

**ASSESSMENT OF ECOLOGICAL VALUES  
LOT 1 DP 176274 & LOT 2 DP 176274**

**2021 429**

**Prepared for  
FAR NORTH HOLDINGS LIMITED**

Consultation

HAIL Reports

Ecological  
Assessments

Resource Consent  
Applications

Compliance  
Monitoring

Water Quality  
Monitoring

Environmental  
Management

Pest Reduction  
Advice

Enrichment  
Planting

Restoration  
Advice

**NZE Quality System:**

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## TABLE OF CONTENTS

### SECTIONS

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<b>1</b>	<b>INTRODUCTION</b> .....	<b>2-6</b>
1.1	BACKGROUND .....	2-6
1.2	ECOLOGICAL CONTEXT .....	2-9
<b>2.</b>	<b>TERRESTRIAL ECOLOGICAL VALUES</b> .....	<b>2-13</b>
2.1	INTRODUCTION.....	2-13
2.2	FOREST VEGETATION .....	2-16
2.3	WETLANDS .....	2-20
2.4	INDIVIDUAL TREES OR SMALL STANDS OF TREES.....	2-23
2.5	FAUNA VALUES.....	2-23
<b>3.</b>	<b>ECOLOGICAL VALUES</b> .....	<b>3-25</b>
<b>4.</b>	<b>ECOLOGICAL OPPORTUNITIES</b> .....	<b>4-26</b>
4.1	BACKGROUND .....	4-26
4.2	PROTECTING THREATENED AND ENDANGERED SPECIES .....	4-26
4.3	MAXIMISING INDIGENOUS VEGETATION & PROVIDING LINKAGES .....	4-26
4.4	BUFFERING SENSITIVE HABITATS.....	4-29
4.5	RESTORING DEGRADED AREAS.....	4-30
4.6	IMPLEMENTING EFFECTIVE PEST CONTROL.....	4-31
<b>5.</b>	<b>PLANNING MATTERS</b> .....	<b>5-32</b>
5.1	FAR NORTH DISTRICT PLAN .....	5-32
5.2	DRAFT DISTRICT PLAN .....	5-34
5.3	NORTHLAND REGIONAL POLICY STATEMENT.....	5-35
5.4	NATIONAL POLICY STATEMENT FOR FRESHWATER MANAGEMENT .....	5-38
5.5	STOCK EXCLUSION REGULATIONS (FROM 3 SEPTEMBER 2020) .....	5-41
<b>6.</b>	<b>ECOLOGICAL OPPORTUNITIES</b> .....	<b>6-42</b>
<b>7.</b>	<b>CONSTRAINTS</b> .....	<b>7-43</b>
<b>8.</b>	<b>RECOMMENDATIONS</b> .....	<b>8-44</b>
<b>9.</b>	<b>REFERENCES</b> .....	<b>9-45</b>

### APPENDICES:

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<b>Appendix A:</b>	<b>FNDC Proposed Significant Natural Area Identification</b>
<b>Appendix B:</b>	<b>Plant Species List</b>
<b>Appendix C:</b>	<b>Bird Species List</b>

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## EXECUTIVE SUMMARY

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Far North Holdings Limited have purchased Lots 1 & 2 DP 176274 with the intention of incorporating them into the Ngawha Innovation and Enterprise Park located on the adjoining property to the west via a private Plan Change. It is proposed that all of Lot 1 and most of Lot 2 be used for agricultural or horticultural related purposes. The proposal entails intensifying and diversifying the cropping and productive use of this land and includes buildings, storage areas, tunnel houses, glasshouses, car parks and accessways required to sustain these activities. The north end of Lot 2 bounds the site of the proposed Matawii reservoir and is outside the scope of this investigation. FNHL have requested this ecological assessment prior to establishing any horticulture or agricultural enterprises at the site in order to identify any ecological constraints or opportunities that the site may provide.

The land is situated on State Highway 12 north of Kaikohe Golf Course and Northland Regional Corrections Facility. The Lots are surrounded by residential and lifestyle properties and dry stock farms.

The Lots are located within the Kaikohe Ecological District and Northland Ecological Region. The Kaikohe Ecological District covers approximately 62,800 ha, of which only 2,001 ha is protected, almost half at one site. Of the natural areas remaining in 2000, 51% was forest, 34% shrubland, 1.5% swamp forest and swamp shrubland, 3.5% wetland, and 10% lakes or open water. The district includes several unique ecological features, including Lake Omapere, the largest freshwater lake in Northland.

Ecological values at the Lots include mature tōtara-taraire-puriri dominated forest, kahikatea-maire tawaka swamp forest and natural inland flax-sedgeland wetlands. Indigenous vegetation at the Lots includes ~5ha of natural inland wetland and ~8.6ha of forest, some of which has been recognised as a significant natural area in the Protected Natural Area Programme surveys of the district in the early 1990s and was remapped as Significant Natural Area by Wildland Consultants Limited in 2019. Wetlands are also a regional and national priority for protection on private land and natural inland wetlands are protected from development by the National Policy Statement for Freshwater Management and accompanying National Environmental Standards for Freshwater which were released in 2020. The majority of the Lots drain south-east to the Waitangi River which enters the Bay of Islands at Haruru Falls. We have recommended approximately 2.5 ha of planting across the Lots, predominantly to protect and enhance forest edges and buffer existing wetlands in accordance with the national policy statement.

The ecological opportunities at the Lots arise from maximising the extent and quality of the indigenous vegetation, buffering sensitive habitat such as wetlands, connecting habitat fragments, allowing drains to infill naturally to improve ecological connections for fish and implementing effective pest control for protection of fauna.

We consider that the policies and objectives of the Far North District Plan and Northland Regional Policy Statement and the relevant National Policy Statements (particularly the National Policy Statement for Freshwater Management) would be given effect to if the following actions are undertaken:

- Retention of all existing wetland and forest vegetation and sufficient buffer to protect their ecological values.
- Removal of livestock from areas of indigenous vegetation at the site.
- A restoration planting plan for the Lots be prepared by a suitably qualified and experienced ecologist and implemented with the aim of connecting existing habitat fragments, especially around Young's Kahikatea Remnant.
- Retaining isolated mature trees or small groups of trees and protecting their root structures to maintain and enhance their ecological value.
- A weed management plan to be prepared for the Lots by a suitably qualified and experienced ecologist and implemented effectively.

- A pest control plan for the Lots to control feral cats, rats, possums and mustelids to be developed by a suitably qualified and experienced ecologist and implemented effectively.
- The keeping of domestic pets at the Lots to be banned.
- All indigenous vegetation and habitats (including newly created habitats) at the Lots to be formally protected either through the site management plan or covenanting.

## 1 INTRODUCTION

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### 1.1 BACKGROUND

Far North Holdings Limited (FNHL) is the owner of a property situated opposite (north of) Ngawha Springs Road and the existing Kaikohe Golf Course, Kaikohe. FNHL is the commercial trading and asset management arm of the Far North District Council. It is proposed that all of Lot 1 and most of Lot 2 be used for agricultural or horticultural related purposes. The proposal entails intensifying and diversifying the cropping and productive use of this land and includes buildings, storage areas, tunnel houses, glasshouses, car parks and accessways required to sustain these activities. The north end of Lot 2 bounds the site of the proposed Matawii reservoir and is outside the scope of this investigation.

FNHL have requested this ecological assessment to support a plan change and prior to establishing any horticulture or agricultural enterprises at the site in order to identify any ecological constraints or opportunities that the site may provide.

Note: This is a high level assessment which will need to be supported by additional surveys, (such as lizard, mudfish and bat surveys), once the final use and layout is confirmed.

This investigation was undertaken over two recently acquired lots: Lot 1 DP 176274 (18.3174ha) and Lot 2 DP 176274 (34.195ha). This investigation area is referred to here as 'the Lots' which have a history of being operated as pastoral grazing and for cropping. The area is zoned Rural Production in the Far North District Plan. Livestock have been removed since the land was purchased by FNHL, however if this were to change, all cattle, pigs and deer must be excluded from natural wetlands on site, and from rivers over one metre wide from 1 July 2025. The location of the property is shown in Figure 1.



**Figure 1: Location of Lot 1 & Lot 2 DP 176274, Ngāwha, Kaikohe**

NZ Environmental Limited was retained in June 2021 to assess the terrestrial ecological values of the Lots and identify constraints and opportunities with respect to those ecological values in the context of determining best land use options, specifically horticulture. An outline plan was provided showing proposed land use on the Lots (Figure 2).



# SCHEME PLAN TO BE PROVIDED BY FNHL

**Figure 2** Plan provided by FNHL showing proposed land use. Note area to left of dotted line covered in NZ Environmental Report number 2018 276 (2019)

## 1.2 ECOLOGICAL CONTEXT

The Lots are located in the Kaikohe Ecological District (ED) and Northland Ecological Region (McEwen 1987, Brook 1996). The Kaikohe Ecological District is located in the centre of the mid-north between the Bay of Islands in the east and the Hokianga Harbour in the west. The district is centred approximately on Lake Omapere and adjoins the Puketi ED to the north, the Hokianga ED to the west and north-west. Kerikeri ED to the east and Tangihua ED to the south. The district extends from the Waima River in the west to Pakaraka in the east and includes the upper catchments of the Waitangi River.

Conning and Miller (2000) mapped and briefly described most of the areas of indigenous natural vegetation within the Kaikohe Ecological District and also provided an analysis of the main vegetation types as well as information on threatened species and other taxa of scientific interest present in the district as part of the Protected Natural Areas Programme ('PNAP') in 1994 and 1995. The Kaikohe ED covers approximately 62,800ha, approximately 13,190ha (21%) of which comprises natural areas (Conning and Miller 2000). Conning and Miller (2000) identified 84 natural areas scattered across the district. Of the natural areas identified, 51% was forest, 34% shrubland, 1.5% swamp forest and swamp shrubland, 3.5% wetland, and 10% lakes or open water (Conning and Miller 2000). The protected natural areas within the Kaikohe ED cover only 2,001ha, almost half of which comprises one location (Conning and Miller 2000).

The Kaikohe Ecological District contains several distinct features including:

- Lake Omapere, which is the largest freshwater body in Northland.
- South and east of Lake Omapere, volcanic cones and basalt lava flows have produced some of the best examples of volcanic broadleaf forest in the Northland Region. These forests are seasonally important kukupa (*Hemiphaga novaeseelandiae*) habitat.
- Where water flow has been impeded remnants of swamp forest and wetland sometimes occur.
- The geothermal and gumland heath area of Ngawha Springs is unique in the Northland Region.

The underlying geology of Mangakahia Complex sedimentary and basaltic volcanic rock types is typical of the Kaikohe ED, which contains a high diversity of vegetation types, including some which are regionally and nationally rare such as gumland, mature podocarp forest, volcanic broadleaf forest, swamp shrubland, and swamp forests. Mānuka-kānuka (*Leptospermum scoparium* - *Kunzea robusta*) shrubland, broadleaf-podocarp and secondary podocarp forest and are the most common vegetation types within the district (Conning and Miller 2000).

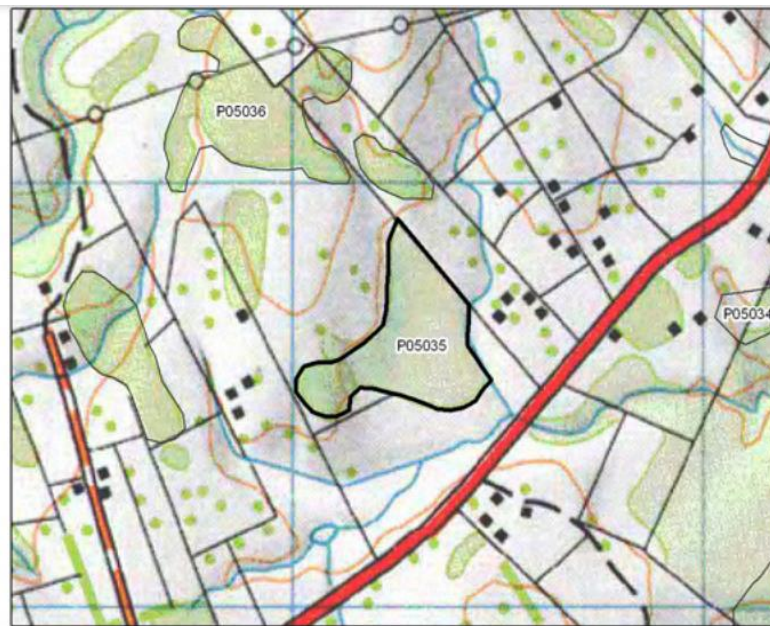
The majority of the vegetation within the Kaikohe Ecological District has been cleared for farming, forestry and human settlement. The district extends from sea level at the head of the Hokianga Harbour to 360m asl and has a mild, humid, and generally windy climate, winds being predominantly from the south-west. The average rainfall is 1,766mm per year, with most rainfall occurring during winter. The driest months are January and November. The District is also subject to periodic cyclonic storms in late summer and early autumn which bring heavy rainfall and may have widespread effects such as floods, slips and windfalls. Heavy rainfall also occurs when north-easterly flows arise between ridges of high pressure to the east and troughs over the Tasman Sea. The mean annual temperature is 14.7°C. The District has about 2000 hours of bright sunshine per year. (Conning and Miller 2000).

Conning and Miller (2000) considered that the priority areas for protection in the Kaikohe Ecological District included gumlands, wetlands, mature podocarp, kauri, and volcanic broadleaf forests, as well as areas of kiwi (*Apteryx mantelli*) habitat.

Having evaluated the sites with indigenous vegetation throughout the district, Conning and Miller grouped them according to two levels of ecological significance, with Level 1 sites being of the highest ecological value and Level 2 sites supporting populations of indigenous flora and fauna, but of generally lower ecological value than Level 1 sites.

Conning and Miller (2000) identified two Level 1 sites within or near the Lots including Young's Kahikatea Remnant (Site P05/035) and Kopenui Stream Remnants (Site P05036) as well as one Level 2 site (Ngawha swamps (Site P05034)). Each of these is described in more detail below.

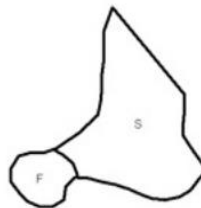
Young's Kahikatea (*Dacrycarpus dacrydioides*) Remnant, P05035, (Figure 3), was considered by Conning and Miller to be a Level 1 site due to it being an extremely rare swamp forest - Maire tawake (*Syzygium maire*) was identified as Threatened-Nationally Critical and regionally significant and mānuka At-Risk-Declining. This site was also identified in the proposed District Plan SNAs (SNA ID: FN669, described in Appendix A).



**P05035 Youngs Kahikatea Remnant**

0 125 250 500 Metres

S= Shrubland  
F= Forest  
W= Wetland  
E= Estuarine

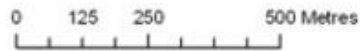


**Figure 3: PNA P05035 Youngs Kahikatea Remnant**

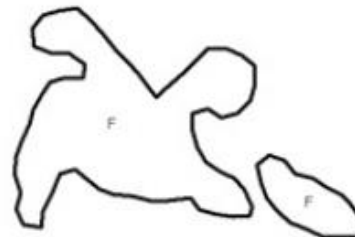
Kopenui Stream Remnants, P05036, (Figure 4), was assessed by Conning and Miller to include taraire-pūriri (*Beilschmiedia taraire-Vitex lucens*) forest and hillslope tōtara (*Podocarpus tōtara*) forest and was also identified by the Wildland Consultants Limited survey of the district (SNA ID: FN172, Appendix A).



**P05036 Kopenui Stream Remnants**

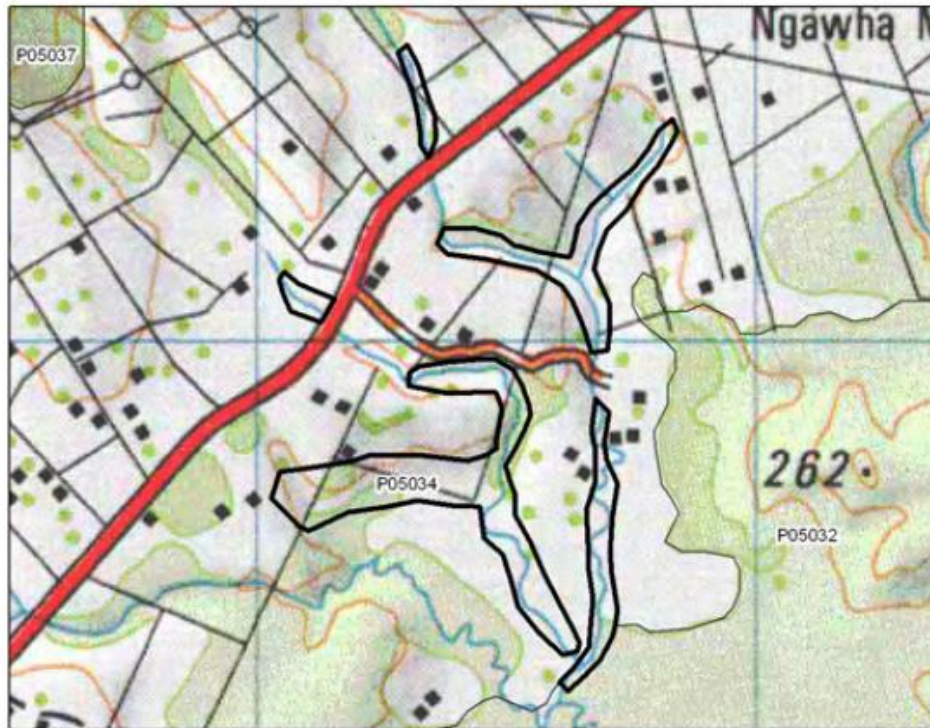


S= Shrubland  
F= Forest  
W= Wetland  
E= Estuarine



**Figure 4: PNA P05036 Kopenui Stream Remnants**

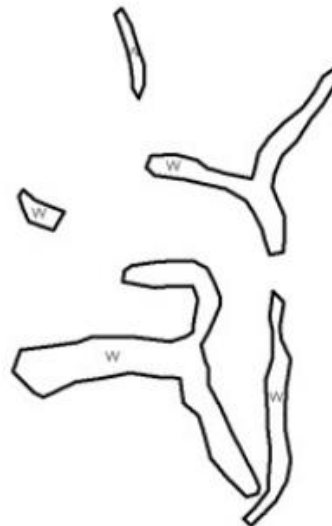
Two small wetland areas, on the Lots, close to the highway were included by Conning and Miller as part of the Ngawha Swamps, P05034 (Figure 5).



**P05034 Ngawha Swamps**

0 125 250 500 Metres

- S= Shrubland
- F= Forest
- W= Wetland
- E= Estuarine



**Figure 5: PNA P05034 Ngawha Swamps**

The Lots drain south-east to the Ngāwha Stream which flows east to the Waiaruhe River before joining the Waitangi River and entering the Bay of Islands at Haruru Falls. The Lots are surrounded by lifestyle properties, dairy and dry stock farms and is located near the Kaikohe Golf Course, Northland Regional Corrections Facility (Ngāwha Prison) and the Ngāwha Geothermal Power Stations.

## 2. TERRESTRIAL ECOLOGICAL VALUES

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### 2.1 INTRODUCTION

A walkover survey of both Lots was made by Heather Windsor and Mike McGlynn on 1 June 2021 to assess flora and fauna values. Tricia Scott and Jono More were present for some of the walkover providing additional flora and fauna expertise. Gary Bramley and Tricia Scott made a walkover survey on 22 June 2021.

From discussions with the landowner, and reference to historical photographs, and personal observation<sup>1</sup> over 30 years, the Lots have historically been used for dry stock farming including beef cattle and horses, with part of Lot 2 recently re-grassed after a crop of maize (*Zea mays*). Most of the vegetation across the Lots was exotic pasture with about 30% of the area in tree cover and with a wetland component of about 13% (the majority of the wetland is within forest cover).

From the SH12 south-west boundary, the Lots slope down to the north for approximately 100m culminating in a flat area beyond which some wetland has been fenced to exclude livestock. Drainage channels have been dug through this flat area. The flat area extends north (across the stream) for another c. 350m before both Lots rise gently in elevation toward the north gaining an extra ~20m in height above the flat area (Plate 1).



**Plate 1** Looking north-west across Lots from SH12 boundary

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<sup>1</sup> Tricia Scott

Ecological values occur in large pockets across the Lots, primarily associated with the forested and wetland areas. There are three main areas of ecological value as follows:

- Forest. There are two large forest areas on the Lots. In the north is podocarp forest which was included as a portion of the Kopenui Stream Remnants identified by Conning and Miller (2000). The Youngs Kahikatea Remnant Forest also identified by Conning and Miller (2000) is located in the south-east area.
- Wetlands. There are three wetland areas, including Youngs Kahikatea Remnant Forest which contains swamp forest (i.e. wetland habitat).
- Individual mature puriri, tōtara and taraire trees or small stands of puriri, tōtara and taraire within the areas of pasture.

These areas of ecological value are shown in Figure 6 and described in more detail below.



**Figure 6: Extent of ecological values in forest, trees, and wetlands W1, W2 and W3 on the Lots.**

A list of the plant species recorded is provided as Appendix B. Swamp maire (maire tawake) in the Youngs Kahikatea Remnant Forest is of particular conservation concern with this species considered to be “Threatened (Nationally critical)” (de Lange et al. 2017). Two other species present at the Lots are considered “Threatened (Nationally vulnerable)” including a variety of mānuka (*Leptospermum scoparium* var. *incanum*) and akatea (*Metrosideros perforata*). Whilst generally common, all three of these species are considered threatened as a result of myrtle rust arrival in New Zealand in 2017. The effect of myrtle rust on native species is yet to be demonstrated and all species in the Myrtaceae family are considered threatened or at risk as a precautionary measure until the effects are



known. The most common variety of mānuka (*Leptospermum scoparium* agg.) is also considered at-risk – declining as a result of myrtle rust.

## 2.2 FOREST VEGETATION

There are two main areas of forest on the Lots as shown in Figure 6. Together these areas cover approximately 8.6ha. These forest areas provide food and habitat for terrestrial flora and fauna such as birds and lizards and, very likely long-tailed bats (*Chalinolobus tuberculatus*).

The Kopenui Forest Remnant was predominantly podocarp forest dominated by totara with common puriri (Plate 2). Although the main area was fenced, stock have had access to these forest areas until recently and consequently the understorey vegetation has been negatively impacted (Plate 3). The canopy vegetation was in relatively good condition. Because of regular livestock access, the understorey and ground layer were either largely absent or dominated by exotic species, particularly wandering willie (*Tradescantia fluminensis*). Where present, the indigenous understorey comprised common species such as hangehange (*Geniostoma ligustrifolium*), kawakawa (*Piper excelsum*), silver fern (*Cyathea dealbata*), mapou (*Myrsine australis*) and pigeonwood (*Hedycarya arborea*). The forest areas included some large mature individuals with diameters at breast height up to 1m and heights of more than 22m.

Most of the western area of forest in the Kopenui Remnant was newly fenced and stockproof. A greywater dispersal field is located within this block.



**Plate 2** Tōtara forest along edge of Kopenui Stream fragment on Lot 1



**Plate 3** Predominantly tōtara stand with sparse understorey

In the Young's Kahikatea Forest Remnant, the dominant tree species was kahikatea. Conning and Miller (2000) describe swamp forests such as this forest remnant, as a 'rare and diminishing habitat type and containing one of only two records or maire tawake-kahikatea/tī kōuka (cabbage tree, *Cordyline australis*) swamp forest in the Kaikohe Ecological District. It was noted that a number of drains have been dug around the forest area which has led to some drying out of the ground, especially in the southernmost part of the area identified by Conning and Miller.

Most of this forest area was fenced, but the fences were of poor quality and stock have had periodic access to this forest. Kahikatea were the dominant canopy tree with mature swamp maire (Plate 4), rimu (*Dacrydium cupressinum*), taraire (*Beilschmiedia tarairi*), kohekohe (*Dysoxylum spectabile*) and puriri scattered within. The canopy vegetation was in relatively good condition, however, as a result of regular livestock access the understorey and ground layer were sparse. Where present, the indigenous understorey comprised a moderate diversity of fern species such as silver fern (*Cyathea dealbata*), water fern (*Histiopteris incisa*), hounds' tongue (*Zealandia pustulata subsp. pustulata*) and thread fern (*Blechnum filiforme*). Within the subcanopy there were several species of shrub and saplings such as mānuka, hangehange, kawakawa, mapou and pigeonwood. The forest areas included some large mature individuals with diameters at breast height up to 1m and heights of more than 22m (Plates 4 – 6).

Approximately 1.5ha of the Young's Kahikatea Forest Remnant and surrounding bush is unfenced and consequently there is limited understorey vegetation in the unfenced sections (Plate 7).



**Plate 4** North-west corner of Young's Kahikatea Remnant showing mature maire tawake



**Plate 5** Young's Kahikatea Remnant understorey where there is a moderately high diversity of fern species present



**Plate 6** Young's Kahikatea Remnant understorey with flowing water



**Plate 7** Drain's from Youngs Kahikatea Remnant - south area Lot 2

## 2.3 WETLANDS

There were two main wetland areas located on the Lots. A third wetland area located predominantly on the west neighbouring piece of land (Reiwhatia B1 – also owned by FNHL), continues in the south-west corner of Lots 1 and 2 (as shown in Figure 3 as W3).

The wetland area nearest the SH12 (W1) occupies ~3900 m<sup>2</sup> and is already fenced within a ~0.8ha area with pasture surrounds averaging approximately 10m. Vegetation within this wetland area included flax (*Phormium tenax*), cabbage trees (*Cordyline australis*), sedges and rushes including wiwi (*Juncus edgariae*), giant rush (*J. pallidus*), lake club rush (*Schoenoplectus tabernaemontani*), *Machaerina rubiginosa*, *Carex virgata*, *Cyperus ustulatus*, *Isolepis prolifera*, exotic grasses such as browntop (*Agrostis capillaris*) and swamp millet (*Isachne globosa*) and ferns such as wheki and swamp kiokio (*Parablechnum minus*). Examples of this wetland vegetation are shown in Plate 8.



**Plate 8 Wetland vegetation south-west area (W1)**

The second wetland area (W2) was within the Youngs Kahikatea Remnant, and mainly on the south side of the forest (Figure 3, page 10). Flowing and standing water was present inside the forest as shown in Plate 6 & Plate 9. The area of the wetland inside the forest was estimated to be ~2.5 ha, and outside a further 1.5 ha, but drainage channels dug around the forest have likely lowered the groundwater levels throughout. Vegetation within the wetland areas comprised sedges and rushes, including kauri sedge (*Schoenus tendo*), *Carex virgata*, soft rush (*Juncus effusus* var. *effusus*), Red woodrush (*Luzula rufa* var. *rufa*), fan-flowered rush (*J. sarophorus*), *Isolepis prolifera*, exotic grasses such as Mercer grass (*Paspalum distichum*) and swamp millet and ferns such as water fern (*Histiopteris incisa*), wheki and swamp kiokio (*Parablechnum minus*, *P. novae-zelandiae*). Examples of this wetland vegetation are shown in Plates 6, and 9 - 11.



**Plate 9** Young's Kahikatea Remnant Swamp Forest



**Plate 10** Kahikatea/ swamp maire in Young's Kahikatea Remnant



**Plate 11** Young's Kahikatea Remnant vegetation

## 2.4 INDIVIDUAL TREES OR SMALL STANDS OF TREES

There are several mature tōtara and puriri located over the Lots, primarily in the area west and north of the Young's Kahikatea remnant. Some taraire trees are also represented as individual trees. These are predominantly single trees, but some stands of two or more trees are also present (Plate 12, Figure 3).

These trees provide a food source, roosting and nesting habitat for birds across the landscape. They also provide favourable habitat for bat roosts, especially within the hanging dead *Astelia* leaves which are particularly common in the puriri trees at the Lots.

Several exotic *Cryptomeria japonica* were also present on the sloping pasture along the fenceline – these trees do not have a significant value as habitat.



**Plate 12: Recently re-grassed area with single trees on skyline.**

## 2.5 FAUNA VALUES

Birds encountered during the visits to the Lots were common native and exotic species typical of farmland and residential gardens. A list of bird species recorded is provided in Appendix C. No bird species of conservation interest were identified during the site visit on 1 June 2021. However, Australasian bittern (*Botaurus poiciloptilus*) and spotless crane (*Porzana tabuensis*) may well utilise the wetland areas. Bittern are secretive birds typically found in wetland habitats with dense beds of sedges and reeds. Bittern were identified in the Ngawha Swamps PNA (P05034) by Conning and Miller (2000).

Tree wētā (*Hemideina* sp.) were seen on tōtara in the Kopenui fragment.

The only mammal seen was a rabbit (*Oryctolagus cuniculus*), however horse and cattle sign were observed, and taraire seeds on the ground had been gnawed by rats (*Rattus* spp.). Hedgehogs (*Erinaceus europaeus occidentalis*), mice (*Mus musculus*), brushtail possums (*Trichosurus vulpecula*), mustelids (*Mustela nivalis*, *M. erminea* and *M. putorius furo*), and feral cats (*Felis catus*) are all likely to occur at the Lots or pass through them.



The wetland environment within the Young's Kahikatea Remnant was considered to be suitable for Northland mudfish (*Neochanna heleioides*), a "Threatened" - Nationally Vulnerable species (Dunn, N.R.; et al. 2018). Northland mudfish are only found within a 25km radius of Lake Omapere and are possibly be present in this type of habitat.

A lizard survey was not carried out as part of this assessment. Shrubland and forest habitat is suitable for six native lizard species with threat rankings ranging from "not threatened" to "At Risk (Relict)" (DOC Herpetofauna database).

- Pacific gecko (*Dactylocnemis pacificus*) At Risk – Relict.
- Forest gecko (*Mokopirirakau granulatus*), Elegant gecko (*Naultinus elegans*), Northland green gecko (*Naultinus grayii*), and Ornate skink (*Oligosoma aeneum*) all At Risk – Declining.
- Copper skink (*Oligosoma aeneum*) - Not Threatened.

Long tailed bats were identified during the Matawii dam survey and can be expected to forage for insects in the forest, wetland and stream areas at the Lots and may roost in some of the larger trees such as puriri and tōtara.

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### 3. ECOLOGICAL VALUES

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Mature native trees, particularly those that are in poor health and have abundant crevices and cavities, provide valuable roost sites for bats, which are known to be present in the area. Stands of remnant podocarp hardwood forests, despite being degraded from grazing animals and pests, provide valuable habitat for native birds such as tui and kukupa, and invertebrates such as wētā. With respect to ecological function, kukupa is the only landscape scale seed disperser remaining in the area, and puriri provides food for kukupa all year round, so even isolated trees can be important across the landscape.

Within both forest remnants rata vine (*Akatea sp.*) was observed – a threatened plant with a ranking of Nationally Vulnerable (de Lange et al. 2017). Swamp maire is even more threatened with a ranking of Nationally Critical (Robertson et al. 2017). This is the highest level of threat classification. Habitat loss is a major threat to maire tawake as their health and vigour are in a slow decline in areas that were once riparian forest but are now partially drained farmland. *Leptospermum scoparium var. incanum* is also threatened – Nationally vulnerable, while mānuka is considered At-risk - Declining. In terms of the proposal it is essential to protect and buffer areas where threatened plants occur.

The wetland areas present meet the definition of wetlands under the Act and are considered natural inland wetlands in the context of the National Policy Statement Fresh Water (NPSFM) 2020.

The 121,225m<sup>2</sup> area labelled 'proposed site' shown in Figure 2 has low ecological values aside from the small area of wetland (Figure 5). ....

There are five areas of low ecological values, identified as pasture and located at the roadside, between the W1 wetland and the house and the large area of farmland north of the Young's Kahikatea remnant. There are two areas of moderate value which can be improved located on the low-lying land between W1 and Young's Kahikatea Forest and around the house and three areas of high value which are located at W1, Youngs Kahikatea Forest and Kopenui Forest Remnant.

Areas assigned low ecological value are those with a long history of grazing and cropping and depauperate of indigenous species. Areas assigned a moderate ecological value are those with indigenous species and habitat value which is degraded and vulnerable to edge weed encroachment and runoff and is isolated from other habitats – these are areas which would benefit from managed planting, weed control and protection or expansion to create linkage to higher quality habitats. High value habitats are those containing threatened plants, plant assemblages or food and roosting resource for threatened or vulnerable fauna. Indigenous forest and wetland habitat and remnant old trees scattered across the slopes provide valuable roosting, and foraging sources for threatened and at-risk species including potentially bats, lizards, bittern, spotted crane, and northland mudfish.

The mid horticulture area (Figure 2) comprises moderately steep to gently sloping land with isolated trees and some areas of forest which have moderate ecological values. We recommend these individual native trees should be retained. If removal of any of these trees is required, we recommend bat surveillance be undertaken first to confirm the level of effects and provide an opportunity to mitigate them. The removal of livestock is the first step to protecting these old remnant trees well in excess of 200 years old.

The Top horticulture area (Figure 2) comprises moderately steep land with isolated trees and forest which have similarly moderate ecological values. We recommend that they be retained. If removal of any of these trees is required, we recommend bat surveillance be undertaken first to confirm the level of effects and provide an opportunity to mitigate them.

## 4. ECOLOGICAL OPPORTUNITIES

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### 4.1 BACKGROUND

The proposal is to use the land for agricultural or horticultural applications in association with the nearby Ngawha Innovation and Enterprise Park (Figure 2). The Lots currently include a range of habitat types of varying ecological value, some of which (e.g. wetlands) are a regional and national priority for protection on private land where restoration and enhancement is encouraged or required if development is proposed (Department of Conservation and Ministry for the Environment 2007, NPS-FM 2020). The ecological opportunities at the Lots arise from the following:

- Protecting threatened and endangered species
- Maximising indigenous vegetation & providing habitat linkages
- Buffering sensitive habitats
- Restoring degraded areas
- Implementing effective pest control for fauna

Each of these matters is dealt with in more detail below.

### 4.2 PROTECTING THREATENED AND ENDANGERED SPECIES

Protecting threatened and endangered plants would best be achieved by demarcating the habitat areas where these plants are present and creating a buffer zone around these. This is particularly relevant to the wetland and swamp forest habitats which have been reduced in extent by drainage, grazing and removal of plants. Indigenous vegetation clearance should be avoided as far as possible and land use options should look for ways of optimising productivity without degrading the nearby habitats. We recommend that if a plan change is contemplated, that the Kopenui Forest and Young's Kahikatea Forest areas, as delineated in Figure 6, be covenanted to ensure long-term protection in accordance with the relevant policies and objectives in the operative district plan (12.2.3.1 & 12.2.3.2). Water levels will need to be maintained within the identified habitat zones by avoiding water diversion or drainage within 100m of the wetlands.

To protect vulnerable fauna, cats should be banned from the Lots. A weed and pest management plan focusing on the site as a whole should be prepared by a suitably qualified ecologist and implemented effectively so as to improve the quality of the vegetation stands and provide safe habitat for the threatened species present or likely to be so.

### 4.3 MAXIMISING INDIGENOUS VEGETATION & PROVIDING LINKAGES

Maximising the extent of indigenous vegetation would be achieved by avoiding indigenous vegetation clearance in the first instance. We recommend that all the areas of indigenous vegetation identified in Figure 6 be retained for that purpose. In addition to retaining vegetation, the buffering of sensitive habitats, connection of habitat fragments and restoring of degraded areas will require a programme of native species planting.

Many species (such as kūkupa and tui (*Prosthemadera novaeseelandiae*) travel widely throughout the landscape on a seasonal and annual basis and make use of a variety of habitat types throughout the year. Other, more poorly mobile species, such as large

invertebrates (e.g. kauri snails *Paryphanta* spp.) or lizards, will not move through the landscape unless there is continuous suitable habitat. This restricts their populations and can result in ongoing declines. Figure 7 outlines areas around the Young's Kahikatea Remnant, which, if planted, would enhance the ecological connections between the existing remnants, particularly for such poorly mobile species. By replanting key areas and establishing habitat connectivity across the Lots, the potential for biodiversity enhancement will be maximised and a wider range of species will be catered for than would otherwise be the case.

Because the Young's Kahikatea Remnant is a type of natural inland wetland, we recommend an additional 10 to 20 metre buffer zone to protect ecosystem health. We note that the NPS-FW prohibits activities which is likely to or would result in the drainage or partial drainage of a natural inland wetland from within 10m of any wetland and this has informed our recommendation in this respect. Figure 7 shows the proposed buffer zone which, considering wetland areas which have been drained and grazed, would result in an additional 1.5ha of planting being required around Young's Kahikatea Remnant. Some natural regeneration will also occur in this area now that livestock have been excluded.

Given its identification as a site with high ecological value by both Conning and Miller and Wildland Consultants Limited, we recommend all the trees within Kopenui Stream Remnant be retained to maintain those existing ecological values and contribute to ecological resilience and sustainability of the forest remnant.

We note that this proposal is not consistent with the proposed land use indicated by FNHL which showed horticulture over the majority of this area (Figure 2). Figure 2 also shows horticulture overlaying part of the Kopenui Stream fragment forest, and most of the individual adult trees. These two land uses are not mutually exclusive, and horticulture could be sensitively located around the existing trees without necessitating their removal.

Section 5.1 below refers to the District Plan which states that: removal of habitats of indigenous fauna are to be avoided including by limiting the removal of specimen trees. Agriculture has taken place on these pieces of land for decades with the trees in place and we consider that horticulture could continue on the Lots without necessitating any removal of trees.



**Figure 7: Proposed area for covenanting or other long-term protection, (outlined in blue), which includes a 10 to 20m buffer zone and restoration of retired wetland areas particularly on the eastern side of the forest. The key planting areas around Young's Kahikatea Remnant shown in yellow. Drains in red which will be let to fill in naturally**

#### 4.4 BUFFERING SENSITIVE HABITATS

The National Policy Statement for Freshwater Management (NPSFM, 2020) requires that we all:

- Manage freshwater in a way that 'gives effect' to Te Mana o te Wai:
  - through involving tangata whenua
  - working with tangata whenua and communities to set out long-term visions in the regional policy statement
  - prioritising the health and wellbeing of water bodies, then the essential needs of people, followed by other uses.
- Improve degraded water bodies and maintain or improve all others using bottom lines defined in the Freshwater NPS.
- An expanded national objectives framework:
  - two additional values - threatened species and mahinga kai - join ecosystem health and human health for recreation, as compulsory values
  - councils must develop plan objectives that describe the environmental outcome sought for all values (including an objective for each of the five individual components of ecosystem health)
  - new attributes, aimed specifically at providing for ecosystem health, include fish index of biotic integrity (IBI), sediment, macroinvertebrates (MCI and QMCI), dissolved oxygen, ecosystem metabolism and submerged plants in lakes; councils will have to develop action plans and/or set limits on resource use to achieve these attributes.
  - tougher national bottom lines for the ammonia and nitrate toxicity attributes to protect 95% of species from toxic effects (up from 80%)
- Avoid any further loss or degradation of wetlands and streams, map existing wetlands and encourage their restoration.
- Identify and work towards target outcomes for fish abundance, diversity and passage and address in-stream barriers to fish passage over time.
- Set an aquatic life objective for fish and address in-stream barriers to fish passage over time.
- Monitor and report annually on freshwater (including the data used); publish a synthesis report every five years containing a single ecosystem health score and respond to any deterioration.

Additional planting around wetlands and streams where indigenous vegetation is lacking would serve to buffer those habitats more effectively from adjacent land-uses and protect the ecological values they contain. Figure 8 shows an additional 0.5 ha of wetland buffer planting within already fenced bounds. This area would be planted with appropriate, locally sourced species according to a planting plan prepared by a suitably qualified and experienced ecologist. The appointed ecologist would also oversee and monitor the planting to achieve restoration of appropriate vegetation types typical of the Kaikohe Ecological District. This would have ecological benefits at the Lots but would also positively affect downstream habitats in the Waitangi catchment and provide additional connectivity across the wider Kaikohe Ecological District.



**Figure 8: Wetland area outlined in yellow, with minimum 10m buffer planting in red. An existing drain connects the two wetland areas (green). The large wetland (W1) is connected to more extensive wetlands to the west as is the smaller area demarcated (W3).**

#### 4.5 RESTORING DEGRADED AREAS

The forest areas and isolated trees at the Lots have been subjected to livestock grazing. If the parts of the property outside the forest areas are to be grazed in the future, we recommend that adequate fences are established and maintained to prevent any further livestock damage to the forest. With respect to individual trees, we also recommend protecting their root structures from heavy animals such as cattle and horses.

Some of the single puriri trees were in poor health because of possums, grazing animals, and possibly also from the impact of heavy machinery, on the root system. Recent and planned land use which keeps livestock off the Lots will help restore the degraded areas. By isolating trees behind appropriate fencing (if necessary) and removing possums, the health of the trees should recover.

We recommend replanting approximately 2.4ha at the margins around the Young's Kahikatea Remnant Swamp Forest to restore ecological connection, buffer the forest wetland areas and improve the overall health of this rare ecosystem. The supplementary

planting plan should be prepared and supervised by a suitably qualified and experienced ecologist.



**Figure 9: Proposed wetland buffer planting around wetland 1 (W1) of 0.4 ha is shown in red and is contiguous with an additional wetland planting forming an ecological buffer zone between W1 and W2. Swamp forest buffer planting around Youngs Kahikatea Remnant (W2) of 1.8 ha is shown in yellow**

#### 4.6 IMPLEMENTING EFFECTIVE PEST CONTROL

In order to protect indigenous fauna and forest health at the Lots, pest mammals including possums, cats, rats, hedgehogs, mice and mustelids require control. Herbivores such as rabbits and hares might require control until plantings are established but are unlikely to pose a long-term threat to the ecological values at the Lots.

We recommend a control programme be designed by a suitably qualified and experienced ecologist and implemented to protect native wildlife and habitats at the Lots. Ideally any control would be integrated with existing operations being undertaken in the surrounding areas (e.g. Top Energy land and the adjoining NIEP).



## 5. PLANNING MATTERS

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### 5.1 FAR NORTH DISTRICT PLAN

The objectives of the Far North District Plan relating to indigenous flora and fauna are outlined in Section 12.2.3 of the plan. The objectives are:

12.2.3.1 To maintain and enhance the life supporting capacity of ecosystems and the extent and representativeness of the district's indigenous biological diversity.

12.2.3.2 To provide for the protection of, and to promote the active management of areas of significant indigenous vegetation and significant habitats of indigenous fauna.

12.2.3.3 To recognise issues of wellbeing including equity for landowners in selecting methods of implementation.

12.2.3.4 To promote an ethic of stewardship.

These objectives are supported by the policies outlined in Section 12.2.4 as follows:

12.2.4.1 That areas of significant indigenous vegetation and significant habitats of indigenous fauna be protected for the purpose of promoting sustainable management with attention being given to:

- (a) maintaining ecological values,
- (b) maintaining quality and resilience,
- (c) maintaining the variety and range of indigenous species contributing to biodiversity,
- (d) maintaining ecological integrity; and
- (e) maintaining tikanga Maori in the context of the above.

Note: In determining whether a subdivision, use or development is appropriate in areas containing significant indigenous vegetation and significant habitats of indigenous fauna, Council shall consider each application on a case by case basis, giving due weight to Part II of the Act as well as those matters listed above.

12.2.4.2 That the significance of areas of indigenous vegetation be evaluated by reference to the criteria listed in Appendix III of the Northland Regional Policy Statement (refer also to definition of "significant" in 12.2.5.6).

12.2.4.3 That adverse effects on areas of significant indigenous vegetation and significant habitats of indigenous fauna are avoided, remedied or mitigated by:

- (a) seeking alternatives to the disturbance of habitats where practicable,
- (b) managing the scale, intensity, type and location of subdivision, use and development in a way that avoids, remedies or mitigates adverse ecological effects,
- (c) ensuring that where any disturbance occurs it is undertaken in a way that, as far as practicable:
  - (i) minimises any edge effects,

- (ii) avoids the removal of specimen trees,
  - (iii) does not result in linkages with other areas being lost,
  - (iv) avoids adverse effects on threatened species,
  - (v) minimises disturbance of root systems of remaining vegetation,
  - (vi) does not result in the introduction of exotic weed species or pest animals.
- (d) encouraging, and where appropriate, requiring active pest control and avoiding the grazing of such areas.

12.2.4.4 That clearance of limited areas of indigenous vegetation is provided for.

12.2.4.5 That the contribution of areas of indigenous vegetation and habitats of indigenous fauna to the overall biodiversity and amenity of the District be taken into account in evaluating applications for resource consents.

12.2.4.6 That support is given to programmes for weed and pest control, including support for community pest control areas established by the Northland Regional Council under the Regional Pest Management Strategies, in areas of significant indigenous vegetation and significant habitats of indigenous fauna and surrounding lands.

12.2.4.7 That community awareness of the need and reasons for protecting areas of significant indigenous vegetation and significant habitats of indigenous fauna be promoted.

12.2.4.8 That restoration and enhancement of indigenous ecosystems is based on plants that would have occurred naturally in the locality and is sourced from local genetic stock where practicable.

12.2.4.9 That the Council will work with landowners and communities to ensure outcomes are achieved in an effective and equitable manner.

12.2.4.10 In order to protect areas of significant indigenous fauna:

(a) that dogs (excluding working dogs), cats, possums, rats, mustelids and other pest species are not introduced into areas with populations of kiwi, dotterel and brown teal,

(b) in areas where dogs, cats, possums, rats, mustelids and other pest species are having adverse effects on indigenous fauna their removal is promoted.

12.2.4.11 That when considering resource consent applications in areas identified as known high density kiwi habitat, the Council may impose conditions, in order to protect kiwi and their habitat.

12.2.4.12 That habitat restoration be promoted.

12.2.4.13 That the maintenance of riparian vegetation and habitats be recognised and provided for, and their restoration encouraged, for the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna, preservation of natural character and the maintenance of general ecosystem health and indigenous biodiversity.

12.2.4.14 That when considering an application to clear areas of significant indigenous vegetation or significant habitats of indigenous fauna,

enabling Māori to provide for the sustainable management of their ancestral land will be recognised and provided for by Council.

These policies and objectives have been considered in preparing this report. In order to give full effect to these policies and objectives, we recommend the following actions:

- Retention and enhancement of all existing wetland, forest, and indigenous riparian vegetation.
- A weed management plan to be prepared for the Site by a suitably qualified and experienced ecologist and implemented effectively.
- A pest control plan for the Site to control feral cats, rats, possums and mustelids to be developed by a suitably qualified and experienced ecologist and implemented effectively.
- The keeping of domestic pets at the Site to be banned.
- A restoration planting plan for the Site to be prepared by a suitably qualified and experienced ecologist with the aim of restoring degraded habitat (particularly riparian habitats), buffering sensitive habitats such as wetlands and streams, connecting existing habitats and recreating appropriate habitats at the Site.
- All indigenous vegetation and habitats (including newly created habitats) at the site to be formally protected either through the plan change or via covenanting.

The above recommended plans would best be integrated with those developed for the NIEP property to the west.

We have recommended an additional 4.9ha of planting across the site, including 0.3ha mixed broadleaf-podocarp volcanic forest, 2.4ha mixed swamp forest and wetland species, 0.4ha of wetland buffer planting, and approximately 1.8ha of wetland planting to re-establish ecological connections across the Site.

## 5.2 DRAFT DISTRICT PLAN

Although the Proposed District Plan is yet to come into effect, it needs to be considered.

- Policy IB-P3 is to Avoid, remedy or mitigate adverse effects of land use and subdivision on Significant Natural Areas outside of the coastal environment.

The vegetation in the identified Kopenui Remnant Forest, and the Youngs Kahikatea Swamp Forest meet the threshold of a Significant Natural Area.

- Policy IB-P5 is to Avoid, remedy or mitigate adverse effects of land use and subdivision on indigenous biodiversity located outside the coastal environment.
- Policy IB-P7 is to Encourage active management of pest plants and pest animals.
- Policy IB-P9 is to Promote the protection of species that are endemic to Northland by:
  - a) eco-sourcing plants from within the ecological district,
  - b) avoiding the keeping of cats, dogs and mustelids in areas that have acutely or chronically threatened species,

- c) requiring responsible pet ownership in kiwi present areas.
- Policy IB-P10 is to Protect indigenous biodiversity by considering the following matters when assessing proposals for land use and subdivision:
  - a) the temporary or permanent nature of any adverse effects,
  - b) cumulative effects of activities that may result in loss or degradation of habitats, species populations and ecosystems,
  - c) the extent of any vegetation removal,
  - d) the effects of fragmentation,
  - e) linkages between indigenous ecosystems and habitats of indigenous species,
  - f) the potential for increased threats from pest plants and animals,
  - g) downstream effects on wetlands, rivers, streams and lakes from hydrological change in catchments,
  - h) whether the indigenous vegetation meets the criteria for a Significant Natural Area,
  - i) the location, scale and design of any proposed development,
  - j) the functional need of regionally significant or critical infrastructure,
  - k) any positive contribution the development has on the indigenous biodiversity, where located outside of the coastal environment.

The three key areas worthy of protection and enhancement from an ecological perspective, highlighted above, are the wetland (W1), the kahikatea swamp forest (W2) and the taraire-puriri-tōtara remnant forest area in the north of Lot 1 (part of the Kopenui Remnant). To avoid adverse effects of land use, increased buffer planting, restoration of the ecological linkages, together with weed and pest management support these objectives. Excluding livestock from these areas is the most immediate action contributing to these objectives.

### 5.3 NORTHLAND REGIONAL POLICY STATEMENT

Objective 3.4 of the Northland Regional Policy Statement is to:

Safeguard Northland's ecological integrity by:

- a) Protecting areas of significant indigenous vegetation and significant habitats of indigenous fauna,
- b) Maintaining the extent and diversity of indigenous ecosystems and habitats in the region; and
- c) Where practicable, enhancing indigenous ecosystems and habitats particularly where this contributes to the reduction in the overall threat status of regionally and nationally threatened species.

Policy 3.15 is to maintain and / or improve (amongst other matters) areas of significant indigenous vegetation and significant habitats of indigenous fauna by supporting, enabling

and positively recognising active management arising from the efforts of landowners, individuals, iwi, hapū and community groups.

Objective 3.4 is supported by Policy 4.4.1 relating to the maintenance and protection significant ecological areas and habitats, specifically:

(3) Outside the coastal environment and where clause (1) does not apply, avoid, remedy or mitigate adverse effects of subdivision, use and development so they are not significant on any of the following:

(a) Areas of predominantly indigenous vegetation,

(b) Habitats of indigenous species that are important for recreational, commercial, traditional or cultural purposes,

(c) Indigenous ecosystems and habitats that are particularly vulnerable to modification, including wetlands, dunelands, northern wet heathlands, headwater streams, floodplains and margins of freshwater bodies, spawning and nursery areas.

(4) For the purposes of clause (3), when considering whether there are any adverse effects and/or any significant adverse effects:

(a) Recognise that a minor or transitory effect may not be an adverse effect,

(b) Recognise that where the effects are or maybe irreversible, then they are likely to be more than minor,

(c) Recognise that there may be more than minor cumulative effects from minor or transitory effects.

(5) For the purpose of clause (3) if adverse effects cannot be reasonably avoided, remedied or mitigated then it may be appropriate to consider the next steps in the mitigation hierarchy i.e. biodiversity offsetting followed by environmental biodiversity compensation, as methods to achieve Objective 3.4.

Assessment of significance of indigenous vegetation or indigenous habitats under the Criteria in Appendix 5 of the Northland Regional Policy Statement.

### **1. Representativeness**

(a) Regardless of its size, the ecological site is largely indigenous vegetation or habitat of indigenous fauna that is representative, typical or characteristic of the natural diversity at the relevant and recognised ecological classification and scale to which the ecological site belongs:

i. If the ecological site comprises largely indigenous vegetation types; and

ii. Is typical of what would have existed circa 1840; or

iii. Is represented by faunal assemblages in most of the guilds expected for the habitat type; or

(b) The ecological site

i. Is a large example of indigenous vegetation or habitat of indigenous fauna, or

ii. Contains a combination of landform and indigenous vegetation and habitat of indigenous fauna, that is considered to be a good example of its type at the relevant and recognised ecological classification and scale.

The Kopenui Forest Remnant and the Youngs Swamp Forest meet the criteria as a large example of indigenous vegetation and habitat of indigenous fauna.

**2. Rarity/ distinctiveness**

- (a) The ecological site comprises indigenous ecosystems or indigenous vegetation types that:
- i. Are either Acutely or Chronically Threatened land environments associated with LENZ Level 4); or
  - ii. Excluding wetlands, are now less than 20% of their original extent; or
  - iii. Excluding man made wetlands, are examples of the wetland classes that either otherwise trigger Appendix 5 criteria or exceed any of the following area thresholds (boundaries defined by Landcare delineation tool);
    - a) Saltmarsh greater than 0.5 hectare in area; or
    - b) Shallow water (lake margins and rivers) greater than 0.5 hectare in area; or
    - c) Swamp greater than 0.4 hectare in area; or
    - d) Bog greater than 0.2 hectare in area; or
    - e) Wet Heathlands greater than 0.2 hectare in area; or
    - f) Marsh; Fen; Ephemeral wetlands or Seepage / flush greater than 0.05 hectares in area.
- (b) Indigenous vegetation or habitat of indigenous fauna that supports one or more indigenous taxa that are threatened, at risk, data deficient or uncommon, either nationally or at the relevant ecological scale.
- (c) The ecological site contains indigenous vegetation or an indigenous taxon that is:
- i. Endemic to the Northland-Auckland region; or
  - ii. At its distributional limit within the Northland region.
- (d) The ecological site contains indigenous vegetation or an association of indigenous taxa that:
- i. Is distinctive of a restricted occurrence; or ii. Is part of an ecological unit that occurs on an originally rare ecosystem; or
  - iii. Is an indigenous ecosystem and vegetation type that is naturally rare or has developed as a result of an unusual environmental factor(s) that occur or are likely to occur in Northland; or
  - iv. Is an example of nationally or regionally rare habitat as recognised in the New Zealand Marine Protected Areas Policy.

Young's Swamp Forest contains a mature stand of maire tawake which is Threatened – Nationally Significant and a distinctive association of indigenous vegetation (maire tawake-kahikatea/tī kōuka) which is rare in the Kaikohe Ecological District).

The Kopenui Forest meets the rarity criteria because it contains representative taraire-pūriri-tōtara volcanic broadleaf forest which is now acutely threatened and have been reduced to less than 20% of their original extent in Northland.

### 3. Diversity and pattern

- (a) Indigenous vegetation or habitat of indigenous fauna that contains a high diversity of:
  - i. Indigenous ecosystem or habitat types; or
  - ii. Indigenous taxa.
- (b) Changes in taxon composition reflecting the existence of diverse natural features or ecological gradients; or
- (c) Intact ecological sequences.

The vegetation and habitats did not meet the criteria for diversity and pattern.

### 4. Ecological context

- (a) Indigenous vegetation or habitat of indigenous fauna is present that provides or contributes to an important ecological linkage or network, or provides an important buffering function; or
- (b) The ecological site plays an important hydrological, biological or ecological role in the natural functioning of riverine, lacustrine, palustine, esturine, plutonic (including karst), geothermal or marine system; or
- (c) The ecological site is an important habitat for critical life history stages of indigenous fauna including breeding / spawning, roosting, nesting, resting, feeding, moulting, refugia or migration staging point (as used seasonally, temporarily or permanently).

The ecological context may also be important for kukupa, bat roosting sites and mudfish habitat.

These policies would be achieved by a range of mechanisms including retaining mature native trees which have value for bat roosting and important seed dispersing avifauna such as kukupa, buffering existing habitats from horticultural or other land use activities, improving the quality of the habitats through weed and pest control and through covenanting or other legal protection.

## 5.4 NATIONAL POLICY STATEMENT FOR FRESHWATER MANAGEMENT

The National Policy Statement for Freshwater Management (2020) (NPSFW) came into effect on 3 September 2020 and required a new transitional policy to be inserted into the Water and Soil Plan to guide resource consent decision-making in relation to freshwater resources.

The objective of the NPSFW is to ensure that natural and physical resources are managed in a way that prioritises:

- (a) first, the health and well-being of water bodies and freshwater ecosystems
- (b) second, the health needs of people (such as drinking water)

(c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

The NPSFW sets out 15 national policies as follows:

1. Freshwater is managed in a way that gives effect to Te Mana o te Wai.
2. Tangata whenua are actively involved in freshwater management (including decision making processes), and Māori freshwater values are identified and provided for.
3. Freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments.
4. Freshwater is managed as part of New Zealand's integrated response to climate change.
5. Freshwater is managed through a National Objectives Framework to ensure that the health and well-being of degraded water bodies and freshwater ecosystems is improved, and the health and well-being of all other water bodies and freshwater ecosystems is maintained and (if communities choose) improved.
6. There is no further loss of extent of natural inland wetlands, their values are protected, and their restoration is promoted.
7. The loss of river extent and values is avoided to the extent practicable.
8. The significant values of outstanding water bodies are protected.
9. The habitats of indigenous freshwater species are protected.
10. The habitat of trout and salmon is protected, insofar as this is consistent with Policy 9.
11. Freshwater is allocated and used efficiently, all existing over-allocation is phased out, and future over-allocation is avoided.
12. The national target (as set out in Appendix 3) for water quality improvement is achieved.
13. The condition of water bodies and freshwater ecosystems is systematically monitored over time, and action is taken where freshwater is degraded, and to reverse deteriorating trends.
14. Information (including monitoring data) about the state of water bodies and freshwater ecosystems, and the challenges to their health and well-being, is regularly reported on and published.
15. Communities are enabled to provide for their social, economic, and cultural wellbeing in a way that is consistent with this National Policy Statement.

Of particular relevance to this proposal are policies 3, 6, 7, 9, and 12.

With respect to Policy 6, identification, and mapping of the wetlands on the property is informing the planning of the land use. The wetland areas will all be avoided and given a protective buffer zone of a minimum of 10 metres to ensure that they are not compromised by the proposed new land uses.



With respect to Policy 9, habitats of indigenous freshwater species will be protected by implementation of targeted weed and pest control.

Specific requirement 3.22 of the NPSFW relates to natural inland wetlands and includes the following:

(1) Every regional council must include the following policy (or words to the same effect) in its regional plan(s): "The loss of extent of natural inland wetlands is avoided, their values are protected, and their restoration is promoted, except where:

(a) the loss of extent or values arises from any of the following:

- (i) the customary harvest of food or resources undertaken in accordance with tikanga Māori
- (ii) restoration activities
- (iii) scientific research
- (iv) the sustainable harvest of sphagnum moss
- (v) the construction or maintenance of wetland utility structures (as defined in the Resource Management (National Environmental Standards for Freshwater) Regulations 2020<sup>2</sup>)
- (vi) the maintenance or operation of specified infrastructure, or other infrastructure (as defined in the Resource Management (National Environmental Standards for Freshwater) Regulations 2020
- (vii) natural hazard works (as defined in the Resource Management (National Environmental Standards for Freshwater) Regulations 2020); or

(b) the regional council is satisfied that:

- (i) the activity is necessary for the construction or upgrade of specified infrastructure; and
- (ii) the specified infrastructure will provide significant national or regional benefits; and
- (iii) there is a functional need for the specified infrastructure in that location; and
- (iv) the effects of the activity are managed through applying the effects management hierarchy."

(2) Subclause (3) applies to an application for a consent for an activity:

- (a) that falls within any exception referred to in paragraph (a)(ii) to (vii) or (b) of the policy in subclause (1); and
- (b) would result (directly or indirectly) in the loss of extent or values of a natural inland wetland.

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<sup>2</sup> A wetland utility structure is a structure placed in or adjacent to a wetland whose purpose, in relation to the wetland, is recreation, education, conservation, restoration, or monitoring; and for example, includes the following structures that are placed in or adjacent to a wetland for a purpose described in paragraph (a): jetties, boardwalks and bridges connecting them, walking tracks and bridges connecting them, signs, bird-watching hides, monitoring devices and maimai.

- (3) Every regional council must make or change its regional plan(s) to ensure that an application referred to in subclause (2) is not granted unless:
- (a) the council is satisfied that the applicant has demonstrated how each step of the effects management hierarchy will be applied to any loss of extent or values of the wetland (including cumulative effects and loss of potential value), particularly (without limitation) in relation to the values of: ecosystem health, indigenous biodiversity, hydrological functioning, Māori freshwater values, and amenity value; and
  - (b) any consent is granted subject to:
    - (i) conditions that apply the effects management hierarchy; and
    - (ii) a condition requiring monitoring of the wetland at a scale commensurate with the risk of the loss of extent or values of the wetland.
- (4) Every regional council must make or change its regional plan(s) to include objectives, policies, and methods that provide for and promote the restoration of natural inland wetlands in its region, with a particular focus on restoring the values of ecosystem health, indigenous biodiversity, hydrological functioning, Māori freshwater values, and amenity value.

The habitat enhancement, together with management and protection of wetlands is consistent with the NPS and contributes to catchment wide improvements.

## 5.5 STOCK EXCLUSION REGULATIONS (FROM 3 SEPTEMBER 2020)

The Lots are covered by the "low altitude land maps" which are defined as part of the regulation<sup>3</sup>. The mapped areas show low altitude land where beef cattle and deer must be excluded from lakes and rivers over one metre wide from 1 July 2025. The mapped areas also show where all cattle, pigs and deer must be excluded from natural wetlands with an area more than 500 square metres from 1 July 2025.

Stock must be excluded from the beds of lakes, rivers and wetlands, and must not be on land closer than three metres to the bed of rivers and lakes. However, stock need not be excluded from land within three metres of the bed if there is a permanent fence in place on 3 September 2020. As outlined in the report stock have already been excluded from the NIEP site to facilitate the development of horticultural and mixed-use innovation land use.

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<sup>3</sup> [Stock exclusion regulations | Ministry for the Environment](#)

## 6. ECOLOGICAL OPPORTUNITIES

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The ecological values of the Lots currently range from low to high and are dispersed across the Lots with the highest value habitats being the wetlands and remnants of forest growing on volcanic soils.

With respect to Appendix III of the Northland Regional Policy Statement the Kopenui Forest Remnant and the Youngs Swamp Forest, meeting Criteria 1, being a large example of indigenous vegetation and habitat of indigenous fauna, were assessed as significant. Young's Swamp Forest contains a mature stand of maire tawake which is Threatened – Nationally Significant, and a distinctive association of indigenous vegetation (maire tawake-kahikatea/tī kōuka) which is rare in the Kaikohe Ecological District. The Kopenui Forest meets the rarity Criteria 2 because it contains forest, representative taraire-pūriri-tōtara volcanic broadleaf, which is now acutely threatened ecosystems that have been reduced to less than 20% of their original extent in Northland. Habitats on Site are potentially important for kukupa, bat roosting sites and mudfish habitat (Criteria 4).

There are also natural inland wetlands as defined by the NPS-FM (W1) and within the Youngs Kahikatea Forest (W2). Low-lying land between these two areas provides an opportunity to extend the wetland area, by 1.8 ha, and create an ecological linkage between two rare habitats, swamp forest and flax/ sedgeland wetland.

Weeds, particularly in the Kopenui Forest Remnant where tradescantia is widespread in the groundcover, likely spread by animals, have resulted in reduced ecological values in the understorey layer.

There is also an opportunity to improve the terrestrial, and wetland ecological values at the Site by undertaking buffer planting around the perimeter of the identified habitats and infilling the grazed areas within these blocks.

The increase in horticultural production with more varied crops provides an opportunity to increase plant diversity and both funding and incentive for a more concerted effort with weed and pest control over the Lots. Ecological constraints from increased disturbance due to activity, lighting, and noise will need to be assessed and managed once they become defined.

## 7. CONSTRAINTS

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Horticulture is a permitted activity on the Lots. Subject to confirmation of any proposal the methods set out in this report are generally good ecological practice and would likely address any effects. The constraints outlined below take into account the rules and objectives within the District and Regional Plans and the National Policy Statements to provide informed direction for FNHL when deciding the optimal use of specific areas within the Lots. Despite the permitted activity status, the presence of ecological values at the Lots poses constraints on any development which might be undertaken there. In particular, Chapter 12 of the Far North District Plan<sup>4</sup> outlines rules relating to clearance of indigenous vegetation throughout the district. The nature of the vegetation at the Lots means that beyond the permitted activity thresholds, vegetation clearance at the Lots would require resource consent as either a restricted discretionary or discretionary activity (depending on the specific circumstances). The District Plan also contains policies, objectives and rules relating to effects on lakes, rivers and wetlands (including riparian areas).

- The NPSFM (2020) imposes limits to areas where any activity must be avoided such that earthworks and the taking, damming, diversion, or discharge of water within 100m of a wetland is not permitted if any detrimental effect on the wetland is likely. The NPSFM regulations prevent clearance of vegetation, earthworks, or the taking, damming, diversion, or discharge of water within 10m of the mapped wetlands. We recommend that horticultural activities, such as perennial cropping, be setback 20m from the wetlands, and the forest blocks. Earthworks and any other activities related to the horticultural development would necessarily have to meet the 100m setback rules from the wetlands to ensure that the wetlands are maintained and improved over the long-term.
- In relation to the individual trees or smaller groves, retention, reconnection (where practicable) and protection of these is recommended. If removal or modification of mature indigenous trees is proposed, this would need to be supported by additional surveys to determine the potential effects and any mitigating actions sufficient to address the adverse effects on those habitats.
- The management actions detailed in Section 4 should be implemented to avoid and mitigate any detrimental ecological effects such as loss of trees/ vegetation, drainage of wetlands, spread of weeds, nutrient enrichment and sedimentation of waterways, and to enhance the ecological values on the land recommended to be set aside from development.
- Habitat within the Youngs Kahikatea Forest contains wetland areas suitable for Northland mudfish. There is a possibility that Northland mudfish would be present here due to their abundance in the nearby Ngāwha swamps. If mudfish were found, monitoring and maintenance of this population would be required because of their Threatened – Nationally Vulnerable (2018) conservation status.
- The proposal to intensify and diversify the cropping and productive use of this land has the potential to adversely affect the ecological values at the Lots. To mitigate risk buildings, storage areas, tunnel houses, glasshouses, car parks and accessways need to be set back from identified ecological areas by at least 20m from the forest buffer, and outside the wetland exclusion zones.

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<sup>4</sup> Chapter 12.1 of the Far North District Plan relates to indigenous vegetation in Outstanding Landscapes and Chapter 12.2 relates to other indigenous vegetation clearance throughout the district. Chapter 12.7 provides for activities in lakes, rivers and wetlands.

## 8. RECOMMENDATIONS

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It is recommended that:

- Trapping be carried out to establish the presence of Northland mudfish in the wetlands on the Lots.
- Ecological buffer and linkage planting be carried out as detailed in Section 4 which entails an additional 4.9ha of planting across the site, including 0.3ha mixed broadleaf-podocarp volcanic forest, 2.4ha mixed swamp forest and wetland species, 0.4ha of wetland buffer planting, and approximately 1.8ha of wetland planting to re-establish ecological connections across the Site.
- Weed and pest management be carried out as detailed in Section 4.
- Best practice erosion and sediment control for all earthworks necessary to develop the Lots be undertaken in accordance with an environmental management plan which includes protection and buffering of indigenous habitats, in order to address adverse effects.
- Mature indigenous trees be retained with cropping taking place around these. In the case of Innovation Park proposed activities conflicting with this, additional ecological surveys to identify bats, lizard or alternative options be undertaken.

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## 9. REFERENCES

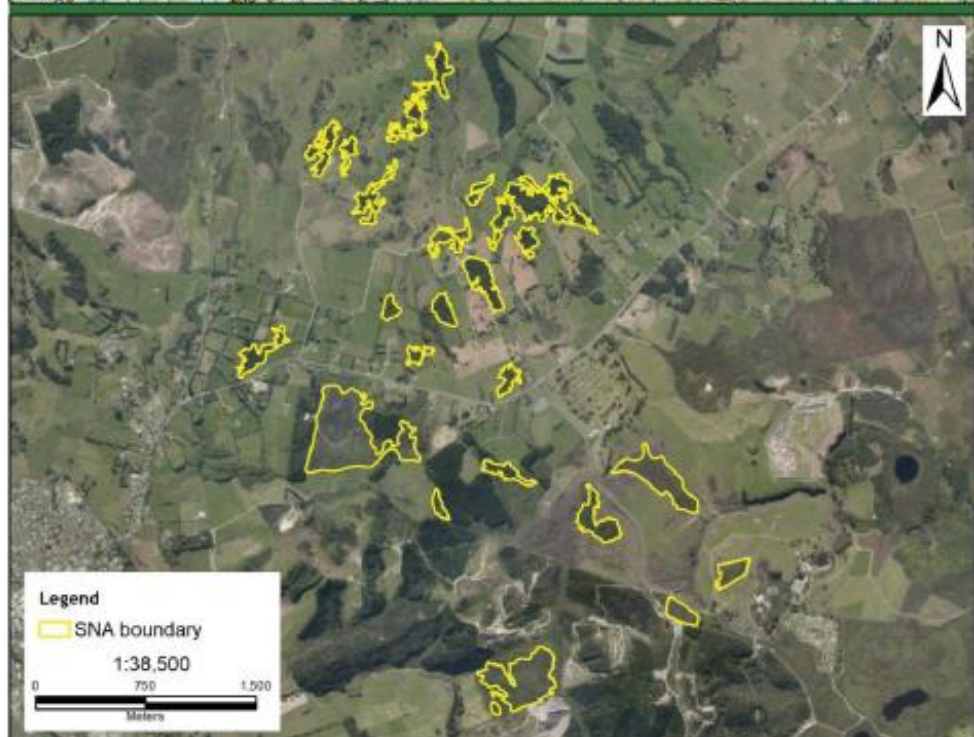
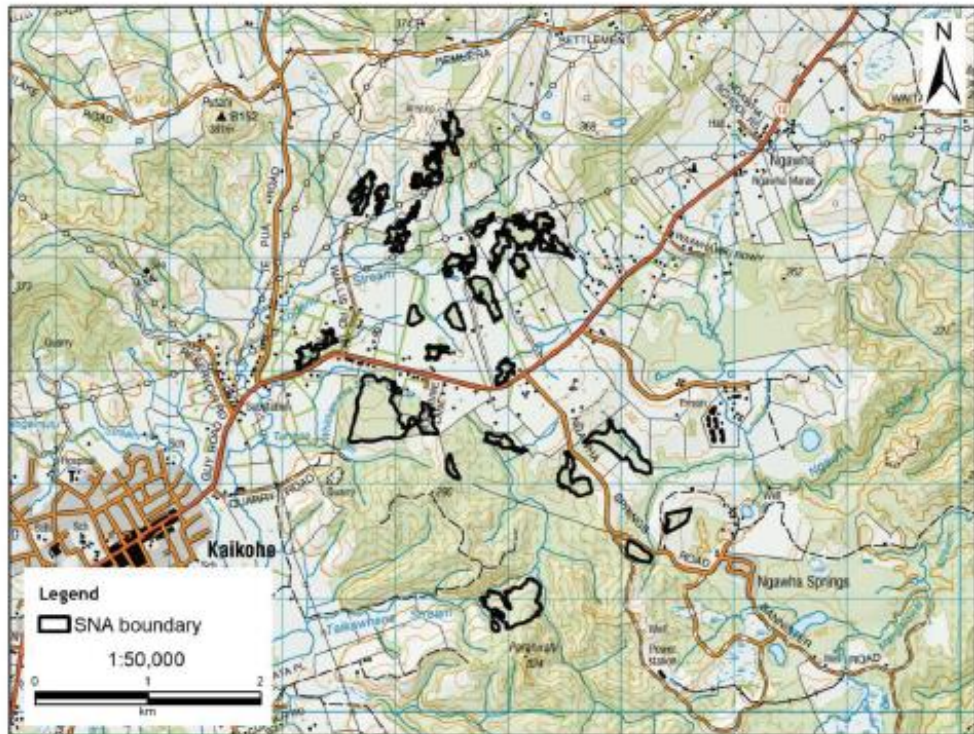
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**APPENDIX A**  
**FNDC PROPOSED SIGNIFICANT NATURAL AREA IDENTIFICATION**

FN172

Kopenui Stream Remnants



## KOPENUI STREAM REMNANTS

<b>SNA ID:</b>	FN172
<b>Protection Status:</b>	Unprotected
<b>Area (ha):</b>	103.15
<b>Altitude Range (m):</b>	200 - 368
<b>Ecological District:</b>	Kaikohe
<b>Grid Reference:</b>	E1674888, N6082619

VEGETATION TYPE	LANDFORM
Tōtara forest	Hillslope
Taraire-pūriri forest	Hillslope
Conning and Miller (2000)	

<b>Flora:</b>	None known.
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<b>Fauna:</b>	None known.
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<b>Notes/Comments:</b>	The taraire-pūriri dominant portion is representative of the volcanic broadleaved forest, which was once typical of forests on the volcanic plateau east of Lake Omapere, but which are now rare. This site has an emergent rimu element, which is uncommon in the Kaikohe ecological District (Conning and Miller (2000)).
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<b>Significant:</b>	Yes
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<b>Significance Justification:</b>	<b>Criteria Met</b> <b>Justification</b>	
	1a(i)	Contains representative forest vegetation types.
	1a(ii)	Contains vegetation types representative of pūriri-taraire forests which would have existed circa 1840.
	2a(i)	The site occurs on 'Acutely Threatened' and 'Chronically Threatened' land environments.
	2a(ii)	Pūriri-taraire forests have been reduced to less than 20% of their original extent in the Northland Region.

<b>Threats/Modifications/Vulnerability (Desktop Assessment):</b>	Unknown.
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<b>References:</b>	Conning and Miller (2000).
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<b>Assessment for Significance Based On:</b>	Northland 0.1 metre Urban Aerial Photos (2017) and existing information as cited above.
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<b>Boundary Changes Since 1999:</b>	Boundaries adjusted to follow the extent of indigenous vegetation based on 2017 digital aerial photographs.
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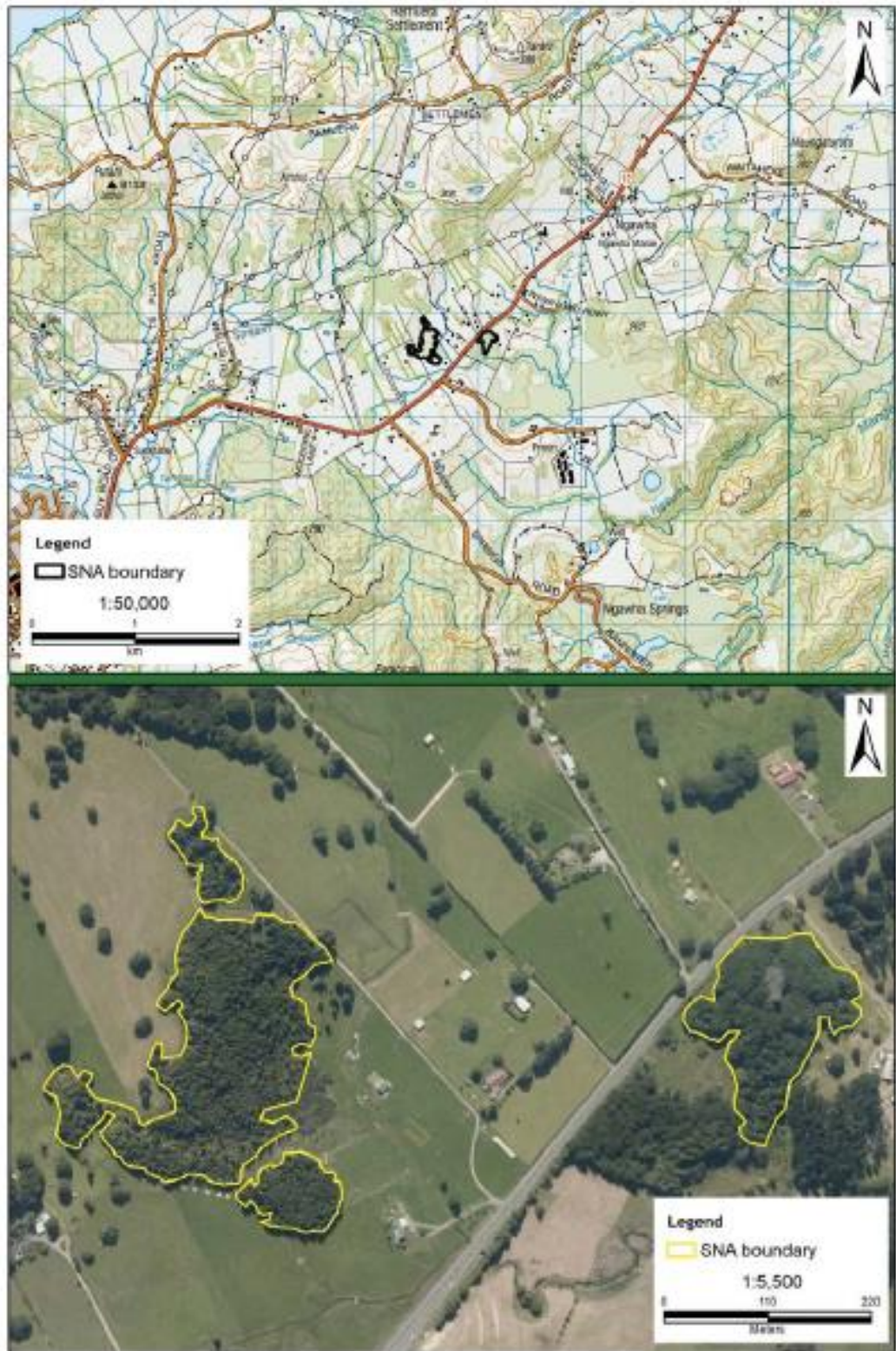
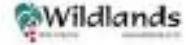
<b>Field Work Required?</b>	No
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<b>Assessment Date:</b>	15/7/2019
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FN669

Young's Kahikatea Remnant



## YOUNG'S KAHIKATEA REMNANT

<b>SNA ID:</b>	FN889														
<b>Protection Status:</b>	Unprotected														
<b>Area (ha):</b>	7.48														
<b>Altitude Range (m):</b>	226 - 245														
<b>Ecological District:</b>	Kaikohe														
<b>Grid Reference:</b>	E1876487, N6083708														
<b>VEGETATION TYPE</b>	<b>LANDFORM</b>														
Kahikatea forest	Toeslope														
Maire tawake-kahikatea-tī kōuka forest	Volcanic flats														
Mānuka scrub	Volcanic flats														
Conning and Miller (2000)															
<b>Flora<sup>1</sup>:</b>	Maire tawake ( <i>Syzygium maire</i> ; Threatened-Nationally Critical; regionally significant) and mānuka ( <i>Leptospermum scoparium</i> ; At Risk-Declining) (Conning and Miller 2000).														
<b>Fauna:</b>	None known.														
<b>Notes/Comments:</b>	Contains swamp forest, which is a rare and diminishing habitat type (Conning and Miller 2000).														
<b>Significant:</b>	Yes														
<b>Significance Justification:</b>	<table border="1"> <thead> <tr> <th>Criteria Met</th> <th>Justification</th> </tr> </thead> <tbody> <tr> <td>1a(i)</td> <td>Contains representative forest and scrub vegetation types.</td> </tr> <tr> <td>1a(ii)</td> <td>Contains vegetation types representative of kahikatea swamp forests which would have existed circa 1840.</td> </tr> <tr> <td>2a(i)</td> <td>The site occurs on 'Acutely Threatened' and 'Chronically Threatened' land environments.</td> </tr> <tr> <td>2a(ii)</td> <td>Swamp forests are a rare and diminishing habitat type, with kahikatea forests reduced to less than 20% of their original extent in the Northland Region.</td> </tr> <tr> <td>2b</td> <td>Supports a regionally significant plant species.</td> </tr> <tr> <td>2d(i)</td> <td>Contains one of only two records of maire tawake-kahikatea-tī kōuka swamp forest in the Kaikohe Ecological District.</td> </tr> </tbody> </table>	Criteria Met	Justification	1a(i)	Contains representative forest and scrub vegetation types.	1a(ii)	Contains vegetation types representative of kahikatea swamp forests which would have existed circa 1840.	2a(i)	The site occurs on 'Acutely Threatened' and 'Chronically Threatened' land environments.	2a(ii)	Swamp forests are a rare and diminishing habitat type, with kahikatea forests reduced to less than 20% of their original extent in the Northland Region.	2b	Supports a regionally significant plant species.	2d(i)	Contains one of only two records of maire tawake-kahikatea-tī kōuka swamp forest in the Kaikohe Ecological District.
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2b	Supports a regionally significant plant species.														
2d(i)	Contains one of only two records of maire tawake-kahikatea-tī kōuka swamp forest in the Kaikohe Ecological District.														
<b>Threats/Modifications/Vulnerability (Desktop Assessment):</b>	This site is located within open farmland and may be grazed at times.														
<b>References:</b>	Conning and Miller (2000).														
<b>Assessment for Significance Based On:</b>	Northland 0.1 metre Urban Aerial Photos (2017) and existing information as cited above.														
<b>Boundary Changes Since 1999:</b>	Boundaries adjusted to follow the extent of indigenous vegetation based on 2017 digital aerial photographs.														

<sup>1</sup> Two indigenous plant species (maire tawake, mānuka) in the Myrtaceae family were recorded at the site. All of the Myrtaceae species are at risk of infection by myrtle rust (*Austropuccinia psidii*), a potentially devastating rust which has no known treatment. Along with other species in the Myrtaceae family, the threat status of the species present has been elevated as a precautionary measure based on the potential threat posed by myrtle rust (see de Lange *et al.* 2018). However, the Myrtaceae species found at the site were not assessed against the ecological significance criteria because these species are common and widespread in the Kaikohe Ecological District.

**APPENDIX B  
Plant Species List**

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Table A-1 Plant List Kopenui Fragment	
Latin Name	Common name
<b>Dicotyledon trees and shrubs</b>	
<i>Beilschmiedia tarairi</i>	Taraire
<i>Carpodetus serratus</i>	Putaputaweka
<i>Coprosma arborea</i>	Mamangi / tree Coprosma
<i>Coprosma rhamnoides</i>	Coprosma
<i>Dysoxylum spectabile</i>	Kohekohe
<i>Geniostoma ligustrifolium</i>	Hangehange
<i>Hedycarya arborea</i>	Porokaiwhiri / Pigeonwood
<i>Knightia excelsa</i>	Rewarewa / NZ honeysuckle
<i>Melicytus ramiflorus</i>	Mahoe
<i>Myrsine australis</i>	Red matipo /mapau
<i>Piper excelsum</i>	Kawakawa
<i>Podocarpus totara</i>	Tōtara
<i>Solanum aviculare var. aviculare</i>	Poroporo
<i>Weinmannia sylvicola</i>	Towai
<b>Lianes and climbers</b>	
<i>Freycinetia banksii</i>	Kiekie
<i>Metrosideros perforata</i>	Rata vine
<i>Ripogonum scandens</i>	Kareao / supplejack
<b>Herbaceous monocots</b>	
<i>Astelia hastata</i>	Perching lily
<i>Earina mucronata</i>	Peka-a-waka / bamboo orchid
<i>Solanum nigrum*</i>	Black nightshade
<b>Grasses, sedges and rushes</b>	
<i>Oplismenus hirtellus</i>	
<b>Ferns and Fern Allies</b>	
<i>Asplenium oblongifolium</i>	Shining spleenwort
<i>Asplenium flaccidum</i>	Hanging spleenwort
<i>Cyathea dealbata</i>	Silver tree fern
<i>Diplazium australe</i>	Ring fern
<i>Histiopteris incisa</i>	Mata / water fern
<i>Hymenopyllum sp. demissum(?)</i>	Filmy fern
<i>Icarus filiformis</i>	Thread fern, climbing hard fern
<i>Lygodium articulatum</i>	Mangemange
<i>Notogrammitis billardierii</i>	Strap fern
<i>Paesia scaberula</i>	Ring fern
<i>Parablechnum procerum</i>	Small kiokio
<i>Parapolystichum microsora subsp.pentangulare</i>	Smooth shield fern
<i>Pneumatopteris pennigera</i>	Gully fern
<i>Pyrrosia eleagnifolia</i>	Leather leaf fern
<i>Pyrrosia scaberaella</i>	
<i>Selaginella kraussiana*</i>	African clubmoss
<i>Zealandia pustulata subsp. pustulata</i>	Hound's tongue

Table A-2 Plant List Kahikatea Forest Remnant	
Latin Name	Common name
<b>Gymnosperm trees and shrubs</b>	
<i>Dacrycarpus dacrydioides</i>	Kahikatea
<i>Dacrydium cupressinum</i>	Rimu
<i>Podocarpus totara</i>	Tōtara
<b>Dicotyledon trees and shrubs</b>	
<i>Ackama rosifolia</i>	Makamaka
<i>Aristolelia serrata</i>	Makomako / wineberry
<i>Beilschmiedia tarairi</i>	Taraire
<i>Carpodetus serratus</i>	Putaputaweta / marbleleaf
<i>Coprosma aereolata</i>	Thin leaved coprosma
<i>Coprosma spathulata</i> subsp. <i>spathulata</i>	
<i>Coprosma robusta</i>	Karamu
<i>Coprosma rhamnoides</i>	
<i>Hoheria populnea</i>	Lacebark
<i>Leptecophylla juniperina</i> subsp. <i>Juniperina</i>	Prickly mingimingi
<i>Dysoxylum spectabile</i>	Kohekohe, NZ mahogany
<i>Geniostoma ligustrifolium</i>	Hangehange
<i>Hedycarya arborea</i>	Porokaiwhiri / Pigeonwood
<i>Leptospermum scoparium</i> agg.	Mānuka
<i>Leucopogon fasciculatus</i>	Mingimingi
<i>Metrosideros perforata</i>	Rata
<i>Myrsine australis</i>	Red matipo /mapau
<i>Phyllocladus trichomanoides</i>	Tanekaha / celery pine
<i>Piper excelsum</i>	Kawakawa
<i>Pseudopanax arboreus</i>	Fivefinger, whauwhaupaku
<i>Rubus fruticosus</i> *	Blackberry
<i>Schefflera digitata</i>	Pate / seven-finger
<i>Solanum aviculare</i> var. <i>aviculare</i>	Poroporo
<i>Solanum mauritianum</i> *	Woolly nightshade
<i>Syzygium maire</i>	Swamp maire, tawake
<i>Ulex europaeus</i> *	Gorse
<i>Veronica</i> sp	Hebe
<i>Vitex lucens</i>	Puriri
<i>Weinmannia sylvicola</i>	Towai
<b>Monocot trees and shrubs</b>	
<i>Cordyline australis</i>	Cabbage tree, ti kouka, palm lily
<i>Phormium tenax</i>	Harakeke / Flax
<b>Lianes and climbers</b>	
<i>Freycinetia banksii</i>	Kiekie
<i>Ripogonum scandens</i>	Supplejack / kareao
<b>Herbaceous monocots</b>	
<i>Astelia hastata</i>	Perching lily
<i>Astelia microsperma</i> (?)	
<i>Earina mucronata</i>	Bamboo orchid, peka-a-waka
<i>Lemna minor</i>	Common duckweed

<b>Dicot herbs</b>	
<i>Ageratina adenophora</i> *	Mexican devil
<i>Cardamine hirsuta</i> *	Bitter cress
<i>Centella uniflora</i> *	Centella
<i>Cirsium vulgare</i> *	Scotch thistle
<i>Conyza albida</i> *	Fleabane
<i>Digitalis purpurea</i> *	Foxglove
<i>Jacobaea vulgaris</i> *	Ragwort
<i>Lotus pedunculatus</i> *	Lotus
<i>Metrosideros perforata</i>	Akatea
<i>Nertera balfouriana</i>	
<i>Persicaria maculosa</i> *	Willow weed
<i>Ranunculus repens</i> *	Creeping buttercup
<i>Ranunculus sp</i> *	
<i>Solanum nigrum</i> *	Black nightshade
<i>Stachys sylvatica</i> *	Hedge woundwort
<i>Taraxacum officinale</i> *	Dandelion
<i>Verbena bonariensis</i> *	Purple-top
<b>Grasses, sedges and rushes</b>	
<i>Carex secta</i>	Purei, Pukio
<i>Carex geminata</i>	Cutty grass, Rautahi
<i>Carex virgata</i>	Swamp sedge, pukio, toitoi, toetoe
<i>Cyperus brevifolius</i> *	
<i>Digitaria sanguinalis</i> *	Summer grass
<i>Isachne globosa</i>	Swamp millet
<i>Isolepis aucklandica</i>	
<i>Isolepis prolifera</i>	
<i>Juncus articulatus</i> *	Jointed rush
<i>Juncus acuminatus</i>	Sharp-fruited rush
<i>Juncus effusus var. effusus</i>	Soft rush
<i>Juncus pallidus</i>	Giant rush, leafless rush
<i>Juncus sarophorus</i>	Broom rush; fan-flowered rush
<i>Luzula rufa var. rufa</i>	Red woodrush
<i>Machaerina teretifolia</i>	Rush
<i>Oplismenus hirtellus</i>	
<i>Paspalum distichum</i> *	Mercer grass
<i>Schoenus tendo</i>	Kauri sedge, kauri Schoenus
<i>Uncinia sp</i>	Hook sedge
<b>Ferns and Fern Allies</b>	
<i>Asplenium oblongifolium</i>	Shining spleenwort
<i>Arthropteris tenella</i>	Jointed fern
<i>Asplenium flaccidum</i>	Hanging spleenwort
<i>Asplenium oblongifolium</i>	Shining spleenwort
<i>Asplenium polyodon</i>	Sickle spleenwort
<i>Blechnum filiforme/ Icarus filiformis</i>	Thread fern
<i>Cyathea medullaris</i>	Black tree fern, mamaku, black mamaku
<i>Dicksonia squarrosa</i>	Wheki / rough tree fern
<i>Histiopteris incisa</i>	Mata / water fern
<i>Hymenophyllum sp. demissum ?</i>	Filmy fern
<i>Icarus filiformis</i>	Thread fern
<i>Lygodium articulatum</i>	Mangemange
<i>Notogrammitis billardierei</i>	Common strap fern
<i>Notogrammitis sp.</i>	Strap fern
<i>Paesia scaberula</i>	Ring fern
<i>Parablechnum minus</i>	Swamp kiokio
<i>Parablechnum novae-zelandiae</i>	Swamp kiokio
<i>Parablechnum procerum</i>	Small kiokio
<i>Pneumatopteris pennigera</i>	Gully fern
<i>Pteris carsei</i>	Netted brake
<i>Pyrrosia eleagnifolia</i>	Leather leaf fern
<i>Selaginella kraussiana</i>	African club moss
<i>Zealandia pustulata subsp. pustulata</i>	Hounds tongue, kowaowao

Table A-3 Plant List Wetland	
Latin Name	Common name
<b>Gymnosperm trees and shrubs</b>	
<i>Dacrycarpus dacrydioides</i>	Kahikatea
<i>Dacrydium cupressinum</i>	Rimu
<i>Podocarpus totara</i>	Tōtara
<b>Dicotyledon trees and shrubs</b>	
<i>Carpodetus serratus</i>	Putaputaweta / marbleleaf
<i>Leptospermum scoparium var. incanum</i>	Mānuka
<i>Leptospermum scoparium</i>	Mānuka
<i>Myrsine australis</i>	Red matipo /mapou
<i>Rubus fruticosus*</i>	Blackberry
<i>Solanum mauritianum*</i>	Woolly nightshade
<i>Vitex lucens</i>	Puriri
<b>Monocot trees and shrubs</b>	
<i>Cordyline australis</i>	Cabbage tree, ti kouka, palm lily
<i>Phormium tenax</i>	Harakeke / Flax
<b>Lianes and climbers</b>	
<i>Muehlenbeckia australis</i>	Pohuehue, large-leaved muehlenbeckia
<b>Herbaceous monocots</b>	
<i>Potamogeton cheesemanii</i>	Red pondweed
<i>Potamogeton suboblongus</i>	Mud pondweed
<i>Myriophyllum sp</i>	Water milfoil
<b>Dicot herbs</b>	
<i>Anagallis arvensis *</i>	Pimpernel
<i>Anthemis cotula</i>	Stinking mayweed
<i>Bellis perennis*</i>	Bellis daisy, lawn daisy
<i>Calystegia sepium*</i>	Pink bindweed
<i>Centella uniflora*</i>	Centella
<i>Cerastium fontanum*</i>	Mouse-ear chickweed
<i>Cirsium vulgare*</i>	Scotch thistle
<i>Conyza albida*</i>	Fleabane
<i>Epilobium chionanthum</i>	Marsh willowherb
<i>Erythranthe guttata*</i>	Monkey musk
<i>Fumaria muralis subsp. Muralis*</i>	Scrambling fumitory
<i>Galium palustra*</i>	Cleavers
<i>Gamochoaeta coarctata</i>	Purple cudweed
<i>Geranium molle</i>	Doves foot cranesbill
<i>Helminthotheca echioides*</i>	Oxtongue
<i>Holcus lanatus*</i>	Yorkshire fog
<i>Hydrocotyle moschata var. parvifolia</i>	
<i>Hypochaeris radicata</i>	Catsear
<i>Jacobaea vulgaris*</i>	Ragwort
<i>Leontodon saxatilis</i>	
<i>Leucanthemum vulgare*</i>	Oxeye daisy
<i>Lotus pedunculatus*</i>	Lotus
<i>Myosotis arvensis</i>	Field forget-me-not
<i>Oenanthe pimpinelloides*</i>	Carrot weed

<i>Oxalis brasiliensis</i> *	Brazilian oxalis
<i>Persicaria hydropiper</i> *	Water pepper
<i>Persicaria maculosa</i> *	Willow weed
<i>Phytolacca octandra</i> *	Inkweed
<i>Plantago major</i> *	Broad leaf plantain
<i>Plantago lanceolata</i> *	Narrow-leaved plantain
<i>Prunella vulgaris</i> *	Self-heal
<i>Ranunculus repens</i> *	Creeping buttercup
<i>Ranunculus sp</i> *	
<i>Rumex acetosella</i> *	Sheep's sorrel
<i>Rubus fruticosus</i> agg.*	Blackberry
<i>Rumex crispus</i> *	Narrow-leaved dock
<i>Rumex obtusifolius</i> *	Broad-leaf dock
<i>Rumex pulcher</i>	Fiddle dock
<i>Silybum marianum</i> *	Variegated thistle
<i>Solanum nigrum</i> *	Black nightshade
<i>Sonchus arvensis</i> *	Sow thistle, sowthistle
<i>Taraxacum officinale</i> agg.*	Dandelion
<i>Trifolium pratense</i> *	Red clover
<i>Trifolium repens</i> *	White clover
<i>Veronica serpyllifolia</i> *	Turf speedwell
<b>Grasses, sedges and rushes</b>	
<i>Agrostis stolonifera</i>	Creeping bent
<i>Cyperus ustulatus</i>	Giant umbrella sedge
<i>Cenchrus clandestinus</i> *	Kikuyu
<i>Dactylis glomerata</i> *	Cocksfoot
<i>Eleocharis sphacelata</i>	Kutakuta, tall spike sedge
<i>Isachne globosa</i>	Swamp millet
<i>Isolepis prolifera</i>	
<i>Juncus acuminatus</i>	Sharp-fruited rush
<i>Juncus edgariae</i>	Wiwi
<i>Juncus pallidus</i>	Giant rush, leafless rush
<i>Juncus planifolius</i>	Grass-leaved rush
<i>Lolium rigidum</i> *	Annual rye grass
<i>Lolium perenne</i> *	Perennial rye grass
<i>Machaerina rubiginosa</i>	Baumea
<i>Machaerina teretifolia</i>	Baumea
<i>Paspalum dilatatum</i> *	Paspallum
<i>Paspalum distichum</i>	Mercer grass
<b>Ferns and Fern Allies</b>	
<i>Azolla pinnata</i>	Ferny azolla
<i>Azolla rubra</i>	Red azolla
<i>Cyathea medullaris</i>	Black tree fern, mamaku, black mamaku
<i>Dicksonia squarrosa</i>	Wheki / rough tree fern
<i>Histiopteris incisa</i>	Mata / water fern
<i>Paesia scaberula</i>	Ring fern
<i>Parablechnum minus</i>	Swamp kiokio
<i>Parablechnum novae-zelandiae</i>	Kiokio/palm-leaf fern
<i>Pneumatopteris pennigera</i>	Gully fern
<i>Polystichum vestitum</i>	Punui, prickly shield fern
<i>Pteridium esculentum</i>	Rarauhe/bracken
<i>Parapolytichum microsorum</i> subsp. <i>pentangulare</i>	Creeping shield fern
<i>Pyrrosia elaeagnifolia</i>	Leather-leaf fern, Pyrrosia

\*denotes introduced and naturalised species



**APPENDIX C**  
**Bird Species List**

Latin Name	Common name
<i>Porphyrio melanotus</i>	Pukeko
<i>Alauda arvensis</i> *	Skylark
<i>Phasianus colchicus</i> *	Common pheasant
<i>Turdus philomelos</i> *	Song thrush
<i>Passer domesticus</i>	Sparrow
<i>Platycercus eximius</i> *	Eastern rosella
<i>Hirundo neoxena</i> *	Welcome swallow
<i>Prothemadera novaeseelandiae</i>	Tui
<i>Turdus merula</i> *	Blackbird
<i>Tadorna variegata</i>	Paradise shelduck
<i>Rhipidura fuliginosa</i>	Pīwakawaka/Fantail
<i>Circus approximans</i> *	Harrier Hawk
<i>Todiramphus sanctus</i> *	Kōtare/Kingfisher

\*denotes introduced and naturalised species

