Otago Regional Council

ORC NOTIFICATION RECOMMENDATION REPORT

File No:	999859517-8703
Application No:	RM24.184
Prepared for:	Staff Consents Panel
Prepared by:	Shay McDonald – Senior Consents Planner
Date:	20 March 2025

Subject: **Application RM24.184 by Oceana Gold (New Zealand) Limited for various consents relating to the Macraes Phase Four mine expansion.**

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1. Purpose

To report and make recommendations under sections 95A-G of the Resource Management Act 1991 (the Act) on the notification decision for the above application.

2. Background Information

Applicant: Oceana Gold (New Zealand) Limited
Applicant's Agent: Mitchell Daysh Limited
Site address or location: Macraes Gold Project, Golden Point Road, Macraes Flat.
Legal description(s) of the site: Refer Appendix 1
Record of title number and owner: Refer Appendix 1
Consent(s) sought: Refer Appendix 2, in summary:

- 34 new or replacement resource consents
- Section 127 variations to 20 existing consents

Purpose: Gold mining
Current consents: Refer application.
Section 124 timeframes:

- This application is for new activities, replacement activities, and s127 variations. Where consents are being replaced, the application was lodged more than six months prior to the expiry of the relevant consents, and s124 applies.

3. Executive Summary

Oceana Gold (New Zealand) Limited (**OGL, the Applicant**) has applied for resource consents to authorise activities associated with the site-wide expansion of mining activities at the Macraes Gold Project (**MGP**).

Recent exploration has highlighted opportunities to economically extend the life of mine (**LOM**) from around 2024 to around 2030 by expanding some areas of the current operation and revisiting areas previously mined over the last 30 years. This extension proposal is referred to as the Macraes Phase Four (**MP4**) Project. The MP4 Project will involve pit extensions, waste disposal into pits as backfill, extension of waste rock stacks, ongoing tailings disposal including the creation of a new tailings storage facility (**TSF**), and other ancillary activities required to support the active mining operation and the proposed offsetting and compensation activities.

MP4 is a comprehensive project that has been split into three stages. This application is for the third part of Stage 3, which is the largest stage. The Applicant has applied to Otago Regional Council (**ORC**), Waitaki District Council (**WDC**), and Dunedin City Council (**DCC**) for all resource consents and s127 variations necessary to authorise the MP4 proposal. Consents required from ORC include 34 new resource consents as well as s127 variations to 20 existing resource consents.

This report discusses adverse effects of the MP4 proposal insofar as they relate to the activities regulated by ORC. However, the nature of the activities means that it is not always possible to neatly assign an adverse effect to an individual activity, and there is a degree of overlap between the ORC, DCC, and WDC assessments. Additionally, the activities requiring authorisation from regional and territorial authorities are intrinsically linked and cannot realistically be implemented in isolation. A conservative approach has been taken in this report; where adverse effects stem directly from an activity authorised by ORC, or where adverse effects result from activities that require authorisation by either DCC or WDC but cannot be implemented without the relevant supporting ORC resource consents, they are assessed in this report.

The key issues are:

- More than minor adverse effects on terrestrial ecology.
- Potentially more than minor adverse effects on surface water quality.
- Potentially more than minor adverse effects on mana whenua values.

The Applicant has requested that these applications be publicly notified; therefore, public notification is mandatory. It is acknowledged that on this basis an extensive report discussing the potential adverse effects of the proposal for the purpose of making a notification decision is not required. However, for the benefit of potential submitters and any other interested parties, this report seeks to summarise and interpret of all of the information provided with the application, the further information provided via the s92(1) process, and the independent peer reviews commissioned by ORC such that an understanding of the potential adverse effects, and any uncertainty in this assessment, can be accessed in one location.

This report should be read in conjunction with corresponding notification reports from DCC and WDC.

4. Application Documents

Application as lodged

The application as lodged comprised an Assessment of Environmental Effects supported by a suite of technical assessments. These documents are listed below:

- Macraes Phase 4 Project Resource Consent Application and Assessment of Environmental Effects, prepared by Mitchell Daysh Limited, dated 28 March 2024, including Appendices 1-30
    - Appendix 1: Records of Title
    - Appendix 2: WSP – Frasers Tailings Storage Facility Feasibility Design Report
    - Appendix 3: Engineering Geology Limited – Frasers Tailings Storage Facility Feasibility Design Report – Peer Review
    - Appendix 4: Engineering Geology Limited - Golden Bar Waste Rock Stack Design Report

- Appendix 5: Engineering Geology Limited - Trimbells Waste Rock Stack Closure Stability Assessment
- Appendix 6: Pells Sullivan Meynink - Macraes Phase 4 Consenting – Project Element 4.3.2: Open Pit Extensions
- Appendix 7: Pells Sullivan Meynink- Macraes Phase 4 Consenting – Project Element 4.3.2: Open Pit Stability Assessment for Frasers TSF
- Appendix 8: Mine Waste Management Limited - Macraes Mine Phase 4.3 Environmental Geochemistry Assessment
- Appendix 9: Strata Geoscience - Macraes Mine Phase 4.3 Environmental Geochemistry Assessment – Peer Review
- Appendix 10: Engineering Geology Limited - Macraes Phase 4 Project - Erosion and Sediment Control Report
- Appendix 11: GHD - Macraes Phase IV – Coronation – Surface and Groundwater Assessment
- Appendix 12: GHD - Macraes Phase IV – Golden Bar – Surface and Groundwater Assessment
- Appendix 13: GHD - Macraes Phase IV – Frasers TSF - Innes Mills – Golden Point and Cumulative Surface and Groundwater Assessment
- Appendix 14: GHD - Golden Bar Dewatering Assessment
- Appendix 15: Ahikā - Assessment of Effects on Vegetation & Avifauna
- Appendix 16: Ahikā - Macraes Phase 4 Project – Ecological Impact Management Plan
- Appendix 17: Bioresearches - Herpetofauna Survey & Assessment – Macraes MP4
- Appendix 18: Bioresearches - Lizard Management Plan – Macraes MP4 Projects
- Appendix 19: Bioresearches - Invertebrate Survey & Assessment – Macraes MP4
- Appendix 20: Greg Ryder Consulting - Macraes Phase Four – Coronation Mine Proposed Expansion – Effects on Surface Waters
- Appendix 21: Greg Ryder Consulting - Macraes Phase Four – Golden Bar Mine Proposed Expansion – Effects on Surface Waters
- Appendix 22: Greg Ryder Consulting - Macraes Phase 4 – Frasers TSF - Innes Mils Proposed Expansion – Aquatic Ecology Assessment
- Appendix 23: Origin Consultants - Archaeological and Heritage Assessment for OceanaGold MP4
- Appendix 24: Tim Kelly Transportation Planning Limited - Macraes Goldmine MP4 Proposal Transportation Assessment
- Appendix 25: Brown, Copeland & Co Limited - Assessment of the Economic Effects of OceanaGold's Proposed Macraes Phase 4, Stage 3 Project
- Appendix 26: TechNick - MP4 Project Stage 3 Blasting Vibration and Airblast Effects Assessment OGNZL Macraes New Zealand
- Appendix 27: WSP - Macraes Phase 4 Expansion: Stage 3 Landscape and Visual Assessment
- Appendix 28: Acoustic Engineering Services - OceanaGold Macraes Phase 4 Project Assessment of Environmental Noise Effects
- Appendix 29: Beca - Air Quality Technical Assessment – Life of Mine Extension MP4 Stage 3
- Appendix 30: Letter from Aukaha

<u>Requests for further information</u>

Discussions were held between ORC and the Applicant in relation to the proposal to vary resource consents under s127 rather than apply for new resource consents. The Applicant's final response, which was accepted by ORC, is detailed in:

- Letter, RE: RM24.184 section 127 variations, dated 3 October 2024, signed by Suzanne Watt – Manager Environment & Social Performance, Oceana Gold (New Zealand) Limited.

Two requests for further information were made. These are summarised as follows, noting that each response comprised a package of information, including new documents and updates to previous technical reports:

- Response to s92(1) request for further information, dated 15 October 2024.
- Response to s92(1) request for further information, dated 7 February 2025.

Following the above s92 process, the Applicant provided an updated AEE, and several revised technical assessments on 18 February 2025. Not all technical reports were updated, and all reports attached to the revised AEE should be read in conjunction with the s92 material.

The Applicant also provided three emails to the processing councils subsequent to the updated AEE provided on 18 February 2025 that are considered to be further information to the application:

- Email containing offset models informing the current version of the Ecological Impact Management Plan, dated 24 February 2025.
- Email containing NES-CS assessments of consent requirements for soil disturbance of HAIL sites, dated 5 March 2025.
- Email clarifying vegetation disturbance at Trimbells WRS seepage outlet, dated 12 March 2025.

5. Consenting History

Oceana Gold owns and operates the MGP which is located approximately 30 kilometres (**km**) northwest of Palmerston. The Macraes mine commenced operations in 1990. A series of resource consents were granted under the Resource Management Act 1991 (**RMA**) between 1992 and 2006 for various expansions of both the production level and physical elements of the mine, including pits, waste rock stacks (**WRS**), and storage facilities for tailings and process water.

The LOM is dynamic and varies from year to year. In 2010, OGL sought and was later granted 55 resource consents for an extension to the life of the Macraes mining operation.[1] This was termed the Macraes Phase III Project (**MP3**). MP3 was expected to take the consented mine life through until 2020, instead of mine closure occurring in 2012 as was previously proposed. Notably, the MP3 consents were granted with durations that extended significantly beyond 2020. Under MP3, underground mining at the Frasers Underground Mine (**FRUG**) has continued in parallel with the open pits and has now ceased. The opencast mining operations were scheduled to be scaled back towards the scheduled end the mine's life (2019-2020).

Between 2012 and 2020, OGL sought and were granted further extensions to the life of the Macraes Operation, taking the operating life through until 2024, with the scaling back of activities and rehabilitation pushed back to 2025 and 2026. A summary of this consenting history is shown in Table 1.

[1] RM10.351-01-55

Table 1 Resource consents granted for mine extensions since the MP3 project.

Area	Resource Consents	Projected extension to LOM
Coronation Project	RM12.378.01-15	One year
Coronation North Project, including expansion of Coronation Pit.	RM16.138.01-20	Three years
Coronation North Extension	RM19.085.01-03	Three years, in combination with other mining.
Deepdell North Stage III Project	RM20.024.01-14	One year
Golden Point Underground	RM20.130.01-06	Four years

Recent exploration success has highlighted opportunities to economically extend the LOM from 2024 to around 2030 by expanding some areas of the current operations, and revisiting areas previously mined over the last 30 years. The latest proposal to extend the LOM is MP4. MP4 is divided into three stages, with applications previously lodged for:

- Stage 1 – Renewal of a limited number of consents associated with the Back Road Waste Rock Stack (**BRWRS**), Top Tipperary tailings storage facility (**TTTSF**), Frasers WRS, FRUG, and Coronation Open Pit.[2]

- Stage 2 – Raise TTTSF to 570 metres reduced level (**m RL**) and co-disposal of dry tailings and waste rock in Frasers Pit.[3]

Stage 3 of the MP4 project is itself divided into three separate applications:

1. The Golden Point Underground (**GPUG**) mine expansion and extension – consents granted.[4]

2. The Continuity Consents Project (**CCP**) involving an extension to Innes Mills Pit and development and initial disposal of tailings in Frasers tailings storage facility (**FTSF**) – consents granted.[5]

3. This application RM24.184 which includes the following key components:

    - Down dip extension of three open pits (Innes Mills, Coronation, Golden Bar) and their associated backfills and WRSs;
    - Backfilling of the Coronation North Pit following the completion of currently authorised mining;
    - Further tailings disposal in the FTSF to support the open pit extensions and current consented mines;
    - Minor realignment of Golden Bar Road;

[2] RM22.192 for the BRWRS is still under application, as is the wetland reclamation associated with Frasers South WRS (RM24.541); all other consents have been granted.
[3] Consents for the co-disposal project were granted but this project is no longer planned and has been superseded by MP4 stage 3.
[4] RM23.783.01-0.3 and RM20.130.01.V1, RM20.130.05.V1, RM20.130.06.V1
[5] RM23.868.01-02 and multiple variations to RM10.351 consents.

- Partially infilling Golden Point Pit with waste rock rehandled from Northern Gully WRS and some waste rock from Innes Mills Pit to form buttressing on the west wall;
- Ancillary features including topsoil stockpiles, low-grade ore stockpiles, silt ponds, areas for pit infrastructure, and access roading; and
- Activities associated with the mitigation, remediation, offsetting, and compensation of the effects of the above activities.

A detailed description of the MP4 project is provided in Section 7 of this report.

6. Description of the Environment

The application contains a very thorough description of the existing and consented mine facilities. This description is adopted for this report, with a brief summary provided for context.

Beyond describing mining features, the application did not contain a description of the natural environment but deferred to the relevant technical reports for such descriptions. A summary of the key features of the environment is provided below in the remainer of Section 6 to assist with the interpretation of the adverse effects assessment presented later in this report; however, for a full description of the environment please refer to Appendices 2-30 of the application.

6.1 Site Visit

I have visited the site on numerous occasions for the purpose of understanding this MP4 proposal and other applications. Site visits occurred on the following dates:

- 27 Feb 2023
- 27 Mar 2023
- 16 June 2023
- 24 July 2023
- 15 Nov 2023
- 11 June 2024 alongside technical experts from Geosolve and Specialist Environmental Services
- 12 June 2024 alongside technical experts from e3 Scientific and Torlesse Environmental
- 20 June 2024 alongside technical experts from e3 Scientific
- 15 Oct 2024
- 25 Nov 2024 alongside technical experts from e3 Scientific

6.2 General

- The MGP is located approximately 30 km inland from Palmerston, at Macraes Flat, East Otago. Macraes Flat is flanked by the Taieri Ridge to the northwest, Shag Valley and Horse Range to the east, and the coastal hills and extinct volcanic cones of Palmerston and Waikouaiti to the southeast.

- Macraes Flat is situated on an elevated plateau, at approximately 500 m above sea level, that is isolated from the main state highways and towns of East Otago. The local road, Macraes Road, connects Macraes Flat and the associated Macraes Operation with State Highway 85 to the east and State Highway 87 (the Middlemarch-Hyde Road) to the west.

- All of the mining activities at the Macraes Operation, including those proposed as part of MP4, are located within the boundaries of current Crown Minerals permits held and land owned by OGL.

- The climate at Macraes is controlled predominantly by the mountains to the west of the site (Rock and Pillar Range) which act as a barrier to incoming weather systems from the west, leading to a fairly dry climate with limited precipitation.

The site, for the purpose of this application, is the Oceana Gold ownership boundary, which loosely coincides with the mining permit boundary. These are shown in Figure 1. However, this report will focus on three key areas, being:

- The **Coronation Area**, comprising Coronation and Coronation North pits and their associated waste rock stacks.
- The **Central Mining Area**, comprising the centrally located mining features Frasers Pit and the FTSF, Innes Mills Pit, and Golden Point Pit as well as their associated waste rock stacks. While there are other mining features located in this area these are generally only relevant to this proposal in terms of potential cumulative effects.
- **Golden Bar Area**, comprising Golden Bar Pit and associated waste rock stack.

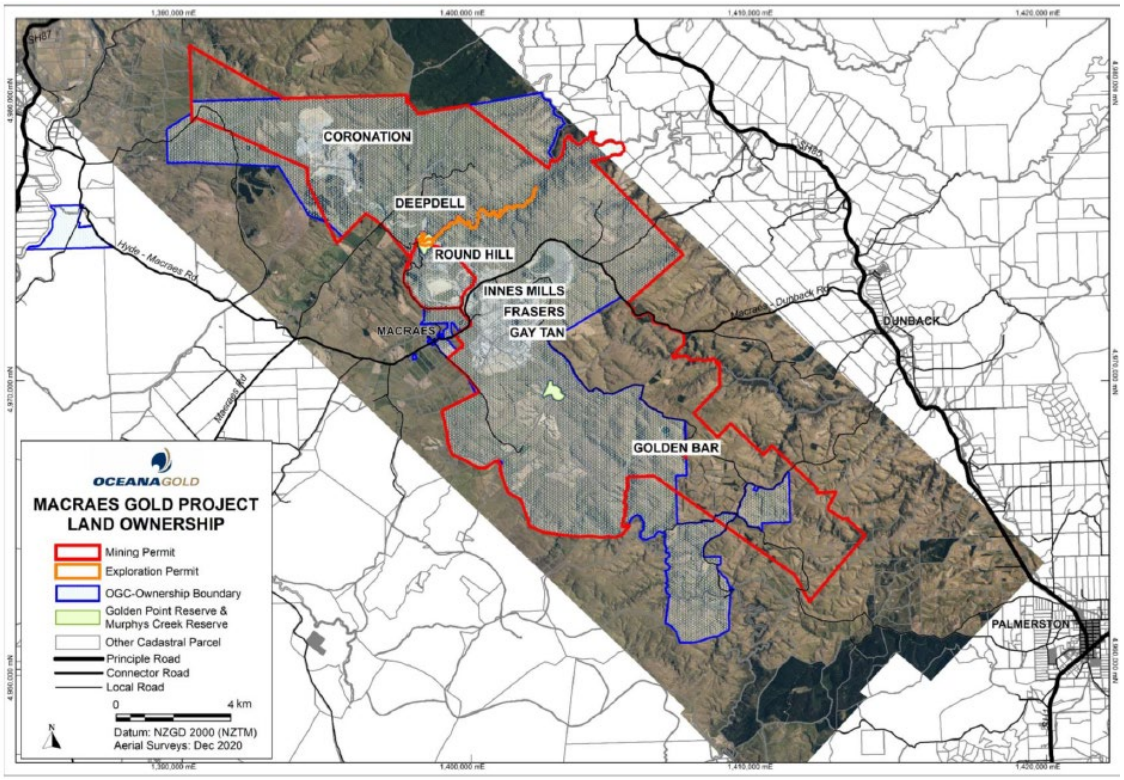

Figure 1 Land owned by OGL (blue) and boundary of Crown Minerals Permit (red). Source: RM24.184 application. Map is oriented to true north.

Unless specifically stated otherwise, all plan grids, references, and geological orientations are to 'mine north' which is approximately 45 degrees anticlockwise from true north. Mine north follows the strike of the Hyde Macraes shear zone which defines the ore body sub crop and surface exposures. Geographic directions are given in terms of mine north, unless stated otherwise. Images taken from technical assessments are oriented such that the vertical axis represents mine north, unless stated otherwise.

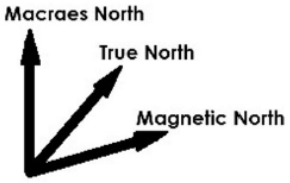

Figure 2 Mine north vs true north. Source: RM24.184 application.

6.3 Consented Mining Activities

Implemented consents and consents likely to be implemented within a similar timeframe to MP4 activities are part of the existing environment.

A dominant feature of the existing environment is the various open pits and underground mines and associated activities at the Macraes Operation. These are generally shown in Figure 3 and include:

- Various open pits (operating and non-operational);
    - Operating
        - Frasers Pit (Gay Tan Stage 5); and
        - Innes Mills Pit (Stages 7-8).
        - These active pits currently utilise the Frasers West WRS, Frasers East WRS, Frasers South WRS, and Frasers Backfill.
    - Inactive
        - Round Hill Pit (also known as Golden Point Pit) in which the GPUG access portals are located;
        - Innes Mills West Pit (currently a water storage sump);
        - Golden Bar Pit (a pit lake);
        - Deepdell North Pit (Stage 5);
        - Coronation Pit Stage 5 (partially filled pit lake); and
        - Coronation North Pit (partially filled pit lake).
        - Associated with the above inactive open pits are the BRWRS (partially formed), Northern Gully WRS, Golden Bar WRS, Deepdell East WRS, Coronation WRS, Coronation North WRS, and Trimbells WRS.
- Two underground mines
    - Frasers - being decommissioned; and
    - Golden Point - being actively mined) – consents granted until 2030;
- Various waste rock stacks (active and rehabilitated);
- A network of haul roads and general mine service tracks;
- A Processing Plant;
    - The Processing Plant uses a large quantity of water and grinds the mined ore into fine particles before subjecting it to other physical, thermal, and chemical processing steps to remove and refine the gold. OGL currently holds all necessary resource consents to authorise the operation and maintenance of the Processing Plant until 31 August 2032.
- Four tailings storage facilities;
    - Mixed tailings impoundment (MTI) - inactive
    - Southern Pit Option 10 (**SP10**) and Southern Pit option 11 (**SP11**) – both inactive,
    - TTTSF – active with consented capacity until March 2025 after which time tailings will go to the Frasers Tailings Storage Facility.

  - Frasers TSF Stage 1 which is being constructed and is expected to receive tailings in March 2025 – consent granted for construction and receipt of 6 megatonnes (**Mt**) tailings.
- A comprehensive network of water management infrastructure including diversion drains, silt ponds, sumps, pit lakes and freshwater storage reservoirs;
- Two consented water storage reservoirs that have not yet been constructed, being Camp Creek Dam and Coal Creek Dam.
  - Camp Creek dam is relied on as a mitigation measure for MP4 to maintain water quality in Deepdell creek. Potentially also required as part of GPUG consents. All consents are held to construct and operate this dam and do not lapse, expiring on 1 Oct 2046.
  - Coal Creek dam consents do not lapse and expire 24 April 2052. Could be needed to augment low flows in coal creek and mare burn for maintaining water quality.
- Associated infrastructure to support ongoing operations in the form of district roads, powerlines, workshop facilities and offices and associated water and amenity facilities.
- Closure activities – have been considered in previous applications and have been consented to the extent possible, given some closure activities will not occur until more than 35 years following cessation of mining. The consented scenario is for pit lakes, and rehabilitation of other mine impacted areas to support post-mining land uses.

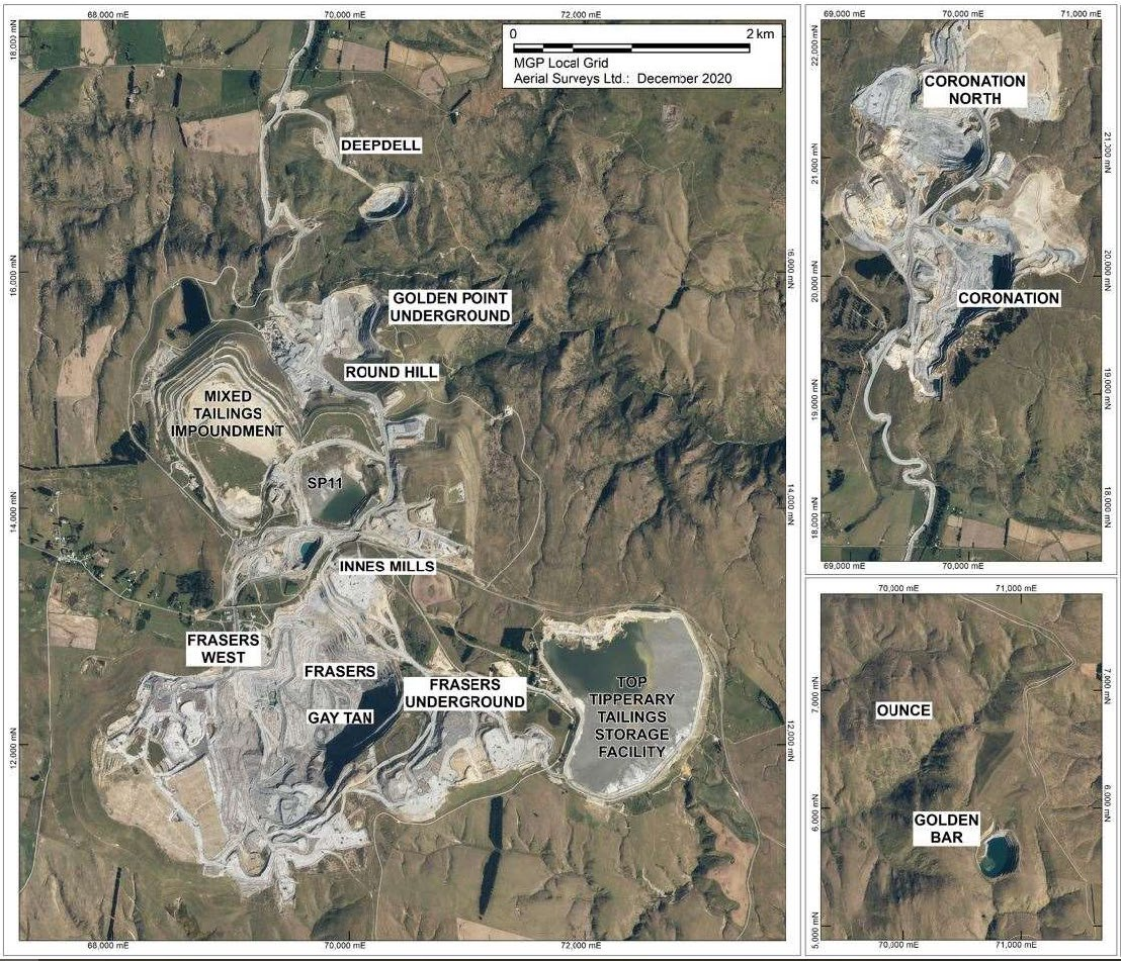

Figure 3 Major mining features. Source: RM24.184 application appendix 13.

6.4 Geology and Topography

A thorough description of regional and local geology can be found in Appendices 2-7 of the Application.

The topography of the wider Macraes site is driven by the geologic evolution of the region. Long term weathering and erosion of the underlying rock resulted in a distinctive low relief peneplain which is bounded by the North Branch Waikouaiti River to the west, Deepdell Creek to the north, and Murphys Creek to the south. Deepdell Creek has been deeply incised into this erosional surface resulting in steep valley slopes and minimal alluvial deposition. In contrast, the North Branch Waikouaiti River is characterised by shallow relief, broad valleys and alluvial deposition.

The Hyde–Macraes Shear Zone (**HMSZ**) comprises a mineralised shear zone which has been mapped for at least 25 km by OGL geologists. The HMSZ represents the principal gold bearing ore body exploited by the Applicant and generally strikes north and dips at about 15° to the east. The ore is a combination of mineralised sheared graphitic schist and associated mineralised quartz veins. The gold is associated with pyrite and arsenopyrite within the Hyde-Macraes Shear Zone, which is the gold bearing structure.

The original topography has been altered by thirty years of mining and waste deposition. Mining has been generally aligned with the orientation of the major shear zone. This has altered portions of original catchments in the main Macraes mine site, but the primary streams and rivers surrounding the mining site remain and are intermittent/permanent in nature.

At the time the application was lodged, the mining footprint at MGP involves a total disturbance area of approximately 2,150 hectares (**ha**) of which approximately 650 ha has been rehabilitated. Disturbed areas are shown in Figure 3.

6.5 Groundwater

In general, the groundwater on the site is influenced by the presence of mining features. Groundwater quality is primarily influenced by seepage from pits, waste rock stacks, and tailings storage facilities. Groundwater quantity is influenced by the presence of open pits and underground mines which interrupt pre-mining groundwater flows. Generally, groundwater flow is topographically driven and discharges via seeps or springs in topographical low points. Local groundwater flows in the vicinity of open pits or underground mine workings are generally inflows to the pit or underground workings.

No areas of the site overlie any mapped aquifers, nor any groundwater or nitrogen protection zones.

The Coronation pit is located on the ridgeline that divides the Deepdell Creek and Mare Burn surface water catchments. Given its elevation the Coronation pit is interpreted to also coincide with the groundwater catchment divide which follows the surface water catchment divide. Based on the current hydrogeological understanding of the project area the groundwater flow direction for the Coronation area is presented in Figure 4.

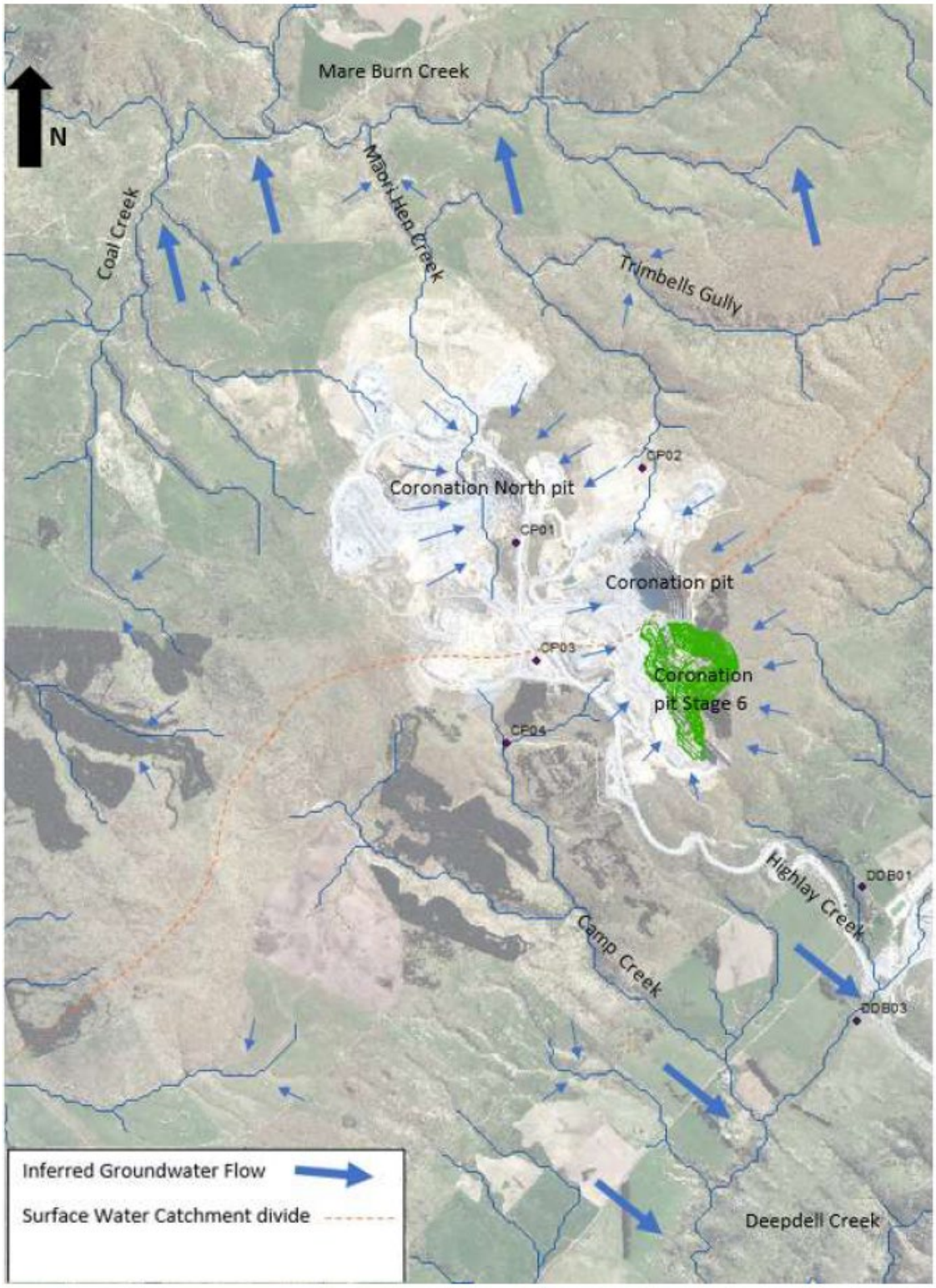

Figure 4 Inferred existing and proposed mining groundwater flow direction. Source: RM24.184 Appendix 11.

Golden Bar

Based on the current hydrogeological understanding of the project area the conceptual groundwater flow model for the Golden Bar site is presented in Figure 5.

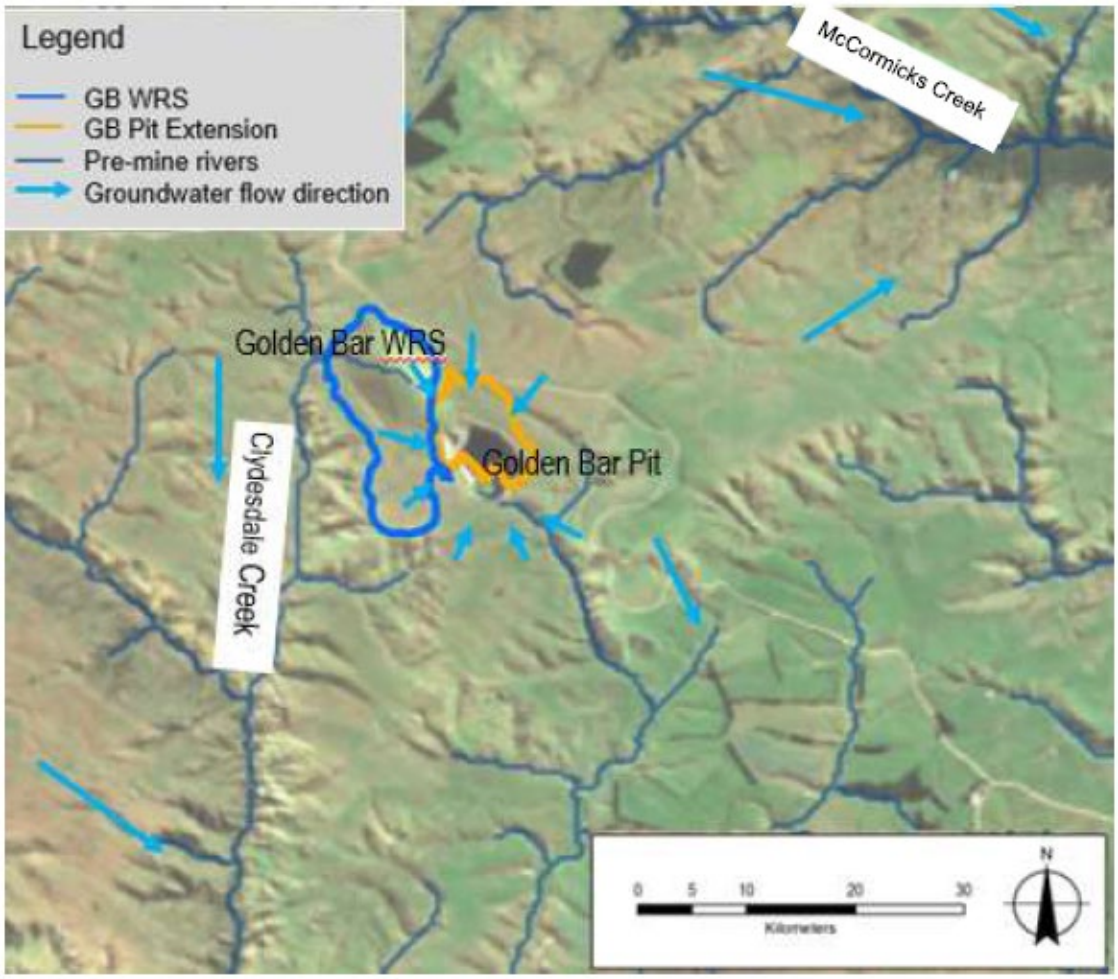

Figure 5 Inferred existing and proposed mining groundwater flow direction. Source: RM24.184 Appendix 12.

6.6 Surface Water

Surface water on the site is influenced by historic and current mining activities. Surface waterbodies have been reclaimed, diverted, and piped. Groundwater that would otherwise have recharged surface waterbodies flows into pit voids and underground mine workings. Surface water quality is influenced by discharges of contaminants to land and water, either via direct discharges from silt ponds or pit lakes, or via seepage.

6.6.1 Overview of Surface Water Catchments

The MGP site is located within the Shag River/Waihemo, Taieri, and Waikouaiti River catchments.

- The Shag River/Waihemo flows in a south-easterly direction and enters the ocean close to Matakaea.
    - This catchment is impacted primarily by the mining features in the central area, such as Frasers pit and TSF, Innes Mills Pit, Golden Point Pit, and their associated waste rock stacks but is also impacted by the Coronation mining activities.

- The Waikouaiti River North Branch (**NBWR**) flows in a southerly direction from the mine site and enters the ocean near Karitane. The catchments consist primarily of agriculture and forestry.

- This catchment is impacted by the Golden Bar mining activities as well as those in the central area, such as Frasers pit and TSF, Innes Mills Pit, Golden Point Pit, and their associated waste rock stacks.

- The Taieri River flows in a southerly direction to the ocean south of Dunedin.
  - This catchment is impacted by the Coronation mining activities.

The smaller rivers and streams that are tributaries of the three main rivers identified above are shown in Figure 6.

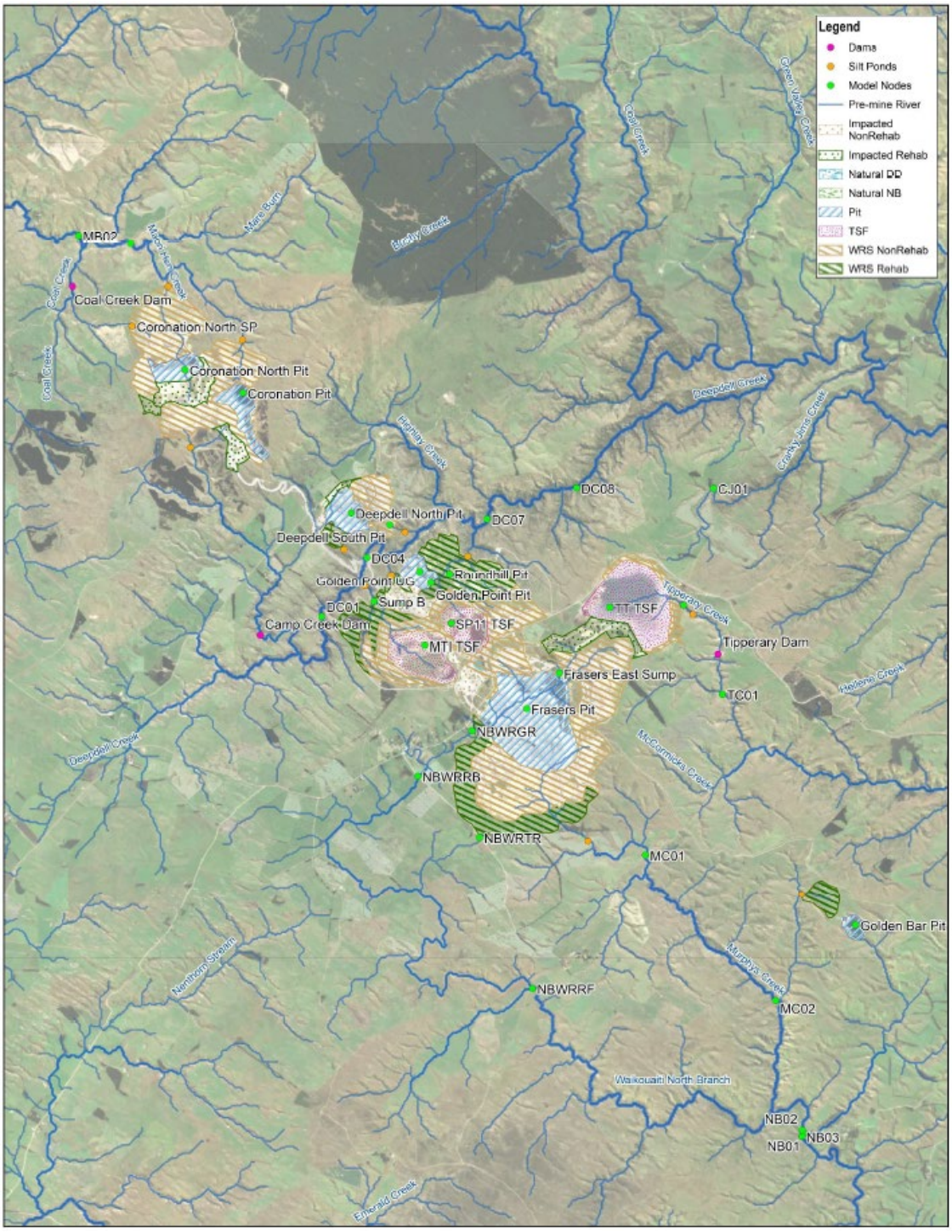

Figure 6 The mine in relation to key surface waterbodies (shown as pre-mine rivers). Source: RM24.184 Appendix 13.

6.6.2 Coronation Area

Detailed descriptions of the surface water features can be found in Appendix 11 (GHD) and Appendix 20 (Ryder). Rivers and mining features of relevance to the Coronation Mining Area are shown in Figure 7.

Natural Surface Water Features

- The Coronation Mine area is located primarily within the Taieri Catchment, but partly in the Shag River/Waihemo Catchment.

- The existing Coronation Mine area is located primarily in the headwaters of Maori Hen Creek and a major tributary of Trimbells Gully.

- Both Māori Hen Creek and Trimbells Gully are tributaries of the Mare Burn.

- The Mare Burn catchment is approximately 6,550 ha in area, or about 1.15 % of the Taieri River catchment.

- The Mare Burn flows into the Taieri River approximately 12 km downstream of the confluence of Māori Hen Creek and Trimbells Gully.

- The Coronation Mine area is also located partly in the headwaters of Camp Creek, which is a major tributary of Deepdell Creek. Deepdell Creek is a tributary of the Shag River/Waihemo.

- Discharges from the Coronation area have the potential to reach the Taieri River via the Mare Burn as a result of WRS seepages and the Shag River via the Deepdell catchment as a result of pit lake overflow and/or groundwater transport.

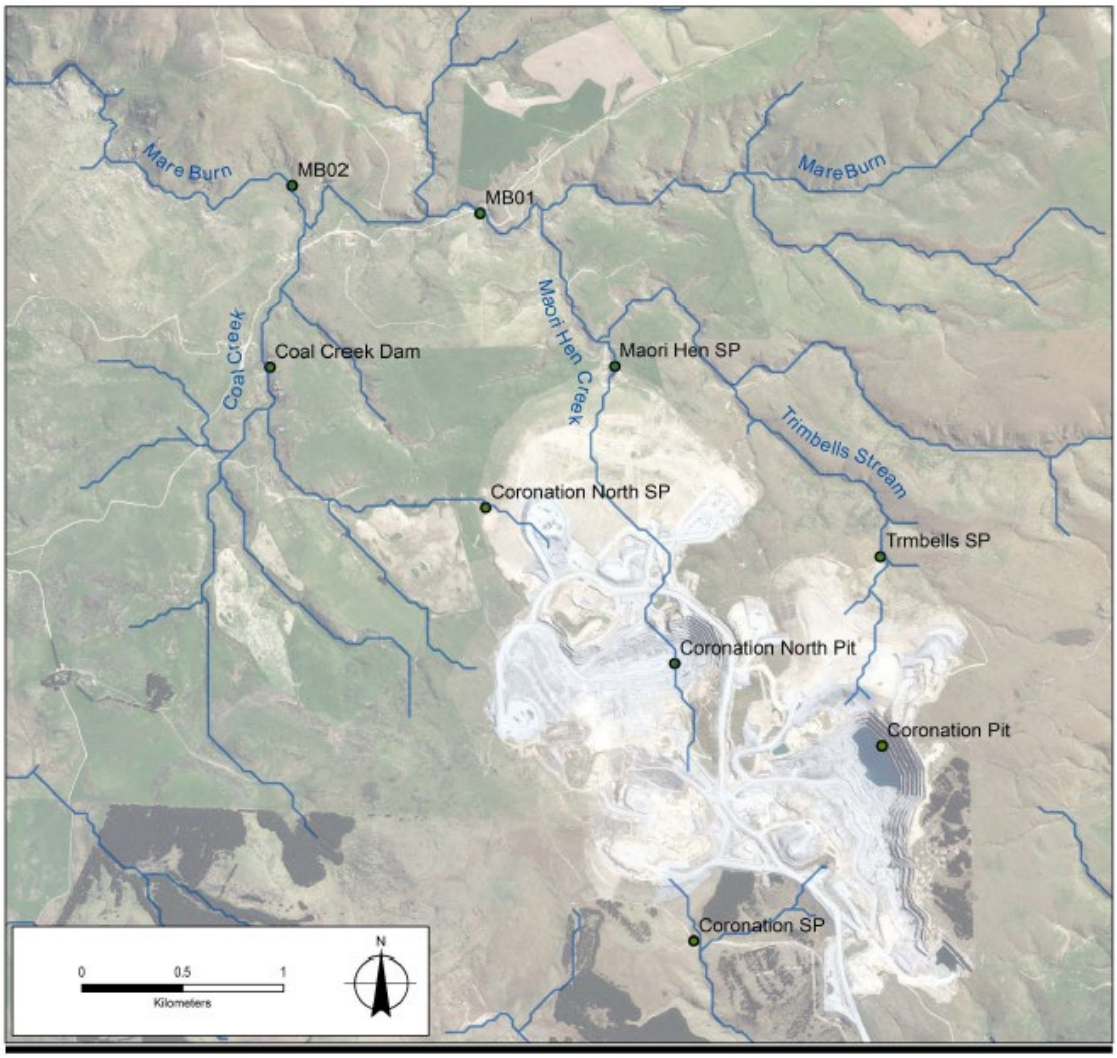

Figure 7 Rivers (shown as pre-mine rivers), silt ponds, and monitoring locations. Source: RM24.184 Appendix 11.

Artificial Surface Water Features

The majority of seepage from the Trimbells, Coronation, Coronation North Pit, and Coronation North WRSs moves laterally within the near surface weathered schist and is captured in silts ponds and/or reports to the receiving surface water catchment.

The following silt ponds are located within the Coronation area:

- Trimbells Silt Pond
- Coronation Silt Pond
- Coronation North Silt Pond
- Maori Hen Silt Pond

The Applicant holds all required resource consents to construct and operate a dam within Coal Creek, including for the discharge of water from the dam into Coal Creek. This dam has not been constructed, but it is possible that it will be constructed and utilised during the MP4 consent term.

Monitoring Locations and State of the Existing Environment

- Surface water quality is monitored in the Mare Burn at monitoring locations MB01 and MB02 and within Trimbells Gully at TG01 and TG02.

- Appendix 20 to the application presents the existing water quality.

- Ammoniacal nitrogen concentrations are generally low, although have exceeded existing compliance limits on several occasions.

- Nitrite-nitrate-nitrogen concentrations are more variable with some sites showing quite high levels in recent years.

- Excepting the spikes in ammoniacal nitrogen and nitrite-nitrate-nitrogen due to accidental discharges the current concentrations of these contaminants sit within the A or B band of their respective NPS-FM attribute states.

- Dissolved metals and sulphates are below the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (**ANZG**) Default Guideline Values (**DGV**) protective of 95% of species, or other relevant guidelines as appropriate.

- Schedule 1A to the Regional Plan: Water for Otago (**RPW**) identifies significant aquatic values of the Mare Burn Catchment. These are significant spawning areas for trout, significant habitat for juvenile trout, and the presence of riparian vegetation of significance to aquatic habitats.

- Appendix 20 (Ryder) states that Assessments over the past 10 years or so have not identified the presence of any suitable salmonid spawning habitat, nor have any salmonids been caught in Mare Burn tributaries within the areas surveyed within, downstream and adjacent to the Coronation mine footprint. It is likely that this type of habitat is located much further downstream in the catchment towards the Taieri River. Barriers to upstream passage are also likely to restrict the presence of salmonids in the upper Mare Burn catchment. Ryder assumes that 'riparian vegetation' refers to overhanging tussocks.

6.6.3 Golden Bar

Detailed description of the relevant surface water features can be found in Appendix 12 (GHD) and Appendix 21 (Ryder).

Discharges from the Golden Bar Pit and WRS primarily impact the NBWR (via the Clydesdale Creek (a tributary of Murphys Creek) and Golden Bar Creek respectively) as a result of pit lake spillage and WRS seepage. There is also potential for contaminants sourced in the Golden Bar area to reach the Shag River via McCormicks Creek. Rivers and mining features of relevance to the Golden Bar Area are shown in Figure 8.

Natural Surface Water Features

- The Golden Bar mining area is located within the NBWR catchment.

- The existing rehabilitated Golden Bar Waste Rock Stack (**GBWRS**) drains primarily into the Clydesdale Creek catchment.

- Clydesdale Creek has a catchment area of approximately 357 ha and is a tributary of Murphys Creek.

- Murphys Creek is a tributary of the Waikouaiti River and represents about 19% of the Waikouaiti River catchment.

- The existing Golden Bar Pit lies in the headwaters of Golden Bar Creek.

- Golden Bar Creek is a small tributary of the NBWR, joining this river approximately 1.3 km downstream of the confluence of Murphys Creek and the NBWR.

- Golden Bar Creek has a catchment area of approximately 930 ha.

- Golden Bar Creek has a farm dam formed of earth across the uppermost gully in which the creek forms. Below this is a seepy, boggy-type section before a visible surface flow.

- The Golden Bar Pit currently overflows into Golden Bar Creek, but even with this water source, the creek carries very little flow in the upper reaches, particularly in the drier months.

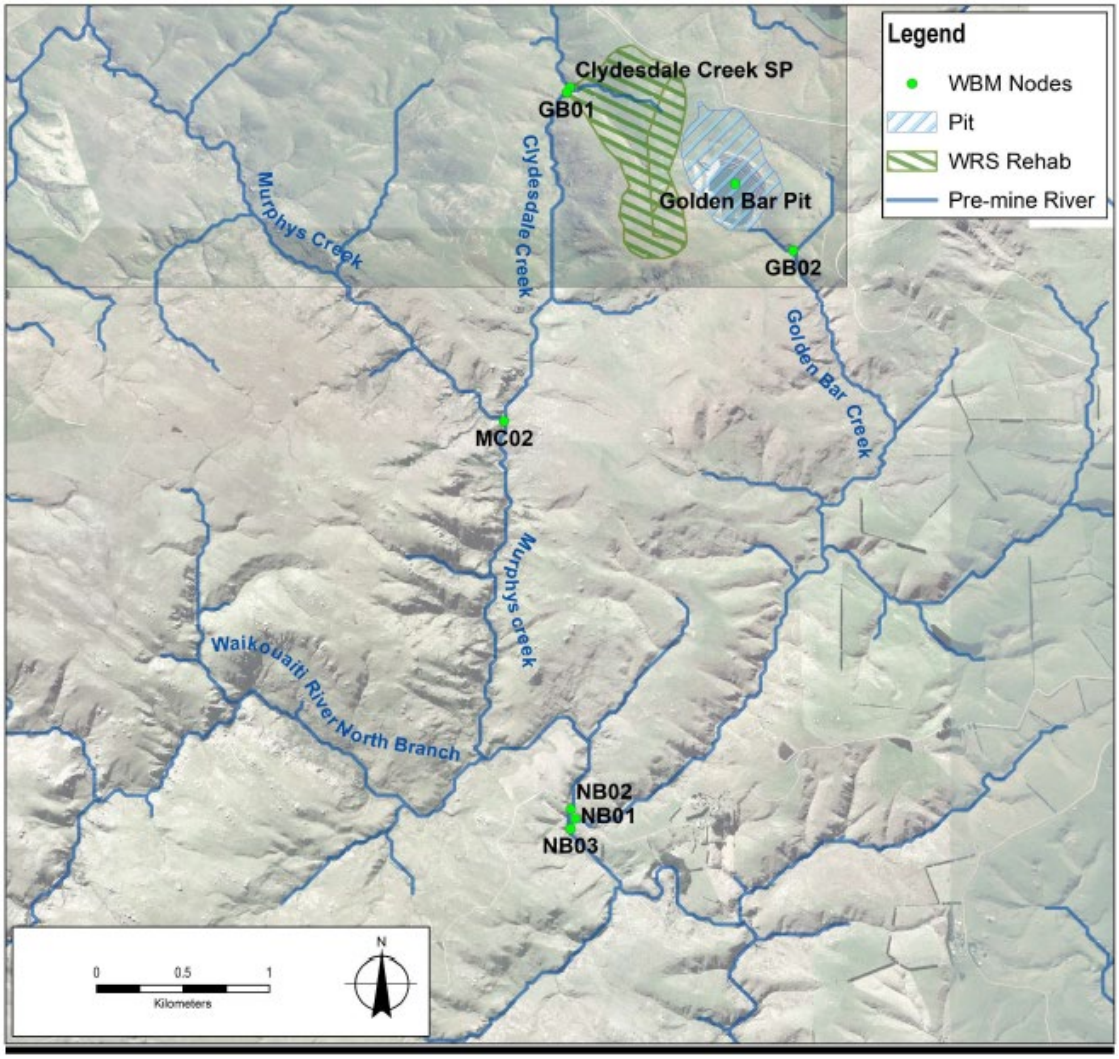

Figure 8 Rivers (shown as pre-mine rivers), silt ponds, and monitoring locations relevant to the Golden Bar area. Source: RM24.184 Appendix 12.

Artificial Surface Water Features

The majority of seepage from the Golden Bar Pit and waste rock stack moves laterally within the near surface weathered schist and is captured in silts ponds and/or reports to the receiving surface water catchment.

The following silt ponds are located within the Golden Bar mining area:

- Clydesdale Silt Pond, which is located within Clydesdale Creek, approximately 60 m downstream of the toe of the existing GBWRS.

Monitoring Locations and State of the Existing Environment

- Surface water quality is monitored at the following locations:
    - GB01 Clydesdale Creek immediately downstream of the Clydesdale silt pond
    - GB02 Golden Bar Creek immediately downstream of the Golden Bar Pit
    - MC02 Murphys Creek immediately downstream of the Clydesdale Creek confluence
    - NB01 Golden Bar Creek immediately upstream of the confluence with NBWR
    - NB02 NBWR immediately upstream of the Golden Bar Creek confluence
    - NB03 NBWR immediately downstream of the Golden Bar Creek confluence

- Appendix 21 of the application describes the existing water quality.

- GB01 receives water draining from the existing rehabilitated GBWRS. These waters are alkaline with elevated nitrate-nitrite and sulphate concentrations, and low ammoniacal nitrogen concentrations. Cyanide and dissolved metals are generally low and below water quality guidelines. Conductivity and hardness are generally high.

- GB02 is just downstream of the Golden Bar Pit. This creek also has alkaline water. Nitrate-nitrite-nitrogen concentrations are typically two orders of magnitude lower than at GB01 and sulphate is typically an order of magnitude lower.

- NB01 at the downstream end of Golden Bar Creek has even lower sulphate concentrations, while dissolved metals and cyanide are generally low and below water quality guidelines.

- NB03 is downstream of the confluence of Golden Bar Creek and NBWR. Sulphate concentrations are elevated relative to background levels, but usually well below existing consented compliance criteria. Similarly, cyanide and dissolved metal concentrations are usually well below their respective compliance criteria concentrations (and relevant guidelines).

- Schedule 1A to the RPW identifies numerous ecosystem values of the Waikouaiti River, including the NBWR. The Waikouaiti River supports significant habitat for flathead galaxiid, hybrid galaxiid, banded kokopu and koaro.

6.6.4 Central Mining Area

Detailed descriptions of the surface water features can be found in Appendix 13 (GHD) and Appendix 21 (Ryder) of the application.

- This area is significantly impacted by mining. A full list of mine features can be found in the application and is summarised in Section 6.3 earlier in this report.

- The central mining area has impacts on both the Deepdell Creek catchment (in the Shag catchment) and the NBWR catchment.

- The primary natural surface waterbody in this area is Deepdell Creek.

- Schedule 1A to the RPW identifies Deepdell Creek as providing significant habitat for flathead galaxiid.

- Deepdell Creek joins the Shag River approximately 8 km upstream of the OGL Shag River Loop Road surface water compliance monitoring site and approximately 25.5 km upstream of the OGL McCormicks monitoring site. The Cranky Jims Creek and Tipperary Creek catchments report to the Shag River in the section between these two monitoring sites.

- Deepdell Creek has a median flow of approximately 30 litres per second (**L/s**) and a 7-day mean annual low flow (**MALF**) of 4 L/s at the DC04 gauging site. In summer, the flow in Deepdell Creek can drop significantly, however, even under these low flow events, the creek is punctuated with deep, very slow flowing sections. Small riffle and run sections are also present.

- Lower Deepdell Creek typically has a pH above 7 (often between 7 and >8) and relatively high conductivity. The pH has remained stable over time.

- Dissolved inorganic nitrogen concentrations are moderate to low (nitrate-nitrite-nitrogen, averages of 0.32 milligrams per litre (**mg/L**) at DC07 and 0.075 mg/L at DC08 since the start of 2020). At DC07 and DC08, recent (since the start of 2020) ammoniacal and nitrate nitrogen concentrations are typically within the National Policy Statement for Freshwater Management 2020 (**NPS-FM**) Attribute band A (for toxicity).

- Sulphate concentrations are significantly higher in Deepdell Creek at monitoring sites downstream of the mine's influence, however they are generally well below the surface water compliance limit of 1,000 grams per cubic metre (**g/m^3**) at DC08 (median of 183 mg/L since the start of 2020), except on one occasion (1,310 mg/L, 22 February 2024).[6]

- Except for iron and arsenic at DC07, element concentrations have largely remained below laboratory detection limits in Deepdell Creek, and the concentrations measured at DC08 have consistently remained below consent compliance limits. The iron concentrations should be treated with caution as they likely result from elevated background concentrations.

- Weak acid dissociable (**WAD**) cyanide concentrations have been below the laboratory detection limit at all sites on all sampling occasions.

- The nearby natural surface waterbodies and the relevant monitoring locations are shown in Figure 9.

[6] 1 g/m^3 is the same as 1 mg/L.

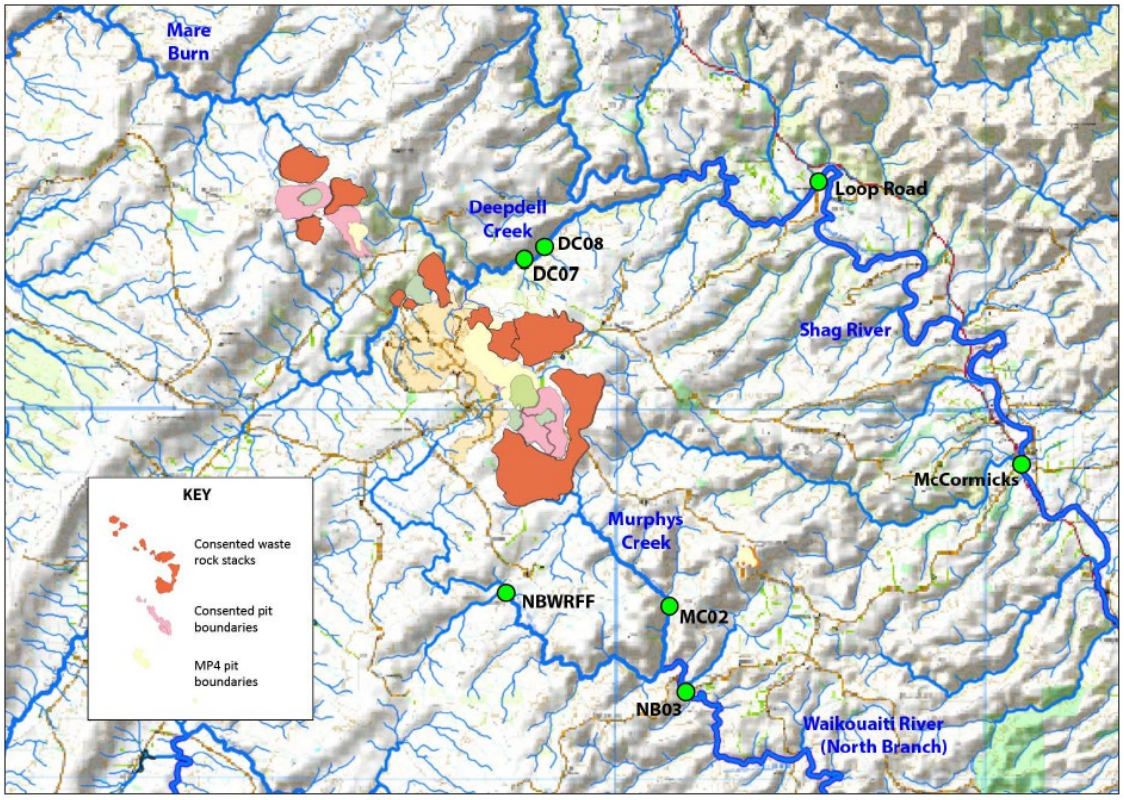

Figure 9 Rivers and monitoring locations in the central mining area. Source: RM24.184 Appendix 22.

6.7 Aquatic Ecology

A full description of aquatic ecological values can be found in Appendices 20-22 (Ryder) of the application.

Mare Burn

- Algae (periphyton) and macrophyte cover is assessed at Mare Burn catchment monitoring sites (TG01, MB01, MB02) seasonally each year. Mat algae cover usually dominates all three sites, but filamentous algae cover can be observed on occasions and its presence appears to be seasonally dependent.

- Macrophytes can be abundant at MB01 in summer (69% cover) but can drop away to less than 1 % at other times of the year. Macrophyte and periphyton cover vary seasonally and from year to year, and this is likely to be due to the seasonal influence of temperature and the frequency and duration of stable flows and flood flows.

- Comparisons of the benthic invertebrate communities from the 2017 (when regular monitoring commenced), 2021, and 2022 surveys are made in Appendix 20.

- Generally speaking, mayfly densities and QMCI scores at MB01 and MB02 are very similar for 2017 and 2021/2022 indicating no adverse effects as a result of mining. These health metrics for TG01 are more degraded in 2021 relative to 2017. There is no clear reason why this in the case, although TG01 is a smaller tributary and located further up the catchment, and subsequently is probably more likely subject to the effects of low flows in the warmer months of the year.

- Monitoring of Mare Burn surface waters is still in its infancy and as such long-term trends have yet to be determined.

- Annual quantitative electric fishing surveys have been undertaken at three monitoring sites (MB01, MB02, TG01) in late summer/early autumn since 2017. Flathead galaxias are commonly found at all three sites along with freshwater crayfish (kōura).

- The Taieri flathead galaxiid (Galaxias depressiceps) is by far the dominant fish species in the Mare Burn catchment, having been found in a number of tributaries surveyed.

- Brown trout have previously been recorded in the catchment, but only in the lower reach near the confluence with the Taieri River. There is at least one known fish barrier on the lower Mare Burn – a farm dam. This dam probably restricts trout from gaining access further up the catchment, which is positive for the catchment's galaxiid population.

- Ryder Environmental freshwater ecologists sighted an adult eel (tuna) in Trimbells Gully (at monitoring site TG01) in 2016, but there are no other records for tuna in this catchment.

Deepdell Creek

- The most recent reported monitoring of benthic macroinvertebrates at Deepdell Creek monitoring sites (2023) indicated community composition at Deepdell sites was largely composed of molluscs (snails) and trichopterans (caddisflies), with dipterans (true-flies) contributing to community abundance in winter and spring, and ephemeropterans (mayflies) contributing to abundance at control sites in some seasons. Crustaceans and plecopterans (stoneflies) were also present across all sites at low densities throughout the year.

- Taxa belonging to caddisflies, mayflies (Ephemeroptera) and stoneflies (Plecoptera) are referred to as EPT taxa and, collectively, are indicative of good water quality and habitat conditions in streams and rivers.

- The proportion of EPT abundance varied among Deepdell Creek sites in all seasons in 2023, generally declining between sites DC00 and DC03, then generally increasing between sites DC05 and DC08 . In general, EPT taxa represent relatively minor proportion of the total invertebrate community at Deepdell Creek monitoring sites, except at DC00, DC02 and DC08.

- Quantitative electric fishing surveys have been undertaken at Deepdell Creek monitoring sites in late summer for many years (over three decades). The Taieri Flathead galaxiid (*Galaxias depressiceps*) is by far the dominant fish species in Deepdell Creek, and site DC07, located downstream of the mine, typically supports a large population.

- The Taieri flathead galaxias has been classified by the Department of Conservation as 'Threatened – Nationally Vulnerable', with criteria C (3) (moderate population, with population trend that is declining, total area of occupancy ≤ 100 ha (1 km2), predicted decline 10–50%) and the qualifiers 'Conservation Dependent' and 'Data Poor'.

- Surveys have also found short- and long-fin eels and trout.

- Long-term linear trend analyses indicated that average galaxiid body length and galaxiid densities across Deepdell sites have not significantly varied over time, except for density at DC05, which appears going from 65 per 10 m of stream length in 2013 to 8 per 10 m stream reach in 2023. Habitat changes at this site, such as changes to the run-pool

transition at the downstream end of the site with increased water depth and lower velocities, could be influencing DC05 fish densities.

Shag River/Waihemo

- The Shag/Waihemo catchment supports a diverse fish community with sixteen species having been recorded, including 14 native species and 2 sports fish (brown trout and brook char). Seven of the native species recorded are of conservation concern.

- Since 2009, eleven species of freshwater fish have been collected from the Otago Regional Council State of the Environment monitoring site at Craig Road, which is downstream of the McCormick monitoring site. Upland bullies have been among the most abundant species on all sampling occasions. Other species regularly caught are shortfin and longfin eels, common, bluegill and upland bullies and lamprey.

NBWR

- Regular benthic macroinvertebrate sampling is undertaken at the NBWRRB (a monitoring site in NBWR) subject to the presence of surface water sufficient to sample.

- The macroinvertebrate communities at NBWRRB in 2022 and 2023 were dominated by taxa tolerant of poor habitat and water quality conditions, with small crustaceans, chironomidae midges, molluscs (snails) and oligochaete worms abundant throughout the year.

- In 2022 aquatic survey of NBWRRB, a range of fish were caught using electric fishing techniques, including a healthy population of upland bullies. No galaxiids were caught at this site in 2021; however, in 2022 three individuals were caught, as well as one koura and one shortfin eel.

- At MC02 (in Murphys Creek) three galaxiids were caught during the 2018 fish survey. Because of erosion issues, the monitoring location was moved 100 m further downstream later that year.

- Electric fishing at this new site in summer 2019 found only one galaxiid, with no fish observed during spot fishing in pools, runs, and riffles near the site and between the new and previous sites.

- Electric fishing at MC02 for the 2020 summer survey yielded four galaxiids and 15 galaxiids were found in the 2021 survey.

- Forty-two galaxiids and one longfin eel (~900 mm long) were caught during the February 2022 survey, while 15 galaxiids were caught in the 2023 survey.

- Trend analysis has not been undertaken for dish surveys at the Waikouaiti River catchment sites due to the difficultly in accurately assessing the galaxiid population.

6.8 Terrestrial Ecology

A full description of terrestrial ecological values can be found in Appendices 15 and 16 (Ahikā/Whirika) and in 17-19 (Bioresearches) of the application.

Macraes Ecological District

- The present vegetation of the Macraes Ecological District is of a highly modified nature, with approximately 75% of the district dominated by exotic vegetation types (mainly improved pastureland) and the remainder of the vegetation types being indigenous and comprised of varying density, narrow-leaved tussockland, copper tussock-based wetlands and grey shrubland interspersed with remnants of original forest cover and scattered ephemeral wetlands.

- The remaining native vegetation communities currently present within the Macraes area are botanically diverse and comprise 601 indigenous (including 18 Data Deficient, 65 At Risk and 31 Threatened species) and 237 exotic species.

- The remaining vegetation communities are likely to be derived from the original vegetation communities that existed before human colonisation of the region, but many are likely to be considerably reduced in extent and species diversity. Invasion by exotic shrub and tree species, particularly gorse and broom, is an increasing problem in the area, as is conversion of tussock grassland to pasture and feed crop on lower slope land.

- Of the fauna, fifty-six species of birds have been recorded from the Macraes Ecological District, of which thirty-six are indigenous and twenty are introduced. The area's indigenous avifauna are likely being predated by exotic mammals, though the impact of this predation pressure on population dynamics is not known. They are also being impacted by changes to their habitats, however the nature of these changes and their impacts on the species is again not known.

- The area is noted for its high diversity of seven lizard species and the invertebrate communities are diverse (for a region at moderate altitude) and include some species that are rare or of biogeographic interest.

- The lizard species are being similarly impacted as birds by exotic mammals and habitat change, though the severity of predation is somewhat moderated by the abundance of rocky habitats offering safer retreat sites.

The Site

- The ecological impact that may arise from the MP4 project activities can occur both within the actual footprint of the MP4 project but also may extend beyond the footprint. A 100 m buffer is used for this potentially impacted area. The footprint and the buffer together are the zone of influence (**ZOI**).

- The project footprint is 101 ha and the buffer is 104 ha. This does not include the additional 328 ha within the ZOI for which consents are already held and are not being modified as part of this MP4 proposal.

- The ZOI includes indigenous vegetation including ephemeral wetlands and other natural inland wetlands, riparian vegetation, riparian/wetland vegetation mosaic, shrubland, and tussockland.

- These vegetation types provide habitat for 128 indigenous plants including 14 nationally At Risk, Data Deficient or locally uncommon species and 10 indigenous bird species, including one Threatened and two At Risk species.

- Within the ZOI there is approximately 90 ha of suitable or potentially suitable lizard habitat, supporting a large but unknown (likely high thousands) population of lizards.

- Within the ZOI there is approximately 90 ha of suitable or potentially suitable invertebrate habitat, likely supporting a large but unknown number of invertebrates, including one threatened species of moth, *Orocrambus sophistes*.

- The indigenous vegetation communities occur on three threatened land environments.

- Ephemeral wetlands in the Coronation area are critically endangered naturally uncommon ecosystems and are a priority for protection.

- The tussockland, shrubland, wetland, riparian and ephemeral wetland vegetation communities present in the project impact area are considered significant under the partially operative and proposed Otago Regional Policy Statement and the Waitaki District Plan and would qualify as Significant Natural Areas under the criteria in the National Policy Statement for Indigenous Biodiversity (**NPS-IB**).

- There are no Regionally Significant Wetlands (as identified in the RPW) within the site area.

6.9 Air

A full description of the existing air quality can be found in Appendix 29 (Beca) of the application.

- The Otago region comprises a number of areas specified as separate airsheds by the Minister for the Environment through notice in the New Zealand Gazette, as well as an airshed comprising the balance of the region.

- Twenty-two Otago airsheds have been gazetted, representing Otago's main urban areas. These are grouped into four airshed categories (1-4) for simplicity. The Macraes Mine is not located in any of the 22 urban areas.

- In accordance with the National Environmental Standards for Air Quality (**NES-AQ**), the balance of a region is an airshed by default. Hence, Macraes Mine is located within airshed 23.

- Airshed 23 is not a polluted airshed as per the NES-AQ.

- The Regional Plan: Air for Otago (**RPA**) categorises the 22 airsheds into three air zones. The site is located in Air Zone 3, which is defined as being any area in Otago that isn't located within either Air Zone 1 or Air Zone 2.

- Other than the Macraes Mine, land uses in the surrounding area include low-intensity pastoral farming and some residential dwellings. Possible sources of air contaminants typical of rural areas include unsealed roads, agricultural activities, dry unvegetated fields, and domestic heating.

- The Applicant monitors air quality at a number of monitoring locations. These are shown in Figure 10.

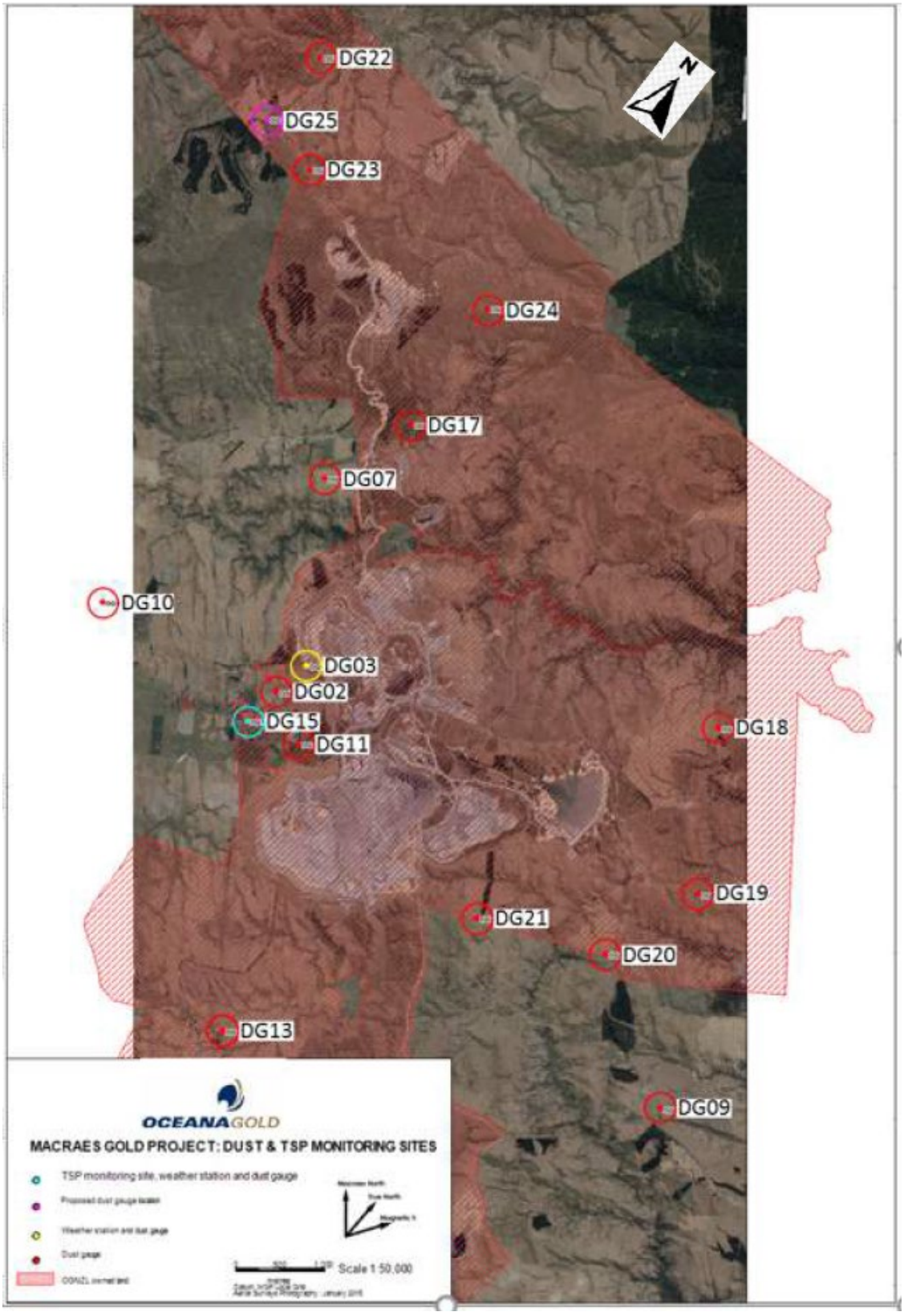

Figure 10 Air quality monitoring locations. Source: RM24.184 Appendix 29.

- Nearby sensitive receptors are shown in Figure 11. Note the following corrections:
    - R9 is no longer considered a sensitive receptor, as it has been confirmed to be a shed and not a dwelling.
    - The correct address for R1 is 1668 Macraes Road, not 1700 Macraes-Dunback Road.

- Macraes-Dunback Road does not exist and all references to it should be read as Macraes Road.
- R1 is approximately 650 m west of the Innes Mills haul road.

Receptor No.	Receptor	Sensitivity to Dust	Zoning	Approximate distance from nearest project activity
R9	Residential dwelling at 1668 Macraes - Dunback Road	Medium - High	Rural General	1.0 km southwest of IMW 0.84 km west of FRBF
R1	Residential dwelling at 1700 Macraes - Dunback Road	Medium - High	Rural General	1.1 km southwest of IMW 1.0 km west of FRBF
R2	Holiday house (previously a Church) at 1726 Macraes Rd	Medium - High	Rural General	1.5 km southwest of IMW 1.5 km west southwest of FRBF
A	Coronation Hall at 1750 Macraes - Dunback Road	Medium - High	Rural General	1.7 km southwest of IMW 1.7 km west southwest of FRBF
B	Macraes Moonlight School	High	Rural General	1.8 km southwest of IMW 1.8 km west southwest of FRBF
C	Cricket Pavillion at 16 Hyde Street	Medium - High	Rural General	1.8 km southwest of IMW 1.9 km west of FRBF
R3	Residential dwelling at 47 Hyde Street	Medium - High	Rural General	2.0 km southwest of IMW 2.1 km west of FRBF
R4	Residential dwelling Four Mile Road	Medium - High	Rural General	3.6 km northwest of CNBF
R5	Residential dwelling 406 Horse Flat Road	Medium - High	Rural General	2.2 km south of Coronation Pit 3.9 km northwest of IMW
D	Golden Point Reserve – historical landmark	Medium	Rural Scenic	2.9 km southeast of Coronation Pit 2.4 km northwest of IMW
E	Callery's Battery – historical landmark	Medium	Rural Scenic	2.9 km southeast of Coronation Pit 2.4 km northwest of IMW
R6	Residence 593 Macraes - Dunback Road	Medium - High	Rural General	3.0 km north northeast of Golden Bar expanded pit
R7	Residence 659 Richie Road	Medium - High	Rural General	3.9 km northeast of Golden Bar expanded pit
R8	Residence 800 Stoneburn Road	Medium - High	Rural General	3.2 km southeast of Golden Bar expanded pit

Figure 11 Sensitive receptors. Source: RM24.184 Appendix 29.

7. Description of Activity

7.1 General MGP Information

Mining

Large scale mining results in the mobilisation of naturally occurring metals and other substances from the rock mass, giving rise to impacts on water quality.

Acid and metalliferous drainage (**AMD**) is a general term used to describe waters that are chemically impacted by mining activities, and which can contain significant quantities of

toxic metals, salts, and acidity. AMD is typically generated by the excavation of rocks that contain sulphide minerals such as pyrite. When these minerals are exposed to oxygen and water, they undergo weathering processes and oxidise, generating acidity and releasing toxic metals. Once acidity and metals are generated they can then be mobilised by any water sources, including rainfall, surface runoff water, water from dust suppression, or processing water.

AMD waters can be categorised into three general types depending on their pH and the concentration of sulphate and metals.

- Acid rock drainage – has high acidity, low pH, and has occurred due to the oxidation of acid producing sulphide minerals. Acid rock drainage generally contains significant dissolved toxic metals.
- Neutral metalliferous drainage – the acid produced by the oxidation of sulphide material has been neutralised by other minerals such as carbonates, with resultant waters having high toxic metal concentrations but circum-neutral pH.
- Saline drainage – waters close to neutral-to-alkaline in pH with elevated sulphate.

At Macraes, the waste rock is non-acid forming, with low sulphide sulphur, and are unlikely to generate acid rock drainage. The waste rock does have the potential to generate neutral metalliferous drainage due to the release of contaminants of concern (arsenic, nitrogenous compounds, sulphate, iron, zinc, and copper).

Processing Plant

Processing of the ore involves production of a sulphide concentrate via flotation of crushed and ground ore. Historically this ore was processed via carbon-in-pulp cyanidation resulting in historical tailings which are elevated in sulphide minerals. Commencing in 1999, an autoclave was installed with the sulphide concentrate being fed through this pressure oxidation system to oxidise the sulphide minerals to liberate the gold before carbon-in-pulp cyanidation. This has resulted in a lower sulphide content in the tailings yet a higher proportion of process mineral residues and the formation of secondary minerals such as gypsum +/- anhydrite, jarosite +/- alunite, and ferric sulphate. The process residues from the flotation and the gold extraction systems are discharged as mine tailings into purpose-built tailings storage facilities.

There are no changes proposed to the processing of ore. The current processing capacity at the Processing Plant is approximately 6.5 mega tonnes (**Mt**) per annum and this will remain the same.

Water Management

Mine impacted water is managed via the Mine Water Management System (**MWMS**). This is a key part of the mining operation at the site. A full description of the MWMS is provided in section 2.4.6 of the application's Assessment of Environmental Effects (**AEE**). I agree with this description and do not repeat it here. In summary, the MWMS involves the collection and recycling of mine impacted waters to ensure that there is sufficient water available for processing of ore and for any other operational needs, to ensure there isn't water in a location where it isn't needed or where it would impede mining operations, and to control (i.e. avoid or manage) discharges of mine impacted waters to the wider environment.

7.2 The MP4 Proposal

A full description of the proposal can be found in the application AEE and in the supporting technical reports. This description is adopted for the purposes of this report. A summary of the key points is provided below.

For clarity, where this report refers to activities that will occur, the inherent assumption is that these activities will occur *subject to the relevant approvals being granted.* This approach is taken for the sake of brevity, and to avoid the need to make repeated references to 'the proposed activity' or to say 'assuming consent is granted'. Where activities can occur as permitted activities, or are authorised by existing resource consents, this will be explicitly stated either in the main body of text or in a footnote.

7.2.1 Frasers Tailings Storage Facility Stage 2

Additional detail on the construction and operation of the Frasers Tailings Storage Facility (**FTSF**) can be found in Appendix 2 (WSP) and Appendix 3 (EGL) of the application.

Construction

- Tailings generated at the processing plant are currently stored in the TTTSF. The TTTSF will reach full consented capacity in early 2025.

- To provide the necessary tailings storage capacity to support the current LOM plan and the proposed LOM extension, a new TSF – the FTSF – will be established in the mined-out Frasers Pit.

- The establishment of the FTSF is being consented in two stages. Resource consents for the initial smaller stage (Stage 1) were sought as part of the CCP and were granted.[7] These enable initial construction of the Frasers Backfill Embankment (**FRBF**) and storage of 6 Mt of freshly milled tailings. Construction is underway.

- This MP4 proposal seeks to authorise the second, larger stage of the FTSF development and tailings storage for the full LOM.

- Construction of the FTSF Stage 2 will involve increasing the height of the FRBF and width of the FRBF at the northern end of Frasers Pit using backfilled waste rock stripped from the nearby Innes Mills.

- The FRBF will be raised from 450 m RL (Stage 1) to 480 m RL (Stage 2), with batter grades of approximately 3H:1V and a crest width of approximately 100 m. See Figure 12.

- Approximately 25 Mt of material will be required for the FRBF extension to 480 m RL.[8]

- The embankment raise will increase the storage capacity from 6 Mt (Stage 1) to approximately 35.5 Mt of freshly milled tailings.

- Subject to obtaining all the necessary approvals, the Applicant expects that the construction of the Stage 2 FRBF will follow immediately on from Stage 1, commencing in 2026 and continuing until 2027.[9]

[7] RM23.868.01 and RM23.868.02 and variations to consents in the RM10.351 suite.
[8] Section 127 variation to RM10.351.49.V2.
[9] The FRBF also requires a building consent.

- Discharges of dust and contaminants to air will occur during construction and operation of the FTSF.[10]

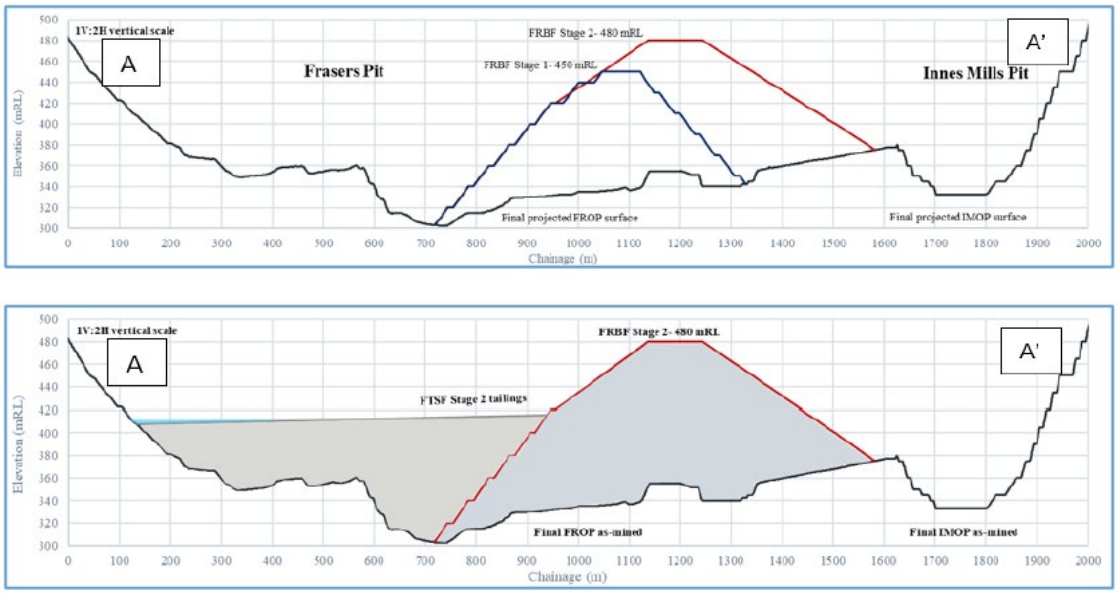

Figure 12 Schematic north south cross section at the deepest part of the tailings showing FRBF Stage 2 relative to Stage 1 (top) and the completed FTSF (bottom). Source: RM24.184 application.

Tailings Delivery and Deposition

- For Stage 2, approximately 29.5 Mt of freshly milled tailings from the Processing Plant is proposed to be disposed of via a series of conventional sub-aerial slurry discharge spigots along the FRBF to FTSF.[11]

- The route for the tailings delivery line from the processing plant will be the same as that which established for Stage 1. This is shown in Figure 13.

- Tailings slurry will be discharged from at or below the crest of the FRBF to create a tailings beach, maintaining a wet beach.

- Tailings and water will be impounded behind the FRBF.[12]

- The beach will slope of 1 in 100 to the south, away from the backfill embankment, which will generate a decant pond. See Figure 14.

- The final tailings beach level will be approximately 417 m RL but may vary by a few metres as a result of operational factors.

- The discharge of tailings will continue during the embankment raise, with construction of the FRBF expected to remain well ahead of the level of the rising tailings beach.

- Stage 2 will provide for approximately 5 years of additional tailings storage assuming a Processing Plant ore processing rate of 6 – 6.5 Mt per annum.

[10] Section 127 variation to RM10.351.52.V3
[11] RM24.184.01 s15 discharge of contaminants and water.
[12] RM24.184.03 s14 damming of water

- Frasers Pit will continue to receive mine impacted water such as WRS and tailings seepage water on an ongoing basis, as well as water from the dewatering of other pit lakes on an as required basis, to support the management of the overall water balance at the Processing Plant and existing mine facilities.[13]

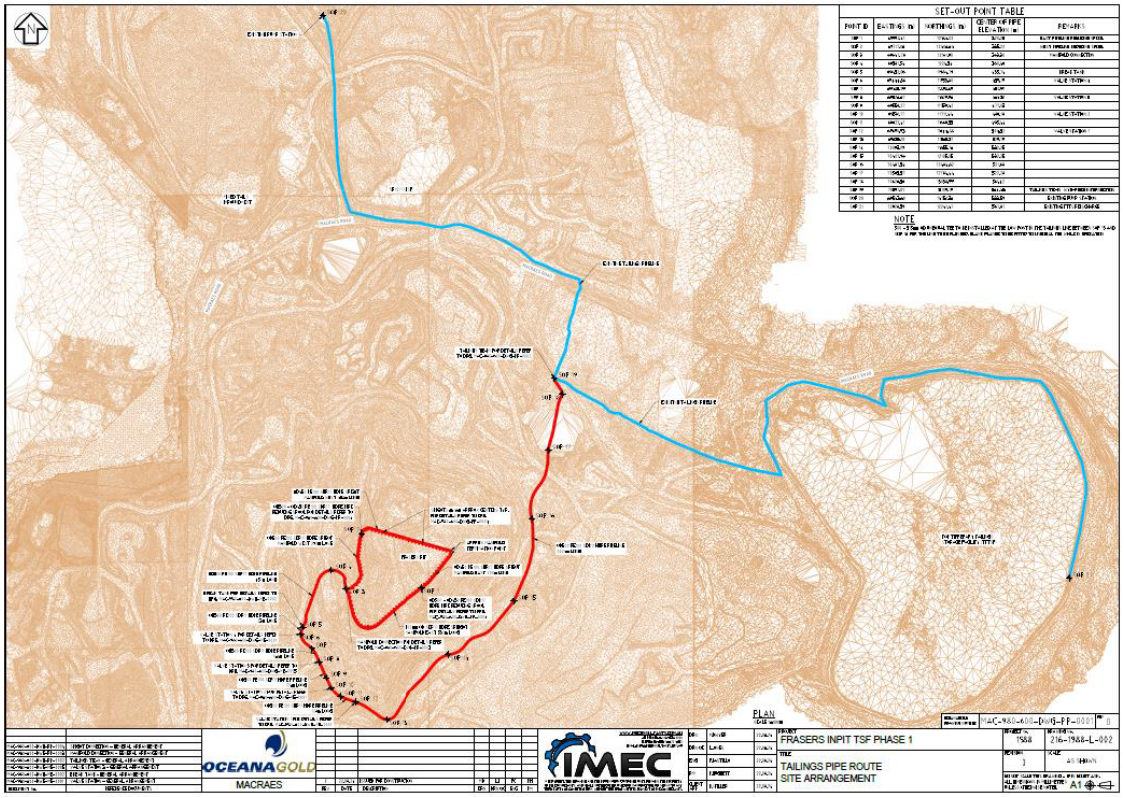

Figure 13 Tailings delivery line (red line) as established for Stage 1 FTSF. Source: RM24.184 application.

[13] Discharge of water and contaminants to land and water, provided for by RM10.351.47.V2 and RM10.351.43.V2,

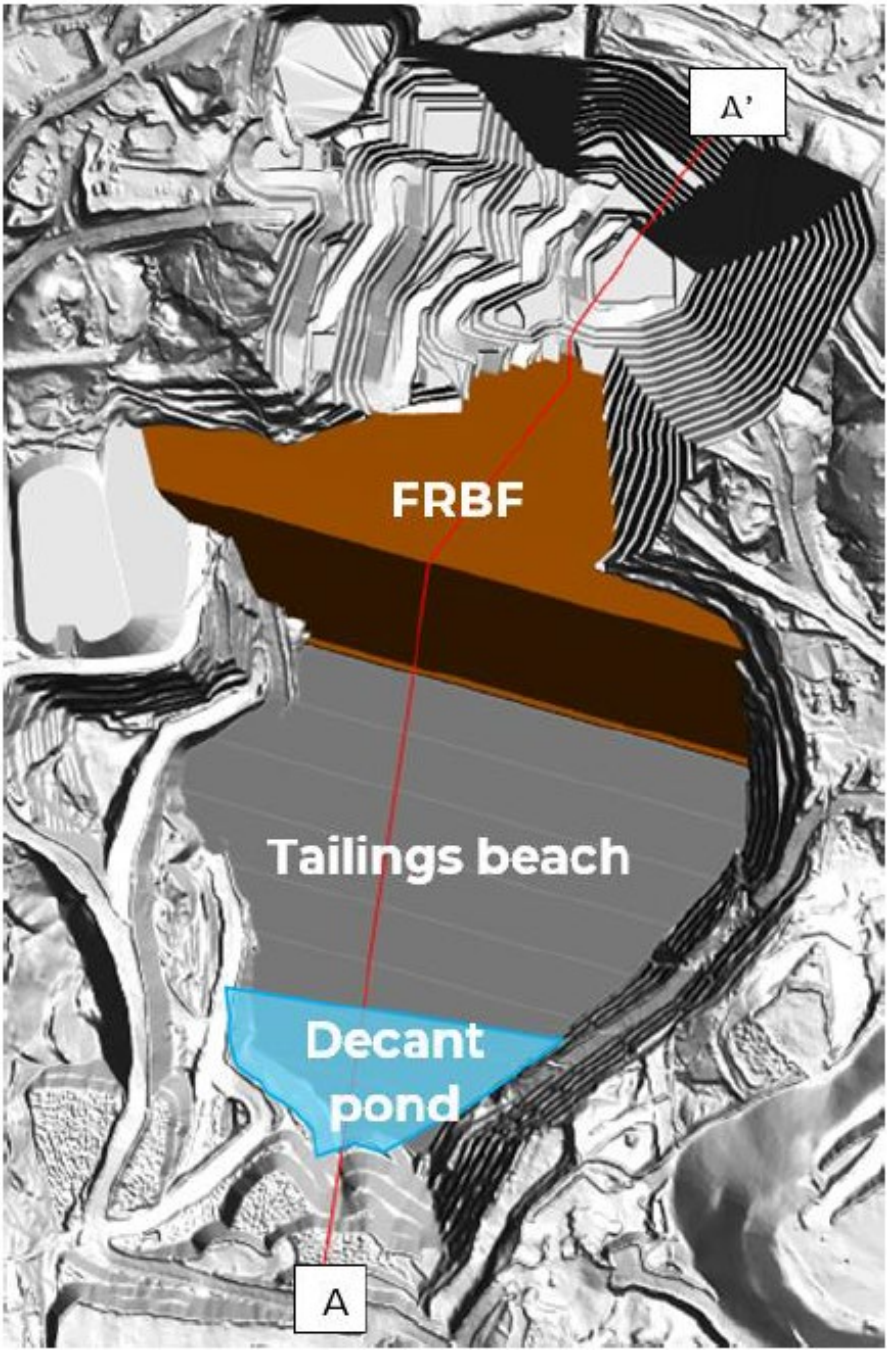

Figure 14 FRBF, the tailings beach, and decant pond. Source: RM24.184 application.

Tailings Return Water

- Tailings return water, stormwater, and influent mine impacted water will be pumped out of the pit and returned to the process circuit using a floating pump system in the tailings decant pond.[14]

- Return water will be pumped at a rate of up to 500 L/s and will be returned to the processing plant via a series of up to four storage ponds (staging ponds) or used elsewhere in the mine water management system.

[14] RM24.184.02 s14 take and use surface water.

- The staged return path is necessary because of the very high head that that the decant pond and other water will be pumped.

- Water will be raised from the previous stage, discharged into the next pond, then retaken and pumped through to the next stage.

- The pumping route will be the same as that established for the Stage 1 FTSF. This is shown in Figure 15.

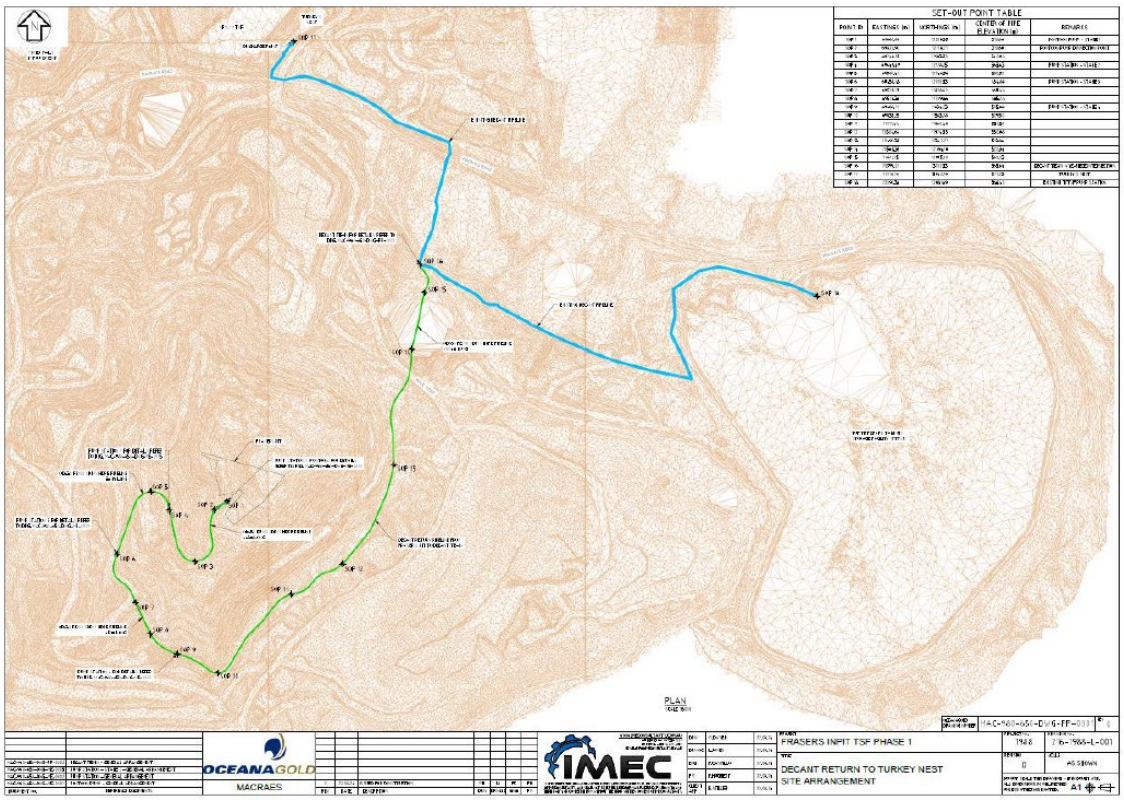

Figure 15 Tailings return water line established for Stage 1 (green line). Source: RM24.184 application.

Closure

- Should no further stages of FTSF proceed, closure of Frasers Pit will occur in a manner consistent with the current and consented closure plan which is for a pit lake to form from groundwater inflows,[15] rainfall, surface water runoff from nearby surfaces,[16] and discharges of contaminated mine water from other parts of the mine.[17]

- After approximately 50 years, the Frasers Pit Lake will form above the tailings surface and will coalesce with the Innes Mills Pit Lake above the FRBF crest at 480 m RL. This is termed the Frasers Innes Mills (**FRIM**) Pit Lake.

7.2.2 Innes Mills Open Pit Stage 9 and 10 Extensions

The extension of the Innes Mills Pit is a land use activity that is regulated by WDC. This land use is facilitated by activities that require consents from ORC.

[15] Section 127 variation to RM10.351.45.V2
[16] Section 127 variation to RM10.351.46.V2
[17] Section 127 variations to RM10.351.43.V3 and RM10.351.47.V3

- Innes Mills Pit is currently being actively mined. A small extension to both sides of the pit was authorised as part of the Frasers co-disposal project in July 2023.[18]

- A further small expansion was authorised as part of the CCP in April 2024.

- This MP4 application proposes a further extension of 200 m to the west (Stage 9) and 150 m to the east (Stage 10) to enable the recovery of down dip ore. Refer Figure 16.

- Mining operations will use standard drill and blasting methods, with excavators, haulage trucks, and various ancillary mobile plant to maintain haul roads and tip heads. Ore will be transported directly to the processing plant.

- The proposed extensions will result in an increase to the Innes Mills Pit footprint of approximately 12.5 ha, increasing the total footprint to approximately 71 ha – an increase of 21%.

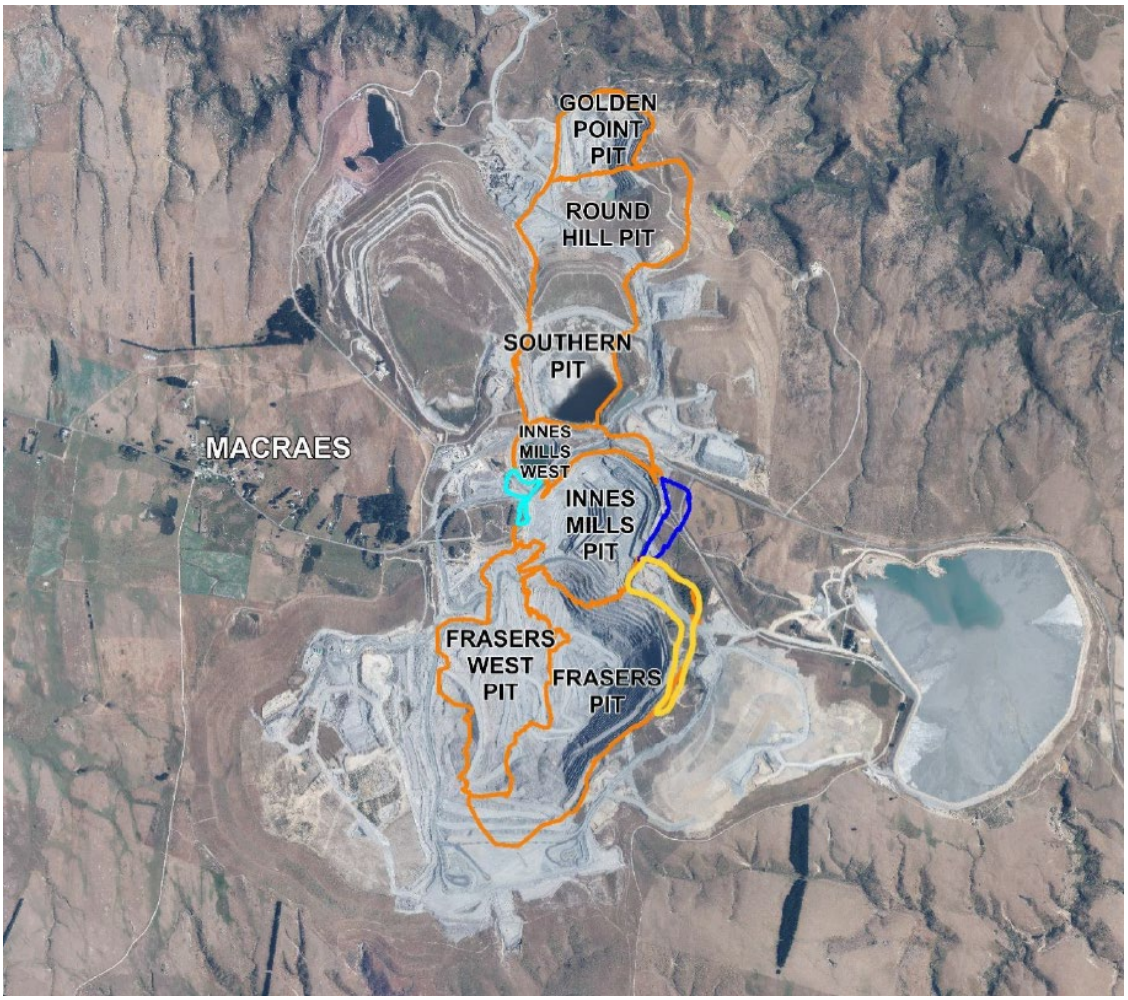

Figure 16 Light and dark blue areas represent the Innes Mills Stage 9 and 10 extensions, respectively. The yellow area is the currently consented extent of Frasers Pit that will not be mined as a result of the pit becoming the FTSF. Orange areas are the current consented pit extents. Source: RM24.184 application.

[18] WDC land use consent 201.2022.2047 and Discharge Permit RM23.076.01 and variations to multiple RM10.351 consents.

- The extensions will extend over existing mine haul roads and access roads, Golden Bar Road, areas previously disturbed by mining, and small remnant patches of rank pasture/tussock.

- Stormwater and surface runoff water will be diverted around the pit to prevent this runoff entering the pit during mining.[19]

- The Stage 10 extension to the east will occur within 100 m of areas of natural inland wetland and areas of riparian/wetland vegetation mosaic. Indications are that the extension will result in the partial or complete drainage of the wetland areas.[20]

- Dewatering of the pit extensions is required before mining of the extensions can commence. This will occur as a continuation of existing pit dewatering. Groundwater may continue to be abstracted from horizontal drainage holes drilled into pit walls and from existing groundwater bores located within 200 m of the pit rim for the duration of the mining operations.[21]

- No new groundwater bores are expected to be necessary to facilitate the dewatering of the pit during operations.

- Water that collects in pit sumps from stormwater runoff or from groundwater ingress will be used within the mine water management system.[22]

- The mining of the Stage 9 and 10 extensions will result in the movement of 90.3 Mt of material, of which 6.1 Mt will be ore and 84.2 Mt will be waste.

- Waste rock from Innes Mills will primarily be placed within the FRBF. Excess waste rock beyond that required to complete construction of the FRBF will be placed on the Frasers WRS.[23]

- Approximately 5 Mt of Innes Mills waste rock may be used to partially backfill Golden Point pit.[24]

- Innes Mills Pit may continue to receive mine impacted water such as WRS seepage water on an as required basis, as necessary to support the management of water at the existing site facilities.[25]

- As a result of the increased size of the pit, an additional water storage pond (external to the pit) may be required to support the management of water during mining. This would be located west of the pit and south of the MTI. Storage capacity will be no more than 19,500 m^3.

[19] Section 127 variation to RM10.351.50.V2.
[20] RM24.184.04 s9 use land in a manner that contravenes a national environmental standard.
[21] Section 127 variation to RM10.351.51.V3.
[22] Section 127 variation to RM10.351.48.V3.
[23] In accordance with RM10.351.09.V1, expiring 1 October 2046.
[24] Section 127 variation to RM10.351.49.V2
[25] Section 127 variation to RM10.351.43.V3 and RM10.351.47.V3

- Discharges of contaminants to air will occur during mining, construction and rehabilitation of waste rock stacks, hauling or ore and waste rock, and ancillary activities.[26]

- Closure of the Innes Mills Pit will be consistent with the current MP3 and CCP closure plan. A pit lake will form in the balance of the pit from groundwater inflows,[27] rainfall, surface water runoff from nearby surfaces,[28] and discharges of contaminated mine water from other parts of the mine.[29]

- After approximately 50 years, the FRIM Pit Lake will form.

- Long-term (>200 years) the FRIM Pit Lake levels are expected to reach a level of up to 494 m RL. These levels are below the northwest pit rim spill point of 497 m RL and therefore no direct surface water discharge from the lake to the NBWR is predicted.

- When pit lake levels exceed 487 m RL some seepage is expected to report to Murphys Silt Pond through the waste stored in the south of Frasers Pit. This seepage will be captured and treated prior to release to the NBWR.

7.2.3 Golden Point Backfill and Northern Gully WRS Rehandle

- Approximately 5 Mt of waste rock from the Innes Mills Pit extension will be disposed of within and adjacent to Golden Point Pit to provide buttressing for geotechnical instability identified within the MTI.[30]

- Upon completion of mining in GPUG around 2029-2030, further buttressing will be completed using approximately 5.4 Mt of waste rock which will be rehandled from the Northern Gully WRS.

- Discharges of contaminants to air will occur during mining, construction and rehabilitation of waste rock stacks, hauling, and ancillary activities.[31]

7.2.4 Golden Bar Road Realignment

To facilitate the extension of Innes Mills Pit the northern section of Golden Bar Road will be realigned to the east. The realignment will remove a section of Golden Bar Road approximately 730 m in length and replace it with a road section that is approximately 160 m shorter, with an intersection at Macraes Road approximately 250 m northeast of the existing intersection. The design and ongoing administration of the road are matters for WDC. The proposed realignment is shown in Figure 17.

Construction of the road platform will require removal of vegetation and topsoil from the proposed alignment to expose a stable rock base on which a road base will be developed using waste rock from Innes Mills Pit.[32] The alignment of the new road will potentially be located within 100 m of a natural inland wetland. No drainage effects upon the wetland are

[26] Section 127 variation to RM10.351.52.V3
[27] Section 127 variation to RM10.351.45.V2
[28] Section 127 variation to RM10.351.46.V2
[29] Section 127 variations to RM10.351.43.V3 and RM10.351.47.V3
[30] Section 127 variations to RM10.351.49.V2
[31] Section 127 variation to RM10.351.52.V3
[32] RM24.184.31 s15 discharge contaminants to land

anticipated. No works will occur within 10 m of any natural inland wetlands, including the wetlands that were identified and fenced off as the result of earlier consent processes.

Figure 17 Proposed Golden Bar Road realignment. Wetlands are shown as green polygons. Source: RM24.184 application.

7.2.5 Golden Bar Pit Extension – Stage 2 and Golden Bar Waste Rock Stack Extension

The extension of the Golden Bar Pit is a land use activity that is regulated by WDC. This land use is facilitated by activities that require consents from ORC. The proposed pit and waste rock stack extensions are shown in Figure 18.

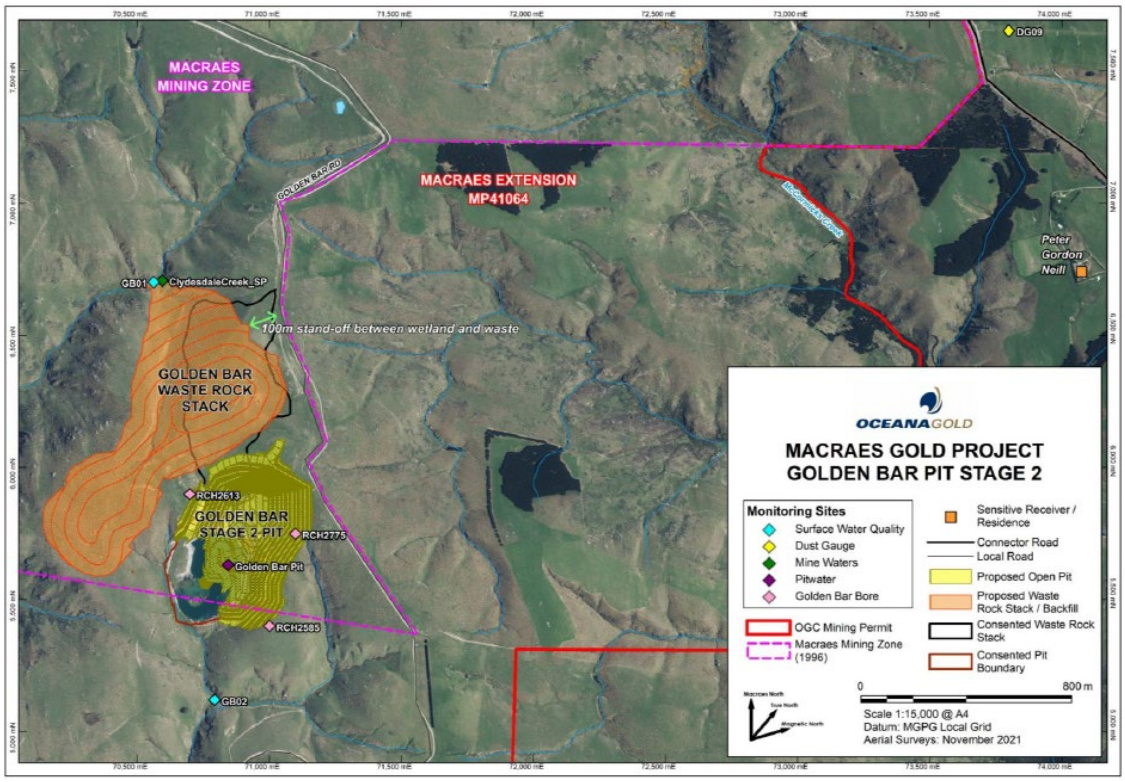

Figure 18 Extension of Golden Bar Pit (yellow shading) overlaying the Stage 1 pit consented boundary (brown line). Extension of GBWRS (orange shading) overlaying the Stage 1 waste rock stack outline (black outline). Source: RM24.184 application.

Pit Extension

- Golden Bar Pit is located approximately 10 km south of the processing plant, near the boundary of OGL owned land.

- The Golden Bar pit was mined from 2004-2006 (Stage 1) and has been partially rehabilitated to form a pit lake.

- The Golden Bar Pit is filled with water to its maximum capacity and is currently spilling water to a tributary of Murphys Creek, known locally as Golden Bar Creek.[33] The pit lake has formed via ingress of groundwater, surface runoff, and rain.

- Dewatering of the pit lake is required before mining can commence.[34] Approximately two years prior to the commencement of mining the water will be pumped from the pit and either:

    - Pumped to Frasers Pit via a temporary pipeline installed adjacent to the Golden Bar haul road.[35]
    - Discharged to Golden Bar Creek, subject to stream hydrology and compliance with instream water quality criteria.[36]

- Mining activities will occur 24 hours a day and seven days per week, but blasting will operate on a more restricted schedule.

[33] Authorised by Discharge Permit 2002.763 expiring 30 November 2037.
[34] RM24.184.16 section 14 take and use surface water and RM24.184.17 take and use groundwater.
[35] Section 127 variation to RM10.351.43.V3.
[36] RM24.184.18 s15 discharge water and contaminants to water.

- The mining of the Stage 2 extension will result in the movement of 34.8 Mt of material, of which 2.2 Mt will be ore and 32.6 Mt will be waste.

- The current Golden Bar pit has a footprint of 13 ha. The extension will involve some disturbance within the existing pit and an additional 14.4 ha of new disturbance, some of which will occur over previously disturbed and rehabilitated areas.

- The highest point of the pit is approximately 580 m RL and the deepest part will be 420 m RL, which is 45 m deeper than the Stage 1 pit. This results in a 160 m high east wall.

- Surface water diversions will be established around the Golden Bar Pit and the adjacent stockpile areas to facilitate the mining activity and minimise surface water ingress to the pit.[37]

- Dewatering of the pit will continue during mining operations via abstraction of surface water and influent groundwater from the pit sump.[38] Water will be used in the MWMS or pumped into the silt control structures and stored prior to discharge in accordance with silt pond discharge permits.

- Clearance and permanent removal of indigenous and exotic vegetation will be required to facilitate the Golden Bar Stage 2 Pit extension.

- The Stage 2 pit extension will encroach into an area of headwater gully approximately 120 m in length that was initially described as the top of Golden Bar Creek but was later clarified to be a mosaic of riparian and wetland vegetation, of which approximately 80 m^2 is classified as natural inland wetland.[39] See Figure 19.

- The 120 m section of riparian and wetland vegetation will be permanently removed.

[37] RM24.184.15 s14 diversion of surface water.
[38] RM24.184.16 and RM24.184.17 section 14 take and use surface water take and use groundwater.
[39] RM24.184.19 s9 use land in a manner that contravenes a national environmental standard.

Figure 19 Area of riparian/wetland vegetation mosaic, of which a part is natural inland wetland. Source: RM24.184 first s92 response Appendix 9.

Waste Rock Stack Extension

- Ore from the pit will be stockpiled adjacent to the GBWRS and then will be transported to the processing plant on smaller haulage trucks.

- Waste rock will predominantly be stored in the GBWRS[40], but some may be used for the construction of in-pit haul roads or temporarily stored in the pit.[41]

- The Stage 2 GBWRS consists of an approximate 450 m extension to the southwest of the existing rehabilitated Stage 1 GBWRS and a 120 m extension to its northern face. The final Stage 2 GBWRS toe will be located at the existing Clydesdale silt pond.

- The final height of the Stage 2 GBWRS will be 610 m RL, which is approximately 60 m above the current Stage 1 GBWRS. The storage capacity of the GBWRS extension will be just over 30 Mt.

- Construction of the Stage 2 GBWRS will be staged, starting from the downstream toe of the northern side of the existing GBWRS. Waste rock will be placed in layers up to the top elevation of the existing Stage 1 GBWRS, before expansion to the southwest. Waste rock will be placed out to the perimeter and the WRS raised in layers covering the full footprint until it reaches the design height.

[40] RM24.184.23 s15 discharge contaminants to land
[41] RM24.184.20 s15 discharge contaminants to land

- Perimeter drains will be established around parts of the extended GBWRS to direct surface runoff into the silt control structures[42], prior to treatment (if required), and ultimately discharge into local waterways.[43]

- The GBWRS extension will involve approximately 26 ha of disturbance outside the footprint of the existing rehabilitated Stage 1 GBWRS.

- The deposition of waste rock to create the Stage 2 GBWRS will result in the permanent loss of approximately 430 m of river extent, of which 95 m has a natural bed and 335 m has a modified bed.[44] These areas are shown in Figure 20 and Figure 21.

- This river is located within the Clydesdale Creek catchment and currently runs along the base of the existing rehabilitated Stage 1 GBWRS.

- Areas of natural inland wetland are present near the juncture of this river and the Clydesdale silt pond. These will be lost.[42] These areas are shown in Figure 22.

Figure 20 Natural stretch of riverbed. Source: RM24.184 first s92 response Appendix 9.

[42] RM24.184.26 s14 diversion of surface water.
[43] RM24.184.27 s15 discharge water and contaminants to water
[44] RM24.184.24 s13 disturb, deposit, reclaim riverbed and s9 use land in a manner that contravenes a national environmental standard.

Figure 21 Induced section of river. Source: RM24.184 first s92 response Appendix 9.

Figure 22 Areas of natural inland wetland near to Clydesdale Silt Pond. Source: RM24.184 first s92 response Appendix 9.

- In total, the pit extension and GBWRS extension will require the clearance and permanent removal of approximately 28.2 ha of semi-natural or indigenous vegetation and 0.4 ha of exotic vegetation, as well as the permanent removal of 0.83 natural inland wetland and riparian/wetland vegetation mosaic.

- The previously used private haul road will be reinstated and used as the haul route to the processing plant.

- Discharges of contaminants to air will occur during mining, extension and rehabilitation of the GBWRS, hauling, and ancillary activities.[45]

- A range of support infrastructure will be established prior to the commencement of mining and will remain on site until mining is completed. These include a water pipeline between Golden Bar Pit and Frasers Pit, a portable smoko room, a fuel tank, a small ablution facility and septic tank, potable water facilities for drinking and ablutions, a wireless comms repeated, electricity infrastructure.[46] There are no regional council consenting requirements for these activities.

- Upon completion of mining operations at Golden Bar Pit, dewatering will cease and the pit void will be left to fill with water from rainfall, groundwater inflows from the pit walls,[47] WRS seepage water, and surface runoff.[48]

- Pit lake filling is expected to take approximately 35-42 years, at which time water will drain to Golden Bar Creek as it does currently.[49]

7.2.6 Coronation Open Pit Extension – Stage 6

The Stage 6 Coronation pit (**CO6**) extension is a land use activity that is regulated by WDC; however, the pit extension and ancillary activities are facilitated by regional resource consents. The proposed pit extension is shown in Figure 23.

[45] RM24.184.30 s15 discharge contaminants to air.
[46] There will be no discharge of human waste to land on site.
[47] RM24.184.22 s14 take and use groundwater.
[48] RM24.184.21 s14 take and use surface water.
[49] RM24.184.18 s15 discharge water and contaminants to water.

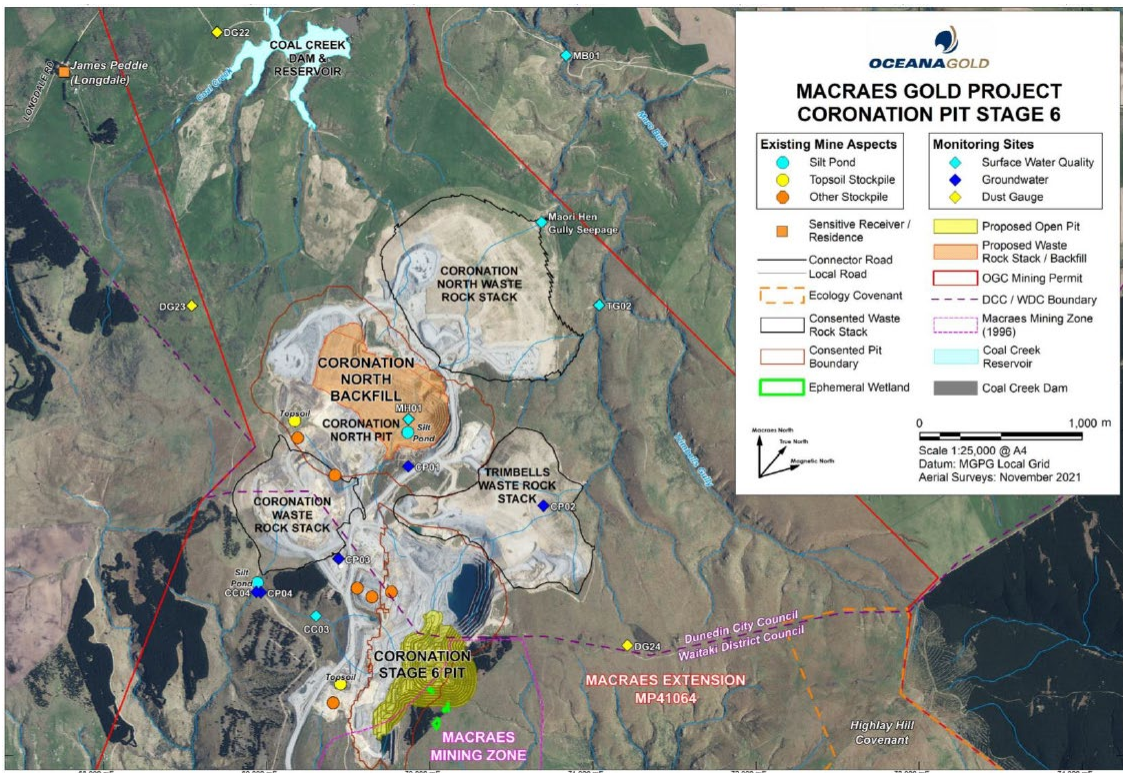

Figure 23 CO6 pit extension shown in yellow shading. Existing CO5 pit consented area is shown as a brown line. Source: RM24.184 application.

- The Coronation Pit is located approximately 5 km north of the processing plant, well within OceanaGold-owned land and within the area covered by mining permit MP41064.

- Coronation Pit was mined from 2013-2019 and is currently used as a temporary water storage reservoir.[50] Water is pumped to the pit from Deepdell North Pit and Innes Mills West Pit.[51]

- The proposed open pit extension consists of an approximately 250 m down dip extension to the southeast of the existing Coronation Stage 5 Pit (**CO5**).

- The current CO5 pit has a footprint of 85 ha. The CO6 extension will involve some disturbance within the existing consented area, i.e. the consented CO5 area that has not yet been mined, plus an additional 6 ha of new disturbance.

- The CO6 pit extension involves excavation to a depth of approximately 120 m, which is not as deep as the deepest part of the CO5 pit.

- Mining activities will occur 24 hours a day and seven days per week, but blasting will operate on a more restricted schedule.

- Dewatering of the pit is required before mining can commence. Dewatering is expected to take approximately four months at 200 L/s.[52]

- Dewatering water will be used in the MWMS.

[50] Section 127 variation to RM12.378.14.V1.
[51] Authorised by RM21.272.01 and RM21.433.01.
[52] RM24.184.09 s14 take and use surface water.

- Dewatering of the pit will continue during mining operations via abstraction of surface water from the pit sump and groundwater from horizontal drains in the pit walls and from bores surrounding the pit.[53] Water will be used for dust suppression or elsewhere in the mine water management system.

- The mining of CO6 will result in the movement of 28.9 Mt of material, of which 2.2 Mt will be ore and 26.7 Mt will be waste.

- Existing surface water diversion drains around Coronation Pit may be extended or repositioned to accommodate the proposed pit extension.[54]

- The CO6 extension encroaches on an area which consists of tussock land and three ephemeral natural inland wetlands. It is assumed that these wetlands will be permanently lost.[55]

- Ore will be transported directly to the processing plant using mining trucks and the existing Coronation haul road.

- Waste rock will be disposed as backfill into the existing Coronation North Pit[56], once the additional mining of the Coronation North Pit has been completed.

- A small quantity of selected waste material will be used as a downstream toe drain and buttress at the Trimbells WRS seepage outlet near the Maori Hen/Trimbell's Creek confluence. Engineering of a barrier to exclude the advective flow of oxygen in the WRS basal layers is also proposed subject to feasibility assessment and detailed design and will be completed as part of WRS rehabilitation.

- If required to manage mine scheduling, some waste rock may be disposed of to the existing Coronation WRS,[57] Coronation North WRS, and Trimbells WRS[58], which are yet to be fully rehabilitated and have residual capacity available. However, consents enabling the construction of these WRS expire in 2026, so their continued construction is included in this application.

- Discharges of contaminants to air will occur during mining, construction and rehabilitating waste rock stacks, hauling ore and waste rock, and ancillary activities.[59]

- No new infrastructure is required to support the Coronation mining activities, as this is already in place from previous Coronation and Coronation North mining.

- Prior to site decommissioning, a spillway will be cut in the southern end of Coronation Pit to facilitate future pit lake overflow to a tributary of Camp Creek. The spillway will consist of an approximately 1.27 ha excavation around 370 m long and 33 m wide and down to approximately 660 m RL. This is shown in Figure 24.

[53] RM24.184.10 s14 take and use groundwater.
[54] RM24.184.06 s14 diversion of surface water.
[55] RM24.184.05 s9 use land in a manner that contravenes a national environmental standard.
[56] RM24.184.12 s15 discharge contaminants to land.
[57] RM24.184.08 s15 discharge contaminants to land.
[58] RM24.184.11 s15 discharge of contaminants to land.
[59] Section 127 variation to RM12.378.15.V1.

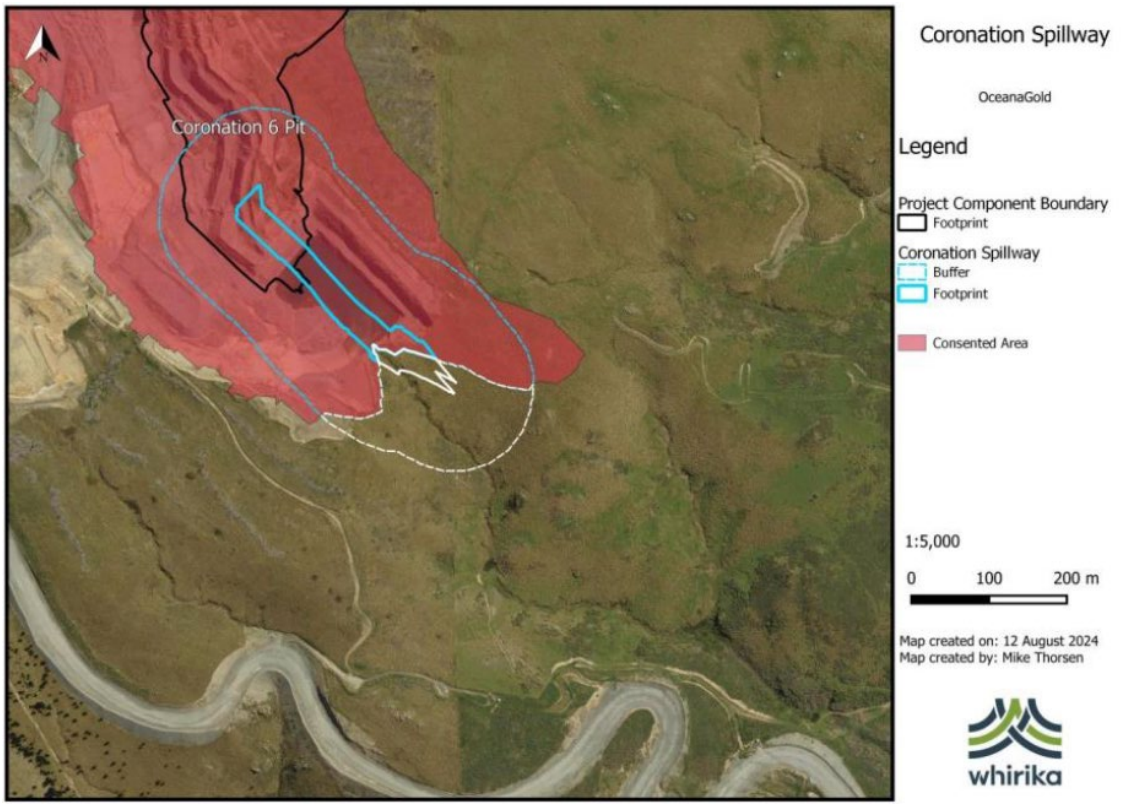

Figure 24 Proposed location of coronation spill way (solid blue and solid white lines) at southern edge of the pit. The CO6 pit extent is shown by the black line; the CO5 consented pit extent is shown in red shading. Source: RM24.184 application.

- After completion of mining at Coronation Pit, dewatering will cease and the CO6 pit void will be left to fill with water from rainfall, groundwater inflows from the pit walls[60], WRS seepage water, and surface runoff[61], to form the Coronation Pit Lake.

- After approximately 90 years and at 637 m RL pit lake water will seep through the Trimbells WRS to the north via the natural spill level where the undisturbed ground is overlain by waste rock. The seepage through the WRS will enter Trimbells Gully and ultimately the Mare Burn.

- After approximately 200 years the pit lake will overflow to the headwaters of Highlay Creek, located within the Deepdell Catchment, via a low point on the southern perimeter at 660 m RL.

7.2.7 Coronation North Backfill

The Applicant proposes to undertake further mining of the Coronation North Pit, in accordance with the existing WDC and DCC resource consents that provide for this.

- Dewatering of the Coronation North Pit will be required prior to mining, and during mining. This will involve pumping of water from pit sumps and from bores within the pit walls and within 200 m of the pit margins.[62]

[60] Section 127 variation to RM12.378.11.V1.
[61] Section 127 variation to RM12.378.12.V1
[62] RM24.184.13 and RM24.184.14 s14 take and use surface water and groundwater.

- A discharge permit is sought to enable the backfilling of the existing Coronation North Pit with waste rock from the CO6 pit extension.[63]

- A minimum backfilling level will be established following completion of mining to address in-pit stability issues. This will be managed by DCC and WDC resource consents.

- If the Coronation North Pit is completely backfilled, there will be no ongoing water management requirements.

- If the pit is not completely backfilled, a shallow pit lake will form in the remaining pit void. This is enabled by an existing suite of consents, which will be varied to reflect this MP4 proposal.[64]

- Temporary stockpiles of rehabilitation materials will be formed in close proximity to the backfill for subsequent use in WRS rehabilitation.

- Dust and contaminants will be discharged to air during mining, backfilling, hauling ore and rock, and construction of waste rock stacks.[65]

7.2.8 Murphys Ecological Enhancement Area and Other Ecological Enhancements

Where this section discusses offsetting or compensation, these are only discussed to enable a full understanding of the MP4 proposal. Offsetting and compensation are not matters that can be considered in terms of the adverse effects assessment.

- The MP4 proposal is expected to have residual adverse effects on terrestrial and aquatic ecology that are more than minor.[66] The Applicant proposes to offset and compensate for these residual adverse effects by undertaking specific protection or improvement actions within a designated ecological enhancement area, the Murphys Ecological Enhancement Area (**MEEA**) in the Murphy's Creek Catchment.

- Activities proposed in the MMEA as part of the offset and compensation package are detailed in section 3.8 of the AEE but include legal protection of the MEEA, stock and predator proof fencing, installation of culverts[67], predator control, revegetation, weed management, receival of lizards salvaged from other areas of the site, and enhancement of lizard habitat.

- Detailed design of the MEEA, which will identify the full extent of the works required, including the need for any culverts or other works within the beds of streams, will be initiated once OGL has confirmed the location and dimensions with relevant stakeholders.

- In addition to the activities proposed within and in support of the MEEA, the Applicant also proposes to create an area of ephemeral wetlands covering approximately 0.3 ha on

[63] RM24.184.12 s15 discharge contaminants to land.
[64] Section 127 variations to RM16.138.12.V1, RM16.138.14.V1, RM16.138.17.V1, RM16.138.06.V1.
[65] Section 127 variation to RM16.138.19.V1.
[66] Residual adverse effects are those effects that remain after measures to avoid, minimise, and remedy are undertaken, to the extent that those measures are practicable.
[67] Culvert installation will generally comply with permitted activity rules, except for the temporary damming and diversion of surface water to install culvert 1 which requires consent RM24.184.34.

the flat sloping exotic grassland-dominated spur on the Taieri Ridge, 3.5 km west of the CO6 Pit.

- Offsetting for two wetlands affected by the Innes Mills Stage 10 extension will involve creation of a new wetland (0.1 ha) with 50% indigenous wetland species at one of the water subsurface discharge points in the Golden Bar WRS.

- If the presence of *Orocrambus sophistes* (a Threatened moth) be confirmed in pre-clearance surveys, host plants (thought to be tussock grasses) of the moth will be transplanted on the Golden bar WRS, or another protected location, during the tussock rehabilitation plantings. If the presence of the moth is confirmed, a research programme will be undertaken to learn more about this species and its habitat.

7.2.9 Mine Closure and Rehabilitation

- The current mine closure strategy involves creation of lakes in mined-out pits, shaping and rehabilitation of other mining areas using soils and plantings for a range of suitable post-mining land uses, and establishment of a Community Trust focussed on enhancing the future of the Macraes community.

- This will remain the closure strategy following completion of the MP4 project.

- Rehabilitation objectives are detailed in the section 3.10.1 of the AEE as well as in existing resource consents.

- The specific closure scenarios for each of the open pits, and the ongoing resource consenting requirements, have been described in the preceding sections of this report.

- With respect to backfills and WRSs, these will be designed, constructed, and progressively revegetated to ensure that they are complementary to the existing landforms upon closure.

7.3 Compliance with Current Consent

Principal Compliance Specialist Rachael Brennan provided the following summary of the Applicant's recent compliance history.

Oceana Gold conduct regular monitoring as required by their consent conditions including water quality, geotechnical, aquatic and air quality monitoring and reporting. The most substantial monitoring requirement involves water quality monitoring, where on occasion, some sites have been missed from monitoring due to system or human error.

Consent non-compliance over the past 5 years has predominantly been due to significant delays with providing monitoring reports. This was attributed to Covid and staffing issues at the site and have mostly been resolved with reporting currently up to date. Over this period, despite not being able to supply the full report on time, Oceana Gold kept the Council informed of any exceedances of water quality limits or other non-compliance issues. There were 37 exceedances of water quality limits at 11 monitoring sites during the past 5 years. Of these 13 were significant exceedances attributed to current mining operations. The exceedances were investigated, and the source identified, with additional monitoring and mitigation undertaken by Oceana Gold. The results of recent monitoring show an improvement, with a couple of sites still showing moderate exceedances of limits but reducing. Oceana Gold continues regular

dialogue with the Otago Regional Council to ensure progress toward consent compliance continues.

There have been several incidents involving unconsented activities in the last 5 years with some identified and reported by Oceana Gold. One involved non-compliance with the National Environmental Standards for Storing Tyres Outdoors Regulations 2021. This resulted in an abatement notice being issued and a short-term consent being sought and granted to Oceana Gold. A second incident involved the unauthorised discharge to land of contaminants including hydrocarbons and domestic wastewater from a sucker truck. There was no discharge to water and the site was remediated to the satisfaction of the Council. A third incident involved activities with 10 m of a natural inland wetland in contravention of the NES-F, prior to consent being granted.

8. Status of the Application

8.1 New Resource Consents

Authorisation of the MP4 proposal will require 34 new resource consents under the following planning instruments:

- Regional Plan: Water for Otago (**RPW**)
- Regional Plan: Waste for Otago (**RPWaste**)
- Regional Plan: Air for Otago (**RPA**)
- Resource Management (National Environmental Standards for Freshwater Regulations) 2020 (**NES-F**)

The Applicant has described the relevant rules and regulations that apply to each activity in Table 4.2 and in section 4.3.1 of the AEE. For ease of reference, the Applicant's Table 4.2 is replicated in Appendix 2 to this notification report. I agree with the Applicant's assessment and adopt it for this report.

8.2 Section 127 Changes to Consent Conditions

This application to vary the consent conditions of 20 existing resource consents is made under Section 127 of the Act.

Whether an application is truly one seeking variation, or whether in reality it is seeking consent to a materially different activity, is a question of fact and degree to be determined in the circumstances of the case. In the decision for Body Corporate 970101 v Auckland CC[68] the High Court held that where the variation would result in a fundamentally different activity, or one having materially different adverse effects, or one that seeks to expand or extend the original activity, it should be treated as a new application. This has been upheld in the Court of Appeal following an appeal on this decision.[69] The Council must compare any difference in adverse effects likely to follow from the proposed variation with those associated with the activity in its original form. If the change will result or potentially result in a consequential increase in adverse effects, the application must be treated as if it were for a new consent.

The requested variations are listed in Table 4.2 of the application and are further described in Section 4.3.2 of the application which also lists the reasons that, in the opinion of the Applicant, s127 variations are appropriate. The issue of whether the proposed variations are

[68] *Body Corporate v Auckland City C*ouncil [2000] 6 ELRNZ 183
[69] *Body Corporate 97010 v Auckland City C*ouncil [2000] 3 NZLR 513

in fact variations or whether they would be more appropriately assessed as new activities was a topic well traversed during the early stages of the processing of this application. Following these discussions some changes to the original application were proposed by the Applicant in this regard, and this is reflected in the revised AEE (18 February 2025) provided at the conclusion of the s92 process. In summary, I agree that the activities described as variations should be treated as variations rather than new activities. For ease of reference, the Applicant's Table 4.2 is replicated in Appendix 2 to this notification report.

Section 127(1) of the Act states that the holder of a resource consent may apply to a consent authority for a change or cancellation of a condition of the consent (other than any condition as to the duration of the consent). Section 127(3) states that Sections 88 to 121 shall apply, with all necessary modifications, as if:

a) *the application were an application for a resource consent for a discretionary activity; and*
b) *the references to a resource consent and to the activity were references only to the change or cancellation of a condition and the effects of the change or cancellation respectively.*

Therefore, when considering the application, the Council is limited to only considering the effects of the proposed change to the condition, rather than the terms of the existing permit itself. The Council may grant or decline the application and, if granted, may impose conditions under Section 108 of the Act.

Section 127(4) provides that for the purposes of determining who is adversely affected by the change, the Council must consider, in particular, every person who make a submission on the original application and may be affected by the change.

8.3 Permitted Activities

The application states that the construction, operation, and maintenance of culverts on the bed of a tributary of Murphys Creek will be undertaken in accordance with all relevant permitted activity rules, except for the damming and diversion of water required to facilitate the construction of 'Culvert 1'.

The ongoing use of the Clydesdale silt pond 'dam' structure is permitted by RPW rule 13.1.1.1 because its construction was authorised by land use consent 2002.761.

8.4 Consents Not Required

The closure scenario describes activities that would require authorisation by resource consent under the current planning framework. However, several of these activities are not expected to occur for more than 35 years i.e. outside the maximum term allowable by the RMA. These activities include:

- Damming of water in Coronation Pit against the Trimbells WRS.
- Passive discharges of water from the pit lakes to local waterways following closure.
- Potential consents to establish new water quality mitigation options described in Section 5.4 of the AEE, should OGL wish to depart from capturing and management of seepage water.

Consents will be sought for these activities in the future, if the planning framework at the time requires these activities to be authorised by resource consent.

8.5 Overall Activity Status

Based on the description of the activities as set out in the application, I consider that the Applicant has applied for all the relevant resource consents from ORC.

Applications involving a number of different activity statuses can be bundled together, so that the most restrictive activity classification is applied to the overall proposal. The bundling approach developed from case law is to enable appropriate consideration of the effects of an activity, or group of activities. Overall, the proposal has a ***discretionary*** activity status in respect of activities requiring consent from ORC.

In Section 4.4 of the AEE the Applicant states that, as a result of bundling, the overall proposal has a non-complying activity status. This is the bundled status of the ORC, WDC, and DCC applications. I am not aware of any reason that regional and territorial authority consents cannot be bundled for the purpose of notification, and I note that the activities that would be authorised by regional consents cannot be given effect to in isolation of the territorial authority consents, and vice versa. Given the Applicant has requested this bundling, I agree that the overall status of the proposal is ***non-complying***.

9. Assessment of Adverse Environmental Effects

9.1 Permitted Baseline

The Consent Authority may disregard an adverse effect if a rule in a plan or national environmental standard permits an activity with that effect. In this case, there are either no permitted activity rules for the specific activities at this site, for example discharges of contaminants to land and water, or the activities as proposed far exceed the permitted thresholds for the activity, for example discharges to air from mineral extraction or the taking and use of ground or surface water.

For these reasons the permitted baseline is not considered relevant to this proposal and is not given further consideration in the below assessment of adverse environmental effects.

9.2 Receiving Environment and the Existing Consented Baseline

The receiving environment is the environment upon which a proposed activity may have effects. The receiving environment includes the current and reasonably foreseeable future state of the environment as it may be modified by permitted activities and by the implementation of resource consents that have been granted at the time the application is being considered. It does not include the environment as it might be modified by the implementation of future resource consents yet to be granted, nor does it include unlawful activities, even if these are already occurring.

In this case, the receiving environment is the wider mine site as it has been modified by the implementation of previous and current resource consents; groundwater, surface water, wetlands, and indigenous vegetation, as well as their natural, physical, cultural values, and habitats they support; and ambient air quality and receptors beyond the active mining areas that are sensitive to changes in ambient air quality.

The existing consented environment is complex. When considering the baseline upon which to assess adverse effects I have taken the following approach:

1. Where an existing consented activity is being directly and unambiguously replaced, I have not considered the existing activity as part of the existing environment, with the following exception:

    - The Applicant has applied to replace two resource consents that have been implemented, but not to their full extent. These authorise the discharge of waste rock onto the Coronation WRS and to the Coronation North and Trimbells waste rock stacks, and these consents would both expire in 2026.[70] Waste rock stacks are essentially permanent structures, and it would be fanciful to assume that they were not there for the purpose of reconsenting. The Applicant has applied to replace these consents on the same terms; i.e. the waste rock stacks will be constructed within the existing footprint, to the finished height and profile enabled by the current consents. On this basis, I consider that it is appropriate to disregard the effects of the unimplemented parts of the consents for the matters that will not be altered.

2. Where consents are held for an activity or activities, and these consents have not yet been implemented but do not lapse and do not expire in the near future, these activities are assumed to form part of the existing consented environment. Examples include the Camp Creek and Coal Creek dam consents.

3. In some cases the Applicant has not explicitly applied to replace a resource consent, but has instead noted that they will surrender the currently held consent if the new consent is granted and exercised. In these cases I consider that the existing consent does form part of the consented environment, and the effects of the new activity would be on top of this. For example, where consents are sought for new water permits to take and use water at Coronation Pit, effects are considered cumulatively.

4. Where resource consents are proposed to be varied, the existing consents are part of the existing environment and only the effects of the proposed changes to conditions are considered.

5. In respect of activities affecting water quality, I do not consider that the existing numerical compliance limits as set out in other consents, including consents being varied as part of this application, are an appropriate baseline upon which to consider potential adverse effects. Rather, the current measurable state of the environment is the appropriate baseline. This is because:

    - The current state of the environment is the actual environment upon which the activities will have effects, given the activities are proposed to commence within the short term.
    - The current state of the environment represents the cumulative effects of all mining activities at the site to date.
    - I note that the technical assessments provided by the Applicant predict future effects utilising the existing measurable state of the environment as the baseline.

Taking the above points into account, I do note that the technical assessments provided with the application appropriately consider the potential adverse effects of the proposal in its entirety, including in conjunction with other activities that have already been implemented or are likely to be implemented within the MP4 timeline. This enables an understanding of

[70] RM23.648.01 and RM19.085.03 enabling discharge of waste to land (but not directly to water or to the beds of rivers).

the likely cumulative effects – which are the real-life effects that will occur upon the environment – of the Macraes mining operation.

9.3 General Comments

Given the volume of information presented in the application, the requests for further information, and the technical audits (peer-reviews), the assessment of adverse effects presented below is necessarily a summary of the findings of the application process to date.

Following the response to the second s92(1) request for further information, a final round of technical audits was undertaken after which time the s92 process was concluded. Sufficient additional information had been provided by the Applicant for the potential adverse effects to be understood to the extent required to make an informed notification decision, noting that the Applicant has requested that this application be publicly notified.

For the benefit of the decision maker and potential submitters, this assessment of adverse effects summarises the key information contained in the application, the findings of the technical audit process, including recommendations, and then presents concluding comments as to potential adverse effects.

The following technical experts were engaged by ORC to audit the application:

- **Colin Macdiarmid**, Geotechnical Team Leader at GeoSolve Limited – assessed all geotechnical and stability aspects of the application on behalf of ORC, DCC, and WDC.
- **Alexandra Badenhop**, Technical Director – Water and Environmental Management at e3 Scientific – assessed all groundwater and surface water modelling, and effects on groundwater.
- **Michael Greer**, Principal Scientist, Director at Torlesse Environmental Limited – assessed surface water quality and aquatic ecology.
- **Glenn Davis**, Managing Director at e3 Scientific – assessed terrestrial ecology matters on behalf of ORC, DCC, and WDC.
- **John Iseli**, Principal Air Quality Consultant at Specialist Environmental Services – assessed air quality matters.

All technical experts listed above have visited the site on at least one occasion for the specific purpose of understanding the site in the context of this MP4 proposal.

This report should be read in conjunction with the corresponding notification reports from DCC and WDC to enable a holistic understanding of the potential adverse effects.

9.4 Geotechnical Effects

Potential adverse geotechnical effects include:

- Instability or collapse of pit walls, in-pit embankments, or instream dams;
- Loss of containment of the FTSF or other dams;
- Failure of waste rock stack slopes; and
- Ground deformation (cracking, slumping, subsidence) behind the pit crests,

A land use consent is not typically required from ORC for the extension of an open pit, unless the pit extension will encroach upon a natural inland wetland which is the case for all three pit extensions proposed by this application. Further, pit stability effects are considered relevant and are assessed because the pit extensions are directly enabled by permits that

provide for the taking and use of surface and groundwater, and by the diversion of water. Furthermore, the long-term pit stability is influenced by the formation of pit lakes, which require authorisation by regional council consents.

Please also refer to the WDC and DCC notification reports in relation to geotechnical effects.

9.4.1 Summary of Applicant Assessment

Pit wall stability

Appendix 6 (PSM) of the application contains an assessment on pit wall stability for the proposed pit extensions at IM Stages 9-10, CO6, and GB2. Pit wall stability is a matter considered by both the DCC and WDC in respect of the applications for land use consents.

Two-dimensional limit equilibria analyses were undertaken for each of the proposed pit expansions, selected to represent the most adverse pit wall and geological structure geometries and rock mass conditions. Analyses were completed for both the operational stage and post closure stage under static and seismic loads. The assessment analysed the Factor of Safety (**FoS**) for each of the identified sections under static and appropriate earthquake loading conditions.

In general, PSM found that the FoS for highwalls with typical hard rock conditions are generally greater than 1.5. For Innes Mills, in-pit pumping and localised drainage strategies are required to maintain groundwater draw down behind pit walls to ensure stability under static conditions.

Where adversely oriented geological structures are present, bench to inter ramp scale instabilities may be expected during mining. Any rapid movement is likely to initiate prior to pit lake filling where a change in condition has occurred, such as active mining, blasting or rapid water ingress. Block sliding along adversely oriented geological structures is a known instability risk within the open pits at Macraes, and the Applicant actively manages such instability during mining through routine geotechnical mapping, stability monitoring and Trigger Action Response Plans (**TARPs**) via the site's geotechnical principal hazard management plan.

Where potential highwall instabilities have been identified, the failure extents are contained within the immediate bounds of the respective pits.

Under the AEP 1:2,500 Maximum Design Earthquake (**MDE**) (low probability strong ground shaking) slope movements are anticipated for the closure scenario. Failure scarps (dislocation of the ground surface) could extend beyond the pit crest in some locations, but it is noted that many natural slopes in the surrounding area will also deform at this level of shaking. The Applicant will continue to manage movement rates using a geotechnical slope management framework.

Existing instability in the southwest wall of Coronation North Pit will be managed during further mining using the same slope management framework referenced above. Following the completion of authorised mining, the Applicant states that the southwest pit slope will be remediated by backfilling of the pit to achieve a FoS for the southwest pit slope of at least 1.0 under Maximum Design Earthquake seismic loading prior to site decommissioning.

Rapid large-scale pit wall failures are not expected during closure; movements are expected to be progressive creep-style events and therefore the likelihood of seiche events is low.

Some ongoing deformation (tension cracking, slumping, subsidence) could occur behind the pit crest post-closure. PSM recommend defining an exclusion zone around the crest of the pits to isolate hazards associated with ground movement and falling from height. Further geotechnical assessment is required to define an appropriate exclusion zone, although PSM note 100 m as an approximation. The Applicant has agreed that a condition of consent should require this additional geotechnical assessment and the establishment of an exclusion zone.

During closure conditions, the hydrostatic pressure of water in the pit lakes generally improves the pit wall stability.

FTSF Stability

Appendix 2 (WSP), Appendix 3 (EGL), and Appendix 7 (PSM) of the application speak to the design and stability assessment of the FTSF.

The design of the FTSF (Appendix 2) was undertaken in accordance with the New Zealand Society on Large Dams (**NZSOLD**) Dam Safety Guidelines (**NZDSG**), and includes analysis and assessment of:

- Potential failure modes: no credible failure modes with potential catastrophic failure were identified. Credible failure modes with potential containment loss are limited to either tailings dust exposure or seepage issues during long-term closure. The risk of these is considered low.
- Potential impact classification (**PIC**): assessed as low during operations and closure.
- Geotechnical design: Included consideration of appropriate waste rock parameters and analysis of seepage, static stability, seismic stability, settlement and deformation. Results of these analyses demonstrate the FRBF 'structure' meets stability requirements of the NZDSG. Large deformation and downstream embankment failures during closure may occur but this would be inconsequential as the FRBF will be partially or completely submerged and no release of contents outside the Innes Mills pit could occur.
- Geotechnical pit wall risks: Assessment of the risks associated with the stability of the Frasers Open Pit walls indicates that backfill and tailings placed in the pit will improve the stability of the west wall in comparison to end of mining; however, ongoing creep of the west wall is expected and highwall movement on the east and west wall is anticipated under Safe Shutdown Earthquake (**SEE**) seismic loadings. The main risks associated with highwall movement (sub-aqueous sliding resulting in potential seiche waves) can be managed throughout operations and after closure by the large projected freeboard between the top of the tailings, and later the pit lake, and the pit rim. The Applicant will manage these risks through its current geotechnical management programme that includes radar monitoring, visual inspections/mapping and associated trigger action response plan, and remedial works as required.
- Tailings operating plan: this is as described in the application.
- Tailings and backfill scheduling: there is no risk that the rising tailings beach will overtop the advancing FRBF crest. A final tailings level of 416.5 m RL relative to a final FRBF crest of 480 m RL is predicted.

- FTSF closure: closure is as described in Section 7.2.1 of this report. A pit lake will form in the FTSF which will overtime coalesce with the Innes Mills Pit Lake.
- Key project risks: A dam safety management system/programme, established within an Operations Maintenance and Surveillance Manual, is proposed to ensure all dam safety requirements outlined in the NZDSG are addressed and actively managed during operations.

FTSF stability has been assessed by PSM (Appendix 7). This report states that foundation conditions for the FTSF embankment and impounded tailings will be influenced by past mining activity, existing slope performance, and interactions with Frasers underground mine workings. Several pit slope instabilities have occurred during mining.

Slope stability analyses were completed to provide an understanding of the expected long-term stability of the FTSF. PSM find that operational safety can be maintained throughout the FTSF construction and the existing pit walls will maintain sufficient stability during FTSF backfilling and under seismic loading scenarios throughout closure. The final FRIM lake level will remain below the pit crest, which protects against potential external loss of FTSF contents.

As for the other open pits, some ongoing deformation (tension cracking, slumping, subsidence) could occur beyond the FTSF pit crest during closure. PSM recommend an exclusion zone of approximately 150 m is established, with the precise zone to be informed by additional geotechnical assessment. The Applicant has agreed to do this.

WSP recommends the establishment of an Operations Maintenance and Surveillance Manual, which includes appropriate emergency preparedness information, to ensure all dam safety requirements outlined in the NZDSG are addressed and actively managed during operations. The Applicant states that this recommendation will be adopted in the proposed conditions of the relevant FTSF resource consents**.**

Golden Bar Waste Rock Stack

The GBWRS will be extended by approximately 26 ha and increase its height by 60 m up to 610 m RL. EGL (Appendix 4) considers the Golden Bar WRS has been designed in accordance with accepted engineering practices and notes that existing WRSs at Macraes that have been designed to similar standards have demonstrated satisfactory performance to date.

Construction procedures, including supervision and quality control practices for the extension of the GBWRS will meet accepted engineering standards.

All of the final slopes of the proposed extension to the GBWRS have been checked to confirm they can achieve a long-term static FoS exceeding 1.5. EGL made the following recommendations to mitigate stability risks:

- Any rehabilitation material on the Stage 1 GBWRS shall be removed and stockpiled for stability and rehabilitation purposes of the Stage 2 GBWRS profile;
- Any foundation soils over rock shall be removed and stockpiled prior to rock placement for stability and rehabilitation purposes;
- The area between the GBWRS toe and Clydesdale Silt Pond is cleaned out of any accumulated sediment to rock before the placement of fill;
- Foundation conditions are inspected and recorded by Oceana Gold's geotechnical engineer during construction to confirm that all soils have been stripped and that there

are no unfavourable fault structures within the rock which could affect the stability of the GBWRS; and

- Ephemeral gullies beneath the GBWRS footprint be filled with coarse size, free draining waste rock material, either through high tip-head segregation or direct placement to promote under drainage of the Golden Bar WRS.

The Applicant has not explicitly stated that they will implement these mitigation measures but has relied on them in concluding that the stability of the GBWRS will be ensured. It is expected that this will be clarified in consent conditions.

An assessment of the earthquake performance of the GBWRS has also been undertaken and indicated satisfactory performance under both operating and safety evaluation (maximum credible) levels of earthquake shaking. According to EGL, under SEE shaking estimated seismically induced deformations are small. However, some cracking and settlement of the surface could be expected. Such deformations are unlikely to compromise the integrity of the WRS and can be readily repaired with an excavator, which is no different to many natural landforms.

In addition, as the GBWRS is located immediately adjacent to the pit, the effect of the open pit on the stability of the WRS has been incorporated into the geotechnical stability assessment by PSM. The pit stability will be reviewed by the Applicant following completion of the detailed design. Any instability of the pit affecting the GBWRS during operation will be mitigated by reprofiling and rehabilitating prior to closure.

Erosion and sediment control measures will be employed to manage surface water within the GBWRS working area to prevent undercut of the foundation soils by directing water to silt ponds or the pit.

The Applicant concludes that the GBWRS design will meet relevant standards and ensure stability of the WRS slopes.

Trimbells Waste Rock Stack

Trimbells WRS is an existing WRS located at the northern margin of Coronation Pit. The construction of the Trimbells WRS is authorised by a suite of resource consents which expire on 22 April 2026. These consents have been exercised but not to their full extent, and there remains approximately 8 Mt or 3.7 Mm^3 of capacity to discharge waste rock to this WRS while remaining within the footprint and height parameters outlined in the existing consent. The Applicant has stated that any discharge of waste rock to Trimbells WRS will be in accordance with the original authorised parameters so as to ensure that there are no new geotechnical risks introduced.

The Coronation Pit comprising the merged CO5 and CO6 voids will fill up with water as part of the mine closure plan. The closure plan has a proposed outlet channel at the southern end of the Coronation Pit, which will discharge to Highlay Creek in the Deepdell Catchment. However, prior to the pit lake reaching overflow level, there is a low point in the Northern wall of Coronation Pit (637 m RL) that will result in up to approximately 23 m of water depth being locally impounded against the Trimbells WRS. This will result in seepage through the Trimbells WRS, ultimately entering the Trimbells Gully Creek. This is shown conceptually in Figure 25.

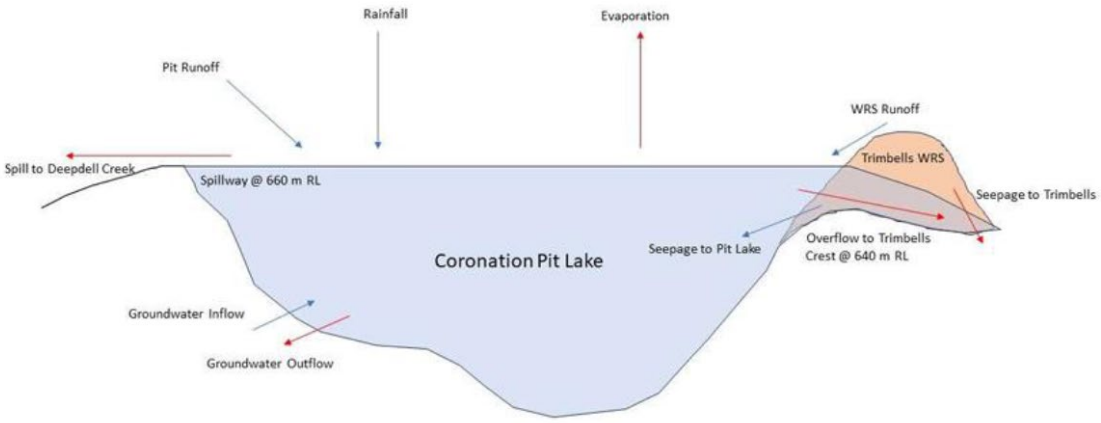

Figure 25 Long-term conceptual summary Coronation water balance. Source: RM24.184 application.

EGL (Appendix 5) consider the stability of the Trimbells WRS during the closure phase, while this impoundment of water and seepage is occurring. The Applicant notes that this is a feature of the existing environment and will not be exacerbated by this MP4 proposal. While I agree that the existence of the Trimbells WRS and the impoundment of water against the WRS are a consequence of the existing consents and the closure strategy that was implicit in the CO5 consents, I would note that the neither the impoundment nor the seepage was assessed or even described in the previous consent applications or decisions. As such, I consider that it is appropriate that the effects of these activities be assessed here, as the MP4 proposal will involve the replacement of some of the previous consents, and variations to others.

EGL state that while the Trimbells WRS is in effect damming the water in Coronation Pit, there are no potentially catastrophic failure modes due to the approximately 500 m long seepage path length and any piping and backward erosion type failure mechanisms would not be self-sustaining. EGL note the following risks and mitigations:

- The final slopes of the WRS have been checked to confirm they can achieve a longterm static FoS exceeding 1.5.
- An assessment of earthquake performance of the WRS has been undertaken and indicates satisfactory performance under both Operating Basis Earthquake (**OBE**) and SSE levels of earthquake shaking.
- The WRS is located immediately adjacent to the pit. Any effect of the adjacent Coronation Pit on the stability of the WRS should be reviewed as the pit is developed but could be mitigated by reprofiling and rehabilitating prior to closure.
- Seepage may occur at the toe of the WRS. To avoid local slumping at the toe in closure it is recommended that a toe drain and buttress be considered. This may need to be 25 m in height and 10 m wide at the toe of the Trimbells WRS and would be constructed from selected waste rock material onsite. Further detailed assessment is recommended.

Noting that the localised impoundment of water against the Trimbells WRS and seepage through the WRS will not likely occur within the maximum 35-year consent term that could be applied for, the Applicant nonetheless proposes to use a quantity of waste rock to construct a downstream toe drain and buttress at the Trimbells WRS seepage outlet near the Maori Hen Creek/Trimbell's Creek confluence to ensure appropriate long-term management of seepages, both on stability and water quality. The Applicant states that they may also consider constructing a low permeability facing layer on the upstream side of the Trimbells WRS to minimise seepage of pit lake water through the WRS. This would be subject to

feasibility assessment and detailed design, would need to consider both stability and water quality effects, and would be completed as part of WRS rehabilitation.

Water quality impacts of this seepage are discussed in Section 9.7 of this report.

Other Waste Rock Stacks

The MP4 Project will utilise existing WRS storage capacity at Frasers WRS, Coronation WRS and Coronation North WRS. Any use of these facilities will remain within their already consented parameters such that the proposed discharges of waste rock to land at these locations does not give rise to any additional geotechnical risks. It is noted that the final slopes of all WRSs are required by existing consents to have a minimum factor of safety against instability of 1.2 (under the worst combination of events). The proposed discharges of waste rock will all be undertaken in accordance with that obligation.

These facilities are yet to be fully rehabilitated and have approximate residual capacity as follows:

- Coronation WRS: 5.3 Mt / 2.5 Mm^3
- Coronation North WRS: 36.3 Mt / 16.7 Mm^3
- Trimbells WRS: 8 Mt / 3.7Mm^3

Existing regional resource consents enabling the deposition of waste rock to these locations expire in 2026 and are proposed to be renewed as part of the MP4 Project to ensure adequate temporal coverage of the MP4 Project and to enable waste rock and rehabilitation material to be deposited in these facilities utilising the residual capacity in their authorised designs. No changes are proposed to the footprints of these facilities.

The discharge of waste rock to the various Frasers WRSs is authorised by existing resource consents which endure until 2046 and are therefore not assessed.[71] Discharges of waste rock to backfill and buttress Golden Point Pit is provided for by existing resource consents and have therefore not been assessed.[72] The effects of these activities have not been assessed here.

Discharges of waste rock to the Coronation WRS, Coronation North WRS, and Trimbells WRS have been applied for but have not been assessed on the basis that the consents that provide for this construction have been implemented to a significant extent, and the proposed replacement of these consents is on the basis that the discharge will not deviate from the existing consented parameters (footprint, height, or stability) of the waste rock stacks. This is considered reasonable in this situation.

Clydesdale silt pond and dam stability

A replacement resource consent is sought to dam water in Clydesdale Silt Pond. Clydesdale Silt Pond has a storage volume of less than 20,000 m^3 and an embankment height of about 7 m and has been in operation since 2003. No physical changes to the silt pond are required to facilitate the Golden Bar WRS extension.

Clydesdale Silt Pond is not a classifiable dam, and the ongoing use of the structure is permitted. Nonetheless, the silt pond will continue to be operated in accordance with OceanaGold's Silt Ponds and Reservoirs Operations, Maintenance and Surveillance Manual,

[71] Discharge permit RM10.351.09.V1
[72] RM10.351.49.V2 global pit backfill consent

which specifies the dam safety management measures applied to the site's silt ponds and reservoirs. Of note, silt ponds are inspected quarterly, and appropriate emergency preparedness and emergency response procedures are followed.

9.4.2 Summary of Technical Audit and Recommendations

The application and the technical reports of relevance to geotechnical stability effects were audited by Colin Macdiarmid, Geotechnical Team Leader at GeoSolve. Full comments can be found in the following memoranda:

- Geotechnical Audit – Various Consents, Oceana Gold, dated 19 June 2024;
- Geotechnical Audit (RFI Responses) – Various Consents, Oceana Gold, dated 17 November 2024

Mr Macdiarmid considers that the technical information provided in support of the application is robust and at a suitable level for consenting.

In relation to the open pit stability assessments, Mr Macdiarmid considers that the modelling inputs and assumptions are appropriate and clearly explained. Generally, there is a risk of instability in pits post-closure, and the proposal to mitigate this risk via exclusion zones to ensure FoS of 1.5 outside the exclusion zone is considered reasonable from a geotechnical perspective, but Mr Macdiarmid notes that the practicalities of maintaining this in perpetuity should be considered by others.

Mr Macdiarmid notes that groundwater control behind pit walls is required to maintain stability for the Innes Mills pit (and potentially the other pits) and to ensure that the FoS for the nearby public road is >1.5. This will be possible during operations; however, post closure there will be a critical time before the lake fills where the stability may be critical for the public road.

Mr Macdiarmid recommends that:

- A consent condition be imposed that require additional geotechnical analysis be undertaken at the time of closure to determine an appropriate exclusion zone around the pits. This analysis should make use of any new data gathered during mine development.
- A consent condition should require that FoS of any public roads be maintained at 1.5 during operation and closure.

With respect to the Stage 2 FTSF development, Mr Macdiarmid states that design and stability reports fully explain all data inputs and these are considered appropriate. The FTSF has been designed in accordance with current good practice, appears to be classified (low PIC) appropriately, and there are no credible geotechnical fail modes. Post-closure the FTSF will be submerged within the pit, hence there are no external geotechnical effects. Mr Macdiarmid notes that there is a risk that water and contaminants stored within the FTSF could be lost to the historic underground FRUG mine workings, and that this should be considered by the relevant groundwater expert.

Several minor queries were raised by Mr Macdiarmid in relation to the waste rock stack stability assessments. These questions were put to the Applicant during the s92 process and were addressed to the satisfaction of Mr Macdiarmid. Waste rock stacks are expected to be appropriately stable under both static and seismic conditions.

Mr Macdiarmid noted that there is significant ongoing instability in the Coronation North Pit, and that the proposed backfilling would buttress any unstable ground, provided that a minimum level of backfill is achieved. Mr Macdiarmid initially recommended that a minimum backfill level of 560 m RL be prescribed in consent conditions to ensure that the historic in-pit landslide caused by the pit operations is adequately stabilised.[73] A condition requiring the side slopes of any placed backfill to achieve a minimum FoS of 1.2 under the worst possible combination of events is imposed on the existing regional discharge permit and proposed for any the replacement permit.[74]

Following completion of the audit process, the Applicant later proposed to undertake further mining of the Coronation North pit to the extent provided for by the existing WDC and DCC land use consents. At this time, the Applicant also proposed to remove the specified backfill level from consent conditions, and instead proposed that the setting of a minimum backfill be determined by future stability assessments to be undertaken prior to site decommissioning, while still ensuring that the southwest pit slope retains a minimum FoS of 1.0. Mr Macdiarmid reviewed this modified proposal and agreed that deferring the setting of a backfill level to after completion of mining was appropriate, because additional instability could be encountered during mining that would potentially require a higher level of backfill. Mr Macdiarmid proposed a consent condition as follows:

Backfilling of Coronation North pit shall achieve a minimum Factor of Safety for the southwest pit slope of 1.0 under Maximum Design Earthquake seismic loading and a minimum Factor of Safety for the southwest pit slope of 1.5 under static loading. Confirmation of this Factor of Safety must be provided in the form of peer reviewed findings of a geotechnical assessment submitted to the consent authority as part of the Site Decommissioning Plan required by Condition 5.1.

At the time of writing this report, this condition has not been put to the Applicant.

9.4.3 Conclusions

Overall, the geotechnical assessments are robust, describe the relevant stability risks, and recommend appropriate mitigation measures to manage potential adverse effects. In general, the Applicant has agreed to implement the mitigation measures recommended by the experts that they have engaged, either by explicitly stating that they will do so, or by implication as a result of describing the recommended mitigations in their AEE and drawing conclusions that appear to rely on those mitigations. The one exception is the pit wall FoS for the Coronation North Pit wall recommended by Mr Macdiarmid, which the Applicant has not yet had an opportunity to consider.

Based on the Applicant's assessment and the technical peer review by Mr Macdiarmid, I consider that adverse geotechnical effects will be no more than minor during mining, closure, and post-closure.

9.5 Groundwater and Surface Water Modelling

Groundwater and surface water effects have been assessed primarily by analytical and numerical modelling. The modelling accounts for the effects of existing mine features as well as the effects of activities for which all required consents are held where it is likely that these activities will be implemented within the MP4 timeframe. Modelling of surface and

[73] The minimum backfill level would be imposed on the WDC and DCC land use consents rather than the ORC discharge permit.
[74] Discharge Permit RM16.138.10.V1 to be replaced by RM24.184.12.

groundwater primarily accounts for the effects of seepages from waste rock stacks and tailings storage facilities to surface water and groundwater, as well as direct discharges of mine impacted water from silt ponds, seepage sumps, and pit lakes. Modelling does not account for the potential effects of erosion and sedimentation.

9.5.1 Summary of Applicant Assessment

Description of Modelling

GHD (Appendices 11-14) developed numerical groundwater models for each area (Coronation, Golden Bar, and the central mining area) and used these to assess groundwater inflow into the pits during dewatering as well as groundwater recovery post-mining for up to 400 years. Models were calibrated before undertaking model predictions. The results of the groundwater modelling provide predictions of groundwater flows into and out of the pits as well as groundwater seepage from the pits, waste rock stacks, and the FTSF.

An existing site-wide Goldsim Water Balance Model (**WBM**) has been utilised to estimate future impacts on the receiving water quality as a result of mining and rehabilitation activities. The WBM was updated to include revised and improved data.

The modelling undertaken by GHD relies heavily on the geochemistry and water quality analyses undertaken by MWM (Appendix 8). MWM present acid base accounting data that supports previous investigations confirming that waste rock at Macraes is generally non-acid forming, with low sulphide sulphur, and is unlikely to generate acid rock drainage.

A WRS seepage model was developed to forecast future water quality trends for WRS at Macraes. The model found that a key driver for poor water quality was the average height of the WRS, with higher concentrations identified for taller WRS. A relationship was derived and used to forecast sulphate concentrations for the proposed expansions to WRSs. Sulphate concentrations were used to derive concentrations of other contaminants to create source terms for forecasting water quality through predictive modelling. Pit lake hydrogeochemical modelling was undertaken to understand the potential effects on groundwater and surface water during pit lake filling and overflow.

Peer Review Process

Strata Geoscience Review

The Applicant engaged Strata Geoscience to undertake a review (Appendix 9) of the MWM geochemistry assessment. Strata Geoscience state that MWM use available monitoring data from many aspects of large-scale mining at Macraes to inform planning for future operations at the site. The current operations are an analogue for planned operations. Overall, Strata Geoscience consider that MWM have utilised the benefits of analogue monitoring and minimised the risks of such modelling with adequate additional geochemical testing. It appears that Strata Geoscience were provided a draft version of the MWM report for review. Consequently, five recommendations were made to improve the draft material that was reviewed. Strata Geoscience explain that the process for pit lakes models is that MWM derive geochemical characteristics for different inputs into the pit lake, GHD provide mass flows in and out of the pit based on hydrological and climate data, and then MWM complete a geochemical model of the pit through time.

WGA Review

The Applicant engaged WGA to undertake an independent peer review (Appendix 30) of the groundwater and surface water modelling undertaken by GHD (appendices 11-14). WGA in

their peer review reviewed the model boundary conditions, key assumptions, constraints and basis of calibration and are satisfied that the approach to modelling that informed the outputs in the reviewed reports provides an accurate and correct representation of the documented models.

WGA state that the structure and calibration of the groundwater model simulating the Coronation area is consistent with past modelling work at the site. The calibrated model and the associated predictive models documented in the report (GHD 2024a) are considered to be fit for the purposes of simulating groundwater drawdown and recovery related to the CO6 development and sulphate transport in groundwater around the Coronation area. The structure and input parameters for the WBM are appropriate to simulate the effects of the proposed CO6 development on downstream flows and water quality. The input water quality values applied to the modelling appear reasonable. Overall, the technical assessment of the water quality effects arising from the proposed C06 development is considered to be defensible and fit for purpose.

WGA state that the structure and input parameters for the WBM developed to simulate the effects of the proposed dewatering of Golden Bar Pit on water quality in Golden Bar Creek is appropriate for this purpose. The input water quality values applied to the modelling appear reasonable and are consistent with observed mine and receiving water quality data from the same area. The calibration of the WBM has been undertaken targeting several water flow, water storage and water quality datasets from the same area. Overall, the WBM model covering the water quality effects in the Golden Bar Creek catchment arising from dewatering of Golden Bar Pit is considered to be well calibrated and fit for purpose.

WGA state that the structure and calibration of the groundwater model simulating the Golden Bar area is consistent with past modelling work at the MGP. The calibrated model and the associated predictive models documented in the report (GHD 2024b) are considered to be fit for the purposes of simulating groundwater drawdown and recovery around the Golden Bar Stage 2 Pit and groundwater transport of sulphate within the Golden Bar area. The structure and input parameters for the WBM developed to simulate the effects of the proposed Golden Bar Stage 2 development on downstream flows and water quality is appropriate for this purpose. The input water quality values applied to the modelling appear reasonable. The calibration of the WBM has been undertaken targeting several water flow, pit lake filling/water storage and water quality datasets from the same area. Overall, the WBM model covering the water quality effects in the NBWR catchment arising from the GB Stage 2 development is considered to be well calibrated and fit for purpose.

In relation to the central mining area (FRIM, FTSF, Golden Point Pit) and cumulative effects, WGA state that the structure, defined boundary conditions and calibration of the groundwater model simulating the MP4 project is consistent with past modelling work at the MGP. The model used by GHD is generally considered to be fit for the intended purpose of assessing groundwater flows to the simulated opencast pits and identifying the discharge areas for contaminant plumes arising from simulated MGP mining features. The structure and input parameters for the WBM are appropriate to simulate the effects of the proposed MP4 development on downstream flows and water quality at existing water quality compliance points. A review of the mine water model schematic confirms that the significant mine structures and receiving water catchments have been incorporated into the model. The input water quality values applied to the modelling appear reasonable, being based on more than 30 years of water quality monitoring records from the MGP.

Runoff and groundwater discharges from catchment areas unimpacted by mining operations are calculated using the Australian Water Balance Model (**AWBM**) method. This method has been applied for past water balance modelling at the MGP and the outcomes accepted by ORC. The runoff calculations have been calibrated separately for the Deepdell Creek and NBWR catchments. The calibration outcomes are of good quality and have been appropriately applied to other catchments intersecting the MGP.

The WBM developed for the cumulative effects assessments appropriately includes only those mitigation measures that are achievable within the 'selected mitigation scenario' for Deepdell Creek and NBWR. Mitigation options that were practically unachievable, overly optimistic or not adequately supported by existing trials were excluded from the selected mitigation scenario for each catchment. The specific mitigation measures that were selected are discussed further in Section 9.7 of this report.

9.5.2 Technical Audit and Recommendations

The application and the technical reports of relevance to groundwater and surface water modelling were audited by Alexandra Badenhop, Technical Director – Water & Environmental Management. Full comments can be found in the following memoranda:

- Technical Review, dated 4 March 2025.

Ms Badenhop notes that two of the recommendations made by Strata Geoscience do not appear to have been included in the MWM report. However, these are not critical deficiencies. The MWM report and modelling are otherwise considered to be robust. Ms Badenhop agrees with the contaminants of concern identified by MWM.

Ms Badenhop states that, for the most part, the groundwater and surface water models are well documented, and assumptions have been clearly stated. Ms Badenhop explains that groundwater modelling was undertaken to estimate pit inflows for current and expanded mining scenarios, to simulate groundwater recovery after cessation of mining, and to undertake solute transport modelling during groundwater recovery. She states that groundwater modelling assumes that all seepage from waste rock stacks migrates within groundwater. This is considered conservative. It is appropriate to use sulphate as a model for other contaminants.

The groundwater models are expected to provide adequate predictions for long-term groundwater conditions. However, Ms Badenhop notes that the groundwater models are run with the assumption of mine closure conditions i.e. assuming that all waste rock stacks have been rehabilitated, and that this could mean that short term (mining phase) concentrations of contaminants in groundwater are underestimated. GHD responded to this query as part of the s92 process, stating that during the mining phase, due to the higher infiltration rate of the unrehabilitated waste rock stacks, a greater flux of contaminants is likely to be observed in toe seeps of waste rock stacks rather than any significant infiltration into the underlying schist.

Ms Badenhop raises the following concerns/queries which should be clarified by the Applicant:

- Waste rock stacks are one of the key sources of contamination. Concentrations of contaminants from waste rock stacks used in the models are based on a relationship from average waste rock stack height. A table of current surface area, volume and

average heights for each of the waste rock stacks proposed should be provided with assurance that the models have used these updated values.
- Clarification regarding the water level measurements that groundwater models were calibrated to – are they one-off measurements from a specific date or are they are statistic
- Climate change modelling was included for the surface water balance modelling, but not for the groundwater modelling.
- The lack of management of sulphides requires further justification.
- The groundwater models assume no existing sulphate plume. This is unlikely to affect long-term predictions but could underestimate short-term predictions.

Surface water modelling assumes that waste rock seepage is captured in silt ponds and managed via the mine water management system, to be stored within open pits or later discharged into the receiving surface water via pit overflows. That is to say, surface water modelling does not utilise seepage as a constant baseflow input to streams for modelling purposes. Ms Badenhop considers that this may result in surface water modelling underpredicting contaminant concentrations in surface waters during times of low flows. I would note that the approach taken in the surface water modelling appears to reflect the actual water management practices on site, whereby seepage water from waste rock stacks is largely expected to move laterally within weathered schist close to the surface, be captured in silt ponds, and then recycled within the mine water management system. However, some seepage may report to the receiving surface water environment directly.

9.5.3 Conclusions

Based on the peer review reports included with the application, and the independent technical audit undertaken by Ms Badenhop, the groundwater and surface water modelling appear to be fit for purpose and can be relied on in the groundwater and surface water assessments. Ms Badenhop has identified a limited number of uncertainties that she considers should be clarified by the Applicant, and I agree that these should be addressed; however, when also taking into account the peer reviews by WGA and Strata Geoscience, these are not considered to be critical deficiencies.

9.6 Effects on Groundwater

Groundwater quantity and flows, as well as groundwater quality can be adversely impacted by mining.

9.6.1 Summary of Applicant Assessment

Geochemical test work and assessment of empirical data from site indicates that the key contaminants of concern for the project are arsenic, nitrogenous compounds (due to ammonium-nitrate-based blasting residues), and sulphate. Some data suggest that on occasion iron (**Fe**), zinc (**Zn**), and copper (**Cu**) can also be elevated. Such data, supported by acid base accounting results confirm that acid rock drainage is not expected at this site; rather, lesser-risk neutral metalliferous drainage is expected, which is currently observed at the site (e.g., circum-neutral drainage elevated in sulphate and some contaminants of concern).

The groundwater contaminant plume, which emanates from mining features such as open pits, waste rock stacks, and tailings storage facilities, is illustrated in the groundwater modelling using sulphate due to its low potential for attenuation within the groundwater system and existing elevated nature in some receiving surface water bodies as a result of mining activity associated with MGP. As such, it is considered a conservative element with

which to assess contaminant mobilisation and transport from the backfilled waste and subsequent pit lakes to receiving waterbodies via the groundwater system.

Coronation Mining Area

The groundwater modelling provides predictions of groundwater inflow and outflow into and out of the existing and proposed Coronation Pit and Coronation North Pit, as well as groundwater recovery for 400 years. Modelling also provides predictions for groundwater seepage from Trimbells WRS, Coronation WRS, Coronation North Pit WRS and Coronation North WRS with the majority of seepage expected to move laterally within the near surface weathered schist and be captured in silt ponds and/or report to the receiving surface water catchment.

Modelling results indicate that dewatering rates (inflows into the proposed CO6 pit extension) range from 2.0 L/s at the beginning of mining to 0.8 L/s toward the end of mining. A relatively small reduction of 1 L/s is expected in the groundwater contributions to the Mare Burn Creek flows due to pit dewatering. This is approximately 4.5% of the total groundwater contribution estimated by the model.

The groundwater model indicates that all dissolved contaminants transported in groundwater away from the open pits and stored wastes in the Coronation area including the CO6 development will eventually discharge to receiving waters in the Mare Burn catchment, upstream from the MB02 compliance monitoring point. The groundwater contaminant plume from the WRSs and the Coronation Pit Lake is predicted to reach a maximum extent of approximately 1,600 m to the northwest and approximately 1,000 m to the southeast from these sources over 400 years. The estimate of sulphate flux (of groundwater discharging to surface water up stream of the compliance monitoring location MB02) is estimated to be 183 kg/day (20 years post closure) and 696 kg/day (230 years post closure) using the higher dispersivity values. The sulphate flux discharging to the Deepdell catchment is estimated to be <1 kg/day. The majority of the estimated sulphate mass is expected to be captured in the Trimbells and Maori Hen Silt Ponds where its release to the receiving environment will be buffered by other inputs such as direct rainfall and runoff before spilling to the receiving environment.

As part of the s92 process, GHD provided an assessment of potential adverse groundwater effects on persons. This stated that the zone of influence in terms of groundwater drawdown and groundwater contamination is limited to areas within the mine footprint. Groundwater contamination (as represented by sulphate) is largely contained to areas immediately surrounding mine facilities and structures. The 400-year contaminant plume extent does not extend over any known non-OGL groundwater bores. GHD consider that the limited plume extent means that the proposed activities are not likely to have an adverse effect upon current or future users of groundwater.

GHD recommend that groundwater monitoring (both water level and water quality) along the predicted path of the contaminant plumes be undertaken utilising existing and new groundwater bores to provide calibration of the groundwater and surface water models and more certainty on the overall effects.

The Applicant does not appear to have agreed to the additional groundwater monitoring recommended by GHD.

Golden Bar Mining Area

The groundwater modelling provides predictions of groundwater inflow and outflow into and out of the existing and proposed pit as well as groundwater recovery post-mining. Groundwater inflows into the existing pit are approximately 0.2 L/s and for the stage 2 extension the indicated inflows range from 1.8 L/s at the beginning of mining to 0.7 L/s towards the end. The dewatering is expected to have negligible impact to the groundwater contributions to McCormicks Creek and Murphys Creek flows. Groundwater recovery was computed for 400 years. Modelling results indicate that at the end of 400 years the groundwater levels have mostly recovered throughout the model domain other than in the immediate vicinity of the put where the water level is approximately 20 m below the pre-mining steady state conditions.

The groundwater model indicates that almost all dissolved contaminants transported in groundwater from the Golden Bar Stage 2 Pit and GBWRS will eventually discharge to receiving waters upstream from the NB03 compliance monitoring point. The groundwater contaminant plume is modelled to reach a maximum extent of approximately 800 m (from the GBWRS) to the south-west and 900 m (from the pit lake) to the south-east direction over a period of 400 years. The total modelled contaminant (sulphate) mass estimated to discharge into the creeks in the NBWR catchments have been estimated as approximately 26 kg/day 20 years post closure, 76 kg/day 230 years post closure, and 80 kg/day 400 years post closure. These values represent contaminants sourced from the Golden Bar area only. Sulphate flux discharged at Golden Bar Creek (GB02) and towards McCormicks Creek are considered minor at approximately 0.1 kg/day 230 years post closure.
The majority of these seepages are expected to move laterally within the near surface weathered schist and be captured in silt ponds, pit sumps and/or report to the receiving surface water catchment.

As part of the s92 process, GHD provided an assessment of potential adverse groundwater effects on persons. This stated that the zone of influence in terms of groundwater drawdown and groundwater contamination is limited to areas within the mine footprint. Groundwater contamination (as represented by sulphate) is largely contained to areas immediately surrounding mine facilities and structures. The 400-year contaminant plume extent does not extent over any known non-OGL groundwater bores. GHD consider that the limited plume extent means that the proposed activities are not likely to have an adverse effect upon current or future users of groundwater.

GHD recommend that groundwater monitoring (both water level and water quality) be undertaken utilising existing and additional groundwater monitoring wells in the wider vicinity of the proposed pit extension and the WRS as well as near McCormicks Creek and Murphys Creek prior to and during mining to assist with a better model calibration and to confirm the envelope of effects presented in this assessment. The Applicant does not appear to have agreed to the additional groundwater monitoring recommended by GHD.

Central Mining Area
GHD has completed an assessment on surface water and groundwater cumulative effects of the proposed FTSF Stage 2 and Innes Mills mine extension within the Deepdell and the NBWR catchments. This includes the effects from the GPUG expansion and extension, Coronation and Golden Bar Pit developments and associated waste rock disposal, including partial backfilling of Golden Point Pit. The groundwater modelling does not include the implementation of the Back Road Waste Rock Stack (**BRWRS**) consents.

The groundwater modelling provides predictions of groundwater inflow and outflow into and out of existing and proposed pits during dewatering, as well as during groundwater recovery for 400 years. Modelling also predicts seepages from pit lakes, waste rock stacks, backfills, and tailings storage facilities.

A higher volume of seepage reporting to the Murphys Silt Pond through waste stored in the south of the Frasers Pit is considered possible (for pit lake waters in excess of 487 m RL above which waste is stored on the southern pit crest). In this event GHD recommend that this increase in seepage be captured and treated in the same manner as currently occurs (captured prior to Murphys Silt Pond and pumped back to FRIM) with provision for increased pumping capacity considered if required.

The groundwater model identifies stream depletion effects arising from the MGP. Groundwater contributions to Deepdell Creek are expected to be reduced by approximately 3 L/s or 260 m^3/day (approx. 8%) due to pit dewatering. Smaller reductions are expected for other rivers. However, the simulated stream depletion effects are almost all existing effects arising from development of existing opencast pits and the GPUG mine.

The groundwater model indicates that all dissolved contaminants transported in groundwater away from mining impacted areas of the MGP, including the opencast pits, stored waste rock and tailings, will eventually discharge to receiving waters upstream from the existing compliance monitoring points on the Shag River, Tipperary Creek, Murphys Creek, and the NBWR. The extent of the sulphate plume at the end of the 400 year simulation is expected to extend horizontally by approximately 4 km along Deepdell Creek to the east from the source area (northern gully WRS); approximately 800 m along Deepdell Creek to the north from the source area (MTI); approximately 1700 m along Murphys Creek to the south from the source area (FSWRS); approximately 1700 m along Tipperary Creek to the south from the source area (TTTSF); and approximately 800 m to the west along the NBWR from the source area (FWWRS).

The groundwater contaminant plume is modelled to primarily impact Deepdell Creek (from a combination of WRS seepage and Pit Lake overflow) with an estimated sulphate seepage flux of between 24 and 861 kg/day (20- and 200-years post closure respectively). The NBWR is modelled to receive an estimated sulphate seepage flux of between 5 and 116 kg/day (20- and 200-years post closure respectively) with the majority of the mass sourced directly from WRS seepage. The majority of these seepages are expected to move laterally within the weathered schist and be captured in silt ponds, pit sumps and/or report to the receiving surface water catchment.

A key outcome of the groundwater modelling is the difference in simulated mass loads between 20 years post-closure and 200 years post-closure. This difference emphasises the delay between the loss of contaminants from stored wastes at the MGP and the eventual discharge of these contaminants to the receiving surface waters. Therefore, the water quality management planning undertaken by OGL has taken into account the need to plan for increasing contaminant mass loads for a considerable period (200 + years) into the future.

An important assumption built into the groundwater mass transport modelling, and into the mine water balance modelling, is that historical underground mine workings at the northern end of the Golden Point Pit are to be effectively sealed as part of site closure. This management measure is required to ensure rising groundwater levels within the Golden Point Pit backfill do not result in overflows to Deepdell Creek via these workings. The

Applicant states that the primary driver of increased flows through the adit is a driving head which is dependent on the level of water in the Round Hill Pit sump. When the pit sump water level exceeds a certain level, increased hydraulic connection can occur between the Round Hill Pit sump and the Golden Point historic underground workings connected to the adit. This increased hydraulic connection can cause an increased flow from the adit to occur, even during dry periods. The Applicant states that they have updated procedures and technology relating to the operation of the Round Hill Pit sump and continue to ensure the sump level is routinely monitored and actively managed to an operational level that is set below the level at which hydraulic connection to the adit occurs. Management of the pit sump level will remain an operational water management measure. Other potential long-term solutions are described in the AEE.

As part of the s92 process, GHD provided an assessment of potential adverse groundwater effects on persons. This stated that the zone of influence in terms of groundwater drawdown and groundwater contamination is limited to areas within the mine footprint. Groundwater contamination (as represented by sulphate) is largely contained to areas immediately surrounding mine facilities and structures. The 400-year contaminant plume extent does not extent over any known non-OGL groundwater bores. GHD consider that the limited plume extent means that the proposed activities are not likely to have an adverse effect upon current or future users of groundwater.

GHD recommend that groundwater monitoring well are installed within the modelled contaminant plume extent. This will aid in improving the understanding of contaminant mobilisation and transport within the underlying aquifer, assist in future model calibration and confirm the envelope of assessed effects. Areas in which there is insufficient coverage (based on the modelled contaminant plume) are located down hydraulic gradient of the existing Frasers WRS and the proposed Frasers TSF, and to the south of Deepdell Creek in the vicinity of the proposed BRWRS. The Applicant has stated that they will update the Water Quality Management Plan to incorporate the recommended monitoring when updates are undertaken to reflect the requirement of the MP4 consents, if they are granted.

9.6.2 Summary of Technical Audit and Recommendations

The application and the technical reports of relevance to groundwater effects were audited by Alexandra Badenhop, Technical Director – Water & Environmental Management. Full comments can be found in the following memorandum:

- Technical Review, dated 4 March 2025.

As set out in 9.5.2 of this report, there are a number of areas for which Ms Badenhop considers that there is some uncertainty. While these matters should be clarified, they are not considered critical deficiencies, and the predictions of the groundwater model in terms of groundwater quantity and quality changes can generally be relied upon, especially for long-term contaminant concentrations.

In summary, the impact on groundwater quality, as indicated by the modelling, is generally expected to be low, although Ms Badenhop considers that there is some uncertainty about the short-term effects. Ms Badenhop supports the GHD recommendation for additional groundwater monitoring along the predicted contaminant plume in all areas of the site to provide further calibration of the model and more certainty as to effects.

9.6.3 Conclusions

The predictions of the groundwater models appear to be generally reliable. Peer-reviewers engaged by the Applicant consider that the models are fit for purpose. Ms Badenhop has identified a limited number of uncertainties that she considers should be clarified by the Applicant, and I agree that these should be addressed. However, when also taking into account the peer reviews by WGA and Strata Geoscience, these are not considered to be critical deficiencies, and the predictions of the groundwater model can generally be relied upon. The models predict that groundwater drawdown is limited to areas immediately adjacent to the current pits, and even after 400 years, the contaminant plume is confined within the mine boundaries. Adverse effects on groundwater quantity and quality would appear to be no more than minor.

I would note that consideration of adverse effects on any persons other than the Applicant who may drill and take water from a bore screened within the contaminant plume have not been assessed, because these activities would require an access agreement by the Applicant as well as authorisation by a resource consent, and it would be more appropriate to consider those adverse effects via that consenting process.

Adverse effects on surface water are discussed separately in Section 9.7 below.

9.7 Surface Water Effects

Adverse surface water effects could occur via direct discharges of contaminants into surface water, or via migration of contaminated groundwater into surface water, or as an indirect result of reduced groundwater base flows to rivers.

9.7.1 Summary of Applicant Assessment

The prediction and interpretation of surface water effects is set out in reports produced by MWM (Appendix 8), GHD (Appendices 11-14), and Ryder (Appendices 22-22). My understanding of the interrelationship of these reports is as follows:

1. MWM derive geochemical characteristics for different inputs into the pit lakes to develop pit lake models.
2. GHD provide mass flows in and out of the pit based on hydrological and climate data, and predict pit lake filling rates.
3. MWM complete a geochemical model of the pit through time, showing pit lake water quality during filling and at overflow.
4. GHD use pit lake water quality to predict effects i.e. actual quantification of water quality changes, on groundwater (from seepage) and surface water, at specific locations.
5. Ryder interprets the data in the context of the specific surface water receiving environment.

The surface water effects assessment relies on the outputs of predictive models. As set out in Section 9.5 of this report, the predictions of the groundwater and surface water models appear to be generally reliable. Peer-reviewers engaged by the Applicant consider that the models are fit for purpose and the assumptions inherent in the models are appropriate for the site. Ms Badenhop has identified a limited number of uncertainties that she considers should be clarified by the Applicant, and I agree that these should be addressed. However, when also taking into account the peer reviews by WGA and Strata Geoscience, these are not considered to be critical deficiencies, and the predictions of the ground and surface water models can generally be relied upon.

The GHD models consider the following scenarios, which capture present day through to long-term operation following pit lake spilling:

- Mining – during active mining where waste rock stacks are under construction and pits are being dewatered and excavated. Active management of mine water is in place and seepages are captured and returned to the mine water management system.
- Closure - All surfaces are rehabilitated (other than pit walls), most pits not yet overflowing, seepage from WRSs may not have reached peak predicted values, active return pumping of TSF drains maintained.
- Long-term – Pits that are projected to overflow have reached the overflow, all surfaces are rehabilitated (other than pit walls), seepage from WRSs have reached peak predicted values, all mine waters discharging to the environment other than where in-perpetuity pumping and treatment provisions are made.
- Long-term + Climate Change – Equivalent to Long Term Phase with the addition of climate change effects on rainfall and evaporation.

Key modelling assumptions generally applied across all areas of the site include:

- Dewatering from pits during mining operations is not represented in the water quality outcomes. These operations are undertaken with a degree of manual control and could be inaccurately reflected in a predictive model. It is assumed that these discharges are undertaken based on existing consent requirements and done in a manner that does not negatively impact water quality within the receiving environment. Alternatively, these waters are recycled within the mine water management system and reused on site.
- Rehabilitation of remaining impacted and waste rock surfaces is undertaken and completed promptly on completion of mining.
- TSS levels discharging to the receiving environment are managed using appropriately sized silt ponds and other sediment and erosion protection measures.
- During the mining phase all operational waters are managed on site and remain within a closed system. For example, water from the tailing's impoundments (including captured seepage) is recirculated and re-used for mine operations. Losses of these waters to the environment is through either uncaptured seepage to ground or evaporation.
- Seepage from WRSs is modelled based on an increase with time to a maximum predicted value. The potential for seepage concentrations to reduce from this maximum due to depletion of contaminant sources is not accounted for.
- All contaminants are assumed to be conservatively transported within both the groundwater and surface water environments on a mass balance basis.

Effects on surface water quantity occur through stream depletion effects associated with pit dewatering, including inflows to pits during pit lake filling. Effects on surface water quality occur through direct discharges to surface water from silt ponds or from pit lake overflow, or via seepage that reports to surface water (uncaptured seepage). It is noted that the majority of seepages from pits, waste rock stacks, and tailings storage facilities migrate through the weathered schist and are captured in silt ponds or are captured in underdrains. The modelled water quality at surface water nodes takes into account all seepage, both captured and uncaptured.

The GHD assessments of water quality predictions are cumulative, in the sense that they predict future water quality outcomes which include the combined effects of this MP4 proposal with water quality effects that would occur as a result of other consents that are separately authorised and implemented, or likely to be implemented within the MP4 timeline. This provides a holistic and realistic assessment that recognises that cumulative

effects are the actual real-life effects. However, this does not enable a clear understanding of what contribution MP4 has to future cumulative effects. The exception is for the NBWR catchment, where such a distinction was made as a result of a s92 request.

Water quality results are compared to relevant guidelines levels protective of water quality and ecological health and to existing numerical compliance thresholds as set in existing resource consents in each catchment.

Coronation

Key assumptions in the Coronation surface water modelling include:

- The Coal Creek Dam is not operational.
- Water quality of the overflow from the Coronation Pit Lake through the Trimbells WRS remains consistent and does not deteriorate further before entering the Trimbells silt pond and ultimately Trimbells Gully.
- Seepage from the Coronation North Pit WRS is partitioned into saturated and unsaturated seepage in order to quantify seepage volumes to Coal Creek (via the pit crest) and seepage to the surrounding schist. Seepage to Coal Creek is generated through the non-saturated portion of the backfill located above the pit crest of 580 m RL and reports to Coal Creek within the WBM. The movement of seepage in the surrounding schist is modelled within the Groundwater Model as are estimates of contaminant flux movements into the receiving water bodies through this pathway.

Predictions of the surface water modelling:

1. The Coronation Pit Lake will overflow via a low point to the south to Deepdell Creek via the Highlay Creek sub-catchment approximately 200 years post closure with a mean overflow about 1.5 L/s.
2. Prior to this, the pit lake will seep through the Trimbells WRS to the Mare Burn. This will occur about 90 years post closure. The major assumption is that water quality does not deteriorate as it flows through Trimbells WRS. Seepage volumes reach a maximum rate of 0.61 L/s.

The majority of sulphate mass (and that of other elements of concern) draining to the Mare Burn catchment will likely be captured in the Trimbells and Maori Hen Silt Ponds where mixing with rehabilitated WRS runoff and natural runoff will occur. Post closure, the release of water from these silt ponds to the receiving environment will be controlled by the spillway, and overflow during low flow periods is likely to be small and/or cease. This should enable the silt ponds to provide a 'buffering' effect to the receiving water in the Mare Burn. The surface water model therefore replicates this scenario and does not mirror the groundwater model which assumes constant discharge of seepage waters into the receiving water bodies.

A key assumption in the WBM is that the dissolved contaminant concentrations in seepage flows from the CO6 pit lake through Trimbells WRS toward Trimbells Gully will not increase due to contact with the stored wastes. MWM has identified several management techniques to reduce the oxidation of sulfide minerals and minimise the mobilisation of any oxidation products. These techniques include the installation of an advective barrier (equivalent to a low flow barrier) against the downstream toe of the WRS to reduce the potential ingress of oxygen to the base of the WRS. Conceptually, this technique is reasonable and has been applied elsewhere although further research at the MGP is likely to be needed into its effectiveness and to ensure that this water does not become a significant source of contaminant flux to Trimbells Gully. The Applicant has committed to installing an

engineering solution during rehabilitation of the Trimbells WRS to ensure that this assumption is valid.

Water Quantity Effects

GHD predict that dewatering rates from the proposed Coronation Stage 6 pit expansion could range from 2.0 L/s (at the beginning of the excavation) to 0.8 L/s (towards the end). GHD report that a small reduction (~1 L/s) is expected in the groundwater contributions to the Mare Burn Creek flows due to pit dewatering, representing approximately 4.5% of the estimated total groundwater contribution. Ryder considers that this potential flow reduction can be considered minor with respect to surface flows in the Mare Burn and unlikely to influence the ecology of local creeks through physical changes to the watercourses.

GHD estimates that the groundwater loss through the Trimbells WRS pathway will increase from 0 L/s to a maximum rate of 0.61 L/s. Again, as for small reductions in flow associated with pit dewatering, this potential small increase in flow can be considered minor with respect to surface flows in the Mare Burn and unlikely to influence the ecology of local creeks.

Water Quality Effects

Water quality results are presented for monitoring locations MB01 and MB02, which are shown in Figure 26.

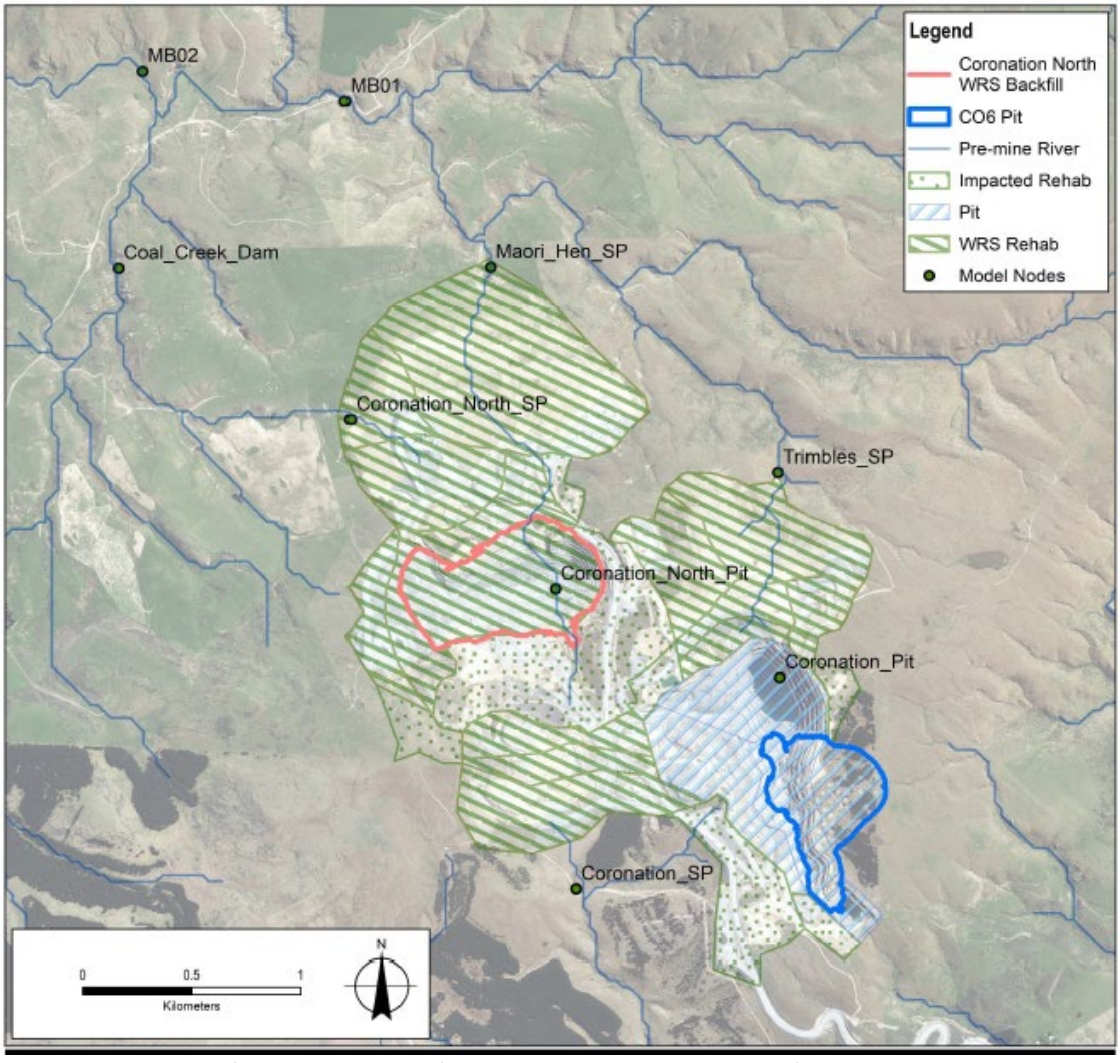

Figure 26 Monitoring locations MB01 and MB02. Source: RM24.184 Appendix 11.

At both MB01 and MB02 the long-term scenario shows a general increase in nitrate-nitrogen post mining. This increase is associated with an increase in WRS seepage volumes with time; however, low flow concentrations are balanced by capture and buffering of seepage within the Trimbells and Maori Hen Silt Ponds. Conversely, the ammoniacal-nitrogen concentrations are expected to decrease post mining as the WRS surfaces are rehabilitated. There are no compliance limits set at MB01 for nitrate-nitrogen or ammoniacal nitrogen. There is a low (<1%) probability of exceedance of the existing compliance limit at MB02 for nitrate-nitrogen in the long-term scenario. Both current and predicted long-term concentrations of ammoniacal nitrogen and nitrate-nitrite-nitrogen sit within NOF bands A or B of their respective NPS-FM attribute states.

In general, sulphate is predicted to increase at both MB01 and MB02 in the modelled long-term scenario relative to the mining and closure periods. This increase is associated with an increase in WRS seepage volumes with time; however, low flow concentrations are balanced by capture and buffering of seepage within the Trimbells and Maori Hen silt ponds. The long-term scenario shows a low (<1%) probability of exceedance at MB01 for sulphate, but not at MB02. Predicted future 95th percentile concentrations in the Mare Burn at MB01 and MB02 are well below the current compliance limit (1,000 mg/L) and would largely meet the British Columbia guideline of 309 mg/L for soft/hard to hard water (76-180 mg/L). Increases in water hardness reduce the toxicity of sulphate. There is also evidence to suggest that concentrations higher than this would not adversely affect the local flathead galaxias population or the benthic invertebrate community in general. This is discussed further in Section 9.8.

The modelled <1% probability of exceedance for sulphate and nitrate-nitrogen at both MB01 and MB02, respectively, following mine closure is dependent on the buffer storage capacity of both Trimbells Silt Pond and Maori Hen Silt Pond being retained indefinitely. If either or both of these silt ponds are removed, the sulphate exceedance frequency is likely to increase. The Applicant has not clearly stated the future plans for these silt ponds; hence, there is some uncertainty about what is proposed.

Modelling of arsenic, cyanide, copper, iron, lead and zinc concentrations indicates that they are unlikely to exceed their current consented compliance limits at either MB01 or MB02 through the operational or post closure period. Further, current and predicted long-term metal concentrations meet their respective ANZG default guideline values for protection of 95% of species even without adjusting for hardness (increases in water hardness reduce the toxicity of some metals).

The already consented Coal Creek Dam was not incorporated in the modelling, as the model results indicated it is unnecessary. However, construction of this dam remains a valid contingency measure to provide augmented base flows in Mare Burn during dry summer periods should future compliance necessitate this.

Golden Bar

The Golden Bar Pit is currently full and spilling into Golden Bar Creek. The pit will need to be dewatered before mining can commence. The initial proposal considered discharging various but significant quantities of pit lake water directly to local streams; however, this approach could take up to three years and is likely to result in adverse water quality and erosion effects. A recent change to the proposal has largely removed the option for discharges of pit lake water into local creeks during initial dewatering. Instead, the majority of the water will be pumped to Frasers Pit for use in the mine water management system.

This will minimise water quality effects and will also enable an operationally acceptable dewatering rate. Up to 5 L/s may be discharged into Golden Bar Creek at approximately the same location as the current pit lake overflow, to maintain flows within Golden Bar Creek. The Applicant has stated that this will be done such that existing compliance criteria are met.

Key assumptions in the Golden Bar surface water modelling include:

- There are no specific assumptions beyond the general assumptions described earlier in this section.

Predictions of the surface water modelling:

1. Initial pit dewatering could take from 1.25-2.5 years depending on the dewatering rate.
2. Following the end of mining, the pit lake water rises such that overflow level could be reached after a period of approximately 35-42 years post closure, following which pit lake water would spill into Golden Bar Creek via a pit low point to the southeast.
3. The mean overflow from the pit is estimated at approximately 3.2 L/s but may temporarily cease during dry periods.

Water Quantity Effects

GHD state that the pit inflow rate into the existing pit is approximately 0.2 L/s and for the proposed pit extension will range from 1.8 L/s at the start of dewatering to 0.7 L/s toward the end of dewatering. This will have negligible impact to the groundwater contribution to the McCormicks Creek and Murphys Creek flows.

Water Quality Effects

Water quality results are presented for monitoring locations GB01, GB02, and NB01, which are shown in Figure 27.

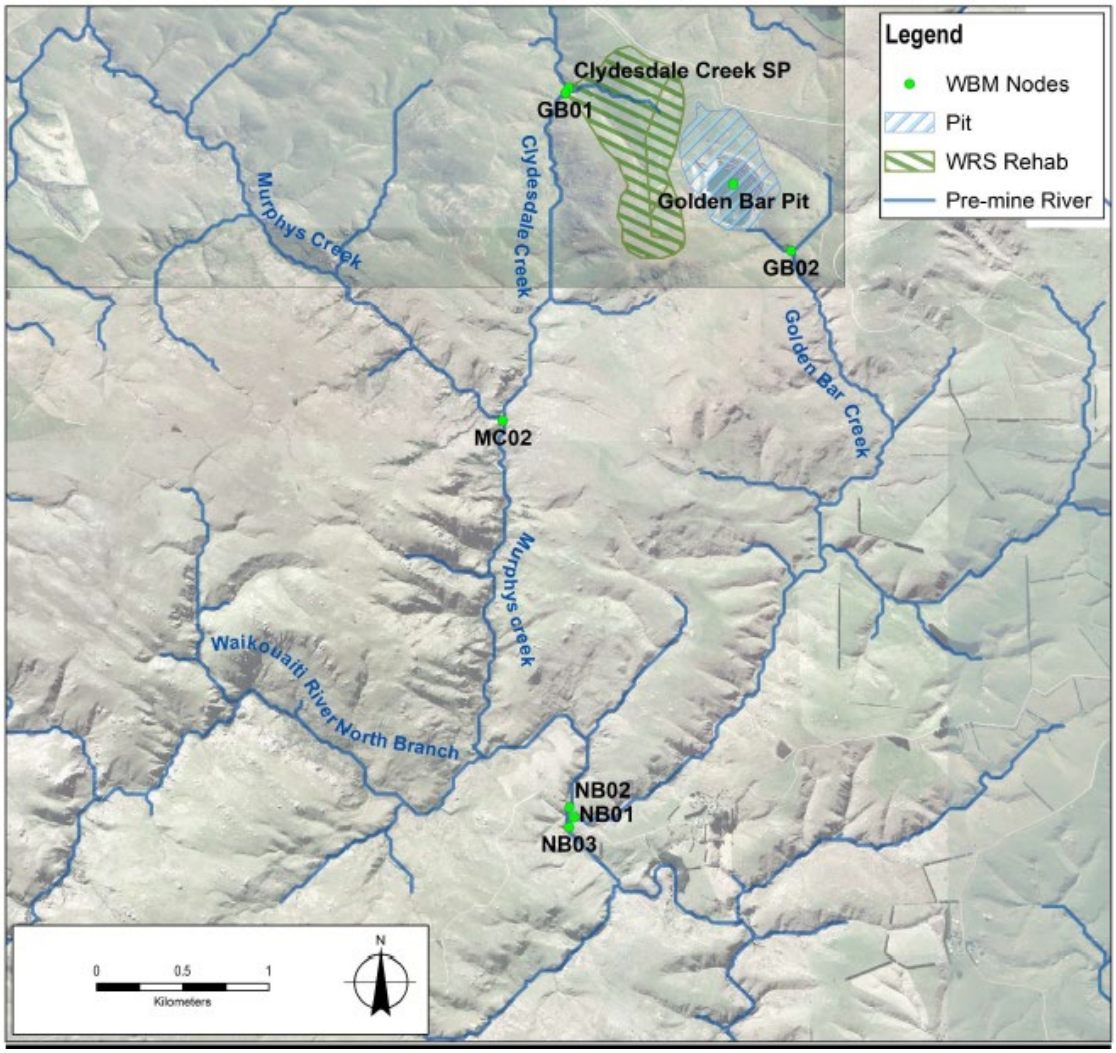

Figure 27 Monitoring locations GB01, GB02, and NB01. Source: RM24.184 Appendix 12.

Sulphates

In general, at GB01 sulphate is predicted to increase in the closure and long-term scenarios relative to the mining period. This increase in sulphate concentrations is due to the increased size of the GBWRS and therefore increased seepage flows and concentrations. The sulphate mass loads are expected to increase from the start of the Stage 2 WRS expansion and to have reached a steady state by the end of the defined closure period (2045- 2050). Climate change may result in a small reduction in long-term concentrations as the balance of seepage water and runoff shifts.

Sulphate concentrations at GB02 are predicted to be low during the mining and closure phases as flows within the tributary are from natural catchment runoff and groundwater recharge only prior to overflow from the pit lake. Long-term, water spilling from the Golden Bar Pit Lake will influence water quality at this location with sulphate concentrations predicted to increase as elevated sulphate pit lake water spills into the upper reaches of this catchment. Sulphate concentrations at GB02 are expected to remain below 400 g/m^3 during this period which is reflective of the maximum predicted Golden Bar Pit Lake sulphate concentrations as reported by MWM (434 mg/L).

The water quality at NB01 is only affected by non-mined areas unless the Golden Bar pit is overflowing (as per current situation) resulting in only natural catchment water quality being predicted in the stated mining and closure phases at NB01. The long term and closure

scenarios show it is unlikely for a sulphate concentration of 400 g/m^3 to be exceeded at NB01 during this period which is reflective of the maximum predicted Golden Bar Pit Lake sulphate concentrations as reported by MWM.

While there are no sulphate compliance limits for sites GB01, GB02 and NB01, the predicted median sulphate concentrations at these sites over time are below the current consent compliance limit for NB03 (250 mg/L) and would largely meet the British Columbia guideline of 309 mg/L for soft/hard to hard water.

Ammoniacal nitrogen and nitrate-nitrogen
At GB01, ammoniacal nitrogen concentrations are modelled to have little change with time and no notable increases from current levels at the monitoring location. Nitrate-nitrogen concentrations are modelled to increase following construction of the expanded WRS and the subsequent increase in seepage flow rates. This will be subject to good practice being applied in construction and progressive rehabilitation of the WRS expansion.

At GB02 ammoniacal nitrogen and nitrate nitrogen concentrations are expected to reduce once regular overflow from the pit lake begins due to the diluting effect from the pit lake water.

As for the GB02 monitoring location, the ammoniacal nitrogen and nitrate-nitrogen values at NB01 during the mining and closure stages have higher concentrations than the post closure stage. This is due to the modelled natural ammoniacal nitrogen and nitrate-nitrogen values being higher than the predicted concentrations in the pit lake water. The water quality at NB01 is only affected by non-mined areas unless the Golden Bar pit is overflowing (as per current situation) resulting in only natural catchment water quality being predicted in the stated mining and closure phases at NB01.

Monitoring frequency does not follow NPS-FM 2020 protocols; however, as a general guide, predicted future nitrate concentrations would most likely place all monitoring sites in the NOF bands A or B for ammoniacal-N and nitrate-N (both for protection against toxic effects of these forms of nitrogen).

Cyanide and metals
Arsenic, cyanide, copper, iron, lead and zinc are predicted to meet ANZG default guideline values (95% species protection) throughout the operational period of the mine and the post closure period, with the exception of arsenic at GB02 (post-closure) and copper at GB01 (during mining and long-term). Ryder does not consider that either of GB01 or GB02 are appropriate locations for compliance monitoring points, because GB01 is right at the base of the WRS and has limited ability to receive any dilution water, and GB02 has very little flow in later summer and is dry on occasion.

At NB01, all contaminants are expected to meet ANZG default guidelines for protection of 95% of species during mining and post-closure, except for arsenic, for which the maximum and 95th percentile concentrations may exceed the ANZG 95% DGV for long-term scenario.

Central Mining Area and Cumulative Effects
Mining in this central area will impact upon the Deepdell Catchment (within the Shag Catchment) and the NBWR catchment. This assessment considers the impact of the mining activities in this central area cumulatively with the Coronation mining activity (which will

impact the Deepdell Catchment) and the Golden Bar mining activities (which will impact the NBWR catchment).

Key assumptions in the surface water modelling for this central mining area include:

- The backfilling of Golden Point Pit will include measures to control seepage through the historic mine adits. As such, seepage through adits has not been included.
- Seepage is assumed to be not treated unless stated otherwise.
- Following the mine closure period (ending 2050) it is assumed that provision is made for infrastructure to capture and treat all remaining seepage flows from TSF underdrains and discharge is done in a manner that does not adversely affect the environment.
- Seepage reporting to Murphys Creek includes resultant seepage from infiltration (to the WRS only). Additional seepage as a result of the rising FRIM Pit Lake level (above the pit rim of 487 m RL on which waste is stored) is assumed pumped back to the FRIM Pit Lake.
- The freshwater dilution dam at Camp Creek (or an alternative source of augmentation water) is available upon mine closure and can augment the flow within Deepdell Creek at a maximum rate of 20 L/s during low flow periods (unless overflow should occur), reducing to a minimum discharge of 2 L/s at DC04 flows above 50 L/s.

Predictions of the surface water modelling:

1. The Innes Mills and Frasers pit lakes will fill independently while lake levels are below the FRBF embankment at 480 m RL, with some interaction of seepages through the backfill from Frasers to Innes Mills.
2. The pit lake levels will reach the embankment level approximately 51 years post-closure, following which water will spill from Frasers to Innes Mills until levels equalise.
3. The combined FRIM pit lake is modelled to reach a long-term equilibrium level of between 486 m RL and 494 m RL. It is unlikely that the lake will spill into the NBWR, as the northwest pit rim will be at 497 m RL.
4. FRIM water levels above 487 m RL will potentially result in increased seepage through the Frasers South WRS to Murphys Silt Pond. Water draining through this pathway is planned to be captured in the Murphys Silt Pond and is pumped back to FRIM.

<u>Deepdell Creek/Shag Catchments</u>

Additional flow and contaminant fluxes to Deepdell Creek will occur via overflow from CO6 Pit Lake, seepage from the combined FRIM Pit Lake via *in situ* schist and waste rock embankment, runoff from the Golden Point waste infill surface, and seepage from the Golden Point waste infill.

The modelling considers two scenarios:

- The **basecase scenario** assumes that collected seepage from the MTI and SP11 tailings facilities, along with seepage from the backfilled Golden Point Pit and Northern Gully WRSs, is collected within the Battery Creek and Maori Tommy Silt Ponds from which discharge is controlled by relative inflows and evaporation such that overflow during low flow periods is limited (i.e. the model optimises the operation of the silt ponds at closure).
- The **proposed mitigation scenario** includes all measures in the basecase, with the additional construction of the Camp Creek reservoir or alternative source of dilution water allowing for flow augmentation during low flow periods.

The water quality results are presented at monitoring and compliance points DC07, DC08, Shag River at Loop Road and Shag River at McCormicks. Both scenarios are considered for the mining phase, closure phase, and long-term phase.

It is noted that while the Camp Creek dam has not been constructed, the Applicant holds all required consents to construct the dam and to discharge water from the dam to augment flows in Deepdell Creek. Hence, the proposed mitigation scenario is feasible.

Water Quality Deepdell Catchment and Shag Catchment

In general, the modelling shows that compliance with the DC07 and DC08 compliance criteria is high in the scenario that includes the construction and operation of the flow augmentation. The same can generally be said for the basecase scenario where the flow augmentation is not constructed and operational; however, expected concentrations at DC07 and DC08 (particularly during low–median flows) will likely be comparatively higher and some elements (e.g. nitrate-nitrogen) do show an elevated chance of exceeding the existing water quality criteria. Furthermore, the basecase scenario assumes optimal operation of the Maori Tommy Silt and Battery Creek Silt Ponds, i.e. no (or a very limited) spill waters to Deepdell Creek during low flow events. Spill events from these silt pond during low flow events could potentially result in sulphate concentrations in excess of 1,000 mg/L at DC07 and DC08 (and up to 1,500 mg/L) unless dilution water is present. The construction and operation of the Camp Creek Dam will therefore likely offer significant benefits in terms of the ability to provide contingency during periods of prolonged low flow and will result in less reliance on controlling the Maori Tommy and/or Battery Creek Silt Ponds overflow. Metals are typically below the ANZG 95% DGV for the mitigated scenario.

At Loop Road and McCormicks, the results largely mirror that as shown for DC08 and take into account the significant dilution downstream of DC08. Arsenic and sulphate show low probability of exceeding compliance limits during mining and post closure, respectively. Modelled exceedances of iron within the Shag River are primarily a result of the assumed basecase water quality and are likely conservative and significantly over-stated. Copper is modelled to exceed the 95% default guideline value during the mining phase in both the basecase and mitigated scenario.

North Branch Waikouaiti River Catchment

The NBWR catchment is impacted by the Innes Mills stage 9 and 10 extensions, the Golden Bar Stage 2 Pit extension, waste disposal at FTSF, Frasers WRS, and Golden Bar WRS, the operation of the FTSF, and the formation of the FRIM and Golden Bar Pit Lakes within the headwaters of the NBWR.

Modelling considers two scenarios:

1. The **basecase** scenario which assumes that the status quo controls are in place within the catchment, and assumes the following controls are in place:
    a. Murphys silt pond is pumped to Frasers Pit in perpetuity;
    b. Frasers West and Clydesdale silt ponds discharge by overflow to the NBWR;
    c. WRS seepage draining directly to the NBWRTR monitoring location is not collected and drains directly to the NBWR.

2. The **selected mitigation** scenario which consists of the following components:
    a. Rehabilitation of WRSs - The Frasers West/South and Golden Bar WRSs are rehabilitated to achieve an average annual infiltration (and seepage) rate reduction to 29.2 mm/year;

b. Passive Treatment Systems are capturing and treating all seepage water from the Frasers West, Frasers South and Golden Bar WRSs and reducing sulphate loads by 30% before discharge to the respective silt/collection ponds;
c. Controlled Discharge - The Frasers West Silt Pond, Murphys and Clydesdale Silt Ponds are converted to sumps and discharge to the receiving surface water environment only at elevated flows. The sumps are assumed to be fitted with high level alarms where capacity reaches 90%, above which emergency pumping or carting water back to Frasers Pit would occur; and
d. A new sump capturing seepage from the Frasers West and South WRSs is constructed at or near the monitoring location NBWRTR. This sump will operate in a similar manner to the Frasers West and Clydesdale Silt ponds in terms of discharge to the NBWR and return to Frasers.

The Applicant states that they will ensure that WRS seepage from Frasers South and West WRS, and Golden Bar WRS is pumped to open pits to ensure compliance with existing water quality standards until the mitigation measures that are assumed in the 'selected mitigation' and any other scenario can be established after mining. The Applicant acknowledges that some of these mitigations may require additional resource consents.

The water quality results are presented at monitoring and compliance points NBWRRF, MC02 and NB03.

Water Quality – NBWR

Basecase modelling of the NBWR shows compliance exceedance at the surface water compliance locations NBWRRF and NB03. The WGA peer review stated that through the modelling process it became clear that the discharge of water in areas of the NBWR catchment impacted by mining would lead to unacceptable downstream water quality outcomes.

By implementing a selected range of mitigation measures within the catchment (as in the mitigation scenario), the risk of compliance exceedance is significantly reduced with concentrations of sulphate, Nitrate N, Ammoniacal N and copper below the stated compliance limits. Elevated arsenic at compliance location NB03 is a result of the Golden Bar pit spill and could be managed by controlled discharge (during high flows) and/or treatment (e.g. dosing the pit lake with Ferric Chloride). As in the Shag River catchment, modelled concentrations of iron are primarily a result of the assumed basecase water quality and modelled exceedances of iron are likely conservative and significantly overstated. Ryder states that for mining and long-term scenarios, virtually all modelled contaminants at all surface water compliance sites meet the ANZ default guidelines for 95% species protection. Copper is modelled to exceed the ANZG 95% DGV at NBWRRF and NB03 in the long-term phase even in the selected mitigation scenario.

GHD recommend early implementation of the selected mitigation measures to ensure that the predictions can be relied on.

Dr Ryder recommends that hardness and dissolved organic carbon are included (if not already) in the regular monitoring programme for surface water parameters, along with pH and temperature, as these appear to have potential to strongly influence the toxicity of water quality parameters, particularly some metals.

9.7.2 Technical Audit and Recommendations

The application and the technical reports of relevance to surface water effects were audited by Michael Greer, Director and Principal Scientist of Torlesse Environmental. Full comments can be found in the following memorandum:

- Surface water review – Oceana MPIV, dated 11 March 2025.

Provided the assumptions built into the modelling are valid, in particular that there is no deterioration of water quality through the Trimbells WRS, then Dr Greer agrees that adverse effects on water quality within the Mare Burn will be no more than minor because:

- Only sulphate, nitrate, arsenic, and zinc concentrations are expected to increase, at MB01 (the more impacted site) and increased concentrations of these parameters are not expected to result in a change in toxicity risk as:
    - Median nitrate concentrations are expected to stay under the 99% species protection threshold while 95th percentile concentrations are expected to remain between the 90% and 80% species protection thresholds;
    - Sulphate concentrations are not expected to exceed existing compliance standards, which were set for ecological protection through whole of effluent toxicity testing; and
    - Median arsenic and zinc concentrations are still expected to meet the ANZG (2018) 95% species protection threshold.

Dr Greer also agrees that the Coronation activities are unlikely to result in exceedances of the existing water quality criteria, noting that these are not considered protective of the environment.

At Golden Bar, Dr Greer considers that effects on water quality within Golden Bar Creek and the NBWR will generally be no more than minor because:

- Only sulphate, nitrate, arsenic, and zinc concentrations are expected to increase for any period and increased concentrations of these parameters are not expected to result in a change in toxicity risk as:
    - Median nitrate concentrations are expected to stay under the 99% species protection threshold while 95th percentile concentrations are expected to remain between the 90% and 80% species protection thresholds;
    - Sulphate concentrations are not expected to exceed 1000 mg/L, which are understood to have been confirmed as providing adequate ecological protection to local species through whole of effluent toxicity testing; and
    - Median arsenic and zinc concentrations are still not expected to exceed the ANZG (2018) 95% species protection thresholds in either water body.

However, in Clydesdale Stream (GB01) there is potential for more than minor adverse effects during the closure period and in the long-term if the modelled effects of climate change do not eventuate. The predicted increase in copper during these phases is almost an order of magnitude greater than the ANZG 80% species protection guidelines. Dr Greer notes that this is presumably at least partly driven by already consented mining activities.

While sulphate concentrations are also expected to exceed toxicity driven existing compliance standards in the Clydesdale Stream, Dr Greer notes that they are already exceeded there. The increases in sulphate concentration at GB01 is also modest (20%) and presumably at least partially driven by already consented mining. Consequently, Dr Greer

agrees with Dr Ryder that the increase in sulphate at this site is unlikely to increase toxicity risk.

With respect to the existing compliance limits, Dr Greer agrees that none are expected to be exceeded at BG02 or NB03, noting that these are not considered protective of the environment.

In terms of the central mining area and the cumulative effects assessment, Dr Greer considers that the adverse effects on water quality within Deepdell Creek, Murphys Creek, Shag River, and the NBWR are likely to be no more than minor because:

- Only copper, sulphate, nitrate, arsenic, and zinc concentrations are expected to increase for any period and increased concentrations of these parameters are not expected to result in a change in toxicity risk as:
  - Median nitrate concentrations are expected to stay under the 99% species protection threshold while 95th percentile concentrations are expected to remain between the 90% and 80% species protection thresholds.
  - Sulphate concentrations are not expected to exceed existing compliance standards when the assumed mitigations are employed. Dr Greers understands that these were set for ecological protection through whole of effluent toxicity testing (note, based on information provided with the second S92 response, even without mitigation the proposed activity is expected to reduce the effects of the activity in the North Branch of the Waikouaiti Rivers where the risk of sulphate compliance standard exceedance is greatest);
  - Median arsenic and zinc concentrations are still not expected to exceed the ANZG (2018) 95% species protection thresholds in any water body; and
  - Median copper concentrations are not expected to exceed the ANZG (2018) 95% species protection thresholds when the assumed mitigations are deployed.

However, Dr Greer notes that modelling suggests that there is a risk of more than minor copper toxicity effects in the NBWRRF site without these mitigations.

With respect to the existing compliance limits, Dr Greer agrees that none are expected to be exceeded at the monitoring locations in these catchments, noting that these are not considered protective of the environment.

As a general comment, Dr Greer notes that differentiating the future effects of the proposed activities from the future effects of otherwise authorised activities would be helpful to understand the relative contribution of MP4 to future effects.

9.7.3 Conclusions

Predictions for water quality suggest that in general current compliance limits can be complied with for most contaminants during mining and post-mining, although for the Deepdell Creek and NBWR catchments this relies on successful implementation of various mitigation measures. Compliance with existing consent limits does not speak to the magnitude of effects and is simply an indication that the numerical thresholds that apply to other consents affecting the catchments can be complied with. In fact, the current compliance limits provide for significant adverse effects.

However, most contaminants are also expected to remain below the relevant guidelines that are protective of ecological health. Metals are generally below the ANZG 95% DGV, which

would correspond to minor effects or less. The exceptions are at GB01 in Clydesdale Stream, where there is potential for more than minor toxicity effects from copper, and at the NBWRRF site where there is potential for more than minor copper toxicity effects if the assumed mitigations are not implemented or are not successful.

In my opinion, limited weight should be given to the 'selected mitigation' scenario in the NBWR catchment, because some of the mitigation measures would require authorisation by additional resource consents and the efficacy of, for example, the passive treatment systems, would require trials or further feasibility studies. The Applicant states that until the mitigation measures are in place they will pump seepage back to pits to ensure compliance with existing water quality compliance criteria. This is not the same as saying they will pump water back to ensure compliance with guidelines protective of good water quality or ecological health. Therefore, until the mitigations are in place I consider that there is potential for more than minor adverse effects on water quality in the NBWR catchment. There is a greater degree of certainty in the Deepdell Catchment, as all required consents are held to construct and operate the Camp Creek dam, and this is the only mitigation measure that is required to ensure that adverse water quality effects are appropriately constrained.

In the Mare Burn catchment, there is some uncertainty about the proposed future management of the Trimbells Silt Pond and Maori Hen Silt Pond and whether the buffer storage capacity will be retained indefinitely. This should be confirmed by the Applicant so that sulphate effects can be clarified. Additional uncertainty is introduced by the assumption that water quality does not deteriorate through the Trimbells WRS. The Applicant has agreed to install a toe drain and buttress to manage stability and seepage quality and has further agreed to undertake feasibility studies and detailed design for the preferred engineering solution, which may be an advective barrier (as was recommended by MWM) to reduce the potential ingress of oxygen through the WRS. The effectiveness of this solution would require further research to ensure that this water does not become a significant source of contaminant flux to Trimbells Gully. However, the Applicant does have available the option to construct and operate the Coal Creek dam to introduce dilution waters to the Mare Burn catchment. This dilution water was excluded from the modelling so any benefits of dilution would represent an improvement from the modelled scenarios.

Neither the GHD nor Ryder assessments were updated to reflect the additional mining in Coronation North that is proposed as part of this application. It is not clear if the GHD modelling considered the existing state of the Coronation North Pit or if it considered that the Coronation North Pit would be mined to the full extent enabled by the existing resource consent (soon to expire) when undertaking their assessment. Therefore, it is not clear if any predictions would change now that Coronation North mining is proposed. It is also noted that this application provides for the formation of a shallow pit lake in Coronation North Pit, should the pit not be fully backfilled. It is not clear how or if this has been taken into account within the GHD or Ryder assessments, noting that while the formation of a Coronation Pit Lake is provided for by existing consents, the scenario put forward in the MP4 assessment was for a backfill that sits proud of the Coronation North pit rim.

In summary, adverse water quality effects are likely to be no more than minor in the Mare Burn, Deepdell, and Shag catchments, but could be more than minor in the NBWR catchment.

9.8 Effects on Aquatic Ecology

Changes in flow or water quality can adversely impact aquatic flora or fauna through physical changes to instream habitat or through toxicity effects. Discharges of sediment and reclamations can also adversely impact on aquatic life through damage or loss of habitat.

The assessment below is presented as a cumulative assessment on a catchment scale.

9.8.1 Summary of Applicant Assessment

Mare Burn Catchment

Ryder states that there is nothing unique about the aquatic plant and periphyton communities of the Mare Burn or Trimbells Gully. Historically, since European colonisation, this has been a farming catchment with no protection of watercourses from stock access, resulting in nutrient inputs into surface waters and associated proliferations of plants and periphyton under favourable conditions. The proposed Coronation expansion will not exacerbate this situation.

A minor reduction in groundwater contribution to the Mare Burn catchment due to dewatering, and a minor increase in flow when the pit lake eventually reaches its overflow level after a post closure period of approximately 90 years, are anticipated. These minor changes in flow over time are unlikely to influence the ecology of local creeks because there are no physical changes to the watercourses and less than minor changes to water quality.

Bioavailable forms of nitrogen (primarily ammoniacal-nitrogen and nitrate-nitrogen) and phosphorous (dissolved reactive phosphorous), in sufficient concentration, can potentially cause nuisance algae and plant growths in surface waters. There is a predicted increase in bioavailable nitrogen in the mining and post-mining scenarios at some monitoring sites, and even current concentrations of bioavailable nitrogen at some sites are sufficient to promote nuisance growths if other environmental factors are variable. This is not uncommon in New Zealand catchments dominated by horticultural and pastoral farming practices. However, bioavailable phosphorus concentrations are low in surface waters draining the Macraes Gold Mine, and are low enough to be limiting growth. Future mining operations are not anticipated to cause increases in surface water phosphorus concentration, therefore algae and plant growths are not anticipated to degrade surface waters in the future, as a result of mining activities.

The benthic invertebrate communities of the Mare Burn have not altered materially since mining has commenced in the catchment. Indicators of ecosystem health (mayfly densities and QMCI scores), while fluctuating from year to year and season to season, have not shown any clear trends over time. The invertebrate community at TG01 shows some sign of degradation in 2021 and 2022 relative to 2017, however data for 2019 and 2020 indicate the community was as at least as healthy then as it was in 2017, and it is too early to establish whether any long-term trend is developing. There is no evidence to suggest that future mine induced water quality will significantly alter the composition of the benthic invertebrate community at Mare Burn monitoring sites.

Regular monitoring of stream ecosystem components at downstream monitoring sites since 2017 have not detected any significant adverse changes in ecosystem health, while the local Taieri flathead galaxiid population, if anything, appears to be increasing. This species has been shown to be resilient to elevated nitrate and sulphate concentrations and is not expected to be adversely affected by the anticipated increases in concentration over time. Predicted changes in water quality over the short to very long-term appear to remain largely

within existing compliance limits for the Mare Burn, apart from some occasional exceedances of the sulphate compliance limit for MB01. However, there is no evidence to suggest that fish populations will be adversely affected as a result of the proposed Coronation expansion.

However, it is too early to establish whether any long-term trends in local stream ecosystems are developing and continued monitoring of fish and benthic invertebrate communities is recommended. The Applicant has agreed to ongoing monitoring, although details of such monitoring are not specified in the application. Existing water quality compliance limits for the Mare Burn appear to be met both now and in the long-term future. Currently, there is no evidence to indicate that they are posing a threat to the local aquatic ecological community.

Deepdell Catchment

Some minor changes to surface water flows in the Deepdell Catchment are expected; however, these largely result from the separately authorised GPUG mining. Provided the mitigation options relied on in the GHD modelling are implemented, water quality changes are expected to be minor, and Ryder does not expect that the MP4 project will result in changes to the composition of the aquatic fauna of any affected streams.

NBWR Catchment

Dewatering Effects

Golden Bar Pit dewatering will be achieved by pumping the majority of the water to the Frasers Pit, with a small quantity being discharged to Golden Bar Creek. Consequently, changes to the benthic flora and fauna and fish communities are not expected. The discharge is for a relatively short period of time.

Ecology and habitat loss

The predicted changes in water quality during the operational and post closure phases of the Golden Bar mine are unlikely to alter the make-up of the benthic invertebrate and fish communities of local receiving waters. Golden Bar Creek appears to support a very small fish population in its headwaters near the Golden Bar Pit (only one eel has been observed in all surveys) and this is probably due to a periodic lack of water associated with drier months of the year. Field notes going back several years often note the difficulty in collecting invertebrate samples due to the lack of surface flow. Despite this, and stock access creating pugging in places, the benthic invertebrate community is relatively healthy with a higher presence of EPT taxa than at other monitoring sites in the upper Waikouaiti River North Branch catchment. Seepage water from the extended waste rock stack is not expected to make its way into Golden Bar Creek.

The extended Golden Bar Pit encroaches into the very top of the Golden Bar Creek for a distance of 120 m. The first 50 m or so is a constructed farm pond with an earth dam and below this is a boggy section of channel before a surface flow is visible. The riparian/wetland vegetation mosaic in this area will be lost.

Another watercourse on the opposite side of Golden Bar Pit, in the Clydesdale Creek catchment, would be directly affected by the expansion of the WRS. This stretch of river will be reclaimed and values/habitat permanently lost.

Surveys of the aquatic fauna in this general area of the catchment prior to the commencement of mining at Golden Bar found gullies to support very low densities of invertebrates dominated by snails (*Potamopyrgus*), which are tolerant of poor water quality

and habitat conditions, as evidenced by the low QMCI scores of between 2.9 and 3.3. Clydesdale Creek is not monitored regularly for ecology, but is much smaller than Golden Bar Creek and is also unlikely to support a fish community in its upper reaches. The upper headwaters of Clydesdale Creek was surveyed for fish and benthic invertebrates in 2002, prior to mining. No fish were captured or seen (Ryder Consulting 2002).

While stream ecology values associated with stretch of Clydesdale Creek and the riparian/wetland vegetation mosaic in the Golden Bar Creek headwater gully described above are low, Ryder recommends that an equivalent length of local (to the Macraes area) stream habitat with similar or potentially better ecological values, be identified and protected to offset the loss of the watercourses.

In summary, Ryder does not expect to see any changes in the composition of aquatic fauna of the streams and rivers affected by the MP4 proposal, provided the mitigation measures outlined in GHD are implemented and managed. On this basis, the Applicant considers that adverse effects on aquatic ecology will be no more than minor.

9.8.2 Summary of Technical Audit and Recommendations

The application and technical reports of relevance to aquatic ecology were audited by Michael Greer, Principal Scientist, Director at Torlesse Environmental Limited. Full comments can be found in the following memorandum:

- Surface water review – Oceana MPIV, dated 11 March 2025.

In the opinion of Dr Greer, the Ryder reports adequately describe the impacted receiving environments and their values. Algal and macrophyte effects assessments for the impacted streams are provided and, following updates through the s92 process, are considered to be adequate. Dr Greer states that the assessments of adverse effects on benthic macroinvertebrates and fish are 'light' but overall considers that they are adequate to enable an understanding of the potential adverse effects. Cumulative effects have been assessed, and following receipt of further information regarding the potential for increased periphyton growth associated with modelled increases in nitrate concentrations, Dr Greer agrees with the scale of the adverse effects as described in Ryder.

9.8.3 Conclusions

There appears to be no disagreement between the Applicant and Dr Greer about the potential adverse effects that the MP4 proposal may have on aquatic ecology. On this basis, I accept these expert opinions and find that adverse effects on aquatic ecology are likely to be no more than minor.

I would qualify this conclusion by reinforcing that the effects on aquatic ecology rely on future water quality being as predicted i.e. that contaminants generally remain below relevant water quality guidelines that are protective of ecological health. This future water quality is as predicted by models, which assumed that a number of important mitigation measures are implemented, particularly in the NBWR catchment. As noted in previous sections, some of these mitigation measures are not in place, may require additional resource consents to implement, and would require ongoing management to verify that they are as effective as expected. This introduces some uncertainty. The Applicant has stated that they will return seepage water to the mine water management system as required to remain within the existing compliance limits. Collecting and recycling mine impacted water is a

sensible action; however, only ensuring that water quality remains below existing compliance limits is a very low bar, as these limits allow for significant adverse effects.

9.9 Terrestrial Ecology Effects

Except as it relates to natural inland wetlands and NES-F specified setbacks around such wetlands, indigenous vegetation clearance does not require a land use consent from ORC. However, out of caution, the effects of the vegetation clearance on terrestrial ecology are assessed below because:

- Vegetation clearance is required to accommodate the extension of open pits, and the open pit extensions are directly enabled by the taking and diversion of water which require authorisation by regional resource consents.
- The pit extensions at Coronation, Innes Mills, and Golden Bar encroach upon natural inland wetlands, so a land use consent is required for the earthworks and vegetation clearance required to facilitate the extension in these areas.
- Vegetation clearance is required to accommodate the extension of the GBWRS.
- The activities requiring authorisation from regional and territorial authority are intrinsically linked and cannot realistically be implemented in isolation.

This section should be read in conjunction with the corresponding notification reports from WDC and DCC.

9.9.1 Applicant assessment

The impacts of the MP4 proposal on terrestrial ecology are reported on by Ahikā (now Whirika) in Appendices 15 and 16 and by Bioresearches in Appendices 17-19. Whirika consider the adverse effects on vegetation and avifauna, whereas Bioresearches consider effects on herpetofauna (lizards) and invertebrates.

As an overarching comment, I would note that there is inconsistent information in the various reports (and iterations of those reports) about the extent of vegetation, habitat, and fauna that will be impacted. To some extent it appears that this is a reflection of the difficulty in precisely measuring some of these features. Hence, the numbers presented below should be treated as approximations.

The level of ecological effect is described as set out in the EIANZ guidelines.[75] In their reports, Bioresearches explain that a level of effect that corresponds to Moderate, High or Very High is generally accepted by ecologists to constitute a 'significant ecological effect' under the RMA and it is usual for a 'Very High' level of effect to trigger re-design or avoidance. A Low or Very Low level of effect is usually considered to correspond to a 'minor ecological effect' or 'less than minor ecological effect', respectively under the RMA. A level of effect of Moderate or higher generally requires mitigation measures to reduce the level of effect.

Coronation Mining Area

The proposed activities in the Coronation 6 area involve the extension of Coronation Pit and the excavation of a spillway channel to direct future pit lake overflow into a tributary of Camp Creek, as well as the construction of a toe drain and buttress at the base of Trimbells WRS.

Matters of importance in the Coronation area are:

[75] EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems.

- 2.77 ha of the Coronation mining area is identified as a Threatened Land Environment of New Zealand (LENZ) environment.
- The ephemeral wetlands at Coronation are Critically Endangered Natural Ecosystems.
- The tussockland, shrubland, wetland, riparian and ephemeral wetland vegetation communities present in the project areas are considered significant under the partially operative and proposed Otago Regional Policy Statement and the Waitaki District Plan and would qualify as Significant Natural Areas under the criteria in the National Policy Statement for Indigenous Biodiversity.

The activities at Coronation will involve the permanent loss of one previously impacted ephemeral wetland, 0.06 ha in area. Dewatering of the Coronation Pit will also result in further changes to 0.16 ha of ephemeral wetland within the buffer area. This will likely shift the vegetation away from a community typical of long-inundation ephemeral wetlands to one more characteristic of short-inundation ephemeral wetlands mostly comprising the same species as currently, but at lower stature, with a higher preponderance of exotic pasture grasses such as Yorkshire fog and browntop. It is therefore assumed that these wetlands will be lost entirely. Whirika anticipates the impact of this Project on ephemeral wetlands will result in an approximate 0.9% reduction in extent of the vegetation community in the Macraes ED and about a <1.1% reduction in the number of sites within the Macraes ED. The overall level of effect is described by Whirika as very high. This wetland loss cannot be avoided, minimised, or remedied. Effects on wetlands in the buffer zone can be to some extent minimised by fencing. However, total loss is assumed because of hydrological changes.

The Coronation activities will result in the removal of some rare species of plants. Effects of this removal are assessed as moderate by Whirika.

The activities at Coronation will result in clearance, and permanent removal, of approximately 3 ha of semi-natural or indigenous vegetation. This includes 3 ha of narrowleaved tussock grassland which represents 0.1% of the extent of this vegetation community in the Macraes Ecological District. In addition, there may be some effect on the surrounding vegetation on 7.3 ha of indigenous vegetation in the buffer zone. Whirika assess the magnitude of the Project's impact on this vegetation community at a local scale to be low.

Excavation of the CO6 Pit will also result in the permanent loss of 0.03 ha of riparian/wetland vegetation mosaic. Pit dewatering is likely to result in changes to around 0.2 ha of the vegetation community within the buffer area. This will shift the vegetation community in this area towards a drier community with higher preponderance of pasture grasses and a reduction, and eventual loss, of more water dependent species such as the pukio. The magnitude of the Project's impact on this vegetation community at a local scale is assessed by Whirika as low.

Effects on invertebrates and lizards are considered separately below.

Golden Bar

Matters of importance in the Golden Bar area are:

- 28.2 ha of the Golden Bar area are identified as a Threatened Land Environment of New Zealand (LENZ) environment.
- The tussockland, shrubland, wetland, riparian and wetland vegetation communities present in the project areas are considered significant under the partially operative and

proposed Otago Regional Policy Statement and the Waitaki District Plan and would qualify as Significant Natural Areas under the criteria in the National Policy Statement for Indigenous Biodiversity.

The Golden Bar component of the MP4 Project will involve the clearance, and permanent removal, of approximately 28.2 ha of semi-natural or indigenous vegetation classified as a threatened LENZ. Development of Golden Bar Pit extension and the GBWRS extensions will lead to the permanent loss of 27.3 ha of narrow-leaved tussock grassland, with some effect on the 35.9 ha in the 100 m buffer. In addition, 0.06 ha of shrubland is expected to be permanently lost from the area. The level of effect associated with the loss of the tussockland is high; the loss of shrubland has a low level of effect.

The Golden Bar Pit activities are also expected to result in the permanent loss of 0.87 ha of riparian/wetland vegetation mosaic which includes approximately 0.008 ha of natural wetland vegetation, as well as another 0.08 ha area of natural inland wetland. Dewatering is likely to result in changes to around 0.1 ha of similar vegetation in the buffer area. This will shift the vegetation community in this area towards a drier community, with a higher dominance of pasture grasses, and reduction and eventual loss of more water dependent species, such as the pukio. Sediment runoff could have a moderate effect on 0.12 ha of the riparian vegetation in the gullies existing in the Golden Bar WRS. These activities have a low level of effect, as assessed by Whirika.

The loss of vegetation described above will subsequently result in loss of habitat for the New Zealand falcon, pipit, harrier hawk, spur-winged plover and paradise shelduck. Therefore, the proposed activities will result in some disruption to local bird populations. Whirika considers that the level of effect on New Zealand falcon and pipit is high.

Effects on invertebrates and lizards are considered separately below.

Central Mining Area – FTSF and Innes Mills

The proposed activities in the Frasers-Innes Mills area will lead to the permanent loss of 0.2 ha of tussock grassland, 0.27 ha of riparian/wetland vegetation mosaic including 0.16 ha assessed as being a natural inland wetland, as well as 7.3 ha of pasture communities. The loss of vegetation described above will lead to the temporary loss of habitat for pipit, spur-winged plover and paradise shelduck.

Overall, Whirika considers that there is a low level of ecological effect from all activities in this area.

Effects on invertebrates and lizards are considered separately below.

Golden Point Backfill Buttress, Northern Gully WRS Rehandle, and Golden Bar Road Realignment

Whirika considers the construction of the Golden Point Backfill Buttress will not create any adverse effect on the site's avifauna or vegetation provided rockfall into the shrubland from the buttress slopes is managed. In addition, Whirika considers it is unlikely excavation of the Northern Gully WRS will result in impacts on pipit.

Roadworks associated with construction of the Golden Bar Road realignment will result in the permanent loss of 0.1 ha of narrow-leaved tussock grassland. There may also be some potential effects on 0.3 ha of sparse narrow-leaved tussock grassland in the buffer area. In

addition, the proposed activity could increase sediment inflows to one fenced example of a moderate-diversity naturally uncommon ephemeral wetland of 0.7 ha in the buffer area. However, this type of habitat is not sensitive to sediment deposition, and any effect is likely to be manageable using commonly used mitigation techniques such as silt-intercept barriers. Overall, Whirika considers that the effect of the Golden Bar Road Realignment on the narrow leaved tussock grassland and ephemeral wetland communities have a low level of effect. Optimisation of the road alignment and detailed design will further mitigate potential adverse effects.

Lizards

Potential adverse effects of the proposed project on local herpetofauna extend to two 'At Risk' (korero gecko and tussock skink) and one 'Not threatened' (McCann's skink) taxa confirmed to be present in the ZOI. In addition, there are historical records of a further five threatened or 'At Risk' lizard species from the surrounding landscape. Therefore, it is possible that impacts may extend to additional threatened or 'At Risk' species if they are later found to be present in any of the project components.

Potential direct effects on approximately 124 ha of land, including approximately 90 ha that supports suitable lizard habitat (the remaining 34 ha represents unsuitable mine workings and open water), within the ZOI impact footprint are anticipated. Potential direct effects include:

- Injury to or mortality of native lizards, including 'At Risk' taxa;
- Direct and permanent loss of lizard habitat and associated resources;
- Displacement of resident native lizards into adjacent habitat that may already be at population carrying capacity or may be of lower habitat quality;

Potential indirect effects on approximately 105 ha of land, including approximately 79 ha that supports suitable lizard habitat (the remaining 26 ha represents unsuitable mine workings and open water), within the buffer zone are anticipated (Table 4.6). However, there is a moderate level of uncertainty around the magnitude of these impacts as adequately quantifying them is inherently difficult. Potential indirect effects include:

- Increase in habitat edge effects and habitat fragmentation;
- Reduction in ecological connectivity/ corridors due to fragmentation;
- Disturbances within the buffer zone of the ZOI due to increased noise, vibrations, sediment run-off, dust creation, and artificial lighting;
- Loss of areas available for restoration and improvement of ecological corridors across the landscape.

The staged implementation approach to the Macraes mine has to date impacted over 2,000 ha of land, an unknown portion of which previously supported indigenous vegetation and habitat for lizards. For each stage of the MP4 project, impact management has been undertaken to address project stage effects. However, cumulative environmental impacts resulting from many different, often individually insignificant, or unaccounted for, effects or because of failures in previously implemented effects management can accumulate over time to produce an overall effect greater than envisioned at each project stage. In addition, non-project related effects potentially resulting from surrounding land use practices such as pastoral farming activities (e.g., conversion of tussock to grazing pastures) can act in conjunction with project effects to generate unforeseen ecological impacts over the longer term.

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Bioresearches states that cumulative effects are usually neither measured nor accounted for because they are difficult to discern. Yet it is important to consider the impacts of the proposed activity, in conjunction with the effects of existing activities and over time (after avoiding, remedying, and mitigating), to understand a project's overall level of impact. The assessment of cumulative effects requires the consideration of appropriate temporal and spatial boundaries for the assessment, and consideration of the interactions of the ecological effects of the project along with past and future activities. One type of cumulative effect is incremental habitat loss (permanent or effective) or degradation or fragmentation, which can be difficult to assess on a project-by-project basis.

For the MP4 project, in the context of cumulative effects on native lizards, Bioresearches consider that an appropriate temporal scale would be the date prior to the establishment of the mine in 1990 through to 2030 (the current proposed LOM). An appropriate spatial scale for consideration of cumulative effects is the Macraes ED. With respect to potential future effects, further staged implementation of the mine, ongoing agricultural pressures in the surrounding landscape, and general habitat degradation through spread of pests, weeds, and diseases are expected to cause potential disturbance to or reduce available habitat for lizards and/ or maintain declining population trends.

At least three (possibly four) species of lizard (Otago, grand and Otago green skink) previously reported on OceanaGold's Macraes landholdings have seemingly declined to extinction or near-extinction in recent decades and all except one species found in the ZOI are in a state of population decline. Furthermore, extensive areas of high-quality lizard habitat (e.g., complex rock tor features, native tussockland, and riparian habitats) have been cleared or converted over the decades to accommodate mining and agricultural practices. The cumulative impact of these historical effects, in conjunction with those anticipated from the MP4 Stage 3 project, could have long-term consequences for native lizard populations and their habitats if impacts are not appropriately mitigated. Bioresearches state that, while no dedicated attempts have been made to quantify cumulative impacts, due to the complexity and uncertainty surrounding cumulative impact analysis, historical impacts have been considered in assigning magnitude of effect.

Based on the current assessment, the project would result in the direct mortality of an undetermined number (likely high thousands) of native lizards, including the loss of individuals of 'At Risk' taxa, within the project footprints. The proposed project would also result in the permanent loss of approximately 73 ha of identified lizard habitat, much of it occupied by native lizards (including 'At Risk' and 'Not Threatened' taxa). At least 12 irreplaceable rock tors/ rock tor complexes would be lost. In addition, potential indirect, temporal, and unquantified impacts may affect up to 79 ha of suitable or potentially suitable lizard habitat, including 71 high quality rock tors, in the buffer zone.

On a landscape scale, the impacted areas are relatively small compared to the availability of habitat for native lizard taxa within the local (< 1% of land within OGL Macraes landholdings) and Macraes ED (< 0.5%) landscapes. However, considering the potential additive or cumulative effects of historical and future land conversion and habitat clearance, the scale of the impact on local lizards is likely to be higher.

The level of effects on native lizard populations and their habitats within the project area, prior to measures to avoid, remedy, or mitigate, range from Very low to High. The level of effect on lizards is low to very low at coronation and coronation north, northern gully waste

rock stack, Innes Mills Pit extension, Golden Point backfill buttress, and Golden Bar Road realignment. The level of effect is high at Golden Bar Pit extension and GBWRS. These effects are prior to any measures to avoid, remedy, or mitigate effects.

The Whirika Impact Management Plan considers that adverse effects on lizards can to some extent be minimised by salvaging lizards and translocating them to a protected area, and that effects can to some extent be remedied by rehabilitating lizard habitat on waste rock stack and rehabilitating exotic vegetation communities inhabited by lizards. Even after these measures, the residual adverse effects are considered to be more than minor.

Invertebrates

An invertebrate survey of the MP4 Project area were undertaken by ecologists in April, May, and September 2022 to inform an assessment of invertebrate values and effects. A total of 748 individual specimens were recorded during the survey, using moth light trapping, sweep netting, hand-searching, and opportunistic sighting techniques. Fourteen taxonomic orders were recorded, and 56 taxa were assigned to either a genus or species level identifications.

Most of the species identified in the sampling were endemic, common, and widespread; however, one threatened 'Nationally Vulnerable' moth species (Crambidae: *Orocrambus sophistes*) was caught in the GBWRS area. This species is endemic to New Zealand and has a very localised distribution (confined to the inland drier Mackenzie and Central Otago areas of the South Island). It is thought to feed exclusively on tussock grasses. Therefore, the potential effects of the proposed project on the local invertebrate communities extend to at least one threatened species. The presence of 'at risk' species cannot be disregarded, and a conservative approach has been taken when considering the effects.

Potential direct effects on approximately 124 ha of land, including approximately 90 ha that supports suitable invertebrate habitat (the remaining 33 ha represents unsuitable mine workings), within the ZOI impact footprint are anticipated. Here all habitat values would be permanently lost.

- Loss of habitat and associated resources;
- Invertebrate mortality during physical works (particularly to threatened species); and
- Loss of invertebrate contributions to ecosystem functioning.

On a wider landscape scale, it is estimated that the direct loss of invertebrate habitat from the surrounding local landscape (i.e., within OceanaGold Macraes landholdings) and from the Macraes ED, would be in the order of < 1% and < 0.5%, respectively.

Potential indirect effects on approximately 105 ha of land, including approximately 79 ha that supports suitable invertebrate habitat (the remaining 26 ha represents mine workings), within the buffer zone are anticipated. However, there is a moderate level of uncertainty around the magnitude of these impacts as adequately quantifying them is inherently difficult.

- Increase in habitat edge effects and habitat fragmentation;
- Reduction in ecological connectivity/corridors due to fragmentation;
- Disturbance within project buffer zones due to increased noise, vibrations, sediment run-off, dust, artificial lighting, etc; and
- Loss of areas available for restoration and improvement of ecological corridors across the landscape.

For the MP4 project, in the context of cumulative effects on native invertebrates, an appropriate temporal scale would be prior to the establishment of the mine in 1990 through to 2030 (the current proposed LOM). An appropriate spatial scale for consideration of cumulative effects is the Macraes ED. With respect to potential future effects, further staged implementation of the mine, ongoing agricultural pressures in the surrounding landscape, and general habitat degradation through spread of pests and weeds are expected to cause potential disturbance to or reduce available habitat for invertebrates and/ or maintain declining population trends.

Due to the limited information available on invertebrate species and populations at the Macraes mine, it is not possible to determine whether any species have declined to extinction or near-extinction in recent decades as a result of mining. One species recorded in the ZOI is nationally threatened and while the reasons for decline of this species is unclear, habitat loss from farming and mining is likely to be a contributing factor. Extensive areas of habitat for invertebrates (e.g., native tussockland, shrubland, and riparian habitats) have been cleared or converted over the decades to accommodate mining and agricultural practices. While no dedicated attempts have been made to quantify cumulative impacts, due to the complexity and uncertainty surrounding cumulative impact analysis, historical habitat loss has been considered in assigning magnitude of effect.

Based on the current assessment, the project would result in the direct mortality of an undetermined and indeterminate number of endemic and native invertebrates, including the potential loss of an unknown quantity of individuals of a 'Nationally Vulnerable' species.

Due to a current lack of available information regarding distribution, range, populations, and abundance of the threatened moth species recorded, the true magnitude and overall level of effect on the local and regional populations of these species is unable to be quantified. In total, there is expected to be a direct loss of ~90 ha of suitable invertebrate habitat across all habitat types within the proposed project footprint areas. Project impacts are anticipated to be greatest at the Golden Bar WRS, which supports habitats used by the 'Nationally Vulnerable' moth *O. sophistes,* and in other project areas where larger areas of tussockland, riparian vegetation, and rock tors would be lost (e.g., Golden Bar Pit).

On a landscape scale, the impacted areas are relatively small compared to the availability of habitat for invertebrate taxa within the local (< 1% of land within OGL Macraes landholdings) and Macraes ED (< 0.5%) landscapes. On a national scale, the effects are likely to be negligible. However, considering the potential additive or cumulative effects of historical and future land conversion, habitat clearance, and growing use of agricultural pesticides the scale of the impact on local invertebrates is likely to be higher.

The level of effects on invertebrate populations and their habitats within the project area, prior to measures to avoid, remedy, or mitigate, range from Very low to High. Specifically, the level of effect on invertebrates is low to very low in all areas except for the Golden Bar Pit extension, where moderate adverse effects are expected, and the GBWRS where a high level of effect is expected.

The Whirika impact management plan considers potential remediation options such as the restoration of invertebrate habitats on capped waste rock stacks or reversion of pastural land to native vegetation on OGL landholdings to replenish invertebrate habitat within the surrounding landscape. Specifically with respect to the 'Moderate' or 'High' 'Level of Effects'

on the 'Nationally Vulnerable' moth at Golden Bar, Whirika proposes to salvage the host plant and undertake research on the habitat of *Orocrambus sophistes* to inform habitat re-creation or enhancement opportunities in a protected site. These activities will contribute to reducing the level of impact on *Orocrambus sophistes*. However, adverse effects remain more than minor after these measures are implemented.

The Whirika impact management plan initially described the salvage of the *Orocrambus sophistes* host plant and undertake research to inform habitat recreation or enhancement opportunities in a protected site outside the project footprint as a measure to minimise effects. However, this action is reliant on research, and thus its effectiveness as a minimisation measure is unknown. Hence, Whirika reclassified the research component as a compensation measure but retained the salvage and recreation of habitat as a minimisation measure.

In summary, this project will (outside of existing consented areas):

- Remove 37 ha of indigenous or semi-natural vegetation comprised of narrow-leaved tussock grassland, shrubland, riparian/wetland vegetation mosaic including 95 m of natural river bed and 335 m of induced river bed (430 m in total) and portions classified as natural inland wetland, and ephemeral wetlands inhabited by 128 indigenous plant species (including fourteen rare species), and which also provides habitat for 11 indigenous bird species, (including one Threatened and two At Risk species).
- Directly impact 45 ha of improved pasture, pine forest (felled), exotic rough pasture and rehabilitated rough exotic grassland on the Northern Gully WRS.
- Potentially affect the surrounding vegetation resulting from project activities extending up to 100 m beyond the project area, containing 51 ha of indigenous vegetation.
- Impact a large but unknown number (likely high 1,000s) of three species of native reptile and their habitats, two of which are listed as At Risk.
- Impact on invertebrate communities inhabiting natural vegetation communities, including one Threatened species.
- Impact on 1.94 ha of wetland and riparian/wetland vegetation mosaic, of which at least 0.708 ha is natural inland wetland and 0.12 is ephemeral wetland.

Overall, without taking into account impact management measures, the Applicant describes the MP4 project as having a low or moderate effect on most of the terrestrial ecological features. The exception to this is a very high impact on three ephemeral wetlands at the Coronation 6 that are critically endangered naturally uncommon ecosystems, a high impact on tussockland, desert broom, NZ falcon, the moth *Orocrambus sophistes* and pipit at Golden Bar, and a high level of effect on native lizards at Golden Bar Pit and Golden Bar Waste Rock Stack.

9.9.2 Summary of Technical Audit and Recommendations

The application and the technical reports of relevance to terrestrial ecology effects were audited by Glenn Davis, Managing Director e3 Scientific. Full comments can be found in the following memorandum:

- Technical review, dated 4 March 2025.

Mr Davis considers that the technical information is robust for most aspects, although the findings of the invertebrate assessment is limited by methodology and timing of the survey.

The vegetation communities are mapped well, and the bird and lizard and invertebrate species present seem well characterised. The setting of a 100-metre buffer for the zone of influence seems reasonable given the nature of the activity and the species present. Mr Davis considers that it is unlikely effects on avifauna, lizards, invertebrates, and indigenous vegetation would occur outside the 100 m buffer.

In terms of methods, Mr Davis states that the floristics and vegetation survey methods are well set out in the Ahikā report, and this was supplemented by plans showing the areas that were traversed on foot. Ahikā also provided an assessment of abundance of the plant species recorded. Mr Davis considers that the methods used will have appropriately characterised the floristic values of the project area. The avifauna survey work (consisting of a single walk through) appears reasonable for the nature of the bird species likely to be present. It is noted that additional surveys would have been helpful at different times of the day and year to determine if there is variability in species present and bird numbers. Notwithstanding this point, Mr Davis finds that the information provided is sufficient given the experience Ahikā has in surveying birds in the Macraes area.

The ecological impact assessment utilises the EIANZ guidelines. This is considered appropriate. The ecological effects assessment is based on an assigned ecological value and the magnitude of the disturbance to each ecological element assessed. Mr Davis agrees with the assignment of ecological values but states that there is a reasonable amount of uncertainty regarding the magnitude of effect. This is acknowledged in the Ahikā assessment where it addresses confidence in the assessment. In many cases the confidence in the assessment is characterised as moderate or moderate-low. Additional analysis would have been helpful to understand the extent of vegetation communities or prevalence of species in order to reach a stronger conclusion on the magnitude of effect. Mr Davis suggests that more detailed mapping of riparian vegetation, wetlands and tussock grassland would improve confidence in the assessment.

In the opinion of Mr Davis, the effects management hierarchy has been applied appropriately; however, it is unclear if avoidance of riparian vegetation has been considered.

In terms of effects on lizards, Mr Davis states that the nature of adverse effects and scale of habitat loss is adequately described. Cumulative effects are discussed in Bioresearches, but it is unclear how this has been taken into account in the assessment. The lizard salvage proposal is based on sound rationale, and the difficulties in establishing lizard populations are acknowledged.

Mr Davis states that the value of the invertebrate assessment is undermined by the timing of the survey and the collection methodologies used. This is well described in Section 3.1.3 of the Bioresearches report (Appendix 19). Cumulative effects have been discussed in the impact assessment, but it is unclear how this has been incorporated into the assessment. Notwithstanding the above, given the information available Mr Davis agrees with the characterisation of the ecological values and the magnitude of effects assigned to the various project components.

Mr Davis does however disagree with the overall characterisation of terrestrial ecological effects given in section 5.6.9 of the AEE, which states that:

"For the most part, the MP4 Project is assessed as having a low or moderate effect on the terrestrial ecological features examined by Ahika."

Mr Davis considers that this incorrectly categorises the ecological effects. This is because the Golden Bar WRS will result in a high level of effect on tussock grassland, lizards, and invertebrates and this is by far the largest area of disturbance within the MP4 project where most of the adverse effects on terrestrial ecology will occur.

In terms of recommendations, Mr Davis notes:

- The Ecological Impact Management Plan is a high-level document. It does not provide the detail as to how each of the mitigation, remediation, offset or compensation measures will be implemented. All of these elements will require objectives, clearly set out implementation measures, monitoring requirements and adaptive management strategies to ensure they meet the consent conditions, which have not yet been proposed.
- The absence of proposed consent conditions limits the confidence in the proposed management of the activities. The consent conditions will be critical to providing the regulatory authorities with confidence that the implementation, monitoring, and long-term management of the Murphys Ecological Enhancement Area, and other aspects of the offsetting and compensation package, can be achieved and maintained into the future.

9.9.3 Conclusions

There is a good level of agreement between technical experts as to the potential adverse effects of the MP4 proposal, and any uncertainties in the characterisation and proposed management of adverse effects are appropriately identified.

It is evident that the proposal will have more than minor adverse effects on terrestrial ecology even after measures to minimise or remedy effects are considered. In particular, there will be a high level of effect on tussock grassland, lizards, invertebrates, and some bird species, and a very high level of adverse effect on ephemeral wetlands in the Coronation area, which are critically endangered natural ecosystems. I agree with Mr Davis that the Applicant's summary of the project's adverse effects as generally low or very low, with some exceptions, is not an appropriate characterisation of effects. The majority of effects will occur in the Golden Bar area, and most of these will have a high level of adverse effect. Additionally, a substantial proportion of the affected areas are classified as LENZ and Significant Natural Areas. Therefore, I consider a better description would be that the project as a whole will result in a high level of adverse ecological effect, with some exceptions where a lower level of effects is expected.

I note that the Whirika reports appear to incorrectly apply the effects management hierarchy as set out in the NPS-FM and the NPS-IB. Both of these national policy statements require that the hierarchy be applied in the specified order, which is:

- Avoid
- Minimise
- Remedy
- Offset
- Compensate

The Whirika assessment appears to prioritise remediation over minimisation (described in Whirika reports as mitigation) and I believe this to be an incorrect application of the

hierarchy. I would also note that the majority of the measures that Whirika states have been taken to avoid adverse effects do not actually avoid (or reduce) the adverse impacts of the proposed activities. Instead, they are better described as alternative versions of the project that were ultimately not put forward for inclusion in this application due to their unacceptable adverse effects.

While not related to this assessment of adverse effects, I would also raise at this time what I see as a fundamental issue with the proposed management of ecological effects. My specific concern relates to the proposal to compensate for more than minor residual adverse effects on the moth *Orocrambus sophistes* which I understand to be threatened species. As set out in various relevant statutory documents, ecological compensation is not appropriate in the following situations:

From NPS-IB Appendix 4:

(a) the indigenous biodiversity affected is irreplaceable or vulnerable;
(b) effects on indigenous biodiversity are uncertain, unknown, or little understood, but potential effects are significantly adverse or irreversible;
(c) there are no technically feasible options by which to secure a proposed net gain within acceptable timeframes.

From Otago Regional Policy Statement 2019, Policy 5.4.6A:

(a) The loss of an indigenous taxon (excluding freshwater fauna and flora) or of any ecosystem type from an ecological district or coastal marine biogeographic region; or
(b) Removal or loss of viability of habitat of a threatened or at risk indigenous species of fauna or flora under the New Zealand Threat Classification System.

From proposed Otago Regional Policy Statement 2021, Appendix 4

(a) the indigenous biodiversity affected is irreplaceable or vulnerable;
(b) effects on indigenous biodiversity are uncertain, unknown, or a little understood, but potential effects are significantly adverse or irreversible;
(c) there are no technically feasible options by which to secure a proposed net gain within acceptable timeframes.
(d) the loss from an ecological district of Threatened taxa, other than kanuka (Kunzea robusta and Kunzea serotina), under the New Zealand Threat Classification System (Townsend et al, 2008); or,
(e) removal or loss of viability of the habitat of a Threatened indigenous species of fauna or flora under the New Zealand Threat Classification System (Townsend et al, 2008).

The Applicant should give further consideration to these matters.

9.10 Air Quality Effects

Adverse air quality effects at the MGP are predominantly associated with dust, or particulate matter, from the handling and transport of waste rock or ore. Adverse effects may also be associated with combustion emissions from the operation of machinery and vehicles, but these effects will be comparatively small.

I would note that the for the Coronation North, Coronation, and the Frasers and Innes Mills mining activities, the Applicant has applied to vary the conditions of the existing discharge permits. The specific variations proposed are:

- Alter the general condition requiring the activity to be exercised in accordance with plans to include a reference to the MP4 proposal; and
- Include a new condition to impose new (lower) trigger limits for total suspended particulate matter.

At Golden Bar, a new discharge permit is sought.

The discharge permits being varied all expire 31 Aug 2032. The term sought for the new permit at Golden Bar is to align with this date. This will enable consideration of a site wide air discharge permit in 2032.

Adverse effects are only considered for activities occurring until 2032.

.10.1 Summary of Applicant Assessment

The nature of effects

An air quality assessment was undertaken by Beca (Appendix 29). This found that the predominant discharges from the site are dust, or particulate matters from the handling and transport of waste rock and ore.

The potential adverse effects from the discharge of dust (particulate matter) include:

- Health effects generally associated with exposure to contaminants associated with dust,
- Health effects from exposure to inhalable dust (as these finer particles can penetrate the nose and mouth if inhaled and can enter the lungs and respiratory tract),
- Nuisance effects generally associated with deposited dust and the coarser fraction of Total Suspended Particulates (**TSP**) such as soiling, effects on amenity and visibility, and
- Effects on ecosystems

Dust discharges from mine activities typically produce larger particle sizes with an aerodynamic diameter of 100 micrometres (**µm**) or greater. These are generally referred to as 'deposited particulates'. Such dust particles would only travel tends of metres from the source under steady winds of 10 m/s and fall out of suspension in the air thereafter settling or depositing onto surfaces. As a class of material, deposited particulates have only minimal physical health impacts (due to limited penetration into the respiratory tract). Hence, in this case, the primary environmental concern is the potential nuisance effects that these discharges may have on neighbouring residents.

Although the predominant discharge will be of deposited particulates, some finer particulates, such as particulate matter with a diameter of less than 10 µm (**PM_{10}**) and less than 2.5 µm (**$PM_{2.5}$**) will make up a proportion of dust discharged, and also be discharged from vehicles and combustion-based equipment. Additionally, the products of combustion, such as sulphur dioxide (**SO_2**), nitrogen oxides (**NOx**) and carbon monoxide (**CO**), will also be discharged from the operation of machinery and vehicles.

The management of effects

The major factors that influence dust emissions from the project activities are:

- Wind speed across the surfaces of exposed soil, excavations or material stockpiles – the critical wind speed for pickup of dust from surfaces is 5 m/s; above 10 m/s loose material pickup increases rapidly,
- The percentage of fine particles in the material on the surface,
- Moisture content of the material and on the surfaces,
- The area of exposed surfaces,
- Mechanical disturbances such as traffic movements, excavation, loading and unloading of materials including drop height, and
- Vehicle speeds.

The Applicant controls dust from these activities by:

- Minimising traffic movements and controlling vehicle speeds to a maximum of 60 km/h on haul roads,
- Adhering to load sizes to avoid spillages,
- Minimising travel distances through appropriate site layout and design,
- Keeping tailings impoundment, pit and haul road maintenance up to date, such as repair of potholes and the laying of fresh gravel or surfacing material, and
- Keeping haul road and exposed surfaces damp during dry conditions with water carts or fixed sprinklers.

Systems for controlling dust emissions need to include methods that modify the condition of the materials so that it has a low tendency to lift with the wind or from disturbances such as vehicle movements, and methods that reduce the velocity of the wind at the surface. The greater the area of exposed material, the greater the potential there is for dust emissions. The smaller the particle size on an exposed surface, the more easily the particles can be picked up and entrained in the wind.

Watering of exposed surfaces and materials that may be disturbed is a primary method of control. Moisture binds particles together preventing them from being disturbed by wind or vehicle movements. The Applicant also maintains and adheres to a Dust Management Plan which applies to various consents authorising air discharge activities on the site.

<u>The monitoring of effects</u>

As required by conditions of the current resource consents, the Applicant undertakes air quality monitoring as follows:

- Dust deposition rates at monthly intervals at 16 sites,
- Real time TSP concentrations at monitoring site DG07 Horse Flat Road, site DG11 Macraes Road (short term programme, now ceased) and site DG15 Macraes Township (ongoing),
- Continuous meteorological monitoring at two representative locations (i.e. sites DG03 mixed tailings dam/offices and DG15 Macraes township),
- Daily record kept of water used for dust suppression.

Additionally, the Applicant monitors weather forecasts, the condition of potential dust generating areas and undertakes additional dust deposition and TSP monitoring. A full description of the air quality monitoring currently undertaken and proposed can be found in Appendix 29 of the application.

The Applicant proposes to continue with the same monitoring programme for the consents being varied, and (presumably, but not yet confirmed by proposed consent conditions) apply

the same programme to the Golden Bar area. However, in keeping with current good practice, the Applicant has agreed to include a 80 µg/m^3 TSP (24 hour average) trigger level monitoring requirement at the existing dust monitoring sites DG15 and DG07. Additionally, the Applicant proposes a short-term PM_{10}/TSP trigger at DG15, similar to what is in place at DG07.

Predicted Effects on Sensitive Receptors

The relevant sensitive receptors were described in Section 6.9 of this report. In summary:

- Most nearby dwellings are clustered near Macraes township and are approximately 1.7 km from Innes Mills West or FRBF. Residential receptors are considered to have medium-high sensitivity to dust.
- The Macraes Moonlight Primary School is also located in the Macraes township. This school is located approximately 1.8 km from Innes Mills Pit. The GPG Dust classifies schools as having a high sensitivity to dust nuisance effect.
- The township also includes several historical buildings including the Stanley's Hotel and the Macraes stables, which are both owned by OGNZL. These receptors were not given further consideration by Beca.
- The Golden Point Reserve and Callery's Battery historic landmarks are located to the northwest of Golden Point Pit. However, both landmarks are more than 2.4 km from IMW and 2.9 km from Coronation South Pit. Therefore, any dust emitted from the proposed activities is highly unlikely to have any adverse effect at these locations. These historic landmarks are considered to have a moderate level of sensitivity.

Discharges of dust and particulates from diffuse sources are not easily quantifiable by modelling techniques. The Beca assessment therefore focussed on results of current monitoring and mitigations for similar activities at the MGP, in accordance with the Ministry for the Environment's *"Good Practice Guide for Assessing Discharges to Air from Industry"* and *"Good Practice Guide for Assessing and Managing Dust".*

Coronation

Figure 28 and Figure 29 show the location of sensitive receptors in relation to the Coronation and Coronation North mining areas. Beca find that, given the separation distance between Coronation Pit, the Coronation North backfill and these receptors, any dust emission from the Pit extension, or other existing operations further away from the receptors, would be expected to have negligible impact on air quality amenity at these receptors. Taking into consideration the FIDOL factors and site dust management techniques used on site, emissions from the project are not expected to have an adverse effect outside the site boundary (OGL owned land) which is at least 1 km from the operations.

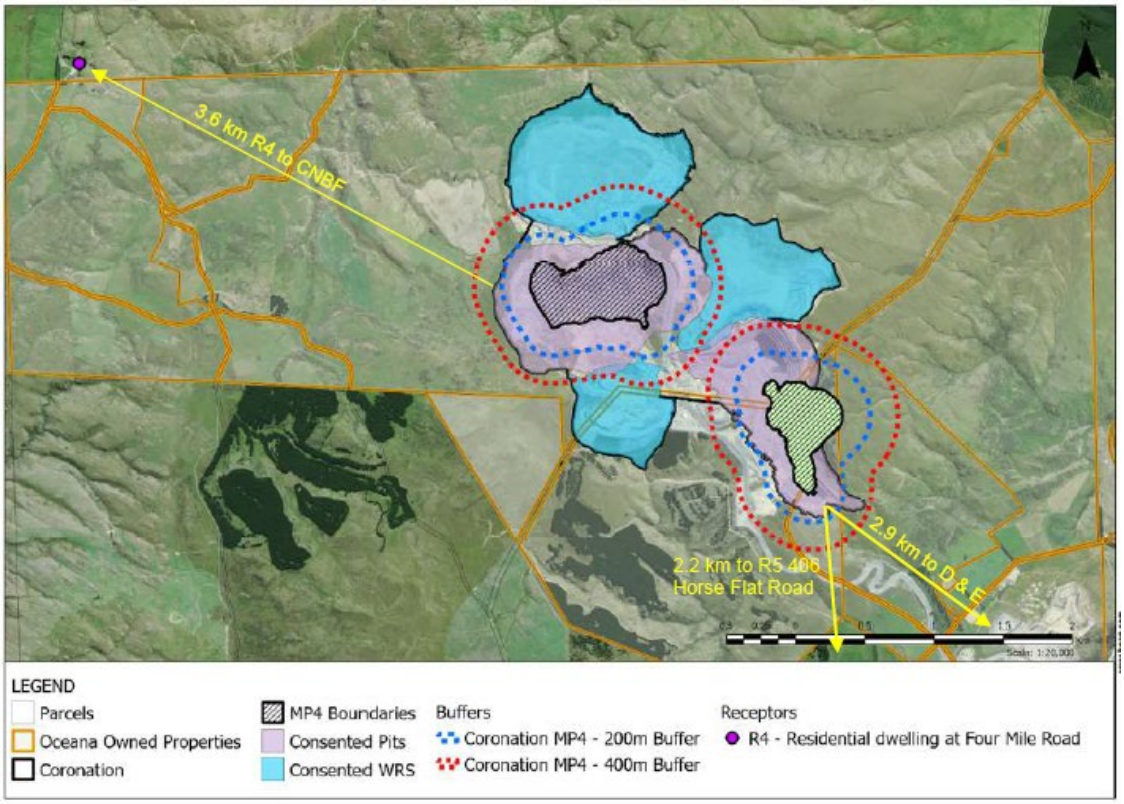

Figure 28 Nearby sensitive receptors to Coronation mining area. Source: RM24.184 Appendix 29.

Receptor	Location relative to nearest dust source	Residual source emissions	Pathway effectiveness	Dust impact risk	Receptor sensitivity	Likely Magnitude of dust effect
R4 Four Mile Road	3.6 km northwest of Coronation North Backfill.	Large	Ineffective	Low risk	High	**Slight adverse effect**
R5 Resident 406 Horse Flat Road	2.2 km south of Coronation Pit	Large	Ineffective	Low risk	High	**Slight adverse effect**
D Golden Point Reserve	2.9 km southeast of Coronation Pit	Large	Ineffective	Low risk	Medium	**Negligible adverse effect**
E Callery's Battery	2.9 km southeast of Coronation Pit	Large	Ineffective	Low risk	Medium	**Negligible adverse effect**

Figure 29 Nearby sensitive receptors Coronation mining area. Source: RM24.184 Appendix 29.

Central Mining Area

Figure 30 and Figure 31 show the location of sensitive receptors in relation to the central area of the site. Beca state that, given the separation distance between IM and FRBF and these receptors, any dust emissions from operations would be expected to have negligible impact on air quality amenity at these receptors. The wider site activities will be in operation during the project and therefore, be a potential continuous source of dust. Taking into consideration the FIDOL factors and site dust management techniques used on site, emissions from the project are not expected to have an adverse effect outside the site boundary. The proposed project would also not be expected to have a noticeable impact on TSP concentrations and dust deposition rates, which are currently observed at these

locations, due to the amount of site equipment essentially remaining constant throughout the project.

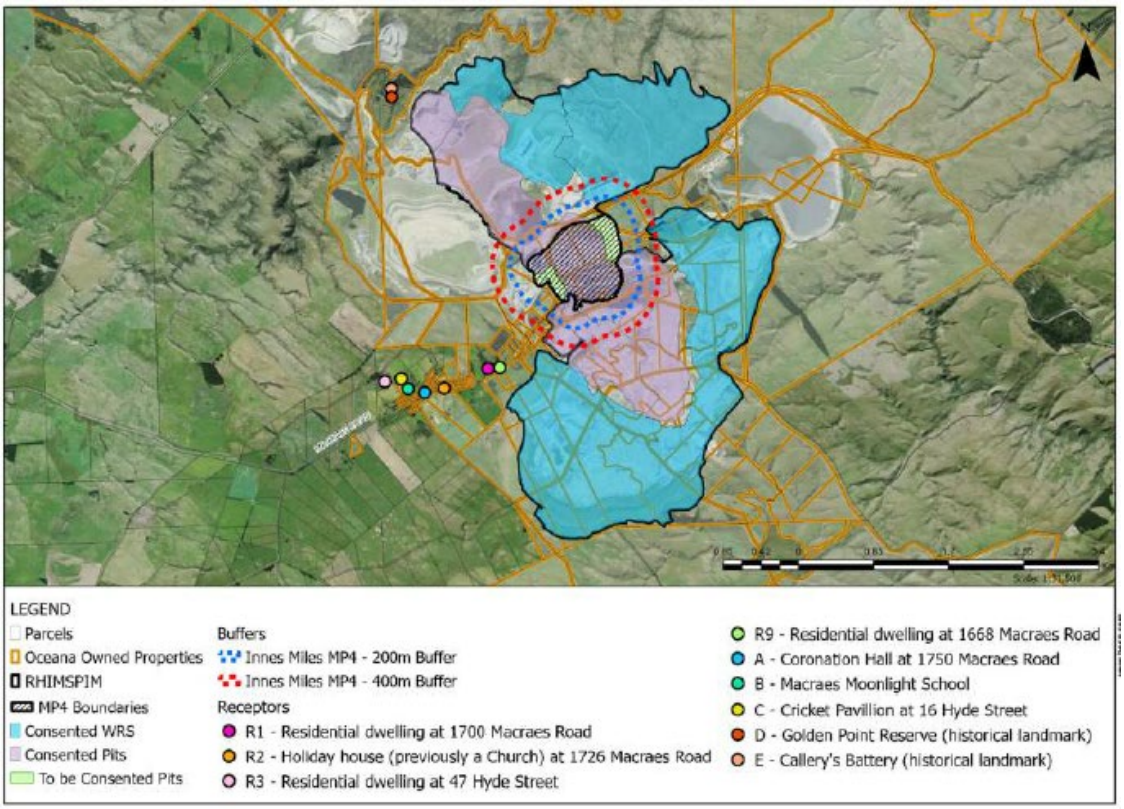

Figure 30 Nearby sensitive receptors central mining area. Source: RM24.184 Appendix 29.

Receptor	Location relative to nearest dust source	Residual source emissions	Pathway effectiveness	Dust impact risk	Receptor sensitivity	Likely Magnitude of dust effect
R9	0.84 km west of FRBF 1.0 km southwest of IMW	Large	Ineffective	Low risk	High	**Slight adverse effect**
R1	1.0 km west of FRBF 1.1 km southwest of IMW	Large	Ineffective	Low risk	High	**Slight adverse effect**
R2	1.5 km west southwest of FRBF 1.5 km southwest of IMW	Large	Ineffective	Low risk	High	**Slight adverse effect**
A	1.7 km southwest of FRBF 1.7 km west southwest of IMW	Large	Ineffective	Low risk	Medium	**Negligible adverse effect**
R5	3.9 km northwest of IMW	Large	Ineffective	Low risk	High	**Slight adverse effect**
D	2.4 km north northwest of IMW	Large	Ineffective	Low risk	Medium	**Negligible adverse effect**
E	2.4 km north northwest of IMW	Large	Ineffective	Low risk	Medium	**Negligible adverse effect**

Figure 31 Nearby sensitive receptors central mining area. Source: RM24.184 Appendix 29.

Golden Bar

Figure 32 and Figure 33 show the location of sensitive receptors in relation to the Golden Bar area. Beca find that, given the separation distance between Golden Bar Pit and these receptors, any dust emission from operations would be expected to have negligible impact on air quality amenity at these receptors. Taking into consideration the FIDOL factors and site dust management techniques used on site, emissions from the project are expected to have less than minor adverse effects outside the site boundary.

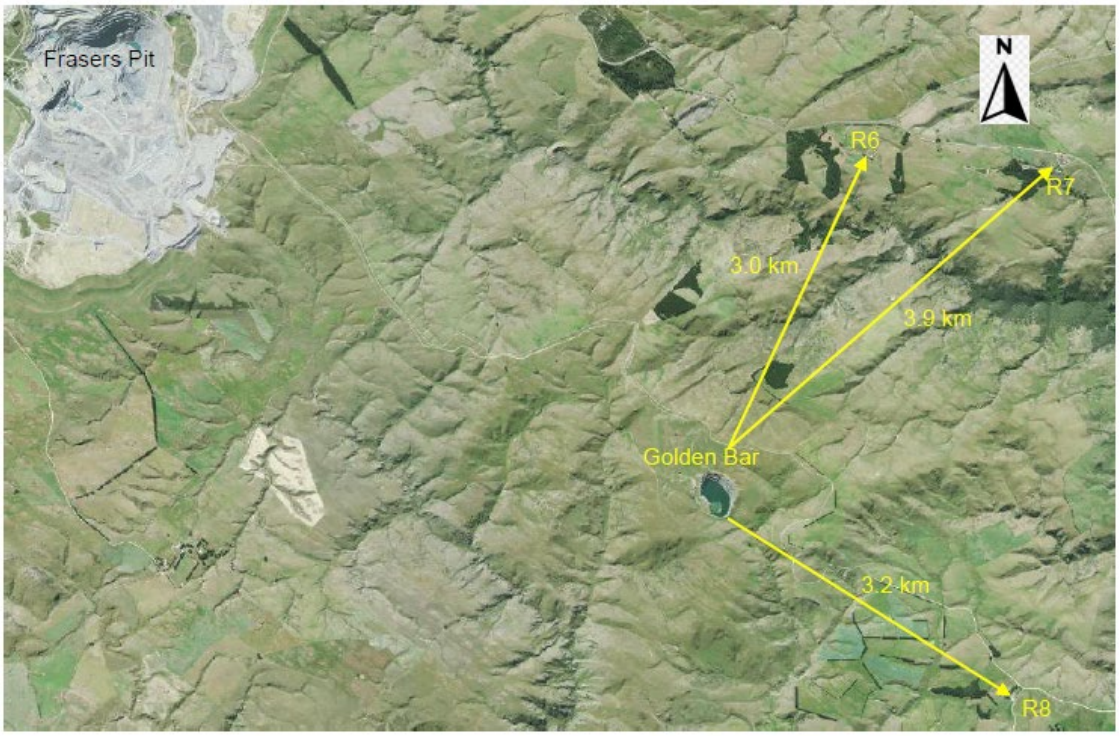

Figure 32 Nearby sensitive receptors Golden Bar mining area. Source: RM24.184 Appendix 29.

Receptor	Location relative to nearest dust source	Residual source emissions	Pathway effectiveness	Dust impact risk	Receptor sensitivity	Magnitude of dust effect
R6	3.0 km north northeast of GB expanded pit	Large	Ineffective	Low risk	Medium	**Negligible adverse effect**
R7	3.9 km northeast of GB expanded pit	Large	Ineffective	Low risk	Medium	**Negligible adverse effect**
R8	3.2 km southeast of GB expanded pit	Large	Ineffective	Low risk	Medium	**Negligible adverse effect**

Figure 33 Nearby sensitive receptors Coronation mining area. Source: RM24.184 Appendix 29.

Haul road

The closest residential dwelling (R1) to the haul road beside Innes Mills is located approximately 650 m from the road. The separation distance is such that any dust generated from vehicle movements is highly unlikely to have any adverse effect at that receptor. Other sensitive receptors are located much further away and therefore, it is very unlikely they would be adversely affected by dust from the haul road.

Summary

The results of ambient air quality monitoring and the complaints history for the wider MGP site demonstrates that any increases above background concentrations of deposited dust, TSP, PM_{10}, and silica, measured at sites in the vicinity of the previous and current mining operations, are small and well below the relevant standards and guidelines recommended

by the Ministry for the Environment. They are also within the concentration limits set by current resource consent conditions for the site.

The concentrations of contaminants including PM_{10}, respirable crystalline silica, nitrogen oxides, and carbon monoxide are expected to remain well within the National Environmental Standards for Air Quality (**NESAQ**) values and current consent limits, beyond the boundary of the project.

In summary, providing the Applicant continues to proactively manage dust within the locations of proposed project activities, using the methods described in this report (Beca) and the Dust Management Plan, Beca conclude that any dust from the site can be adequately avoided and mitigated such that discharges beyond the property boundary will not be offensive or objectionable and any adverse effects, including health effects, will be minimal and the relevant standards and guidelines will not be exceeded.

9.10.2 Summary of Technical Audit and Recommendations

The application and the technical reports of relevance to air quality were audited by John Iseli, Director and Principal Air Quality Consultant at Specialist Environmental Services Limited. Full comments can be found in the following memoranda:

- Technical Peer Review of the Assessment of Effects of Discharges to Air: Oceana Gold NZ Ltd Macraes Mine MP4 Expansion, dated 29 October 2024.

Mr Iseli notes that the overall level of mining activity on the whole site will remain of similar scale, but will occur in different locations. In general, Mr Iseli considers agrees with the description of the site and nearby sensitive receptors, the activities, and the potential dust sources as set out in the Beca. Mr Iseli agrees that the primary contaminant of concern is TSP and that the focus on dust nuisance effects is appropriate. Mr Iseli agrees that the potential health effects of PM_{10}, $PM_{2.5}$, and respirable crystalline silica are not likely to be significant, given the separation distances to dwellings and the information gleaned from historic monitoring data. Furthermore, there is agreement that any adverse effects relating to discharge of combustion products will be less than minor. Greenhouse gas emissions are appropriately described, but Mr Iseli notes that while the assessment indicates an overall reduction in GHG emissions due to mitigation, it is not clear which specific reduction measures are actually proposed by the Applicant.

The assessment has not specifically considered the cumulative effects of concurrent discharges from MP4 and existing consented dust emission sources that are adjacent to the proposed MP4 activities. Even if the mining focus has largely shifted to MP4, there is potential for ongoing dust emissions for a time from the large open areas associated with existing activities. Consequently, Mr Iseli considers that the frequency of winds when each receptor is downwind of dust sources is understated in terms of a cumulative affects assessment.

Mr Iseli states that a degree of caution should be applied to the use of the IAQM assessment matrix when assessing very large and complex dust emission sources in dry climatic conditions. Provided good mitigation measures are diligently applied, Mr Iseli agrees that significant dust effects would not typically be expected to occur at receptors over 400 m from the source. However, he notes that analysis of complaints indicates that dust effects can extend well beyond this distance. Mr Iseli considers that the most impacted receptors will be R1 (1668 Macraes Road) and R5 (406 Horse Flat Road) and that these receptors will be affected to a minor degree.

Mr Iseli recommends that:

- TSP trigger levels of 80 µg/m^3 (24 hour average) be applied to monitoring site DG15. The Applicant has agreed to this.
- Short-term TSP (1-hour) TSP at monitoring site DG15. The Applicant has agreed to this.
- Ongoing TSP monitoring is undertaken in the vicinity of R1 and previous monitoring location DG11 or slightly further east in the general vicinity of Gay Tan Cottage. Such monitoring using a nephelometer is cost-effective and alerts can be sent to OGL, allowing prompt response (such as watering haul roads) if TSP spikes exceed short-term trigger levels. The Applicant has not yet agreed to this.

9.10.3 Conclusions

There is a good level of agreement between Beca and Mr Iseli that the contaminant of most concern is larger fraction dust, and that adverse effects of such dust will primarily manifest as nuisance effects rather than health effects. I accept these expert opinions. Mr Iseli takes a slightly more conservative view of the adverse effects than Beca. Mr Iseli considers that nuisance dust effects may be experienced well beyond the active mining areas, and that diligent application of dust mitigation measures will be required on an ongoing basis to constrain this. On the whole though, adverse effects on air quality are considered likely to be no more than minor, including at the nearest sensitive receptors.

9.11 Effects on Human Health

No standalone assessment on adverse effects on human health was provided in the Application. However, effects are generally discussed by the relevant technical experts.

Effects on human health could result from:

- Deterioration of groundwater or surface water quality.
- Discharges of fine particulate matter to air.
- Contact with contaminated soils or hazardous materials.

As set out in the assessments by GHD, the groundwater contaminant plume is not predicted to impact upon any existing groundwater wells not owned by the Applicant, nor is it predicted to extend beyond the MGP site boundary over a 400 year period. As such, adverse effects on human health associated with groundwater contamination are expected to be less than minor.

As set out in the assessments by Ryder, contaminants in water surface water are generally expected to remain below the relevant guidelines levels that are protective of ecological health at all compliance monitoring locations. The assessments do not provide any comparison to relevant drinking water guidelines. Dr Greer identifies that there is potential for more than minor adverse effects (toxicity effects on instream ecology) in the NBWR catchment if the assumed mitigations are not implemented or are not as effective as expected.

I note that the Stoneburn drinking water supply, supplying a population of 86 people, is sourced from the Waikouaiti River. The supply point is located downstream of the confluence of the NBWR and Murphys Creek, and also downstream of the confluence with Golden Bar

Creek.[76] This is in the vicinity of monitoring locations NB01, NB02, NB03. The Applicant should provide an assessment of the potential adverse effects on this drinking water supply.

As set out in the assessment by Beca, a proportion of the particulate matter generated by the MP4 activities will be fine particulate matter (PM_{10} and $PM_{2.5}$) and this is likely to contain a proportion of crystalline silica. Fine particulate matter and crystalline silica particles that are small enough to be inhaled deep into the lungs, have the potential to cause adverse health effects if people are exposed to concentrations above recommended standards and guideline concentrations for extended periods of time. Beca find that any human health effects resulting from the discharge of these particles will be negligible and will not exceed the relevant guidelines at the site boundary. Mr Iseli has reviewed the Beca assessment and agrees that there are unlikely to be any significant health effects associated with the discharges.

The Applicant has considered the human health effects of contaminants in soils associated with extracting ore and discharging waste rock to land, finding that these activities are managed such that human health is protected. With respect to the use and storage of hazardous substances on site, the Applicant states that these activities will be carried out appropriately and that adverse effects would be less than minor. I would defer to the WDC and DCC notification reports for further assessment of these matters.

In summary, there is potential for adverse human health effects resulting from the MP4 activities. These have been adequately assessed in relation to groundwater quality and air quality and it is likely that these effects will be minor or less. Further assessment (or further interpretation of existing water quality data) is warranted to understand the potential human health effects as they relate to use of surface water. At this time, a definitive conclusion cannot be made as to the surface water impacts on human health.

9.12 Effects on Mana Whenua Values, Practices, and Beliefs

Kāi Tahu has a cultural, spiritual, historic, and traditional relationship with the East Otago and Taieri Catchments of which the proposed mining area is a part.

The relationship of Kāi Tahu Rūnaka with these catchments is a matter of national importance that must be recognised and provided for in managing natural and physical resources. Mining, earthworks, groundwater takes, and the discharge of contaminants are a threat to the values of this wāhi tūpuna landscape and the relationship of Kāi Tahu with these catchments.

In achieving the purpose of the Act particular regard is required to kaitiakitaka. Kāi Tahu whānau exercise kaitiakitaka in this catchment. Maintaining a balance between the right to access and use natural resources, and the responsibility to care for te Taiao and wai māori with a focus on providing a sustainable base for future generations is implicit in kaitiakitaka.

The mining activities proposed set in train adverse effects that may endure for many generations to come. The Applicant has given consideration to the potential long term effects and has proposed a number of measures that are designed to mitigate these effects, even where they do not occur within the maximum allowable consent term. Nonetheless, the technical assessments provided with the application indicate that there is the potential for more than minor effects on terrestrial ecology, including indigenous vegetation and fauna.

[76] https://hinekorako.taumataarowai.govt.nz/publicregister/supplies/view/?id=6cc24685-3f89-ec11-93b0-000d3ad2349a

Furthermore, there is potential for more than minor adverse effects on water quality in the NBWR catchment if the assumed mitigations are not implemented or as effective as expected.

To the extent that adverse effects cultural effects align with adverse effects on water quality and terrestrial ecology, these adverse effects are likely to be more than minor. However, I would defer to mana whenua for a full characterisation of the nature and magnitude of the adverse effects on mana whenua values, practices, and beliefs.

10. Notification and Written Approvals

10.1 Section 95A Public Notification

A consent authority must follow the set out in this section, in the order given, to determine whether to publicly notify an application for a resource consent.

Step 1: mandatory public notification in certain circumstances

(a) Has the applicant requested that the application be publicly notified? **Yes**

(b) Is public notification required by Section 95C? **No**
Has further information been requested and not provided within the deadline set by Council? **No**
Has the applicant refused to provide further information? **No**
Has the Council notified the applicant that it wants to commission a report, but the applicant does not respond before the deadline to Council's request? **No**
Has the applicant refused to agree to the Council commissioning a report? **No**

(c) Has the application been made jointly with an application to exchange recreation reserve land under section 15AA of the Reserves Act 1977? **No**

Public notification is required by Step 1. There is no need to consider subsequent steps.

As required by Regulation 10 of the Resource Management (Forms, Fees, and Procedure) Regulations 2003, direct notice will be served upon the following persons:

(a) every person who the consent authority decides is an affected person under section 95B of the Act in relation to the activity that is the subject of the application or review:
(b) every person, other than the applicant, who the consent authority knows is an owner or occupier of land to which the application or review relates:
(c) the regional council or territorial authority for the region or district to which the application or review relates:
(d) any other iwi authorities, local authorities, persons with a relevant statutory acknowledgement, persons, or bodies that the consent authority considers should have notice of the application or review:
(e) the Minister of Conservation, if the application or review relates to an activity in a coastal marine area or on land that adjoins a coastal marine area:
(f) the Minister of Fisheries, the Minister of Conservation, and the relevant Fish and Game Council, if an application relates to fish farming (as defined in the Fisheries Act 1996) other than in the coastal marine area:
(g) Heritage New Zealand Pouhere Taonga, if the application or review—
(i) relates to land that is subject to a heritage order or a requirement for a heritage order or that is otherwise identified in the plan or proposed plan as having heritage value; or

(ii) affects any historic place, historic area, wāhi tūpuna, wahi tapu, or wahi tapu area entered on the New Zealand Heritage List/Rārangi Kōrero under the Heritage New Zealand Pouhere Taonga Act 2014:

(h) a protected customary rights group that, in the opinion of the consent authority, may be adversely affected by the grant of a resource consent or the review of consent conditions:

(ha) a customary marine title group that, in the opinion of the consent authority, may be adversely affected by the grant of a resource consent for an accommodated activity:

(i) Transpower New Zealand, if the application or review may affect the national grid.

On this basis, I recommend that the following direct notification are made:

- Aukaha on behalf of mana whenua
- The Department of Conservation
- Otago Fish and Game Council
- Public Health South
- Forest and Bird
- Macraes Community Incorporated
- Macraes Moonlight School
- Dunedin City Council
- Waitaki District Council in relation to the Stoneburn drinking water supply point.[77]
- Occupiers of land on which activities will occur:
    - Occupier of 1700 Macraes Road
    - Occupier of 1702 Macraes Road
    - Occupier of 1704 Macraes Road
    - Occupier of 1738 Macraes Road
    - Occupier of 1755Macraes Road
    - Occupier of 1756 Macraes Road
    - Occupier of 1 Hill Street, Macraes
    - Occupier of 3 Hill Street, Macraes
    - Leaseholder at 202 Aignes Road, Stoneburn
    - Leaseholder at 546 Redbank Road, Macraes
    - Leaseholder: Erindale Farm Ltd
    - Leaseholder at 2805 Macrases Road
    - Leaseholder at Stoneburn Road
    - Leaseholder: Filiburn
    - Leaseholder: Appin Farms Limited
- Owners and occupiers of:
    - 1668 Macraes Road
    - 406 Horse Flat Road
    - 1726 Macraes Road
    - 47 Hyde Street
    - 593 Macraes Road
    - 659 Ritchie Road
    - 800 Stoneburn Road
    - 540 Four Mile Road

11. Notification Recommendation

In accordance s95A(3)(a) **it is recommended that the application proceed on a publicly notified basis.**

[77] Taumata Arowai have advised that the water supplier, rather than Taumata Arowai (the regulator) should be considered affected in this situation.

Otago Regional Council

Shay McDonald
Senior Consents Planner
20 March 2025

Otago Regional Council

Decision on Notification

Sections 95A to 95G of the Resource Management Act 1991

Date: 20 March 2025

Application No: RM24.184

Subject: ***Decision on notification of resource consent application under delegated authority***

Decision under Delegated Authority

The Otago Regional Council decides that this resource consent application is to be processed on a **publicly notified** basis in accordance with sections 95A to 95G of the Resource Management Act 1991.

The above decision adopts the recommendations and reasons outlined in the Notification Recommendation Report above in relation to this application. I have considered the information provided, reasons and recommendations in the above report. I agree with those reasons and adopt them.

This decision is made under delegated authority by:

Alexandra King
Manager Consents
20 March 2025

Appendix 1 – Legal Descriptions

- Land within Frasers Tailings Storage Facility which is legally described as:

  Section 4 SO 24124; Section 5 SO 24124; Lot 2 DP 21220; Section 36 Block II Highlay SD; Part Section 6, Block II Highlay SD; Part Section 8, Block II Highlay SD; Section 7, Block II Highlay SD; Section 22, Block II Highlay SD; Section 27, Block II Highlay SD; Section 28, Block II Highlay SD; Section 29, Block II Highlay SD; Section 30, Block II Highlay SD; Section 49, Block II Highlay SD; Part Lot 1 DP 21220; Section 10 SO 24927; Part Section 1 SO 23828; Section 2 SO 23828; Section 12 SO 331188; Section 15 SO 331188; Section 16 SO 331188; Section 4 SO 429137; Road Reserve;

- Land within Innes Mills Pit which is legally described as:

  Part Section 6 Block II Highlay SD; Section 7 Block II Highlay SD; Section 19 SO 331188; Part Section 14 Block II Highlay SD; Sections 4-8 SO 331188; Part Section 8 Block II Highlay SD; Part Section 13 Block II Highlay SD; Sections 4 SO 459659; Part Section 16 Block II Highlay Survey District; Section 19-20 Survey Office Plan 459659; Part Section 15 Block II Highlay Survey District; Section 18 SO 459659; Road Reserve;

- Land within Coronation Stage 6 Pit which is legally described as:

  Part Section 2 Block V Highlay SD; Lot 1 DP 465577; Part Section 2 Block VII Highlay SD; Part Section 11 Block VII Highlay SD;

- Land within Coronation North Backfill which is legally described as:

  Part Section 2 Block V Highlay SD;

- Land within Coronation Haul Road – Pit to Processing Plant which is legally described as:

  Part Pt Section 2 Block V Highlay SD; Part Section 2 Block VII Highlay SD; Part Pt Sections 11 and 12 Block VII Highlay SD; Lot 3-4, 8 Deposited Plan 465577; Part Section 10 Block XII Rock & Pillar Survey District.

- Land within Golden Point Backfill which is legally described as:

  Section 29 SO 459659; Part Section 19 Block IX Highlay SD; Part Section 2 SO 23079;

- Land within Northern Gully Waste Rock Rehandle which is legally described as:

  Section 23, 37-44 Block II Highlay Survey District; Part Section 25 Block II Highlay Survey District; Section 5-6 Survey Office Plan 429137; Section 1-2 Survey Office Plan 625; Section 45 Block II Highlay Survey District; Section 46 Block II Highlay Survey District; Lot 4 and Lot 5 Deposited Plan 21220; Section 35 Block II Highlay Survey District; Section 36 Block II Highlay Survey District; Part Section 29 Survey Office Plan 459659;

- Land within Golden Bar Extension Pit which is legally described as:

Section 8 and Section 22 Block V Dunback Survey District; Section 1-4 Block VIII Dunback Survey District; Section 1, Section 3 and Section 6 Block IX Dunback Survey District; Section 4 Block IX Dunback SD; Section 26 and Section 28 Block V Dunback SD; Section 10 Block V Dunback SD; Part Section 7 Block VIII Dunback Survey District; Section 8 Block VIII Dunback Survey District;

- Land within Golden Bar Waste Rock Stock which is legally described as:

  Part Section 7 Block VIII Dunback Survey District; Section 8 Block VIII Dunback Survey District;

- Land within Golden Bar Haul Road – Pit to Processing Plant which is legally described as:

  Part Section 7 Block VIII Dunback Survey District; Section 8 Block VIII Dunback Survey District.

Appendix 3 Summary of MP4 activities and their ORC consent requirements (source: RM24.184 application, Table 4.2)

Proposed MP4 Activity	Proposed Method	Relevant Existing Consents[78]	Existing Consent Description	Resource Consent Requirements	Consent Term Sought[79]	ORC Rule reference and activity status	Effects Assessment Index
Frasers TSF and Innes Mills Pit Extension							
Disposal of mine process tailings within Frasers TSF	Discharged via conventional sub-aerial slurry discharge spigots predominantly along the south face of Frasers Backfill as described in Section 3.2.3 and further in (WSP 2024).	**RM23.868.01** **Discharge permit (to land and water)**	To discharge mine tailings and contaminants from mine tailings to land and to water for purpose of disposing of mine process tailings in Frasers Tailings Storage Facility.	New Discharge Permit – RM24.184.01 To discharge mine tailings and contaminants from mine tailings **to land** and **to water** for the purpose of disposing of mine process tailings in the Frasers Tailings Storage Facility.	A term of approximately 22 years is sought to align with the expiry of other consents held for Frasers Pit which expire in 2046.	RPW Rule 12.B.4.2 **Discretionary** Waste Plan Rules 5.6.1(2) & 5.6.1(3) **Discretionary**	Refer Section 5.4, Appendix 8 – MWM (2024) and Appendix 13 – GHD (2024c).
Abstraction of surface water for the purpose of dewatering Frasers TSF and use in the Processing Plant.	Pumping of water from the tailings decant pond at a rate of up to 500 L/s using two ~500 kW electric decant pumps (or similar). Water is then staged through ponds back to the Processing Plant as described in Section 3.2.4.	**RM23.868.02** **Water permit (take and use)**	To retake surface water from Frasers Tailings Storage Facility and to retake water from staging ponds for the purpose of dewatering the Frasers Tailings Storage Facility and recycling water for use in mine processing and for dust suppression.	New Water Permit – RM24.184.02 To take surface water from Frasers Tailings Storage Facility for the purpose of dewatering the Frasers Tailings Storage Facility and use in the Mine Water Management System.	A term of approximately 22 years is sought to align with the tailings discharge permit above and the expiry of other consents held for Frasers Pit which expire in 2046.	RPW Rule 12.1.5.1 **Discretionary**	Refer Section 5.4 and Appendix 13 – GHD (2024c).
Damming of water within Frasers TSF	Impoundment of tailings and water behind the Frasers Backfill Embankment as described in Section 3.2.3 and further in (WSP 2024).	-	-	New Water Permit – RM24.184.03 To dam water within the Frasers Tailings Storage Facility for the purpose of operating Stage 2 of the Frasers Tailings Storage Facility.	A term of approximately 22 years is sought to align with the expiry of other consents held for Frasers Pit which expire in 2046.	RPW Rule 12.3.4.1 **Discretionary**	Refer Section 5.4, Appendix 2 – WSP (2024), Appendix 8 – MWM (2024) and Appendix 13 – GHD (2024c).
Earthworks within 100 m of a natural inland wetland that may result in the partial drainage of the wetland	Excavation of Innes Mills Stage 10 extension and potential reduction of phreatic surface in the groundwater profile	-	-	New Land Use Consent – RM24.184.04 To undertake earthworks and land disturbance within 100 m of a natural inland wetland for the purpose of mining Innes Mills Stage 10 Pit	An unlimited term is sought pursuant to section 123(b) of the RMA.	NESFW Regulation 45D(3) **Discretionary**	Refer Section 5.6, Section 6.2.1, Appendix 15 – Ahikā (2024) and Appendix 16 – Whirika (2025).
Disposal of mine impacted water to the open pit lakes following completion of	Pumping and flow of water to Frasers Pit and Innes Mills Pit from various mine	RM10.351.43.V3	To discharge water containing contaminants to water in open pits and Frasers Underground	Variation to authorise extended Innes Mills Pit.	-	Section 127 RMA **Discretionary**	The only change to this activity is the extended margin of the Innes Mills Pit. The extension

[78] Bolding indicates those consents that will be surrendered assuming the requested consent is granted and exercised.
[79] This column addresses Q1.8 of the ORCs s92 request issued on 24 July 2024.

Proposed MP4 Activity	Proposed Method	Relevant Existing Consents[78]	Existing Consent Description	Resource Consent Requirements	Consent Term Sought[79]	ORC Rule reference and activity status	Effects Assessment Index
mining operations within the pits.	sources including tailings decant and seepage water and waste rock stack runoff and seepage water.	Discharge Permit (to water)	mine for the purpose of disposal of water and the creation of lakes (the Golden Point - Round Hill Pit Lake and the Frasers - Innes Mills Pit Lake)	RM10.351.43.V4			does will not result in any change to the discharge activity. Effects of the change in pit extent have been considered in Section 5.4 and Appendix 13 – GHD (2024c).
Impoundment of water in the open pit lakes following the completion of mining operations within the pits.	Containment of pit lakes by backfill (until submerged) and the pit walls.	RM10.351.44.V3 Water Permit (dam)	To dam water in open pits for the purpose of creating the Golden Point - Round Hill Pit Lake and the Frasers - Innes Mills Pit Lake	Variation to authorise extended Innes Mills Pit. RM10.351.44.V4	-	Section 127 RMA **Discretionary**	Water effects: Refer Section 5.4 and Appendix 13 – GHD (2024c). Stability effects refer to section 5.3.3, Appendix 2 – WSP (2024), and Appendix 3 – EGL (2024a).
Filling of the open pit lakes via groundwater inflow following the completion of mining operations within the pits.	Seepage of groundwater from the pit shell into the open pit void (rewatering).	RM10.351.45.V2 Water Permit (groundwater take)	To take groundwater for the purpose of creating the Golden Point - Round Hill Lake and Frasers - Innes Mills Pit Lake	Variation to authorise extended Innes Mills Pit. RM10.351.45.V3	-	Section 127 RMA **Discretionary**	The only change to this activity is the extended margin of the Innes Mills Pit. Effects of the change in pit extent have been considered in Section 5.4 and Appendix 13 – GHD (2024c).
Filling of the open pit lakes via surface water inflow (ceasing diversions) following the completion of mining operations within the pits.	Overland flow of surface water into the open pits.	RM10.351.46.V2 Water Permit (surface water take)	To take surface water for the purpose of creating the Golden Point - Round Hill Lake and Frasers - Innes Mills Pit Lakes	Variation to authorise extended Innes Mills Pit. RM10.351.46.V3	-	Section 127 RMA **Discretionary**	The only change to this activity is the extended margin of the Innes Mills Pit. Effects of the change in pit extent have been considered in Section 5.4 and Appendix 13 – GHD (2024c).
Disposal of mine impacted water to the open pit lakes following completion of mining operations within the pits.	Pumping and flow of water to Frasers Pit and Innes Mills Pit from various mine sources including tailings decant and seepage water and waste rock stack runoff and seepage water.	RM10.351.47.V3 Discharge Permit (to land)	To discharge water containing contaminants to land in open pits and Frasers Underground mine for the purpose of disposal of water and the creation of lakes (the Golden Point - Round Hill Pit Lake and the Frasers - Innes Mills Pit Lake)	Variation to authorise extended Innes Mills Pit. RM10.351.47.V4	-	Section 127 RMA **Discretionary**	The only change to this activity is the extended margin of the Innes Mills Pit. The extension does will not result in any change to the discharge activity. Effects of the change in pit extent have been considered in Section 5.4 and Appendix 13 – GHD (2024c).
Dewatering of Frasers Pit prior to placement of backfill and disposal of tailings. Dewatering of Innes Mills and Innes Mills West Pit during mining.	Pumping of water contained in open pits as described in Section 3.3.7.	RM10.351.48.V3 Water Permit (surface water take)	To take surface water for the purpose of dewatering Frasers Pit, Innes Mills Pit, Southern Pit, Round Hill Pit and Golden Point Pit.	Variation to authorise extended Innes Mills Pit. RM10.351.48.V4	-	Section 127 RMA **Discretionary**	Refer Section 5.4 and Appendix 13 – GHD (2024c).

Proposed MP4 Activity	Proposed Method	Relevant Existing Consents[78]	Existing Consent Description	Resource Consent Requirements	Consent Term Sought[79]	ORC Rule reference and activity status	Effects Assessment Index
Ongoing, as required, abstraction of water from the pit during filling of the pit lakes							
Construction of Frasers Backfill prior to and during the deposition of tailings in Frasers Pit. Partial backfilling Golden Point Pit.	End tipping of waste rock to form an embankment within Frasers Pit as described in Section 3.2.2 and further in (WSP 2024). End tipping of waste rock to partially backfill Golden Point Pit as described in Section 3.3.3.	RM10.351.49.V2 Discharge Permit (to land)	To discharge waste rock to land in Frasers Pit, Innes Mills Pit, Southern Pit, Round Hill Pit and Golden Point Pit for the purpose of disposing of waste rock.	Variation to authorise extended Innes Mills Pit. RM10.351.49.V3	-	Section 127 RMA **Discretionary**	Refer section 5.3.3 and Appendix 2 – WSP (2024), and Appendix 3 – EGL (2024a).
Surface water diversions associated with extension of Innes Mills Pit and ongoing mining operation of Frasers Pit including ongoing diversion of North Branch Waikouaiti River around Frasers Pit.	Some diversions of water exist around the open pits, for example at Frasers Pit where water from the upper reach of the Waikouaiti River North Branch has been cut off by Frasers Pit. Other diversion drains do exist but are not affected by the changes to the Innes Mills pit limit.	RM10.351.50.V2 Water Permit (diversion)	To divert water around the open pits known as Frasers Pit, Innes Mills Pit, Southern Pit, Round Hill Pit and Golden Point Pit for the purpose of preventing surface water ingress and managing surface water runoff	Variation to authorise extended Innes Mills Pit. RM10.351.50.V3	-	Section 127 RMA **Discretionary**	N/A No change to this activity is anticipated as a result of the changes to the Innes Mills Pit limit.
Maintain groundwater levels in and around Frasers Pit and Innes Mills Pit as required.	Pumping of water from pit sumps and from bores within pit walls (horizontal drainage) and within 200m of the pit margins as described in Section 3.3.7	RM10.351.51.V3 Water Permit (groundwater take)	To take groundwater for the purpose of dewatering Frasers Pit, Innes Mills Pit, Southern Pit, Round Hill Pit and Golden Point Pit	Variation to authorise extended Innes Mills Pit. RM10.351.51.V4	-	Section 127 RMA **Discretionary**	Refer Section 5.4 and Appendix 13 – GHD (2024c).
Discharges to air associated with operation of Frasers TSF Stage 2, the extension of Innes Mills Pit, disposal of waste to waste rock stacks and backfills, transporting ore to the processing plant, Realignment of Golden Bar Road, and Backfilling of Golden Point Pit.	Emission of dust or particulate matter from the handling and transport of waste rock and ore and from the storage of tailings. Emission of combustion related contaminants from machinery. As described in Beca (2024).	RM10.351.52.V3 Discharge Permit (to air)	To discharge contaminants from mining operations and post mining rehabilitation to air for the purpose of undertaking mining operations	Variation to existing consent to authorise extension to Innes Mills Pit and FTSF Stage 2 and to impose total suspended particulate matter trigger limits at DG15. RM10.351.52.V4	-	Section 127 RMA **Discretionary**	Refer section 5.11 and Appendix 29 – Beca (2024).

Proposed MP4 Activity	Proposed Method	Relevant Existing Consents[78]	Existing Consent Description	Resource Consent Requirements	Consent Term Sought[79]	ORC Rule reference and activity status	Effects Assessment Index
Coronation Pit Stage 6 Extension							
Vegetation clearance and land disturbance	Surface ripping and excavation associated with mining of the Coronation Pit Stage 6 extension.	-	-	New Land Use Consent – RM24.184.05 To undertake vegetation clearance, land disturbance and earthworks within and near natural wetlands for the purposes of mining the Coronation Pit Stage 6 extension.	An unlimited term is sought pursuant to section 123(b) of the RMA.	NESF Regulation 45D(1) and (2) **Discretionary**	Refer Section 5.6 and Appendix 15 – Ahikā (2024a).
Surface water diversions associated with extension of Coronation Pit and ongoing mining operations within Coronation Pit.	Surface water diversions exist around the Coronation Pit and these will be extended as required to facilitate the proposed pit extension.	**RM12.378.09** **Water Permit (diversion)**	To permanently divert water around Coronation Pit and into unnamed tributaries of Maori Hen Creek, Trimbells Gully, Mare Burn and Camp Creek for the purpose of preventing surface water ingress and managing surface water runoff.	New Water Permit – RM24.184.06 To divert water around Coronation Pit and into unnamed tributaries of Maori Hen Creek, Trimbells Gully, Mare Burn and Camp Creek for the purpose of preventing surface water ingress and managing surface water runoff.	A term of 24 years is sought to align with existing consents that authorise activities in Coronation Pit which expire in 2048.	RPW Rule 12.3.4.1 **Discretionary**	Refer Section 5.4.2 and Appendix 11 – GHD (2024a).
Placement of waste rock within Coronation Pit.	End tipping of waste rock within Coronation Pit for temporary storage of waste rock, construction of in pit haul roads, and disposal of waste rock as pit backfill as described in Section 3.7.3.	**RM23.648.02** **Discharge Permit (to land)**	To discharge waste rock to land in Coronation Pit for the purpose of disposing of waste rock.	New Discharge Permit – RM24.184.07. To discharge waste rock to land in Coronation Pit for the purpose of disposing of waste rock.	A term of 24 years is sought to align with existing consents that authorise activities in Coronation Pit which expire in 2048.	RPW Rule 12.B.4.1 **Discretionary**	Refer Section 5.4, Appendix 8 – MWM (2024) and Appendix 11 – GHD (2024a).
Placement of waste rock within Coronation WRS.	End tipping of waste rock within the existing confines of the Coronation WRS for disposal of waste rock as described in Section 3.7.3.	**RM23.648.01** **Discharge Permit (to land)**	To discharge waste rock and contaminants from waste rock to land, or into land in circumstances which may result in contaminants entering water, for the purpose of constructing the Coronation Waste Rock Stack.	New Discharge Permit – to replace existing consent that expires in 2026 – RM24.184.08 To discharge waste rock and contaminants from waste rock to land, or into land in circumstances which may result in contaminants entering water, for the purpose of constructing the Coronation Waste Rock Stack.	A term of 24 years is sought to align with existing consents that authorise activities in Coronation Pit which expire in 2048.	RPW Rule 12.B.4.1 **Discretionary**	Refer Section 5.4, Appendix 8 – MWM (2024), Appendix 11 – GHD (2024a), Appendix 13 – GHD (2024c).
Dewatering of Coronation Pit prior to and during mining. Ongoing, as required, abstraction of water from the pit during filling of the pit lakes.	Pumping of water contained in the Coronation Pit as described in Section 3.7.7.	**RM23.648.04** **Water Permit (surface water take)**	To take surface water for the purpose of dewatering Coronation Pit and use for the purpose of dust suppression or in the mine water management system.	New Water Permit – RM24.184.09 To take surface water for the purpose of dewatering Coronation Pit and use in the Mine Water Management System.	A term of 24 years is sought to align with existing consents that authorise activities in Coronation Pit which expire in 2048.	RPW Rule 12.1.5.1 **Discretionary**	Refer Section 5.4 and Appendix 11 – GHD (2024a).

Proposed MP4 Activity	Proposed Method	Relevant Existing Consents[78]	Existing Consent Description	Resource Consent Requirements	Consent Term Sought[79]	ORC Rule reference and activity status	Effects Assessment Index
Maintain groundwater levels in and around Coronation Pit as required.	Pumping of water from pit sumps that has accumulated from groundwater inflows as described in Section 3.7.7.	**RM23.648.03** **Water Permit (groundwater take)**	To take groundwater for the purpose of dewatering Coronation Pit and use for the purpose of dust suppression or in the mine water management system.	New Water Permit – RM24.184.10 To take groundwater for the purpose of dewatering Coronation Pit and use in the Mine Water Management System.	A term of 24 years is sought to align with existing consents that authorise activities in Coronation Pit which expire in 2048.	RPW Rule 12.2.4.1 **Discretionary**	Refer Section 5.4 and Appendix 11 – GHD (2024a).
Filling of the Coronation Pit Lake via groundwater inflow following the completion of mining operations within the pit.	Seepage of groundwater from the pit shell into the open pit void (rewatering).	RM12.378.11 Water Permit (groundwater take)	To take groundwater for the purpose of creating the Coronation Pit Lake.	Variation to authorise extended Coronation Pit. RM12.378.11.V1	-	Section 127 RMA **Discretionary**	The only change to this activity is the extended margin of the Coronation Pit. Effects of the change in pit extent have been considered in Section 5.4 and Appendix 11 – GHD (2024a).
Filling of the Coronation Pit Lake via surface water inflow (ceasing diversions) following the completion of mining operations within the pit.	Overland flow of surface water into the open pits.	RM12.378.12 Water Permit (surface water take)	To take surface water for the purpose of creating the Coronation Pit Lake.	Variation to authorise extended Coronation Pit. RM12.378.12.V1	-	Section 127 RMA **Discretionary**	The only change to this activity is the extended margin of the Coronation Pit. Effects of the change in pit extent have been considered in Section 5.4 and Appendix 11 – GHD (2024a).
Impoundment of water in the open pit lakes following the completion of mining operations within the pits.	Containment of the Coronation Pit lake by the pit walls.	RM12.378.14 Water Permit (damming)	To dam water in Coronation Pit for the purpose of creating the Coronation Pit Lake	Variation to authorise extended Coronation Pit.[80] RM12.378.14.V1	-	Section 127 RMA **Discretionary**	Water effects refer Section 5.4 and Appendix 11 – GHD (2024a). Stability effects refer Section 5.3 and Appendix 6 – PSM (2024a).
Discharges to air associated with the extension of Coronation Pit.	Emission of dust or particulate matter from the handling and transport of waste rock and ore. Emission of combustion related contaminants from machinery. As described in Beca (2024).	RM12.378.15 Discharge permit to air	To discharge contaminants from mining operations and post mining rehabilitation to air for the purpose of undertaking mining operations	Variation to authorise extended Coronation Pit and to impose total suspended particulate matter trigger limits at DG07. RM12.378.15.V1	-	Section 127 RMA **Discretionary**	Refer section 5.11 and Appendix 29 – Beca (2024).
Coronation North Backfill							
Surface water diversions associated with the ongoing	Maintenance of existing surface water diversion	RM16.138.15.V1	To divert water around the open pit known as Coronation	Utilise existing consent	-	-	No changes to the existing surface water diversion are

[80] Being an existing consent, a variation to RM12.378.14 is sought although it is now understood that a water permit is not required for the impoundment of water by in situ ground. On that basis, OGNZL may consider surrendering this consent with ORC's agreement to do so.

Proposed MP4 Activity	Proposed Method	Relevant Existing Consents[78]	Existing Consent Description	Resource Consent Requirements	Consent Term Sought[79]	ORC Rule reference and activity status	Effects Assessment Index
mining operation of Coronation North Pit.	drains to prevent surface runoff entering the open pit.	Water Permit (diversion)	North Pit and into unnamed tributaries of Māori Hen Creek, Trimbells Gully, Mare Burn and Coal Creek for the purpose of preventing surface water ingress and managing the surface water runoff				necessary to facilitate the backfilling of Coronation North Pit.
Placement of waste rock within Coronation North WRS and Trimbells WRS.	End tipping of waste rock within the existing confines of the Coronation North WRS and Trimbells WRS for disposal of waste rock as described in Section 3.7.3.	**RM19.085.03** **Discharge Permit (to land)**	To discharge waste rock and contaminants from waste rock to land, or into land in circumstances which may result in contaminants entering water for the purpose of constructing the Coronation North Waste Rock Stack and the Trimbells Waste Rock Stack	New Discharge Permit – to replace existing consents that expire in 2026 – RM24.184.11 To discharge waste rock and contaminants from waste rock to land, or into land in circumstances which may result in contaminants entering water for the purpose of constructing the Coronation North Waste Rock Stack and the Trimbells Waste Rock Stack	A term of 28 years is sought to align with existing consents that authorise activities in Coronation North Pit which expire in 2052.	RPW Rule 12.B.4.1 **Discretionary**	Refer Section 5.4, Appendix 8 – MWM (2024) and Appendix 11 – GHD (2024a).
		RM16.138.09.V1[81] **Discharge Permit (to land)**	To discharge waste rock and contaminants from waste rock to land, or into land in circumstances which may result in contaminants entering water for the purpose of constructing the Coronation North Waste Rock Stack				
Backfilling of Coronation North Pit.	End tipping of waste rock within Coronation North Pit to backfill the pit as described in Section 3.7.3.	**RM16.138.10.V1** **Discharge Permit (to land)**	To discharge waste rock to land within the Coronation North Pit for the purpose of disposing of waste rock	New Discharge Permit – RM24.184.12 To discharge waste rock to land within the Coronation North Pit for the purpose of disposing of waste rock and backfilling Coronation North Pit	A term of 28 years is sought to align with existing consents that authorise activities in Coronation North Pit which expire in 2052.	RPW Rule 12.B.4.1 **Discretionary**	Refer Section 5.4, Appendix 8 – MWM (2024) and Appendix 11 – GHD (2024a).
Dewatering of Coronation North Pit prior to and during mining. Ongoing, as required, abstraction of water from the pit during filling of the pit lakes.	Pumping of water contained in open pits as described in Section 3.7.7.	**RM16.138.11.V2** **Water Permit (take and use)**	To take surface water for the purpose of dewatering Coronation North Pit and use for the purpose of dust suppression	New Water Permit to replace existing consent that expires in 2026 – RM24.184.13 To take surface water for the purpose of dewatering Coronation North Pit and use in the Mine Water Management System.	A term of 28 years is sought to align with existing consents that authorise activities in Coronation North Pit which expire in 2052.	RPW Rule 12.1.5.1 **Discretionary**	Refer Section 5.4 and Appendix 11 – GHD (2024a).

[81] Note that this consent should have been surrendered prior to the exercise of RM19.085.03, however an error in Condition 2 of RM19.085.03, referring incorrectly to RM16.138.01 rather than RM16.138.09, means that RM16.138.09 remains active.

Proposed MP4 Activity	Proposed Method	Relevant Existing Consents[78]	Existing Consent Description	Resource Consent Requirements	Consent Term Sought[79]	ORC Rule reference and activity status	Effects Assessment Index
Maintain groundwater levels in and around Coronation North Pit as required.	Pumping of water from pit sumps and from bores within pit walls (horizontal drainage) and within 200m of the pit margins as described in Section 3.7.7	**RM16.138.13.V1** **Water Permit (take and use)**	To take groundwater for the purpose of dewatering Coronation North Pit and use for the purpose of dust suppression	New Water Permit to replace existing consent that expires in 2026 – RM24.184.14 To take groundwater for the purpose of dewatering Coronation North Pit and use for the purpose of dust suppression or in the mine water management system.	A term of 28 years is sought to align with existing consents that authorise activities in Coronation North Pit which expire in 2052.	RPW Rule 12.2.4.1 **Discretionary**	Refer Section 5.4 and Appendix 11 – GHD (2024a).
Filling of the Coronation North Pit Lake via surface water inflow (ceasing diversions) following the completion of mining operations within the pit.	Overland flow of surface water into the open pits.	RM16.138.12.V1 Water Permit (take and use)	To take surface water for the purpose of creating the Coronation North Pit Lake	Variation to authorise backfilling of Coronation North Pit. RM16.138.12.V2	-	Section 127 RMA **Discretionary**	Refer Section 5.4 and Appendix 11 – GHD (2024a).
Filling of the Coronation North Pit Lake via groundwater inflow following the completion of mining operations within the pit.	Seepage of groundwater from the pit shell into the open pit void (rewatering).	RM16.138.14.V1 Water Permit (take and use)	To take groundwater for the purpose of creating the Coronation North Pit Lake	Variation to authorise backfilling of Coronation North Pit. RM16.138.14.V2	-	Section 127 RMA **Discretionary**	Refer Section 5.4 and Appendix 11 – GHD (2024a).
Impoundment of water in the open pit lakes following the completion of mining operations within the pits.	Containment of the Coronation North Pit Lake by the backfill and pit walls.	RM16.138.17.V1 Water Permit (damming)	To dam water in Coronation North Pit for the purpose of creating the Coronation North Pit Lake	Variation to authorise backfilling of Coronation North Pit.[82] RM16.138.17.V2	-	Section 127 RMA **Discretionary**	Water effects refer Section 5.4 and Appendix 11 – GHD (2024a). Stability effects refer Section 5.3 and Appendix 6 – PSM (2024a).
Overflow of the Coronation North Pit Lake	Overflow of water from the Coronation North Pit Lake to unnamed tributaries of Maori Hen Creek, Trimbells Gully, Mare Burn and Coal Creek.	RM16.138.06.V1 Discharge Permit (to water)	To discharge water containing contaminants from Coronation North Pit Lake to unnamed tributaries of Maori Hen Creek, Trimbells Gully, Mare Burn and Coal Creek for the purpose of pit lake overflow	Variation to authorise backfilling of Coronation North Pit. RM16.138.06.V2	-	Section 127 RMA **Discretionary**	Refer Section 5., Appendix 8 – MWM (2024) and Appendix 11 – GHD (2024a).
Discharges to air associated with the backfilling of Coronation North Pit.	Emission of dust or particulate matter from the handling and transport of waste rock. Emission of combustion related contaminants from machinery.	RM16.138.19.V1 Discharge Permit (to air)	To discharge contaminants from mining operations and post mining rehabilitation to air for the purpose of undertaking mining operations	Variation to authorise backfilling of Coronation North Pit and to impose total suspended particulate matter trigger limits at DG07. RM16.138.19.V2	-	Section 127 RMA **Discretionary**	Refer section 5.11 and Appendix 29 – Beca (2024).

[82] Being an existing consent, a variation to RM16.138.17.V1 is sought although it is now understood that a water permit is not required for the impoundment of water by in situ ground. On that basis, OGNZL may consider surrendering this consent with ORC's agreement to do so.

Proposed MP4 Activity	Proposed Method	Relevant Existing Consents[78]	Existing Consent Description	Resource Consent Requirements	Consent Term Sought[79]	ORC Rule reference and activity status	Effects Assessment Index
	As described in Beca (2024).						
Golden Bar Pit Stage 2 Extension							
Surface water diversions associated with extension of Golden Bar Pit.	Surface water diversions will be established around the Golden Bar Pit and adjacent stockpile areas as required to facilitate the proposed pit extension and ancillary activities.	**2002.489** **Water Permit (diversion)**	Divert water around the Golden Bar Pit and haul roads for the purposes of managing surface water runoff in the catchment of Golden Bar Creek.	New Water Permit – RM24.184.15 Divert water around the Golden Bar Pit and adjacent stockpile areas for the purposes of managing surface water runoff.	A term of 35 years is sought.	RPW Rule 12.3.4.1 **Discretionary**	Refer Section 5.4 and Appendix 12 – GHD (2024b).
Take surface water for the purpose of dewatering Golden Bar Pit	Pumping of water contained in open pits as described in Section 3.6.7.	**2007.552** **Water Permit (take surface water)**	Take and use up to 300m3/day of surface water for the purpose of pit dewatering	New Water Permit – RM24.184.16 To take and use surface water for the purpose of dewatering Golden Bar Pit and use in the Mine Water Management System.	A term of 35 years is sought.	RPW Rule 12.1.5.1 **Discretionary**	Refer Section 5.4 and Appendix 14 – GHD (2023).
Take groundwater for the purpose of dewatering Golden Bar Pit	Pumping of water from pit sumps and from bores within pit walls (horizontal drainage) and within 200m of the pit margins as described in Section 3.6.7	**2007.510** **Water Permit (take groundwater**	Take and use groundwater for the purpose of pit dewatering as part of ongoing mining operations	New Water Permit – RM24.184.17 To take and use groundwater for the purpose of dewatering Golden Bar Pit and use in the Mine Water Management System.	A term of 35 years is sought.	RPW Rule 12.2.4.1 **Discretionary**	Refer Section 5.4 and Appendix 14 – GHD (2023).
Discharge water from Golden Bar Pit to Golden Bar Creek for the purposes of draining Golden Bar Pit	Direct discharge via an overland pipe or drain as described in Section 3.6.7 and GHD (2023).	-	-	New Discharge Permit – RM24.184.18 To discharge water containing contaminants to Golden Bar Creek for the purpose of disposing of water from dewatering of Golden Bar Pit.	A term of 35 years is sought.	RPW Rule 12.B.4.1 **Discretionary**	Refer Section 5.4 and Appendix 14 – GHD (2023).
Mining of the Golden Bar Pit extension including the bed of a tributary to Golden Bar Creek.	Excavation of the bed using mining excavators.	**2002.493** **Land use consent**	Disturb the bed of Golden Bar Creek for the purpose of constructing a pit as part of mining operations within the Golden Bar Development area.	New Land Use Consent – RM24.184.19 Land use consent for vegetation clearance, land disturbance and earthworks within natural wetlands for the purposes of mining the Golden Bar Pit extension.	An unlimited term is sought pursuant to section 123(b) of the RMA.	RPW Rule 13.5.3.1 **Discretionary** NESF Regulation 45D(1) and (2) **Discretionary**	Refer Section 5.5, Appendix – 21 Ryder (2024b) and Appendix 31.
Placement of waste rock within Golden Bar Pit.	End tipping of waste rock within Golden Bar Pit for temporary storage of waste rock and construction of in	-	-	New Discharge Permit – RM24.184.20	A term of 35 years is sought.	RPW Rule 12.B.4.1 **Discretionary**	Refer Section 5.4, Appendix 8 – MWM (2024) and Appendix 12 – GHD (2024b).

Proposed MP4 Activity	Proposed Method	Relevant Existing Consents[78]	Existing Consent Description	Resource Consent Requirements	Consent Term Sought[79]	ORC Rule reference and activity status	Effects Assessment Index
	pit haul roads as described in Section 3.6.3.			To discharge waste rock to land in Golden Bar Pit for the purpose of disposing of waste rock.			
Filling of the Golden Bar Pit Lake via surface water inflow (ceasing diversions) following the completion of mining operations within the pit.	Overland flow of surface water into the open pits.	**2002.763** **Discharge Permit (to water)**	Discharge water into Golden Bar Pit for the purpose of establishing long-term drainage patterns after completion of mining operations in Golden Bar Development Area.	New Water Permit – RM24.184.21 To take surface water for the purpose of creating the Golden Bar Pit Lake.	A term of 35 years is sought.	RPW Rule 12.1.5.1 **Discretionary**	Refer Section 5.4, Appendix 8 – MWM (2024) and Appendix 12 – GHD (2024b).
Filling of the Golden Bar Pit Lake via groundwater inflow following the completion of mining operations within the pits.	Seepage of groundwater from the pit shell into the open pit void (rewatering).			New Water Permit – RM24.184.22 To take groundwater for the purpose of creating the Golden Bar Pit Lake.	A term of 35 years is sought.	RPW Rule 12.2.4.1 **Discretionary**	Refer Section 5.4, Appendix 8 – MWM (2024) and Appendix 12 – GHD (2024b).
Golden Bar Waste Rock Stack Extension							
Construction of the Golden Bar Waste Rock Stack Extension Discharge waste rock to land.	End tipping of waste rock within Golden Bar WRS and its extension footprint as described in Section 3.6.3.	**2002.490** **Discharge Permit (to land)**	To discharge to land contaminants from waste rock, stockpiled ore, and soil for the purpose of storing or disposing of waste rock, stockpiled ore and soil.	New Discharge Permit – RM24.184.23 To discharge waste rock and contaminants from waste rock to land for the purpose of extending the Golden Bar Waste Rock Stack.	A term of 35 years is sought.	RPW Rule 12.B.4.1 **Discretionary**	Water quality effects refer Section 5.4, Appendix 8 – MWM (2024) and Appendix 12 – GHD (2024b). Terrestrial ecology effects refer Section 5.6.2, Appendix 15 – Ahikā (2024), and Appendix 16 – Whirika (2025)
Construction of the Golden Bar Waste Rock Stack Extension.	End tipping of waste rock into the bed of a modified watercourse.	**2002.760** **Land use consent**	To disturb and deposit rock on the bed of Clydesdale Creek for the purpose of disposing of waste rock as part of mining operations within the Golden Bar Development area	New Land Use Consent – RM24.184.24 To reclaim an unnamed modified watercourse and to undertake vegetation clearance, land disturbance and earthworks within a natural inland wetland in the Clydesdale Creek catchment for the purpose of extending the Golden Bar Waste Rock Stack.	An unlimited term is sought pursuant to sections 123(a) and 123(b) of the RMA.	NESF Regulation 57 **Discretionary** RPW Rule 13.5.3.1 **Discretionary** NESF Regulations 45D(1) and 45D(2) **Discretionary**	Refer section 5.5, Appendix 21 – Ryder (2024b), and Appendix 31.
Discharge silt and sediment to Clydesdale silt pond associated with the disturbance and extension of Golden Bar WRS.	Excavation of waste rock with mining excavators. Refer Section 3.4.	-	-	New Discharge Permit – RM24.184.25 To discharge silt and sediment to water for the purpose of extending the Golden Bar Waste Rock Stack.	A term of 35 years is sought.	RPW Rule 12.B.4.1 **Discretionary**	Refer Section 5.4, Section 6 and Appendix 10 – EGL (2024c).

Proposed MP4 Activity	Proposed Method	Relevant Existing Consents[78]	Existing Consent Description	Resource Consent Requirements	Consent Term Sought[79]	ORC Rule reference and activity status	Effects Assessment Index
Divert surface water around Golden Bar WRS	Establish clean water diversion drains around the Golden Bar WRS.	**2002.758** **Water Permit (Diversion)**	To divert water around Golden Bar Pit, the waste rock stack, ore stockpiles and haul roads for the purposes of managing surface water runoff in the catchment of Clydesdale Creek.	New Water Permit – RM24.184.26 To permanently divert water around the Golden Bar Waste Rock Stack and into unnamed tributaries of Murphys Creek for the purpose of preventing surface water ingress and managing stormwater runoff.	A term of 35 years is sought.	RPW Rule 12.3.4.1 **Discretionary**	Refer Section 5.4, and Appendix 12 – GHD (2024b).
Operation of Clydesdale Silt Pond	Impoundment of water within Clydesdale Silt Pond	**2002.757** **Water Permit (damming)**	To dam Clydesdale Creek for the purposes of sediment control, treatment of stormwater runoff and mine dewatering.	New Water Permit – RM24.184.27 To dam water in Clydesdale silt pond for the purpose of sediment control, treatment of stormwater runoff and mine dewatering.	A term of 35 years is sought.	RPW Rule 12.3.3.1(i) **Restricted Discretionary**	Refer Section 5.4, Appendix 12 – GHD (2024b), Appendix 4 – EGL (2023).
Operation of Clydesdale Silt Pond	Passive discharge of water from the base and toe of Golden Bar WRS including to Clydesdale Silt Pond, groundwater, and surface water.	-	-	New Discharge Permit – RM24.184.28 To discharge contaminants to water from the base and toe of the Golden Bar Waste Rock Stack for the purpose of waste rock disposal.	A term of 35 years is sought.	RPW Rule 12.B.4.1 **Discretionary**	Refer Section 5.4, and Appendix 12 – GHD (2024b).
Operation of Clydesdale Silt Pond	Discharge Water from Clydesdale Silt Pond to Clydesdale Creek as described in GHD (2024c).	**2002.759** **Discharge Permit (to water)**	To discharge to water up to 30,000 cubic metres per day of water from the Clydesdale silt pond to Clydesdale Creek for the purpose of releasing surface water runoff	New Discharge Permit – RM24.184.29 To discharge water from silt ponds to Clydesdale Creek for the purpose of operating silt ponds associated with the Golden Bar Waste Rock Stack.	A term of 35 years is sought.	RPW Rule 12.B.4.1 **Discretionary**	Refer Section 5.4, and Appendix 12 – GHD (2024b).
Discharges to air associated with the extension of Golden Bar Pit and construction of the Golden Bar WRS extension and use of the Golden Bar haul road.	Emission of dust or particulate matter from the handling and transport of waste rock and ore, including to the processing plant. Emission of combustion related contaminants from machinery. As described in Beca (2024).	**2007.511** **Discharge Permit (to air)**	To discharge contaminants to air for the purpose of carrying out mining activities and post mining rehabilitation.	New Discharge Permit – RM24.184.30 To discharge contaminants to air for the purpose of carrying out mining activities and post mining rehabilitation.	A term of 8 years is sought to align with the sites existing air discharge permits to enable site wide consideration or air discharges in 2032.	Regional Plan: Air for Otago Rule 16.3.5.9 **Discretionary**	Refer Section 5.11 and Appendix 29 – Beca (2024).
Golden Bar Road Realignment							

Proposed MP4 Activity	Proposed Method	Relevant Existing Consents[78]	Existing Consent Description	Resource Consent Requirements	Consent Term Sought[79]	ORC Rule reference and activity status	Effects Assessment Index
Construction of a road platform from waste rock from nearby open pit mining.	End tipping and dozing of waste rock to establish a road platform. Refer Section 3.5.	-	-	New Discharge Permit – RM24.184.31 Discharge waste rock and contaminants from waste rock to land for the purpose of constructing the Golden Bar Road realignment.	A term of approximately 22 years is sought to align with the expiry of other consents held for mining at Innes Mills Pit (which facilitates the road realignment) which expire in 2046.	RPW Rule 12.B.4.1 **Discretionary**	Refer Section 5.6, Appendix 15 – Ahikā (2024), and Appendix 16 – Whirika (2025).
NGWRS Rehandle							
Discharge silt and sediment to NGWRS silt pond and to Golden Point Pit associated with the rehandling of waste rock from Northern Gully Waste Rock Stack.	Excavation of waste rock with mining excavators. Refer Section 3.4.	-	-	New Discharge Permit – RM24.184.32 To discharge silt and sediment to water in Northern Gully silt pond for the purpose of excavating waste rock from Northern Gully Waste Rock Stack.	A term of approximately 22 years is sought to align with the expiry of other consents held for backfilling of Golden Point Pit (which facilitates the waste rehandling) which expire in 2046.	RPW Rule 12.B.4.1 **Discretionary**	Refer Section 5.4, Section 6 and Appendix 10 – EGL (2024c).
Activities Associated With Mitigation of Surface Water Quality Effects							
Take surface water from silt ponds at Frasers South, Frasers West and Golden Bar to facilitate capture of WRS seepage water and return to the mine water management system.	Pumping of seepage water collected in WRS silt ponds for return to open pits for the purpose of capturing WRS seepage and preventing its discharge to the environment.	-	-	New Water Permit – RM24.184.33 To take and use surface water from Murphys Silt Pond, Frasers West Silt Pond, Redbank Silt Pond, and Clydesdale Silt Pond for the purpose of capturing waste rock stack seepage and preventing its release to the environment and for use in the Mine Water Management System.	A term of 35 years is sought to enable silt ponds to be managed well into the post closure phase	RPW Rule 12.1.5.1 **Discretionary**	Refer Section 5.4 and Appendix 13 – GHD (2024c).
Activities Associated With Implementation of the Murphys Ecological Enhancement Area							
Temporary damming and diversion of surface water associated with construction of a culvert	Use of sandbags, temporary barriers or similar measures to divert the flow of an unnamed tributary of Murphys Creek during construction of "Culvert 1" shown in Figure 3.12 and as described in Section 3.9.	-	-	New Water Permit – RM24.184.34 To temporarily dam and divert water within an unnamed tributary of Murphys Creek for the purpose of constructing culverts associated with establishing the Murphys Ecological Enhancement Area.	A term of 10 years is sought to provide sufficient flexibility in the timing of culvert construction.	RPW Rule 12.3.4.1 **Discretionary**	Refer Sections 5.4.1 and 5.7
Construction and use of culverts on the bed of a tributary of Murphys Creek	Laying of preconstructed culvert sections on the bed of a tributary of Murphys	-	-	**Permitted Activity** The construction, operation and maintenance of culverts including	-	RPW Rule 13.5.1.1 **Permitted**	-

Proposed MP4 Activity	Proposed Method	Relevant Existing Consents[78]	Existing Consent Description	Resource Consent Requirements	Consent Term Sought[79]	ORC Rule reference and activity status	Effects Assessment Index
	Creek including associated preparatory works as described in Section 3.9.			alteration of the bed and associated discharge of bed material in unnamed tributaries of Murphys Creek for the purpose of establishing a predator fence and associated access at the Murphys Ecological Enhancement Area will comply with the conditions of the rules referred to adjacent.		RPW Rule 13.2.1.7B **Permitted** NESF Regulation 70 **Permitted**	
Temporary damming and diversion of surface water associated with construction of culverts	Use of sandbags, temporary barriers or similar measures to divert the flow of the tributary of Murphys Creek during construction of "Culvert 2" and "Culvert 3" shown in Figure 3.12 and as described in Section 3.9	-	-	**Permitted Activity** The temporarily damming and diversion of water within unnamed tributaries of Murphys Creek for the purpose of constructing "Culvert 2" and "Culvert 3" associated with establishing the Murphys Ecological Enhancement Area will comply with the conditions of the RPW Rule 12.3.2.1.	-	RPW Rule 12.3.2.1 **Permitted**	-

Otago Regional Council