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Delmore Fast-track Application

Ecological Impact Assessment

Prepared for: Vineway Limited

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Cover photo: The Site looking southeast towards the dwelling on 53B Russell Road.

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1 INTRODUCTION

Vineway Limited (Vineway) engaged Viridis Limited (Viridis) to undertake an ecological impact assessment (EcIA) of the proposed development of approximately 109 ha of land in six contiguous lots (88, 130 and 132 Upper Ōrewa Road and 53A, 53B and 55 Russell Road, 'the Site') under the Fast-track Approvals Act (FTAA). The location of the Site is shown in Figure 1 and the site extent in Figure 2. The Site is zoned as 'Future Urban Zone' under the Auckland Unitary Plan Operative in Part (AUP-OP).

The development involves subdivision of the Site and construction of a master-planned urban, residential development of approximately 1250 dwellings. The subdivision and construction will occur in two stages, comprising a total of six substages. Preparatory earthworks across the Site comprises cut of 1,272,000 m^3 and fill of 953,000 m^3 over an area of approximately 58.4 ha.

The designated two lane urban arterial road, running from SH1 and Grand Drive in the east along the Site's northern side and then down its western side to the southern boundary of the subject Site, will be constructed as part of the project. There will be walking and cycling infrastructure along the side of this road.

Walkways will be provided throughout the Site, with some routes provided from the Site to the Scenic Reserve to the north. A neighbourhood park is shown indicatively within the middle of the Site. Existing riparian native vegetation will be restored and further enhancement planting will be undertaken. Existing areas of vegetation subject to consent notices will also be restored and enhanced with planting in places. These green spaces will be supported by on-street planting. This will see an approximate total of 43.7 hectares of natural environment across the Site to be maintained, protected and enhanced, which comprises approximately 40% of the total Site area.

This report has been prepared to support a substantive application under the FTAA and discusses the ecological effects of the proposal[1]. Where appropriate, recommendations have been provided to aid in the avoidance, minimisation and remediation of adverse effects that could arise as a result of the proposed works.

An ecological assessment of the Site and neighbouring environment identified the presence of 39 intermittent and permanent streams and 34 natural wetlands. Terrestrial features identified included pine plantations, exotic dominant vegetation, mature native dominant vegetation, planted native vegetation and gorse scrub. The Site provides potential habitat for threatened native species, including bats, lizards, birds and fish. No threatened plant species were identified. The proposal is expected to have an overall low level of effect on the ecological values of the area The proposed mitigation and planting measures will ensure the adverse effects on the ecological values of the Site are minimised and in fact provide for a large net biodiversity gain. The assessment has been informed by relevant regulations, including the National Policy Statement for Freshwater Management (NPS-FM 2020), the National Environmental Standards for Freshwater (NES-F 2020) and the National Policy Statement for Indigenous Biodiversity 2023, amended in October 2024 (NPS-IB 2024).

[1] Effects of the proposed wastewater discharge is assessed separately (Viridis 2025).

Figure 1. Site location as indicated by orange polygon (map source: LINZ NZ Topo 50).

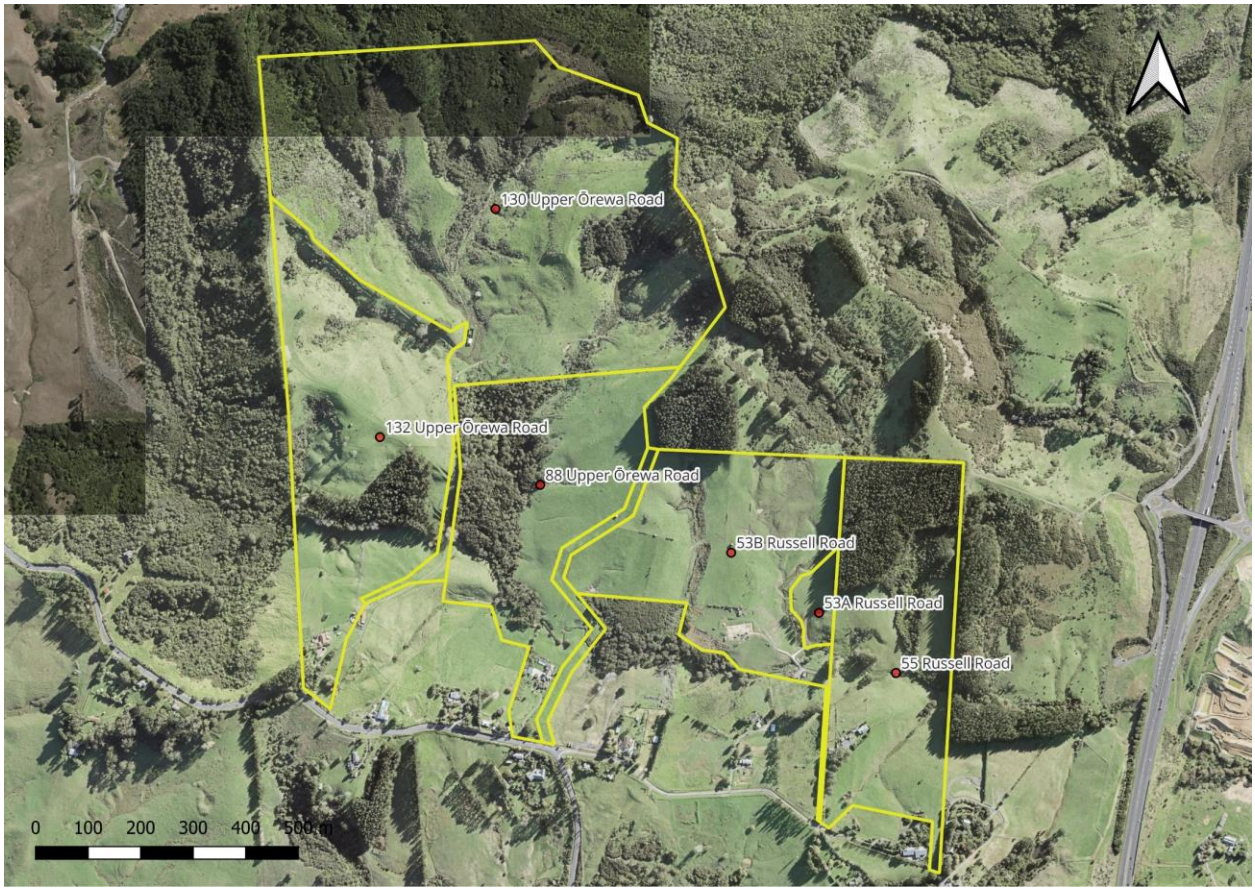

Figure 2. Site extent (aerial source: LINZ Auckland 0.075 m Urban Aerial Photos (2017) & Auckland 0.075 m Rural Aerial Photos (2020)).

2 METHODOLOGY

2.1 Overview

The assessment included a desktop review and site visit, undertaken by a suitably qualified ecologist. The desktop review involved an examination of current and historical aerial imagery of the Site, during which factors such as changes in vegetation and surface water were noted. A review of data on Auckland Council's Geomaps (such as current biodiversity layers, predicted watercourses and Site topography) was also undertaken.

Site assessments were undertaken during December 2023, October and November 2024, and January 2025, during which the presence and extent of freshwater and terrestrial features within the property and surrounding area were recorded and the quality of associated habitat (if any) was visually assessed, in accordance with the methodology detailed in Sections 2.2 through 2.3, below.

2.2 Terrestrial Ecology

The vegetation within the property was assessed during the Site visit. The botanical value of both exotic and native vegetation was recorded, and the quality, extent and connectivity of vegetation was considered. Terrestrial fauna habitat was assessed qualitatively, in conjunction with database reviews (e.g., Department of Conservation's (DoC) ARDs, Bioweb, eBird and iNaturalist) and considered indigenous lizards, birds, and bats. A desktop review of local bat and herpetofauna records from specific databases was undertaken. A review of a recent (2022-2023) bat survey in the local area was also undertaken (Cullen 2023). Opportunistic sightings of avifauna were recorded, and the conservation status of the species, as defined in Robertson et. al. (2021), was noted.

The ecological values of terrestrial features were determined in accordance with the methodology prescribed in the Environment Institute of Australia and New Zealand (EIANZ) guidelines (refer Section 2.4).

2.3 Freshwater Ecology

2.3.1 Streams

During the Site assessment, the presence and extent of streams within Site were noted and the quality of any freshwater habitat was visually assessed. Watercourses were classified as per the AUP-OP definitions to determine the ephemeral, intermittent or permanent status of the watercourse. Freshwater habitat was assessed, noting ecological aspects such as channel modification, hydrological heterogeneity, riparian vegetation extent, substrate type and any fish or macroinvertebrate habitat observed. Riparian and catchment information was also reviewed.

2.3.2 Wetlands

Where appropriate, potential wetland areas were assessed in accordance with wetland delineation protocols (MfE 2022, Clarkson 2014) to determine if an area met the regulatory definition of 'natural inland wetland' (NPS-FM 2020). Potential wetland areas were assessed based on the prevalence of certain vegetation species and their indicator status ratings, as defined in Clarkson et. al. (2021):

- Obligate wetland (OBL) vegetation, which almost always is a hydrophyte (a plant which only grows in wet environments), rarely found in uplands (non-wetland areas).
- Facultative wetland (FACW) vegetation, which usually is a hydrophyte but can occasionally be found in uplands.

- Facultative (FAC) vegetation, which is commonly either a hydrophyte or non-hydrophyte.
- Facultative upland (FACU) vegetation, which is occasionally a hydrophyte but is usually found in uplands.
- Upland (UPL) vegetation, which is rarely a hydrophyte and is almost always found in uplands.

Where the dominance or prevalence tests showed unclear results, hydric soils and hydrology tests were undertaken in accordance with methodology outlined in MfE (2022) and Clarkson (2014).

Wetland assessments also included identifying native and exotic vegetation species, examining the structural tiers within wetland areas, and assessing the quality and abundance of aquatic habitats. Signs of wetland degradation such as pugging and grazing from stock access, structures such as culverts impeding hydrological function, and weed infestation were also noted.

The ecological values of freshwater features were determined in accordance with the methodology prescribed in the EIANZ guidelines (refer Section 2.4).

2.3.3 Macroinvertebrate

Sampling

Protocol 'C2: soft-bottomed, semi-quantitative' was applied for macroinvertebrate sampling (NEMS 2022) within three sampling sites of a main tributary of the Ōrewa River (Figure 3). A composite sample was collected by sweeping a net (with an aperture of 400 mm and mesh size of 0.5 mm) through the stream substrate for a distance of one metre, and/or woody debris brushed to dislodge organisms, followed by three cleaning sweeps to collect organisms in the water column. The substrates were sampled in proportion to their prevalence along the reach. Each sample unit was approximately 0.3 m^2. This was repeated at 10 different locations within the survey reach (100 m), to give a total sampling area of 3 m^2. All samples were preserved in 70% isopropyl alcohol for later identification and inventory.

Figure 3. Sampling site locations.

Analysis

Benthic macroinvertebrates were identified and counted to a level suitable for calculating taxa richness, abundance, EPT taxa richness and % EPT, macroinvertebrate community index (MCI) and quantitative MCI (QMCI) following protocols outlined in NEMS (2022) and Stark *et al.* (2001). EPT is the number of taxa that belong to the Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies) taxonomic groups.

Taxa richness is a measure of the number of invertebrate taxa in a sample. In general, watercourses that support a high number of invertebrate taxa are more likely to be of a higher environmental quality than watercourses with few taxa present. However, interpretation of taxa number data as an environmental indicator is dependent on the pollution sensitivity or tolerance of taxa present.

Abundance is a measure of the total number of invertebrates in a sample. Invertebrate abundance tends to increase in the presence of organic or nutrient enrichment and decreases in the presence of toxic contaminants.

EPT taxa are generally sensitive to changes in water and habitat quality. Percent EPT (%EPT) is a measure of the proportion of EPT taxa making up the community. EPT and % EPT values can provide a good indication of stream health, with high values indicating good water/habitat quality and low values indicating poor water/habitat quality.

The MCI and QMCI are biological indices that are based on species indicator scores between 1 and 10, which are assigned to each taxon based on their sensitivity to organic enrichment. Although developed to assess nutrient enrichment, these scores are now used to assess the general health of New Zealand streams. MCI scores are based on presence/absence data, while the QMCI incorporates abundance

data. Higher MCI and QMCI indicate better habitat and water quality. Scores were compared to the attribute bands and national bottom line (NBL) defined in the National Policy Statement for Freshwater Management 2020 (NPS-FM). The relevant NPS-FM attribute bands and NBLs are reproduced in Table 1.

Table 1. Estimates of stream health using MCI and QMCI indices.

NPS-FM (2020)			
Attribute band	**Description**	**Numeric attribute states**	
		MCI	**QMCI**
A	Pristine conditions	>130	≥6.5
B	Mild pollution	≥110 and <130	≥5.5 and <6.5
C	Moderate pollution	≥90 and <110	≥4.5 and <5.5
National bottom line		90	4.5
D	Severe pollution	<90	<4.5

2.3.4 Fish Survey

To provide an indication of the fish communities present within the stream environments on site, a single fyke net and three Gee's minnow traps were baited with marmite and set across each of the same reaches assessed for macroinvertebrates. Only fine meshed fykes with separator grills were used. All nets and traps were set with an airspace to provide trapped fish access to atmospheric oxygen. The traps were left overnight and checked the following day. All fish captured were identified, measured and counted before being returned to their habitats.

A fish index of biotic integrity (F-IBI) was calculated for each site based on fish species present, altitude and distance inland to estimate fish community integrity (Joy 2007). The relevant NPS-FM attribute bands are reproduced in Table 2.

Table 2. Estimates of fish community integrity using F-IBI.

NPS-FM (2020)		
Attribute band	**Description**	**F-IBI**
A	High integrity of fish community. Habitat and migratory access have minimal degradation.	≥34
B	Moderate integrity of fish community. Habitat and/or migratory access are reduced and show some signs of stress.	<34 and ≥28
C	Low integrity of fish community. Habitat and/or migratory access is considerably impairing and stressing the community.	<28 and ≥18
D	Severe loss of fish community integrity. There is substantial loss of habitat and/or migratory access, causing a high level of stress on the community.	<18

2.4 Ecological Impact Assessment

The overarching approach of this analysis and reporting is to ascertain the existing ecological values on the Site and determine the impact of the proposed works on those values.

The ecological value of the Site, relating to species, communities and systems, were determined as per the EIANZ Ecological Impact Assessment guidelines (EcIAG) for use in New Zealand (Roper-Lindsay et. al.

2018). This report also identifies statutory guidelines and regulation with respect to ecology (such as watercourses, wetlands, high value vegetation and habitats) where relevant to the proposed development. Using this framework, the EcIAG describes a simple ranking system to assign value to species as well as other matters of ecological importance such as species assemblages and levels of organisation. The overall ecological value is then determined on a scale from '*Negligible*' to '*Very High*'.

Criteria for describing the magnitude of effects are given in Chapter 6 of the EcIAG. The level of effect can then be determined through combining the value of the ecological feature/attribute with the score or rating for magnitude of effect to create a criterion for describing level of effects (Table 1). A moderate level of effect requires careful assessment and analysis of the individual case. For moderate levels of effects or above, measures need to be introduced to avoid through design, or appropriate mitigation needs to be addressed (Roper-Lindsay et al. 2018).

Table 3. Criteria for describing the level of effects (from Roper-Lindsay et al. 2018).

Magnitude of Effect	**Ecological Value**				
	Very High	**High**	**Moderate**	**Low**	**Negligible**
Very High	*Very High*	*Very High*	*High*	*Moderate*	Low
High	*Very High*	*Very High*	*Moderate*	Low	Very Low
Moderate	*High*	*High*	*Moderate*	Low	Very Low
Low	*Moderate*	Low	Low	Very Low	Very Low
Negligible	Low	Very Low	Very Low	Very Low	Very Low
Positive	Net Gain	Net Gain	Net Gain	Net Gain	Net Gain

Notes: Where text is italicised, it indicates 'significant effects' where mitigation is required.

3 SITE DESCRIPTION

3.1 Historical Context

The Site is located within the Rodney Ecological District of the Auckland region. Auckland Council's Geomaps Ecosystem potential extent layer indicates that historically (pre-human), the Site would have likely been comprised of the kauri, podocarp, broadleaved forest ecosystem type (WF11) and would have supported a diverse range of invertebrates, amphibians, reptiles, birds and bats (Singers et al. 2017). However, historical aerials available for the area (dating back as far as 1940) indicate that the Site and much of the surrounding landscape has been progressively cleared over the years to make way for agricultural and horticultural land use (Figure 4).

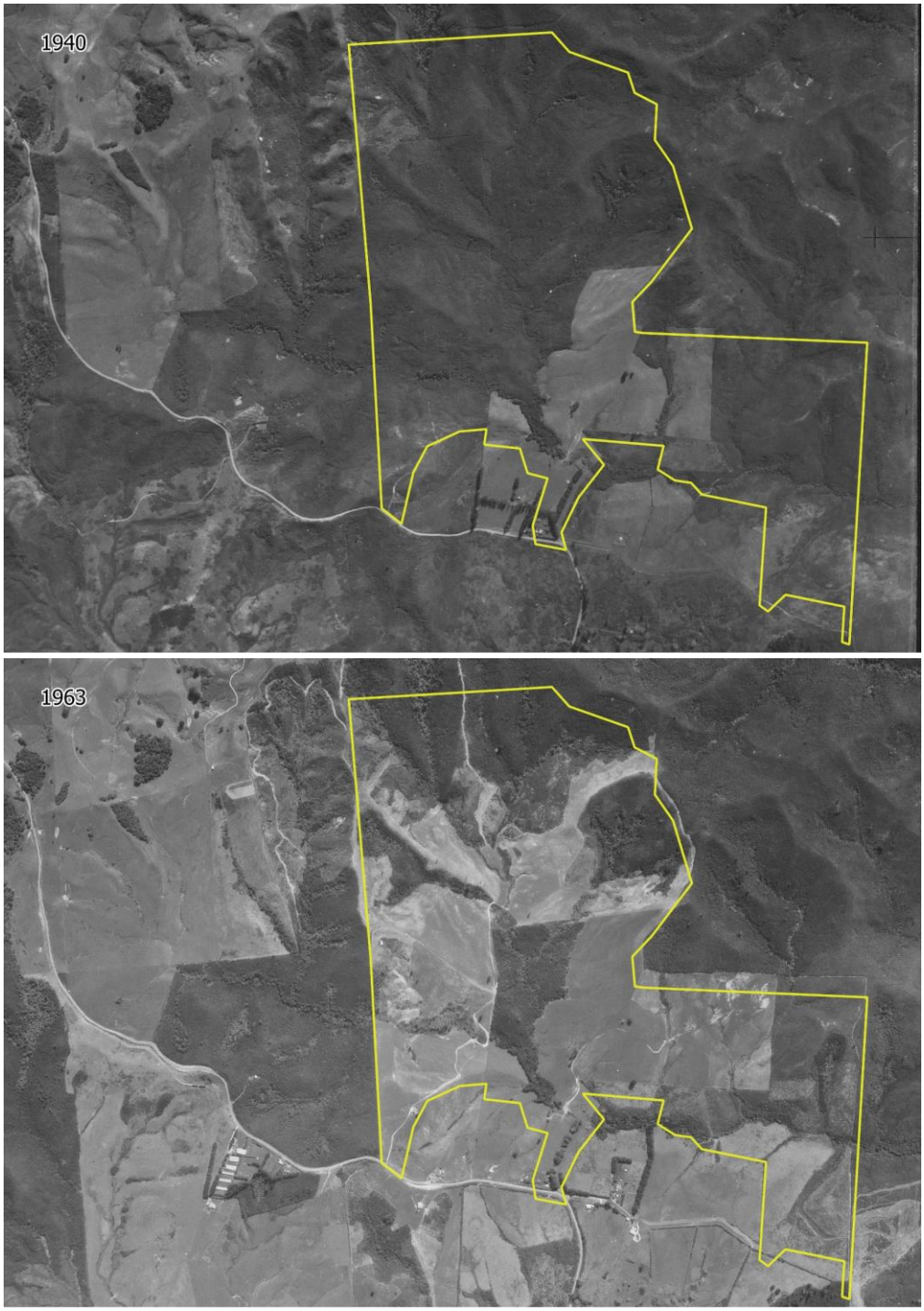

Figure 4. 1940 and 1963 historical aerial imagery of the Site (yellow polygon).

3.2 Local Context

Currently, the Site consists of predominantly farmland and rural residential life-style blocks, with bush fragments present, largely associated with the Nukumea Scenic Reserve, which the Site connects to. The Site is bordered by similar rural residential and farming land uses to the west and south, with various residential developments present to the east. Auckland Council's Geomaps Ecosystem current extent layer indicates several recognised ecosystems are present within the Site boundaries; kānuka scrub forest (VS2), mānuka, kānuka scrub (VS3), a few unclassified areas of vegetation (UC), and remaining fragments of the historic kauri, podocarp, broadleaved forest (WF11) (Figure 5).

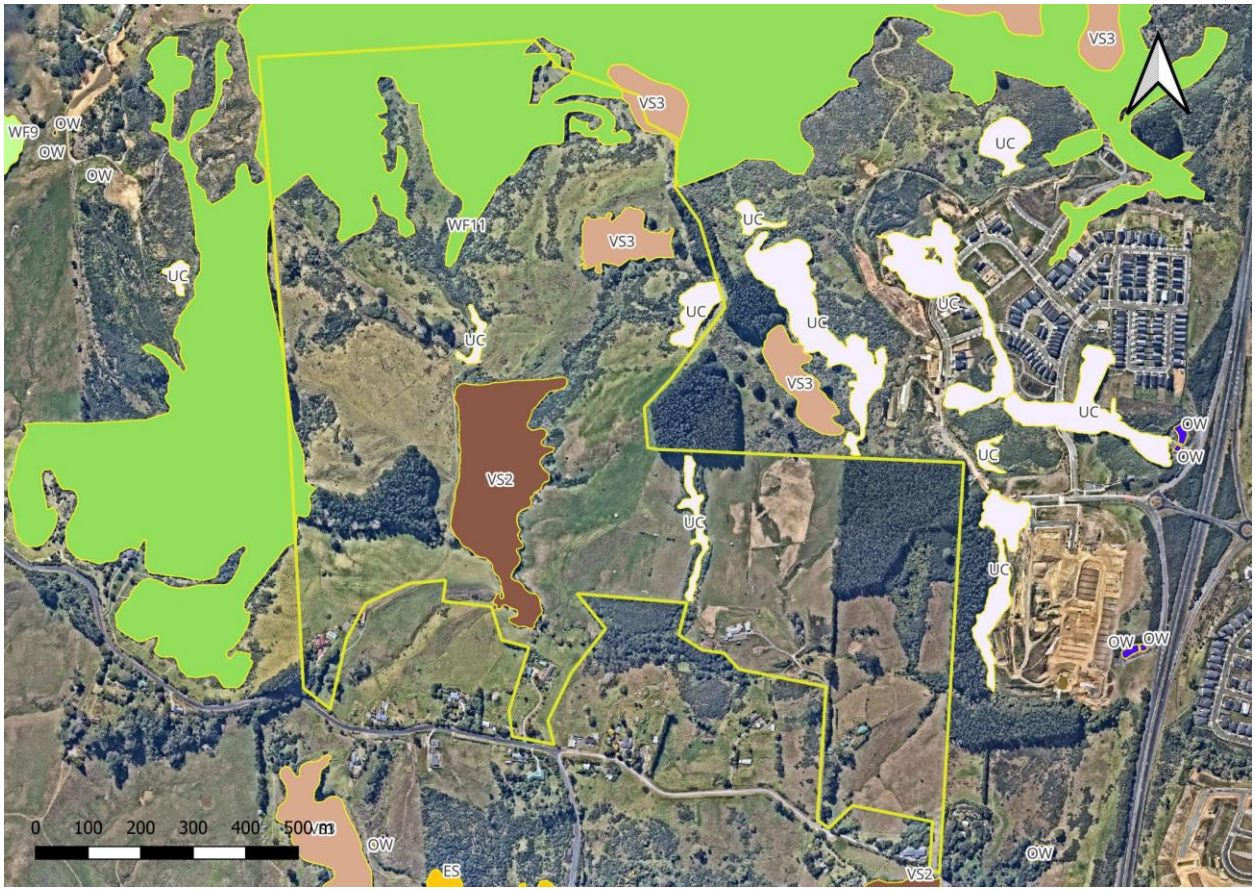

Figure 5. Current ecosystems within the Site as per Auckland Council's Geomaps. VS2 = kānuka scrub forest, VS3 = mānuka, kānuka scrub, UC = unclassified, WF11 = kauri, podocarp, broadleaved forest (WF11) and OW = open water.

Auckland Council's Geomaps indicates that the Site is subject to a Significant Ecological Area (SEA) overlay. SEA_T_6652, which covers the Nukumea Scenic Reserve to the north of the Site, extends into the northern portion of 130 Upper Ōrewa Road and borders 132 Upper Ōrewa Road (Figure 6). SEA_T_6652 was designated an SEA based on the AUP-OP factors:

1.a. Representative of <10% natural extent within Eco District - VS3 (333.08 ha), WF11 (40.37 ha)

2.b. Threatened Species - *Anguilla dieffenbachii, Galaxias maculatus, Gobiomorphus huttoni, Paranephrops*

3.a. Habitat Diversity - VS3, WF11

4.b. Buffer – Buffers a protected area

The Site is also subject to six environmental protection consent notices (Figure 6).

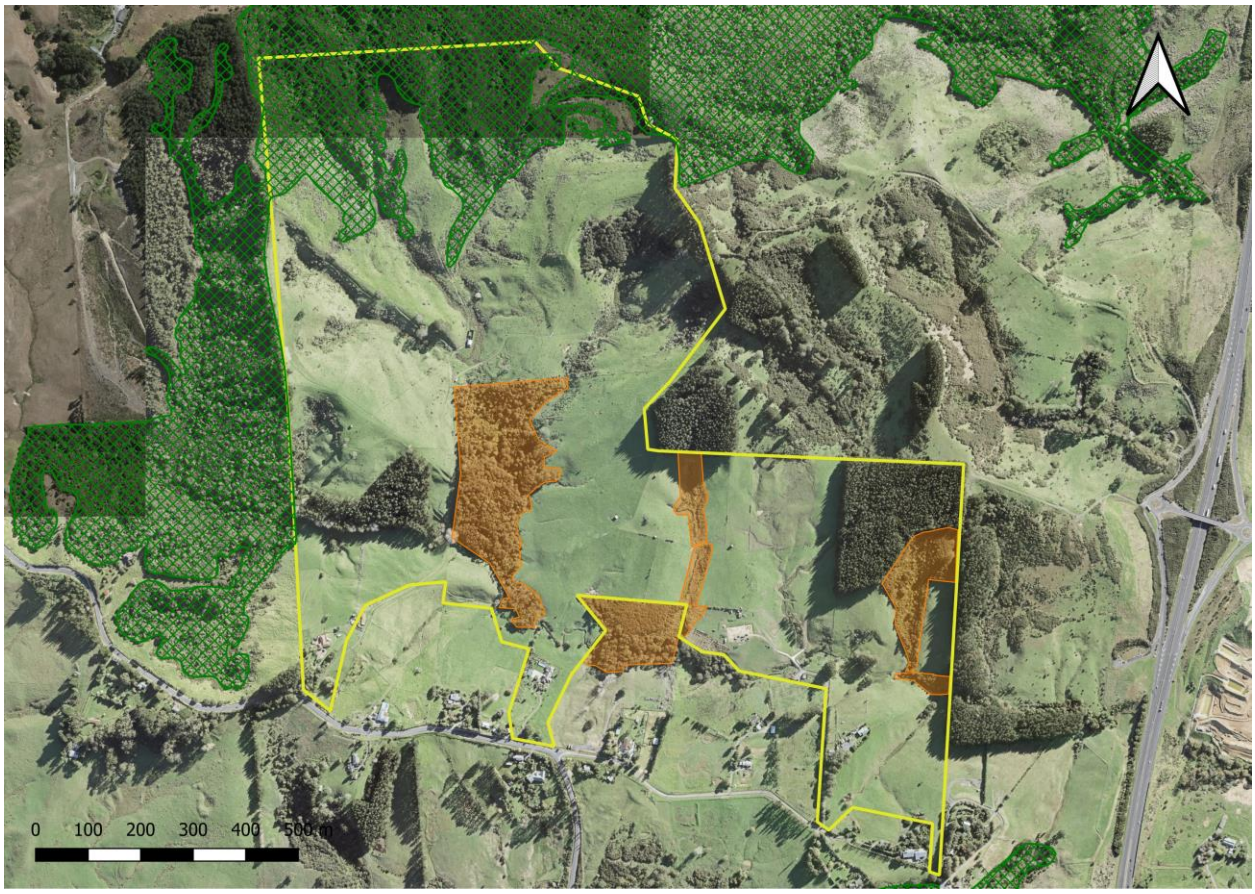

Figure 6. SEAs (green hatch polygons) and consent notice areas (orange polygons) within and adjacent to the Site.

4 TERRESTRIAL ECOLOGY

4.1 Vegetation

Utilising observations from the Site visit and aerial images, the vegetation within the Site has been classified and mapped (Figure 8). Most of the Site was covered in managed pasture. Outside of the managed pasture the main vegetation types included, pine plantations, exotic dominant vegetation, native dominant vegetation and gorse scrub were also present. Outside of these vegetation types scattered individual native and exotic trees were present. The identified vegetation types are described further below in Sections 4.1.1 to 4.1.4.

4.1.1 Pine plantations

Three pine plantations were located within the Site. The canopy was dominated by a monoculture of mature *Pinus radiata*, however a few other mature exotic species were present along some edges of the plantations. Other mature exotic species include poplar (*Populus spp*.) and willows (*Salix spp*.). The understory consisted of a mix of low stature native and exotic species, including ponga (*Cyathea dealbata*), whekī (*Dicksonia squarrosara*), māpou (*Myrsine australis*), māhoe (*Melicytus ramiflorus*), gorse (*Ulex europaeus*), woolly nightshade (*Solanum mauritianum*), pampas (*Cortaderia selloana*) and blackberry (*Rubus fruticosus*).

The ecological value of the pine plantations was considered to be low, given the low native diversity, monoculture canopy and high presence of pest plant species[2]. It is possible that some of the pines may provide habitat for bats, as discussed in Section 4.3.3. The pine plantations are not expected to provide important habitat for native birds or lizards, due to its managed state (i.e., uniformed nature lack of habitat features (e.g., old limbs), lack of diversity (i.e., largely a monoculture), lack of connecting canopy structure.

a) **b)**

Figure 7. a) The eastern most pine plantation and b) the understorey present.

[2] Identified as a plant pest in the Auckland Regional Pest Management Plan 2020-2030 (Auckland Council, 2020).

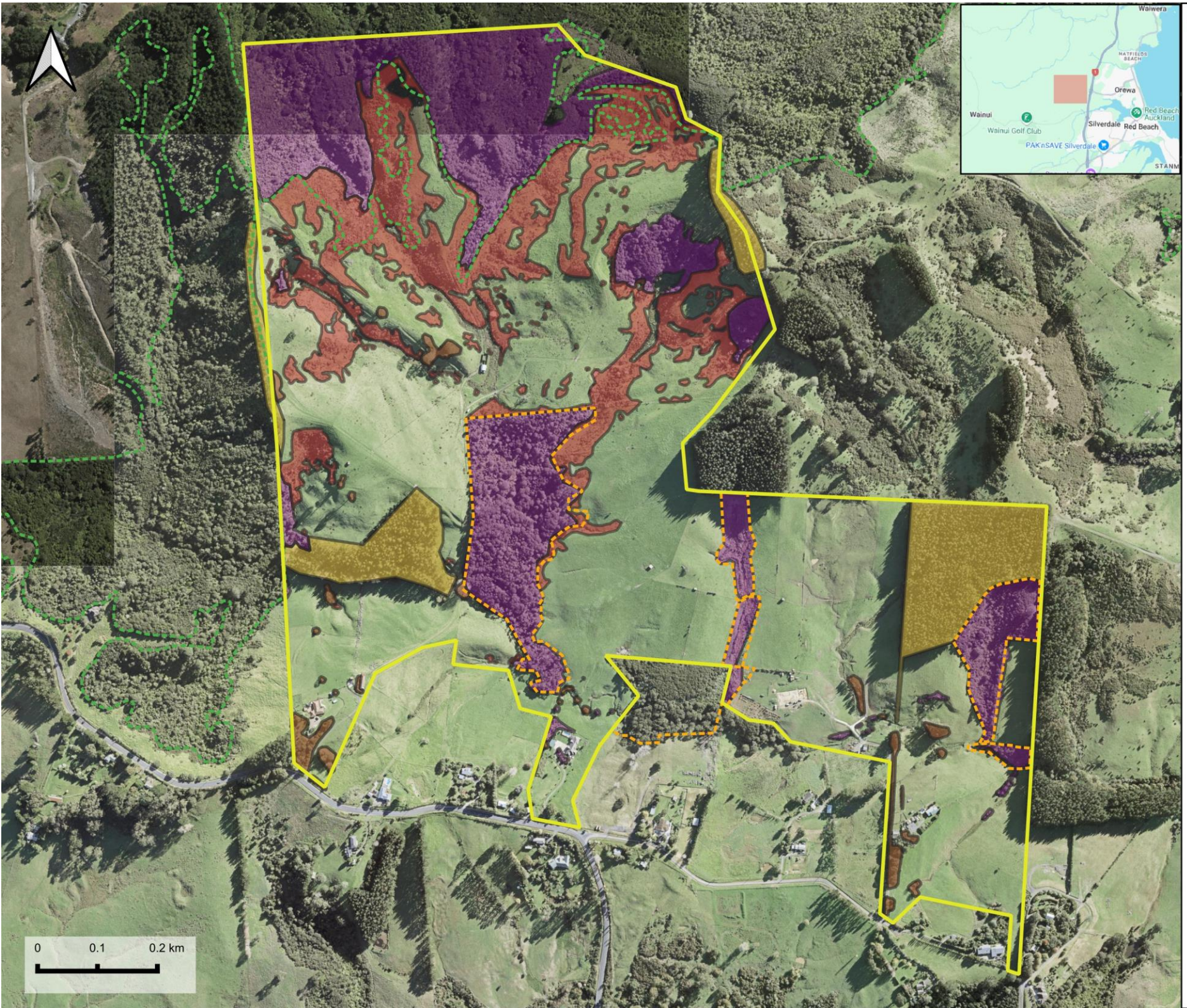

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Figure 8

Vegetation Types

Delmore Project

Legend

- Site
- Consent notice area
- SEA_T_6652
- Pine plantation
- Native dominant vegetation
- Exotic dominant vegetation
- Gorse scrub

SOURCES

LINZ 2017

DISCLAIMER:
This map/plan is not an engineering draft. This map/plan is illustrative only and all information should be independently verified on site before taking any action.

SCALE **1:8,000** **@ A4**

PROJECT NO.	10122
DRAWN BY:	MD
DATE:	10 December 2024

4.1.2 Exotic dominant vegetation

Outside of the pine plantations, a few relatively small pockets of mixed exotic vegetation were present. Species within these pockets included poplar, pine, gum (*Eucalyptus spp*.), blackwood (*Acacia melanoxylon*), bottlebrush (*Callistemon sp*.), she-oak (*Casuarina cunninghamiana*) and willows. Litte to no understorey was present, however a few native species such as red mapou, māhoe, cabbage tree (*Cordyline australis*), and tōtara (*Podocarpus totara*) were present. Pest plant species were also present and included gorse, woolly nightshade, pampas, blackberry, tree privet (*Ligustrum lucidum*) and Chinese privet (*Ligustrum sinense*). Single isolated exotic trees were also scattered throughout the Site (Figure 10).

The ecological value of the exotic trees present on the Site was considered to be low, given the high edge effects and exotic species. It is possible that some of the larger trees may provide habitat for bats, as discussed in Section 4.3.3. The areas of exotic trees are not expected to provide important habitat for native birds or lizards.

a) **b)**

Figure 9. Examples of exotic dominant vegetation within the Site.

a) **b)**

Figure 10. Examples of large isolated exotic trees scattered throughout the Site.

4.1.3 Native dominant vegetation

Relatively large areas of native vegetation were present within the Site. These areas were largely associated with the consent notice areas and the SEA. However, two other fairly large areas of non-protected (i.e., not within a SEA or consent notice area) native vegetation were located within the

northeastern section of the Site and a number of small pockets of non-protected native vegetation were also present.

The two eastern most consent notice areas consisted of young planted native vegetation (Figure 11). Species present within these areas consisted predominantly of mass plantings and native regeneration of common natives such as, mānuka (*Leptospermum scoparium*), kānuka (*Kunzea ericoides*), cabbage trees, tōtara, with a mixture of understorey and edge species including harakeke *(Phormium tenax*), putaputawētā (*Carpodetus serratus*), karamū (*Coprosmas robusta*), and māhoe. Pest plant species such as arum lily (*Zantedeschia aethiopica*), gorse, woolly nightshade, pampas, willow and blackberry were present. These areas were considered to have a moderate current ecological value, as although they were dominated by native vegetation and function as potential ecological corridors, native diversity was low, the vegetation is young, and they were subject to edge effects as they were narrow relative to their width. Edge effects reduce ecological values through increased risk of weed invasion, increased light levels, and a higher risk of damage caused by inclement weather.

The native vegetation within the SEA and the western most consent notice area consisted of a diverse range of regenerating native species. Although the canopy of these areas was often dominated by mānuka and kānuka, other native species were present including tānekaha (*Phyllocladus trichomanoides*), kauri (*Agathis australis*), rimu (*Dacrydium cupressinum*), tōtara, rewarewa (*Knightia excelsa*) and kahikatea (*Dacrycarpus dacrydioides*). These two areas represent mānuka and kānuka forest transitioning into kauri, podocarp, broadleaved forest (WF11) which is a natural successional process. The understorey was dominated by natives such as māhoe, *Coprosma* spp. and tree ferns. Pest plant species such as arum lily, gorse, blackberry, pampas and wild ginger (*Hedychium gardnerianum*) were also present, particularly around the edges. These areas were considered to have a high current ecological value, as they were dominated by a native canopy and understory, they function as ecological corridors and buffers and were only subject to edge effects around their perimeter.

The other native dominant vegetation identified within the Site typically consisted of pockets of mature mānuka and kānuka. These areas were considered to have a moderate current ecological value, as although they were dominated by native vegetation and function as potential ecological stepping stones, native diversity was low and the areas were subject to edge effects.

a) **b)**

Figure 11. Examples of young planted native vegetation within the consent notice areas located a) in the middle of the Site and b) the eastern part of the Site.

a) **b)**

Figure 12. Examples of more mature native vegetation within a) the western consent notice area and b) the SEA.

4.1.4 Gorse scrub

Extensive areas of gorse scrub was present throughout the Site, particularly in the northern section of the Site. While gorse was the dominant species, woolly nightshade was also prevalent. Other species present included blackberry and pampas with the occasional regenerating māhoe or cabbage tree. The ecological value of the gorse scrub present on the Site was considered to be low, given the high edge effects and exotic species. It is possible that some of the gorse scrub may provide habitat for lizards, as discussed in Section 4.3.2. The areas of gorse scrub are not expected to provide important habitat for native birds or bats, due to the lack of preferred feeding and nesting habitat.

a) **b)**

Figure 13. Examples of the gorse scrub throughout the Site.

4.2 Terrestrial Connectivity and Ecological Function

Forest edge communities increase fragmentation of native vegetation within a landscape, and are heavily influenced by increased exposure to sunlight, wind and competition from pest plants. These factors restrict establishment of some native flora and fauna to forest interiors. Fragmentation of native vegetation increases the edge effect and decreases the availability of habitat for species that would normally occur in the interior of vegetated areas. Connectivity between areas of vegetation is important to facilitate ecological function, and loss of connectivity can impair reproductive function for both flora and fauna communities.

Aside from the small pockets of native vegetation, the identified native vegetation within the Site provides ecological connectivity and buffering function to the wider environment, particularly to the

adjacent Nukumea Scenic Reserve, the extended SEA_T_6652 and other SEAs in close proximity (Figure 14). However, the fragmented nature of these areas reduces the quality of the connectivity and ecological functioning values. Their relatively large sizes also reduce adverse edge effects. Overall, the larger areas of native vegetation (i.e., the SEA, the consent notice areas and the two areas of non-protected vegetation within the northeast section of the Site) were considered to have moderate-high connectivity and ecological functioning values.

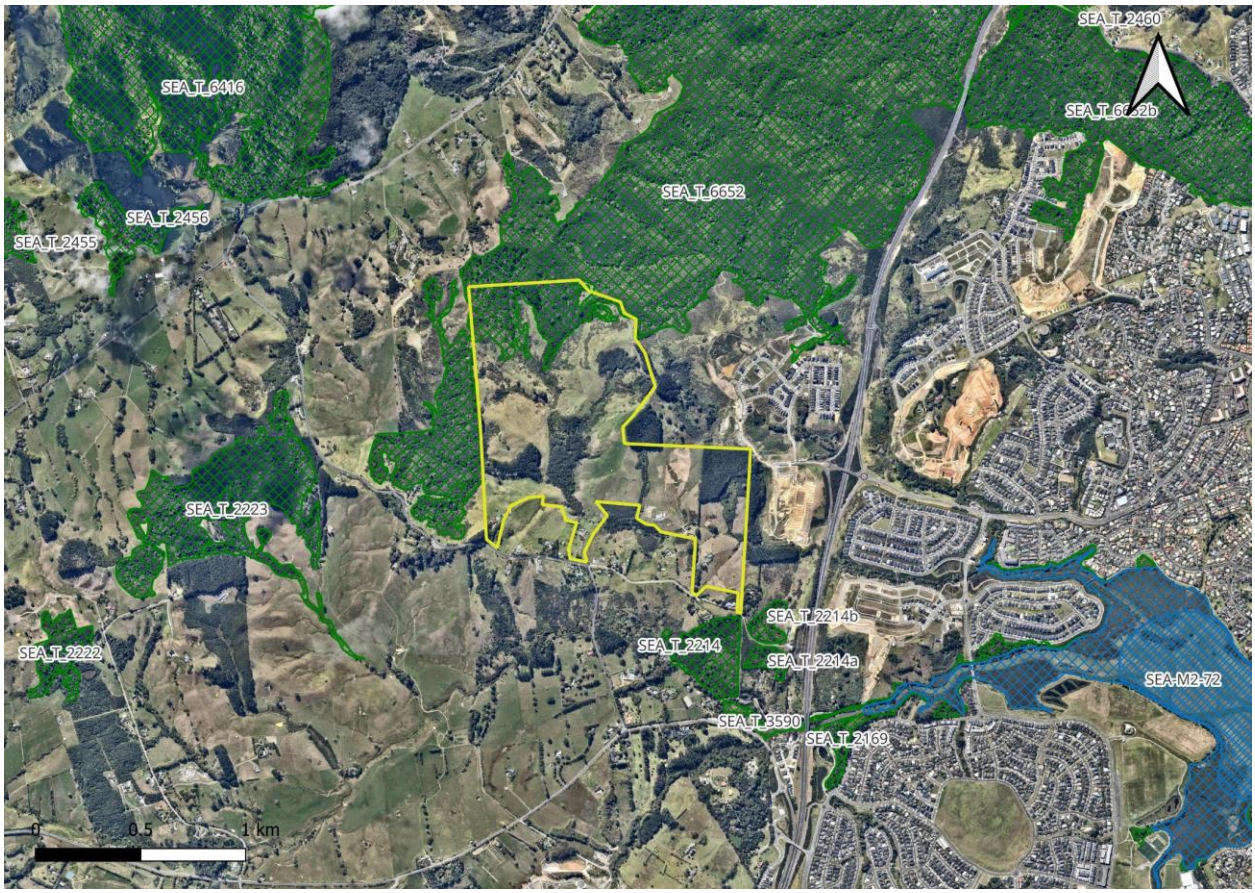


Figure 14. SEAs in close proximity to the Site.

The other identified areas of vegetation within the Site (Figure 8) were typically smaller, fragmented, dominated by exotics, irregular shaped and narrow. As a result, this vegetation is subject to very high edge effects and as such the functioning of the vegetated areas and their ability to persist and resist the effects of adverse weather and weed invasion are significantly reduced. This is clearly demonstrated on the Site by the abundance of weed species. Despite this degradation, the vegetated margins of waterways on the Site provide some ecological functions. These include some shading, bank stability, erosion protection, surface water filtration, habitat, and potential habitat for native birds and. Overall, the connectivity and ecological functioning values of the rest of the Site are considered to be low.

4.3 Fauna habitat

4.3.1 Avifauna (birds)

Avifauna habitat within the Site was relatively diverse and included mature native vegetation, young native vegetation, exotic vegetation, scrub, pine plantations and wetland habitat. The larger patches of native vegetation and the wetland habitat provide the highest quality nesting and roosting habitat.

No formal avifauna surveys were undertaken, however birds seen/heard were opportunistically recorded during the Site visit. Table 4 provides a list of species that could potentially be present, even if

only periodically, within the Site. Records retrieved from eBird.org and iNaturalist for nearby sites were used to indicate what other species may be present but were not observed during the Site visit.

The dominant avifauna community within the Site is expected to contain a combination of common exotic and native species that are abundant in the wider Auckland region including urban, urban fringe, and rural areas, such as the introduced magpie, skylark, black bird, finches, starling, thrush and myna and the native spur winged plover, paradise shelduck, fantail, tūī, kererū, white faced heron, Australasian harrier, kingfisher, silver eye, grey warbler, welcome swallow, shining cuckoo and ruru. It is possible that kākā (At-Risk, Recovering) may visit the area, although they would be expected to be present only fleetingly if at all. It is also possible that the Australasian bittern (Threatened – Nationally Critical) and the North Island fernbird (At Risk - Declining) may utilise the wetland habitat. Banded rail (*Gallirallus philippensis assimilis* - At Risk – Declining) and spotless crake (*Zapornia tabuensis* - At Risk - Declining) are not expected to utilise the Site due to the lack of suitable habitat (i.e., densely vegetated wetlands and/or mangrove/estuarine habitat).

Pipits (*Anthus novaeseelandiae*, At-Risk, Declining) can occur in areas of rough pasture with patches of fern, marshes or bogs and nest on the ground under clumps of tussock or long grass (NZbirdsonline, 2023). There are very few records of this species in the surrounding area and as most of the Site is highly managed for rural production activities, their preferred habitat type is very limited, so it is unlikely that they would use this Site for nesting and would likely only visit occasionally in low numbers if at all.

The ecological value of the larger patches of native vegetation and wetlands for avifauna was considered to be high, with the rest of the vegetation within the Site considered to be low.

Table 4. Birds known to be present in the wider area.

Common name	Species name	Conservation status	Observed on Site
Australian magpie	*Gymnorhina tibicen*	Introduced and Naturalised	
Australasian harrier	*Circus approximans*	Not Threatened	
Australasian bittern	*Botaurus poiciloptilus*	Threatened – Nationally Critical	
Blackbird	*Turdus merula*	Introduced and Naturalised	
Black backed gull	*Larus dominicanus*	Not Threatened	
Canada goose	*Branta canadensis*	Introduced and Naturalised	
Californian quail	*Callipepla californica*	Introduced and Naturalised	
Chaffinch	*Fringilla coelebs*	Introduced and Naturalised	
Eastern rosella	*Platycercus eximius*	Introduced and Naturalised	
Fantail	*Rhipidura fuliginosa placabilis*	Not Threatened	
Goldfinch	*Carduelis carduelis*	Introduced and Naturalised	
Greenfinch	*Chloris chloris*	Introduced and Naturalised	
Grey teal	*Anas gracilis*	Not threatened	
Grey warbler	*Gerygone igata*	Not Threatened	
Kākā	*Nestor meridionalis*	At-Risk, Recovering	
Kererū	*Hemiphaga novaeseelandiae*	Not Threatened	✓

Common name	Species name	Conservation status	Observed on Site
Kingfisher	*Todiramphus sanctus vagans*	Not Threatened	
Mallard duck	*Anas platyrhynchos*	Introduced and Naturalised	✓
Morepork / ruru	*Ninox novaeseelandiae*	Not Threatened	
Myna	*Acridotheres tristis*	Introduced and Naturalised	✓
North Island Fernbird	*Poodytes punctatus vealeae*	At Risk - Declining	
Paradise shelduck	*Tadorna variegata*	Not Threatened	✓
Pheasant	*Phasianus colchicus*	Introduced and Naturalised	✓
Pipit / Pīhoihoi	*Anthus novaeseelandiae*	At Risk, Declining	
Pūkeko	*Porphyrio melanotus melanotus*	Not Threatened	✓
Rock pigeon	*Columba livia*	Introduced and Naturalised	
Red-billed gull / Tarāpunga	*Chroicocephalus novaehollandiae*	At Risk, Declining	
Silvereye	*Zosterops lateralis lateralis*	Not Threatened	
Shining cuckoo	*Chrysococcyx lucidus*	Not Threatened	
Skylark	*Alauda arvensis*	Introduced and Naturalised	✓
Song thrush	*Turdus philomelos*	Introduced and Naturalised	✓
Sparrow	*Passer domesticus*	Introduced and Naturalised	✓
Spotted dove	*Spilopelia chinensis*	Introduced and Naturalised	
Spurwinged plover	*Vanellus miles novaehollandiae*	Not Threatened	✓
Starling	*Sturnus vulgaris*	Introduced and Naturalised	✓
Tūī	*Prosthemadera novaeseelandiae novaeseelandiae*	Not Threatened	
Turkey	*Meleagris gallopavo*	Introduced and Naturalised	
Welcome swallow	*Hirundo neoxena neoxena*	Not Threatened	✓
White faced heron	*Egretta novaehollandiae*	Not Threatened	
Yellowhammer	*Emberiza citrinella*	Introduced and Naturalised	

4.3.2 Herpetofauna (lizards)

Herpetofauna (reptiles and amphibians) comprise a significant component of New Zealand's terrestrial fauna. There are currently 135 endemic herpetofauna taxa recognised in New Zealand (Hitchmough *et al.*, 2021), 85.9% of which are considered 'Threatened' or 'At-Risk'. All indigenous reptiles and amphibians are legally protected under the Wildlife Act 1953, and vegetation and landscape features that provide significant habitat for native herpetofauna are protected by the Resource Management Act 1991 (RMA). Statutory obligations require management of resident reptile and amphibian populations if they are threatened by a disturbance i.e., land development.

A review of the DoC's herpetofauna database (accessed 06/11/2024) found a relatively high number of records for lizard species within 10 km of the Site. The most commonly recorded species were the

introduced plague skink (*Lampropholis delicata*, 49), with forest gecko (*Mokopirirakau granulatus* – At-Risk, declining, 46) being the next most common. There were 20 records for copper skink (Oligosoma aeneum – At-Risk, declining), 11 for ornate skink (*Oligosoma ornatum* – At-Risk, declining) and four for elegant gecko (*Naultinus elegans* – At-Risk, declining).

During the Site visit, opportunistic observations of potential lizard habitat were made. The main potential lizard habitat present was in the areas of native vegetation. Skinks are also likely to be present in the gorse scrub and any thick rank grass. Given the number of observations in the surrounding area and connection to other suitable habitat (i.e., Nukumea Scenic Reserve), it is considered likely that native lizards, including geckos are present within the Site.

The ecological value of the larger patches of native vegetation for herpetofauna was considered to be high, and the ecological value of the rest of the vegetation, outside of the managed pasture within the Site was considered to be moderate. Native lizards are not expected to be present within the managed pasture as it is not suitable habitat, as such the managed pasture was considered to be of negligible value for herpetofauna.

4.3.3 Chiroptera (bats)

New Zealand has two species of endemic bats on the mainland. The most widespread is the long-tailed bat (*Chalinolobus tuberculatus*, Threatened – nationally critical, regionally critical), although colonies are assumed to be small and their health is largely unknown (O'Donnell *et al.,* 2023; Woolly *et al*., 2023).

The lesser short-tailed bat has three described subspecies; the northern lesser short-tailed bat (*Mystacina tuberculata aupourica,* Threatened – nationally vulnerable), the central lesser short-tailed bat (*Mystacina tuberculata rhyacobia,* At-risk – declining) and the southern lesser short-tailed bat (*Mystacina tuberculata tuberculata,* Threatened – nationally increasing) (O'Donnell et al., 2023). There are no known populations of the short-tailed bat on the mainland in the Auckland region, with the closest known population being the northern lesser tailed bat population on Te Hauturu-o-Toi/Little Barrier Island.

Bats roost in tree hollows and under split bark of native and exotic trees, and also in rocky overhangs. Over the breeding season, large communal roosts occur in similar habitat. Bats tend to utilise linear features in the landscape, including vegetation edges, gullies, waterways, and road corridors as they transit between roosts and foraging sites. Long-tailed bats in particular are known to be highly mobile, with large home ranges (>5,000 ha) and can travel large distances (~25 km) each night during foraging. Short-tailed bats require specific habitat consisting of good-quality forest vegetation, so are highly unlikely to be present on the Site.

No formal survey for long tailed bats was completed as part of the investigations for this report. A review of data in the DoC's bat database (accessed May 2024) as well as a recent (2022-2023) bat survey undertaken in the area (Cullen 2023), found that of 93 bat surveys undertaken within 10 km of the Site, a total of 16 bats were recorded, with the closest being approximately 2.5 km to the south (Figure 15). The records are generally associated with remaining fragments of native forest, and all recorded within the last 15 years.

Potential bat habitat within the Site was limited to the more mature vegetation within the Site, namely the native SEA vegetation, the western most consent notice area, the pine plantation and the larger isolated exotic trees (Figure 10). The permanent stream corridors and the larger wetlands within the

Site could also provide foraging and / or commuting habitat for bats. However, the low detection rate from previous surveys indicates that the area is not a high bat activity area.

It is therefore considered possible that long tailed bats may periodically be present within the Site, however the habitat is not expected to support regular visits or large communal roosts. As such, the ecological value of the Site for bats is considered to be moderate, as a small amount of vegetation may provide suitable habitat, and their presence cannot be ruled out.

Figure 15. Bat records within the wider environment.

5 FRESHWATER ECOLOGY

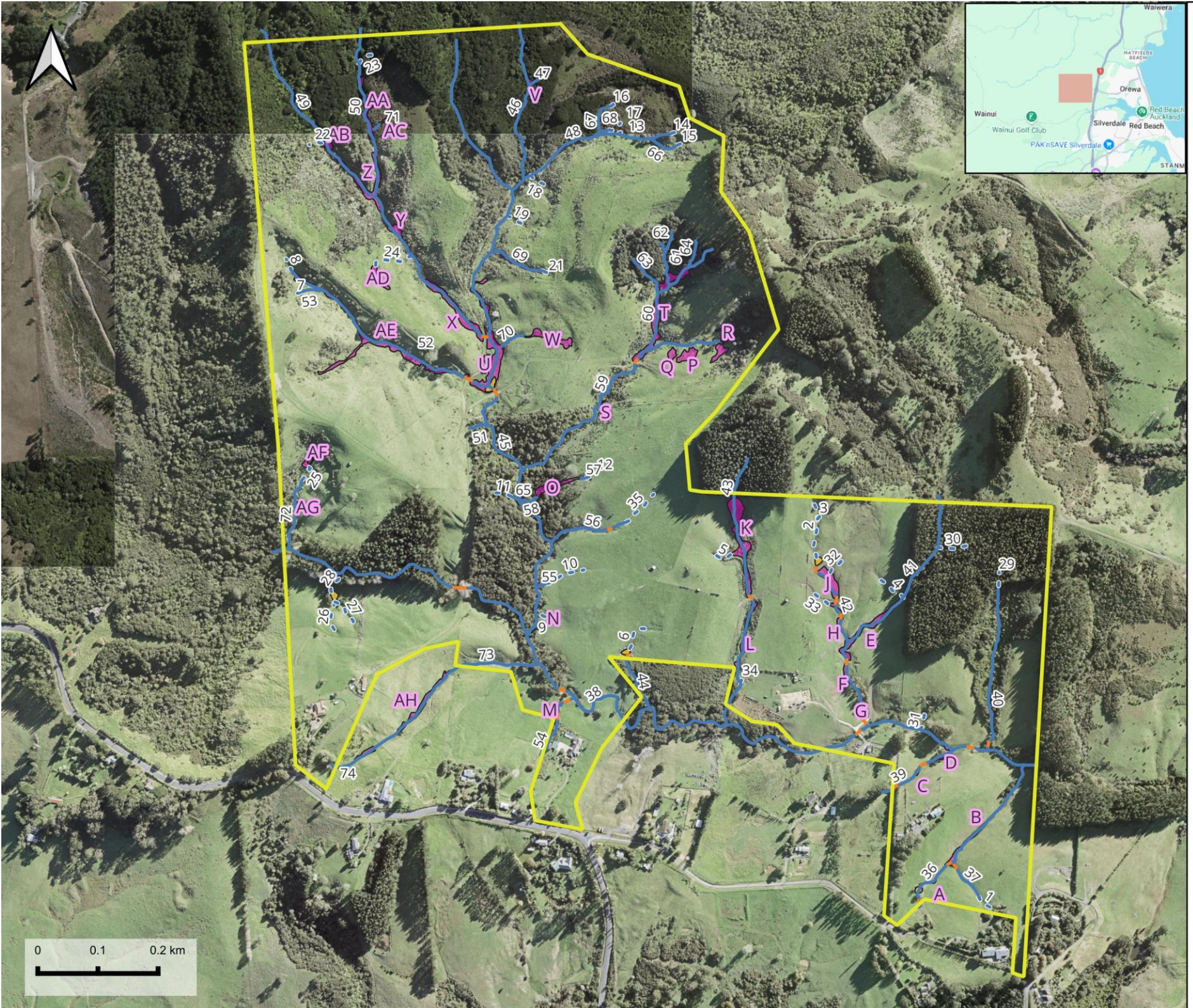
5.1 Streams

All watercourses within the Site were classified and mapped according to the definitions within the AUP-OP as either permanent, intermittent, ephemeral, or artificial drains. Each modelled overland flow path (OLFP) shown in Auckland Council's Geomaps was investigated, and its status assessed.

The watercourse classification types are described in this section. A map with labelled watercourses and a table showing the criteria met for each watercourse are provided in Figure 16 and Appendix A respectively.

5.1.1 Modelled overland flow paths / ephemeral reaches

Many of the OLFPs investigated had no discernible channel and did not meet at least four of the six intermittent stream criteria (Appendix A). Therefore, they did not meet the definition of intermittent or permanent stream. Due to the lack of aquatic habitat, the ecological values of the OLFPs were considered negligible. Photos of some of the larger modelled OLFPs are provided in Figures 17 to 20.



VIRIDIS
Environmental Consultants

Figure 16

Freshwater Features

Delmore Project

Legend

- Site
- Intermittent and permanent streams

OFLPs / ephemeral reaches

- OFLPs / ephemeral reaches
- Crossing / culverts
- Natural wetlands
- Constructed ponds

SOURCES

LINZ 2017

DISCLAIMER:
This map/plan is not an engineering draft. This map/plan is illustrative only and all information should be independently verified on site before taking any action.

SCALE **1:8,000** **@ A4**

PROJECT NO.	10122
DRAWN BY:	MD
DATE:	10 December 2024

a)

b)

Figure 17. a) OLFP 1 and b) OLFP 2.

a)

b)

Figure 18. a) OLFP 4 and b) OLFP 32.

a)

b)

Figure 19. a) OLFP 6 and b) OLFP 10.

a)

b)

Figure 20. a) OLFP 35 and b) OLFP 27.

5.1.2 Intermittent and permanent streams

Thirty-nine intermittent and permanent streams were identified within the Site. A permanent stream (stream 38) runs from west to east along the southern section of the Site to which all the other streams within the Site drain to. This stream is a tributary of the Ōrewa River and drains directly to the Ōrewa River estuary. From the downstream extent within the Site, this stream has a contributing catchment of approximately 330 ha. Streams 41 and 45 are two other main permanent streams, which run north to south within the Site. These streams have approximate contributing catchments of 262 and 72 ha, respectively. Other permanent streams include streams 36, 43, 48, 49, 52, 59 and 73, which have contributing catchments ranging from approximately 6 to 13 ha. All other streams identified are considered likely to be intermittent in nature.

All streams were soft bottomed, often with a high loading of fine sediment. Where stock had access, which was for the majority of the streams, pugging and stream bank erosion was evident. Wetland margins were common along stream edges.

Riparian vegetation, and therefore shading levels, varied considerably between streams, ranging from very high shading from native canopy cover to no effective shading where streams were unfenced and located within managed pasture.

Farm crossings and culverts were present throughout the Site (Figure 16). Some of these culverts were perched and formed partial or complete fish passage barriers.

The current ecological values of the streams ranged from low to high (Appendix A). The range in value was predominately dependent on the amount of effective riparian vegetation present along the stream banks, whether stock had access to the stream, and the abundance of instream habitat.

Photos of some of the intermittent and permanent streams are provided in Figures 21 to 23 below.

a)

b)

Figure 21. Streams a) 31 and b) 36.

a)

b)

Figure 22. Streams a) 41 and b) 43.

a)

b)

Figure 23. Streams a) 49 and b) 72.

5.2 Natural Inland Wetlands

Thirty-four natural inland wetlands were identified within the Site. Both palustrine and riverine wetland hydrosystems were present, creating both marsh and seepage wetlands. Wetlands ranged in size from 16 m^2 (wetland M) to 2,533 m^2 (wetland AE).

All identified natural wetlands were clearly dominated by FACW and OBL species, namely Mercer grass (*Paspalum distichum*, FACW), *Isolepis prolifera* (OBL), *I. reticularis* (FACW), soft rush (*Juncus effusus*, FACW), jointed rush (*J. articulates*, FACW), Māori sedge (*Carex maorica*, OBL), broom rush (*J. sarophorus*, FACW), umbrella sedge (*Cyperus eragrostis*, FACW) and grass-leaved rush (*J. planifolius*, FACW). As such, all of these areas were classified as natural inland wetlands based on the rapid test and in accordance with the wetland delineation protocols (MfE 2022). All wetland extents were clearly and easily defined as a result of a clear transition between FACW and OBL species to FACU and UPL species such as kikuyu (*Cenchrus clandestinus*, FACU), rye grass (*Lolium perenne*, FACU), cocksfoot (*Dactylis glomerata*, FACU), sweet vernal (*Anthoxanthum odoratum*, FACU), paspalum (*Paspalum dilatatum*, FACU), gorse (FACU) and woolly nightshade[3]. Clear changes in topography and hydrology also aided in the delineation of wetland extents.

Some wetlands such as wetland C, AF and AG, appear to have been recently formed as a result of recent land slippages.

All wetlands have been degraded through historical and current agricultural practices. With the exception of the wetlands located within the SEA or consent notice areas, stock had access to the majority of wetlands and damage, such as grazing, pugging and erosion, was evident. All wetlands had a high abundance of exotic species such as Mercer grass, *I. prolifera*, soft rush, jointed rush and umbrella sedge.

As a threatened ecosystem, wetlands have inherent ecological value. However, notwithstanding the above, the current ecological values of the wetlands (and associated habitat) were assessed as ranging from low to high (Appendix B).

Photos of some of the wetlands identified within the Site are provided in Figures 24 to 26 below.

a) **b)**

Figure 24. Wetlands a) B and b) E & F.

[3] A wetland rating has not been assigned to woolly nightshade, but is a commonly accepted FACU or UPL species.

a)

b)

Figure 25. Wetlands a) H, I & J and b) N.

a)

b)

Figure 26. Wetlands a) T and b) X.

5.3 Uncertain areas

Four additional areas (Figure 27) were identified for further wetland assessments due to a higher presence of scattered or clumped soft rush and/or broom rush compared to the rest of the managed pasture within the Site (Figures 28 -29).

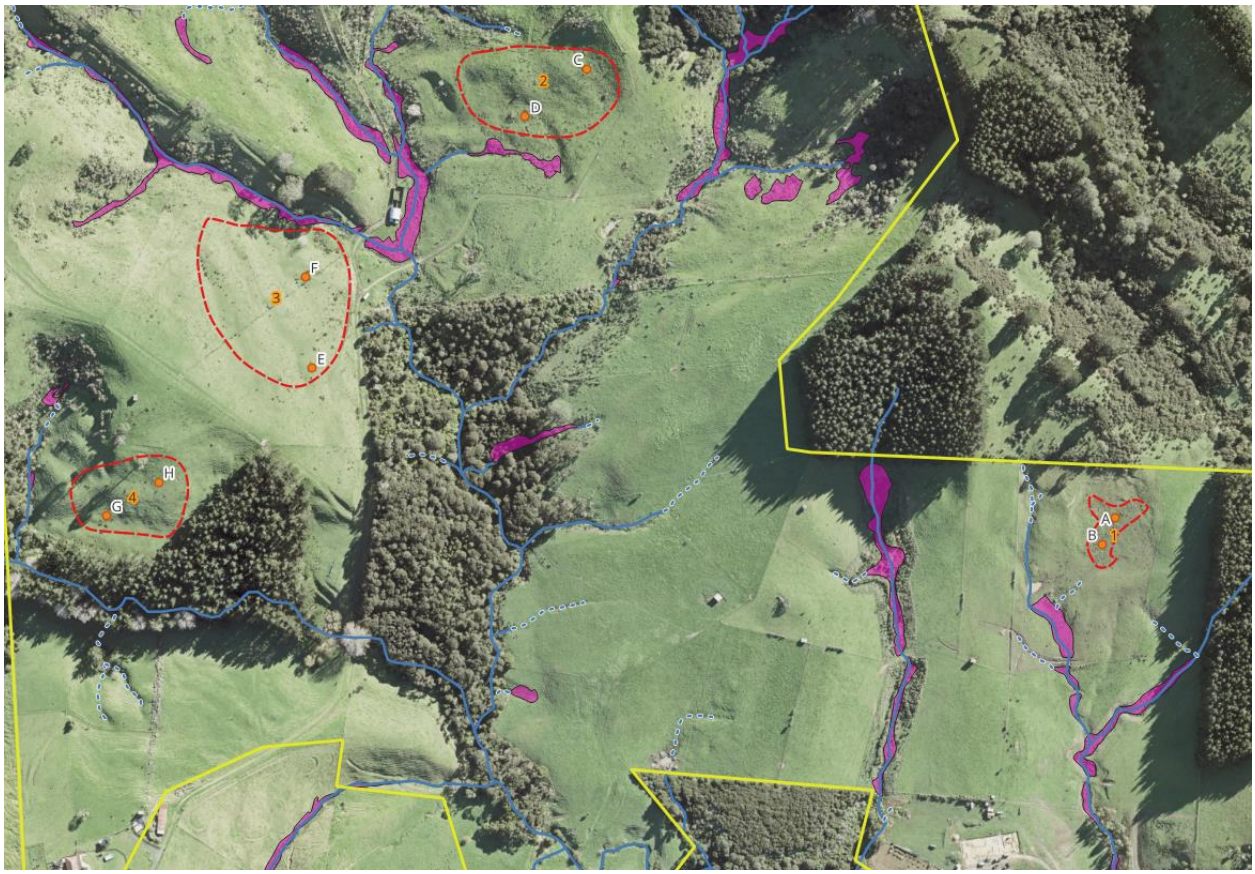


Figure 27. Location of uncertain areas within the Site.

a) **b)**

Figure 28. Uncertain areas a) 1 and b) 2.

a)

b)

Figure 29. Uncertain areas a) 3 and b) 4.

Within areas 1 and 2, two representative vegetation plots were established for each area (Figure 27) and were assessed in accordance with the wetland delineation protocols (MfE 2022, Clarkson 2014).

All four vegetation plots failed both the dominance test and the prevalence index test (Tables 3-6). As such, these areas are not considered to be a natural inland wetland as per the definitions within the NPS-FM.

Table 5. Vegetation Plot A Data

Binomial name	Common name	Rating	Biostatus	Cover (%)	Dominant
Lolium perenne	Perennial ryegrass	FACU	Exotic	40	Yes
Ranunculus repens	Creeping buttercup	FAC	Exotic	20	Yes
Juncus effusus	Soft rush	FACW	Exotic	10	
Lotus pedunculatus	Lotus	FAC	Exotic	10	
Paspalum dilatatum	Paspalum	FACU	Exotic	5	
Holcus lanatus	Yorkshire fog	FAC	Exotic	3	
Trifolium repens	White clover	FACU	Exotic	2	
% of dominant species that are FAC/FACW/OBL					**50%**
Prevalence value					**3.4**

Table 6. Vegetation Plot B Data

Binomial name	Common name	Rating	Biostatus	Cover (%)	Dominant
Lolium perenne	Perennial ryegrass	FACU	Exotic	40	Yes
Lotus pedunculatus	Lotus	FAC	Exotic	20	Yes
Juncus effusus	Soft rush	FACW	Exotic	10	
Ranunculus repens	Creeping buttercup	FAC	Exotic	10	
Paspalum dilatatum	Paspalum	FACU	Exotic	5	
Plantago lanceolata	Narrow-leaved plantain	FACU	Exotic	3	
Trifolium repens	White clover	FACU	Exotic	2	
Hypochaeris radicata	Catsear	FACU	Exotic		
% of dominant species that are FAC/FACW/OBL					**0%**
Prevalence value					**3.4**

Table 7. Vegetation Plot C Data

Binomial name	Common name	Rating	Biostatus	Cover (%)	Dominant
Cenchrus clandestinus	Kikuyu	FACU	Exotic	60	Yes
Juncus effusus	Soft rush	FACW	Exotic	20	
Lolium perenne	Perennial ryegrass	FACU	Exotic	10	
Holcus lanatus	Yorkshire fog	FAC	Exotic	5	
Lotus pedunculatus	Lotus	FAC	Exotic	3	
Paspalum dilatatum	Paspalum	FACU	Exotic	3	
Ranunculus repens	Creeping buttercup	FAC	Exotic	2	
Juncus sarophorus	Broom rush	FACW	Native	2	
Trifolium repens	White clover	FACU	Exotic	2	
% of dominant species that are FAC/FACW/OBL					**0%**
Prevalence value					**3.5**

Table 8. Vegetation Plot D Data

Binomial name	Common name	Rating	Biostatus	Cover (%)	Dominant
Cenchrus clandestinus	Kikuyu	FACU	Exotic	55	Yes
Juncus effusus	Soft rush	FACW	Exotic	25	Yes
Lolium perenne	Perennial ryegrass	FACU	Exotic	15	
Ranunculus repens	Creeping buttercup	FAC	Exotic	5	
Trifolium repens	White clover	FAC	Exotic	3	
Lotus pedunculatus	Lotus	FACU	Exotic	2	
% of dominant species that are FAC/FACW/OBL					**50%**
Prevalence value					**3.5**

Within areas 3 and 4, clumps of soft rush and broom rush were scattered throughout the managed pasture. These clumps ranged in size from approximately 1 m^2 to 3 m^2. Outside of the clumps, the vegetation was clearly dominated (i.e., > 80%) by FACU pasture grasses, such as ryegrass and kikuyu. Since the rushes have a wetland rating of FACW, these clumps would pass both the vegetation dominance test and the prevalence index test. However, due to the scattered nature of the rushes, the overall dominance of FACU pasture species outside of the clumps and the fact that these rush species are considered hardy and to be pasture weeds, it was considered that vegetation alone was not a good indicator for wetland presence. As such, wetland hydrology and hydric soil assessments were undertaken within two representative plots for each area (Figure 24) and were assessed in accordance with the wetland delineation protocols (MfE 2022, Fraser 2018, MfE 2021).

All four test pits had similar characteristics. No peaty material was present. There were no pale low or dark low chroma colours observed within the top 300 mm of the samples. The top approximately 200 mm had a soil colour of 10YR 4/3, and between approximately 200 – 400 mm the soil colour was 10Y/R 6/6. No mottling was observed. Therefore, soils were not considered to be hydric (i.e., soils did not indicate wetland presence).

For wetland hydrology to be considered present one primary indicator or two secondary indicators need to be present. No saturated soils were evident when soil samples were undertaken, and no water was present within the holes. No primary hydrological indicators were observed. The only secondary

hydrological indicator evident was the facultative neutral test. As such, wetland hydrology was not considered present.

Since these areas did not contain hydric soils or wetland hydrology, these areas are not considered to be natural inland wetlands.

a) b)

Figure 30. a) Wetland assessment plot E and b) soil profile.

a) b)

Figure 31. a) Wetland assessment plot F and b) soil profile.

a) b)

Figure 32. a) Wetland assessment plot G and b) soil profile.

a) b)

Figure 33. a) Wetland assessment plot H and b) soil profile.

5.4 Constructed ponds

Five constructed ponds were identified within the Site. All five ponds have been deliberately constructed for agricultural purposes. The four most southern ponds were formed in the upper ephemeral reaches of watercourses. As such they are not considered natural inland wetlands as per the NPS-FM. The northern most pond has been constructed within a permanent stream and natural wetland complex. As such, this pond is considered a natural modification of a natural stream/wetland complex.

a) b)

Figure 34. a) Southeastern pond and b) northeastern pond.

a) b)

Figure 35. a) Southern middle pond and b) northern most pond.

a) b)

Figure 36. Western most pond.

5.5 Macroinvertebrates

The results of the macroinvertebrate survey from within the mainstream tributary (stream 38) are presented in Table 9. Raw macroinvertebrate results are included in Appendix C.

All three sites had macroinvertebrate communities that largely composed of taxa insensitive to inorganic pollution and nutrient enrichment. All sites had MCI-sb and QMCI-sb scores within the NPS-FM (2020) attribute band D, below the NBL. This indicates that the mainstream tributary (stream 38) is in degraded state. The other streams within the site are expected to have similar low MCI-sb and QMCI-sb scores, except within the forested headwaters, such as streams 40, and they upper reaches of 45, 46, 49 and 50. These forested headwaters are expected to have higher MCI-sb and QMCI-sb scores due to the lack of upstream agricultural inputs and higher degree of shading.

Table 9. Macroinvertebrate results.

	Sampling Site		
Parameter	**Up-North**	**DS1**	**DS2**
Abundance	3035	139	763
Taxa richness	18	17	22
EPT taxa richness	3	2	4
% EPT	17	18	12
MCI-sb	88	82	84
QMCI-sb	4.1	4.3	4.2
NPS-FM (2020) Attribute band	D	D	D

5.6 Freshwater Fish

A review of the NZFFD, showed that no previous fish surveys have been undertaken within the entire catchment of stream 38, a main tributary of the Ōrewa River. However, in a similar catchment to the north (a main tributary of the Ōrewa River), shortfin eel (*Anguilla australis*), banded kōkopu (*Galaxias fasciatus*), longfin eel (*Anguilla dieffenbachii*), redfin bully (*Gobiomorphus huttoni*) and kōura (*Paranephrops planifrons*) were identified.

The number and species of fish caught in the overnight trapping survey at each monitoring site are presented in Table 10. Freshwater shrimp (*Paratya* sp.) were also abundant throughout.

All three sites had a F-IBI score within the NPS-FM (2020) attribute band A. This indicates that the mainstream tributary (stream 38) has a high fish community integrity community. The other permanent streams within the site are expected to have similar F-IBI scores, however the intermittent streams with the site are not expected to have as high F-IBI scores due to the general lower abundance and quality of aquatic habitat within these streams and periods of time when the streams are dry, presenting no fish habitat.

Table 10. Fish species and abundance caught at Orewa River tributary monitoring sites.

Fish	Latin name	Threat status	UP	DS-1	DS-2
Longfin eel	*Anguilla dieffenbachii*	At Risk - Declining	1	2	1
Common bully	*Gobiomorphus cotidianus*	Not threatened	4	45	12
Redfin bully	*Gobiomorphus huttoni*	Not threatened	14	29	35
unID juvenile bully	*Gobiomorphus* sp.	NA	-	-	11
Banded kokopu	*Galaxias fasciatus*	Not threatened	2	82	12
Species richness			**4**	**4**	**4**
Total abundance			**56**	**311**	**105**
Fish IBI			**38**	**38**	**42**
NPS-FM (2020) attribute band			**A**	**A**	**A**

6 ASSESSMENT OF ECOLOGICAL EFFECTS

6.1 Impact on Terrestrial Ecology

6.1.1 Vegetation removal

Riparian and wetland buffer vegetation

Excluding pasture, Table 11 and Figure 37 present the vegetation areas proposed for removal within the 20 m riparian and wetland buffer zones. Vegetation removal areas were based on the earthworks clearing drawing series 3725-1-2200-E by McKenzie & Co. (dated February 2025).

Table 11. 20 m riparian and wetland buffer vegetation areas (ha).

		Vegetation Type				
Stage	**Attribute**	**Gorse scrub**	**Exotic dominant**	**Native dominant**	**Pine plantation**	**Total**
1	Existing	0	0.25	2.47	0.66	3.38
	Removed for earthworks	0	0.06	0.15	0.66	0.88
	Removed for revegetation	0	0.19	0	0	0.18
	Total removed	0	0.25	0.15	0.66	1.06
2	Existing	7.34	0.16	9.25	1.12	17.87
	Removed for earthworks	0.96	0.07	0.23	0.28	1.53
	Removed for revegetation	6.38	0.9	0.0	0.84	7.32
	Total Removed	7.34	0.16	0.23	1.12	8.85
Combined	**Total Existing**	**7.34**	**0.41**	**11.72**	**1.78**	**21.25**
	Total Removed for earthworks	**0.96**	**0.13**	**0.38**	**0.94**	**2.41**
	Total Removed revegetation	**6.38**	**0.28**	**0**	**0.84**	**7.5**
	Total Removed	**7.34**	**0.41**	**0.38**	**1.78**	**9.91**

The key points from this table are:

- Currently there is 21.25 ha of existing vegetation within the site. Of this area 9.91 ha is proposed to be removed.
- Of the 9.91 ha vegetation removal:
  - 7.34 ha is gorse scrub. Under the AUP-OP the removal of gorse and other pest plant species is a permitted activity.
  - Only 0.38 is native dominant vegetation, which equates to 2% of the total existing vegetation and 4% of the total removal.
  - 7.5 ha of vegetation removal is specifically for revegetation purposes (i.e. the removal of exotic species to plant natives).

It should also be noted that while 7.5 ha of vegetation removal is specifically for revegetation purposes, much of the removal required for earthworks is proposed to be revegetated as well (and addressed through additional revegetation as later discussed). Approximately only 0.69 ha of the total 20 m riparian and wetland buffer vegetation removal will be permanently removed. This equates a total of 3% permanent vegetation removal within the 20 m riparian and wetland buffer zones. This permanent vegetation removal is largely associated with the proposed road crossings. The remainder of the 20 m riparian and wetland buffer vegetation removal will be revegetated with appropriate native species (drawing series 2180 prepared by Greenwood Associates dated February 2025).

As such, the magnitude of effects are considered low and the overall effects of the 20 m riparian and wetland buffer vegetation removal very low - low. Despite the very low -low effect, in addition to the replacement planting there will be another approximately 6.2 ha of riparian and wetland buffer planting included in the development where currently there is only pasture. Overall, it is considered that there will be a net gain in riparian and wetland planting.

SEA vegetation

The only vegetation proposed for removal with the SEA is the removal of pest plant species (e.g., gorse), which is a permitted activity under the AUP-OP.

The proposed revegetation planting will provide a high degree of ecological connectivity and buffering from edge effects, providing for a net gain in SEA value and ecological functioning.

Consent notice vegetation

Four areas (1-4, Figures 37 & 38) of vegetation removal are proposed within consent notice areas. Areas 1 and 2 are located within Stage 1, while areas 3 and 4 are located within Stage 2.

Area 1 comprises of young, common, planted natives. Mānuka, kānuka and tōtara are the predominant species, with a mixture of understorey species such as māhoe and putaputawētā (Figure 38a). Approximately 200 m^2 of vegetation removal is required to accommodate a new road crossing at this location. This road crossing has been kept to a minimum width to minimise the impact on the vegetation.

Area 2 comprises of young, common, planted natives. Mānuka, cabbage tree and karamū are the predominant species, with a mixture of native wetland species such as *Carex* spp. And *Juncus* spp. (Figure 38b). Approximately 1,300 m^2 of vegetation removal is required to accommodate a new road crossing at this location. This road crossing is associated with the construction of Auckland Transport's (AT) Notices of Requirement (NoRs) 6 that comprise the North Project.

Area 3 comprises of a predominant exotic canopy cover, comprising of poplar (*Populus sp*.) and willow, with a mixture of exotic and native understorey species such as cabbage tree, ponga (*Cyathea dealbata*), mānuka, and agapanthus (*Agapanthus praecox*) (Figure 38c). Approximately 280 m^2 of vegetation removal is required to accommodate a new road crossing at this location. This road crossing has utilised the location of an existing crossing and has been kept to a minimum width practical to minimise the impact on the vegetation.

Area 4 comprises of regenerating indigenous bush area. Tōtara, mānuka, kānuka, ponga and tānekaha are the predominant species (Figure 38d). Approximately 110 m^2 of vegetation removal is required to enable the construction of a piped bridge for utilities. The narrowest section of the area was selected for the crossing to minimise the amount vegetation removal.

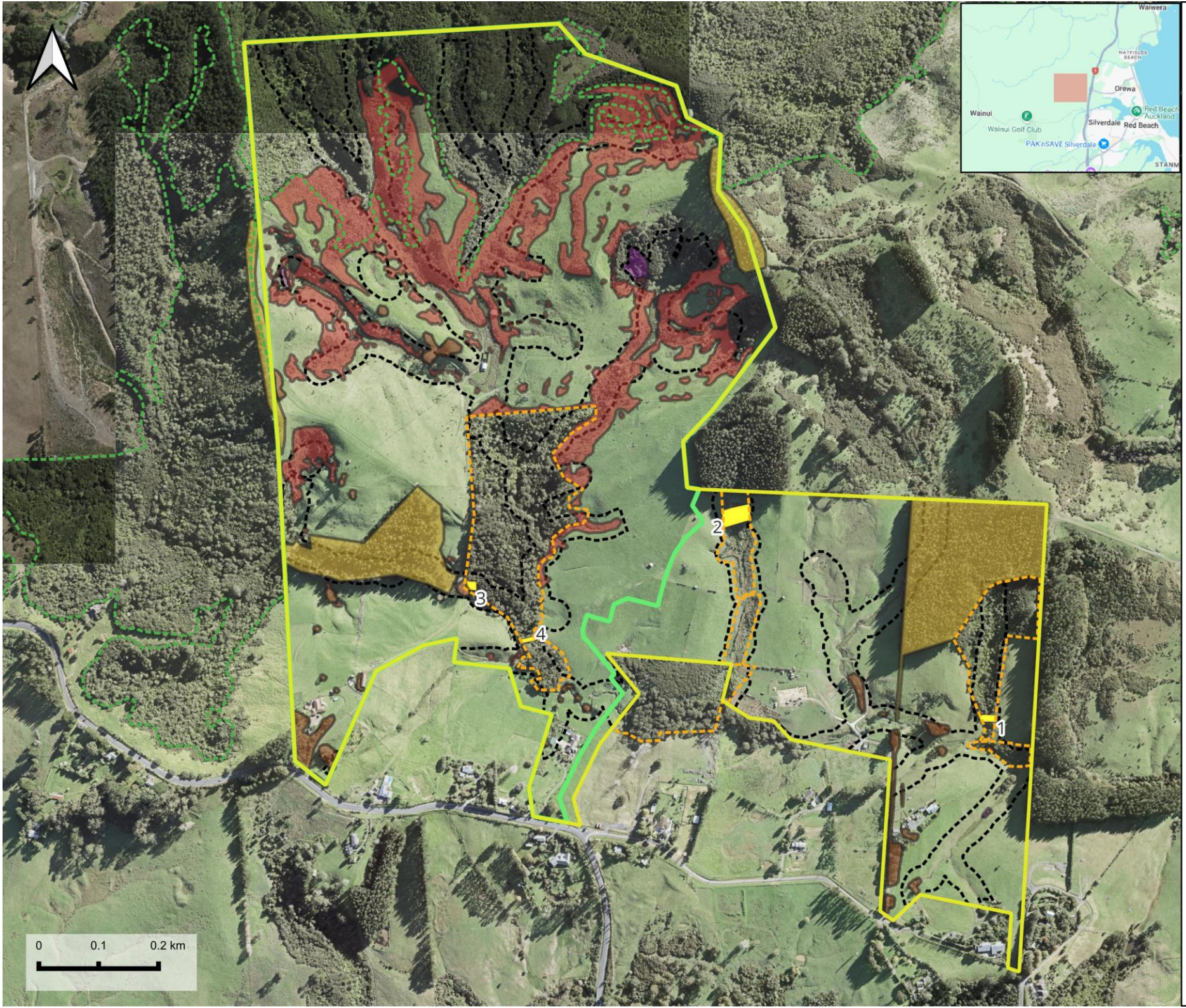


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Figure 37

Vegetation Removal

Delmore Project

Legend

- Site
- Stage 1 & 2 boundary
- Covenants
- SEA_T_6652
- 20m riparian & wetland buffer

Areas proposed for removal

- Pine plantation
- Native dominant vegetation
- Exotic dominant vegetation
- Gorse scrub
- Native covenant removal

SOURCES

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a)

b)

c)

d)

Figure 38. Approximate locations of the required vegetation removal in consent notice areas a) 1 (photo provided by Peers Brown Miller Ltd), b) 2 (photo provided by Peers Brown Miller Ltd) c) 3 and d) 4.

While the above is considered an accurate reflection of the amount of vegetation removal required within the consent notice areas, a conservative approach has been taken and it is assumed that up to 2,345 m^2 and 683 m^2 of earthworks will be undertaken within Stages 1 and 2, respectively, as shown on drawing number A003 by Terra Studio. This represents 7% and 1% of the total consent notice areas within Stages 1 and 2, respectively (4% average).

To offset for the loss of this vegetation it is proposed that the following measures are undertaken:

Stage 1:

- Create 2,471 m^2 of new consent notice areas directly adjacent to the existing consent notice areas and plant with appropriate native species. This is essentially a 1:1 ratio, replacing relatively young planted native species with new plantings. Planting adjacent to the existing areas will help retain the integrity of the existing areas and reduce edge effects. 'Like for like' status will be achieved relatively quickly.

- Plant out approximately 1,550 m^2 of an existing consent notice area, that has been in pasture since the creation of the consent notice and is not required to be planted out, with appropriate native species, creating ecological connectivity and buffering existing consent notice areas.
- Create an additional offset planting area of approximately 3,300 m^2 and protect by way of consent notice. This planting will provide an ecological connection from the Site (through the proposed riparian planting) to the adjacent SEA to the south.

Stage 2:

- Create 3,877 m^2 of new consent notice areas directly adjacent to the existing consent notice areas and plant with appropriate native species. Planting adjacent to the existing areas will help retain the integrity of the existing areas and reduce edge effects.

Overall, the proposed offset measure will provide for offset ratios of 3.1:1 and 5.6:1 (average of 4.4:1) for Stages 1 and 2, respectively. We consider the above appropriately offset the loss of the consent notice areas, taking into account the time delay for the proposed planting to establish. This offset will result in a low magnitude of effect and an overall low level of effect. Figure 39 presents the locations of the Consent Notice areas proposed for removal and for offsetting.

Revegetation planting should be in accordance with the landscape drawing series 2180 prepared by Greenwood Associates (dated February 2025). It is also recommended that, as a condition of consent, a planting maintenance plan is prepared to ensure that the plant establishment is successful, and that maintenance is undertaken in perpetuity.

The existing consent notices for these areas of removal require that the health, ecological value, long term viability and sustainability of these area is not prejudiced. While there will be a loss of native vegetation in the short term, it is in our opinion that, provided the offset measures and recommendations are undertaken, there will be no loss of health or ecological values in the long term within the consent notice areas and that their long-term viability and sustainability will not be compromised. In fact, we consider that there will be a net gain in ecological value.

Native dominant vegetation

Outside of SEA, consent notice areas, and 20 m riparian and wetland margins, an additional 0.41 ha of native domain vegetation is proposed to be removed (Figure 37). This equates to 5% of the remaining native domain vegetation outside of the consent notice areas and 20 m riparian and wetland margins.

The magnitude of effect is considered low and the overall effect is considered very low – low. Furthermore, the proposed revegetation and amenity planting within the Site is anticipated to greatly enhance the native vegetation values across the Site by creating a greater abundance and diversity of native vegetation as well as more sustainable ecosystems.

Other vegetation

All gorse scrub, pine plantation and exotic dominant vegetation is proposed for removal. Where this is occurring within the 10 m riparian and wetland margins, this will be for the preparation of native restoration panting. The removal of the remainder of this vegetation is a permitted activity under the AUP-OP and the overall level of effect of this vegetation removal is considered low. Furthermore, the proposed revegetation and amenity planting within the Site is anticipated to greatly enhance the native vegetation values across the Site by creating a greater abundance and diversity of native vegetation as well as more sustainable ecosystems.

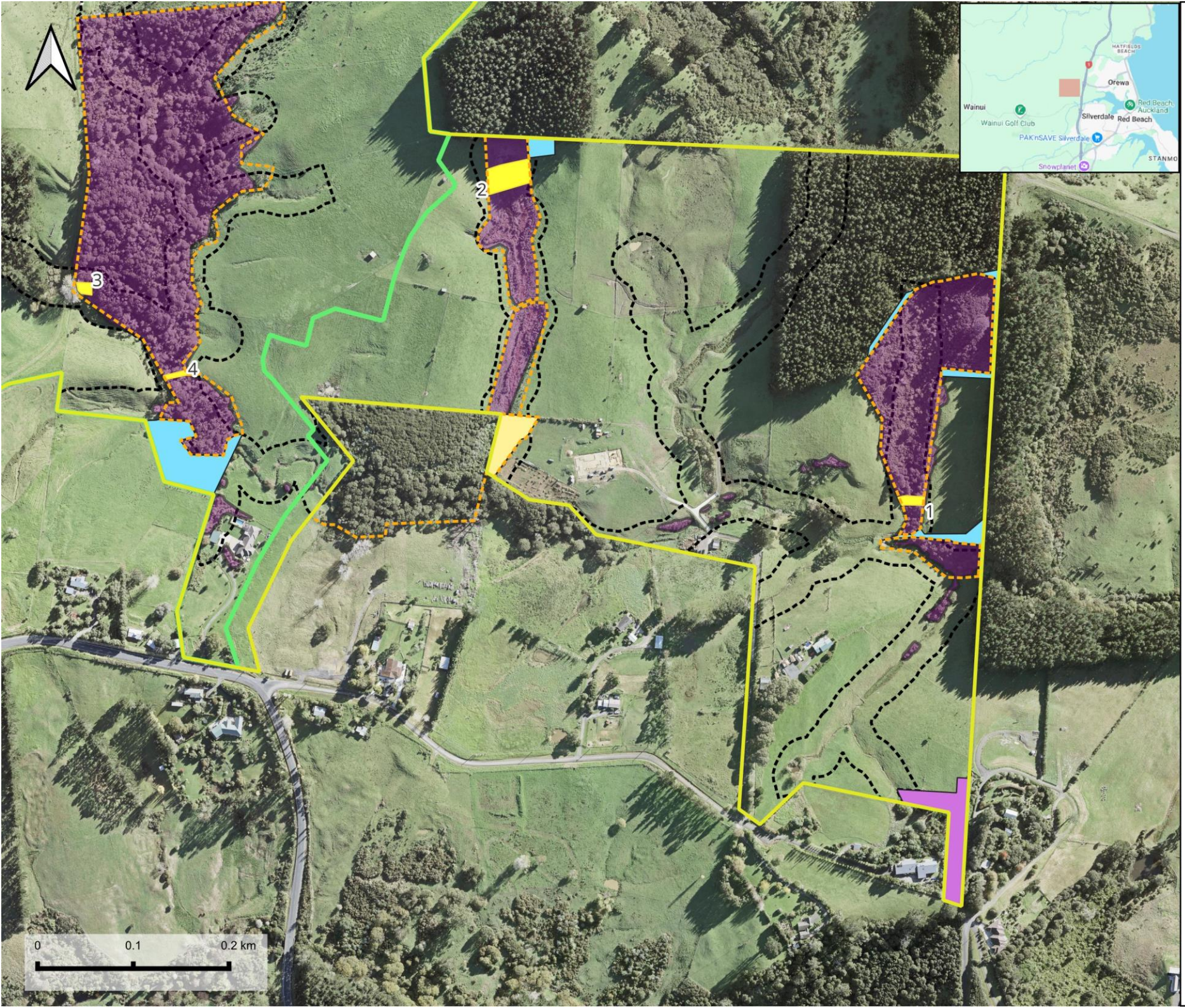

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Figure 39

Consent Notice Area Offset

Delmore Project

Legend

- Site
- Stage 1 & 2 boundary
- Covenants
- SEA
- 20m riparian & wetland buffer
- Native dominant vegetation
- Affected Consent Notice area

Areas proposed for offsettin

- New covenant notice area
- Existing covenant notice area
- Additional offset area

SOURCES

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Summary

A total of 2.25 ha of native and exotic dominant vegetation is proposed to be removed, including where these vegetation types are within riparian and wetland margins and consent notice areas. This area does not include the removal of gorse scrub or pine planation, which is considered a permitted activity and positive outcome in itself.

The overall revegetation planting proposed (drawing series 2180 prepared by Greenwood Associates dated February 2025) will comprise a total area of 32.8 ha (see Section 6.5). All revegetation planting is proposed to be protected under consent notices. This planting will greatly increase the ecological value of the Site through improving plant species diversity and abundance, habitat diversity and abundance, freshwater quality and habitat, connectivity (within the Site and to the wider environment) and ecological resilience.

Overall, the development will make a significant contribution to addressing the critical environmental challenge of national biodiversity loss and degradation.

6.1.2 Avifauna (birds)

The ecological value of the larger patches of native vegetation and wetlands for avifauna was considered to be high, with the rest of the vegetation within the Site considered to be low.

The magnitude of effect of the proposed works on birds is considered to be temporary and low, mitigated to very low.

Birds are highly mobile, unless they are nesting, or have eggs or chicks in the nest. They can move over relatively large distances, depending on the species, to find suitable habitat as required.

Clearance of trees during the bird breeding season has the potential to result in direct mortality of birds, eggs and chicks. It is recommended, as a condition of consent, that any vegetation removal (other than pasture and gorse scrub) or works within wetlands, occurs outside of the bird nesting season (September to February, inclusive). If vegetation clearance is unavoidable during the main indigenous bird nesting season, an experienced ecologist or ornithologist should visually inspect all trees and shrubs proposed for removal before, and no more than 24 hours prior to, felling or removal, to identify any active nests of indigenous birds. This includes checking cavities and hollows for nesting birds (e.g. morepork, kingfisher). Should any nesting of indigenous birds be observed, a 10 m buffer of vegetation should be required to remain around the nest site until an experienced ecologist or ornithologist has confirmed that the nest has failed or the chicks have hatched and naturally left the nest site. The native bird management recommendations can form part of a broader fauna management plan.

Provided that the above recommendations are adhered to, then it is expected the no indigenous birds will be handled or harmed and as such a Wildlife Act Authority (WAA) is not considered required for this activity.

As per the approved consent conditions for AT's North Project, works associated with the NoR 6 within the Site will require additional bird surveys within 'Identified Biodiversity Areas'. Fauna management plans may also be required if 'species of value' are recorded. The construction of the NoR 6 is discussed in further detail in Section 6.3 of this report.

The loss of, and disturbance to, habitat within the Site is not expected to permanently displace the bird community. There is significant unaffected similar habitat, as well as higher quality habitat, in the

immediate surrounds and wider landscape. It is expected any birds present within the site will move away from the disturbed habitat while works are occurring and will recolonise the Site once works have been completed.

The proposed revegetation and amenity planting within the Site is anticipated to greatly enhance its value for native birds by providing increased habitat connectivity and resources such as food, nesting opportunities, and shelter as the vegetation becomes established.

6.1.3 Herpetofauna (lizards)

The ecological value of the larger patches of native vegetation for herpetofauna was considered to be high, and the ecological value of the rest of the vegetation, outside of the managed pasture within the Site was considered to be moderate. The managed pasture was considered to be of negligible value for herpetofauna.

The magnitude of effect on lizards is considered to be moderate and temporary, mitigated to low.

Works within the Site have the potential to result in direct mortality and/or injury of any lizards present, through activities such as earthworks, vegetation removal and the movement of machinery. As lizards are not considered to be highly mobile, they have limited ability to move quickly to safety. Indirect effects on lizards include the loss of habitat as a result of vegetation clearance and associated construction activities. However, the proposed revegetation within the Site is anticipated to enhance its value for lizards by providing increased habitat connectivity and resources such as food, and shelter as the vegetation becomes established.

As works in their habitat cannot be avoided during construction, it is recommended, as a condition of consent, that a lizard management plan (LMP) (which could form part of a broader fauna management plan) is prepared outlining how lizards will be managed during works. The LMP should include measures to capture native lizards from any suitable habitat within the Site, locations where they will be released and the details of the organisation who will undertake the work. The organisation who will undertake the work should have a current Auckland wide lizard salvage WAA. Additional information such as habitat enhancement at the release site and any ongoing monitoring should be provided as necessary. Provided that the above recommendations are adhered to, then it is expected the no indigenous lizards will be harmed and a specific project WAA is not considered required.

6.1.4 Chiroptera (bats)

It was considered possible that long tailed bats may periodically be present within the Site. As such, the ecological value of the Site for bats was considered to be moderate, as a small amount of vegetation may provide suitable habitat, and their presence cannot be ruled out.

The magnitude of effects on bats is considered to be moderate, mitigated to low.

Tree felling when bats are utilising them for roosts or refugia has the potential to result in mortality and/or injury to any bats present. As per the consent conditions in AT's decisions on the AT NoR 6, works associated with the AT NoR 6 within the Site will require additional bat surveys within 'Identified Biodiversity Areas'. If bats are recorded during a survey, an ecological management plan will be required to minimise any potential effects. The construction of the NoR 6 is discussed in further detail in Section 6.3 of this report.

Outside of the 'Identified Biodiversity Areas' associated with the NoR 6, it is recommended, as a condition of consent, that pre-clearance monitoring of potential roost trees as per DOC's Bat Roost

Protocols (DOC 2024) is undertaken. This could be required through the preparation of a bat management plan, or a resource consent condition requiring application of the DOC standards to be undertaken by a competent bat worker. In summary, the DOC protocols state; prior to felling, a suitably qualified and experienced ecologist should assess any tree greater than 15 cm diameter at breast height for potential bat roost habitat, and if there is potential roost habitat then further assessment (e.g., using ABMs) can be undertaken following the protocols to ensure that there are no bats roosting in the tree. Provided that the above recommendations are adhered to, then it is expected the no bats will be handled or harmed and as such a WAA is not considered required for this activity. The bat management plan can form part of a broader fauna management plan.

Clearance of trees is not expected to result in any significant habitat loss or population displacement of a potential bat population. The wider area is not known to be a high use area for bats, which has been reflected in previous ABM survey data. The potential habitat proposed for removal is of low quality with poor connectivity and is heavily influenced by human activities. There is unaffected habitat in the immediate vicinity, and significant higher quality habitat in the wider area which will be unimpacted by the proposed works.

6.2 Impact on Freshwater Ecology

6.2.1 Streams

Culverts/crossings

Aside from culverts, no other streamworks are proposed. The magnitude of effect on the streams as a result of the removal of existing farm culverts, and installation of new culverts is considered to be moderate, mitigated to low through appropriate design and the implementation of fish management.

A total of 24 existing farm culverts across the Site will be removed. Many of these restrict hydrological connectivity and inhibit fish passage. Their removal is expected to improve stream hydrology and reduce localised flow disruptions.

A total of 13 new culverts are proposed (Figure 40). With the exception of culverts 7, 9 and 10, all culverts are less than 30 m in length, 1.3 x the stream width and embedded by 25% (drawing series 3725-0-4800 prepared by McKenzie and Co.). These characteristics help maintain continuity of stream habitat and a natural stream bed and provide for appropriate fish passage.

While culverts 7, 9 and 10 are less than 30 m in length and embedded by 25%, they have not been designed to be 1.3 x the stream width, as these culverts are located in wide flat areas which are impractical to span by a culvert. These culverts are located relatively high up in the catchment, and it is expected that the fish community is presented by strong climbing species such as eels (*Anguilla* spp.) and banded kōkopu. Fish passage will only be impacted during periods of high flow when flow velocities through the culverts increase, decreasing the suitability of the structure in providing fish passage. However, under normal or low flow conditions, due to the culverts short lengths, the embeddedness and the expected upstream fish community, it is considered that these culverts will provide adequate fish passage. During construction of culverts, fish passage can be maintained through clean water diversion channels.

Due to the removal of the existing farm culverts and the design of the new culverts, it is expected the fish passage within the Site's catchment will be improved.

6.2.2 Wetlands

Under the NES-F, the following regulations have been considered for proposed works within the Site:

- Vegetation clearance within, or within a 10 m setback from a natural inland
- Earthworks or land disturbance outside a 10 m, but within a 100 m, setback from a natural inland wetland if it results in, or is likely to result in, the complete or partial drainage of all or part of the wetland
- Earthworks or land disturbance within, or within a 10 m setback from a natural inland
- The diversion of water within, or within a 100 m setback from, a natural inland wetland if (there is a hydrological connection between the taking, use, damming, or diversion and the wetland; and if the taking, use, damming, or diversion will change, or is likely to change, the water level range or hydrological function of the wetland
- The discharge of water into water within, or within a 100 m setback from, a natural inland wetland if there is a hydrological connection between the discharge and the wetland; and if the discharge will enter the wetland; and if the discharge will change, or is likely to change, the water level range or hydrological function of the wetland

Thirty four natural inland wetlands, as per the NPS-FM definitions, were identified within 100 m of the proposed activities.

Vegetation clearance

Vegetation clearance within 20 m of wetlands has been addressed in Section 6.1.1 of this report.

Earthworks, diversion of water and discharge of water to water within 100 m of a wetland

Earthworks will occur within 100 m of all identified wetlands. While earthworks will occur within the wetland catchments, earthworks are not expected to alter the size of the catchment significantly. Additionally, the wetlands within the Site are associated with the stream network, the stormwater approach for the Site mimics, as far as practicable, the existing catchments (McKenzie & Co., 2025a). Where lots are directly adjacent to watercourses, treated stormwater will be discharged toward the watercourses through a T bar energy dissipation device, to maintain flows and minimise flows entering the public system where possible (McKenzie & Co., 2025a).

A relatively large-scale catchment revegetation plan is proposed (see Section 6.5 of this report). This catchment wide approach has increased benefits of small, isolated revegetation programs. The revegetation of the catchment will reduce sedimentation, erosion and flood risks as well as improve water flow regimes.

Based on the above, it is not expected that there will be complete or partial drainage of all or part of a wetland or that there will be a change to the water level range or hydrological function of the wetland.

Earthworks within 10 m of a wetland

Some earthworks will be required directly adjacent to wetlands. Earthworks are not expected to significantly alter the size of the wider catchment, rather it will smooth out the contours allowing for development and avoiding the need for retaining walls, but also for enhancement planting around the wetlands. Effect of sedimentation as a result of the earthworks will be appropriately mitigated through the erosion and sediment controls. Effects of sedimentation on freshwater features are discussed in more detail in Section 6.2.5 of this report.

Earthworks within a wetland

Earthworks within wetlands are required for the installation of 5 of the 13 proposed culverts (culverts 1, 5, 7, 9 and 10) (Figure 40). The culverts have been designed to be less than 30 m, wide and embedded (including rip rap) to allow for a natural bed to be reinstated within the culverts (drawing series 3725-0-4800 prepared by McKenzie and Co.). Modification to the natural wetlands where these are located will be temporary for all but culvert 7 which is associated with the NoR6 and culvert 9 to allo for the retention of the upstream induced wetland habitat. This means that the wetland soil will remain, and the area will remain part of the functioning wetland ecosystem, although devoid of vegetation. Due to the width of culvert 7, some permanent wetland removal will be required. The total area of permanent wetland removal will be 277 m², while the total area of temporary wetland removal associated with earthworks will be 809 m^2, giving a combined total area of 1,086 m^2 of wetland disturbance. Within Stage 1 748 m^2 of disturbance will occur (including the 277 m^2 of permanent reclamation), while in Stage 2 338 m^2 of disturbance will occur. The magnitude of effect prior to mitigation is considered moderate.

There is a total of 22,166 m^2 of identified wetland habitat within the Site. The wetland disturbance area represents 5% of the total wetland habitat within the Site.

Although some of the wetland disturbance is considered to be temporary (809 m^2), and only 277 m ² to be permanent, to offset the loss of wetland value and extent, as a conservative approach was taken, and the total amount of wetland disturbance was considered (1,085 m^2).

All wetlands to be disturbed were of a very similar nature, having a similar plant species composition of predominately common rushes, sedges and grass species. All wetlands were either seepage fed and/or associated with intermittent or permanent stream margins. The wetlands also had similar habitat features, generally lacking indigenous flora biodiversity, structural tiers, and aquatic habitat, and all were in the same contributing catchment of the Ōrewa River. All wetlands were assessed as having a low (wetland B and G) or moderate (wetlands K, U and AE) ecological value.

The loss of the wetlands' functional roles of flood attenuation and nutrient capture will be appropriately mitigated through stormwater management. However, there will still be a loss of wetland extent and value, which is considered a significant residual effect. To offset the loss of this significant residual effect, it is proposed that new wetlands are created at a 3:1 ratio (Figure 41), with 2,244 m^2 of new wetland created in Stage 1 and 1,014 m^2 of new wetland created in Stage 2. All new wetlands will be subject to a minimum of 10 m wide buffer planting around their edges.

The newly created wetlands area all located within the same contributing catchments of the disturbed wetlands and in close proximity. The location of the new wetland areas focused around re-connecting historically connected wetlands and/or increasing the size of wetlands to provide for an increase in habitat values and resilience. Additionally, the new wetlands will contribute to a broader catchment-focused revegetation and enhancement plan and offer wetland habitat and functions comparable to those of the disturbance sites.

As a condition of consent, it is recommended that a detailed wetland offset plan is prepared. This wetland offset plan should be prepared in collaboration with a suitably qualified ecologist, hydrologist and engineer, in general accordance with this report and the landscape plans drawing series 2180 prepared by Greenwood Associates (dated February 2025), and include the following minimum details:

- Area proposed for wetland creation at a minimum 3:1 ratio
- Works to ensure a wetland hydrology is created and maintained

- Planting schedule, including species, density and grade
- Legal protection (e.g., consent notice)
- A five-year maintenance and monitoring plan to ensure the wetland and it's planting is successfully established
- Measure to undertake if the wetland or plantings is not successful

While there will be a temporary loss of wetland extent and value, the newly created wetlands will offset for the loss of wetland area at the impact sites, ensuring at least a no net loss of 1,086 m^2 of wetland extent and value in the medium to long term. Moreover, the offset measure will result in a net gain of 2,172 m^2 of wetland habitat and increase additional ecological values of connectivity and reduce edge effects.

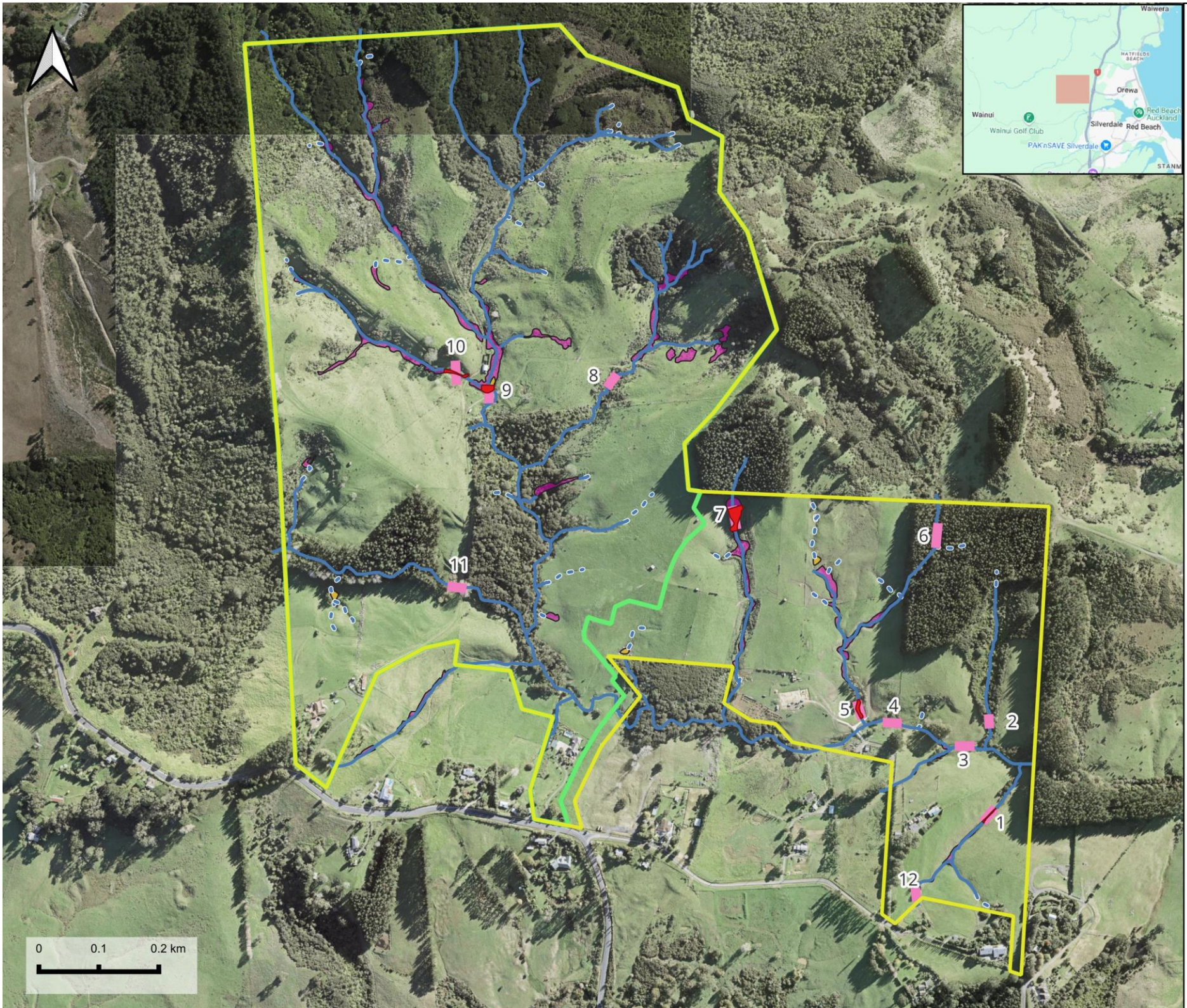

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Figure 40

Works within freshwatr habitats

Delmore Project

Legend

- Site
- Stage 1 & 2 boundary
- Streams
- OFLPs / ephemeral reaches
- Natural wetlands
- Constructed ponds
- Proposed new culverts
- Wetland reclamation

SOURCES

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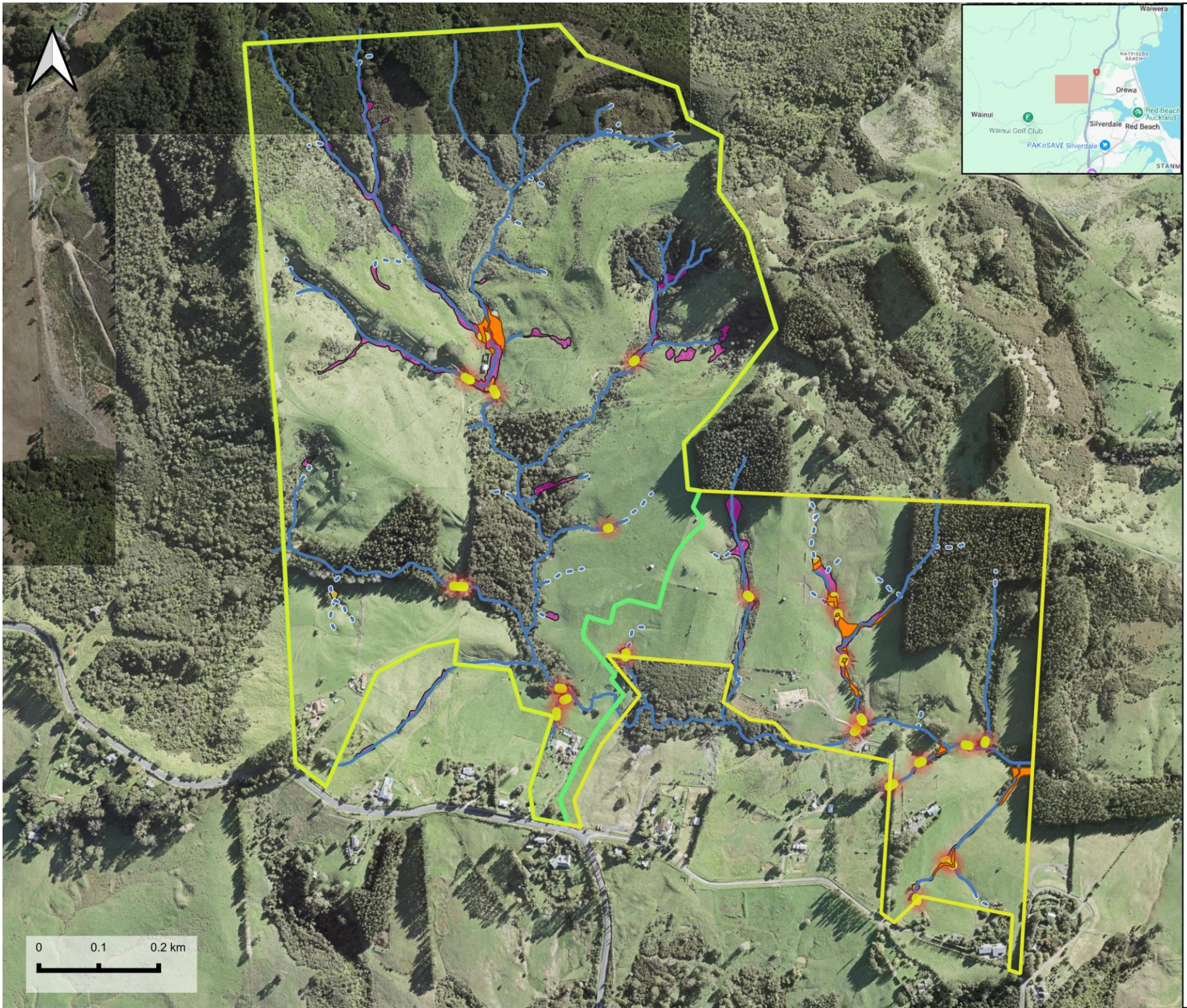

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Figure 41

Wetland Offset

Delmore Project

Legend

- Site
- Stage 1 & 2 boundary
- Streams
- OFLPs / ephemeral reaches
- Natural wetlands
- Constructed ponds
- Farm culverts to be removed
- wetland creation

SOURCES

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6.2.3 Freshwater Fish

The magnitude of effect of the proposed works on indigenous freshwater fish is considered moderate, reducing to low with mitigation.

Aquatic features providing suitable habitat for indigenous freshwater fish are limited to streams, and constructed ponds.

Without mitigation, culvert installation and pond removal could result in native fish injury or mortality. To address this, a native fish management plan is recommended as a consent condition. This plan should ensure the rescue and relocation of indigenous fish from disturbed aquatic habitats.

6.2.4 Stormwater Management

If not appropriately designed and managed, changes to a site's stormwater regime could result in adverse effects on the freshwater environment, such as reduced baseflows to streams and wetlands, altered flow regimes, erosion and sedimentation, and contaminant loading.

McKenzie and Co. have prepared a Stormwater Management Plan (McKenzie and Co., 2025a) to promote sustainable stormwater management and land development on the Site. A water sensitive design has been adopted and incorporated in the stormwater management approach for the development of the Site.

Key features of the stormwater management that have been incorporated to minimise adverse effects on freshwater features, include (McKenzie and Co., 2025a):

- GD01 treatment for all impervious areas
- Equivalent hydrology to pre-development (5mm retention, 95th percentile detention)
- Utilising the existing landform and stream network as far as practicable, by mimicking the existing catchments
- Where lots are directly adjacent to watercourses, treated stormwater discharges towards to the watercourse through a T bar energy dissipation device
- On site tanks will be provided for each lot for treatment and re-use.

6.2.5 Sedimentation

The magnitude of effect of sediment on freshwater environments is considered to be moderate, mitigated to low.

Elevated levels of suspended sediment can have detrimental effects on freshwater environments including reducing light penetration, smothering food and interstitial spaces, and clogging fish and invertebrate gills. Aquatic biota however, are adapted to periods of elevated sediment in the water, as they experience them during times of high river/stream flow. It is chronic exposure to elevated levels of sediment that cause the most detrimental effects on aquatic biota.

It is expected earthworks and vegetation removal will generate sediment, that if not properly managed, could enter and detrimentally effect the freshwater environment. McKenzie & Co. (2025b) have prepared a plan detailing erosion and sediment control measures for the development in line with Auckland Council's GD05 guidelines. Provided that these control measures are adhered to, it is expected the effect of sediment can be mitigated to low.

6.3 NOR

AT has released its decision confirming a designation for the construction of their 'North Project', which includes NoR 6 that traverses the Site. The North Project notice of requirement was supported by an EcIA (T e Tupu Ngātahi, 2023). Ecological features and values such as wetlands and bat corridors, were determined from a relatively high-level and often solely by desktop assessments. Based on this assessment four potential wetlands, a bat corridor and non-wetland vegetation (a pine plantation) was identified within the Site (Figure 42). These areas were defined as 'Identified Biodiversity Areas' (IBAs).

As per the conditions for AT's North Project, works associated with the NoR 6 within the Site will require a pre-construction survey to confirm whether species of value are present within the IBAs and whether the works will likely have a moderate or greater level of ecological effects on those species. If the ecological survey confirms that the works will likely have a moderate or greater level of ecological effects on species of value, then an Ecological Management Plan needs to be prepared.

As this development proposes to construct a section of the NoR6, it is recommended that the Nor 6 conditions relating to the IBAs are incorporated into the consent conditions for this application.

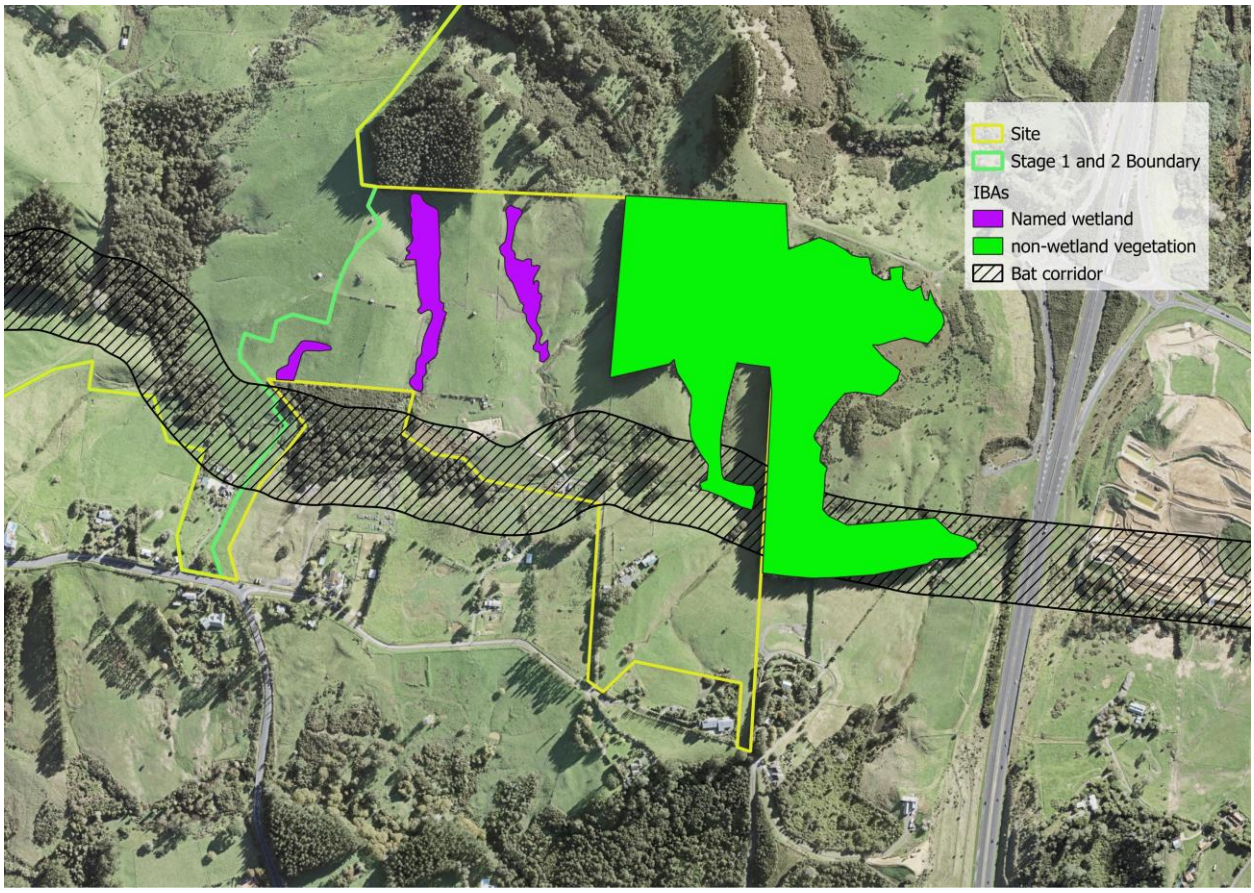

Figure 42. IBAs within the Site.

6.4 Coastal Environment

The Site's freshwater features are part of a contributing catchment to the Ōrewa River, which flows directly into the Ōrewa River estuary, a coastal environment.

The proposed earthworks and vegetation removal will generate the release of sediment. If not carefully managed, this could enter and detrimentally effect this downstream coastal environment through sedimentation. Elevated levels of suspended sediment can have detrimental effects on coastal

environments including reducing light penetration, smothering food and interstitial spaces, and clogging fish and invertebrate gills.

McKenzie & Co. (2025b) have prepared a plan detailing erosion and sediment control (ESC) measures for the development in line with Auckland Council's GD05 guidelines. Provided that these control measures are adhered to, it is expected that the level of effect will be negligible.

6.5 Enhancement and Restoration

The development proposes the following enhancement and restoration measures:

- The removal of 24 existing farm culverts across the Site. Many of these restrict hydrological connectivity and inhibit fish passage. Their removal is expected to improve stream hydrology and reduce localised flow disruptions.
- The creation of 2,170 m^2 of additional wetland habitat, increasing ecological values of connectivity and edge effects for existing wetlands.
- 16.1 ha of riparian and buffer planting within 20 m of streams and wetlands, which includes 10.5 ha of riparian and buffer planting within 10 m of streams and wetlands. This planting will increase the ecological value of the freshwater features, improve water quality and provide ecological connectivity within the Site and to the wider environment.
- Outside of the 20 m riparian and buffer planting, an additional 16.7 ha of revegetation planting that connects and/or buffers the SEA, consent notice areas and riparian margins. This planting will greatly increase the ecological value of the Site through improving plant species diversity and abundance, habitat diversity and abundance, connectivity within the Site and to the wider environment and ecological resilience.

Figure 43 presents the proposed revegetation planting.

Overall, the development proposes to undertake 32.8 ha of revegetation planting. Where appropriate, native vegetation within gorse scrub or exotic dominant areas will be retained. All revegetation planting will be protected by way of a consent notice These enhancement and restoration measures will make a significant contribution to addressing the critical environmental challenge of national biodiversity loss and degradation.

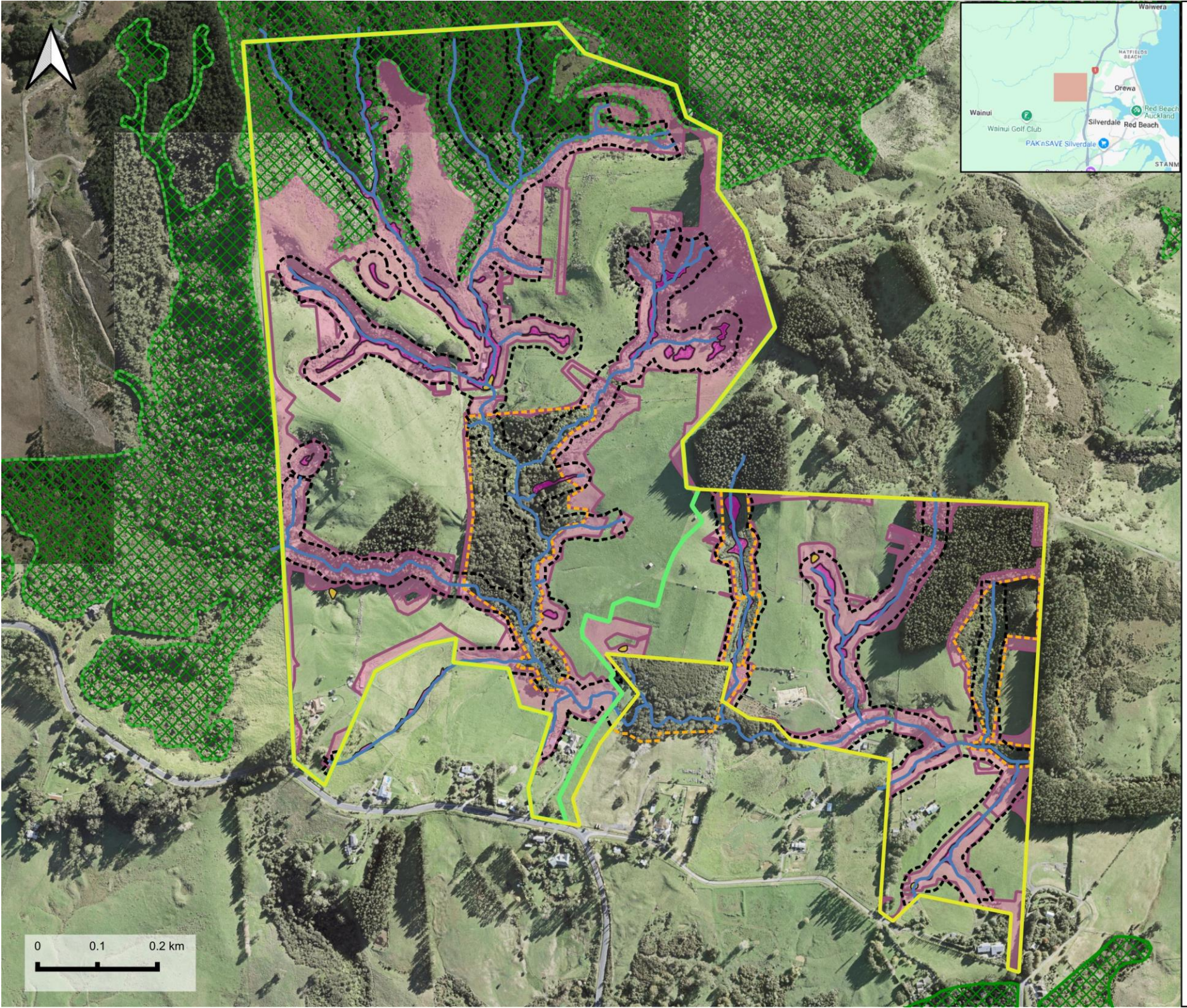

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Figure 43

Proposed Revegetation Planting

Delmore Project

Legend

- Site
- Stage 1 & 2 boundary
- Covenants
- SEA
- 20m riparian & wetland buffer
- Proposed revegetation planting

SOURCES

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DATE:	10 February 2025

6.6 Overall Level of Effects

The overall level of effect for the proposed works is generated using Table 3, taking the ecological value and expected magnitude of the effect on that value. Expected levels of effect for the proposal are given in Table 12. Generally, mitigation is only required when the level of effect is expected to be moderate or higher. However, in line with best practice, a number of mitigation measures are recommended to ensure the level of effect of the proposal remains low.

Table 12. Summary of the level of effects for the proposal after mitigation

Ecological Feature	Ecological Value	Magnitude of effect (before mitigation)	Magnitude of effect (after mitigation)	Level of effect
Riparian and wetland vegetation	low- moderate	Low	Low	Very low - low. Positive following revegetation.
SEA Vegetation	Low (gorse)	Low	Low	Very low. Positive following revegetation.
Consent notice vegetation	Moderate	Moderate	Low	Low. Positive following revegetation.
Native dominant	Moderate - high	Low	Low	Low. Positive following revegetation.
Other vegetation	Low	Low	Low	Very low. Positive following revegetation.
Indigenous avifauna	Low-high	low	Low	Very low. Positive following revegetation.
Indigenous herpetofauna	Negligible - high	Moderate	Low	Low. Positive following revegetation.
Bats	Moderate	Moderate	Low	Low. Positive following revegetation.
Streams (i.e. culverts)	Low - high	Moderate	Low	Low
Wetlands	Low -moderate	Moderate	Low	Low. Positive following revegetation and wetland creation.
Freshwater fish	High	Moderate	Low	Low. Positive following improving fish passage
Erosion and sediment	Low - high	High	Low	Low
Coastal environment	High	Moderate	Negligible	Very Low

7 SUMMARY AND RECOMMENDATIONS

Viridis was engaged to undertake an EcIA within the 109 ha site at 88, 130 and 132 Upper Ōrewa Road and 53A, 53B and 55 Russell Road, which is proposed for development under the FTAA.

An ecological assessment of the Site and neighbouring environment identified the presence of 39 intermittent and permanent streams and 34 natural wetlands. Terrestrial features identified included pine plantations, exotic dominant vegetation, mature native dominant vegetation, planted native vegetation and gorse scrub. The Site provides potential habitat for threatened native species, including bats, lizards, birds and fish. No threatened plant species were identified. The proposal is expected to have an overall low level of effect on the ecological values of the area The proposed mitigation and planting measures will ensure the adverse effects on the ecological values of the Site are minimised and in fact provide for a large net biodiversity gain.

The terrestrial ecological values of the Site comprised of pine plantations, exotic dominant vegetation, mature native dominant vegetation, planted native vegetation and gorse scrub. The Site provides potential habitat for threatened native species, including bats, lizards, birds and fish. No threatened plant species were identified. The proposal is expected to have an overall low level of effect on the ecological values of the area.

Thirty-nine intermittent and permanent streams and 34 natural wetlands were identified within the Site.

The project will involve bulk earthworks, the installation of infrastructure, vegetation removal, culvert installation, and the reclamation of natural inland wetlands. Works proposed to offset/compensate for residual effects on freshwater and terrestrial values include extensive riparian and revegetation planting and the creation of new wetland that is anticipated to achieve higher ecological values than the existing features to be affected.

The following recommendations are provided to avoid and minimise any potential adverse effects to the ecological value of the terrestrial and freshwater environments during the undertaking of earthworks, and development activities, on the Site:

- Site management should include ensuring that no rubbish, fuel, solvents, concrete wash-down material or other related materials enter the freshwater environment;
- Any vegetation removal, other than pasture and gorse scrub, or works within wetlands, occurs outside of the bird nesting season (September to February, inclusive). If vegetation clearance is unavoidable during the main indigenous bird nesting season, an experienced ecologist or ornithologist should visually inspect all trees and shrubs proposed for removal before, and no more than 24 hours prior to, felling or removal, to identify any active nests of indigenous birds. This includes checking cavities and hollows for nesting birds (e.g. morepork, kingfisher). Should any nesting of indigenous birds be observed, a 10 m buffer of vegetation should be required to remain around the nest site until an experienced ecologist or ornithologist has confirmed that the nest has failed or the chicks have hatched and naturally left the nest site. The native bird management recommendations can form part of a broader fauna management plan;
- A consent condition to minimise adverse effects on bats that requires the preparation of a bat management plan, or a resource consent condition requiring application of the DOC standards to be undertaken by a competent bat worker The bat management plan can form part of a broader fauna management plan;

- A LMP is required as a condition of consent and is prepared and implemented by a suitably qualified and experienced herpetologist to minimise adverse effects on indigenous lizards. The LMP can form part of a broader fauna management plan;
- Erosion sediment control measures are implemented according to Auckland Council's GD05 guidelines and strictly adhered to;
- A planting maintenance plan is prepared for the revegetation planting to ensure that the plant establishment is successful, and that maintenance is undertaken in perpetuity;
- Prior to commencement of streamwork activities on the subject site, a native fish management plan, produced by a suitably qualified and experienced freshwater ecologist, should be prepared and submitted to Auckland Council for approval to minimise adverse effects on indigenous freshwater fish;
- Prior to commencement of streamwork activities on the subject site, a detailed wetland offset plan is prepared. This wetland offset plan should be prepared in collaboration with a suitably qualified ecologist, hydrologist and engineer, in general accordance with this report and the landscape plans drawing series 2180 prepared by Greenwood Associates (dated February 2025), and include the following minimum details:
    - Area proposed for wetland creation at a minimum 3:1 ratio
    - Works to ensure a wetland hydrology is created and maintained
    - Planting schedule, including species, density and grade
    - Legal protection (e.g., consent notice)
    - A five-year maintenance and monitoring plan to ensure the wetland and it's planting is successfully established
    - Measure to undertake if the wetland or plantings is not successful;
- The Nor 6 conditions relating to the IBAs are incorporated into the recommended fauna management plan/s.

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Appendix A
Watercourse Classification Table

Watercourse number	Classification	Natural pools	Well-defined channel, such that the bed and banks can be distinguished	Contains surface water more than 48 hours after rain	Rooted terrestrial vegetation is NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Current ecological value
1	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
2	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
3	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
4	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
5	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
6	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
7	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
8	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
9	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
10	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
11	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible

Watercourse number	Classification	Natural pools	Well-defined channel, such that the bed and banks can be distinguished	Contains surface water more than 48 hours after rain	Rooted terrestrial vegetation is NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Current ecological value
12	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
13	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
14	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
15	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
16	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
17	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
18	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
19	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
20	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
21	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
22	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible

Watercourse number	Classification	Natural pools	Well-defined channel, such that the bed and banks can be distinguished	Contains surface water more than 48 hours after rain	Rooted terrestrial vegetation is NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Current ecological value
23	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
24	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
25	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
26	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
27	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
28	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
29	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
30	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
31	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
32	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
33	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible

Watercourse number	Classification	Natural pools	Well-defined channel, such that the bed and banks can be distinguished	Contains surface water more than 48 hours after rain	Rooted terrestrial vegetation is NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Current ecological value
34	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
35	Modelled OLFP / Ephemeral	X	X	N/A	X	N/A	X	Negligible
36	Permanent	✓	✓	✓	✓	X	✓	Low
37	Intermittent	X	✓	Likely	✓	N/A	✓	Low
38	Permanent	✓	✓	✓	✓	✓	✓	Moderate - high
39	Intermittent	X	✓	Likely	✓	N/A	✓	Low
40	Intermittent	✓	✓	Likely	✓	✓	✓	High
41	Permanent	✓	✓	✓	✓	X	✓	Moderate - high
42	Intermittent	X	✓	Likely	✓	N/A	✓	Low
43	Permanent	✓	✓	✓	✓	X	✓	Moderate
44	Intermittent	✓	✓	Likely	✓	X	✓	High
45	Permanent	✓	✓	✓	✓	X	✓	High
46	Intermittent	✓	✓	✓	✓	X	✓	High
47	Intermittent	X	✓	Likely	✓	X	✓	High
48	Permanent	✓	✓	✓	✓	X	✓	Low - moderate

Watercourse number	Classification	Natural pools	Well-defined channel, such that the bed and banks can be distinguished	Contains surface water more than 48 hours after rain	Rooted terrestrial vegetation is NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Current ecological value
49	Permanent	✓	✓	✓	✓	X	✓	Moderate - high
50	Intermittent	✓	✓	✓	✓	X	✓	High
51	Intermittent	X	✓	Likely	✓	N/A	✓	Moderate
52	Permanent	✓	✓	✓	✓	X	✓	Low - moderate
53	Intermittent	X	✓	Likely	✓	N/A	✓	Low
54	Intermittent	X	✓	Likely	✓	N/A	✓	Low
55	Intermittent	X	✓	Likely	✓	N/A	✓	Low
56	Intermittent	X	✓	Likely	✓	X	✓	Low - moderate
57	Intermittent	X	✓	Likely	✓	N/A	✓	Low
58	Intermittent	X	✓	Likely	✓	✓	✓	High
59	Permanent	✓	✓	✓	✓	X	✓	Low - moderate
60	Intermittent	✓	✓	✓	✓	X	✓	Low
61	Intermittent	✓	✓	Likely	✓	X	✓	Moderate
62	Intermittent	X	✓	Likely	✓	X	✓	Moderate
63	Intermittent	✓	✓	Likely	✓	X	✓	Moderate

Watercourse number	Classification	Natural pools	Well-defined channel, such that the bed and banks can be distinguished	Contains surface water more than 48 hours after rain	Rooted terrestrial vegetation is NOT established across the entire cross-sectional width	Organic debris resulting from flooding can be seen on the floodplain	Evidence of substrate sorting, including scour and deposition	Current ecological value
64	Intermittent	X	✓	Likely	✓	X	✓	Moderate
65	Intermittent	X	✓	Likely	✓	X	✓	Moderate
66	Intermittent	X	✓	Likely	✓	X	✓	Low
67	Intermittent	X	✓	Likely	✓	X	✓	Low
68	Intermittent	X	✓	Likely	✓	X	✓	Low
69	Intermittent	X	✓	Likely	✓	X	✓	Low - moderate
70	Intermittent	X	✓	Likely	✓	N/A	✓	Low
71	Intermittent	X	✓	Likely	✓	X	✓	Moderate
72	Intermittent	X	✓	Likely	✓	X	✓	Low
73	Permanent	✓	✓	✓	✓	X	✓	Low
74	Intermittent	X	✓	Likely	✓	X	✓	Low

Appendix B
Wetland Values Table

Wetland ID	Buffer vegetation	Stock excluded	Freshwater habitat abundance	native plant species dominant	Size*	Current ecological value
A	✗	✗	Negligible	✗	Small	Low
B	✗	✗	Low	✗	Small	Low
C	✗	✗	Negligible	✗	Small	Low
D	✗	✗	Negligible	✗	Small	Low
E	✗	✓	Low	✗	Small	Low
F	✗	✓	Low	✗	Small	Low
G	✗	✓	Low	✗	Small	Low
H	✗	✗	Negligible	✗	Small	Low
I	✗	✗	Negligible	✗	Small	Low
J	✗	✗	Negligible	✗	Small	Low
K	✓	✓	Moderate	✓	Small - Medium	Moderate
L	✓	✓	Moderate	✗	Small - Medium	Moderate
M	✓	✗	Negligible	✗	Small	Low
N	✗	✗	Negligible	✗	Small	Low
O	✓	✓	Low	✗	Small	Low
P	✗	✗	Negligible	✗	Small	Low
Q	✗	✗	Negligible	✗	Small	Low
R	✗	✗	Negligible	✗	Small	Low
S	Partial	✗	Negligible	✗	Small	Low
T	Partial	✗	Low	✗	Medium	Low
U	✗	✗	High	✗	Small	Moderate
V	✓	✓	Negligible	✗	Small	Low
W	✗	✗	Negligible	✗	Small	Low
X	✗	✗	Low	✗	Small	Low
Y	Partial	✗	Low	✗	Small	Low
Z	✓	✓	Moderate	✓	Small	High
AA	✓	✓	Low	✗	Small	Moderate
AB	✓	✓	Low	✗	Small	Moderate
AC	✓	✓	Low	✗	Small	Moderate
AD	✗	✗	Negligible	✗	Small	Low

AE	Partial	X	Moderate	X	Moderate	Moderate
AF	X	X	Negligible	X	Small	Low
AG	X	X	Negligible	X	Small	Low
AH	X	X	Low	X	Small	Low

Note: * Size ratings used: small - < 0.25 ha, medium – 0.25 – 0.5 ha, large >0.5 ha.

Appendix C
Macroinvertebrate Data

			Sampling Site		
Taxonomic Group	**Taxa**	**MCI-sb Score**	**UP-North**	**DS-1**	**DS-2**
Leptophlebiidae	Neozephlebia	7.6			16
Leptophlebiidae	Zephlebia	8.8	2		16
Leptoceridae	Hudsonema	6.5		1	20
Hydroptilidae	Oxyethira	1.2	16	3	8
Hydroptilidae	Paroxyethira	3.7	2	1	1
Polycentropodidae	Polyplectropus	8.1	5		
Leptoceridae	Triplectides	5.7	192	15	56
Coenagrionidae	Xanthocnemis	1.2	96	1	
Veliidae	Microvelia	4.6	48		
Hydrophilidae	Hydrophilidae	8		1	
Simuliidae	Austrosimulium	3.9			36
Chironomidae	Corynoneura	1.7		1	
Tipulidae	Limonia	6.3		1	
Muscidae	Muscidae	1.6			1
Chironomidae	Orthocladiinae	3.2	64	2	20
Dixidae	Paradixa	8.5	64	5	8
Tipulidae	Paralimnophila	7.4		1	1
Chironomidae	Polypedilum	8		4	
Sciomyzidae	Sciomyzidae	3			1
Chironomidae	Tanypodinae	6.5	64	4	12
Tipulidae	Zelandotipula	3.6	1		
Collembola	Collembola	5.3			2
Crustacea	Isopoda	4.5	64		
Crustacea	Ostracoda	1.9	80		
Paracalliopiidae	Paracalliope	0	1120	5	48
Atyidae	Paratya	3.6		25	24
Acari	Acari	5.2			1
SPIDERS Dolomedes	Dolomedes	6.2	1		2
Physidae	Physella (Physa)	0.1	944	1	1
Tateidae	Potamopyrgus	2.1	256	68	480
Mollusca	Sphaeriidae	2.9			1
Oligochaetes	Oligochaetes	3.8			8
Hirudinea	Hirudinea	1.2	16		

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