, to be reactivated)

The construction of the Clydesdale WRS was authorised under existing resource consents. This WRS is to be expanded under MP4 under the name Golden Bar WRS.

The existing design capacity is 6.77 Mm³ (14.76 Mt). Under MP4 the design capacity is to be increased to 22.12 Mm³ (48.11 Mt). The design height of the Golden Bar WRS is to be increased from 550 mRL to 600 mRL, an addition of 40 m.

5.2 Water Quality Management Measures

5.2.1 WRS – Source Water Quality and Contaminant Load Management

A key objective of WRS capping and rehabilitation is the reduction in long-term mean infiltration rates to approximately 5% of mean annual rainfall (approximately 32 mm/year).

Existing WRS construction practice at the Macraes Operation has focused on creating water retaining structures (i.e. restricting rainfall runoff and thereby promoting infiltration of rainfall). The purpose of this practice has been to prioritise erosion and sediment control, protecting receiving waters from sediment laden runoff prior to establishment of surface cover systems. The draw-back of this approach is that it increases infiltration rates and contaminant loads generated within the WRSs.

Currently, design features of WRS construction that contribute to increasing infiltration rates include:

- Capping being left incomplete, with the expectation that further wastes may be stored on top in the future.
- Top areas being reinstated while maintaining flat or dished surfaces, causing localised surface ponding.
- Windrows being retained preventing water shedding.
- Construction benches with reverse slopes retaining runoff from slopes as seen on Northern Gully WRS, Frasers West WRS and a localised area on Frasers East WRS.

Where the above features are retained, elevated infiltration rates can persist.

Future WRS designs are to incorporate the following water management features targeted at reducing infiltration and thereby reducing contaminant loads discharging from the WRS:

- WRS surfaces must be progressively rehabilitated during mining and as soon as practicable after each lift, surface, batter, bench or area of a WRS is no longer required for active placement, access, drainage, safety or operational purposes.
- Construction of each WRS is to be undertaken as set out in the WRS Management Plan. Specifically:
 - WRS lifts are to be as per construction zones set out in the WRS Management Plan. Each lift is to be constructed with a compacted upper surface that has a slope and layout designed to enhance runoff and reduce oxygen flux between lifts.
 - Engineered toe bunds are to be established to seal off underdrains and underflows discharging from the toe of the Frasers East WRS, Frasers West WRS and Golden Bar WRS. The objective of the toe bunds is to minimise oxygen flux entering the base of the WRS via underdrains. Specifically, toe bunds are to be constructed:
 - Into Frasers East WRS above Frasers East Silt Pond.
 - Into Frasers West WRS above Murphys Creek Silt Pond.
 - Through conversion of the existing Clydesdale Creek Silt Pond a toe bund for Golden Bar WRS above Clydesdale Creek.
 - The final cap is to be designed and installed to maximise rainfall runoff, minimise infiltration and minimise erosion risk. The final cap is to be installed and the WRS rehabilitated as soon as possible following completion of the WRS.
- Existing completed WRSs (Frasers East WRS and Frasers South WRS) shall be evaluated and where appropriate to promote runoff and reduce infiltration:
 - Where existing WRS caps have been constructed to reduce runoff, site-specific designs will be developed and implemented to enhance runoff and reduce infiltration.
 - Where existing benches have reverse slopes, retaining runoff from higher slopes, targeted shallow drains or regrading of the bench slope is to be investigated as a measure of reducing infiltration.

References:

- WRS Management Plan
- WRS Capping Management Plan
- MWM concept design report for the toe bunds
- GHD SW/GW report, Appendix F, Mitigations

5.2.2 Pit Lake – Source Water Quality Management

Arsenic concentrations in water accumulating in Golden Bar Pit lake following the close of mining operations are to be managed through dosing of the lakes with ferric chloride solution. It is projected that ferric chloride dosing could achieve dissolved arsenic removal rates of up to 88%.

The maximum pit lake arsenic concentration triggering the need for treatment is 0.042 g/m³. This is a maximum trigger as measured from surface sampling close to the pit lake overflow point. However, the decision made to instigate a dosing round should take into account arsenic trends in the pit lake water. Dosing to manage arsenic concentrations should occur before the concentration reaches the trigger level. Ferric chloride dosing frequency is to be determined through monitoring of pit lake water quality, as set out in Section 4.3.7.

Each ferric chloride treatment is expected to result in a sharp decrease in lake water concentration followed by a slow subsequent increase, leading to a sawtooth pattern in concentrations. It is expected multiple and ongoing treatments will be required to maintain the pit lakes below the targeted maximum concentration. Following dosing, arsenic concentrations in the pit lake may temporarily drop below 0.01 g/m³.

5.2.3 Silt Ponds – Hydraulic Management

Silt ponds are required by consent to be installed close downstream from the toe of each WRS to reduce silt loads discharging to surface receiving waters through the construction and immediate post-closure periods of WRs operations.

The primary function of each silt pond is to provide sufficient water storage capacity to slow runoff flows from the upstream WRS and thereby enable suspended sediment to settle to the base of the pond.

Silt ponds have been installed:

- At the toe of Frasers West WRS upstream from the NBWR (Frasers West Silt Pond)
- On Murphys Creek at the toe of Frasers West WRS (Murphys Creek Silt Pond)
- At the toe of Frasers South WRS (Frasers South Silt Pond)
- At the toe of Clydesdale WRS (now called Golden Bar WRS) (Clydesdale Silt Pond)

The planned expansion of Golden Bar WRS under MP4 requires the downstream relocation of the Clydesdale Silt Pond.

5.2.4 Capture Drains and Sumps – Hydraulic Management

The key objective of installing WRS seepage capture drains and sumps is to minimise the contaminant mass loads discharging from WRSs in the catchment to the NBWR.

Prior to application for the MP4 consents, no WRS seepage capture drains or sumps were required, or have been installed, in the NBWR catchment.

Following authorisation of the MP4 consents the following seepage capture drains and sumps are to be installed:

- Frasers East WRS:
 - A seepage collection sump to receive water discharging from the toe of Frasers East WRS.
 - A pump is to be installed in the sump, with the collected water to be discharged to the MWM system. Prior to the end of Mining Stage B, the water from the seepage collection sump is to be pumped to the WTP for treatment and discharge.
 - This sump is separate from the existing Frasers East Silt Pond as it is to target the collection of WRS seepage water directly at the toe of Frasers East WRS.
- Frasers West WRS:
 - Seepage collection sumps are to be installed in each of the gullies at the toe of the WRS, as presented in Figure 3.
 - A seepage collection sump to receive water discharging from the toe of Coronation North WRS through the engineered toe bund to be established to seal off the underdrains discharging to the toe of Coronation North WRS.
 - Pumps are to be installed in each of the sumps, with the collected water to be discharged to the break tank identified in Figure 11, or an equivalent reservoir.
- Prior to the close of Mining Stage B all water collected from the sumps and seepage capture drains is to be pumped to the WTP for treatment, followed by discharge.

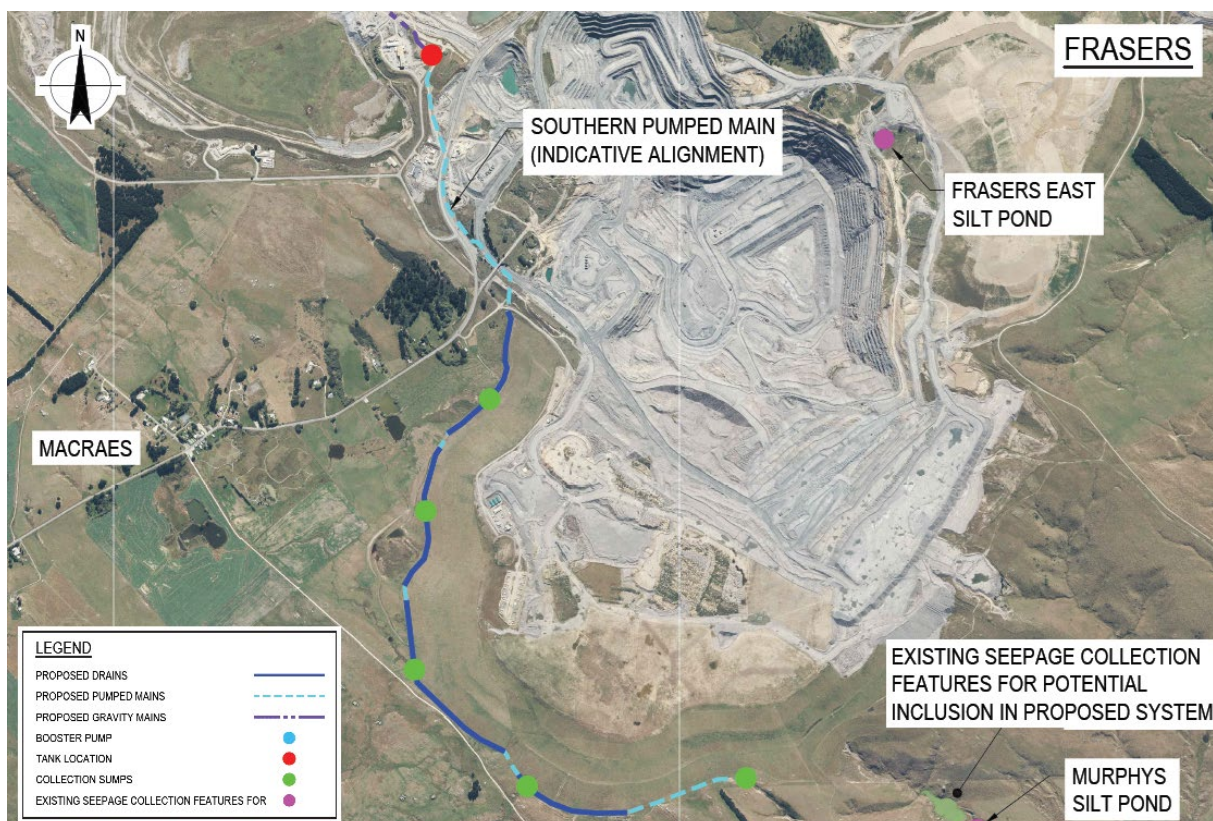


Figure 11: Seepage Capture Drains and Sumps – Central Area – Conceptual Layout

5.2.5 WTP Return Flows –Water Quality and Hydraulic Management

Refer to Section 6.3.

5.3 Monitoring

All environmental monitoring for water flows and water quality are to be undertaken in accordance with the Water Monitoring Plan.

5.3.1 Surface Water – Flow Monitoring

5.3.1.1 Stream Flows

An automated surface water flow gauging site is to be installed at an appropriate physical location on the NBWR, close to the NB03 water quality compliance monitoring site, such that ongoing flow rates may be measured. The water levels and flows shall be recorded at intervals of 10 minutes, with the data transmitted using telemetry to the OceanaGold site office.

At least three manual flow gaugings shall be undertaken within six months of the surface water flow gauging site installation on the NBWR at different flow rates to provide an accurate flow rating curve for the site.

Every two years an inspection of the flow gauging site shall be conducted to confirm the rating curve remains valid. Additionally, an inspection shall be made of the site if the flow data suggests there may have been a physical change at the site.

The objectives of monitoring at this site are to:

- Act as a flow monitoring point controlling the release of supplementary water to NBWR from the WTP.
- Verify the effectiveness of provision of supplementary flows to the NBWR as a water quality mitigation measure.
- Enable the cumulative contaminant mass loads entering the NBWR from mining operations in this catchment to be calculated for the compliance monitoring site at NB03.
- Verify the flows achieved at NB03 as a result of the targeted release of water for stream eutrophication management purposes.

Table 16: Surface Water Flow Monitoring Sites – NBWR Catchment

SITE	LOCATION	OBJECTIVE	STATUS
Waikouaiti River North Branch flow gauge	Appropriate site near NB03, downstream of Golden Bar Creek confluence.	To obtain a representative flow measurement contiguous with the NB03 water quality compliance location	Planned

5.3.1.2 Pit Lake Overflows

When the Golden Bar Pit lake is nearing its long-term overflow level, a weir is to be constructed at the overflow point and an automated water level monitoring installed, such that ongoing flow rates may be recorded. The water levels and flows shall be recorded at intervals of 10 minutes, with the data transmitted using telemetry to the OceanaGold site office.

At least three manual flow gaugings shall be undertaken at the pit lake discharge weir as soon as possible following the start of overflow, at different discharge flow rates, to provide an accurate flow rating curve for each pit lake overflow monitoring site.

Every two years an inspection of the flow gauging sites shall be conducted to confirm the rating curve remains valid. Additionally, an inspection shall be made of the site if the flow data suggests there may have been a physical change at the site.

The objective of monitoring at this site is to enable the contaminant mass load entering the NBWR from Golden Bar Pit lake to be calculated.

5.3.2 Pit Lake Level Monitoring

Once pit dewatering ceases and the lake starts to form in Golden Bar Pit lake, the development rate for the pit lake is to be monitored by taking manual water level readings at monthly intervals (or more frequently). As an option, automated water level monitoring sensors may be utilised.

The objectives of monitoring the pit lake level is:

- To enable the contaminant mass load accumulating in the pit lake over time to be calculated
- To enable the accuracy of the projected pit lake overflow date to be improved
- To confirm likely overflow rates in advance of the pit lake overflow

5.3.3 Surface Water Quality – Compliance Monitoring

Surface water samples shall be obtained for compliance monitoring purposes at the sites and frequency listed in Table 9. Sample parameters are to be **Type A** as presented in Table 25.

Table 17: Water Quality Compliance Monitoring Sites – Mare Burn

SITE	FREQUENCY	DESCRIPTION	NZTM (NORTHING)	NZTM (EASTING)
GB02	Monthly	Golden Bar Creek	4967911	1407089
NBWRRF	Monthly	NBWR Ross Ford	4967166	1401021
NB03	Monthly	NBWR downstream of confluence with Golden Bar Creek	4964562	1405803

Table 18: Aquatic Biological Compliance Monitoring – Shag River Catchment

SAMPLE TYPE	FREQUENCY	SITES	METHODS
Aquatic flora ⁽¹⁾	Summer (Dec-Feb) Autumn (Mar-May) Spring (Sep-Nov)	MC01, MC02, GB02, NBWRRF, NB03	Visual assessment of percentage cover of filamentous algae, mat-forming algae, macrophytes and moss.
Benthic macroinvertebrates	Summer (Dec-Feb) Autumn (Mar-May) Winter (Jun-Aug) Spring (Sep-Nov)	MC01, MC02, GB02, NBWRRF, NB03	Taxonomic composition and abundance. Sampling shall include calculation of the macroinvertebrate community index (MCI) and the quantitative MCI (QMCI)
Fish	Late summer (Feb-Mar)	MC01, MC02, NBWRRF, NB03	Taxonomic composition and abundance, by electric fishing survey.

Notes:

⁽¹⁾ Aquatic flora monitoring supports the ecological response trigger assessment described in Viridis (2026a). The visual cover-based method is consistent with monitoring undertaken under existing Macraes Operation consents and is proposed for MP4.

⁽²⁾ Fish monitoring is not planned at GB02, as no fish have been recorded at this site during monitoring undertaken since 2004.

5.3.4 Surface Water Quality – Other Monitoring

The objectives of undertaking additional surface water quality monitoring in the Shag River catchment are:

1. To provide control site data for comparison with Compliance Monitoring site results, in case trigger value exceedances at the Compliance Monitoring site are a result of upstream or background water quality trends.
2. To enable the development of correlations between Electrical Conductivity (EC) monitoring results and contaminant concentrations, where possible. If such correlations can be developed, the automated monitoring system may provide more detailed indications of contaminant concentration trends than are possible using manual sampling alone.
3. To maintain an ongoing record of the effects of the Macraes Operation at various points Deepdell Creek.

Automated Monitoring Sites

An automated surface water quality monitoring site is to be established at the same location as the automated flow monitoring station described in Section 3.3.1. The following parameters shall be recorded at intervals of 10 minutes, aligned with the flow recording frequency, with the data transmitted using telemetry to the OceanaGold site office. The parameters to be measured are:

- EC
- pH
- Temperature
- Turbidity

Control Monitoring Sites

Water quality control monitoring is proposed for the NBWR catchment. However, at this stage appropriate control sites are still to be identified.

Surface water samples shall be obtained for control monitoring purposes at the site and frequency listed in Table 4. Sample parameters are to be Type A as presented in Table 25.

Table 19: Water Quality Control Monitoring Sites – Shag River Catchment

SITE	FREQUENCY	DESCRIPTION	NZTM (NORTHING)	NZTM (EASTING)
DC00C	Monthly	Proposed control sites to be added to tributaries un-influenced by Macraes Operations above NB03	TBC	TBC

Additional Monitoring Sites

Additional monitoring sites are defined and used to provide early indication of water quality trends, inform the development of new water quality management and mitigation measures, and inform environmental effects assessments. These sites are monitored voluntarily by OceanaGold and are subject to change as required to meet OceanaGold's purposes.

Seven additional surface water quality monitoring sites are currently designated in the NBWR catchment (Table 20). Sample parameters are to be Type A as presented in Table 25.

Table 20: Water Quality Additional Monitoring Sites – Shag River Catchment

SITE	FREQUENCY	DESCRIPTION	NZTM (NORTHING)	NZTM (EASTING)
Fraser's East Sump	Monthly	Above Fraser's TSF eastern highway	4972790	1401492
NBWRGR	Monthly	NBWR Gifford Road	4971767	1399946
NBWRTR		NBWR Tributary 01	4969873	1400078
NBWRRB	Monthly	NBWR Redbank Road	4970961	1398983
MC100	Monthly	Downstream of Murphys Creek silt pond	4969680	1402110
NB01	Monthly	Golden Bar Creek upstream of confluence with NBWR	4964619	1405830
NB02	Monthly	NBWR upstream of confluence with Golden Bar Creek	4964676	1405805

5.3.5 WRS Seepage Monitoring

5.3.5.1 Flows

Flow monitoring stations are not currently installed or operational on any of the WRS seepage discharge points WRSs in the Shag River catchment.

Automated cumulative volume monitoring systems are to be installed on the following mine water riser pipes:

1. From the Fraser's East WRS seepage collection drain and sumps to the MWM system or eventual to the WTP.
2. From the Murphys Creek WRS seepage collection sump to the MWM system, or eventual to the WTP.
3. From the Fraser's West WRS seepage collection drain and sumps to the MWM system or eventual to the WTP.
4. From the Golden Bar WRS seepage collection sump to the to the MWM system or eventual to the WTP.

Water volumes shall be recorded at intervals of 10 minutes, with the data transmitted using telemetry to the OceanaGold site office.

5.3.5.2 Water Quality

Water quality monitoring site for mine water discharging from WRSs are proposed at the sites and sampling frequency listed in Table 13. The site locations are presented in Figure 3. Sample analysis parameters are to be Type C as presented in Table 25.

Table 21: Water Quality WRS Monitoring Sites – Shag River Catchment

SITE	FREQUENCY	DESCRIPTION	NZTM (NORTHING)	NZTM (EASTING)
Fraser's East WRS Seepage	Monthly		4972693	1401765
Fraser's West Silt Pond	Monthly	Silt pond collecting runoff from Fraser's West Rock Stack	4970932	1399520
Murphy's Creek Silt Pond	Monthly		4969800	1401998
Clydesdale Creek Silt Pond	Monthly	Clydesdale Creek Silt Pond at Golden Bar	4968855	1405799
Clydesdale WRS Seepage	Monthly	Coronation North WRS Seepage	TBC	TBC

5.3.6 TSF Seepage Monitoring

No seepage monitoring is planned for Fraser's TSF.

5.3.7 Pit Lake Monitoring

Following the close of mining and dewatering operations in Golden Point Pit, and the start of pit lake development in this pit, lake water quality monitoring shall be undertaken at the site and frequency listed in Table 15. Sampling as set out in Table 7 shall continue until the pit lake reaches overflow and then into the future. Sample parameters are to be Type B as presented in Table 25.

The objectives of the monitoring are to:

- Confirm the validity of the predictive water quality modelling undertaken in support of the MP4 consents.
- Enable decisions to be made regarding the frequency and timing of ferric chloride dosing to manage arsenic concentrations in the lake water (Section 3.2.2).

Table 22: Water Quality Monitoring Sites – Pit Lakes

SITE	FREQUENCY	DESCRIPTION	SAMPLE TYPE
Golden Point Pit	Monthly	Golden Point Pit lake	Grab sample of shallow water in pit lake

5.3.8 Groundwater Monitoring

The groundwater monitoring programme incorporates new groundwater monitoring wells to allow for characterisation of groundwater influenced by the MP4 project.

Groundwater sampling is to be undertaken by a suitably trained professional. Samples shall be collected using groundwater sampling methodology consistent with NEMS guidance.

The groundwater level in each well is to be measured prior to sampling.

Field parameters (pH, temperature, electrical conductivity, oxidation-reduction potential and dissolved oxygen) shall be monitored during purging. Groundwater samples should be collected after the measured parameters have stabilised.

5.3.8.1 Frasers West WRS

Under the Compliance and Monitoring Schedule attached to Discharge Permit RM10.351.10 V1 and RM10.351.11, groundwater monitoring is required of surrounding groundwater bores and the phreatic surface for Frasers West WRS.

Representative samples of groundwater from the surrounding groundwater bores shall be obtained. Groundwater bores monitored shall be those located at:

- North and west of Frasers West WRS, and south of the NBWR (FDB03, 04, 05, 06, 07, 08 and 10).
- West of Frasers West WRS (FDB02 and FDB11).
- South of Frasers West Waste Rock Stack (FDB13).

The location of the above bores are shown on Figure 12.



Figure 12: Frasers West WRS Groundwater Monitoring Sites

5.3.8.2 Frasers East WRS

Under the Compliance and Monitoring Schedule attached to Discharge Permit RM10.351.10 V1 and RM10.351.11, groundwater monitoring is required of surrounding groundwater bores and the phreatic surface for Frasers East WRS.

Representative samples of groundwater from the surrounding groundwater bores shall be obtained. Groundwater bores monitored shall be those located at:

- East of the rock stack known as Frasers East Waste Rock Stack (FE02).
- South of the rock stack known as Frasers East Waste Rock Stack (FE03).
- Bore FE01, North of the Frasers East WRS, is no longer sampled as this bore was destroyed as planned and is not required to be replaced.

The location of the above bores are presented on Figure 12.

6 MINE WATER TREATMENT PLANT

6.1 Introduction

A key change to existing water management practices at the Macraes Operation proposed for MP4 is the inclusion of an active WTP operating through the mining period and into the future, to treat water being discharged to the environment, reducing contaminant mass load discharges from site. Water treatment is to be implemented during mining operations for the treatment of captured WRS seepage waters. Following close of mining operations, the plant is to treat both WRS and TSF seepage waters as per the timeline in Figure 1.

6.2 Treatment Flows

A Water Treatment Plant (WTP) is to be installed close to the existing Processing Plant as documented in the Process Flow water treatment report (Process Flow 2026). The nature of the WTP remains to be finalised but at present Reverse Osmosis (RO) has been identified as the base-case treatment technology. This WQMP assumes RO remains the technology of choice.

Three stages of WTP development are planned:

- Stage 0 – a temporary test plant to provide field validation of the use of RO to meet the required level of mine water treatment. Treated water may be discharged to the MWMS or to a receiving water body provided the discharge does not lead to non-compliance with downstream water quality criteria.
- Stage 1 – a plant treating up to 5 L/s and discharging primarily to the NBWR near Giffords Road.
- Stage 2 – a full-scale plant treating all captured seepage waters with distributed discharges across the Macraes Operation.

For WTP design purposes, the following operational design margins for Stages 1 and 2 are recommended:

- $\pm 30\%$ applied to the annualised flow rates to account for the likely variation in daily treatment requirements.
- An additional +25% contingency to account for uncertainty in seepage flow capture rates.

A summary of the mean inflow rates to the WTP estimated by the WBM is provided in Table 23, with the following transition caveats:

- Reductions in seepage and capture rates resulting from WRS capping are unlikely to be realised immediately following closure, with influent WRS flows declining over time during the post-closure period.
- Reductions in TSF underdrain discharges are unlikely to be fully realised immediately following closure, with influent drain flows declining over time during the post-closure period.
- WRS seepage rates and TSF underdrain flows are expected to have reduced to the mean flows indicated in Table 23 approximately 10 years post-closure.

Table 23: RO Plant Throughflow.

PARAMETER	UNITS	MINING STAGE A ⁽¹⁾	MINING STAGE B	CLOSURE	POST-CLOSURE
WRS seepage combined	L/s	5.0	18.2 ⁽²⁾	18.2 ⁽²⁾	7 ⁽³⁾
TSF drains combined	L/s	-	-	26.9	15.9
Total WTP influent ⁽⁴⁾	L/s	5.0	18.2	45.1	22.9
Brine percentage of influent	%	15	15	15	15
Treated water discharge rate	L/s	4.25	15.5	38.3	19.5
	m ³ /day	367	1,337	3,312	1,682
Brine flow discharge ⁽⁵⁾	m ³ /day	65	236	584	297

Notes:

⁽¹⁾ Excludes operations of the Stage 0 test WTP described above.

⁽²⁾ Seepage captured based on current WRS net percolation rates.

⁽³⁾ Seepage captured following capping of WRS areas and corresponding reduction in net percolation.

⁽⁴⁾ Assumes all planned captures of WRS seepage and drain discharges required under this plan are in place.

⁽⁵⁾ Daily average.

6.3 Return Flows

By default, all water delivered to the WTP for treatment is expected to be returned to the source catchments, less the WTP waste streams.

However, flexibility is required in managing to the return flows to achieve the best water quality outcomes for the Macraes Operation as a whole. Specifically, flexibility is required to:

1. Maintain receiving environment water quality below the trigger values at the monitored compliance locations.
2. Retain flows for flushing purposes.
3. Provide for system repairs and maintenance.

Discharge volumes to each of the three main catchments and two sub catchments will generally be proportional to the captured seepage flow rate within each catchment recognising that approximately 15% of captured volume will be managed as a brine waste. For the benefit of achieving the above objectives an operational flexibility envelope of $\pm 50\%$ of the rolling 12 month capture volume is allowed for (or an alternate envelope defined by an ecological assessment at the time of implementation). Discharges to in catchment stores and the Camp Creek and Coal Creek Dams are included in this volume calculation.

Maximum discharge flow rates are provided for under Table 1 in the Water Treatment Plant Discharges memorandum from GHD (2026c).

6.4 WTP Brine Disposal

One of the waste streams from the RO WTP is a brine concentrate, with projected flows presented in Table 23. The brine is projected to have a total dissolved solids concentration in the order of 34,300 g/m³, predominantly comprised of MgSO₄.

Projected brine flows are to be discharged as follows:

1. Treatment Stage 1 – Brine is to be returned to the MWM system.
2. Treatment Stage 2 (during Mining Stage A) – Brine is to be returned to the MWM system.
3. Treatment Stage 3 (during and following Mining Stage B) – Brine is to be pumped into the lower workings of FRUG.

Modelling indicates brine storage at the rates listed in Table 23 can effectively continue indefinitely due to ongoing brine seepage into the host schist rock and brine seepage into the deeper tailings mass stored in Frasers TSF.

6.5 Brine Disposal System Installation

During Mining Stage A:

- An automated water level and EC monitoring system is to be installed in the existing vertical FRUG access shaft that opens onto the deeper workings (Figure 13).
- An injection bore targeting the lower FRUG workings is to be installed in a location close to that indicated in Figure 13.
- A pipeline and associated pumping system are to be installed to enable brine delivery from the WTP to the Brine Injection Well.

6.6 Monitoring

Automated monitoring of the rate and cumulative volumes of brine flows to the MWM system during Mining Stage A and to the FRUG Brine Injection Well during and following Mining Stage B are to be monitored automatically.

Monitoring of both water level and EC in FRUG is to be implemented as soon as the monitoring system is installed, to provide baseline water levels and water quality data. Monitoring of both water level and EC is to continue throughout the period of active brine storage in FRUG, to enable the effects of brine injection on water levels to be monitored and to provide advance notice if brine storage in FRUG is reaching capacity.

The above monitoring is principally to support operational management of the brine storage process, rather than for environmental compliance purposes.

6.7 Effects Management

Injection of brine into FRUG could potentially result in:

- Brine being forced out under pressure into the Frasers TSF tailings mass, and thence to the capped TSF surface or to Innes Mills Pit via the planned drainage systems to be installed in Frasers Pit.
- Mine water levels rising within the FRUG access shafts until the overflow level is reached, although this is a less likely outcome.

The preliminary operational trigger water level for brine disposal in FRUG of 509 mRL is consistent with the tailings elevation at the western edge of the Frasers TSF following closure.

Should monitoring indicate water levels within FRUG The water level monitoring system should enable support the operational mine water abstraction from FRUG to maintain a water level initially below a trigger level linked to the decant water level in Frasers TSF surface elevation. Over the longer term, the trigger level is to be linked to the capped level of Frasers TSF. The trigger level in both situations is expected to be above the designated surface in Frasers TSF, as there is no environmental benefit arising from maintaining the water level in FRUG below these designated surfaces.

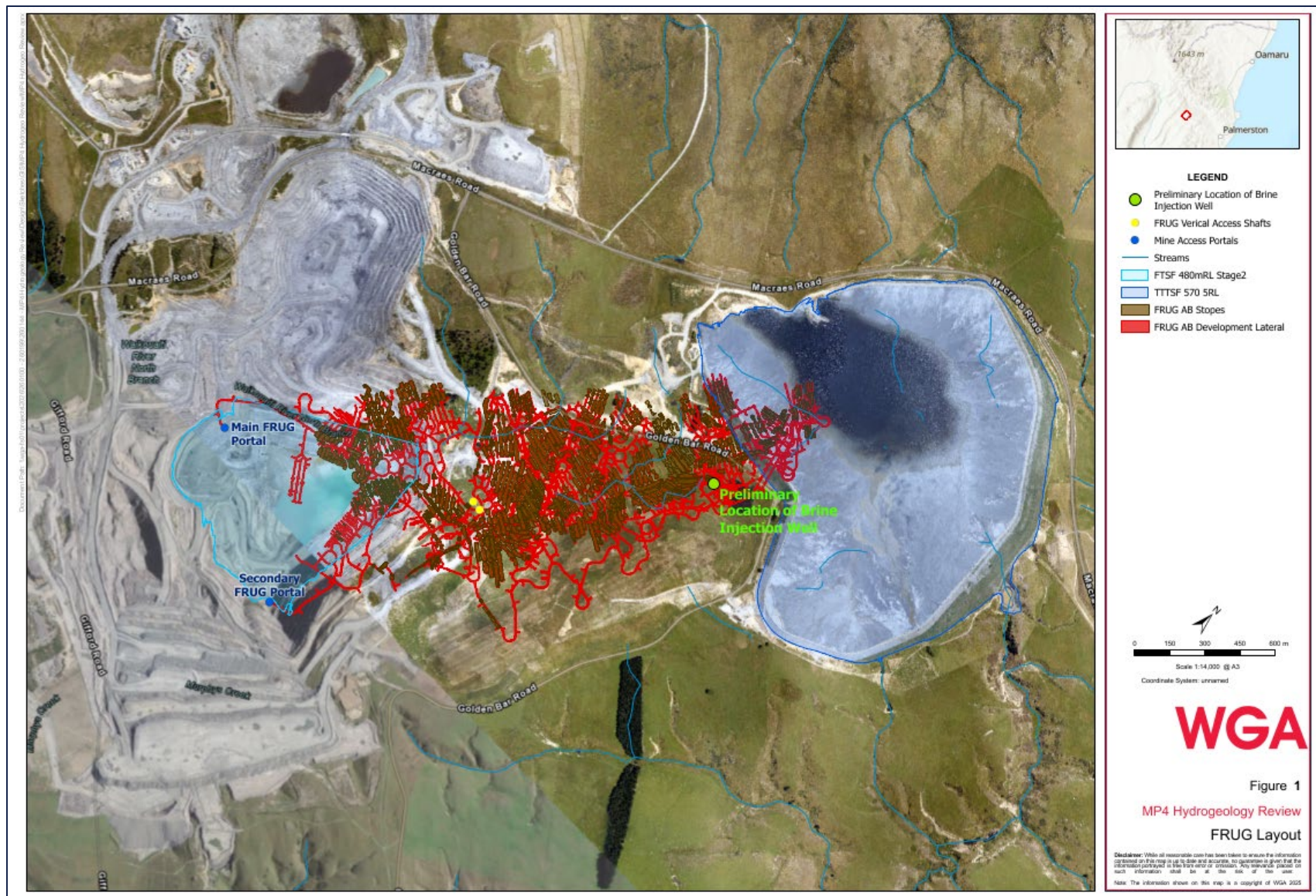


Figure 13: Key FRUG Features for Brine Management

7 MONITORING

7.1 Monitoring Plans

Water quality monitoring plans have been updated through the work undertaken in support of the MP4 consenting. The following monitoring plans apply to the entire Macraes operation, excluding Tipperary Creek. It is envisaged that the monitoring plan for the Tipperary Creek catchment will be updated following approval of MP4 and implementation of this WQMP.

The monitoring plans for the wider site to be referred to are:

- Macraes Phase 4 Water Monitoring Plan – Draft

7.2 Monitoring Types

7.2.1 Climate Monitoring

Climate inputs to site operational water management and environmental performance assessment and modelling are primarily derived from climate monitoring at the Golden Point weather stations. It is expected that there is variability in the climatic conditions across the Macraes Operation given the spatial and topological distribution of the site.

To improve certainty on model calibrations and environmental assessments going forward, electronic weather stations with daily recording frequency, including evaporation measurements, are to be maintained in the Coronation North, Golden Point and Frasers South areas (Table 24; Figure 14).

Table 24: Climate Monitoring Sites

SITE	TYPE	DESCRIPTION	LOCATION (X,Y)	STATUS
Golden Point	Electronic weather station	Top Office on Golden Point Road	TBC	Existing
	Pan Evaporation monitoring	Top Office on Golden Point Road	TBC	Inactive Reactivate
Coronation North	Electronic weather station incl. pan evaporation.	Near Coronation North WRS	TBC	Proposed
Frasers South	Electronic weather station incl. pan evaporation.	On Frasers South WRS	TBC	Proposed

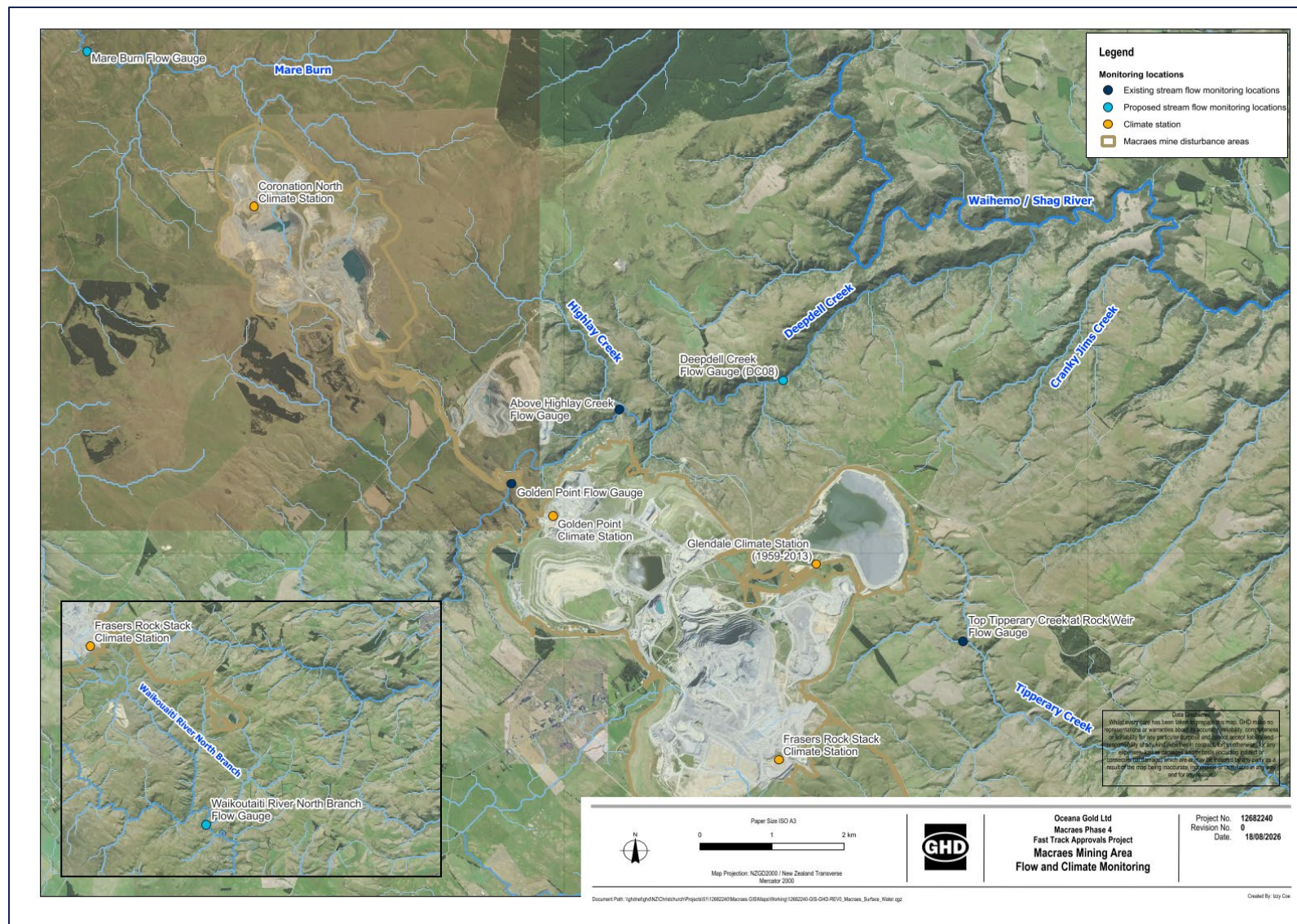


Figure 14: Macraes Operation Climate and Surface Water Flow Monitoring Locations.

7.3 Water Quality Monitoring Parameters

Environmental water monitoring components for the Macraes Operation include:

- **Compliance Monitoring:** Undertaken at set intervals and locations to satisfy the proposed compliance regime and provide basis for performance monitoring to ORC (Viridis 2026).
- **Operational Monitoring:** Undertaken at set intervals and locations to build OGLs reference data base and provide early performance monitoring of potentially adverse water quality developments. Operational monitoring is considered to include climate monitoring for the site.
- **Investigative Monitoring:** Undertaken as a response to identified adverse outcomes or following exceedance of compliance trigger levels.

Surface and groundwater samples are to be analysed for the parameters as outlined in Table 25. Surface water is defined into four types:

- Type A replicates the proposed compliance monitoring as per Viridis, 2026
- Type B is recommended for pit lake waters
- Type C for waste rock seepage collection
- Type D for tailings seepage collection

Field parameters should be measured in the field at the time of sample collection with calibrated probes.

Table 25: Water Quality Sampling Parameters

PARAMETER	SW (1) TYPE A*	SW TYPE B	SW TYPE C	SW TYPE D	GW STD. QUARTERLY	TTTSF MONTHLY	TTTSF QUARTERLY
Calcium	✓				✓	✓	
Magnesium	✓				✓	✓	
Potassium	✓				✓	✓	
Sodium	✓				✓	✓	
Bicarbonate	✓				✓	✓	
Carbonate	✓				✓	✓	
Chloride	✓				✓	✓	
Sulphate	✓	✓	✓	✓	✓	✓	
Hardness	✓				✓		
Dissolved Arsenic	✓	✓	✓	✓	✓	✓	
Dissolved Boron	✓	✓	✓	✓			
Dissolved Copper	✓	✓	✓	✓	✓		✓
Total Iron	✓	✓	✓	✓			
Dissolved Iron					✓		✓
Dissolved Lead	✓	✓	✓	✓	✓		✓
Dissolved Nickel	✓	✓	✓	✓	✓		
Dissolved Zinc	✓	✓	✓	✓	✓		
Cyanide (WAD)	✓			✓			✓
Total Suspended Solids		✓					
Dissolved non-purgable organic carbon (DNPOC)	✓						

PARAMETER	SW (1) TYPE A*	SW TYPE B	SW TYPE C	SW TYPE D	GW STD. QUARTERLY	TTTSF MONTHLY	TTTSF QUARTERLY
Total Nitrogen					✓		✓
Nitrate Nitrogen	✓	✓	✓	✓	✓		
Ammoniacal Nitrogen	✓	✓	✓	✓	✓		
pH	✓	✓	✓	✓	✓	✓	
Electrical Conductivity (EC)	✓	✓	✓	✓	✓	✓	
Temperature	✓	✓	✓	✓	✓		
Turbidity	✓	✓					

Note:

(1) As per Viridis 2026 compliance monitoring framework.

7.4 Top Tipperary Tailings Storage Facility Surface Water Monitoring

OceanaGold currently holds Discharge Permits RM10.351.16_V3 and RM10.351.17_V3 covering discharge of mine tailings and contaminants from mine tailings to land and water, respectively, for the purpose of disposing of mine process tailings in the Top Tipperary TSF.

Water quality details relating to the management of sediment (pursuant to Discharge Permit Consents numbered RM10.351.13, RM10.351.20 and RM10.351.23) are contained in the OceanaGold Erosion and Sediment Control Plan (ESCP).

Under the Compliance and Monitoring Schedule attached to Discharge Permits RM10.351.16_V3 and RM10.351.17_V3, the following surface water monitoring is required:

Monthly representative water samples from the following surface water compliance monitoring sites:

- Shag River Compliance Point 2 ("Shag River at McCormicks")
- Tipperary Creek ("TC01")
- Cranky Jims Creek ("CJ01")

The location of each site is shown on Figure 16. All surface water sites shall be sampled on the same day. Samples shall be analysed at monthly intervals for the parameters listed in Table 26.

Table 26: Top Tipperary Tailings Storage Facility Surface Water Monitoring Parameters

GROUP	PARAMETER
Major Cations	Calcium
	Magnesium
	Potassium
	Sodium
Major Anions	Bicarbonate
	Carbonate
	Chloride
	Sulphate

8 WATER QUALITY TRIGGERS AND COMPLIANCE CRITERIA

8.1 Water Quality Management Philosophy

Environmental water quality management at the Macraes Operation has historically focused on measures specific to locations and mine elements. This philosophy supports the development of clear processes for environmental water quality management through the operational period of the mine.

The current philosophy has shifted to catchment-based water management planning to meet proposed water quality criteria through the MP4 operational period, during closure and through the post-closure period. Consequently, environmental water quality in each of the major catchments intersecting the Macraes Operation is to be protected through the pro-active implementation of a suite of measures scheduled in accordance with the overall mine plan.

8.2 Compliance Philosophy

Under the existing framework, compliance is generally assessed through direct comparison of monthly monitoring results against applicable consent limits at each compliance site. In most cases, exceedance of a consent limit on any sampling occasion constitutes non-compliance. However, consents RM20.024.09 and RM20.024.14 require that, at HC02, compliance with consent limits for nitrate nitrogen, arsenic, copper, lead, and zinc is assessed using rolling statistics¹.

To support MP4, a new compliance framework has been developed. The framework consists of trigger values that, when exceeded, initiate defined response actions. In practice, the framework operates as a stepwise process:

1. Surface water quality is monitored monthly at defined locations.
2. Monitoring results at compliance sites are compared against trigger values, adjusted for site-specific chemistry where appropriate.
3. Where a trigger value is exceeded, it will prompt further assessment and, where appropriate, investigation and/or management response.
4. Where exceedances occur at a defined frequency or duration, and are demonstrated to be attributable to mine operations, this results in non-compliance.
5. Non-compliance, where demonstrated to be attributable to mine operations, will trigger management intervention and, if appropriate, longer-term mitigation measures.

This structure distinguishes between early warning indicators (trigger value exceedances) and elevated likelihood of adverse effects (non-compliance), enabling a proportionate, risk-based response. The derivation of the water quality trigger and compliance framework for MP4 is provided in a surface water quality framework report by Viridis (2026).

8.3 Compliance Monitoring Sites

A water quality compliance site is a defined monitoring location within the receiving environment where water quality is formally assessed against compliance or trigger values. Compliance sites represent locations where potential project-related effects are expected to be measurable and form the basis for compliance assessment.

¹ Median or 95th percentiles, based on annual or 36 consecutive monthly samples, depending on parameter being assessed.

A control site is not influenced by project-related activities and is used to characterise background receiving environment conditions. Control sites provide a reference against which compliance site results can be compared to help distinguish natural variability or background quality from potential project-related effects.

Water quality compliance and control monitoring sites for the Macraes Operation are listed in Table 27 and their locations presented in Figure 16.

8.4 Water Quality Compliance Criteria

8.4.1 Narrative Standard

The waters of Mare Burn, Deepdell Creek, Highlay Creek, Tipperary Creek, McCormicks Creek, Cranky Jims Creek, the Shag River, Murphys Creek, Cydesdale Creek, Golden Bar Creek and the North Branch of the Waikouaiti River shall at all times be free of contaminants attributable to mineral processing and associated activities in concentrations which adversely affect directly or indirectly water uses or which adversely affect humans, animals, plants and/or aquatic life.

8.4.2 Numerical Standards for Compliance

The existing water quality consent criteria for the Macraes Operation, are presented in Table 28. These criteria are applicable:

1. At MB01, MB02 until the end of Mining Phase A (Table 29).
2. At DC08, Shag at Loop Road, Shag at McCormicks, SPMP1, until the end of Mining Phase A (Table 30).
3. At GB02, MC01, MC02, NBWRRF, NB03, until the end of Mining Phase A (Table 31).
4. At HC01, CJ01, TC01 into the future (Table 29).

The proposed water quality consent criteria for the Macraes Operation linked to the MP4 consents are presented in Table 32. These criteria are applicable:

1. At MB01, MB02 following the end of Mining Phase A (Table 29).
2. At DC08, Shag at Loop Road, Shag at McCormicks, SPMP1, following the end of Mining Phase A (Table 30).
3. At GB02, MC01, MC02, NBWRRF, NB03, until the end of Mining Phase A (Table 31).

Table 27: Surface Water Quality Control and Compliance Monitoring Sites

SITE	WATERCOURSE	PURPOSE	TYPE ⁽¹⁾	COMPLIANCE REGIME
Shag/Waihemo River catchment				
DC00	Deepdell Creek	Control ⁽²⁾	WQ	Pre-MP4 → MP4
DC08	Deepdell Creek	Compliance	WQ/ECO	Pre-MP4 → MP4
SPMP1	Battery Creek	Compliance	WQ	Pre-MP4 → MP4
HC02 ⁽³⁾	Highlay Creek	Compliance	WQ	Pre-MP4 ⁽³⁾
Shag at Loop Road	Shag/Waihemo River	Compliance	WQ	Pre-MP4 → MP4
Shag at McCormicks	Shag/Waihemo River	Compliance	WQ	Pre-MP4 → MP4
CJ01 ⁽³⁾	Cranky Jims Creek	Compliance	WQ	Pre-MP4 ⁽³⁾
TC01 ⁽³⁾	Tipperary Creek	Compliance	WQ	Pre-MP4 ⁽³⁾
North Branch Waikouaiti River catchment				
MC01	Murphys Creek	Compliance	WQ/ECO	Pre-MP4 → MP4
MC02	Murphys Creek	Compliance	WQ/ECO	Pre-MP4 → MP4
GB02	Golden Bar Creek	Compliance	WQ/ECO	Pre-MP4 → MP4
NBWRRF	North Branch of Waikouaiti River	Compliance	WQ/ECO	Pre-MP4 → MP4
NB03	North Branch of Waikouaiti River	Compliance	WQ/ECO	Pre-MP4 → MP4
Taieri River (Mare Burn) catchment				
MB00	Mare Burn	Control ⁽²⁾	WQ	Pre-MP4 → MP4
MB01	Mare Burn	Compliance	WQ/ECO	Pre-MP4 → MP4
MB02	Mare Burn	Compliance	WQ/ECO	Pre-MP4 → MP4

Note:

⁽¹⁾ WQ = water quality monitoring, ECO = aquatic ecology monitoring.

⁽²⁾ Control sites are monitored voluntarily by OGLNZ and provide data that is used to evaluate the change in water quality between upstream non-impacted sites and compliance sites.

⁽³⁾ These sites will not be affected by the MP4 Project. Compliance criteria for these sites are initially excluded from the new compliance framework under MP4. However, it is expected that they will be brought under the new compliance framework in the future.

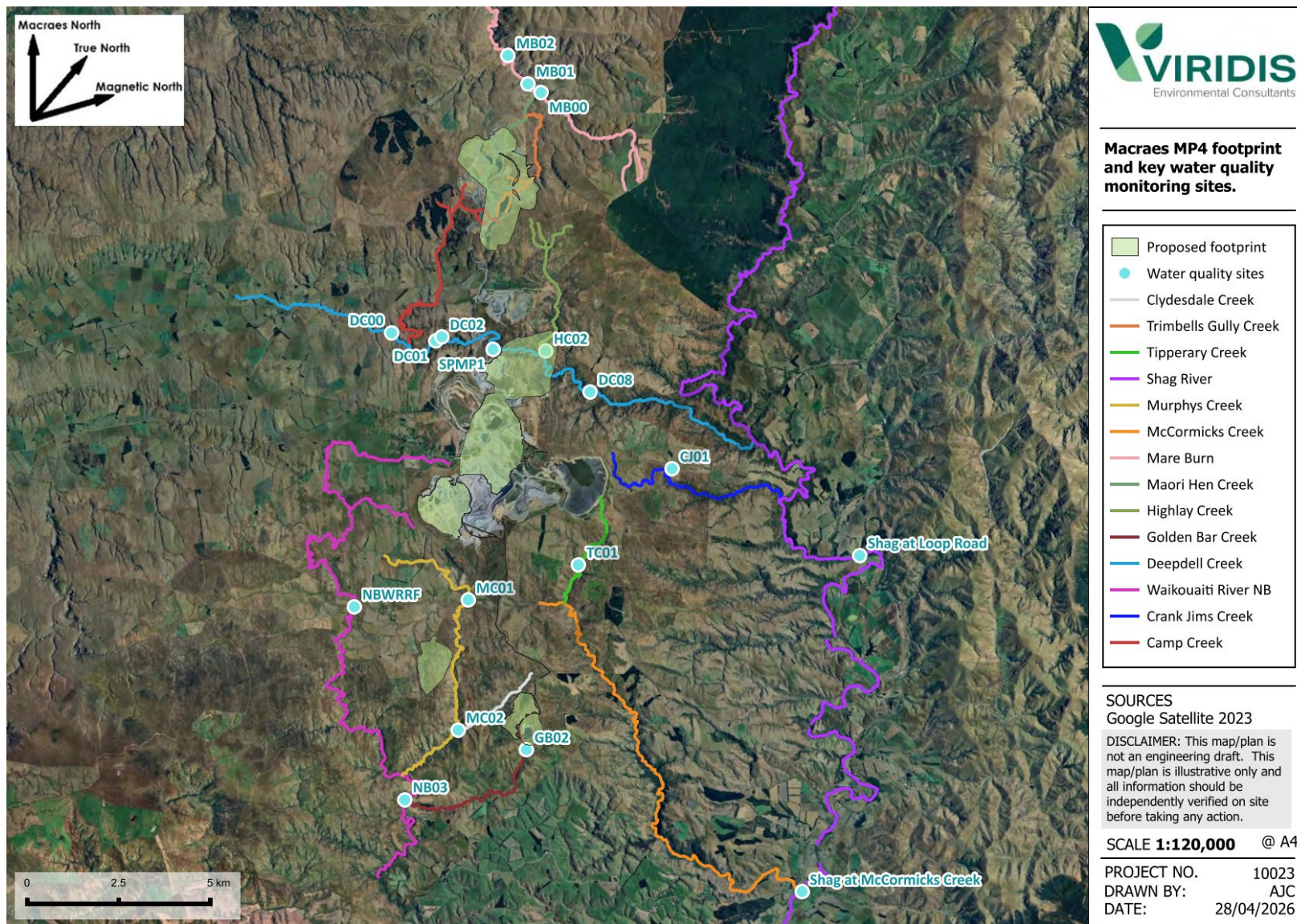


Figure 16: Macraes Operation Key Surface Water Quality Monitoring Site Sites

Table 28: Existing and Mining Phase A - Water Quality Compliance Limits at Macraes Operation Listed by Parameter

PARAMETER ⁽¹⁾	LIMIT	MODIFIERS/NOTES	APPLICABLE SITES
pH (unitless)	7 - 8.5		Shag at Loop, Shag at McCormicks
	6.5 - 9.5		MB02
	6.0 - 9.5		CJ01, DC08, MB01, MC01, MC02, GB02, HC02, NB03, NBWRRF, SPMP1, TC01
Visibility (TSS/turbidity)	30 - 50%	Change from control site	MB02
Sulphate	1,000		CJ01, DC08, HC02, MB01, MC01, NBWRRF, TC01
	250		NB03, Shag at Loop Road, Shag at McCormicks
Ammoniacal nitrogen (g N/m ³)	0.24		MB02
Nitrate nitrogen (g N/m ³)	2.4	as annual median A,B	DC08, HC02, MB02, Shag at Loop Road
	3.5	as annual 95th percentile A,B	DC08, HC02, Shag at Loop Road
Arsenic	0.15	CCC for As(III)	CJ01, DC08, GB02, MB01, MB02, MC01, MC02, NBWRRF, SPMP1, TC01
	0.013	TV for As (V) at 95% protection level	HC02
	0.01	maximum acceptable value	NB03, Shag at Loop Road, Shag at McCormicks
Copper	0.018 ⁽³⁾		CJ01, DC08, GB02, MB01, MB02, MC01, MC02, NB03, NBWRRF, Shag at Loop Road, Shag at McCormicks, SPMP1, TC01
	0.0076 ⁽³⁾		HC02
Iron	1		CJ01, DC08, GB02, MB01, MB02, MC01, MC02, NB03, NBWRRF, SPMP1, TC01
	0.3		HC02
	0.2		NB03, Shag at Loop Road, Shag at McCormicks

PARAMETER ⁽¹⁾	LIMIT	MODIFIERS/NOTES	APPLICABLE SITES
Lead	0.0059 ⁽³⁾		CJ01, DC08, GB02, MB01, MB02, MC01, MC02, NB03, NBWRRF, Shag at Loop Road, Shag at McCormicks, SPMP1, TC01
	0.043 ⁽³⁾		HC02
Zinc	0.23 ⁽³⁾		CJ01, DC08, GB02, MB01, MB02, MC01, MC02, NB03, NBWRRF, Shag at Loop Road, Shag at McCormicks, TC01
	0.044 ⁽³⁾		HC02
Cyanide	0.1		CJ01, DC08, MB01, MB02, MC01, NB03, NBWRRF, Shag at Loop Road, Shag at McCormicks, SPMP1, TC01

Notes:

⁽¹⁾ Units are in g/m³ unless stated otherwise; All metals are tested in the dissolved fraction unless stated.

⁽²⁾ Acronyms: HMTV = hardness modified trigger value; DGV = default guideline value; NBL = national bottom line; A applied as fixed limit; B Calculated at pH of 8.

⁽³⁾ Adjusted here for a standard Macraes Operation hardness of 220 g/m³ as CaCO₃, though typically presented in consent schedules at a hardness of 30 or 100 g/m³ as CaCO₃.

Table 29: Existing and Mining Phase A - Water Quality Compliance Limits at Macraes Operation – Mare Burn Catchment

PARAMETER ^(1,2)	MARE BURN	
	MB01	MB02
Arsenic	0.15	0.15
Cyanide _{WAD}	0.10	0.10
Copper ⁽³⁾	0.018	0.018
Iron	1.0	1.0
Lead ⁽³⁾	0.0059	0.0059
Zinc ⁽³⁾	0.23	0.23
Sulfate	1,000	-
Ammoniacal Nitrogen (g N/m ³) ⁽³⁾	-	0.24
Nitrate Nitrogen (g N/m ³) ⁽³⁾	-	2.4
pH (range)	6.0 – 9.5	6.5 – 9.5
Visibility (TSS/turbidity)	-	30 - 50% change from control site

Note:

⁽¹⁾ Surface water within the creek at each of these monitoring sites shall not exceed the water quality compliance criteria shown in Table 29, unless infallible evidence can be provided that the level of a parameter is either naturally occurring or unrelated to mining activities.

⁽²⁾ Units of g/m³ except where otherwise indicated.

⁽³⁾ Refer to Table 28 for modifiers and notes.

Table 30: Existing and Mining Phase A - Water Quality Compliance Limits at Macraes Operation – Shag River Catchment

PARAMETER ^(1,2)	BATTERY CREEK	DEEPELL CREEK	HIGHLAY CREEK	TIPPERARY CREEK	CRANKY JIMS CREEK	SHAG RIVER	SHAG RIVER
	SPMP1	DC08	HC02	tc01	CJ01	at Loop Road	at McCORMICKS
Arsenic	0.15	0.15	0.013	0.15	0.15	0.01	0.01
Cyanide _{WAD}	0.10	0.10	-	0.10	0.10	0.1	0.1
Copper ⁽³⁾	0.018	0.018	0.0076	0.018	0.018	0.018	0.018
Iron	1.0	1.0	0.3	1.0	1.0	0.2	0.2
Lead ⁽³⁾	0.0059	0.0059	0.043	0.0059	0.0059	0.0059	0.0059
Zinc ⁽³⁾	-	0.23	0.044	0.23	0.23	0.23	0.23
Sulfate	-	1,000	1,000	1,000	1,000	250	250
Nitrate Nitrogen (g N/m ³) ⁽²⁾	-	2.4 (3.5)	2.4 (3.5)	-	-	2.4 (3.5)	-
pH (range)	6.0 – 9.5	6.0 – 9.5	6.0 – 9.5	6.0 – 9.5	6.0 – 9.5	7.0 – 8.5	7.0 – 8.5

Note:

⁽¹⁾ Surface water within the creek at each of these monitoring sites shall not exceed the water quality compliance criteria shown in Table 30, unless infallible evidence can be provided that the level of a parameter is either naturally occurring or unrelated to mining activities.

⁽²⁾ Units of g/m³ except where otherwise indicated.

⁽³⁾ Refer to Table 28 for modifiers and notes.

Table 31: Existing and Mining Phase A - Water Quality Compliance Limits at Macraes Operation – North Branch Waikouaiti River

PARAMETER ^(1,2)	MURPHYS CREEK	MURPHYS CREEK	GOLDEN BAR	NBWR	NBWR
	MC01	MC02	GB02	NBWRRF	NB03
Arsenic	0.15	0.15	0.15	0.15	0.01
Cyanide _{WAD}	0.10	-	-	0.10	0.10
Copper ⁽³⁾	0.018	0.018	0.018	0.018	0.018
Iron	1.0	1.0	1.0	0.2	0.2
Lead ⁽³⁾	0.0059	0.0059	0.0059	0.0059	0.0059
Zinc ⁽³⁾	0.23	0.23	0.23	0.23	0.23
Sulfate	1,000	-	-	1,000	250
pH (range)	6.0 – 9.5	6.0 – 9.5	6.0 – 9.5	6.0 – 9.5	6.0 – 9.5

Note:

⁽¹⁾ Surface water within the creek at each of these monitoring sites shall not exceed the water quality compliance criteria shown in Table 31, unless infallible evidence can be provided that the level of a parameter is either naturally occurring or unrelated to mining activities.

⁽²⁾ Units of g/m³ except where otherwise indicated.

⁽³⁾ Refer to Table 28 for modifiers and notes.

Table 32: Mining Phase B and Closure Water Quality Compliance Limits at Macraes Operation (Viridis 2026).

PARAMETER ^(1,2)	TYPE	MODIFIERS	TRIGGER VALUE ⁽³⁾	NON-COMPLIANCE CRITERIA ⁽⁴⁾
pH (unitless)	Chronic	-	6.5 – 9.0	More than two exceedances within any rolling 12-month period
Turbidity (NTU) ⁽⁵⁾	Chronic	-	5	More than two exceedances within any rolling 12-month period
Sulphate	Chronic	Hardness	500 (when <100 g/m ³ hardness) 1,000 (when ≥100 g/m ³ hardness)	More than two exceedances within any rolling 12-month period
Ammoniacal nitrogen ⁽⁶⁾ (g N/m ³)	Chronic	pH, temperature	Refer to lookup Table B1 in Appendix B	More than two exceedances within any rolling 12-month period
Nitrate nitrogen ⁽⁶⁾ (g N/m ³)	Chronic	Hardness, chloride	1.1 (when <30 g/m ³ hardness) 2.6 (when 30-150 g/m ³ hardness or >150 g/m ³ with Cl <30 g/m ³) 29 (when >150 hardness with Cl ≥30 g/m ³)	More than two exceedances within any rolling 12-month period
SIN (g N/m ³) Filamentous algae	Eutrophication	-	0.075 30% cover of filamentous algae >2 cm in length	The rolling annual median SIN trigger is exceeded as a result of mine operations and coincides with a sustained nuisance algal growth response, as determined in accordance with Section 8.4.3.
Arsenic ⁽⁷⁾	Chronic	-	0.013 0.042 at DC08 and SPMP1	More than two exceedances within any rolling 12-month period
Boron	Chronic	-	0.94	More than two exceedances within any rolling 12-month period
Copper	Chronic	DOC ⁽⁵⁾	$TV = 0.00047 \times \left(\frac{DOC}{0.5}\right)^{0.977}$	More than two exceedances within any rolling 12-month period
	Acute	Hardness, pH, DOC ⁽⁵⁾	$TV = \frac{\exp(-6.6 + 0.78 pH + 0.58 \times \ln(hard.) + 0.70 \times \ln(DOC))}{1,000}$	Single exceedance
Iron ⁽⁸⁾	Chronic	-	0.28	More than two exceedances within any rolling 12-month period

PARAMETER ^(1,2)	TYPE	MODIFIERS	TRIGGER VALUE ⁽³⁾	NON-COMPLIANCE CRITERIA ⁽⁴⁾
Lead	Chronic	Hardness	$TV = 0.0034 \times \left(\frac{Hardness}{30}\right)^{1.27}$	More than two exceedances within any rolling 12-month period
Nickel	Chronic	Hardness, pH, DOC ⁽⁵⁾	Refer to lookup Table B2 in Appendix B	More than two exceedances within any rolling 12-month period
Zinc	Chronic	Hardness, pH, DOC ⁽⁵⁾	Refer to lookup Table B3 in Appendix B	More than two exceedances within any rolling 12-month period
	Acute	Hardness, pH, DOC ⁽⁵⁾	$TV = \frac{\exp(2.5 - 0.12 pH + 0.6 \times \ln(hardness) + 0.13 \times \ln(DOC))}{1,000}$	Single exceedance
Cyanide ⁽⁹⁾	Chronic	pH, temperature	$TV = 0.007 \times (1 + 10^{(pH - (9.721 - 0.0194 \times T))})$	More than two exceedances within any rolling 12-month period

Notes:

⁽¹⁾ All units g/m³ unless stated.

⁽²⁾ Metals analysed in dissolved fraction unless stated.

⁽³⁾ Applies to all compliance sites, unless stated.

⁽⁴⁾ Compliance assessment is based on routine monthly compliance monitoring results.

⁽⁵⁾ Acronyms: DOC = dissolved organic carbon; SIN = soluble inorganic nitrogen, which is the sum of ammoniacal nitrogen, nitrate nitrogen and nitrite nitrogen.

⁽⁶⁾ Not considered protective of eutrophication effects.

⁽⁷⁾ As(V) concentrations; in the absence of speciation testing, dissolved arsenic is used as a conservative surrogate for comparison.

⁽⁸⁾ Total iron, is used as a conservative surrogate for weak acid extractable concentrations in the absence of an available analytical method.

⁽⁹⁾ Weak acid dissociable (WAD) cyanide.

⁽¹⁰⁾ For detailed explanation of trigger value and compliance derivations, refer to Viridis (2026).

8.4.3 Standard for the Management of Eutrophication

The surface water quality compliance framework developed by Viridis (2026) adopts a combined nutrient and ecological response approach for the assessment of eutrophication. A soluble inorganic nitrogen (SIN) trigger value of **0.075 g N/m³**, assessed as a rolling annual median, is used as an indicator of sustained nutrient enrichment. An ecological response is also required to demonstrate that nutrient enrichment is resulting in nuisance algal growth.

The framework requires both exceedance of the SIN trigger and repeated exceedance of an ecological response trigger for eutrophication-related non-compliance. It provides for the specific ecological response metric and assessment methodology to be further defined. For the purposes of this Plan, the ecological response trigger is 30% cover of filamentous algae greater than 2 cm in length, consistent with Biggs (2000).

Where the SIN trigger is exceeded, the monitoring results will be assessed to determine whether the exceedance is attributable to mine operations, taking account of conditions at relevant control sites and other relevant factors. Where the ecological response trigger is exceeded, follow-up aquatic flora monitoring will be undertaken approximately one month later. A sustained nuisance algal growth response is demonstrated where the ecological response trigger is also exceeded during the follow-up monitoring.

Eutrophication-related non-compliance occurs where a mine-attributable exceedance of the rolling annual median SIN trigger coincides with a sustained nuisance algal growth response.

Where eutrophication-related non-compliance is identified, appropriate management measures will be implemented in accordance with Sections 10.4 and 10.5 of this Plan.

A site will return to compliance where either:

- The rolling annual median SIN concentration no longer exceeds 0.075 g N/m³
- Monitoring no longer demonstrates a sustained nuisance algal growth response.

9 KEY WATER QUALITY RISKS

The key water quality risks at the Macraes Operation relate to the potential for non-compliance with existing or proposed criteria. Modelling of the performance of mine site water flow and quality management measures (GHD 2026) has identified risks of non-compliance for some water quality parameters at some of the compliance monitoring points listed in Table 27. These risks are summarised in Figure 17.

The modelling outcomes summarised in Figure 17 are based on the assumption that all of the water quality management measures documented in this plan are designed and implemented in accordance with the schedule provided in this plan (Table 1). Failure to appropriately implement the planned water quality management measures carries with it an increased risk of non-compliance.

The risk of structural failure of mine elements leading to the rapid uncontrolled development of environmental water quality issues through the uncontrolled release of contaminants is dealt with in other mine management plans.

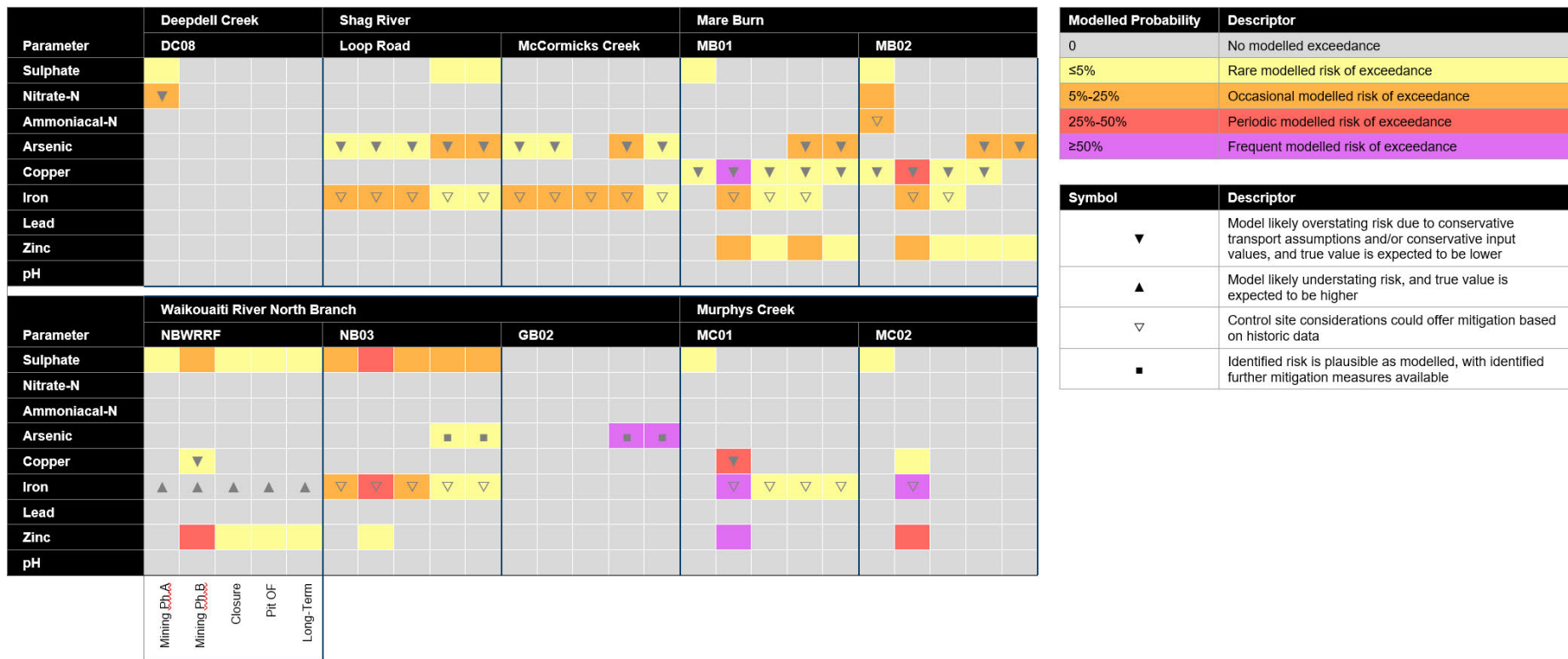


Figure 17: Macraes Operation Compliance Risks from Water Balance Modelling (GHD 2026a)

10 RISK MANAGEMENT AND CONTINGENCY PLANNING

10.1 Introduction

Contingency management is a transient process whereby issues that may arise or have arisen with little to no advance notice are addressed over the short term. This is not an adaptive management approach but rather an approach of planning for unexpected issues. Over the medium to longer term, potential issues are addressed through the design and implementation of water quality management and mitigation measures.

Contingency planning for Water Quality Management is linked to:

- Monitoring of water quality trends and water quality results at the Compliance Monitoring points, with specific reference to trigger levels.
- Monitoring of water quality trends at on-site monitoring points, which are not reported externally, including:
 - Pit lake water quality
 - WRS seepage water quality
 - FRUG water quality
 - TSF drain discharge water quality
 - WTP discharge water quality (reporting requirements depend on MP4 consent criteria)
- Monitoring of mine water discharge flows at on-site monitoring points, which are not reported externally, including:
 - WRS seepage discharge flows
 - TSF drain discharge flows
 - WTP discharge water quality (reporting requirements depend on MP4 consent criteria)

10.2 Risk Management

Water risks are managed as per the OceanaGold Risk Management Standard and Risk Management Guidelines. Water related risks are identified through a water management specific site risk assessment and included into the Macraes Risk Register. Material water risks are further assessed using a Bowtie risk assessment process.

References:

- OGC-450-GUI-005 Risk Management Guidelines
- OGC-330-STD-001 Risk Management Standard
- MAC-207-RSK-001 Water Management Risk Assessment
- MAC-250-RSK-005 Macraes Risk Register
- Macraes material water risks

10.3 Water Management Risk Assessment

A water management risk assessment, undertaken in 2022 prior to the initiation of the MP4 consenting process in accordance with the Risk Management Guidelines, identified water-related risks that are recorded in the site risk register. Material risks have been subject to bowtie analysis to assess causes and potential impacts and to define risk-specific controls and actions to reduce risk. Actions arising from the bowtie analyses are tracked through the OceanaGold action tracking system. A summary of material risk descriptors is provided in Table 33.

Table 33: Summary of material water quality related risks for Macraes Operation

RISK EVENT DESCRIPTOR	INHERENT CONSEQUENCE (WITHOUT CONTROLS)	RESIDUAL CONSEQUENCE (WITH CURRENT CONTROLS)
Unable to secure consents that enable future mine life (progression of mining activities) or new/amended consent conditions have tightened compliance regime for the site which requires further (and costly) treatment	5	2
Uncontrolled release of contaminants into waterways causing prolonged off-site impact and a compliance breach resulting in prosecution	4	3
Unable to comply with or meet requirements to changes or new regulatory policy	4	2

The water management risk assessment is reviewed annually and following any significant water-related environmental incident or material change to water management processes. Any new material risks identified will be assessed through bowtie analysis.

10.4 Contingency Management Process

Contingency management follows a stepwise procedure:

1. Identify the effects that need to be managed.
2. Investigate and identify the source of the effects.
3. Identify and prioritise short term solutions to address the issue.
4. Implement an effects management process whereby management measures are sequentially implemented and their effectiveness at addressing the issue is monitored.
5. Confirm that a valid solution has been implemented and observed effects of risks have been managed.
6. Document the contingency management process followed and the outcomes.

Further work on this section may be required to ensure the contingency management process appropriately provides for eutrophication-related non-compliance, to be addressed once the MP4 consent conditions have been finalised.

10.5 Contingency Management Options

Short term water quality management options for the Macraes Operation are similar to the management measures documented in Sections 3.2, 4.2 and 5.2. However, they are limited to measures that are authorised under existing consents and can be implemented rapidly while remaining in compliance with the conditions attached to all consents supporting the Macraes Operation.

Potential contingency measures to address the risk of exceedance of parameter trigger levels at Compliance Points include:

1. Release of additional water from a freshwater dam to improve downstream water quality.
2. Adjust targeted rates of treated water discharge flows from the WTP.
3. Source and treat additional water at the WTP to enable targeted increases in discharge flow rates from the WTP.

Potential contingency measures to address unplanned WTP shutdown include:

1. Temporarily divert the captured mine water from the WTP to an open pit, one of the pit lakes or FRUG, while repairs to the WTP are undertaken.

Potential contingency measures to address unplanned issues with brine storage in FRUG include:

1. Divert brine flows to deep discharge into one of the pit lakes.

Further work on this section is required to ensure the contingency management options appropriately provide for eutrophication-related non-compliance.

10.6 Trigger Action Response Plans (TARPs)

TARPs outline what processes should be followed for specific incidents and what changes as the level of emergency increases. These documents are designed to assist those involved in the emergency to react quickly and decisively at certain points of the emergency. TARPs are available on SharePoint MAC-253-FOR-003 Trigger Action Response Plans (TARPs) and in the MineStar and Plant Control Rooms and at Incident Control Points.

A TARP is available for the following event that has potential environmental implications and water impacts:

- Weather Event

A TARP is to be developed early in the Mining Phase A period to address the following event that has potential environmental implications and water impacts:

- Water Quality Trigger Exceedances at Compliance Monitoring points

Note that this TARP is to distinguish between a trigger exceedance and non-compliance in accordance with Section 8 and Viridis (2026), including appropriate assessment/investigation following a trigger exceedance and management response where non-compliance is established.

10.7 Incident Reporting

All water related incidents, including exceedances of water quality trigger levels and non-compliances with water quality criteria linked to resource consents are reported and tracked through the site's incident management system (InControl), following the water management standard guidelines.

Reporting of incidents and exceedances to ORC are undertaken through the Environmental team and all major incidents should be reported as soon as practicable to either the Manager - Environment and Social Performance or the Superintendent - Environment.

ORC must be notified **within 24 hours** of identification of:

1. Any material failure of erosion and sediment controls associated with a WRS, which result in an unexpected direct discharge of sediment to water.
2. Any exceedance of a limit, trigger value or standard specified by consent.
3. Any non-compliance with a monitoring, sampling, analysis, recording or reporting requirement of consent.

ORC must be provided with a written report **within 5 working days** of the notification above, detailing:

1. The nature and cause of the incident or non-compliance.
2. Any actual or potential adverse environmental effects arising from the incident or non-compliance.
3. The actions taken to remedy the incident or non-compliance.
4. The measures implemented, or proposed to be implemented, to prevent recurrence.

11 COMPLIANCE TRACKING

11.1 Compliance Tracking

Consent compliance in relation to monitoring and performance is mainly monitored through InViron, which flags exceedances to specified standards. It is also tracked and reviewed during preparation of the Quarterly Monitoring Reports that are prepared and submitted to the ORC.

11.2 Process Tracking

The main method of consent compliance tracking is by using InForm. InForm enables tasks to be assigned in relation to specific consent conditions requiring actions to be completed, such as annual review of the WQMP.

11.3 Non-Compliance Register

From 2024 onwards environmental events reported in InControl have been separated into three categories:

- Non-Compliance (Measurable)
- Non-Compliance (Technical)
- Environmental Incident (Non-conformance with OGC/BU Management System)

A list of environmental events can be generated in InControl by going to the “Reports and Graphs” tab, selecting “Statistics Reports” and the “Summary Event Report Listing” option. From there the Event Category needs to be selected as “Environment” and the Event Type as “Environment – Environment Event”. To identify those reports that are water related, the Event Sub Type can be set to “Water”. Exporting the generated report provides the OGLNZ Macraes site water event report. This report can be broken down further within Excel and PowerBI to identify water-related non-compliances and enable review of these events.

Exceedances and notifications to ORC are logged and recorded through a spreadsheet housed in “I” drive to enable 24-hour notifications and 5-day follow-ups with council to be recorded and tracked.

12 RECORDS AND DOCUMENTATION

12.1 Data Management

OceanaGold uses the on-line INX software package to record and track health, safety, environmental and training data and obligations related to water management. Records are stored securely and indefinitely within this facility

The following suites are utilised in relation to water management:

- InControl: Event, incident and hazard reporting, action tracking, audits, inspections, task observations, meeting minutes and Management of Change.
- InTuition: Worker's training and competency records and requirements.
- InForm: Stakeholder details, communications, and obligations.
- InViron: Environmental monitoring data.

Water quality and phreatic monitoring records are held by the Environment and Community Team.

Pit water abstraction flow records are collected by the mining team with data provided to the Environment and Community Team and stored on service provider monitoring websites, predominantly through the Harvest system.

Water related inspection and maintenance reports are held by the relevant department or through corporate maintenance databases i.e. Pronto.

All water related management plans are kept as controlled documents secured within the OceanaGold document control system TeamBinder and published to SharePoint for access by Macraes personnel.

12.2 Reporting

12.2.1 ORC Quarterly Monitoring Reports

At quarterly intervals a Quarterly Monitoring Report is prepared and supplied to the ORC in relation to water quality sampling. The purpose of this report is to comply with the reporting requirements of the Compliance and Monitoring Schedules appended to key resource consents, present the results of the quarters monitoring and highlight any variances and issues encountered.

Reports are due for submission to the ORC within one month of the end of the quarter (quarters align to seasons).

12.2.2 Sustainability Reporting

OGC prepares an annual Sustainability Report in accordance with the Global Reporting Initiative (GRI) Standards – Core Option and the G4 Mining and Metals Sector Disclosures. As water management is identified as a material matter for the business, it is addressed as a dedicated section within the OceanaGold Sustainability Report and includes performance reporting against defined water-related metrics.

Water performance data are reported annually using a standardised template and include volumes of water withdrawn, discharged and consumed, the percentage of water reused or recycled, and details of any non-compliances or complaints, including those related to water. Performance is assessed through comparison with results from previous reporting periods.

Reference:

- MAC-210-PRO-000 Macraes Sustainability Data Collection

12.2.3 Brine Disposal

An Annual Brine Management Report is to be submitted to ORC during any year in which brine is discharged to FRUG.

The report must include:

1. Total annual brine discharge volumes
2. Maximum and average daily discharge rates
3. Mine water level monitoring results
4. Electrical conductivity monitoring results where available
5. Any trigger exceedances and corrective actions undertaken
6. An assessment of the performance of the brine disposal system

13 WQ MANAGEMENT REVIEW AND AUDIT

13.1 WQMP Updates

This WQMP shall be reviewed and updated annually and/or in any of the following circumstances:

- Following any water related Level 3 or greater consequence event (as rated using the Operational Risk Matrix OGC-450-FOR-007).
- Any water quality related amendments to the site risk register.
- Prior to implementation of MP4 consents that involve changes to water management or changes to compliance criteria.
- Prior to implementation of any future consents or variations to consents that involve changes to site water management or changes to compliance criteria.
- Legislative changes relevant to water management at the Macraes Operation.
- Updates to the Macraes Operation Life of Mine Plan.
- The design and implementation of new water quality management measures.

Changes to this WQMP are to be authorised by Manager – Environment and Social Performance.

13.2 Sustainability Reporting

OGC prepares an annual Sustainability Report in accordance with the Global Reporting Initiative (GRI) Standards – Core Option and the G4 Mining and Metals Sector Disclosures. As water management is identified as a material matter for the business, it is addressed as a dedicated section within the OceanaGold Sustainability Report and includes performance reporting against defined water-related metrics.

Water performance data are reported annually using a standardised template and include volumes of water withdrawn, discharged and consumed, the percentage of water reused or recycled, and details of any non-compliances or complaints, including those related to water. Performance is assessed through comparison with results from previous reporting periods.

References

- MAC-210-PRO-000 Macraes Sustainability Data Collection
- Macraes site water accounting methodology

13.3 Compliance Review

The main method of consent compliance tracking is by using InForm. InForm allows for tasks to be assigned in relation to specific consent conditions requiring actions to be completed, such as annual review of the Water Quality Management Plan.

Consent compliance in relation to monitoring and performance is mainly monitored through InViron, which flags exceedances to specified standards. It is also tracked and reviewed during preparation of the Quarterly Geotechnical Monitoring reports and Quarterly Monitoring Reports that are prepared and submitted to the Otago Regional Council.

13.4 Non-Compliance Register

From 2024 onwards environmental events reported in InControl have been separated into three categories:

- Non-Compliance (Measurable)
- Non-Compliance (Technical)
- Environmental Incident (Non-conformance with OGC/BU Management System)

A list of environmental events can be generated in InControl by going to the “Reports and Graphs” tab, selecting “Statistics Reports” and the “Summary Event Report Listing” option. From there the Event Category needs to be selected as “Environment” and the Event Type as “Environment – Environment Event”. To identify those reports that are water related the Event Sub Type can be set to “Water”. Exporting the generated report provides the OGL Macraes site water event report and this can be broken down further within Excel and PowerBI to identify water related non-compliances and allow for review of these events.

Exceedances and notifications to council are also logged and recorded through a spreadsheet housed in “I” drive to allow for 24-hour notifications and 5-day follow-ups with council to be recorded and tracked.

13.5 Internal Reviews

13.5.1 Corporate Water Management Standard Audit

OGL Corporate conducts annual audits covering the Integrated Management System (IMS), Health Standards, Safety Standards, Environment Standards and External Affairs and Social Performance Standards. Typically, up to three standards from the Environmental Standards Manual are selected each year for auditing.

Once finalised Corporate Audit reports are logged in InControl and actions assigned for any items requiring corrective action.

A Macraes Audit Schedule is published annually.

References

- MAC-250-SCH-001 Macraes Audit Schedule
- MAC-207-TEM-000 Water Management Audit Template

13.5.2 Communications Register Review

A communications register is located under the Communications tab in InForm. To review the details of any water management related communications it is possible to filter by the topic (i.e. Water Management), select the date period required and then sort the list by type (up/down arrow in the column header) to get an alphabetical list of communications. PowerBI will be able to generate a water management related communications report.

13.5.3 Review of Water Management Records and Data

The following data and records can be used to assess water management performance: Meeting minute records are stored in InControl.

Table 34: Records Summary

RECORD	DESCRIPTION
SLT Meeting Minutes	The SLT (Senior Leadership team) meets on a monthly basis. Meetings include a safety share, project overview or topic. Water management related topics or issues are included as relevant to each month's discussions
IMS Update to SMT	On a six-monthly basis a review of the IMS and environmental performance for the previous six month is presented to the Senior Management Team (SMT).
Water Management Team Minutes	The Water Management Team meetings are held on a monthly basis and maintains an action list of tailings related items.
HSE Representatives Meeting Minutes	HSE Rep Meetings are held monthly. There is the opportunity for water management issues and incidents to be discussed.
Environmental Incident Reports and InControl Actions	Overdue Actions are discussed daily at the Daily Production Meeting and weekly in SMT.
Environmental Management Application Forms	Where an EMA form has been completed for an activity involving water management, the form is completed and if approved returned to the person requesting the activity for actioning. Periodic reviews of EMA activity progress are conducted (as an inspection) to ensure compliance with EMA specifications. Any issues or outstanding items will be logged as incidents or inspection follow-up actions in InControl.
Monitoring Data	There is currently limited ability to review and trend data within InViron. Monitoring data needs to be exported to Excel for analysis and review. Once PowerBi is fully implemented it is anticipated review of water related monitoring data will be clearer and simpler.

13.6 External Reviews

13.6.1 Otago Regional Council Reviews and Compliance Audits

The ORC reviews and provides feedback on the ORC Quarterly Monitoring report. Feedback is generally via e-mail to the Superintendent- Environment and via the shared "Enviro" (enviro@oceanagold.com) inbox.

The ORC conducts two yearly compliance audits. These audits cover compliance with consent conditions and water related monitoring. ORC provides a draft audit report for comment prior to finalisation. Audit reports provide a ranking for each area/section of either full compliance, low risk non-compliance, moderate non-compliance, or significant non-compliance.

13.6.2 External/Third Party Feedback

External audits are carried out on as "as required" basis and can be initiated by OGLNZ Macraes, by Corporate or by an external agency such as a Council.

14 REFERENCES

ANZG 2026. Toxicant default guideline values for aquatic ecosystem protection: Ammonia in freshwater. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. CC BY 4.0. Australian and New Zealand Governments and Australian state and territory governments, Canberra, ACT, Australia. February 2026.

ANZG 2024a. Toxicant default guideline values for aquatic ecosystem protection: Nickel in freshwater. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. CC BY 4.0. Australian and New Zealand Governments and Australian state and territory governments, Canberra, ACT, Australia. July 2024.

ANZG 2024b. Toxicant default guideline values for aquatic ecosystem protection: Zinc in freshwater, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand governments and Australian state and territory governments, Canberra, ACT, Australia. May 2024.

Biggs BJ 2000. New Zealand periphyton guidelines. Detecting, Monitoring and Managing Enrichment of Streams. NIWA, Christchurch.

GHD 2026a. Macraes Phase 4 FTA. Surface and Groundwater Assessment. Report produced for OceanaGold (New Zealand) Limited by GHD Ltd. Document No. 12682240-REP

GHD 2026b. Macraes Phase 4 FTA. Water Monitoring Plan. Report produced for OceanaGold (New Zealand) Limited by GHD Ltd. Document No. 12682240-GHD-RPT-Rev0.

MWM 2026. Macraes Site Visit – Field Notes and Recommendations. Report produced for OceanaGold (New Zealand) Limited by Mine Waste Management Ltd. Document No. J-NZ0498-020-M-RevA.

NEMS 2019. National Environmental Monitoring Standards Water Quality. Water Quality Part 1 - Sampling, Measuring, Processing and Archiving of Discrete Groundwater Quality Data » National Environmental Monitoring Standards (NEMS).

Viridis 2026a. Macraes Phase 4 Project. Recommended surface water quality compliance framework. Report produced for OceanaGold (New Zealand) Limited by Viridis Environmental Consultants. Document No. 10023-010-E5, dated 3 September 2026.

Viridis 2026b. Recommended MP4 surface water quality and aquatic ecology monitoring. Memorandum produced for OceanaGold (New Zealand) Limited by Viridis Limited. Document No. 10023-019-5, dated 2 September 2026.

APPENDIX A

LEGISLATIVE REFERENCES AND RELEVANT RESOURCE CONSENTS



A1 Legislative References and Guidelines

Table A1: Legislative References and Guidelines

LEGISLATION
• Resource Management Act 1991 (including amendments) • National Policy Statement for Freshwater Management 2020 • Fast-track Approvals Act 2024 • Resource Management (National Environmental Standards for Freshwater) Regulations 2020 • Water Measurement and Reporting Regulations • Stock Exclusion Regulations • Regional Plan: Water for Otago • Drinking Water Standards for New Zealand 2005 (Revised 2018) • National Environmental Standards for Sources of Human Drinking Water
GUIDELINES
• International Council of Mining Metals Mining Principles • International Council of Mining Metals Water Stewardship Framework • Guidelines for Drinking Water Quality Management for New Zealand 2019 • AS/NZS 5667 (1998) Water Quality – Sampling, Part 5 Guidance on sampling drinking water and water used for food and beverage processing. • NEMS (2019): National Environmental Monitoring Standards Water Quality. Water Quality Part 1 - Sampling, Measuring, Processing and Archiving of Discrete Groundwater Quality Data » National Environmental Monitoring Standards (NEMS)
CORPORATE
• OceanaGold Environment Policy • OGC-450-GUI-005 Risk Management Guidelines • OGC-450-STD-019 Environmental Standards Manual • OGC-500-STD-001 External Affairs and Social Performance Manual

A2 Resource Consents

Resource consents list to be finalised following award of FTA MP4 consents.

APPENDIX B

CONSENT TRIGGER LOOK-UP TABLES



Table B1: ANZG (2026) freshwater 95% species-protection guideline values for ammoniacal nitrogen (g N/m3) at different pH and temperature values

Temp. (°C)	pH																														
	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0
10	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.5	1.4	1.3	1.2	1.2	1.0	0.94	0.84	0.74	0.64	0.55	0.47	0.40	0.34	0.29	0.24	0.21	0.17	0.15	0.13
11	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.6	1.5	1.5	1.4	1.4	1.3	1.2	1.1	1.0	0.90	0.80	0.71	0.61	0.53	0.45	0.38	0.33	0.27	0.23	0.20	0.17	0.14	0.12
12	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.3	1.2	1.1	1.0	0.95	0.85	0.76	0.67	0.58	0.50	0.43	0.36	0.31	0.26	0.22	0.19	0.16	0.13	0.12
13	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.1	1.1	0.99	0.90	0.81	0.72	0.63	0.55	0.47	0.41	0.34	0.29	0.25	0.21	0.18	0.15	0.13	0.11
14	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.0	0.94	0.85	0.77	0.68	0.60	0.52	0.45	0.39	0.33	0.28	0.23	0.20	0.17	0.14	0.12	0.10
15	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.1	1.0	0.98	0.90	0.82	0.74	0.66	0.58	0.50	0.43	0.37	0.31	0.27	0.22	0.19	0.16	0.14	0.12	0.10
16	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.0	0.93	0.86	0.78	0.70	0.63	0.55	0.48	0.41	0.35	0.30	0.25	0.21	0.18	0.15	0.13	0.11	0.096
17	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.0	0.95	0.89	0.82	0.75	0.67	0.60	0.52	0.46	0.39	0.34	0.29	0.24	0.20	0.17	0.15	0.12	0.11	0.091
18	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.13	1.10	1.1	1.0	0.97	0.91	0.85	0.78	0.72	0.64	0.57	0.50	0.44	0.38	0.32	0.27	0.23	0.20	0.17	0.14	0.12	0.10	0.087
19	1.2	1.2	1.2	1.2	1.2	1.15	1.13	1.11	1.09	1.06	1.0	0.98	0.93	0.88	0.82	0.75	0.69	0.62	0.55	0.48	0.42	0.36	0.31	0.26	0.22	0.19	0.16	0.13	0.11	0.098	0.084
20	1.1	1.1	1.1	1.1	1.1	1.09	1.08	1.06	1.03	1.00	0.97	0.93	0.88	0.83	0.78	0.72	0.65	0.59	0.52	0.46	0.40	0.34	0.29	0.25	0.21	0.18	0.15	0.13	0.11	0.093	0.080
21	1.1	1.1	1.1	1.0	1.0	1.03	1.01	0.99	0.97	0.94	0.91	0.87	0.83	0.78	0.73	0.67	0.61	0.55	0.49	0.43	0.37	0.32	0.28	0.23	0.20	0.17	0.14	0.12	0.10	0.087	0.075
22	1.0	1.0	1.0	1.0	1.0	0.99	0.98	0.96	0.94	0.91	0.88	0.84	0.80	0.76	0.71	0.65	0.59	0.53	0.47	0.42	0.36	0.31	0.27	0.23	0.19	0.16	0.14	0.12	0.099	0.084	0.072
23	0.98	0.98	0.97	0.96	0.95	0.94	0.93	0.91	0.89	0.87	0.84	0.80	0.76	0.72	0.67	0.62	0.56	0.51	0.45	0.40	0.34	0.30	0.25	0.22	0.18	0.15	0.13	0.11	0.093	0.080	0.069
24	0.93	0.92	0.92	0.91	0.90	0.89	0.88	0.86	0.84	0.82	0.79	0.76	0.72	0.68	0.63	0.58	0.53	0.48	0.42	0.37	0.32	0.28	0.24	0.20	0.17	0.15	0.12	0.10	0.088	0.075	0.065
25	0.88	0.88	0.87	0.87	0.86	0.85	0.83	0.82	0.80	0.78	0.75	0.72	0.68	0.65	0.60	0.55	0.51	0.45	0.40	0.36	0.31	0.27	0.23	0.19	0.16	0.14	0.12	0.099	0.084	0.072	0.062
26	0.84	0.83	0.83	0.82	0.81	0.80	0.79	0.78	0.76	0.74	0.71	0.68	0.65	0.61	0.57	0.53	0.48	0.43	0.38	0.34	0.29	0.25	0.22	0.18	0.16	0.13	0.11	0.094	0.080	0.068	0.058
27	0.79	0.79	0.78	0.78	0.77	0.76	0.75	0.74	0.72	0.70	0.68	0.65	0.62	0.58	0.54	0.50	0.45	0.41	0.36	0.32	0.28	0.24	0.20	0.17	0.15	0.12	0.11	0.089	0.075	0.064	0.056
28	0.75	0.75	0.74	0.74	0.73	0.72	0.71	0.70	0.68	0.66	0.64	0.61	0.58	0.55	0.51	0.47	0.43	0.39	0.34	0.30	0.26	0.23	0.19	0.16	0.14	0.12	0.099	0.084	0.071	0.061	0.052
29	0.71	0.71	0.70	0.70	0.69	0.68	0.67	0.66	0.64	0.62	0.60	0.58	0.55	0.52	0.48	0.45	0.41	0.37	0.32	0.29	0.25	0.21	0.18	0.16	0.13	0.11	0.094	0.079	0.067	0.058	0.050
30	0.66	0.66	0.66	0.65	0.65	0.64	0.63	0.62	0.60	0.58	0.57	0.54	0.52	0.49	0.45	0.42	0.38	0.34	0.30	0.27	0.23	0.20	0.17	0.15	0.12	0.10	0.088	0.074	0.063	0.054	0.046

Notes: For conditions outside the ranges of 10-30°C and 6-9 pH, the trigger value corresponding to the nearest boundary condition within the validated range should be applied.

Table B2: ANZG (2024a) freshwater 95% species-protection guideline values for dissolved nickel (g/m3) at different pH, hardness and DOC values

Parameter		DGV (g/m ³)							
pH		6.0							
Hardness (g/m ³ CaCO ₃)		12	23	31	39	83	166	223	397
DOC (g/m ³)	0.5	0.0027	0.0041	0.0048	0.0055	0.0079	0.011	0.012	0.016
	1	0.0039	0.0061	0.0073	0.0084	0.012	0.017	0.02	0.025
	3	0.0065	0.01	0.013	0.015	0.023	0.033	0.039	0.051
	5	0.0081	0.013	0.016	0.019	0.03	0.044	0.051	0.068
	10	0.011	0.017	0.02	0.024	0.04	0.061	0.072	0.106
	15	0.013	0.02	0.023	0.028	0.046	0.071	0.086	0.118
	20	0.015	0.022	0.026	0.03	0.05	0.079	0.096	0.134
pH		6.5							
Hardness (g/m ³ CaCO ₃)		12	23	31	39	83	166	223	397
DOC (g/m ³)	0.5	0.0024	0.0034	0.0039	0.0044	0.0061	0.0079	0.0089	0.011
	1	0.0034	0.005	0.0058	0.0066	0.0094	0.012	0.014	0.018
	3	0.0053	0.0082	0.0099	0.012	0.017	0.024	0.028	0.035
	5	0.0065	0.01	0.012	0.014	0.022	0.032	0.037	0.047
	10	0.0084	0.013	0.016	0.019	0.03	0.044	0.052	0.069
	15	0.0099	0.015	0.018	0.022	0.035	0.053	0.062	0.084
	20	0.011	0.017	0.02	0.024	0.038	0.059	0.07	0.096
pH		7.0							
Hardness (g/m ³ CaCO ₃)		12	23	31	39	83	166	223	397
DOC (g/m ³)	0.5	0.0019	0.0026	0.0029	0.0033	0.0043	0.0056	0.0062	0.0077
	1	0.0027	0.0038	0.0043	0.0048	0.0065	0.0085	0.0095	0.012
	3	0.0043	0.0063	0.0074	0.0084	0.012	0.016	0.018	0.023
	5	0.0051	0.0077	0.0091	0.01	0.015	0.021	0.024	0.03
	10	0.0065	0.0098	0.012	0.014	0.021	0.03	0.034	0.044
	15	0.0074	0.011	0.013	0.016	0.024	0.035	0.041	0.055
	20	0.0082	0.012	0.015	0.017	0.027	0.04	0.047	0.062

Parameter		DGV (g/m ³)							
pH		7.5							
Hardness (g/m ³ CaCO ₃)		12	23	31	39	83	166	223	397
DOC (g/m ³)	0.5	0.0014	0.0018	0.002	0.0022	0.0028	0.0034	0.0038	0.0046
	1	0.002	0.0027	0.003	0.0033	0.0042	0.0052	0.0057	0.0068
	3	0.0032	0.0045	0.0052	0.0057	0.0077	0.0098	0.011	0.013
	5	0.0038	0.0055	0.0064	0.0072	0.01	0.013	0.014	0.017
	10	0.0047	0.0069	0.0082	0.0093	0.014	0.019	0.021	0.026
	15	0.0052	0.0078	0.0093	0.011	0.016	0.022	0.025	0.032
	20	0.0057	0.0085	0.01	0.012	0.018	0.025	0.029	0.037
pH		8.0							
Hardness (g/m ³ CaCO ₃)		12	23	31	39	83	166	223	397
DOC (g/m ³)	0.5	0.001	0.0012	0.0013	0.0014	0.0016	0.002	0.0023	0.003
	1	0.0014	0.0018	0.002	0.0021	0.0024	0.0029	0.0031	0.0039
	3	0.0023	0.003	0.0034	0.0037	0.0047	0.0055	0.0059	0.0067
	5	0.0026	0.0037	0.0042	0.0047	0.0062	0.0075	0.008	0.009
	10	0.0031	0.0045	0.0053	0.006	0.0084	0.011	0.012	0.014
	15	0.0033	0.005	0.0059	0.0067	0.0097	0.013	0.015	0.018
	20	0.0035	0.0053	0.0063	0.0072	0.011	0.015	0.017	0.02
pH		8.5							
Hardness (g/m ³ CaCO ₃)		12	23	31	39	83	166	223	397
DOC (g/m ³)	0.5	0.0007	0.0008	0.0008	0.0008	0.0011	0.0015	0.0017	0.0021
	1	0.001	0.0012	0.0012	0.0013	0.0014	0.0019	0.0022	0.0028
	3	0.0015	0.002	0.0022	0.0023	0.0028	0.003	0.0032	0.004
	5	0.0017	0.0023	0.0026	0.0029	0.0037	0.0042	0.0043	0.0049
	10	0.0019	0.0027	0.0032	0.0036	0.0049	0.0062	0.0067	0.0073
	15	0.002	0.0029	0.0034	0.0039	0.0056	0.0074	0.0082	0.0094
	20	0.002	0.003	0.0036	0.0041	0.006	0.0082	0.0092	0.011

Notes: For conditions outside pH 6-8.5, hardness 12-397 g/m³ and DOC 0.5-20 g/m³, the trigger value corresponding to the nearest boundary condition within the validated range should be applied.

Table B3: ANZG (2024b) freshwater 95% species-protection guideline values for dissolved zinc (g/m3) at different pH, hardness and DOC values

Parameter		DGV (g/m³)							
pH		6.2							
Hardness (g/m³ CaCO ₃)		20	30	60	90	120	180	300	440
DOC (g/m³)	0.5	0.0079	0.0092	0.012	0.013	0.015	0.017	0.019	0.021
	1	0.0087	0.01	0.013	0.015	0.016	0.019	0.021	0.023
	2	0.0096	0.011	0.014	0.016	0.018	0.021	0.024	0.026
	5	0.011	0.013	0.016	0.019	0.021	0.025	0.028	0.03
	10	0.012	0.014	0.018	0.021	0.024	0.028	0.031	0.033
	15	0.013	0.015	0.019	0.023	0.026	0.029	0.032	0.035
pH		6.5							
Hardness (g/m³ CaCO ₃)		20	30	60	90	120	180	300	440
DOC (g/m³)	0.5	0.0065	0.0076	0.0097	0.011	0.012	0.014	0.016	0.017
	1	0.0075	0.0087	0.011	0.013	0.014	0.017	0.018	0.02
	2	0.0086	0.01	0.013	0.015	0.017	0.019	0.021	0.023
	5	0.01	0.012	0.015	0.018	0.02	0.023	0.026	0.028
	10	0.012	0.014	0.018	0.021	0.023	0.027	0.03	0.033
	15	0.013	0.015	0.019	0.023	0.025	0.03	0.033	0.035
pH		7.0							
Hardness (g/m³ CaCO ₃)		20	30	60	90	120	180	300	440
DOC (g/m³)	0.5	0.0048	0.0056	0.0072	0.0083	0.0092	0.011	0.012	0.013
	1	0.0059	0.0068	0.0087	0.01	0.011	0.013	0.015	0.016
	2	0.0072	0.0083	0.011	0.012	0.014	0.016	0.018	0.019
	5	0.0094	0.011	0.014	0.016	0.018	0.021	0.023	0.025
	10	0.011	0.013	0.017	0.02	0.022	0.026	0.029	0.031
	15	0.013	0.015	0.019	0.022	0.025	0.029	0.032	0.035

Parameter		DGV (g/m ³)							
pH		7.5							
Hardness (g/m ³ CaCO ₃)		20	30	60	90	120	180	300	440
DOC (g/m ³)	0.5	0.0035	0.0041	0.0053	0.0061	0.0068	0.0079	0.0088	0.0096
	1	0.0045	0.0053	0.0068	0.0079	0.0088	0.01	0.011	0.012
	2	0.0059	0.0069	0.0088	0.01	0.011	0.013	0.015	0.016
	5	0.0083	0.0097	0.012	0.014	0.016	0.018	0.02	0.022
	10	0.011	0.013	0.016	0.018	0.02	0.024	0.026	0.028
	15	0.013	0.015	0.019	0.021	0.024	0.027	0.03	0.033
pH		8.0							
Hardness (g/m ³ CaCO ₃)		20	30	60	90	120	180	300	440
DOC (g/m ³)	0.5	0.0025	0.003	0.0039	0.0045	0.0051	0.0059	0.0066	0.0072
	1	0.0035	0.0041	0.0053	0.0062	0.0069	0.008	0.0089	0.0097
	2	0.0048	0.0056	0.0073	0.0084	0.0093	0.011	0.012	0.013
	5	0.0072	0.0085	0.011	0.013	0.014	0.016	0.018	0.019
	10	0.0097	0.011	0.015	0.017	0.019	0.021	0.023	0.025
	15	0.012	0.014	0.018	0.02	0.022	0.025	0.028	0.03
pH		8.3							
Hardness (g/m ³ CaCO ₃)		20	30	60	90	120	180	300	440
DOC (g/m ³)	0.5	0.0021	0.0025	0.0033	0.0038	0.0042	0.005	0.0055	0.006
	1	0.003	0.0035	0.0046	0.0053	0.0059	0.0069	0.0077	0.0084
	2	0.0042	0.005	0.0065	0.0075	0.0083	0.0095	0.011	0.011
	5	0.0065	0.0077	0.01	0.012	0.013	0.015	0.016	0.017
	10	0.0089	0.011	0.014	0.016	0.018	0.02	0.022	0.023
	15	0.011	0.013	0.017	0.019	0.021	0.024	0.026	0.028

Notes: For conditions outside 6 pH-8.3, hardness 20-440 g/m³ and 0.5-15 g/m³ DOC, the trigger value corresponding to the nearest boundary condition within the validated range should be applied.

APPENDIX C

SITE PERSONNEL CONTACT DETAILS

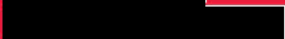


TBC by OGNZL



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