OGNZL Wharekirauponga mine:

Overall summary of ecology matters

Report prepared for

OceanaGold (NZ) Ltd

Prepared by

RMA Ecology Ltd

Report number and date

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BETTER ECOLOGICAL OUTCOMES

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BETTER ECOLOGICAL OUTCOMES

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1.0 Background

1.1 Introduction

OceanaGold (NZ) Ltd (OGNZL) is proposing the Waihi North Project (WNP) to extend the life of its Waihi operation. The WNP includes activities that may have adverse effects on indigenous vegetation or on significant habitats of indigenous fauna (hereafter, collectively 'ecology values' or 'biodiversity').

1.2 Objective

The objective of this report is to provide a concise and comprehensive summary of the actual and potential effects (both adverse and positive) on ecology values affected by the Waihi North Project. This includes direct and indirect effects, as well as temporary and permanent effects and includes the proposed works around the existing Waihi facilities, the Willows Surface Facilities Area, and the Wharekirauponga Underground Mine and Dual Tunnel (see Table 1 and Figure 1).

1.3 Information sources

Information sources that we have relied upon in compiling this summary are:

- Bioresearches, 2024. Proposed Wharekirauponga Underground Mine: DRAFT native frog effects assessment. Report prepared for OGNZL by Van Winkel, D, 4 December 2024.
- Bioresearches, 2024. Terrestrial Ecological Impact Assessment (Waihi Area): Waihi North Project. Report prepared for OGNZL. 5 December 2024.
- Bioresearches, 2024. Waihi North Project: Ecological Management Plan. Report prepared for OGNZL. 4 December 2024.
- Bioresearches, 2024. Waihi North Project: Residual Effects Offset Plan. Report prepared for OGNZL. 27 September 2024.
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- Lloyd, B. 2024. A plan to monitor the response of populations of two native frog species to the proposed Wharekirauponga Underground Mine project. Report prepared for OGNZL. 22 October 2024.
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- Boffa Miskell Limited. 16 October 2024. Waihi North Project: Freshwater ecological assessment. Report prepared by Boffa Miskell Limited for OceanaGold (NZ) Ltd. OceanaGold Document Reference: WAI-985-000-REP-LC-0007 Rev C.1.

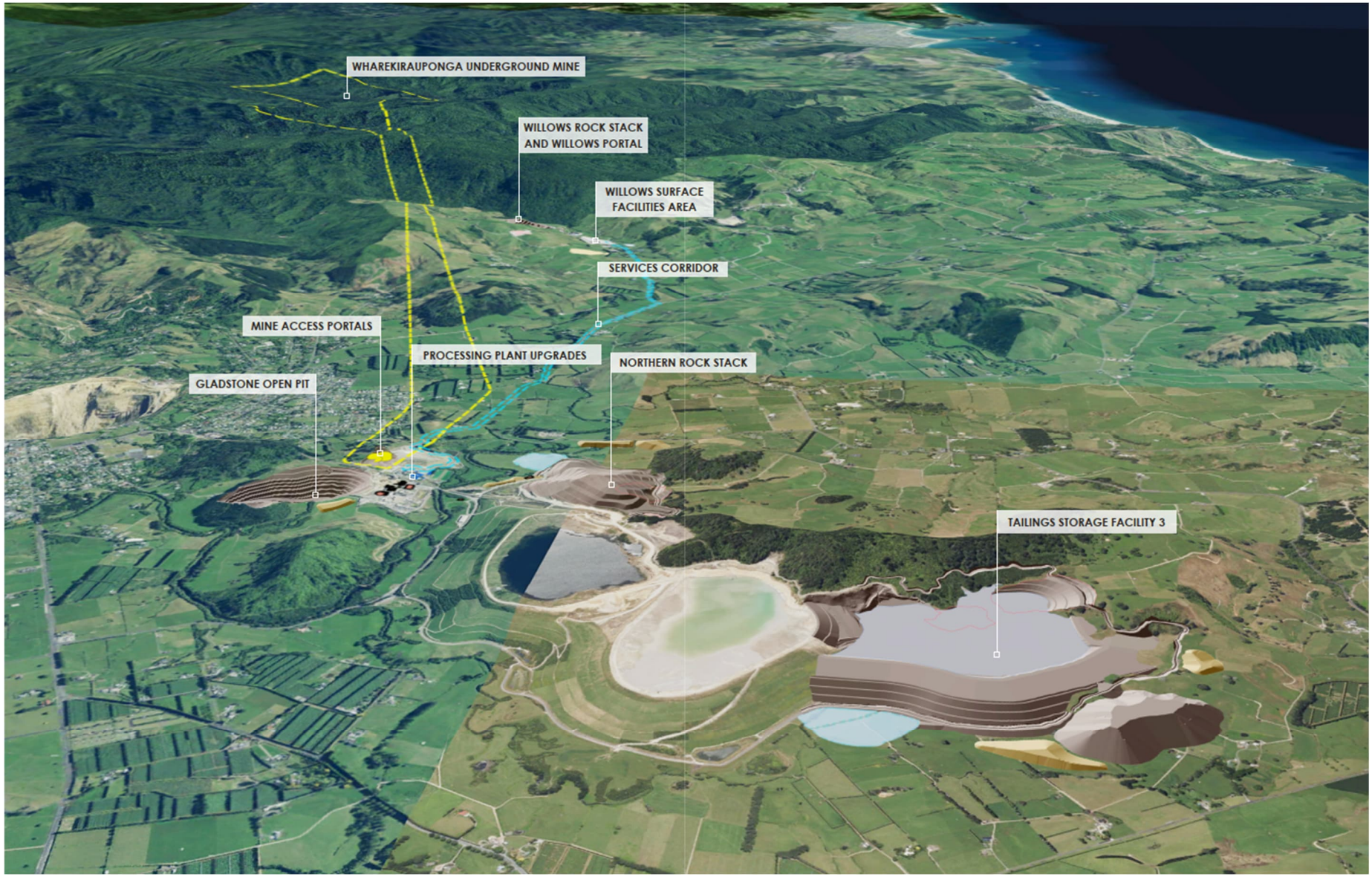

Figure 1. Overview of the key components of the Waihi North Project. Map sourced from OceanaGold, 17 June 2022.

2.0 Description of the Waihi North Project

2.1 Overview and constituent parts of the project

The current Waihi life of mine plan is to complete production by the end of 2030. Study work conducted between 2016 and 2020 identified opportunities to expand the Waihi operation with one new open pit and a new underground development beneath Wharekirauponga, within Coromandel Forest Park. The WNP will integrate these new developments with OGNZL's existing mines and existing and consented mining infrastructure.

The WNP comprises several distinct project components inside and outside of the Coromandel Forest Park (CFP), which are described in Table 1 and in the following text (which has been sourced, with minor modifications, from the OGNZL Project Summary, and technical assessment reports prepared by Bioresearches Ltd and Boffa Miskell Ltd).

Figure 1 provides an overview of the location of the various component of the project.

Table 1. Constituent parts of the overall Waihi North Project (WNP).

Component of WNP project	Description
Outside of the Coromandel Forest Park	
• Gladstone Open Pit ("GOP")	A new open pit to the west of the existing Waihi SFA that will be converted to an in-pit Tailings Storage Facility once mining of the pit is complete ("GOP TSF").
• Tailings Storage Facility 3 ("TSF3")	A new Tailings Storage Facility that will be established to the east of existing TSF1A.
• Northern Rock Stack ("NRS")	A new rock storage facility that will be established to the north of existing TSF2.
• Processing Plant Upgrade	An upgrade to the existing Processing Plant at the Waihi SFA to increase its ore processing capacity from 1.25 million tonnes per annum to 2.25 million tonnes per annum.
• Water Treatment Plant Upgrade	An upgrade to the existing Water Treatment Plant at the Waihi SFA which will double its water treatment capacity.
• Conveyor Modifications	Modifications to the existing overland and load out conveyors to allow rock loading and conveying to the new Northern Rock Stack ("NRS") and return of rock to the mines for backfilling.
• Services Trench	A new trench which connects various services between the new Willows SFA and existing Waihi SFA, including electricity, fibre and waste and potable/raw/recycled water services.
• The Willows Surface Facilities Area ("Willows SFA")	A new Surface Facilities Area on company-owned farmland adjacent to the Coromandel Forest Park which will contain a temporary rock stack and various infrastructure to support the underground mine
• Wharekirauponga Access Tunnel	A new underground tunnel for transporting ore, rock, and various equipment between the WUG and the existing Waihi SFA.
Within the Coromandel Forest Park	
• The Wharekirauponga Underground Mine ("WUG")	A new underground mine beneath the Coromandel Forest Park (CFP), the surface manifestations of which will include up to four vent raises,

		multiple drill rig sites, exploration drill sites, camps and associated facilities and helipads.
•	The Wharekirauponga Dual Tunnel ("Dual Tunnel")	A new underground dual tunnel which connects the WUG to the Wharekirauponga Access Tunnel and Willows SFA (see below) beyond the CFP.
•	The Waihi North Biodiversity Project	An $8.4 million predator control and ecological enhancement project, to be implemented across an area of up to 18,870 ha of the southern CFP which is aimed at achieving long-term (inter-generational) positive ecological outcomes for the area.
•	Mine resource exploration and investigation	A selection of activities associated with progressing the understanding of the Wharekirauponga resource with activities to include exploration and both hydrogeological and geological investigation.

2.2 Methods used for ecological data collection

Industry-standard methods and tools were applied to survey, sampling, and assessment of ecology values at the WNP locations. These are listed below in Table 2. A more detailed explanation of how each of these tools were applied – including locations, sampling periods and dates, survey design, data analysis and interpretation tools - can be found in the relevant technical reports for the subject areas of ecology reporting.

Table 2. Survey tools applied to the ecological assessment of ecological values across the component parts of the Waihi North Project. See Table 1 for an explanation of the acronyms within the WNP. SNA166 is Significant Natural Area no.166 located to the immediate north of TSF3.

Subject of survey	Survey / Sampling method	Location applied within WNP
Vegetation/ Plants	SNA identification through database query	SNA166, WUG, Willows SFA
	Walk-through method to map broad types	GOP, TSF3, NRS & SNA166, Willows SFA
	Vegetation plots/ RECCE method	SNA166, GOP, TSF3, NRS, Willows SFA
	Revegetation site mapping & aging by planting records	Revegetation planting areas
	Transect vegetation surveys	WUG
	Threatened & At Risk & orchid surveys	WUG
Avifauna/ Birds	5-minute bird counts	SNA 166, WUG
	Targeted pipit survey – 5 mbc & general observation	TSF3 and surrounds
	Acoustic Recording Devices	WUG
Bats	Automatic Bat Monitors	GOP, TSF3, NRS, WUG, Willows SFA
	Hand-held bat detectors	SNA 166 & select areas within GOP, TSF3, and NRS
Lizards	Manual search of potential refuges	TSF3, NRS, WUG / SNA 166, WUG, Willows SFA
	Artificial Cover Objects (ACOs)	TSF3, NRS, WUG / SNA 166
	Funnel traps or pitfall traps	SNA 166 & select areas within
	Nocturnal spotlighting/ binocular spotlighting/ Visual Encounter Surveys	GOP, TSF3, and NRS TSF3/ SNA 166/ NRS, WUG, Willows SFA
Frogs	Manual search – lifting potential habitat/ refuge objects	WUG, Willows SFA WUG
	20 x 20 plots – Archey's frog	WUG & surrounds
	Nocturnal plot and transect surveys – Archey's frog	WUG

	Systematic stream habitat searches – Hochstetter's frog	WUG, NRS, TSF3
Invertebrates	Terrestrial invertebrates – manual search, observational surveys (esp. spotlighting at night)	WUG, Willows SFA
Wetlands	NPS-FM Wetland Delineation Protocols, including the recent Pasture Species Exclusion list	WUG, Willows SFA, TSF3, NRS, WUG
Streams	Overall stream ecological condition/ SEV	TSF3, NRS, WUG & Willows SFA
	Water quality - Past reports/ existing data	TSF3, NRS, WUG
	Water quality - Handheld YSI meter/ lab analysis	WUG, Willows SFA
	Fish species - NZ Freshwater Fish Database	WUG, Willows SFA, TSF3, NRS
	Fish species - electric fishing	select TSF3, NRS, WUG areas
	Macroinvertebrates – kick-net	Willows SFA, TSF3, NRS, WUG
	Periphyton - Past reports/ data	TSF3, NRS, WUG
	Periphyton - Total mean cover plots	WUG
Springs	Temperature & chemical composition & biological composition	WUG

Ecological significance and the level of potential ecological adverse effects arising from the project were assessed using:

1. The Significant Natural Area (SNA) criteria listed in the Waikato Regional Policy Statement; and

2. The EIANZ Ecological Impact Assessment guidelines for use in New Zealand (Roper-Lindsay *et al.* 2018) (EcIAG), in particular, Table 4 (attributes for assessing value), Table 8 (magnitude of effect criteria), and Table 19 (level of effect matrix) of the guidelines.

2.3 Component parts outside of the Coromandel Forest Park

2.3.1 Gladstone Open Pit

The proposed Gladstone Open Pit will be situated predominantly over Gladstone Hill and part of Winner Hill. The Processing Plant is located immediately to the east of the proposed pit and the Martha Pit conveyor is directly to the north. Land use comprises rolling farmland and pastures, with a small pine plantation to the south west. The pit will disturb an area of approximately 18.7 ha and will be about 95 m deep (1,005 mRL), 375 m wide and 625 m long. The pit will be mined using conventional open pit mining method. The Gladstone Open Pit will be operated as an open pit from development and production through to closing of the pit as a tailings storage facility. The pit will be mined over a period of approximately six years and conversion of GOP into a TSF will commence thereafter.

The pit area supports mostly exotic pasture, with a rock outcrop to the northeast of a pine (*Pinus radiata*) plantation and two areas of young (ca. 15 years) plantings adjoining the southeast of the plantation.

The rock outcrop sits beneath a large pine tree and a small number of other exotic trees where the centre of proposed Gladstone Pit would be. It has a number of native species growing on and around the boulders.

Approximately 0.75 ha of native plantings at Gladstone Pit (planted in 2008) adjoin a restored wetland to the south and are adjacent to a similar area of planting (composition and age) that projects from an adjacent pine plantation. The plantings have been undertaken voluntarily and have not been required to satisfy conditions of any previous resource consent. They are over five metres in height, appear to be in

good health, and have become self-sustaining as evidenced by some of the planted species present in seedlings.

Plate 1. Planted vegetation adjacent to pine block at proposed Gladstone Pit site. The area includes the vegetated rock outcrop in the background on the right side of the image.

The planted block forms a protective buffer around the headwaters of a watercourse. The vegetation there is more mature, and includes large mamaku (*Cyathea medullaris*) and dense *Carex* stands within the flowing water. The riparian vegetation provides buffer function to support the water quality and aquatic habitat. A further area of planted vegetation east of the rock outcrop (approximately 0.6 ha) is much younger (planted 2011), isolated from other ecological features including other plantings, and generally provides amenity value to the existing processing area. The pine plantation has a dense understory of Chinese privet (*Ligustrum sinense*), with areas of blackberry (*Rubus fruticosus* agg.), Japanese honeysuckle and small stands of Japanese cherry (*Prunus serrulata*).

A lizard survey recorded ten 'At Risk' copper skinks around the edges of the pine plantation, restoration plantings and the rock outcrop near where the centre of the proposed pit would be. Six (6) copper skinks were recorded at the rock outcrop and four (4) from 9-year old restoration plantings and pine plantation edge. Overall, the vegetation and isolated rock outcrops provide habitat for native copper skinks, which appear to be relatively widespread where habitats provide cover in the Gladstone Pit area.

No geckos, frogs or bats were recorded from this part of the site.

Overall, the areas of planted native vegetation and the rock outcrop rate are of moderate ecological value, largely due to the presence of copper skinks. The pine plantation has negligible botanic value, limited (low) ecological value other than the potential for 'High Value' copper skinks to be present, and is subject to rotation harvest; its overall ecological value is assessed as low.

The area of the proposed Gladstone Open Pit also encompasses the headwaters of a tributary gully of the Ohinemuri River, which leads to a restored wetland in the lower reaches (Gladstone Wetland). The intermittent watercourse contains mostly sections of well-defined channel and sections of dry terrace where no channel is evident. All vegetation surrounding the headwater gully is planted. The overall ecological value of the watercourse is moderate, based on:

- An Invertebrate community of moderate diversity, and dominated by detritus eating taxa;
- Macro-invertebrate Community Index score of 91;
- The absence of high-quality stream indictor macroinvertebrate species (EPT species - Ephemeroptera, Plecoptera and Tricoptera);
- Stream Ecological Valuation (SEV) score of 0.617;
- No fish present; and
- Stream channel and banks unmodified, well established restored riparian.

2.3.2 Tailings Storage Facility 3

A new Tailings Storage Facility (TSF3) is proposed to provide the tailings storage for the WNP in addition to that provided by the proposed GOP TSF. TSF3 is a downstream earth and rockfill embankment structure, and will form an impoundment to store the discharged slurry tailings pumped from the Processing Plant.

The proposed crest height for the embankment is RL155, forming a 46 m high embankment above the existing ground at the downstream toe (RL109). The TSF3 downstream embankment will be constructed between the existing TSF1A embankment and the rising hills to the east which wrap around to the north and behind TSF1A to form the impoundment (Figure 3).

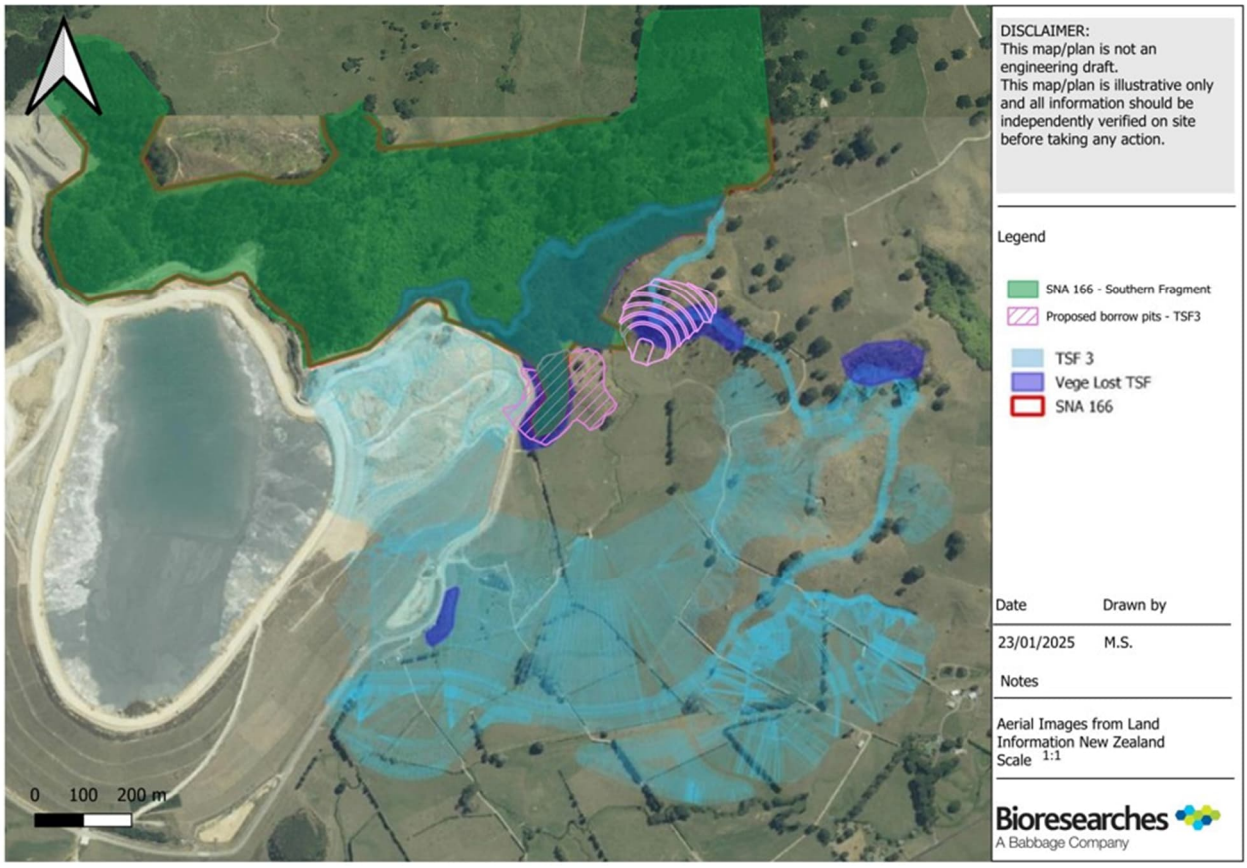

Figure 3. Tailings Storage Facility Surface elements (TSF3) (turquoise and dark blue shaded areas). The Significant Natural Area (SNA 166) is illustrated by the red polygon.

The impoundment partially covers the existing Eastern Stockpile area. The total footprint of TSF3, including the extent of the stockpile and uphill diversion drain, is approximately 115 ha. Of this area, 20

ha is already part of the existing footprint of TSF1A and Eastern Stockpile. The new footprint is therefore 95 ha.

Most of the vegetation within the footprint of TSF3 is exotic pasture (See Figure 3), which has low ecological values. In the northern part of proposed TSF3 there are woody vegetation communities, some of which are native and form part of a wider Significant Natural Area (SNA) to the north of the site.

The establishment of TSF3 would permanently remove an 8.3 ha area of moderate value rewarewa / tree fern forest within the southern SNA 166 fragment. This represents 14.5 % of the southern fragment, including approximately 30 % (4.6 ha) of the tree fern and 21 % (3.6 ha) of the rewarewa forest within the fragment. Beyond the SNA, some 1.8 ha of low value vegetation / habitat from three smaller forest fragments would also be permanently removed.

A small (0.3 ha) elongated (100 m) strip of planted vegetation is fenced and lies south of the SNA 166 southern fragment, at the foot of TSF1A. It will be within the TSF3 footprint. This fragment is planted with karo, kōhūhū, tōtara, karamu, kānuka, and a border of flax around the edges. The plants are very healthy and weed prevalence is low. The fragment is small and isolated, and the planted species are a very small sample of those found within a naturally occurring, regenerating ecosystem.

No geckos, frogs or bats were recorded from this part of the site.

The TSF3 site is located within a sub-catchment of some 20 ha of the wider Ruahorehore Stream catchment (some 2,000 ha). The sub-catchment runs southeast to northwest through the proposed TSF3 site to discharge into the Ohinemuri River east of Waihi township. Land use in the catchment is predominantly pastoral and although the mainstem appears to follow its original course, large areas of the surrounding catchment have been drained with artificial channels.

With the exception of the headwaters, this sub-catchment of the Ruahorehore Stream is characterised by an incised channel of varying width (0.17 - 3.3 m) and depth (0.2 - >1 m), and substrate comprised largely of silt / sand with occasional small gravels and bedrock present. Riparian vegetation is absent along much of its length, although parts in the lower reaches of the Ruahorehore Stream have been subject to planting by OGNZL. Bank slumping is evident along much of the stream length, with areas of pugging from stock also present. Macrophytes are often abundant, particularly along the stream edges including the emerged exotic species willow weed and Mercer grass (*Paspalum distichum*) and the submerged species *Elodea canadensis* and *Nitella sp*.

The headwaters of the sub-catchment are located within a regenerating forest area (SNA166), upstream of other survey sites. The stream channel there is predominantly comprised of large boulders, with a mixture of pools, runs, cascades and waterfalls present. No macrophyte species were present at that site and bank erosion was absent. Vegetation within the riparian zone is dense with black tree fern (*Cyathea medullaris*) the dominant species, with some remnant mature pine trees present.

The Ruahorehore Stream, both adjacent to and downstream of the proposed TSF3 is a highly modified habitat of generally moderate-poor quality. Riparian vegetation is limited (except within the SNA) with excessive macrophyte growth common. The macroinvertebrate communities present are diverse with pollution sensitive macroinvertebrate taxa present at all sites, but communities are dominated by those species that are more pollution tolerant. Diverse macroinvertebrate and fish communities are present and include the presence of kōura and longfin eel (At Risk – Declining).

Overall ecological values of the Ruahorehore Stream within the proposed TSF3 footprint are of Moderate (upper catchment)) and High (SNA forest) ecological value.

2.3.3 Gladstone Pit Tailings Storage Facility

The Gladstone Pit will be mined in a period of six years, comprising approximately 2.6 Mt of ore and 18.7 Mt of waste rock. The waste rock generated from the development of the pit is important for the mine material balance, with much of the material being used as construction material for the new TSF3 and GOP TSF. Post mining, GOP will be backfilled with waste rock to form a base for converting it into a tailings storage facility.

The rock used for backfilling will be sourced from the NRS and MOP4 cutback. Rock from the NRS will be transported across the Ohinemuri river by reversing the existing mainland conveyor. Construction of the GOP TSF involves backfilling the pit with 5Mt of suitable rock material and the pit walls will be reworked for this purpose.

No additional clearance of vegetation or habitats will be required beyond that already cleared for the expansion of the Gladstone Open Pit.

2.3.4 Northern Rock Stack

The WNP project will produce 28.4Mt of various waste rock types which will primarily be stored at Waste Rock Stack 1 and 2 at Willows Rd Farm, NRS Phase 1, and temporary stockpiles across the project area. Waste rock from the project will be reused during operation for constructing TSF3, partially backfilling Gladstone pit, and providing backfill for the Wharekirauponga and Martha Underground mines.

The Northern Rock Stack will be designed to store both Potentially Acid-Forming and Non-Acid-Forming rock. Two topsoil stockpiles will be constructed at the northern extent of the Company owned land and adjacent to Golden Valley Road. The stockpiles can contain up to 100,000 cubic metres of material and will be constructed to a nominal height of 10 m above natural topography.

The northern toe of the stockpile is defined by the current alignment of the overhead power lines. Water requiring treatment will be directed to the existing WTP for the WNP. The project requires upgrades to the WTP to manage the significant increase in water treatment demand. As such, the existing WTP will be expanded by adding new treatment streams.

The vegetation within the NRS is comprised almost entirely of voluntary plantings, which are largely contiguous with the northern fragment of SNA 166. The plantings include common planted native shrubland species planted voluntarily over the last 11-21 years and are not associated with any consent requirements. Most of these planted species are also naturally regenerating in the understorey across various plantings, where they were recorded as seedlings in 2022. Other species not part of the original plant schedule have naturally colonised, including various native fern species, shrubs and exotic weeds.

The size and shape of the planted blocks is not a cohesive solid block, but being riparian they are generally aligned with stream margins and are 15 m – 50 m wide over approximately 5.5 ha. The most “intact” component is roughly 100 m wide and 200 m long. Most of the feature is considered to be “edge”. The plantings do have a riparian enhancement function, and being linear, and now generally established with natural regeneration occurring, there also is likely to be some corridor / movement facilitation function, for both aquatic and terrestrial flighted invertebrates and also common native birds (e.g. fantail, grey warbler, silvereye).

As with the Gladstone Pit assessment, the NRS is a well planted developing restoration area that supports natural regeneration and probably supports fauna movement locally. Overall, the areas of planted native vegetation and the pine forest can be concluded to be of Moderate ecological value.

The footprint of the NRS encompasses a significant portion of the stream 'TB1', its tributaries and associated features, all of which result from an existing formed diversion from an earlier expansion of the mining operations at Waihi. The stream within the NRS footprint has a reasonably wide (1.7 – 3.4 m) channel with a predominantly silt / sand substrate with the occasional small gravel present. Water flow is slow, with large and deep pools (up to 1.26 m deep) present along the reach and some areas of anoxic sediment. Riparian vegetation has been planted to approximately 10 m either side and fenced off from the surrounding grazed pasture.

Overall, streams within the NRS footprint are considered to be of Moderate ecological value. The streams are historically highly modified with streambeds smothered by fine sediment; partially a result of their predominantly pasture catchments. Macroinvertebrate communities are dominated by pollution tolerant taxa, while the presence of EPT taxa was relatively low. The fish fauna is sparse, with only shortfin eel species recorded during the surveys.

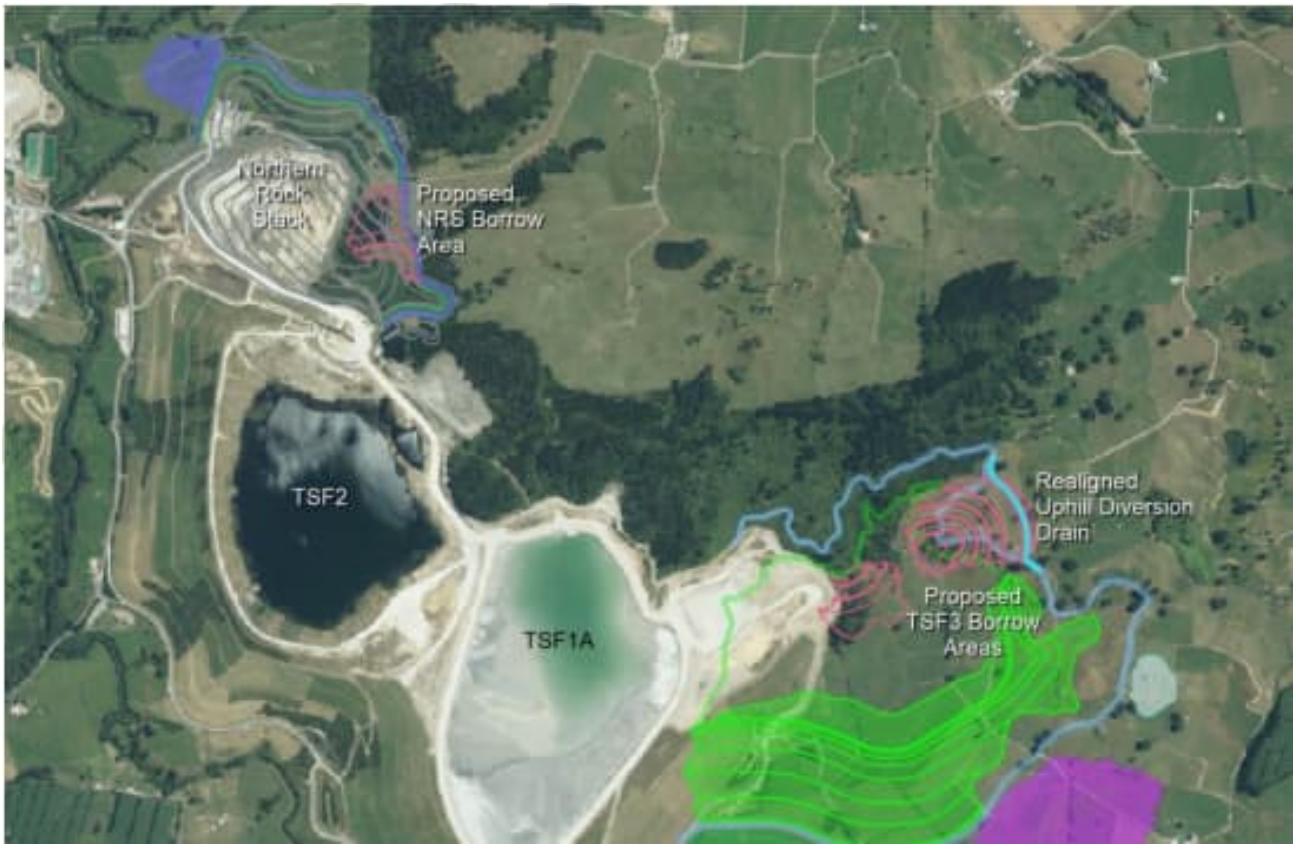

Figure 4. Northern Rock Stack location and footprint (upper left of picture), and associated TSF3 (graphic sourced from OGNZL Fast Track project description dated August 2024).

2.3.5 Processing Plant

The Processing Plant will be upgraded to replace aging machinery and increase its capacity from 1.25 million tonnes per annum of ore to 2.25 million tonnes per annum (or 273 tonnes per hour, based on a 94 % utilisation). This will likely involve the refurbishment and relocation of processing equipment from OGNZL's Reefton Mine as the preferred option, as well as the installation of some new pieces of infrastructure.

Some changes to the current layout of the Processing Plant will be required to accommodate the new infrastructure. However, all infrastructure will remain within the footprint of the existing Processing Plant.

The Processing Plant will be located on land already developed for processing purposes, including gravelled surrounding areas. No vegetation or wildlife habitat will be removed for its construction.

2.3.6 Willows Surface Facilities Area

2.3.6.1 Construction and infrastructure

The Willows Road property, on which surface facilities supporting the Wharekirauponga mine will be located, constitutes approximately 197 Ha of dry stock and dairying land with significant hilly areas to the north and west. The Mataura Stream runs through the property to the east and bounds the property to the north and east. The property includes a northern block that will not accommodate any mine infrastructure, the south boundary of which runs partially through the centre of the current stream alignment.

There are several unnamed tributaries to the Mataura Stream located on the property, some of which are ephemeral, whilst others appear to be spring fed. There is a small area of wetland adjacent to the Mataura Stream, with other flood plains evident in stream beds of unnamed tributaries in the SFA created by road crossings and poorly constructed perched culverts.

Infrastructure will be sited to avoid impacting on the lower, more substantial wetland area adjacent to the Mataura Stream. An internal access road off Willows Road onto the site will be constructed, with spur connections to the main site infrastructure.

These roads will be sealed for the main trafficked section, with the balance constructed of gravel, with 6 m running width and provision for drainage. An 8 m wide haul road will run from the portal to the rock stack, with a connection to the workshop and heavy vehicle wash pad. This road will incorporate spoon drains to collect rock stack contact water from upper storage locations as well as diverting non-contact water around the rock stack. A light vehicle wheel wash will be installed in proximity of the site exit. A separate 6 m wide all-weather road will be established to service the explosives storage magazines.

A rock stack of approximately 5 ha will be located as depicted in Figure 5. All material stored on this stack is assumed to be Potentially Acid Forming (PAF). A collection pond will be designed with capacity to contain storm events and include a sump and pumping station. Contact water collected in the collection pond will be pumped to the existing Waihi WTP for treatment. Uncontaminated springs and identified seepages will be isolated from the rock stack materials and connected through directionally drilled pipework to the lower tributary reaches.

Once rock from this stack has been exhausted (through backfilling of the mine workings), the site will be rehabilitated and returned largely to its original configuration, with improved riparian areas and stock exclusion fencing to protect waterways.

Road crossing of tributaries will all be rebuilt as many currently include perched culverts preventing fish migration in the waterways and they are poorly constructed resulting in flood plain areas. New crossings and culverts will be designed to allow for fish and eel movement up the stream tributary corridors.

The Willows portal will form the initial tunnel entrance. Suitable earthmoving equipment will be utilised in its construction. If necessary, blasting will be employed. Once the face area of the portal has been established, ground support will be installed in accordance with the geotechnical design, including steel sets/arches, rock bolts, concrete and steel plates.

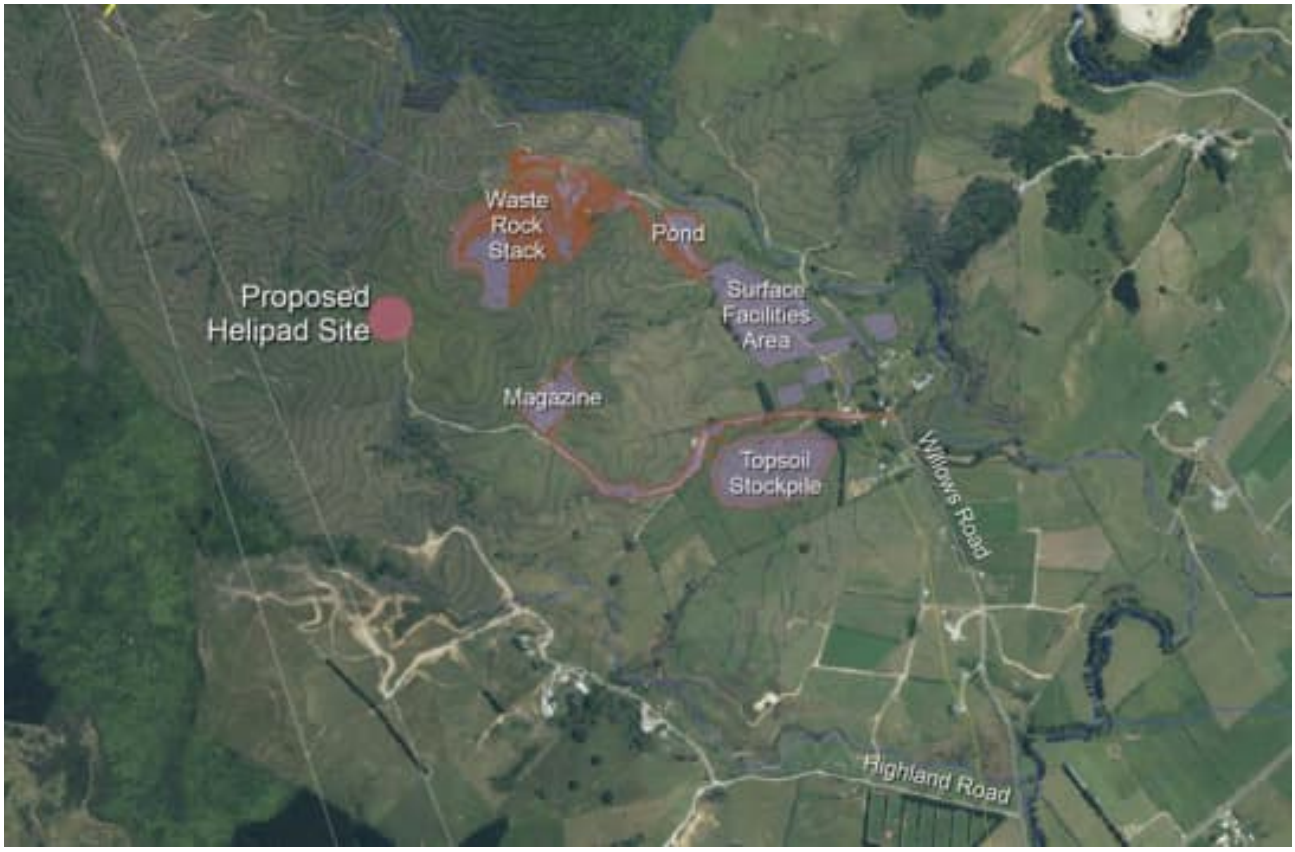

Figure 5. Willows Road surface facilities, including facilities area, topsoil storage, pond, magazine, Willows waste rock stack and proposed helipad site (graphic sourced from OGNZL Fast Track project description dated August 2024).

2.3.6.2 Terrestrial ecology values

Most of the site supports exotic pasture; however woody vegetation exists in some places, as is described below, and as shown on Figure 6.

Native forest and scrub vegetation present mainly comprises narrow riparian remnants confined to steep tributary sides, and some isolated trees in pasture (vegetation survey areas 6 & 7 – see Figure 6). Riparian areas are all currently unfenced and are heavily grazed.

Mānuka forms a fragmented canopy interspersed with emergent tawa, kohekohe and nikau, above an understorey of kawakawa, karamu, māhoe, wineberry and several fern species. These riparian remnants lack a ground tier and regeneration of indigenous species is sparse or absent due to stock grazing and trampling.

The footprint of the rock stack that overlies Tributary 2 is typical of the site and comprises sparse woody vegetation, with only occasional native species (e.g. māhoe, mānuka, wheki and ponga). The stream channel is steep with evidence of erosion, and pasture grasses are present within the channel itself. Native scrub becomes denser farther upstream as the stream and tributaries become more incised.

Māhoe and makomako are common shrubs, with ferns in the understory. Vegetation quality was assessed as poor with many dead trees observed.

Vegetation on the boundary with Coromandel Forest Park (vegetation survey areas 1 & 2) includes mature forest remnants with patchy undergrowth, and areas of secondary scrub dominated by mahoe, with common karamu, pōnga, lancewood and pigeonwood. Kahili ginger (an invasive environmental weed) dominates the understorey, and pampas is also locally common. Vegetation survey area 1 is

partially fenced, and mānuka, bracken and kiokio ferns grow along the fence margins, interspersed with rank pasture grass.

In terms of wildlife, a juvenile Hochstetter's frog was recorded in a small stream fed from a freshwater spring near the centre of vegetation survey area 3 (outside of the proposed works footprint), indicating recruitment has occurred in the area. Willows Road is heavily impacted from stock access and grazing with few habitats and refuges for native lizards.

It is possible that some lizard species suited to grassland habitats (e.g. copper skink) may be present within the property in ungrazed areas, although these were assessed as small and isolated at the time of survey and it is unlikely that lizards are present. Nevertheless, precautionary surveillance and salvage measures will be incorporated into construction management in order to minimise the mortality risk to native lizards. The majority of habitat within the property is pasture or scrub and is not suitable for bats.

2.3.6.3 Aquatic ecology values

The Willows Road site forms the mid reaches of the Mataura Stream, which has its headwaters within the native forested catchments of Coromandel Range. The perennial main stem flows in a south easterly direction (adjacent to the development areas within Willows Farm) before discharging into the Ohinemuri River between Willows Road and Corbett Road. Side tributaries of the Mataura Stream that are within Willows Road include Tributaries 1, 2 and Tributary 3 (see Figure 6), all of which are located within farmland gullies on Willows Farm. All tributaries flow in an easterly direction and into the Mataura Stream.

The assessed reach of Mataura Stream has good instream habitat quality and quantity consisting of an array of different habitats, including, riffles, runs, pools, undercut banks and overhanging / encroaching vegetation. Sediment cover is minimal with some sediment build up in slower flowing or more sheltered areas. Macroinvertebrate assemblages and indices are reflective of the good-quality habitat with many sensitive taxa. Fish species richness is diverse with six native fish species recorded within the stream or in adjacent catchments. Riparian vegetation and stream shading is limited and included mostly rank pasture and low stature vegetation. There did not appear to be any level of modification to the stream channel within the assessed reach, however the riparian margin was highly modified. The part of the Mataura Stream within the proposed development site is of High ecological value.

Tributary 2 (where the Willows Waste Rock Stack is proposed) has good instream habitat quality and moderate quantity consisting mostly of riffles habitat and also featuring pools, runs, occasional waterfalls, undercut banks, overhanging / encroaching riparian vegetation and root mats from mostly low stature riparian vegetation. While habitat may have been diverse, these habitats are not abundant. Sediment cover across the stream is low, but there is higher cover in reaches with lesser gradients. Macroinvertebrate assemblages and indices are reflective of the habitat. Fish species richness is low with only shortfin eel detected, likely due to the fish barrier downstream and the impaired habitat quality of the reach. Riparian vegetation and stream shading are limited and include mostly rank pasture and low stature vegetation along most of the reach. However, there is more established vegetation within the upper reaches where stock was not able to access due to the steepness of the banks. Stream modification along the reach is moderate with numerous culverts for stock crossing (including a perched culvert), erosion and bank slumping from stock access, limited riparian vegetation and a constructed online pond. Tributary 2 has Moderate ecological value.

Mataura Wetland is situated within Willows Road and is approx. 2,815 m^2 (0.28 ha) in extent, including a well-defined, permanent wetland with a persistently high water table (indicated by soil profiles) and transitional "damp area" where there is an obvious visual ecotone of wet tolerant grasses and rushes. The feature is situated in the lower reaches of Tributary 1, near its confluence with Mataura Stream. Remnant historic wetland vegetation within the wetland includes two mature swamp maire (*Syzygium maire;* Nationally Critical).

2.4 Component parts within the Coromandel Forest Park

2.4.1 Wharekirauponga Access Tunnel

Tunnelling will commence with a single tunnel from the Willows portal and will continue until the orebody at Wharekirauponga is reached – a distance of approx. 6.8 km (Figure 7). Vent shafts will be constructed along the tunnel – the effects of those are addressed in the next sub-section of this report.

Some vegetation clearance is proposed along the route of the access tunnel, in order to provide for investigative drilling sites and for up to four vent shafts.

2.4.2 Wharekirauponga Underground Mine – mine development

The Wharekirauponga orebody is located approximately 4.5 km north-east of the now decommissioned Golden Cross Mining area and 11 km north-northwest of the Waihi Processing Plant. The resource lies beneath the Coromandel Forest Park within the Wharekirauponga Minerals Mining Permit (60541) area. OGNZL is proposing to construct an access tunnel system to undertake further exploration and subsequent mining of the Wharekirauponga resource.

Willows Road will be the site for an access portal and surface infrastructure to service the construction of the access tunnels and the subsequent mine operation. The project will comprise surface infrastructure, tunnel portals, a tunnelling system and the mine itself.

Surface supporting infrastructure for the WUG component of the WNP will be sited on land owned by OGNZL (Willows Road Farm). It is proposed that the orebody be initially accessed via a portal (the Willows Portal) located on the property. An initial drive to the first vent shaft located on the boundary will then be constructed. Thereafter, a dual tunnel will be driven (at an incline) to the top of the orebody. Approximately 1.2 km from the orebody, an additional decline will be constructed off the main tunnel drives to access the lower part of the orebody. Tunnel depths will vary between 100 m and 500 m below the surface (other than access declines).

The project also comprises four ventilation and one egress shafts, the diameters of which will be up to 5.5 m. Surface based geological drilling and surface construction of the mine ventilations shafts will be serviced supported via helicopter, typically staged from the Willows Road helipad.

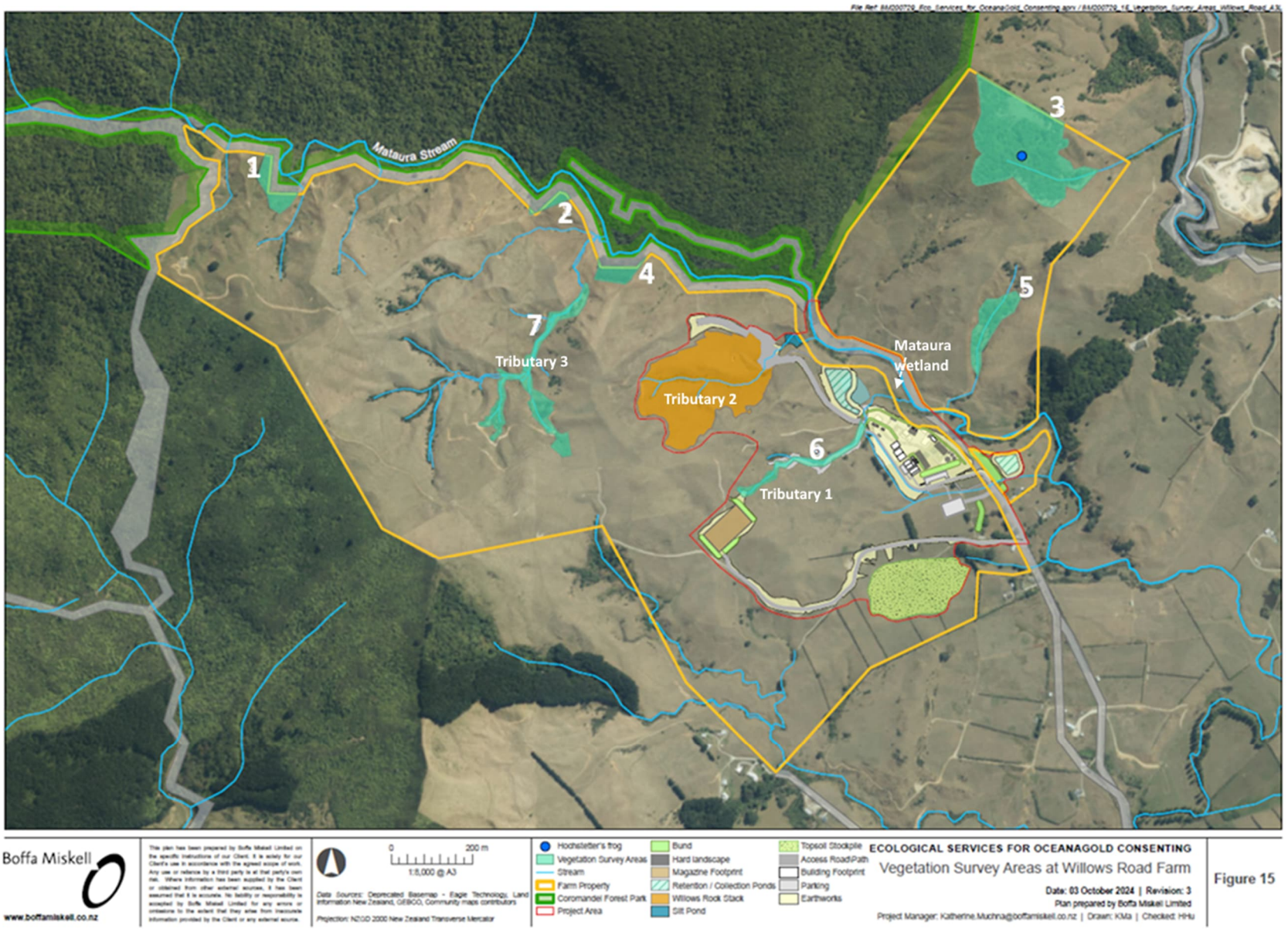

Figure 6. Vegetation assessment areas at Willows Road (sourced from Boffa Miskell 2024 terrestrial ecology assessment report, with larger labels added). See text for description of numbered locations.

Development of the tunnelling system from the Willows Portal location to access the orebody will proceed as follows:

- Portal and a single tunnel at Willows Road to the edge of Coromandel Forest Park (1,300 m long);
- Ventilation shaft on the Willows Road south of the Coromandel Forest Park (250 m long). This shaft will act as an exhaust during tunnel construction before being converted to an intake during mining operations;
- Dual tunnel from the edge of Coromandel Forest Park to the footwall of the Wharekirauponga orebody (5,500 m long);
- Multiple declines as the dual tunnel approaches the top of Wharekirauponga, for access to the lower portions of the orebody (500 – 1,200 m long);
- Cross cuts at 200 m spacing along the length of the dual tunnel, providing a connection between the intake and exhaust tunnels (1,000 m total);
- Cuddies to cater for infrastructure requirements including ventilation, sumps, pumps, and electrical equipment (200 m); and
- Cuddies for refuge chambers in single drive tunnel sections (600 m).

The ventilation system has been designed to be adequate to supply sufficient quantities of air for safe and efficient tunnelling, exploration and mining operations in line with New Zealand regulatory requirements, including diesel exhaust dilution rates, airflows, velocities and dust. Several shafts will be required, with number and location depending on final mine design and constructability.

Water collected from the mine/tunnel, and, where required, acid forming rock contact water will be pumped to the existing WTP at Waihi for treatment and discharge/recycling.

Apart from the underground works involved in developing the mine, surface activities above the ore body will include (data sourced from OGNZL Staged Fast-Track Project Description dated August 2024):

- The ability to position a total of 20 exploration drill sites within the WUG WKP Access Arrangement Area (AA Area);
- A total of six operational drill rigs;
- A total of six camps and messing facilities, located on any existing or new drill site;
- A total of four helipads, located on any existing or new drill site;
- A total of four surface geotechnical exploration drill sites within the WUG WKP AA Area to confirm suitable vent shaft sites;
- A total of four surface geotechnical exploration drill sites outside the WUG WKP AA Area above the dual access alignment;
- A total of four exploration drill sites for the purpose of drilling additional piezometer holes to assist with pumping test investigation and/or other hydrogeological testing or baseline data collection;
- Surface vegetation clearing and construction of four larger pads (up to 900 m^2) for hydrogeological pump test investigations and ventilation construction;
- A total of five river pump sites for abstracting surface water; and
- The use of a man-portable rig for up to 50 sites for drilling shorter (<100 m) holes.

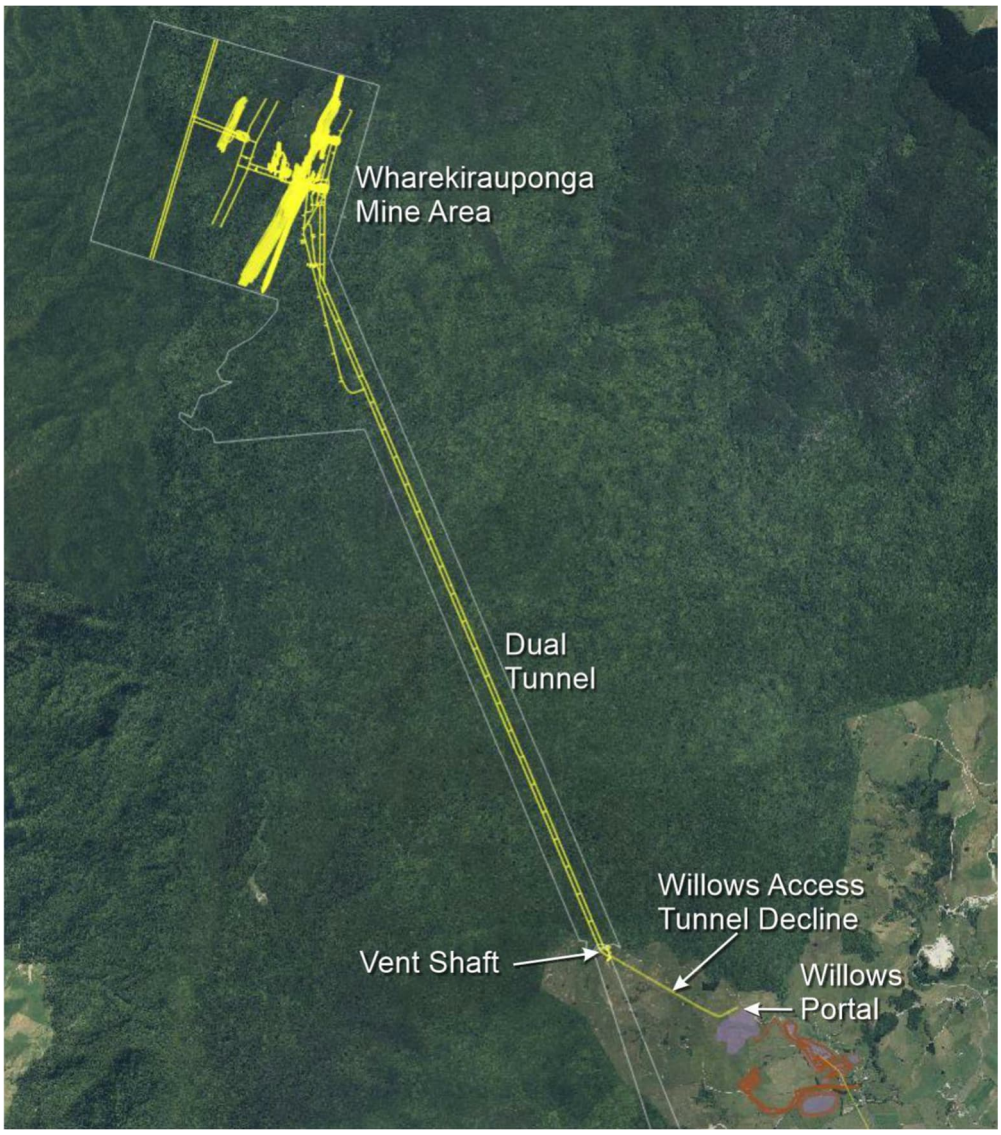

Figure 7. Location of Willow Access Tunnel Decline, the dual access tunnel, and the Wharekirauponga Mine Area. (graphic sourced from OGNZL Fast Track project description dated August 2024).

2.4.3 Wharekirauponga Underground Mine – surface ecological values

Three broad vegetation types exist within the Wharekirauponga catchment, including kauri forest, mixed secondary broadleaved forest, and kanuka scrub.

Kauri forest is found mainly on ridgelines and knolls on the sides of valleys. Kauri dominates the top canopy, often comprising groups of young kauri (rickers) growing closely together, with many of the trees over 25 m tall. Tanekaha, and to a lesser extent toatoa, are interspersed sporadically throughout canopy and subcanopy tiers. Rimu and rewarewa are also present in moderate densities along with towai and *Pseudopanax discolor*. Toro and tāwari are occasionally present.

Secondary broadleaved forest is the principal vegetation type in the Wharekirauponga catchment. The canopy structure is patchy, with numerous tall emergent trees interspersed throughout a relatively low stature (<5 m tall) subcanopy. Rewarewa, tanekaha and pukatea are the most abundant canopy species, while tawa is locally co-dominant in places. Ponga and nikau are ubiquitous in the subcanopy, and mahoe is also common. Miro, tanekaha, tōtara, hinau, rimu, tanekaha, toatoa and kauri are occasionally present in low abundances. Ponga, māmāku, pigeonwood, wheki, hangehange,

makamaka, lancewood, mapou and kanono are frequently present in subcanopy layer and/ or understorey tiers, along with epiphytic orchids, ferns and lianes such as supplejack and kiekie.

Kānuka scrub typically has a top canopy layer approximately 5 m tall, comprising kanuka and pole-sized rewarewa, tanekaha and towai, in varying proportions. Rimu and mahoe occur frequently in the scrub canopy but are not abundant. Mapou, kauri, ponga, rimu, pigeonwood, mingimingi, mahoe, *Pseudopanax discolor*, supplejack, towai and karamu, hangehange, kiokio are also common, while miro, nikau, kauri grass, toro, lancewood, kumeraho, morelotia, bushy clubmoss, makamaka, *Gahnia xanthocarpa*, kiekie, wheki, akapuka, kānuka, kamu and toropapa are often present. Tree ferns are more common on the lower slopes and hillsides. In the lower, easterly part of the valley, wilding pines are present amongst the scrubland.

During surveys in 2020, thirty-four species of orchid were found across seven different orchid types (gnat, perching, finger, bird, sun, spider and greenhood orchids). Plots within kauri forest had the greatest overall orchid diversity (number of types) and species richness. Two *Pittosporum virgatum* (Threatened – Nationally Vulnerable) were recorded in Wharekirauponga. King fern (*Ptisana salicina*, At Risk- Declining) was incidentally observed within the wider Wharekirauponga catchment.

Hochstetter's frogs are present in the Wharekirauponga catchment and the numerous small, stony-bottomed tributaries provide high quality habitat for Hochstetter's frog. Quantitative Archey's frog surveys undertaken at 121 potential exploration drill sites and vent sites within the Wharekirauponga catchment established that Archey's frogs are common throughout the project site, but are less prevalent in vegetation types associated with drier, more well drained soils. Archey's frogs occupy a wide range of forest types provided there is sufficient groundcover and refuge habitat available.

Lloyd (2024) used available data from sample plots surveyed within Wharekirauponga catchment, and concluded that the likely total Archey's frog population size within the surface above the underground mine ("vibration footprint") ranges between 61,406 – 278,785 individuals (48,888 – 152,774 adult frogs). Further work by Lloyd has provided an assessment of the abundance of Hochstetter's frogs within the potential disturbance area of the WUG[1] based on Hochstetter's frog transect searches within streams in an area of the project footprint that may be at risk of being affected by groundwater drawdown. That analysis found numbers of Hochstetter's frogs within the potentially affected stream margins (12.1 km) were 0.91 and 1.05 frogs per 20 m long search transect (depending upon analysis method applied).

With regard to lizards, baseline ecological surveys in the Wharekirauponga catchment have detected a single forest gecko and nine elegant geckos. Low population densities and/ or cryptic behaviour of native geckos and skinks make detection difficult. It is likely that native skinks and geckos are present throughout the catchment (albeit probably at low numbers).

Bat surveys have previously been carried out at specific sites as part of the Wharekirauponga exploration drill surveys and baseline ecological surveys and none have been recorded.

Twenty-four bird species were recorded during baseline surveys (16 native, 8 exotic), including common forest birds such as miromiro / tomtit, riroriro / Grey warbler, ruru / morepork, kererū, tūi and korimako / NZ bellbird. Kākā were also heard incidentally throughout the site although not captured during formal surveys or on acoustic recorders.

[1] Lloyd, B. 2024. Analyses of the results of surveys for Hochstetter's frog undertaken in 2024 to assess the impacts of stream flow reductions associated with the Wharekirauponga Underground Mine. Report prepared for OGNZL. 14 October 2024.

Aquatic assessments were undertaken within the main stem of Wharekirauponga Stream, and within its smaller lower tributaries and upper tributaries (i.e. Thompson Stream, Adams Stream, Edmonds Stream, Teawaotemutu Stream). Ecological surveys undertaken included water physiochemistry, periphyton, macrophytes, macroinvertebrates and fish communities.

Macroinvertebrate communities were diverse across all sites and representative of high-quality stream habitats, with high abundance of sensitive taxa present across all sites. Fish communities were diverse for the sampling sites with a total of six different species present across sampling sites. The Wharekirauponga Waterfall is located downstream of sites T-Stream East and Edmonds Stream and presents a significant fish barrier, with distinct differences in fish communities observed between sites located upstream and downstream. No introduced fish species were observed at any of the sites.

The freshwater habitats surveyed within the Wharekirauponga Stream and its tributaries are of Very High ecological value. All habitats are classified as significant, and support a diverse community of native flora and fauna, including Threatened and At-Risk fish species and sensitive macroinvertebrate taxa. Measured water physiochemistry parameters at the time of sampling demonstrated good ecosystem functionality. Periphyton communities were abundant in taxa and indicative of good quality streams. Macroinvertebrate communities were diverse in sensitive taxa, with instream habitat quality scores (QMCI scores) all excellent.

Pest animal surveys undertaken in winter and spring 2024 detected a range of pest animals, many of which were assessed as being in high abundance, including rats, mice, possums, stoats, feral cats, and pigs. Ferrets and deer were also detected.

A warm spring (ca. 19 degrees Celsius) emerges from the ground some 5 m from the true right bank of the main stem of the Wharekirauponga Stream between the Trib R and the Edmonds Stream tributaries, 120 m upstream of the hydrological monitoring site named WKP-3. It has been measured with a mean flow of ca. 6.67 L/s. The spring emergence occurs in a pool area heavy in orange deposit, before passing as a shallow sheet flow cascading over rocks (also heavy in orange bed deposit) some 5 m to discharge into the main stem of the Wharekirauponga Stream. Within the spring there is minimal aquatic habitat present, and it is poor habitat for macroinvertebrates and fish as it is shallow and smothered in a heavy deposit. No fish were observed and are unlikely to be present.

The ecological characteristics of the warm spring and its outlet reflected very weak temperature and water quality signature for geothermal systems, and the characteristics of the biological communities were very weak compared to more typical geothermal ecosystems in New Zealand. However, the lack of the presence of any defining flora or fauna, and the greater emphasis of a more temperate and cosmopolitan biota does not suggest a unique or representative geothermal ecosystem at this location. Accordingly, the warm spring does not have particular or strongly distinguishing geothermal ecological values, and is assessed as having an overall a Low ecological value.

3.0 Assessment of ecological effects and management/mitigation

3.1 Analysis approach

Each of the footprint areas of the project components supports ecological values in the surrounding areas, as well as within the project footprints. Direct and indirect potential adverse effects have been considered by the various experts in their assessments.

In their consideration of potential adverse effects, the relevant experts have taken into account the following;

- The assessments were undertaken against an existing environment that is in part influenced by existing consented mining activities and in other areas, not.
- Mitigation is generally not taken into account when developing offset solutions. For example, even if frog or native fish salvage and relocation is proposed as mitigation, the offset provided assumes a level of impact as if mitigation has not been undertaken or is not effective at preventing injury or death.
- Voluntary ecological enhancements undertaken by OGNZL have been substantial over the past several decades and are reflected in the large areas of native shrubland and young forest that has been established along some watercourses around their existing Waihi based mining areas. This has not been a result of a requirement of conditions of a resource consent or other legislative requirement, but is rather the result of company policies around good environmental practice and engagement with the local community. While these plantings will have had enormous ecological benefit for stream health and habitat for wildlife, they are not 'counted' as part of the overall offset package that is proposed as part of this WNP project.

To assess the anticipated magnitude of potential ecological effects, ecology experts worked with other subject matter experts to understand the potential effects of sediment, earthworks, mine design, blasting design, stormwater discharge, treated water discharges, vibration, noise, air quality and other disciplines. Ecology experts have worked closely with other discipline leads to understand and translate these project design aspects into on-the-ground implications for ecology values. The assessments presented in the ecology reports reflect the project design at that time; any subsequent changes to the project design may have implication for the scale or severity of ecological effects and may therefore change the conclusions reached by the ecology experts.

Ecological loss: benefit assessments have been considered at the local level – that is, unavoidable impacts on streams or native vegetation or wildlife are proposed to be offset or otherwise addressed through actions that are nearby, on the same stream system or on the same habitat patch or within the same wildlife population, or are located to provide broader benefits, such as buffering, corridors or habitat linkages. This is explained in the ecology reports as seeking to provide a 'Nature Positive' or 'Net Gain' approach to effects management.

3.2 Summary of ecological effects

The ecology values that have been identified as potentially being unavoidably affected by the project are listed in Table 3, together with the 'value' of that ecology, any mitigations proposed, and the type and quantum of ecological redress or enhancement that is proposed to offset or otherwise compensate for effects, including where habitat values will be lost.

In aggregate, the offset and compensation components, together with proposed mitigations, constitute the *effects management package*.

Separate from the effects management package, there are several *additional ecological enhancements* that are proposed by OGNZL. These are not required to address adverse effects, but rather contribute to more a cohesive and comprehensive (and usually spatially sensible) means of enhancing ecology.

It is important to note that in aggregate these are substantial work in themselves in terms of spatial scale, breadth of ecological enhancements, and longevity of benefits to biodiversity in the landscape around the proposed mine site.

The additional ecological enhancements comprise:

- Willows SFA – planting of the edge of the Coromandel Forest Park to provide an ecological buffer between the Park and farmland. The total area of planting will be 5.5 ha.

- Integration of riparian planted corridors and connections across the area containing GOP, NRS, TSF3 and other existing TSFs.

- Willows SFA Mataura Wetland – fencing, stock exclusion, protection, and restoration.

- The Waihi North Biodiversity Project, which is an $8.4 million predator control and ecological enhancement project, to be implemented across an area of up to 18,870 ha of the southern CFP which is aimed at achieving long-term (inter-generational) positive ecological outcomes for the area. The Waihi North Biodiversity Project is more fully described in Section 3.3 as it constitutes significant package of funding and long-term commitment to improving the overall biodiversity of the Southern Coromandel Ranges.

- Preliminary designs of the TSF3/Ruahorehore Stream diversion suggest that a small wetland or backwater refuge area feature could be created as part of the diversion. The potential wetland/refuge would occur about half-way up the diversion. The objective of the wetland creation would be to provide increased habitat availability for eels (and other climbing fish) that migrate up and down the stream diversion, a rest area for migrating fish, and to enhance the functionality of the watercourse.

- The existing and planned (TSF3) tailings lakes form notable features within the OGNZL land holdings, and across the broader landscape. The tailings lakes are large, shallow and as they are elevated receive little runoff from the surrounding land. This means that the water quality can reach high levels of clarity and quality. Even without extensive ecological management, these lakes are self-developing as ecological features. Wildfowl are temporary visitors to the lakes, and reed beds are forming naturally along some of the margins. Active management of the lakes will provide further ecological enhancements. It is estimated that enhancement of the tailing lakes will provide 7,485 m of littoral margin length (cf. 1.5 ha), and an open water area of some 88 ha.

The effects management package, together with the additional ecological enhancements comprise the overall *ecological enhancement package*.

A more concise summary of the losses and enhancements described in Table 3 is provided below, and is illustrated in Figures 8-11.

1. Component parts within the Waihi mine area

Losses

- Gladstone Open Pit - reclamation of 47 m of intermittent stream
- Gladstone Open Pit - loss of 0.14 ha of riparian vegetation
- Northern Rock Stack – diversion of 1,389 m of stream
- TSF3 – diversion of 2,118 m of stream
- TSF3 – loss of pond habitat
- Gladstone Open Pit – 1 ha of a native planted vegetation, and 0.4 ha of the rocky hilltop which has a small number of native species and some lizard habitat
- TSF3 – removal of 3.6 ha of SNA rewarewa forest, and 4.6 ha of SNA tree fern scrub, 1.2 ha of low value mixed scrub and pōhutukawa (non-SNA western fragment), 0.4 ha of tree fern scrub (non-SNA Eastern Fragment) and 0.3 ha low value non-SNA planted vegetation.
- Northern Rock Stack – removal of 8.1 ha of native plantings.

Enhancements proposed

- Stream diversions (including functional design & riparian planting) within the Waihi mine area: 2,765 m
- Stream riparian restoration along the Mataura Stream and Ohinemuri River catchment: 7,646 m
- Offset 1: Areas available for replacement planting (18.7 ha). A minimum of 16.2 ha of this area will be planted in natives.
- Offset planting - 17.5 ha offset planting, 20 ha enhancement planting adjoining or within SNA 166, and 20 ha of offset restoration plantings along Ohinemuri River and around Gladstone Pit. All native plantings will be subject to 20 years of pest control (rats, possums, mustelids).
- Pest animal control: 6.5 ha of additional retained and protected habitats that support copper skinks on OceanaGold land at Gladstone Pit, where they are contiguous with terrestrial revegetation for habitat compensation (above).

2. Components parts within the Willows Road area

Losses

- Reclamation of 558 m of Tributary 2 (for waste rock stack)
- Approximately 0.25 ha of mixed native / exotic vegetation will be removed in the footprint of the rock stack and portal entrance

Enhancements proposed

- Riparian restoration of 1,995 m of stream length of Tributary 1 and Tributary 3 (see Figure 8).
- The loss of Tributary 2 is temporary (i.e. the adverse effect will be remedied), but the effects management and stream offset calculations set out above have assumed a permanent loss of the watercourse. However, we note that the rock stack is expected to have a 10-year lifespan and following that there will be a period of rehabilitation of Tributary 2. The rehabilitation of the tributary will result in an improved and enhanced catchment compared to that at present, i.e. the tributary will also meet its potential ecological value as assessed through an appropriate ecological offset model. This rehabilitation occurs beyond the offset provided for an assumed permanent loss of the tributary. Combined, the proposed offset and the proposed rehabilitation of Tributary 2

will result in a net gain in freshwater ecological values for the Willows Road component of the project.

3. Component parts within the Coromandel Forest Park area

Losses

- Permanent loss of flow to 7 linear meters (9 m^2 area) of warm spring.
- Temporary loss of vegetation / habitat (0.84 ha – see breakdown in table below) at the proposed exploration drill, pump and vent raise sites and impacts on fauna that occupy those areas.
- A low (but uncertain) risk for this project to generate residual adverse effects on Archey's and Hochstetter's frogs from water and air discharges from the vent raises, the surface expression of blast vibrations, and potential changes to the wetted margins of streams over part of the site. The potential areas of habitat include 314 ha for Archey's frogs and up to 1.5 km of stream in the Edmonds Catchment for Hochstetter's frogs.

Breakdown of vegetation clearance areas within the Coromandel Forest Park area above WUG

Description	Number	Clearance per site (m^2)	Total clearance (m^2)
Exploration and downstream exploration	8	150	1,200
Geotechnical drill sites	4	150	600
VWP additional	4	150	600
Tunnel alignment	4	150	600
Sub-total clearance with wooden decking	20		3,000
Pumping tests and ventilation shafts	4	900	3,600
Vent shafts exploration/ piezos	50	Minimal clearance i.e. canopy trimming	
Near stream piezos	12	Associated clearance already approved	
Grant total additional clearance			6,600
Other clearance (already applied for)	12		1,800
Total clearance being applied for			8,400 (0.84 ha)

Enhancements proposed

- Restoration and stock exclusion of at least six spring and gully headwaters (at least 80 m in length in total) within headwaters of Tributary 3 at Willows Farm.
- Vegetation clearance areas within the WUG site will be remediated back (in the medium to long term) to native vegetation following completion of use of those areas of drill sites, pump sites, camp facilities etc.
- The temporary loss of these vegetation areas will be offset by replanting and facilitating the natural regeneration of an approximately 27 ha area on the north east ridge and entire forest boundary at Willows Road (see Figure 8).
- The primary compensation measure to address these potential residual effects on frogs and other fauna, is wide scale intensive pest control over an area of 632 ha, including 314 ha exposed to vibration levels greater than 2mm/s and 318 ha immediately adjacent for a

period of 15 years, plus a 1 km wide buffer zone in which ungulates will be controlled to low levels.

- Compensation funding is proposed to undertake investigations into the efficacy of different predator control strategies and techniques to improve populations of Archey's frogs, and for the further development of methods to assess the efficacy for frogs of predator control generally assess efficacy of pest control regimes for frog recovery. The sum of funding will be $25,000 when the fund is first established, and then $25,000 annually for so long as mining activities continue.

3.3 Waihi North Biodiversity Project

The above-described ecological effects package is separate from the additional ecological enhancement package, which is a summarised as six additional enhancement actions in Section 3.2.

One of those additional enhancement actions is the Waihi North Biodiversity Project, which is so substantial that it warrants a more complete description – which is provided below.

Waihi North Biodiversity Project will establish and implement a $8.4 million predator control and ecological enhancement project within an area of up to 18,870 ha of the southern Coromandel Forest Park over a minimum 10 year term. The Project is intended to achieve long-term (inter-generational) positive ecological outcomes for the area and is additional to the measures necessary to mitigate, offset or compensate for the environmental effects associated with the project.

Broadly, the Waihi North Biodiversity Project will involve control of stoats, possums, feral cats, goats and deer. Within the 18,870 ha management area a more intensively controlled "core area" is proposed comprising approximately 1,300 ha which will include all of the Otahu Ecological Area (c. 655 ha) and immediately surrounding areas. Within the core area the species listed above will be controlled as well as rats, hedgehogs, pigs and perhaps mice.

The Waihi North Biodiversity Project is large enough that a variety of biodiversity benefits will accrue for a range of species and habitats typical of the Waihi Ecological District and southern Coromandel generally.

OGNZL has committed to finance the work involved in establishing and designing the Waihi North Biodiversity Project including providing $2,400,000 prior to commencing scoping within the Coromandel Forest Park to get the Waihi North Biodiversity Project underway, and then $600,000 annually thereafter for ten years or until mine closure, whichever is greater.

The dollar value offered for each year is proposed in the expectation that it will be sufficient to fund two years of predator control (one during operation and one following closure). In effect, ten years of mining should fund the implementation of 20 years of predator control work.

There are no anticipated adverse effects associated with the Waihi North Biodiversity Project, and the anticipated positive effects are not relied upon in any way for mitigation for the effects of mining activities, which are managed in their own right.

It is intended that the Waihi North Biodiversity Project will be operated as a partnership with tangata whenua, allowing due exercise of kaitiakitanga. It is intended that the objectives and details of the programme will be developed and implemented in partnership with tangata whenua.

In order to secure this commitment, OGNZL has proffered a set of consent conditions provided in the application documents, which are intended to be imposed on any approval granted for the WNP.

Table 3. Ecology values potentially affected by the WNP project, and proposed effects management approaches.

Ecological Effect (quantum and component of project) and information source	Scale and ecological value of resource impacted	Mitigation/ remediation proposed	Offset or compensation proposed	Net-balance (no-net-loss, net-loss or net-gain; and supporting basis for accounting)
GOP, NRS, TSF3 – streams (information sourced from Boffa Miskell freshwater ecology report (2024) for WNP) • Effect 1: GOP stream reclaim 47 m • Effect 2: NRS divert 1,389 m of Stream • Effect 3: TSF3 divert 2,118 m of stream	Impact 1: loss of 47 m moderate value Impact 2: divert 1,389 m moderate value Impact 3: divert 2,118 m moderate-high value	Native fish & koura salvage. Maintain fish passage for new culvert installations. Stream diversions (a form of mitigation): re-create streams through diversions of 2,764 m length	For the 47 m of stream reclaimed and the residual 644 m of stream not replaced by diversions, and to address time lags in functional restoration of diversions, restore 7,646 m of stream margins along the Mataura Stream and Ohinemuri River catchment	Net-gain for stream ecological values (functions and biodiversity), and a net-loss of extent of stream. The substantial stream and river margin restoration works are proposed as compensation for the permanent loss of 644 m of residual stream loss.
GOP, NRS, TSF3 – wetlands (information sourced from Boffa Miskell freshwater ecology report (2024) for WNP) • None affected	None affected	N/A	N/A	N/A
GOP, NRS, TSF3 – terrestrial (information sourced from Bioresearches terrestrial ecology report (2024) for WNP) • Effect 1: Removal of 8.1 ha native vegetation (including voluntary plantings) within the NRS • Effect 2: Removal of 3.6 ha of rewarewa forest and 4.6 ha of treefern scrub within SNA 166, and 1.2 ha of non-protected Western Fragment, and 0.4 ha of tree fern scrub (non-SNA Eastern Fragment) and 0.3 ha low value non-SNA planted vegetation • Effect 3: The loss of known habitat for copper skinks within the proposed Gladstone Open Pit, including 1 ha of native plantings, and 0.4 ha of rocky outcrop		Lizard salvage and relocation	Offset 1: Areas available for replacement planting (18.7 ha). A minimum of 16.2 ha of this area will be planted in natives. Offset planting - 17.5 ha offset planting, 20 ha enhancement planting adjoining or within SNA 166, and 20 ha of offset restoration plantings along Ohinemuri River and around Gladstone Pit. All native plantings will be subject to 20 years of pest control (rats, possums, mustelids). Pest animal control: 6.5 ha of additional retained and protected habitats that support copper skinks on OceanaGold land at Gladstone Pit, where they are contiguous with terrestrial revegetation for habitat compensation (above).	Modelled by BOAM (vegetation) and BCM (skinks). Net-gain outcomes for each.
Willows SFA – terrestrial (information sourced from Boffa Miskell terrestrial ecology report (2024) for WUG and Willows SFA) • Effects are less than minor	Effects are less than minor	N/A	None required or proposed.	N/A

Ecological Effect (quantum and component of project) and information source	Scale and ecological value of resource impacted	Mitigation/ remediation proposed	Offset or compensation proposed	Net-balance (no-net-loss, net-loss or net-gain; and supporting basis for accounting)
Willows SFA – streams (information sourced from Boffa Miskell freshwater ecology report (2024) for WNP) • Effect 1: Temporary loss of 588 m Tributary 2 under rock stack	588 m (moderate value)	Remediate Tributary 2 (full 588 m) and plant margins following removal of rock stack	Impact 1: Restore and protect 1,995 m of stream in the adjoining Tributary 3 and Tributary 1 catchments.	No-Net-Loss of extent when only considering Tributary 2 stream restoration following remediation works. A clear Net-gain for values when also including the riparian restoration of the Tributary 3 streams.
Willows SFA – wetlands (information sourced from Boffa Miskell freshwater ecology report (2024) for WNP) • Effect 1: Potential partial dewatering of the Mataura wetland	nil	Avoid works within or near to the Mataura wetland (0.28 ha).	Enhance the Mataura wetland (0.28 ha) by 10 m fenced buffer, remove stock, weed & pest management, and planting programme. This is supported by a BOAM model assessment (see Boffa Miskell report 2024)	The result will be a net ecological improvement to the Mataura wetland within the same catchment, as an additional ecological enhancement action (not linked to an adverse effect).
WUG spring – loss of 7 m of geothermal stream (information sourced from Boffa Miskell freshwater ecology report (2024) for WNP)	Loss of 9 m^2 of low value freshwater habitat	none	Compensation: fencing and planting of 85 m of headwater springs and seepage gullies of Tributary 3 at Willows SFA (amounting to 180 m length of watercourse (approx. 51 m^2 of freshwater habitat), which is a 6:1 enhancement ratio.	Enhancement of 6 x the area of spring loss of 9 m^2 of geothermal spring at WUG is commensurate.
WUG terrestrial (information sourced from Boffa Miskell terrestrial ecology report (2024) for WUG and Willows SFA; the OGNZL WUM groundwater and surface water management and monitoring plan (2024), and from the RMA Ecology Ltd assessment of effects report on WUG frogs (2024)); and offset calculations contained within this report. • Effect 1: loss of indigenous vegetation • Effect 2: potential loss of native frogs	Temporary loss of vegetation / habitat (0.84 ha). A low (but uncertain) risk of adverse effects on Archey's and Hochstetter's frogs The potential areas of habitat include 314 ha for Archey's frogs and up to 1.5 km of stream in the Edmonds Catchment for Hochstetter's frogs.	Check for bats prior to felling. Salvage frogs & lizards Groundwater mitigations including reinjection, grouting and supplying supplementary water	Vegetation clearance areas above the WUG site will be remediated back (in the medium to long term) to native vegetation following completion of surface works. The temporary loss of these vegetation areas will be offset by replanting and facilitating the natural regeneration of an approximately 27 ha area on the north east ridge and entire forest boundary at Willows Road (see Figure 8). The primary compensation measure to address these potential residual effects on frogs and other fauna, is wide scale intensive pest control over an area of 632ha, including 314 ha exposed to vibration levels greater than 2mm/s and 318 ha immediately adjacent for a period of 15 years. Compensation as research funding is proposed to undertake investigative work	Frog effects – modelled using Basic, BCM and BOAM offset models. Net-gain for extent and values from native forest planting. Net -gain is the most likely outcome for frogs from the mitigation and offset proposed.

Ecological Effect (quantum and component of project) and information source	Scale and ecological value of resource impacted	Mitigation/ remediation proposed	Offset or compensation proposed	Net-balance (no-net-loss, net-loss or net-gain; and supporting basis for accounting)
			above WUG and within the wider Wharekirauponga Animal Pest Management Area to assess efficacy of pest control regimes for frog recovery	
Services Trench • None – all works will avoid the mapped Favona wetland	N/A	N/A	N/A	No adverse effect.

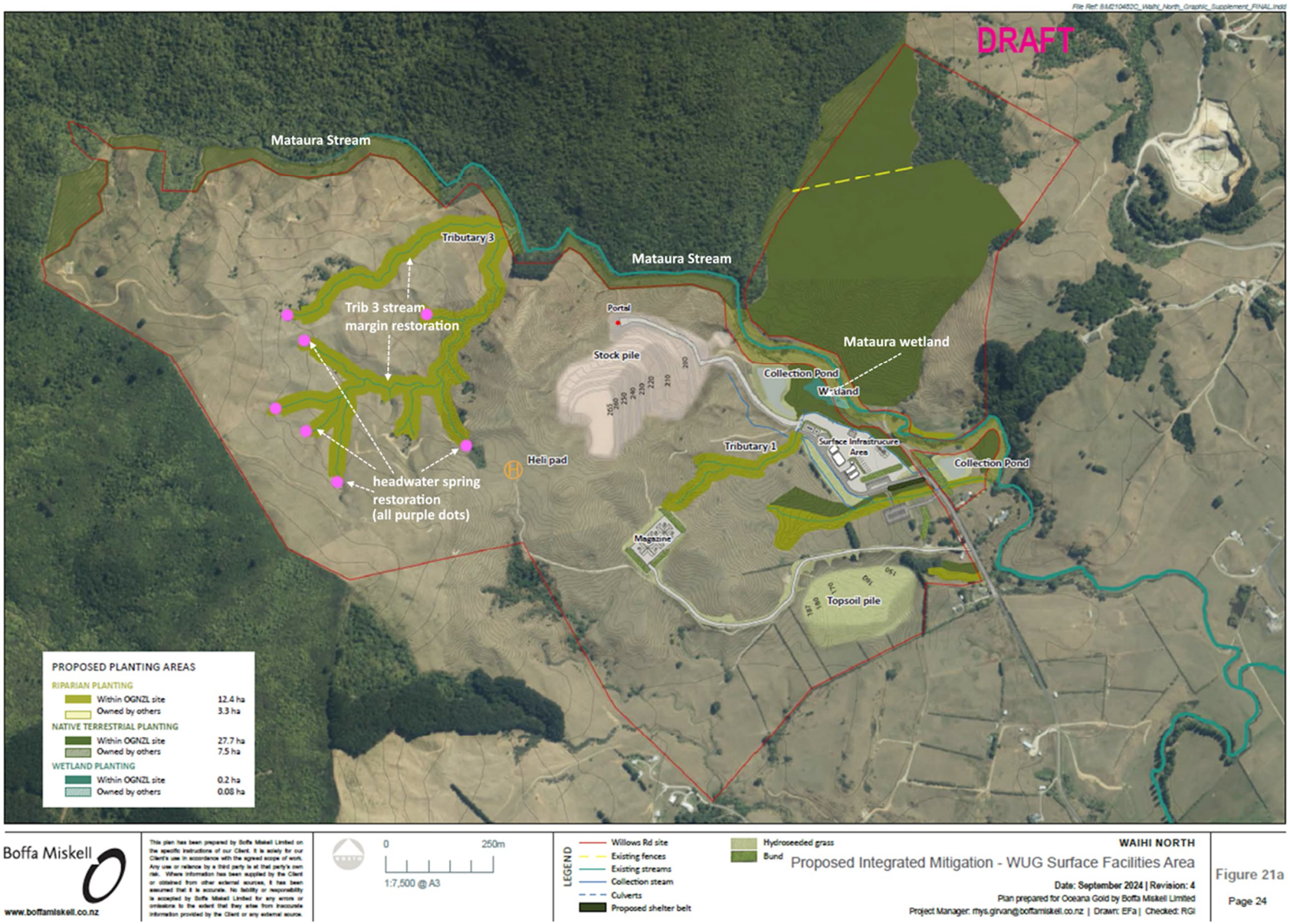

Figure 8. Location of freshwater and terrestrial offsets and compensation within Willows Road area (source – Boffa Miskell 2024, with markups added for labelling).

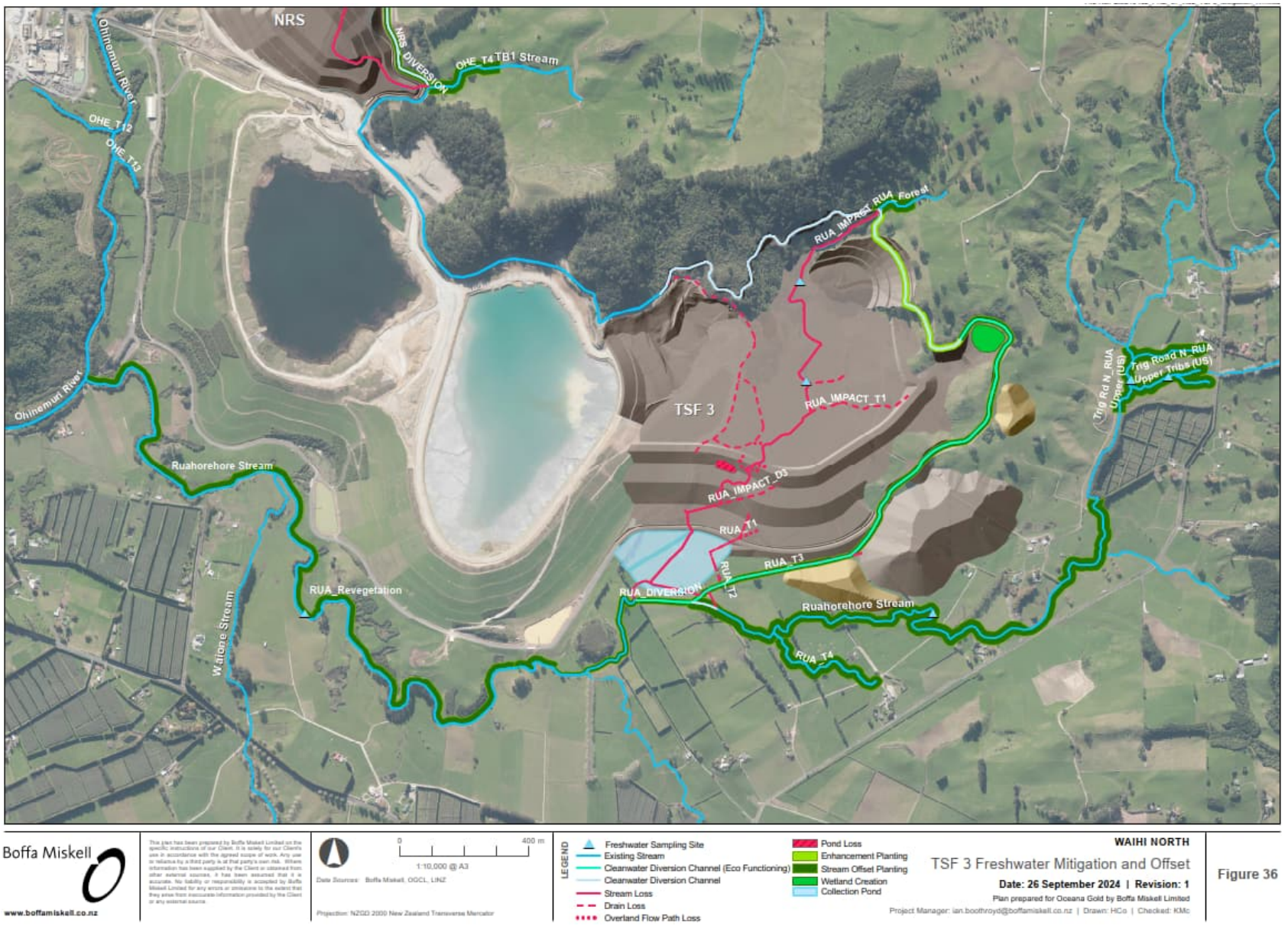

Figure 9. TSF3 freshwater mitigation (diversions) and offsetting (stream restoration).

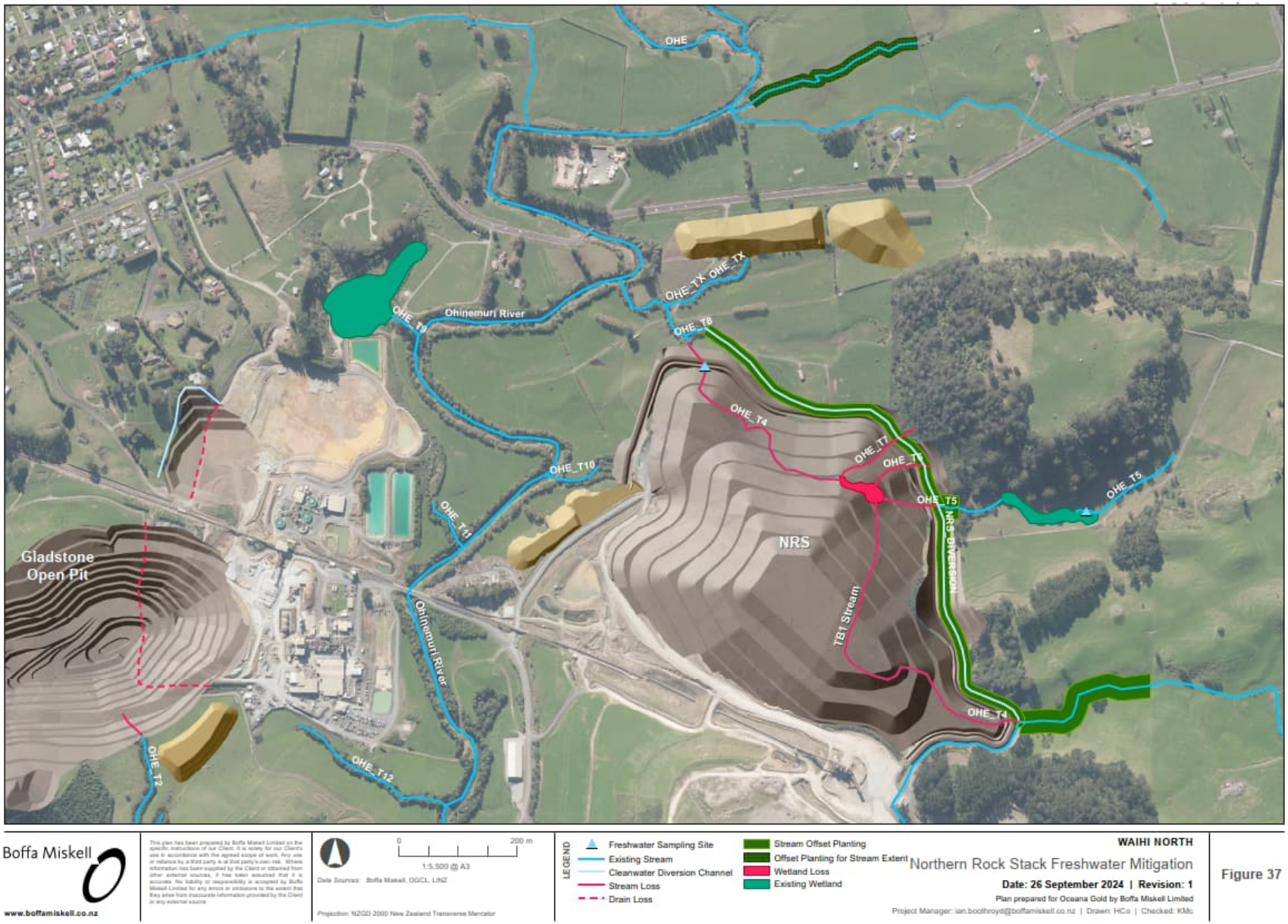

Figure 10. Northern rock stack freshwater mitigation (diversions) and offsetting (stream restoration).

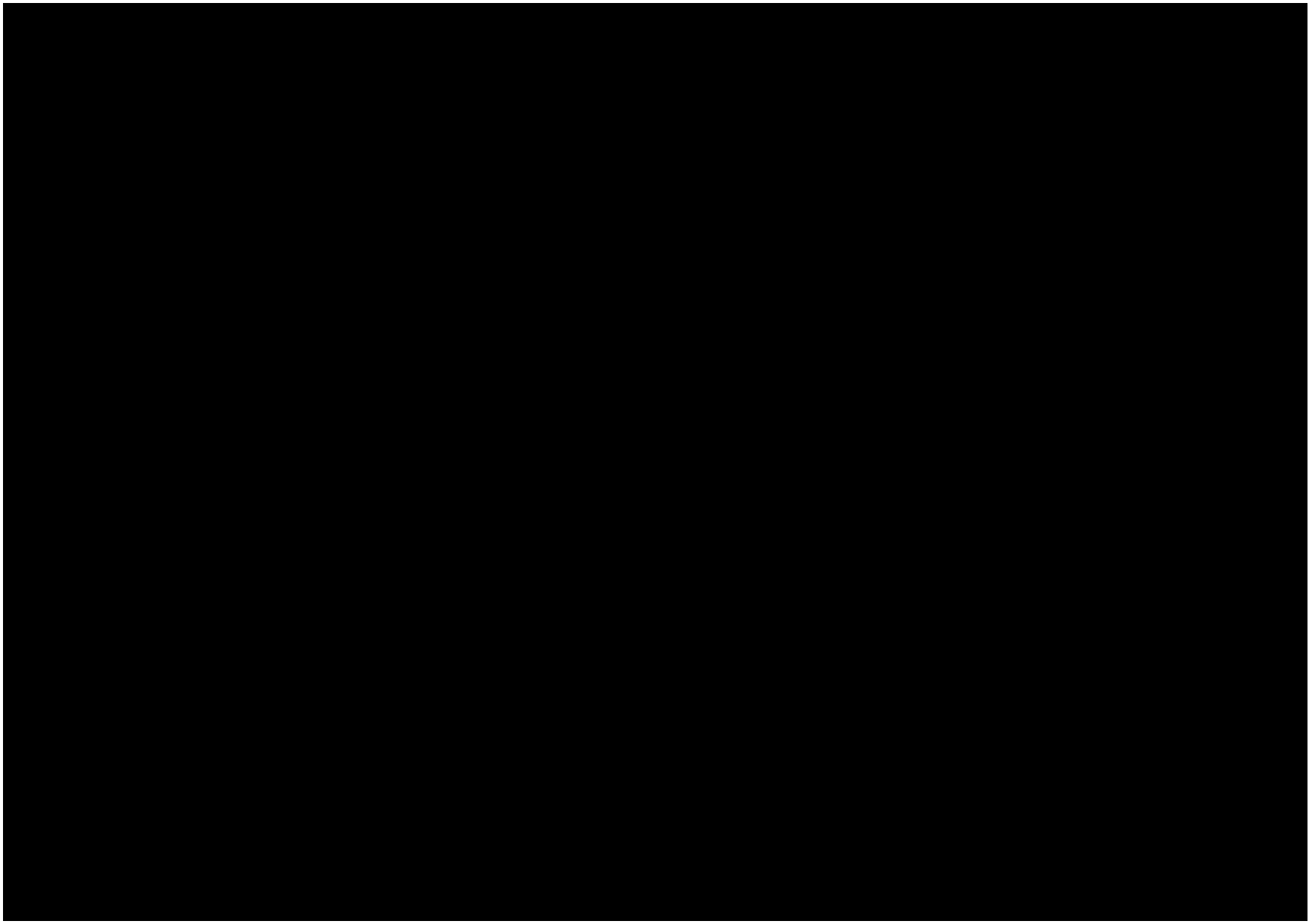

Figure 11. Terrestrial offset planting and enhancement works proposed to address residual impacts from the Gladstone pit, Northern Rock Stack and TSF3.

3.4 Additionality

All of the component parts of the effects management package involve activities or actions that would not have been otherwise undertaken by OGNZL or other agencies or organisations, and are not otherwise required by a Rule or statute.

In that regard, they are each additional to that legally required and the ecological benefits arising from these actions can be considered additional for the purposes of meeting 'ecological additionality' which usually forms one of several biodiversity offset and ecological compensation criteria or principles.

The project Ecology and Landscape Management Plan includes a range of initiatives to mitigate unavoidable adverse effects on landscape values. The landscape architects have identified that planting undertaken for ecological purposes is also useful and important for managing effects on landscape and natural character. As the primary objective for the native plantings being proposed is due to the need to mitigate, offset or compensation for adverse effect on ecology, and because the planting is not otherwise required or planned for, these plantings meet the 'additionality' principle of biodiversity offsetting.

4.0 Summary and conclusion

A suite of ecological enhancements is proposed to address the assessed effects on ecology values for the WNP project.

Some of those enhancements are mitigations proposed to salvage and relocate wildlife, or to realign or divert streams to prevent loss of connectivity. Where loss of values is unavoidable after mitigation - for example through loss of lizard habitat, stream length, or indigenous vegetation clearance, or where there may be a risk of loss of frogs – substantial biodiversity offsets or ecological compensation is proposed.

As is outlined in Table 3, all adverse effects on terrestrial ecology values will be replaced through extensive revegetation at the Waihi and Willows Road sites, or substantial animal pest control programmes to enhance landscape-level native forest communities and wildlife populations within the Wharekirauponga catchment and surrounds, such that the overall benefits will result in clear net-gain outcomes for target wildlife or communities.

For aquatic ecology values, an extensive programme of stream re-design and diversion is proposed, which will replace most loss of stream extent and all stream values by providing greatly improved watercourse quality at the Waihi site and throughout most of the Willows Road property. Where stream extent cannot be fully replaced, ecological compensation directed at extensive additional stream and river riparian restoration works will occur within the Mataura (Willows Farm) and Ohinemuri (Waihi) sites.

For the warm spring within Wharekirauponga, the loss of values associated with dewatering of the spring will be compensated for through restoration of spring values within multiple sites at Willows Farm. Loss of extent cannot be offset; however, the extensive programme of waterway, spring, forest, and wetland restoration at Willows Road is considered to provide measurable compensation. Mitigation for loss of groundwater – and hence avoidance of effects on fauna associated with water features that may be dewatered by the mine workings - includes reinjection, grouting and supplying supplementary water.

Additional enhancement of wetlands and seeps within the Wharekirauponga forested area is likely to result from the control of pest animal ungulates throughout a wide area of that catchment and surrounds, although this is not measurable and has not been 'counted' in our assessment.

Programmes to enhance terrestrial features are addressed separately from those that seek to offset or compensate for loss of aquatic values - there is no double-counting. All proposed enhancement locations and activities are additional to the level of management planned, required, or funded for those sites.

Although the assessment of individual effect categories and types of species of environments has been considered separately for the purposes of effects management, the overall enhancement programme is directed at creating connected ecological systems across the local landscape – from mountains to gullies and streams, and to connect forest areas to provide corridors for wildlife movement.

Most of the technical documents prepared by OGNZ on ecology matters relate to the measurement of values, effects and management of adverse effects through application of the effects management

hierarchy – and therefore initiatives are linked to addressing specific risk or threats or impacts on biodiversity.

Separate to this effects management package is a substantial package of additional ecological enhancements. The additional ecological enhancement package includes six (6) initiatives to protect edge environments of the Coromandel Park through substantial planting, integration at a landscape level of planted areas within the Waihi operation area, wetland creation and wetland protection – none of which are linked to a specific project impact, and all of which are proposed to provide additional, substantial benefits. By far the most substantial of these six initiatives is the Waihi North Biodiversity Project, which is an $8.4 million predator control and ecological enhancement project across an area of up to 18,870 ha of the southern CFP and which is aimed at achieving long-term (inter-generational) positive ecological outcomes for the area.

Overall, the package of ecological enhancements proposed by OGNZL for the WNP is centred on a net-gain ecology approach and will achieve clear net-benefits that substantially exceed the value and extent of areas modified or removed.

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