



Rehabilitation and Closure Plan

2025-2026

Document Reference: WAI-200-PLN-011

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APPROVALS

OGC Designation	Name	Designation	Signature	Date
Superintendent Environment	- Mark Burroughs	Mr		June 2025

REVISION HISTORY

Date	Revision No.	Issued for	By
2016	17	Annual Review for OGNZL	Part A - Kathy Mason, Part B – Malcolm Lane
2017	18	Annual Review for OGNZL	Part A – MB/RS, Part B Roll over
2018	19	Annual Review for OGNZL	Part A – MB, Part B
2019	20	Annual Review for OGNZL	Part A – CC, Part B – MB
2020	21	Annual Review for OGNZL	Part A & B – Mark Burroughs
2021	22	Annual Review for OGNZL	Part A & B – Mark Burroughs
2022	23	Annual Review for OGNZL	Part A & B – Cassie McArthur & Kristin Gillard
2023	24	Annual Review for OGNZL	Part A & B – Cassie McArthur
2024	25	Annual Review for OGNZL	Part A & B – Sam Mortensen & Mark Burroughs
2025	26	Annual Review for OGZNL	Part A & B – Sam Mortensen & Mark Burroughs

1 INTRODUCTION

1.1 Background

The conditions of Mining Licence 32-2388 (which have been incorporated into the Hauraki District Plan) and consents granted for the Martha Mine Extended Project require an annual review of a Rehabilitation and Closure Plan ("the Plan"). The conditions of consent for the Favona, Trio, Correnso, SUPA and Project Martha Mines also require the preparation of a Rehabilitation Plan. This is the twenty-fourth version of the Plan to be prepared since Extended Project activities commenced in 1999.

1.2 Relevant Conditions

The requirements for rehabilitation and closure are specified in:

- The Hauraki District Plan
- Consents and conditions relating to Storage 2 and the conveyor silt ponds
- The Waikato Regional Council consents and conditions for the Martha Mine Extended Project
- The Hauraki District Council land use consent and conditions for the Extended Project no 97/98 – 105
- The HDC land use consent for the relocation of the Cornish Pumphouse (No 85.030.009.PP)
- Condition 4 of Schedule 1 attached to Waikato Regional consents for the Favona Mine (refer consent number 109741, 109742, 109743, 109744, 109745, 109746)
- The Hauraki District Council land use consent and conditions 85.050.326.E for the Favona Underground Mine
- The HDC land use consent for the relocation of the Grand Junction Refinery Building and Strongrooms
- The HDC land use consent for the Trio Development Project, RC-15735
- Waikato Regional Council consents for the Trio Development Project (121416-121418, 121446, 121447)
- Hauraki District Council land use consent for the Trio Mine, RC-15774
- Waikato Regional Council consents for the Trio Mine (121694-121697)
- Hauraki District Council land use consent for the Correnso Underground Mine, 202.2012
- Waikato Regional Council consents for the Trio Mine (124859 – 124864)
- Hauraki District Council land use consent for the Slevin Underground Project Area, 202.2016.00000544.001
- Project Martha Schedule One. Common conditions for Hauraki District Council and Waikato Regional Council.
- The HDC land use consents for the TSF1A crest raise (LUSE 202.2018.00000812.002) and TSF2 crest raise (LUSE 202.2021.00001466.001)

All of the relevant conditions are listed in **Part A Appendix A**. It should be noted that there are also consent conditions relating to the Rehabilitation Bond, post closure Trust (the Martha Trust) and Capitalisation Bond.

1.3 Report Content and Structure

In accordance with the consent conditions this report has been divided into two parts, Parts A and B. Part A summarises the rehabilitation activities that were carried out between 1 April 2024 to 31st March 2025 and outlines those rehabilitation activities that are planned for the coming year, i.e. 1 April 2025 to 31st March 2026. Part B outlines the rehabilitation and closure activities that would be needed should closure occur on 1 July 2026.

2 REFERENCE AND COMPLIANCE

Level	Source
References	Environment Waikato. 2010. Significant Natural Areas of the Hauraki District – Terrestrial and Wetland Ecosystems. Environment Waikato Technical Report 2010/08.
	WAI-200-REP-011. Verum Group - Passive Treatment Trial -Stage II
	WAI-200-REP-010 EGL Newmont Waihi Gold Tailings Storage Facility Closure Criteria
	WAI-200-REP-008 Site Visit to the Tailings Storage Facility, Oceana Gold Mine – Bob Stewart 8 August 2024
	WAI-200-REP-009 Soil and Pasture Growth Analysis and Fertiliser Recommendations for the Tailings Storage Facility -Bob Stewart.
Site	WAI-200-PLN-006 Waihi Pest Control Management Plan 2025.
	WAI-200-REP-007 Waihi Rehabilitation Monitoring Report 2025
	WAI-200-PLN-016 Biodiversity Environmental Material Risk Management Plan
	WAI-200-PLN-017 Landscape Plan Waihi
	WAI-200-PRO-043 Monitoring Topsoil Depths on the Tailings Storage Facility
	WAI-200-PRO-044 Worm Surveying
	WAI-200-PLN-010 Tailings Storage Facility Monitoring Plan

PART A – Ongoing Rehabilitation Operations



Figure 1 Riparian planting on Golden Valley Road.

1 INTRODUCTION

1.1 Document Purpose and Structure

Various Waikato Regional Council and Hauraki District Council consent conditions require a OGNZL to have a Rehabilitation and Closure Plan. Generally, these conditions require that Part A of the Rehabilitation and Closure Plan shall:

- describe the programme of progressive rehabilitation (including revegetation) that is proposed for the site for the following twelve months, should closure not be proposed during that period; and
- report on any such works undertaken during the previous year.

The monitoring period for this report is 1st April 2024 to 31st March 2025.

Appendix A contains a list of relevant Rehabilitation and Closure conditions for all projects. Detailed monitoring results have been included in the Rehabilitation Monitoring Report (WAI-200-REP-007) which is to be read in conjunction with this plan.

Previous iterations of this Plan have separated OGNZL's progressive rehabilitation activities into mandatory or discretionary activities, with many of these activities or projects already completed. Much of this information has been removed in a previous review, which instead focuses on rehabilitation activities completed during the previous year and rehabilitation activities planned for the year ahead, as is required by consent conditions. For information on previously completed mandatory or discretionary projects, earlier versions (2022-2023 and earlier) of this report should be referred to.

1.2 Site operations overview

Underground mining

The focus of underground mining activities is currently the completion of backfilling in Correnso Underground and continuing the mining of Martha Underground (MUG).

Waste rock produced over the period was either trucked to surface and placed on the polishing pond stockpile, stockpiled within the Martha Pit, or used as backfill in MUG or Correnso Production stopes.

Martha Pit

The Martha Pit remains in care and maintenance with no open pit production mining activities taking place. However, in pit dumping of waste rock from the underground via the underground portal has occurred. The waste rock is stored there until required for backfilling. The north wall slip remediation is currently consented, but not planned until at least 2028.

Tailings Storage Facilities

Construction activities through the 2024/25 season involved downstream works to prepare for the crest raise to 179.5mRL. Due to weather delays the scheduled works and proposed rehabilitation was unable to be completed. Completion is planned for 2025/26 construction season.

1.3 Climate Summary

Climate has a considerable impact on rehabilitation and the following section provides a summary of the climatic conditions that have influenced site conditions over the past year. Climate conditions also assist with the interpretation of pasture productivity data. Climate data has been sourced from OGLNZ records and NIWA Climate summaries.

1.3.1 Rainfall

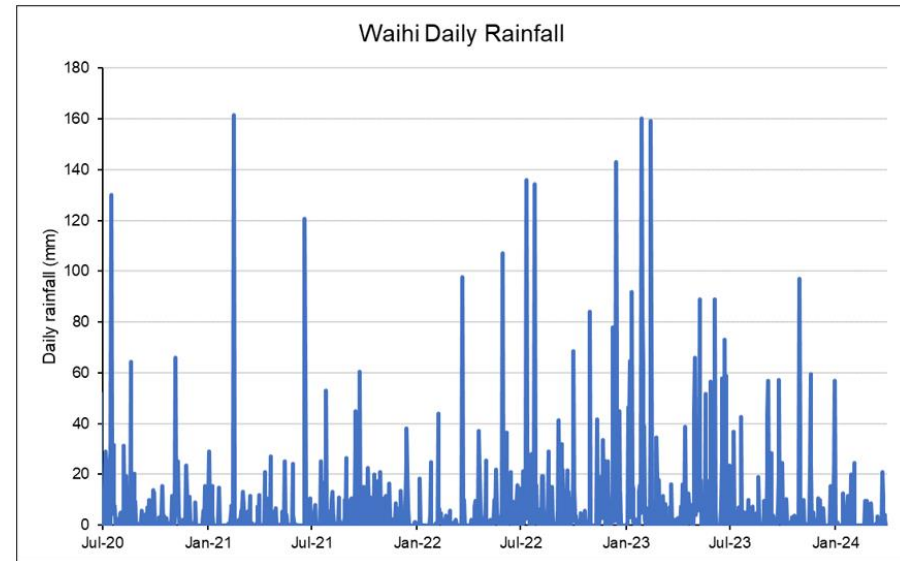
Annual and seasonal rainfall trends are displayed in Figure 2. The Cumulative Rainfall Departure (CRD) plot presents long term trends in rainfall since 2000. Historical rainfall data for Waihi has been collected since 1907, with annual rainfall ranging from 1249 – 3234 mm.

A total of 1191 mm of rain was recorded during the reporting period, down from the previous reporting period (2215.6 mm). The month with the highest rainfall during the reporting period was June 2024 (406 mm) followed by June 2023 (196.6 mm) and the driest month was March 2025 (57 mm) followed by November 2024 (64.80 mm).

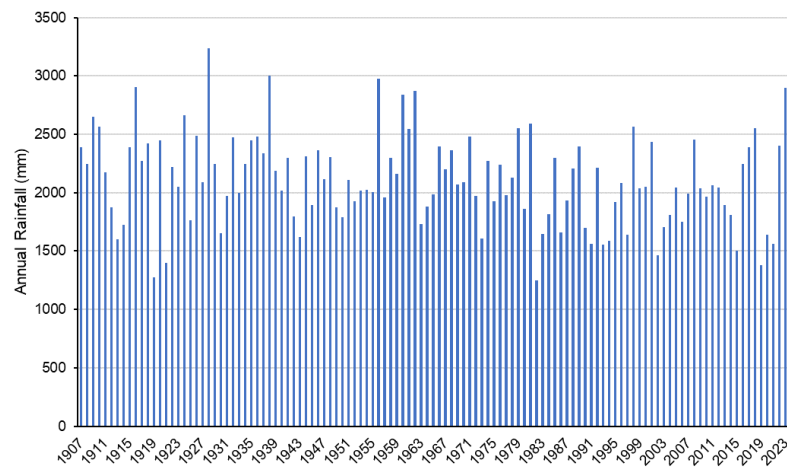
Cumulative Rainfall Departure



Waihi Daily Rainfall



Waihi Historical Rainfall



Waihi Monthly Rainfall

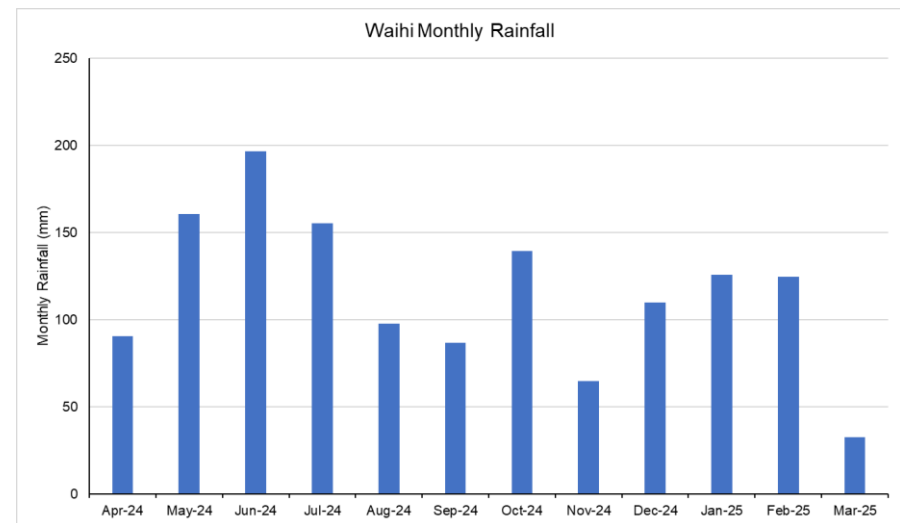


Figure 2 Waihi historical rainfall data.

1.3.2 Seasonal trends

Winter 2024 was the 3rd warmest on record, with temperatures above average for most of the country. June and July were dry months for many parts of the country.

Spring 2024 were above average for much of the North Island, with rainfall below normal.

Summer 2024/25 again was warmer than normal, with less rainfall and lower than normal soil moisture levels.

1.3.3 Soil moisture deficit

Soil moisture deficit is calculated based on incoming daily rainfall (mm), outgoing daily potential evapotranspiration and a fixed available water capacity of 150mm (the amount of water in the soil reservoir the plants can use).

Rainfall was below normal for the eastern Bay of Plenty and Coromandel area during the 2024/25 period. This resulted in lower than normal soil moisture levels. The soil moisture deficit index for Hauraki District below shows relatively high soil moisture deficit into the summer of 2025, with relatively low rainfall and warm conditions (Figure 3). The national soil moisture deficit map (Figure 4) demonstrates dry conditions throughout much of the country in March 2025. Warm, dry conditions extended through until April 2025.

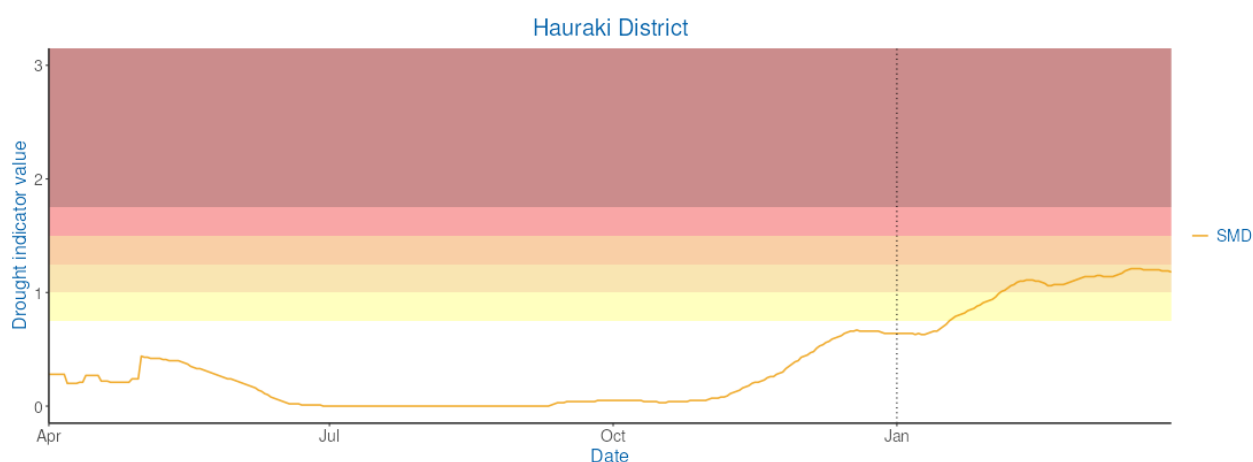


Figure 3 Soil moisture deficit index for Hauraki District April 2024- March 2025. Sourced from Niwa.co.nz

Soil moisture deficit (mm) at 9am on 01/03/2025

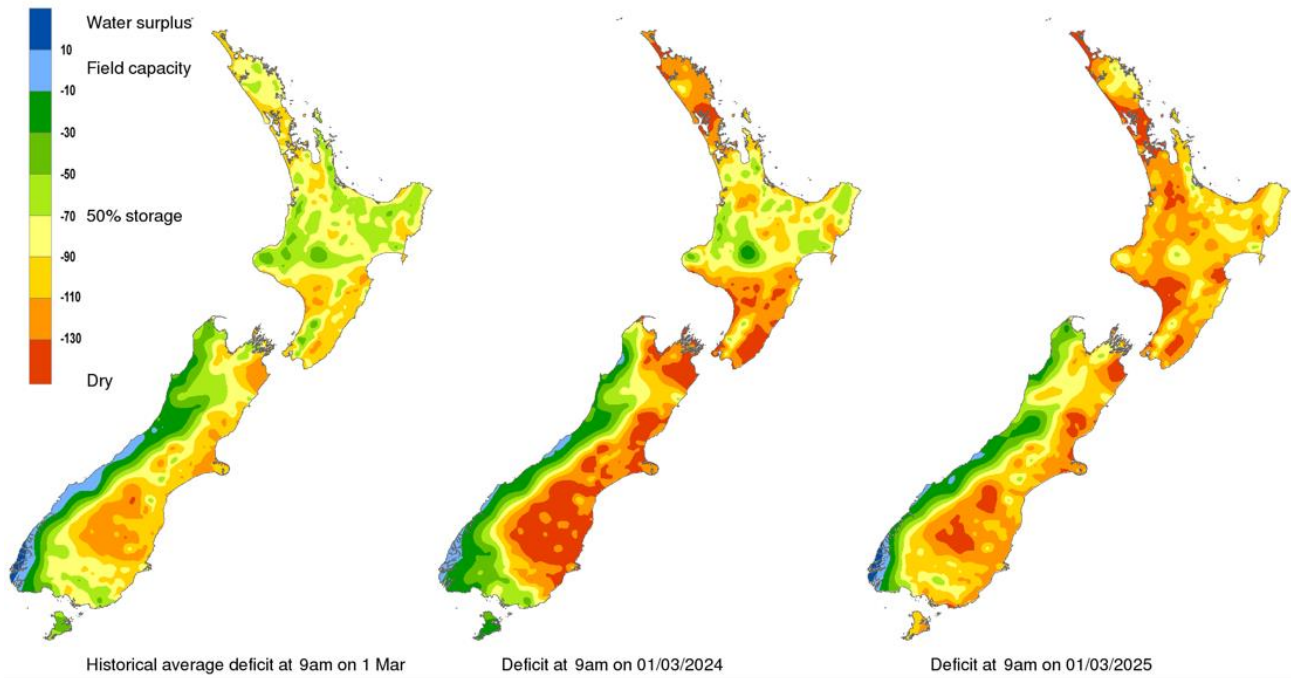


Figure 4 National soil moisture deficit map for March 2025. Niwa.co.nz

2 CLOSURE CONCEPTS AND OVERVIEW

This section provides an overview of the closure planning process at Oceanagold, and introduces the current closure concepts for each aspect of the operation.

2.1 Integrated mine closure planning

Oceanagold Waihi site has a cross functional closure committee. The purpose of this committee is to meet 6 monthly and ensure that closure planning process is carried out in accordance with company standards and legal requirements, and is fully incorporated into operational planning.

Oceanagold is utilising the Integrated Mine Closure Good Practice Guide from the International Council of Mining and Metals (ICMM) to support this process. Integrated mine closure is an iterative process that considers environmental, social and economic aspects through the life of the mine (refer to Figure 5).



Figure 5 Integrated Mine Closure (From ICMM Guidelines).

2.2 Martha Open Pit

The original closure concept plan for the Martha Pit envisaged a recreational lake with a park located to the East. After the Barry Road collapse and identification of hazard zones by GNS, a Master Rehabilitation and Closure Concept Plan was developed in 2006 by mining company staff, Waikato University, Department of Conservation, Waihi Community Vision, the Landscape Design Company along with tourism and marketing advisors (Figure 6). The Master Rehabilitation and Closure Concept Plan envisages the creation of a pit lake with a surface level of around 1104m and the development of an integrated parkland around the lake focussing on an extensive area accessible to the lake edge on its eastern side. Revegetation and amenity plantings, and management of screening trees and removal of weeds along with extensive walkways and recreational features are incorporated within the Master Rehabilitation and Closure Concept Plan.

The Rehabilitation and Closure Concept Plan for the Martha Open Pit is considered a “work in progress” and is subject to change and more detailed landscape planning when the site nears closure. The 2006 Closure Concept Plan (Figure 6) was updated following the approval of the Martha East Layback. In 2016, changes were made to show the North Wall following remediation, including partial capping of the failed section. Other minor changes include widening of the lake to the north and southeast, an extension of the track network to accommodate the north wall remediation cutback, and minor amendments to the landscape and track network to the east of the pit. This updated plan is included as **Figure 7**.

Future works associated with Project Martha (approved February 2019) will not substantially change the current Closure Concept Plan. Minor changes include confined earthworks and the creation of a noise bund on the North Wall. This work is not scheduled to commence until at earliest 2028.

The landscape plan for the pit currently includes a pontoon located on the west side of the open pit and a boat ramp on the southern side. In future reporting periods, OGNZL will re-evaluate whether this is the best option in terms of providing lake access to the public.

In addition to the closure plan, a landscape vision has also been developed. It is intended that rehabilitation will establish a self-sustaining ecosystem. After extensive consultation with stakeholders the following landscaping philosophy was adopted:

- Progressive removal of exotic weed seed sources from the pit perimeter to reduce ongoing long-term maintenance of pit walls.
- Provision of a new seed bank near the pit area i.e. around the pit rim, by revegetation of primarily native seedlings local to the area.
- Weed control, mulching and maintenance particularly in the first few years and reducing as plants become established and weed seed burden depletes.
- Native plant species trials on pit walls where opportunities arise.

Generally, the aim is to preserve views of the future lake from the surrounding pit rim walkways by using low grasses and groundcovers broken up in places with some small tree species (e.g., manuka and pittosporum). This will also address the long-term issue of maintaining visibility for security for pedestrians using this walkway.

Rehabilitation undertaken to date around the Open Pit is included in Figure 8.

To assess the likely cost of ongoing maintenance around the pit post closure, and to gather data for measuring progress against the maintenance effort closure condition, current maintenance effort for weed control and maintenance around the open pit is included in Section 4.22 of this plan.

2.3 Tailings Storage Facility

The overall original concept plan for the rehabilitation of the Tailings Storage Facility (Figure 9) remains generally unchanged. Figure 10 provides an updated version of Figure 9. Slight differences include the possibility of more embankment native vegetation and the presence of walking or cycling tracks. These have yet to be defined and given the time until closure, further detail will be added in future years. Figure 11 shows a summary of rehabilitation completed at the Tailing Storage Facility to date.

2.3.1 Embankment Rehabilitation

The waste rock embankment is rehabilitated to pasture and native vegetation. OGNZL generally plants areas of the waste rock embankment in native vegetation:

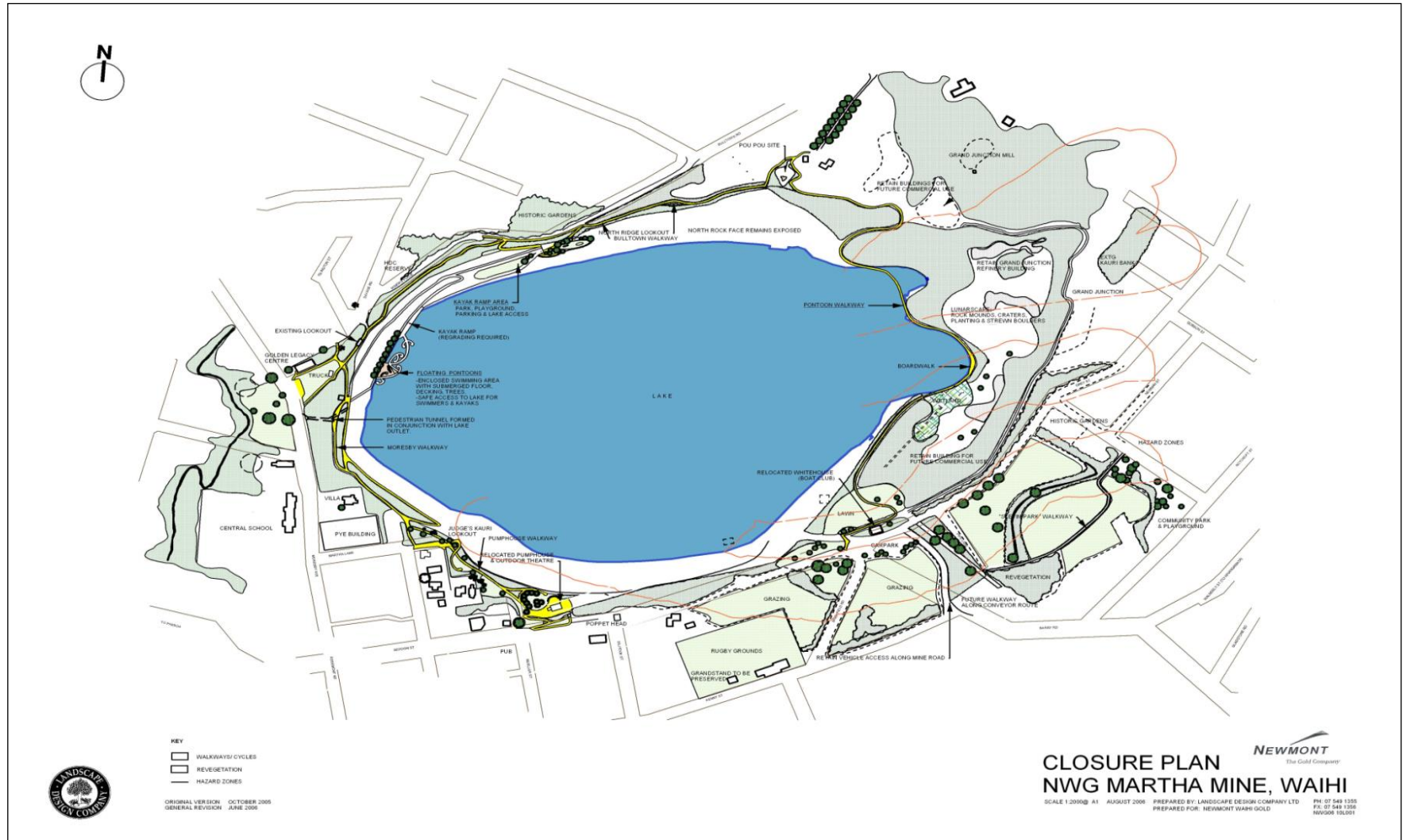
- if the embankment slope exceeds 20 to 25 degrees, and there is a risk of tracking by stock and damage to the land if the area is rehabilitated to pasture, or,
- if there are awkward areas that are difficult to farm, e.g. triangles of land adjacent to ramps, or,
- if there is an ecological benefit in planting selected areas.

While shrubs and small trees have been used on site to provide a better stability option than pasture on steep batters and eliminate potential damage from stock traffic, they may also inhibit observations of possible seeps or cracks that



may develop in surface areas. They also require more maintenance effort than pasture in the long term, and deep rooting tree species require removal to protect the Zone G capping layer.

The intention is to maximise the amount of pastureland available to the post-closure Trust while ensuring that native vegetation is planted in appropriate areas to ensure the long-term integrity of the capping layer, while achieving biodiversity objectives.





KEY

Kanuka vegetation – proposed areas of kanuka planting, post closure. Existing nearby native vegetated areas to provide seedbank for natural succession.

Refinery Building – historic Grand Junction Refinery Building relocated to this location and landscaped in 2013. Options to incorporate access to building as part of closure.

Existing Kauri Bank – planted during the 2000s as recognition for staff service to the company. Proposed to be retained post closure.

Grand Junction Relics – historic features retained during development of Open Pit and noise bund. Pit perimeter road currently runs through these. Options to incorporate access as part of closure.

Grand Junction Mill Area – includes concrete footings and terraces from historical mill, documented by archaeologist. Potential for visitor interpretation area at closure.

Slevin Park Grazing, Grazing, Farm Park – areas currently either partially or fully grazed. Proposed to be leased to local farmer for grazing at closure.

Historic Gardens – historical gardens of relocated houses including fruit trees and flowering specimen trees. Proposed to be retained post closure.

Figure 7: Current Closure Concept Plan for Open Pit and Surrounds updated 2022



Figure 8: Rehabilitation of Open Pit and Surrounding Areas

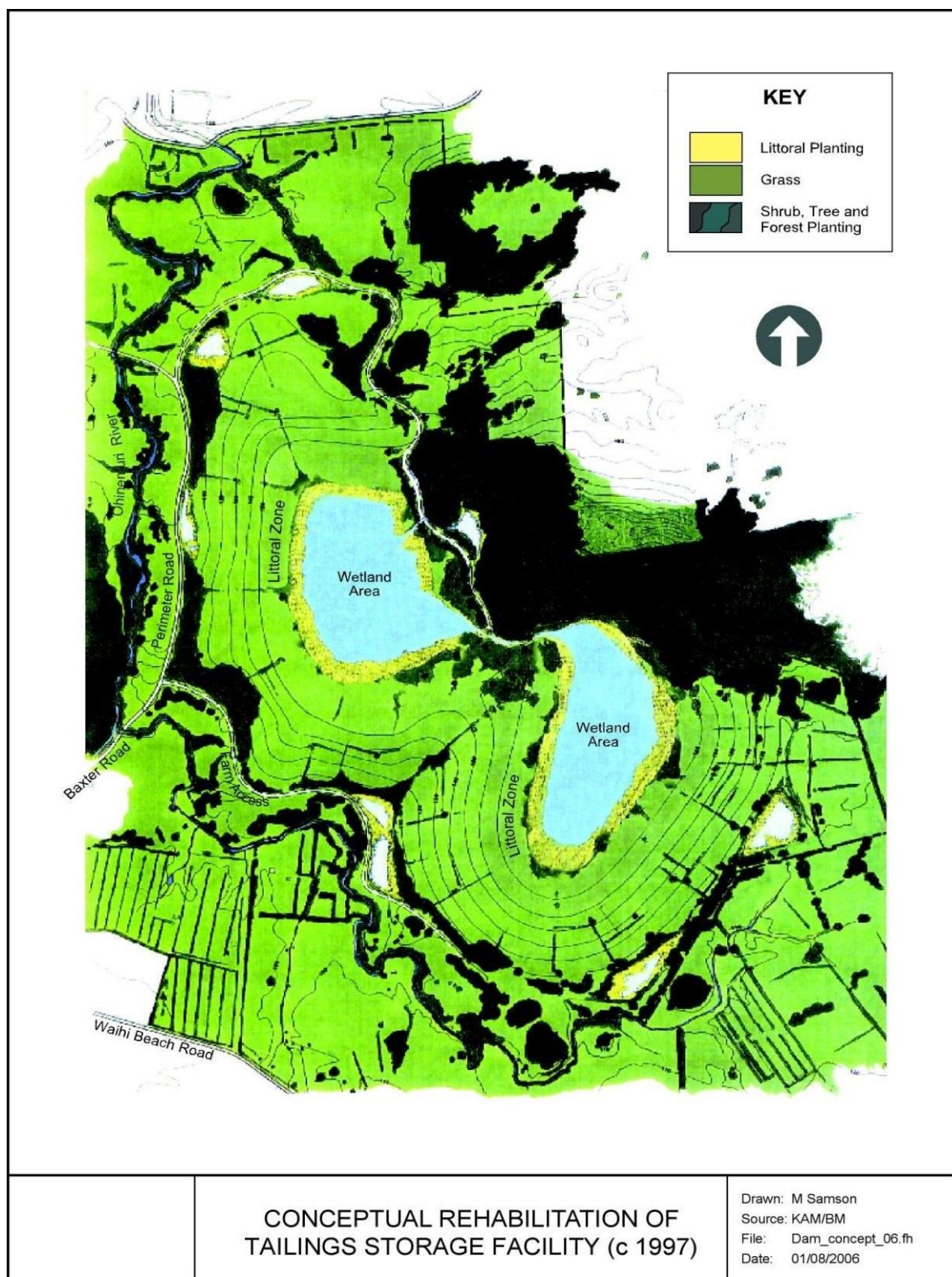


Figure 9: Newmont Waihi Gold Waste Disposal Area Closure Concept 1997



Closure Plan - Tailings Storage Facilities 1A & 2

Figure

Drawn by: MPS DesignShed

Figure 10: Current Closure Concept for Tailings Storage Facility

'2.ai

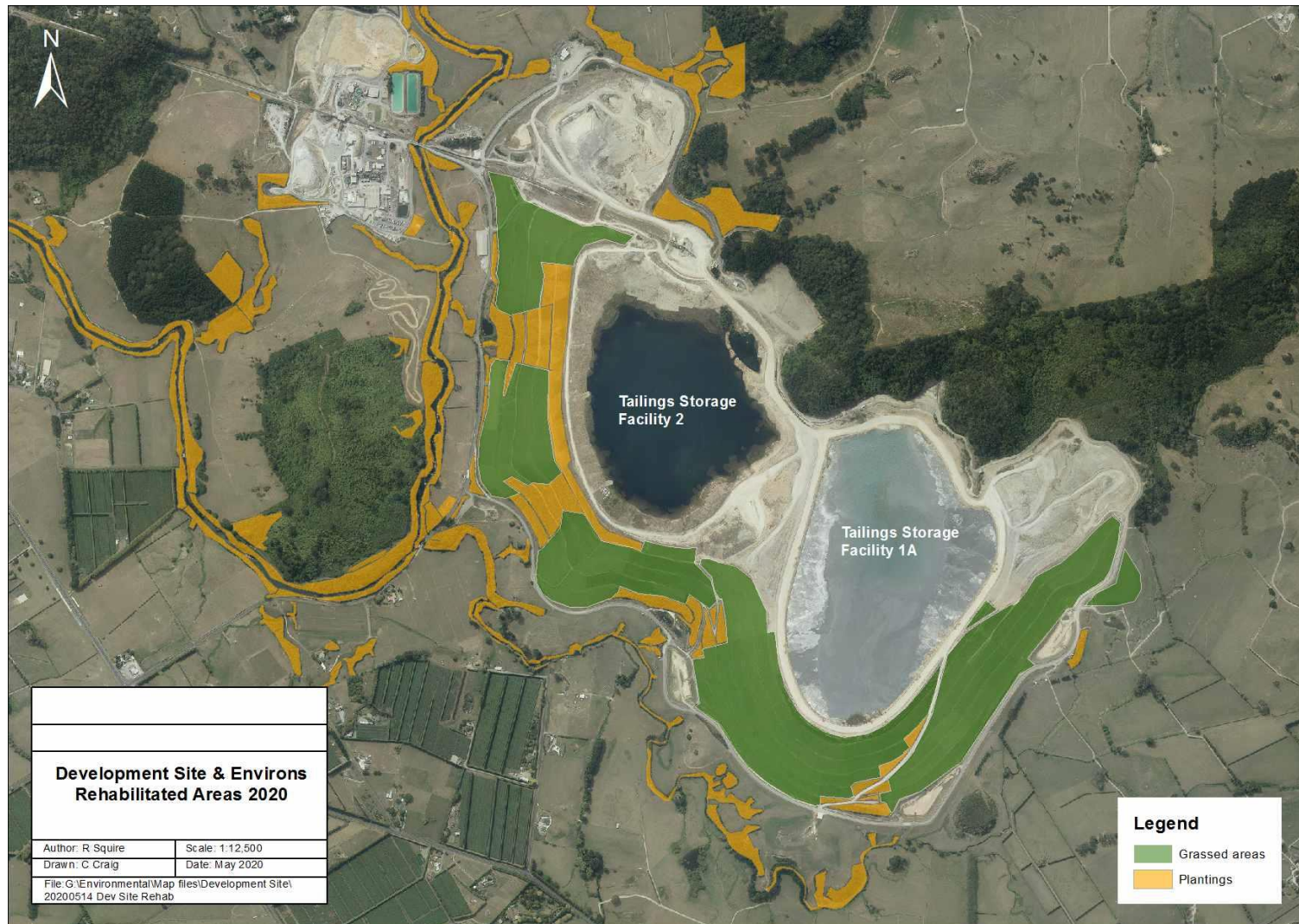


Figure 11: Rehabilitation of the Tailings Storage Facility site to Date

2.4 Case Study- Motumanawa – Union Hill

The mine site and associated mine owned land within the Waihi area present an opportunity for wider landscape scale restoration and recreation. The Waihi Battery site on Motumanawa (Union Hill) is a significant historical area dating from the earliest period of Waihi's mining history. The property is owned by and maintained by Oceanagold in partnership with Waihi Heritage Vision. In addition to regular monitoring to ensure the remains are protected and safe and walking tracks are maintained; active ecological restoration has taken place to control weeds and restore natural habitat. Walking tracks around this historical site and in the wider vicinity make the site an appealing place to visit, and an increasingly important habitat for local wildlife.

Native plantings around the site complement and soften the visual impact of the remaining structures, whilst providing wider biodiversity and soil benefits (Figure 12). Living ecosystems are also showing evidence of becoming established on the structures themselves. The naturally established 'living roof' on top of a concrete relict (Figure 13) provides a suitable medium for orchids and native ferns.

This site shows the potential for mining remains to be retained and integrated into the landscape at closure.



Figure 12 Decommissioned cyanide tanks at Union Hill with native planting in the foreground



Figure 13 Living roof at Union Hill (Photo by Robyn Simcock)

2.5 Restoration Principles

The following restoration principles and associated considerations have been drafted to allow a strategic approach to planning plantings, in line with learnings received over time. These principles provide direction and set the framework for more detailed planning.

Right plant, right place

- Selecting plants able to withstand tough environmental conditions for establishment – high winds, hot/dry (and sometimes very wet) summer, little or no topsoil; and infertile/low pH soils.
- Operational monitoring and safety requirements and regulations may sometimes outweigh aspirations for planting.
- Exclusion of deep rooting trees from TSF embankments and steep pit batters
- Short lived species may provide a nurse crop in association with, or ahead of, long lived species.
- Take advantage of natural ecosystem services provided by landscaping – shelter, screening, dust attenuation, stormwater management, riparian management.
- Considering long term maintenance requirements.
- Retain sight lines and safety setbacks from vital infrastructure (eg survey prisms, IT equipment, power lines, roads) structures, barriers and signage.
- Plant growth rates and the length of time for planting to reach the desired visual screening, aesthetic effect or canopy coverage should also influence plant selection.
- Aesthetically pleasing, or useful, when in public eye (community perception).
- Considering future mining implications- anticipating future screening requirements, future development areas, and potential loss during operational or closure earthworks.

Biodiversity and resilience

- Dense edges to reduce likelihood of weed establishment
- Restoration of multiple vegetation tiers from root zones to litter layers to canopy.
- Forming diverse habitat niches, complementary flowering and fruiting species to extend food supply for native invertebrate fauna and pollinators through the seasons.
- Riparian plantings consider requirements for freshwater biology including tuna and inanga habitat.
- Protection and enhancement of existing habitat.
- Promoting a naturally regenerating environment and functioning ecosystem.

Plant supply

- Eco-sourcing of plant material by collecting seed from remnant vegetation as close as possible to the location of planting, and from a similar ecotone.
- Selection of species that are of significance to the area and to mana whenua eg. Northern Rātā, Totara.
- High quality plants resilient and adapted to the local conditions.
- Supporting local suppliers where possible.

Sustainability

Land is to be left in a self-sustaining, safe and stable condition post closure. Rehabilitation works need to be integrated with operations and maintenance aspects for both now and into the future. Oceanagold need to be able to demonstrate diminishing maintenance requirements.

- Low maintenance
- Forward planning
- Aspire to achieve long term canopy coverage to reduce maintenance requirements.
- Balancing need for mowing (whilst retaining open space in future public areas) vs maintenance effort.
- Detailed recording and reporting to ensure learnings are applied to future projects and knowledge passed on.

Context sensitive and place based approach

The mine site and surrounding areas hold natural, cultural, environmental and historic values that contribute to a sense of place.

Consideration should be made to:

- places of significance to Māori
- Historic buildings or structures
- Records of local ecology
- Remnant forests and local reference ecosystems

Connectivity with community (community asset, other ecological groups, neighbours) and the surrounding landscape.

Recognise and incorporate Māori and European cultural heritage.

Staff and community awareness of the impact and importance of the rehabilitation programme.

Pest management and biosecurity

- Reducing maintenance effort by fostering natural regeneration and ensuring adequate canopy cover.
- Regular monitoring and observation of establishing plantings to identify issues.
- Regular surveillance for Kauri dieback / Myrtle rust
- Appropriate predator control programme in newly created habitat.

2.6 Planting planning and tracking

The Waihi Ecological District covers the southern end of the Coromandel Range and the Ohinemuri catchment. Formerly, vegetation would've consisted of kauri-podocarp-broadleaved forest and montane podocarp totara/broadleaved forest at higher altitudes with alluvial floodplain podocarp forests leading down to the Pohutukawa Puriri forests of the coast (Waikato Regional Council, 2010).

A review of planting data collected over the life of the mine has determined that since 1991, Waihi Gold Mine operators have planted over 940,000 native plants around the Waihi area, making a considerable impact on the wider landscape, and enhancing connectivity between established habitats of Karangahake Gorge and Coromandel Forest Park. Planting numbers and locations are recorded in ArcMap in order to demonstrate the impact of plantings over time on the landscape (Figure 14 overleaf).



Figure 14 OceanaGold planting undertaken in Waihi since 1991

Native plants are sourced from Waihi Ecological District where possible, and Kauri Gold are contracted to plant and maintain the sites. By their fifth year, plants have grown to a stage where significantly less weed control is required. Riparian sites are prone to flood damage and weed invasion from upstream, but regular maintenance minimises issues. The typical planting list and ratio for native plantings is included below in table 1.

Table 1 Typical Waihi site plant selection ratio – general native revegetation.

Botanical Name	Māori/Common Name	%
<i>Cordyline australis</i>	Tī kōuka, Cabbage tree	5
<i>Coprosma robusta</i>	Karamū	8
<i>Dodonea viscosa</i>	Akeake	5
<i>Griselinia littoralis</i>	Kāpuka, Broadleaf	3
<i>Hebe stricta</i>	Koromiko	6
<i>Hoherea populnea</i>	Houhere, Lacebark	5
<i>Kunzea ericoides</i>	Kānuka	15
<i>Leptospermum scoparium</i>	Mānuka	15
<i>Podocarpus totara</i>	Tōtara	5
<i>Phormium tenax</i>	Harakeke, Flax	15
<i>Pittosporum crassifolium</i>	Karo	8
<i>Pittosporum eugenoides</i>	Tarata	5
<i>Pittosporum tenuifolium</i>	Kōhūhū	5

Planning for future plantings associated with the proposed Waihi North Project are based on species recorded in the area, suited to the climate, and known to be important food sources and habitat for fauna. Species incorporated into planting lists include tītoki, rangiora, whau, northern rātā, hoheria, mānuka, mapou, kaikomako, kōwhai, koromiko, kohekohe, hangihangi, nikau and pūriri.

3 CLOSURE CRITERIA

As described below, the Mining Licence and consent conditions provide the overall objective for closure and subsequent handover of the site to the Martha Trust.

Schedule 1 to the Waikato Regional Council consents for the Martha Mine Extended Project states the following in condition 9:

“Prior to commencement of construction of the tailings storage facility (Storage 1A), the consent holder shall prepare a concept plan (“the Plan”) describing the proposed method of rehabilitation and closure of the Site. “The objective of this Plan shall be to ensure rehabilitation and closure of the Site in such a manner that in the long term the Site, and any structures on it, will remain stable; and any water discharging from the Site, and any groundwater under the Site, will be of a quality such that it will not adversely affect aquatic life, or other users of the water resource.”

The Hauraki District Council Land Use Consent for the Martha Mine Extended Project (No 97/98 – 105) states the following in 3.31, condition 10 (refer complementary condition in WRC Schedule 1, condition 10.10):

“The Councils shall release the rehabilitation bond on the completion of closure of the site.”

“Completion of closure of the site” means when the elements of the entire project have been demonstrated by the consent holder to the satisfaction of the Councils to have reached a stable, self-sustaining, rehabilitated state as defined by the approved Rehabilitation Plan.”

In addition, the varied Mining Licence 32-2388 condition 36 states the following in condition 36:

“Mining, processing and waste disposal operations shall be carried out in such a manner as to ensure that the surface of the land suffers as little permanent damage as possible. The licence area is to be left in a clean and tidy condition after mining operations have ceased including removing from public view any used derelict equipment and machinery and the pit faces are to be left in a stable and safe condition.”

In summary, closure will be complete when OGNZL can demonstrate that the site has reached a stable, self-sustaining, rehabilitated state as defined in the approved Rehabilitation and Closure Plan, and the open pit walls are safe and stable. For this reason, OGNZL has included current closure completion criteria within the Rehabilitation and Closure Plan so that it is clear to all parties when closure has been achieved. Closure criteria are developed in conjunction with and are agreed upon by the Councils before their incorporation into the Closure Plan.

OGNZL has developed a process for defining Closure Criteria based on a “narrative” or descriptive definition of “what” is the closure objective and “quantitative” or descriptive definition of “how” the objective is to be achieved. The quantitative method definition of each criterion may include numerical standards if appropriate for measurement and may not be required or appropriate for every closure element of the site.

Narrative criteria = closure objectives

Quantitative = methodology to achieve the narrative criteria.

It should be noted that some closure criteria are still in the process of being developed. These are included in the sections that follow and will be progressed and refined over the coming years, and associated monitoring methods developed.

3.1 Discharges to Surface Water

Closure completion criteria for discharges to surface water are already stated in the conditions of consent. Comprehensive regular monitoring takes place to demonstrate compliance with consent conditions.

Preliminary criteria are suggested as follows:

Narrative:

Discharges from the site, either alone or in combination, shall not cause a significant adverse environmental effect on the receiving surface water, including users of the resource and aquatic biota.

Quantitative:

The discharges, either separately or in combination, shall not cause the receiving water standards specified below to be breached (refer Consents Tables 1 and 2).

Table 2: Receiving Water Standards

Parameter (g/m ³ unless otherwise stated)	Receiving Water Concentration	
	Hardness 20 g/m ³ CaCO ₃	Hardness 100 g/m ³ CaCO ₃
Temperature	Less than 3°C increase	Less than 3°C increase
pH	6.5 to 9.0	6.5 to 9.0
Suspended solids	For upstream concentrations of less than or equal to 100 g/m ³ the increase shall be no greater than 10 g/m ³ . For upstream concentrations of greater than 100 g/m ³ the increase shall be no greater than 10%.	For upstream concentrations of less than or equal to 100 g/m ³ the increase shall be no greater than 10 g/m ³ . For upstream concentrations of greater than 100 g/m ³ the increase shall be no greater than 10%.
Cyanide CN(wad)1	0.093	0.093
Iron	1.0	1.0
Manganese	2.0	2.0
Copper	0.003	0.011
Nickel	0.04	0.160
Zinc	0.027	0.100
Silver 1	0.0002	0.0024
Total ammonia	Refer Table 2	Refer Table 2
Antimony	0.03	0.03
Arsenic	0.190	0.190
Selenium	0.005	0.005
Mercury	0.000012	0.000012
Cadmium	0.0003	0.001
Chromium (VI)	0.01	0.01
Lead	0.0004	.0025

Notes:

- (1) Site specific derived criteria using US EPA (1985) methodology.
- (2) Monitoring of metals shall be based on the soluble test method, defined as the concentration of dissolved metals measured in that fraction which passes through a 0.45 um filter except for mercury (Hg) which shall be based on acid soluble concentrations determined on unfiltered samples.
- (3) Current analytical procedures for mercury have a practical quantification limit (PQL) of 0.0005 ppm. This PQL is acceptable for the purposes of reporting mercury concentrations. The reporting 'limit' for mercury concentrations shall be reviewed annually by the consent holder and shall be adjusted in line with improvements in analytical technology.
- (4) ~~Prior to 30 October 2007, The selenium concentration in the receiving water shall remain below the trigger limits of 0.02 g/m3 90% 97% of the time on an annual basis, and shall not exceed 0.035 g/m3 in any single analysis, based on monitoring undertaken pursuant to condition 16 of consent 971318. After 30 October 2007, selenium concentrations shall not exceed 0.005 g/m3, unless otherwise agreed with the Waikato Regional Council in writing.~~ In the event that these limits are exceeded, the consent holder shall inform the Waikato Regional Council as soon as practicable and prepare a report, to the satisfaction of the Council, to demonstrate that continued discharges at concentrations exceeding the trigger limits will have no more than minor effects on the Ohinemuri River. This report shall be provided to the Council within two months of the consent holder becoming aware of the trigger exceedance.

Table 3: Criteria for Ammonia

Chronic Criterion - g/m ³ as Ammonia							
Temp °C \ pH	0	5	10	15	20	25	30
6.50	3.0	2.8	2.7	2.5	2.5	2.5	2.4
6.75	3.0	2.8	2.7	2.6	2.5	2.5	2.5
7.00	3.0	2.8	2.7	2.6	2.5	2.5	2.5
7.25	3.0	2.8	2.7	2.6	2.5	2.5	2.5
7.50	3.0	2.8	2.7	2.6	2.5	2.5	2.5
7.75	2.8	2.6	2.5	2.4	2.3	2.3	2.4
8.00	1.82	1.70	1.62	1.57	1.55	1.55	1.59
8.25	1.03	0.97	0.93	0.90	0.90	0.91	0.94
8.50	0.58	0.55	0.53	0.53	0.53	0.55	0.58
8.75	0.34	0.32	0.31	0.31	0.32	0.35	0.38
9.00	0.195	0.189	0.189	0.195	0.21	0.23	0.27

3.2 Pit lake (Surface Water)

When mining is complete, the Martha Pit is proposed to be filled with water to create a recreational lake to RL1103. In order to fill the lake, consents are in place for water to be pumped from the Ohinemuri River. Studies have determined that there would be a need to add lime to the lake over the filling period and on an ongoing basis to maintain water quality. The consent conditions address both water quality and potential flooding issues as described below.

Existing WRC consents 971287 to 971293 and 139551.06 to 139551.08 relate to pit lake formation and discharge. Condition 19 states that discharge from the pit lake shall not commence until the discharge,

after reasonable mixing, can meet the receiving water criteria specified in Table 1 and the consent holder has received written approval from WRC for the discharge to commence.

Condition 18 states that prior to commencing discharge from Pit Lake the consent holder shall complete, to the satisfaction of Waikato Regional Council, a report that clearly details the likely incremental impact that this discharge will have on the flood routing capacity of the Mangatoetoe Stream. The consent holder shall then prepare a plan of works designed to mitigate the impacts of this discharge on any potentially affected properties or public utilities in the Mangatoetoe Stream catchment. Subject to the granting of any necessary consents, and at least six months prior to commencing discharge from the Pit Lake, the consent holder shall implement those measures to the satisfaction of the WRC.

Further technical studies are required to determine appropriate success criteria. Preliminary criteria are suggested as follows:

Narrative:

Lake Discharge shall not cause a significant adverse environmental effect on the Mangatoetoe Stream, including users of the resource and aquatic biota.

Lake water quality shall be suitable for recreational purposes.

Quantitative:

1. *The lake discharge shall not cause the receiving water standards specified in Tables 1 and 2 above to be breached.*
2. *Increases to the Mangatoetoe Stream flows resulting from the lake discharge shall not exceed;*

Yet to be determined.

3.3 Surface/Groundwater recovered system

In 2023/24, WWLA were commissioned by OGNZL to develop a groundwater monitoring plan for baseline aquifer water quality characterisation with the water quality sampling assessment providing a benchmark for desirable groundwater conditions criteria at closure around Martha Pit.

Six monthly sampling of suitable standpipe piezometers around the Martha pit commenced in autumn 2024. Full results will be presented in the five-yearly Shallow and Deep Aquifer Report with summarised results included in the annual Dewatering and Settlement Monitoring Report.

WWLA were commissioned to develop a groundwater model for OGNZL's Waihi Operation. Existing hydrogeologic information for the site will be utilised to prepare a Conceptual Groundwater Model (CGM) that summarises the material properties, hydraulic gradients, surface and groundwater levels and flow paths within the groundwater system. The CGM report will provide information on how the project is expected to impact on groundwater and the surface water bodies that depend on groundwater. The CGM is the first step in completing a Numerical Groundwater Model that will become a tool that assists with compliance reporting and provide predictions of underground and open pit rewaterning rates following mine closure. It is anticipated that this work will be completed by the end of 2025.

This work will contribute to closure planning and will be included in this plan including predicted groundwater levels, flow pathways and water quality, surface/ ground water interaction. This information

will provide a baseline for assessment of environmental and cultural indicators, and closure criteria for these aspects.

3.4 Discharge of Seepage Drainage to Surface Water

The intent is to commence direct discharge of the seepage water from the network of drains beneath the Tailings Storage Facilities when the water quality proves to be acceptable. This will require the approval of WRC (refer WRC consents 971303 and 971304, condition 8).

The intent long term is to discharge the underdrainage direct to the adjacent receiving water via drains that will allow the water to flow from the manholes to the receiving water. Storage 1A has been designed to readily accommodate this but there are several deep manholes within Storage 2 and for this reason, some thought needs to be given to how the water can be direct discharged from them long term.

Passive Treatment Trial

OceanaGold is exploring passive treatment options that could be used to treat TSF drainage upon eventual mine closure, as well as considering passive treatment options that can be used during operations prior to closure. Seepage generally has low pH and contains elevated concentrations of Fe, Mn and a range of other trace elements. From November 2016- August 2018, Verum Group managed two types of small scale passive treatment systems to test various options including Vertical Flow Reactors (VFRs), Limestone beds and Steel slag beds.

Further passive treatment trials were undertaken throughout 2023 and 2024 with multiple cell systems installed with IBCs at TU and L10 sites. These trials proved to be effective and potential solutions to treat TSF drainage, however further exploration was required to ensure all factors were completely understood.

The next step would be to install a larger scale passive treatment system at one or more of the drainage points. The success of such a system would provide valuable information for closure and confidence to stakeholders that passive treatment solutions can be applied at the site.

Preliminary criteria are suggested as follows:

Narrative:

The discharge of seepage shall not cause a significant adverse environmental effect on the Ohinemuri River or Ruahorehore Stream, including users of the resource and aquatic biota.

Quantitative:

Seepage discharges shall not cause the receiving water standards specified in Tables 1 and 2 above to be breached.

3.5 Discharge of Bypassed Seepage to Groundwater

Some seepage from the TSFs is expected to bypass the drainage network and arrive in groundwater on site. This is referred to as TSF bypass seepage to groundwater. The discharge of TSF bypass seepage to groundwater, subject to conditions, is authorized by WRC consent 971305 for Storage 1A

and W1761 for Storage 2. Consent conditions clearly define the narrative closure criteria (refer consent 971305 condition 26 and 29 and W1761 condition 10 and 10A).

To meet the requirements of “stable” and “self-sustaining” OGNZL believes it is reasonable that the monitoring wells should demonstrate stable or improving trends in groundwater quality before closure and handover can occur. Refer to the TSF Monitoring Report – Groundwater for details on the current monitoring frequency and locations. Closure monitoring locations are likely to be a selection of the operational monitoring wells. Preliminary criteria are suggested as follows:

Narrative:

Discharges from the site, either alone or in combination, shall not cause a significant adverse environmental effect on the receiving groundwater and surface water, or on users of these resources, or, in the case of surface water, aquatic biota.

Seepage from the TSFs, in combination with all other discharges authorised from the Waste Disposal Area, shall not cause an adverse environmental effect on groundwater, or on users of this resource, outside the boundaries of Area D (Figure 15).

Quantitative:

Results from the groundwater monitoring wells shall demonstrate stable or improving trends in groundwater quality.

For surface water, the groundwater discharges, either separately or in combination with all other site discharges, shall not cause the receiving water standards specified in the consents to be breached.

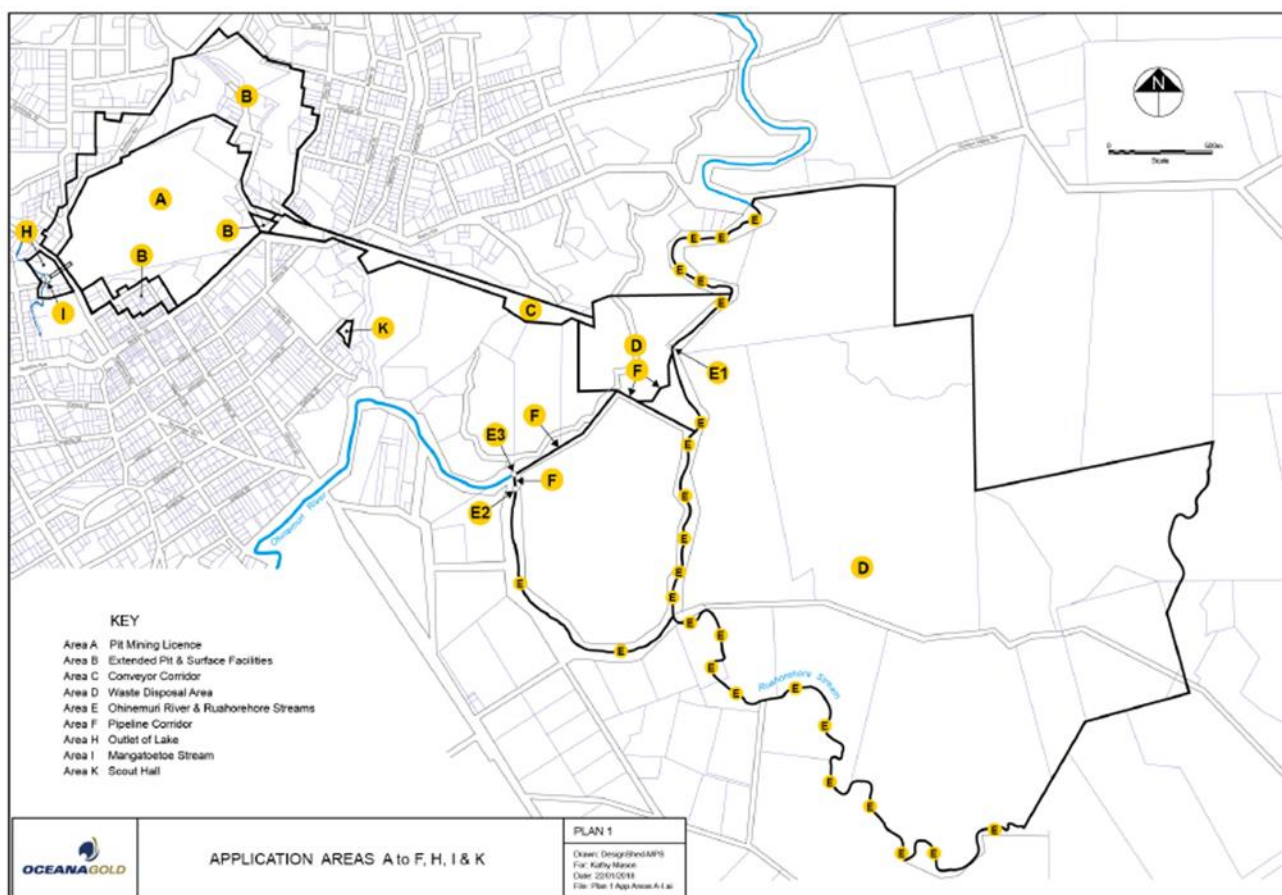


Figure 15 OGNZL Areas A to F, H, I & K

3.6 Soils

The closure completion criteria for soils currently focus on any potential contamination of soils due to modern mining related activities such as hydrocarbon and chemical spills and/or incorrect placement and treatment of PAF rock. Currently, site investigations for ground contamination are undertaken on a case by case basis where required for construction activities, which helps build an understanding of the volumes that may require remediation at closure.

One such site investigation was undertaken during the monitoring period by WWLA for a carpark development at the Processing Plant. Soil sampling identified topsoil and reworked natural material (fill) with natural levels of contaminants that are not of concern to the environment or human health.

Peer review has suggested that further criteria for soil are developed, acknowledging that there are many other aspects of soil that underpin (and can constrain) rehabilitation potential – such as soil biota, water infiltration and storage. Soil criteria may be expanded to cover vegetation rehabilitation areas to consider aspects such as leaf litter depth. These criteria will be reviewed to factor in Cultural balance plan considerations as part of the corporate closure planning process- where a full review of closure criteria will be undertaken.

Preliminary criteria are suggested as follows:

Narrative:

To identify, and as relevant remove, treat and/or appropriately dispose contaminated soil around the site to achieve regulatory requirements relevant to the proposed future use of the land.

Quantitative:

Yet to be determined.

3.7 TSF Embankment Pasture

The landscape philosophy for the TSF embankments is for a combination of pasture and native plantings. The methodology for rehabilitating the embankments is well established and the results have been successful. Rehabilitation of the embankment involves the covering of the bulk fill with a layer of unconsolidated waste rock (surrogate subsoil) one metre in depth. Over this a 100mm layer of topsoil is limed, fertilized, and spread then seeded with a mixture of pasture grasses. The embankments are leased to a farmer who grazes light cattle in the paddocks. The embankments are maintained through regular fertilizer application, as advised by an Agricultural consultant; and regular maintenance of drainage systems, fences and races.

The key management objectives for the pasture on the embankments are to:

- Ensure adequate residual biomass following grazing to ensure soil remains protected;
- Prevent soil erosion and scouring by storm runoff, stock and vehicles;
- Prevent growth of tall tree species on pasture that may cause wind induced soil disturbance;
- Control invasive weeds; and
- Prevent stock damage to indigenous species.

Animal productivity, while important, is a secondary objective. High stock grazing rates or grazing with heavy stock may lead to pugging by cattle in wet weather, soil damage, increased erosion and weed invasion. In the worst case, if left unmanaged, this could compromise the integrity of the TSF capping layer. Where the embankment has been rehabilitated in pastoral vegetation the current aim is to achieve a level of pasture productivity that is similar to land of the same slope in the district, under pastoral land use.

To support this philosophy, pastoral knowledge through the dairy industry has been applied. A minimum Olsen phosphate level of 25 parts per million (ppm) is considered an appropriate target level for productive dairy pasture on the volcanic ash soils of the region and will ensure growth of a vigorous sward, provided fertiliser maintenance requirements are met annually. Meeting this criterion will mean that the land meets one of the minimum requirements for dairy grazing at point of closure.

Bare soil is an indication of poor pasture management in an established pasture or poor seed germination/seed distribution in new pasture and can lead to excessive runoff and subsequent soil erosion. A stable sward should have less than 10% soil exposed over a minimum of two consecutive years.

District average production figures for land of similar slope to the embankment will need to be obtained from a registered agricultural consultant to assist with the criteria. No set yield figure can be provided, as seasonal variations need to be allowed for.

In October 2024, pasture dry matter measurement was ceased at the recommendation of the Peer Reviewer for the following reasons.

- Over 10 years data has shown that production is strongly linked to rainfall, with no statistically significant difference between TSF1A and TSF2.
- Over 80% cover is the most important measure, which is assessed visually by the agricultural consultant. Pasture condition and areas of erosion are also assessed by EGL.
- The productivity and health of the pasture will continue to be assessed annually visually by the agricultural consultant, and through analysis of the soil chemistry samples.
- The closure condition requiring minimum earthworm density in pasture areas has now been measured and shows the TSFs are compliant. Earthworms provide resilience by increasing infiltration and buffering soil fertility.

Grass cage monitoring should resume at least 3 years prior to closure.

Setting a minimum level of earthworm population that existed on an undisturbed pasture prior to topsoil being removed from Storage 2 area will indicate a healthy biological state in the soil and significantly contribute to desirable physical and chemical properties in the soil.

Considerable experience with the embankment area that has already been rehabilitated indicates that the criteria listed below are collectively achievable within five years, using the proposed methods and knowledge described above. Monitoring of the embankment pasture is an important aspect of rehabilitation and maintaining the integrity of the TSF embankments.

Current closure criteria that relate for the embankment soil were developed in conjunction with the Rehabilitation Peer Reviewer at the time (Dr Craig Ross) with advice from geotechnical and mining engineering input.

pH will be considered for inclusion during a full review of closure criteria, that will take part as part of the corporate closure planning process.

Preliminary criteria are suggested as follows:

Narrative:

To provide a vegetative cover that will allow a sustainable land use similar to that which existed pre-mining while minimising erosion and ensures the stability and integrity of the embankment remains with standard farming inputs.

Quantitative:

1. *Phosphate levels determined by the Olsen Method should be a minimum of 25 $\pm$ 5 ppm for two consecutive years after restoration.*
2. *Clover/grass compositional balance should be 20-30%/80-70%.*
3. *Exposed soil surfaces should be no greater than 10% of the rehabilitated area under grazing over two consecutive years.*
4. *Pasture production should equal the yearly district average for two consecutive years.*
5. *Earthworm population's average over 10 x 1 m² plots should be a minimum of 100 individuals per square metre.*

Monitoring methods and results against the above criteria are discussed in further detail in Section 4.3.2.

3.8 TSF Embankment Native Plantings

Native shrubs and trees have been planted at various times on the TSF embankments since 1990, with the objectives of minimising erosion and damage from stock on the embankment, providing natural landscape values that complement the rural environment, and providing habitat for native biodiversity. The first plantings were in three locations on TSF2 behind the West Silt Pond and S1 pond and one block in between from the 100 m to 110 m level; primarily focussed on slopes of greater than 20-25 degrees.

Indigenous vegetation is preferred primarily due to its ability to stabilise banks reducing erosion¹, and provide habitat for local wildlife. However, the main concern with the establishment of indigenous vegetation on the embankment is the potential for deep tap roots to penetrate the Zone G sealing layer. Any breach of the sealing layer, which is designed to prevent the ingress of oxygen to the unoxidised acid generating material beneath the cover, increases the potential for acid drainage to occur and to impact on discharge water quality.

Recent research by Phillips etc all Published reports (in Marden et.al. 2005²) indicate:

- That the majority of native plant roots are concentrated in the upper 0.5m of the soil profile.
- The major vertical and obliquely inclined roots change abruptly and strike horizontally at a relatively shallow depth.
- The rooting depth of most New Zealand indigenous species rarely exceeded 2 m.
- Root depth and structure can vary depending on the substrate that the plant is growing in.

Based on this and the fact that the thickness of the cover materials (Zone G, H and topsoil) is approximately 2.1 m thick, it is unlikely that indigenous tree roots on the embankment will penetrate Zone G. In addition, the compaction and low permeability of Zone G will likely prevent root penetration.

In 1998, OGNZL commissioned Landcare Research to carry out a study of the root depths of indigenous plants growing on the rehabilitated embankment area. The study concluded that mature tall tree species (i.e. greater than 20 m tall) are at greater risk of wind throw than shrub and small tree species³. The taller species therefore were not preferred on the embankment as at maturity any wind throw could create local disturbance of the cover materials with the possibility of exposing Zone G to erosion. The overlying Zone H provides protection for Zone G; this condition must be maintained. It is also important to ensure that tree seedlings are not root bound when planted to reduce the likelihood of wind throw caused by spiralled roots.

OGNZL made the decision to remove cabbage trees and tōtara from areas of the embankment where there was risk that the tap root could damage the Zone G cap. The areas of embankment plantings where this is required are shown in Figure 16. This includes any native plantings on the second batter of the embankment or higher, but not the top of the embankment structure. Any of these species that are naturally regenerating are targeted through an annual maintenance sweep for weeds.

¹ Simon, A et al. 2023. Te Paiaka – native root project: Quantifying the benefit of native, riparian vegetation to reduce bank erosion and sediment loads.

² Marden M., Rowan C., and Phillips C.: Stabilising characteristics of New Zealand indigenous riparian colonising plants. *Plant and Soil* (2005) 278:95-105.

³ Watson A, Phillips C, Simcock R.: Root depth Investigations of indigenous Plants: tailings dam Embankment- Martha Gold Mine, Waihi. Landcare Research Contract Report LC9798/90. April 1998).

A number of tall New Zealand indigenous species have been planted in the older plantings at the foot of the embankment. One species, tōtara, has self-sown with seeds introduced from mature trees growing along the Ohinemuri River between 200 and 500 metres away.



Figure 16: Embankment Plantings Requiring Ongoing Deep Rooting Tree Removal

Preliminary criteria are suggested as follows:

Narrative:

1. *To provide a sustainable vegetative cover that will minimise erosion and ensures the stability and integrity of the embankment remains,*
2. *To enhance both amenity and biodiversity at the Site by providing habitat and a food source for birdlife.*

It is noted that the second narrative criteria is not mandatory in terms of the consent conditions. It is discretionary, providing an internal goal to aspire to.

Quantitative:

To have achieved 80% canopy closure as measured from aerial photographs based on a representative area of the planting.

The expectation is that in the long term, maintenance will consist of an annual walkover to remove cabbage trees, invasive weeds and self-introduced deep rooting trees. Initial monitoring of rehabilitation

planting has been undertaken using the RECCE method, with results reported in the Rehabilitation Monitoring Report.

3.9 Wetland Habitats

Many wetland habitats across New Zealand have been degraded or drained, and only 10% of the country's pre-human wetland areas remain. Once tailings deposition is complete, the TSF lakes provide an opportunity to create new wetland habitats and enhance food availability for indigenous wetland bird species.

Ryder Environmental undertook an ecological assessment of TSF2 lake and found that while some wetland plants have established naturally, and bird species are present, there are many opportunities for enhancement when the lake is reformed. Given final tailings deposition into both TSF structures is some years away, a pond rehabilitation plan will be developed closer to closure which will set out criteria for the ponds, and proposed works to achieve the criteria.

At the request of a Peer Reviewer, the following preliminary criteria for wetland habitats are proposed, and will be refined in future reporting periods:

Narrative:

- 1. To provide a sustainable constructed wetland that will provide habitat and a food source to indigenous bird species.*

Quantitative:

Yet to be developed but will likely include wetland flora composition and/or cover criteria.

It should be noted that these criteria, once finalised, are discretionary and are not required by OGNZL's consent conditions.

3.10 Pit Surrounds and Pit Walls

There are essentially two separate areas to be considered:

- The pit rim walkway and associated plantings, and,
- Vegetation on the upper pit slopes.

The aim of the pit rim walkway is to create an aesthetically pleasing area for the public to enjoy with minimal weed species that will preserve views of the current mine and the future lake. The area incorporates the historic gardens to the North, exotic trees including fruit trees as a reminder of the previous inhabitants of the area, and a mixture of new exotic and native plantings which include a kauri grove and riparian planting adjacent to the Eastern Stream. The plantings also need to regard to the Screen Planting Plan, which is a requirement of Hauraki District Council Land Use Consent No 97/98-105 and the Mining Licence.

Revegetation of the upper pit slopes is covered by Mining Licence condition 37 which states:

"The upper pit slopes shall be treated to ensure revegetation as soon as possible in the mining programme and in accordance with the current approved Rehabilitation and Closure Plan. Revegetation of the upper slopes will be carried out as far as practicable and may preserve some areas without vegetation to preserve and reflect the mining heritage of the town provided that the water quality of the

Pit Lake remains suitable for direct discharge to surface waters in accordance with resource consents held by the licensee from the Waikato Regional Council."

The pit walls above lake level on NAF material have been successfully hydroseeded with grasses and over time, other species have naturally colonised the area. Parts of the upper pit wall have been planted with a variety of indigenous species. This allows for the provision of a seed bank. The intention is to essentially let nature take its course while preventing noxious weeds and where necessary avoiding tall trees that could be susceptible to wind throw that could damage the pit slopes as well as blocking the pit lake outlet.

Some of the upper pit walls have been shotcreted and in those areas, planting is not an option. In other areas PAF material is exposed on the pit walls. No planting or hydroseeding is currently planned on the PAF pit slopes and these will essentially remain bare areas for the foreseeable future although some natural regeneration in less reactive areas will occur. Planned cutbacks of PAF areas may allow for hydroseeding in the future.

Narrative:

To provide a sustainable vegetative cover over appropriate areas of the pit that will minimise erosion, combat weed encroachment, and where practicable maintain a vegetated cover that assists in stabilising soil and enhancing visual amenity.

Quantitative:

To maintain the existing vegetative cover with a steadily reducing workload in terms of weed control.

Maintenance effort undertaken by contractor Kauri Gold is tracked and reported in Section 4.6 to establish a baseline and measure changes over time.

Results of initial RECCE monitoring of rehabilitation plots in the Martha Pit are reported in the Rehabilitation Monitoring Report.

3.11 TSF Safety and Stability

The embankments have been designed and constructed to ensure long term safety and stability. Monitoring and review of the design and construction performance has been ongoing since construction commenced. Details for assessing the stability of the embankments were presented as a part of the permitting process. Relevant stability design detail has been considered for development of the completion criteria.

Preliminary criteria are suggested as follows:

Narrative:

That the tailings storage facilities are structurally stable and that they will not cause adverse effects on the safety of users or downstream users, or on the environment.

Quantitative:

Quantitative criteria were developed by Engineering Geology Ltd and are contained in WAI-200-REP-010. It should be noted that limits are included both for existing and yet to be installed settlement

markers. The depths of fill will require confirming following installation and the deformation limits will need to be adjusted accordingly.

In addition to these quantitative criteria, there should be no visual indication of instability. Note that the Operations, Maintenance and Surveillance Manual⁴ includes weekly and monthly visual checklists.

Monitoring results are reported in the Tailings Storage Facility Monitoring Report.

3.12 Pit Wall Safety and Stability

As previously discussed, the key for the pit slopes is to define in practice the meaning of “safe and stable” as stated in Mining Licence condition 36 as follows:

“... The licence area is to be left in a clean and tidy condition after mining operations have ceased including removing from public view any used derelict equipment and machinery and the pit faces are to be left in a stable and safe condition.”

OGNZL made a presentation on the meaning of “safe and stable” at the 2014 peer review meeting.

The Pit Wall Risk Assessment concludes that the post-closure lives risk associated with wall failure or rock fall is de minimis, while recommending some intervention to maintain acceptable levels of risk during lake filling when the likelihood of wall failure temporarily increases. The Pit Wall Risk Assessment also indicates that the pit walls will meet international guidelines and the socially accepted norm for tolerable life risk of 10^{-5} p.a during the closure and post closure periods. It is OGNZL’s view that this tolerable risk threshold should form the basis of the closure criteria for the pit walls.

OGNZL will conduct a revised deterministic assessment in the coming review period. Similarly, a probabilistic assessment will be reviewed. As stage one to this process a review of Martha Pit Geotechnical Design parameters has been reviewed by AMC (March 2023).

The current monitoring system for the open pit is extensive and will continue while the pit is in care and maintenance and throughout Project Martha, however the Pit Wall Risk Assessment indicates that radar monitoring will not be required and can cease once operations are complete within the open pit. The monitoring programme will be reviewed, and quantitative closure criteria will be developed closer to closure.

Preliminary criteria are suggested as follows:

Narrative:

1. *To ensure that the Mine Lake and its surrounds (the Site) provide a safe and sustainable recreational facility for the benefit of the Waihi community.*

Quantitative:

- a) *A minimum acceptable risk threshold,*
-

- b) *A set of movement criteria related to movement patterns, rates and magnitudes,*
- c) *Minimum factors of safety under static and seismic conditions,*
- d) *Controlled access in areas with a significant risk of subsidence collapse and deformation risk.*
- e) *Definition of the buffer zone.*

Closure criteria will need to be developed and refined over time in response to events such as flooding and monitoring trends, therefore the costs of developing and refining these closure criteria have been allowed in the Rehabilitation Bond estimate.

3.13 Underground Workings

OGNZL carries out underground mining with the aim of ensuring the safety and health of employees during operations and the long-term safety and health of the community. Mining methods and practices employed at these operations focus on reducing the risks to public safety by backfilling of the workings in accordance with the relevant consent conditions. The backfilling is completed to the satisfaction of the HDC geotechnical reviewer.

Development of completion criteria will continue as these projects are developed. Preliminary criteria are suggested as follows:

Narrative:

To ensure the long-term safety of people and infrastructure located above and adjacent to the underground workings, the ventilation and escape shafts.

Quantitative:

1. *Backfilling of the stope voids and stacked developments (including ventilation rises and ore/waste passes) where geotechnical conditions require backfilling to ensure long term stability.*
2. *Backfilling of 100m of the underground workings decline from the portal,*
3. *Backfilling of the shallow section of decline between Favona and Trio, (currently used to haul to and from Correnso)*
4. *Backfilling and capping of the ventilation and escape shafts.*
5. *Barricading the ventilation portal into the pit from underground and backfilling the first 50m of the ventilation drive from the pit.*

4 REHABILITATION AND CLOSURE ACTIVITIES UNDERTAKEN 2024/25

4.1 Closure planning

The work programme of the site closure committee during 2024/25 included:

- Developing a RACI for closure and rehabilitation operations to define roles and responsibilities.
- Undertaking a full review of the Closure risk assessment.
- Completing a Tier 3 Maturity assessment against the ICMM Closure guidelines
- Developing a three year action plan to work on areas of improvement identified in the maturity assessment.

A review of the internal site Closure Plan is underway, alongside a full review and gap assessment of technical closure documents to identify closure threats and opportunities, and refine future work plans.

4.2 Surface Groundwater recovery system

In order to understand the surface groundwater recovery system at closure , the following activities were undertaken:

- Six monthly sampling of suitable standpipe piezometers around the Martha pit commenced in autumn 2024.
- WWLA were commissioned to develop a groundwater model for OGNZL's Waihi Operation that summarises the material properties, hydraulic gradients, surface and groundwater levels and flow paths within the groundwater system. It is anticipated that this work will be completed by the end of 2025.

4.3 Passive treatment trial

Stage II of the passive treatment trial at TU and L10 discharge points at the Tailings Storage Facility was completed in October 2024. The trial incorporates two parallel flow systems using 3-4 IBCs, a vertical flow reactor, varied leachate mediums in the second treatment tank, and a settling pond at the end. Regular sampling and refinement of the system has been undertaken throughout the monitoring period, and Verum Group have presented a report detailing the results, outcomes and next steps for the trial (WAI-200-REP-011).

These trials proved to be effective and potential solutions to treat TSF drainage, however further exploration was required to ensure all factors were completely understood. Factors that influence the effective removal of Fe, Mn, Co, Zn and Ni for discharge include flow rates, residence times, oxygenation requirements and different types of treatment media (pumice, limestone, steel slag, wetland).

The possibility of further passive treatment trials on a larger scale will be considered through the corporate closure planning and budgeting process.



Figure 17 Installation of passive treatment trial at TU site.

4.4 Native Planting

4.4.1 Planting projects

Planting was undertaken at a rural Oceanagold property at Golden Valley that was purchased in relation to the Waihi North Project. 2000 native species were planted in June 2024 along a section of the Homunga Stream which has been fenced and stock excluded. Once complete, this project will provide 700m of riparian habitat important for tuna and inanga and water quality in the Ohinemuri catchment. Plant establishment at this site has been challenging due to a variety of factors including strong winds, early frosts and lack of rainfall.

Learnings applied to the 2025 planting season, where an additional 7000 plants are to be planted include:

- Amending the plant species list,
- Using additional fertiliser,
- Establishing fast growing shelter species first, then interplanting more sensitive species as 2nd year plant material.
- Regular monitoring of planting success.

Maintenance of existing plantings, and minor infill plantings took place during the monitoring period.



Figure 18 Section of the Homunga Stream where planting is underway to protect riparian margins.

4.4.2 Planting monitoring

The following planting monitoring activities were undertaken during the monitoring period:

1. Photo points of the RECCE plots were established using the drone. These were added to Appendix 1 of the Rehabilitation Monitoring Report.
2. Screen planting photopoints were established. Refer to the Rehabilitation monitoring report, section 5 for more information.
3. General weed surveillance and liaison with contractor to address problem areas.
4. Established photopoints for Tradescantia biocontrol and sought advice on management from Landcare, Scion and Waikato Regional Council. Explored bringing in a student to study Biocontrol.

4.5 Staff engagement

A workforce sustainability engagement group named Kapa Kākāriki was formed with the purpose of encouraging staff involvement in environmental and rehabilitation initiatives both on and offsite. Activities included

- a beach clean up at Waihi Beach for World Oceans day,
- a site wide cleanup for Keep New Zealand Beautiful week ;
- Organising staff to assist with Golden Valley planting;
- assisting local community group HELP Waihi to undertake planting and weeding in Gilmour Lake reserve for Arbor Day (Figure 20).



Figure 19 Kapa Kakariki logo



Figure 20 Planting crew at Gilmour Lake for Arbor Day.

4.6 Pest Plant and Animal Control

Control of pest plants and pest animals was undertaken in accordance with the site Pest Management Plan. The objective of this Plan is to have a single document that sets out pest management priorities and responsibilities. The following section outlines the different activities undertaken during the monitoring period.

4.6.1 Pest Animal Control Activities undertaken

4.6.1.1 Predator Control

Target species for the Predator Control programme are rats, stoats, weasels, hedgehogs and possums. In addition, rats and mice are targeted around buildings and electrical equipment. A map of trap locations is contained within the Pest Control Management Plan. The existing Predator Control network is comprised of:

- 50 Philproof bait stations for Double Tap baits; and 50 DOC200 traps, placed to protect areas of native vegetation and bird habitat around the Development Site. The network covers an area of approximately 307ha and is serviced on a monthly basis.
- Two DOC200 traps are installed at Slevin Park around OGNZL's compost site.
- Bait stations are installed around building and electrical equipment targeting mice and rats, serviced weekly by Kauri Gold.

During the monitoring period, the following improvements were made to the predator control network:

- Deploying traps around the Pit Rim walkway, including undertaking initial monitoring then rolling 8 DOC 200 and 9 Victor rat traps in January 2025.
- Installing 8 rat traps in residential mine owned properties in support of Predator Free Waihi backyard trapping initiative.
- Reviewing trap catch data, and identifying areas to increase trapping/baiting capacity in those areas with high bait take/ catches.

4.6.1.1.1 Catch results

Table 4 shows predator trap catch data for the past 3 years to the end of March 2025. For the 2024/25 period and moving forward to results for the Development Site network and Pit/compost site will be differentiated. Figure 21 and Figure 22 overleaf demonstrate catch results on a geographical and seasonal basis, which over time will be reviewed to assist adaptation of the trap servicing approach.

Table 4 2024/25 Predator Trap Catch data

Pest species	Number trapped			
	2022/23	2023/24	2024/25	
			Dev Site	Pit + compost site
Rat	14	47	60	8
Stoat	7	5	18	0
Hedgehog	6	21	22	3
Ferret	6	1	0	0
Mouse	2	0	5	0
Other	0	5	0	0



Figure 21 Map showing number of predators caught at each trap during 2024/25

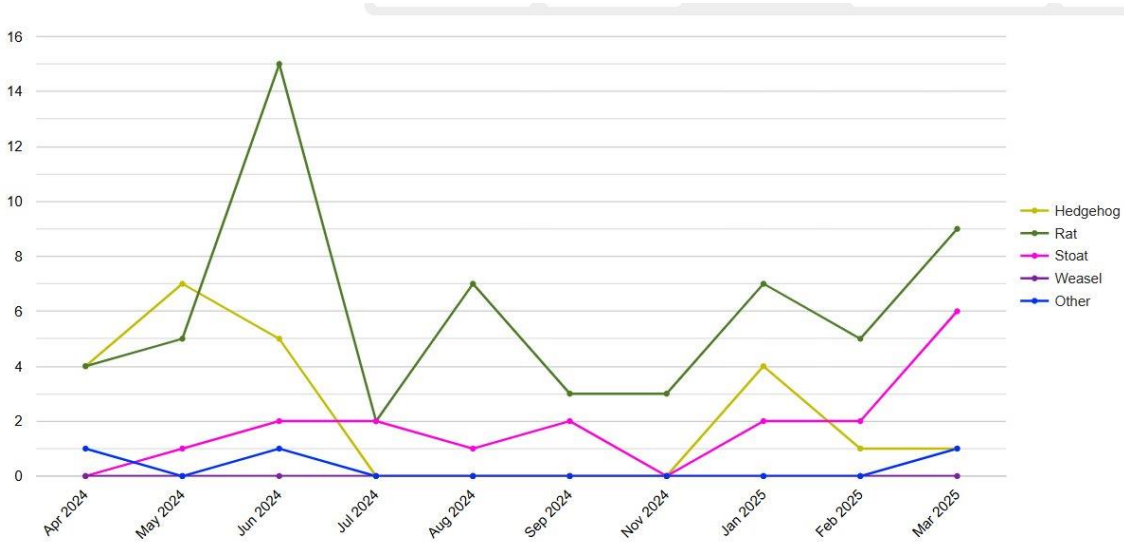


Figure 22 Seasonal predator catches over time for each predator species.

4.6.1.1.2 Bait station results

The exact number of predators targeted by the bait station network is unable to be demonstrated, however the volume of bait take (refer Figure 23 below) indicates that a large number of rats and

possums are being addressed – particularly in the areas adjacent to rehabilitation plantings, and the Significant Natural Area above the TSFs.



Figure 23 Bait station heatmap demonstrating high bait take areas.

A priority for the 2024/25 period was to upskill and increase capacity of the team to undertake Predator Control onsite. This has included:

- 6 staff attending the NMIT Predator Trapping Methods course. Oceanagold organised the training in Waihi township and opened up spaces for the wider community, funding 2 community members from Predator Free Waihi to attend.
- Staff taking over management of predator control networks in Wharekirauponga associated with Waihi North Project exploration permits.
- Attending Manaaki Kaimai Mamaku Forum, Predator Free Hauraki Coromandel, and Waikato Biodiversity Forum events in order to connect with and learn from other biodiversity restoration activities in the area.

4.6.1.1.3 Predator Control Plan

Using the techniques learnt in the NMIT training to review our approach, the team embarked on development of a comprehensive Predator Control plan in order to align our activities with the outcomes wanting to be achieved. This plan is documented within the Pest Control Management Plan, with an associated underlying implementation plan.

The desired outcomes of the Predator Control Plan are that:

- Native plantings are protected;
- Predation on existing wildlife is reduced;
- Within staff and the wider community, awareness of biodiversity is increased and there are opportunities to be involved.

The vision and goals of the plan are introduced in Figure 24 below. Specific actions are monitored via an internal implementation plan.

We will provide safe, healthy habitats for native wildlife across Waihi sites by:

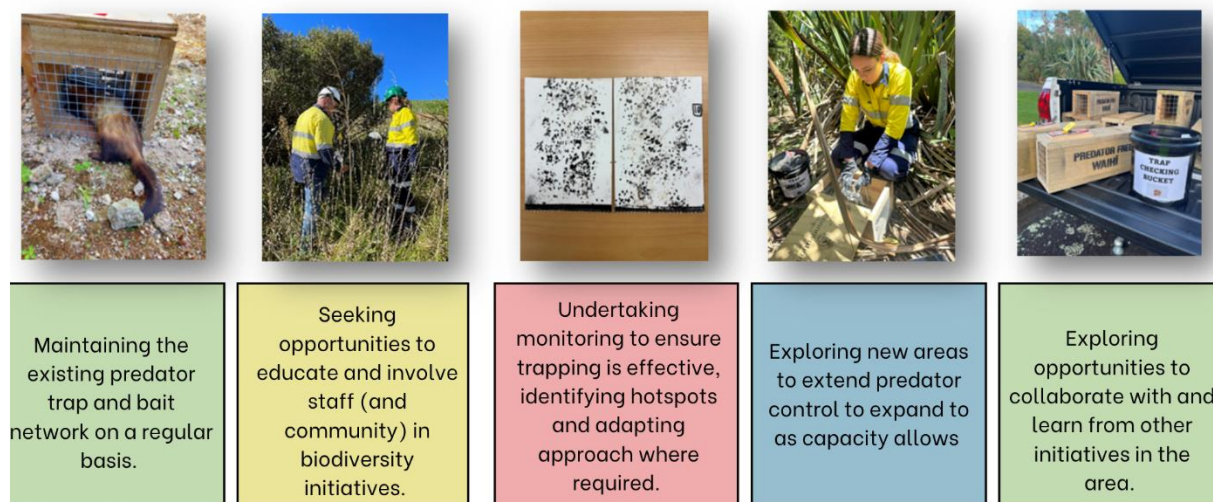


Figure 24 Predator Control Plan vision and objectives.

4.6.1.2 Predator Free Waihi

In the wider community, mine staff have been actively participating in local community initiative, Predator Free Waihi. Predator Free Waihi seeks to educate the surrounding community about the plight of native wildlife, and provide the tools in order to help keep them safe from predators. OceanaGold have come on board to support the project in Waihi township in a number of ways including:

- providing funding to the project to purchase traps for a trap line in a local Council reserve through Sponsorships and Donations process,
- Setting up a trapline on land around the public Martha Pit rim walkway, which will be checked by staff volunteers.
- Encouraging staff to grab a rat trap for their backyard through promoting the project during Conservation week.
- Installing backyard rat traps in mine owned residential houses around town.



Figure 25 Staff participating in Predator Free Waihi with traps in their backyards.

4.6.1.3 Other animal pests

Turkeys and Canada geese have flocked on the TSF embankments and the TSF2 lake in increasing numbers. Since turkey control was undertaken in 2022, the population is estimated to be approximately 40 adult birds. The resident population of Canada geese is estimated to be around 200 adult individuals.

A programme of Canada goose control by egg adding has been implemented over the past three years to prevent recruitment to the adult population. Table 5 demonstrates the number of eggs added over time. The nests are mostly concentrated around the TSF2 lake edge, however do not appear to be reducing overtime. .

Table 5 Canada Geese added at TSF

	2022	2023	2024
Eggs	168	199	167
Nests	31	37	40

Control of turkeys and Canada geese using a firearm resulted in limited success in the previous year, therefore was not undertaken during this monitoring period, however this may be reviewed in the future.

Advice received from pest control experts included using sedative baits to allow the birds to be more easily targeted, and using a 'squad' of personnel with a firearm are options that will be reviewed in the future.



Figure 26 OceanaGold Staff member undertaking Canada goose egg adding on TSF2.



Figure 27 Canada goose nest with marked added eggs.

4.6.2 Weed management

The main objectives of the weed and pest plant control programme are to maintain weeds and pest plants to manageable levels, while exploring ways to reduce maintenance effort and alternatives to herbicide application. Alternative approaches are required in hard to access areas – such as the use of biocontrol, aerial drone technology, and a telehandler. Weed management activities undertaken during the 2024/2025 period are outlined below.

4.6.2.1 Biocontrol

OGL Waihi have been exploring the use of Biological Control (biocontrol), which uses one living organism to control another over a number of years. One of the approaches that has been trialled is using a combination of Yellow Spot fungus and Tradescantia leaf beetle to control *Tradescantia fluminensis* - an invasive weed that smothers the forest floor and large areas under plantings at the site. This combination approach is proving an effective way to keep infestations to a manageable level, with

these agents now being spread to other locations around the site. Buddleia weevil (*Cleopus confusus*) is also well established across the site – proving effective at knocking back Buddleia and preventing it from spreading, reducing the need for herbicide application.

The team are currently exploring other options for the control of certain weeds through discussions with the Waikato Regional Council and Landcare Research.

Continued monitoring of existing biocontrol agents occurred during the reporting period (Tradescantia yellow spot fungus, Tradescantia leaf beetle and Buddleia weevil). Advice received from Waikato Regional Council suggested that the monitoring programme could be streamlined and the frequency reduced. Photo points have been established and will be retaken on an annual basis. Results are introduced in the Waihi Rehabilitation Monitoring Report. A map of original release locations is contained in Figure 30.

Tradescantia

The Tradescantia yellow spot fungus has naturally spread around and was also introduced via infected Tradescantia translocation to four new sites on OGNZL property. At the original release site (Baxter Road Bridge 1), the fungus has controlled large areas of Tradescantia allowing infill planting in this area. Unfortunately a flooding event smothered the fungus affected plants, requiring a follow up release. At all other locations, evidence of fungus spread is evident, but dieback of Tradescantia is limited. Downstream monitoring also occurs at three locations to assess how effective the natural spread of the fungus is.



Figure 28 Tradescantia leaf beetle release to area affected by yellow spot fungus.

Tradescantia leaf beetle was introduced at two sites to trial effectiveness in January 2023. Monitoring has identified that leaf browse is occurring, with the beetle and evidence of browsing being observed in Summer 2024. In summary, the combination of the beetle and fungus appear to keep Tradescantia under control, however further monitoring is required to determine effectiveness. iNaturalist records and casual observations of beetle browse indicate the beetle is present in other areas around Waihi so may be spreading naturally.

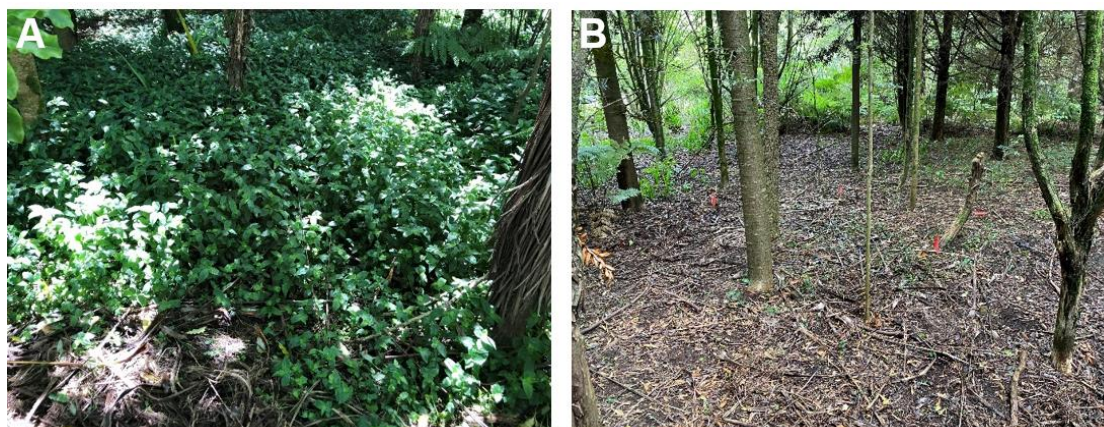


Figure 29 Baxter Road Bridge site before - 2018 (A) and after 2021 (B) release of fungus.

Buddleia

Buddleia leaf weevil is well established across the Martha Pit and TSFs, and appears to be reducing the spread of buddleia. The weevils naturally colonise new plants and cause leaf damage, reducing the health of plants and preventing them from flowering and spreading seed. Contractors are asked to avoid spraying Buddleia onsite, to ensure the weevil population is maintained.

Photopoints demonstrate a significant reduction in the size, health and spread of *Buddleia* across the site. INaturalist observations and personal communication indicates the weevil has been observed in other areas around the Waihi area, including Union Hill so it appears to be naturally spreading. During the monitoring period local tertiary education provider Toi-ohomai visited the site to explore the possibility of a long term student project, which will continue to be explored in the future.



Figure 30 Biocontrol introduction and monitoring sites

Japanese Honeysuckle

The Honshu White Admiral (*Limentis glorifica*) is one of two agents released to attack Japanese honeysuckle in New Zealand. The butterfly has successfully been established in Karangahake however has been vulnerable to predation by wasps. Since 2021 there have been 11 sightings recorded on INaturalist in the Waihi area – including around the Waihi mine site. Staff will continue to monitor presence on site and record sightings on INaturalist, and continue conversations with Landcare Research regarding the success of establishment of the butterfly in the area.

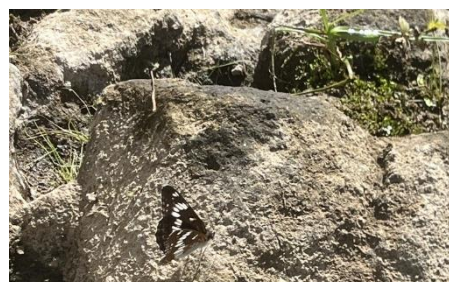


Figure 31 Honshu white admiral butterfly observed in riparian area near Baxter Road site.

4.6.2.2 Drone Spraying

A specialised drone, used since 2023, is proving an effective method to undertake aerial spraying of weeds in hard to access areas. Target species are gorse, pampas and pine trees, which establish readily on open pit batters and stockpiles, and are unable to be accessed safely on foot. A relatively intensive approach is required initially to get weeds down to manageable levels – so reducing the source of seed is a key outcome. Follow up is required to prevent re-establishment.

In August 2024, drone spraying focussing on the pit rim circumference from the rip rap level down three batters, and the Favona Stockpile.

In March 2025, Dronezap completed a spray of the Favona stockpile, and a full pit spray - addressing weeds in the entire pit for the first time. A follow up spray is proposed for Spring 2025; and thereafter a less intensive approach is expected to be required.



Figure 32 Dronezap are able to spray the entire Pit from above.



Figure 33 Aerial photograph of Martha Pit demonstrating effective aerial herbicide application below rip rap.

4.6.2.3 Weed control with Telehandler

The highwall at the South Western end of the Martha Pit features an array of naturally establishing native vegetation, with broom, wattles and gorse establishing within. Use of the drone is not possible as it is difficult to target just weed species without affecting native species establishing on the wall.

Undertaking weed control safely requires use of a telehandler, which is able to lift two personnel safely up to the wall with a pole saw and knapsacks.



Figure 34 Telehandler operating at the SW end of the Pit to access hard to reach areas safely.

This task was previously on a 3 yearly schedule, and was undertaken in November 2024. It is intended to increase the frequency of the task to 2 yearly, to keep on top on establishing weeds and reduce the amount of time to complete the task. Removal of the wattles at the top of the wall which couldn't be reached safely is a priority for 2025 to prevent seed continuing to enter the pit plantings and beyond.

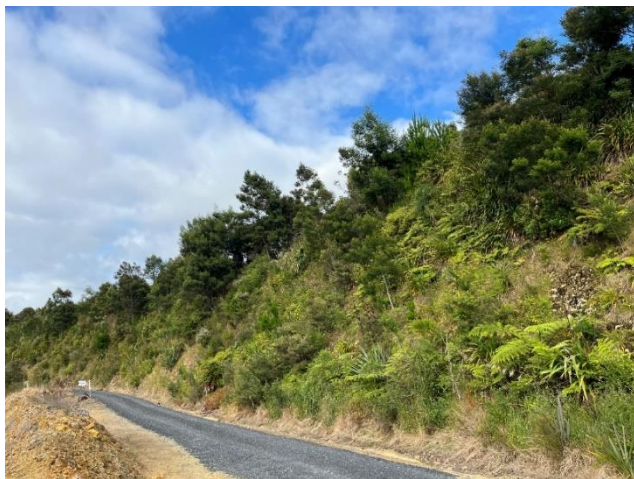


Figure 35 Before (L) and after (R) weed control

4.6.2.4 Removal of deep rooting tree species – embankment plantings

Removal of deep rooting trees (in particular, cabbage trees, tōtara & rewarewa) throughout all bush blocks in the TSF embankment plantings was undertaken in September 2024 to prevent damage to the Zone G capping layer. Cabbage trees, tōtara and rewarewa were removed by either spraying, hand pulling, or the cut and paste method. Privet, broom and other weed species encountered during the removal of deep rooting tree species were also removed. Despite the density of plantings and canopy

closure, deep rooting seedlings and weeds continue to become established and therefore it is expected that an annual sweep of these areas will continue to be required.

4.6.2.5 Routine pest plant control

Routine weed and pest plant control was undertaken around the rest of the site, as outlined in the Pest Control Management Plan. Kauri Gold Limited (KGL) are engaged on a full time basis to undertake the majority of maintenance activities around all OGLNZ Waihi sites. Environmental team members coordinate landscape maintenance tasks, attending KGL meetings on a regular basis to assist with planning and to discuss priorities. In addition, contractors Dronezup come in once or twice per year to undertake aerial drone spraying.

The closure criteria require that vegetation cover is maintained with a steadily reducing workload in terms of weed control. Maintenance effort was measured in 2024/25 to work towards establishing a baseline understanding of how maintenance effort is changing over time as rehabilitation plantings become more established. Generally, higher profile areas such as the Pit Rim walkway require the highest level of maintenance, due to the level of mowing, spraying and hand weeding required. A new system has been developed and is being implemented in 2024/25, with baseline data collected outlined in Table 6 below.

During the monitoring period, approximately 1805 labour hours were spent on landscape maintenance activities across the site. This approach will continue to be refined to ensure a more accurate assessment of closure costs.

Table 6 Maintenance effort

Area	Contractor	Target species	Labour hours 2024/25
Martha Pit			
Pit Rim walkway	Kauri Gold	Cherry, ivy, wattle, pine, banksia, hawthorn	674.5
Spraying, hand-weeding, repairs, track maintenance, mowing.			
Northwest Wall		Wattle, pampas, broom, pine, Spanish heath, privet, cherry, banksia.	96
Top Pit Batter (above perimeter road).		Wattle, pampas, broom, pine, Spanish heath, privet, cherry, banksia.	37
Future pit lake edge (below perimeter road, above rip rap).		Wattle, pampas, broom, pine, Spanish heath, privet, cherry, banksia.	
Western pit screening area		Wattle, pine	54
Eastern Pit screening area (noise bund)		Wattle, broom, privet, cherry, banksia, ivy, agapanthus	30
Conveyor corridor /Barry St coreshed fence line			28.5
Inside pit (below riprap)	Dronezup	Pine, gorse	96
Development site			
Embankment plantings	Kauri Gold + OGL staff	Cabbage, totora, blackberry, nightshade, gorse, broom, privet. All invasives	42
Dev site roadsides		Buddleia, gorse, pine, thistle, broom, grass.	124
Topsoil stockpile		Gorse, thistle	0
Stockpiles (central,eastern, ignimbrite, northern)			23
TSF2 lake edge		All invasives	26

General TSF			18
Baxter Rd (coreshed) planting			10
Favona/Mill	Kauri Gold		
Favona stockpile	Dronezap	Pampas, gorse	16
Burn Pile	Kauri Gold		20
Management / maintain plantings			
Favona wetland		Nightshade, privet, broom, blackberry	36
Roadsides/ carparks		All invasives	11
Water treatment plant/ mill / Baxter Rd / Polishing ponds		Grass / all invasives	91.5
Gatehouse area		General weeding	22
Stores and media bunkers		All invasives	6
UG laydown			8
UG amenities and stores buildings		All invasives	24
Town/ Recreational			
Black Hill, Winner Hill & Union Hill	Kauri Gold	Union Hill- trackside cuts, wattle. Removal of invasives – spray, chainsaw.	165.5
Moresby Ave Administration Office & Education Centre		General maintenance	22
Riparian Margins		All invasives	8
Conveyor Corridor		All weed species, hedge cutting; removing trees on farms	50
OGNZL Landholdings – Residential & Rural Properties and Heritage Areas		General maintenance	46

4.6.3 Biosecurity

The approach to management of key biosecurity risks - Kauri dieback (*Phytophthora agathidicida*) and Myrtle rust (*Austropuccinia psidii*) is outlined in the Pest Control Management Plan. This section provides a summary how this relates to the rehabilitation programme for existing operations.

In order to prevent the risk of Kauri dieback coming to the operating site; and to undertake surveillance; the following controls are implemented:

- Maintaining a hardpacked metalled surface around the Pit Rim and Union Hill walkways, with adequate drainage that drains surface water away from Kauri trees.
- Training has been undertaken with all environmental and exploration staff, in order to increase awareness around Kauri dieback and encourage reporting,
- In 2024/25, a full survey of kauri trees identified around the Pit Rim plantings was undertaken. No evidence of kauri dieback was recorded. This will be undertaken on an annual basis.
- A comprehensive Kauri Dieback Management plan is in place for Exploration work undertaken in the Wharekurauponga catchment.

Myrtle rust is not covered by a National Pest Management Plan, however staff are encourage to report any sightings to the Environmental Team. Infections will be removed if required to protect other plants.

4.7 Rehabilitation Monitoring

The Waihi Rehabilitation Monitoring Report summarises rehabilitation efforts to date, the results of the first round of monitoring from RECCE plots, and the outcomes of planting and revegetation trials, including implications for rehabilitation and recommendations for future work. This report is designed to be read in conjunction with this Rehabilitation and Closure Plan. The key outcomes of this report are summarised in the following section. Over time, the monitoring approach will evolve to align with closure criteria as they are refined and further developed.

4.7.1 Revegetation

Many planting and revegetation trials have been undertaken around site with the aim to determine the most successful outcomes for rehabilitation that meet operational and closure requirements while providing the best opportunity for future land use. Standardised and scheduled monitoring of these is important to ensure relevant data and information can be collected to inform OGL's rehabilitation and closure plans. In August – September 2022, long term monitoring plots were set up and assessed using the RECCE method to help to track the progress of rehabilitation efforts and assess the effectiveness of planting techniques and revegetation trials. Twenty-six long term monitoring plots were set up in various types of rehabilitation around the site, including:

- Open pit – manuka fascining trial
- Open pit – natural revegetation
- Open pit – pohutukawa plantings
- TSF2 – capping trials
- TSF2 flax trial
- TSF2 – fascining trial
- Kete plantings
- TSF1A and TSF2 embankment plantings

Plot locations are shown in Figure 36. Black dots denote plot corner locations.

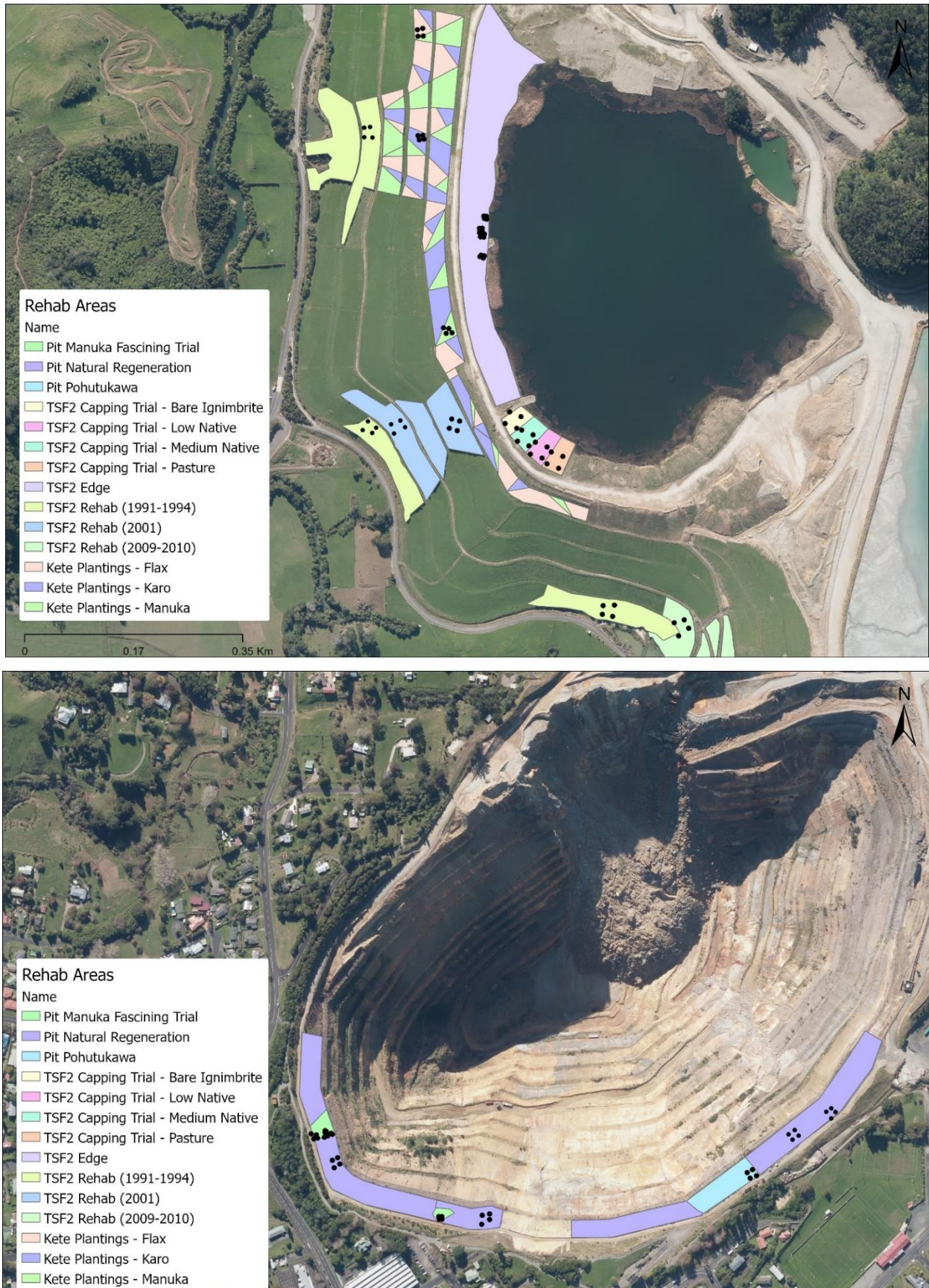


Figure 36 RECC Plot locations at TSF (top) and Pit (bottom).

Monitoring plots vary in size from 5m² x 5m² to 20m² x 20m². Data collected from each of the plots include site description, cover-abundance of all species present, seedling species count sub plots, sapling species and count, and tree species stem count and diameter. Replicable drone photos will be taken of each plot in order to assess canopy cover and measure growth over time.

Findings from these assessments include the following:

- Evidence of natural regeneration is occurring across the older plantings, with an expected higher native seedling diversity in older, more established blocks of vegetation.
- Manuka fascining is a low cost and effective method for establishing vegetation in harsh conditions, resulting in a high level of natural regeneration. If this method is utilised in the future, it should take place on bare ground, as competition with grasses will hinder seedling recruitment.
- Natural establishment is another promising treatment option for the pit walls, however competition from exotic species would require active management.
- Establishment of pohutukawa in the pit has had mixed success and is vulnerable to frost, Northern rātā could be a suitable alternative to be trialled in the future.
- Weed control is currently required in all areas to eliminate competition for native seedlings establishing.
- It is likely that maintenance effort will reduce over time, particularly in larger, dense planted blocks. Smaller areas or less dense plantings will require more intensive maintenance due to edge effects from surrounding invasive seed sources.
- Planting a single species in a monoculture, as was originally done with the kete plantings, does not result in a desirable ecological outcome and shouldn't be repeated in future. However, due to operational constraints, there is no intention to undertake further plantings on the embankments at this stage.
- Amendments to the monitoring methodology is required to gather data associated with the closure criteria – for example recording the percentage native and non native canopy and ground cover.

These monitoring results will be assessed in more detail and used to inform the design of future rehabilitation efforts for the site. A summary of improvements to the monitoring programme are discussed in detail in the Rehabilitation Monitoring Report and summarised in section 4.8 of this report.

Permanent photo points of the rehabilitation plots using the drone were established in the 2024/25 monitoring period. This will allow visual assessment of each plot and improve the ability to track vegetation growth and development over time. These photos will be repeated each time the RECCE plots are surveyed, and results of the visual assessment will be discussed in the Rehabilitation Monitoring Report.

4.7.2 Pasture monitoring and maintenance

Grazing of the TSF embankment pasture continues to be managed by an adjoining farmer. Conservative grazing practices such as frequent paddock rotation and only grazing young stock ensure the embankments are not damaged by grazing activities. Conservative grazing requirements were incorporated into the grazing lease that covers the embankment areas in June 2023.

Assessment of the performance of the rehabilitated embankments has been carried out annually by Dr Bob Stewart, Fertilizer and Lime Research Centre, Massey University. Bob Stewart has been the site's agrarian consultant for a number of years and provides independent management recommendations based on the previous year's monitoring results, as summarised below. Due to Bob's retirement, this is his final report, and a new provider- AgFirst has been engaged to provide these reports moving forward. OceanaGold staff undertake monitoring of earthworm populations, topsoil sampling and quality, and

pasture production. The locations of soil sampling and grass cages are demonstrated in Figure 37. These results are presented below.

The objective of the assessment is to:

- Inspect the embankment for pasture and soil condition; and
- determine if the fertilizer strategy for spring topdressing is working effectively.

The 2024 Report provided by Bob Stewart (WAI-200-REP-009). is based on soil sampling data collected and analysed in June 2024 and drone footage and photos from around the same time. A site visit by Bob Stewart occurred in August 2024, which confirmed the interpretations made from the images supplied for the previous years report. An additional report for this visit was provided (WAI-200-REP-008) which also outlined recommendations for pasture renovation. The new consultant, Ag First, undertook an initial familiarization visit in early 2025, and will return to undertake their annual assessment in June 2025.



Figure 37 Grass cage and soil testing locations 2024

4.7.2.1 Soil Chemistry

Annual soil chemistry tests are required to indicate constraints on pasture productivity and soil composition and inform fertiliser recommendations. Soil sample results are compared against target soil test ranges for rehabilitated soils. The closure criteria relating to soil chemistry is the following:

'Phosphate levels determined by the Olsen Method should be a minimum of 25+6ppm for two consecutive years after restoration.

Soil samples are taken by OceanaGold staff in winter each year to 750mm depth using a standard soil corer. Samples are sent to Hill Labs for analysis and interpreted by Bob Stewart for inclusion in his report. Results are reviewed against target soil test ranges for rehabilitation soils.

The report for the 2023-24 year concluded the following:

- Mean Olsen-P levels were just within the target range of 20-30ug at the TSF2 sites.
- At both TSF1A sites Olsen P levels of 19 and 14 Pm were below the target range.
- The mean pH of 5.8-6.0 is within guidelines for TSF1A and TSF2.
- Mean TSF2 sulphate (SO₄-S) levels are similar to 2023, with TSF1A considerably higher 170ug however this is similar to what has been observed in years prior.
- Mean potassium (K) levels are at the lower end of the target range, which is consistent with pasture observations.

These findings and recommendations are discussed with the farmer for implementation.

The report recommendations for fertilizer application in 2024-25 are as follows:

1. For both TSFs to apply 400kg/ha 40% Potassic Superphosphate
2. Nitrogen (N) at 90kg/ha urea applied in spring, separately from the superphosphate.
3. As pH levels are stable, liming is not required.

At the date of writing this report, fertilizer has been applied to all paddocks aerially with 400kg/ha Super 7K plus trace. No nitrogen has been applied.

4.7.2.2 Clover/Grass Composition and Ground Coverage

The closure criteria for composition and coverage are as follows:

'Clover/grass compositional balance should be 20-30%/ 70-80%

Exposed soil surfaces should be no greater than 10% of the rehabilitated area under grazing over two consecutive years.'

Pasture condition is measured visually, TSF2 demonstrates satisfactory cover within guidelines. Some weeds were present, however the composition of clover/rye grass was satisfactory.

TSF1A shows a good grass cover at >80% with a satisfactory balance of grass/clover. Prominent dung and urine patches were noted suggesting a K deficiency. At site A, the site visit noted a decline in ryegrass, indicating a pasture renovation of this batter may be required. Bob Stewart recommends direct drilling of perennial ryegrass which will be planned for 2025.

4.7.2.3 Pasture Production

Since mid-2016 there has been a single set of grass cages on TSF2 that are used as a control for assessing pasture production on TSF1A. The closure criteria related to pasture production is:

'Pasture production should equal the yearly district average for two consecutive years.'

The procedure for monitoring grass cages is outlined in WAI-200-PRO-011. Figure 37 shows the locations of grass cages on the TSF embankments. Grass growth is measured on a monthly basis where grass within the cages is cut and sent to RJ Hill Labs for pasture dry weight analysis.

The results of grass cage monitoring are summarised in Bob Stewart's 2024 report. In general, dry matter yield exceeds the slope adjusted productivity of 8000kg/ha/yr for dry stock farming which is the closure criteria for pasture production. The variation from year to year observed usually reflect climate differences, particularly rainfall.

At the suggestion of the Peer Reviewer, given consistent production results for the past 10 years reflective of rainfall, monitoring using grass cages will be ceased until closer to closure to demonstrate compliance with the criteria.

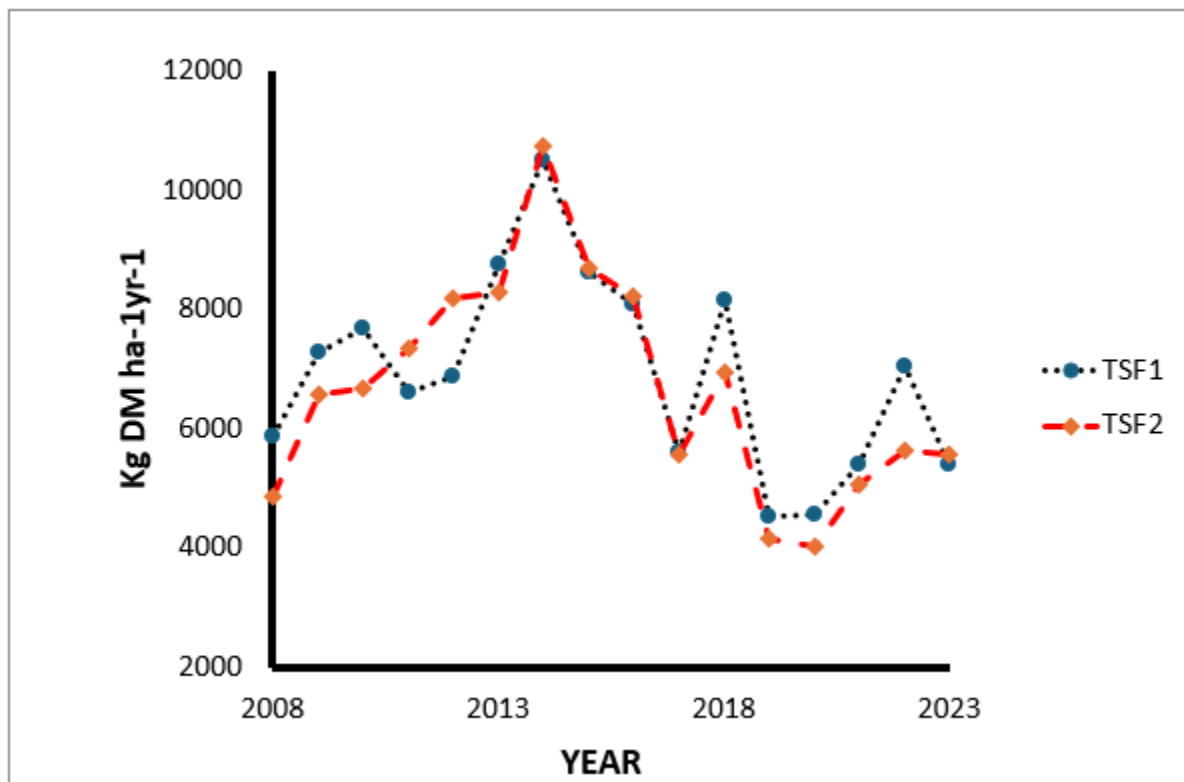


Figure 38 Pasture Growth 2008- 2023

4.7.2.4 Pasture Renovation Options

Pasture renovation options have been discussed with Bob Stewart who recommends the following:

- The prime objective is to maintain ground cover on the rehabilitation as opposed to stock feeding. As long as the ground cover function is maintained, there is little necessity for ground disturbance.
- Cultivation and reseeding is not recommended on the embankment slopes as there is a high risk of erosion.
- Pasture renovation when required, should be done via direct drilling of perennial ryegrass with cultivars as per the recommended rehabilitation mix (Refer WAI-200-REP-008).
- Advice is being sought from new consultant AgFirst regarding pasture renovation at TSF1A Site A.

4.7.3 Pasture and Embankment Maintenance

From time to time, work is undertaken to repair or improve rehabilitated areas of the embankment and associated drains and ponds. During this reporting period, this has included:

- Sump clearing

- Clearing bench drains
- Clearing eastern stockpile drain to S5
- Sampling of the stockpile drains and diversion drain runoff
- Central stockpile silt traps were desilted and maintained;
- West Silt Pond and S1 Pond installation of new probes and transmitters

4.7.4 Tailings storage Facility Site Rehabilitation following crest raise.

A crest raise of TSF1A has been undertaken in the summer of 2024/25 to raise the height to 178.0 mRL. OGNZL will commence HDC Land Use Consent 202.2021.00001466.001, which permits the construction of TSF1A to 182mRL. The crest raise involved stripping the embankment down to RL165 bench prior to building it back up to the new crest level. Due to delays, the works were unable to be fully completed during the summer construction season. Where final surfaces are created in Spring 2025, progressive rehabilitation will occur.

As the new batter is steeper and livestock grazing could be challenging, Bob Stewart has proposed the following seed mix of suckling clover, Yorkshire fog, sweet vernal, and chewings fescue which was previously used on the Pit walls. These low fertility species, although slower to establish, will provide an initial and persistent vegetative cover more suited to the steep batter conditions.

Vegetation establishment will be visually monitored using the drone on a quarterly basis.

4.8 Earthworm Abundance

Earthworms are an important part of pasture productivity, improving soil structure and fertility. They increase efficiency of nutrient turnover, enriching the soil with nitrogen, phosphorus and potassium, and increase soil porosity through burrowing. Therefore, earthworms are used as an indicator of soil health.

The topsoil used to construct the embankment typically comes from stockpiles and has a low earthworm population. Earthworm populations can build up quickly under the right conditions, although occasional seeding of introduced earthworms on the TSF embankments has been carried out in partnership with local primary schools and under the guidance of Paul Gregg, Associate Professor of Soil Science from Massey University in the 1990s.

To maintain a healthy earthworm population, the following conditions and management actions are recommended:

- Avoiding compaction and pugging of the embankment soil.
- Improving drainage to prevent water logging.
- Increasing soil fertility and pasture production.
- Ensuring adequate organic matter is available.
- Ensuring a suitable pH range for soil which is therefore suitable for earthworms.

To assess earthworm abundance against the relevant closure criteria, surveys are undertaken on a 5-yearly basis. Healthy earthworm numbers indicate a well-functioning ecosystem and good soil health.

The closure criteria for earthworm abundance is:

'Earthworm population's average over 10x1m² plots should be a minimum of 100 individuals per square metre.'

4.8.1 Survey Methodology

The methodology used to assess earthworm abundance has been based on the Ag Research 'Great Kiwi Earthworm survey' guidelines. A series of 200x200x200mm plots are established across the embankment pasture of TSF2 and TSF1A (Figure 39).

The survey needs to be undertaken during winter when the soil is wet, which is when earthworms are active and nearest the surface. A spade is used to dig a square 200x200mm sod of the topsoil and turned out onto a tarpaulin. A depth of 200mm is the goal although with a recommended topsoil depth of 100-150mm this may not be achievable in some areas.

The sod is broken up and all earthworms are counted. Any other interesting observations are noted. Earthworms are highly sensitive to sunlight and are to be returned to the soil as soon as possible. The average number of worms per 1m² is extrapolated from the 200x200mm count data. Any sample with less than 5 earthworms in the sample requires further investigation via a retest.

The last earthworm survey was undertaken in 2022 and will be undertaken again in 2027. In areas where earthworm abundance is low, the area is rechecked within a year following the survey where possible.

A Standard Operating Procedure for earthworm surveys – Worm Surveying – WAI-200-PRO-044 was developed in 2024.



Figure 39 Earthworm survey plot locations and 2022 results

4.8.2 Survey Results

The average number of earthworms per square metre across all plots is 615.4 which far exceeds the closure criteria of 100 individuals per square metre. However, six sites had less than five worms per sample. Results from the earthworm survey, undertaken in May 2022 are presented in Figure 20 above and Table 4 below. The next full survey will be undertaken in winter 2027.

The six low sites were resampled in May 2024. At TSF2 these were sites A8, A9, C2, C4 & C5, and at TSF1A, site C5. Four additional samples were taken at each site, 1m from the centre point to the north, south, east and west. Worms were counted as per the original procedure. The results are presented in **Error! Reference source not found.** below.

Table 7 2022 Earthworm survey results

	Sample depth (mm)	Number of worms in sample	Estimate of number of worms/1m ²
TSF1A Site A		Average: 35.9	Average: 897.7
1	120	24	600
2	100	37	925
3	85	61	1525
4	85	20	500
5	85	47	1175
6	85	37	925
7	100	67	1675
8	60	6	150
9	70	29	725
10	20	30	750
11	100	37	925
TSF1A Site B		Average:22.8	Average: 569.4
1	180	22	550
2	150	13	325
3	100	24	600
4	100	41	1025
5	100	35	875
6	120	7	175
7	100	21	525
8	200	10	250
9	100	32	800
TSF1A Site C		Average: 24.5	Average: 612.5
1	200	19	475
2	200	18	450
3	200	7	175
4	200	36	900
5	70	2	50
6	95	12	300
7	100	28	700
8	100	21	525
9	200	42	1050
10	200	60	1500
TSF2 Site A		Average: 30.2	Average: 755.6
1	200	23	575
2	200	39	975
3	200	60	1500
4	200	58	1450
5	200	32	800

6	200	29	725
7	200	31	775
8	200	<u>0</u>	0
9	200	<u>0</u>	0
TSF2 Site B		Average: 18.6	Average: 463.9
1	200	21	525
2	200	13	325
3	200	36	900
4	160	10	250
5	200	13	325
6	200	18	450
7	200	17	425
8	200	13	325
9	160	26	650
TSF2 Site C		Average: 13.2	Average: 330.6
1	170	15	375
2	100	<u>4</u>	100
3	100	6	150
4	70	<u>4</u>	100
5	150	<u>2</u>	50
6	70	13	325
7	120	29	725
8	80	27	675
9	100	19	475

Table 8 2024 Earthworm survey re-test sites

Site	Sample depth	Worm count	Estimate number of worms/m ²
TSF1A Site C5			
1	100	17	425
2	180	17	425
3	200	22	550
4	150	32	800
TSF2 Site A8			
1	180	53	1352
2	100	51	1275
3	90	52	1300
4	100	49	1225
TSF2 Site A9			
1	100	49	1225
2	50	23	575
3	120	17	425
4	100	23	575
TSF2 Site C2			
1	120	28	700
2	190	22	550
3	90	24	600
4	50	30	750
TSF2 Site C4			
1	90	9	225
2	90	7	175
3	130	2	50
4	100	10	250
TSF2 Site C5			
1	110	8	200
2	110	9	225
3	90	8	200
4	90	12	300

TSF2 Site C

TSF2 Site C (refer Figure 40 below) was retested due to three out of nine sites having less than 5 worms per sample in the 2022 survey. For the retest, the average earthworm abundance per sample was 14 with one sample having less than 5 worms present. This site is known as an area where the topsoil depth is low. The site is south facing, with moss under the grass which may indicate a low pH. Due to the site being steep, it has been unable to be fertilised, however it is expected that now aerial application of fertiliser is taking place, soil health and subsequently worm abundance should continue to increase. This site will be revisited in 2025/26 to recount worms.



Figure 40 TSF2 Site C

4.8.3 Discussion

To summarise, the majority of sites except TSF2 Site C meet the closure criteria of at least 100 worms per 1m². Dr Stewart noted in his 2023 report that one of the two soil sampling sites on TSF2 has been changed as this small paddock being used was not being regularly fertilised, so was not representative of the wider area being managed.

As discussed above, earthworm abundance is expected to increase now this site is being fertilised, and will be retested in 2025-26. The full survey is due to be repeated in 2027.

4.9 Topsoil Management

The plant growth layer, Zone H, on the TSF embankments and most rehabilitated areas is a 0.2m thick subsoil layer of Non-Acid Forming materials (NAF), covered with a nominal 100mm depth of topsoil. Topsoil is usually salvaged from the nearby topsoil stockpiles but can be grown in situ through inputs of organic matter incorporated by soil organisms (particularly earthworms). Maintenance of topsoil is essential to ensure the integrity of the embankments and the maintenance of a healthy vegetative coverage.

The purpose of measuring topsoil depths is to:

- Understand the variation in topsoil depth across the TSF embankments.
- Better understand the dynamics of topsoil depths, pasture productivity and native seedling requirements.
- To help determine the current topsoil inventory to achieve desired final rehabilitation outcomes.

4.9.1.1 Method

Topsoil depth is measured through a survey undertaken using chevron pattern across the embankment of approximately 10 samples per paddock. A GPS-located hole is augured down to a prominent texture change, and the depth measured from the surface.

In autumn 2025, the topsoil survey was undertaken across TSF2 pasture and plantings in accordance with procedure WAI-200-PRO-043

The aim is to get a full initial inventory of the embankments in 2025/26, then annually re-survey a few paddocks to determine if depths have changed. Only if re-surveys indicate a significant change would a more thorough survey be considered.

4.9.1.2 Results

The first topsoil survey was undertaken of TSF2 in May 2025. Results are shown in Figure 41 below.

The average topsoil depth across TSF2 is 11.7. Results identify 38 areas where topsoil is less than 5cm. Topsoil did not appear to be significantly deeper in planted areas, compared with pasture.

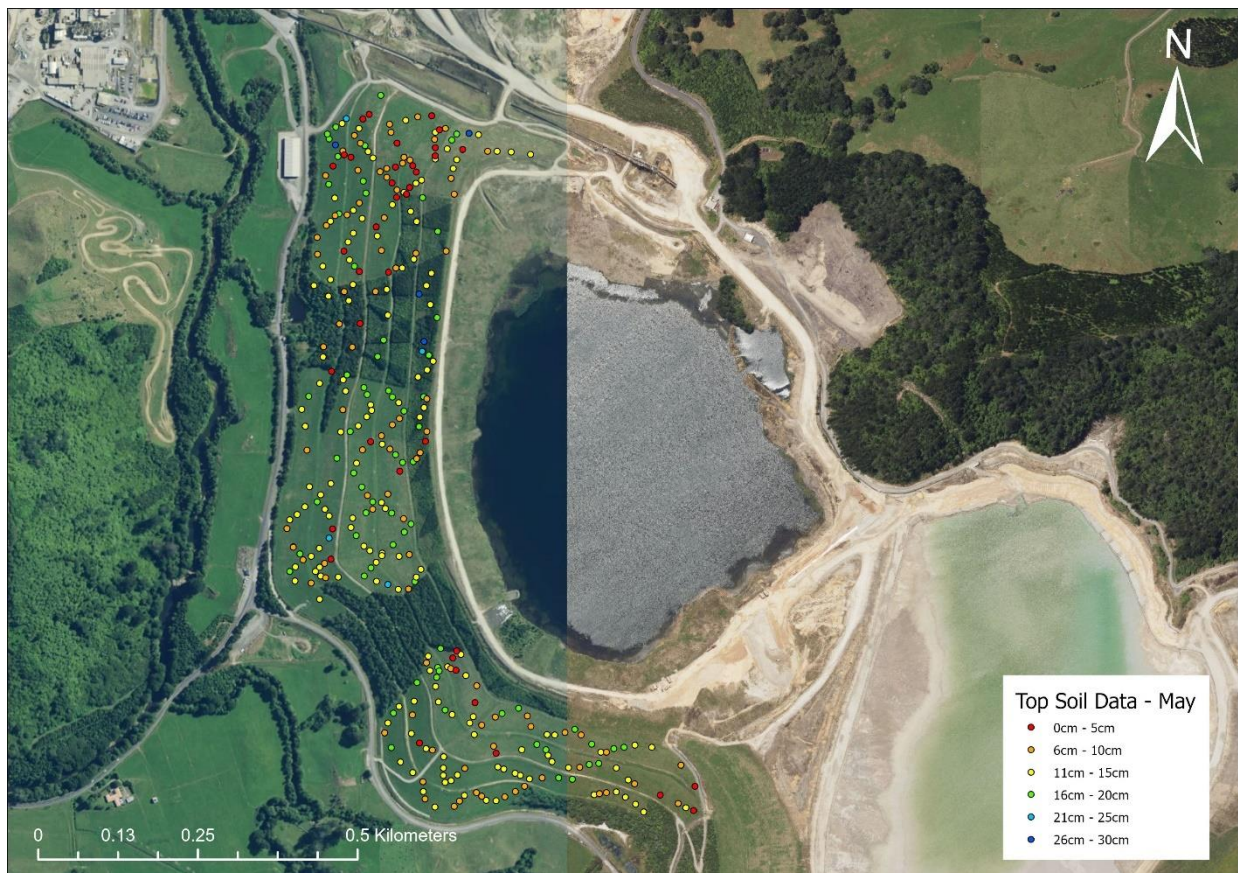


Figure 41 TSF2 Topsoil depths

4.9.1.3 Outcomes

TSF1A will be surveyed during the 2025/26 monitoring period. Results of the topsoil survey will be shared with Agricultural consultant and TSF Engineer to discuss whether any interventions are required.

4.9.2 Topsoil Stockpiles

Topsoil underlying various structures is stripped and stockpiled for later used for rehabilitation purposes. In general, the current principles of managing topsoil stockpiles on site are the following:

Responsibilities

- Engineering Geology Limited (EGL) monitor the topsoil stockpile inventory onsite and estimate the required volume of topsoil for future rehabilitation requirements. This is recorded on an annual basis and recorded in the TSF Geotechnical report.
- OGLNZ Site Services are responsible for maintaining the quality of topsoil stockpiles, until they are required for rehabilitation purposes

Management of existing topsoil stockpiles

- As of June 2025, the total volume of soil in the stockpiles is 124,875m³, with a surplus of topsoil of approximately 26,789m³.
- Best practice suggests that stockpiles should generally not exceed 3m. Some older stockpiles on site are greater than 5m, however given their coarse, well drained texture and volcanic ash origin should mean they can rapidly recover once aerated and activated by plant roots.
- Existing stockpiles generally have a dense grass cover over most of their area and are grazed to help maintain vigorous grass growth.
- To maintain topsoil quality, stockpiles are ripped using machinery to loosen and aerate the subsoil and increase drainage. This is undertaken on an as required basis.
- Weeds are addressed as required through regular surveillance
- Stockpiles are re-grassed as soon as practical to reduce soil damage and loss caused by rain.

General

- In some cases, exposure of large areas of topsoil for extended periods is inevitable due to operational requirements during construction activities. Care will be taken to ensure runoff is contained within silt collection ponds.
- Where possible, stockpile sites are selected to maximize protection from strong winds and away from waterways/ drainage systems.
- Prior to topsoil removal, existing vegetation is removed to avoid green vegetative materials being incorporated into the replaced soil at the site.
- Where possible, the handling of topsoil material should take place in dry soil conditions to avoid soil compaction.
- Appropriate sediment control measures may be required to prevent the discharge of soil into watercourses until vegetation is established on the stockpile.
- Use of other waste materials may be suitable as a medium for rehabilitation and will be assessed on a case-by- case basis.

4.9.3 Screen planting

Screen plantings have been undertaken over many years at various places around the operating site and surrounding landscape. These showcase a variety of native species, including Olearia spp, Lacebark, Griselinia and tōtara.

In order to understand growth rates and better understand screen planting establishment processes, photo points were established at two sites, with results discussed in the Rehabilitation monitoring report, section 7.



Figure 43 Baseline photopoint of 1.5 year old screen planting around the Pit Rim walkway.

Additional screen planting is in the planning stages for company owned farmland surrounding the proposed TSF3, which will be included in this aspect of monitoring once completed.

4.10 Rehabilitation activities planned for 2025/26

4.10.1 Native planting

- Planting 7000 native plants at farm at Golden Valley riparian project in May 2025. Planning for completion of this project in 2026 with infilling of larger native tree species within established shelter.
- Replacements at Pit rim screen planting for Arbor Day 2025.
- Discretionary Screen Planting for proposed TSF3
- Planning for Waihi North Project – plant supply and maintenance procurement.
- 6 monthly drone monitoring of Golden Valley Planting.
- Retake screen planting photo points.

4.10.2 Pest Plant and Animal Control

Pest plant and animal control will continue in 2025/2026 as outlined in the Pest Control Management Plan. Areas of focus for this period are:

- Follow up aerial spray of Martha Pit utilising Drone in Spring 2025.
- Continue improvements to labour tracking system for landscape maintenance.
- Annual sweep of TSF embankment plantings for deep rooting and weed species.
- Implement Predator Control plan for the site, including rolling out traps to new areas, and regularly reviewing data for adaptive approach.
- Three staff attending the Vertebrate Pesticide methods course in Thames – April 2025.
- Consider firearm control of Canada Geese/ turkeys in collaboration with surrounding landowners.
- Increase use of INaturalist by staff to record distribution of biocontrol agents and observe bird life.
- Continue to seek opportunities to learn from and collaborate with other biodiversity initiatives in the area.

- Northwall – remove wattles at top of wall unable to be accessed by telehandler.
- Refining monitoring methods for biocontrol.

4.10.3 Pasture monitoring and maintenance

Pasture monitoring and maintenance will continue in the next reporting period. Improvements include:

- Application of fertilizer to TSF embankments, as recommended by Agricultural Consultant.
- Pasture renovation of TSF1A Site A using perennial ryegrass species; and monitoring of establishment.
- Recount of TSF2 Site C earthworms (June/July)
- Continue topsoil survey across TSF1A.
- Rehabilitation of TSF1A crest raise and associated monitoring.

4.10.4 Rehabilitation and Closure Monitoring

The approach to rehabilitation monitoring at the OceanaGold Waihi site continues to evolve, enriched by the advice and guidance provided by peer review and external advisors. While not all recommendations are able to be addressed immediately, they have been carefully considered and where possible incorporated into future monitoring plans.

A Rehabilitation Monitoring schedule has been prepared in Table 9 in order to allow effective planning of the future rehabilitation approach and schedule key tasks in line with closure criteria.

Table 9 Rehabilitation monitoring schedule

What	Method	2025/26	2026/27	2027/28	2028/29
TSF Embankment pasture <i>Note planned activities – TSF1a crest lift 2025/26 requiring rehabilitation</i>					
Clover/grass compositional balance	Visual assessment from Drone Photo or site visit (Agarian consultant)				
Exposed soil surfaces					
General soil chemistry	Soil chemistry				
	Sample in May				
Pasture production	Grass cages				
On hold until closer to closure.					
Monitor establishment of new rehabilitation following crest raises	Method tbc.				
Topsoil depth	Topsoil survey	TSF1A			
Earthworm populations	Earthworm survey 5 yearly. Low spots as required	Retest site TSF2C		Full	
Embankment native plantings					
Native species Diversity/abundance recruitment	RECCE plot surveys				
Canopy Cover	Aerial photos of RECCE plots				
Topsoil and leaf litter depth	Topsoil survey	TSF1A			
Deep rooting species	Annual sweep				

TSF2 lake margins (including capping trial) <i>Note planned activities – potential resumption of tailings deposition in TSF2 2027/28.</i>					
Native species Diversity/abundance recruitment	RECCE plots				
Canopy cover	Aerial drone image				
Martha Pit Wall					
Native species diversity/abundance recruitment	RECCE Plots	Develop SOP			
General (across all areas)					
Weed surveillance and control	Maintenance effort (Monthly)				
	General weed surveillance				
Biocontrol monitoring	Growth/ coverage Photo points Annual				
Predator control	Number of predators caught (monthly)				
Screen plantings	Photo points				
Wildlife	Bird monitoring survey TSF1A – abundance and mortality (weekly)				
	TSF2 Bird monitoring survey (Quarterly)				
	Record sightings of indicator bird species (opportunistic)				
	Predator catch data				
	Goose nest data				
New planting establishment	Record numbers and area on ArcMap				

Interpretation

- New monitoring methods as of the 2025/26 monitoring period are **highlighted in bold**.
- Squares coloured in Green denote regular monthly/ weekly or quarterly tasks.
- Squares coloured in Orange denote annual tasks.
- Squares coloured in Blue denote tasks undertaken every few years

4.11 Proposed improvements to rehabilitation monitoring and management

It is imperative that OGNZL use monitoring results to inform future management and development of the future rehabilitation approach.

Closure criteria have been developed over the years influenced by consent conditions and peer review recommendations. A number of closure criteria related to vegetation rehabilitation require refinement in order to inform the monitoring approach. Table 10 below summarises proposed amendments to the current rehabilitation approach. More context and detail is provided in the Rehabilitation Monitoring Report.

Table 10 Proposed improvements to rehabilitation monitoring and management.

Aspect	Proposed Action
General	- Develop Standard operating procedure for monitoring not captured elsewhere to ensure consistency in approach. - Align existing rehabilitation monitoring programme with Waihi North Project requirements should consent be received. - Embed monitoring schedule into team operations and assign tasks to team members; undertaking 6 monthly meetings.
Vegetation Monitoring	- Seek ecological advice to simplify RECCE method – e.g. exotic grasses and ground cover could be estimated via a coverage percentage, as opposed to all individual species being identified. - Consider rationalising the number of plots to increase efficiency. Add one additional RECCE plot to the pit natural regeneration cohort for next monitoring round. - Establish method and measure canopy cover of RECCE plots. - Consider a discretionary closure criteria for natural regeneration. - Methodology for aerial photographs
Soil	- Continue conversations around the cultural balance plan with relevant iwi to inform development of closure criteria and associated monitoring programme for soil as part of corporate closure planning work.
Weed Management	- Continue to improve system for tracking weed maintenance effort in liaison with contractor. - Focus on weed infestations around Pit Rim walkway to prevent establishment in the Pit. - Streamline biocontrol monitoring to take annual photopoints. - Consider other biocontrol agents for problem weeds.
Rehab Planting	- Scoping of 1.1ha Pit rim area for community planting site. - Consider opportunities to trial the planting of drains and or sediment ponds prior to closure to enhance water quality and biodiversity. - Monitor establishment of TSF1A pasture rehabilitation as advised by Agricultural consultant and EGL. - Continue to refine and communicate restoration principles to guide plant selection and planning for future planting projects. - Develop restoration recipe based on previous learnings that captures a prescription for establishment and maintenance of different rehabilitation treatments. - Improve planting tracking and mapping to capture historic and future data in a consistent format to demonstrate the impact across the landscape.
Cultural Balance Plan	- Continue engagement to ensure completion of Cultural Balance Plan. - Continue conversations with mana whenua regarding aspects that can be prioritised and incorporated into rehabilitation planning and monitoring, and what involvement they might like to have.
Wildlife	- Undertake staff training on use of INaturalist and encourage recording of indicator bird species. - Embed Predator Control plan and associated action plan. There is a focus on reviewing monitoring data to inform adapting the approach. - Explore opportunities to refine and expand predator control operations across the site.

Lake margins	- Participate in project planning in anticipation for TSF2 crest lift to ensure consent requirements are met. - Continue conversations regarding potential indicator species through the Cultural Balance Plan.
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These improvements and tasks will be entered into INX INControl with actions assigned to team members with a timeline for completion.

4.12 Peer Review Recommendations 2023/24

Number	What	OGNZL Progress
1	Continue weed control adjacent to the pit walkway. Kill ivy in the canopy of trees and constrain the spread of ivy, honeysuckle, and jasmine into native plantings. Identify tree privet, cotoneaster, and elaeagnus to facilitate their poisoning and removal by Kauri Gold	This has been discussed with Kauri Gold. Removal of ivy is not currently feasible, and is kept contained as much as possible. Privet has not been removed as it performs screening function. Further assessment, inclusion in LINZ annual workplan, (and associated funding) would be required prior to their removal.
2	Explore the interaction between heritage, the Whai Oranga o Pukewa: Cultural Balance Plan, and rehabilitation using one case study area of mining heritage.	Information regarding the wider context of the site and heritage opportunities has been added to the Rehab and closure plan Section 1.4
3	Quantify screen planting performance and growth rates in addition to planned photo points.	Screen planting photo points have been established and height estimated. Please provide further advice regarding purpose of growth rates and performance.
4	Develop detailed methods for managing and establishing vegetation above 1,104 m RL5 that meet survey control and prism monitoring requirements and rehabilitation objectives. Include as a standard operating procedure.	Principles have been added to 7.4 of the Pest control management plan. SOP is not feasible at this stage.
5	Stop the measurement of pasture production using cages until 3 years before closure. Continue soil chemistry measurements and ask the new agricultural consultant to assess their representativeness across the TSFs.	Grass cage monitoring stopped October 2024. Soil chemistry measurements continued for Agricultural consultant.
6	Take or extract suitable photos of TSF1A and TSF2 to identify pasture cover, seepages, and/or acid patches within grassed areas in drier periods (mid- to late summer). Include representative photos in the annual RCP.	Drone was unavailable during summer. Regular inspections of pasture cover, seepages and acid patches take place coordinated by the TSF engineer.
7	Add a section or appendix to RCP 2024 recording the renovation of the lowest TSF1A batter, 3-, 6- and 9-month outcomes, and amended methods and maintenance for similar areas. Include a table summarising the differences from and similarities to previous pasture establishment and maintenance methods (and native species).	Recommendations have been received from Bob Stewart for this renovation, however is not planned to take place until Spring 2025 – with further advice from new Ag Consultant.
8	Develop a detailed method for TSF1A lift root-zone rehabilitation, responsive erosion control, and pasture establishment that is adapted to the steeper slopes proposed for this lift. Compare and contrast with established rehabilitation methods.	Proposed rehabilitation method outlined in section 4.7
9	Measure topsoil depth across the embankment slopes and in pasture and native forest areas, prioritising the TSF1A lift before stripping and after rehabilitation.	TSF2 undertaken in May 2025, TSF1A to be undertaken in June. Sampling was not able to be undertaken prior to TSF1A lift works beginning.
10	Develop a topsoil storage management plan based on the effectiveness of 2024 ripping treatments and the TSF1A crest raise, to manage topsoil in stockpiles to enhance its quality.	Topsoil stockpile management principles have been added to the RCP section 4.9.2. Feedback welcome.

11	Investigate methods to transition sediment ponds and downstream drains to closure by reducing herbicide application and enhancing biodiversity values.	Methods have been investigated and added to rehab monitoring report – future improvements section. Undertaking a trial is not currently possible, however will be considered in the future.
12	Remediate isolated areas of erosion of the ramp surface drain (TSF2) and isolated castle drain ‘perching’ with soil fill (TSF1A), as identified by Engineering Geology Ltd (2024a, 2024b).	EGL recommendations implemented by site services.
13	Reduce the potential for erosion of the Waste-Water Treatment Plant residue stockpiles.	Confirmed unable to be used or disposed of on site. Removal has been budgeted for in 2025/26
14	Remove redundant infrastructure in revegetation areas.	Planned and budgeted for removal in 2025/26.

Geochemistry Peer Reviewer Recommendations 2023

Recommendations from the 2022/2023 Geochemistry Peer Reviewer Report require large changes to the current Rehabilitation and Closure Plan, including updating closure concepts and criteria with additional stakeholder input. Given the site’s final landform is currently unknown with the Waihi North Project in the consenting phase, it is proposed that these changes are incorporated following the decision on the Waihi North Project consent applications.

**PART A APPENDIX A –
CONSENT CONDITIONS**

The relevant consent conditions relating to Rehabilitation and Closure are:

Varied Mining Licence 32-2388

3.1 Rehabilitation.

1c The licensee shall progressively implement Part A of the approved Rehabilitation and Closure Plan and shall implement Part B of the approved Rehabilitation and Closure Plan in the event of closure occurring. The appropriate Rehabilitation and Closure Plan is the plan approved pursuant to the conditions of the resource consents granted by the Waikato Regional Council for the extended project.

Fencing.

...

22c. On completion of mining operations any fences not required for safety purposes to be either removed or retained by mutual agreement between the relevant territorial authorities and the licensee.

Waste Rock Embankments and Tailings Ponds

...

Immediately following the completion of tailings deposition and until rehabilitation of the surface is complete the surface level of the tailings shall be measured at not less than two- monthly intervals to provide a record of settlement."

Rehabilitation

General

The licensee shall rehabilitate the whole licence area in accordance with the approved Rehabilitation and closure Plan referred to in condition 1c, and in accordance with the work programme specified in condition 2.

The licensee shall progressively strip and stockpile, as far as practical, topsoil from all areas to be used for construction and waste disposal in the process plant and waste disposal area. This stockpiled topsoil or topsoil stripped during the course of operations shall be used to produce the maximum rehabilitation benefit.

Mine Site

At all times mining shall be carried out in a manner which will ensure that environmental disturbance is kept to a minimum. All necessary steps shall be taken by the licensee to prevent unnecessary destruction of or damage to vegetation or property and to ensure the safety of the public and livestock.

Mining, processing and waste disposal operations shall be carried out in such a manner as to ensure that the surface of the land suffers as little permanent damage as possible. The license area is to be left in a clean and tidy condition after mining operations have ceased including removing from public view any used derelict equipment and machinery and the pit faces are to be left in a stable and safe condition.

The upper pit slopes shall be treated to ensure revegetation as soon as possible in the mining programme and in accordance with the current approved Rehabilitation and Closure Plan. Revegetation of the upper slopes will be carried out as far as practicable and may preserve some areas without vegetation to preserve and reflect the mining heritage of the town provided that the water quality of the Pit lake remains suitable for direct

discharge to surface waters in accordance with resource consents held by the licensee from the Waikato Regional Council.

Adequate drainage shall be provided on all access tracks and benches to prevent erosion of any adjacent land.

Conveyor Route

Upon completion of the project the land along the conveyor route shall be restored to its former condition unless the relevant territorial authority requires that it shall be left for use as a public walkway or other useful amenity provided that the cost of so doing does not exceed the cost of restoration to the former condition.

Process Plant Site

If, at or after the end of mining operations, the process plant or the wastewater treatment plant is dismantled, the area formerly occupied by and surrounding the dismantled plant shall be contoured, and as far as is reasonably practicable restored and in a manner that will protect water quality and avoid soil erosion.

Tailings and Waste Disposal Site

The licensee shall make good all final surfaces of the waste rock embankments, tailings storage areas, perimeter bund and any associated works in the waste and tailings disposal area at Baxter Road.

Rehabilitation of the final surface shall be progressive as areas of a practical working size become available and shall include the provision of a suitable rooting medium, contouring and drainage as required, to ensure the establishment and maintenance of a surface which will protect water quality and avoid soil erosion.

42A

Prior to each increase in embankments and crest height of Tailings Storage Facility 1A above RL 166, as part of the Third Stage – Continued Waihi Operations within Annex A, the licensee shall provide to the Hauraki District and Waikato Regional Councils for their approval, a report detailing the height of the crest rise, the sequence of works proposed, and an anticipated timeline in which the physical works and revegetation of the embankments and crest will occur. The approved report shall form part of the Rehabilitation and Closure Plan required by 1(c) of this licence and shall incorporate the revegetation programme in 42A(c) below.

The licensee shall have completed revegetation of the embankment slopes of Storage 1A to RL166 by 31st March 2014.

Unless otherwise agreed in writing by Hauraki District Council and Waikato Regional Council, the licensee shall undertake the revegetation planting of the embankment slopes of Storage 1A such that after 31st March 2014, all revegetation planting shall be staged relative to the annual lifts of the embankment crest, i.e. the lift undertaken in the previous season is to be revegetated while the current season's lift is being undertaken. Stockpile areas are excluded from the requirements of 42A(b) & (c).

If the programme in 42A(c) above is not achieved, the licensee shall forthwith provide a review to Hauraki District and Waikato Regional Councils detailing the reasons why this has occurred and measures proposed to address programme timing.

Post Production

45. The maintenance of the Martha Hill Amenity Lake and Use Buildings shall be the responsibility of the company for the period of ten (10) years following the end of production operations or until the end of the license period whichever is the sooner.

Annex A

The Open Pit Rehabilitation

41. At the end of mining operations the dewatering pumps will be moved and the void created will refill with water (groundwater and stormwater). It is proposed to augment the filling of the pit by taking water from the Ohinemuri River. After a period of approximately five years a new lake will be created. This will be rehabilitated into a recreational area in accordance with the approved Rehabilitation and Closure Plan.

The Tailings and Waste Disposal Area Rehabilitation

77. The waste and tailings disposal area will be rehabilitated in accordance with the approved Rehabilitation and Closure Plan to grass and native vegetation and wetlands (with permanent ponds). This will be achieved by staged revegetation of final slopes of the disposal area as soon as disposal operations allow. Stockpiled topsoil will be used to the maximum benefit in rehabilitation.

Martha Mine Extended Project - Waikato Regional Council Consents and Conditions

9.0 Rehabilitation/closure Plan

Prior to commencement of construction of the tailings storage facility (Storage 1A), the consent holder shall prepare a concept plan ("the Plan") describing the proposed method of rehabilitation and closure of the Site. The objective of this Plan shall be to ensure rehabilitation and closure of the Site in such a manner that in the long term the Site, and any structures on it, will remain stable; and any water discharging from the Site, and any groundwater under the Site, will be of a quality such that it will not adversely affect aquatic life, or other users of the water resource.

The plan shall be in two parts:

Part A shall describe the programme of progressive rehabilitation (including revegetation) that is proposed for the Site for the following twelve months, should closure not be proposed during that period; and shall report on any such works undertaken during the previous year

Part B shall:

A) describe the proposed method of final rehabilitation and closure should closure occur within the following twelve months

B) include an assessment of any residual risk that the Site would pose to the environment and the neighbouring community should closure occur within the following 12 months.

C) include a programme for monitoring of the Site following closure, and list all maintenance works likely to be necessary at the closed Site for the foreseeable future.

Review

The Plan shall be reviewed and updated annually and the concepts shall be described in more detail as appropriate.

The consent holder shall submit the Plan, and each annual review and update thereof, to the Panel for its review.

The consent holder shall then submit the peer reviewed Plan to the Waikato Regional Council for approval.

Implementation

The consent holder shall progressively implement Part A of the approved Plan and shall implement Part B of the approved Plan in the event of closure occurring.

Martha Mine Extended Project - HDC Land Use Consent and Conditions (No 97/98 – 105)

3.23 Rehabilitation

...

The consent holder shall rehabilitate all areas that have been subjected to mining operations as part of the Extended Project.

Prior to the commencement of construction of the tailings storage facility (Storage 1A), the consent holder shall submit to the Council for approval detailed rehabilitation plans. These plans will be consistent with the relevant Annual Work Programme referred to in Condition

3.2 and the Rehabilitation/Closure Plan approved by the Peer Review Panel pursuant to Condition 8 of Schedule 1 to the Waikato Regional Council consents.

The rehabilitation plans shall set out:

proposed recontouring of and rehabilitation of the noise bunds.

Landscaping and details regarding facilities proposed for the recreational reserve at the eastern end of the new mine lake;

Location of pedestrian access, tracks and viewing facilities around the extended pit perimeter;

Planting and landscaping proposals for the remainder of the upper pit benches/batters and the immediate pit surrounds, that have not already been progressively rehabilitated;

Ongoing rehabilitation measures proposed to pyritic rock areas;

Safety fencing

Maintenance proposals;

With respect to Area D the areas to be grassed

Details of the investigation and removal process for areas that may contain contaminated soils.

In considering these plans, Council shall take into account:

the degree of compliance with the concepts described in the relevant Annual Work Programme;

their usefulness and practicability in terms of the Waihi community;

on-going maintenance issues.

HDC 3.31, condition 10 contains the following condition:

The Councils shall release the rehabilitation bond on the completion of closure of the site.

“Completion of closure of the site” means when the elements of the entire project have been demonstrated by the consent holder to the satisfaction of the Councils to have reached a stable, self-sustaining, rehabilitated state as defined by the approved Rehabilitation Plan.”

Storage 2 Consents – Waikato Regional Council

Rehabilitation conditions are also specified in the existing consents for Storage 2. The existing consents for Storage 2 state the following:

W1761. “To discharge natural water containing waste onto the land and into the ground beneath storage 2 and the holding pond”.

12. *The Grantee shall remove at the request of the Board mining equipment, buildings, pipes, silt traps and other structural works associated with the Water Right at the expiry, surrender or abandonment of the right provided that this condition shall not apply to the water treatment plant if the relevant territorial local authority consents to its remaining.*

Note that the condition above also applies to W1751 below. In addition, the following conditions apply:

W1751 *“To dam unnamed water courses in order to construct a perimeter bund and access road around the north, west and south edges of the designated areas for storages 1 and 2 for waste and tailings disposal”*

The rehabilitation plans and progressive rehabilitation of the site of the bund will be reviewed by a Peer Review Panel whose members will be appointed by the Grantee and approved by the Board. All costs related to the Peer Review Panel shall be borne by the Grantee.

The Grantee shall be responsible for ongoing maintenance of the rehabilitated area for the term of the right.

Note that conditions 6 and 7 above, are also specified in W1749 “To dam unnamed water courses within the designated area for storage 2 in order to construct an impoundment structure for the containment of tailings from mining operations...”

Conveyor Silt Ponds – Waikato Regional Council

Condition 13 of W 1742 states the following:

“The Grantee shall rehabilitate and landscape the catchment and adjoining land surrounding the open pit site in accordance with the Rehabilitation and Closure Plan as specified in Schedule 1 of the Waikato Regional Council Consents for the Extended Martha Mine Project as granted in December 1998.”

Condition 12 of W1743 states the following:

“The Grantee shall remove at the request of the Board mining equipment, buildings, pipes, silt traps and other structural works associated with this Water Right at the expiry, surrender or abandonment of the right provided that this condition shall not apply to the water treatment plant if the relevant territorial local authority consents to its remaining.”

HDC Land use Consent 85.030.009.PP (Pumphouse Relocation)

8. Rehabilitation

“The consent holder shall rehabilitate all the areas subject of the earthworks upon completion of the works to a state as good as it was before the work commences. The rehabilitation works within Mining Licence 32-2388 shall be generally in conformity with the approved Rehabilitation and Closure Plan dated July 2001 – 2002 or any subsequent approved update”.

Favona Underground Mine Consents – Hauraki District Council Land Use Consent 85.050.326.E

Rehabilitation

“29. The consent holder shall prepare a Rehabilitation Plan covering all areas that may be affected by the Favona Underground Mine. This Plan shall be submitted to the Council for written approval prior to the exercise of this consent. The Plan shall set out details on flooding of the mine, plugging of the decline, landscaping, rehabilitation of the polishing pond stockpile area, planting, fencing, and ongoing maintenance and may be the same Plan that is required as a condition of consents granted by the Waikato Regional Council (see note below). The Plan shall be consistent with and complement the Rehabilitation Plan prepared for the Martha consents.

30. The consent holder may amend the Plan at any time. No amendments shall be made to the Plan without the written approval of Council. Unless otherwise agreed in writing by the Council, the consent holder shall undertake the rehabilitation works in accordance with the most recent version of the approved Rehabilitation Plan.”

(Note: Conditions 29 & 30 are complementary to Condition 4 of Schedule One – General Consents granted by the Waikato Regional Council).”

Favona Underground Mine Consents – Waikato Regional Council

Schedule 1 attached to resource consent numbers 109741, 109742, 109743, 109744, 109745 and 109746 states the following:

Rehabilitation Plan

“The consent holder shall prepare a Rehabilitation Plan covering all areas that may be affected by the Favona Underground Mine. This Plan shall be submitted to the Council for written approval prior to the exercise of this consent. The Plan shall set out details on flooding of the workings, plugging of the decline, landscaping, rehabilitation of the polishing pond stockpile area, planting, fencing, and ongoing maintenance and may be the same Plan that is required pursuant to condition 27 of the land-use consent granted by the Hauraki District Council. The Plan shall be in alignment with the Rehabilitation Plan prepared for the Martha consents.

The consent holder may amend the Plan at any time. No amendments shall be made to the Plan without the written approval of the Council. Unless otherwise agreed in writing by the Council, the consent holder shall undertake the rehabilitation works in accordance with the most recent version of the approved Rehabilitation Plan.”

Screen Planting Conditions

The conditions of Hauraki District Council Land Use Consent No 97/98-105 and the varied Mining Licence 32-2388 require the preparation of a management plan for screen planting to mitigate the visual effects of the Extended Pit and the Grey Street noise bund.

Specifically the screen planting conditions are as follows:

“3.14 Screen Planting

Prior to the exercising of the consent, the consent holder shall prepare and submit to the Council for approval a plan and schedule indicating planting proposals to mitigate the visual effects of extending the open pit. This plan and schedule will include:

An outline of the type and approximate number of plants to be used;

Details of the trees and plants to be relocated as a result of mining activities and the position that those trees and plants will be relocated;

A planting plan on a suitable scale agreed with Council;

A schedule of implementation;

A programme for the progressive removal of invasive exotic trees, plants and seedling (e.g. wattle and pine) in order that the intended mix of native and exotic plants becomes the dominant species.

Within twelve months of granting this consent, the consent holder shall commence implementing the planting schedule.

The noise bunds at Grey Street and to the west of the pit shall be hydroseeded and planted in accordance with the plan referred to in (a) above immediately following completion of construction of the bunds."

Mining Licence condition 25 is similar to the aforementioned condition.

In addition Mining Licence condition 6 states the following under the heading "Construction Operations".

"Vegetation outside of the area 5 metres from the final pit perimeter as shown in Annex A to the licence boundary shall be protected and retained to the maximum extent practicable and where necessary, particularly opposite the top of Martha Street and Savage Road, shall be supplemented to minimise the visual impact of the project."

Grand Junction Refinery and Strong Rooms Relocation Consent

A landscaping plan be prepared and approved by HDC's Planning and Environmental Services Manager within 6 months of relocating the Refinery and Strong room/s. The landscaping plan shall facilitate public viewing from the Pit-Rim walkway and accommodate future public access to the building. Maintenance of the landscaped area shall be the responsibility of the consent holder.

17. That the Martha Mine Rehabilitation Plan (MMRP) shall be updated to take account of the CMP requirement, as part of the 2010 Annual Review Programme, and that the CMP, once completed, be incorporated by reference into the MMRP.

Trio Development Project HDC Land Use Consent RC-15735

The land use activities permitted under this consent for all activities relating to the Trio Development Project within the Trio Project Area as described in the application documents, being the construction and use of an exploration access incline and decline and associated underground workings and facilities, include, but are not limited to, the following activities:

...

Rehabilitation activities, including backfilling with waste rock and flooding with treated water and water from the Ohinemuri River.

20. The consent holder shall prepare a Rehabilitation Plan covering all areas that may be affected by the construction and use of the workings associated with the Trio Development Project. This plan shall be submitted to the Waikato Regional Council and Hauraki District Council (the "Councils") for written approval within 2 months to the exercise of this consent. The Plan shall set out details on flooding the underground workings, backfilling the vent shaft and access decline, and removal of surface infrastructure and planting of surface areas affected. As a minimum the Plan shall provide for the backfilling of the initial 200m length of the access decline tunnel from the current Favona access tunnel. The consent holder may amend the Plan at any time. No amendments shall be made to the Plan without the written approval of the Councils. Unless otherwise agreed in writing by the Councils, the consent holder shall undertake the rehabilitation works in accordance with the approved Rehabilitation Plan.

The Plan shall be consistent with and complement the Rehabilitation Plan required by the conditions of consent for the Martha and Favona mines.

Trio Development Project WRC Consents (121416-121418, 121446, 121447).

Schedule 1, Condition 4:

The consent holder shall prepare a Rehabilitation Plan covering all areas that may be affected by the construction and use of the workings associated with the Trio Development Project. This plan shall be submitted to the Waikato Regional Council and the Hauraki District Council (the “Councils”) for written approval within 2 months of the exercise of this consent. The Plan shall set out details on flooding the underground workings, backfilling the vent shaft and access decline, and removal of surface infrastructure. The consent holder may amend the Plan at any time. No amendments shall be made to the Plan without the written approval of the Councils. Unless otherwise agreed in writing by the Councils, the consent holder shall undertake the rehabilitation works in accordance with the approved Rehabilitation Plan.

Trio Mine HDC Land Use Consent.

The consent holder shall prepare a Rehabilitation Plan covering all areas that may be affected by the construction and use of the workings associated with the Trio Underground Mine Project. This Plan shall be submitted to the Waikato Regional Council and Hauraki District Council for written approval prior to the exercise of this consent.

The Plan shall be in two parts:

Part A shall describe the programme of progressive rehabilitation (including re-vegetation and backfilling) that is proposed for the site for the following twelve months, should closure

not be proposed during that period; and shall report on any such works undertaken during the previous year.

Part B shall:

describe the proposed method of rehabilitation and closure should closure occur within the following 12 months;

include an assessment of an residual risk that the site would pose to the environment and the neighbouring community should closure occur within the following 12 months; and

include a programme for monitoring of the site following closure, and list all maintenance works likely to be necessary at the closed site for the foreseeable future.

Review

The Plan shall be reviewed and updated annually and the concepts shall be described in more detail as appropriate.

The consent holder shall submit the Plan, and each annual review and update thereof, to the Peer Review Panel (as required by the Martha Extended Project) for its review.

The consent holder shall then submit the peer reviewed Plan to the Hauraki District Council and Waikato Regional Council for approval.

Implementation

Approved by: M Burroughs Approval Date: June 2025

Next Review: June 2026

OceanaGold Corporation
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The consent holder shall implement Part A of the approved Plan and shall implement Part B of the approved Plan in the event of closure occurring.

Rehabilitation Plans associated with the Martha Extended Project and Favona Mines

The rehabilitation Plan may also include any other information that the consent holder wishes, and may be combined with the Rehabilitation Plan(s) associated with the Martha open pit and Favona underground mines.

Trio Mine WRC Consents (121694-121697)

Schedule 1, condition 4:

The consent holder shall prepare a Rehabilitation Plan covering all areas that may be affected by the construction and use of the workings associated with the Trio Underground Mine Project. This Plan shall be submitted to the Waikato Regional Council and Hauraki District Council for written approval prior to the exercise of this consent.

The Plan shall be in two parts:

Part A shall describe the programme of progressive rehabilitation (including re-vegetation and backfilling) that is proposed for the site for the following twelve months, should closure not be proposed during that period; and shall report on any such works undertaken during the previous year.

Part B shall:

describe the proposed method of rehabilitation and closure should closure occur within the following 12 months;

include an assessment of an residual risk that the site would pose to the environment and the neighbouring community should closure occur within the following 12 months; and,

include a programme for monitoring of the site following closure, and list all maintenance works likely to be necessary at the closed site for the foreseeable future.

Review

The Plan shall be reviewed and updated annually and the concepts shall be described in more detail as appropriate.

The consent holder shall submit the Plan, and each annual review and update thereof, to the Peer Review Panel (as required by the Martha Extended Project) for its review.

The consent holder shall then submit the peer reviewed Plan to the Hauraki District Council and Waikato Regional Council for approval.

Implementation

The consent holder shall implement Part A of the approved Plan and shall implement Part B of the approved Plan in the event of closure occurring.

Rehabilitation Plans associated with the Martha Extended Project and Favona Mines

The Rehabilitation Plan may also include any other information that the consent holder wishes, and may be combined with the Rehabilitation Plan(s) associated with the Martha open pit and Favona underground mines.

Correnso Mine HDC Consent

4. Rehabilitation Plan

The consent holder shall prepare a Rehabilitation Plan covering all areas that may be affected by the construction and use of the workings associated with the underground mining within Area L of the Golden Link Project Area. This plan shall be submitted to the Waikato Regional Council and the Hauraki District Councils (the "Councils") for written approval prior to the exercise of this consent. The Plan shall set out details on backfilling and flooding the underground workings, backfilling the vent shaft and access decline, and removal of surface infrastructure. The consent holder may amend the Plan at any time. No amendments shall be made to the Plan without the written approval of the Councils.

Unless otherwise agreed in writing by the Councils, the consent holder shall undertake the rehabilitation works in accordance with the approved Rehabilitation Plan.

Correnso Mine WRC Consents 124859-124864

73 The consent holder shall prepare a Rehabilitation Plan (Plan) covering all areas that may be affected by the construction and use of workings associated with the Correnso Underground Mine. This plan shall be submitted to Waikato Regional Council and Hauraki District Council for written approval prior to the commencement of the Correnso Underground Mine.

The Plan shall be in two parts:

Part A shall describe the programme of progressive rehabilitation (including revegetation and backfilling) that is proposed for the site(s) for the following twelve months, should closure not be proposed during that period; and shall report on any such works undertaken during the previous year

Part B shall:

Describe the proposed method of rehabilitation and closure should closure occur within the following 12 months;

Include an assessment of any residual risk that the site(s) would pose to the environment and the neighbouring community should closure occur within the following 12 months, and

Include a programme for monitoring of the site(s) following closure, and list all maintenance works likely to be necessary at the closed site(s) for the foreseeable future.

The consent holder shall implement Part A of the approved Plan and shall implement Part B of the approved Plan in the event of closure occurring.

Slevin Underground Project Area (SUPA) HDC Consent 202.2016.00000544.001

36 The consent holder shall prepare a Rehabilitation Plan (Plan) covering all areas that may be affected by the construction and use of workings associated with the Slevin Underground Mine. This plan shall be submitted to Waikato Regional Council and Hauraki District Council for written approval prior to the commencement of the Slevin Underground Mine.

The Plan shall be in two parts:

Part A shall describe the programme of progressive rehabilitation (including revegetation and backfilling) that is proposed for the site(s) for the following twelve months, should closure not be proposed during that period; and shall report on any such works undertaken during the previous year

Part B shall:

Describe the proposed method of rehabilitation and closure should closure occur within the following 12 months;

Include an assessment of any residual risk that the site(s) would pose to the environment and the neighbouring community should closure occur within the following 12 months, and

Include a programme for monitoring of the site(s) following closure, and list all maintenance works likely to be necessary at the closed site(s) for the foreseeable future.

The consent holder shall implement Part A of the approved Plan and shall implement Part B of the approved Plan in the event of closure occurring.

Martha Drill Drive Project (MDDP) HDC Consent 202.2017.00000664.001

(conditions superceded by Project Marths)

28 The consent holder shall prepare a Rehabilitation Plan (Plan) covering all areas that may be affected by the construction and use of workings associated with the MDDP. This plan shall be submitted to Waikato Regional Council and Hauraki District Council for written approval prior to the commencement of the MDDP.

The Plan shall be in two parts:

i) Part A shall describe the programme of progressive rehabilitation (including backfilling) that is proposed for the site(s) for the following twelve months, should closure not be proposed during that period and shall report on any such works undertaken during the previous year.

Part B shall:

Describe the proposed method of rehabilitation and closure should closure occur within the following 12 months;

Include an assessment of any residual risk that the site(s) would pose to the environment and the neighbouring community should closure occur within the following 12 months; and

Include a programme for monitoring of the site(s) following closure, and list all maintenance works likely to be necessary at the closed site(s) for the foreseeable future.

The consent holder shall implement Part A of the approved Plan and shall implement Part B of the approved Plan in the event of closure occurring.

29 The Plan shall be reviewed and updated annually and the concepts shall be described in more detail as appropriate.

30 The consent holder shall submit the Plan, and each annual review and update thereof, to the Peer Review Panel (as required by the Martha Extended Project HDC Consent No. 97/98-105) for its review.

31 The consent holder shall then submit the peer reviewed Plan to Hauraki District Council and Waikato Regional Council for approval.

32 The Rehabilitation Plan may also include any other information that the consent holder wishes, and may be combined with the Rehabilitation Plan(s) associated with the Martha open pit and underground mines of Favona, Trio, CEPPA and SUPA.

Project Martha Consent HDC/WRC Common Conditions

The consent holder shall rehabilitate all areas that have been subject to mining activities as authorised as part of this consent.

The consent holder shall prepare a Rehabilitation and Closure Plan covering all areas that may be affected by the mining activities authorised as part of this consent. The plan shall be submitted to the Councils for certification at least 30 working days prior to the commencement of mining activities authorised by this consent. If certification is not provided within 30 working days of the Councils' receipt of the Rehabilitation and Closure Plan mining activities authorised by this consent may commence.

The Rehabilitation and Closure Plan shall be in two parts:

Part A shall describe the programme of rehabilitation (including re-vegetation and backfilling) that is proposed for the site(s) for the following twelve months, should closure not be proposed during that period; and shall report on any such works undertaken during the previous year;

Part B shall:

Describe the proposed method of rehabilitation and closure should closure occur within the following 12 months;

Include an assessment of any residual risk that the site(s) would pose to the environment and the neighbouring community should closure occur within the following 12 months; and

Include a programme for monitoring of the sites(s) following closure, and list all maintenance works likely to be necessary at the closed site(s) for the foreseeable future.

Project Martha HDC Land Use Consent Conditions

60. The consent holder shall prepare and implement a maintenance programme for the removal of invasive exotic trees, plants and seedlings in areas surrounding the Martha Pit. The maintenance programme shall be documented in the Rehabilitation and Closure Plan required in accordance with Condition 24 of Schedule One.

TSF2 Crest Raise - HDC Land Use Consent LUSE 202.2018.00000812.002

14. The consent holder shall prepare a Rehabilitation and Closure Plan (the Plan) covering all areas that may be affected by the TSF2 Crest raise. This plan will be consistent with the relevant Annual Work Programme as required by condition 4 above and may form part of the Rehabilitation and Closure Plan approved by the Peer Review Panel pursuant to Condition 8 of Schedule 1 to the Waikato Regional Council consents to the Martha Mine Extended Project and condition I(c) of the expired Mining Licence 32-2388 (Refer Hauraki District Council Plan Rule 5.17.4.1 PI). The Plan shall be submitted to Waikato Regional Council and Hauraki District Council for written approval prior to the commencement of the TSF2 crest raise. Rehabilitation planting for areas affected by the crest raise shall integrate into the previous planting undertaken and shall be consistent with the general design approach contained in the Rehabilitation and Closure Plan referred to in this condition.

15. The plan shall be reviewed and updated annually and the concepts shall be described in more detail as appropriate. This shall include the identification of areas to be planted and grassed.

16. The consent holder shall submit the Plan, and each annual review and update thereof, to the Peer Review Panel (as required by the consent for the Martha Mine Extended Project) for its review.

17. The consent holder shall then submit the peer reviewed Plan to the Hauraki District Council and Waikato Regional Council for approval.

18. Rehabilitation of the embankment surface shall be progressive as areas of a practical working size become available and shall include the provision of a suitable rooting medium, contouring and drainage as required, to ensure the establishment and maintenance of a surface which will protect water quality and avoid soil erosion.

19. Prior to each increase in the crest height of the TSF2 embankment, the consent holder shall prepare a report to the Hauraki District Council and Waikato Regional Council detailing the sequence of works proposed, and an anticipated timeline over which the physical works and revegetation of the embankment and crest will occur. The report shall form part of the Rehabilitation and Closure Plan.

Unless otherwise agreed in writing by Hauraki District Council and Waikato Regional Council, the consent holder shall revegetate the lift undertaken in the previous season.

Advice note:

Stockpiles are to be excluded from Conditions 18 to 19.

TSF1A Crest Raise – HDC Land Use Consent LUSE-202.2021.00001466.001

7. Rehabilitation of the final surface shall include weed control and revegetation with native species along and within the boundary of the Significant Natural Area T13UP166 (SNA) to buffer and minimize edge effects on the SNA rather than allowing self generation.

Advice note: Condition 7 supplements Conditions 1(c) and 41-42A of expired ML 32 2388 and Condition 3.23 of expired Land Use consent 97/98-105 which address rehabilitation requirements.

PART B – Sudden Closure

1 INTRODUCTION

The following sections address the requirements of Part B of the annually updated Rehabilitation and Closure Plan (Plan) required by condition 25 of Schedule 1 Common Conditions of the resource consents for Project Martha. In short, Part B assumes cessation of mining by 30 June 2026, and describes:

- the proposed method of rehabilitation and closure should closure occur within the following 12 months;
- an assessment of any residual risk that the site(s) would pose to the environment and the neighbouring community should closure occur within the following 12 months; and
- a programme for monitoring of the sites(s) following closure, and list all maintenance works likely to be necessary at the closed site(s) for the foreseeable future.

In meeting the Part B Plan requirements of the conditions of the resource consents condition 25, Part B also addresses the requirements of several land use consent conditions.

The works outlined in Part B of the Plan are subject to peer review (condition 7 of Schedule 1). In previous years, Part B has presented both the description of the works and the estimated cost of undertaking them. The cost estimates establish the appropriate Rehabilitation and Capitalisation Bond quanta. Under the conditions of consent the bond quanta are not subject to peer review. This year, the bond estimates are presented in separate reports.

2 STARTING ASSUMPTIONS

2.1 Date of Cessation of Mining

The Plan covers the period to 30 June 2026, which sets the assumed date for cessation of mining.

2.2 Mitigation Measures

OceanaGold Rehabilitation and Closure standard 5.27 states “Mitigation measures shall be clearly documented in closure plans”. Closure mitigation is a continual process and methods of mitigation at the Waihi site include:

- Inter-departmental 6 monthly closure meetings
- Annual bond reviews and updates
- Annual rehabilitation and closure plan revisions
- Annual plan external reviews (Peer Review)
- Closure risk assessments
- Closure identified as an Environmental Material Risk (EMR)
- Internal and external company audits

2.3 Closure Period

Completion of closure of the site is that point in time when the elements of the entire project have been demonstrated by OceanaGold to have reached a stable, self-sustaining and rehabilitated state to the satisfaction of the Councils. This is a point in time defined as “closure” and is deemed to be reached when:

- the pit slopes are shown to be in a stable and safe condition;
- any water discharging from the site, and any groundwater under the site, achieves a quality that it will not adversely affect aquatic life, or other users of the water resource;
- any structures on the site are stable;
- all revegetation required for the extended project is complete, and monitoring demonstrates it to be self-sustaining; and
- all modern underground stopes infilled.

The minimum time to complete closure of the site after cessation of mining is determined by conditions 20(b) and (c) of discharge permit 971293, which provides for discharge from the pit lake into the Mangatoetoe Stream. Condition 20(b) states:

“... The consent holder shall monitor the effect of Pit Lake discharge on the Mangatoetoe Stream for a minimum period of five years after the lake first overflows. ...”

Condition 20(c) states:

“The consent holder shall, in consultation with the Waikato Regional Council, develop and undertake a monitoring programme during lake filling and for a period of up to 5 years after filling for the purpose of locating any springs that may be reactivated or result from connections from Pit Lake.”

Estimates of the time to fill the lake indicate a duration of 7.5 years, and conditions 20(b) and (c) stipulate another five years to monitor the lake overflow. For the purposes of this report, an additional year is added to provide for removal of plant and equipment, to complete a range of technical studies, reports, plans and manuals, and the initial work for drafting and letting the closure works contract (or contracts). The resulting closure period duration of 12.5 years is assumed.

In practice, Closure will be achieved in many areas well within that timeframe.

Discharge permit 971293 is currently active however will be superseded by discharge permit AUTH139551.06.01 when activated.

2.4 Timing

Some activities are more significant than others in terms of timing. In particular, the following is assumed:

- the bulk of the demolition, dismantling and salvaging of plant including buildings, fuel storage, explosives magazines, crushers, conveyors, vehicle wash bays, and stores would take place early in the process, i.e. years one and two;

- items such as pumps, pipework, refuge chambers, and fans would be retrieved from underground as soon as possible to allow backfilling to be completed prior to the commencement of flooding of the open pit;
- rehabilitation of exposed PAF at the embankment at the waste disposal area could commence immediately;
- prompt rehabilitation of PAF areas would allow collection pond water to be direct discharged;
- capping of the tailings surface of Storage 1A following lowering of the water within the impoundment to allow the tailings to dry over the first summer, capping expected to take one to two years to complete, i.e. years 2 and 3;
- water treatment would be required until the water quality improved sufficiently to allow direct discharge, particularly for the Storage 1A tailings pond (three years). The assumption for TSF1A decant and process water is 6 months of cyanide treatment followed by 2.5 years of metals treatment, and for three years of metals reduction treatment for other sources; and
- lake filling would commence one year after closure is confirmed and would take approximately 7.5 years.

2.5 Current Mine Status

The scope of works to rehabilitate the Waihi gold mines covers all of the consented projects and assumes the following status for each.

2.5.1 Martha Mine

Mining within the Martha pit ended in April 2015 following a rock fall from the northeast pit wall that compromised the north wall ramp access. In April 2016, another larger (approximately 2 million tonnes) failure occurred in the same location. Project Martha consent to reopen and mine the pit was granted in February 2019. No surface mining has commenced with current focus on the mining of the Martha Underground.

2.5.2 Martha Mine East Layback

The Martha East Layback project ended with the access restriction created by the April 2015 rock fall. The Project Martha consent should eventually see resumption of mining the Eastern Wall, however timing is unknown.

2.5.3 Martha Exploration Project

There is no plan to start this project and the project's consents have effectively lapsed.

2.5.4 Favona and Trio Mines

Mining at the Favona and Trio underground mines is complete.

Favona and Trio infrastructure (declines and Trio vent shaft) continue in operation to service Correnso and Martha Underground.

2.5.5 Correnso Project

Mining in Correnso has been completed, with some backfilling of development drives still required to meet consent conditions.

2.5.6 SUPA Project

No mining is planned to take place in the orebodies under SUPA during the period covered by this Plan.

2.5.7 MDDP

The Martha Development Drive Project is complete and is now considered part of Project Martha Underground.

2.5.8 Project Martha

Development and mining of Martha Underground is intended to continue in the period covered by this Plan. Stopping commenced in Q3 of 2021.

2.6 Rehabilitation Areas

Progressive rehabilitation takes place during the life of the mine. Areas that have been or will be rehabilitated within the coming year are not included in the areas for rehabilitation following sudden closure. The areas assumed for rehabilitation and included in this Plan are summarised in Table 11 Rehabilitation Areas and **Figure 44**. The area accounts for a crest raise on TSF1A during the period, creating more exposed embankment requiring rehabilitation.

Table 11 Rehabilitation Areas

Mine Element	Area (ha)
Martha pit surface facilities area and north wall benches	9.19
Conveyor corridor	1.34
Mill, water treatment plant, polishing pond stockpile etc.	19.58
Waste disposal area (WDA)	
Embankments	32.68
Load-out area and workshop	2.73
Eastern haul road	1.28
Tailings storage facility 1A capping	11.50
Tailings storage facility 2 capping	2.00
WDA stockpiles - topsoil	4.62
WDA stockpiles & other	51.91
Total:	133.83

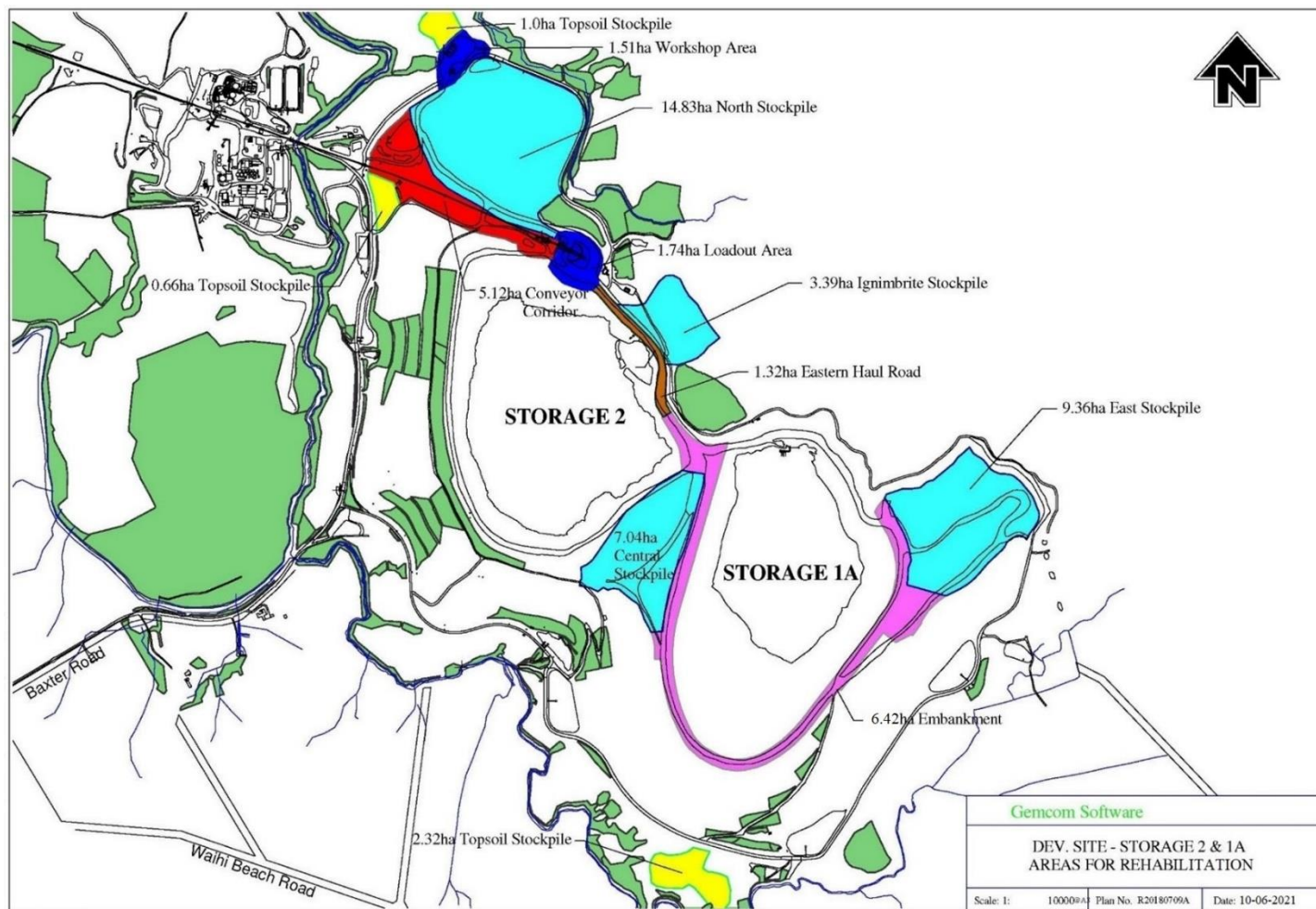


Figure 44: WDA Rehabilitation Areas

3 MARTHA MINE

3.1 Closure

3.1.1 Overview

The conceptual closure plan for the open pit prepared in 2008 and shown in **(Figure 45)** remains mostly unchanged. However, as part of Stage 4, the north wall will require realignment **(Figure 46Figure 46)**.

All waste rock or ore has been moved from the surface facilities area and with no mining planned, no further use of the area is proposed before 30 June 2025.

Without safe access, the pumping and any other equipment currently within the pit is assumed to be abandoned.

A pit closure timeline is provided in Appendix A.

3.1.2 Pit Wall Stabilisation Works

3.1.2.1 Pit Wall Hazard Identification and Scaling

At the completion of mining, a Hazard Management Plan would be written to identify areas around the lake edge that may be prone to softening, and to identify areas that need to be scaled and rocks removed.

3.1.2.2 Riprap for Lake

The riprap around the lake edge is complete, other than that section that was lost with the northeast wall failure. This lost section will be reinstated during the failure remediation works.

3.1.3 Pit Lake and Park

3.1.3.1 Lake Level Studies and Grand Junction B/Western Adit

Based on technical work carried out for the Extended Project, it was determined that the lake level should be conservatively set at RL 1104 (mine datum). The level was set relative to the adjacent Mangatoetoe Stream, and historic mine workings at the western end of the pit were considered. In this regard, the lowest known potential exit point was described as the former warm spring which flowed from an adit at RL 1106 (mine datum).

It is assumed that Grand Junction B shaft will require capping given that it is in the vicinity of the lake outlet.

3.1.3.2 Drainage Tunnel and Outlet Channel

OceanaGold's predecessor commissioned URS (now AECOM) to complete an outlet design review for the Martha pit lake, and this was completed in February 2011. The report updates investigations carried out in late-1996. The recommended outlet is a 1.8m diameter pipe approximately 150m long, which discharges to the Mangatoetoe Stream.

As part of Project Martha, a replacement discharge consent was applied for. AUTH 139551.08.01 was granted December 2018. This allows discharge of the overflow from the lake via an outlet structure and channel to the Mangatoetoe Stream.





3.1.3.3 Lake Filling

It was previously assumed that the existing mine dewatering booster pumps would be used to pump water from the Ohinemuri River to fill the lake. With access into the pit now restricted it may not be possible to recover those pumps, but there are a range of other pumps and pipework currently in use underground or at the process plant that would become available upon cessation of mining.

3.1.3.4 Lime Addition to Lake

For sudden closure, the assumption is that limestone is added to the lake during and beyond filling to maintain lake water pH.

The remodelled predictions for lake water quality undertaken by AECOM in 2018 identified a need to add alkalinity to the lake to ensure robust water quality at lake filling. The predictions suggested that alkalinity should be added to the river water as it is discharged to the lake, to provide 60 g/m³ of CaCO₃. It is predicted that up to 3,450t of alkalinity as calcium carbonate should be added to the total river water volume with this likely to be undertaken by lining an open channel, along which the river water flows, with limestone. Assuming 50% efficiency in alkalinity production from limestone, a mass of 6,900t of limestone comprising clean 25-50 mm chip would be required in the open channel over the filling period.

To maximise the alkalinity input to the lake during filling, and based on advice from AECOM, OceanaGold proposed installing limestone in channels or swales along the length of the haul road. This proposal was described in previous versions of the Plan but is now possible only at the upper end of the north wall ramp. Limestone addition will also be possible on the benches of the remediated northeast wall, during and after this work is complete.

Once full, the lake is assumed to require an ongoing addition of limestone at an annual rate of 30t of alkalinity (as CaCO₃) to maintain lake water pH in the long term. With approximately 50% dosing efficiency for limestone, this amounts to 60t limestone annually. The type of limestone used would be fine lime supplied in bulk form to a lime silo from where a prescribed quantity would be added to a batch mixing tank via a screw feeder. The lime would be dosed at a set rate into a known flow rate of water and discharged onto the surface of the lake via a floating diffuser arrangement.

A reassessment of changes to the long-term lake water quality predictions resulting from the northeast wall failure is planned, i.e. to determine whether the remediated wall contains less or more sulphides and whether those sulphides are more or less reactive.

3.1.4 Surface Facilities Area

3.1.4.1 NAG Testing Programme

At closure, it is expected that a testing programme would be carried out at the Surface Facilities Area (SFA) to identify PAF rock, including PAF sheeting that would need to be removed.

It is assumed that scraping 200mm of residual PAF material from an area of 2ha will be required, with this material pushed into the base of the crusher slot, or possibly into the pit.

3.1.4.2 Filling Crusher Slot and Recontouring SFA

It is assumed that the crusher slot would be filled at closure. The slot requires 83,000m³ of material to fill, and the ramp area adjacent to it requires 7,000m³.

3.1.4.3 Revegetation

The SFA, which totals around 6.3ha, will be covered in 0.5m of subsoil and laid with 100m of topsoil and grassed.

3.1.5 Noise Bund

Material from the Grey Street noise bund will be used to provide the subsoil and topsoil required to rehabilitate the SFA. The bund contains 120,300m³ of suitable NAF material, compared with a minimum of about 30,000m³ required for SFA rehabilitation. The excess could either be disposed of at the pit or used to address any potential shortfall of subsoil and topsoil at the waste disposal area.

3.1.6 Lakeside Amenities

3.1.6.1 Historic Structures

Works associated with the relocation of the Pumphouse and Grand Junction Refinery Building are complete. Eight pillars of the Powerhouse Foundations removed during the Grand Junction Refinery building shift will be reinstated.

3.1.6.2 Pit Rim Walkway

The pit rim walkway will likely remain operational during the closure works. Detours may be required in places. (**Figure 46**). For example, adding or forming approximately 500m of walkway in the Grand Junction area and surrounds is provided for.

3.1.6.3 Amenities Block/Services (South Side of Lake)

The Whitehouse Building, which sits outside the high and medium hazard zones, could be used as a lakeside amenities block.

3.1.6.4 South Wall Boat Ramp

A new sealed access road from the Whitehouse to a boat launching ramp located in the southeast corner of the pit between the Royal and Martha hazard zone is provided for.

The south wall boat ramp is assumed to include a jetty for ease of launching and retrieving craft. As previously noted, the ramp is assumed to be a concrete slab of around 200m² in area and x 0.5m thick.

3.1.6.5 Recreational Pontoons

In the event of sudden closure, a swimming pontoon is provided for, located at the western end of the pit. The shape of the pontoon approximates that shown in the pit closure concept plan (**Figure 46**) and includes a submerged swimming area.

3.1.6.6 Carpark

The assumption is that the Whitehouse carpark would be used. The carpark is sealed and in good condition.

3.1.6.7 Access Road and Carpark Maintenance

It is expected that maintenance of the access roads and carpark would be necessary and is provided for.

3.1.6.8 Interpretation Boards

OceanaGold has placed interpretation boards and signage around the pit rim walkway. The assumption is that no further interpretation boards would be necessary in the event of sudden closure.

3.1.6.9 Lookouts and Seating

The assumption is that existing lookouts and seating are appropriate, and no further allowance is made in this year's bond report.

3.1.7 Planting and Landscaping

3.1.7.1 Native and Exotic Tree Planting

Some further planting may be necessary in the surface facilities area only. The assumption is to plant around 1.2ha of kanuka vegetation as shown in **(Figure 46)**, plus some other individual trees.

3.1.7.2 Mowing

Some of the walkways, plantings and viewing platforms that are either built or proposed on land around the pit perimeter are or will be on land not managed by the Martha Trust. It is unclear who will be responsible for these areas in the long term. OceanaGold, LINZ, DOC and the Hauraki District Council will need to resolve this issue in the future. Maintenance may be self-funding through tourism operations and grazing, but as this remains unresolved, is provided for.

3.2 Post-Closure

In the absence of an obvious owner for the pit lake recreational facilities, routine maintenance is provided in perpetuity for the:

- Access road, parking areas and boat ramp;
- Floating pontoons;
- Pit rim walkway;
- Lake outlet structure; and
- Parkland (mowing).

Event-driven maintenance is included on a two to 10-year cycle for the pontoons, pit rim walkway and lake outlet on the assumption that major rainstorms or earthquakes could require additional effort beyond the routine. Refurbishment and replacement is included for the floating docks and the lake outlet structure on 30-year and 50-year cycles respectively.

4 CONVEYOR, PROCESS PLANT AND WTP

4.1 Closure

4.1.1 Decommissioning

4.1.1.1 Process Plant and Water Treatment Plant

All buildings, plant and equipment associated with the conveyor, polishing pond stockpile, process plant and water treatment plant will be decommissioned and removed from site (Figure 47).

Concrete footings, plinths, bunds etc. would be either buried or broken up and disposed of in the tailings storage facilities.

It is proposed to decommission and remove the water treatment plant. OceanaGold is in negotiation with the Councils regarding water treatment plant removal, which is expected to require a consent variation.

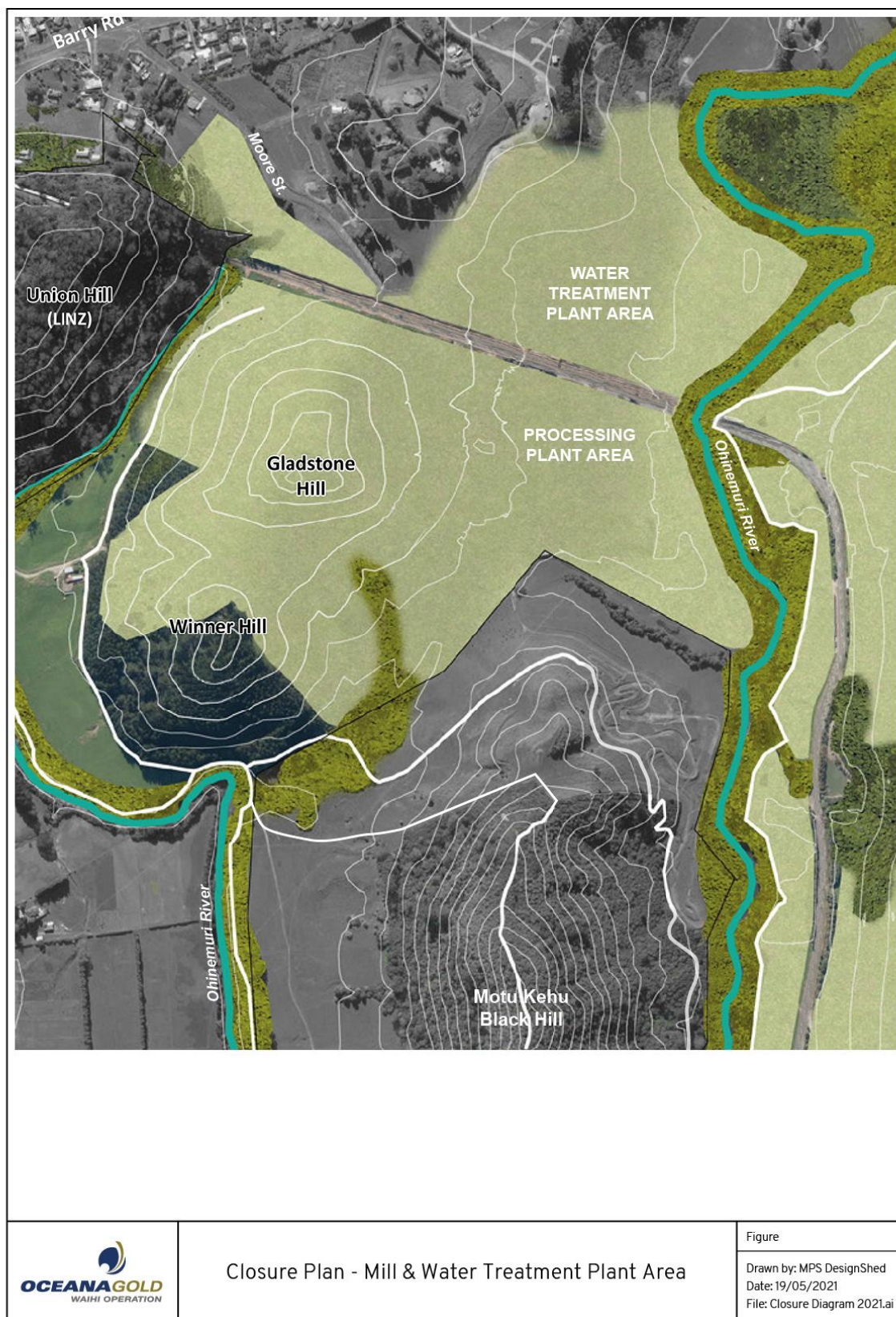


Figure 47: Mill and WTP area.

4.1.1.2 Conveyor

There has been a strong desire indicated by members of the community (expressed through the WCV) to leave the Union Hill tunnel open and incorporate the conveyor corridor as an extension to the Waihi walkway network. Allowing public access to the conveyor tunnel introduces safety and additional maintenance obligations, none of which should fall to OceanaGold under sudden closure, or to the Martha Trust post-closure. The conveyor walkway option is not included in the Plan.

Once the mechanical plant and any PAF and concrete is removed from along the conveyor trace, the area would be ripped. The portals at each end of the conveyor tunnel would be plugged with a 10m³ concrete bulkhead to prevent access.

The conveyor passes through Armco culverts beneath Grey Street and Barry Road. A decision would need to be made regarding these culverts. In practice they could either be left open to allow stormwater drainage to pass to the Barry Road silt pond, or alternatively they could be filled. In the case of the Barry Road culvert this may involve ripping up the road to fill beneath it. Further work is needed closer to closure to accurately identify how these culverts would be rehabilitated.

The land along the conveyor route is owned by various parties including LINZ. It does not form any of the land to be handed over to the Martha Trust at the end of closure.

4.1.2 Contaminated Soil

There is no expectation of a major issue with contaminated soil. Nevertheless, investigations of potentially contaminated soils at the processing plant area, and its removal, is provided for. A volume equivalent to 1m depth of material across 20% of the mill area is assumed.

4.1.3 Stockpile Removal

The waste rock on the polishing pond stockpile has reached maximum capacity of approximately 600,000m³. If sudden closure occurred, the waste rock would be used to backfill open underground stopes.

If any ore remains in the ROM stockpile at 30 June 2025, it would be processed in short order.

4.1.4 Revegetation

There is a possibility the processing plant area could be a future industrial site for Waihi and that many of the buildings, offices, carparks and roads would be left in place.

The remaining two thirds of the process plant area (i.e. that area not occupied by buildings and roads), the conveyor trace, and the WTP and stockpile areas will be recontoured, topsoiled, fertilised and grassed. It is assumed that the restored land would be used for the purposes of grazing, and maintenance costs have not been included because this land would either be sold or leased to a local farmer. For the conveyor trace, maintenance costs will fall to the owner of the land.

4.2 Post-Closure

With the areas secured and returned to productive pasture, or owned by others, there are no post-closure obligations associated with the conveyor, stockpile areas, or process plant water treatment plant areas.

5 WASTE DISPOSAL AREA

5.1 Closure

5.1.1 Overview

The conceptual closure plan for the tailings storage facilities (TSFs) initially prepared in 1998 remains fundamentally unchanged (refer **Figure 48**). It comprises a partial capping of the tailings against the embankment crest, retention of part of the impoundments as shallow ponds, and planting of the embankments and capping including a wetland littoral zone around the ponds. Spillways would be constructed to discharge into and from Storage 2.

For the scenario of sudden closure within the coming year it is assumed that:

- The bulk of the exposed area is assumed to be PAF and will be covered with compacted, low permeability Zone G, followed by Zone H growth layer and topsoil;
- Rehabilitation of the unfinished parts of the waste rock embankments would commence immediately following sudden closure;
- Additional capping would be completed on the Storage 2 tailings pond, and revegetated using riparian planting along the pond edge and pasture elsewhere;
- The rehabilitated Storage 2 pond water would continue to flow into a tributary of the Ohinemuri River (TB1), north of the tailings storage facilities;
- Rehabilitation of the Storage 1A tailings pond would need to be delayed for a period, assumed to be around one year, to allow the tailings to consolidate prior to receiving capping and plantings as described for Storage 2;
- Once water quality in the Storage 1A pond improves sufficient to obviate the need for continued treatment, the pond would discharge to the Storage 2 pond and thence to the Ohinemuri via the TB1 tributary;
- Some modifications to the underdrainage system would be progressively implemented, diverting individual drains to the river as water quality improves;
- As one of the last activities, the haul roads and waste loadout area, which are assumed to be sheeted with PAF, would be covered with a 0.6m thick Zone G layer to exclude air and water before receiving growth layers, topsoil and plantings;
- The NAF stockpile footprints, primarily those of the Northern stockpile and ignimbrite stockpile located to the east of the Storage 2 pond, would be recontoured and planted; and

- Some water reticulation and fencing across the rehabilitated areas is installed for farming purposes.



Figure 48: TSF Rehabilitation Concept

5.1.2 Waste Rock Embankments

The total area assumed to be PAF, including the Waste Loadout, the workshop area, the eastern haul road, the eastern and central stockpiles and the Storage 1A embankment is 51.91 ha (**Error! Reference source not found.**). Rehabilitation of these areas would comprise:

- a Zone G capping layer with a thickness of 1.5m on the Storage 1A embankment;
- a Zone G capping layer with a thickness of 0.6m on the other PAF areas;
- a Zone H subsoil layer, with a thickness of 0.5m across the total area; and
- a topsoil layer, nominally 100mm thick, across the full area to which fertiliser is added and grass seed sown.

The materials balance available for rehabilitation was reassessed as part of this review. This indicated a surplus of all material required to complete the rehabilitation works. There is 751,516m³ of material in the North Stockpile of which approximately 300,000m³ of material is suitable for Zone G. This is sufficient to complete TSF1A to the level planned during the coming reporting period.

The assumption is that two construction seasons would be necessary to complete the embankment rehabilitation works.

5.1.3 Native Plants

The assumption is that there may be some awkward or steep areas that would be better planted in native shrubs than grassed/grazed. Planting of an area of 2ha is provided for, including five years of maintenance.

5.1.4 Tailings Capping

Project Martha ore is planned to be processed throughout 2025-26, and it has yet to be shown that the tailings will be NAF. The continued assumption is that limestone would be applied to the tailings surface prior to placement of the capping material at an application rate of 80 t/ha.

Once limestone application is complete, geotextile would be laid prior to capping with 1.5m of ignimbrite, 0.5m of subsoil and 0.1m of topsoil.

Revegetation may produce superior results without subsoils and topsoil placed over the ignimbrite capping. It is assumed that this comment may have been specific to the planting of the riparian margins of the cap. In any event, the closure works assumption for this Plan remains that soils will be placed across all of the capped area.

The tailings capping requirement was reviewed last in 2020 with input from Engineering Geology. The capping objective is to minimise the area of capping while protecting the embankment crest by ensuring sufficient separation between the crest and the residual pond edge. A capping area of around one third the existing pond area was considered adequate and adopted for TSF1A. This equates to a capping width of around 70m.

TSF2 already has more than one third of the original pond area capped, although there are zones along the western shoreline where the separation between crest and water's edge is only 40-50m. The assumption is that additional capping will occur in these zones, bringing the average width of the capping for TSF2 to around 80m.

It is expected that capping of TSF2 could be completed over one summer (Year 1), while Storage 1A may need to be capped over two consecutive summers depending on tailings consolidation and pore pressure dissipation rates.

Permission for a crest raise on TSF2 has been granted. Prior to crest construction it is anticipated that the current placed capping material would be removed and stockpiled.

5.1.5 Riparian Planting around Tailings Pond Areas

A strip of riparian planting along the shoreline of each of the tailings ponds is provided for. This will comprise a 2-3m strip of wetland plants on the lake margin, outside of which (on the cap) is a 5-8m wide strip laid with locally sourced Manuka slash (fascinating).

The remaining areas of capping receive subsoils and topsoil, fertiliser and grass.

5.1.6 Tailings Pond Spillways and Siting

In June 2013, OceanaGold's predecessor engaged Engineering Geology to produce drawings for the outlets/spillways for the tailings ponds. Those drawings were included in that version of the Plan and are not repeated here.

5.1.7 Underdrainage Modifications

It is expected that underdrainage (seepage) could be progressively discharged as the drainage quality and volume from individual drains improves. It is assumed that this takes place progressively over the period of closure. Gravity outlet systems would be constructed to allow the ten toe drain sumps and one seepage outlet for TSF2, and five toe drain sumps and two seepage outlets for TSF1A to discharge direct to the receiving waters.

As previously, the ability to divert good quality seepage to the nearby Ruahorehore Stream is built into the TSF1A seepage collection system, and that only a small amount of work would be necessary to institute the diversions. In contrast, more work would be required and has been assumed for TSF2.

5.1.8 Limestone Addition to Haul Roads

The requirement for applying limestone to the haul roads, as assumed in some of the past Plans, is confirmed by EGi to be unnecessary.

EGi also offered an alternative of ripping and liming these areas to form NAF prior to the placement of plant growth and topsoil layers. The alternative approach may be less expensive and warrants further investigation for future Plans.

5.1.9 Eastern Haul Road Capping

Once the embankment and tailings rehabilitation is complete, the haul roads would be decommissioned and rehabilitated. Due to the material used for sheeting, the assumption is that the road surfaces are PAF. The

Eastern Haul Road is assumed to be capped with 0.6m of Zone G material, followed by Zone H material (0.5m depth) and topsoil (0.1m depth).

5.1.10 Rehabilitation of Stockpile Areas

It is expected that the land beneath the Northern NAF stockpile and the ignimbrite stockpile would require some minor recontouring prior to topsoiling with 100mm of topsoil and grassing (topsoil is not required on the topsoil stockpiles). This is a conservative assumption as material from both stockpiles will be used for rehabilitation elsewhere in the waste disposal area, and the recontouring would be done as part of the material recovery.

Stockpile volumes are detailed in **Table 12**.

Table 12: NAF Stockpile areas

Location of NAF Areas	Volume (m³)
Northern NAF Stockpile (suitable for zones A, B, G H)	269,790
Northern NAF Stockpile (Tuff, sandy silt)	407,816
Ignimbrite Stockpile	16,000
Ignimbrite (Entrained)	30,000
PAF – Central stockpile	196,037
PAF- East stockpile	487,431
Ignimbrite Rockfill	311,381
NAF (surplus soils stockpile) – Suitable for zones A, B, G and H	0
Topsoil E (Torrens)	34,228
Topsoil F (South)	72,492
Topsoil B (Mill)	18,155
Topsoil (Dev Workshop)	0

Rehabilitation is assumed to occur progressively over two years.

Rehabilitation of the central and eastern stockpiles are included with the rehabilitation of the waste rock embankments.

5.1.11 Ponds

It is assumed that for sudden closure, the following ponds would be retained around the waste disposal area:

- West silt pond
- S1
- S3
- S4
- S5
- NSPSP

These ponds could provide water storage opportunities for other water users in the future. It is also noted that in 2014 Hauraki District Council consented a new water take for Waihi township above the processing plant site near the Golden Valley Bridge, and the ponds could provide potential water storage. It may also be possible for an industrial water user to set up at the processing plant site and to use the water that is

stored on site. In summary, the ponds could be a valuable asset/water source in the future for the Martha Trust, or for others. As assumed last year, the assumption is that the ponds will be retained.

Some work associated with pond outlets, e.g. provision of a culvert under the perimeter road from S1, is provided for.

The assumption is that NCP would be filled in at closure, but that this work would be done as part of the recovery of material from and rehabilitation of the northern NAF stockpile.

5.1.12 Fencing, Water Reticulation and Farm Races

It is assumed that once rehabilitation has taken place, fencing and water reticulation would be completed on the embankments.

The fencing on the TSF2 embankment is essentially complete. For TSF1A, some additional fencing and water reticulation is required. On the capped tailings areas for both TSFs, fencing will also be required, particularly to separate the riparian plantings from the areas of pasture.

The total area of new fencing will be 55ha. It is assumed that all areas are fenced into 1ha paddocks, with a mix of nine wire battened fences and fences with four electric wires. Timing is assumed to coincide with that of completion of capping and planting, i.e. in Year 1 for TSF2 and spread across Years 2 and 3 for TSF1A.

Six new water troughs with associated pipework and installation, as assumed previously, are included, giving a total of 24 troughs on the TSFs.

Formation of farm races at the waste disposal area would be spread across the three years of TSF rehabilitation works.

5.1.13 Drain Maintenance

The embankments are constructed, and drainage is progressively installed, so that the embankments do not pond water. While construction of drains as a separate work item is not required, maintenance is required of the surface drainage systems during the closure period. In the first four years of closure the assumption is that surface drains would require cleaning while earthworks were being carried out. The amount of silt reaching the ponds would quickly reduce as rehabilitation works were completed and vegetation becomes established. The assumption is that during the closure period monthly checks would be carried out to determine what if any maintenance of the drains may be necessary.

Once rehabilitation is complete there would be minimal erosion, similar to adjacent farmland, and drain maintenance would decrease.

5.1.14 One-off events

It is possible that the occurrence of one-off events such as heavy rainstorms may require review/design of remedial work/construction work, e.g. slumping that might block the perimeter drains and require stabilisation or settlement/deformation of an outlet weir from the pond that requires reconstruction of the outlet weir. It is assumed that such events could occur randomly at intervals ranging typically between two and ten years.

5.2 Post-Closure

5.2.1 Waste Rock Embankments

Annual walkover surveys and reports by a professional engineer, in line with the requirements stipulated by NZSOLD, are assumed for the waste rock embankments in perpetuity. In addition, the Site Management Coordinator (refer s7.1.6) would undertake regular and routine embankment walkover checks and wilding tree control.

Provision is also made for routine maintenance of the embankments, for additional event-driven maintenance on a six-year to 20-year cycle, and for more extensive maintenance effort following extreme events on a 50-year cycle. Some drain maintenance may be required on an ad hoc basis dependent on performance.

Routine and event-driven maintenance, and periodic (50-year cycle) refurbishment of the TSF pond outlets is included in perpetuity.

5.2.2 Other

It is assumed that fences, water supply, farm races and the like are maintained by whomever leases the land.

6 UNDERGROUND MINES

6.1 Closure

6.1.1 Decommissioning

As in the previous Plans, removal of underground pumping equipment soon after the cessation of mining is assumed once the Project Martha pit portals are sealed.

6.1.2 Underground Workings/Dcline

Conditions of consent require the backfilling of a short section of the Trio access development, of the two existing ventilation shafts, and of the Favona portal.

For Correnso and MUG, the consent conditions require the backfilling of any open stopes at closure, and of certain sections of overlapping development.

The underground volumes to be backfilled as required under the conditions of the consents is in **Table 13**.

Table 13: Underground closure backfilling

Description	Quantity (m ³)
MUG	448,740
Correnso	105,295
Empire/Dobson	70,178
Louis	17,435
Favona	227,722

Trio	11,246
TOTAL	880,616

6.1.3 Portal Box Cut

Rehabilitation of the box cut would be one of the last underground-associated activities to take place. It would involve battering down of the box cut, bringing in material and recontouring to blend it in with the natural contours of the landscape.

The majority of the work would comprise dozing in the sides of the box cut, the material from which is NAF. The area would then be topsoiled and grassed.

6.1.4 Ventilation/Escape Shafts

There are two, 2.4m diameter shafts (a ventilation shaft and an escape shaft) for Favona as well as the Trio Vent Shaft which has a diameter of 3.5m, to be backfilled. The escape shaft contains a ladderway that would need to be removed before filling with waste.

Assuming a depth of 100m and shaft diameter of 2.4m for the two Favona shafts, and a depth of 138m and diameter of 3.5m for the Trio ventilation shaft, approximately 500m³ of backfill material would be needed for each of the Favona shafts, and 1,400m³ would be required for the Trio Ventilation Shaft. The shafts are steel lined and based on similar work underground it would be feasible to fill these shafts by tipping waste rock down them.

Concrete would then be poured to secure the top of the shafts. It is assumed that one ready mix truck full (5m³) of low strength concrete would be sufficient for the two Favona shafts, and 15m³ would be necessary for the Trio Ventilation shaft (total 25m³ of concrete for all three shafts).

6.1.5 Stockpiles

The material on the Polishing Pond Stockpile has reached maximum capacity. Underground mining has been tipping wasterock onto the floor of the open pit.

Up to 40,000m³ of waste rock could be on the surge stockpile near the underground portal to be used as underground backfill. However, volumes are often less. The following volumes of waste rock are currently stockpiled:

- Polishing Pond = 650,000m³
- Martha Pit = 160,000m³

The assumption is that there will be no stockpile footprints that will require rehabilitation as they will all be used for underground backfill.

The assumption is that any PAF material will have been removed for placement underground, and that the whole area will require ripping, topsoiling and grassing.

6.1.6 Ponds

The assumption is that at closure, a number of ponds around the Mill area would need to be filled (**Table 14**).

Table 14: Mill ponds.

Pond	Volume (m ³)	Area (m ²)
Mill Collection Pond	4,243	5,400
Favona Stockpile Collection Ponds	13,800	7,900
TCP1	159	1,000
TCP2	1,831	1,800
TOTAL	20,033	16,100

Rehabilitation comprises dozing in the walls of the ponds to form free-draining landforms before the areas are topsoiled and grassed.

6.1.7 Haul Roads

The haul roads from the underground portal to the stockpiles and Process Plant would be ripped, limed, topsoiled, fertilised and grassed. Removal of an assumed 1m depth of PAF is included.

6.1.8 Access Road

The access road around the Process Plant area is sealed and would be useful for future farm access. For this reason, it is assumed to be left in place.

6.1.9 Water Management

During rehabilitation operations, clean water from undisturbed areas of the catchment above the portal would continue to be directed around the work areas until earthworks were complete and a successful pasture had developed. The open drain would then be filled to eliminate a potential safety hazard and the need for ongoing maintenance. Fill material would be sourced from the 'unsuitables' stockpile at the waste disposal area. It is assumed that approximately 4,000 m³ of material would be needed to complete the work.

6.1.10 Ancillary Facilities

In the event of sudden closure it is likely that the Underground Amenities office would be retained for some form of use post-mining.

As described above for the process plant area, excavation and removal of an average of 1m of contaminated material over part of the area is assumed.

6.1.11 Fencing

Upon completion of rehabilitation, the security fence surrounding the shafts would no longer be necessary and would be removed. Depending on the final land use, the security fence around the processing plant may also be removed.

6.1.12 Maintenance

Depending upon the final land use, ongoing maintenance may be limited to normal pasture maintenance or weed control. This will involve fertilising the soil, removing weeds etc. In the early years, land restored to pasture will need to be managed in such a way that it is not overgrazed or pugged. After that time, the area

should be able to be managed in a similar way to surrounding farmland. The assumption is that the farmer/new owner would take responsibility for this task.

6.2 Post-Closure

No ongoing maintenance or monitoring associated with the underground mines is assumed beyond Closure.

7 ADMINISTRATION

This section covers the management, monitoring and maintenance elements of closure, aftercare, and post-closure.

7.1 Closure

7.1.1 Staffing Overview

It is assumed that the Councils would need staff to complete rehabilitation and closure activities until such time that the site reaches Closure, at which time the Martha Trust is able to take responsibility of the ongoing management of the site. The Councils' responsibilities would include completing all physical rehabilitation and closure tasks, monitoring and maintenance, water treatment, and the necessary administrative tasks.

Initially, a greater number of staff would be required, and it is expected that a Site Manager with engineering experience would be needed for the first two years to oversee the bulk of the rehabilitation earthworks around the site. By Year 3, much of the remaining work would relate to environmental monitoring, inspections, and general maintenance as opposed to major decommissioning and earthworks activities. By Year 5, it is expected that environmental monitoring and maintenance would be the remaining routine tasks. At that point in time, all activities could be managed by one person, referred to as the Site Management Coordinator.

The staffing assumptions are outlined in the following sub-sections.

7.1.2 Site Manager

The Site Manager would be a full-time role for the initial three years while the bulk of the demolition of plant and earthmoving activities were taking place. One of the Site Manager's initial tasks would be to draw up a tender document for the rehabilitation of the site, and then to form a Rehabilitation Earthworks contract. The Site Manager would oversee all works on site and act as the Company Liaison Officer, including managing a liaison forum to keep residents and interested parties informed of rehabilitation activities if such a forum is deemed desirable by the Councils. It is assumed that no Council Liaison Officer would be necessary, given that the Councils would be carrying out the work.

Beyond Year 3 it is expected that the environmental staff, and later the Site Management Coordinator, would take on the main site management role.

7.1.3 Management Support

It is assumed that some logistics/administrative support would be needed during the first four years of closure. The equivalent of one person employed full time for the first three years to undertake logistics/clerical duties while the bulk of the closure activity are taking place, and part-time in Year 4, is provided for.

7.1.4 Accountancy

It is assumed that a full-time accountant would be necessary for a period of two years. Beyond that time it could be assumed that there would be only minor accountancy requirements including annual tax statements and accounts, and for that reason the costs have been progressively reduced over the remainder of the 13-year closure period.

7.1.5 Environmental

One Environmental Officer and one Environmental Technician are assumed to be required on a full-time basis for Years 1 to 2. Beyond that time, the Environmental Officer would continue through to Year 5.

As part of the transfer from Environmental Staff to the Site Management Coordinator, a long-term Surveillance and Maintenance Manual would be prepared for the waste disposal area and the Pit Lake Area. The Site Management Coordinator would be expected to follow the requirements of the manual. The manual would include monitoring and maintenance requirements, check sheets and trigger levels to warn of any possible problems at an early stage. The Manual would also include a requirement for inspections by appropriately qualified professionals, reducing in frequency over time. At the time of these inspections, all monitoring data would be reviewed, and the Surveillance and Maintenance Manual would be updated and amended as necessary.

By Year 5, the Environmental Officer would be retained on site on a part-time basis (or alternatively full time for six months) for the purpose of training the Site Management Coordinator.

7.1.6 Site Management Coordinator

The position would commence in Year 5, with some overlap with an Environmental Officer for the purposes of training. This would be a full-time role for Years 5 to 8, reducing to part-time thereafter.

The Site Management Coordinator would be responsible for the following:

- engaging contractors and consultants to provide necessary external services;
- undertaking routine inspections at regular intervals, after heavy rain as necessary, and following unusual events such as earthquakes;
- determining whether the pit lake outlet and tailings pond outlets require clearance, and carrying out any necessary work in a timely manner;
- identifying and removing noxious weeds above lake level in the open pit;
- identifying and scaling down rocks on the pit walls that may be a public safety issue;
- identifying and removing any large trees in the vicinity of the tailings ponds, pit lake or embankment that could be susceptible to wind throw and potential damage (e.g. to capping layers or blocking outlets) and removing in a timely manner;
- determining whether any surface drains require maintenance, and either carrying out that work if minor, or arranging suitable contractors if necessary;

- arranging reagent supply and maintenance on an as required basis for the limestone addition plant;
- carrying out pest and weed control;
- arranging for contract mowing of grassed areas adjacent to the pit lake on a regular basis;
- maintaining buildings and facilities as necessary, e.g. access roads, farm races, carparks, lookouts and later the amenities block adjacent to the lake etc.;
- regularly inspecting the waste disposal area to ensure that grazing is being carried out responsibly, fertiliser and lime is being applied as necessary, and that nothing untoward such as cracking and erosion are occurring;
- inspecting and maintaining/replacing pH and conductivity meters, water level dippers and flow meters; and
- entering data and maintaining records.

7.1.7 Gardener/Caretaker

In the event of sudden closure, it would also be necessary to hire a gardener/caretaker to maintain existing plantings and generally keep things tidy and secure for a period spanning Years 1 to 5.

7.1.8 Water Treatment Plant Operators

The assumption is that staff comprising three shift supervisors and six operators would be needed to run the water treatment plant for the assumed three years of decant and other water treatment. Operators are assumed to also be able to conduct maintenance.

It may be that the labour costs could be reduced by automating the water treatment plant or manning it for example during daytime hours and not at night. This will be given further consideration in future plans.

7.1.9 Geotechnical Monitoring

Assistance would be required to ensure that:

- rehabilitation operations take place in accordance with the required engineering specifications as required by the conditions of consent, and the requirements of the Building Act; and
- ongoing monitoring and maintenance requirements are being attended to.

Assistance would be required for two construction seasons (October to March, i.e. six months each) to test the embankment and haul road capping. The role requires a Senior Technician. The Councils could choose to retain the existing contractors, Geotechnics, to carry out this role.

7.1.10 Surveying Assistance

Surveying would be required over the entire closure period, but primarily during the initial two years during which the bulk earthworks are completed. As the lake is being filled and earthworks are being completed at the waste disposal area, surveyors would be needed for the purposes of monitoring, and to produce as built plans. In the longer term, surveying would be required for the purposes of monitoring only.

7.1.11 Fixed Plant Maintenance Technicians

The assumption is that operating plant (including pumping and pipeline systems and any associated flowmeters/telemetry etc.) would require maintenance for the first two years. This would include maintenance of the seepage system and tailings decant pumps. The work would be carried out by the WTP staff.

7.1.12 Ancillaries

7.1.12.1 Vehicles

Vehicles would need to be provided for those staff members who need them. It is assumed that four to five vehicles are needed for Years 1 and 2, reducing progressively beyond that point (**Table 15**).

Table 15: Closure staffing.

	Year							
	1	2	3	4	5	6	7	8-13
Site Manager	1	1	1	1				
Logistics/Admin	1	1	1	1				
Accountancy	1	1						
Environmental Officer	1	1	1	1	1			
Environmental Technician	1	1						
Site Co-Ordinator				1	1	1	1	1
Gardener/caretaker	1	1	1	1	1			
WTP Shift Supervisors	3	3	3					
WTP Operators	6	6	6					
Senior Geotech	0.5	0.5						
Surveyor	1	1						
Total Number	16.5	16.5	13	5	3	1	1	1

7.1.12.2 Office Expenses

For the early years of closure, offices would be needed for the various staff on site. There are a number of office facilities around the site that could be utilised, e.g. the pit Whitehouse and/or the underground office facilities.

Office expenses would include such things as cleaning, tea, coffee, couriers, postage, photocopying, printing, stationery, phone, power, and computing facilities.

7.1.12.3 Long Term Building/Administration Costs

In the long term, there would need to be equipment storage and office facilities for use by the Site Management Coordinator. It is assumed this building is required from Year 6 onwards. The running costs allowed include general repairs and maintenance, power, telephone, consumables (tea/coffee, stationery, couriers, postage etc.), water and computer hire.

7.1.12.4 Long Term Maintenance Costs

Long term maintenance costs are expected to include consumables required for long term maintenance activities such as weed/pest control, minor seeding/planting, maintenance of facilities e.g. signs, repair of security fencing, etc. The work would be carried out by the Site Management Coordinator.

7.1.12.5 Scout Den

As part of their agreement with OceanaGold, the Scouts had the option of moving their building near to the pit lake at some later date if they wished. They have since confirmed that they wish to remain in their current location.

7.1.12.6 Rates

HDC has informed OGNZL that it imposes rates on its reserves. WRC also charges rates to trust property. The 2025-26 bond review includes the updated rating position and any associated costs from both HDC and WRC.

7.1.12.7 Insurances

The conditions of consent specify that the Rehabilitation Bond should:

“...enable the Councils in the event of the bonds being called upon, to purchase Industrial and Special Risk Insurance in the sum of \$12 million (1998 dollars) and Public Liability Insurance in the sum of \$5 million (1998 dollars)...”

Using the CPI, the inflated level of cover for these two policies is currently around \$17 million and \$7 million respectively.

7.1.13 Water Treatment Costs

The post-mining volumes requiring water treatment were reviewed. Last calendar year's treatment volumes, excluding mine dewatering volumes and adjusted for average rainfall are adopted.

The decant water volumes for treatment also assume an additional 50,000m³ in Year 1 to reduce the volume on TSF1A from its current 500,000m³ to assist drying of tailings prior to capping.

Three years of treatment to remove metals from all sources, and an initial six months of cyanide treatment for decant and water from the Mill Contingency Pond (MCP), is assumed.

7.1.14 Environmental Management and Monitoring

7.1.14.1 Overview

It is expected that if the mine closed suddenly, the Councils would continue to require a level of monitoring, maintenance and reporting that would reduce as closure proceeds in preparation for handing the relevant areas over to the Martha Trust.

Many monitoring activities would cease, but some monitoring of revegetation and discharge quality, for example, would need to continue for a period. Once dewatering ceases, the monitoring focus would change from settlement and possible effects on bore users, to rebound and monitoring for the occurrence of springs

as the lake level rises. Elution water would not be required once ore processing had ceased, and biological monitoring would not be required once discharges from the water treatment plant cease.

There is no provision for peer review during the closure period. The assumption is that peer review would not be required if the Councils were managing the site, as opposed to OceanaGold, because there would be no perceived need for “independence”.

The function of the peer review panel is to provide independent advice to both OceanaGold and to the Councils in specific technical areas that the latter cannot provide from in-house expertise. The peer review panel provides an independent check, particularly for the Councils, that the advice provided by OceanaGold’s specialists is appropriate.

The assumption under sudden closure is that OceanaGold ceases to exist as a viable entity, that mining ceases, and that the Councils take over responsibility for closing the site. Under these circumstances, the Councils would be expected to continue to seek technical advice and would engage suitably qualified specialists directly. Whether those advisors are the existing peer reviewers, or any other appropriately qualified party, would be up to the Councils. In any event, there is no need for the Councils to engage two sets of specialists, each set providing advice covering the same disciplines.

It is assumed that the Council’s will continue to require technical support for the following disciplines for which there is currently a peer review role:

- Hydrogeology;
- Geochemistry;
- Revegetation;
- Iwi observer;
- Geotech – underground;
- Geotech – TSFs; and
- Geotech – pit.

The level of technical input required through the closure period is assumed to comprise:

- Advice from the full suite of advisors at current peer reviewer levels for Years 1 and 2 for finalising closure criteria, for assessing pit wall stability and modelled lake water quality prior to the start of pit rewatering, and for checking underground backfilling;
- Beyond Year 2, little to no input required in relation to the underground mines, revegetation, and TSF stability, with reduced inputs on lake (and other) water quality;
- Pit stability advice continues at current levels into Year 3 or 4, which is assumed to coincide with the period of least stability during rewatering;
- Reduced technical support required during Years 4 to 6;
- Increased support in Year 7, and some in Year 8 in relation to lake water quality prior to the lake’s first discharge;
- Minimal advice during Years 9 to 12; and
- Advice from the full suite of advisors in Year 13 to provide final sign off against closure criteria (in practice, sign off on TSF stability and revegetation could, in all probability, be provided earlier than Year 13).

In addition to the above, provision is included for a range of other specialist inputs from Council staff and/or consultants including:

- Updating pit factors of safety;
- Defining pit stability and closure criteria;
- Pit wall prism monitoring interpretation;
- Prism monitoring trend analyses;
- Ground rebound and spring monitoring;
- Pit lake water quality monitoring and reporting;
- Pit lake water quality management handover report preparation;
- Preparation of a maintenance and surveillance monitoring plan for the waste disposal area;
- Undertaking deformation surveys of the waste rock embankments;
- An updated dam breach analysis;
- A dam safety review;
- Preparation of an emergency action plan;
- Tailings and piezometric level monitoring;
- Waste disposal area inspections and reports;
- Waste disposal area water monitoring;
- River and stream water quality monitoring; and
- Monitoring of private bore water levels and responses.

Also included is equipment replacement, maintenance, calibration and physical work involved in undertaking the monitoring.

Further detail of the key elements of closure period monitoring follow.

7.1.14.2 General

7.1.14.2.1 Rehabilitation and Closure Plan

The Rehabilitation and Closure Plan is revised annually over the life of the project. Under sudden closure, no further revisions would be required.

7.1.14.2.2 Monitoring of Noise and Vibration

No blast vibration monitoring is assumed during the closure period. Even if some blasting was required, e.g. to form the lake outlet tunnel (currently assumed to be bored) or to remove foundations, the monitoring requirement is expected to be minimal.

Similarly, some minimal noise monitoring could continue while construction operations were being carried out and only during the daytime as work would not be carried out at night.

7.1.14.2.3 Surveying

The costs of surveying at the waste disposal area, settlement monitoring and maintenance of the in-pit robotic maintenance system are provided for.

7.1.14.2.4 Revegetation Inspection

Revegetation of the embankment has to date been well managed and based on years of experience there should be no issue in terms of revegetating the remaining areas. Nevertheless, the Councils could seek advice on rehabilitation matters. The assumption is that inspections would need to take place during the closure period, but they would be phased out over time.

During the early stage of the closure period (Years 1 to 3), it is expected that the Soil Scientist would carry out an annual inspection and write a report in addition to reviewing the Rehabilitation and Closure Plan and/or providing advice when needed. After Year 3, the bulk of the rehabilitation works would be complete, and inspections should only need to take place every five years until the end of the closure period.

7.1.14.2.5 Environmental Monitoring Equipment

The assumption is that the monitoring equipment held on site at present would be available for immediate use by the Councils, and later the Martha Trust.

7.1.14.2.6 Monitoring Equipment, Maintenance & Consumables

Servicing equipment, repairs, and replacement of consumables are provided for, progressively reducing after Year 3 as water treatment ceases.

7.1.14.3 Martha Mine

7.1.14.3.1 Pit Slope Monitoring

Under sudden closure, it is assumed that a considerable amount of geotechnical work would be required prior to flooding the pit; including updating factors of safety; finalising closure criteria studies; hazard mapping; reviewing, and if appropriate revising, the pit wall monitoring system; groundwater monitoring; crack monitoring etc.

There will be some initial works and set up required. The frequency and intensity of monitoring is expected to reduce with time.

An updated Pit Slope Management Plan was submitted in 2019 as part of Project Martha conditions.

7.1.14.3.2 Lake Filling Surface Rebound/Spring Monitoring

Once lake filling commences, it is expected that monitoring would focus on surface rebound and spring monitoring as opposed to dewatering induced settlement. The monitoring involved is expected to include surveying and piezometer monitoring.

The Waihi township survey takes place twice a year and takes two people approximately thirty working days to complete and requires a professional surveyor to supervise the process and write up the data. The data is then adjusted by Engineering Geology Ltd, and an annual report prepared.

For the rebound monitoring, some rationalisation of the current monitoring programme could be assumed, by reducing the number of survey sequences. The assumption is that the monitoring could be reduced by about one half.

The assumption is that the surveying would take place on a six-monthly basis during lake filling and for three years beyond. This is because changes to the rhyolitic tephra, which is sensitive to pore pressure, would occur at the end of lake filling and it is the rhyolitic tephra on which the town is built. An additional three years of surveying beyond the end of lake filling is recommended to cover any lag period that might occur.

7.1.14.3.3 Lake Water Quality – Monitoring and Reporting

Water quality monitoring is assumed throughout the full closure period, with the monitoring intensity reducing once the lake is full and discharging.

7.1.14.4 Waste Disposal Area

7.1.14.4.1 Maintenance/Surveillance

The scope of monitoring and surveillance of the TSFs is assumed as current Plans detail. Surveillance is expected to reduce over time and depend on geotechnical recommendations and dam safety regulations.

7.1.14.4.2 Water Monitoring

Water monitoring at the waste disposal area during the closure and post closure periods is expected to consist of the following:

- Groundwater quality and water levels,
- Underdrainage water quality and flows,
- Tailings pond water quality,
- Embankment runoff water quality.

Underdrainage from the tailings storage facilities would flow direct to receiving waters via gravity outlets following modifications to the existing seepage system. For TSF2, it is assumed that there would be ten toe drain sumps and one seepage outlet, and for TSF1A, there would be five toe drain sumps and two outlets for seepage. All of these would flow via gravity.

Similarly, the overflow from the rehabilitated tailings ponds would require monitoring, and hand-held pH and conductivity meters would be appropriate for this purpose. Water reporting to the collection ponds is now discharged without treatment provided in-line monitoring indicates appropriate water quality. Further advances in rehabilitation prior to and following sudden closure would result in pond water quality improvements, and the existing monitoring could be continued for a period. Drainage flows would be best monitored in the long-term using a bucket and stopwatch. Groundwater levels could be measured if this was deemed necessary.

7.1.14.4.3 Ohinemuri River/Ruahorehore Stream Monitoring

During the closure period, particularly while treated water was being discharged, the assumption is that some of the current, very extensive biological and water quality monitoring would continue, reducing with time.

As a final downstream check during the post closure period, sampling within the Ohinemuri River and Ruahorehore Stream (both upstream and downstream of the site) is assumed to occur twice a year.

7.1.14.5 Underground Mines

The assumption is that some monitoring of private bores would be carried out. This might involve a private bores or existing OceanaGold piezometers. The monitoring would take place as the lake level rises and there is a corresponding readjustment in the surrounding groundwater levels. Beyond that time the lake would be a sink with groundwater moving towards the lake.

The assumption is that the bores would be sampled six monthly for a range of cations and anions, pH, EC and iron and manganese.

7.2 Post-Closure

7.2.1 Martha Trust

Provision for the administration and running of the Martha Trust in perpetuity is included. It is assumed that Trustees will draw an honorarium and will be covered by Trustees liability insurance. Other Trust-specific operating requirements include asset insurance cover, public liability insurance and accounting, legal and consulting services.

7.2.2 Staffing

The Martha Trust will employ one part-time staff member; the Site Management Coordinator, who will be familiar with and managing the site at the time it is handed over to the Trust. This is essentially a continuation of the role as described above in s7.1.6, but need not be the same individual as the Trust will be able to engage another person should it so choose and as the need arises. However, the position would be permanently retained, reporting to the Trustees.

The Site Management Coordinator will be provided with a vehicle and the tools and equipment required to undertake the routine maintenance and monitoring tasks. Equipment maintenance and consumables, along with a building and its associated operating and maintenance, are provided for.

7.2.3 Environmental Management and Monitoring

The Site Management Coordinator's responsibilities will include routine checking and maintenance tasks associated with the pit lake, its outlet, and the waste disposal area, and engaging and paying others to undertake monitoring or maintenance work where the scope or scale is beyond that of the Site Management Coordinator's responsibilities or capabilities.

Specifically, the role will undertake the:

- Routine maintenance tasks described in s3.2 and s5.2 in perpetuity;

- Management of the continued pit wall monitoring for four years (or 10 years from the time of the initial lake discharge), including the servicing and calibration of equipment, and the coordination of consulting inputs and reporting;
- Maintenance and supply of limestone to the pit lake water treatment plant, and the replacement or refurbishment of plant as required;
- Collection of surface water and groundwater samples, delivery for analysis, the maintenance of a monitoring database and the routine reporting of results to the Councils; and
- Reporting to the Trustees.

8 RESIDUAL RISK

8.1 Background

An assessment of the residual risk associated with the closed site was first undertaken in 1997 (and reported in 1998 in the first Capitalisation Sum report). While some changes were made to that assessment in subsequent years, the first full assessment review was undertaken and reported in the 2015 Capitalisation Sum report. That review was supported by a range of other risk studies, including an updated risk assessment and dam breach analysis for the waste rock embankments (2011) and the first pit wall risk assessment (2014). In 2020 a Comprehensive Dam Safety Review (CDSR) was undertaken for both TSFs. This assessed compliance with New Zealand Society of Large Dams (NZSOLD) requirements.

The pit wall risk assessment was reviewed and updated in 2016. At the time of preparing this Plan, the updated assessment findings were in draft form, but initial feedback on the draft is that the conclusions are overly conservative. The updated findings, including the noted conservatism, are included in this latest residual risk assessment.

The conditions of consent require assessment of the residual risks for the closed site, i.e. for the post-closure period. Residual risk through the closure period was included for the first time in the 2014 residual risk assessment. Both closure and post-closure residual risks are included in this Plan.

The closure risk assessment is based on the post-closure risk assessment, excluding any risk events that cannot occur during the closure period. It is derived by:

- Taking the post-closure risk assessment and checking it for completeness, incorporating any changes since the previous assessment;
- Identifying which of the events in the risk register could occur during the closure period and which during the post-closure period; and
- Quantifying each risk event appropriate to the period in which it is assumed to occur.

Detail of the risk assessment method is contained in the bond reports. The method is known to the Councils, having been developed in conjunction with them in 1997, is described in the 2015 Capitalisation Sum report, and that description is repeated in this year's version of the Capitalisation Sum report. The full description is not repeated here.

8.2 Climate Change

A consequence of climate change could be increased intense rainfall and flood potential. Potential impacts need to be assessed as part of OGNZL standard 5.0 Closure and Rehabilitation Management. 5.3.2 *Adequate consideration shall be given to the effects of climate change and flood planning during closure planning.*

With each project phase, technical reports are created to support the consent application. In 2018 GHD Ltd produced Water Management Assessment for Project Martha. This includes rainfall and flood hydrological model analysis that incorporates potential climate change impacts.

In addition, specifically for Tailings Storage Facilities, Probable Maximum Precipitation (PMP) must be calculated as part of NZSOLD required dam break studies and routine operational freeboard management. This ensures enough freeboard is maintained on the facilities to ensure there is little risk of overtopping. PMP analysis was reviewed updated in 2020 and considered the effects of climate change. An extra 1m is added to the PMP sum as another factor of safety and reassurance that the TSF's have the capacity to receive extreme weather precipitation.

At closure, TSF spillways will be created which will lead to a tributary of the Ohinemuri (TB1) where surplus water is direct discharged to receiving waters.

8.3 Findings

An abridged version of the risk register listing the credible and material risk events, and the period during which each risk exists (the exposure period), is summarised in **Table 16**. A full copy of the risk register is provided in Appendix B.

8.3.1 Risk Profile

The risk profile ranks all of the analysed risk events in descending order of risk quotient (the product of likelihood and consequence). It provides a clear focus on those events that pose the greatest risk. The risk profiles for both the closure and post-closure periods are shown in **Figure 49**.

8.3.1.1 Closure Risk Profile

Figure 49 shows that during closure the Pit-21 Hazard zone collapse and Pit-1c Pit wall failure – damage risk events dominate the profile.

Table 16: Risk Register Summary.

Risk Event ID	Short Description	Exposure Period		Comment
		Closure	Post-Closure	
Pit-1b	Pit wall failure - safety	✓	✓	Likelihood of a wall failure causing serious injury or loss of life derived from updated pit wall risk assessment.
Pit1-c	Pit wall failure - damage	✓	✓	New risk event. Likelihood and magnitude derived from updated pit wall risk assessment.
Pit-1e	Pit wall failure - floodwave		✓	Seiche analysis confirms that wall failures cannot generate waves capable of overtopping pit rim. Risk only exists once the lake is full <u>and</u> open to the public.
Pit 1f	Pit wall failure prevention	✓	✓	New risk event. Assumed preventative action taken against pending pit wall failure, incurring cost to Councils during closure, or the Martha Trust post-closure.
Pit-7b	Pit lake outlet failure		✓	Risk assumed to be material only once outlet formed and in use.
Pit-8a	Pit lake water quality	✓	✓	Buffering of lake water pH incurs greater cost than assumed in closure estimate.
Pit-21	Hazard zone collapse	✓	✓	
WDA-5	TSF bypass seepage	✓	✓	
WDA-8	Catastrophic tailings release	✓	✓	
WDA-27	Delay in reducing PIC		✓	Only a risk to the Martha Trust, which is assumed to seek a lower potential impact classification (PIC) to reduce embankment surveillance costs.

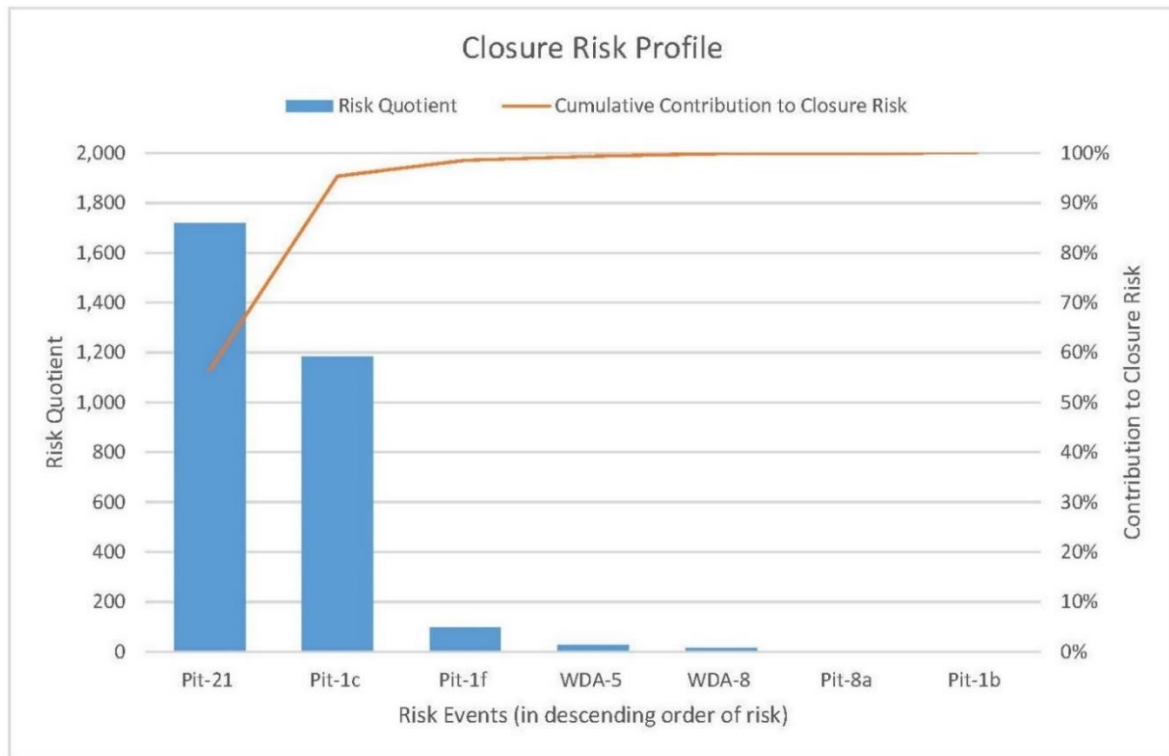


Figure 49: Risk Profiles.

The risk quotient provides a quantitative and directly comparable value of the risk each event poses during the closure period. For example, the second-highest ranked risk event (Pit1-c Pit wall failure – damage, risk quotient = 1,200) poses 70% of the closure risk posed by the top-ranked risk event (Pit-21 Hazard zone collapse, risk quotient = 1,700). The third-highest ranked risk event (Pit-1f Pit wall failure prevention) poses a little over 5% of the risk posed by Pit-21.

The risk profile also shows the cumulative contribution of each event to the total closure risk. Pit-21 poses around 55% of the total closure risk, and, with Pit-1c included, the two top-ranked risks represent about 95% of the total closure risk.

8.3.1.2 Post-Closure Risk Profile

The post-closure risk profile is also dominated by the Pit-21 Hazard zone collapse risk event. The event has the same risk quotient as exists through the closure period. However, because the risk posed by the other post-closure risk events is either equal to or less than that during the closure period, the Pit-21 risk event represents 85% of the total post-closure risk.

The total post-closure risk is about two thirds that assessed for the closure period.

The events that pose the same level of risk in the closure and post-closure periods, listed in descending order of risk, are:

- Pit-21 Hazard zone collapse;
- WDA-5 TSF bypass seepage; and
- WDA-8 Catastrophic tailings release.

Events that pose a lower risk in the post-closure period than during the closure period, listed in descending order of risk and their post-closure risk expressed as a percentage of the closure risk (in brackets) are:

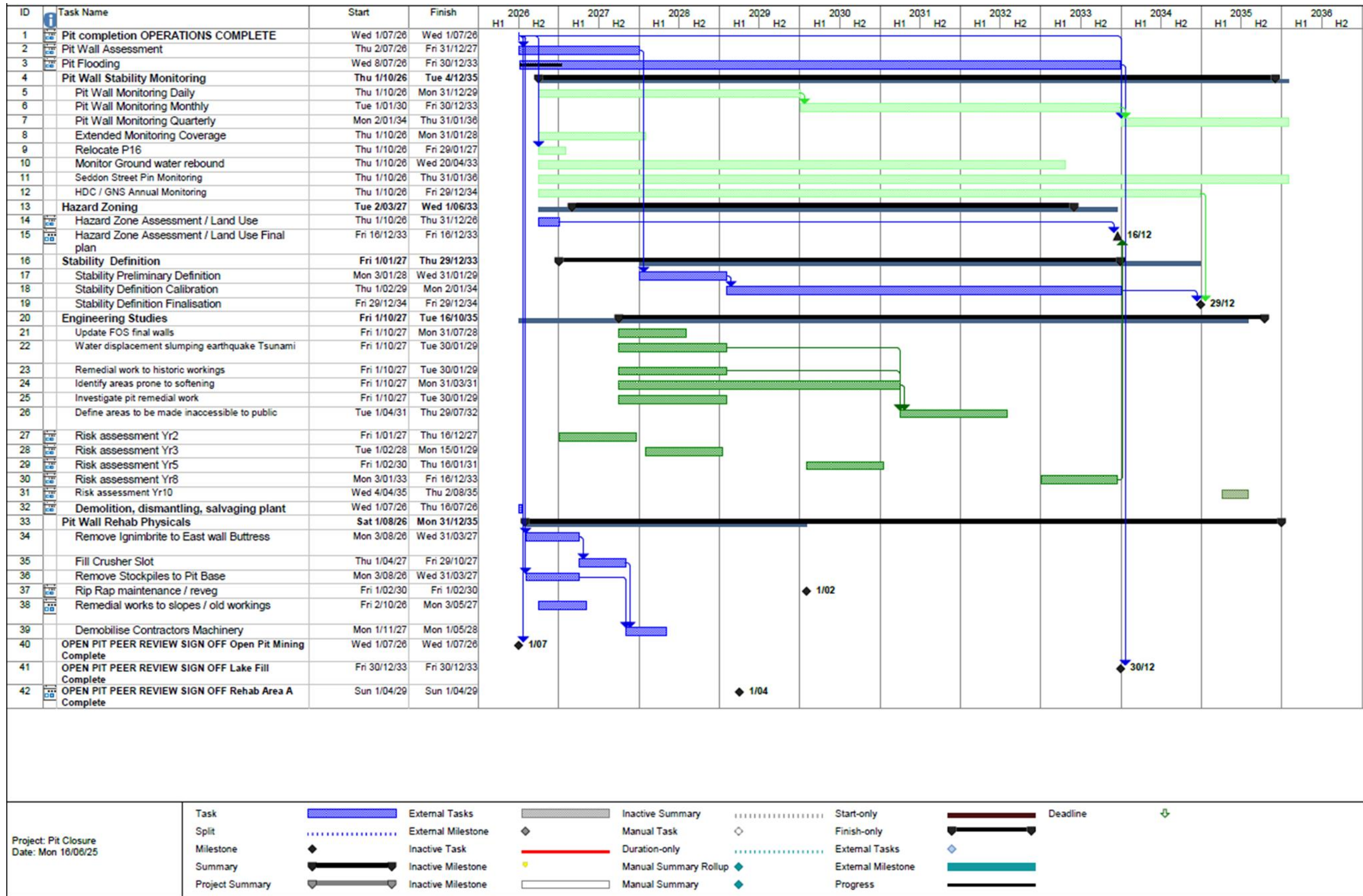
- Pit-1f Pit wall failure prevention (4%);
- Pit-1b Pit wall failure – safety (76%); and
- Pit-1c Pit wall failure - damage (effectively 0%).

The risk associated with Pit-8a Pit lake water quality increases in the post-closure period, which is to be expected.

There are also three events that pose a material risk only in the post-closure period. Listed in descending order of risk these are:

- Pit-7b Pit lake outlet failure;
- WDA-27 Delay in reducing PIC; and
- Pit-1e Pit wall failure – floodwave.

PART B - APPENDIX A
MARTHA PIT CLOSURE TIMELINE



PART A - APPENDIX B
RESIDUAL RISK REGISTER

OCEANAGOLD WAIHI CLOSURE AND POST-CLOSURE RISK ASSESSMENT
RISK REGISTER

Created 20 December 2013; last updated 28th May 2021

1998 ID	ID	Short Description	Consequences	Risk Quotient Closure Post-Closure		Exposure Period	Comments
PIT							
1.1	Pit-1a	Failure of wall near pumphouse	Damage to Cornish pumphouse. Capital/clean up cost \$1.5-3M. Relocation would represent worst-case, at cost of \$3M Plus establish two additional monitoring benchmarks \$2-5k. Annual O&M costs \$2-4k p a			Post-Closure	Since this risk was originally identified, the pumphouse has been moved from pit rim, which mitigates the risk that is now considered immaterial. The risk was identified and quantified in the original 1998 risk assessment, so this is a change from the inputs to the initial Capitalisation Sum derivation.
1.2	Pit-1b	Pit wall failure - safety	Serious injury or loss of life	9.7E-02	7.4E-02	Closure & Post-Closure	The fatality risk associated with a pit wall failure is shown to be acceptable, so could be considered to be immaterial and excluded on that basis. In any event the Martha Trust would not incur direct costs relating to a serious injury or fatality, e.g. the societal cost of a fatality, typically referred to as the value of statistical life. NZ's Accident Compensation Act ensures that the Trust is most unlikely to be directly liable, and the Trust's operating costs include the payment of premiums for public liability insurance in perpetuity. A wall failure resulting in injury could however result in an enquiry into the ongoing safety risk in order to prevent a recurrence. For the Trust, the cost would be limited to that associated with engaging professional advice (legal, engineering etc.). Physical remedial works are covered in Pit-1c.
1.3	Pit-1c	Pit wall failure - damage	Damage to property	1,184	0	Closure & Post-Closure	Pit wall failure and risk has been assessed in a separate study (Lane, 2016), the results from which are used as inputs. The model provides for costs associated with any magnitude failure, but assumes dependence between moderate, large and major failures on each wall. Only one (the one with the largest risk quotient), is assumed to occur during each model simulation (2,000 simulations run). While there is some relationship between Pit-1b and Pit1-c, the likelihood associated with Pit-1b is many magnitudes less than that of Pit-1c, that any dependence can reasonably be, and is, ignored. Damage to the existing power lines was considered, and is assumed to be covered in the fixed component of the occurrence cost.
1.4	Pit-1d	Pit wall failure - buffer area				Post-Closure	Pit wall failure and risk has been assessed in a separate study (Lane, 2016), the results from which are used as inputs. Failure affecting the buffer zone around the pit perimeter is included in Pit-1c.
	Pit-1e	Pit wall failure - floodwave	Serious injury or loss of life caused by a floodwave generated by a large and rapid wall failure into the lake, and damage to property should the wave overtop the pit perimeter.	0.0E+00	3.2E-01	Post-Closure	This risk was first identified in the 2014 risk assessment review. Seiche magnitude and risk has been assessed in separate studies (PSM and Lane, 2014, respectively), the results from which are used as inputs. The current closure plan limits the areas near lake level to the launching ramp and swimming pontoons. The PSM study shows that wave heights are insufficient to overtop the pit rim at any other location. There remains a fatality risk for anyone present at either of these sites at the time of the seiche, however that risk is significantly less than analysed for a potential east end park, which has been shown to be negligible. As described for event Pit-1b, the Trust would not be liable for any related societal cost sand the Trust's operating costs include the payment of premiums for public liability insurance in perpetuity. Because a seiche is generated by a wall failure, and the enquiry-related costs are already included for a fatal wall failure in risk event Pit-1b, no similar cost need inclusion as an occurrence cost for the seiche risk. It is however likely that a large wave would damage both the launching ramp and swimming pontoons. The occurrence cost to repair
	Pit-1f	Pit wall failure prevention	Cost to implement prevention actions	97	4	Closure & Post-Closure	This is a new risk identified during the 2016 pit wall risk assessment/review. It provides input to the risk cost to the rehabilitation bond, agreed to by OGC during the 2015 peer review meeting, and to the risk cost for the capitalisation sum. The prevention cost is based on unloading of approx 10% of the top of the wall, but only applies to large and major failures as it is not cost-effective for smaller failures..
2.1	Pit-2a	Dust	Non-compliance with consent limits			Post-Closure	This risk only exists during operations, and potentially at some reduced level during the closure period. It was excluded as it is not a post-closure issue.
2.2	Pit-2b	Contaminated soil	Cost of remediation			Post-Closure	This issue was excluded on the assumption that any contaminated areas would be identified and excavated, the excavated material being disposed of to the tailings storage facilities, early in the closure period and prior to the Councils signing off that all closure criteria are met. Not a post-closure issue.
3.1	Pit-3a	Rebound damage to pumphouse	Cost of repair			Post-Closure	Excluded during the 1998 assessment of the basis that the settlement and rebound effects would be minor and less than those occurring during dewatering (none), and would be complete by the end of the closure period. The risk could not therefore exist post-closure and was excluded from the analysis. Confirmed in the 2014 review.
3.2	Pit-3b	Rebound damage to buildings	Cost of repair			Post-Closure	Excluded during the 1997 assessment of the basis that the settlement and rebound effects would be minor and less than those occurring during dewatering (none), and would be complete by the end of the closure period. The risk could not therefore exist post-closure and was excluded from the analysis. Confirmed in the 2014 review.
3.3	Pit-3c	Rebound damage to services	Cost of repair			Post-Closure	As for buildings.
4.1	Pit-4a	Dewatering affects groundwater supplies	Cost to provide equivalent alternative water supplies			Post-Closure	Conceivably could occur during dewatering and for part of the pit flooding period, but hasn't. Presents no risk following closure.
4.2	Pit-4b	Groundwater contamination	Cost to provide equivalent alternative water supplies			Post-Closure	During pit rewatering there could be a reversal of the existing inward flow of groundwater such that contaminated water from within the old mine workings potentially affects water quality in bores surrounding the township. However, any outward flow would be into the lower aquifer, which is too deep and has insufficient yield to be used for water supply purposes (at this time). Final lake level is going to be lower than the pre-existing groundwater level in Martha Hill so flows after pit flooding groundwater flows will again be towards the pit prior to the start of the post-closure period.

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				Closure	Post-Closure		
5.1	Pit-5a	Blast noise	Excessive noise due to blasting recorded outside pit boundaries.			Operations	Operational risk only.
5.2	Pit-5b	Pumphouse damage	Repair of blast vibration induced damage to pumphouse.			Operations	Operational risk only. The risk of structural damage to the Pump House as a result of blasting vibration was originally identified as a separate issue as the risk was considered greater here than for other structures in Waihi due to its proximity to the pit and its design/construction.
5.3	Pit-5c	Blast vibration	Non-compliance with consent limits			Operations	Operational risk.
5.4	Pit-5d	Fly rock	Worker and public safety			Operations	Operational risk.
6.1	Pit-6a	Noise	Non-compliance with consent limits			Operations	Operational risk.
6.2	Pit-6b	Stringent noise standards	Unworkable limit has significant cost implications on mining contract.			Operations	Operational risk.
7.1	Pit-7a	Flooding	Pit lake discharge causes flooding in Mangatoetoe catchment			Post-Closure	Lake discharge issues can only occur after lake filling is complete. The lake discharge weir will be designed to maximise flood routing such that the proportion of lake flow in the Mangatoetoe reduces with increasing rainfall. Given the necessary sign-off processes within the consents, and those required to achieve "closure", this is not considered a credible post-closure risk
7.2	Pit-7b	Outlet failure	Cost to repair or replace damaged outlet structures.	0	176	Post-Closure	Routine maintenance of the outlet structure and tunnel is assumed to be required during the post-closure period. This is a base cost included in the Martha Trust's operational budget. Post-closure, there is a risk that the proposed lake outlet tunnel and associated structures could be damaged, for example as a result of an earthquake. This may be insurable. As underground structures are less susceptible to earthquake damage than above-ground structures, the likely consequence is that some maintenance of the works would be required, particularly at the portals. The 1998 estimate of cost to undertake this work was \$80,000 to \$400,000 (median and P95). These values are retained in 2016, but adjusted for inflation. The 1998 assessment also considered an increased maintenance costs would be incurred following a failure. The \$2,000 to \$5,000
8.1	Pit-8a	Lake water quality	Additional cost to treat lake water	4	11	Closure & Post-Closure	This risk was included in the 1998 assessment, at which time chemical modelling indicated a lake water quality suitable for discharge. Recent modelling indicates otherwise, and the base costs include treatment (alkalinity addition) in perpetuity. The 2014 review based the revised consequential cost to represent an increase of 50-100% of the annual base cost (median and P95), and increased the likelihood by an order of magnitude. These assumption are retained, with adjustment for inflation. Given the currently assumed water treatment system required in the base case to maintain lake quality, the previously identified alternative mitigation options are redundant
8.2	Pit-8b	Aquatic biology	Degraded lake water quality reduces diversity of biota			Post-Closure	A less-than-expected water quality could reduce the diversity of biota in the lake. However, unless the water quality is compromised to the point where it cannot be used for recreational purposes (refer Pit-8-c) or discharged without treatment (Pit-8a), there is no consequence.
8.3	Pit-8c	Public amenity/health	Degraded lake water quality prevents the lake's use or poses health hazard.			Post-Closure	Failure to meet safe swimming water quality equates to a failure to meet a closure criterion, meaning that closure is not achieved. Once closure is achieved, the issue can't be a post-closure risk as the proposed base case lake mitigation option (water treatment) must be capable of achieving this minimum standard. The risk that achieving the minimum standard may cost more than expected is covered in the preceding risk event (Pit-8a).
9.0	Pit-9	Lake filling delays	Additional overhead costs associated with extended rewatering period			Closure	The rehab bond assumes a certain period to flood the pit, but a if series of droughts reduces river flow, rewatering could take longer and there would be increased costs. Assumed closure period already includes a 12-month delay allowance, which is considered sufficient to render this risk inconsequential. A closure risk, but not in the post-closure period.
10.0	Pit-10	Regulatory change	Additional treatment costs or installation and operation of alternative discharge to the Ohinemuri River.			Post-Closure	Such a change could result in an unacceptable discharge quality necessitating a delay in gaining permission to discharge, or necessitating change to the currently proposed discharge, e.g. the piping of the lake outlet to the Ohinemuri River where the additional dilution prevents significant adverse effect, and/or treatment of lake water prior to discharge (covered in risk event Pit-8a). In any event, this issue would need to be resolved before OGC receives sign-off from the Council indicating that site closure has been attained. This is therefore not a post-closure risk.
11.1	Pit-11a	Fuels and solvents				Post-Closure	The management of these substances is undertaken in accordance with the appropriate regulations. Any contamination of soils in the pit or ancillary area as a result of spills during operation is expected to be cleaned up as part of the closure activities. The cost associated with this work is a base cost. This ceases to be an issue during closure, and hence is not a post-closure risk.
11.2	Pit-11b	Explosives				Post-Closure	As for fuels and solvents.
12.1	Pit-12a	Noise bund ARD				Operation & Closure	If some unoxidised material is incorporated in the bund, acidic run-off and/or leachate could result. This has not been an issue during operations, so is considered to be a non-issue. Significant attention was given to the identification and handling of potentially acid-forming (PAF) rock during bund construction. These processes did identify mis-classified PAF fill during bund construction and resulted in re-excavation and removal of the affected areas.
12.2	Pit-12b	Noise bund instability				All	A slump or failure of the outside shoulder of the bund could block Eastern Stream and cause flooding. The consequence is the cost of repair of the bund, repair of any resulting flood damage to, and possible purchase of, neighbouring properties and a fine for an unauthorised discharge. With the removal of the bund early during the closure period, this ceases to be an issue. Circumstances have changed since 1998 and, following identification of the subsidence hazard zones, there are no longer any adjacent private properties that could be affected.
13.0	Pit-13	Uncontrolled spring flow				Post-Closure	Some increase in spring flows or "damp" areas could potentially occur as groundwater level returns to near pre-mining levels. This issue is not considered significant due to the conservative level adopted for the lake level, and the distance from the lake to town areas that lie below this level. For the areas of town at an elevation of less than RL1104 m, i.e. primarily in the south and west, no mining was undertaken so the risk is very low.
14.1	Pit-14a	Mine manager's house damage				Post-Closure	Mine manager's house has been removed

TABLE B-1: RISK					
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14.2	Pit-14b	Grand Junction refinery damage			Post-Closure No risk from mining once mining and rehab is completed. Relocated refinery building at less risk during rehabilitation activities than prior to its relocation.
14.3	Pit-14c	Grand Junction powerhouse damage			Operation & Closure Base costs allow for reinstatement of columns. No other deliberate or accidental damage considered credible in the post-closure period.
15.0	Pit-15	Revegetation failure			Post-Closure It has been accepted by the Councils that rehabilitation will not be possible for all of the pit wall exposed above the lake.
	Pit-16	Vandalism of WTP	Cost of repair or replacement to lake water treatment plant.		Closure & Post-Closure Normal insurance against theft or vandalism mitigates this risk. Insurance premiums are included as a base case of the Martha Trust operating costs.
	Pit-17	Unidentified PAF	If not Identified and removed/remediated, PAF could adversely affect lake or other surface waters (excludes pit walls and noise bund, which are covered elsewhere).		Closure With the exception of pit wall PAF areas above lake level, identification and remediation of PAF is an obligation during closure activities, and satisfactory resolution is required to achieve closure. There is currently no waste rock in stockpile in the SFA, and following cessation of mining in 2015, no possibility of the current situation changing. The surface of the SFA will be covered with NAF from the noise bund. The risk that the noise bund material contains PAF is covered elsewhere (Pit-12a).
	Pit-18	Public safety	Drownings, accidents involving lake users.		Post-Closure The Martha Trust cannot be responsible for swimming/boating safety accidents within the pit lake, but could be implicated if any accidents were directly attributable to the mining remnants, e.g. pit wall failure etc. The pit wall risk assessment indicates that the level of post-closure lives risk was <i>de minimis</i> . The Martha Trust operating costs provide for the Trust to purchase and maintain public liability insurance.
	Pi-19	Lake fails to fill	Unable to create promised recreational lake. Cost of change to closure plans, or sealing to allow filling.		Closure Not a credible risk. Lake level is set at 2m below the lowest known potential outlet, and some 10m below the groundwater level existing prior to the start of the modern mining period.
	Pit-20	LINZ prevent lake access	LINZ excludes the public from using the lake, and Martha Trust from undertaking lake-related maintenance.		Post-Closure LINZ manages the land under the lake and much of the land surrounding the lake, including the lake outlet site. As the manager of the land on behalf of the people of NZ, it is inconceivable that LINZ would exclude the public from using the lake and surrounding amenities, or could successfully do so. Nor is it reasonable to assume that it would prevent the Trust from undertaking lake-related management/maintenance activities, as in doing so LINZ would inherit that responsibility. The OGC proposal is to return to the closure plan with an east end park, meaning access to the lake would not be via LINZ land (unless the area can be extracted from the Trust deed and passed to LINZ)
	Pit-21	Hazard zone collapse	Serious injury or fatality. Cost to fence off and remediate collapsed area, and potentially to realign affected section of pit rim walkway.	1,718 1,718	Closure & Post-Closure This is a new risk not considered in 1998, and follows the identification of hazard zones in 2002. Hazard zone collapse risk has been assessed in a separate study (Lane, 2014) from which the likelihood of a future collapse is drawn. If the risk were to apply, it would relate to the pit rim walkway development over the Mary, Martha and Empire hazard zones. It is assumed that as the land owner, the Trust would need to make the area safe by fencing off the collapse, rerouting any affected walkway. Also include for some native planting to mitigate visual effects. The Royal and Edward zones overlie areas that, for the most part, do not form parts of the Trust land, so would not contribute materially to the risk. However, collapses into the historic underground workings are a legacy issue for the NZ government and for HDC, not for OGC or the Trust, and without any occurrence cost falling to the Trust, the risk is excluded from any potential contribution
PROCESS PLANT, WTP AND CONVEYOR CORRIDOR					
16.1	Mill-1a	Conveyor noise			Post-Closure Operational issue only.
16.2	Mill-1b	Mill noise			Post-Closure Operational issue only.
16.3	Mill-1c	Noise exceedance			Post-Closure Operational issue only.
17.1	Mill-2a	Conveyor dust			Post-Closure Operational issue only.
17.2	Mill-2b	Lay-down area dust			Post-Closure Extended Project construction issue only.
17.3	Mill-2c	Stockpile dust	Effects on crops, amenity, health, soil contamination, or a non-compliance.		Post-Closure Operational risk. This was identified as five separate risks in the 1998 assessment, all of which were excluded.
18.0	Mill-4	Minewater pipeline burst			Post-Closure Operational issue only.
19.0	Mill-5	Decant pipeline burst			Operation & Closure Operational and short term (3 years) closure issue only.
20.0	Mill-6	Tailings pipeline burst			Post-Closure Operational issue only.
21.0	Mill-7	Seepage pipeline burst			Operation & Closure Seepage quality needs to be suitable for direct discharge prior to achieving Closure. Not a post-closure risk.
22.0	Mill-8	Collection pond pipeline burst			Operation & Closure These pipes will be decommissioned by the end of closure, and the pond water quality will have improved considerably in response to rehab completion, so this is not a post-closure issue.
23.0	Mill-9	Mill bridge failure			All Post-closure, while the bridge is expected to remain, its use will be limited to farm purposes for which the Martha Trust is not A risk of failure does not exist post-closure.
24.1	Mill-10a	WTP chemical spills			Post-Closure Operational issue only.
24.2	Mill-10b	WTP tank collapse			Operation & Closure If the WTP is mothballed, as proposed in 1998, then the tanks would contain only water and there would be no consequence of a failure. However, the WTP is over-sized for providing treatment for any contaminated water stream arising at the closed site. It is also over-sized for use as a community treatment facility, although part of the WTP could be retained and used for this purpose - in which case it would not be a Martha Trust responsibility. OGC is proposing to decommission the WTP as part of the closure works, which would occur prior to achieving closure. Once removed, there is no possible risk.
25.0	Mill-11	Treated water out-of-spec			Operation & Closure Operational and closure risk, after which treatment ceases (by definition) and the risk ceases to exist.
26.1	Mill-12a	Mill chemical spills			Post-Closure Operational issue only.
26.2	Mill-12b	Mill tank collapse			Post-Closure Operational issue only.
27.0	Mill-13	Chemicals handling and storage			Post-Closure Operational issue only.
28.1	Mill-14a	Stockpile - soil contamination			Post-Closure Leaching of oxidation by-products is expected to cause soil contamination beneath the ore stockpile. As it will occur, the issue is not a risk and has been accounted for in the base cost of the process plant clean-up at the end of operations.
28.2	Mill-14b	Stockpile - groundwater contamination			Post-Closure Some minor quantities of stockpile leachate may be reaching groundwater and affecting quality. A cut-off drain was installed down-catchment of the mill and ancillary areas (down-catchment of the Mill Contingency Pond) that could be re-commissioned in the unlikely event that contaminated groundwater appears 10 to 13 years after removal of the contaminants from the stockpile. Covered in WDA-5.

1998		TABLE B-1: RISK					
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				Closure	Post-Closure	Period	
28.3	Mill-14c	Stockpile - surface water contamination				Operations	An operational risk. The stockpiles will be empty at closure, and the area contoured, covered and planted as part of the closure activities.
29.0	Mill-15	MCP discharge				Post-Closure	Operational risk only.
30.0	Mill-16	Contaminated soil				Post-Closure	Site clean-up of contaminated soils within the process plant area is covered as a base cost (refer also Mill-14a).
31.0	Mill-17	Hazardous material storage/handling				Post-Closure	Operational risk only.
32.0	Mill-18	Regulatory change to discharge standards				Operations	A business risk during operations. During the early part of closure while the WTP is still in service, the significantly reduced volumes for treatment mean that the mass load and concentrations of contaminants will less and the available dilution proportionately greater. The treated water discharge ceases during closure and there is no post-closure risk.
33.0	Mill-19	Conveyor tunnel collapse				Operations	During operations, this is a business risk only. Opportunities to leave the tunnel open for future tourism purposes is still under consideration, and may be considered if no liability is transferred to the Martha Trust. The current default option is to plug both portals with concrete to prevent access - no consequence in the post-closure period.
34.0	Mill-20	Insufficient WTP capacity				Post-Closure	Operational risk only.
35.0	Mill-21	Unacceptable air emissions				Post-Closure	Operational risk only.
	Mill-22	Chemical spill from WTP	Environmental damage to Ohinemuri River			Operation & Closure	The lime spill into the Waitekauri at Golden Cross initiated a review of whether a similar incident was possible at Waihi. To attain closure, the WTP would no longer be operating. Whether mothballed, as originally proposed, or decommissioned and removed as currently proposed, there would be no remaining bulk storage of lime or any other chemical, hence no potential to spill.
WASTE DISPOSAL AREA							
36.0	WDA-1	Collection pond water quality				Operation & Closure	One of the success criteria that OGC must attain before site closure is complete is that collection pond water quality must not discharges must not cause an exceedance of the in-river water standards. Water quality in the ponds relies primarily on successful completion of rehabilitation on the waste rock embankment structures. Once successfully rehabilitated, the risk of poor water quality occurring in the ponds was considered by the expert panel to be inconceivable. The panel's position was based on experience with improving run-off quality as rehabilitation advances, and the risk is further mitigated by the role of the site management coordinator (which is broader than proposed in 1998)
37.0	WDA-2	Collection pond sediment discharge				Post-Closure	The operational risk. Once the embankments are capped, experience and practice shows that the quality of run-off improves and sediment in the minor quantities that might flow through these very large ponds poses no risk to the receiving environment.
38.0	WDA-3	Perimeter drain failure	A small topsoil slump from the toe of the embankment, or a localised failure of the perimeter bund, causes deterioration in site discharge water quality.			Closure & Post-Closure	In 1998, the likelihood of either failure was assessed as low, and with little to no post-closure consequences the risk was excluded. The role of the site management coordinator was expanded to deal with exactly this sort of event, and costs for event-driven maintenance is included in the base cost - the risk is mitigated.
39.1	WDA-4a	Contractors workshop - contaminated soil				Closure	Removal of any contaminated soil is an expected requirement of closure. This is a base cost.
39.2	WDA-4b	Solvents, hydrocarbon spill				Closure	Management of hazardous substances is covered by regulation. Any contamination by these products would be cleaned up at closure.
39.3	WDA-4c	Workshop pad ARD				Post-Closure	No PAF material used in the construction of the pad on which the workshop is founded, and any surface contamination would be removed as part of the rehabilitation activities, the cost of which is included in the base costs.
40	WDA-5	Tailings bypass seepage	Cost to install and operate K drain(s) and a small passive treatment system.	25	25	Closure & Post-Closure	The potential for bypass seepage from the tailings is limited by the: • Low permeability of the tailings, which increases with time due to consolidation; • Natural containment provided by the generally low permeability bedrock, particularly the weathered bedrock; and • Upward groundwater gradients. This risk event now also includes the consequences of drainage system failure - previously WDA-9. To warrant any remedial action, the volume and/or quality of seepage would need to be capable of having an adverse effect on the receiving surface waters- much of the current seepage, especially from TSF2 wouldn't have a significant adverse effect. The risk is further mitigated by the role and responsibilities of the site management coordinator. If bypass seepage did occur in the post-closure period, it would be in such minor quantities and of a quality that no detectable change would be expected to be measurable following dilution. Additionally, the ongoing monitoring of seepage quality shows improvements with time as the TSFs mature and the control processes designed to control acid generation (soil and water covers) take effect. In summary, the likelihood for potential bypass seepage affecting the rivers is low. As this risk event represents several events (WDA-5, 6, and 9), the expert panel increased the likelihood from the 10 ⁻⁵ per annum assessed in 1998 by half an order of magnitude. It is worth noting that an engineering risk assessment of the waste rock embankments (Lane, 2011) assessed the combined likelihood of a contaminant (leachate) release due to collection system failure or earthquake was 2.4 x 10 ⁻⁵ p.a. during the operational period and 2.5 x 10 ⁻⁷ p.a.in the post-closure period. The likelihood assessed by the expert panel in 2014 is twice the operational likelihood derived during the earlier detailed study and more than two orders of magnitude greater than that derived for the post-closure likelihood. Given that the causes/initiating events of (leachate and/or tailings) bypass seepage are not limited solely to the drain failure, the 2014 likelihood is considered a reasonable estimate for the operational period. While it is grossly overstated for the post-closure period, the 2014 value has been retained for conservatism. Assuming bypass seepage did occur, the solution would be to install a K drain near to area of concern and to collect and treat seepage prior to discharge as has been the practice during operations. For the minor quantities involved, a passive treatment system such as a small wetland or mussel shell reactor place close to the area of concern would be appropriate.
41.0	WDA-6	Waste rock bypass seepage				Post-Closure	Refer above to WDA-5. While the source is different, the causative agent, the collection systems, and the environmental pathways are the same as for tailings seepage. The solution would also be the same, and based on experience the likelihood is also similar. The consequence assigned to WDA-5 assumes several K drains and one or two passive treatment systems, which is sufficient to include seepage reporting to the groundwater beyond the toe of the waste rock embankments originating from either source.

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42.0	WDA-7	Perimeter bund ARD				Post-Closure	While included in the 1998 as an unknown, with passing time it is possible to eliminate this risk event. It is known that some small quantities of PAF are contaminating the perimeter bund around TSF1A (TSF2 was constructed before PAF material was excavated from the Martha pit). The extensive monitoring of groundwater and surface water demonstrates that this material is not having a significant, or possibly even measurable, effect on the surface receiving waters.
43	WDA-8	Catastrophic tailings release	Repair of breach to encapsulate PAF waste rock and tailings. Clean-up of tailings deposited in the flood plain down-catchment. Compensation for affected landowners. Management, legal and regulatory costs.	16	16	Closure & Post-Closure	In the original risk assessment (1998), based on the evidence of Dr. Trevor Matuschka, a sudden release of tailings due to an embankment failure was assessed as being inconceivable. On technical grounds, the proposal was to exclude this risk event from inclusion in the risk cost. However, at that time it was accepted that tailings dams failure was of particular interest to the Councils and the public due to then-recent events in Spain (Los Frailes) and at Golden Cross. As a result, Waihi Gold decided to include this risk for political reasons. A sudden release of tailings is typically an insurable risk, and in 1998 the solution was to include a consequence equal to the cost of insurance premiums for a period of 50 years, beyond which the catastrophic failure was deemed not to be credible. By adopting this approach, no recognition was given to likelihood of failure, i.e. by including the cost of premiums in the Capitalisation Sum, the assumption was of a 100% probability of failure on the day the Trust inherited ownership of the closed site liabilities. One of the objectives of the first-principles review of the Capitalisation Sum in 2014 was to assess the need and appropriateness of insurance. There are two reasons for reviewing this aspect. First, if coverage of the risk events can be included in the risk cost (contingent liability) component of the Capitalisation Sum, then the Trust should not be burdened with the cost of unnecessary premiums. Secondly, if cover for the risk events can be included in the risk cost component, then doing so offers better security as the required funds will be available without relying on an insurance company to decide whether or not there are circumstances that warrant honouring the policy or not. Thirdly, if insurance does provide the best risk treatment, the review provides background information for assessing the reasonableness of the cost of insurance cover. The inputs to the 2014 review were based on a detailed engineering risk assessment (Lane, 2011), a dam break analysis (Matuschka, 2011) and a detailed remediation estimate (Storer, 2014). The approach in this review is to ignore insurance as an option in the first instance, and to derive a risk cost based solely on the risk assessment outputs. If necessary, the inclusion of insurance cover in the risk cost can be included if it offers a more cost-effective treatment, i.e. reduces the overall contingency liability component of the Capitalisation Sum. The likelihood of a catastrophic release of tailings in the post-closure period is derived in a separate study (Lane, September 2011), and is considered negligible (1 in 1 million). The very low likelihood means that the risk could be considered to be immaterial and excluded from the assessment, however it is retained at this stage for continuity and to see if its inclusion is warranted. The consequences of an embankment breach are also defined in a separate study (Engineering Geology, July 2012), which were used to estimate a cost for clean up, structural repair, compensation and administration and management costs (Storer, 2014).
44.0	WDA-9	Seepage release	Collection and treatment of released seepage following drainage system failure			Post-Closure	This issue relates to release of tailings pore fluids or waste rock leachate as a result of failure of the underdrainage system, i.e. it differs from the issue of bypass seepage addressed in issues 40 and 41. During the 2014 review, the expert panel assessed that drain failure did not pose a credible risk. It is known that the drains will block and/or fail over time. This is not a concern geotechnically, nor environmentally unless the seepage is of sufficiently poor quality and/or occurring in such quantities as to adversely affect the receiving water. The collection and treatment of such seepage is covered above in WDA-5.
45.0	WDA-10	Waste rock embankment damage				Post-Closure	This issue was assessed and is included in the engineering risk assessment, and above in risks event WDA-8. the repair of minor damage due to wind-thrown vegetation, rainfall or earthquake etc. is covered in the Martha Trust's operating costs, i.e. the site management coordinator.
46.0	WDA-11	Embankment overtopping				Closure & Post-Closure	This is a possible initiating event for a catastrophic failure of the embankment release of tailings, which is covered in WDA-8. Post-closure, tailings pond water is of suitable quality to discharge and other than the potential geotechnical consequences covered in WDA-8, any overflow would have no adverse effect.
47.0	WDA-12	Wildlife health				Post-Closure	Operational risk only.
48.0	WDA-13	Revegetation failure				Post-Closure	Experience over the past 25 years indicates that OGC's revegetation procedures are effective and confirms that there is no realistic likelihood of large failures. Repair of small failures are included in the base costs.
49.0	WDA-14	Non-compliant noise				Post-Closure	Operational risk only.
50.0	WDA-15	Tailings dust				Operation & Closure	There has been no tailings dust issue during operations even when a substantial beach formed on TSF2 due to the regional weather and poor drainage characteristics of the tailings, which prevent the tail drying out. Post-closure, tailings will be inundated to a depth sufficient to ensure a water cover even following an extended drought, eliminating the risk of tailings dust.
51.0	WDA-16	Waste rock dust				Operations	Operational risk only. No exposed waste rock in post-closure period.
52.0	WDA-17	Loss of dust control				Post-Closure	Operational risk only.
53.0	WDA-18	Regulatory change to discharge standards				Closure	Achieving a pond water quality suitable for discharge is one of the success criteria that OGC needs to meet before Closure is attained (and has already been achieved for TSF2). This is not a post-closure risk
54.0	WDA-19	Hazardous material storage/handling				Post-Closure	Operational risk only.
55.0	WDA-20	Tailings ponds significantly larger than planned				Post-Closure	There is no consequence if the proportions of covered to pond areas differ in reality following rehabilitation of the tailings storage facilities surface to that promoted during the consent process.
56.0	WDA-21	Flood erosion damage at TSF toe				Post-Closure	Remediation of event-driven damage is provided for in the Martha Trust operating costs, i.e. is a base cost.
57.0	WDA-22	Insufficient NAF material for rehab.				Closure	This is not a post-closure risk. Routine updates are made of the material balances required for completion of the waste rock embankment construction (for which these is an excess) and rehabilitation (for which there is sufficient quantities).
58.0	WDA-23	Failure to achieve Zone A spec.				Post-Closure	Operational risk only.
59.0	WDA-24	Failure to achieve Zone G spec.				Post-Closure	Operational risk only.

TABLE B-1: RISK				Risk Quotient		Exposure	Comments
1998 ID	ID	Short Description	Consequences	Closure	Post-Closure	Period	
60.0	WDA-25	Degraded tailings pond water quality				Post-Closure	The only credible initiating event would be exposure of tailings for a considerable period, i.e. sufficient for them to drain and de-saturate sufficiently to allows sulphide oxidation to occur during an extended drought. The closure proposal is to set the final water level in the TSF impoundments sufficiently above the tailings level to avoid exposing the tail under most extreme drought events. Even if an extreme drought were to drop the water level to tailings level or less, the period(s) of exposure would be short and very infrequent, and the inherent buffering capacity in the tail would prevent water quality degradation until it is all consumed. Over time, the tail will be buried under a layer of inert sediment from up-catchment, providing an additional factor of safety against water quality degradation.
61.0	WDA-26	Impacts of rare & endangered species				Operations	No species were identified within the currently disturbed footprint, and no proposal to increase that area. Not a post-closure risk.
	WDA-27	Delay in achieving low PIC	Incremental cost of continuing the surveillance required for a medium/high PIC for a further period of 2 to 12 years	0	78	Post-Closure	The expectation is that once tailings deposition ceases, followed by a period of consolidation and capping of the impoundment perimeter(s), a potential impact assessment will reduce the PIC from a medium (or high) to low classification, with a commensurate reduction in the required level and cost of surveillance on the embankments. The base case assumption is that reclassification will be achieved by closure. If a reduction in PIC is not achieved at closure, the Martha Trust will be required to continue with the higher level of surveillance until the reclassification is achieved. The delay of 2-12 years represents a period of 15 to 25 years beyond the last tailings deposition
OFF-SITE & MISCELLANEOUS							
62.0	Off-1	Contractors accident				Operation & Closure	This is a business risk that exists only during operations and part of closure and therefore is not for consideration within this assessment.
63.0	Off-2	Traffic				Post-Closure	Operational risk only.
64.0	Off-3	Bulltown Road tip				Post-Closure	A concern was raised about the potential for leachate from the tip to enter the pit lake and compromise the water quality. Consideration of the separation distances between the two facilities eliminated this as a risk - the tip and the pit are sited in different catchments.
65.0	Off-4	Unacceptable visual impacts				Post-Closure	Operational risk only.
66.0	Off-5	Road stopping not approved				Operations	In 1998, there was a very small risk that the Hauraki District Council might not pursue the applications to stop the roads required for the Extended Project. This was never a post-closure risk, and the expert panel excluded it from quantification (and HDC stopped the roads that allowed the Extended Project to proceed). While not the same roads as considered in the Extended Project, the 2014 expert panel identified it as a potential risk to the current closure concept for the pit. However, if HDC doesn't want to stop any of the roads around Grey St/Slevin St, then there is no need to pursue this further It is not a post-closure risk
67.0	Off-6	Receiving environment degradation by others				Post-Closure	Operational risk only.
68.0	Off-7	Community opposition to project				Post-Closure	Operational risk only.
69.0	Off-8	Unacceptable CO ₂ discharges				Post-Closure	The imposition of, for example, a carbon tax is a business risk. It ceases at the end of operations.
70.0	Off-9	Decrease in property values				Closure	A study in support of the Extended Project consent applications showed that the operation has increased property values in Waihi, a prediction that has been confirmed by subsequent studies. OGC has given an undertaking to divest itself of its holdings at the end of the project in a way that prevents significantly and artificially depressing the property market. It is expected, that in order to maximise its commercial return, OGC will abide by this commitment. The sale of property is not included as a cost reduction in either the Rehab Bond or the Cap Sum, is not a Martha Trust responsibility, and is not a post-closure risk.
	Off-10	Monitoring boreholes fail	Collapse or drainage into monitoring boreholes causes localised settlement and property damage.			Closure & Post-Closure	Some groundwater monitoring boreholes may be operating up until the achievement of closure. The concern was a repeat of the Gladstone Rd incident. Several factors militate against this being an issue. First, groundwater would have rebounded to pre-mining levels, meaning that drainage down the hole cannot occur. Secondly, new bores are grouted during installation of the piezometers. Thirdly, while some of the old monitoring wells are open, as they rely on manual dipping of water levels, if these were to create a problem they would have already done so.
	Off-11	Mining remnant liability	Damage to historic mining remnants requires remediation and additional protection works.			Post-Closure	The historic remnants located on land currently proposed to be owned and managed by the Martha Trust are limited to the Grand Junction refinery and power house. The refinery is surrounded with a security fence, and could remain closed if necessary. The optimal solution would be to allow public use/access provided this was done in a way that avoids increasing the Trust's liability. Final details are being worked on as part of the ongoing closure planning. The power house foundations are too robust to be considered a damage liability, which would not be the Trust's responsibility in any event.
	Off-12	Inability to relinquish land	NWG is unable to divest all of its land holdings			Closure & Post-Closure	This is a risk to OGC only. It is relates primarily to Union Hill and Slevin Park as the urban and rural properties will always be saleable.
UNDERGROUND							
	UG-1	Sinkhole formation	Fatality or serious injury to member(s) of public. Remediation of property damage.			Post-Closure	Given the detailed geotechnical evaluations and peer review, and the backfilling of all areas of potential ground instability, this was not considered a credible post-closure risk.