3. ENVIRONMENTAL SETTING

3.1 OVERVIEW

This section outlines the key characteristics of the proposed work sites for the WNP and the surrounding environment.

It provides details of:

- Existing relevant authorisations and approvals;
- Site zoning, land ownership, and residential activities;
- Cultural setting;
- Geology, hydrology and hydrogeology characteristics;
- Aquatic and terrestrial ecology values;
- Landscape and natural character values;
- Existing water resource users;
- Archaeological and historic heritage features;
- Existing noise and vibration levels;
- Meteorology;
- Air quality; and
- The transportation network.

Together, these factors provide a thorough analysis of the existing environment and establish a baseline against which to guide decision-making.

3.2 EXISTING AUTHORISATIONS AND APPROVALS

OGNZL currently holds a range of approvals for mining and related activities in and around the WNP area. Details of the existing activities and their respective authorisations are set out in the report presented in **Part E** of the application documents.

The existing authorised activities in each of the WNP's project areas are summarised below.

3.2.1 Area 1

OGNZL has an ongoing mineral exploration drilling programme within Area 1. This is authorised by suite of resource consents and non-RMA approvals set out on **Part E** of the application documents.

The existing authorised activities include:

- Up to drill sites 9 sites on Department of Conservation administered land and up to 2 drill sites on HDC road reserve, with no more than 10 sites in total being active at any time (each site comprising a wooden drill platform established in a cleared area no more than 12m x 12m);
- Up to 3 platform-based drill rigs, plus one portable drill rig in use at any one time;
- Installation of piezometers at existing drill sites;[36]
- Installation of up to 24 near stream piezometers across 12 sites;
- Ability to undertake pumping tests at four sites, and associated water takes and discharges;
- The installation, maintenance and use of a telemetry system for data collection;
- Native frog and lizard salvage and relocation prior to vegetation clearance at exploration sites;
- Two camp sites (one fixed, the other located on any drill site);
- Two helipads;
- Water pumps and associated pipes, hoses and tanks; and
- Minimum impact activities such as geological mapping, geochemical sampling, water flow gauging and geophysical surveys.

Surface aspects of the programme are shown in Figure 3-1 below.

[36] Concession 87585-OTH authorises the installation and drilling of six piezometers at existing drill sites and provides an extension of term for four exiting piezometers. As part of this application, OGNZL proposes to replace Concession 87585-OTH with a new concession and obtain authorisation for all activities covered by Concession 87585-OTH for the life of the WNP (refer to Section 4).

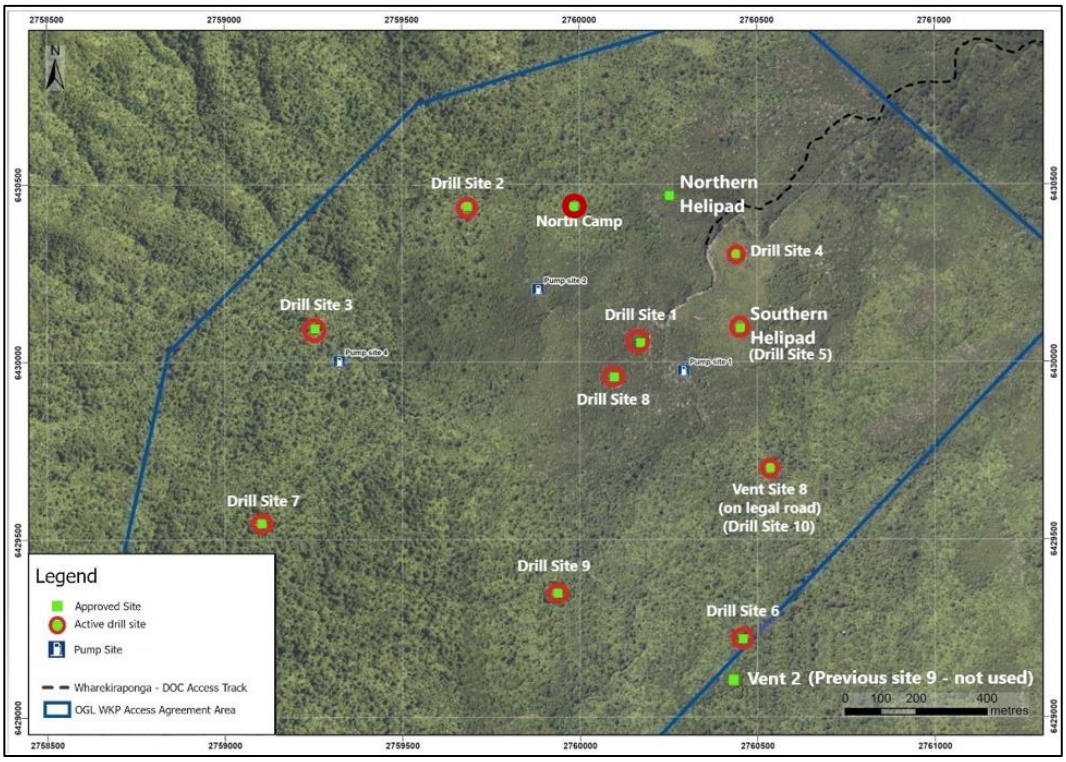

Figure 3-1: Wharekirauponga Drilling Programme Locations

With the exception of 2 drill sites on the road reserve, all these exploration activities take place on Department of Conservation administered land and are authorised under the various approvals detailed in the report contained in **Part E** of these application documents. In summary the key existing authorisations are:

> Mining Permit 60541 (Crown Minerals Act) – expires 2060;

> Access Arrangement 48614-AA-V4 (Crown Minerals Act) – expires 2027 with review in 2025;

> Minimum Impact Activity Authority 91248-MIA – expires 2026;[37]

> Concession 87585-OTH (Conservation Act) – expires 2025;[38]

> Concession 101993-OTH (Conservation Act) – expires 2034;

[37] Minimum Impact Activity Authority 91248-MIA authorises minimum impact activities within an area of MP 60541 (but excluding the area of access arrangement 48164). As set out in Section 4, OGNZL proposes to replace 91248-MIA with a new Wharekirauponga Access Arrangement that covers all WNP related activities on public conservation land within the Mining Permit 605481 area.

[38] OGNZL proposes to replace concession 87585-OTH with the Northern Concession and Wharekirauponga Access Arrangement, and to obtain authorisation for all activities covered by Concession 87585-OTH for the life of the WNP.

- Wildlife Act Authority 97859-FAU (Wildlife Act) – expires 2027 (subject to early expiry in 2025 in line with Access Arrangement);
- A suite of land-use consents granted by HDC (no expiry date); and
- Water take and discharge permits granted by WRC (global water take for drilling expires 2025 and is currently under renewal application with WRC; water take and discharge permit for pump testing at four sites expires 2029).

Together, these authorisations permit the existing exploration programme in its entirety.

3.2.2 Area 2

There are no existing or consented mining activities within Area 2.

3.2.3 Area 3

The southern portion of the tunnel corridor is located within the Favona Underground Mining area. The use of land for underground mining in this location is authorised by the Favona Underground Mine Land Use Consent 85.050.326.E (2004). More detail of the Favona consent is provided in the Existing Consented Activities report provided in **Part E** of these application documents.

The southern entrance to the tunnel will be via a new portal at the Waihi SFA. Existing consents at the SFA are addressed under Area 5, below.

3.2.4 Area 4

Area 4 comprises an underground purpose-built Services Trench between the proposed Willows SFA and the existing Waihi SFA (Area 5). The Services Trench will carry electricity, fibre, potable water, treated water and mine water (including rock stack contact water). Applications for the Services Trench works have already been lodged with WRC and HDC and are currently being processed.

More detail on the details of what is authorised is provided in the Existing Consented Activities report contained in **Part E** of these application documents.

An easement application for the section of the Services Trench which traverses Crown land is required from the Department of Conservation, and an application for this has been submitted (Application 117761-OTH).

3.2.5 Area 5

There are a range of existing mining activities undertaken within Area 5 (see Figure 3-2 below). They include:

- The Processing Plant;
- The WTP;
- The Favona Portal;
- The Favona Stockpile;
- The Run of Mine Stockpile;
- The Polishing Pond Stockpile;
- The Concrete Batching Plant; and
- The Maintenance Workshop area.

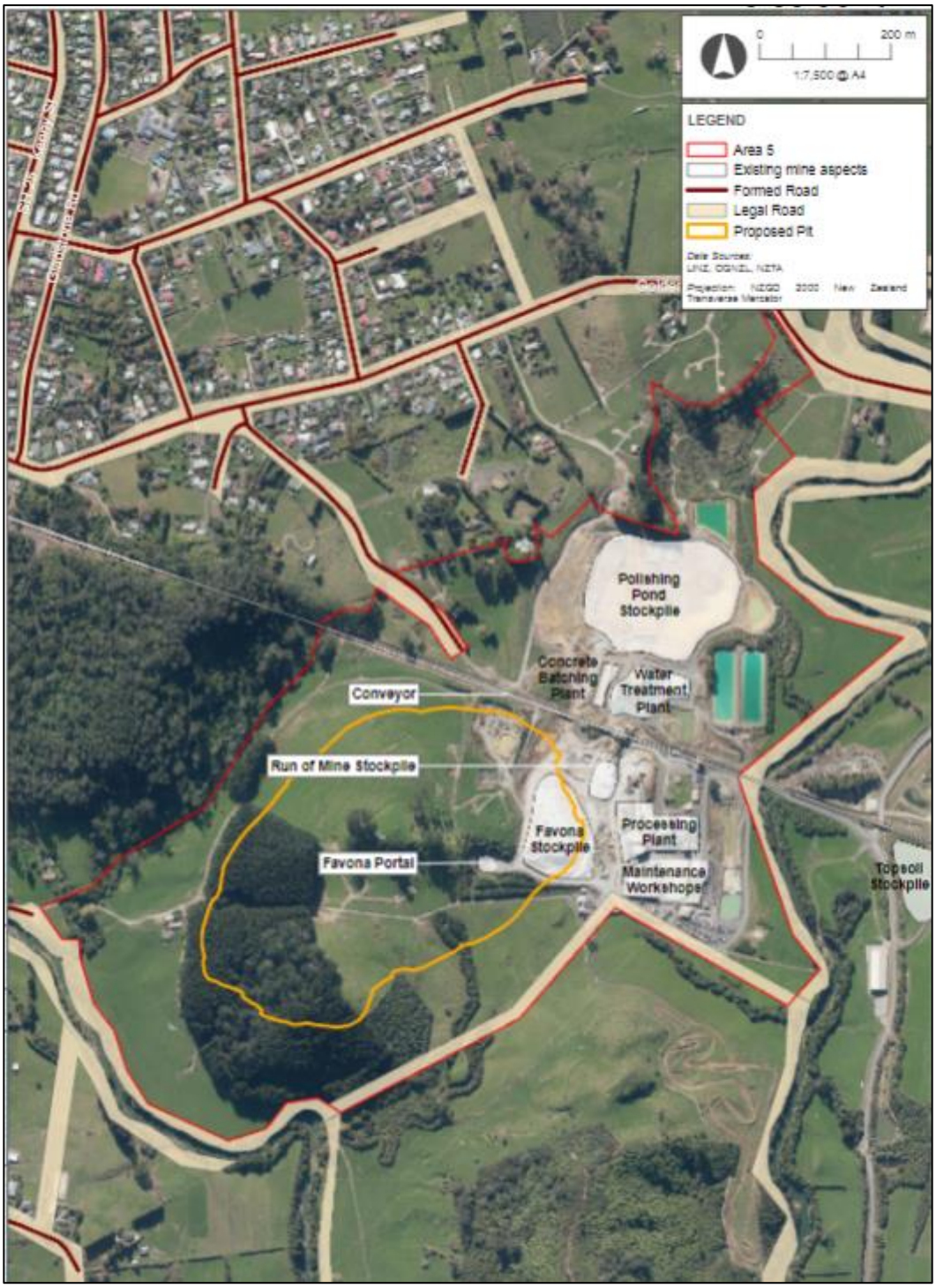

Figure 3-2: Existing Authorised Mining Activities within Area 5

A summary of how the use of land for each element is authorised is provided in Table 3-2 below. More detail on each element, how it is authorised, and the details of what is authorised is provided in the Existing Consented Activities report contained in **Part E** of these application documents.

Table 3-1: How the Use of Land for Each Existing Element Within Area 5 is Authorised

Activity	How is the Land Use Authorised?		
	HDP Permitted Activity Rule 5.17.1.1(P1) / ML 32 2388	HDP Permitted Activity Rule 5.17.1.1(P2) / LUC 97/98-105	Other
Conveyor	✓	✓	N/A
Processing Plant	✓		
WTP	✓		
Favona Portal			Favona Exploration Decline Land Use Consent 85.050.325.D and the Favona Underground Project LUC 85.050.326.E (2004).
The Run of Mine Stockpile	✓		
The Favona Stockpile	✓	✓	Favona Exploration Decline Land Use Consent 85.050.325.D
Polishing Pond Stockpile			Favona Underground Project LUC 85.050.326.E (2004).
Concrete Batching Plant			Correnso Underground Mine LUSE-202.2012 (2013). Project Martha LUC LUSE-202.2018.00000857.004.
Maintenance Workshop, Store and various other Amenity Facilities at the Waihi SFA	✓		LUSE-202.2022.00001604.001 authorises mining operations within and immediately adjacent to the unformed portion of Domain Road in the Rural zone and Reserve (Passive) zone to the south of the Processing Plant. These activities are limited to: The establishment and use of portacom structures and containers for storage;

Activity	How is the Land Use Authorised?		
	HDP Permitted Activity Rule 5.17.1.1(P1) / ML 32 2388	HDP Permitted Activity Rule 5.17.1.1(P2) / LUC 97/98-105	Other
			The use of buildings for workshop activities; Retaining walls, drainage and a safety berm; An access road, laydown area, car parking, and security fencing; and Electrical, water and wastewater lines.
The Favona Portal and decline			The Favona Exploration Decline Land Use Consent 85.050.325.D The Favona Underground Mine Land Use Consent 85.050.326.E (2004) authorises the expansion of the Favona Portal.
The Favona Underground Mine			The Favona Underground Mine Land Use Consent 85.050.326.E (2004) authorises this activity.

Various WRC resource consents authorise activities within Area 5. They are listed in Table 3-3 below and authorise:

- The discharge of contaminants to air within the footprint of the existing works;
- The taking of elution water from the Ohinemuri River;
- The WTP discharge to the Ohinemuri River;
- The diversion of natural water around the existing disturbed area;
- The discharge of water from silt ponds and collection ponds to the surface water during high flow events; and
- The discharge of material to land within stockpiles.

More detail on each element, how it is authorised, and the details of what is authorised is provided in the Existing Consented Activities report contained in **Part E** of these application documents.

Table 3-2: Existing WRC Resource Consents for Activities at Area 5

Resource Consent	Expiry Date
Discharge to Air	
AUTH 124859.01.04 [Project Martha consent] Discharge contaminants into the air relating to all activities within the Golden Link Project Area. This includes dust and carbon dioxide arising from mining operations, emissions from the Processing Plant including waste heat and water vapour, vehicle fumes, and other minor and / or fugitive emissions associated with mining operations; and within Area D1 only, smoke from burning of tramp material (including vegetation and surplus packaging).	16/07/2037
AUTH 109741 [Favona Consent] To discharge contaminants to air from the mine portal, ventilation shaft(s) and project area (fugitive emissions) being dust, CO2, blast fumes and exhaust fumes.	31/12/2028
Taking of water	
AUTH 1145542 Take up to 430 cubic metres per day of water from Ohinemuri River for elution water purposes.	15/7/2017
Water Treatment Plant Discharge	
AUTH 971318.01.12 To discharge treated water from the WTP into the Ohinemuri River via two discharge points.	13/10/2034
AUTH 971319.01.11 To place and use structures in the Ohinemuri River for the discharge of treated water from the WTP into the Ohinemuri River.	13/10/2034
AUTH 971320.01.11 To place and use structures in the Ohinemuri River for the discharge of treated water from the WTP into the Ohinemuri River.	13/10/2034
Diversion Drains	
AUTH 971310 To divert natural water (farm water runoff and intercepted groundwater) to the south on the western side of the Processing Plant site area.	13/10/2034
AUTH 971317	13/10/2034

Resource Consent	Expiry Date
To discharge natural water (farm runoff and intercepted groundwater) diverted to the south on the western side of the Processing Plant site area.	
AUTH 109743 To divert and discharge ground and surface water (farm runoff and intercepted groundwater) from around the project area [the Polishing Pond Stockpile].	13/12/2028
Silt and Collection Pond discharges	
AUTH 971313 To place and use structures across a watercourse for the purpose of constructing a collection pond for the WTP.	13/10/2034
AUTH 971314 To dam a watercourse for the construction of a collection pond for the WTP.	13/10/2034
AUTH 971315 To discharge water from the collection pond to the Ohinemuri River.	13/10/2034
AUTH 971311 To discharge settled stormwater from the silt ponds into the Ohinemuri River and the Ruahorehore Stream.	13/10/2034
AUTH 971312 To discharge water from the collection ponds within Area D, to the Ohinemuri River and to the Ruahorehore Stream.	13/10/2034
Stockpiles	
AUTH 971295 To place ore, waste rock, topsoil and other material in stockpiles.	13/10/2034
AUTH 109744 To discharge waste rock and ore onto land in temporary surface stockpiles and to discharge seepage from the temporary stockpiles into ground [Polishing Pond Stockpile].	31/12/2028

OGNZL's existing Waihi operations are also authorised under Mining Permit 41808 (Crown Minerals Act) which expires in 2044. More detail on this authorisation is contained in **Part E** of these application documents.

3.2.6 Area 6

Existing mining activity within Area 6 consists of the Northern Stockpile, TSF2, workshops, and the ore conveyor. These are shown in Figure 3-3, below.

The use of land for various mining operations in and around the area occupied by TSF2 and the Northern Stockpile is currently authorised by:

- Rule 5.17.4.1(P1) of the HDP, where that activity is undertaken in accordance with the conditions of, and within the area covered by, expired Mining Licence ("**ML**") 32 2388 (ML 32 2388), including but not limited to:
  - The establishment and operation of TSF1A up to a height of 177.25 m RL;
  - The use of the Northern, Central and Eastern Stockpiles;
  - The operation of the conveyor;
  - The establishment and use of various haul roads, perimeter roads, topsoil stockpiles, diversion drains and collection ponds; and
  - Rehabilitation.
- LUSE202.2018.00000812.002 which authorises the establishment, operation, and rehabilitation of TSF2 up to a height of 160.7 m RL; and
- LUSE 202.2021.00001466.001 which authorises the establishment, operation, and rehabilitation of TSF1A up to a height of 182 m RL.

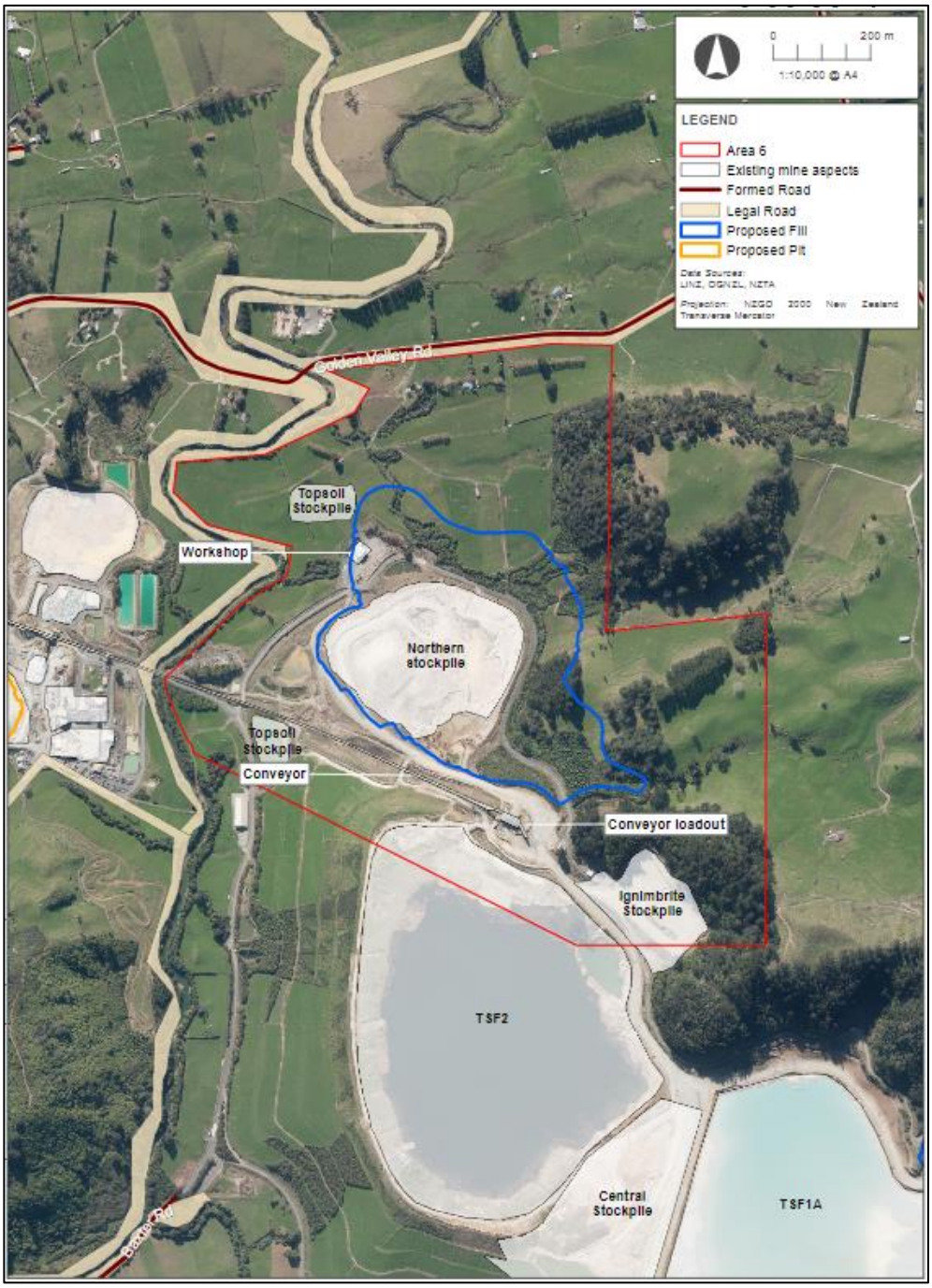

Figure 3-3: Existing authorised mining activities within Area 6

Various WRC resource consents authorise activities at TSF2 and the Northern Stockpile area. They are listed in Table 3-4 below and authorise:

> The discharge of contaminants to air within the footprint of the existing works;

> The diversion of natural water around the existing disturbed area, including via the Northern Uphill Diversion Drain which will be extended as part of the WNP;

- The discharge of water from collection and silt ponds to surface water during high flow events;
- The discharge of material to land within the Northern Stockpile;
- Various consents which authorise the establishment and operation of TSF2; and
- The discharge of water from TSF2 to TB1 following rehabilitation.

Table 3-3: Existing WRC Consents Which Authorise Activities in Area 6

Resource Consent	Expiry Date
Discharge to Air	
AUTH 124859.01.04 [Project Martha consent] Discharge contaminants into the air relating to all activities within the Golden Link Project Area. This includes dust and carbon dioxide arising from mining operations, emissions from the Processing Plant including waste heat and water vapour, vehicle fumes, and other minor and / or fugitive emissions associated with mining operations; and within Area D only, smoke from burning of tramp material (including vegetation and surplus packaging)	16 July 2037
Diversion Drains	
AUTH 971296 To divert natural water (farm runoff and intercepted groundwater) around Oxidised Stockpile N2	13/10/2034
AUTH 971297 To discharge natural water (farm runoff and intercepted groundwater) diverted around Oxidised Stockpile N2 at the northern end of Storage 2 into an unnamed tributary (Unnamed Stream1) of the Ohinemuri River	13/10/2034
AUTH 971298 To divert an unnamed tributary (Unnamed Stream 2) of the Ohinemuri River at the northern end of Storage 2	13/10/2034
AUTH 971299 To divert part of an unnamed tributary (Unnamed Stream 1) of the Ohinemuri River by way of culverting at the northern end of Storage 2	13/10/2034
AUTH 971309 To divert natural water (farm runoff and intercepted groundwater) around Storage 2 (and part of Storage 1A) via the Northern Uphill Diversion Drain	13/10/2034
AUTH 971310	13/10/2034

Resource Consent	Expiry Date
To discharge diverted natural water (farm runoff and intercepted groundwater) around Storage 2 (and Part of Storage 1A) via the Northern Uphill Diversion Drain into an unnamed tributary (Unnamed Stream 2) of the Ohinemuri River	
Silt and Collection Pond discharges	
AUTH 971311 To discharge settled stormwater from the silt ponds into the Ohinemuri River and the Ruahorehore Stream	13/10/2034
AUTH 971312 To discharge water from the collection ponds within Area D, to the Ohinemuri River and to the Ruahorehore Stream	13/10/2034
Stockpiles	
AUTH 971295 To place ore, waste rock, topsoil and other material in stockpiles	13/10/2034
TSF2	
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	1/10/2026
W1761 To discharge natural water containing waste onto the land and into the ground beneath storage 2 and the holding pond	1/10/2026
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 in a line described as approximately NZMS260-T13-648193 north to 645196 south to 644184 south east to 652175 and northeast to 657181, near Black Hill Reserve.	1/10/2026
Discharge from Rehabilitated TSF	
AUTH 971323 To discharge water from the tailing ponds following rehabilitation into an unnamed tributary (Unnamed Stream 2) of the Ohinemuri River	13/10/2034

As noted above, OGNZL's existing Waihi operations are also authorised under Mining Permit 41808 (Crown Minerals Act) which expires in 2044. More detail on this authorisation is contained in **Part E** of these application documents.

3.2.7 Area 7

TSF3 encompasses the Eastern Stockpile and keys into TSF1A, as shown in Figure 3-4, below.

The use of land for various mining operations in and around the area occupied by TSF1A and the Eastern Stockpile is currently authorised by:

- Rule 5.17.4.1(P1) of the HDP where that activity is undertaken in accordance with the conditions of, and within the area covered by, expired Mining Licence 32 2388, including but not limited to:
  - The establishment and operation of TSF1A up to a height of 177.25 m RL;
  - The use of the Eastern Stockpile;
  - The establishment and use of various haul roads, perimeter roads, topsoil stockpiles, diversion drains and collection ponds; and
  - Rehabilitation.
- Rule 5.17.4.1(P2) of the HDP where that activity is undertaken in accordance with the conditions of, and within the area covered by expired Land Use Consent 97/98 – 105, including:
  - Mining operations and associated earthworks;
  - Stockpiling of waste rock;
  - Construction and use of haul roads;
  - Miscellaneous drainage works; and
  - Rehabilitation.
- LUSE 202.2021.00001466.01 which authorises the establishment and operation of TSF1A up to a height of 182 m RL.

An overview of the areas which are subject to Rule 5.17.4.1(P1) and Rule 5.17.4.1 (P2) is provided in Figure 3-5, below.

The area covered by LUSE 202.2021.00001466.01 is shown in Figure 3-6.

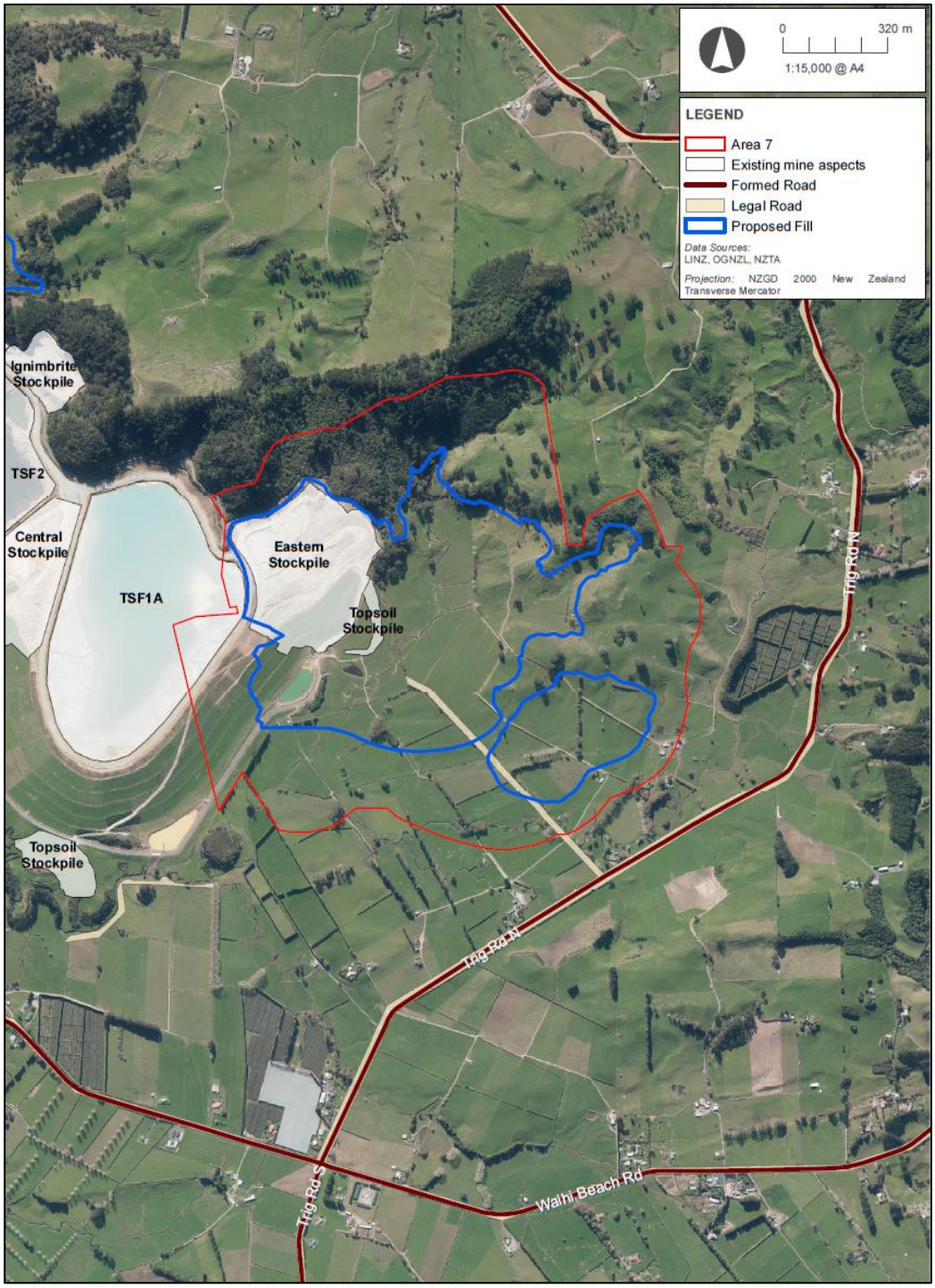

Figure 3-4: Existing Authorised Mining Activities Within Area 7

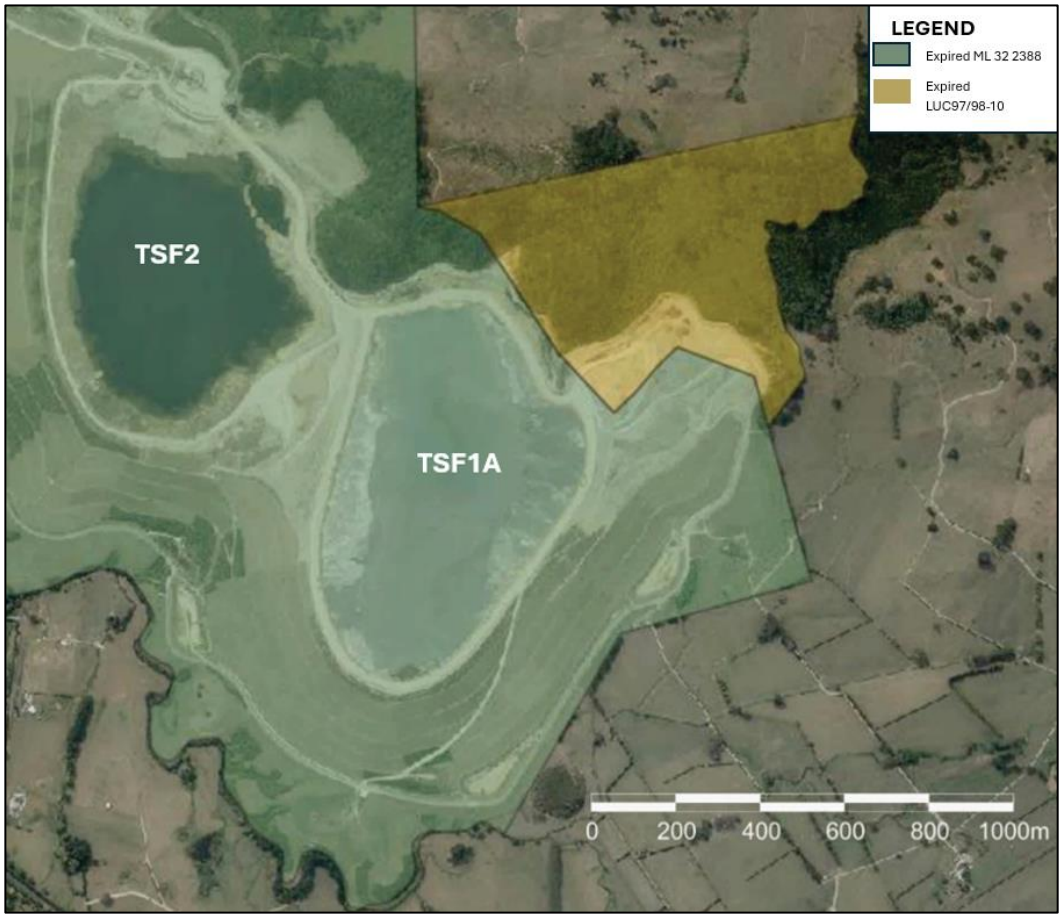

Figure 3-5: Areas of Land Covered by Rule 5.17.4.1(P1) (expired ML 32 2388) (blue) and Rule 5.17.4.1(P2) (expired LUC 97/98-10 (yellow)

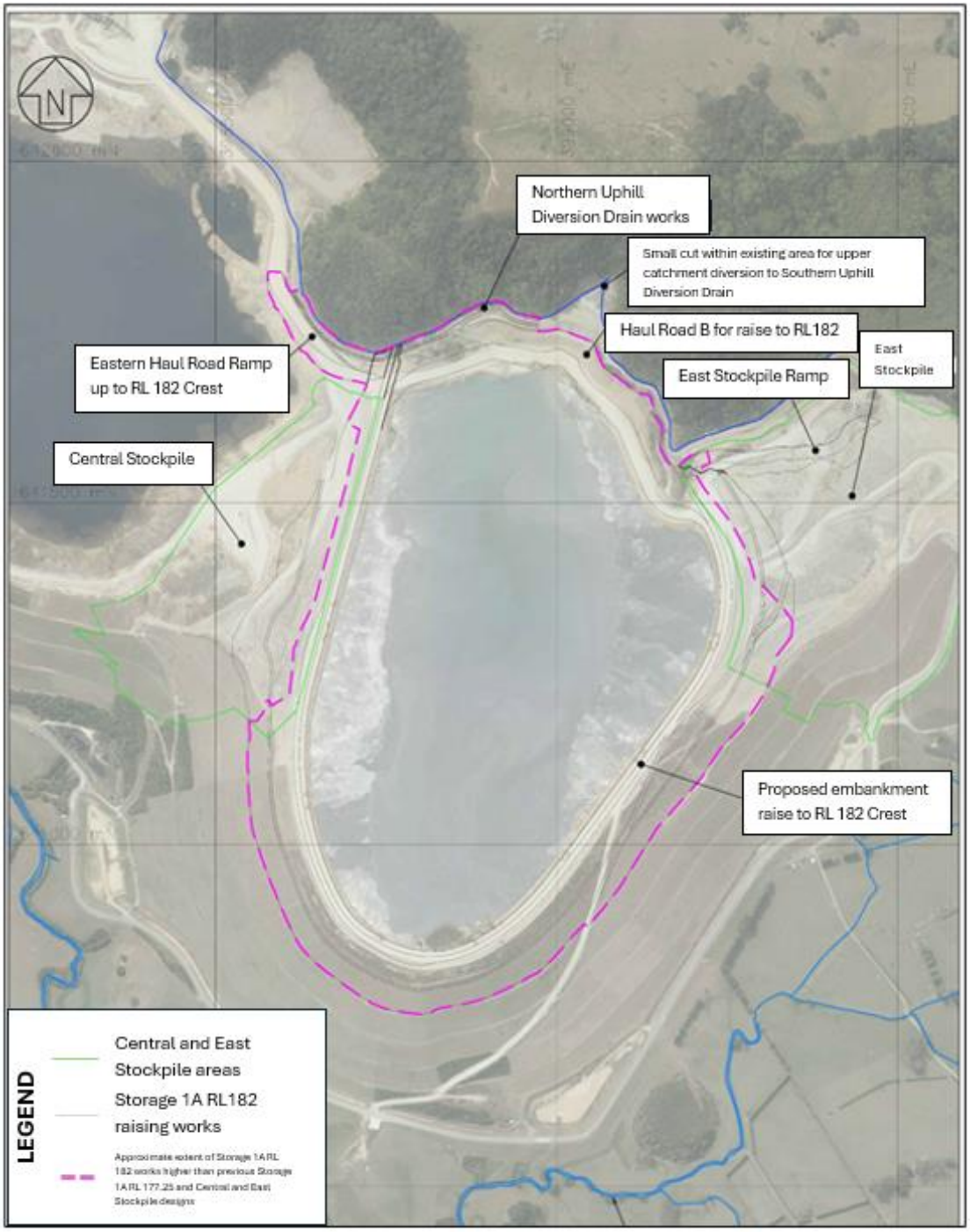

Figure 3-6: Area of TSF1A Covered by LUSE 202.2021.00001466.01 Which Authorises the Establishment and Operation of TSF1A up to a height of 182 m RL (area within the pink dashed line)

As noted above, OGNZL's existing Waihi operations are also authorised under Mining Permit 41808 (Crown Minerals Act) which expires in 2044. More detail on this authorisation is contained in **Part E** of these application documents.

3.3 SITE ZONING, HIGHLY PRODUCTIVE LAND, LAND OWNERSHIP, AND RESIDENTIAL ACTIVITIES

3.3.1 Site Zoning

The proposed work sites for the WNP are located within the regulatory boundaries of the WRC, the HDC, and the TCDC.

The HDP and Thames Coromandel District Plan ("**TCDP**") specify zoning for the proposed work sites and anticipated use and development within these areas. These are identified in the sections below.

3.3.1.1 Area 1

Area 1 comprises land both within the HDC and TCDC regulatory boundaries.

The Wharekirauponga orebody is located within Area 1 and beneath the Coromandel Forest Park. The Coromandel Forest Park is located within the HDP's Conservation (Indigenous Forest) Zone and the TCDC's Conservation Zone (see Figure 3-7).

The proposed works within Area 1 also intersect:

- SNA T13P152;
- Wharekirauponga Heritage Area (Category B) 271;
- Outstanding Natural Landscape ("**ONL**") (Map N2 of the HDP);[39] and
- Outstanding Natural Feature and Landscape ("**ONFL**") (Map 38 Overlays of the TCDP).

[39] Section 5.2.1(5) of the HDP classifies the whole of the Conservation (Indigenous Forest) Zone as "Outstanding Natural Landscape".

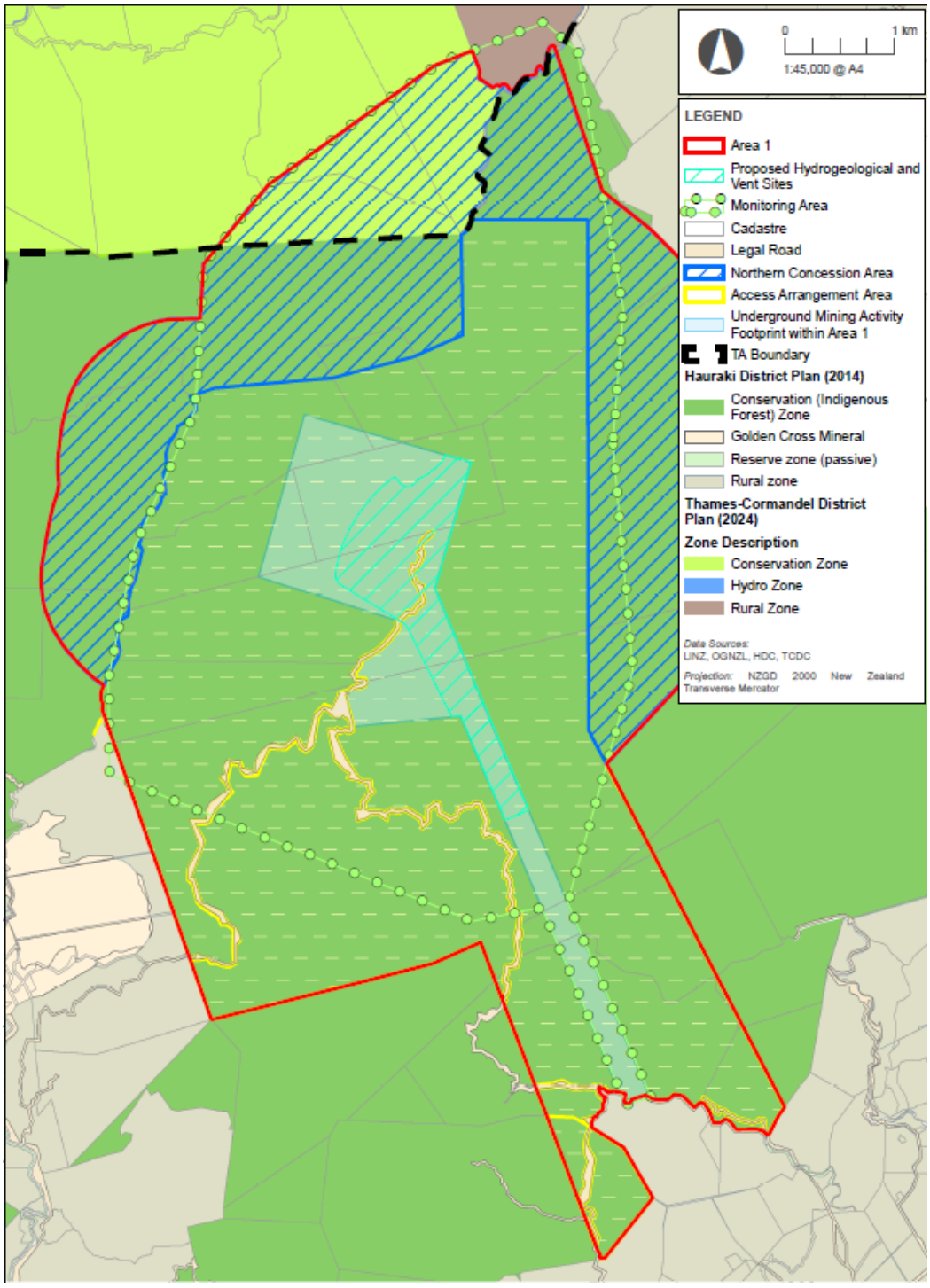

Figure 3-7: Hauraki District Plan and Thames Coromandel District Plan Surface Zoning of the Wharekirauponga Orebody and Area 1

The Department of Conservation's Waikato Conservation Management Strategy (2014 – 2024) seeks to implement objectives and policies relating to the integrated management of natural and historic resources (including species managed by the Department of Conservation), recreation, tourism, and other conservation purposes. The objectives and policies of the Conservation Management Strategy that are of relevance to the WNP have been considered within the technical assessments supporting this application (provided as Part B to these application documents), and within Section 8.8.3 of this report.

3.3.1.2 Area 2

Area 2 comprises land within the HDC regulatory boundaries.

Surface facilities activities associated with the proposed mining of the Wharekirauponga orebody will be located in Area 2 at a site on Willows Road (the Willows SFA, the Willows Portal, the Willows helipad etc). The site is located entirely within the Rural Zone (refer to Figure 3-8). It is bounded by the Rural Zone to the south and the Conservation (Indigenous Forest) Zone and Coromandel Forest Park to the north. There is a small section of Reserve (Passive Zone) adjacent to the banks of the Mataura Stream, however, this is located outside of the boundaries of the site, within Crown owned land.

Figure 3-8: Hauraki District Plan Zoning of Area 2

3.3.1.3 Area 3

Area 3 comprises land within the HDC regulatory boundaries.

The proposed Wharekirauponga Access Tunnel linking the existing Waihi SFA (Area 5) to the Wharekirauponga orebody (Area 1) will be located within Area 3 and will, as illustrated in Figure 3-9:

- Traverse beneath the Rural Zone;
- Traverse beneath areas of the Residential Zone, including residential development along Barry Road, Mataura Road and Wenlock Street; and
- Traverse beneath a small area of Martha Mineral Zone.

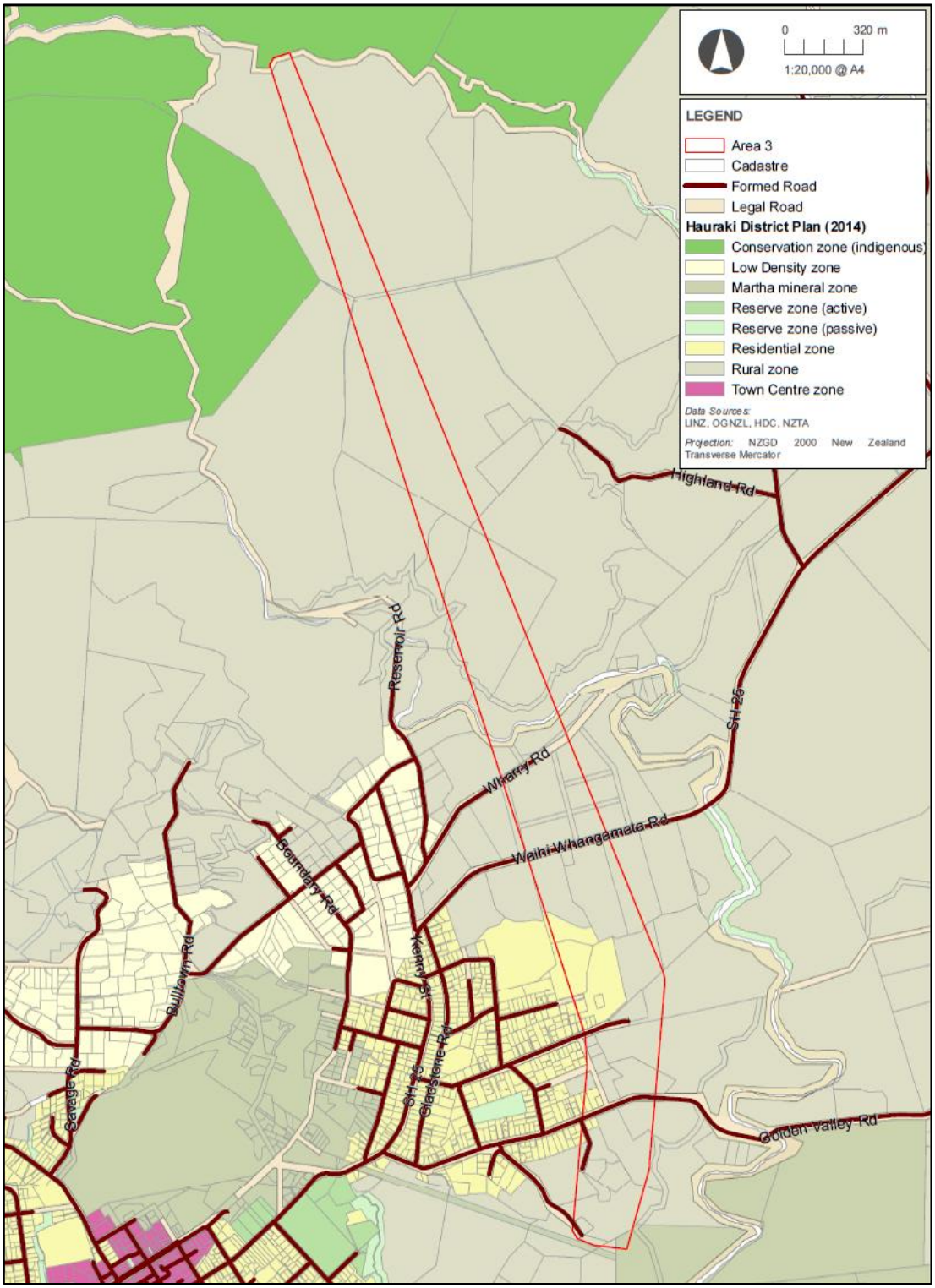

Figure 3-9: Hauraki District Plan Zoning of Area 3

3.3.1.4 Area 4

Area 4 comprises the Services Trench, which does not form part of this application, other than as detailed in Section 3.2.4.

3.3.1.5 Area 5

Area 5 comprises land within the HDC regulatory boundaries.

The GOP and upgrades to the Waihi SFA in Area 5 will be located within the Rural Zone and the Martha Mineral Zone (refer to Figure 3-10). Area 5 is bounded by land in the Martha Mineral Zone to the east, Reserve (Passive) Zone to the south (Ngāti Koi Domain), and Rural Zone to the west and north.

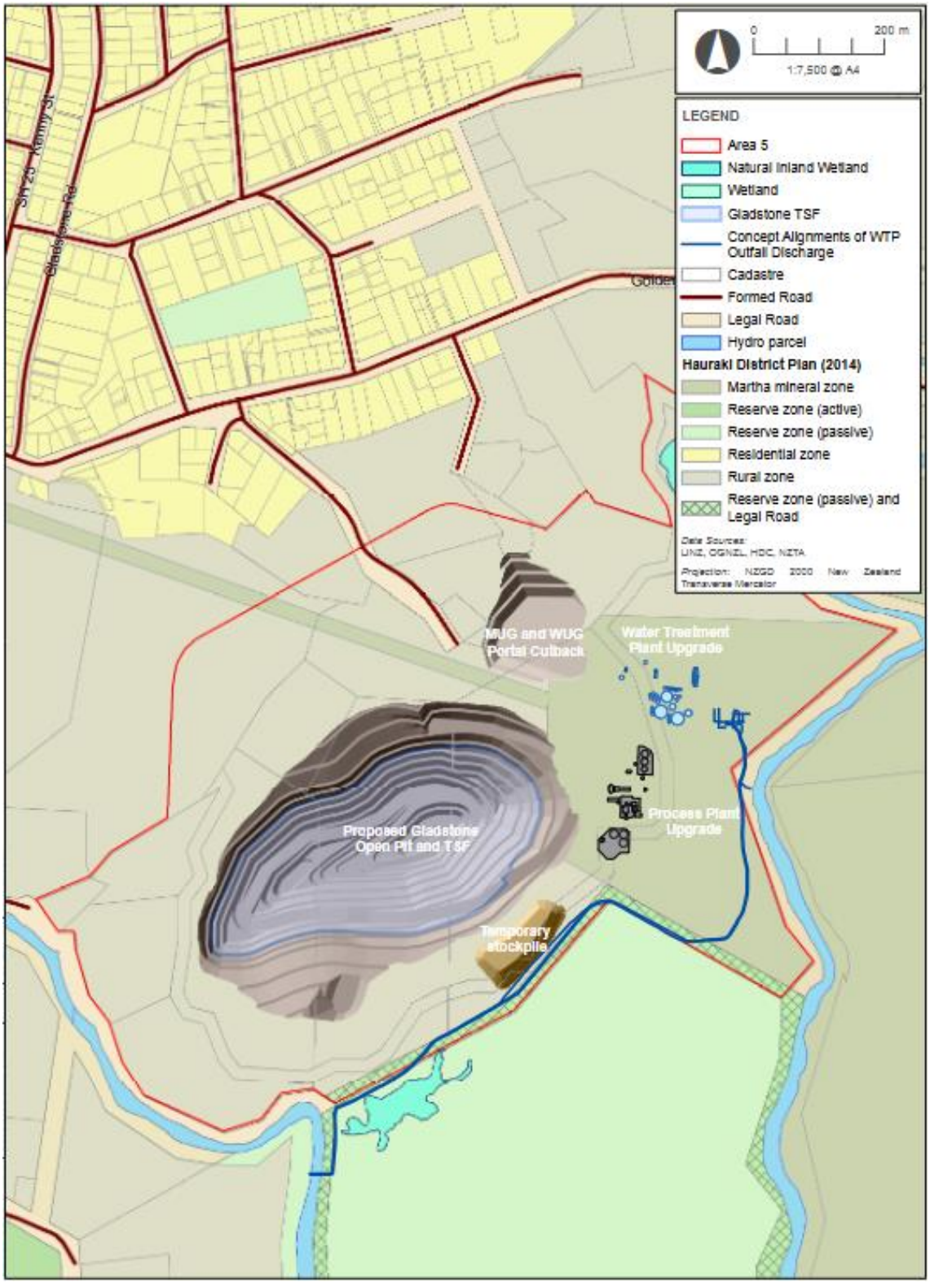

Figure 3-10: Hauraki District Plan Zoning of Area 5

3.3.1.6 Area 6

Area 6 comprises land within the HDC regulatory boundaries.

The NRS and associated infrastructure proposed in Area 6 will be located within the Martha Mineral Zone (refer to Figure 3-11). The area is adjoined by Rural Zone to the north and east, the Martha Mineral Zone to the west, and the Reserve (Passive) Zone (the Ngāti Koi Domain) to the south-west.

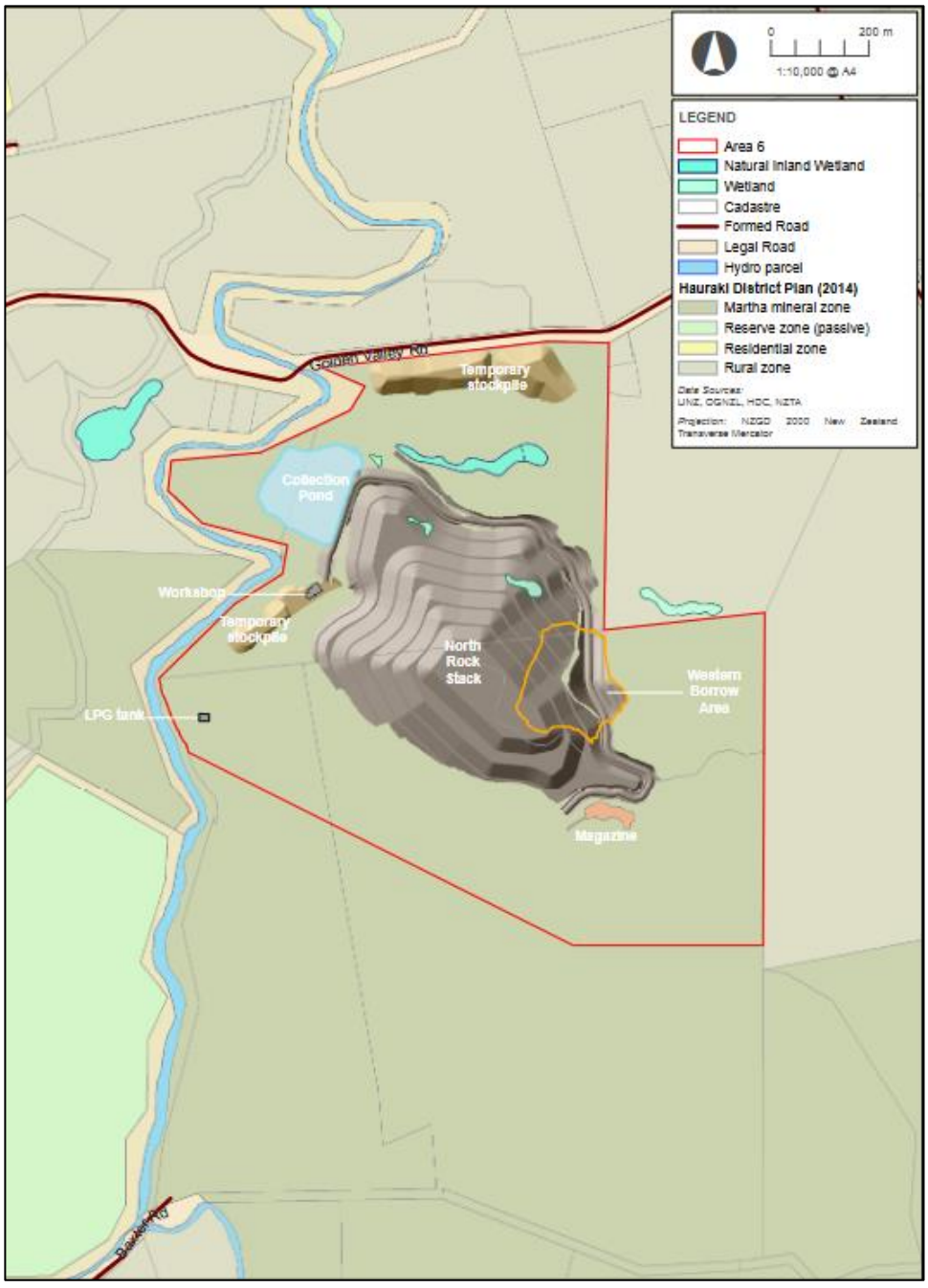

Figure 3-11: Hauraki District Plan Zoning of Area 6

3.3.1.7 Area 7

Area 7 comprises land within the HDC regulatory boundaries.

TSF3 and associated infrastructure proposed within Area 7 will be located within both the Rural Zone and the Martha Mineral Zone (refer to Figure 3-12).

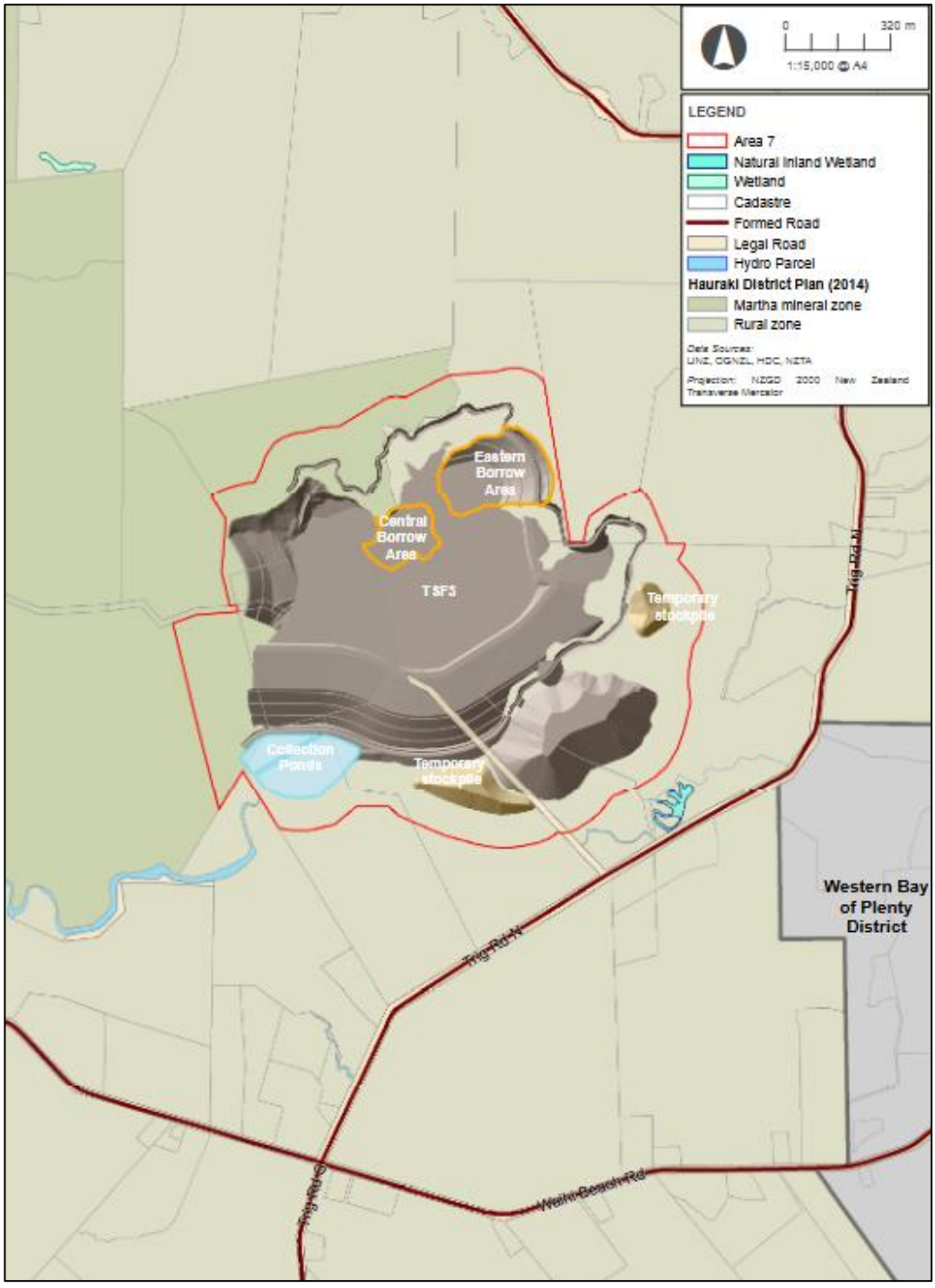

Figure 3-12: Hauraki District Plan Zoning of Area 7

3.3.1.8 Activities outside Areas 1 – 7

A number of activities are also proposed outside Areas 1 – 7 (as detailed further in Section 2.13 of this report). The zoning of these activities is as follows:

- **Operating the existing conveyor in the reverse direction**

  As set out in Section 2.10.1.1 of this report, as a result of the proposed reversing of the conveyor to provide for the transfer of rock between the GOP, Polishing Pond Stockpile, and the NRS, part of the conveyor to the west (and outside) of Area 5 will also be operating in a reverse direction (albeit with no material on it).

  The conveyor is located on Martha Mineral Zone land.

- **Undertaking terrestrial and riparian restoration and enhancement planting**

  Restoration and enhancement planting is proposed outside of, but in close proximity to Areas 2, 3, 4, 5, 6, and 7.

  The zoning of the areas for proposed restoration and enhancement planting includes the following zones, as depicted on Figures 2-33, 2-35, 2-38, 2-60, 2-67, 2-79:

  - Conservation (Indigenous Forest) Zone;
  - Reserve (Passive) Zone;
  - Rural Zone; and
  - Martha Mineral Zone.

- **Establishing carparking at Kenny Street**

  As set out in Section 2.13.3 of this report, OGNZL proposes to establish 150 car parking spaces on sites located adjacent to the Martha Mine. The proposed parking areas are located on Martha Mineral Zone and Unformed Road.

3.3.2 Highly Productive Land

The National Policy Statement for Highly Productive Land 2022 ("**NPS-HPL**") came into effect on 17 October 2022. It provides direction to protect highly productive land ("**HPL**") from inappropriate use and development. The WNP includes activities in Areas 2, 3, 5, and 7 that have been identified as HPL (in accordance with Clause 3.5(7) of the NPS-HPL). Figures 3-13 – 3-16 below illustrate that land within Areas 2, 3, 5, and 7 which is deemed highly productive under the NPS-HPL.

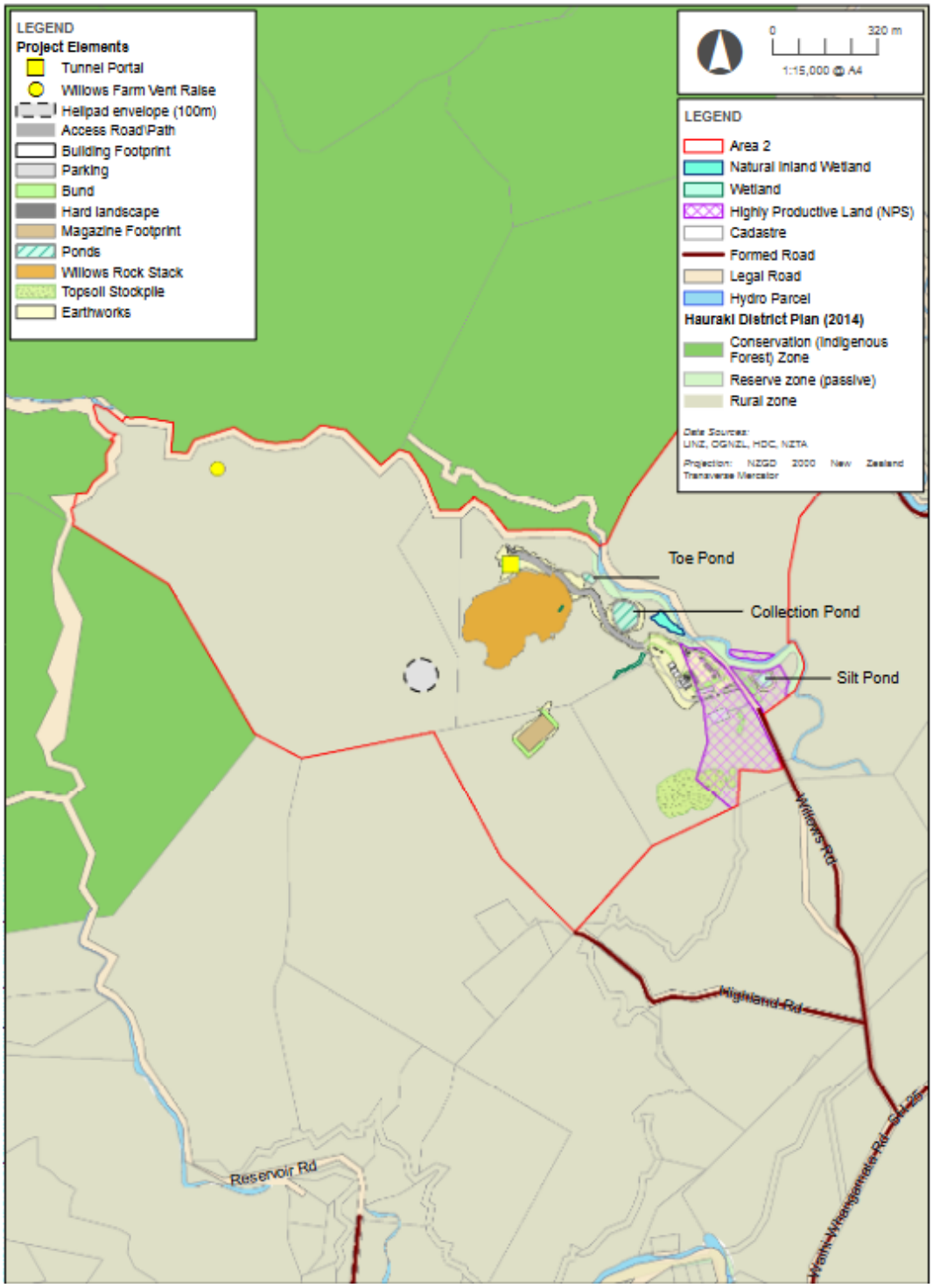

Figure 3-13: Highly Productive Land Within Area 2

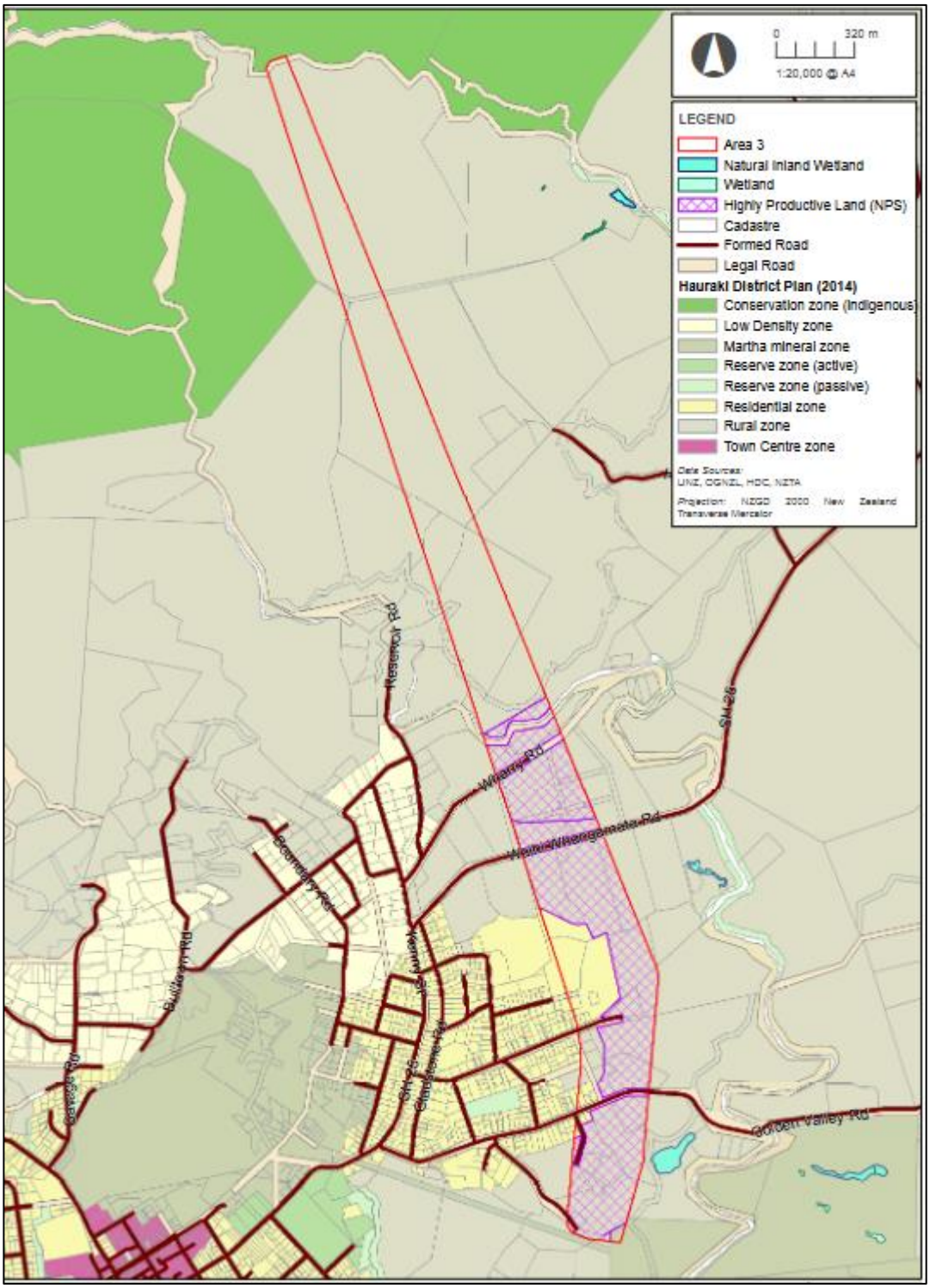

Figure 3-14: Highly Productive Land Within Area 3

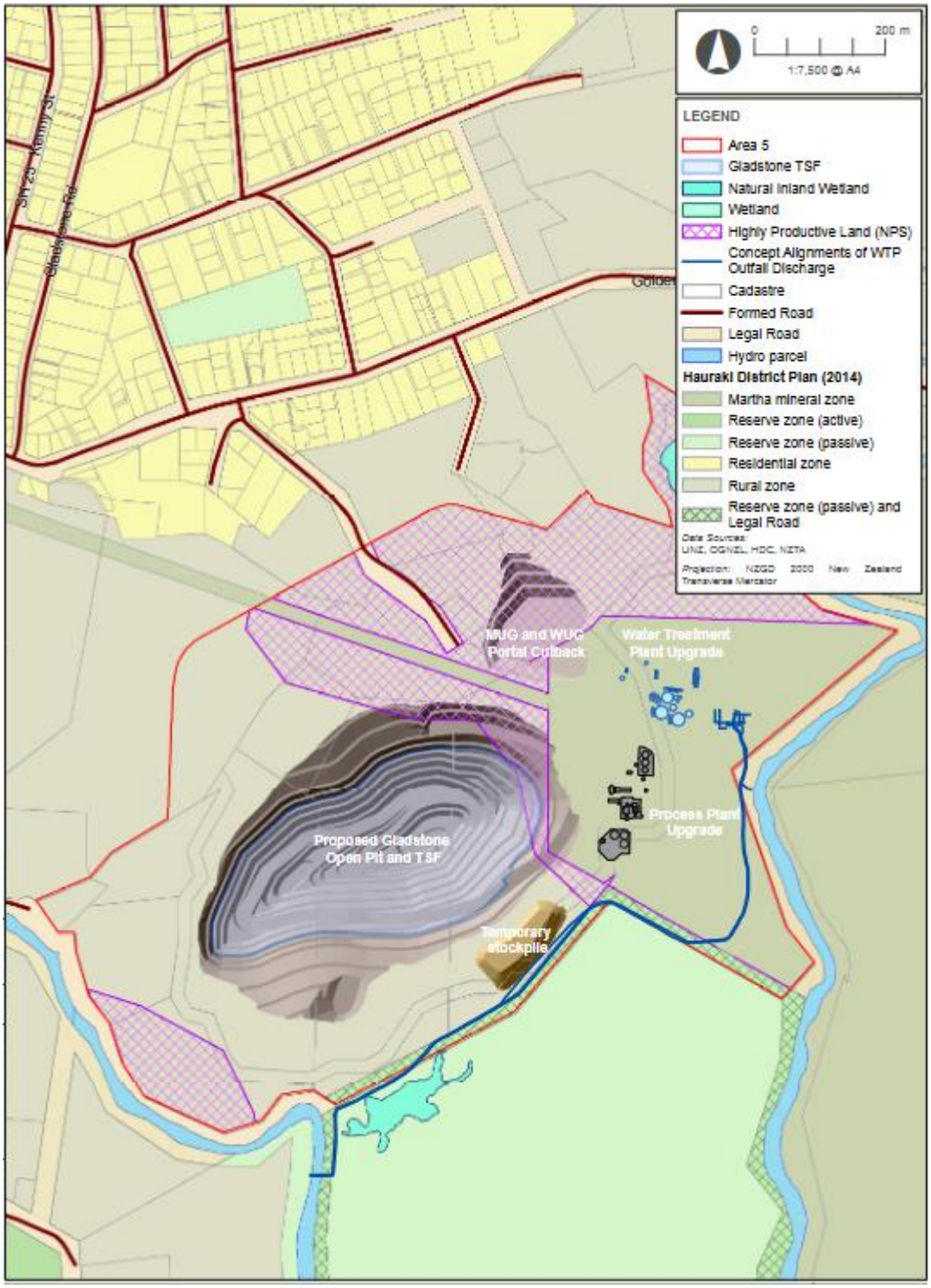

Figure 3-15: Highly Productive Land Within Area 5

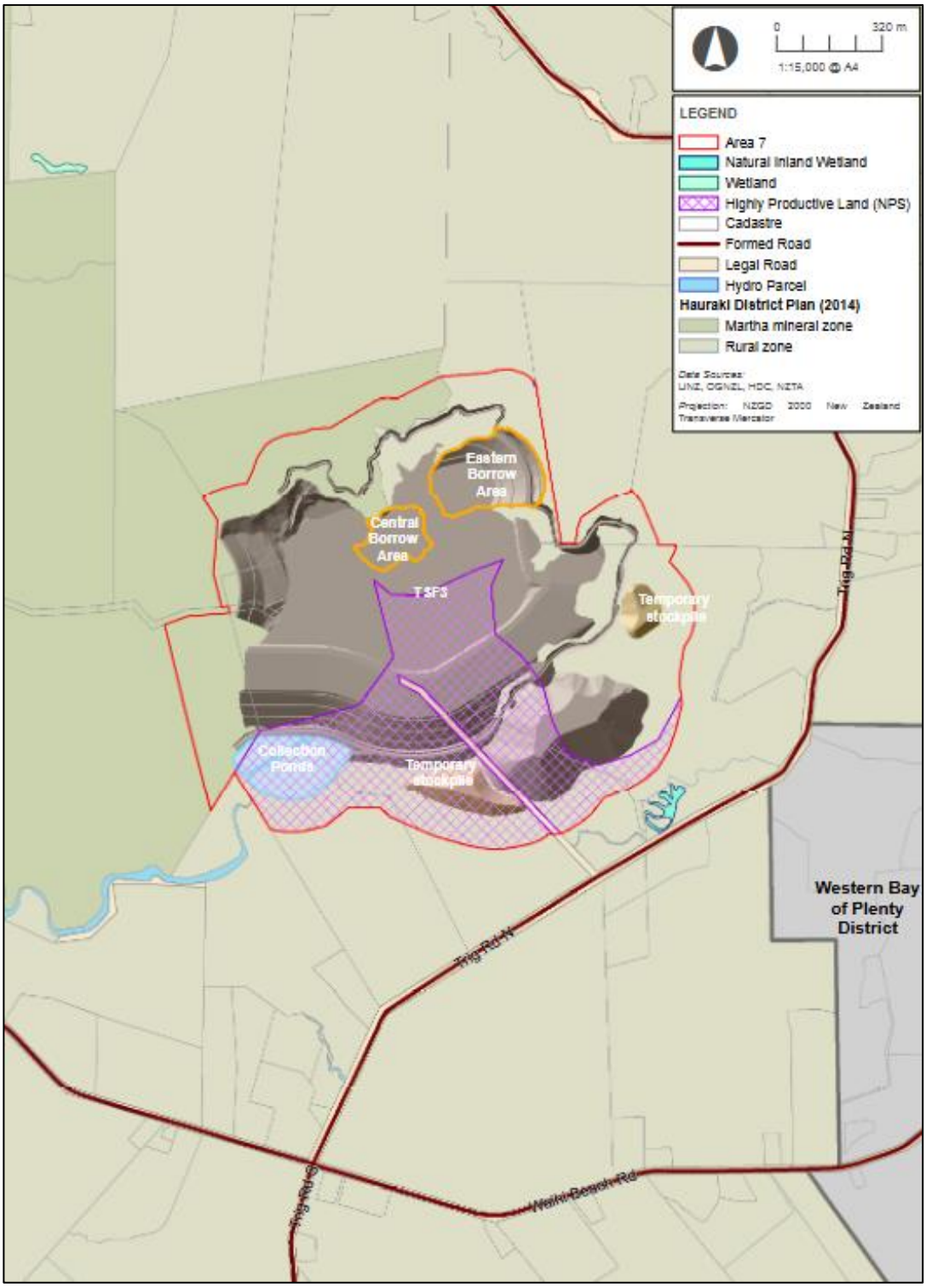

Figure 3-16: Highly Productive Land Within Area 7

3.3.3 Land Ownership

With the exception of those areas and locations listed below, OGNZL owns the sites on which the proposed WNP activities will be located or located beneath.

The sites and locations that are not owned by OGNZL comprise:

- Areas of the Coromandel Forest Park - administered by the Department of Conservation and HDC;
- Areas of road reserve associated with the Area 1 and Area 2 works, and proposed planting – administered by HDC and the New Zealand Transport Agency Waka Kotahi ("**NZTA Waka Kotahi**");
- Privately owned land and dwellings located above the Wharekirauponga Access Tunnel corridor; and
- Areas of marginal strip where planting is proposed, where the Mill Bridge and laydown yard are located, and treated water discharge lines are located – administered by the Department of Conservation.

Part J of these application documents provides further details of the land ownership for the sites on which the proposed WNP activities will be located on or beneath, including associated Records of Title.

3.3.3.1 Land Use Agreements and Approvals

Area 5

As set out in Section 2.10.12, OGNZL and HDC have signed an agreement relating to the road-stopping of Domain Road. This agreement utilises the Public Works Act 1981 process for road-stopping. The proposed road-stopping does not form part of this application.

Area 7

OGNZL purchased the land on which the Area 7 TSF and associated infrastructure is proposed for use as a TSF in 2019 after obtaining approval under the Overseas Investment Act.

As set out in Section 2.12.6, OGNZL has lodged a request with HDC for the stopping of a length of Baxter Road partially located within Area 7, and its supplementary transfer to OGNZL. The proposed road-stopping does not form part of this application.

3.3.4 Residential Activities

Residential activities occur at varying distances from the proposed WNP activities, as follows (noting that the associated landowner details and Records of Titles for these properties are provided in **Part J** to these application documents):

- Area 1: There are no dwellings located within or adjacent to the proposed work areas (as illustrated on the land tenure map provided as Figure 3-17);
- Area 2: There are no dwellings located within the proposed work areas, however a number of privately owned dwellings are located near the site's southern boundary, as shown on the land tenure map provided as Figure 3-18. The closest of these comprise three dwellings to the south-east (accessed off Willows Road), and two dwellings to the south-west (accessed off Highland Road). Current outlooks for these dwellings are as follows:
  - 122 Willows Road is north-west facing (towards Area 2), capturing low lying pastoral land, and rolling hillsides gradually rising towards the Coromandel Forest Park;
  - 111A and 111B Willows Road are north-west facing (towards Area 2), consisting of localised depressions in the landform and more distance rising landforms. Views are largely defined by tree stands and shelterbelts; and
  - 98A and 98B Highland Road are north-east facing and characterised by rural features including the rising pasture covered hillsides of the Coromandel Range foothills.
- Area 3: The corridor of the proposed access tunnel to the Wharekirauponga orebody will be located beneath land owned by both OGNZL and private individuals, with the location of non-OGNZL owned dwellings illustrated on the land tenure map provided as Figures 3-19 and 3-20;
- Area 4: Comprises the Services Trench, which does not form part of this application, other than as detailed in Section 3.2.4.
- Area 5: There are no dwellings located within the proposed work areas; however, a number of privately owned dwellings are located to the north of Area 5 as shown on the land tenure map provided as Figure 3-21. The closest dwelling is located approximately 130 m to the north of the Area 5 boundaries;
- Area 6: There are no dwellings located within the proposed work areas, however three privately owned dwellings are located in close proximity to the areas to the east of the site (as shown on the land tenure map provided as Figure 3-22):
  - 669 Golden Valley Road, located on the eastern boundary of the site;

- 654 Golden Valley Road located approximately 230 m east of the site; and
- 639 Golden Valley Road located approximately 250m east of the site.

Of note, a dwelling could be built as a permitted activity on Lot 2 DP 491737, north-east of Area 6. This is one of the Records of Title that comprise 591 Trig Road (refer to **Part J**).

Views from the existing and potential future dwellings in this area are typically oriented to the north (away from the proposed work areas) and are partially obscured beyond intervening vegetation.

- Area 7: There are no dwellings located within the proposed works area, however there are several privately owned dwellings located near the site, predominantly on the eastern and southern boundaries (along Trig North Road and Waihi Beach Road), as illustrated on the land tenure map provided as Figure 3-23.

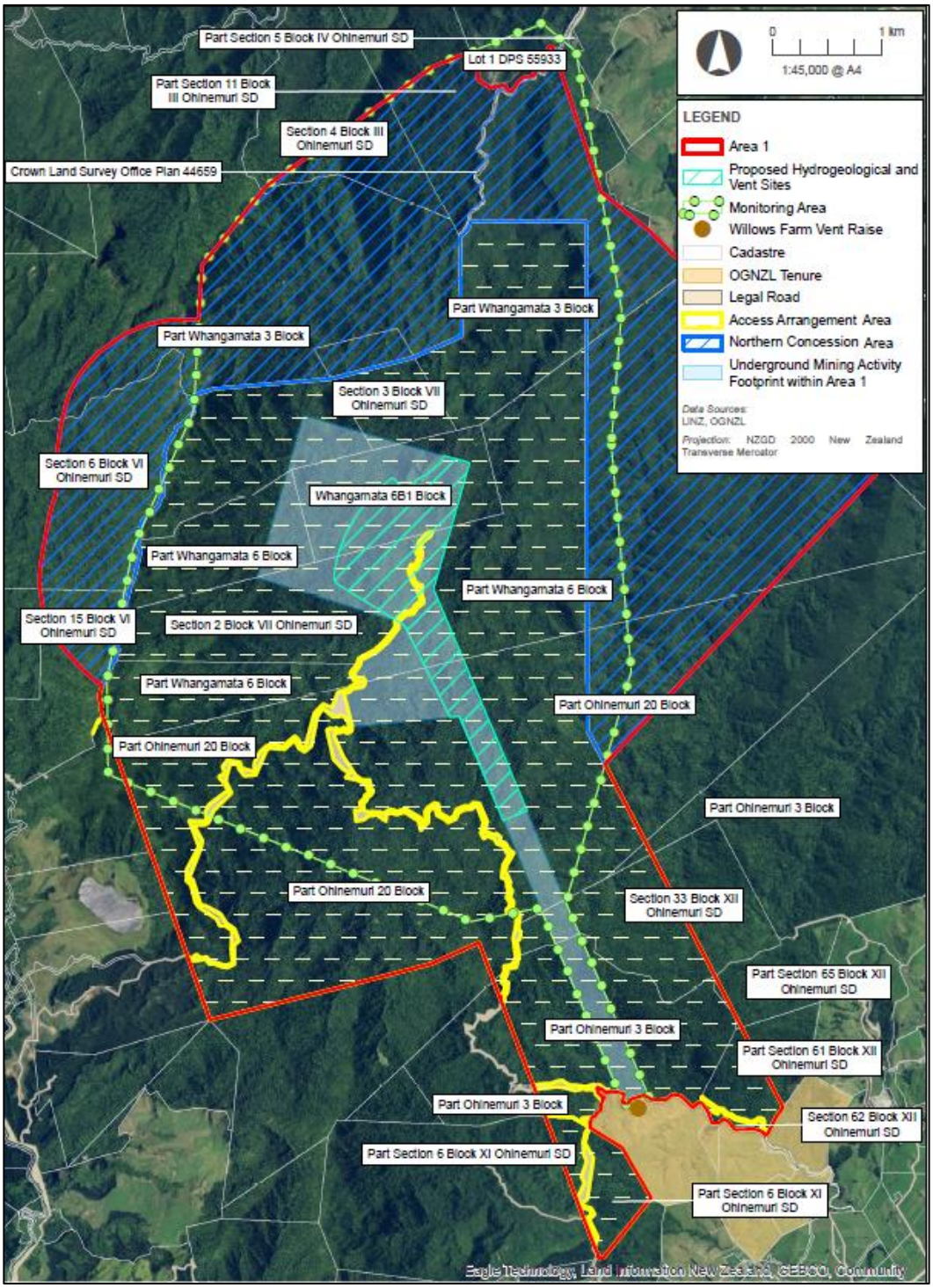

Figure 3-17: Area 1 and Surrounding Area Land Tenure

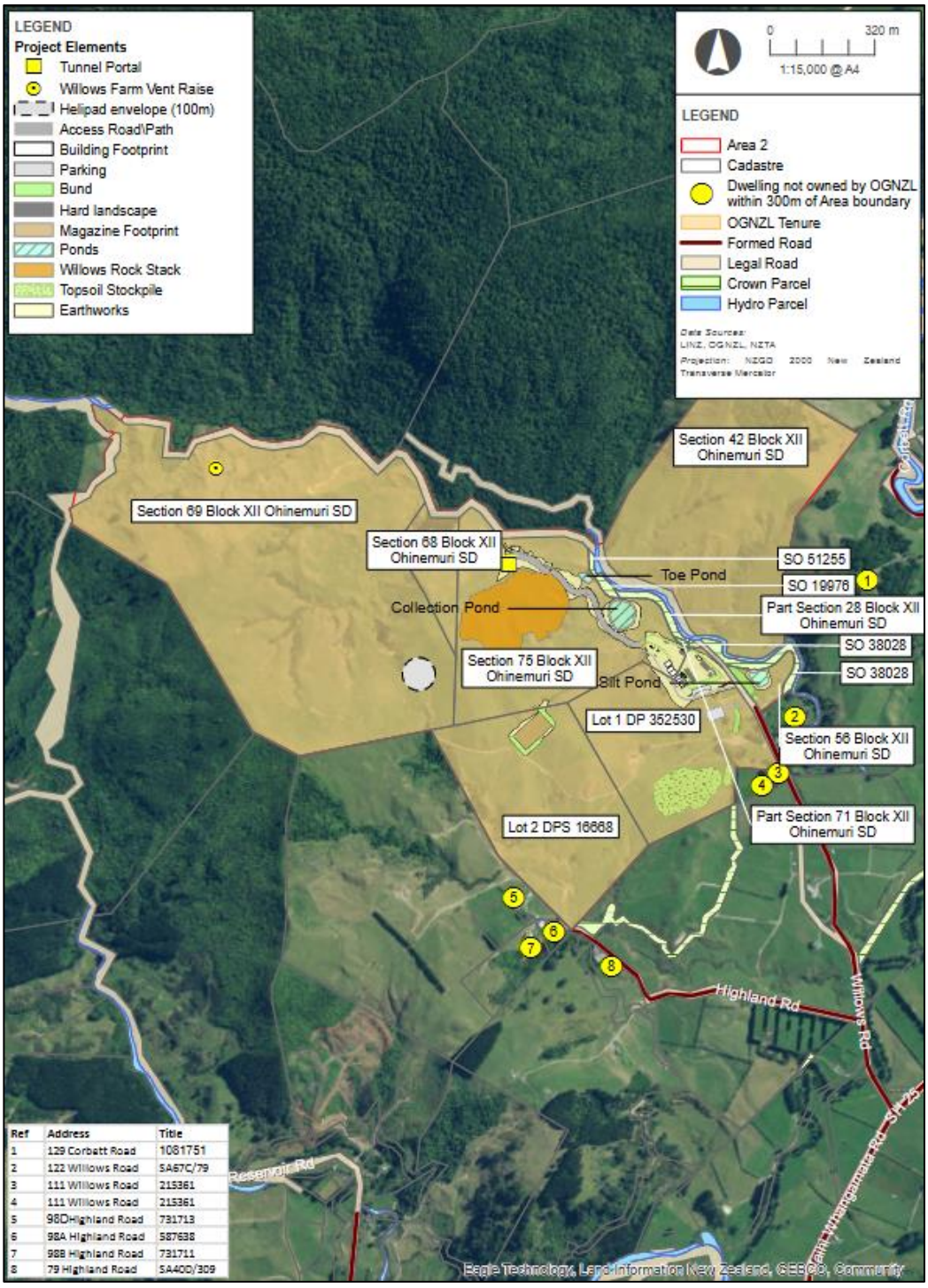

Figure 3-18: Area 2 and Surrounding Area Land Tenure

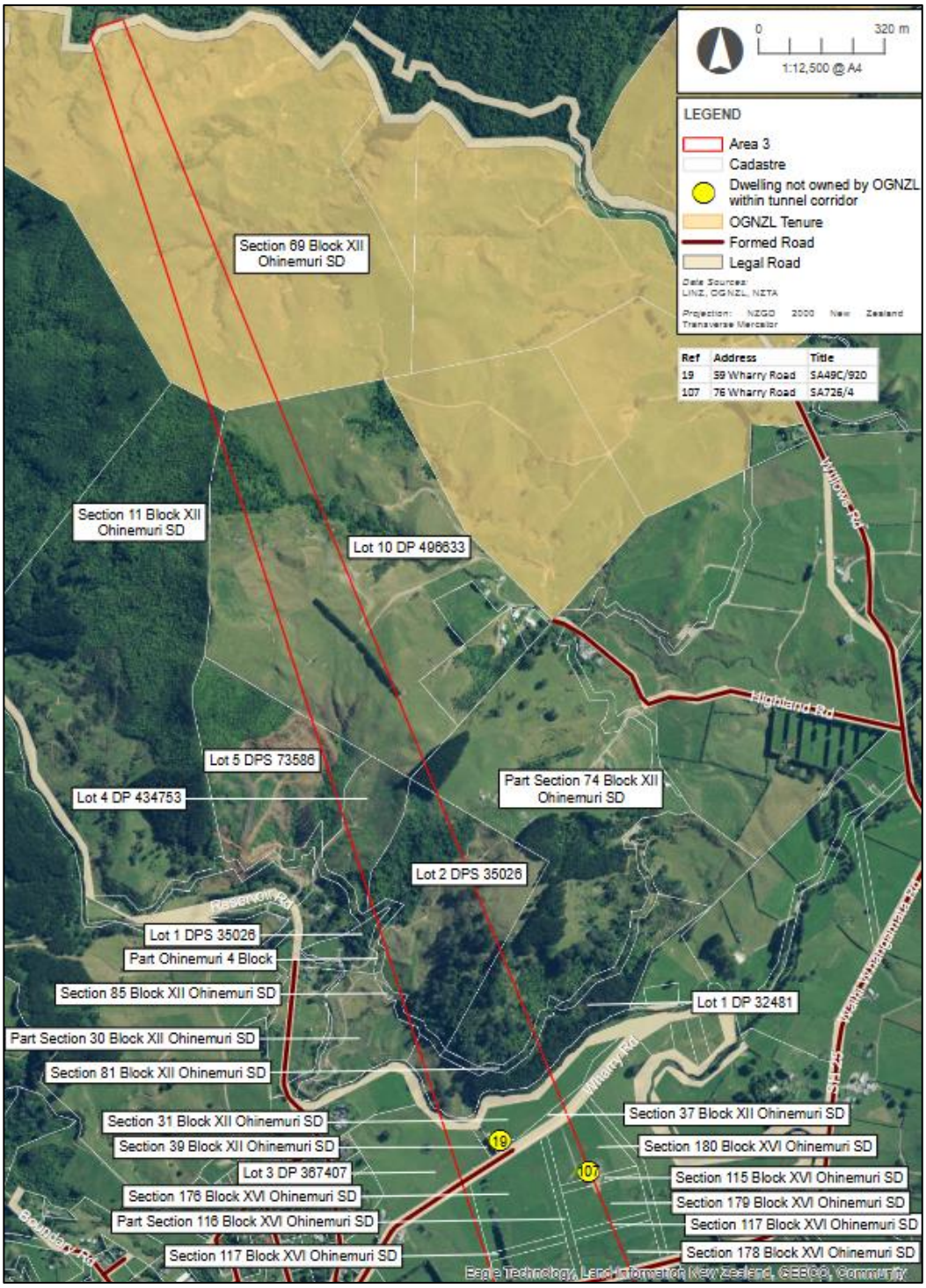

Figure 3-19: Area 3 and Surrounding Area Land Tenure – Northern End

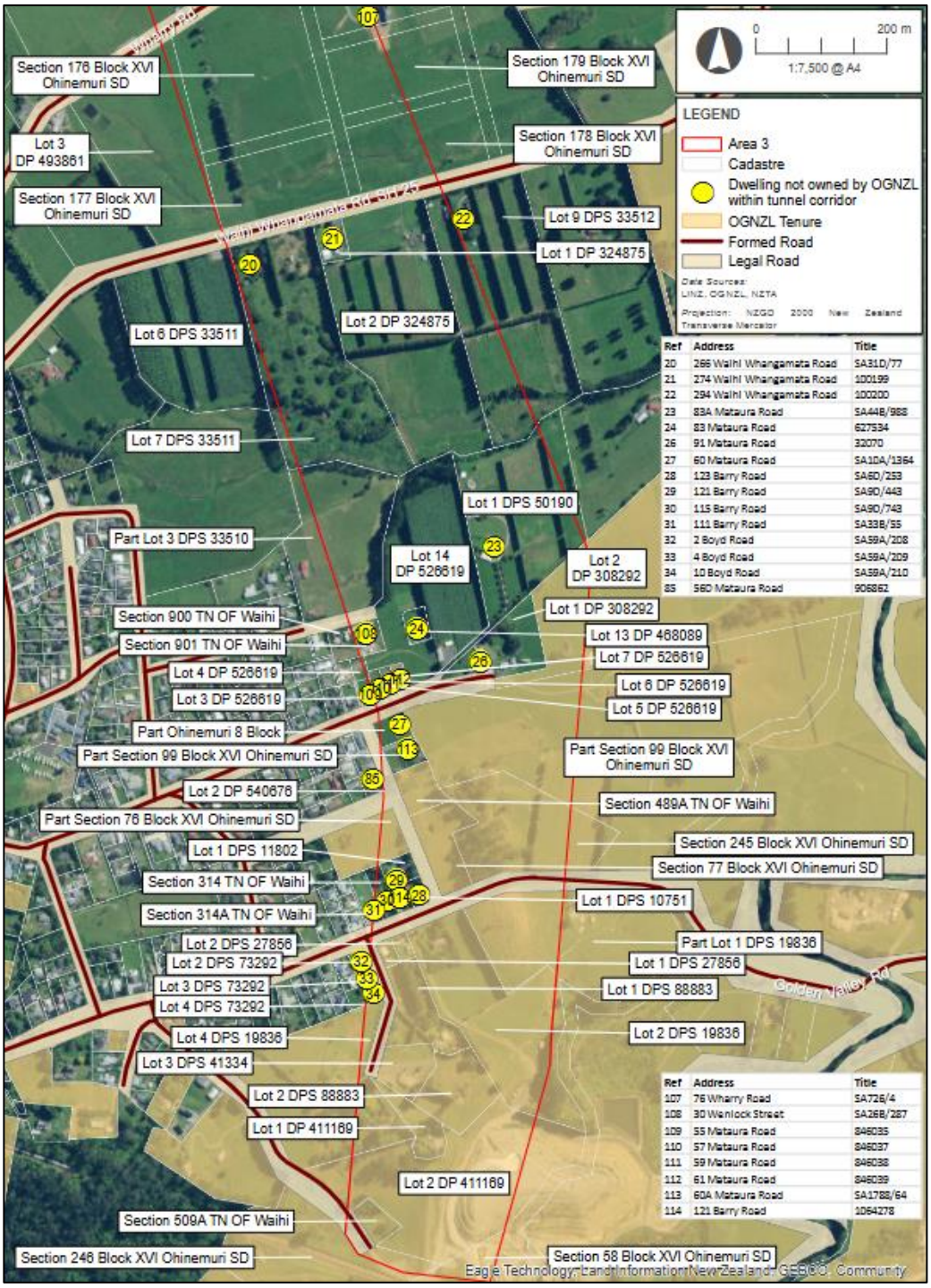

Figure 3-20: Area 3 and Surrounding Area Land Tenure – Southern End

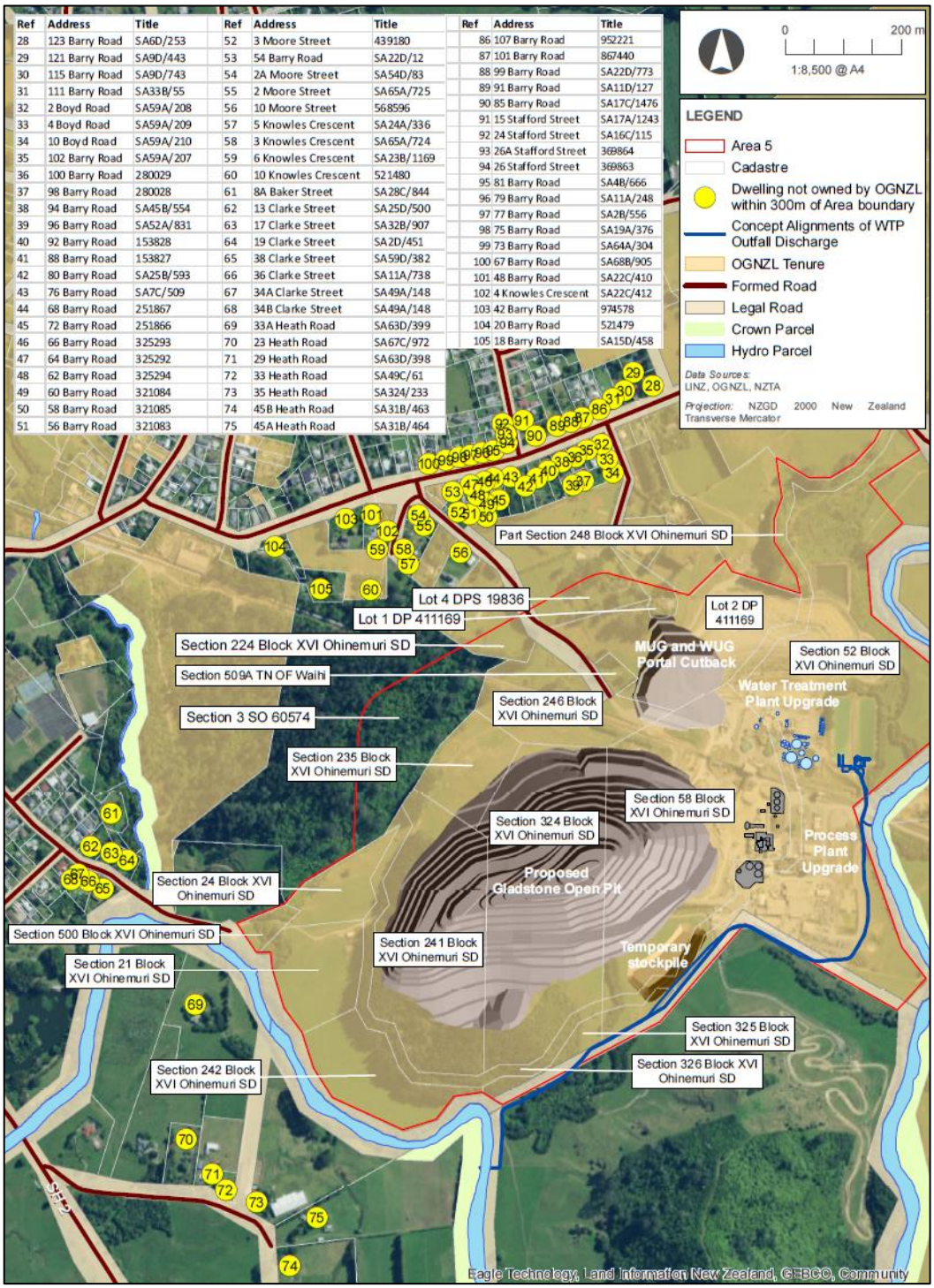

Figure 3-21: Area 5 and Surrounding Area Land Tenure

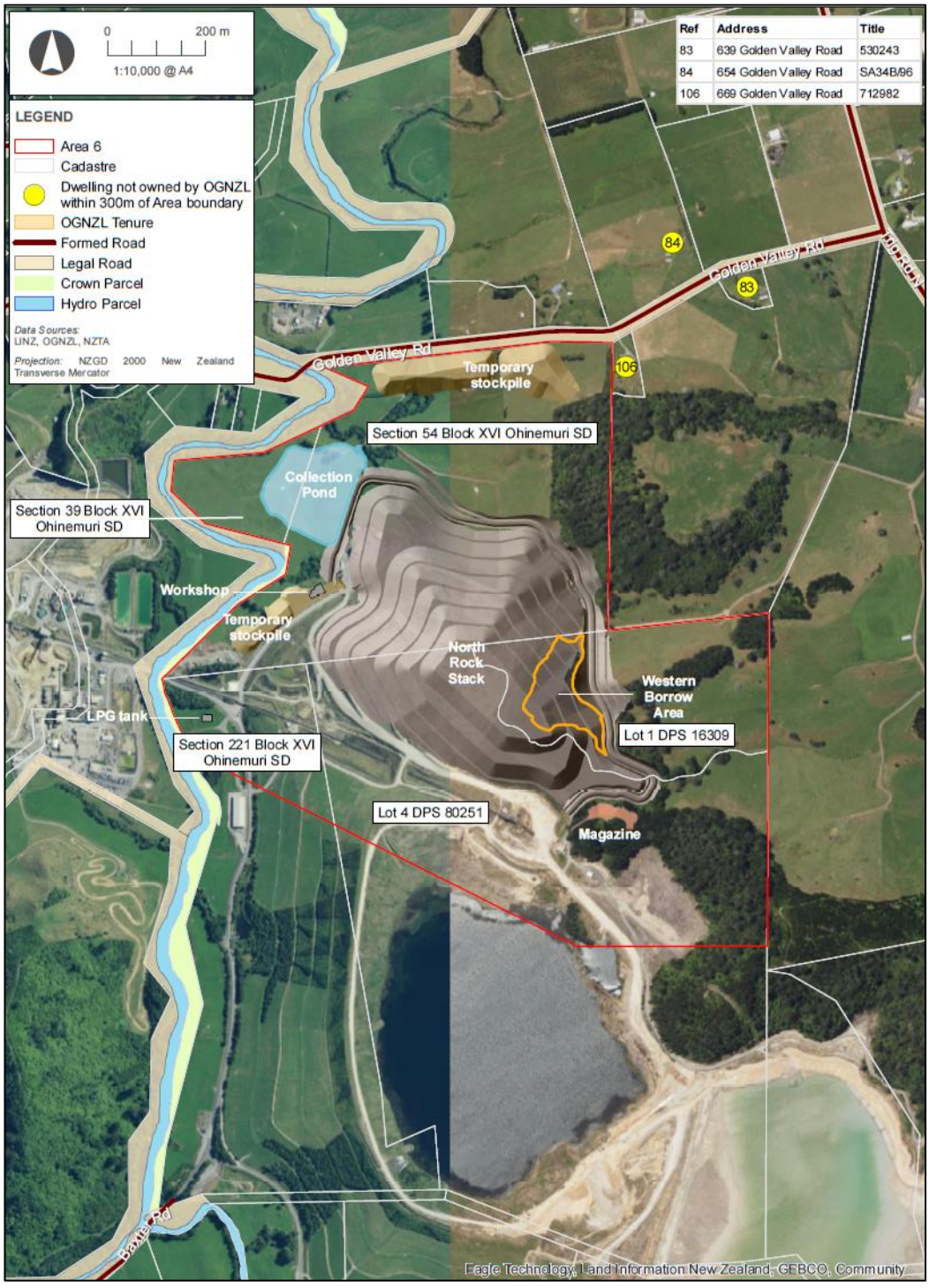

Figure 3-22: Area 6 and Surrounding Area Land Tenure

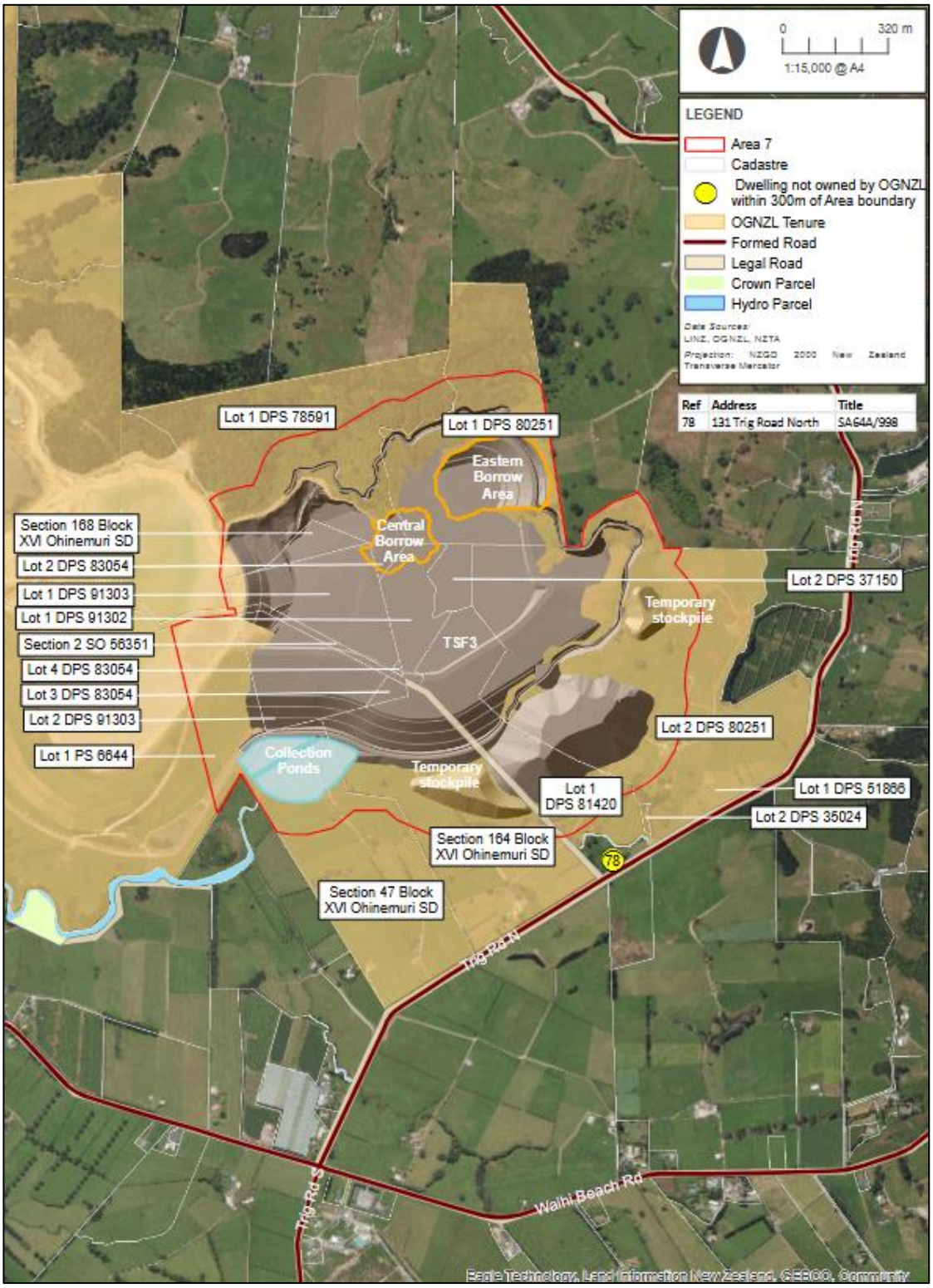

Figure 3-23: Area 7 and Surrounding Area Land Tenure

3.4 CULTURAL SETTING

The following iwi entities indicated they have an association with the project area.

- Ngaati Whanaunga;
- Ngāi Tai ki Tāmaki;
- Ngāti Hako;
- Ngāti Hei;
- Ngāti Maru;
- Ngāti Porou ki Hauraki;
- Ngāti Pū;
- Ngāti Rahiri Tumutumu;
- Ngāti Tamaterā; and
- Ngāti Tara Tokanui / Ngāti Koi.

OGNZL has consulted each of these entities in good faith to ascertain the nature of their interest. This consultation is summarised in Section 5, and identified cultural effects are assessed in Section 6.2 of this report.

Whilst the Waihi area has a rich cultural history, there are no parcels of Māori land, marae, or identified wāhi tapu within the project area.

3.5 GEOLOGY

A detailed description of the geological characteristics of the proposed work sites for the WNP are provided in WSP (2025a), GHD (2025d), EGL (2025a, 2025c, 2025d, 2025e, and 2025g), WWLA (2025a), and PSM (2025a), copies of which are provided in **Part B** of these application documents and summarised below.

The Wharekirauponga area comprises several epithermal veins within host rhyolite domes. The rhyolite domes are overlain by pyroclastic units and post-mineralisation andesite. Various streams have eroded through the cover rocks to expose the underlying rhyolite.

The system comprises three main veins (referred to as the ‘EG Vein’ (Eastern Graben Vein), ‘T Stream Vein’ and ‘Western Vein’). Each of these consists of a main vein several metres wide, with hanging wall and footwall stringer vein sets also present.

The entire Wharekirauponga area is overlaid by post-mineralisation andesite. The rhyolite host rocks are exposed at the surface locally.

The sectional geology and surface geology of the Wharekirauponga area is shown in Figures 3-24 and 3-25 below.

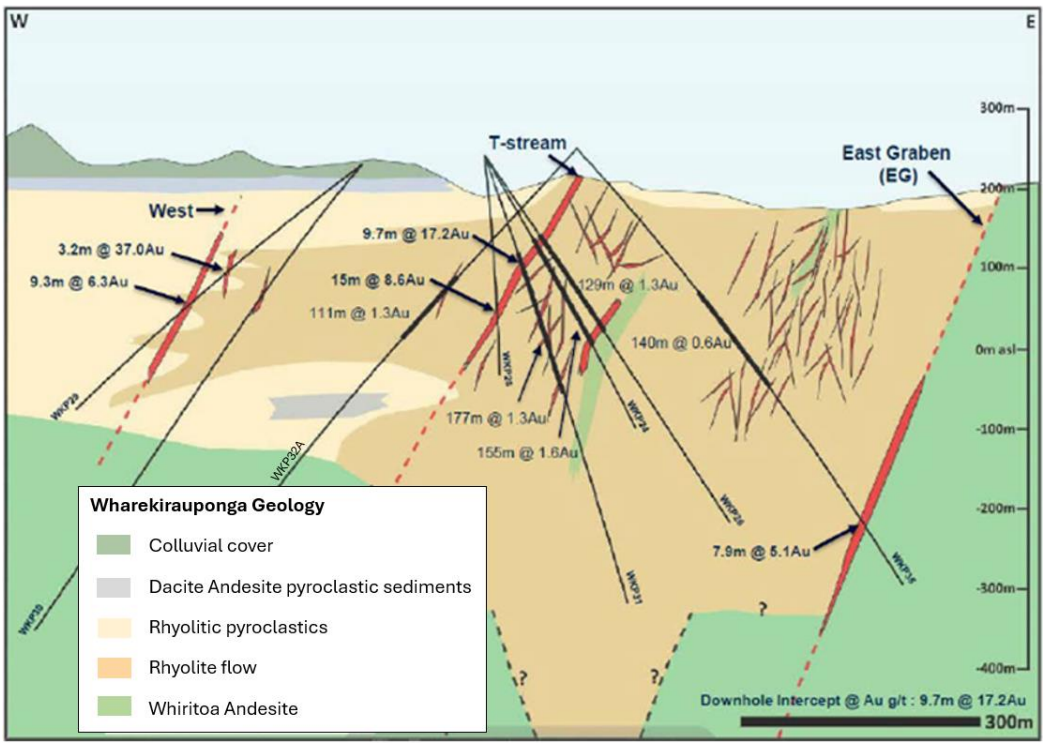

Figure 3-24: Sectional Geology Through Wharekirauponga (WSP 2025a)

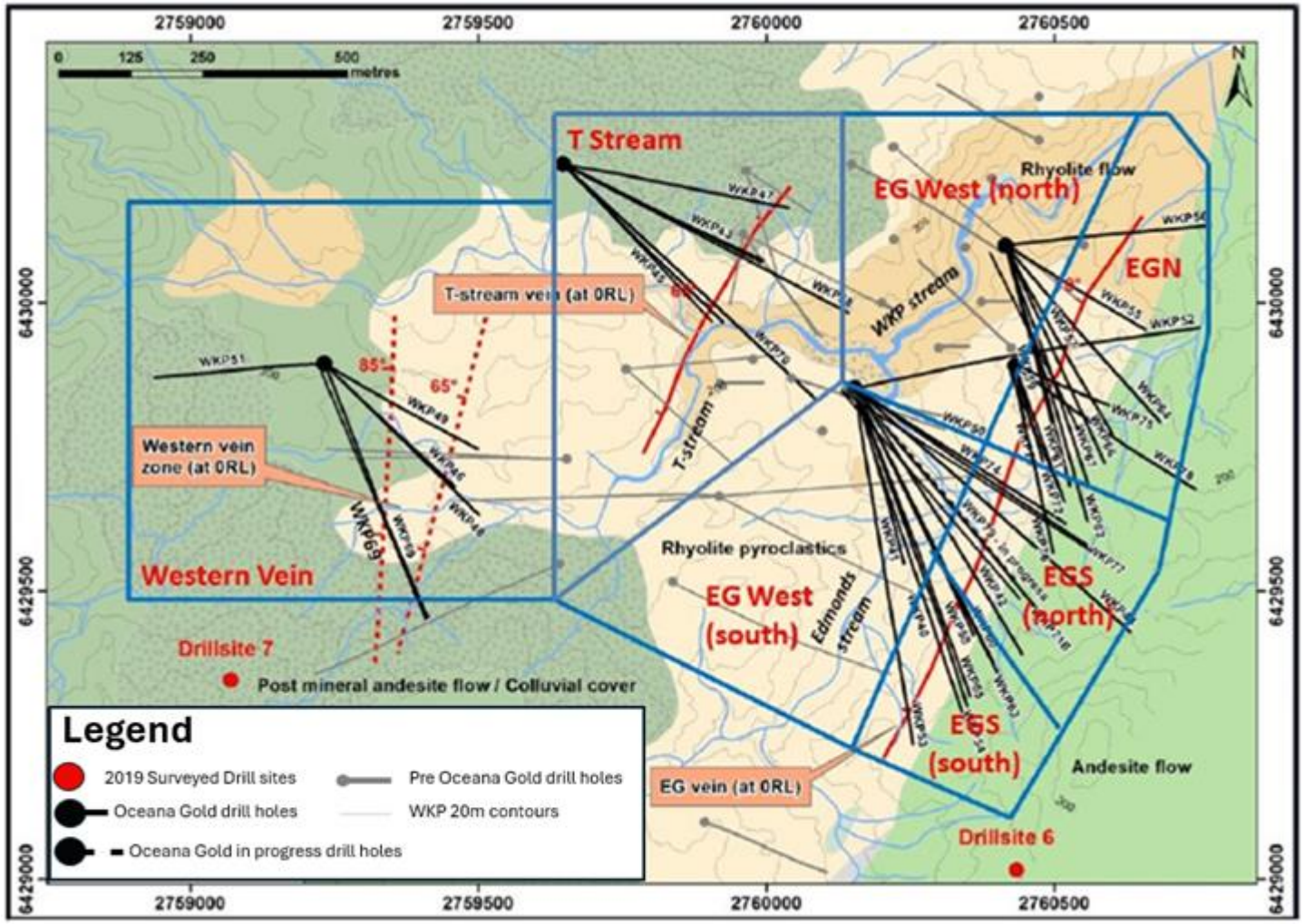

Figure 3-25: Surface Geology of the Wharekirauponga Area (WSP 2025a)

The geology of the Wharekirauponga Valley is Whiritoa andesite on the eastern side, truncated by the Edmonds Fault that dips to the west. Whakamoehau andesite is located on the western side of the valley, being post-mineralisation andesite and dacite with andesite tuff breccia and recent colluvial cover. The mineralised unit is described as the Edmonds Formation, composed of rhyolitic flows and lapilli tuff that is commonly hydrothermally altered. The mineralised rhyolitic volcanics are fault-bound and interpreted to be uplifted to some degree.

Investigative drilling along the alignment of the decline to the proposed Area 1 WUG Dual Tunnel, as well as other test pits and boreholes at the Area 2 Willows SFA and Willows Portal have encountered weak, highly weathered andesite or tuff and strong to very strong andesite. This rock is overlaid by fine grained soils comprising weathered volcanic ash, residual weathered volcanic rock, and colluvium.

At the proposed site of the Area 2 Willows Portal, the ground conditions comprise fine grained soils to 1.0 m below ground level ("**BGL**"), then highly weathered andesite to 5.0 m BGL, with moderately weathered, moderately strong andesite, lapilli tuff and tuff breccia at more than 5.0 m BGL. The andesitic rocks do not contain enriched sulphides or trace elements.

At the site of a proposed ventilation evasé at the north-western end of Area 2, a borehole drilled to 231 m BGL initially encountered weak to moderately strong volcanic rock, then strong rock from approximately 130 m BGL to the end of the hole. The onsite Area 2 terraces located nearer the Mataura Stream comprise alluvial soils including gravels, sands and silts, often containing boulders of volcanic rock.

The Area 3 Wharekirauponga Access Tunnel corridor has been designed to remain below the younger volcanics and will be driven entirely through low permeability andesite. It will pass through the Waihi Fault (an east dipping fault) approximately 2,200 m north of the Area 5 WUG Portal. The andesitic rocks do not contain enriched sulphides or trace elements. The geologic profile along the proposed Wharekirauponga access tunnel alignment is provided in Figure 3-26.

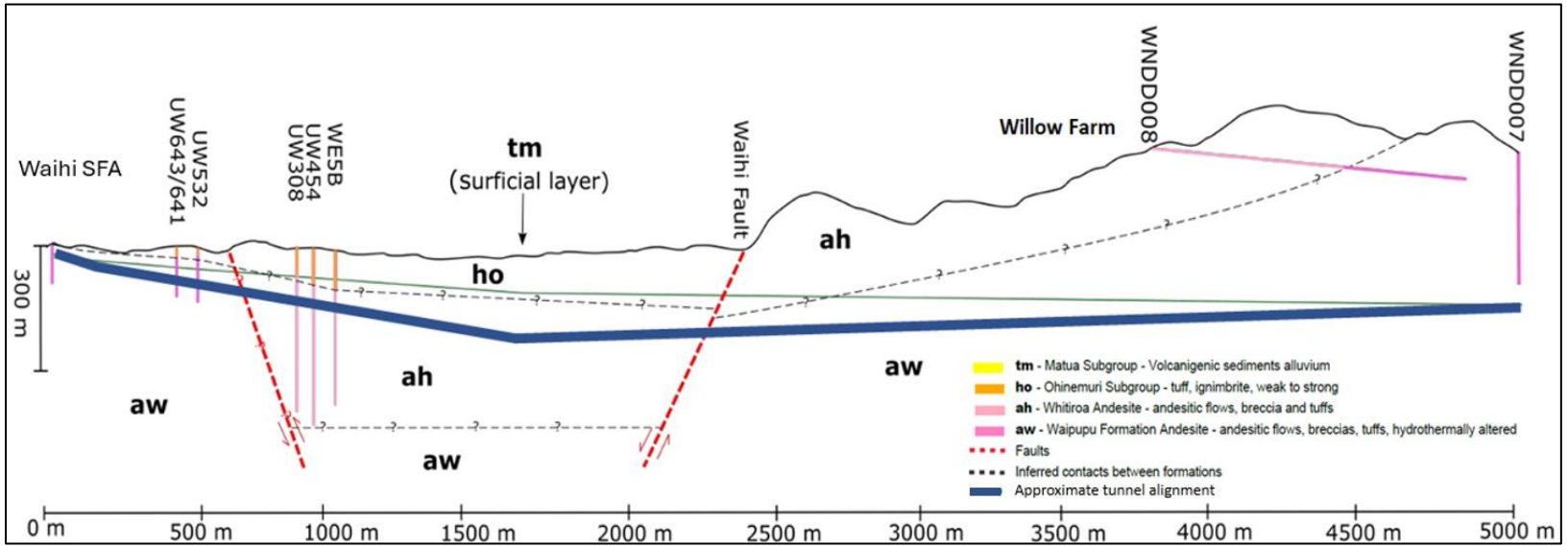

Figure 3-26: Geological Profile along the Wharekirauponga Access Tunnel (Approximate Tunnel Alignment Shown in Blue) (WWLA (2025c))

The geology in the vicinity of the proposed Area 5 GOP consists of a weathered upper andesite with some hydrothermal breccia included. Young volcanics are present on the eastern and southern flanks of Gladstone Hill. Alluvium is present to the south and west. At the location of the Gladstone Wetland (detailed further in Section 3.8.2 of this report), dacite exists that supports the wetland and forms the neighbouring Black Hill. The geology within which the GOP is proposed to be established is illustrated in Figure 3-27.

Two historic landslides are present on the west and north-east sides of Gladstone Hill. The proposed development of the GOP will stabilise the west side and remove the north-east landslide.

The Area 6 NRS lies above rhyolite, dacite and ignimbrite, which are positioned above varying thicknesses of volcaniclastics, hydrothermal vent breccia, and andesite rock (refer to Figure 3-28).

The geology in the vicinity of the proposed Area 7 TSF3 is distinct from other proposed WNP work areas as the Golden Valley Fault separates the proposed work area from the existing TSFs to the west (refer to Figure 3-29).

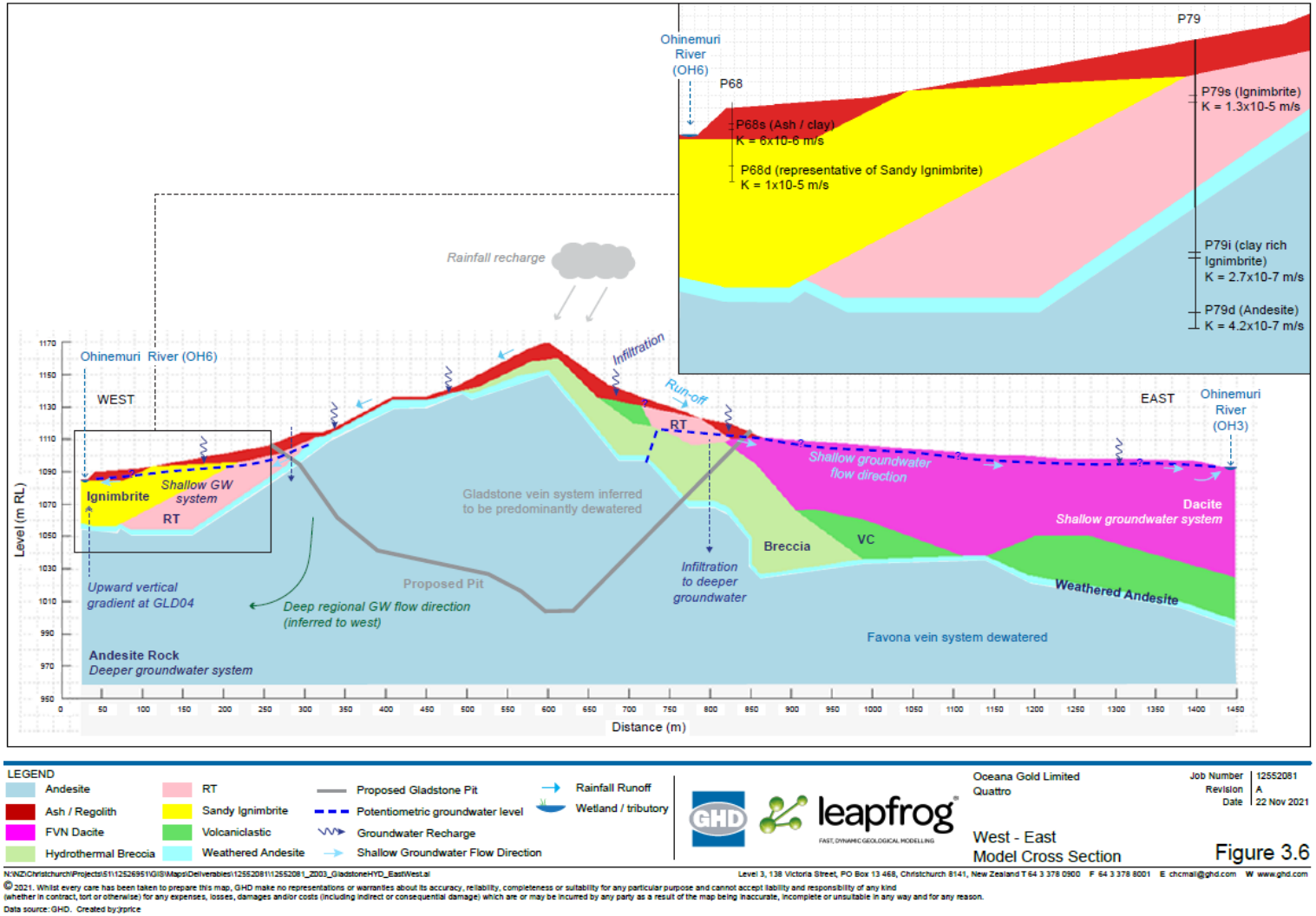

Figure 3-27: GOP West-East Cross-Section (GHD 2025d)

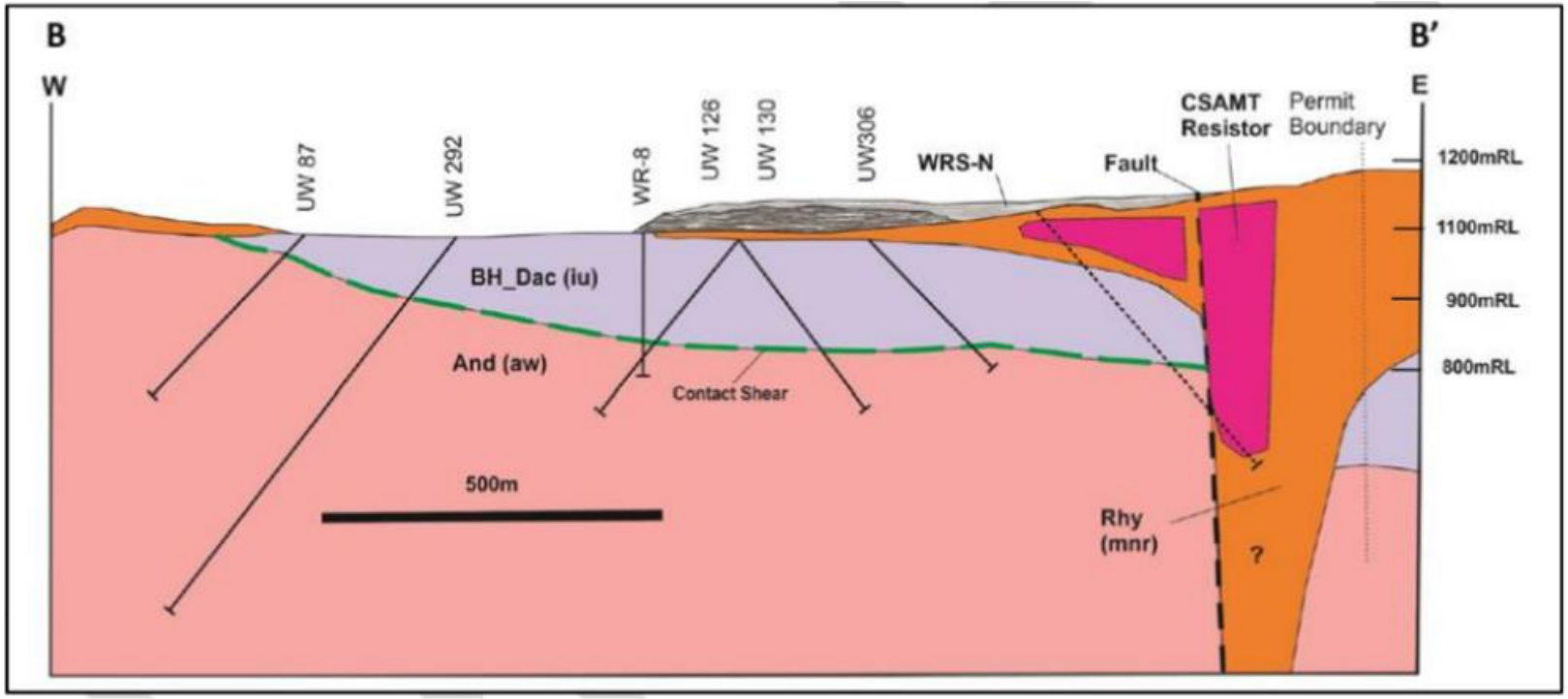

Figure 3-28: NRS Geology - East-West Cross-section. Rhyolite (orange), Dacite (light purple), Ignimbrite (grey), Andesite (light pink) (GHD 2025d)

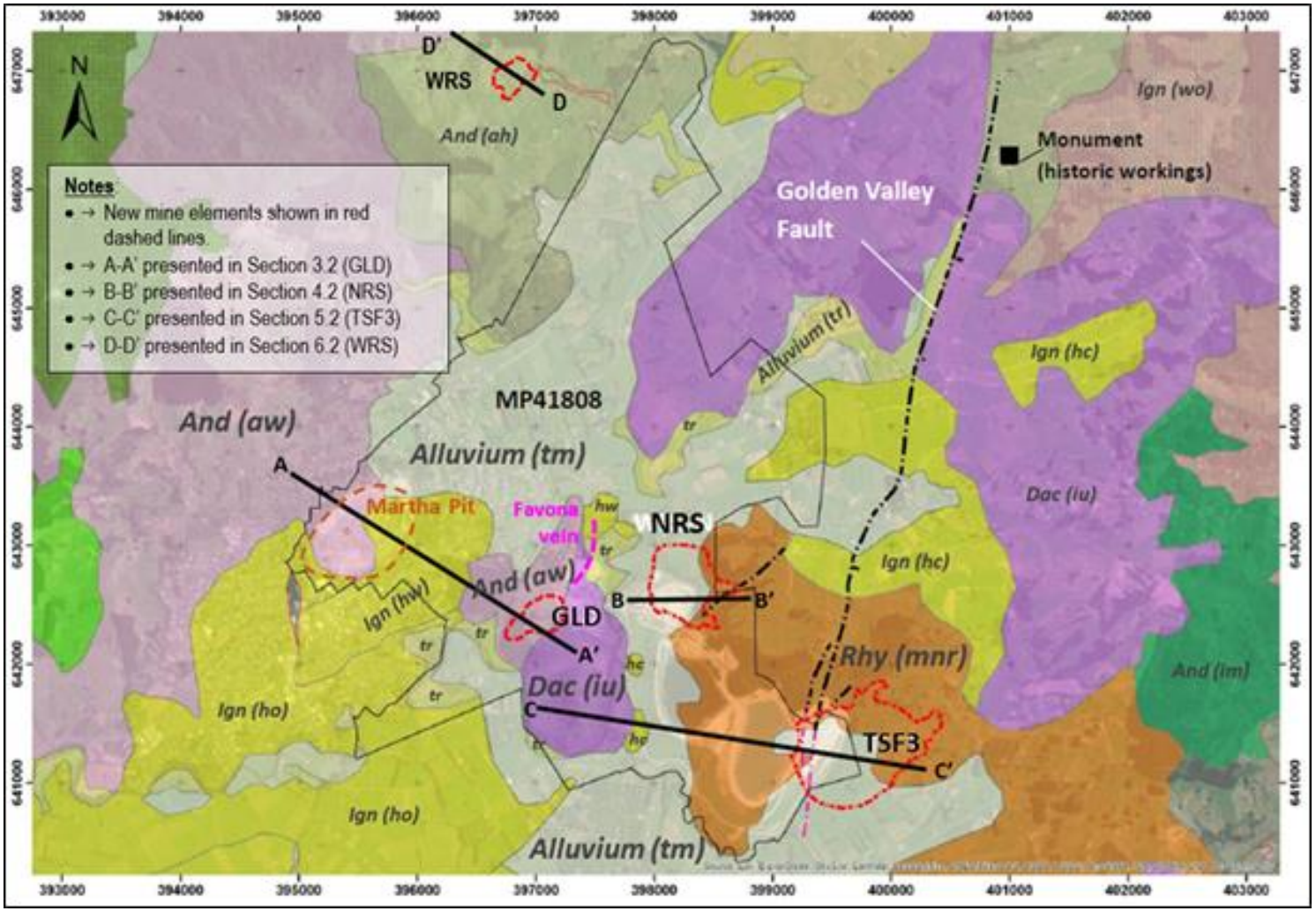

Figure 3-29: Regional geological setting in which TSF3 sits (GHD, 2025d)

The Area 7 site is located within a surficial alluvial gully (defined as 'the paleo-gully') dipping to the southwest and surrounded by rhyolite ridges of the Ruahorehore Rhyolite (unit *mnr*). Both the paleo-gully and rhyolite ridges form significant features at the proposed TSF site (refer Figure 3-30). The paleo-gully appears to be infilled with remnants of a complex mixture of rhyolite tuffs, pyroclastic flows, and gaseous lava flows.

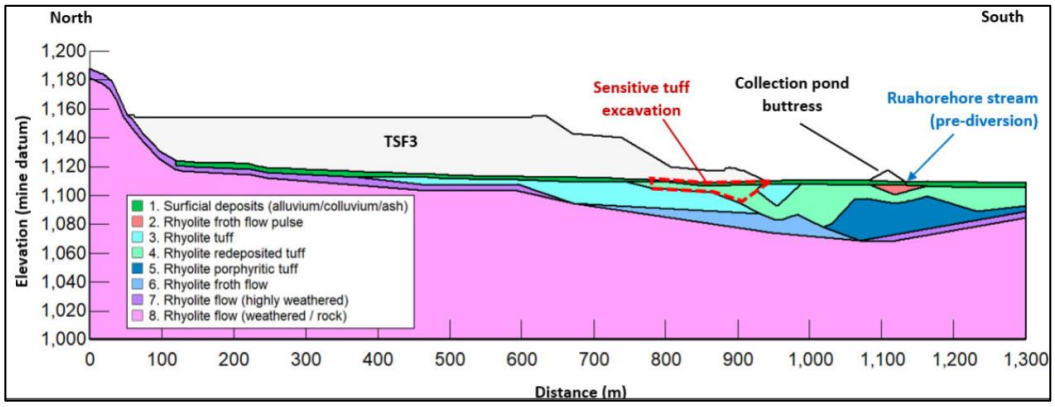

Figure 3-30: Northeast-southwest cross section of paleo-gully beneath the TSF3 site (GHD, 2025d)

3.6 HYDROLOGY

The hydrology attributed to the proposed work areas of the WNP is described in GHD (2025c), WWLA (2025a and 2025c), and EGL (2025c and 2025d), which are provided in **Part B** of these application documents.

3.6.1 Otahu River Catchment

3.6.1.1 Area 1

The proposed works within Area 1 of the WNP are predominantly located within the Wharekirauponga Stream Sub-Catchment of the Otahu River Catchment.

The Otahu River Catchment is 71 km^2 in area and drains towards Whangamatā at the northeast via the Otahu River. The Wharekirauponga Stream Sub-Catchment is approximately 40 km^2 in area, as shown in Figure 3-31.

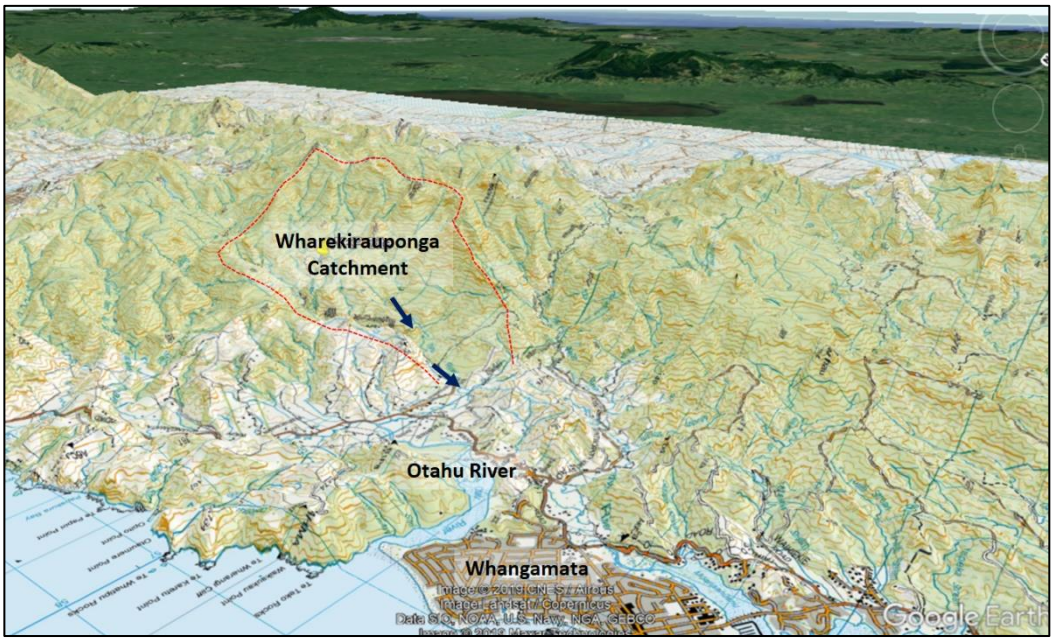

Figure 3-31: Wharekirauponga Stream Sub-Catchment Area (Looking Southwest)

Numerous tributaries flow into the Wharekirauponga Stream, including the Edmonds, Adams and Thompson Streams and multiple unnamed tributaries (see Figure 3-32).

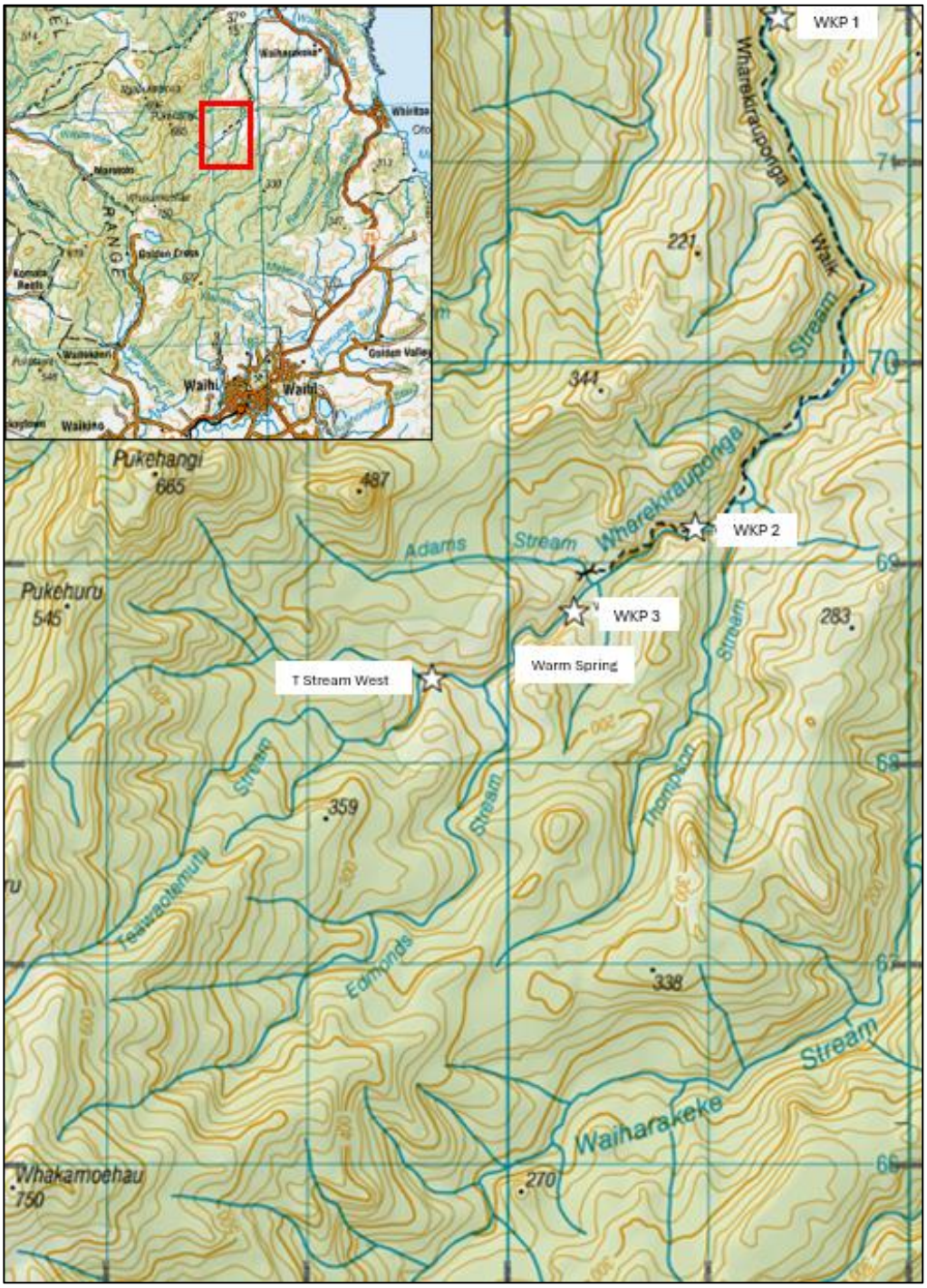

Figure 3-32: Wharekirauponga Stream Sub-Catchment and Long Term Flow Gauging Stations (squares are 1 km^2)

The watercourses listed below traverse Area 1 and are included in the Regional Plan's "Natural State Water Class", for "*...outstanding waterbodies and important habitats because they are unmodified or substantially unmodified by human intervention*":

- Mataura Stream;
- Waiharakeke Stream;
- Thompson Stream;
- Edmonds Stream;
- Teawaotemutu Stream;
- Adams Stream; and
- Wharekirauponga Stream.

The Wharekirauponga Stream Sub-Catchment receives approximately 2.17 m/year of rainfall with an average daily rainfall volume reporting to the catchment of 86,200 m^3/day. Much of the rainfall within the Wharekirauponga Stream Sub-Catchment is absorbed by the soil regolith that has formed on the rock surface. Drainage of this water over time sustains the surface water flow within the catchment. At times when these soils are saturated, rainfall runoff occurs increasing flows in the surface waterbodies. Under dry conditions, little shallow soil drainage occurs and baseflow to the surface waterbodies is supported by a small amount of groundwater discharge, mainly at the catchment's headwaters (see Figure 3-33). A small warm spring also discharges at 3.5 L/s from the EG Vein immediately adjacent to Wharekirauponga Stream just upstream of the WKP3 flow gauge shown in Figure 3-32.

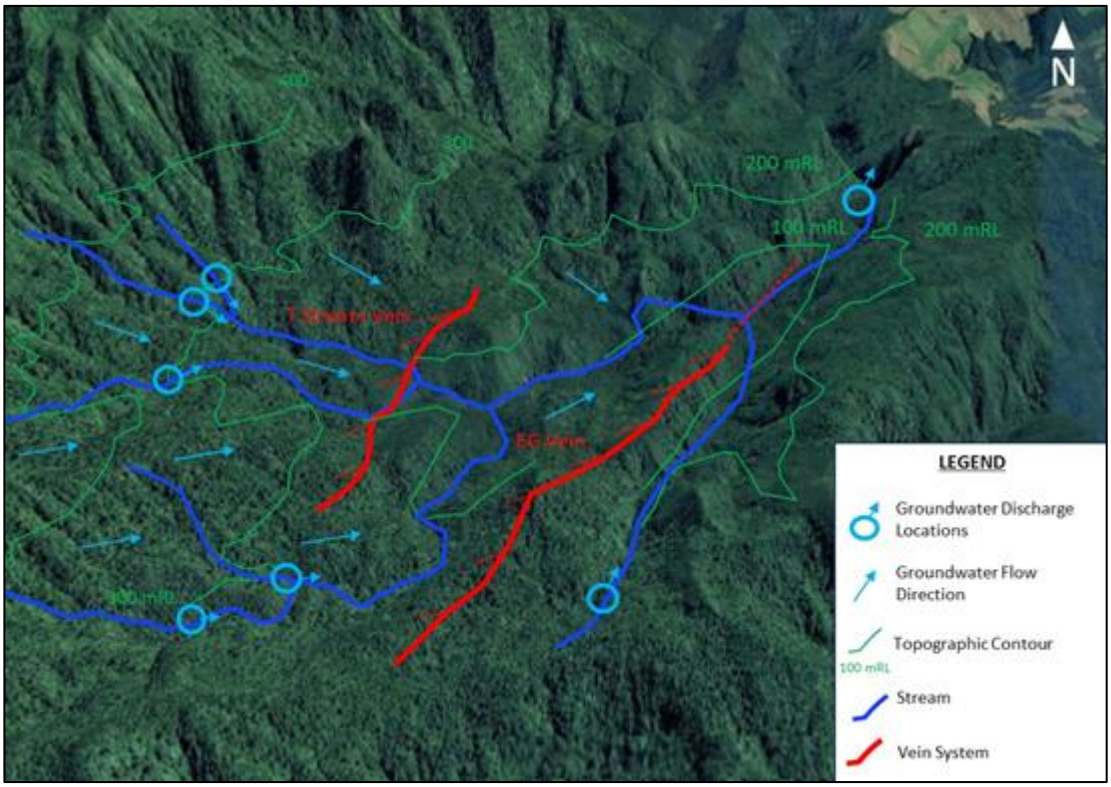

Figure 3-33: Conceptual Model of Wharekirauponga Hydrology, Including Small Springs in Tributary Headwaters

Surface water gauging has been undertaken in the Wharekirauponga Stream Sub-Catchment for a number of years at the long-term gauging stations shown in Figure 3-32. Median flows from the flow gauging stations are provided in Table 3-5. These show that the catchment is relatively flashy in response to rainfall, with seasonal fluctuations in flow rates.

Table 3-4: Surface Water Flows (L/s) Measured at Key Points in the Wharekirauponga Stream Sub-Catchment (GHD 2025c)

Location	Jan - 19	Jun - 19	Sep - 19	Jan - 20	May - 20	Aug - 20	Dec - 20	May - 21	Median
T Stream West	44.3	60.8	252.9	28.8	23.6	144.0	56.4	50.5	69
WKP3	79.6	85.8	424.5	52.5	36.9	267.0	95.3	83.5	80
WKP2	145.9	90.5	426.2	69.7	48.6	Not measured	120.9	104.7	90
WKP1	Not measured	Not measured	Not measured	90.8	68.2	Not measured	164.0	142.2	100

3.6.2 Ohinemuri River Catchment

The proposed works within Areas 2 – 7 of the WNP are located within the Ohinemuri River Catchment. The Ohinemuri River Catchment is approximately 290 km^2. Waihi is in the upper area of the catchment. Tributaries emerge from steep, forested sub-catchments, through mainly flat farmland to join the river as it flows west. Beyond Waihi, the river runs through the Karangahake Gorge and joins the Waihou River near Paeroa.

3.6.2.1 Area 2

The Willows SFA and associated infrastructure proposed within Area 2 is located within the Mataura Stream Sub-Catchment (see Figure 3-34) of the Ohinemuri River Catchment.

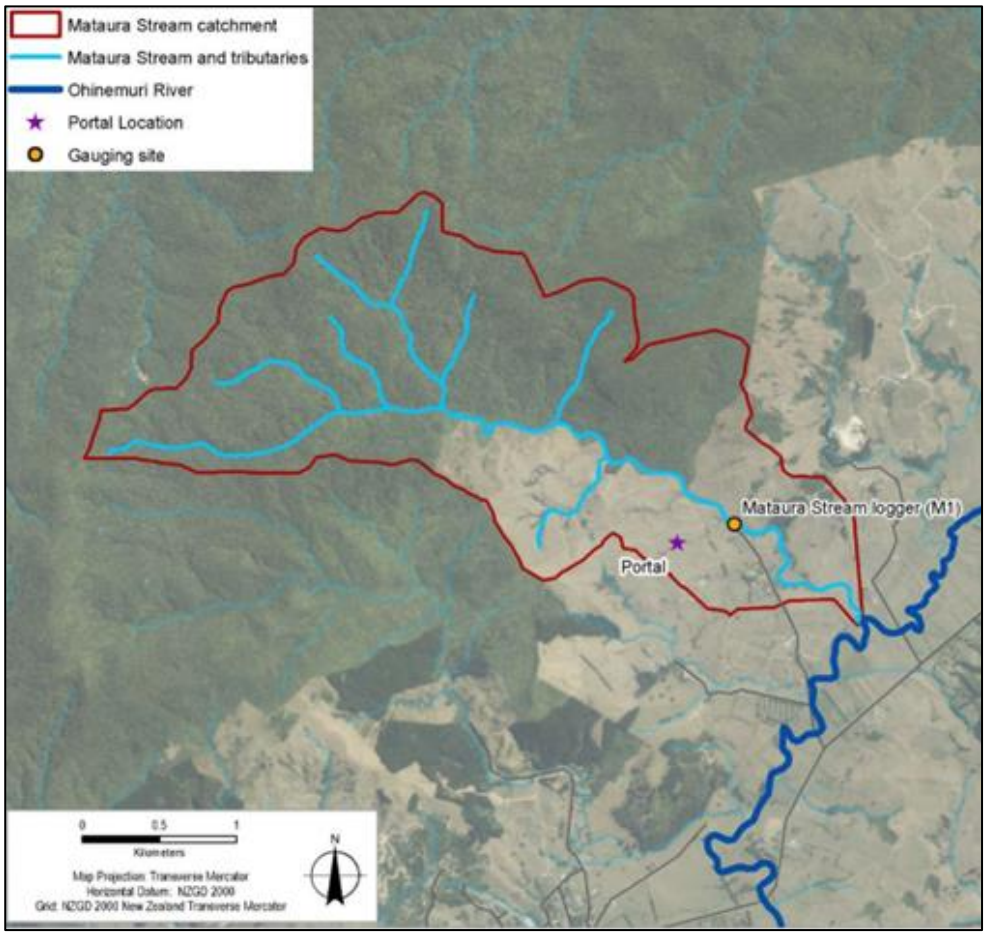

Figure 3-34: Mataura Stream Sub-Catchment and Location of Proposed Willows Portal (GHD 2025c)

The Mataura Stream has a catchment of 6.6 km^2 in area. The upper reaches of the Mataura Stream are relatively unmodified and follow a natural flow path from a gully system in the Coromandel Forest Park. The stream becomes increasingly modified as it flows through farmland to its confluence with the Ohinemuri River between Corbett Road and Willows Road.

The stream flows south-east out of the Coromandel Forest Park and along part of the northern boundary of Area 2 before veering south / south-east on the eastern side of Willows Road, bisecting the proposed Willows SFA area along a similar alignment to the unmade section of Willows Road. The stream width varies between 5 m to 8 m with a depth of 0.3 m to > 1m. The riparian margins (outside the Coromandel Forest Park) have been fenced off to provide a buffer of 5 m on both banks. The riparian vegetation is mixed, with exotic weed species present. Recent bank erosion is evident.

The Mataura Stream has a median flow of approximately 10,000 m^3/day, varying between 54 L/s (on 16 March 2021) to 355 L/s (on 10 July 2020).

Various unnamed tributaries flow across the proposed site of the Willows SFA and into the Mataura Stream. One small tributary is located within the footprint of the proposed WRS. It is unfenced, and contains several culverts, including one perched culvert. The tributary has a largely gravel and cobble bed, a width of between 0.2 m to 1 m, and a depth of between 0.05 m to > 0.25 m. The tributary shows evidence of stock access with extensive pugging and slumped banks. Riparian vegetation is mostly pasture grass, with three pockets of more diverse vegetation higher up in the tributary.

3.6.2.2 Area 3

Within the Ohinemuri River Catchment, the Wharekirauponga Access Tunnel will pass under:

- The Walmsley Stream at Wharry Road;
- Three unnamed tributaries of the Ohinemuri River located south of SH25:
  - Two flow west- east through 266 and 294 Waihi - Whangamatā Road, merge within 320 Waihi - Whangamatā Road and then discharge to the river via one of the northern allotments that make up 91 Mataura Road (Lot 1 DPS 75342); and
  - The third tributary flows west-east through the most southerly of the allotments that comprise 91 Mataura Road (Part Section 99 Block XVI Ohinemuri SD); and
- Tributaries of the Mataura Stream at 69 and 98D Highland Road.

The Regional Plan identifies the Walmsley Stream in the 'Significant Trout Fisheries and Trout Habitat Water Class. The tributaries of the Mataura Stream are not subject to a particular Regional Plan Water Management Class.

These waterways flow to the Ohinemuri River, which flows west via the Karangahake Gorge to the Waihou River. The Wharekirauponga Access Tunnel will not be driven beneath the Mataura Stream or the Ohinemuri River.

3.6.2.3 Area 4

Area 4 comprises the Services Trench, which does not form part of this application, other than as detailed in Section 3.2.4.

3.6.2.4 Area 5

The Ohinemuri River passes by the eastern Area 5 site boundary, around Black Hill and past the southern side of Winner Hill before turning south-west under SH2. OGNZL monitors river water quantity and quality in accordance with existing consent conditions, including via the Frendrups Gauge in the Ohinemuri River to the east of the Waihi SFA (refer to Figure 3-35), from which river / stream flow variations and medians can be derived. Median flows are recorded as 75,400 m^3/day at the Frendrups Gauge.

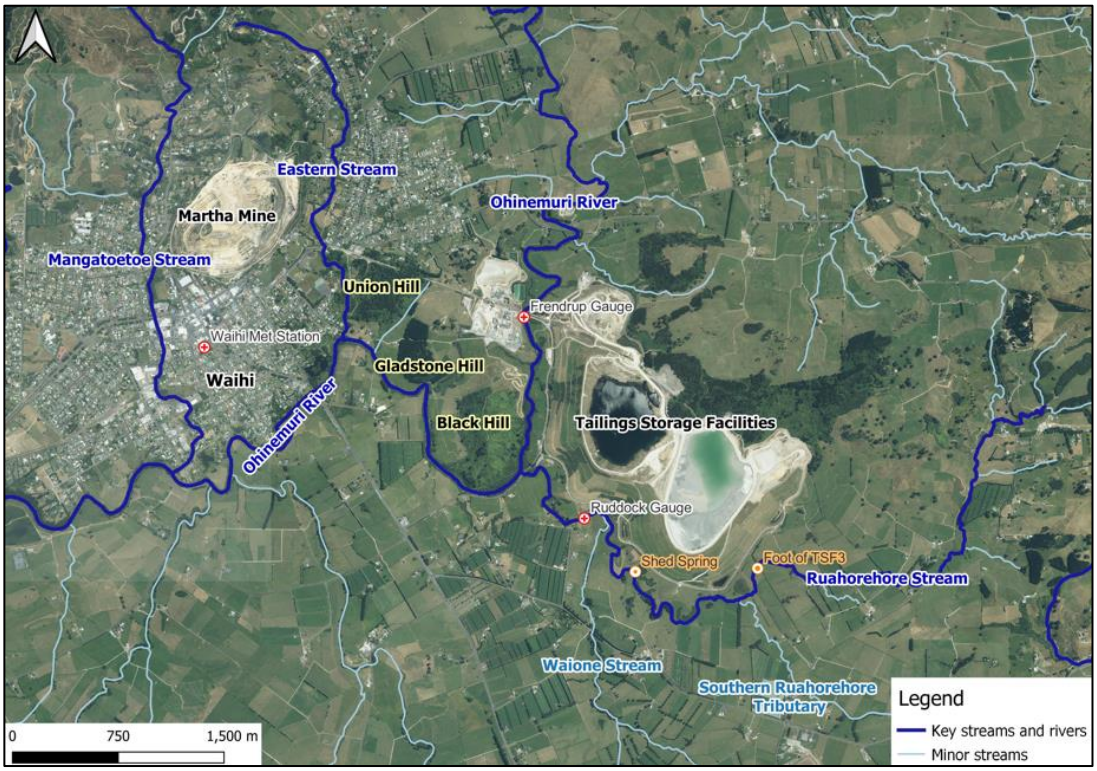

Figure 3-35: Surface Waterbodies and Monitoring Locations Around Areas 5, 6, and 7

To the east of the site, the Ruahorehore Stream meets the Ohinemuri River on the south-east side of Black Hill within the HDP's SNA 165A.

The Gladstone Wetland, which is located outside the footprint of any of the proposed Area 5 works, is located adjacent to the Ohinemuri River. It has two tributaries, one of which extends up into the footprint of the proposed GOP (Figure 3-36).

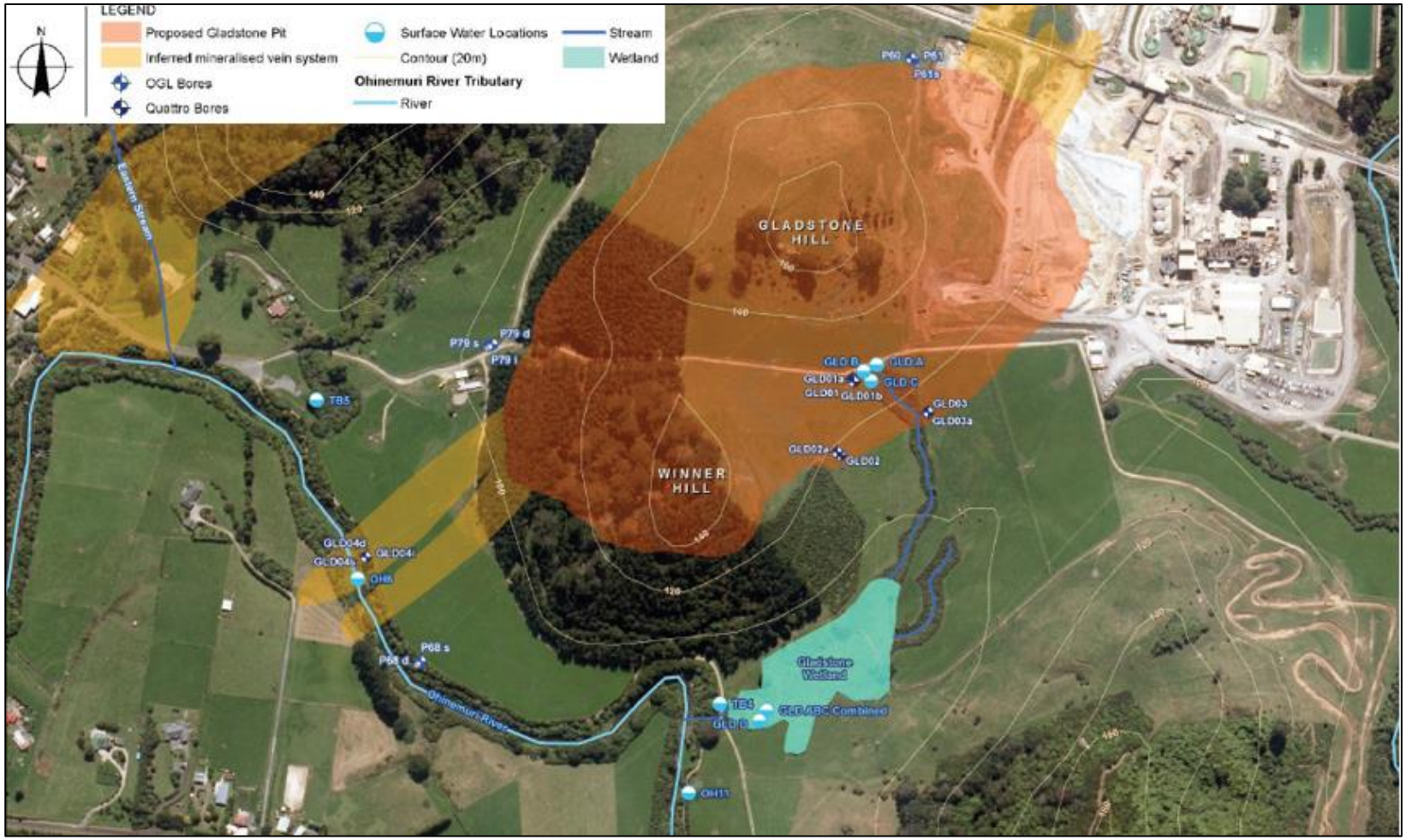

Figure 3-36: Location of Gladstone Wetland Tributaries

3.6.2.5 Area 6

The NRS and associated infrastructure proposed within Area 6 is located within the TB1 Sub-Catchment of the Ohinemuri River Catchment. TB1 drains a catchment of approximately 112 ha and runs north-west to join the Ohinemuri River north of the Frendrup Gauge (see Figure 3-37). TB1 was substantially modified when the Northern Stockpile was constructed, with the footprint of those works extending over its original alignment.

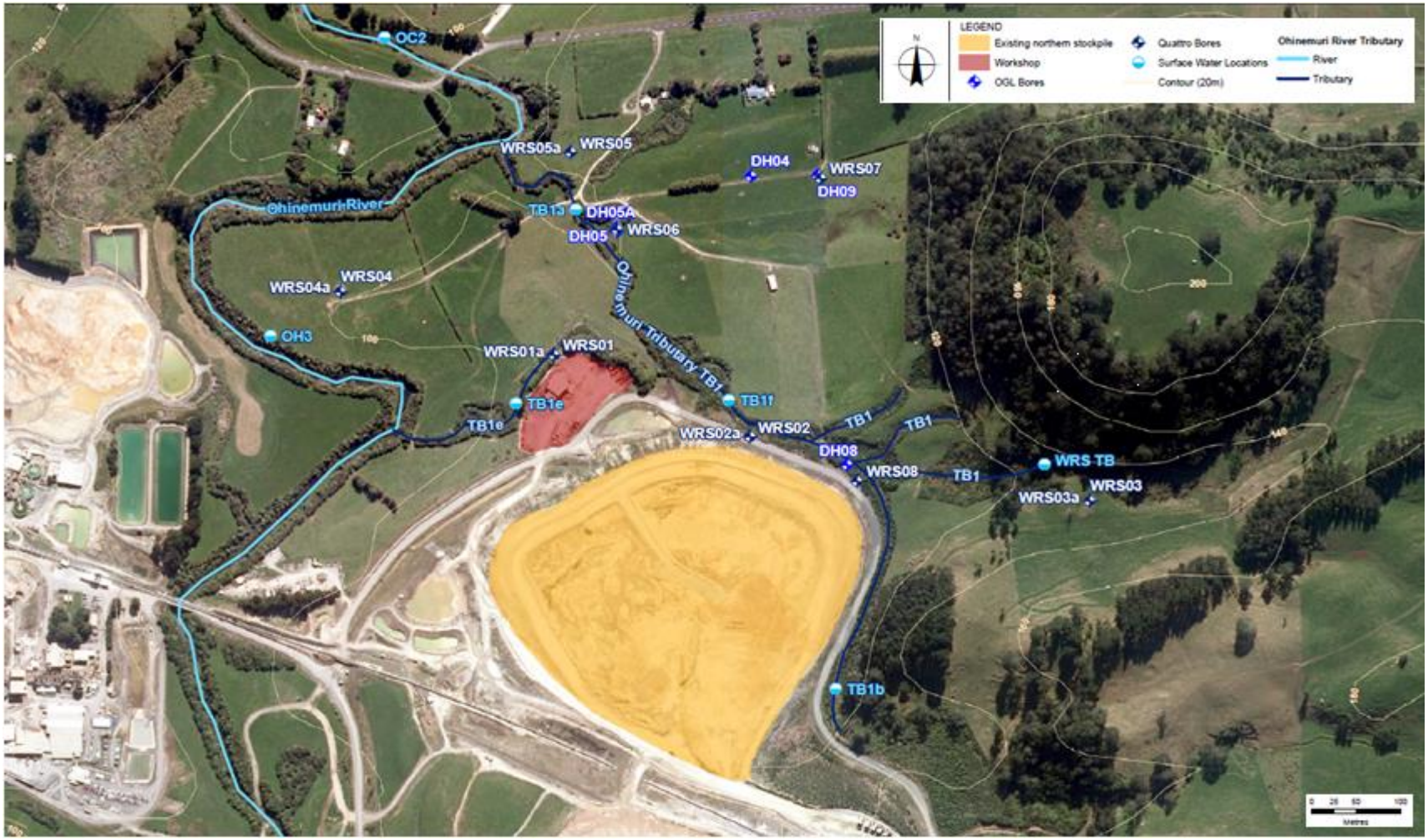

Figure 3-37: Alignment of TB1

3.6.2.6 Area 7

TSF3 and associated infrastructure proposed within Area 7 is located within the Ruahorehore Stream Sub-Catchment of the Ohinemuri River Catchment. The Ruahorehore Stream has a catchment of approximately 20 km2, with flow ranging from 1,850 – 1,500,000 m3/day, and a median flow of 27,900 m3/day as measured at the Ruddock Gauge (see Figure 3-35). It increases flows in the Ohinemuri River below its confluence by approximately 38%.

The Ruahorehore Stream Catchment at the toe of TSF3 (see Figure 3-35) is 5.8 km^2 and has a median flow of 1,349 m^3/day. Large areas of the Ruahorehore Stream Sub-Catchment have been drained with artificial channels. A constructed farm pond, originally a constructed silt pond developed as part of the TSF1A construction programme, is located within the proposed footprint of TSF3 and provides water for stock.

Two unnamed, spring-fed tributaries flow south out of SNA 166 (comprising Kahikatea Puketa-Tawa forest) at the northern extent of Area 7 and converge, forming a tributary within the proposed footprint of TSF3 (refer to Figure 3-38). The tributary flows south through the area via farm drains to join the Ruahorehore Stream. The farm drains are shallow with typically very low to no flow baseflow. From its convergence with these farm drains, the Ruahorehore Stream flows west, around the toe of the existing TSFs, under Baxter Road and into the Ohinemuri River at Black Hill.

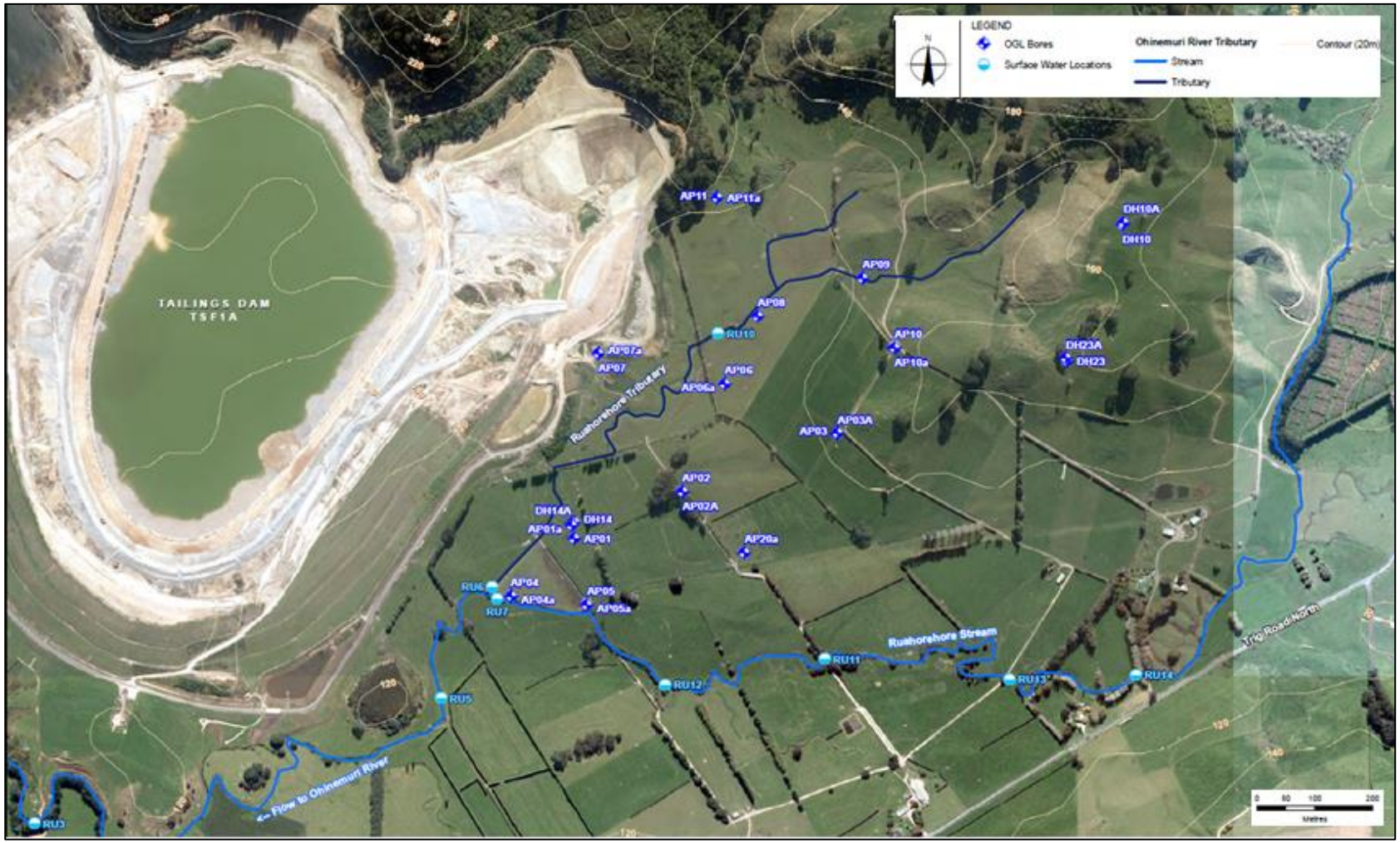

Figure 3-38: Localised View of Waterbodies Within Area 7 (GHD 2025d)

Development of TSF3 requires dewatering, and diversion of the Ruahorehore Tributary and part of the Ruahorehore Stream at the south-west toe of TSF3 (as previously mentioned in Section 2.12.1.6 of this report). The Ruahorehore Stream Sub-Catchment, and the section to be diverted, is shown in Figure 2-74.

3.7 HYDROGEOLOGY

The hydrogeology attributed to the proposed work areas of the WNP is described in WWLA (2025a and 2025c), GHD (2025c), and EGL (2025d and 2025g) which are provided in **Part H** of these application documents.

3.7.1 Area 1

The hydrogeology of the Wharekirauponga epithermal gold deposit is complex due to geology and setting. The three hydrogeologic domains (shown in Figure 3-39) include:

- Water table aquifer;
- Rhyolite host rock aquifer; and
- Vein system aquifer.

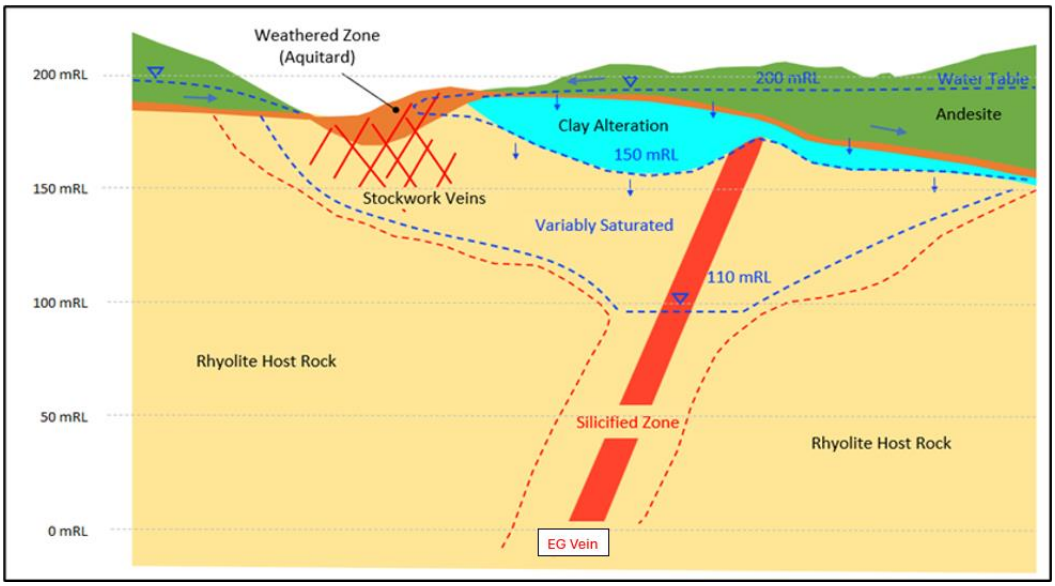

Figure 3-39: Generalised hydrogeologic section of the Wharekirauponga epithermal gold deposit (WWLA 2025a)

The water table aquifer is comprised of groundwater within the post mineralisation andesite (and rhyolite where exposed at the surface). The aquifer is open to the atmosphere and the water level varies as a function of rainfall. Groundwater movement in the aquifer is dominantly lateral with flow paths that generally follow the topographic expression (refer to Figure 3-40).

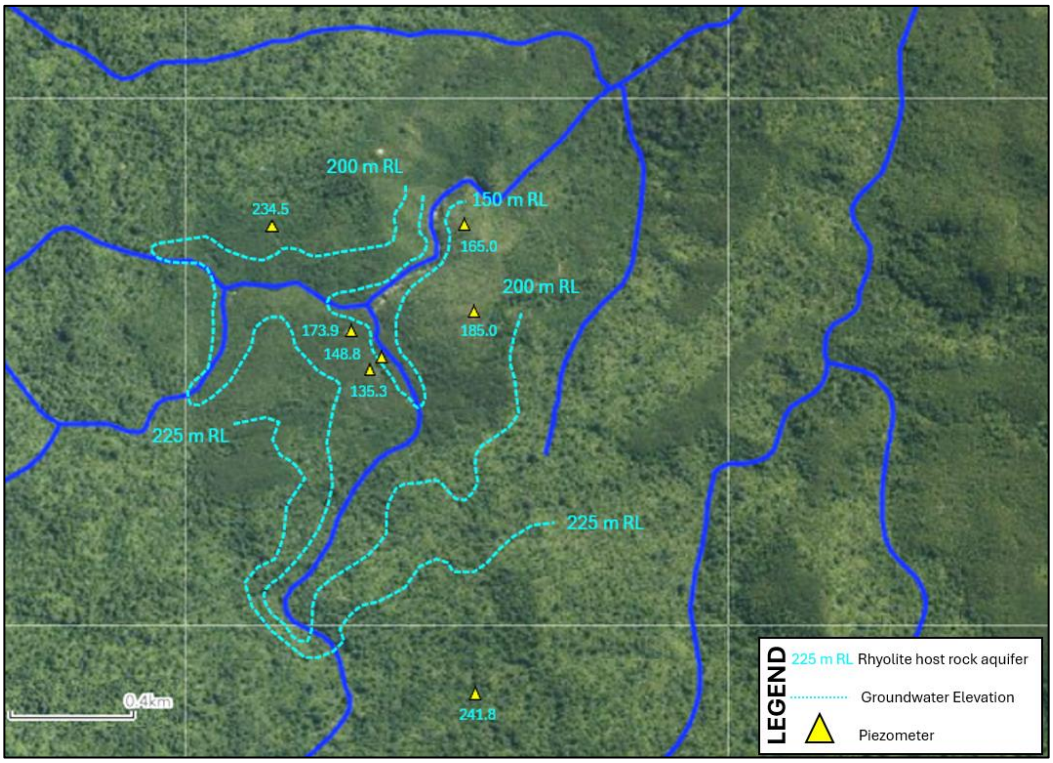

Figure 3-40: Shallow Groundwater System Piezometric Surface at Wharekirauponga (WWLA 2025a)

The rhyolite host rock aquifer underlies the post mineralisation andesite. The upper part of the rhyolite has been hydrothermally altered to a low permeability clay capping that hosts groundwater. Groundwater in that part of the system is held within the clay and is semi-confined in most places by the overlying andesite. Where exposed at the surface the groundwater within the clay capping is unconfined. There is limited groundwater movement in the upper part of the system due to its low hydraulic conductivity (permeability). There is a downward hydraulic gradient caused by the underdrainage effects from the lower part of the system. There is no evidence of saturated downward flow from this unit into deeper groundwater, i.e. this groundwater could be perched above the deeper system.

Beneath the clay alteration zone is rhyolite that is host to the main EG Vein and hanging wall stockwork vein system. Immediately adjacent to the vein systems the rhyolite rock is highly silicified, fractured and has variable permeability depending on the degree of fracturing, which can be high. Depending on the locality, parts of the rock mass above and adjacent to the vein system are unsaturated due to the degree of fracturing and associated high permeability. Strong downward hydraulic gradients are observed in many parts of the rhyolite aquifer system. There is limited connectivity between the rhyolite host rock aquifer and the water table where only partially saturated conditions exist.

The EG Vein is at least partly drained along its length to an elevation of between 100 to 110 m RL and is lower than the surrounding piezometric levels. The low water level in the vein system aquifer is a result of its high permeability and because there is an outlet (discharge zone) along the strike of the vein to the northeast within a lower reach of the Wharekirauponga Stream. The presence of high permeability conditions is confirmed by the relatively flat hydraulic gradient within the deep groundwater system as shown in Figure 3-41.

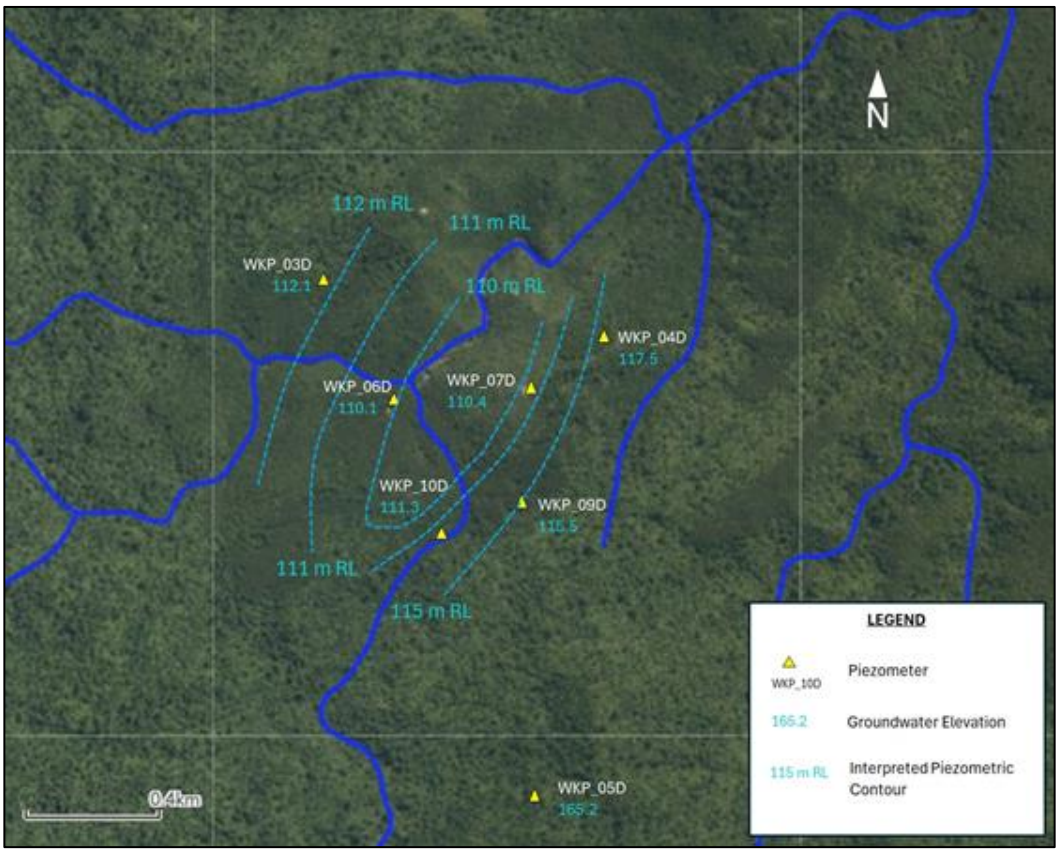

Figure 3-41: Deep groundwater system piezometric surface at Wharekirauponga (WWLA 2025a)

3.7.2 Area 2

The hydrogeology of the proposed Willows SFA has been investigated by way of test pits and machine drilled bores in the locations shown in Figure 3-42.

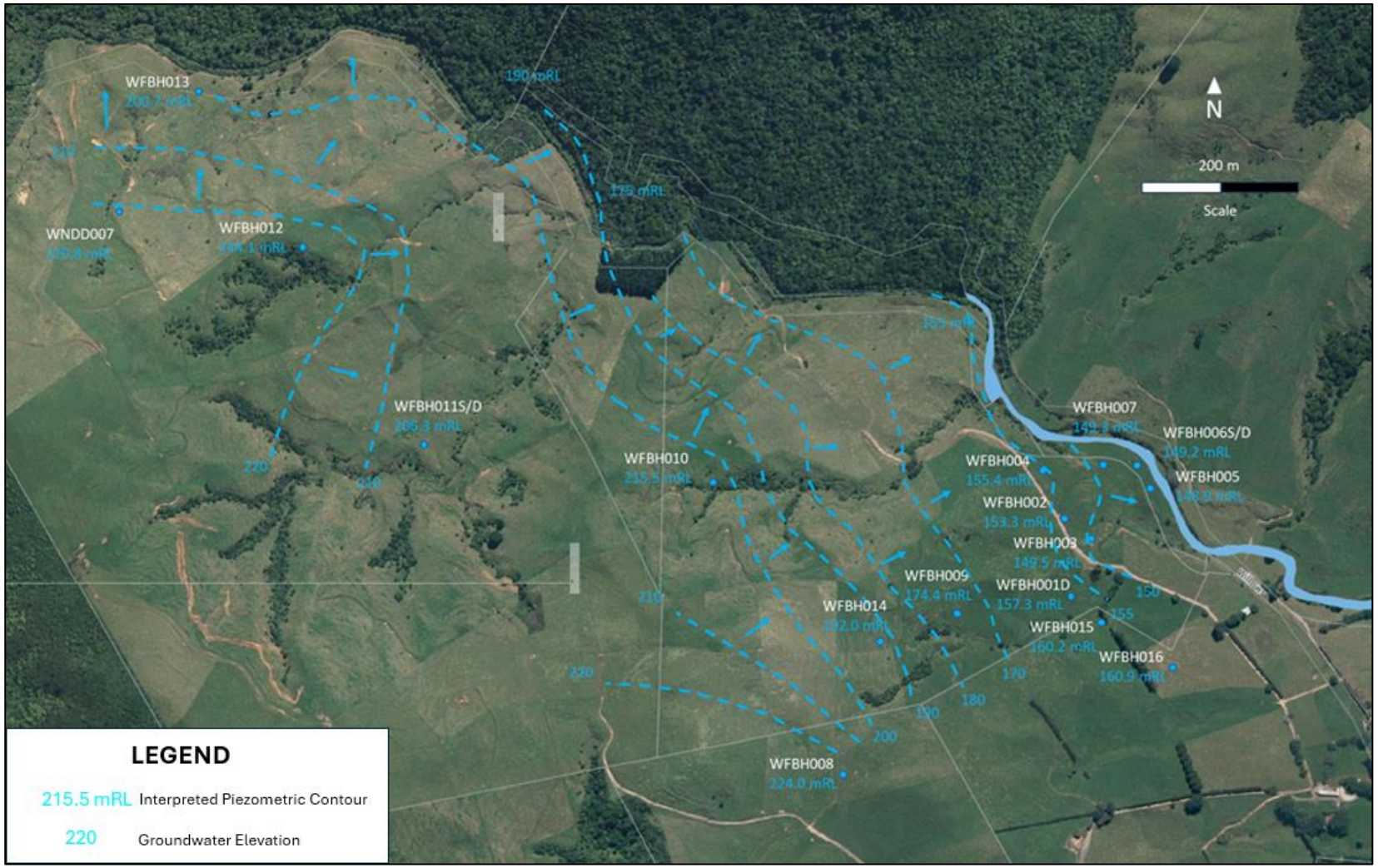

Figure 3-42: Willows SFA Groundwater Monitoring Locations and Interpreted Piezometric Contours (GHD 2025b)

The conceptual hydrogeologic model for the site shows that interflow makes the largest contribution to surface waters, with some baseflow sourced from the rock mass. A west-east conceptual cross-section of the proposed Willows Portal is shown in Figure 3-43.

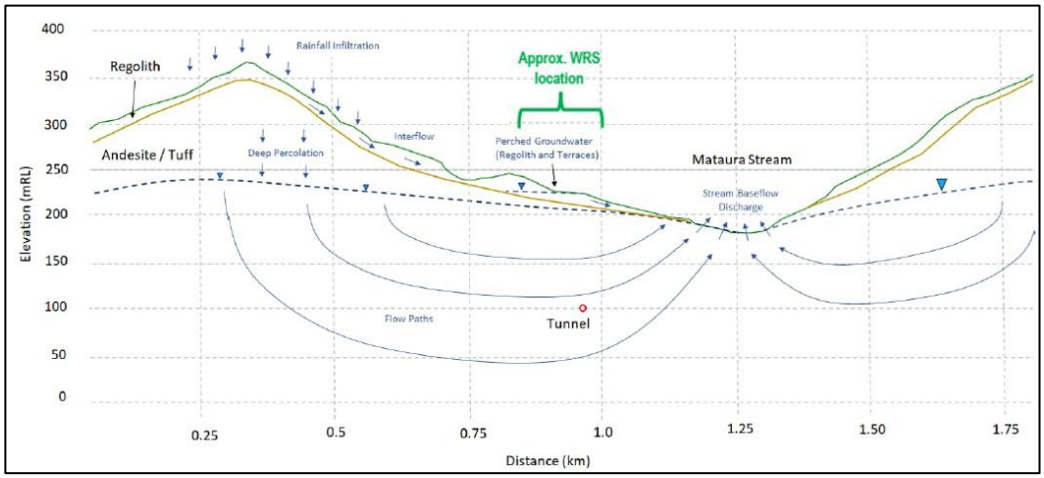

Figure 3-43: Willows SFA West-East Conceptual Cross-Section (WWLA 2025c)

A drillhole to 231 m BGL at the site of the proposed ventilation evasé at the north-western end of Area 2 recorded groundwater at around 10 m depth. It is estimated that this depth to groundwater is generally consistent across the site.

The assumed average rock mass hydraulic conductivity is approximately 2.5 x 10^{-8} m/s and fault zones were indicated to have hydraulic conductivity of 1.0 x 10^{-5} m/s.

3.7.3 Area 3

The Wharekirauponga Access Tunnel corridor is located within an area identified by the Regional Plan as the Waihi Basin Aquifer Management Area. The groundwater consists of a shallow system at 0.5 m to 30 m depth, and a deeper system more than 30 m below ground level.

The conceptual hydrogeological model for the Wharekirauponga Access Tunnel alignment generated by WWLA (2025c) is provided in Figure 3-44.

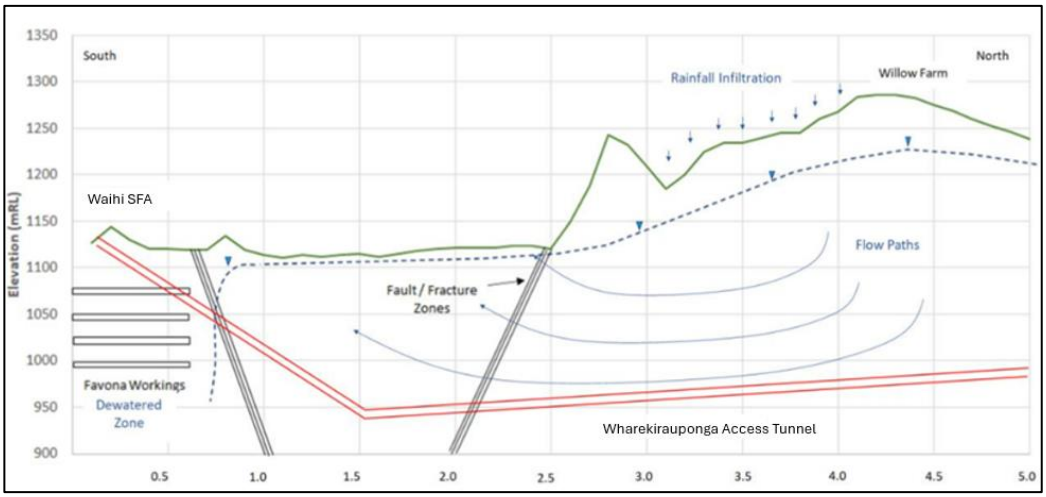

Figure 3-44: Conceptual Hydrogeologic Model for the Wharekirauponga Access Tunnel

The shallow groundwater system consists of surficial alluvium and younger volcanic material deposits with shallow groundwater flowing southeast from the Coromandel Ranges. It is considered that the Wharekirauponga Access Tunnel will not intersect the shallow groundwater system. The tunnel's decline will be driven through an area that has been dewatered to around 70 m below ground level by the existing underground mines near the proposed WUG Portal.

The deep groundwater system within Area 3 is within andesite. The dewatering of existing underground mines near the Waihi SFA has affected this deep groundwater system near the southern end of the tunnel corridor and portal. Therefore, fully saturated conditions will not be encountered until some point along the tunnel decline, beneath the shallow groundwater system.

In the southern half of Area 3, groundwater flows toward the west (i.e. the Wharekirauponga Access Tunnel corridor is perpendicular to the flows). A downward gradient is expected through much of the tunnel corridor, except for an upward gradient near the Ohinemuri River.

3.7.4 Area 4

Area 4 comprises the Services Trench, which does not form part of this application, other than as detailed in Section 3.2.4.

3.7.5 Area 5

Within Area 5 the groundwater system near Gladstone Hill consists of a shallow groundwater system in young volcanic and alluvium deposits and a deeper system within the andesite rock mass. The systems are separated locally through the presence of low

permeability weathered layers. The andesite rock mass which hosts the Gladstone vein system is already dewatered for the most part due to the Favona Underground Mine. The vein system in the southwest is only partly dewatered. The andesitic rocks do not contain enriched sulphides or trace elements.

The area of the proposed GOP and the Waihi SFA upgrades is located within the Regional Plan's 'Waihi Basin Aquifer'. For water allocation, the WRC specifies a combined (shallow and deep aquifers) management volume of 6M m^3/year[3].

3.7.6 Area 6

The hydrogeology beneath the proposed area of the NRS shows no clear separation of shallow and deeper groundwater systems. This is due to the presence of multiple alluvial paleochannels within and overlying variable volcanics (ignimbrite, dacite and rhyolite). Overall, it is interpreted that the groundwater systems are hydraulically connected and collectively discharge to the Ohinemuri River west of the NRS.

3.7.7 Area 7

Groundwater within Area 7 recharges in the ridge to the north / northeast (within SNA 166), then flows south / southwest to the Ruahorehore Stream. Shallow groundwater emerges near the rhyolite foothills to produce springs. The Ruahorehore Stream has a limited groundwater catchment (see Figure 3-45).

The deeper groundwater system also recharges from infiltration in the SNA 166 ridges to the north, ultimately discharging to the Ohinemuri River.

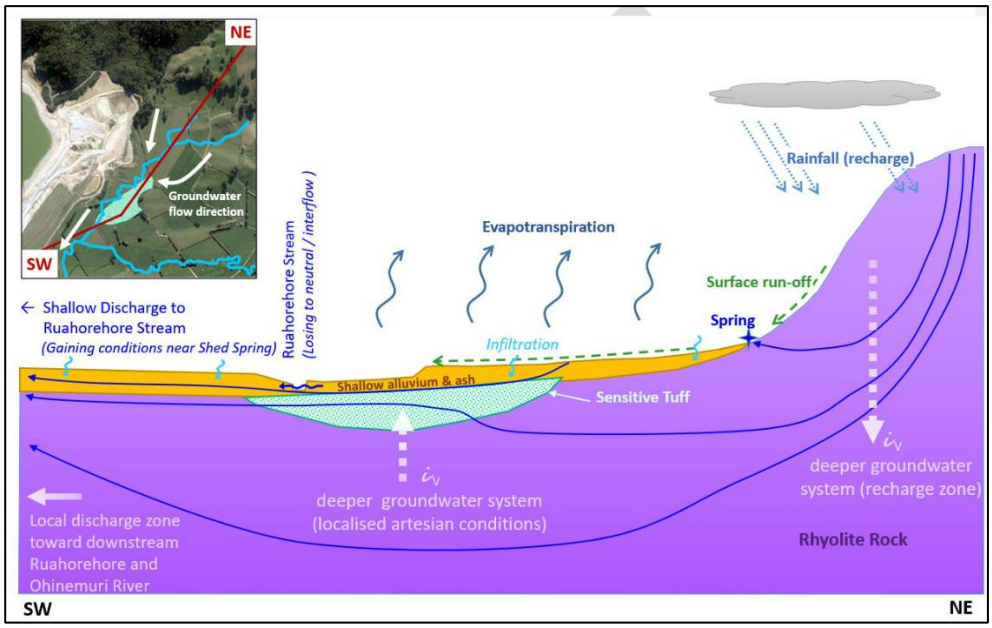

Figure 3-45: Area 7 Groundwater System (GHD 2025d)

3.8 ECOLOGY

3.8.1 Aquatic Ecology

The aquatic ecology values attributed to the various waterbodies located within and in close proximity to the proposed work areas of the WNP are detailed in Boffa Miskell (2025c), a copy of which is provided in **Part B** of these application documents.

Within Area 1, the Wharekirauponga Stream and its tributaries including the Teawaotemutu Stream (both arms), Adams Stream, Edmonds Stream, Thompson Stream, and unnamed tributaries within the Coromandel Forest Park have high ecological value.

The warm spring located approximately 5 m from the true right bank of the Wharekirauponga Stream, just upstream of the WKP3 flow gauging site (see Figure 3-32) has low ecological value, as detailed further below.

The main stem of the Wharekirauponga Stream is shown in Figure 3-46, with representative photographs of the tributaries to the stream provided in Figures 3-47 and 3-48.

Figure 3-46: Main Stem of the Wharekirauponga Stream

Figure 3-47: Northern (left) and Southern Teawaotemutu Streams

Figure 3-48: Thompson Stream (left) and 'R' Tributary

The streams are surrounded by riparian vegetation and enclosed by steep banks. Water quality in the Wharekirauponga Stream is predominantly “excellent” with good clarity, providing support for aquatic fauna. Survey results for periphyton (algae) and macroinvertebrate communities indicated high-quality instream habitats. The channels provide diverse habitats with numerous bedrock platforms and large boulders, often narrowing the channel and creating hydrological features such as chutes, cascades, and waterfalls. Riffle-pool-run sequences were abundant across all sites, with pools having a mixture of depths.

A 4 m high waterfall on the Wharekirauponga Stream limits fish passage. Kōaro and long fin eel have been identified upstream of the waterfall, with downstream sites having a more diverse fish community which includes kōaro, longfin eel, torrentfish, redfin bully, and banded kōkopu.

The warm spring referenced earlier (temperature of 19°C to 20°C) (refer to Figure 3-49) emerges as a pool heavy in orange deposit. Beyond the pool, the water forms a shallow sheet flow (also heavy in bed orange deposit) cascading over rocks for 5 m then discharging into the main stem of the Wharekirauponga Stream. Sampling has revealed that the warm spring has moderately raised levels of sulphates, sodium and metals and has a calcium bicarbonate dominant water type. The algal communities present are reflective of a temperate water community with some representation of algae also found in geothermal waters. The warm spring provides a poor habitat for macroinvertebrates and fish. The lack 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. As noted previously the warm spring has low ecological value.

Figure 3-49: Warm Spring Emergence (left) and Discharge to the Wharekirauponga Stream

Within Area 2, the Mataura Stream (refer to Figure 3-50) runs through the Willows SFA and is of high ecological value. Its headwaters are in the forested catchments of the Coromandel Range, and the stream is included in the Regional Plan's 'Significant Trout Fishery and Trout Habitat Water Class'.

The Mataura Stream has good instream habitat quality and quantity and consists 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, including shortfin and longfin eel.

Riparian vegetation and stream shading are limited and include mostly rank pasture and low stature vegetation. There does not appear to be any level of modification to the stream channel within the assessed reach, however the riparian margin is highly modified.

Figure 3-50: Mataura Stream During High Flow

Within Area 2, various unnamed tributaries flow across the area of the proposed Willows SFA and into the Mataura Stream. One of these, Tributary 2, which has moderate ecological value, will be impacted by the WRS (as illustrated in Figure 3-51).

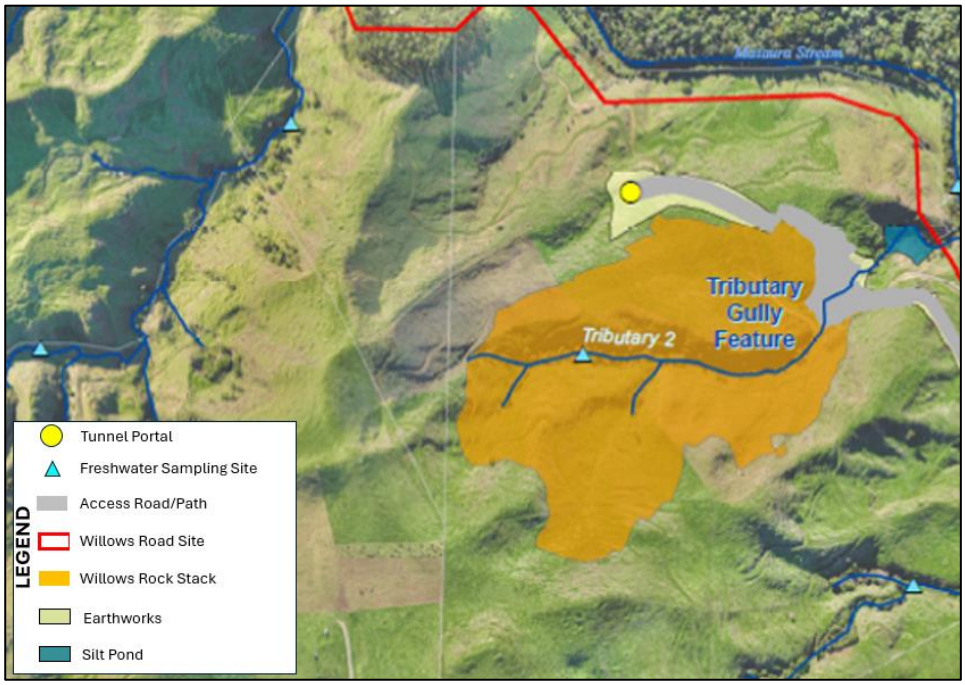

Figure 3-51: Tributary 2 Impacted by the WRS

Tributary 2 has good instream habitat quality and moderate quantity, and consists mostly of riffles habitat, featuring pools, runs, occasional waterfalls, undercut banks, overhanging / encroaching riparian vegetation, and root mats from mostly low stature riparian vegetation. The habitats are diverse, but not abundant. A representative photograph of Tributary 2 is provided in Figure 3-52.

Figure 3-52: Tributary 2 Reach with Grazed Margins on Both Sides of the Stream

There is a perched culvert on Tributary 2 where a dam has created a small online pond, likely used for stock watering (refer to Figure 3-53). There are a few other man-made culverts and natural partial barriers to fish passage along the tributary reach. Sediment cover across the stream is low. There is higher sediment cover in reaches with lesser gradients.

Figure 3-53: Perched Culvert on Tributary 2

Macroinvertebrate assemblages and indices are reflective of the habitat. Fish species richness is low with only shortfin eel detected 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. More established vegetation is within the upper reaches which stock is not able to access due to the steepness of the banks (see Figure 3-54).

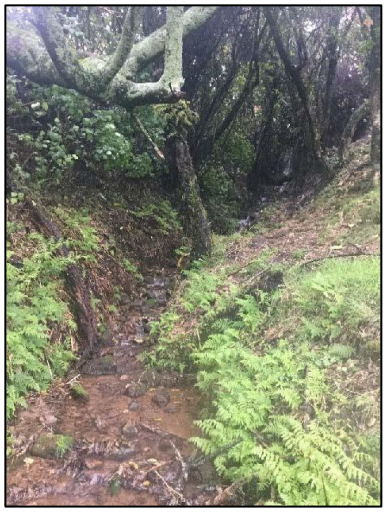

Figure 3-54: Tributary 2 Within a Pocket of Riparian Vegetation Near its Upstream Extent

The proposed activities of the WNP will interact with the Ohinemuri River in various locations within Areas 5 and 6. The Ohinemuri River is classified as a significant trout fishery and has moderate overall ecological values. Key identified attributes of the Ohinemuri River include:

- The water quality of the Ohinemuri River at SH25 and the Karangahake Gorge (respectively upstream and downstream of OGNZL's existing treated water discharge) are within the National Policy Statement for Freshwater Management ("**NPS-FM**") Category A attribute state for ammoniacal nitrogen, dissolved reactive phosphorus ("**DRP**") and nitrate nitrogen dissolved oxygen, ammoniacal nitrogen, TON and E. coli, with trends being indeterminate or improving (especially total phosphorus);
- At the Queens Head site (downstream of the OGNZL site), E. coli, TON and ammoniacal nitrogen (annual median) meet NPSFM Category BA, with a degrading trend;
- DRP meets NPSFM Category A at all monitoring sites within the Ohinemuri River, whilst E. coli meets NPSFM Category D at all sites within the Ohinemuri River;
- For the most part water quality variables met the WRC's 'Excellent' category for the physico-chemical components (pH, dissolved oxygen). Not all attributes monitored by WRC are the equivalent of those used in the NPSFM categories, but the median value for

total phosphorus suggests at least satisfactory quality (WRC water quality categories); and

- Water quality has elevated levels of Nitrogen (satisfactory – unsatisfactory) with lower levels of phosphorus (~satisfactory-excellent); and
- Biological indicators of water quality (cf; periphyton, Macroinvertebrate Community Index ("**MCI**") and Quantitative Macroinvertebrate Community Index ("**QMCI**") show a poor to moderate water quality condition of the Ohinemuri River within the Waihi Basin, and indicative of moderate nutrient enrichment, mostly resulting from land use activity within the catchment.

Based on monitoring undertaken by WRC and OGNZL of currently consented treated water discharges into the Ohinemuri River:

- Periphyton (benthic algae) are below the threshold for filamentous algae and algal mats as set out in the NZ Periphyton Guidelines;
- Algal productivity (measured as Chlorophyll a (chl-a) exceeded the NZ Periphyton Guidelines at sites upstream and downstream of the discharges in May 2017; chl-a was highest at the upstream site;
- Periphyton is dominated by diatoms followed by filamentous algae;
- Algal standing crop or biomass was below the thresholds set out in the NZ Periphyton guidelines;
- Macroinvertebrate community Index scores (QMCI and MCI) show the Ohinemuri River to range from poor to fair; and
- Shortfin eels and common bullies are the most widespread and common species recorded during monitoring. Longfin eels, Cran's Bully, rainbow trout and Banded kokopu have all been recorded during monitoring surveys.

In addition to interactions with the Ohinemuri River, the proposed works within Area 6 interact with a number of streams of moderate ecological value (see Figure 3-55), including TB1. Of note:

- The streams are historically highly modified with streambeds smothered by fine sediment; partially a result of their predominantly pasture catchments;
- Macroinvertebrate communities within the streams are dominated by tolerant taxa, while the presence of EPT taxa was relatively low; and
- Fish fauna are sparse, with only shortfin eel species recorded during surveys.

Within Area 7, the headwaters of the sub-catchment where TSF3 will be located (see site 'RUA Forest' on Figure 3-56) is located within a regenerating forest area. The ecological values in this area are very high. The stream channel is predominantly comprised of large boulders, with a mixture of pools, runs, cascades and waterfalls present. No macrophyte species were identified at this site and bank erosion is absent. Vegetation within the riparian zone is dense with black tree fern (Cyathea medullaris), the dominant species, with some remnant mature pine trees present.

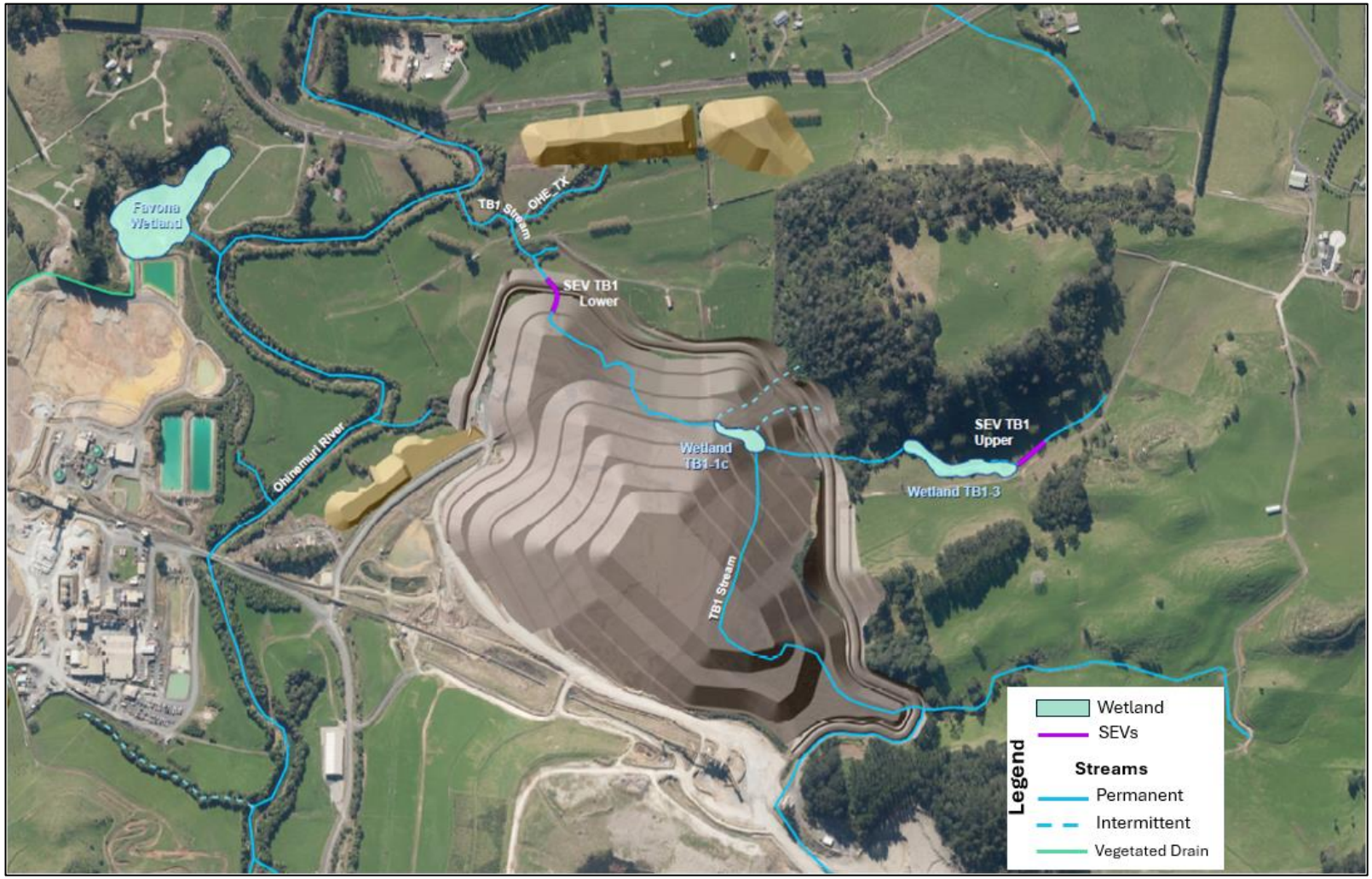

Figure 3-55: Aquatic Ecology of Area 6

Figure 3-56: Aquatic Ecology of Area 7

Freshwater crayfish / Kōrora, longfin eel and shortfin eel are all present in this area. A waterfall located between site RUA Upper and site RUA Forest (see Figure 3-56) represents a significant barrier to fish passage of swimming species to these headwaters. The freshwater ecological values across the rest of the Ruahorehore Stream Sub-Catchment are varied with a mixture of permanent waterways, vegetated drains and water collection ponds.

The tributary of the Ruahorehore Stream which connects to the headwaters is of high ecological value. Longfin eel, shortfin eel, and freshwater crayfish have been recorded in this waterbody. Where it emerges from the ridge into the cleared portion of the proposed TSF3 footprint, the tributary is 0.17 m to 1.48 m wide with >1m high, almost vertical stream banks. The bed is predominantly smooth clay and silt / sand, with some smaller gravels. Water clarity is good at a mean depth of 0.28 m. Macrophyte species were rare, with small patches of watercress and starwort (Callitriche sp.) present. Large areas of bank collapse have resulted in large patches of pasture grass species growing in the channel and riparian vegetation consists of overgrown pasture grasses with occasional fern, gorse and other groundcover weed species. A representative photograph of the Ruahorehore Tributary is provided in Figure 3-57.

Figure 3-57: Ruahorehore Tributary within the Proposed TSF3 Footprint

The Ruahorehore Stream, both adjacent to and downstream of the proposed TSF3, is a highly modified habitat of medium ecological value. Riparian vegetation is limited with excessive macrophyte growth common. The macroinvertebrate communities present are diverse, with the pollution sensitive EPT1 taxa present at all sites. Communities are dominated by those species that are more pollution tolerant. Riparian replanting (by OGNZL and its predecessors) is present in the lower reach of the stream but is otherwise largely absent. The streambanks are slumping along much of its length and are pugged in some areas. A representative photograph of the Ruahorehore Stream is provided in Figure 3-58.

Figure 3-58: Ruahorehore Stream Near Proposed TSF3

3.8.2 Terrestrial Ecology

The terrestrial ecology values for the proposed work areas of the WNP are detailed in Boffa Miskell (2025a) and Bioresearches (2025a), a copy is provided in **Part B** of these application documents.

3.8.2.1 Area 1

There is one SNA located within the proposed Area 1 works area, being SNA T13P152. SNA T13P152 is identified by the HDP as having 'National' terrestrial ecological significance, and is recognised as containing broadleaved indigenous hardwoods, indigenous forest, manuka and / or kanuka.[40]

Boffa Miskell (2025a) identified three main vegetation types within the Wharekirauponga catchment, as follows:

> Kauri forest – found mainly on ridgelines and knolls on the sides of valleys. Kauri dominates the top canopy, often comprising groups of young kauri growing closely together, with many of the trees over 25 m tall. Historically, kauri stands would have been a common vegetation type, but historical logging and land clearance has depleted and fragmented kauri forest in the area.

> Mixed secondary broadleaved forest – The principal vegetation type in the Wharekirauponga catchment is broadleaved secondary forest. The most abundant canopy species are rewarewa, tanekaha, and pukatea, with tawa also co-dominant in some areas. The subcanopy is dominated by ponga and nikau, with mahoe being common. Other species like miro, tanekaha, tōtara, hinau, rimu, toatoa, and kauri are present but in low abundances.

> Kānuka scrub – typically comprises kanuka, rewarewa, tanekaha and towai. Rimu and mahoe are frequent but not abundant. Other common species include mapou, kauri, ponga, rimu, pigeonwood, mingimingi, mahoe, *Pseudopanax discolor*, supplejack, towai and karamu, hangehange and kiokio.

In addition, surveys identified 34 species of orchid across seven different orchid types (gnat, perching, finger, bird, sun, spider and greenhood orchids).

The Wharekirauponga Valley provides habitat for three native bird species with a New Zealand Threat Classification status of 'At Risk' or 'Conservation Dependent', being:

> The whitehead / pōpokatea;

> The yellow-crowned parakeet / kākāriki; and

> The kākā.

[40] Significant Natural Areas of the Hauraki District, Terrestrial and Wetland Ecosystems, Waikato Regional Council, 2010.

Other notable species such as the North Island brown kiwi and long-tailed cuckoo are potentially present in the Coromandel Forest Park but were not detected by surveys undertaken in 2019 and 2020.

Two ground dwelling skink species and one arboreal gecko have been recorded within 10 km of Wharekirauponga. The area provides habitat for the Forest Gecko and Elegant Gecko, which both have a NZ Threat Classification of 'At Risk – Declining'. However, whilst there are extensive areas of high-quality lizard habitat throughout the catchment, there is also a notable presence of invasive predators (including pigs, mice, rats and wasps).

Despite the Coromandel Forest Park offering high quality habitat for bats, no bats were detected during extensive bat surveys of the Wharekirauponga catchment between 2018 – 2021. This may be explained by the high density of pest animals in the area (discussed later in this sub-section).

The Wharekirauponga catchment is likely to contain a characteristic suite of native forest terrestrial invertebrates, including species such as wētā, paua slugs and peripatus in forested sites.

Of note, the Coromandel Forest Park has very high ecological value for native frog species, with survey work undertaken between 2018 and 2022 showing that two leiopelmatid species—Archey's frog and Hochstetter's frog occupy the forests and streams above the WUG footprint. These are important endemic species. New Zealand has only three native frog species and these are of conservation concern.

Given the importance of the species, OGNZL commissioned a team of ecologists to conduct research and provide advice on how leiopelmatid frogs may be affected by the WNP and how those effects could be managed. That work is contained in a series of reports, copies of which are included in **Part B** of these application documents:

> RMA Ecology (2025a) – which provides an overarching assessment of the potential effects on native frogs, including an ecological risk assessment;

> Boffa Miskell (2025b) – which sets out methods proposed to control mammalian pests at a specified site which is to be utilised for the release of salvaged animals;

> Lloyd (2025a) – which provides an estimation of the Archey's frog population within the area potentially affected by vibrations from blasting activity associated with the WUG; and

> Bioresearches (2025b) – which provides an assessment of the potential ecological effects of the WNP on native frogs.

Collectively, these reports are referred to as the Leiopelmatid Frog Assessments.

With regard to the existing environment values for native frog species, the Leiopelmatid Frog Assessments have noted that:

> Archey's frog occupies dense, damp native forest and ridge tops, from c. 200 to 1,000 metres above sea level, where humidity is frequently high. It is not specifically associated with stream, creeks, or other waterbodies;

> Until recently, it was estimated that the total national Archey's frog population was between 5,000 – 20,000 mature individuals. That limited population and the threats to it from predators together with the potential for further large-scale loss of preferred habitat from forest clearance supported the frogs being classified as At Risk under the New Zealand Threat Classification System and critically endangered under the International Union for Conservation of Nature's Red List ("**IUCN Red List**"). That conservation status is in part because they are small and hard to find;

> Concentrated efforts to properly understand the distribution of Archey's frog and their abundance have been lacking. It was assumed the population was small and the frogs were believed to be in a precarious position and at real risk of decline leading to potential extinction;

> As part of the WNP, extensive native frog surveys were undertaken between 2017 – 2022, both within the Wharekirauponga Stream Sub-Catchment, and as part of a Coromandel wide distribution study. In total, over 1,600 hours have been spent surveying for Archey's frog, including at Wharekirauponga during drill site selection. These surveys have extended the known population range of Archey's frogs in the Wharekirauponga area further north to now include the Wires and Wentworth tracks (north of Whangamatā), westward towards Paeroa, and south towards Waihi. Surveys have found that Archey's frogs are widely, but not densely, distributed throughout the Wharekirauponga catchment. Other locations where Archey's frogs are in at least equal densities as Wharekirauponga include Golden Cross, the Waitekauri area, and the Karaka Track area just east of Thames. The surveys have also identified that Archey's frogs occupy a wide range of macrohabitats (forest types) provided there is sufficient groundcover and refuge habitat available. In total, OGNZL commissioned surveys have recorded over 1,300 individual frogs. As a comparison, at the time of writing, DOC's database of Archey's frogs only includes 437 recordings dating back to 1862;

> Survey data analysis estimated that the number of adult Archey's frogs living in the 315 ha area of forest above the WUG ranges between 48,888 and 152,774 (61,406–278,785 for all age frogs);

> Assuming similar abundance throughout the Coromandel Range, estimates for the total Coromandel population are 8–25 million adult Archey's frogs. Of note, habitat in the

Wharekirauponga study area is low quality for Archey's frogs compared to many other areas in Coromandel, so the total Coromandel population could be higher. This is significantly greater than original assumptions of population size, of between 5,000 - 20,000 mature individuals, for the national population;

- The habitat area affected by the WUG footprint represents only 0.61% of Archey's frogs inferred 52,000 ha distribution range;
- Hochstetter's frog is closely associated with streams and typically inhabits a narrow zone along small, forested streams and seeps within native forest fragments. This habitat is usually found in cool, temperate headwater streams in densely forested catchments at elevations between 160 and 800 metres above sea level;
- Hochstetter's frog is widely distributed and abundant across the Coromandel Peninsula. Prior to 2019 there was limited information on the presence and abundance of Hochstetter's frogs in the Wharekirauponga Stream Sub-Catchment. Surveys undertaken for the WNP have added to the information; and
- A detailed survey undertaken in 2024 estimates that the population of 12.1 km of stream length in the lower reaches of Edmonds Stream catchment ranges between 549 and 637 frogs (i.e. approximately 1 frog / 20 m length of stream).

Overall, the Archey's and Hochstetter's frog populations in the affected Wharekirauponga Catchment are representative of the wider Coromandel populations in terms of distribution and abundance.

As noted above, baseline pest monitoring identified very high pest densities within and around Wharekirauponga. Notable pests found in the area include:

- Rats – predators of native frogs, lizards and birds;
- Mice – thought to predate juvenile native frogs;
- Possums – which browse native vegetation and prey upon nesting birds;
- Stoats – a key predator of native lizards, birds and frogs;
- Feral cats – which may be a key predator of native frogs and other species; and
- Pigs – which have been documented directly predating native frogs and other native species as well as damaging the forest floor and thus impacting forest successional processes.

A wetland assessment was undertaken by Bioresearches and WWLA across a 305 ha area (within and in close proximity to Area 1) to identify any wetlands that have a potential risk of impact from the proposed WUG dewatering activities. 50 natural inland wetlands were

identified within the area of investigation, with eight of these being considered to have a higher susceptibility of being affected by the proposed works. These eight wetlands, and their locations, are detailed further in Section 6.4.1.1 of this report).

Overall, the ecological value of Area 1 is considered very high.

3.8.2.2 Area 2

There are no SNAs located within the footprint of the proposed Area 2 works.

In Area 2, native forest and scrub vegetation mostly consist of narrow riparian remnants along steep tributary sides and some isolated trees in pasture. These riparian areas are unfenced and heavily grazed (see Figure 3-59), with sparse or absent regeneration of indigenous species due to grazing and trampling. As a result, riparian vegetation provides shade and organic material to the tributaries but offers little habitat for native fauna.

Figure 3-59: Pasture and riparian vegetation at Willows Road Farm

Pine trees, waterway corridors, and forest margins on the property provide potential native bat habitat and flight corridors. However, all potential bat habitat is outside the Willows SFA footprint. Common native and introduced birds are found within Area 2, but rare and distinctive bird species are unlikely to inhabit the area.

The habitat within Area 2 is relatively poor for native terrestrial forest invertebrates due to fragmentation and stock damage. Additionally, there is limited habitat and refuges for native lizards, making it unlikely that they are present in the area.

Field surveys of the proposed Willows SFA site indicate it is generally unsuitable as habitat for Archey's and Hochstetter's frogs. Outside the Willows SFA, there is some suitable frog habitat, and a juvenile Hochstetter's frog was identified at a freshwater spring. This is located on the eastern side of the Willows site, distant from the WNP proposed works footprint.

Although heavily grazed, the Mataura Wetland, located near the boundary with the Mataura Stream, is a well-defined transitional "damp area" where there is an obvious visual ecotone occurring, and an inner functional wetland. Soil profiles reveal a persistently high water table, along with the presence of wet tolerant grasses and rushes. There is also evidence of historical wetlands within this area indicated by the presence of two mature swamp maire (Syzygium maire – a 'Threatened – Nationally Critical' species that is rare in the Waihi Ecological District). The Mataura Wetland is of moderate ecological value.

3.8.2.3 Area 3

The Wharekirauponga Access Tunnel is predominantly located beneath pastural farmland. However, it will pass (at significant depth) beneath SNA T13P204. The SNA is identified by the HDP as having 'Local' terrestrial ecological significance, with the area subject to Covenant 81.761.410.

3.8.2.4 Area 4

Area 4 comprises the Services Trench, which does not form part of this application, other than as detailed in Section 3.2.4.

3.8.2.5 Area 5

No SNAs are located within the proposed Area 5 work areas, however SNA TP13P165 ("**SNA 165**") is located in the southern part of the Ngāti Koi Domain to the east of the GOP and Waihi SFA. SNA 165 covers approximately 31 hectares and is identified by the HDP as having local significance.

The Waihi SFA is a highly modified industrial environment that presents no terrestrial ecology values of significance.

The GOP will encroach over part of the Winner Hill pine plantation and over native vegetation that has been planted around the Favona Portal and the headwaters of the unnamed Gladstone Hill tributary. The pine plantation on Winner and Gladstone Hills has 'Low' ecological value as habitat for native species. The planted native revegetation at the GOP has 'Moderate' ecological value.

The planted native vegetation along the Ohinemuri River at Waihi is part of a wider planting and rehabilitation programme voluntarily undertaken by OGNZL and its predecessors since 1991. Some 93,000 plants, covering around 19 ha of riverbank, were planted along the Ohinemuri River mainstem near the Martha Mine between 1995 and 2005. The resultant mature riparian vegetation contributes greatly to the ecological values of the Ohinemuri River. Extensive replanting along tributaries of the Ohinemuri River, including the Ruahorehore Stream east of Baxter Road, has also been undertaken by OGNZL and its predecessors, encompassing some 10 ha with around 107,000 plants. In total, OGNZL has planted 935,000 plants across a 55 ha area encompassing OGNZL, public, and private property. The timing and extent of revegetation works around the Waihi SFA is shown in Figure 3-60, below.

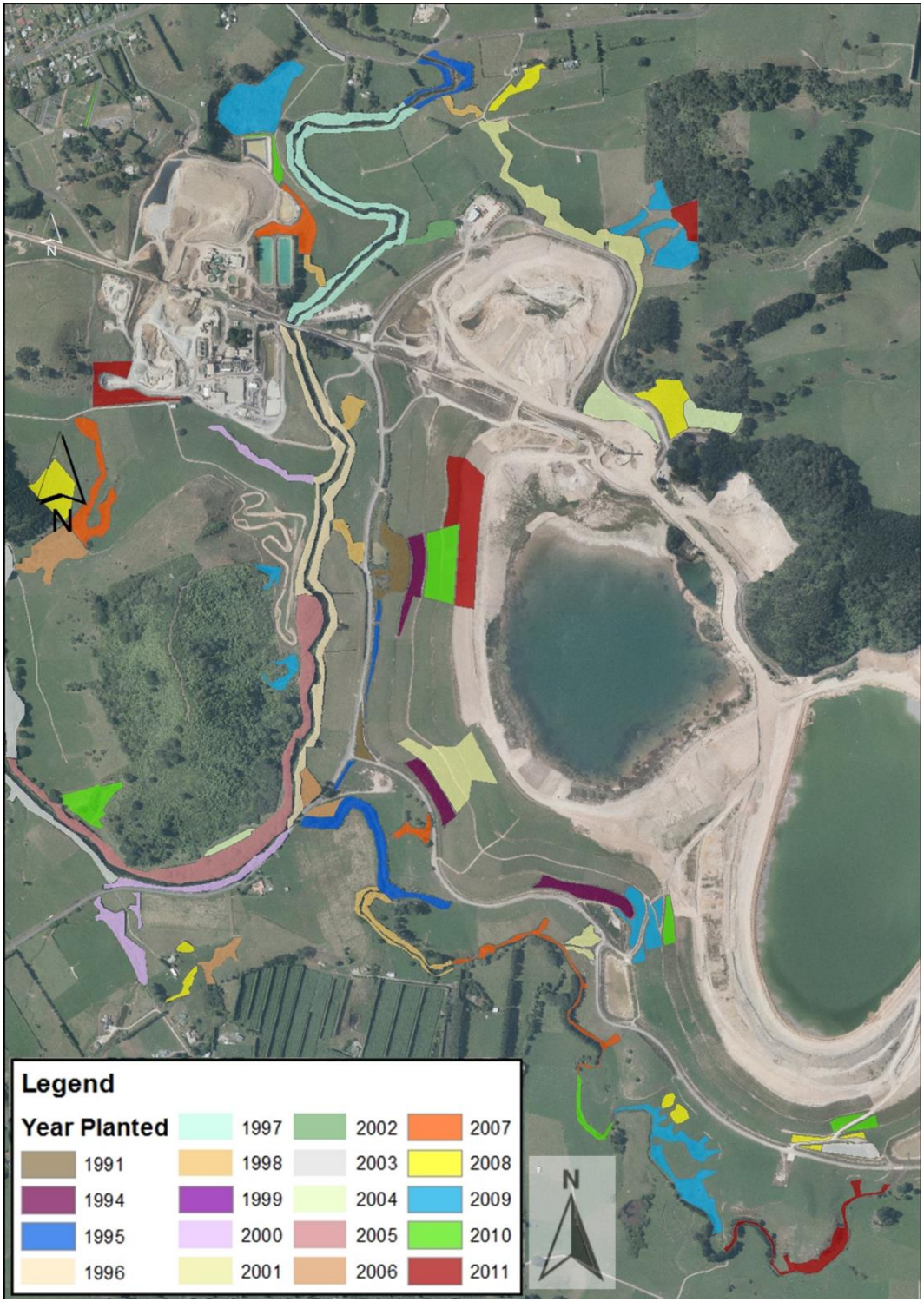

Figure 3-60: Voluntary Replanting Around the Waihi SFA

Copper Skinks have been recorded around the Waihi SFA, including at the GOP and Union Hill. These skinks are an 'At Risk' species under the New Zealand Threat Classification system. The WNP does not propose any works at the Copper Skink sites north of the WTP, at Union Hill, or at the 'At Risk' Moko Skink sites at SNA 166 which adjoins the NRS and TSF3. Surveys undertaken (refer Figure 3-61) did not record any geckos and indicate that the GOP does not provide habitat for native bats or frogs. The GOP site has 'Moderate' ecological value, largely due to the presence of habitat that supports 'At Risk' Copper Skinks.

The Gladstone Wetland is a small restored natural inland wetland that sits just outside the proposed boundary of the GOP, within the Ngāti Koi Domain (refer to Figure 3-62). The watercourses which feed the wetland are intermittent, with no measurable baseflow during dry summer periods.

The two tributaries that feed the Gladstone Wetland do not meet the 'natural inland wetland' definition; however, they are considered to have moderate ecological values, including:

- Unmodified stream channel and banks with well-established restored riparian margins;
- An invertebrate community with moderate diversity and dominated by detritus eating taxa;
- MCI scores indicative of 'Fair' water quality and SEV score is indicative of a 'good' quality habitat; and
- No fish species present.

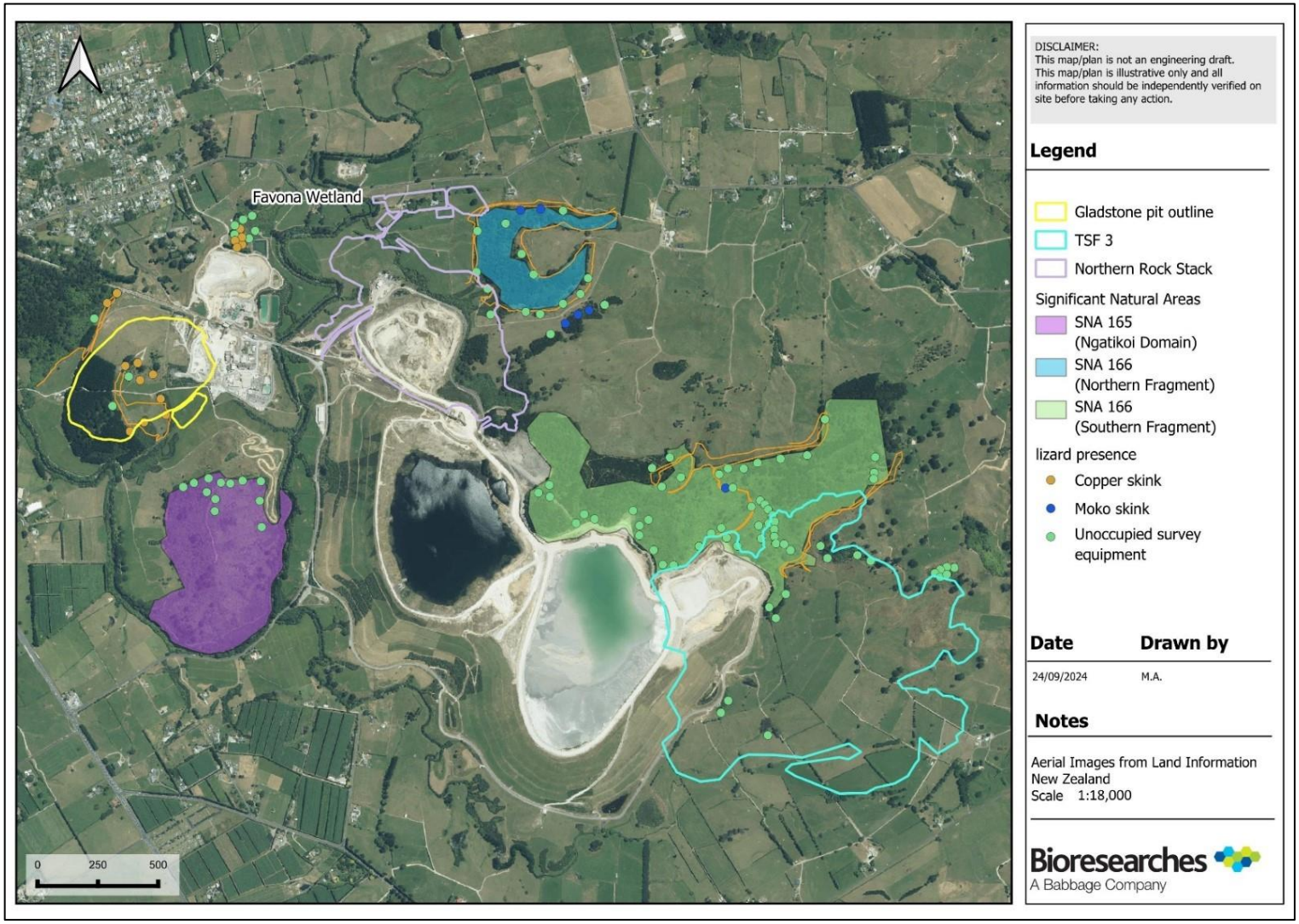

Figure 3-61: Native Lizard Survey Records

Figure 3-62: Ecology of the Gladstone Wetland and its Tributaries

The Gladstone Wetland is the likely the result of a farm track, raised embankment, and culvert established immediately downstream sometime in the 1960s.

It was actively restored in the 2000s by OGNZL's predecessor through extensive planting. The wetland has good connectivity to other wetland features in the landscape, with potentially high value habitat for Threatened / At Risk marsh birds.

The Gladstone Wetland meets the Waikato Regional Policy Statement ("**Waikato RPS**") significance criteria, based largely on the restoration of the wetland from what appears to have been an exotic, willow-dominated wetland, to an indigenous plant dominated wetland.

3.8.2.6 Area 6

The 11.5 ha northern unit of SNA 166 adjoins the eastern side of the NRS (refer to Figure 3-63). Vegetation in this area consists of exotic scrub, pines with subsidiary rewarewa forest, and rewarewa forest with subsidiary pines. Scattered kauri, rata and pohutukawa trees were also recorded.

The northern unit of SNA 166 was surveyed for native fauna (bats, birds, lizards and frogs). Moko skinks, which have a conservation status of 'Nationally At-Risk-relict', were found in (and south) of this area. The proposed NRS footprint avoids those moko skink sites.

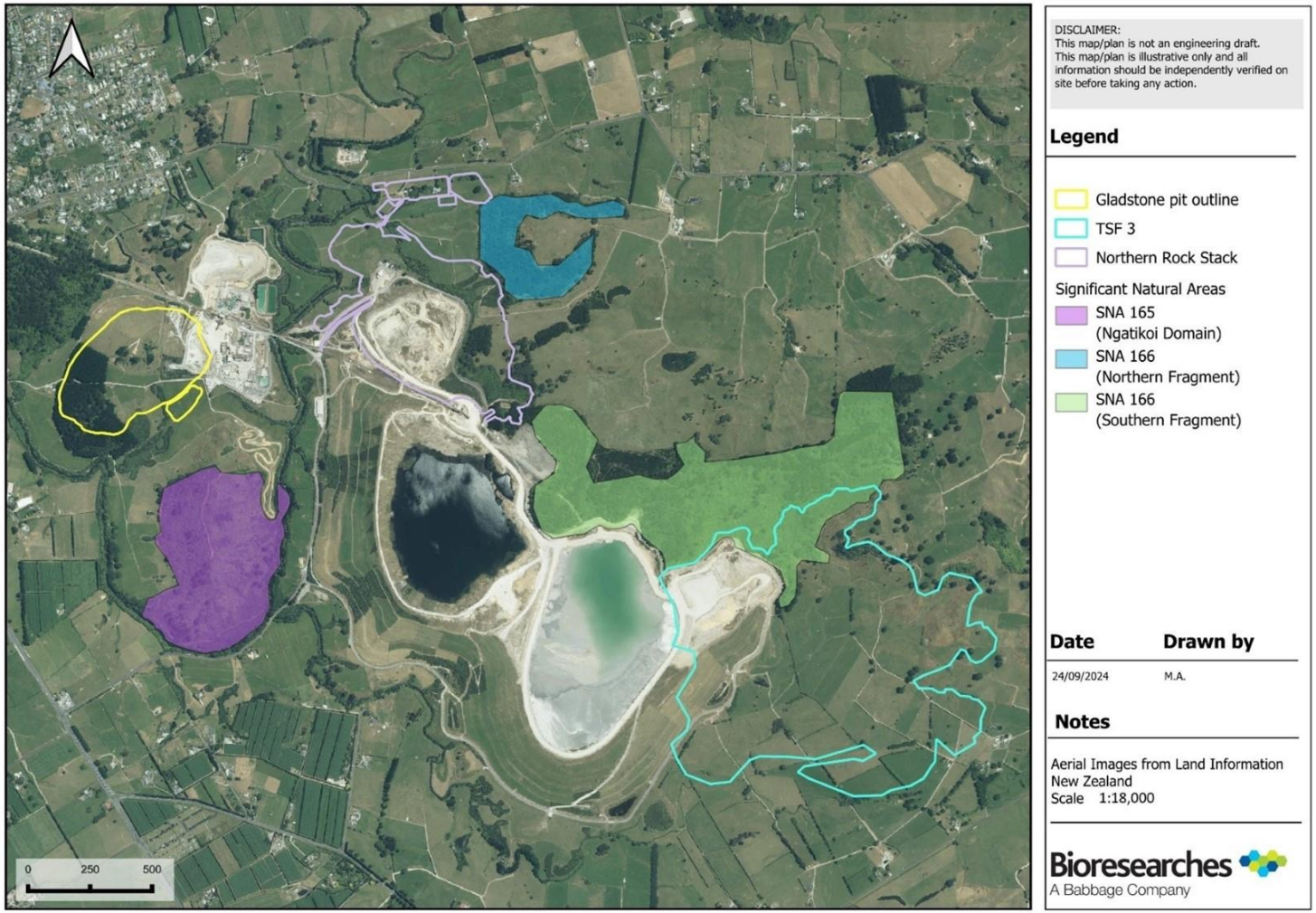

Figure 3-63: Significant Natural Areas in the Vicinity of the Waihi SFA

The north-eastern part of the southern 57 ha fragment of SNA 166 (refer to Figure 3-63) is located near the proposed explosives magazine site. This part of the SNA is characterised by pine forest with some rewarewa present. No native fauna of significance was recorded in this part of the southern SNA 166 unit.

The ecological value of habitat within the NRS site is moderate. The native vegetation is mainly riparian plantings established voluntarily since around 2005 by OGNZL and its predecessor. The plantings include kānuka, karo, cabbage tree, kauri, māhoe, tōtara, ribbonwood, flax, makomako, koromiko, karamū, and māpou. Other species not part of the original plant schedule have naturally colonised, including various native fern species. The vegetation does not provide bat roosting habitat, nor have native bats been recorded in the nearby SNA 166 or pine plantations. Surveys have not discovered any native lizards, however the native and established plantings support habitat for skinks or arboreal lizards. TB1 does not provide habitat for native frogs.

There is a constructed wetland area within the footprint of the proposed NRS (see Wetland TB1 – 1c in Figure 3-55 above). It was formed during and following the construction works for the Northern Stockpile.

3.8.2.7 Area 7

The proposed footprint of TSF3 encroaches into the southern unit of SNA 166 (see Figure 3-63). The encroachment will displace some 3.6 ha of rewarewa scrub and 4.6 ha of tree fern scrub. The TSF3 footprint outside SNA 166 will encroach over 1.2 ha of scrub and pōhutukawa, 0.4 ha of tree fern scrub and 0.3 ha of planted vegetation. The affected vegetation within the SNA has moderate ecological value, and the vegetation outside of the SNA has low ecological value.

3.9 LANDSCAPE AND NATURAL CHARACTER VALUES

The landscape and natural character values attributed to the proposed work areas of the WNP are detailed in Boffa Miskell (2025e), a copy of which is provided in **Part B** of these application documents.

The Coromandel Forest Park beneath which the Area 1 Wharekirauponga orebody is located is recognised as an ONL within the HDP, and an ONFL within the TCDP. The landscape is high value and particularly sensitive to change. It is characterised by steep landforms and peaks covered in native forest, forming a prominent backdrop to the east, with vivid, wild, and remote qualities. The steep terrain often limits visibility from lower areas and gullies providing fragmented views. Its volcanic origins and extensive native forest cover contribute to its distinctive appearance.

The dense native forest restricts views to and from Te Wharekirauponga Track (refer to Figure 3-64).

Figure 3-64: Te Wharekirauponga Track View

The proposed Area 2 Willows SFA is located within the foothills of the Coromandel Range Landscape Character Area, adjacent to the Coromandel Forest Park. The Willows site is not classified as an area of outstanding natural feature or landscape.

The Coromandel Ranges are the dominant feature in the broader landscape, with the ranges containing steep and rugged landforms with gorges and "V" shaped valleys up to 700 m above sea level.

The Coromandel Forest Park is visible from the foothills, and small areas of indigenous vegetation are evident throughout the Willows site within the stream valleys that drain into nearby rivers. Landforms are a combination of moderate to steep slopes with pasture, exotic forestry, and native forest in gullies and on some higher slopes.

At the Willows site and in the surrounding area, rural activity occurs throughout the foothill's mid and upper slopes, with lower lying areas providing for grazing, cropping and forestry use. A scattering of rural settlement maintains a relatively open rural character with clusters of dwellings and farm infrastructure evident, including dairy sheds and large implement sheds. Fenced paddocks, hedgerows and access tracks are common and maintain a cohesive productive rural character. Some quarrying activity is visible within the Coromandel foothills.

Within Area 3, the surface level landscape and natural character values under which the proposed Wharekirauponga Access Tunnel corridor will pass comprise:

> At the northernmost end, the Area 2 Willows site. As outlined above, this consists of paddocks, patches of vegetation and scattered trees on hilly terrain that rises to the north into the foothills of the Coromandel Ranges;

- The central section of the corridor will run between the end of Highland Road (to the south of the Willows site) to the northern bank of the Walmsley Stream. This area is decreasingly hilly (in a north to south direction) with gullies on the main north / south ridge. The south / west side of the main ridge contains native vegetation, forestry blocks and scattered trees and scrub. On the eastern side the ridge is mostly paddocks. There are rural-residential properties at the end of Highland Road, east of the tunnel corridor; and
- At the southernmost end, the tunnel corridor will run between Walmsley Stream and the location of the proposed WUG Portal. Terrain in this area is gently undulating. It is characterised by rural residential and agricultural land uses with associated shelter belts, patches of native and exotic vegetation and scattered trees. Most rural properties are fenced into paddocks. At the west, the southern section of the tunnel corridor is below the eastern edge of a residential development on Barry Road, Mataura Road and Wenlock Street.

Within Area 5, the Waihi SFA is an existing working rural area that is visually contained by hills in each direction with mature vegetation around the periphery of the site. In the wider landscape, gently sloping and rounded foothills with a north-south orientation are distinguished by rural land use and pockets of native and exotic vegetation.

Views towards the Area 5 site from dwellings south-east of Waihi include vegetated recreation areas along the Ohinemuri River and rural lifestyle properties along Heath Road. For dwellings located in Waihi to the west of the Area 5 site, views of the site are limited by foreground native vegetation and pine plantations on Winner and Gladstone Hills. Views from dwellings located north-east of Waihi are limited by intervening development and vegetation, with limited views of Favona Hill and Union Hill on the skyline.

OGNZL's existing mining operations are "*a characteristic of the Waihi landscape*" (Boffa Miskell, 2025e) and have avoided major adverse landscape or visual effects due to the screening provided by topography and vegetation.

Within Area 6, the proposed area for the NRS is a modified area of working rural landscape that is underlain by an undulating, modified alluvial terrace.

The landscape is a mix of native riparian plantings, voluntarily established along the Ohinemuri River and TB1, exotic shelter belts, scattered bands of native shrubs, pasture, and (to the east and south-east), vegetation in the SNA 166. Apart from SNA 166, there are no significant or outstanding natural features or landscapes in the Area 6 vicinity.

The existing TSFs, Black, Union and Winner Hills and SNA 166 limit the views of Area 6. However, dwellings and road users in the surrounding rural areas of Golden Valley and Waihi may have oblique views to topsoil stockpiles, and vehicles travelling along Golden Valley Road may have transient views of the area.

From the Ngāti Koi Domain and Black Hill, the area is visible within the context of the established mining operation.

Area 7 is located within an area of transition between the Coromandel Range foothills and a larger productive rural floodplain to the south-east. The existing TSFs are integrated into an elevated, vegetated backdrop. The landscape has a productive rural character with farm buildings and dwellings.

Views are a mix of open and enclosed paddocks with roadside shelterbelts. Southerly and easterly views to the site (i.e. views from land to the north and west) are prevented by the ridgeline to the north and TSF1A to the west. Views north and north-east to the site from Trig Road North, Trig Road South, Waihi Beach Road, and State Highway 2 ("**SH2**") are rural with flat pasture in the foreground, rising to low hills screened by shelterbelts and the vegetated ridge on the skyline. Dwellings at high points on Trig Road South and Waihi Beach Road may have views of the existing TSFs.

3.10 EXISTING WATER RESOURCE USERS

A detailed description of the existing surface and groundwater users within close proximity to the proposed work areas of the WNP are provided in GHD (2025c), a copy of which is provided in **Part B** of these application documents.

Within Area 1, the distance between the WUG and the closest groundwater users, coupled with the anticipated and limited draw down, mean any dewatering effects on groundwater users will be indiscernible.

For Area 2, the nearest registered bore (ID 72_10311) to the Willows SFA is approximately 1.5 km to the east, with a recorded bore depth of 200 m. The nearest surface water take is a HDC abstraction authorised by Water Permit AUTH130392. This is located west of the Willows SFA in the Walmsley Stream catchment, within the Coromandel Forest Park foothills.

For Area 3, there are three small diameter groundwater bores, likely used for stock or domestic drinking water supply, within 400 m of Wharekirauponga Access Tunnel corridor.

They are:

- Bore ID 72_5193;
- Bore ID 72_771; and
- Bore ID 72_1223.

For Area 5, 48 registered bores are located within 3 km of the GOP. Nine have water permits authorising groundwater abstractions. The nearest are Bores 72_959 and 72_961, being 430 m – 440 m south of the GOP. The nearest consented groundwater abstraction site is Bore 72_9798 at Black Hill Orchard on SH2, approximately 820 m south of the GOP.

For Area 6, no registered bores are located within approximately 800 m of the proposed NRS, including the area between the proposed NRS site and the Ohinemuri River. The closest downstream surface water take is from the Ohinemuri River approximately 10 km downstream.

For Area 7, there are 49 registered water users within 3 km of the TSF3 site, with one located within 1 km of TSF3 (Bore ID 72_8695). This bore is associated with groundwater take AUTH131303 and is located 450 m from the proposed edge of TSF3, and 750 m from the deepest point of the excavation to be dewatered. The nearest down-gradient bore user (BORE ID 72_8693) is just over 1 km away.

Two surface water takes are registered, between 1 and 2 km from TSF3:

- Water permit AUTH125719 authorises a water take from a tributary of the Ruahorehore Stream located to the south for agricultural farming (dairy) purposes. It is topographically separated by a rhyolite ridge that bounds the proposed TSF3 site; and
- Water permit AUTH120591 authorises a water take from the Ruahorehore Stream 1.7 km downstream of TSF3 for horticultural and frost protection purposes.

An additional unregistered water user has been identified as taking water from a farm pond located approximately 830 m to the east of TSF3.

3.11 ARCHAEOLOGY AND HISTORIC HERITAGE

Gold was discovered in the Wharekirauponga Valley in the 1890s. In 1896 the Royal Standard company purchased and consolidated claims in the area as the Royal Standard Mine. The company constructed a horse-drawn tramway to access the area from the Otahu Stream south of Whangamatā. A mining battery was transported to site, and water races, a manager's house, offices, and storehouse were constructed. Subsequent prospecting failed to verify sufficient gold to support further investment. The site was sold in 1899 and was abandoned after further short-lived prospecting.

Within Area 1 the tramway now provides tramping access into the Wharekirauponga area from Parakiwai Road at the east. The remnants of the Royal Standard Battery are registered with the New Zealand Archaeological Association ("**NZAA**") as site T12/68 and scheduled in the HDP as heritage item HAU271 with Category B (Regional or Sub-Regional) significance. It is shown on HDP Map 18, located north of Area 1.

No other recorded archaeological or heritage sites have been identified near the Wharekirauponga orebody, and there are no known pre-European Māori sites within the boundaries of Area 1.

Within Area 2, three heritage features were previously present at the Willows SFA, as illustrated in Figure 3-65, comprising:

> The Mataura Stream Water Race, T13/961;

> The Willows Timber Tramway, T13/962; and

> The High-Level Walmsley Timber Tramway, T13/963.

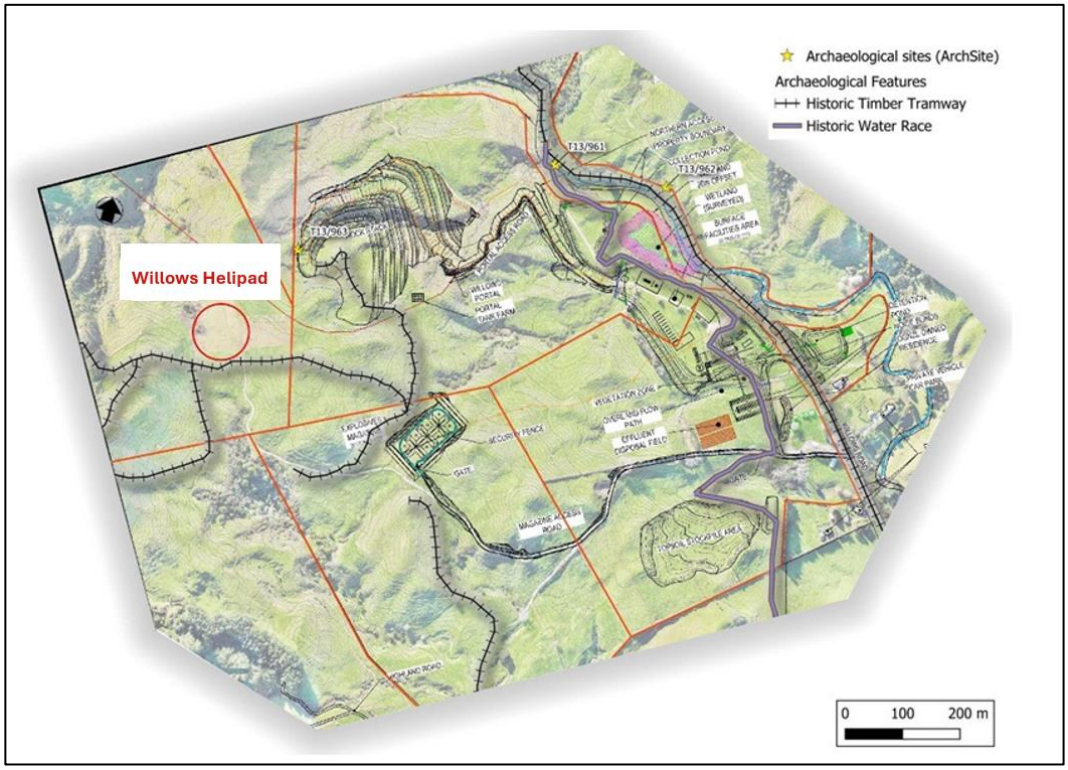

Figure 3-65: Archaeological and Heritage Features Within Area 2

The Willows Timber Tramline feature has limited heritage significance as there is no surviving evidence of the tramway alignment, and none of its structural elements remain.

The Walmsley Tramway was a horse-drawn tramway used to carry timber to Waihi. It has limited heritage significance because none of its structural elements remain. It is also shown as heritage item HAU265 in the HDP, although its mapped extent (HDP Map 25) does not extend to the onsite features identified.

Historically, water for the Waihi gold mines was taken from the Mataura and Waitete Streams and the Ohinemuri River. The Mataura Stream was part of a network of historic water races (channels) used to provide hydraulic energy to mining and processing sites for sluicing, the operation of hydraulic elevating technology, ore-processing machinery, and to remove tailings and other wastes.

The Mataura Stream Water Race (refer to Figure 3-66) was a wooden intake dam on the Mataura Stream near the current boundary of the Willows Access Tunnel with the Coromandel Forest Park. An earthen channel followed topography to Walmsley Creek at the south-west. The heritage value is limited as it has been significantly modified, retaining none of its original profile or fabric. Its alignment remains along some sections of the race as a benched track, while in other areas there is no visible surface evidence. The remnant feature, near the Mataura Stream intake, is shown below.

Figure 3-66: Mataura Stream Water Race remnants

There are no known pre-European Māori sites within the footprint of the Willows SFA.

For Area 3, within the vicinity of the southern end of the Wharekirauponga Access Tunnel, historic heritage features (as illustrated in Figure 3-67) include:

> Tramway, NZAA T13/818;

> Waihi Low Level Water Race, NZAA T13/817;

> Silverton Hill gold mining complex and Battery, NZAA T13/819; and.

> Favona Old and New Shaft, NZAA T13/306.

Figure 3-67: Archaeological and Heritage Features Within the Vicinity of the Southern end of Area 3 (northern four features shown)

The tramway brought firewood to fire the ore-roasting kilns on Union Hill and occasionally ore from the Waihi mines to the Victoria Battery at Waikino. Modification of the land at the northern end of the tramline has removed any evidence of the tramway. The remaining alignment of the tramline is located to the west of the proposed Gladstone Pit and will not be affected by any works associated with the project.

The Waihi Low Level Water Race was designed to feed water from the Ohinemuri River to the Martha Mine Union Battery. It was constructed in 1889-1890. The race operated until 1913, when processing operations for the Martha Mine switched to the Victoria Battery site. The Race is pre-1900 in date and is of local importance.

The Silverton Hill gold mining complex is centred on Silverton Hill, south of Barry Road – Golden Valley Road. It includes a multipart overlay of shafts and drives, and possible terraces. Two small drives to the east are associated with the complex. Any proposed works are unlikely to affect these subsurface elements. A magazine and a 'dam-like' feature are also recorded within this area. However, in a recent survey neither could be located. The magazine's recorded location is a farm track on Moore Street, with no visible remains and the dam is believed to have been destroyed during the previous mine expansion and located within the current stockpile.

The Favona Old and New Shaft are located at 808 Golden Valley Road. The site consists of infilled shafts, a mullock (soil or rock) heap and a concrete building / machinery foundation. Any works are unlikely to impact these features.

Within Area 5, various historic heritage sites have been identified in close proximity to the Waihi SFA and GOP (refer to Figure 3-68).

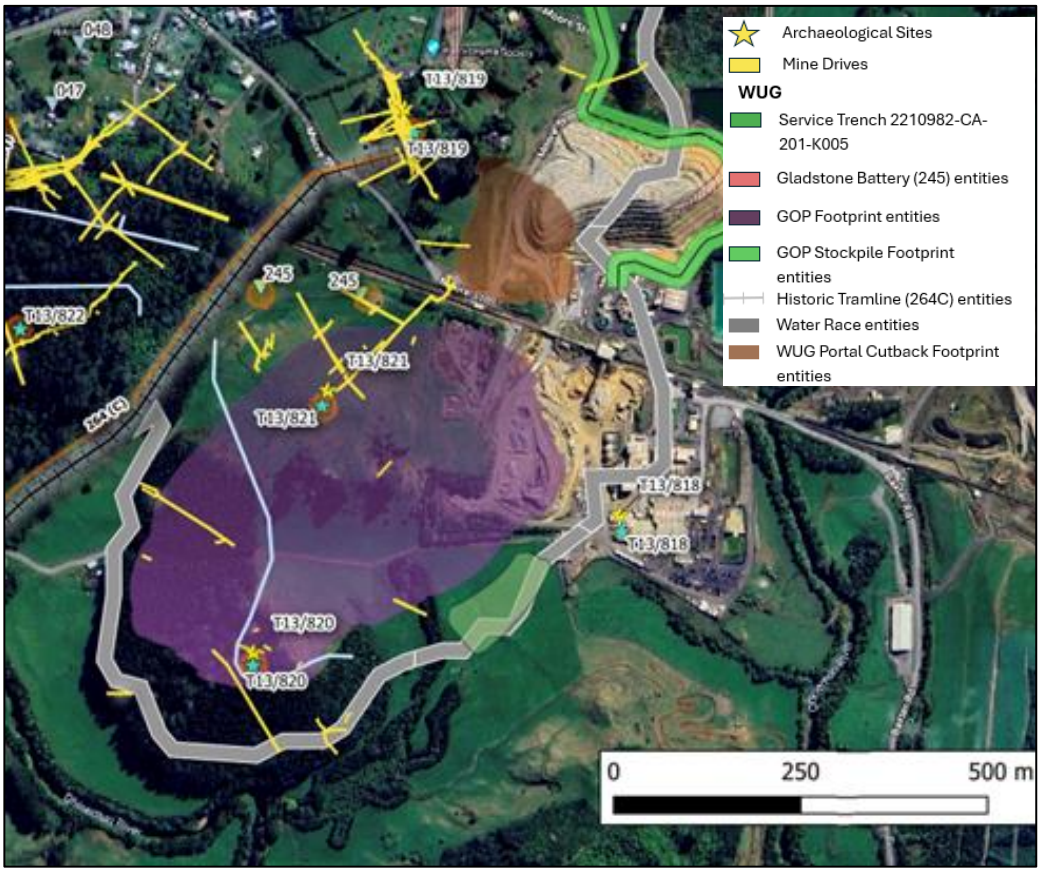

Figure 3-68: Archaeological and Heritage Features in Close Proximity to Area 5

Outside of the proposed works footprint, these features include:

> The historic Gladstone Battery (referenced in the HDP as HAU245) located between Union Hill and Gladstone Hill near the northern edge of the proposed GOP. There is no evidence of any remaining heritage association in this area;

> A historic tramline (NZAA T13/318) that runs along the south-eastern and eastern side of Union Hill. This is identified as a Category C Heritage Item in the HDP (reference HAU264); and

> A historic tramway that follows a north-easterly alignment between the Clarke Street court bowl and Moore Street, west of Union Hill (referenced in the HDP as HAU264(C) Waihi Gold Mining Company - Tramways - Silverton Hill gold mining complex and Battery).

Within the proposed works footprints of the GOP and the Waihi SFA (as illustrated in Figures 3-68 and 3-69), these features include:

- A small section of the historic Ohinemuri-Waihi Lower-Level Water Race, NZAA T13/817. The water race intersects the Winner Hill pine plantation. Overall, this feature has local significance and low historic value;
- The Winner Hill pre-1900 gold mining complex, NZAA T13/820;
- The Gladstone Hill pre-1900 gold mining complex, NZAA T13/821. The HDP (Map K4 and Chapter 6.1) schedules this feature as item 'HAU245 Gladstone Battery, Waihi - Category C (Local or Neighbourhood significance)'. The site is highly modified, and historic remnants consist of sub-surface drives and shafts; and
- The Silverton Hill gold mining complex which is to the north-west, between the WTP and Barry Road, NZAA T13/819.

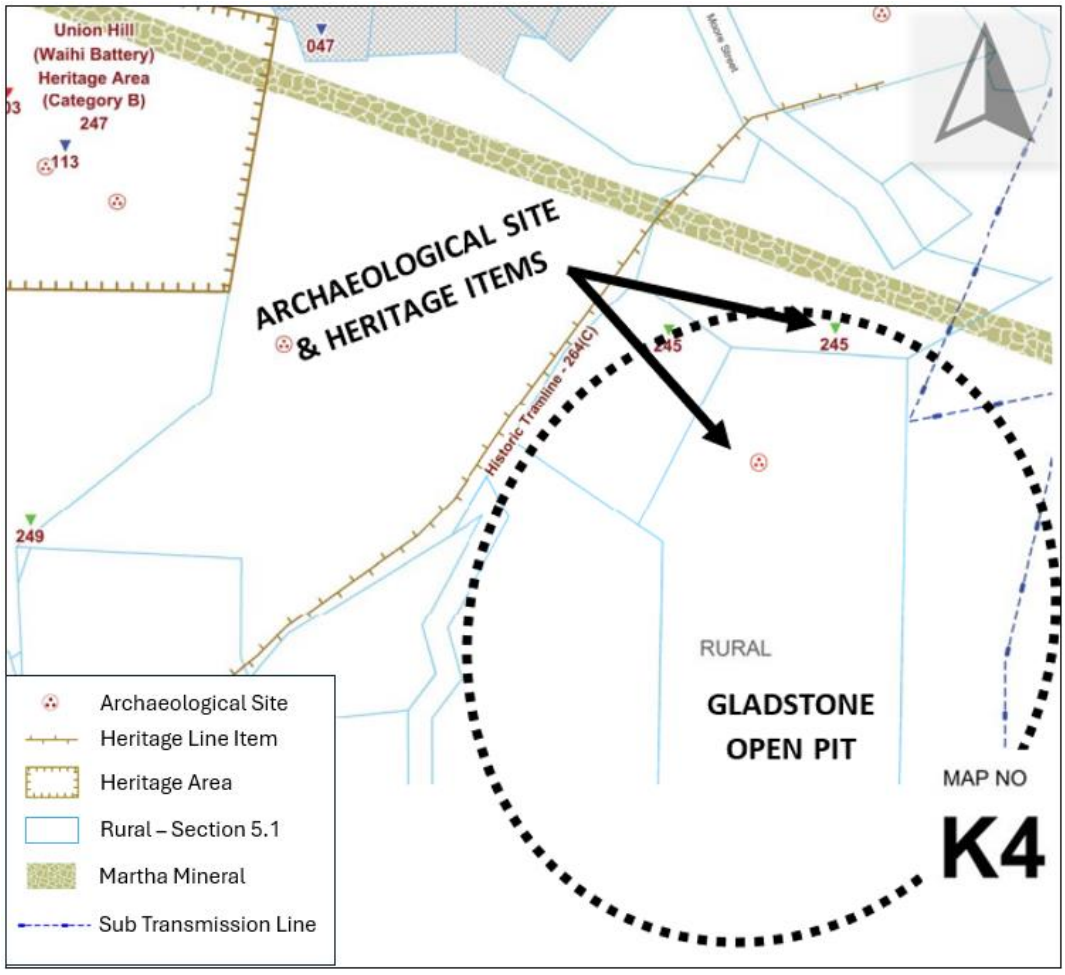

Figure 3-69: Hauraki District Plan Map K4 – Archaeological and Heritage Features in the Vicinity of Area 5

There are no known archaeological features of Māori origin on Gladstone Hill or Winner Hill, or within the GOP footprint.

No archaeological or heritage features (including those of Māori origin) have been identified within the footprint of the proposed Area 6 NRS, however adjacent to the northern extent of the NRS is the Queen of Waihi Shaft dating from 1895-96, NZAA T13/971 (refer to Figure 3-70). This feature is sunk approximately 50 m into rhyolite.

Figure 3-70: Archaeological and Heritage Features in Close Proximity to Area 6 (yellow dot)

No archaeological or heritage features (including those of Māori origin) have been identified within the footprint of the proposed Area 7 TSF3.

3.12 RECREATION AND TOURISM VALUES

Greenaway (2025) provides a fulsome assessment of the existing recreation and tourism values in the vicinity of the proposed WNP, a copy of which is provided in **Part B** of these application documents.

Wharekirauponga Valley is a remote area with basic tracks, routes, and huts with little interaction occurring between recreational users of the area. In summer the area is popular for pig hunting and tramping activities.

The remote setting and selection of heritage features (as detailed in Section 3.11) inform the recreation values.

The Te Wharekirauponga Track (north of the Wharekirauponga orebody) is used by trampers and runners entering from Parakiwai Quarry Road to the east. In 2023 a track counter installed by OGNZL recorded 3,209 walkers going into the Coromandel Forest Park and 2,943 heading towards the Parakiwai carpark ('out' of the forest). This equates to a daily average of 7.3 walkers heading south and 8.1 heading north. Around 250 of the recorded walkers were OGNZL staff accessing existing drill sites when weather prevents helicopter access.

Secondary tramping access is available from the south-east via private land (permission is required) and Corbett Road (a paper road) to the Parakawai Track (crossing the WUG Dual Tunnel alignment) shown below in purple. This access is mainly used by local hunters.

Formal walking tracks within the proposed works area are illustrated in Figure 3-71. There is no consistent track in this area.

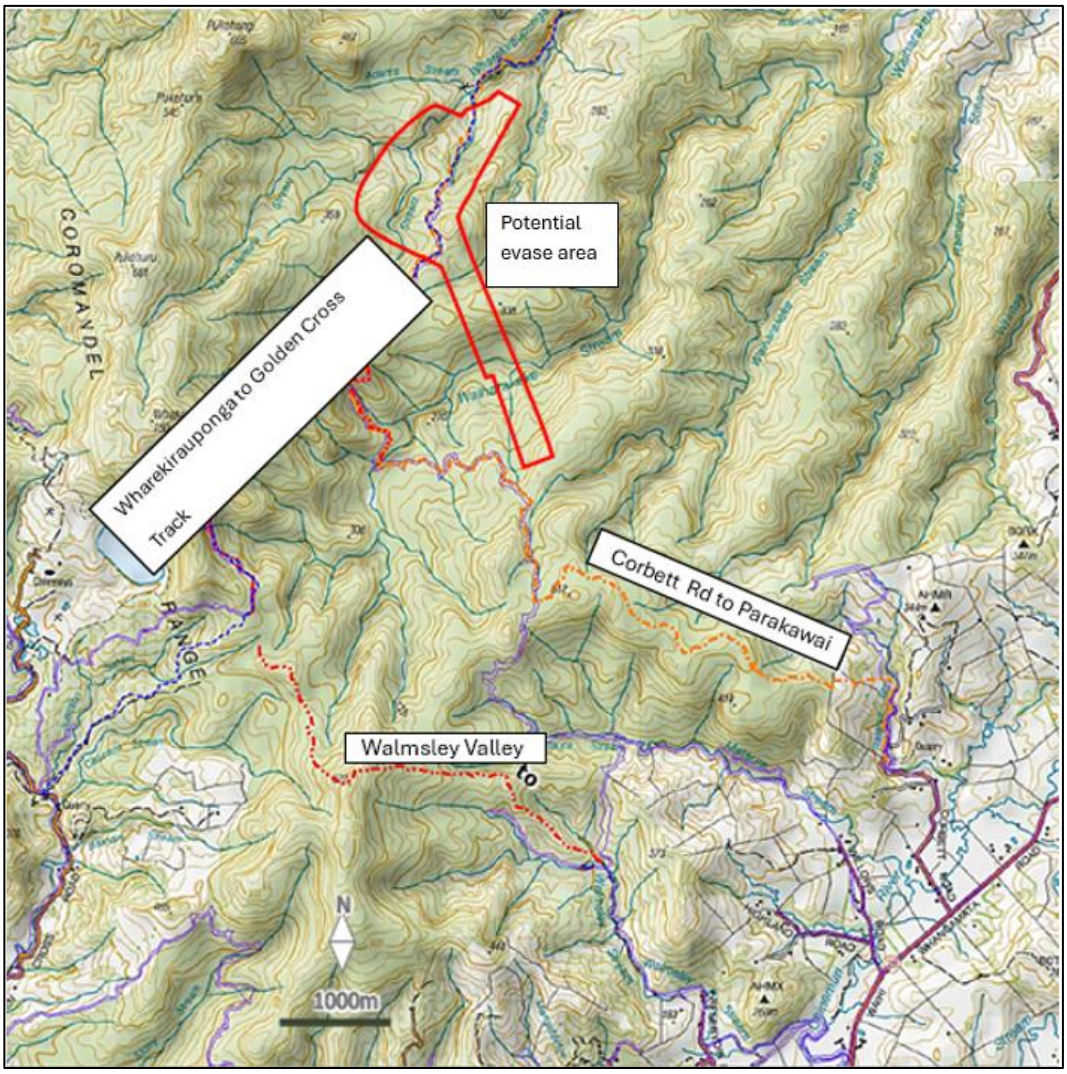

Figure 3-71: Formal Walking Tracks Around the Wharekirauponga Valley

The areas in which the WUG and the Willows SFA are proposed have little or no recreational value, with OGNZL owning a substantial portion of the land.

In the vicinity of the proposed Area 5 works, mountain biking and running trails have been developed on part of Winner Hill and Gladstone Hill in the proposed GOP footprint, as shown in Figure 3-72.

Figure 3-72: Trail Map for Mountain Bike Traits in the Vicinity of GOP and the Waihi SFA

The 54 hectare Ngāti Koi Domain (shown in Figure 3-72) is located south of the Waihi SFA and is bounded by the Ohinemuri River to the east, south and west, and Domain Road to the north.

The reserve is a combination of bush and farmland, part of which is currently leased for grazing. A track from the end of Clarke Street follows the Ōhinemuri River upstream and leads to a lookout on the summit of Blackhill. There is no vehicle access into the reserve.

The Blackhill Motocross track is located within the north-eastern part of the reserve (refer to Figure 3-73). It is accessed by motocross club members via an internal road that leads from Clarke Street, over Winner and Gladstone Hills. Access is an informal arrangement between the motocross club and OGNZL. The motocross club has no formal tenure over the access.

Figure 3-73: Blackhill Motocross Track (with the Processing Plant to the north-west)

The central and southern areas of the Ngāti Koi Domain are located within SNA 165A. The middle area of the reserve is hilly with significant tree groups (Nos. 085 and 133) located at the western and southern boundaries of the reserve.

An annual multisport event (the "Nugget") passes across farmland to the west of the Waihi SFA and Winner Hill, with access provided by OGNZL exclusively for this event. Routes of the annual Nugget multisport event include:

> An access route meandering north-east across farmland and through the proposed NRS footprint; and

> An approximately 10 km loop which circuits the Martha Mine and the reserve via the western side of Winner Hill on OGNZL land.

The Ohinemuri River meanders through and past various proposed features of the WNP. The river is utilised for recreational activities including swimming and angling.

Between December and February, the water quality for swimming in the Ohinemuri River is monitored by WRC at the Karangahake Gorge, upstream of Mackaytown. From 2018 to 2021 the water was suitable for swimming 89% of the time. Of note, the river reach adjacent to the Waihi SFA and the wider WNP footprint is not subject to the Regional Plan's 'Contact Recreation' Water Management Class.

Kayaking within the Ohinemuri River at Waihi is infrequent as the river is too narrow. Kayaking is more common from Owharoa Falls at Waikino (9 km downstream of Waihi) and then through the Karangahake Gorge.

The Ohinemuri River is one of the most popular angling rivers in the Waikato Region with excellent access opportunities and good population of rainbow and brown trout. The river is recognised by the Regional Plan as a significant trout fishery, and bi-annual surveys by

OGNZL have occasionally recorded trout in the river reaches near the proposed WNP work areas. Fish & Game New Zealand describe the Ohinemuri River as one of the region's most popular rivers. In the 2014 – 2015 fishing season, the Ohinemuri River was the sixth-most popular river fishery in the Auckland / Waikato Fish & Game region.

TB1 which flows into the Ohinemuri River (refer to Figure 3-37) has no recreational value.

The Ruahorehore Stream, which flows into the Ohinermuri River, is of limited interest to most anglers. It is one of several small streams in the Waihi basin which hold trout fished by local anglers.

3.13 NOISE

The existing noise environments within the vicinity of the proposed WNP are described in Marshall Day (2025), a copy of which is provided in **Part B** of these application documents.

Daytime noise with the Coromandel Forest Park is reasonably quiet and reflects a typical bush setting with natural noise sources including birdsong and wind gusts in trees. At night background noise levels reduce significantly.

Daytime noise in Waihi is typical of a small town, with background daytime noise levels being 43dB to 50dB and varying with proximity to the town centre and local roads. The largest contributor to noise in Waihi is local traffic on SH25. Background noise levels reduce markedly at night, by 5 to 15 decibels.

Background noise in the rural area surrounding Waihi is lower than in the town centre during the day, and slightly higher than in the town centre at night. This is attributed to night-time traffic on SH2 and SH25.

3.13.1 Noise from Existing Mining Activities

The existing and historical consents that authorise OGNZL's activities in Waihi each provide some controls on noise generation, directly through noise limits, or indirectly through activity restrictions or other mechanisms.

Expired mining licence ML 32 2388 specified the following operational noise limits:

> *All activities provided for by the Mining Licence taking place on any site within the Mining Licence area shall not exceed the following limits when measured at or within the boundary of any residentially zoned site or the notional boundary of any occupied dwelling in the Rural Zone and measured over the periods specified below:*
>
> | | | |
> |---|---|---|
> | *Monday – Friday* | *0700 – 2100* | *55 dB L_{Aeq}* |
> | *Saturday* | *0700 – 1200* | *55 dB L_{Aeq}* |

All other times	*40 dB L_{Aeq}*
2100 – 0700 (the following day)	*70 dB L_{AFmax}*

Under the conditions of ML 32 2388, noise monitoring is to be undertaken on a weekly basis during construction and at least biannually for normal operations. OGNZL is also required to prepare and maintain a Noise Management Plan that details the methods used to comply with the noise limits. The most recently certified version of this was issued in November 2023 and brings together all of the conditions and obligations from the various consents and permits that OGNZL hold for its mining operations at Waihi.

Regular ongoing noise monitoring to assess compliance with OGNZL's existing consents is compiled and reported quarterly to HDC. Figure 3-74 shows the average noise level as well as an indication of the range of all measured noise levels at those positions. An analysis of the data by Marshall Day (2025) indicates that noise levels are only slightly influenced by whether Martha Mine is operating or not, and whilst mining operations would be audible, other anthropogenic noise sources are also clearly audible and contributing to the overall noise environment.

Marshall Day (2025) notes that determining whether mining operations are compliant with the controls or not can be problematic, this is because that in some cases, the measured noise levels (of all sources) are above the compliance limit.

Noise monitoring indicates that for much of the time combined noise levels from mining operations and extraneous noise sources (that have not been removed from the measurement data set) are lower than the HDP noise limits. As stated in Marshall Day (2025), this means existing mining activity noise must be at or below the prescribed limits. The activities and associated machinery do not vary significantly from day to day, so mining generates a relatively consistent level of noise that is almost always compliant.

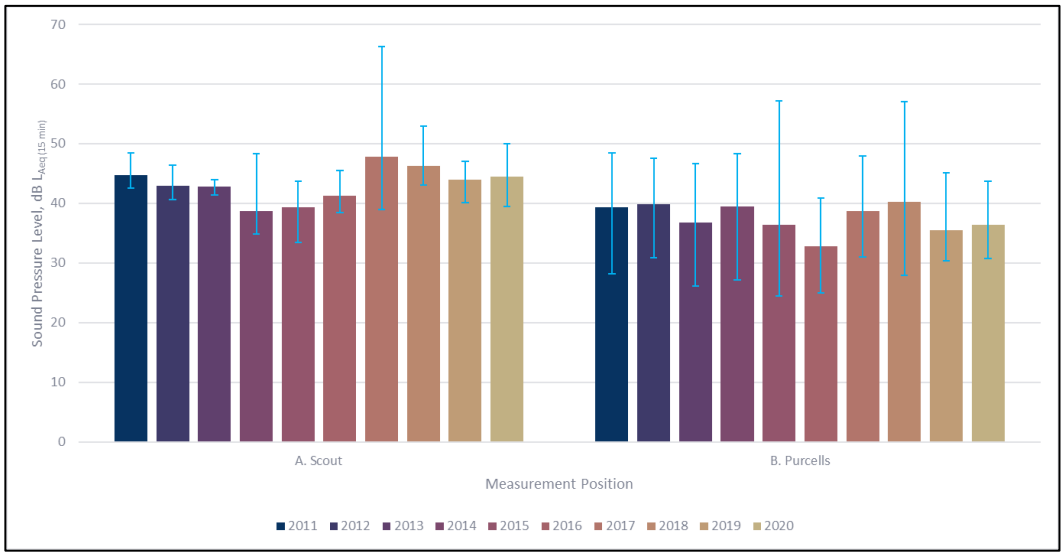

Figure 3-74: Mean noise levels at OGNZL's compliance monitoring sites, 2011 – 2020 (Marshall Day 2025)

3.14 VIBRATION

The existing vibration environments within the vicinity of the proposed WNP are detailed in Heilig (2025), a copy of which is provided in **Part B** of these application documents.

Drilling and blasting have been used to fragment rock for all mining at Waihi over the previous 30 years. The method is highly efficient and allows the rock to be broken in manageable size fragments for excavation. Because the explosive detonates very quickly, a great quantity of energy is introduced into a relatively small volume of rock, which in turn creates a vibration pulse that propagates through the rock mass.

Although people may recognise sounds and vibrations, it is difficult to quantify perceptions and sensitivities. Inside a structure, people may feel the building vibration and hear the objects around them rattle, such as windows and trinkets on tables and walls. When a vibration is perceived in this way, some people will say that they felt very strong vibrations. When outside of a building, these potential secondary effects are absent, and the perceived effect is much less for the same level of vibration.

The existing vibration environment in Area 1 is low, and Heilig (2025) notes the absence of private properties within several kilometres of the areas where underground blasting will be undertaken to develop the WUG.

Within close proximity to the proposed Area 5, 6, and 7 work areas, existing mining activities include underground blasting. However, whilst the proposed WNP activities will occur

contemporaneously with existing mining and blasting activities, they will be sufficiently distanced from each other so to avoid resulting cumulative effects for receivers.

The consent conditions of the existing land use consents held by OGNZL are based around the HDP vibration standards but incorporate a number of additional constraints. Both the Australian Standard and the ANZEC Guidelines propose peak values consistent with the HDP, the Mining Licence following the 2017 variation, and Project Martha.

Under OGNZL's existing consents, overpressure limits are 128 dBL, slightly above the 120 dBL limit in the HDP. However, as set out in Section 6.11.2, OGNZL proposes that overpressure limits for WNP align with the more conservative HDP levels.

OGNZL monitors vibration from the existing Favona and Correnso operations via a comprehensive monitoring network and blasting results from each of the monitoring locations are displayed on OGNZL's website.

3.15 GROUND CONTAMINATION

Potential ground contamination in the WNP footprint is addressed by WWLA (2024), a copy of which is provided in **Part B** of these application documents.

The PSI concluded that a number of Hazardous Activities and Industries List ("**HAIL**") activities have (or potentially have) occurred within the WNP footprint. The existing HAIL activities within the project footprint are generally localised and limited in magnitude and pose low potential for significant effects on human health, the environment and the overall project. A summary of the HAIL activities associated with each project element is provided in the sub-sections below.

3.15.1 Processing Plant and Water Treatment Plant

There are multiple existing chemical and fuel storage areas around the Processing Plant. The most significant of these is the cyanide storage and mixing areas, as well as the chemicals stored in the WTP. While most are bunded and well maintained, there is high potential for low to moderate levels of contamination to exist immediately surrounding most dangerous goods stores, most likely only extending to shallow soils.

Due to the storage of chemicals and fuels, HAIL Activity E.71 applies to the entire Processing Plant and WTP site and is considered the highest risk to human health and the environment.

Other potential sources of contamination, which pose a moderate risk are most likely associated with the following areas and activities:

- Electrical transformers located near the offices and the WTP (HAIL Activity B2);
- Explosives storage, including the magazine west of the Processing Plant and ammonium nitrate storage northwest of the WTP (HAIL Activity C1);
- Mining activities across all Processing Plant areas (HAIL Activity E7);
- Workshops (HAIL Activity F4);
- Wastewater treatment at the WTP (HAIL Activity G6); and
- Past chemical and fuel spills at the WTP and cyanide mixing area (HAIL Activity I).

3.15.2 Gladstone Open Pit

The site of the proposed GOP has been farmland for as long as records are available. Given that cattle yards have been present since the 1960s, WWLA (2024) considers it possible that persistent livestock dip or spray chemicals have been used historically. Any contamination is likely confined to surface soils in the immediate vicinity of the yards.

As such, HAIL Activity A8 applies to the wider site and is considered to pose a moderate risk to human health and the environment.

3.15.3 Tailings Storage Facility 3

The site of the proposed TSF3 has been used for dairying / livestock grazing for much of its recorded history, with localised market gardening occurring in some areas during the 1980s and 1990s.

Potential sources of contamination, which pose a moderate risk, are most likely associated with the following areas and activities:

- Drench use in yards and storage in sheds (HAIL Activity A8);
- Historic market gardening in the centre and centre-east of the site (HAIL Activity A10);
- Diesel storage in aboveground storage tanks (HAIL Activity A17); and
- Asbestos use in buildings (HAIL Activity E1).

3.15.4 Northern Rock Stack

The site of the proposed NRS has been pastoral for most of its recorded history, with the dwelling present constructed at a time when asbestos use was common.

Potential sources of contamination, which pose a moderate risk are most likely associated with the following areas and activities:

> Drench use in yards and storage in sheds (HAIL Activity A8);

> Diesel and waste oil storage in aboveground storage tanks and waste oil storage area (HAIL Activity A17); and

> Asbestos use in buildings (HAIL Activity E1).

3.15.5 Willows Surface Facilities Area

The site of the proposed Willows SFA has been used for dairying / livestock grazing for most of its recorded history.

Potential sources of contamination, which pose a moderate risk are most likely associated with the following areas and activities:

> Drench use in yards and storage in sheds (HAIL Activity A8);

> Asbestos use in buildings (HAIL Activity E1); and

> Effluent application to land in paddocks where irrigation occurs and the irrigation pond (HAIL Activity G5).

3.15.6 Coromandel Forest Park

There may be some minor contamination remaining around former mine workings in the immediate vicinity of the Royal Standard Battery. However, WWLA (2024) considers that there is no potential for these workings to impact on WUG due to the separation between the historic mine workings and proposed surface ventilation evasé.

3.16 METEOROLOGY AND AIR QUALITY

Meteorological data recorded within the vicinity of the proposed WNP activities has identified that:

> At OGNZL's Barry Road climate station, between 2013 and 2019 the prevailing, strongest winds were from the west and west-southwest, with secondary winds from the north-east;

> Average wind speed recorded since 2013 is 3.43 m/s;

> Calms occur for 10.82% of the time;

> Wind speeds greater than 5 m/s (which lift dust from unconsolidated surfaces) occurred approximately 26% of the time;

- Wind speeds are highest in spring and lowest in autumn;
- NIWA data indicates that Waihi's long-term average annual rainfall is 2,110 mm; and
- January to March, and October are the driest months with average monthly rainfall of 60 mm to 95 mm. The months of January to March also have the lowest average number of rainy days, between six and eight days per month. Rainfall during the rest of the year averages 110 mm in May to almost 250 mm in June. Other months average 10 (April, November, December) and 18 (August) rainy days.

With regard to air quality, the western half of the GOP is located within the Waihi Airshed, with the remainder of Area 5 located in an airshed covers rural land within the Waikato Region. The Waihi Airshed is not a "polluted" airshed, and air quality within the proposed WNP work areas is typical of other rural areas in New Zealand.

OGNZL monitors dust deposition rates and Total Suspended Particulate concentrations associated with existing mining activities in Areas 5, 6 and 7.

Dust deposition rates are low or within an acceptable range at all existing monitoring sites and are comparable to background levels. Since January 2000, dust deposition rates have exceeded consented levels on six occasions and across four locations. Of the six exceedances, three are attributed to external sources (such as fertiliser deposition or contamination with bird droppings), rather than site activities. The most significant exceedance occurred in November 2000, and can likely be attributed to either an abnormal event, or a highly localised source of dust.

Total Suspended Particulate levels around the Martha Mine are generally below the consented limit of 45 µg/m^3 (7-day average). Between 2005 and 2020 ten exceedances were recorded at the three monitoring sites located nearest to the Martha Mine. Only one exceedance was recorded after July 2010.

3.17 TRANSPORTATION NETWORK

The transportation environment and networks evident within and surrounding the proposed WNP work areas are detailed in Stantec (2025), a copy of which is provided in **Part B** of these application documents.

Key considerations of the transportation environment and networks include:

Area 2 – Willows SFA and Supporting Infrastructure

- Willows Road (Area 2) being classed as a "Local Road" in the HDP's road hierarchy. Local roads provide access to adjoining properties and are not designed for high traffic volumes and do not provide key network functions;

- Willows Road is a no-exit road formed and sealed for approximately 1.3 km. Beyond the seal, the road continues north into the Coromandel Forest Park as an unmade 'paper' road. There are no road markings, and it has a minimum sealed width of 5.7 m and a maximum width of 7.2 m for 1.2 km, The last formed and sealed section (100 m long) is 2.8 m wide;
- One-lane bridge approaches on Willows Road are 3.7 m wide, and an existing culvert is 5.5 m wide;
- The speed limit on Willows Road is 100 km/h, although the road geometry and width are unlikely to enable that speed;
- Highland Road branches off Willows Road towards the north-east approximately 275 m north of the Willows Road – SH25 intersection. Highland Road is a no-exit road providing access to residential and rural properties south-west of the Willows Portal;
- The Willows Road - SH25 intersection is a standard T-intersection with a sight distance that complies with Austroads requirements for a 100 km/h speed zone;
- Average daily traffic volume for Willows Road is 81 vehicles/day up to the Highland Road intersection. Beyond the intersection this drops to 48 vehicles/day. Heavy vehicle traffic accounts for 6% to 10%, respectively.
- No crashes were recorded on Willows Road between 2016 to 2023

Areas 5, 6, and 7 – Waihi SFA, GOP, NRS, and TSF3

- Baxter Road is classed as a 'Local Road' in the HDP's road hierarchy. It is a sealed no-exit road with a 100 km/h speed limit.
- Baxter Road is primarily used to access OGNZL's underground mines and the Waihi SFA. Access points are shown in Figure 3-75. The primary vehicle access to the Waihi SFA is the Ohinemuri River bridge from the site gate at the northern end of Baxter Road. The gate is 1.2 km north of the Baxter Road - SH2 intersection. The NRS and TSF3 will be accessed from SH2 via Baxter Road and internal haul roads. Baxter Road is gated to prevent unauthorised access to OGNZL's land;
- The Baxter Road / SH2 junction is a recently upgraded T-intersection. Sight distances comply with Austroads requirements for a 100 km/h speed zone;
- Traffic data recorded during January 2019 logged 100 to 140 vehicles/hour during peak periods (shift changes 06:00 to 07:00 and 18:00 to 19:00). Up to 80 vehicles/hour were recorded at other times;

- No crashes were recorded on Baxter Road between 2016 – 2020. However, four crashes were recorded on SH2 near the Baxter Road intersection, none were at the intersection itself;
- Moore Street, 500 m southeast of the Moore Street - Barry Road intersection, is used when oversized or heavy loads cannot use Baxter Road. It is also an alternative access to Baxter Road if the Ohinemuri River floods;
- The Clarke Street access is used for over-weight or over-dimension vehicles. It is also used by the Black Hill Motocross Club members; and
- Two access gates off Golden Valley Road, east of Moore Street, are used for monitoring, exploratory work, and over-dimension loads.

Figure 3-75 illustrates the road hierarchy for the transport network surrounding Areas 5, 6, and 7.

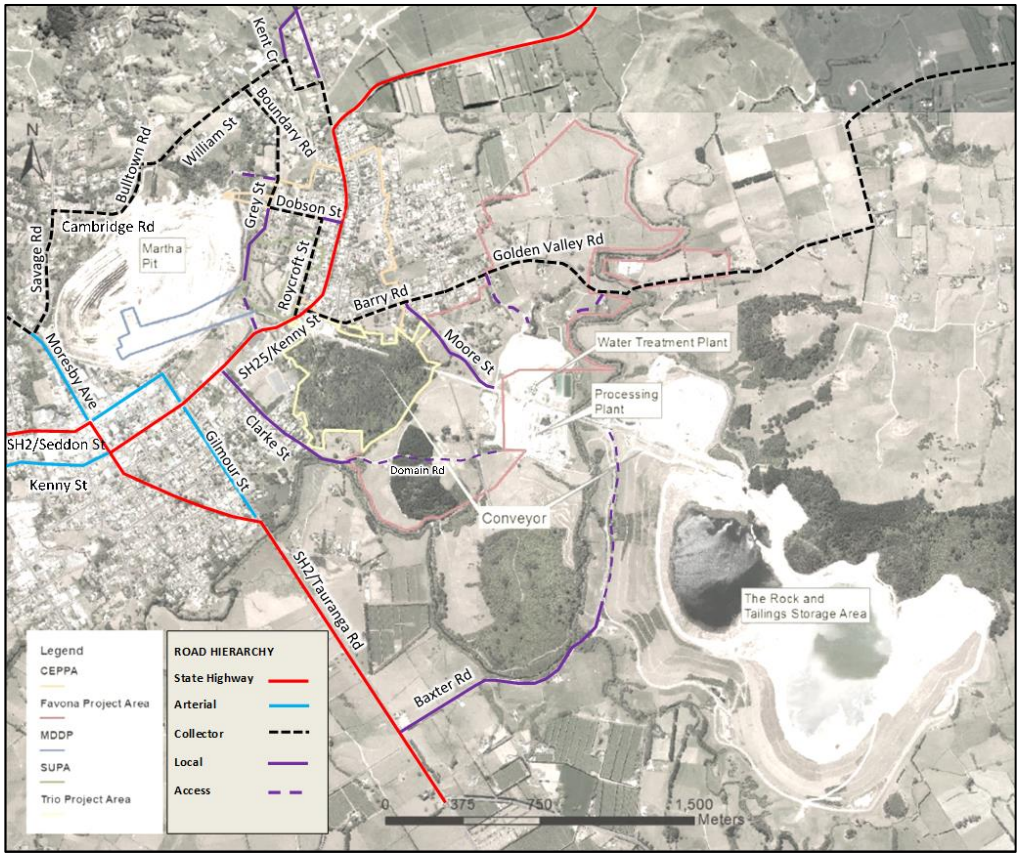

Figure 3-75: Waihi Road Network Layout

3.18 BIODIVERSITY PROJECT AREA

The area of the Waihi North Biodiversity Project, as shown in Figure 2-81 (within Section 2 of this report) comprises approximately 18,870 ha. It includes conservation park (15,800 ha), stewardship land (2,680 ha), marginal strip (34 ha) and local purpose reserve (Waihi Water Conservation Reserve, 376 ha). This area includes the Maratoto Block which in turn includes the 655 ha Otahu Ecological Area (discussed below).

3.18.1 Zoning

The area of the Waihi North Biodiversity Project is in land administered by both the HDC and TCDC. The boundary between the two districts is shown on Figure 2-81 as "TA Boundary".

The portion of the area of the Waihi North Biodiversity Project in the Hauraki District is subject to:

- The Conservation (Indigenous Forest) Zone;
- Several SNAs;
- Several Heritage Areas; and
- ONL and ONF areas, as shown on Map N2 of the HDP.

The portion of the area of the Waihi North Biodiversity Project in the Thames-Coromandel District is subject to:

- The Conservation Zone; and
- An ONL.

3.18.2 Ecological Values

The area of the Waihi North Biodiversity Project has not been subject to a comprehensive biodiversity survey, and knowledge about the ecological values of areas within its boundaries varies. In 1984 the New Zealand Forest Service reported that the Maratoto Block of the Coromandel Forest Park was home to a variety of species of conservation concern including kōkako, Hochstetter's frog, North Island brown kiwi, kākāriki, long-tailed bat, Rhytida snail and paua slug. Some of these species might still be present. Others might feasibly be reintroduced to the area of the Waihi North Biodiversity Project if pest numbers can be reduced to, and sustained at, low levels.

Flora and fauna identified in the area of the Waihi North Biodiversity Project in the recent past include common and uncommon species such as kohekohe, pōhutukawa, kauri, northern rātā, tūrepo (large-leaved milk tree), North Island brown kiwi, kererū (New Zealand pigeon), pekapeka (long-tailed bat), Archey's frog, Hochstetter's frog and pua o te reinga (woodrose, Dactylanthus). Some of these species still persist there while others may have disappeared locally or be patchily distributed at low density.

Recent monitoring around the wider Wharekirauponga area has shown high population indices of pests including rodents, possums, mustelids, feral cats, and pigs.

The area of the proposed Waihi North Biodiversity Project is in the Waihi Ecological District, an area of approximately 43,700 ha located at the southern end of the Coromandel Range and northern end of the Kaimai Range, with the Ohinemuri River catchment between and includes the east coast between Whangamatā and Waihi Beach. The Waihi Ecological District encompasses the Otahu Ecological Area (which includes the Otahu Dedicated Area) and the Parakawai Geological Area, as shown in Figure 3-76 below. The Otahu Dedicated Area and the Parakawai Geological Area are both included in Schedule 4 of the Act as 'land on which non-mining activities are ineligible'.

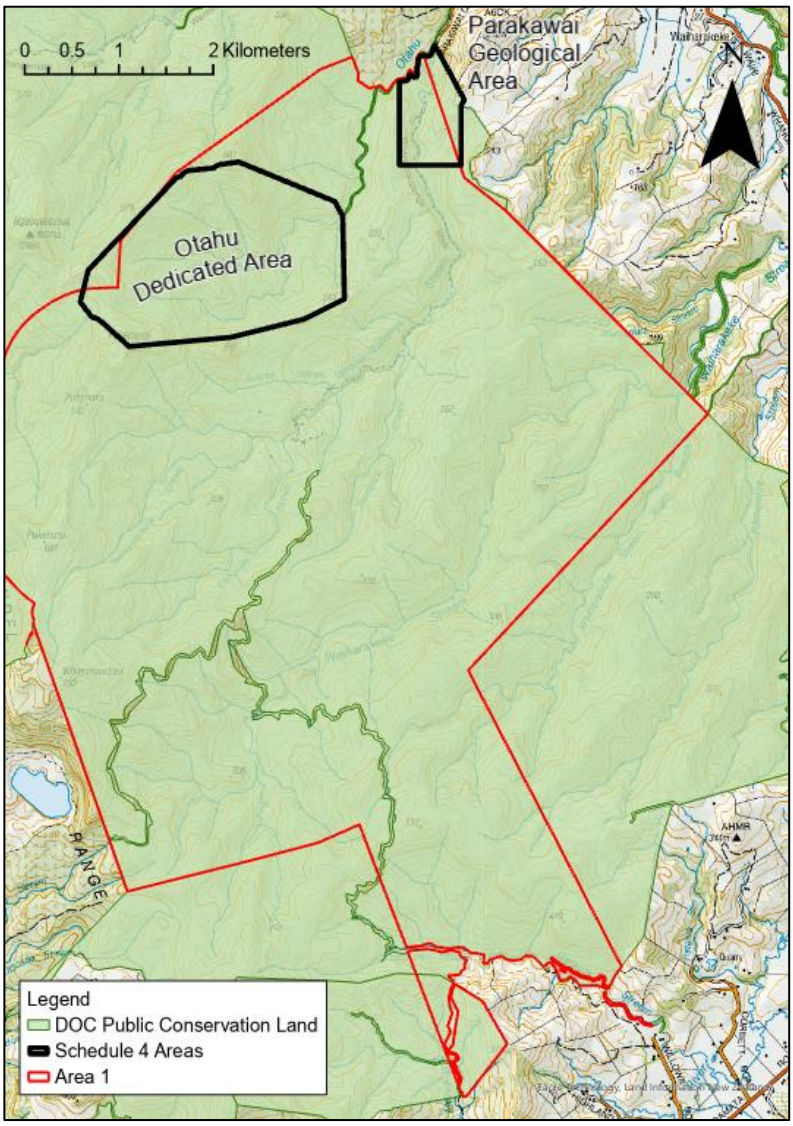

Figure 3-76: Location of the Otahu Dedicated Area and Parakawai Geological Area in relation to Area 1 of the WNP

Accordingly, no approvals to undertake activities in the Otahu Dedicated Area or the Parakawai Geological Area are sought in this application.

In relation to the Parakawai Geological Area it is noted that OGNZL currently holds an approval (Concession 87585-OTH) for the operation of a water level transducer and associated monitoring activities at the established WKP01 monitoring site located within the Parakawai Geological Area. The WKP01 water level transducer is installed below the stream surface with a logger box installed on the stream bank. The logger box is attached to a telemetry communications mast and conveys real-time river level data to OGNZL's telemetry site. Quarterly river flow gauging using a handheld FlowTracker device also occurs at this site. Concession 87585-OTH expires in December 2025. OGNZL will seek to authorise the continued use of the monitoring site at WKP01 outside of the Fast-track process by way of a concession application from the Department of Conservation. Should a concession for the continued operation of monitoring activities at WKP01 not be granted, OGNZL will look to undertake the data collection activities in an alternative location outside of the Parakawai Geological Area.

While this application does not seek approvals to undertake activities in the Otahu Dedicated Area and Parakawai Geological Area it is noted that the application does refer to potential future works within these areas in relation to the Waihi North Biodiversity Project, with the application seeking to secure OGNZL's funding, development (with tangata whenua), and commitment to the delivery of the Waihi North Biodiversity Project, with any approvals required for the project to be applied for at a later date once the design of the project and how it will be delivered are confirmed.

The application documents also make reference to the undertaking of pest control management and low impact environmental monitoring activities within the Otahu Ecological Area, and water monitoring activities within the Parakawai Geological Area. As noted, approval for these low impact activities is not being sought within the Otahu Dedicated Area and Parakawai Geological Area as part of this application. OGNZL will seek to obtain any necessary approvals for activities in these locations outside of the Fast-track process, and should it be determined that activities in these locations are unobtainable through mechanisms outside of the Fast-track process, OGNZL will look to undertake the activities in alternative locations and with associated approvals. OGNZL will consult further with the Department of Conservation with regard to determining an appropriate location and management approach for these activities.

Therefore, no non-mining activities are being applied for on Schedule 4 ineligible land.