

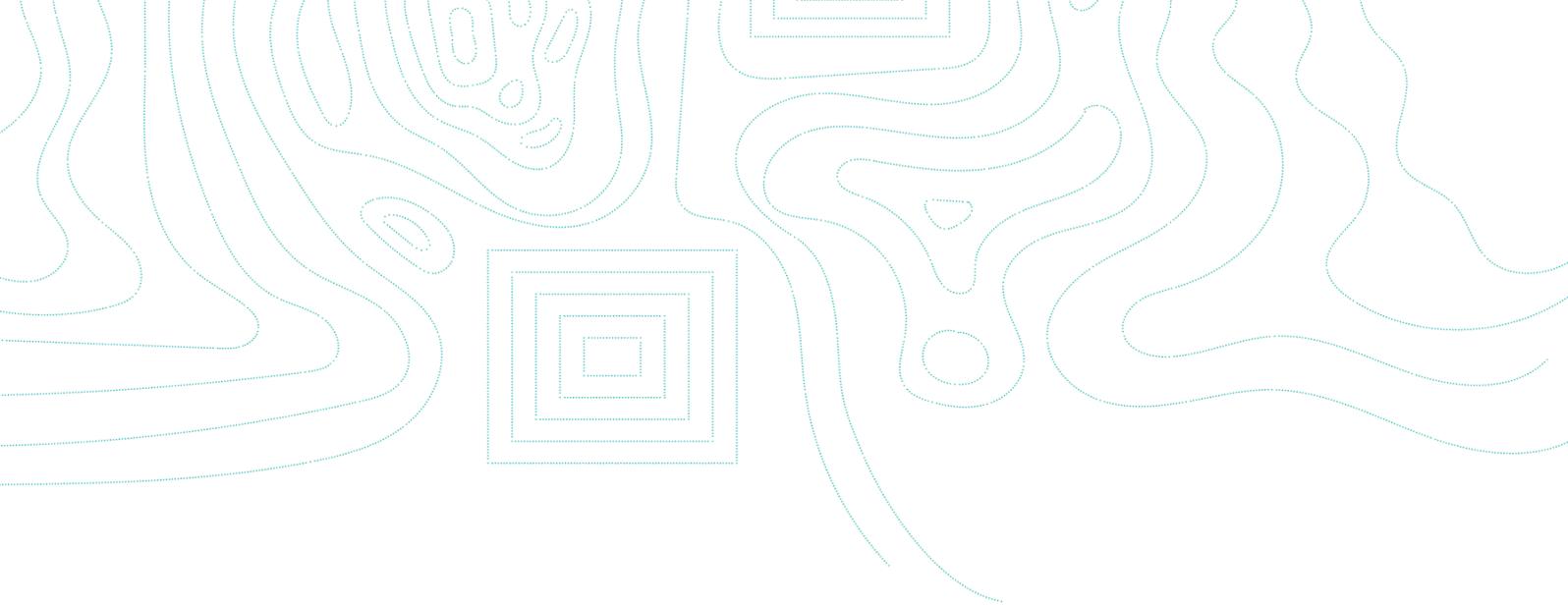
The top half of the page features a teal-to-green gradient background with a white dotted topographic map pattern. The word "BlueGreen" is written in a bold, white, sans-serif font in the upper left corner.

# BlueGreen

A horizontal photograph showing a quarry landscape with a small stream or pond in the center, surrounded by brown earth and rocks.

## Belmont Quarry Land Exchange

Overview of Ecological Values



## Document Quality Assurance

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*Cover photograph:* View south looking over existing Belmont Quarry (foreground) and eastern side of south-western gully

# Executive Summary

## Background

Winstone Aggregates (Winstone), a division of Fletcher Concrete and Infrastructure Limited (Fletcher), is undertaking development to establish and use a new Over Burden Deposition Area (OBDA) at Belmont Quarry, located in Lower Hutt in the Wellington Region. To enable this, Winstone is proposing a land exchange involving approximately 34 hectares of Fletcher-owned land to be added to the conservation estate, in return for approximately 24 hectares of Crown-owned reserve land managed and controlled by Greater Wellington Regional Council as part of Belmont Regional Park.

## Purpose

The purpose of this report is to provide an overview of the indigenous habitats and species present and establish the conservation values of each area of land and to provide an explanation of why the exchange would benefit the conservation estate.

## Land exchange terminology

For clarity, this report uses the terms DOC Give and DOC Get to describe the two components of the proposed exchange.

- **The DOC-Give** area refers to the area of Crown-owned reserve land within Belmont Regional Park that Winstone seeks to obtain for the establishment of the OBDA. The DOC-Give area covers approximately 23.86 (rounded to 24) hectares.
- **The DOC-Get** areas refer to the Fletcher-owned land that Winstone proposes to transfer into the conservation estate. The DOC-Get areas cover approximately 33.8 (rounded to 34) hectares across four parcels of land.

## Scope of report

This report describes the biodiversity and freshwater values of the DOC-Give and DOC-Get areas based on historic and recent field surveys. Field investigations have been carried out in this area for more than ten years, supported by recent extended survey work that provides a detailed and current understanding of local ecological conditions. It covers terrestrial vegetation, freshwater habitats, and habitats for indigenous fauna including avifauna, herpetology and bats.

## Summary of findings

Ecological surveys show that both the DOC-Give and DOC-Get areas contain comparable habitat types, with the DOC Get areas covering a larger footprint and including several areas in a more advanced state of native regeneration and retained mature forest. Both areas have a small number of rare taxa (a lizard several plants and some birds). Freshwater streams are predominantly in the DOC get with only headwaters in the DOC give area. Both have regenerating natural inland wetland areas. Faunal habitats are present across both areas and are reasonably the same noting the DOC get offers more and more mature habitat. The key distinction is the presence of nine mature swamp maire trees in the DOC-Give area. To balance this disparity Winstone proposes to plant 200 swamp maire plants in an appropriate wetland area in the DOC, as part of an improvement package to enhance the conservation values of the land to be managed by DOC. Overall, the assessment indicates that the land proposed for addition to the conservation estate is greater in area and holds higher ecological value than the land to be exchanged.

This report has been jointly authored by [redacted] (terrestrial and aquatic ecology) and [redacted] (avifauna), (main authors) with input from [redacted] (Herpetology), [redacted] (bats). The authors confirm that, in our capacity as authors of this report, we have read and agree to abide by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses Practice Note 2023.

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## 1.0 Definitions and Terms Used

Term	Definition
Three classes that describe vegetation development are generally age-related, and they are described as:	
<b>Exotic seral</b>	Predominantly exotic early colonisers or post farming land use, generally hardy species including the first indigenous species such as ferns that begin ecological succession toward a more biodiverse steady state ecosystem. Species presence is fluid and the community is highly responsive to external pressures.
<b>Seral</b> (early, mid, late)	An intermediate stage in ecological succession as an ecosystem advances toward its climax community. More than one serial stage may evolve until a steady state ecosystem forms. This is typically the most diverse stage with decreasing fluidity in species presence and abundance.
<b>Climax or mature</b>	A steady state ecosystem where dominant biomass is usually woody and forms a closed canopy. This stage is resistant to change and has stable species representation except where large disturbances occur.
Other definitions include:	
<b>DOC-Get</b>	The Northern and Southern Gullies, the Firth Block, and Dry Creek as shown in Figure 1.
<b>DOC-Give</b>	The area within Regional Park overlaid with the proposed OBDA as shown in Figure 1.
<b>Endemic</b>	Plants and animals that are unique to an area or species that may migrate but breed only in that area.
<b>Ephemeral</b>	As defined by Greater Wellington Regional Council guidance. A hydrological rather than ecological definition that is reflected here.
We note that just where on a river's continuum the boundaries between perennial-intermittent-ephemeral are changes seasonally and annually. The purpose here, though, is to demark the types of aquatic assemblages, and so a focus is on the apparent biological components rather than purely the hydrology.	
<b>Ephemeral stream</b>	A stream that flows only for short periods following heavy or persistent rain and is otherwise dry and without aquatic life. The bed is usually vegetated or, under canopy, full of leaf and woody litter.
<b>Intermittent stream</b>	A stream that flows for longer periods, typically during wet seasons, but may become dry during seasonal soil moisture deficit. It has a defined channel and may reduce to persistent pools that provide refugia for fish.
<b>Perennial stream</b>	A stream with permanent flows year-round.

## **2.0 Introduction**

### **2.1 Purpose of report**

Winstone Aggregates (Winstone) is applying under the Fast Track Approval Act 2024 (FTAA) for a land exchange with the Department of Conservation. The swap includes a portion of the Belmont Regional Park (a recreational reserve under the Reserves Act 1977). This report considers the ecological (conservation) values, condition, and future opportunities for each of proposed exchange areas: the areas currently owned by Winstone that it is offering to the Department of Conservation as part of the exchange are referred to as (the DOC-Get), and the area Winstone wishes to acquire (the DOC-Give). This report provides ecological information to inform the land exchange application (Figure 1).

### **2.2 Project history**

The exchange proposal has been considered at various times since 2016; and has been subject of various survey work since then. The data presented comes from several years of different surveys and work to establish the values of these sites. The 2025 data collection (vegetation, habitat, lizard and bird analysis) builds on the Boffa Miskell Limited 2016 study of the proposed hilltop land, later surveys of some of the proposed exchange areas, the condition of the northern streams, and other accessible survey data. As mentioned above the footprint of land to be included in the exchange has evolved over that time in response to the information and feedback received.

### **2.3 Scope and limitations of ecological information**

The vegetation surveys are comprehensive, or as comprehensive as surveys can be for around 70 ha of vegetation in complex topography. The aquatic surveys are also representative of the two main perennial systems. The avian and herpetological field and desktop work has been undertaken by others. Invertebrate surveys are not considered required because of the nature and age of the regional park exchange area.

### **2.4 Section 33 of the FTAA**

If the Panel approve the exchange, the proposed overburden disposal development will still need to obtain RMA and Wildlife Act approvals under the FTAA as part of the Projects substantive application. This report only deals with the exchange component. The use of the area as overburden placement is part of the later substantive application and will be assessed against NPS IB, NPS FM, NES and Regional and district consent matters (with respect to ecology).

As part of the exchange, section 33 of the FTAA, requires that information be included in the application about the activity on the exchange land proposed, and an assessment of the activity's effects on the environment where relevant to the exchange (as required by Schedule 4 of the RMA). This report addresses those effects noting that as the land exchange is essentially a land transfer very few effects can be said to arise from that.

### **2.5 Assessment of conservation values**

This report focuses on the values present in the land to be exchanged. It describes the communities, habitats, species, and ecological values and functions of the DOC-Give and DOC-Get areas in the local and ecological district context. This report also makes note of improvement works to be done, and potential outcomes for each block.

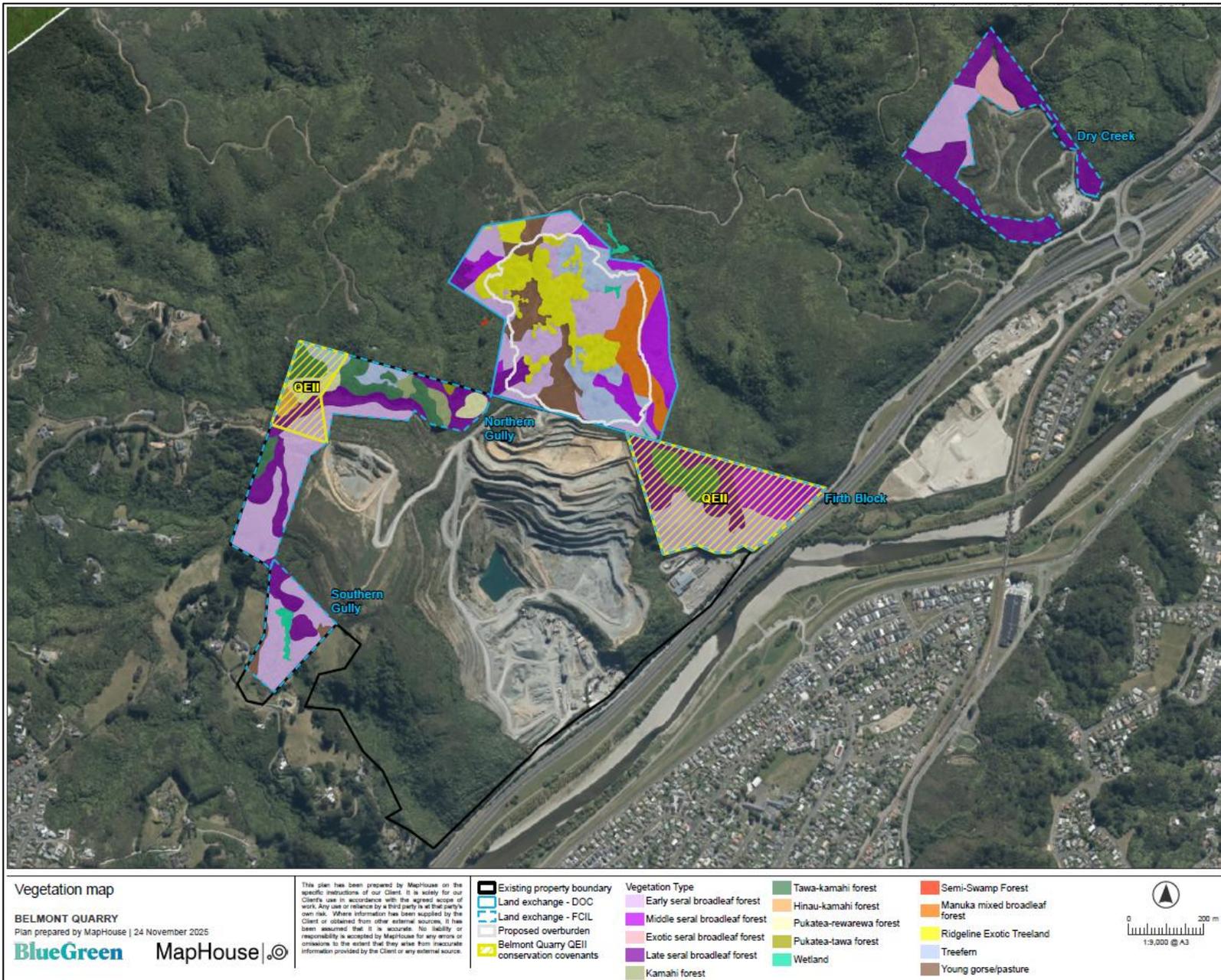


Figure 1: The DOC-Give and DOC-Get areas & vegetation types. Note the DOC-Give has the OBDA enclosed in a white line, and a blue outer line represents the exchange area.

### 3.0 Site and surrounds

The site lies within the Sounds-Wellington Ecological Region (39) and the Wellington Ecological District (39.01). The Ecological District is characterised by steep, strongly faulted hills and ranges (McEwen, 1987). The district is very windy with frequent North-West gales, warm summers and mild winters. It includes a range of soils derived from greywacke and loess, as well as alluvial, peaty, and stony soils in the valley. The Wellington Ecological District was originally mostly forested; today it is modified by farming and urbanisation, with pasture, gorse, and regenerating shrublands throughout and only a few remaining remnant forest areas (McEwen, 1987).

The proposed site is a 24 ha area situated on upper slopes between two streams that drain east into the Hutt River and is part of the 615 ha Belmont-Dry Creek Key Native Ecosystem (KNE) (Greater Wellington Regional Council, 2015a, (Figure 2) an area identified by Forest and Bird as a regional park corridor. The KNE contains remnant and regenerating (approximately 50 years) forest on the lower slopes and valley floors, as well as manuka scrubland on the hill country. Native avifauna species recorded within the KNE include tui, kereru, whitehead, bellbird, grey warbler, silvereye, fantail, harrier, NZ falcon, tomtit and black-backed gulls. (GWRC, 2023).

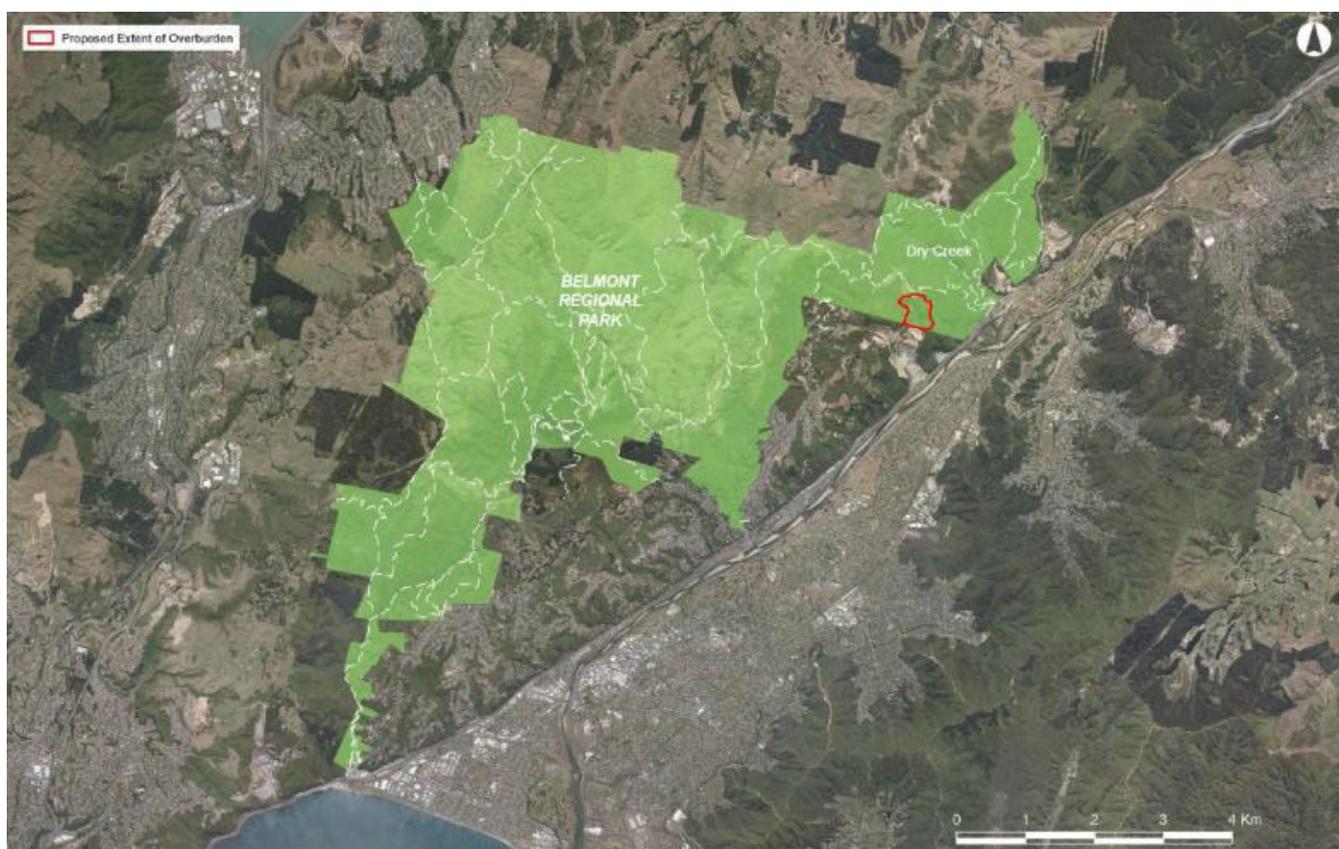


Figure 2: The Belmont Regional Park and the red area are the approximate areas of the proposed OBDA.

There are several areas adjacent to or near the proposed site that have been identified as Significant Natural Resources (SNRs) (Lower Hutt City Council, 2004). The values for which they are determined are provided in Table 1. Mitcalfe (1997) Also recognised the Firth Block (Haywards Quarry Bush SNR 15), adjacent and east of the site, as being ecologically significant.

One tributary, at the eastern and southern end (but outside) of the site, has been identified as within an SNR ((Mitcalfe, B. J., 1997) And again identified as “significant” under the then GWRC criteria.

**Table 1: Identified Hutt City Council SNRs that are within proximity to the proposed exchange areas.**

HCC SNR		Values Identified
1	Belmont bush	Lowland forest vegetation. Pukatea-matai / tawa forest remnant. Kereru.
3	Boulder Hill bush	Lowland forest vegetation. Tawa/miro forest remnant. Regenerating broadleaf forest.
15	Hayward Quarry bush	Lowland forest in the hill country.
17	Haywards shrubland	Regenerating shrubland in the hill country
31	Liverton Road bush	Lowland forest in the hill country

### 3.1 Historic Forest Types

The Regional Forest Ecosystem Study (Singers et al., 2018) Shows the land of the quarry and adjoining Belmont regional part as suitable for, and once covered in MF7 – Tawa, kāmahī, podocarp forest. This forest type is currently regionally endangered, with 22% remaining. Examples persist in the Dry Creek catchment in nearby Belmont Regional Park (and one of the DOC get areas).

This ecosystem occurs on a wide range of parent materials, although soil fertility is typically low to moderately low. (Singers et al., 2018). The canopy is dominated by tawa and kāmahī, with rimu generally the most abundant emergent podocarp tree, though locally northern rata is also common. Miro, kahikatea, matai, tōtara and Hall's tōtara may also be present.

Despite a large area of this forest type remaining nationally, a substantial proportion has been fragmented or entirely lost for pastoral agriculture and forestry. Animal pests are significant threats, resulting in declines in palatable canopy and sub-canopy species and in functionally important forest birds. (Clout, 2006).

Die-back of northern rata and kāmahī has been attributed to possum browse, and in many locations, northern rata is now an uncommon emergent tree. (Rogers & Leathwick, 1997).

Goats are locally a threat and, in combination with other pests, have the potential to cause canopy collapse, regeneration failure and species loss within this ecosystem.

The stream riparian system and side gullies, typical also of MF 7, were once (and still show signs of being) pukatea-swamp maire assemblages below the tawa hill slope components. The swamp maire was once a feature of the Hutt River floodplain (WF8).

### 3.2 Geology and soils

Heine (1975) Records the parent material as Greywacke and Greywacke drift on weathered Greywacke and steep to very steep unstable (erodible) surfaces. These have Korokoro hill slopes (mainly) with lesser areas of Ngaio loams and Ruahine steep land soils, with land-use capability data. (Hewitt et al., 2010) Suggesting various degrees of susceptibility to sheets, rill gully and scree erosion (see Table 2). These soils held a pre-human rimu-rata forest with Hīnau-tawa-kāmahi. They are generally well-drained soils.

**Table 2: Geomorphology and Soils of the Site**

LCU Unit	Description
<b>Dry Creek &amp; Northern Tawa Soils</b>	
4e1	Rolling to strongly rolling downlands mantled with loess and/or volcanic tephra below 200 m asl with Brown, Pallic and Melodic (yellow-brown earths and intergrades between yellow-brown earths and yellow-brown loam) soils in moderate to high (1200-2000 mm) rainfall areas, with a potential for severe sheet and rill erosion when cultivated.
6e6	Moderately steep to steep greywacke hill country below 400m asl with Brown (yellow brown earth) soils, in moderate (1100-1600mm) rainfall areas subject to periods of soil moisture deficit and wind, with a potential for moderate sheet, soil slip and scree erosion.
7e2	Steep to very steep greywacke hills and mountain lands below the treeline (1500m asl) with strongly leached low fertility Brown, Recent, Pumice and Ultic (yellow brown earth and yellow brown pumice) soils in moderate to high (1200-3000mm) rainfall areas with a potential for severe soil slip, debris avalanche and scree erosion, and moderate sheet and gully erosion.

### 3.3 LENZ Threatened Environments

Table 3 shows the categories of the Land Environments of New Zealand (LENZ) threat classification (Walker et al., 2007a). There are six categories; the first five environments are threatened. The sixth is secure. These categories correspond with the colour coding for the Belmont Quarry areas surveyed and depicted within Figure 3.

The proposed OBDA (the DOC-Give) is primarily a land class that retains very little indigenous vegetation (reflective of its past use as a working farm). The proposed exchange sites offered by Winstone (the DOC-Get) are mixed in that, in terms of land environments, the lands offered cover areas that are underrepresented and lands that retain greater representation.

**Table 3: Threatened Environment Classification 2007 (colour coding as per mapping)**

Category	Criteria	Name
1	<10% indigenous vegetation is left	Acutely Threatened
2	10–20% indigenous vegetation left	Chronically Threatened
3	20–30% indigenous vegetation is left	At-Risk
4	>30% left and <10% protected	Critically under-protected
5	>30% left and 10-20% protected	Under protected
6	>30% left and >20% protected	Less reduced and better protected

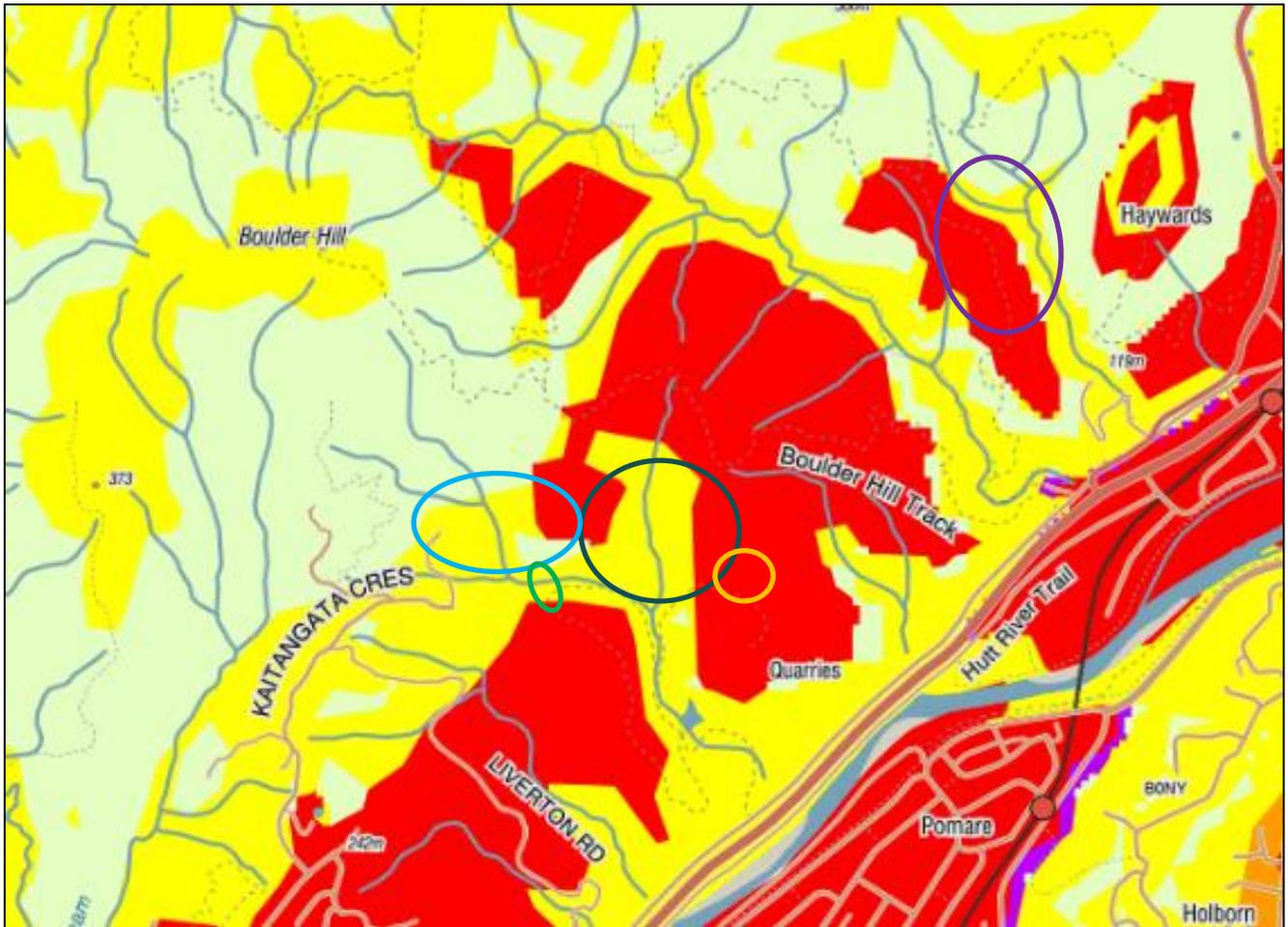


Figure 3: LENZ classification and related areas of this study. Blue -northern tawa kāmahi-Cottle and eastern extension forest, black, green southern gully, OBDA, orange, Firth block, purple, Dry Creek seral area.

### 3.4 The OBDA through time

The proposed OBDA and setback area (demarked only indicatively in the following old aerial photographs) is a product of historic use as farmland, followed by regeneration. Figure 4 illustrates the state of the vegetation cover from 1941 until 2010. It shows that in 1941, the site was pasture with exotic (pine) trees, and the gullies had a low gorse (we assume) mixed with a young broadleaf native canopy. This is where the current young swamp maire are located and reflects the lower level of modification of those areas. The wider landscape is clothed in a mixture of young gorse and native components on steep slopes. By 1974, the gully vegetation had spread, and the pasture component was diminishing.

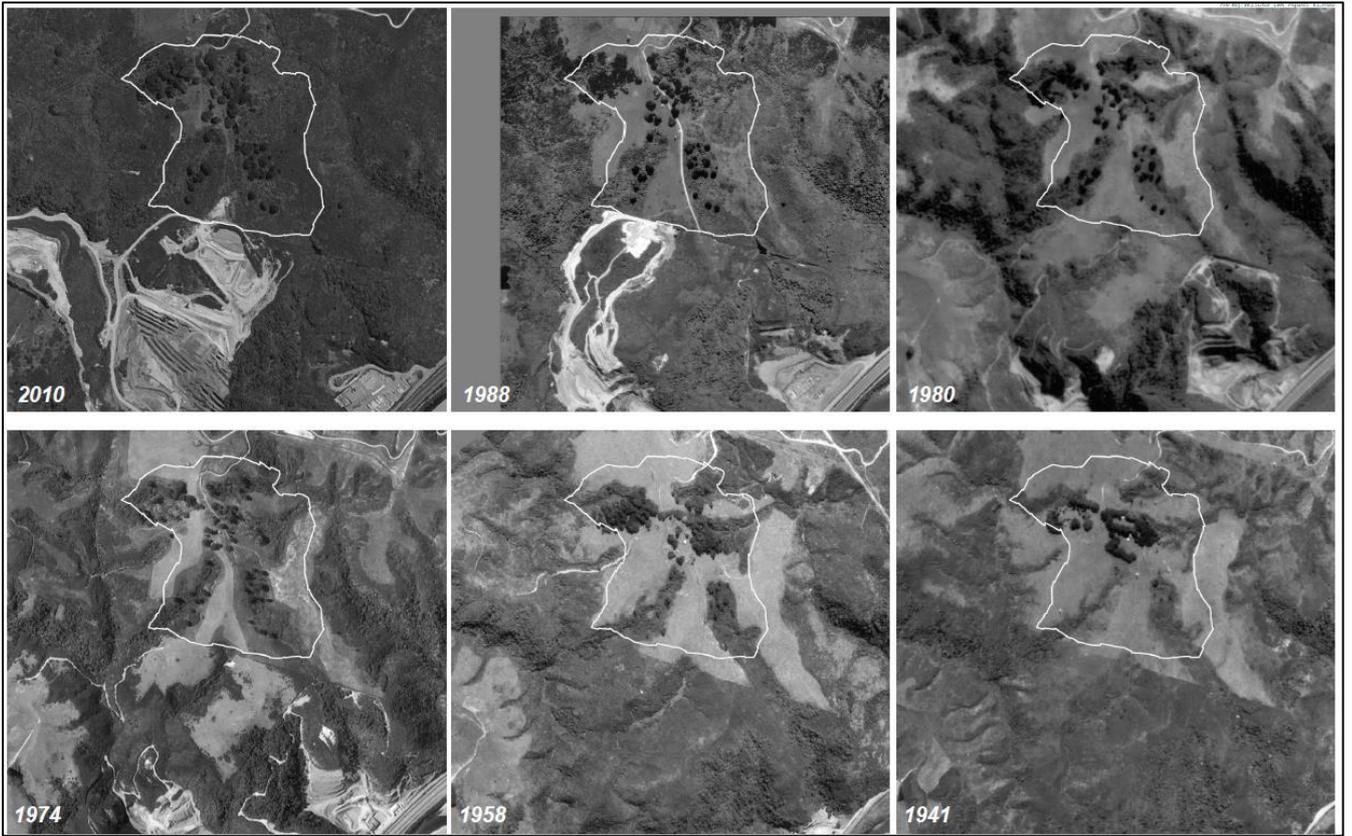


Figure 4: Aerial (1940-2010) photographs showing the land condition over time and an indication of the OBDA area.

## 4.0 Proposal

### 4.1 Introduction to exchange areas

This report focuses on the proposed exchange of 24 ha of recreational reserve land (DOC-give) for four neighbouring areas with various ecological conditions (the DOC-Get). Those areas are the hill slope and edge areas of the “Dry Creek area” a rejuvenating post quarry succession restoration (7.65 ha), the Northern Gully tawa-kāmahi forest and stream and a portion of the southern Cottle block (12.63 ha), a Southern Gully wetland and revegetated side slopes (3.94 ha), and the Firth Block QEII (9.6 ha). These areas sum to 34 ha, and form the proposed set of exchange areas (the DOC-Get). These areas are shown on Figure 5 below

This section describes the land areas relevant to the proposed exchange between Fletcher and the Crown. It identifies the four areas of land proposed for transfer to the Crown (the DOC-Get areas) and the area of land to be transferred to Fletcher (the DOC-Give area). It identifies the location and operational setting of Belmont Quarry within the Wellington Region and its relationship to adjoining Crown land within Belmont Regional Park. It provides legal descriptions, ownership details, and the applicable district and regional plan provisions for all affected parcels, supported by maps and scheme plans. This section also records existing open space covenants, site access arrangements, network utilities, and relevant statutory instruments to establish the physical and planning context for the proposed exchange.

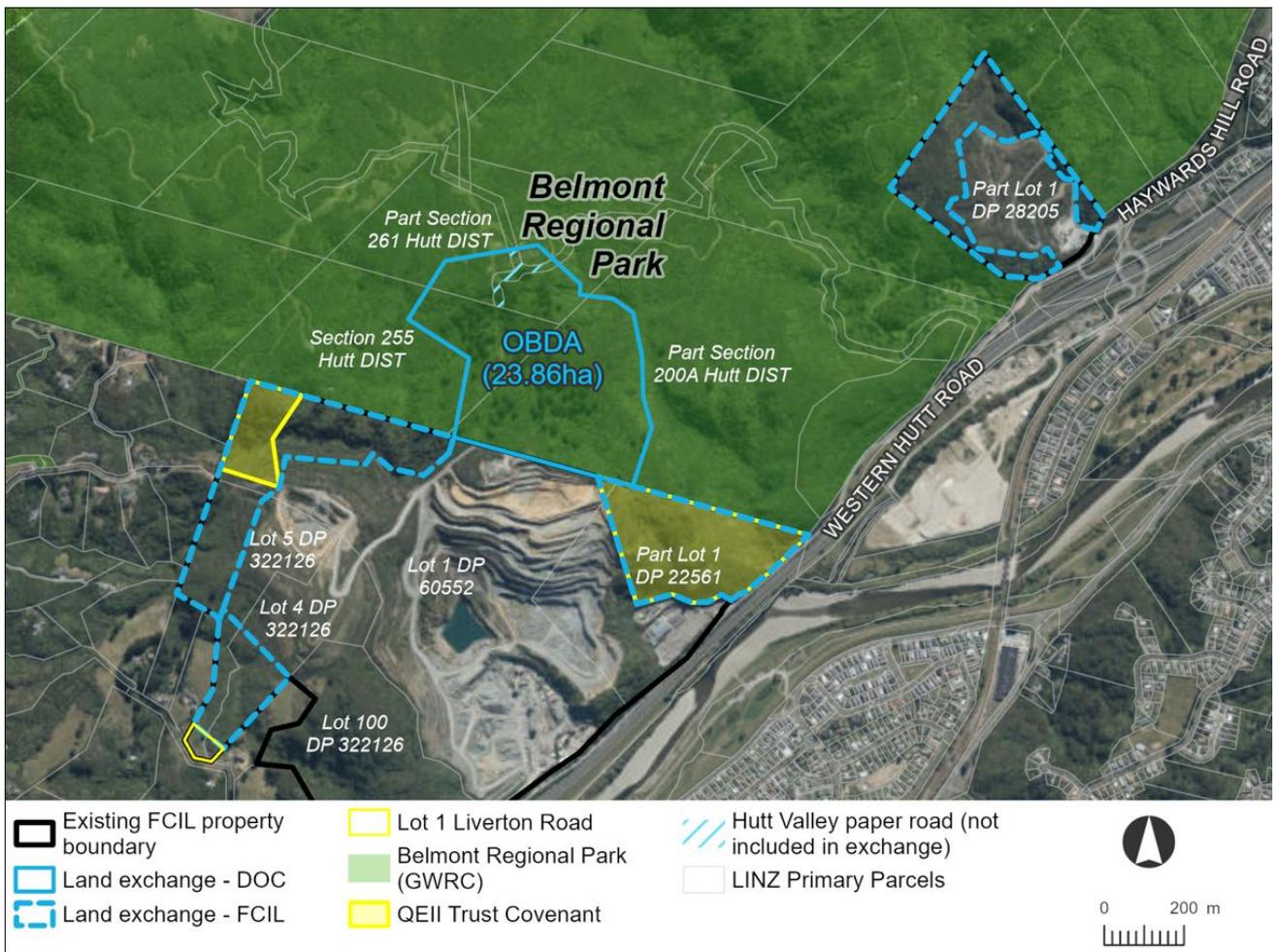


Figure 5: Overview of Proposed Land Exchange Parcels

## 4.2 DOC-Get

Fletcher proposes to transfer four land parcels to the conservation estate owned by DOC. These are the Northern Gully, Southern Gully, Firth, and Dry Creek blocks. Together they comprise 34 hectares of land (more or less) adjoining Belmont Regional Park and include a mix of forest, scrub, and wetland environments.

### 4.2.1 DOC-Get: Northern Gully (12.63 ha)

The Northern Gully is located to the north-west of the quarry (see Figure 6). This parcel comprises south-facing hill slopes and deep gullies with forested stream margins and younger broadleaf on west facing slopes adjacent to an earlier overburden site. The Northern Gully comprises an elongated, broadly L-shaped block of 12.63 ha. It is situated across the northwestern corners of Lot 5 DP 322126 and Lot 1 DP 60552. Open Space Covenant 5-07-755 (Covenant 10476608.1) is located in the northwest corner of the Northern Gully (coloured in yellow, see Figure 6).

Established native forest with a dominant tawa kamahi and pukatea canopy spans the northern side of the watercourse. Ramarama (Nationally critical (de Lange et al., 2018)) is present in this forest. Outside these established forest areas, the remainder of the block comprises mid- to early-seral regenerating native bush. The southern portion of Lot 5 DP 322126 has been subject to overburden placement and subsequent rehabilitation, including native planting.

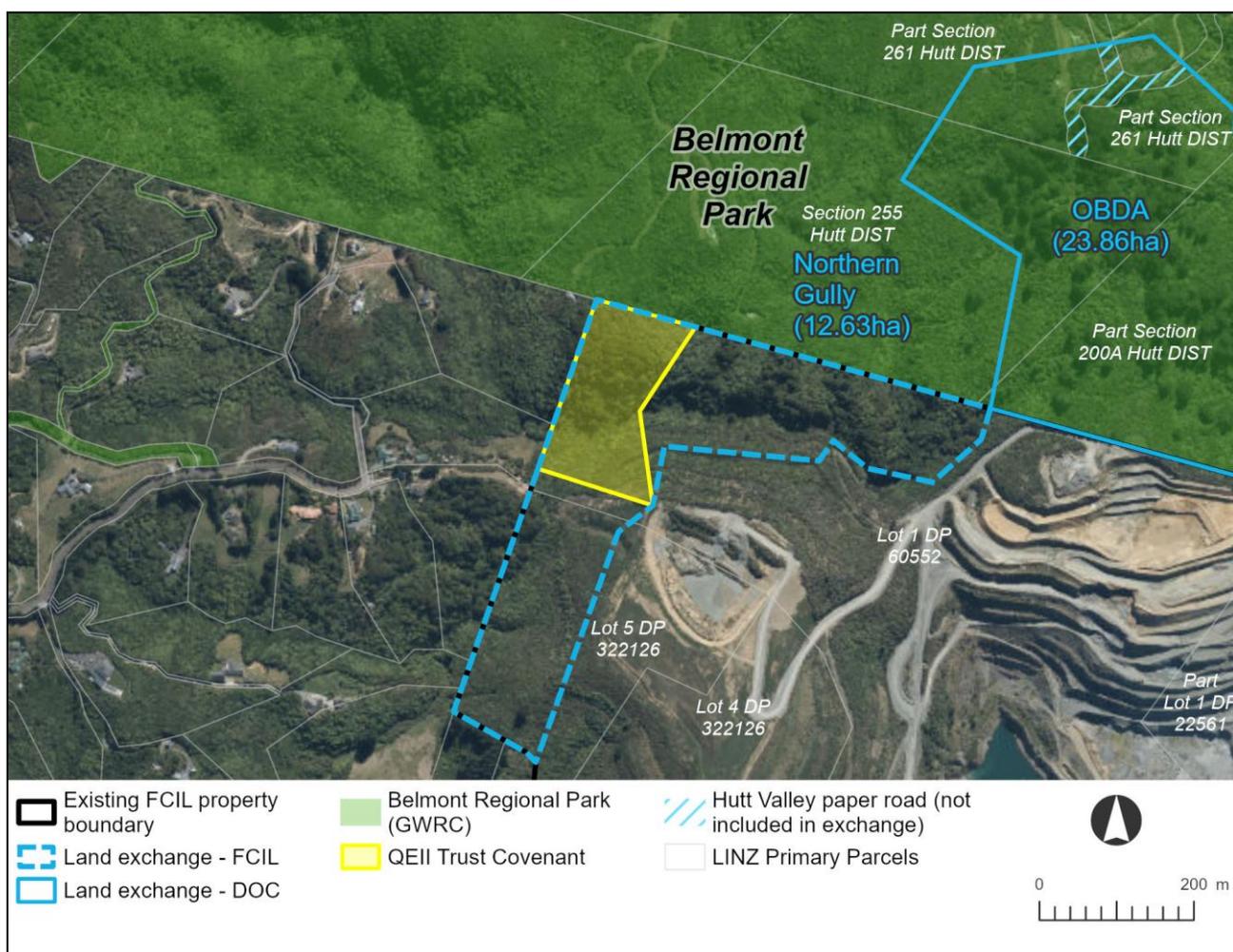


Figure 6: Northern Gully Block and QEII Covenant area

#### 4.2.2 DOC-Get: Firth Block (9.6 ha)

Located to the east of the Belmont Quarry is the Firth Block, which comprises a QEII-covenanted parcel with high ridgeline and steep south-facing slopes (Figure 7). The Firth Block is primarily located on Part Lot 1 of DP 22561, with a small triangle in the northeastern corner of Lot 1 DP 60552. Firth Block comprises a truncated triangular area of approximately 9.6 ha.

Vegetation in the Firth Block is a mix of broadleaf scrub and tree fern mosaics, with an older tawa stand at the head of a south-draining gully. Small patches of manuka occur on upper slopes, while the eastern faces contain mid-seral forest with mapou common in the canopy. The ridgeline and slopes provide continuity of native cover across the block. A portion of an old farm pond and associated edge wetland is within the boundary of the Firth Block and near the proposed OBDA. An ephemeral gully system bisects the block and drains south which contains wetter adapted ferns and broadleaf shrublands on very steep slopes. These features contribute to additional habitat diversity, supporting species related to freshwater environments. The block is within the wider home range of native bird species recorded in Belmont Regional Park.

Firth Block (Pt Lot DP 22561 (RT WN31D/969)) is subject to encumbrance 9032630.1 (shown as F on the Adamson Shaw plans) in favour of Hutt City Council for the protection of vegetation on this part of the Land. The area is 7m wide and adjoins the northern boundary of Part Lot 1 DP 22561. This part of the Land also falls within the Open Space Covenant Area E (as shown on the Adamson Shaw plans). As this encumbrance area falls within the existing QEII area, the vegetation is protected.



Figure 7: Firth Block and QEII Covenant area

#### 4.2.3 DOC-Get: Dry Creek (7.94 ha)

The exchange area referred to as Dry Creek is situated entirely on Part Lot 1 DP 28205. Dry Creek comprises a U-shaped parcel of land approximately 7.94 ha in area (Figure 8). A small area in the northern corner of the Dry Creek block contains historic fill with a mix of exotic and native regenerating vegetation. The balance of the block comprises late seral broadleaf forest.



Figure 8: Dry Creek Block (outlined in blue) for land exchange

#### 4.2.4 DOC-Get: Southern Gully (3.94 ha)

The proposed Southern Gully comprises some 3.94 hectares, which skirts the lower south-west extent of overburden deposited in the Cottle Block and is contiguous with the Northern Gully along its western extent (Figure 9). This aspect of the proposed land exchange forms a lower vegetated gully that separates modified terraces that are gradually revegetating in the Cottle Block, and a rural lifestyle development established along Liverton Road.

The Southern Gully is predominantly surrounded by late-stage, mid-successional native vegetation, while the wetland area itself is regenerating after being historically covered in exotic pasture grasses used for grazing purposes. The Southern Gully comprises a large area of poorly drained soil, which is relatively unique when viewed in the context of the surrounding area. A range of wetland plants have been planted already. These include lowland ribbon wood, toi toi, *Carex secta*, harakeke and lacebark. These

plants appear to have been planted within the last 5 or 6 years. These factors make the site an ideal nursery and restoration area for growing both pukatea and swamp maire. A swamp maire restoration (200 trees) is proposed as part of the conservation gain initiative. The site also offers various areas in which weed control and further revegetation work could be utilised to improve biodiversity and to help offset the vegetation loss associated with the establishment of the proposed OBDA.



Figure 9: Southern Gully

### 4.3 DOC-Give: OBDA (23.86 ha)

The following paragraphs describe the Crown land parcels that contain the DOC-Give area proposed to be exchanged, including their legal descriptions, management status, and the relationship to the Belmont Quarry operation. The total area proposed for exchange is 23.86.

The DOC-Give area (Figure 10) falls within the Belmont-Dry Creek Key Native Ecosystem (KNE) identified in the GWRC's 2023-2028 operational plan. Its landscape values are recognised in the Toitū Te Whenua Parks Network Plan 2020-2030. The site is predominantly covered first by open areas of old pines and gorse regeneration and then off the top land by regenerating native broadleaf forest that increases in age downslope from the spur, reflecting historic farming concentrated on the ridgeline and gentler slopes.

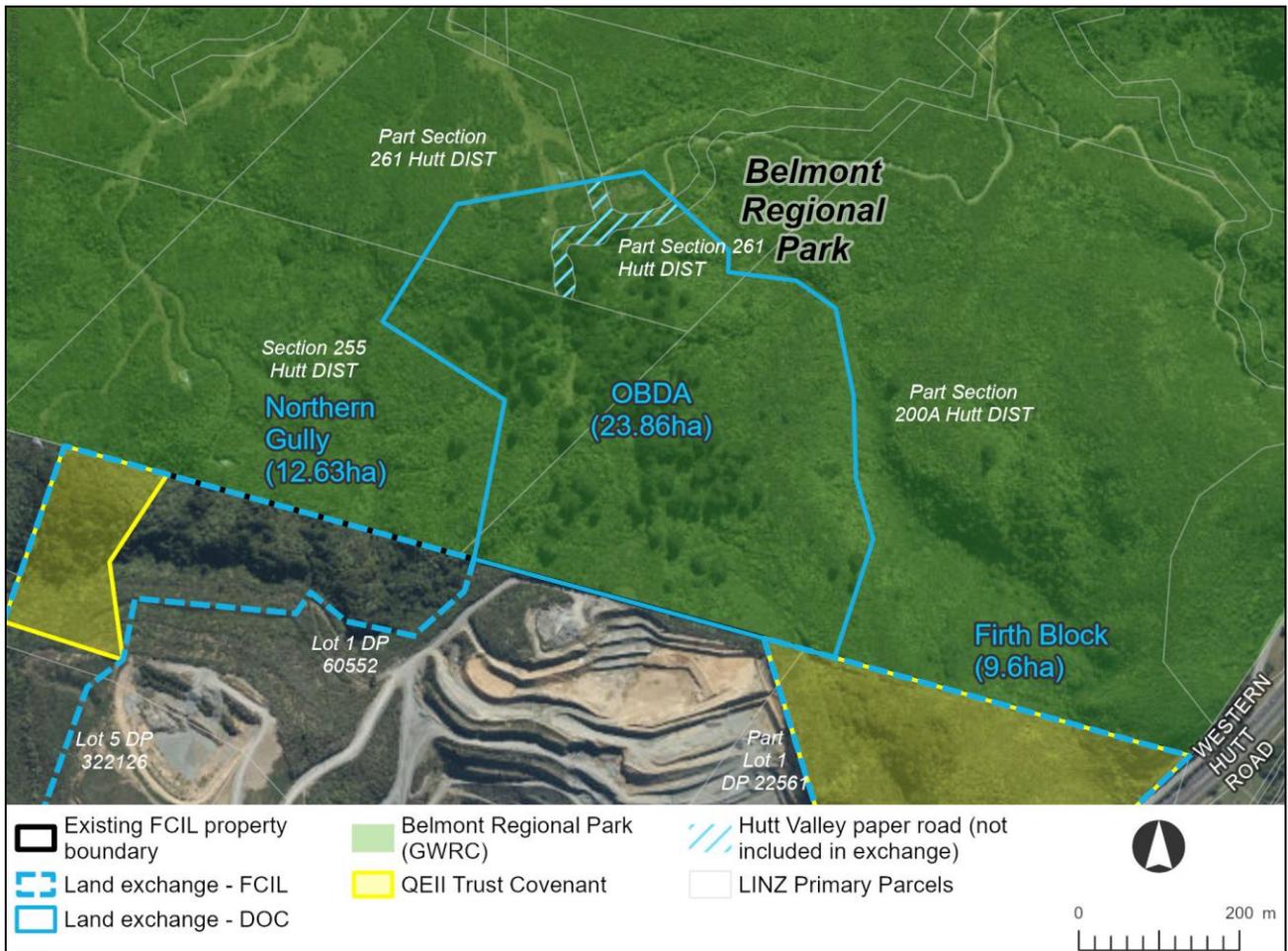


Figure 10: The DOC-Give land, aka the OBDA

## 5.0 Methods

This section describes the methods we have used to prepare our assessment. For this report:

- The survey of the OBDA focused on the OBDA and its immediate 100m outer area but included lower slopes as well. Surveys were carried out to evaluate ecological features, species, and values.
- The DOC-Get sites were surveyed to evaluate ecological features, species, and values, although these areas have not received as much survey work as the OBDA.
- Stream surveys focused on the perennial lower gully reaches of the central main stem and western tributary, which are the main stems of perennial freshwater stream habitats. The survey also did not cover the OBDA ephemeral tributaries.
- Acoustic surveys were conducted for birds and for bats and these coupled with site habitat investigation provide the evidential basis for the expert opinions as to presence and condition for those faunal groups
- Lizard surveys involving baited tapping, passive trapping, and active night spotlight search support expert opinion as to likely presence of species and distributions.

### 5.1 Desktop review of data and literature

Desktop resources which informed this current assessment of ecological values included:

- A review of relevant plans and documentation supplied by GBS Winstone (Singers et al., 2018);
- Checking of existing biological databases (e.g. NIWA freshwater fish and FRBIS databases, OSNZ atlas and eBird);
- Search for published information on the biological values within the affected area and surrounding landscape (e.g. (Forbes, A. S., 2013));
- Information derived from known datasets on landforms, soils, climate and topography of the site, including Land Environments New Zealand (LENZ) and Potential Vegetation of New Zealand (PVNZ – (Walker et al., 2007b)).
- Published rarity and habitat contextual information, e.g. ((de Lange et al., 2018; Holdaway et al., 2012; Leathwick et al., 2002; Williams et al., 2007) (Townsend et al., 2008))
- Published research literature with respect to bats, birds, lizards and plants (e.g. Herbet et al 2025 on swamp Maire habitat refugia).

### 5.2 Field investigations

The data attained comes from the following site investigations:

Date	Activity	Specialists
19/9/16	Terrestrial ecologist and botanist undertook the vegetation investigations at the overburden site.	Terrestrial ecologist, botanist
21/9/16	Freshwater and avifauna ecologists undertook initial aquatic investigations at the overburden site.	Freshwater ecologists, avifauna ecologist
9/11/16	Freshwater and avifauna ecologists undertook further aquatic investigations at	Freshwater ecologists, avifauna ecologist

Date	Activity	Specialists
	the overburden site and (for freshwater) sampled the northern and eastern perineal main stems.	
10/08/22	Ecologist undertook wetland area surveys at the overburden site.	Ecologist
28–30 June 2025	Two ecologists undertook vegetation surveys of the OBDA, southwestern stream gully and forest and Firth Block.	Two ecologists
Early September 2022	Vegetation surveys of the Dry Creek site.	Ecologist
Early September 2022	Vegetation surveys of the northern tawa forest area.	Ecologist
20.11.2025	Botanical field survey of the Southern Gully wetland and surrounds and Northern Kamahi gully	Two Ecologists
8/7/25	An ornithologist and herpetologist undertook a site visit to ascertain available habitat.	Ornithologist, herpetologist
13/5/25	Ecologist retrieving bioacoustics recorders #1–3 and deploy bioacoustic recorder #4.	Ecologist
15/10/25	Ecologist and ornithologist undertook a site visit to retrieve bioacoustic recorder #4.	Ecologist, ornithologist
17/10/25	Ornithologist on site with Department of Conservation terrestrial (fauna) ecologist.	Ornithologist, DOC terrestrial fauna ecologist
20/10/25	Wetland survey and swamp maire habitat surveys.	Ecologist
24 Oct-14 Nov 2025	22 detectors over 21 nights distributed throughout	Ecologist
25.09.2025	75 ACO's set up for lizards -OBDA	Herpetologist
4-5 <sup>th</sup> .11.2025	Set up of 105 baited pit fall traps for lizards - OBDA	Herpetologist
3 <sup>rd</sup> -14.11.2025	Three nights of spot lighting for lizards - OBDA	Herpetologist

### 5.2.1 Vegetation

Prior to the site visit, the extent and types of vegetation were delineated in a geographic information system (GIS) using topographic maps and high-resolution aerial photography.

These delineated vegetation communities were then ground-truthed in the field, where each identified community type was walked and described (with species lists compiled and searches for threatened or at-risk species conducted). Any field variations that differed from the desktop map were noted, and the maps were corrected. Each community visited was assessed using photographs and descriptions, including species lists and basic structural measurements.

At points considered representative by the ecologist, standard 20m by 20m RECCE plots (McNutt, 2012) were undertaken in forest, shrub, or wetland environments, as the investigators considered necessary to capture a representative assemblage description (in addition to species lists). A drone was used to capture useful imagery that also assisted in mapping communities.

### 5.2.2 Avifauna

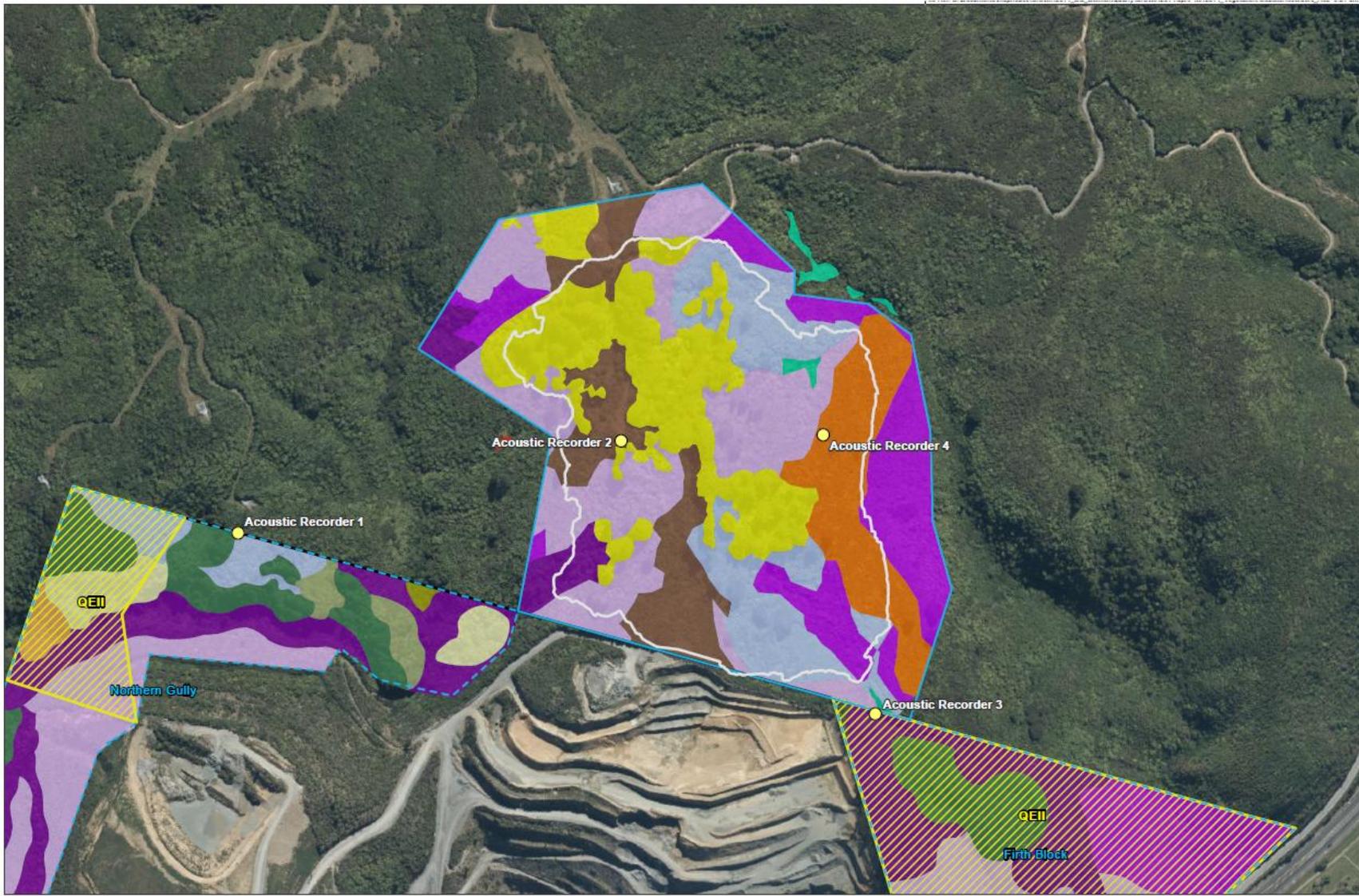
Given the mobile nature of birds and the mosaic of vegetation habitat types present, surveying habitat types rather than land areas (i.e., OBDA and proposed land exchange areas) was considered the most appropriate approach. As such, bioacoustics recorders were deployed at four locations to sample different habitat types (refer to Table 4 and Figure 11). Continuous audio recordings have been obtained across four sites. Styles Group analysed the bioacoustics data with the results provided to

.<sup>1</sup>

In addition to the bioacoustic surveys, EBird data (Appendix 6) and on-site roaming inventory were collated of all birds seen and heard over the course of each site visit (listed in Section 5.2 above), and a specific site visit was undertaken by the qualified ornithologist to assist in their determination of the likely assemblages and values.

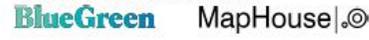
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<sup>1</sup> Acoustic recorder 4, which went in later than the first three, has not, at writing, been analysed.



Vegetation map and acoustic recorders

**BELMONT QUARRY**  
 Plan prepared by MapHouse | 08 October 2025



This plan has been prepared by MapHouse on the specific instructions of our Client. It is solely for our Client's use in accordance with the agreed scope of work. Any use or reliance by a third party is at that party's own risk. Where information has been supplied by the Client or obtained from other external sources, it has been assumed that it is accurate. No liability or responsibility is accepted by MapHouse for any errors or omissions to the extent that they arise from inaccurate information provided by the Client or any external source.

<ul style="list-style-type: none"> <li> Existing property boundary</li> <li> Land exchange - DOC</li> <li> Land exchange - FCIL</li> <li> Proposed overburden</li> <li> Belmont Quarry QEII conservation covenants</li> <li> Acoustic bird recorders</li> </ul>	<p><b>Vegetation Type</b></p> <ul style="list-style-type: none"> <li> Early seral broadleaf forest</li> <li> Middle seral broadleaf forest</li> <li> Late seral broadleaf forest</li> <li> Kamahi forest</li> <li> Tawa-kamahi forest</li> <li> Hinau-kamahi forest</li> <li> Pukatea-rewarewa forest</li> <li> Pukatea-tawa forest</li> <li> Wetland</li> <li> Semi-Swamp Forest</li> <li> Manuka mixed broadleaf forest</li> <li> Ridgeline Exotic Treeland</li> <li> Treefern</li> <li> Young gorse/pasture</li> </ul>
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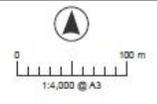


Figure 11: Location of bioacoustics records

**Table 4: Bioacoustic recorder deployment details (locations shown in Figure 11)**

BIOACOUSTIC RECORDER	HABITAT	SITE	RECORDING PERIOD
AR1 (Tawa)	Tree free and tawa-kāmahi forest	Northern gully	17-24 July 2025
AR2 (Exotic)	Ridgeline exotic treeland and young gorse/pasture	OBDA	17-24 July 2025
AR3 (Lake)	Lake surrounded by late seral broadleaf forest	Firth Block QE II	17-24 July 2025
AR4 (Manuka)	Manuka mixed broadleaf forest	OBDA	13-19 August 2025

### 5.2.3 Herpetofauna

As documented in Blueprint Ecology (2025, appended to this report), 75 triple-stacked artificial cover objects (ACOs) were set along forest margins and 105 pitfall traps within forest habitat at BRP/OBDA on 25 September 2025 (Figure 12).

In addition three nights spotlight survey and various habitat searches were undertaken while on site. The data is supported by previous lizard investigations in the QEII Firth block, joined and immediately south of the OBDA, that have been undertaken in the area (e.g. (Bell, T., Herbert, S., & Melzer, S., 2013)).

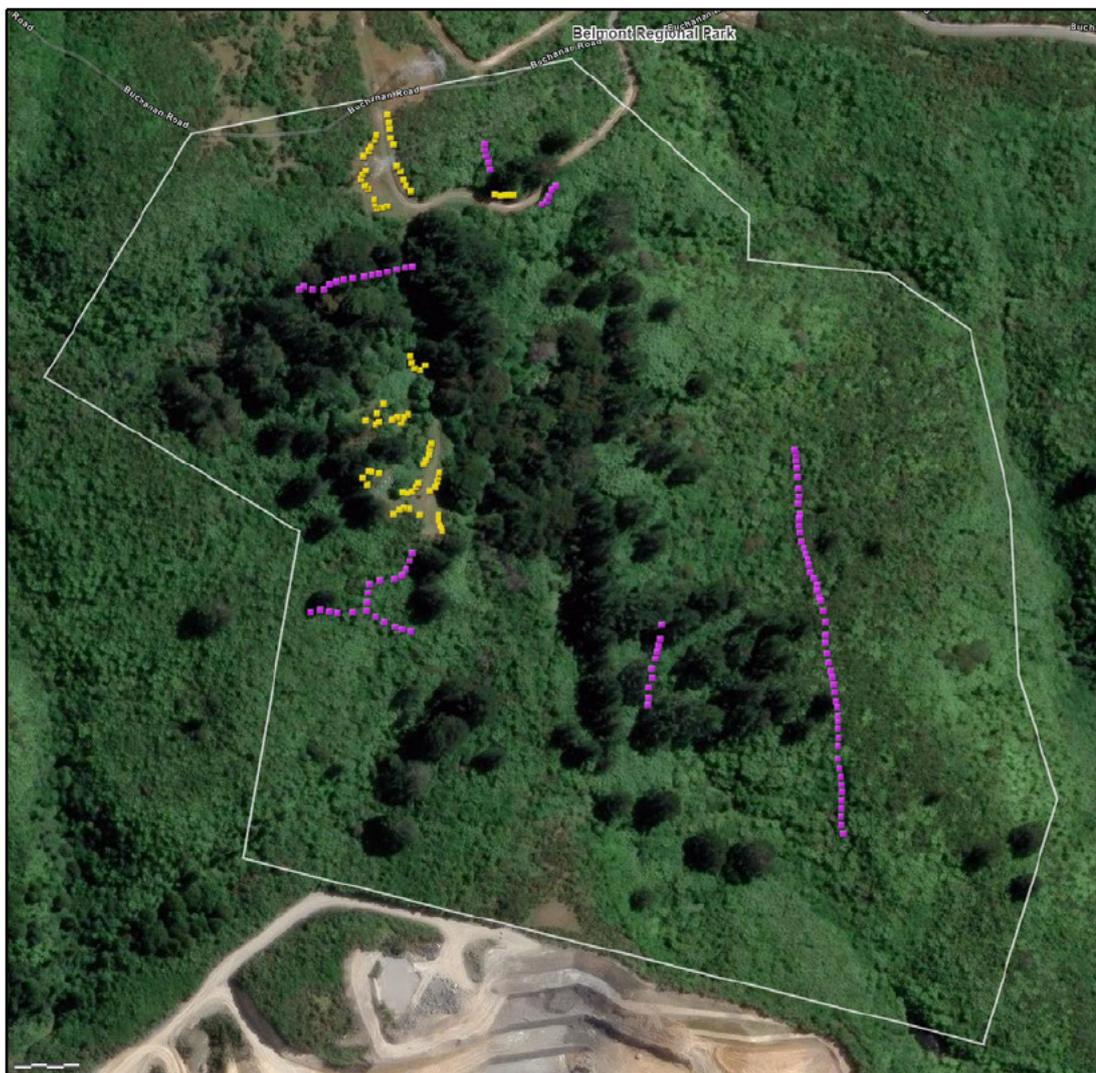


Figure 12: Lizard survey at DOC-Give. ACO (yellow square), pitfall trap (pink square), BRP site boundary (white line).

## 5.2.4 Bats

An acoustic bat survey was undertaken using Song Meter Mini Bat (Wildlife Acoustics) full spectrum recorders which passively record both long-tailed bat (at 40 kHz) and short-tailed bat (at 28 kHz) echolocation calls. The survey was conducted over 21 nights between the 24th October and the 14th November 2025. 22 habitat features preferred by long-tailed bats for roosting, commuting, and foraging were targeted across both the land to be potentially used as the overburden site, and the parcels of land to be transferred to DOC in exchange (Figure 13).

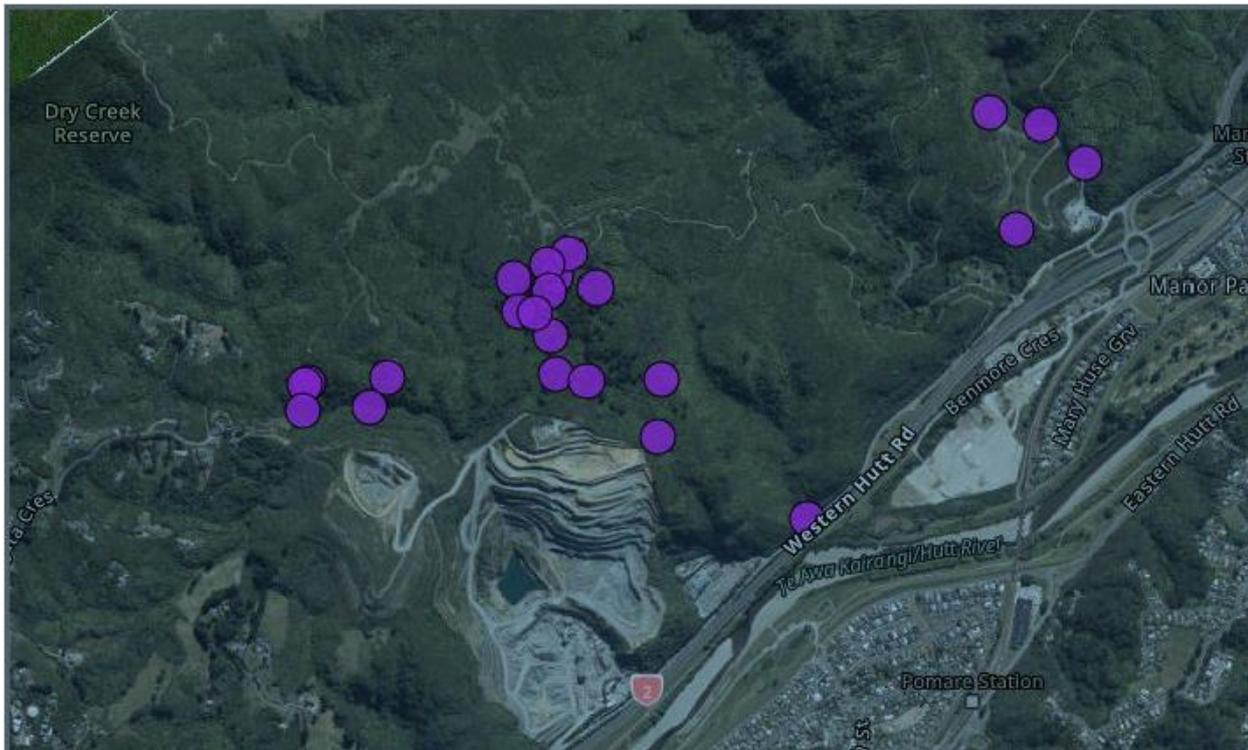


Figure 13: Location of bat recorders between 24 October to 14 November 2025

## 5.2.5 Aquatic

While aquatic surveys are not required for the land exchange, as the OBDA does not include perennial streams, there may be effects to these areas (through discharge) if consents are obtained. The areas of exchange include the ephemeral headwaters of several tributaries that feed into the surveyed main stem of the central stream. The results of those stream surveys are shared here in this report, but not the various methods and survey details (that report is appended to this report). The data gathered for the stream values was by way of standard fish and macroinvertebrate surveys (Joy et al., 2013; Stark et al., 2001) and Rapid habitat assessments (Clapcott, 2015).

## 5.3 Limitations of assessment

We note that while bioacoustics recorders are an effective method for surveying avifauna, particularly nocturnal or cryptic species, this method has several limitations that need to be considered when interpreting data:

- This method only detects birds that vocalise. As such, the absence of a species in a dataset may be because it is not present, or because it did not vocalise when the bioacoustics recorders were deployed.

- One limitation of bioacoustics recorders is that they are not effective at identifying individuals (compared to tag and release) and therefore should not be used to try to estimate population sizes. They are limited to presence absence monitoring.

## 5.4 Comparative Values Assessment

As this is an ecological values assessment, which is a subset of conservation values assessment for an exchange, under FTAA, we do not test the ecological significance of the area (usually as against Policy 23 of the Regional Policy Statement (RPS)), which applies to RMA approvals, not those under the Conservation Act, Reserves Act or FTAA.

We determined the ecological values of the habitat and species present. This will be on a continuum from negligible to very high, with an effort to discriminate subtle differences between the exchange areas to assist in decision-making.

Ecological value is a complex concept and may be interpreted in many ways. For this report, we refer to ecological values as being those features which are either:

- (a) Indigenous species, or
- (b) Indigenous habitats, or
- (c) Are functions and processes used or “valued” by native species and their habitats to persist in the landscape, or
- (d) As it relates to the rarity and representativeness at the Ecological District (ED) scale.

These, in part, align with the NPS IB, which seeks the maintenance of and at least no overall reduction of all the following:

- (i) the size of populations of indigenous species;
- (ii) indigenous species occupancy across their natural range;
- (iii) the properties and function of ecosystems and habitats used or occupied by indigenous biodiversity;
- (iv) the full range and extent of ecosystems and habitats used or occupied by indigenous biodiversity;
- (v) connectivity between, and buffering around, ecosystems used or occupied by indigenous biodiversity;
- (vi) the resilience and adaptability of ecosystems; and

The NPS-IB, however, has a national-level view, and items 1-4 at least have significant scale-definition issues that are harder to apply to a direct parcel by parcel comparison.

We also consider the current health and condition, and their likely persistence, under permitted activities and realistic land management.

Some decision on how value is graded and allocated has had to be made, and generally adheres to the following process:

- Indigenous species are valued more than exotic species;
- Indigenous dominated habitat types are valued more than exotic ones;
- Indigenous species are valued in terms of their rarity (i.e. Threatened or At Risk species) as defined by (Townsend et al., 2008);
- Underrepresented and naturally rare habitat types (Williams et al., 2007; Wiser et al., 2013) are valued more than common ones;
- Later successional species and “key stone” species are typically more valued than pioneer species;
- Functions and services relating to critical resources and processes are more valued than common resources or resources and services of minor (or transitory) importance.
- Intact and more representative assemblages (those with the “right” number of species in the “right” locations) are more valued than fragmented, weed-invasive, and species-deficient habitat areas.

In this way, we have made decisions on the ecological value of each site and potential mitigation sites. Ecological values have been assigned to individual species as well as features/habitats, as per (Roper-Lindsay et al., 2018b) guidelines (Table 5, Table 6 and Table 7) and using the NPS IB Appendix 1 significance criteria, ecological concepts.

**Table 5: Guidance for assigning ecological value or importance to a site or area of vegetation/habitat/community**

MATTER	ATTRIBUTES TO BE CONSIDERED
Representativeness	<p>Criteria for representative vegetation and aquatic habitats:</p> <ul style="list-style-type: none"> <li>• Typical structure and composition</li> <li>• Indigenous species dominate</li> <li>• Expected species and tiers are present</li> <li>• Thresholds may need to be lowered where all examples of a type are strongly modified</li> </ul> <p>Criteria for representative species and species assemblages:</p> <ul style="list-style-type: none"> <li>• Species assemblages that are typical of the habitat</li> <li>• Indigenous species that occur in most of the guilds expected for the habitat type</li> </ul>
Rarity/distinctiveness	<p>Criteria for rare/distinctive vegetation and habitats:</p> <ul style="list-style-type: none"> <li>• Naturally uncommon, or induced scarcity</li> <li>• Amount of habitat or vegetation remaining</li> <li>• Distinctive ecological features</li> <li>• National priority for protection</li> </ul> <p>Criteria for rare/distinctive species or species assemblages:</p> <ul style="list-style-type: none"> <li>• Habitat supporting nationally threatened or at-risk species, or locally<sup>2</sup> uncommon species</li> <li>• Regional or national distribution limits of species or communities</li> <li>• Unusual species or assemblages</li> <li>• Endemism</li> </ul>
Diversity & pattern	<ul style="list-style-type: none"> <li>• Level of natural diversity, abundance and distribution</li> <li>• Biodiversity reflecting underlying diversity</li> <li>• Biogeographical considerations - pattern, complexity</li> <li>• Temporal considerations, considerations of lifecycles, daily or seasonal cycles of habitat availability and utilisation</li> </ul>
Ecological context	<ul style="list-style-type: none"> <li>• Site history and local environmental conditions that have influenced the development of habitats and communities</li> <li>• The essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience (from "intrinsic value" as defined in the RMA)</li> <li>• Size, shape and buffering</li> <li>• Condition and sensitivity to change</li> <li>• Contribution of the site to ecological networks, linkages, pathways and the protection and exchange of genetic material</li> <li>• Species role in ecosystem functioning - high level, key species identification, habitat as proxy</li> </ul>

<sup>2</sup> Locally - defined as within Ecological District

**Table 6: Scoring for sites or areas combining values for the four matters listed in Table 5**

VALUE	DESCRIPTION
<b>NEGLECTIBLE</b>	Area rates Very Low for three matters listed in Table 5 and Moderate, Low or Very Low for the remainder.
<b>LOW</b>	Area rates Low or Very Low for the majority of assessment matters listed in Table 5 And Moderate for one. Limited ecological value other than as a local habitat for tolerant native species.
<b>MODERATE</b>	Area rates are High for one matter listed in Table 5, Moderate and Low for the remainder, or Area rates Moderate for two or more assessment matters, Low or Very Low for the remainder Likely to be important at the level of the Ecological District.
<b>HIGH</b>	Area rates are High for two of the assessment matters listed in Table 5, Moderate and Low for the remainder, or Area rates High for one of the assessment matters, Moderate for the remainder. Likely to be regionally important and recognised as such.
<b>VERY HIGH</b>	Area rates High for three or all of the four assessment matters listed in Table 5. Likely to be nationally important and recognised as such.

**Table 7: Factors to consider in assigning value to terrestrial species.**

ECOLOGICAL VALUE	SPECIES CLASSIFICATION
<b>VERY HIGH</b>	<i>Nationally Threatened</i> (Nationally Critical, Nationally Endangered, Nationally Vulnerable, Nationally Increasing <sup>3</sup> ) species found in the ZOI <sup>4</sup> either permanently or seasonally.
<b>HIGH</b>	Species listed as <i>At Risk – Declining</i> are found in the ZOI either permanently or seasonally.
<b>MODERATE</b>	Species listed as any other category of <i>At Risk</i> (Recovering, Relict, Naturally Uncommon) found in the ZOI either permanently or seasonally; or Locally (ED) uncommon or distinctive species.
<b>LOW</b>	Nationally and locally common indigenous species.
<b>NEGLECTIBLE</b>	Exotic species, including pests and species of recreational value.

In the course of preparing this report, we developed a proposed framework for the assessment and comparison of ecological values, based in part on EIANZ criteria and aspects of the NPS IB. That proposed framework was circulated to the Department of Conservation’s ecologist team for comment, while there was largely agreement at a high-level in terms of what the assessment should consider discussions focused on how those values were best articulated.

The following sections set out the descriptions and measures of the DOC-Give and DOC-Get areas, outline their key traits, and then provide the comparison between them focusing on the attributes identified in the Tables above.

<sup>3</sup> Nationally Increasing is category that was devised by DOC (Michel, 2021) in 2021 to resolve a problem that would arise if the population of a taxon assessed as At Risk Recovering A should stabilise. Threatened – Nationally Increasing is assigned to “Small population that have experienced a previous decline (or for which it is uncertain whether it has experienced a previous decline) and that is forecast to increase >10% over the next 10 years or 3 generations, whichever is longer” (Rolfe et al. 2021). Thus, while such a threat category is not identified in Roper-Lindsay et al. (2018a), we have included it along with all other *Threatened* classifications in to the Very High ecological value category.

<sup>4</sup> Roper-Lindsay et al. (2018a) define the Zone of Influence (ZOI) as “the areas/resources that may be affected by the biophysical changes caused by the proposed project and associated activities.”

## 6.0 Detailed Habitat Results

The following is a vegetation and habit description and assessment in which we separate our assessment of each of the four land parcels offered by Winstone in the exchange and then the OBDA.

The Faunal section is separate and follows this habitat section.

### 6.1 The Northern Gully system (Northern Tawa - Kāmahi Forest, eastern extension and Cottle Block)

#### 6.1.1 Current vegetation communities

##### Northern Tawa-Kāmahi Forest Area

The first of the four DOC-Get areas is 12.62 ha of south-facing hill slopes with deep gullies and forest across the mainstream adjacent to the exchange site (this is referred to as the northern tawa-kāmahi area and eastern extension, which includes the east pukatea forest over the central stream). A portion of this area (6ha) is within a QEII covenant (the westernmost area), Figure 15.

In addition, there are the younger north faces of the Cottle block along the length of the central stream and areas south of the headwaters of the southern stream (unnamed), including seral broadleaf, a mature tawa fragment along the western boundary (Figure 15). The northern and southern forest and shrub slopes of the Cottle and tawa blocks form the major riparian cover of the main stem of an unnamed perennial stream that flows to the confluence of the central northern mainstream.

The northern tawa-pukatea-kāmahi area contains three principal ridges and a larger plateau in the northwestern corner (Figure 15). It is connected to the OBDA via the central northern stream and its riparian vegetation to the east. It is connected to the south and west by the quarry revegetated areas of old overburden south (the Cottle Block).

While each landform in the northern tawa kāmahi forest block area has a subtle variation in the prominence of various species, in general, the area is a tawa-pukatea with elements of kāmahi forest, with pukatea along the streams and rewarewa over a pigeonwood, mahoe, and kāmahi lower canopy. Pigeonwood canopy trees are unusually large in this forest. In the east, kāmahi and kāmahi with hīnau are more prominent along the ridges, with tawa on the lower slopes. Two canopy miro were encountered, along with one old rata stump.

The north-western upper plateau is the largest, densest, and oldest tawa forest in the local area, with an excellent representative ground tier absent of herbivore effects. The side gullies are tall māhoe and pigeonwood under sparse tawa with dense supplejack. The upper slopes and plateau outside of the tall tawa are seral broadleaf with mapou, patē, mahoe, mamaku, silver fern, and on the outer edges beyond the boundary gorse, buddleia. The lower slope riparian vegetation (with the true right revegetated terraces) provides full cover to the stream, including occasional tree fuchsia. Over the stream (on the true right side) is the revegetation area of the Cottle block.

The species recorded are listed in Appendix 4. Ramarama (*Lophomrytus bullata* (Threatened – Nationally critical)) is present in the Tawa northern plateau and along the stream flood plain (Figure 14). Three specimens were sighted in the October 2025 survey.



*Figure 14: Ramarama (ca. 6 m tall) on the side of the stream.*

The eastern extension encompasses the lower reach of the southwestern draining gully from the OBDA, and this area contains the most mature pukatea remnant in the region, with a representative middle and ground tier containing notably greater nikau presence and a higher ground fern cover than the younger broadleaf seral gullies in the OBDA.

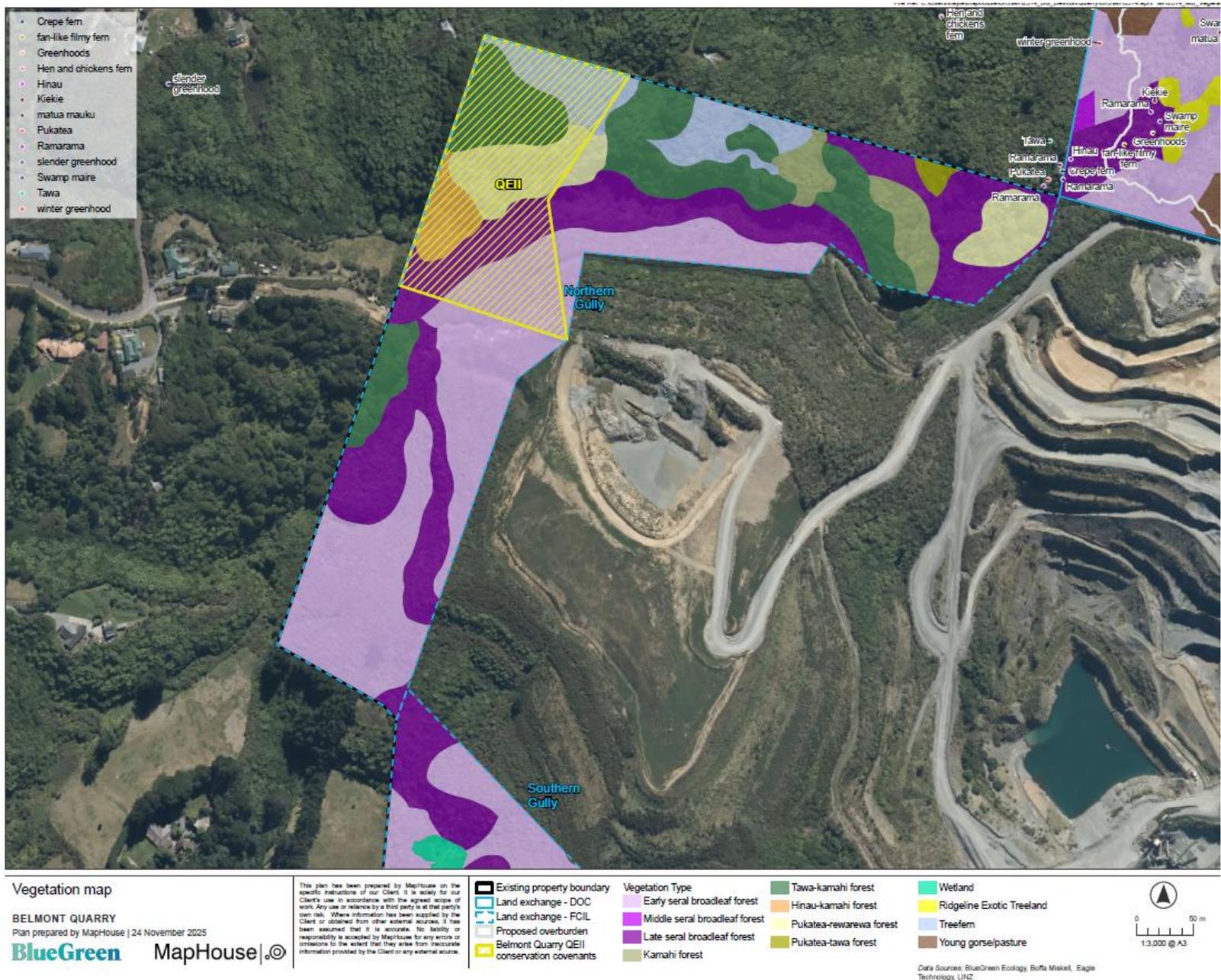


Figure 15: Northern Tawa-kāmahi, eastern extension and Cottle block associations.

### **Cottle Block area**

On the Cottle Block, on the southern side of the stream, the mid-seral vegetation is largely a mix of relatively closed-canopy mahoe, wineberry, manuka, rangiora, mapou, hangehange, kawakawa, and tree fern, with some gorse and tree Lucerne. A species list before the overburden is shown in Appendix 2. There are a few woody weeds. The younger seral stages associated with the overburden surfaces and terraces are largely old gorse with tree lucerne, Himalayan honeysuckle, and naturally regenerated karamu and kanono.

The Cottle Block western boundary contains a fragment of old canopy tawa forest in good condition. Over fifty-five species were recorded (Appendix 4) without any substantive details of the epiphyte survey. No RECCE plots were recorded in this area. This is a good level of species richness for such a modified forest area, and there are elements of the original rimu-rata/tawa-hīnau-kāmahi forestry, namely all the historic under-canopy species, except podocarp and northern rata. Two young miro were seen and are the only podocarp noted outside of rimu and tōtara planted into the Cottle block. Ramarama was the only threatened classified species recorded on this site (Nationally critical). However, it is noted that *Metrosideros* species were recently classified as threatened or at risk due to the potential threat of myrtle rust.

The forest type (Tawa-kāmahi) is underrepresented and regionally classified as threatened. (Singers et al., 2018).

Large, healthy, mature tawa, rewarewa, and pukatea provide a good seed source for the wider park. Supplejack abundance in the gullies was unusually dense (for the Belmont Park). The forest offers considerable protection for a large portion of a high-quality (if depauperate in fish species) aquatic habitat.

The following is a series of photographs illustrating the northern tawa-kāmahi forest and the Cottle block area.



*Figure 16: Upper ridge seral Broadleaf*



*Figure 17: Under tier of the oldest densest tawa forest on the north-western plateau*



*Figure 18: Tawa – rewarewa lower slope*



*Figure 19: Forest floor & stream*



*Figure 20: Forest floor & intermittent stream of a side gully n the north slopes*



*Figure 21: Stream I gully floor covered by broadleaf canopy and tree fern*



Figure 22: Pukatea forest eastern extension canopy.

### 6.1.2 Likely future of the Northern Gully Tawa-kāmahi (including the QEII) and eastern extension area.

The mature tawa-kāmahi and pukatea forests, and riparian broadleaf and gullies are relatively secure aside from any animal pest invasions from the north (Regional Park). Current conditions show limited plant weeds and there is evidence of pest management. This is also true of the eastern pukatea forest area. However, its canopy is not closed, and the seral broadleaf supporting this area will give way to more tawa, kāmahi and pukatea in the future, which have local good seed sources. The two miro in the area may allow further miro to develop (seedlings were observed). There is one larger rimu up the mainstream gully to the north (outside the OBDA and set back), which may also cause rimu regeneration in this downstream area and is more likely than in the uphill OBDA area.

### 6.1.3 Likely future of the Cottle Block

The earlier seral component and tree fern ridges, mostly on the true left side of the southern stream, will develop with more abundant climax species on hand to throw seed into them. However, the Cottle block south area may have more problematic weed issues over time and is less secure than the northern area.

The seral progression in the younger southern area is towards tall māhoe forest (as is much of the central Wellington hill country). This māhoe state is likely to progress more slowly, typically towards a rewarewa-karaka-tawa and titoki forest type, where karaka is invasive. Podocarps and northern rata (once present) are unlikely to return in any great number, reflecting the absence of local seed sources. Very occasional tōtara, miro and rimu occur, and adult miro and a rimu were observed off-site in the central stream gully edge.

This seral trajectory progression is similar to the OBDA's. Still, it is more likely than the OBDA to progress to tawa-kāmahi with titoki and pukatea, and occasional podocarp species, principally because of the proximity of the seed sources of later seral species.

Threats to this seral development are, in the main, the potential for vine weed invasion (old man's beard, Japanese honeysuckle, climbing asparagus). Currently, we understand there is animal control at the Quarry in the Cottle block.

The current quarry management has largely controlled woody weeds and any serious weed accumulation. The progression of revegetation can be seen in detail in aerial photographs, where terracing has led to faster development of a broadleaf canopy than on the slopes. The lower terraces are older and better than the upper tiers. We assume that the upper tiers will (under the same management as is presently the case, which we understand to be plant pest control) develop to the same form and canopy cover condition as the lower terraces and that seed dispersal from the two adjacent tawa forest blocks (the northern and the western (outside of the property)) will support seral progression to tawa-titoki forest. Weed control, however, will remain a requirement, as with most seral progression in Wellington, and while the block is sufficiently advanced not to be threatened with loss from shrub weeds and even woody weeds, vines (old man's beard) and ground mats (*Tradescantia*) could retard development. Control of these weeds is the only major requirement for the progression of this area of the DOC-Get site.

#### 6.1.4 Ecological Value

This section sets out the ecological values for the two sub-areas: first, the Tawa-Kāmahi northwestern forest and eastern extension, and then the Cottle Block.

##### 6.1.4.1 Tawa-Kāmahi and eastern pukatea forest

###### Representativeness

The forest structure is well represented, with all tiers present and well vegetated, with most expected species (albeit some in low abundance). The canopy, with gaps and minus some podocarp species, represents the tawa-rewarewa-kāmahi of its type or the pukatea of its kind. Podocarps and northern Rata are, however, largely absent. The ground tier is suitably dense and responds to topographic variance as expected, with typical dense supple jack in gullies and crown fern and divaricates on the drier ridges and tree fern along several upper ridges. The stream-edge species reflect that sub-habitat (e.g., tree fuchsia). The overall composition and structures are better than average for a similar Ecological District remnant forest. We suggest **high representativeness** in its setting (not as a comparison to a pristine forest example).

###### Rarity and distinctiveness

The tawa-kāmahi forest type (excluding kāmahi, which is not abundant) is rare (underrepresented) in the Region (Singers et al., 2018). In the Belmont Regional Park, there are also very few such remnant tall-tree forest patches remaining (one such is 300m north), and this patch is one of four in the park (excluding Dry Creek valley) and is one of the larger patches. Ramarama is present and is a nationally threatened, critically endangered species. The presence of Ramarama (Threatened - Nationally critical) raised the rarity value also.

We consider it to rank at the **higher end of this continuum** for the habitat it supports.

### Diversity & pattern

Diversity is typical for a mature tawa-kāmahi forest in the region; it is good but lacks some species in the middle tier, and while there is a reasonable epiphytic community, it is also missing taxa there. It also contains seral and early seral broadleaf as well as a kāmahi-dominated forest area, two miro canopy trees and gullies of supplejack and ferns. The pattern of vegetation reflects the age of development and responses to topography and hydrology, with a riparian section, drier but damp gully assemblages and the drier top ridge lines. We consider diversity to have a **moderate** value.

### Ecological context

The tall forest components are an important seed source for tawa, kāmahi, hīnau, miro, titoki, and rewarewa (and so a bird resource as well). The area also serves as a buffer to the stream and provides important functional elements for the freshwater system (especially pukatea instream root mats). We consider its contextual value to be at the higher end of the spectrum (**high**).

### 6.1.4.2 Cottle Block

#### Representativeness

As with the other seral stages in the wider landscape already assessed above, the species present abundances and proportions, and progression are typical for the process in Wellington and on the hills of Wellington. While the early seral broadleaf is often at the stage of natives penetrating the old gorse over the canopy, the area at large is mid to later seral. There is appreciable tawa forest, so we consider this to have **moderate** representativeness, with less certainty about the direction of seral progression or weed dominance in the early seral areas.

#### Rarity and distinctiveness

There is no plant rarity identified. A substantial amount of this area is on a threatened land environment (<10% remaining with indigenous vegetation cover).

This criterion we consider to be **Low**.

#### Diversity & pattern

There is a pattern in the seral development related to topology and hydrology, with different-aged seral stages and slightly different species assemblages in gullies, stream edges, and drier areas. There is a mature tawa patch, a planted area, a wetland, and a stream system, all connected. The species richness is on the lower end of the continuum.

We consider the Cottle block to have moderate habitat diversity and a moderate pattern, so it is rated **Moderate**.

#### Ecological context

The primary contextual role of the Cottle block is as a vegetated connection between the northern tawa-kāmahi area and the southern gully, and, by extension, the south-western gully forest and the Hutt River. It also importantly protects the stream. This may facilitate lizard, invertebrate, and bird movements between the two forest areas, certainly to a greater extent than on pasture or quarry surfaces. It also enables a range of instream species persistence and movement.

For these reasons, we rank the value contextually as **moderate**.

### 6.1.5 Values conclusion

The feature, in its entirety, is sufficiently cohesive, contiguous, and interrelated that we present a single value for the entire feature. In the round, we value this area as of High value, reflective of its substantive area of a more mature canopy and the threatened regional habitat type it represents, as well as the diversity of types, and importantly, its functional role related to the stream protection it has.

### 6.1.6 Value gains achievable

The Cottle block portion, because it is earlier seral and currently lacks later canopy species other than as seedlings, has potential value as succession proceeds and diversity increases. It does not require much management to attain these additional values. It requires some pest management, mainly animal pests (opossum), and continued vigilance against old man's beard. In part, that risk is moderated by the weed management actions of the quarry in its lands (the wider Cottle block and its south-western gully) and GWRC in the Park.

Before exchange, we recommend a weed inventory in the Cottle Block with a follow-up appropriate weed control effort of ecologically concerning weeds (i.e. old man's beard, *Tradescantia* and potential canopy trees (e.g. wattle)) prior to any exchange so that weed issues can be minimised. The risk of problematic weed invasion has been lowered to a very low risk.

These actions will also assist in securing the absence of weeds in the QEII area and, in wider northern and eastern forests, and in the development of a large area of swamp maire.

## 6.2 The Southern Gully

### 6.2.1 Current vegetation communities

The southern gully area incorporates the upper middle reaches of a small catchment, which originates near the top of Kaitangata Crescent (Figure 23). This catchment contains a waterway which drains to the southeast, falling towards the Hutt River/Te Awa Kairangi through at least two waterfalls and a deep gorge before passing under SH2 to join the river. The southern gully area is centred around a relatively flat area in the middle of the catchment, located immediately before the stream falls over the waterfalls and into the gorge.

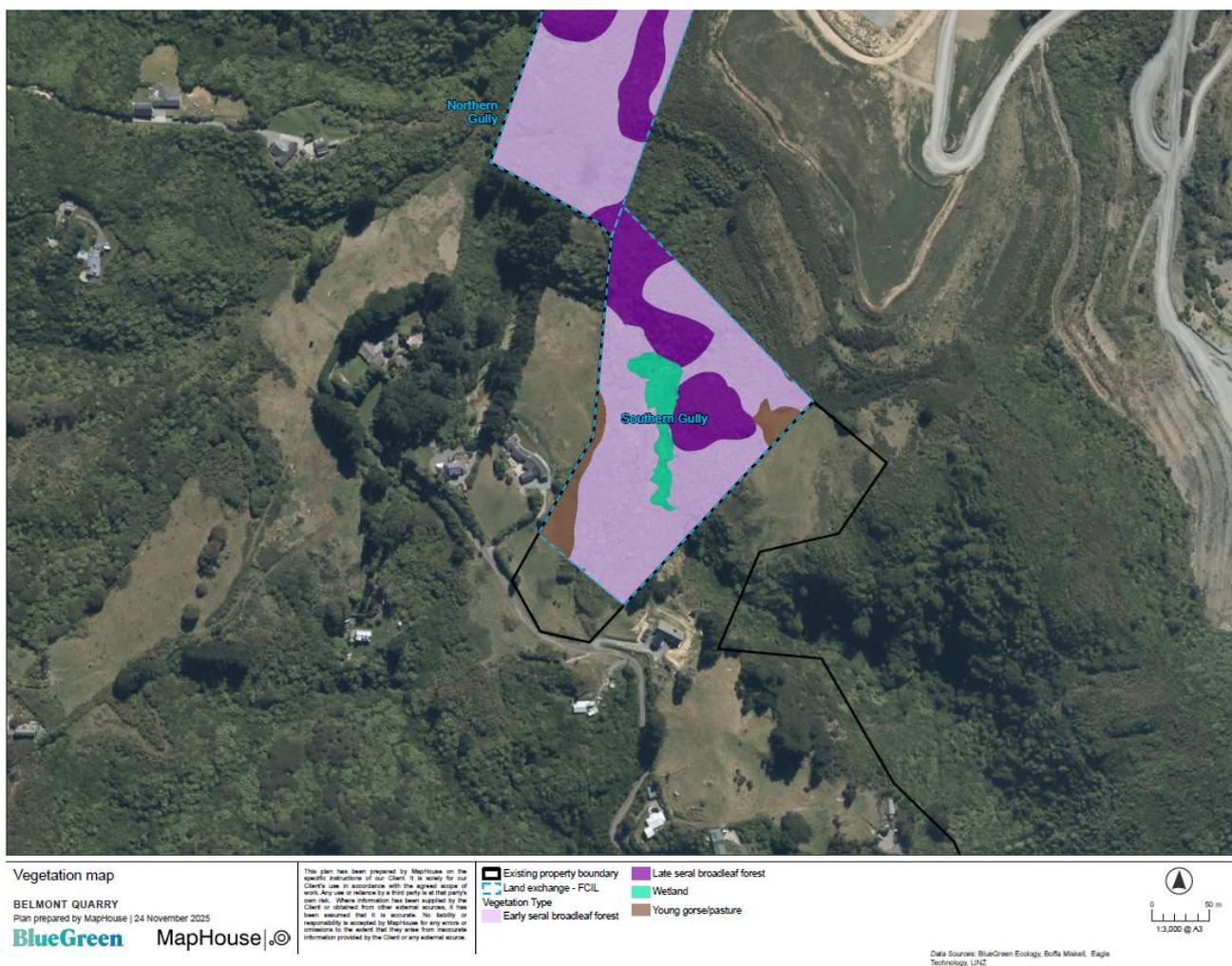


Figure 23. The Southern Gully wetland and surrounding seral broadleaf forest.

The sides of the gully are vegetated with late seral broadleaf forest with some emergent rimu and tōtara, in the north-eastern section, with primarily riparian vegetation near the stream. With the exception of the wetland area, the balance of the southern gully is covered in early seral and mid broadleaf forest. The stream itself contains signs of being a good quality aquatic habitat (Figure 24).



Figure 24: A broadleaf covered reach upstream of the wetland with swamp maire planting potential.

This waterway (above the waterfalls) has a good mix of freshwater habitats, including soft-bed wetland grasses, seral broad-leaf gravel-bed run and riffle reaches, and older, deeper-set seral forest pool and run reaches. The pools contain at least banded kokopu, and there is scope for short-jawed kokopu to be present.

The natural inland wetland (a rare ecosystem in the Wellington Region, making it a rare habitat type) is likely a product of a range of seepages from the surrounding hills (including the old overburden restoration site) and the stream flow being backed up by the landforms that have resulted in the waterfalls immediately downstream. The wetland area at 0.27 ha is large for the local area, typically 30 m wide and 150 m long, with the stream meandering through it. There are wetter areas with obligate wetland species, dryer areas with FACW-dominant species, and areas of blackberry infestation, indicating slightly drier conditions. A range of wetland plants have been planted already (lowland ribbon wood, toetoe, *Carex secta*, tī kōuka, harakeke and *Hoheria*). The upper and middle areas are dominated by *Carex geminata* (Figure 25, Figure 27) while the lower portions of the wetland (Figure 26). It contains small areas of raupō, but it is predominantly a sedgeland with areas of monkey musk. This represents natural regeneration from the site's exotic grass-covered wetter area, and creeping buttercup and Yorkshire fog are still present. The soils, hydrology, and shelter are suitable for the colonisation and growth of pukatea and swamp maire.



*Figure 25: Upper reach of Southern Gully, planted and naturally occurring wetland plants.*



*Figure 26: Lower reach, Carex secta and monkey musk.*



Figure 27: Middle reach covered in *Carex*.

## 6.2.2 Likely future of the Southern Gully

Given time, the early seral broadleaf areas will continue to regenerate as climax canopy species establish, leading to an increase in local seed stock and natural dispersal. The proximity of the southern portion to the edge of the residential area may lead to longer-term weed issues, and the area is considered to be more vulnerable than the northern portion but comparative ease of access to this area makes it a good candidate for restoration/improvement work. The wetland area requires blackberry control but is otherwise stable. The vegetation pattern outside of the wetland is of successional indigenous broadleaf seral stages, from youngest on the upper slopes and southern edge of the site near Liverton Road, where it remains largely gorse and grass, to developing broadleaf forest with mamaku within the northern section. Several emergent rimu and tōtara have been observed in the northern and edge seral broadleaf areas.

The seral trajectory of the slopes is similar to the OBDA's.

The wetland, in the absence of wetland weeds, is relatively secure with a strong *Carex* cover, and the harakeke and Ti Kōuka may spread. The wetland, in the absence of management, however, will only progress very slowly.

Threats to the slopes seral development are, in the main, the potential for vine weed invasion (old man's beard, Japanese honeysuckle, climbing asparagus).

## 6.2.3 Ecological Value

### 6.2.3.1 Representativeness

As with the other seral stages in the wider landscape already assessed above, the species present, abundances, proportions, and progression are typical of the process in Wellington and on the hills of Wellington (and so **moderate**). The wetland is sufficiently large and vegetated with wetland species, many of which are indigenous, that it can be considered to reflect a seral wetland common in the ED and to support several hydrological sequences, meaning that the wetland itself will allow the development of several different wetland vegetation community assemblages reflecting that varied hydrology (and so **moderate**).

Taken as a whole, we consider the Southern Gully to have **moderate representativeness**, with less certainty about the direction of seral progression or weed dominance in the early seral areas.

### 6.2.3.2 Rarity and distinctiveness

There is no plant rarity identified, but there is a wetland with reasonable indigenous representative assemblages, and natural inland indigenous wetlands are reduced to <4% of the historic cover in the Region ((Ausseil et al., 2008)). A substantial amount of this area is on a threatened land environment (<10% remaining with indigenous vegetation cover).

This criterion we consider to be **High**.

### 6.2.3.3 Diversity & pattern

There is a pattern in the seral development related to topology and hydrology, with different-aged seral stages and slightly different species assemblages in gullies, wetlands, stream edges, a stream (also with values and potential for rare taxa) and drier areas. The species richness is on the lower end of the continuum but typical for its seral stage. We consider the southern gully to have moderate habitat diversity and moderate pattern, so it is rated as **Moderate**.

### 6.2.3.4 Ecological context

The primary contextual role of the southern gully is as a vegetated connection between the kamahi northern tawa-kāmahi area and the south-western gully forest (not described in this report), and, importantly, as a protector of the stream. This may facilitate lizard, invertebrate, and bird movements between the two forest areas, certainly to a greater extent than on pasture or quarry surfaces. It also enables a range of instream species to persist and move. For these reasons, we rank the value contextually as **High**.

## 6.2.4 Values conclusion

Two high sub criteria mean that in the round the value of this area is **High value**. It is reflective of its natural habitat diversity, it is a rare and an underrepresented regional habitat type, and in addition it has a contextual role in the protection of water processes and for connectivity of species.

## 6.2.5 Value gains achievable

The Southern Gully, because it has a substantial area of earlier seral broadleaf with a current absence of later canopy species other than as seedlings, has potential value as succession proceeds and diversity increases. It does not require much in the way of management to attain these additional values.

Furthermore, the wetland, currently largely open sedgelands with extensive areas of emergent macrophytes, has substantial potential to become a forested swamp (swamp Maire-dominated).

It requires some pest management, mainly blackberry, and continued vigilance against old man's beard. In part, that risk is moderated by the weed management actions of the quarry in its lands (the wider Cottle block and its south-western gully) and GWRC in the Park.

Prior to exchange, we recommend a weed inventory with follow-up appropriate weed control. Furthermore (and separate from the substantive application for the use of the "OBDA"), we recommend that Winstone's cause 200 swamp maire of appropriate genetic source to be planted and managed to establish in the wetland area. The wetland area at 3000 m<sup>2</sup> (inclusive of damp soils up the stream flood plains) which could support (in the absence of knowledge of the self-thinning process for swamp maire and what end point densities are supportable) over 1000 trees.

## 6.3 Dry Creek

### 6.3.1 Current vegetation communities

The Dry Creek area for exchange covers 7.7 ha of the outer vegetated edge of the site and does not include the roading and weed-infested areas centrally or the cement works at the bottom of the catchment (Figure 28). The catchment covers a diverse range of aspects. Waterways are restricted to the northern corner of the site, with the water quickly being captured and directed underground through buried infrastructure.

The Dry Creek catchment offers a range of aspects and some diverse habitats, including some rocky outcrops in steeper sections.

Figure 29, Figure 30, Figure 31 and Figure 32 illustrate the feature. Along the eastern and northern boundary, the forest is advanced seral broadleaf vegetation with emergent rewarewa (c. 16m) above mamaku, mahoe, karamu, and houpara (Figure 28). Understory species vary between dense fern layers (including *Lyopodium* *Blechnum* and *Asplenium* species) and dense leaf litter, to seedlings of canopy and sub-canopy species representing mature stage forest succession. These include nikau, pigeonwood, rewarewa, and titoki. Native iris and a filmy fern (*Hymenophyllum scabrum*) are present, with epiphytes including a bamboo orchid, hanging club moss fern, hounds-tongue fern, and hanging spleenwort. Common lianes include bush lawyer and native jasmine. The bryophyte layer is well developed, in wetter habitats, as ground cover and epiphytes.

Other vegetation communities were found along the south-western boundary of the site. These included wet seral forest, in the south, primarily consisting of Mahoe, hangehange, houpara, pigeonwood, and mamaku, hounds-tongue fern in this forest is often dominant in the understorey and epiphyte layers. Further north, it offers a variety of assemblages, including seral gullies with manuka, soft tree fern and mahoe, to faces of karaka and crown fern and ridges where emergent rewarewa is again present in the northwestern corner. The western edge slopes down to the Dry Creek Loop track. The substrate here is noticeably rocky underfoot, with mahoe, matipo, mamaku, and rangiora dominating the canopy and ferns and young tall canopy species (rewarewa) in the understory.

The earlier seral vegetation is patchy with some areas with abundant exotic representation, i.e., Gorse, buddleia, wattle, broom, silver wattle, tree lucerne, pampas, pine, blackberry, honey suckle, and other areas and throughout inclusive of developing karamu, mahoe, kanuka, five finger, kawakawa,

hangechange. The exotic-dominated seral stage is dominated by these weed taxa and will need active intervention to remove the ecologically problematic weeds and enable indigenous development, probably through some active planting of chosen species (broadleaf native combination including: wineberry, karamu, kanono, fuchsia, kanuka, mahoe).

Some of the damp areas contain gorse, fennel, Rama grass, soft rush, nasturtium, creeping buttercup, verbena, and ink weed.

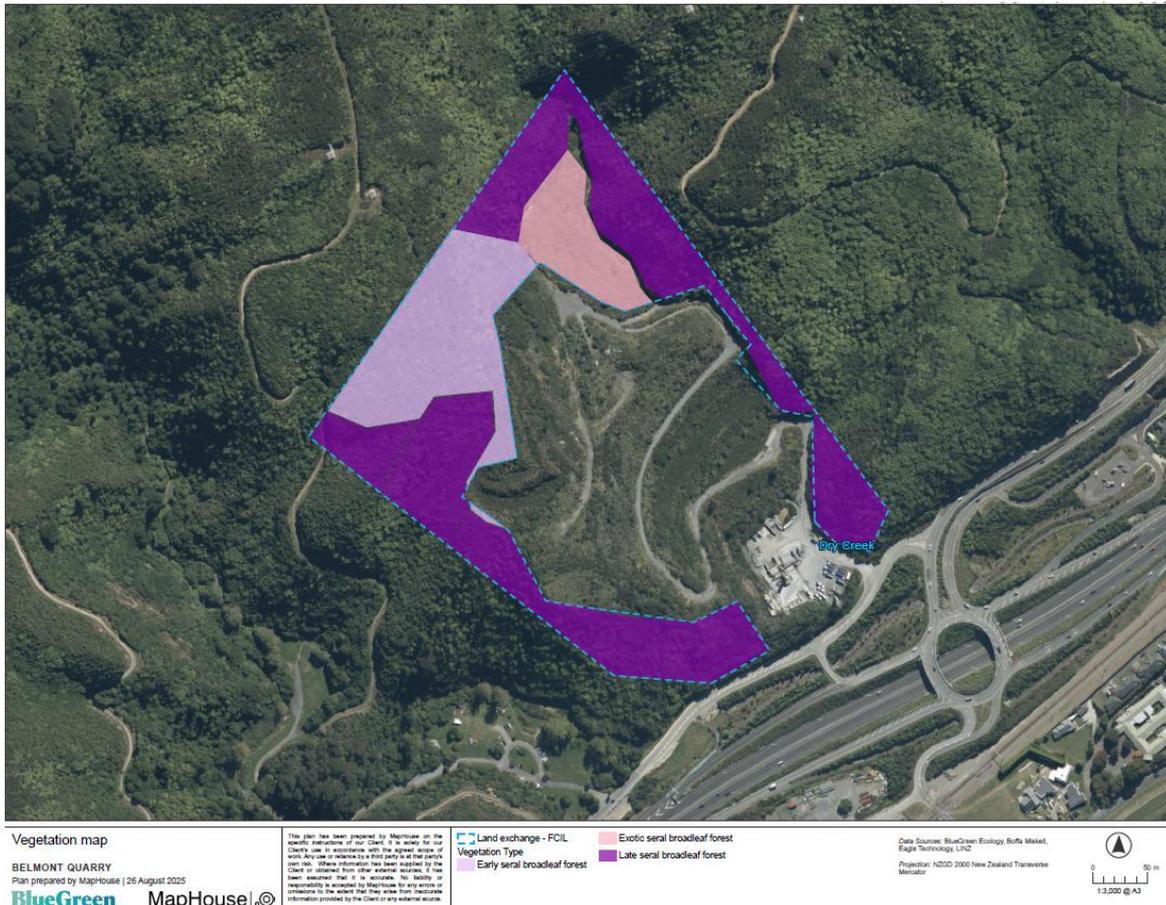


Figure 28: The Dry Creek exchange area



Figure 29: Upper central regrowth, largely exotic and very early seral stage



Figure 30: Upper slopes in mamaku and later seral with rewarewa on the southeast-facing slope. Weed extent is substantial at the bottom of the slope.



Figure 31: Upper stream within the property



Figure 32: Long shot showing emergent rewarewa over advanced seral forest.

### 6.3.2 Likely future of Dry Creek

The more mature steep hill side surrounding areas have a relatively low incidence of invasive pest plants, while the lower slopes and the central flatter area have a greater number and abundance of exotic weeds in an earlier seral native staging.

The other common weeds are seral exotic species, which are high-light demanding species such as broom, gorse, buddleia, and Spanish heath. These under good native broadleaf and tree fern regeneration will phase out and be replaced but that process is slowed significantly by the abundance of these weeds and continued seeding of these weeds. The early seral area will progress in its current form.

The exotic-dominated seral stage is unlikely to progress unassisted, as a number of the weeds present are persistent even through seral stages (old man's beard, wattle, Tradescantia). So, a program of weed management and nurturing of a native broadleaf seral stage canopy should be undertaken through a combination of planting and nurturing natural seed germination in the area.

The future of the outlying slopes is of rewarewa-dominated broadleaf later seral forest, which will then stall its progression until other tree species can establish. However, at that point, the broadleaf forest will be sufficiently representative and healthy and stable as to have good ecological values and ecological functions.

### 6.3.3 Ecological values

#### 6.3.3.1 Representativeness

The Dry Creek indigenous vegetation communities no longer contain the rimu-rata canopy of the pre-human condition; the surrounding hill slopes do contain Rewarewa as a prominent canopy species, with other notable sub-canopy species emerging in the understory (including nikau and titoki). Although canopy tiers have not developed into intermediate stages of succession, the understory, epiphyte and liane layers are present with reasonable diversity for the later seral stage. The species and associations of the surrounding slopes are typical in the ecological domain and region of the regeneration process, even with the weed components.

The area offered, the surrounding slopes, is of **Moderate** representativeness.

#### 6.3.3.2 Rarity and distinctiveness

No at-risk, rare, or threatened species were seen and recorded.

In terms of the abundance, Singers (2018) suggests that late seral broadleaved indigenous forest is relatively common in the Hutt Valley along the northern hill lands.

The gorge and stream in the northeast of the site were notable at a local level, with greater diversity, including species such as hanging club moss and bamboo orchid. However, these values do not exist throughout most of the site.

Part of the site falls on a threatened land environment (<10% remaining with indigenous vegetation cover).

No species are present that are on the lists of Crisp (2020), which records the present conservation status of indigenous vascular species in the Wellington region.

We conclude that the assemblages are of **Low** rarity and distinctiveness

#### 6.3.3.3 Diversity & pattern

There is diversity present related to the variance in landform over some of the sites for regenerating broadleaf/hardwood forest, but it is subtle, and the species assemblage is relatively the same throughout. Several variations in topology and hydrology create a number of sub-habitats related to stream side, gullies, ridges, and steep slopes. We rank these factors as conservatively **Low**.

#### 6.3.3.4 Ecological context

The Dry Creek site offers an extension to adjoining Belmont Regional Park forested land, albeit a narrow corridor of forest around a defined catchment. It has a small area of stream and stream buffering functions, but most of the waterway is piped through the site. It may have some role in species movement and as a seasonal resource and minor buffering of the more internal park area. We consider the area to have low contextual value currently.

### 6.3.4 Values Conclusion

In the round, we conclude that the later seral indigenous systems on the hill slopes have **Low values**, which is the majority of the site.

### 6.3.5 Value gains achievable

The management and control of the exotic-dominated seral area, as well as the broader ecologically problematic weeds, is a process that will enhance the forest's resilience, support its natural progression, and so improve representativeness. The eradication of ecologically problematic weeds where they are dominant will reduce their spread from this area and allow it to develop into a native-dominated area faster.

We recommend that the exotic seral broadleaf area receive intensive weed management (eradication) and appropriate indigenous revegetation, and that these improvements be completed as part of the exchange. We consider that such a process is likely to take about 5 years, but we do not suggest that the risk is such that it should occur before the exchange.

## 6.4 Firth QEII

### 6.4.1 Current vegetation communities

This area (9.6ha) has also been described and mapped by (Forbes, A. S., 2013) as part of the historic quarry extension and to inform the QEII covenanting process. The species list (56 indigenous species) of those surveys is repeated here in Appendix 5. The high prominent ridge line and steep (once quarried) south face that comes off the OBDA general area towards the Hutt River has early and mid-seral broadleaf scrub regeneration on steep and very steep faces (Figure 36). At the head of the Hīnau south-draining gully is an older tawa forest area that also contains emergent Hīnau, pukatea, rewarewa, kahikatea, Nikau, and black beech (*N. solandri*). Young rimu and miro are also recorded as present, as were numerous tōtara seedlings. Up slope is an area of manuka over kiokio (but not wetland) at around 0.6ha. Downslope is an area of rewarewa/broadleaf forest. The various steep slopes about the tawa are later seral broadleaf and tree fern mosaics down (north) to the farm pond/slip induced lake. The eastern faces are middle seral with an unusual amount of mapou in the canopy. The seral stages have largely passed through the gorse phase, and even the very steep southern faces are mostly under an indigenous canopy.

Figure 33, Figure 34 and Figure 35 illustrate the tawa canopy, lake edge and early seral under canopy respectively.



*Figure 33: Tawa forest*



*Figure 34: Lake edge, some of which (true left edge) is within the Firth exchange block*



*Figure 35: Early seral broadleaf and fern under canopy*

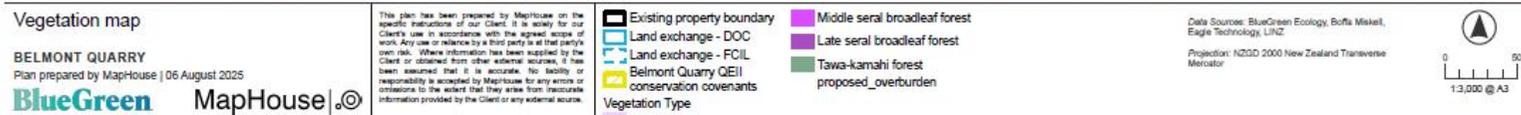


Figure 36: The Firth QEII vegetation. We note that 'not mapped' is an area of manuka scrubland west of the tawa block.

## 6.4.2 Likely future of QEII Firth Block

The surrounding edge-hill slopes of the property are reasonably advanced seral broadleaf and tree, although the Hutt River-facing south is the least secure, with a small range of weeds present. However, those are also the most unstable slopes, and that instability creates both interesting opportunities for indigenous species not common in forests and potential sites for future weed invasion. The eastern slopes will progress, and there is a local tawa seed source, and its progression to mature tawa is likely. The weed presence is otherwise minor overall, and pest animals may be reduced due to GWRC pest animal management in the Park (but also due to general access difficulty). It is more likely than not that there will be continued serial progress without weed and pest management, and so a steady increase in ecological values.

## 6.4.3 Ecological values

### 6.4.3.1 Representativeness

As with the other sites, the mid- and late-seral vegetation has moderate representative value, and the tawa forest (without any substantive under-tier damage) has a relatively high representative value. The small area of manuka scrub is similar but not as extensive as that in the OBDA area (discussed below). The lake wetland edge and open water habitat add diversity to the feature as a whole, but do not assist in considering representativeness.

We conclude that a **High** overall level of representativeness is considered appropriate here.

### 6.4.3.2 Rarity and distinctiveness

No at-risk, rare, or threatened species were seen, and none have been historically recorded. We have not, for this process, undertaken additional surveys, and are reliant on the QEII studies previously, which were detailed and do not list any threatened or at-risk taxa (Appendix 5). The habitat itself also is not threatened, but much of the upper slope (tawa forest area) in indigenous vegetation communities is within the threat class of <10% indigenous cover ((Leathwick et al., 2002), which we suspect is a scale issue on the website's mapping and is not correct. No plant species on the lists of Crisp (2020), which record the conservation status of indigenous vascular species in the Wellington region, are recorded as present.

We conclude that the assemblages are of **Low** rarity and distinctiveness

### 6.4.3.3 Diversity & pattern

A typical diversity of species is present, and there are several landforms and hydrological situations, a gully and steep faces in gravel, several aspects, and thus the small manuka area, the tawa area, and an unusual amount of mapou on the eastern slope.

We consider it to have a **Moderate** level of diversity and pattern.

### 6.4.3.4 Ecological context

The location of the established Tawa forest has potential benefits as a bird take off point due to its elevated location on the edge of the park overlooking the Hutt River. The Firth block tawa forest may allow birds to fly across the Hutt River to the vegetated spurs and range behind Silverstream. There is also mature fruit bearing tawa, along with some of the few beech trees found within in the wider area. There is also a role in stabilising the steep lands of the block, but otherwise, the site has no special or notable contextual value.

We consider the ecological context to be at the **Moderate** end of the continuum.

#### 6.4.4 Values conclusion

Overall, the entire Firth QEII we consider is fairly represented by a **moderate value** with a range of developing Seral broadleaf stages and one mature tawa area on many landforms.

#### 6.4.5 Value gains achievable

Continued development of the earlier seral stages towards a tawa-hīnau forest is most likely. However, rewarewa will be the addition to the canopy long term, and black beech may persist. It is also possible tōtara that the noted young miro, rimu and tōtara may grow into the canopy to add a currently widely missing podocarp component to the park's flora. This area is likely to reach a high value. The current mining face has created an open edge and disturbed soils. It is recommended that the Applicant (before finalisation of the exchange or post exchange) revegetates the top 10 m exposed band along the current quarry edge. We consider this should be done using an Olearia-kāmahi prominent mix of natives to secure the edge soils and substrate, minimise wind and humidity edge effects, and provide the kāmahi that would otherwise take some time to arrive.

### 6.5 The OBDA and Setback Area

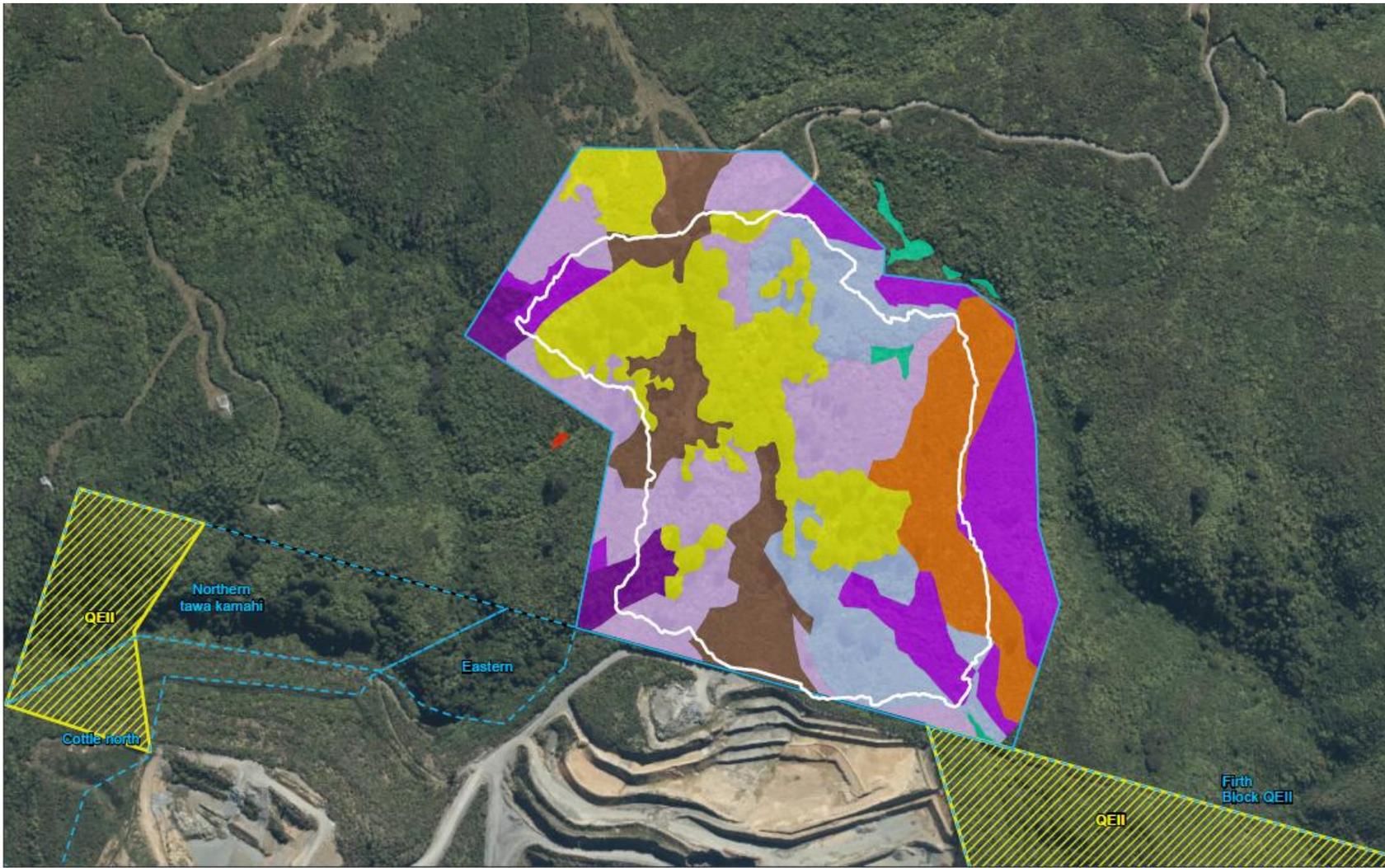
This section describes the ecological values of the OBDA and setback area, which are currently owned by the Department of Conservation and are referred to in this report as the DOC-Give, under the proposed land exchange.

#### 6.5.1 Current vegetation communities

A list of the plant species recorded during the vegetation survey is provided in Appendix 1, as are the RECCE plot data and locations. The survey included areas outside but contiguous to the proposed OBDA and also described features there (for context). Seven different vegetation communities were delineated within the OBDA site (Figure 37). The assemblages are communities that reflect differing stages of forest regeneration and are due to differences in intensity of past farming activity, which was concentrated on the ridgelines and the gentler slopes within the proposed OBDA site (see Figure 4, 1941).

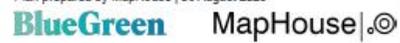
Of the native scrub and forest which are present, the seral tree, mahoe, is a ubiquitous species and is usually dominant with varying mixtures of tree ferns, manuka, and a variety of common Wellington seral broadleaf species. There are a few seedlings and saplings of the possible future canopy present, with rewarewa being the most common.

A summary description of the vegetation communities is presented in the Table 8 below and is sorted by structural form, from wetlands through pioneer shrublands to seral and mature forests.



Vegetation map

BELMONT QUARRY  
Plan prepared by MapHouse | 06 August 2025



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- |  |                               |   |
|--|-------------------------------|---|
| Existing property boundary                 | Middle seral broadleaf forest | Ridgeline Exotic Treeland               |
| Land exchange - DOC                        | Late seral broadleaf forest   | Treefern                                |
| Land exchange - FCIL                       | Wetland                       | Young gorse/pasture proposed_overburden |
| Belmont Quarry QEII conservation covenants | Semi-Swamp Forest             |   |
| <b>Vegetation Type</b>                     | Early seral broadleaf forest  |   |
|  | Manuka mixed broadleaf forest |   |

Data Source: BlueGreen Ecology, Boffa Miskell, Eagle Technology, LINZ  
Projection: NZGD 2000 New Zealand Transverse Mercator



Figure 37: OBDA vegetation communities

**Table 8: Summary of vegetation communities as shown in Figure 37**

Main Habitats	Description
<b>Wetlands</b>	
Natural inland kiokio wetlands	<p>On the floor of several north-eastern tributaries are narrow areas of native wetlands. These wetlands have developed post forest clearance and represent the early successional stage of a Pukatea-Swamp Maire semi-swamp forest. The vegetation in these areas is predominantly kiokio, native sedges (<i>Carex geminata</i>), rushes and ferns with edges of tree fern, manuka and broadleaf shrub species. They are typically 20m wide and 50-80m long with interceding broadleaf-manuka drier components between sedge features. Only one such wetland area is situated in the proposed OBDA exchange area. One swamp maire has been located at the upper end of one of the gullies (that which is within the OBDA).</p>
	
<p><i>Figure 38: Kiokio swamp</i></p>	

Main Habitats	Description
	 <p data-bbox="344 954 657 987"><i>Figure 39: Rautahi Sedgeland</i></p>
<p data-bbox="156 1010 1197 1037"><b>Pioneer shrublands and emerging scrub (&lt;80% woody cover - majority of stems &lt; 10cm dbh)</b></p>	
<p data-bbox="156 1066 279 1122">Gorse shrublands</p>	<p data-bbox="344 1066 1412 1290">On the dry ridgelines where pasture has been most recently maintained, gorse is the main pioneer species forming a diversity of shrub-grasslands, shrublands, and scrub depending on the time since it was last managed. The gorse is typically 1-3m tall, with a variety of pasture grasses and common herbaceous weeds beneath it. Off the ridge down slope west (and to a lesser extent east), the proportion and height of native broadleaf shrubs (i.e. mahoe, hangehange, kanono, rangiora, five finger, karamu, pigeonwood and mapou) increase until it is māhoe and mamaku over the rest at around 4-6meters.</p>  <p data-bbox="344 1962 635 1995"><i>Figure 40: Gorse shrubland</i></p>

Main Habitats	Description
<b>Seral broadleaved forest (majority of stems &gt; 10cm dbh)</b>	
Mahoe-tree fern forest	<p>This community forms a continuous strip along the main valley floor and most tributaries. It is dominated by mamaku, silver fern and gully fern on the shaded south-facing slopes, and māhoe and mamaku on the north-facing slopes.</p> <p>Māhoe stems are typically 30-40 cm DBH, but occasional large trees exceed 90 cm DBH. Tree ferns range in height up to 10m in the central gully. The canopy varies in height from 6 to 10m, with occasional large trees up to 12 m. In the understorey shrubs of kawakawa, kanono, rangiora, pigeonwood, pate and hangehange are common. Young nikau are also seen in the older (larger) vegetation. The floor cover is predominantly ferns (crown fern, kiokio, and hen and chicken). There are very few seedlings of potential canopy species (i.e., tawa, pukatea); the most common are occasional rewarewa seedlings and saplings.</p>
Mahoe/ broadleaved scrub	<p>This māhoe-dominated late seral forest is found in several south-facing gullies that lie adjacent to more mature native forest, thereby benefiting from dispersed seed. On wet south-facing faces, mamaku can dominate. In addition, several other hīnau broad-leaved species, such as hīnau, putaputaweta, tarata, and titoki, occasionally occur in the canopy.</p> <p>The canopy varies from 3-4 m on upper slopes to 6m on the valley floor, and some individual stems reach 8m. The stem size of the dominant māhoe is typically 20-40 cm with some specimens to 1.4 m. The slopes are generally steep to very steep (20° to 40°). Vines of supplejack, bush lawyer, pohuehue, and indigenous clematis are common in the canopy and understorey.</p> <p>The subcanopy and understorey have a good diversity of typical forest shrubs (rangiora, kawakawa, karamu, konono, hangehange, kawakawa, silver fern, pate, putaputaweta, pigeonwood) as well as scattered saplings of potential canopy species such as kohekohe, titoki, pukatea, tawa, nikau, and kāmahī. Notably absent was tree fuchsia, and the abundance of wineberry was lower than expected. The floor has a moderately diverse range of fern species and seedlings, and in a few places (near the older remnants), there are emerging vinelands of kiekie.</p> <p>The core of the vegetation is largely free of exotic weed species, but several invasive weeds occur along the modified margins.</p>

Main Habitats	Description
	 <p data-bbox="344 1037 743 1066"><i>Figure 41: Mahoe/ broadleaved scrub</i></p>
Manuka scrub	<p data-bbox="344 1093 1410 1155">The canopy of the manuka stands is even in height, normally ranging from 3-5 m, but up to 6m in the oldest stands.</p> <p data-bbox="344 1189 1401 1252">The stems of canopy plants are small, ranging from 5-10cm DBH in the youngest stands to 10-20cm dbh in the oldest. A small number of stems reach 35cm DBH.</p> <p data-bbox="344 1285 1425 1447">There are a few other species present in the canopy aside from occasional mahoe, pigeonwood and tree fern (silver fern). The understorey is relatively dense, with stems of kanuka, rangiora, mapou, kanono, and silver fern. There are also occasional seedlings of potential canopy species, such as hīnau and rewarewa. The floor cover has a variety of ferns and mosses, as well as the orchid (<i>Pterostylis alobula</i>).</p>

Main Habitats	Description
	 <p data-bbox="344 965 608 994"><i>Figure 42: Manuka scrub</i></p>
Exotic trees	<p data-bbox="344 1021 1423 1149">The upper ridge and lateral areas are covered in large old pines and macrocarpas. Still, they are also spread more widely, and into the various māhoe seral stages off the ridge line, are two holly species. These are prominent and extend throughout much of the north and western side, sloping down even to the main stream.</p> <p data-bbox="344 1184 1350 1245">Old man's beard is very rare in the OBDA area but has been observed at several locations across the wider site.</p>

### 6.5.2 The RECCE data

A total of 83 plant taxa were recorded on the OBDA site, six of which were exotic (Appendix 1). Typically, any one seral broadleaf RECCE plot indicated around 20 taxa

Table 9). The manuka shrublands are slightly more diverse, with 27 taxa, and the pukatea forest has 26 taxa. The area under the closed canopy mamaku has few taxa (4), and the kiokio-sedge wetlands typically have around 10-12 (of which one is in the OBDA).

Three local plant conservation network plant species lists also reflect the vegetation communities. The lists published come from records by (Mitalcfe, B. J., 1997). The lists are of "remnant 1" (about the north end of OBDA area, probably lower main gully), remnant 2 (the QEII – Firth Block) and "Haywards Quarry" which appears to be the south end of the OBDA area.

These lists, compared with the recent OBDA survey list, show considerable similarities between the 1997 condition and the present. A range of 65 to 82 taxa (the most being recorded in the recent survey), with the differences primarily being the number of ground and filmy ferns and grasses, and the current absence of tree fuchsia, but in essence, little has changed in the composition of the area at large for 30 years.

**Table 9: RECCE plot species richness summaries**

RECCE No.	1	2	3	4	5	6	7	8
VEGETATION COMMUNITY	Under Pine Ridge	Gully floor	Old gorse	Gully head	Gully head under mamaku	Kiokio wetland	Manuka shrub	Pukatea forest
TAXA RICHNESS	19	23	18	22	4	11	27	26

Of note is that (for DOC), in undertaking his own surveys of the OBDA area, also reports the presence of Ramarama (23 individuals, Nationally critical), 1 *Coprosma rubra* (At Risk – declining (adjacent to the wetland)), a *Carex maorica* (Regionally uncommon), a population of *Isolepis Habra* (Regionally uncommon) in a nearby (but outside of the OBDA) wetland, and nine specimens of Swamp maire (At Risk declining). The swamp maire trees do not constitute a forest; they are singular or at one place a loose cluster of three trees. There are no old trees being Ca. 20-40 cm DBH they appear to be around 40-60 years of age and likely developed post farming in the less affected gullies. It is assumed that there must be a parent tree or stand but this has not been located and may now be demised.

We know that there are a further three swamp maire plants in the OBDA and 16 canopy specimens of swamp maire in a south gully outside the exchange area, which currently have a dense carpet of swamp maire seedlings on the gully floor. Survey in the wider park has also confirmed that there is swamp maire habitat outside of the OBDA and in the Winstone's exchange areas nearby (southern gully).

In a workshop with DOC and their experts, we were advised that the presence of swamp maire habitat, in particular, was considered especially valuable in this area.

### 6.5.3 Likely future of the OBDA

The pattern is of progressing indigenous broadleaf seral staging from youngest at the top ridge, where it remains largely gorse and grass with pines, to developing māhoe forest with mamaku. We note that the numerous large old pines will not succumb to native canopy overtopping until they fall from old age. There are several strong mamaku canopy eastward gullies, which are likely stable but species poor, and a small western (central) gully with young swamp maire, which will persist and develop (seedlings are evident). The manuka-kanuka eastern ridge and several gully natural sedgeland with kiokio will progress slowly, largely because the future canopy sources are limited in the local landscape. That said, rewarewa is a developing final canopy species through the manuka/kanuka. The pattern of current vegetation follows the pattern of the extent of farm use and hydrology in the main.

The seral progression is towards a tall māhoe forest (as is much of the central Wellington hill country). This māhoe state is likely to progress more slowly, typically towards a rewarewa karaka-tawa and titoki forest type, where karaka is invasive. Podocarps and northern rata (once present) are hardly returning, reflecting the absence of local seed sources. The manuka ridge is developing towards rewarewa. Occasional tōtara, miro and rimu do occur, and an adult miro and rimu were observed off-site in the central stream gully edge. The māhoe stage, in the absence of assisted progression, is thought to last several hundred years.

At the OBDA site, there is some evidence of rewarewa seedlings and saplings, and very occasional tawa, with rare occurrences of titoki and kohekohe (aside from the pukatea and swamp maire gullies, where there are those remaining canopy areas giving rise to new seedlings of those species).

Threats to this seral development (aside from a lack of seeds of particular species) are, in the main, exotic tree canopy species invasion/persistence (i.e. holly, pine, karaka) and vine weed invasion (old man's beard, Japanese honey suckle, climbing asparagus), matting ground covers (*Tradescantia*, aluminium plant) and browsing exotic animals (possums and goats in the main). Currently, there is evidence of some animal control in the park and that it extends over the OBDA. The threat to retarded development is currently somewhat managed but could become serious if the aforementioned plant weeds develop. The source of future tree canopy is also limited.

In terms of fauna, it is unlikely that the current assemblages will change dramatically over time. Additions of rare species or greater species richness are unlikely until both the OBDA and the wider park are cleared of pest animals and have developed a more mature and varied set of ecological habitats and resources. Part of the limitation is that source populations of other lizard and bird species are not nearby, and access to the OBDA is limited.

#### 6.5.4 Ecological values of the OBDA area

An assessment of the ecological value of the proposed exchange area (OBDA) uses the common four criteria (*representativeness, rarity/distinctiveness, diversity/pattern, and context*) but includes a range of matters around each primary criterion for consideration and is given a value score (Very High, High, Moderate, Low, Negligible) for each criterion (See (Roper-Lindsay et al., 2018b)). These four scores are then combined to provide an overall ecological value of the site. We note that the following is a consideration of the area as a whole, but later (under comparisons in section 9 of this report), we undertake a finer-scale consideration.

##### 6.5.4.1 Representativeness

The central ridge, open ground, and gorse/grass and pine are not representative of any indigenous community. There is, however, a development of gorse as the precursor to broadleaf seral development. Under the various pine and macrocarpa canopies are the usual range of native broadleaf shrubs, along with some ferns and ground cover, making local sources for more rapid spread as the gorse matures and/or the canopy exotics die of old age. But overall, the representativeness of this assemblage/area is **very low**.

The māhoe / broadleaf seral communities of varying ages are representative of the species and structures of Wellington regional broadleaf seral development. There is a small range of species absent, reflecting the wider landscape's history of modification and use, but in general, the fern, ground tier, and shrub layers are typical. What is absent are examples of the final canopy species as saplings, and a range of ground-cover shrubs, ferns, grasses, and herbs (as well as the epiphyte flora of mature forest). We consider the representation of typical mid- to late seral stages across the developing site to be moderately representative, whereas the early seral stage is less representative.

There is one small gully, a natural inland wetland, within the OBDA. It has the typical early seral sedge and fern (*kiokio*) cover with manuka and some *C. propinqua*. Still, it does not have the range of sedges and rushes of a more complete bush gully sedgeland (missing *Isolepis* and *Schoenus* species, *Machaerina* and *wheki*, and the expected swamp maire). We consider this wetland to be of **moderate representation**.

The manuka-kanuka scrub has a good range of expected ground ferns, herbs, orchids, and some grasses. There is evidence of rewarewa saplings, and, in general, the ground-to-low canopy structure is typical. We do not find it highly represented, because "high" would imply a natural state without

absences or the presence of exotics, and so we consider that portion to have **moderate** representational **value**.

#### 6.5.4.2 Rarity and distinctiveness

Natural inland wetlands are regionally rare (<3% remaining Regionally (GWRC<sup>5</sup>) and the eastern side of the OBDA has one such area and several wet gullies that, while not currently natural inland wetlands, are potential habitat for swamp maire. Māhoe seral broadleaf habitat is abundant/ common and is not underrepresented in the ED (or region). Manuka-kanuka shrublands are also not recognised as underrepresented.

There are at least nine young swamp maire (At Risk declining) trees in a number of the eastern gully systems inside the OBDA, which are isolated from the main swamp maire gully (these are outside the OBDA).

There are at least 23 Ramarama specimens (Nationally critical) in the eastern gullies of the OBDA.

There is at least 1 *Coprosma rubra* (At Risk Declining) associated with the eastern wetland.

In general, the OBDA is recorded as occurring in a threatened land environment (<10% remaining with indigenous vegetation cover).

While the OBDA area at large is either early- to mid-seral broadleaf, tree fern, or exotic, there are nevertheless several taxa with rarity classifications and the potential for some of these to expand. The number of these rare species is not high, and their positions are not secure, but we consider it to rank at the **higher end of this continuum**.

#### 6.5.4.3 Diversity & pattern

The diversity of species as represented by the RECCE plots is typical of the seral stages measured and common in Wellington, and as compared to similar seral stages in the region. The diversity, however, is low, and the number of taxa is typically a common suite of 10-15 at any one location. Most tiers are present, while the ground tier is somewhat low in terms of species richness and final canopy, and the epiphyte tier is also very limited. There are also four habitat types associated with hydrology: wetlands, wet gully, ridge-top and slope drier soils, and the manuka ridge, which may be podsolised and has deep groundwater but a shallow damp surface. Thus, there is a range of habitat types across the OBDA. We consider this area to have a **moderate degree of pattern but a low level of diversity**.

#### 6.5.4.4 Ecological context

When viewed within the wider ecological context the OBDA area forms a small chunk on the edge of the wider Belmont regional park and does not perform any significant role as a corridor or feature assisting in the movement of bird and ground-moving taxa. The QEII-Firth block is more important as a jump over the Hutt River to the Stokes valley spurs, as is the Dry Creek area and the western stream corridor.

The OBDA, given its age and development, cannot yet be said to have integrity or to be functioning naturally, with weed potential interference likely and requiring pest control. There are many open exotic areas and an unknown seral successional process. The upper regions of the eastern slopes and gullies regulate water discharge and mitigate rain runoff to the east wetland systems. In terms of size and shape, it (if alone and not part of the wider vegetated park) would be a semi-solid feature (at 24ha), but open centrally. This open, central, large area means that there is generally an absence of secure core habitat; edge effects are largely evident throughout. Processes such as nutrient recycling and hydrology are functioning, and food webs are developing, but (as discussed) the future seral succession progression is as yet unclear and may be limited by the lack of later seral species seed availability and penetration into the OBDA.

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<sup>5</sup> [Greater Wellington — Wetlands in our region](#)

We consider the ecological context to be at the **low end of the continuum**.

#### 6.5.5 Values conclusion

There are a range of values (low to High) associated with the age and extent of seral development noting that as a whole the total area of variously aged and variously developed systems has some current value, but that there are gaps and missing taxa and a lack of evidence of later seral stage species which may cause the successional process to stall (for a time). Several rare taxa are present in low abundance, often as young specimens, suggesting the area has potential for these species (swamp maire, Ramarama).

The open central exotic pine and grassland ridge is currently of **Negligible value**.

The rest of the areas (later seral broadleaf and manuka-kanuka scrub) can be said to fit best as a whole as of **Moderate ecological value** (one high and the rest moderate or lower as per EIANZ (2018)).

## 7.0 Fauna

### 7.1 Avifauna

Avifauna within the proposed exchange areas has been characterised using species records from field surveys, acoustic monitoring devices, and supplementary datasets from the wider landscape. Table 10 provides a compiled list of avifauna species recorded by ecologists while undertaking various site investigations (as listed in Section 5.2), by the bioacoustics recorders (noting that the manuka acoustic recorder data has not, at the time of writing this report, been analysed), as well as by other sources in the wider area. The majority of species recorded in the area are native, Not Threatened (nationally and regionally), and primarily associated with native forests and shrublands (e.g., kereru, fantail, silvereye, grey warbler, ruru, tui, and bellbird).

The Belmont-Dry Creek KNE site is known to provide habitat for at least one breeding pair of NZ bush falcon, which is classified as both nationally and regionally threatened (Crisp et al., 2024; Robertson et al., 2021). Other native forest or shrubland species not recorded in any of the data sources but which may also be present in low numbers in the wider landscape include kaka, parakeets (*Cyanoramphus* sp.) and rifleman.

As shown in Figure 43, the OBDA area is located within the Belmont Regional Park eco-corridor, as identified by Forest & Bird<sup>6</sup>. This eco-corridor likely facilitates the movement of a number of the species listed in Table 10 across the landscape.



Figure 43: Belmont Regional Park eco-corridor (green) as identified by Forest & Bird<sup>6</sup>, with approximate location of the OBDA circled in red

<sup>6</sup> <https://www.forestandbird.org.nz/branches/lower-hutt/ecological-corridors-wellington-region>

Due to the limitations of the bioacoustics method (as outlined in Section 5.3 above), analysis of this data set has focused on species diversity rather than abundance. The greatest diversity of species was recorded in the lake habitat (n=31) (Figure 44) which also included two Threatened and one At Risk species (). Interestingly, more species were recorded in the exotic habitat (n=27) kamahi than in the tawa-kāmahi forest habitat (n=15), but a greater proportion were introduced species (Figure 44 and Figure 45). The greater diversity recorded in the exotic habitat type may be due to its more open structure relative to the tawa-kāmahi forest.

Because of the mosaic of vegetation and habitat types within both the OBDA and land exchange areas, and the mobile nature of birds, these areas are all likely to provide foraging, as well as potentially nesting habitat for low numbers of most of the native species listed in Table 10. However, we note that the farm pond and associated wetland within the boundary of the Firth QEII block is a unique feature that provides habitat for species that were not recorded in other habitats (e.g. shag species), and this was the only habitat type in which Threatened and At Risk species were recorded (refer to Table 10 and Figure 45).

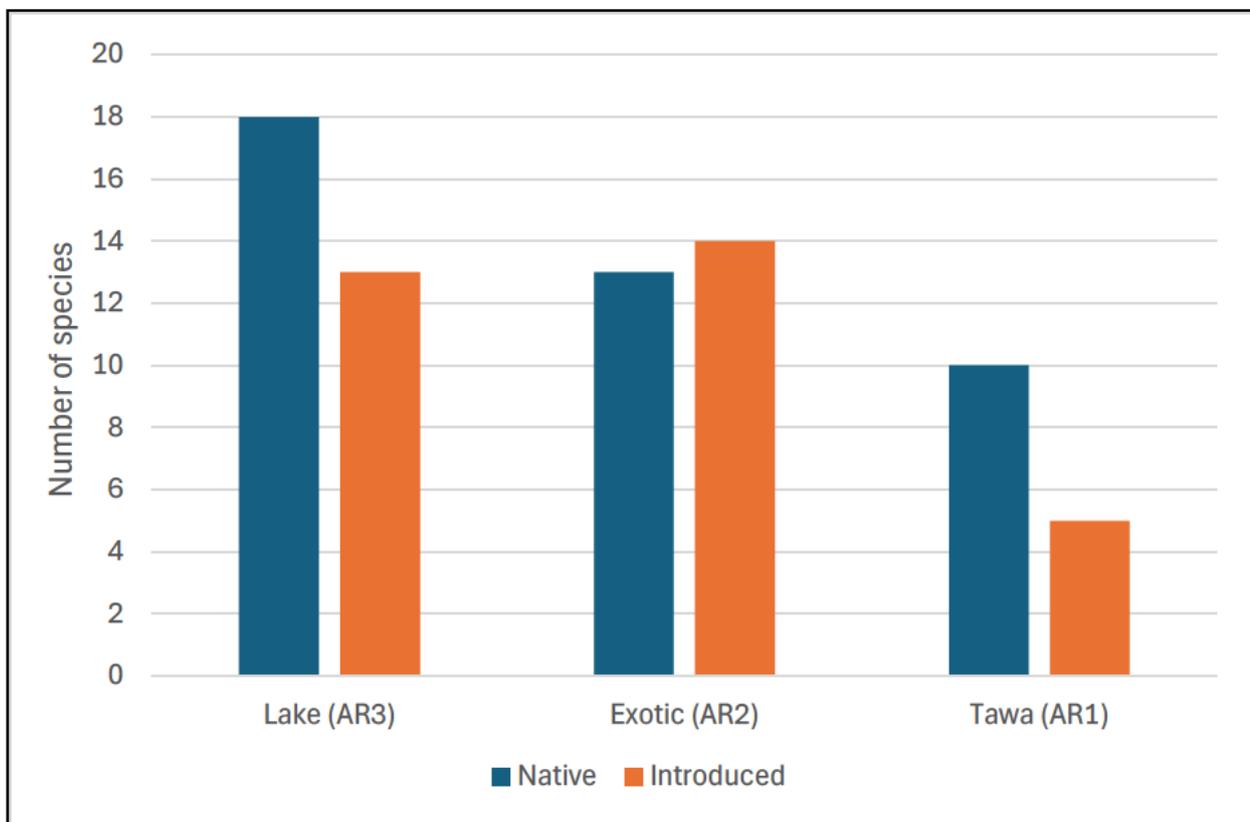


Figure 44: Number of native and introduced species recorded by the bioacoustics recorders within different habitat types (refer to Table 4 and Figure 11)

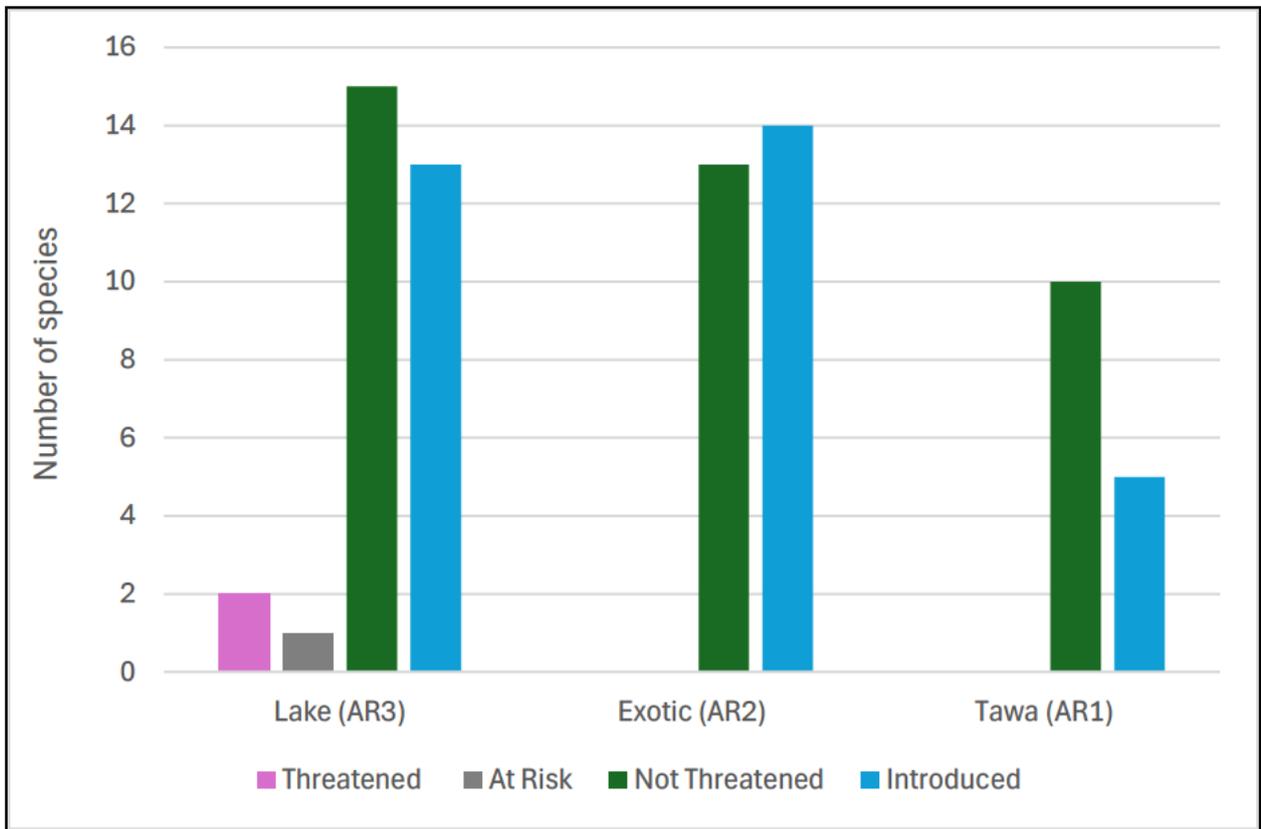


Figure 45: National conservation status of species recorded by the bioacoustics recorders within different habitat types (refer to Table 4 and Figure 11)

**Table 10. Avifauna species occurring within the site and/or wider landscape (ordered by decreasing conservation status)**

SPECIES		NATIONAL CONSERVATION STATUS (Robertson et al. 2021)	REGIONAL CONSERVATION STATUS (Crisp et al. 2024)	DATA SOURCE								
				Site visits <sup>7</sup>	eBird	Belmont-Dry Creek KNE (GWRC 2023)	QEII Firth block (Stephenson 2013)	Lake bioacoustics (AR3) <sup>8</sup>	Exotic bioacoustics (AR2) <sup>8</sup>	Tawa bioacoustics (AR1) <sup>8</sup>	Manuka bioacoustics (AR4) <sup>8</sup>	
Bush falcon	<i>Falco novaeseelandiae</i> "bush"	Threatened - Nationally Increasing	Threatened - Critical	✓		✓						
Caspian tern	<i>Hydroprogne caspia</i>	Threatened - Vulnerable	Threatened - Critical					✓				
Long-tailed cuckoo	<i>Eudynamys taitensis</i>	Threatened - Vulnerable	Threatened - Endangered					✓				
North Island robin	<i>Petroica longipes</i>	At Risk - Declining	Threatened - Vulnerable					✓	✓	✓		
Pied shag	<i>Phalacrocorax varius varius</i>	At Risk - Recovering	Threatened - Vulnerable					✓				
Little shag	<i>Phalacrocorax melanoleucos brevirostris</i>	At Risk - Relict	Threatened - Endangered				✓					
Bellbird	<i>Anthornis m. melanura</i>	Not Threatened	Not Threatened	✓		✓	✓	✓	✓	✓		
Black-backed gull	<i>Larus d. dominicanus</i>	Not Threatened	Not Threatened	✓		✓	✓	✓	✓	✓		
Grey warbler	<i>Gerygone igata</i>	Not Threatened	Not Threatened	✓		✓	✓	✓	✓	✓		
Kereru	<i>Hemiphaga novaeseelandiae</i>	Not Threatened	Not Threatened	✓			✓					
Kingfisher	<i>Todiramphus sanctus vagans</i>	Not Threatened	Not Threatened	✓								
Morepork	<i>Ninox n. novaeseelandiae</i>	Not Threatened	Not Threatened				✓	✓	✓	✓		
Paradise shelduck	<i>Tadorna variegata</i>	Not Threatened	Not Threatened					✓				
North Island fantail	<i>Rhipidura fuliginosa placabilis</i>	Not Threatened	Not Threatened	✓	✓	✓	✓	✓	✓	✓		
North Island tomtit	<i>Petroica macrocephala toetoe</i>	Not Threatened	Not Threatened	✓				✓	✓	✓		
Shining cuckoo	<i>Chrysococcyx l. lucidus</i>	Not Threatened	Not Threatened					✓	✓			
Silveryeye	<i>Zosterops lateralis lateralis</i>	Not Threatened	Not Threatened	✓		✓	✓	✓	✓	✓		
Pukeko	<i>Porphyrio m. melanotus</i>	Not Threatened	Not Threatened					✓				
Spur-winged plover	<i>Vanellus miles novaehollandiae</i>	Not Threatened	Not Threatened				✓	✓	✓	✓		
Swamp harrier	<i>Circus approximans</i>	Not Threatened	Not Threatened	✓		✓		✓	✓	✓		
Tui	<i>Prosthemadera n. novaeseelandiae</i>	Not Threatened	Not Threatened	✓	✓	✓	✓	✓	✓			
Whitehead	<i>Mohoua albicilla</i>	Not Threatened	Not Threatened	✓	✓	✓		✓	✓			
Blackbird	<i>Turdus merula</i>	Introduced	Introduced & Naturalised	✓			✓	✓	✓	✓		
California quail	<i>Callipepla californica</i>	Introduced	Introduced & Naturalised	✓			✓		✓			
Chaffinch	<i>Fringilla coelebs</i>	Introduced	Introduced & Naturalised	✓				✓	✓			
Pheasant	<i>Phasianus colchicus</i>	Introduced	Introduced & Naturalised						✓			
Canada goose	<i>Branta canadensis</i>	Introduced	Introduced & Naturalised					✓	✓			
Dunnoek	<i>Prunella modularis</i>	Introduced	Introduced & Naturalised				✓	✓	✓	✓		

<sup>7</sup> As listed in Section 5.2

<sup>8</sup> Refer to Table 4 and Figure 11 for location and habitat details

SPECIES		NATIONAL CONSERVATION STATUS (Robertson et al. 2021)	REGIONAL CONSERVATION STATUS (Crisp et al. 2024)	DATA SOURCE							
				Site visits <sup>7</sup>	eBird	Belmont-Dry Creek KNE (GWRC 2023)	QEII Firth block (Stephenson 2013)	Lake bioacoustics (AR3) <sup>8</sup>	Exotic bioacoustics (AR2) <sup>8</sup>	Tawa bioacoustics (AR1) <sup>8</sup>	Manuka bioacoustics (AR4) <sup>8</sup>
Eastern rosella	<i>Platycercus eximius</i>	Introduced	Introduced & Naturalised				✓	✓	✓		
Goldfinch	<i>Carduelis carduelis</i>	Introduced	Introduced & Naturalised					✓	✓		
Magpie	<i>Gymnorhina tibicen</i>	Introduced	Introduced & Naturalised					✓	✓	✓	
Redpoll	<i>Carduelis flammea</i>	Introduced	Introduced & Naturalised					✓	✓		
Mallard	<i>Anas platyrhynchos</i>	Introduced	Introduced & Naturalised				✓	✓	✓	✓	
Song thrush	<i>Turdus philomelos</i>	Introduced	Introduced & Naturalised				✓	✓	✓	✓	
Wild turkey	<i>Meleagris gallopavo</i>	Introduced	Introduced & Naturalised					✓	✓		
Yellowhammer	<i>Emberiza citrinella</i>	Introduced	Introduced & Naturalised					✓			
Feral goose	<i>Anser anser</i>	Introduced	Introduced & Naturalised					✓	✓		
Starling	<i>Sturnus vulgaris</i>	Introduced	Introduced & Naturalised				✓				

## 7.2 Bats

No bats were detected. From the survey undertaken it is not considered likely that long-tailed or short-tailed bats are regularly roosting within either the parcel of land to be used as the overburden area or the parcels of land to be given to DOC. No evidence of foraging was detected. While bat activity in a particular area can fluctuate across a season, the absence of any recordings from a survey undertaken in November indicates that the site is unlikely to be important habitat for bats.

## 7.3 Herpetology

Blueprint Ecology (2025) has assessed the habitats and the potential lizard species present and begun trapping surveys. His assessment comparing the habitat areas provides the following information:

- A comparison of lizard habitat values between DOC-Give and DOC-Gets.
- Details of a lizard survey currently being undertaken at DOC-Gives.
- A reply to the Department's request for a detailed lizard survey at each of the exchange sites.

### 7.3.1 Lizard Habitat Quality

Lizard habitat quality has been assessed based on existing lizard record datasets (Bioweb database, iNaturalist), aerial imagery, BlueGreen Ecology's vegetation mapping, and our site observations.

In determining habitat quality, Blueprint Ecology (2025) considered:

- Representativeness: Typical structure, species composition (abundance) and indigenous representation of forest as a proxy for lizard habitat quality.
- Rarity/distinctiveness: Species of conservation significance. This includes At Risk species (copper skink, ornate skink, glossy brown skink, ngahere gecko, barking gecko). There are no relevant Threatened species.
- Diversity and pattern: Habitat diversity, lizard species diversity and patterns in habitat use (e.g., multiple habitat types, multiple lizard species).
- Ecological context: Size, shape, ecological networks (e.g., linkages, pathways).

Habitat quality categories are as follows:

1. No effective habitat. Areas are excluded from mapping. Includes within pine trees.
2. Low-quality habitat. Where very few lizards are expected and/ or no At Risk species are likely to occur.
3. Moderate quality habitat. Not threatened species (e.g., northern grass skink) are common or At Risk species are expected to be recorded at least infrequently and may include more than one species. Includes seral broadleaved, treefern forest, and rank grass margins.
4. High-quality habitat. Includes mature forest with numerous preferred habitat values (e.g., forest with lianes, perched epiphytes, and higher diversity through forest tiers). Provides high-quality habitat for multiple at-risk lizard species. Includes mature forest and larger areas of kānuka or mānuka dominant scrub or forest.

The DOC-Give Area has approximately 20 ha of lizard habitat and the exchange sites have approximately 30 ha of lizard habitat (Figure 46).

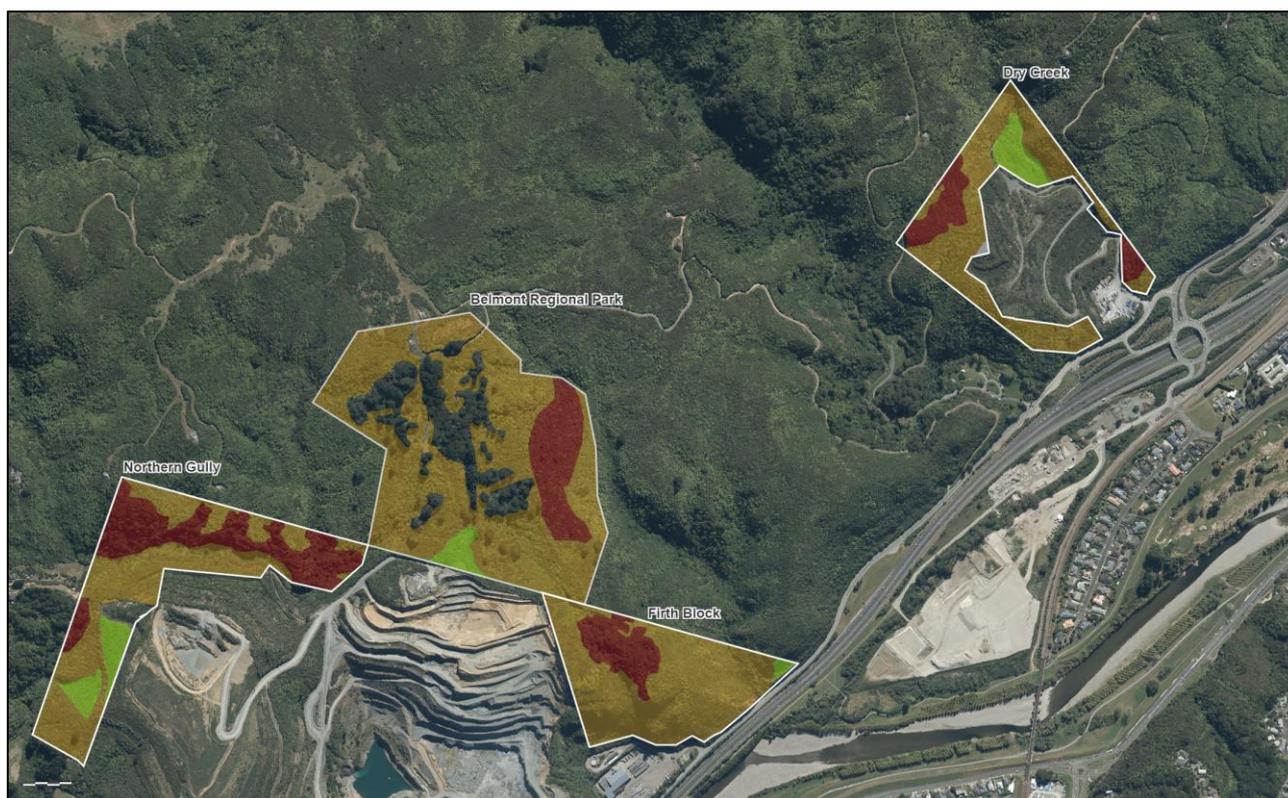


Figure 46: Low habitat quality (green), moderate habitat quality (orange), high habitat quality (red), site boundaries (white line).

### 7.3.2 DOC-Give Lizard Survey

In total, four northern grass skink (*Oligosoma polychroma*) and three ngahere gecko (*Mokopirirakau* “Southern North Island”) have been recorded from the OBDA.

The results show that northern grass skink are present in low abundance (CPUE 3%) 3 in thick grass along the forest margins within the centre of OBDA (Figure 47). The population recorded is not regionally or locally significant, and the number of lizards recorded indicates that the population is small but permanent and self-sustaining.

Ngahere gecko are present within mānuka forest to the east of OBDA, with one animal detected per 5 hours of search effort on average. This species is listed as ‘At Risk - Declining’ in the latest threat classification (Hitchmough et al., 2021) and the population on site is locally significant.

When considering the relatively large area of suitable habitat for other forest dwelling species, and northern grass skink and ngahere gecko as a proxy for other lizard species, we are cautious to entirely discount the presence of other potential lizard species on site (e.g., copper skink *Oligosoma aeneum*). Other species may occur in low abundance (below detectability) or in discrete, localised areas outside of our direct survey areas.



Figure 47: A northern grass skink was recorded at DOC-Give.

### 7.3.3 Conclusion (Lizards)

Given that the seral forest areas are all part of a contiguous cover of vegetation which is continuous across >100 ha of the Western Hills, reasonably assumes that there is a like-for-like habitat quality/composition, equivalence of values and likelihood of lizard occurring within all of the areas.

The results of the DOC-Give land survey are expected to be similar if conducted at each exchange site. This is because each site has multiple hectares of forest, the forests are contiguous between sites, are of very similar age and quality, and the sites occur near each other.

Field surveys in these locations are limited by steep terrain, thick, inaccessible scrub and seral forest, and the inefficacy of current lizard survey methods for detecting low-density, cryptic forest lizard species.

In all cases, it is expected that northern grass skink and/ or a low number of forest lizard species would be recorded at each site. It is possible that higher proportions of barking gecko or ngahere gecko could occur within the high-quality habitats "hot spots". The presence and abundance of these species in these locations have been assumed from the habitat quality assessment. A detailed survey at each site would not substantially influence this assessment, and it would be difficult to rely on survey data where poor detection rates are common, especially in terrain that is difficult to access.

Overall, the proposed land swap results in a net gain in lizard habitat area owned by the Department.

## 8.0 Waterways

### Stream network overview

The DOC-Give contains three short intermittent stream reaches (the setback involves an additional intermittent area). But mostly, it involves the ephemeral headwaters of six gully systems that feed into the perennial systems. The “perennial” area in the east-central system is part of the natural inland wetland feature rather than a strictly stream. There are three eastern and three western discharging features that deliver water into the central northern mainstream and the eastern main stem of a stream. The lower reaches of these systems are all perennial.

### Historic stream modification

The Dry Creek site used to have a stream, but most of that was piped under the old overburden.

### Perennial streams and tributary

The Northern tawa-kāmahi-Cottle area has two of the four main perennial streams in the area. The larger comes from the west and meets the central northern at the Quarry pipe entrance, and from there under the quarry to the Hutt River. The Cottle Block has a tributary of the southern system (intermittent) that leads into the Southern gully main stem into the southern gully site and then down two waterfalls to the Hutt River via the southern gorge (Figure 48).

### Fish passage constraints

All of the systems present have considerable fish passage challenges from the Hutt River. This fact and the fish surveys in the central and western perennial system assure us that there are no trout or a trout hatchery or fishery in any stream potentially affected by discharges. The ephemeral and intermittent gullies are certainly not trout hatcheries with the wrong substrates, too little water and no trout adult (or juvenile) access from the Hutt River.

### Surveyed reaches and sampling results

The gully areas downstream of the DOC-Give (west or east) are largely intermittent at best or contain only a few millimetres of surface flow throughout the year (i.e. no fish habitat and a semi-terrestrial macroinvertebrate fauna). They are largely damp, muddy gully floors with relatively abundant woody and leaf debris. Those perennial reaches further downstream have good macroinvertebrate habitat, and koura are likely common (especially with the reduced fish presence in the central system, but also in the other streams). Freshwater habitat and species values are limited in the intermittent sections (macroinvertebrates) and largely absent in the ephemeral sections.

With respect to the central mainstream and the western stream buffered by the northern tawa-kāmahi forest, Boffa Miskell surveyed some 400m reach of each system (March 2022, Figure 53). They sampled the central main stem (they label as Buchanan stream) and the western main stem (they label as Kaitangata stream) branch for macroinvertebrates, fish and habitat conditions. That data informs the above opinion.

There is no data for the system east of the DOC-Give, nor the Dry Creek site stream.

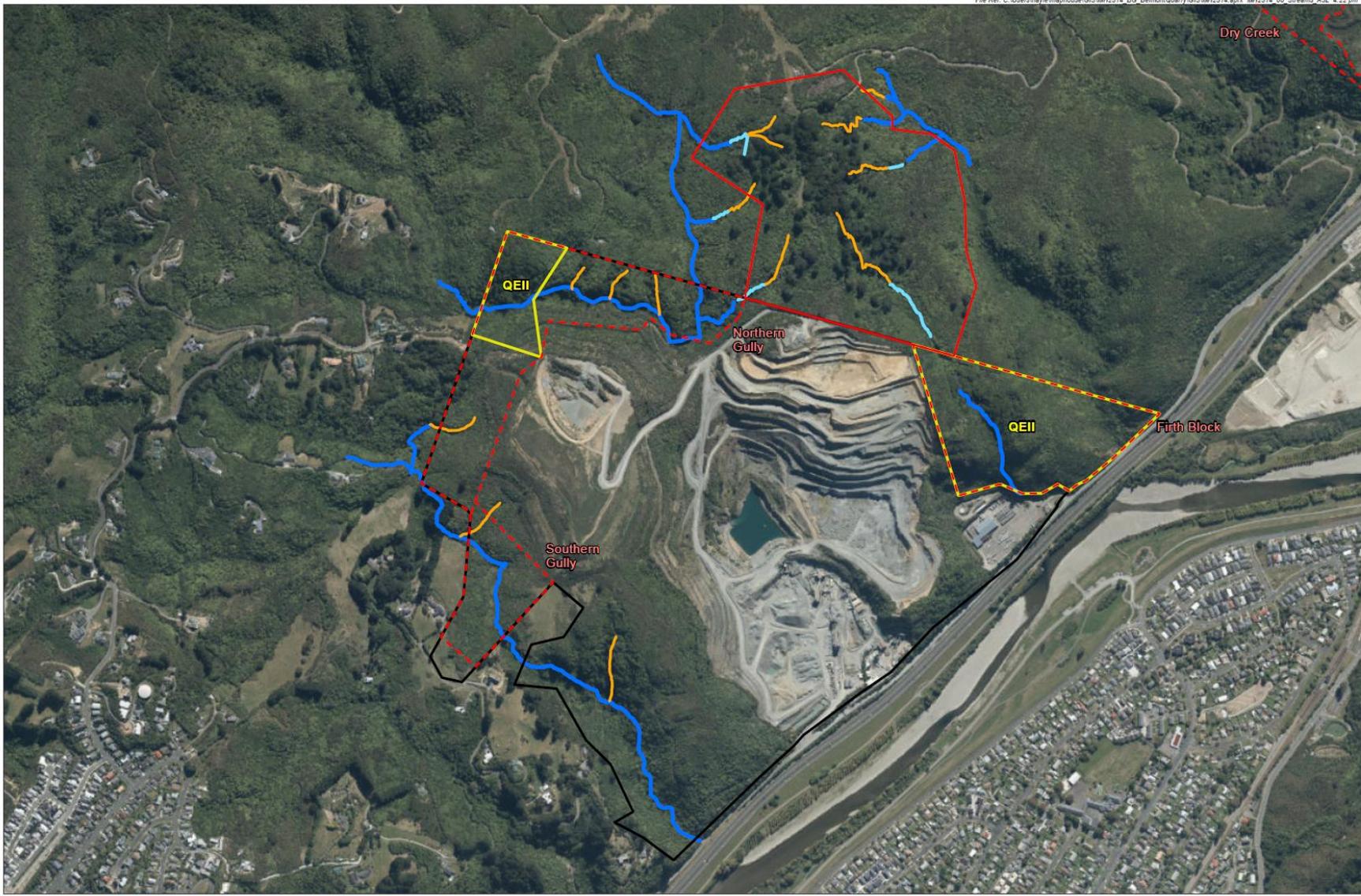
### Aquatic value assessment

The following summarises the findings of the BML surveys for those two main waterways. shows the areas of survey and then the macroinvertebrate data (refer to Table 11 below) and the fish data are discussed.

The northern main stem had a single shortfin eel (*Anguilla australis*; 450 mm in length) and a single longfin eel (*Anguilla dieffenbachia*; 800 mm length). Kōura (freshwater crayfish; *Paranephrops planifrons*)

were also observed during the fish survey. No fish species/individuals were surveyed in the western main stem; however, kōura are present.

The Northern main stem using the EIANZ evaluation system sees the main stem as highly representative (despite the general absence of fish), with moderate rarity and distinctiveness, moderate in terms of pattern and diversity and with a moderate ecological context creating a high value aquatic system. The Western branch ranks moderate for all factors and is considered, therefore, of moderate aquatic habitat value.



**Streams**

**BELMONT QUARRY**  
Plan prepared by MapHouse | 24 October 2025



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- |                            |              |
|----------------------------|--------------|
| Existing property boundary | Perennial    |
| Land exchange - DOC        | Intermittent |
| Land exchange - FCIL       | Ephemeral    |
| QEII Covenant              |              |



Figure 48: Waterways.



*Figure 49: Midwestern arm of the central stream.*



*Figure 50: Lower reach.*



*Figure 51: Central reach, main northern arm*



*Figure 52: Lower reach, main northern arm*



Figure 53: BML survey extent for each system (approx. 400 m).

**Table 11: Summary benthic macroinvertebrate data indices for western arm (W) and northern arm (N).**

Species	W-01	W-02	N-01	N-02	N-03
Total abundance	421	3867	1157	2042	507
Number of taxa	26	31	32	34	34
Number of EPT taxa	12	16	13	17	15
Total abundance of EPT	137	2252	924	1391	194
MCI score	120.8	123.9	123.8	124.7	122.4
QMCI	4	5.2	6.8	6.2	4.9

The stream in the southern gully has received no survey other than visual observations, which indicate it is a perennial system with good instream aquatic habitat quality, a mixed hard-substrate base under forest canopy, and at least banded kokopu. Through the lower wetland, it is more entrenched, narrower, with a dense sedge and grass cover, and is likely good koura habitat.

## 9.0 Comparative Values Assessment (the DOC-Give and DOC-Get)

This section provides a comparison of the values of the DOC-Get areas (Northern Gully, Dry Creek, and Firth QEII) with the DOC-Give area (OBDA and setback). The values of those areas have been described in detail in the preceding sections.

### 9.1 Comparative analysis (habitats)

Figure 54 shows the overview of the proposal i.e. the DOC-Give and DOC-Get areas and the vegetation types in those areas.

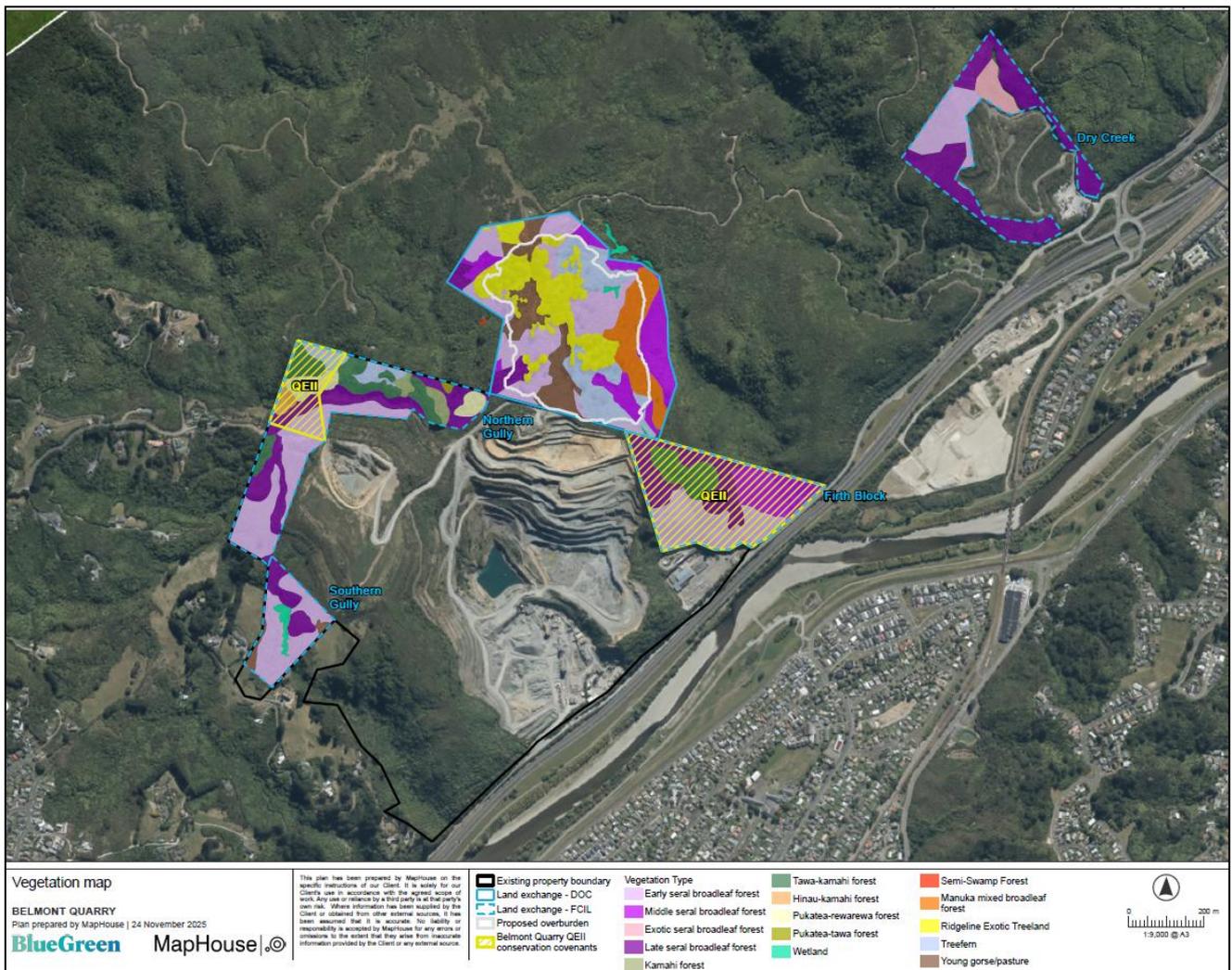


Figure 54: Overview of proposed DOC-Give and the proposed exchange areas.

The following are ways to compare the different exchange areas based on area and value (both in terms of EIANZ processes and broader ecological functions and aspects). Various metrics are used to assist comparisons.

The methods of assessment and comparison presented in this section have been discussed with ecologists from the Department of Conservation. Following this broad and numerical assessment, we make a special assessment of swamp maire and habitat, as a value of special importance noted by the DOC experts.

The first comparison is a GIS-based area (ha) of the different broad habitat types as described above (Table 12)<sup>9</sup>.

The surveys address a total of some 58 ha (24ha in the exchange (DOC-Give) and 34 ha as the potential offering (DOC get)). Table 12 shows that later seral broadleaf is common throughout, but the DOC-Give has most of the pre native or very early seral (exotic) types. The northern tawa-kāmahi - eastern extension and Cottle block has the greatest representation of community types and the most forest. Only the exchange (DOC-Give) area has the kiokio-sedgeland wetland.

Of the total amount present in the survey, the largest (most) habitat type is the early seral broadleaf forest (30.2%), followed by late seral and then middle seral broadleaf and then treefern. All of the seral communities are essentially composed of the same species, but they differ in age, canopy height and intactness. Around 9% of the total area is tall forest, none of which is in the exchange DOC-Give site. Sixteen percent of the total area is predominantly exotic (pasture and trees) most of which is in the DOC-Give area.

**Table 12: Areas (ha) of the different vegetation assemblages in the various areas of exchange.**

Vegetation type	Northern tawa-kāmahi-Cottle (ha)	Southern Gully	Firth QEII (ha)	Dry Creek (ha)	Total DOC-Get (ha)	OBDA + set back(ha)	Total DOC give(ha)
Early seral broadleaf forest	4.09	2.46	3.25	1.95	11.75	5.50	5.50
Exotic seral broadleaf forest				0.80	0.80		0.00
Hinau-kamahi forest	0.30				0.30		0.00
Kamahi forest	0.52				0.52		0.00
Late seral broadleaf forest	3.42	0.92	2.78	4.90	12.02	0.79	0.79
Manuka mixed broadleaf forest					0.00	2.66	2.66
Middle seral broadleaf forest			2.16		2.16	3.56	3.56
Pukatea-rewarewa forest	1.02				1.02		0.00
Pukatea-tawa forest	0.07				0.07		0.00
Ridgeline Exotic Treeland					0.00	5.14	5.14
Semi-Swamp Forest					0.00	0.02	0.02
Tawa-kamahi forest	2.29		1.36		3.65		0.00
Treefern	0.90				0.90	3.24	3.24
Wetland		0.27			0.27	0.23	0.23
Young gorse-pasture		0.29			0.29	2.87	2.87
<b>Grand Total</b>	<b>12.61</b>	<b>3.94</b>	<b>9.55</b>	<b>7.65</b>	<b>33.75</b>	<b>24.00</b>	<b>24.00</b>

DOC-Give = 24ha. DOC-Get = 34ha.

<sup>9</sup> Note there is variance in the decimal extent of the measures and the 2<sup>nd</sup> onwards decimal number reported varies throughout the report depending on rounding. Areas rounded to one decimal point are consistent.

As a direct comparison between the give and DOC-Get areas. Table 13 directly pairs the areas of the different habitat types with the area analysis. It shows that the DOC-Get areas have more moderate- and high-value habitat, while the DOC-Give area is weighted strongly toward lower-value habitats (potential swamp maire/wetland habitat aside).

**Table 13: Value and proportion of the different vegetation assemblages in the total give and total DOC-Get areas.**

Vegetation type	Value	DOC-Get total	DOC-Give total
Young gorse/pasture	Negligible	0.29	2.87
Ridgeline Exotic Treeland	Negligible	0.00	5.14
Exotic seral broadleaf forest	Low	0.80	0.00
Treefern	Low	0.90	3.24
Early seral broadleaf forest	Low	11.75	5.50
Middle seral broadleaf forest	Moderate	2.16	3.56
Late seral broadleaf forest	Moderate	12.02	0.79
Manuka mixed broadleaf forest	Moderate	0.01	2.66
Kāmahi forest	Moderate	0.52	0
Hīnau-kāmahi forest	High	0.30	0
Pukatea-rewarewa forest	High	1.02	0
Pukatea-tawa forest	High	0.07	0
Tawa-kāmahi forest	High	3.65	0
Wetland	High	0.27	0.23
<b>Total area (ha)</b>		<b>33.76</b>	<b>24</b>

Table 14 is a summary of the above analysis and shows that high and moderate vegetation habitats described in Table 13. The sum is 20 ha as compared to 7.3 ha in the DOC-Give, while the amount of negligible (largely exotic) habitat is most prominent in the DOC-Give.

**Table 14: Weighting of the areas of valued assemblages / habitats.**

Value level	DOC-Get total (ha)	DOC-Give (OBDA + setback) total (ha)
Negligible	0.29	8.01
Low	13.45	8.74
Moderate	14.71	7.01
High	5.31	0.23
Totals	33.76	23.99

To further enable a comparison of weighted conservation/ecological value (which does not consider specific species value but habitat types), we have assigned the values a numeric score (on a linear scale where 1 = Negligible, 2 = low) and multiplied them by the areas of each category. A weighting score is as follows (Table 15).

**Table 15: Comparison of the weighted value score for the exchange.**

Value weight score	DOC-Get total (ha)	DOC-Give (OBDA + setback) total (ha)
1	0.29	8.01
2	26.91	17.47
3	44.13	21.03

Value weight score	DOC-Get total (ha)	DOC-Give (OBDA + setback) total (ha)
4	21.24	0.94
<b>Total value</b>	92.57	47.44

Here, the gains (as measured by this process) of the DOC-Get areas are close to 2 times greater than the area of the DOC-Give.

The exchange is not only about area and overarching value scores. There is a range of values, conditions, and ecological aspects that are more difficult to enumerate. These are considered below in summary (Table 16) using the EIANZ values assessment process (from the area descriptions analysis in the above document (sections 4-8) to derive a value based on the four base criteria.

In addition, these are also the responses (Table 16) to the values assessment analysis suggested by DOC (Appendix 7), which are based on the National Policy Statement for Indigenous Biodiversity 2023 – Amended October 2024 (Ministry for the Environment), and use examples in the Department of Conservation guidelines for assessing significant ecological values.

**Table 16: Comparison across the value sets between the give and get.**

Vegetation type	Representativeness	Rarity and distinctiveness	Diversity & pattern	Eco context	EIANZ (2018) Outcome
North tawa-kāmahi	High	High	Moderate	High	Very High
Southern Gully	Moderate	High	Moderate	High	High
Cottle extension	Moderate	Moderate	Moderate	Moderate	Moderate
Firth QEII	High	Low	Moderate	Moderate	Moderate
Dry Creek	Moderate	Low	Low	Low	Low
OBDA + setback	Moderate	High	Moderate	Low	Moderate

Table 17 Expands this assessment to consider a range of ecological functions and processes, as well as other aspects not overtly covered by the EIANZ process. While subjective, we believe the factors listed in the first column for each give-and-get area are relevant. Here, the young age, level of past modification, and exotic components reduce the DOC-Give scores more than they do in the more mature, less modified areas of the exchange. Each “score” is given a numerical value, summed, and then averaged to provide an average score from the factors in Table 18. The exchange looks ecologically more than reasonable under this analysis.

**Table 17: Ecological functions, condition, processes for each area and as a summed relative score.**

Function/process/	Northwestern tawa-kāmahi	Southern Gully	Cottle block	Firth QEII	Dry Creek	OBDA + setback
Weed and pest resilience	High	Low	Low	Moderate	Low	Moderate
Mature forest resources	High	Low	Moderate	Moderate	Low	Low
Signs of later canopy species development	Moderate	Low	Low	Low	Low	Low
Wetland hydrology	No	Moderate	Low	No	No	Moderate
Stream habitat	High	Low	Moderate	Low	Low	None
Stream protection functions	High	Moderate	Moderate	None	None	Low
Other buffering roles	Negligible	Low	Low	Low	Negligible	Low
Intact canopy	High	Low	Low	High	Low	Low
Core habitat due to size or location	Low	Low	Low	Low	Low	Low

Function/process/	Northwestern tawa-kāmahi	Southern Gully	Cottle block	Firth QEII	Dry Creek	OBDA + setback
Special resources	High	Low	Low	Low	Negligible	Low
Corridor or movement assistance roles	Negligible	Moderate	Low	Moderate	Negligible	Low
Numerical outcome	21	14	13	14	7	12
Averaged outcome (#/5)	High	Moderate	Moderate	Moderate	Low	Moderate

0=Negligible/none, 1= low, 2= moderate, 3 = high, 4=very high.

The DOC-Get summed = 55 (averaged 13.785). The DOC-Give = 12.

The EIANZ result and the Table 17 ecological factors results are subtly different (Table 18) but the essence of the analysis is that the DOC-Get is of higher value than the DOC-Give for several reasons and ecological factors (but also see the swamp maire section below).

**Table 18: Summary of two-value assessment outcomes.**

Function/process	Northwestern tawa-kāmahi	Cottle scrub	Southern Gully	Firth QEII	Dry Creek	OBDA + setback
Ecological factors and functions assessment	High	Moderate	Moderate	Moderate	Low	Moderate
EIANZ (2018) processes	Very High	Moderate	High	Moderate	Moderate	Moderate

## 9.2 Comparative assessment (fauna)

While fauna, as explained above, have not been brought into the values assessment in terms of community representativeness, diversity, rarity etc because the assemblages are generally the same and with respect to the birds mobile and so able to use all of the local habitat, there is a trend in the bird data. The likely number of Threatened and At risk faunal taxa are produced below in Table 20 where it can be seen that aside from the Firth Block and specifically the waterbody, the important" fauna are not indicative of any area as better than any other.

**Table 19: Threatened and at Risk faunal taxa across the five areas of survey / assessment.**

Rare taxa - high value species	Northwestern tawa-kāmahi	Cottle scrub	Southern Gully	Firth QEII	Dry Creek	OBDA + setback
Ngahere gecko	x	x	x	x	x	x
Bush falcon					x	
Caspian tern				x		
Long-tailed cuckoo				x		
North Island robin	x		x			x
Pied shag				x		
Little shag				x		
Totals	2	1	2	5	2	1

Ecologically, the exchange appears to weigh in favour of the Department of Conservation in terms of area (ha) and types and ecological values attained rather than given away. However, there is the matter of specific threatened and at-risk plant taxa on site.

While Ramarama is found in both the DOC-Give and DOC-Get areas, there is a single specimen of *Coprosma rubra* and two regionally uncommon wetland species (*Carex maorica* and *Isolepis Habra*) that

are found only the DOC-Give area. The major point of disparity between the DOC-Give and DOC-Get areas was the presence of swamp maire, which we now turn to address.

### **9.3 Swamp Maire**

Swamp maire emerged as a recurring theme in consultation with DOC, and this section sets out the detailed assessment of its presence and habitat potential in response to those discussions.

#### **Swamp maire in the DOC-Give area**

We know that there are six shallow-slope gullies on the DOC-Give. In the east, they drain to a stream-wetland linear feature; to the west, to the central stream. In some of these these gullies, where there is low gradient and where wet sediments have accumulated, swamp maire is present, albeit in low numbers. Between [redacted] and our surveys, we know of 9 swamp maire in the DOC-Give and 14 other canopy trees a little way outside of the DOC-Give area. These trees are young, perhaps 50-60 years old, and may reflect the cessation of farming on the site. No mature older tree, which might be the seed source, has been located, and if there were local mature tree/s / they may now be dead and gone.

Several questions have arisen about the extent of swamp maire habitat potential in the local landscape and, therefore, how important the DOC-Give is for maintaining swamp maire habitat. Then, is there potential habitat or actual swamp maire present in the DOC-Get areas.

#### **Modelling of potential swamp maire habitat**

With respect to the question of the wider area having potential for swamp maire, we approach this in two ways. The first is to use the methods of (Herbert et al., 2025) to predict by modelling the potential in the wider landscape of swamp maire habitat.

Recently (Herbert et al., 2025) published research that uses a range of physical parameters to establish/predict swamp maire habitat in the landscape. They used the following predictors of swamp maire habitat: soil drainage capacity, Topographic wetness index, mean annual humidity, some temperature parameters (noting that the topographic wetness index was most informative), and winter solar radiation. They also considered flood-prone and waterbody data.

Their models for the Hutt area predicted a high probability in regions of the lower, middle, and upper Hutt, and a reasonable probability in the Judgeford area. The land at and about the Quarry is or was an area of high swamp maire probability.

We sourced a GIS expert (MapHouse Limited) to use a similar predictive data set as Herbert et al (Topographic wetness index, Geomorph landforms (local 1m contour data). We looked for a prediction of likely swamp maire habitat at a finer scale across both the DOC-Get and DOC-Give areas and at a wider scale.

While it is hard to convey the predictions clearly on an A4 half-page, they follow obvious land depressions and, at the 1m contour scale, show a myriad of small sites; however, there are stronger linear patterns and clusters of suitable habitat throughout. We aligned the swamp maire location records, and these fall into prediction areas. Some predicted areas are a construct of earthworks. Nevertheless, the mapping shows that there is a range of potential swamp maire habitat across the landscape of this study and several obvious strong potential areas.

Then on 20 October 2025, the author and [redacted] undertook a specific survey to identify if swamp maire was present in the Southern Gully and the lower northern tawa stream flood plains and wet side basins, and also if there was suitable swamp maire habitat there or in the wider landscape.

We did not discover any swamp maire trees in those areas (but we did record Ramarama). We did, however, find potential swamp maire habitat.

The following are the maps<sup>10</sup> (Figure 55 . Figure 56) with two areas denoted by orange circles were both aerials, and the prediction model suggests larger areas of wetland. We ground checked these areas. The red dots on the figures below are the recorded locations of swamp maire.

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<sup>10</sup> We recognise that these maps are difficult to read at this scale and can provide pdf files of these maps on request.

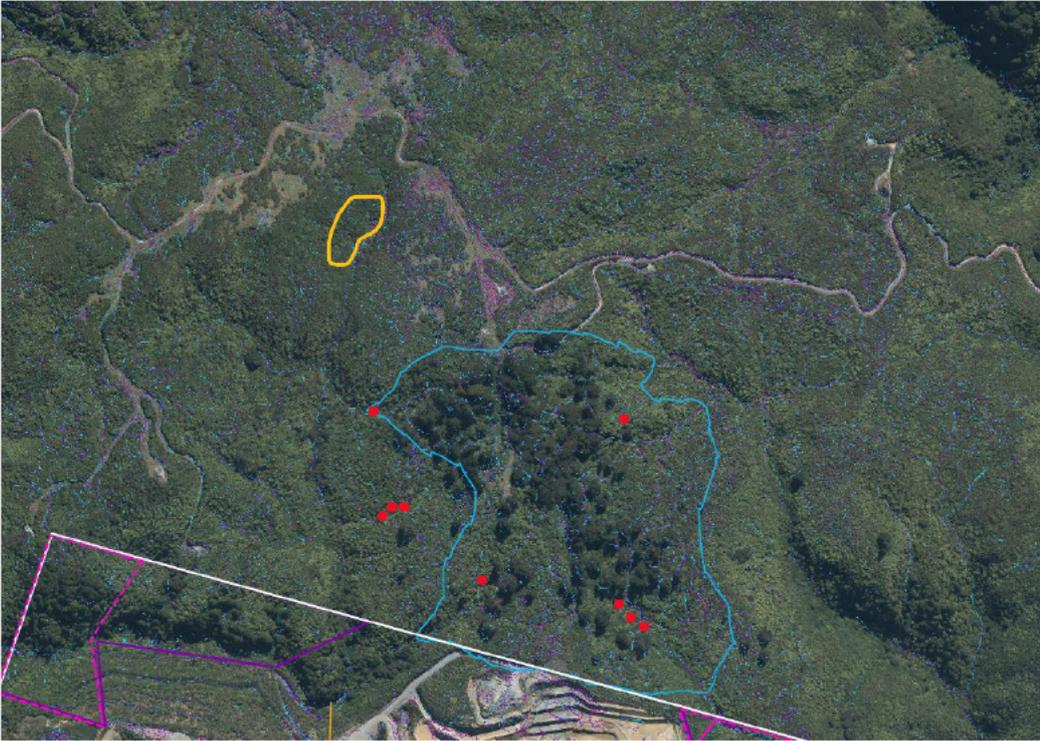


Figure 55: DOC-Give and surrounds

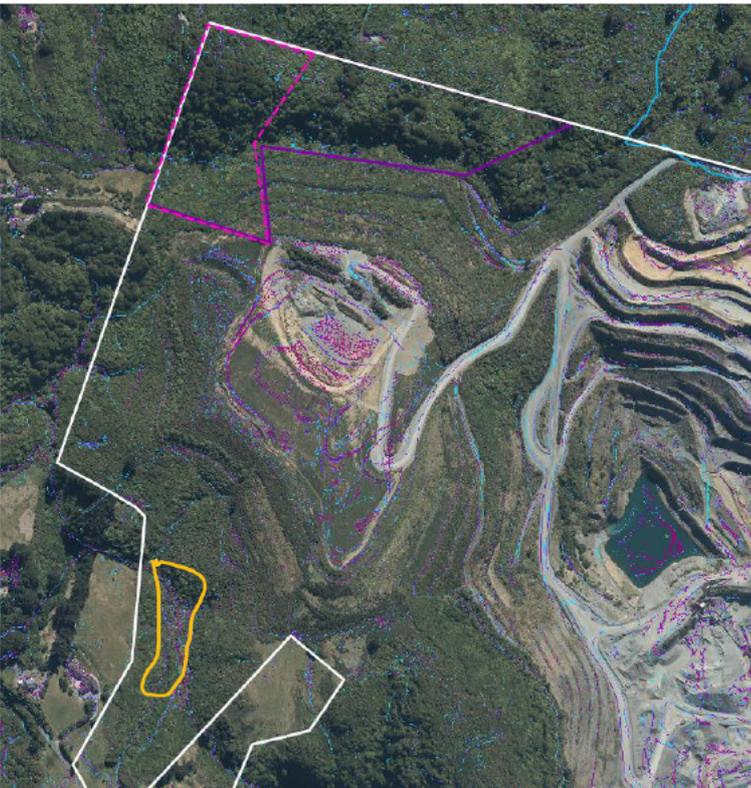


Figure 56: Northern tawa and Southern Gully

The two larger, clustered areas of predicted wetlands proved to be wetlands. The northern area containing upper gullies under māhoe with wet sediment soils alongside an intermittent flow path, very suitable for swamp maire, and much like those areas in the OBDA (Figure 57). These opened into a non-tree canopied rautahi-toetoe wetland with raupō at its southern end and largely obligate and FACW species cover throughout (Figure 58).



*Figure 57: wet floored upper gully good for swamp maire.*



*Figure 58: Open wetland with many areas good for swamp maire.*

The southern Gully wetland, as described above in Section 6.2, also has large areas of obligate and FACW wetland species suitable and available for swamp maire colonisation.

### **Response to findings and addition of the Southern Gully**

As a result of the workshop with DOC and the above additional work, Winstone's have added the Southern Gully exchange area a further 3.94 ha to encompass this 0.27 ha wetland, the stream and the surrounding area (which is later seral broadleaf, noting some is the enriched earlier plant assisted over burden recover area that included tōtara, rimu, miro, hoheria and which can now be seen in the canopy). Into this wetland they proposed to raise and plant 200 swamp maire trees. There is sufficient space and suitable habitat for, we estimate, at least 1000 swamp maire trees if the entire wetland was to be used.

#### **9.3.1 Swamp Maire Conclusion**

We believe that the above modelling and predictions of the presence of swamp maire wider than just the DOC-Give area, and the inclusion of the lower wetland in the Southern Gully (which is of similar size to the OBDA wetland) balances the values regarding swamp maire potential and ensure the DOC give is not the only swamp maire local habitat. Most importantly it will allow an opportunity through the later phases of the application to cause (by way of offset or compensation) even greater swamp maire distribution through active revegetation and possibly even transfers of the swamp maire trees to this area.

We recommend here that as part of the exchange, 200 swamp maire trees are raised from local sources (near enough 20:1) and planted into the wetland and managed to establishment (5 years), ensuring that the DOC-Get also has swamp maire trees. This would also dramatically increase the presence of swamp maire in the area and in a way that accelerates the natural spread and potential of swamp maire in this complex habitat.

We also recommend that part of the substantive application attempts to transfer the existing nine swamp maire in the OBDA by way of whole tree or pruned tree and root ball transfer.

## 10.0 Proposed additional ecological managements and enhancements

A range of ecological management additions and enhancements recommended by the experts involved have been accepted by Winstone's and are to form part of the exchange package. These are, in the main, commitments to weed management, pest management and enhancement of specific species or processes of colonisation of later seral species such as the inclusion of 200 swamp maire planted and noted to establishment in the Southern Gully.

These enhancements are shown on the concept plan in the Boffa Miskell report: BELMONT QUARRY LAND EXCHANGE CONCEPT PLAN, dated 1 December 2025.

We summarise those commitments in the table below.

The extent of pest control proposed will undoubtedly have considerable conservation gains relating to survival and propagation and distribution of seeds, seedlings, and saplings of all vegetation and well as protection of the seed sources of the later canopy trees (pukatea, tawa, hinau, swamp maire, titoki etc) but especially the slow developing later successional future canopy species.

The management also of plant pests will also have considerable conservation gains such that the establishing seral forests do not succumb to old man's beard or other vines or matting ground tiers which can remove the viability and integrity of native vegetation areas.

These managements are important now and are required to secure large areas of the DOC -Get areas into the future as they develop (noting that the mature northern tawa kamahi is the most secure currently because of its integrity and maturity).

The rat control around the farm pond area will increase the ability of nesting bird species success if and were, around the farm pond, birds are breeding. If even one of the At Risk or threatened bird species succeeds in nesting, then that is a significant conservation gain. Further that same rat control will reduce the risk of predation on gecko and skink present and that may boost the local populations of ngāhere gecko and that would be a conservation gain.

Table 20. Belmont Quarry Development, Ecological Enhancements and managements. Fast-Track Project FT308.

Subject area	Target species	Timeframes	Physical Works Required	Measurable objective or outcome
<b>Northern Gully: northwestern forest and eastern pukatea forest</b>	Goat and possum	Pest animal control was +carried out for 5 years post exchange.	<ul style="list-style-type: none"> <li>• Installation of 11 x Flipping Timmy traps for possum control (2 per ha).</li> <li>• Goat eradication.</li> </ul>	Natural regeneration of the under-canopy of the tawa-kamahi forest.
<b>Northern Gully: Cottle Block</b>	<ul style="list-style-type: none"> <li>• Brushtail possum</li> <li>• Old man's beard (<i>Clematis vitalba</i>)</li> <li>• Tradescantia</li> <li>• Potential canopy trees</li> </ul>	Weed and pest animal control carried out for 5 years post exchange	<ul style="list-style-type: none"> <li>• Installation of 13 Flipping Timmy traps for possum control (2 per ha).</li> <li>• Drill and fill (established trees) or cut and paste (juvenile trees) any exotic woody tree species .</li> <li>• 2 x rounds (Spring &amp; Autumn) of OMB vine control work per year for 5 years. Hand pulling young vines and cutting and pasting established vines.</li> <li>• Knapsack spray any blackberry and pampas grass.</li> </ul>	<ul style="list-style-type: none"> <li>- Weed inventory map specifying the key management areas and species.</li> <li>-90% eradication of exotic weed species within the Cottle Block.</li> <li>- No exotic canopy tree species found within the Cottle Block</li> </ul>
<b>Southern Gully</b>	Blackberry, exotic vines, pampas	Weed and pest animal control carried out for 5 years post exchange	<ul style="list-style-type: none"> <li>• Transfer of swamp maire form a cluster of seedlings in the park and potting up and growing on until of a size (1L) to transplant in to the southern gully wetland. Preparation of suitable sites and planting and management of those trees.</li> </ul>	Establishment of 200 swamp maire > 2m in height.
<b>Dry Creek</b>	<ul style="list-style-type: none"> <li>• Broom</li> <li>• Buddleia</li> <li>• Spanish heath</li> <li>• Old man's beard</li> <li>• Wattle</li> <li>• Tradescantia</li> <li>• Rama grass</li> <li>• nasturtium</li> <li>• Verbena</li> <li>• Pampas grass</li> </ul>	Supplementary planting was carried out over 2 years for indigenous revegetation. Maintenance of planting areas is carried out for 4 years after the initial planting, with replanting carried out where required to achieve 90% establishment.	<ul style="list-style-type: none"> <li>• Drill and fill large exotic trees (<i>Acacia spp.</i>)</li> <li>• 2 x rounds (Spring &amp; Autumn) of <i>C. vitalba</i> vine control work per year for 5 years. Hand pulling young vines and cutting and pasting established vines.</li> <li>• Knapsack spray exotic weed species within the weed management area.</li> <li>• Supplementary planting of 0.8 ha. An estimated 7000 plants</li> </ul>	<ul style="list-style-type: none"> <li>- 90 % Eradication of ecologically problematic weeds</li> <li>-Canopy closure, beginnings of natural ecological processes – natural regeneration in understory.</li> <li>- 90% establishment within the supplementary planting area.</li> </ul>
<b>Firth QEII</b>		Planting is to be carried out within a year. Maintenance to take place for 4 years, with replanting where required to achieve 90% cover.	<ul style="list-style-type: none"> <li>• Planting of approximately 1000 kāmahi (<i>Pterophylla racemosa</i>), approximately 1000 <i>Olearia paniculata</i> and kāmuka along the quarry edge.</li> </ul>	Presence and abundance of weeds. 90% establishment within the quarry edge planting area.
	Rats	10 years	<ul style="list-style-type: none"> <li>• Establishment of a rat trap plan and execution of the plan aimed at seasonally reducing local rat numbers prior to the bird breeding season.</li> </ul>	Rat abundance as measured by tracking tunnel monitoring is kept low

## 11.0 Overall Ecological Conclusion

Ecologically and in terms of the conservation estate, between the greater area, the wider diversity of habitats, the older forest components, the greater perennial waterway protection, and the comparatively better arboreal lizard habitat in the DOC-Get area, the conservation gains are evident. In addition, the management additions proposed by Winstone's regarding weed and pests, but importantly the commitment to establish 200 swamp maire in suitable wetland habitat, means that we measure the outcome of the exchange as weighted (ecologically) in favour of the Department of Conservation and that those actions and exchange result in a conservation gain.

That is the case despite the DOC-Give area having a single specimen of *Coprosma rubra*, and two regionally uncommon wetland species only found in the DOC-Give.

## 12.0 Post Exchange Biodiversity outcomes for the DOC-Give

The DOC-Give will have, over the life of the process, all of the vegetation and topographic features stripped, and a terraced layering of overburden laid down in stages (campaigns).

During and as each stage is completed, the restoration plan shall recognise that the surface hydrology (i.e. rainwater) must retain the current pattern and cause water flow to be in similar proportions to each of the six current gully areas to appropriately recharge the two waterways (the eastern wetlands and the central northern stream). It is recognised that these discharges must occur throughout the operation, but that discharges of surface flows must also be suitably treated to minimise contaminant (sediment) loading.

Considering the final landform and creating replacement hydrological gullies creates the opportunity to also replace / remedy / recreate a suitable gully natural inland wetland. That process will be in conjunction with wider surface topsoil improvement and suitable cover and revegetation with a broadleaf mix of native species to expedite recolonisation and speed the seral trajectory of the site, starting in early native seral rather than passing from pasture to gorse to native. In addition, the kāmahī proposed revegetation process will enrich the area with the expected final canopy species, including main tawa, rewarewa, titoki, pukatea, miro, rimu, kāmahī, tōtara, and northern rata (in appropriate places).

This process, over the life of the staged fill and landform construction, will demonstrate the success of the restoration process (or where additional management must be considered). It is expected that, by the end of the entire overburden process, the first restoration stages will be some 20 to 30 years old, and it will be possible, prior to the end of Winstone's use of the DOC-Give, to prove that the process has been successful.

A further consideration with regard to Ramarama, *Coprosma rubra*, and Swamp maire will be how to salvage or replace, or add these species to, the rebuilt landforms, and to establish populations outside the DOC-Give. To this end, we believe that there are material gains ecologically to attempt to transplant the swamp maire trees through a process of coppicing and transferal of the root and stump, and in addition to more recognised seed collection and propagation. We consider that through the application and effects management, there is a real opportunity to cause a significant increase in both Ramarama and swamp maire presence outside of the DOC-Give.

In short, the proposal to manage the effects of the loss of the indigenous biodiversity will be the full remediation of the entire DOC-Give site, such that there will be 24 ha of new fully indigenous broadleaf shrub and forest, which will be at a mosaic of ages and successional stages by the end of the DOC-Give development period. In the round, there should be no loss of extent and an enhanced value to the area. We will provide a further report on the resource consent component of Winstone Aggregates' fast-track application for the new OBDA, addressing the ecological effects of the OBDA and suitable conditions for managing the new OBDA and achieving long-term biodiversity outcomes.

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## Appendix 1: RECCE Plot Data – DOC-Give

See the data for a RECCE position map.

### RECCE 1 - Under pine and macrocarpa on a ridge of the western side slopes

Ridge Recce 1

Recorded by

Landform           Shallow ridge

Date                29/05/2025

Lat 1764036.4625   Long 5441725.2482

Height Class	Species	Common name	% cover	Comments
>25m	<i>Pinus radiata</i>	radiata pine	30	up to 40 m tall
	<i>Hesperocyparis macrocarpa</i>	macrocarpa pine	40	up to 35 m tall
2-5m	<i>Ilex aquifolium</i>	holly	25	Two leaf forms
	<i>Melicytus ramiflorus</i>	māhoe	30	
	<i>Sphaeropteris medullaris</i>	mamaku	10	
	<i>Myrsine australis</i>	red mapou	2	
	<i>Parsonsia heterophylla</i>	New Zealand jasmine	<1	
	<i>Geniostoma ligustrifolium</i> var. <i>ligustrifolium</i>	hangehange	3	
	<i>Coprosma grandifolia</i>	kanono	1	
	0.3-2m	<i>Alsophila dealbata</i>	silver fern	5
<i>Asplenium oblongifolium</i>		huruhuruwhenua, shining spleenwort	5	
<i>Zealandia pustulata</i> subsp. <i>pustulata</i>		hound's tongue	2	
<i>Asplenium flaccidum</i>		hanging spleenwort	<1	
<i>Brachyglottis repanda</i>		rangiora	1	
<i>Corynocarpus laevigatus</i>		karaka	<1	
<i>Hedycarya arborea</i>		porokaiwhiri, pigeonwood	<1	
<i>Asplenium hookerianum</i> var. <i>hookerianum</i>		Hooker's spleenwort	<1	
<i>Pseudopanax crassifolius</i>		lancewood	<1	
<i>Coprosma areolata</i>		thin-leaved coprosma	<1	

## Gully Recce 2

Recorded by

Landform Gully

Date 29/05/2025

Lat 1763947.2482 Long 5441698.3763

Height Class	Species	Common name	% cover
5-12m	<i>Dicksonia squarrosa</i>	wheki	5
	<i>Alsophila cunninghamii</i>	gully tree fern	5
	<i>Alsophila dealbata</i>	silver fern	10
	<i>Sphaeropteris medullaris</i>	mamaku	40
	<i>Alsophila smithii</i>	kātote, Smith's tree fern	1
	<i>Meliccytus ramiflorus</i>	māhoe	15
	<i>Syzygium maire</i>	swamp maire	5
	<i>Myrsine australis</i>	red mapou	1
	<i>Ripogonum scandens</i>	supplejack, kareao	1
	<i>Hedycarya arborea</i>	porokaiwhiri, pigeonwood	3
2-5m	<i>Schefflera digitata</i>	patē, seven-finger	1
	<i>Geniostoma ligustrifolium</i> var. <i>ligustrifolium</i>	hangehange	1
	<i>Piper excelsum</i> subsp. <i>excelsum</i>	kawakawa	1
	<i>Dicksonia squarrosa</i>	wheki	5
	<i>Alsophila cunninghamii</i>	gully tree fern	5
	<i>Alsophila dealbata</i>	silver fern	5
	<i>Alsophila smithii</i>	kātote, Smith's tree fern	5
	<i>Myrsine australis</i>	red mapou	1
0.3-2m	<i>Asplenium flaccidum</i>	hanging spleenwort	1
	<i>Austroblechnum lanceolatum</i>	lance fern, nini	5
	<i>Pakau pennigera</i>	gully fern	1
	<i>Hedycarya arborea</i>	porokaiwhiri, pigeonwood	<1
	<i>Asplenium gracillimum</i>	hen & chicken fern	<1

### Old Gorse - Recce 3

Recorded by

Landform Hillslope

Date 29/05/2025

Lat 1763926.8584 Long 5441637.4327

Height Class	Species	Common name	% cover
2-5m	<i>Ulex europaeus</i>	gorse	20
	<i>Myrsine australis</i>	red mapou	10
	<i>Ilex aquifolium</i>	holly	10
	<i>Hedycarya arborea</i>	porokaiwhiri, pigeonwood	5
	<i>Melicytus ramiflorus</i>	māhoe	15
	<i>Brachyglottis repanda</i>	rangiora	5
	<i>Leptospermum scoparium</i> var. <i>scoparium</i>	mānuka	5
	<i>Sphaeropteris medullaris</i>	mamaku	10
	0.3-2m	<i>Coprosma robusta</i>	karamū
<i>Coprosma grandifolia</i>		kanono	1
<i>Brachyglottis repanda</i>		rangiora	<1
<i>Alsophila dealbata</i>		silver fern	<1
<i>Rubus cissoides</i>		tātārāmoa, bush lawyer	<1
<i>Geniostoma ligustrifolium</i> var. <i>ligustrifolium</i>		hangehange	<1
<i>Paesia scaberula</i>		lace fern	30
<i>Parsonsia capsularis</i> var. <i>capsularis</i>		small flowered jasmine	<1
<i>Parablechnum novae-zelandiae</i>		kiokio	<1
<i>Knightia excelsa</i>		rewarewa	<1

#### Gully head – RECCE 4

Recorded by

Landform Head of gully above-ground water seepage exit

Date 29/05/2025

Lat 1763996.8207 Long 5441595.1522

Height Class	Species	Common name	% cover
5-12m	<i>Pseudopanax arboreus</i>	five finger, whauwhaupaku	40
	<i>Melicytus ramiflorus</i>	māhoe	40
	<i>Dicksonia squarrosa</i>	wheki	5
	<i>Alsophila dealbata</i>	silver fern	1
	<i>Sphaeropteris medullaris</i>	mamaku	1
	<i>Ripogonum scandens</i>	supplejack, kareao	<1
	<i>Metrosideros diffusa</i>	white rātā	<1
	<i>Geniostoma ligustrifolium</i> var. <i>ligustrifolium</i>	hangehange	<1
	<i>Piper excelsum</i> subsp. <i>excelsum</i>	kawakawa	<1
	<i>Brachyglottis repanda</i>	rangiora	<1
	<i>Ilex aquifolium</i>	holly	1
	<i>Coprosma crassifolia</i>		<1
	2-5m	<i>Alsophila dealbata</i>	silver fern
<i>Sphaeropteris medullaris</i>		mamaku	1
<i>Geniostoma ligustrifolium</i> var. <i>ligustrifolium</i>		hangehange	2
<i>Piper excelsum</i> subsp. <i>excelsum</i>		kawakawa	1
0.3-2m	<i>Asplenium bulbiferum</i>	pikopiko	<1
	<i>Lomaria discolor</i>	crown fern	<1
	<i>Austroblechnum lanceolatum</i>	lance fern, nini	<1
	<i>Asplenium oblongifolium</i>	huruwhenua, shining spleenwort	1
	<i>Icarus filiformis</i>	climbing hard fern	<1
	<i>Knightia excelsa</i>	rewarewa	<1

#### East side – Wet gully head – RECCE 5

Recorded by

Landform Wetland gully on the north side below the pines and macrocarpa

Date 29/05/2025

Lat 1764213.6342 Long 5441638.1515

Height Class	Species	Common name	% cover
2-5m	<i>Carpodetus serratus</i>	putaputawētā	10
	<i>Coprosma robusta</i>	karamū	40
	<i>Dicksonia squarrosa</i>	wheki	10
0.3-2m	<i>Parablechnum novae-zelandiae</i>	kiokio	80

**Kiokio wetland - RECCE 6**

Recorded by

Landform Wetland gully, near pest control track

Date 29/05/2025

Lat 1764328.9017 Long 5441638.0753

Height Class	Species	Common name	% cover
2-5m	<i>Dicksonia squarrosa</i>	wheki	5
	<i>Leptospermum scoparium</i> var. <i>scoparium</i>	mānuka	10
	<i>Coprosma robusta</i>	karamū	10
	<i>Carpodetus serratus</i>	putaputawētā	5
	<i>Ulex europaeus</i>	gorse	<1
	<i>Coprosma grandifolia</i>	kanono	5
	<i>Schefflera digitata</i>	patē, seven-finger	<1
0.3-2m	<i>Parablechnum novae-zelandiae</i>	kiokio	45
	<i>Carex geminata</i>	cutty grass, rautahi	35
	<i>Eleocharis acuta</i>	sharp spike sedge	<1
	<i>Carex maorica</i>	Māori sedge	<1

## Manuka Ridge – RECCE 7

Recorded by

Landform Northern manuka hill slope along either side of pest control track

Date 29/05/2025

Lat 1764336.7359 Long 5441554.6833

Height Class	Species	Common name	% cover	
2-5m	<i>Leptospermum scoparium</i> var. <i>scoparium</i>	mānuka	30	
	<i>Knightia excelsa</i>	rewarewa	2	
	<i>Pseudopanax arboreus</i>	five finger, whauwhaupaku	1	
	<i>Myrsine australis</i>	red mapou	5	
	<i>Carpodetus serratus</i>	putaputawētā	1	
	<i>Hedycarya arborea</i>	porokaiwhiri, pigeonwood	5	
	<i>Coprosma grandifolia</i>	kanono	1	
	<i>Alsophila dealbata</i>	silver fern	5	
	<i>Sphaeropteris medullaris</i>	mamaku	5	
	<i>Geniostoma ligustrifolium</i> var. <i>ligustrifolium</i>	hangehange	1	
	<i>Ulex europaeus</i>	gorse	1	
	<i>Melicytus ramiflorus</i>	māhoe	1	
	0.3-2m	<i>Coprosma grandifolia</i>	kanono	5
		<i>Melicytus ramiflorus</i>	māhoe	<1
<i>Geniostoma ligustrifolium</i> var. <i>ligustrifolium</i>		hangehange	5	
<i>Alsophila dealbata</i>		silver fern	<1	
<i>Sphaeropteris medullaris</i>		mamaku	<1	
<i>Leptospermum scoparium</i> var. <i>scoparium</i>		mānuka	<1	
<i>Knightia excelsa</i>		rewarewa	<1	
<i>Pseudopanax arboreus</i>		five finger, whauwhaupaku	<1	
<i>Myrsine australis</i>		red mapou	5	
<i>Carpodetus serratus</i>		putaputawētā	<1	
<i>Hedycarya arborea</i>		porokaiwhiri, pigeonwood	<1	
<0.3m	<i>Paesia scaberula</i>	lace fern	25	
	<i>Geniostoma ligustrifolium</i> var. <i>ligustrifolium</i>	hangehange	<1	
	<i>Rubus cissoides</i>	tātarāmoa, bush lawyer	<1	
	<i>Leucopogon fasciculatus</i>	tall mingimingi	<1	



**RECCE Plots**

BELMONT QUARRY  
Plan prepared by MapHouse | 27 August 2025

**BlueGreen** MapHouse | ©

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- RECCE Plot
- Proposed overburden
- Land exchange - DOC
- Land exchange - FCIL
- Existing property boundary



## Appendix 2: Cottle block pre overburden species list

(Author unknown (a report prepared for consent condition 070245 (RM20-H32-BQ/2 2009))

### Trees and Shrubs

Mahoe	<i>Melicytus ramiflorus</i>
Pate	<i>Schefflera digitata</i>
Manuka	<i>Leptospermum scoparium</i>
Wineberry	<i>Aristotelia serrata</i>
Marbleleaf	<i>Carpodetus serratus</i>
Hangehange	<i>Geniostoma rupestre</i> var. <i>ligustrifolium</i>
Kanono	<i>Coprosma grandifolia</i>
Rangiora	<i>Brachyglottis repanda</i>
Karamu	<i>Coprosma robusta</i>
Pigeonwood	<i>Hedycarya arborea</i>
Mapau	<i>Myrsine australis</i>
Kawakawa	<i>Macropiper excelsum</i>
Koromiko	<i>Hebe stricta</i>
Poroporo	<i>Solanum laciniatum</i>
Fuchsia	<i>Fuchsia excorticata</i>
Kowhai	<i>Sophora microphylla</i>
	<i>Neomyrtus pedunculata</i>
	<i>Lophomyrtus obcordata</i>
	<i>Coprosma crassifolia</i>
	<i>Ulex europaeus</i>
Gorse*	

### Tree Ferns

Mamaku	<i>Cyathea medullaris</i>
--------	---------------------------

### Vines and Climbers

Pohuehue	<i>Muehlenbeckia complexa</i>
Bush Lawyer	<i>Rubus cissoides</i>
Clematis	<i>Clematis paniculata</i>
Drooping spleenwort	<i>Asplenium flaccidum</i>

### Grasses & Related Plants

Toetoe	<i>Cortaderia fulvida</i>
Native Rush	<i>Juncus pallens</i>
Native Rush	<i>Juncus gregiflorus</i>
	<i>Carex secta</i>
	<i>Carex geminata</i>

## Appendix 3: Species list from site visit – Dry Creek

\*Denotes exotic species

Species name	Common name	Threat Status	Growth Form
<i>Acacia dealbata</i> *	Silver Wattle	n/a	Tree
<i>Acacia mearnsii</i> *	Black Wattle	n/a	Tree
<i>Adiantum cunninghamii</i>	Common Maidenhair	Not Threatened	Fern
<i>Alectryon excelsus</i>	titoki	Not Threatened	Tree
<i>Asplenium flaccidum</i>	Drooping Spleenwort	Not Threatened	Fern
<i>Asplenium oblongifolium</i>	Shining Spleenwort	Not Threatened	Fern
<i>Blechnum chambersii</i>	Lance Fern	Not Threatened	Fern
<i>Blechnum discolor</i>	Crown Fern	Not Threatened	Fern
<i>Blechnum novae-zelandiae</i>		Not Threatened	Fern
<i>Brachyglottis repanda</i>	Rangiora	Not Threatened	Tree
<i>Buddleja davidii</i> *	Buddleia	n/a	Shrub
<i>Carex uncinata</i>	A hookgrass	Not Threatened	Grass
<i>Chamaecytisus palmensis</i> *	Tree Lucerne	n/a	Tree
<i>Clematis vitalba</i> *	Old man's beard	n/a	Liane
<i>Coprosma rhamnoides</i>	Mikimiki	Not Threatened	Shrub
<i>Coprosma robusta</i>	Karamu	Not Threatened	Tree
<i>Cordyline australis</i>	Ti Kōuka / Cabbage Tree	Not Threatened	
<i>Coriaria arborea</i>	tutu	Not Threatened	Tree
<i>Cortaderia selloana</i> *	Pampas Grass	n/a	Grass
<i>Corynocarpus laevigatus</i>	Karaka	Not Threatened	Tree
<i>Cyathea dealbata</i>	Silver Fern	Not Threatened	Tree Fern
<i>Cyathea medullaris</i>	Mamuku	Not Threatened	Tree Fern
<i>Cyathea smithii</i>	Kātote / Soft Tree Fern	Not Threatened	Tree Fern
<i>Cytisus scoparius</i> *	Broom	n/a	Shrub
<i>Dicksonia squarrosa</i>	Rough Tree Fern	Not Threatened	Tree Fern
<i>Digitalis purpurea</i> *	Foxglove	n/a	Dicot Herb
<i>Earina mucronata</i> *	Bamboo Orchid	Not Threatened	Orchid
<i>Epilobium species</i> *		Not Threatened	Dicot Herb
<i>Erica lusitanica</i> *	Spanish Heath	n/a	Shrub
<i>Fuchsia excorticata</i>	Kōtukutuku / Tree Fuchsia	Not Threatened	Tree
<i>Geniostoma rupestre</i> *	hangehnage	Not Threatened	Shrub
<i>Genista monspessulana</i> *		n/a	Shrub
<i>Haloragis erecta</i>	turutu	Not Threatened	Low Shrub
<i>Hedycarya arborea</i>	Pigeonwood	Not Threatened	Tree
<i>Hymenophyllum scabrum</i>	Rough Filmy Fern	Not Threatened	Fern

Species name	Common name	Threat Status	Growth Form
<i>Hypericum androsaemum</i> *	Tutsan	n/a	Low Shrub
<i>Knightia excelsa</i>	Rewarewa	Not Threatened	Tree
<i>Lastreopsis glabella</i>	Smooth Shield Fern	Not Threatened	Fern
<i>Leptospermum scoparium</i>	Mānuka	At Risk - Declining	Tree
<i>Leucanthemum maximum</i> *	Shasta daisy	n/a	Shrub
<i>Leucopogon fasciculatus</i>	Tall Mingimingi	Not Threatened	Shrub
<i>Leycesteria formosa</i> *	Himalayan Honeysuckle	n/a	Low Shrub
<i>Libertia species</i>	NZ iris	Not Threatened	Monocot
<i>Lycopodium volubile</i>	Climbing Clubmoss fern	Not Threatened	Fern
<i>Meliclytus ramiflorus</i>	Māhoe	Not Threatened	Tree
<i>Microsorium pustulatum</i>	Hound's Tongue	Not Threatened	Fern
<i>Myrsine australis</i>	Red Māpou	Not Threatened	Tree
<i>Parsonsia species</i>	Akakaikiore / New Zealand Jasmine	Not Threatened	Climber/Vine
<i>Pellaea rotundifolia</i>	Round-leaved Fern	Not Threatened	Fern
<i>Phlegmariurus varius</i>	Clubmoss fern	Not Threatened	Fern
<i>Piper excelsum</i>	Kawakawa	Not Threatened	Tree
<i>Pittosporum eugenioides</i>	Lemonwood / tarata	Not Threatened	Tree
<i>Pittosporum tenuifolium</i>	Kōhūhū	Not Threatened	Tree
<i>Pneumatopteris pennigera</i>	Gully Fern	Not Threatened	Fern
<i>Polystichum neozelandicum</i>		Not Threatened	Fern
<i>Pseudopanax arboreus</i>	Five-Finger . houpara	Not Threatened	Tree
<i>Ranunculus repens</i> *	Creeping Buttercup	n/a	Dicot Herb
<i>Rhopalostylis sapida</i>	nikau	Not threatened	Tree / palm
<i>Rubus fruticosus</i> *	Blackberry	n/a	Low Shrub
<i>Rubus schmidelioides</i>		Not Threatened	Climber/Vine
<i>Rubus sicioides</i>		Not Threatened	Climber/Vine
<i>Selaginella kraussiana</i>	Selaginella	n/a	Fern
<i>Solanum nigrum</i> *	Black Nightshade	n/a	Low Shrub
<i>Tradescantia scandens</i>	tradescantia	n/a	Dicot-herb
<i>Ulex europaeus</i> *	Gorse	n/a	Shrub
<i>Urtica ferox</i>	Ongaonga / Tree Nettle	Not Threatened	Shrub
<i>Veronica stricta</i>		Not Threatened	Shrub
<i>Watsonia meriana</i> *	Watsonia	n/a	Dicot Herb

## Appendix 4: Species list - Northern Tawa kāmahi Forest (not including pukatea forest across the main stream divide, or Cottle)

\*Denotes exotic species

Species name (*)	Common name	Threat Status	Growth Form
<i>Alectryon excelsus</i>	Titoki	Not Threatened	Tree
<i>Alsophila dealbata</i>	Silver fern	Not Threatened	Fern
<i>Aristotelia serrata</i>	Wineberry	Not Threatened	Tree
<i>Asplenium bulbiferum</i>	Hen And Chicken Fern	Not Threatened	Fern
<i>Asplenium flaccidum</i>	Drooping Spleenwort	Not Threatened	Fern
<i>Asplenium gracillimum</i>	Hen And Chicken Fern	Not Threatened	Fern
<i>Asplenium oblongifolium</i>	Shining Spleenwort	Not Threatened	Fern
<i>Asplenium polyodon</i>	Sickle Spleenwort	Not Threatened	Fern
<i>Astelia hastata</i>	tank lilly	Not Threatened	Grass
<i>Austroblechnum lanceolatum</i>	lance fern	Not Threatened	Fern
<i>Beilschmiedia tawa</i>	Tawa	Not Threatened	Tree
<i>Brachyglottis repanda</i>	Rangiora	Not Threatened	Tree
<i>Carex uncinata</i>	nook grass	Not Threatened	Grass
<i>Coprosma areolata</i>	Thin-leaved Coprosma	Not Threatened	Tree
<i>Coprosma grandifolia</i>	Kanono	Not Threatened	Tree
<i>Coprosma rhamnoides</i>		Not Threatened	Shrub
<i>Corynocarpus laevigatus</i>	Karaka	Not Threatened	Tree
<i>Cyathea medullaris</i>	Mamuku	Not Threatened	Tree Fern
<i>Cyathea smithii</i>	Kātote / Soft Tree Fern	Not Threatened	Tree Fern
<i>Dendroconche scandens</i>	Mokimoki	Not Threatened	fern
<i>Elaeocarpus dentatus</i>	Hīnau	Not Threatened	Tree
<i>Freycinetia baueriana*</i>	kiekie	Not Threatened	
<i>Fuchsia excorticata</i>	Kōtukutuku / Tree Fuchsia	Not Threatened	Tree
<i>Geniostoma rupestre*</i>	Hangehange	Not Threatened	Shrub
<i>Hedycarya arborea</i>	Pigeonwood	Not Threatened	Tree
<i>Hymenophyllum demissum</i>	Piripiri	Not Threatened	fern
<i>Hymenophyllum dilatatum</i>	Mauku	Not Threatened	
<i>Hymenophyllum rarum</i>	Filmy fern	Not Threatened	Fern
<i>Icarus filiforme</i>	Thread Fern	Not Threatened	Fern
<i>Knightia excelsa</i>	Rewarewa	Not Threatened	Tree
<i>Laurelia novae-zelandiae</i>	Pukatea	Not Threatened	Tree

<i>Leptopteris hymenophylloides</i>	Crepe Fern	Not Threatened	Fern
<i>Lomaria discolor</i>	Crown Fern	Not Threatened	Fern
<i>Lophomyrtus bullata</i>	Ramarama	Nationally Critical	Shrub
<i>Loxogramme dictyopteris</i>	Lance Fern	Not Threatened	Fern
<i>Melicytus ramiflorus</i>	Māhoe	Not Threatened	Tree
<i>Metrosideros fulgens</i>	Rata	Not Threatened	Liane
<i>Metrosideros perforata</i>	Rata	Not Threatened	Liane
<i>Myrsine australis</i>	Red Māpou	Not Threatened	Tree
<i>Olearia rani</i>	heketara	Not Threatened	Tree
<i>Oreoboleus impar(?)</i>	comb sedge	Not Threatened	Sedge
<i>Pakau pennigera</i>	gully fern	Not Threatened	fern
<i>Parsonsia heterophylla</i>	NZ jasmine	Not Threatened	Liane
<i>Pellaea rotundifolia</i>	round leafed fern	Not Threatened	fern
<i>Pennantia corymbosa</i>	Kaikomako	Not Threatened	Tree
<i>Piper excelsum</i>	Kawakawa	Not Threatened	Tree
<i>Polystichum neozelandicum</i>	Shield fern	Not Threatened	fern
<i>Prumnopitys ferruginea</i>	Miro	Not Threatened	Tree
<i>Pyrosia elaeagnifolia</i>	leather leaf fern	Not Threatened	fern
<i>Rhopalostylis sapida</i>	Nikau	Not Threatened	Tree
<i>Ripogonum scandens</i>	Supplejack	Not Threatened	Climber/Vine
<i>Schefflera digitata</i>	Patē / Seven Finger	Not Threatened	Tree
<i>Weinmannia racemosa</i>	Kāmahi	Not Threatened	Tree
<i>Zealandis pustulata</i>	Hound's Tongue	Not Threatened	Fern

## Appendix 5: Species List for the Firth Block

Mitcalfe, Horne and Beale.

### **OTANICAL NAME MĀORI NAME COMMON NAME**

#### **LIST 1: INDIGENOUS VASCULAR PLANTS**

##### **GYMNOSPERM TREES**

*Dacrycarpus dacrydioides* kahikatea kahikatea

*Dacrydium cupressinum* rimu rimu

*Podocarpus totara* (1) tōtara tōtara

##### **MONOCOTYLEDONOUS TREES**

*Cordyline australis* (unc) tī kōuka cabbage tree

*Rhopalostylis sapida* nīkau nīkau

##### **DICOTYLEDONOUS TREES AND SHRUBS**

*Alectryon excelsus* tītoki tītoki

*Beilschmiedia tawa* tawa tawa

*Brachyglottis repanda* rangiora rangiora

*Carpodetus serratus* putaputawētā marbleleaf

*Coprosma areolata* thin-leaved

*Coprosma grandifolia* kānono kānono

*Coprosma lucida* shining karamu

*Coprosma rhamnoides*

\* *Corynocarpus laevigatus* karaka karaka

*Elaeocarpus dentatus* hīnau hīnau

*Geniostoma ligustrifolium*

var. *ligustrifolium* hangehange hangehange

*Griselinia lucida* puka puka

*Hedycarya arborea* porokaiwhiri pigeonwood

*Knightia excelsa* rewarewa rewarewa

*Kunzea ericoides* kānuka kānuka

*Leptospermum scoparium* mānuka mānuka

*Melicytus ramiflorus* māhoe māhoe

*Myrsine australis* māpou māpou

*Nothofagus solandri* var. *solandri* (1) tawhai rauriki black beech

*Piper excelsum* kawakawa kawakawa

*Pittosporum tenuifolium* kohuhu kohuhu

*Pseudopanax crassifolius* horoeka lancewood

*Schefflera digitata* patē seven-finger

##### **MONOCOTYLEDONOUS LIANES**

*Freycinetia banksii* (unc) kiekie kiekie

*Ripogonum scandens* kareao supplejack

##### **DICOTYLEDONOUS LIANES**

*Metrosideros diffusa* rātā white rātā

*Metrosideros fulgens* akakura scarlet rātā

*Rubus cissoides* tātarāmoa bush lawyer

##### **FERNS**

*Asplenium bulbiferum* manamana hen & chicken fern

Asplenium oblongifolium huruhuruwhenua shining spleenwort  
Asplenium polyodon petako sickle spleenwort  
Blechnum chambersii nini lance fern  
Blechnum discolor piupiu crown fern  
Blechnum filiforme pānako thread fern  
Blechnum fluviatile kiwakiwa ray water fern  
Blechnum novaezelandiae kiokio kiokio  
Cyathea dealbata ponga silver fern  
Cyathea medullaris mamaku mamaku  
Dicksonia squarrosa whekī whekī  
Hypolepis ambigua rarauhi nehenehe a Hypolepis sp.  
Lastreopsis glabella smooth shield fern  
Microsorium pustulatum kōwaowao hound's tongue fern  
Microsorium scandens mokimoki fragrant fern  
Paesia scaberula mātā ring fern  
Pneumatopteris pennigera pākau gully fern  
Polystichum neozelandicum subsp. xerophyllum pikopiko common shield fern

**GRASSES**

Austroderia fulvida toetoe toetoe

**SEDGES**

Ucinia uncinata matau a Māui a hooked sedge sp.

**COMPOSITE HERBACEOUS PLANTS**

Senecio minimus a fireweed sp.

**DICOTYLEDONOUS HERBACEOUS PLANTS, other than composites**

Centella uniflora centella

Haloragis erecta toatoa shrubby haloragis

Stellaria parviflora kohukohu NZ chickweed

+++++

**LIST 2: ADVENTIVE VASCULAR PLANTS**

**GYMNOSPERM TREES**

Pinus radiata radiata pine

**DICOTYLEDONOUS TREES AND SHRUBS**

Buddleja davidii buddleia

Euonymus japonicus (1) Japanese spindle tree

Leycesteria formosa Himalaya honeysuckle

Ulex europaeus gorse

**RUSHES**

Juncus effusus soft rush

**COMPOSITE HERBACEOUS PLANTS**

Cirsium vulgare kotimana Scotch thistle

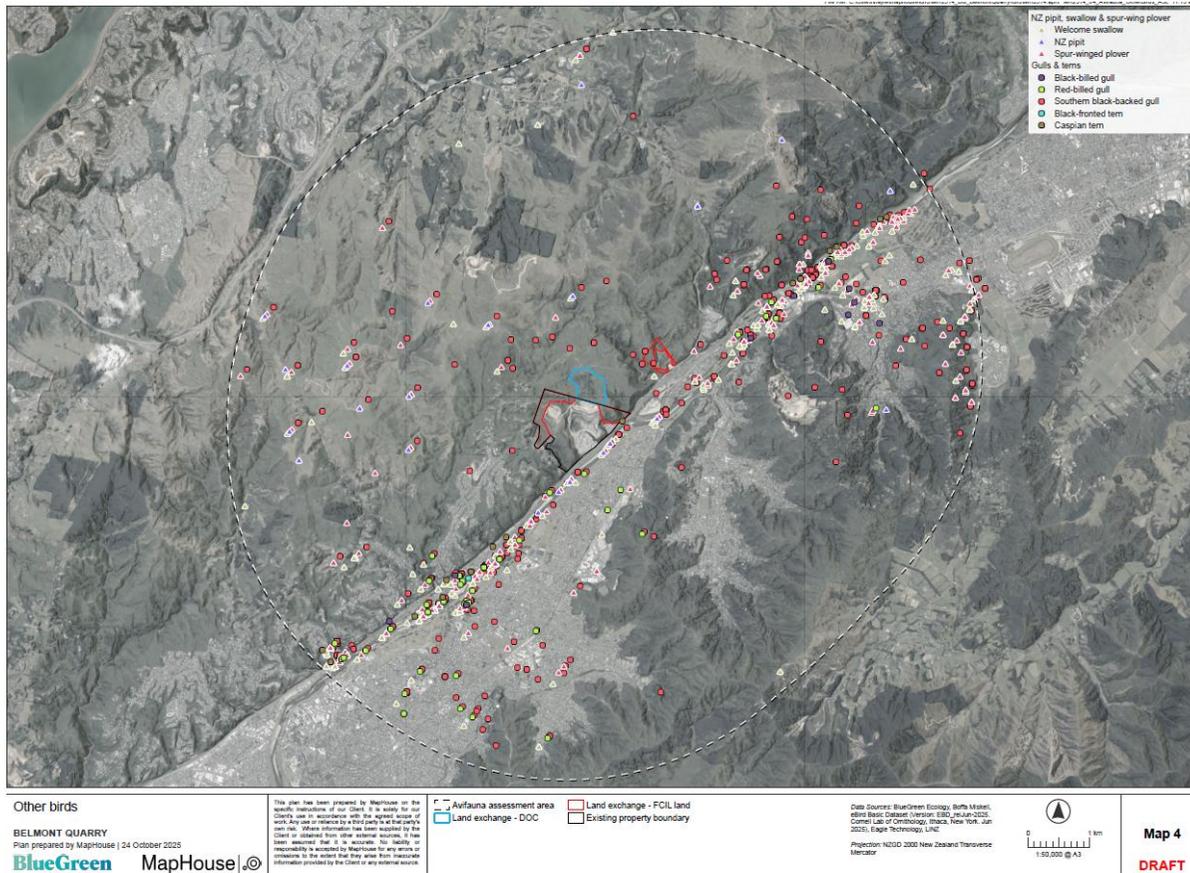
**DICOTYLEDONOUS HERBACEOUS PLANTS, other than composites**

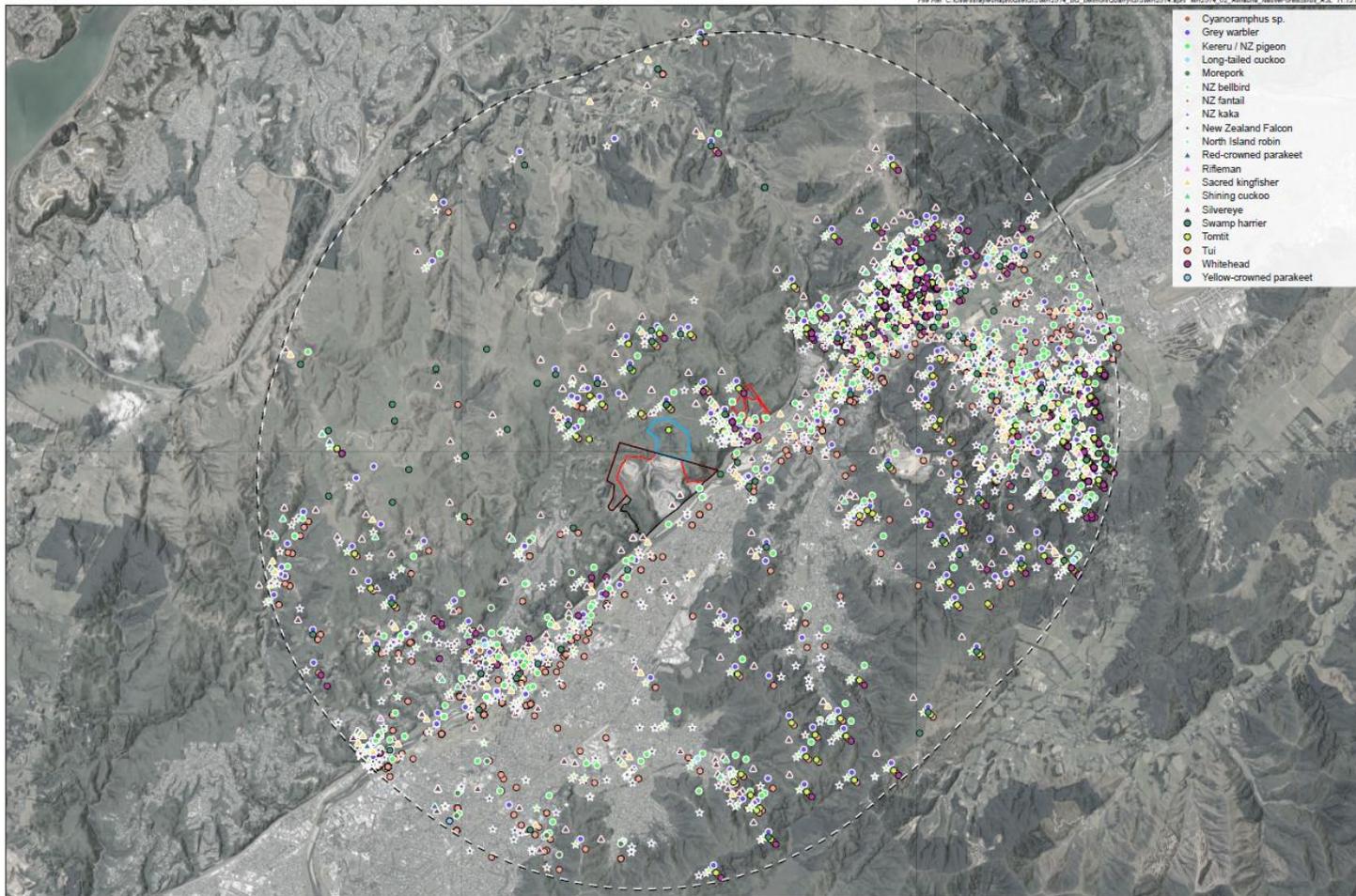
Digitalis purpurea foxglove

Lotus pedunculatus birdsfoot trefoil

Ranunculus repens creeping buttercup

## Appendix 6: EBird Records.





Native forest birds

**BELMONT QUARRY**  
 Plan prepared by MapHouse | 24 October 2025  
**BlueGreen** MapHouse

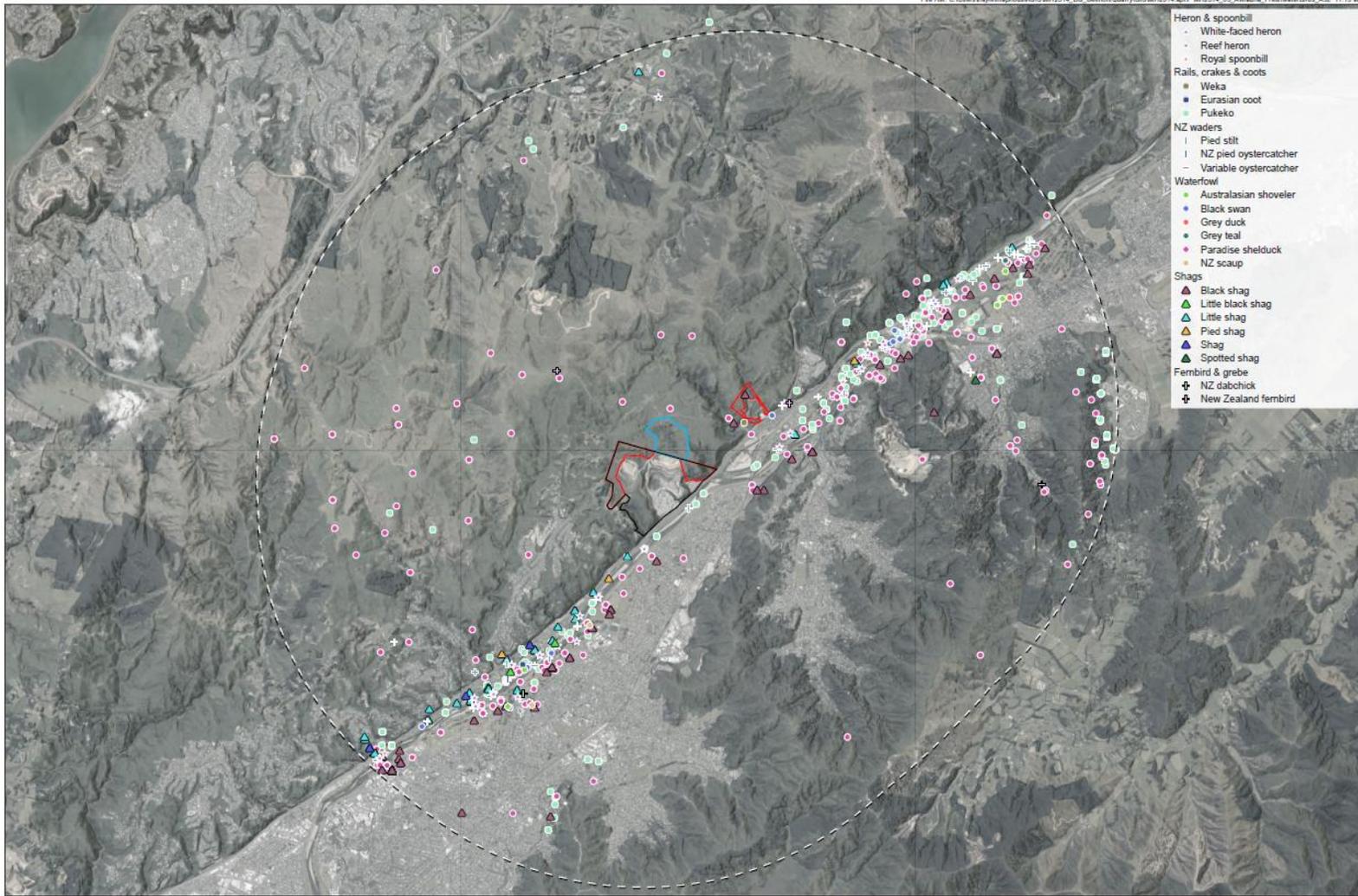
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- Avifauna assessment area
- Land exchange - FCIL land
- Existing property boundary
- Land exchange - DOC

Data Sources: BlueGreen Ecology, Sofra Mistral, eBird Basic Dataset (Version: EBD\_reJun-2025), Cornell Lab of Ornithology, Ithaca, New York, Jun 2025), Eagle Technology, LINZ  
 Projection: NZGD 2000 New Zealand Transverse Mercator



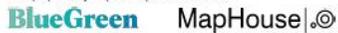
**Map 2**  
**DRAFT**



- Heron & spoonbill
  - White-faced heron
  - Reef heron
  - Royal spoonbill
- Rails, crakes & coots
  - Weka
  - Eurasian coot
  - Pukeko
- NZ waders
  - | Pied stilt
  - | NZ pied oystercatcher
  - Variable oystercatcher
- Waterfowl
  - Australasian shoveler
  - Black swan
  - Grey duck
  - Grey teal
  - Paradise shelduck
  - NZ scaup
- Shags
  - ▲ Black shag
  - ▲ Little black shag
  - ▲ Little shag
  - ▲ Pied shag
  - ▲ Shag
  - ▲ Spotted shag
- Fernbird & grebe
  - ⊕ NZ dabchick
  - ⊕ New Zealand fernbird

**Freshwater birds**

**BELMONT QUARRY**  
Plan prepared by MapHouse | 24 October 2025



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- Avifauna assessment area
- Land exchange - FCIL land
- Land exchange - DOC
- Existing property boundary

Data Sources: BlueGreen Ecology, Boffa Miskell, eBird Basic Dataset (version: EBD\_r6Jun-2025, Cornell Lab of Ornithology, Ithaca, New York, Jun 2025), Eagle Technology, LINZ  
Projection: NZGD 2000 New Zealand Transverse Mercator



**Map 3**  
**DRAFT**

## Appendix 7: DOC Suggested value analysis process

Criterion	Definition	Key assessment principles	Assessment Attributes	Examples
Representativeness	The extent to which indigenous biodiversity is typical or characteristic of the natural diversity of the relevant Ecological District	<p>includes seral (regenerating) indigenous vegetation that is recovering following natural or induced disturbance, provided species composition is typical of that type of indigenous vegetation</p> <p>Fauna habitat should be considered in terms of how well it supports the typical suite of indigenous animals that would occur in the present-day environment. Habitat of indigenous fauna may be indigenous or exotic.</p> <p>It may include commonplace indigenous vegetation and the habitats of indigenous fauna, which is where most indigenous biodiversity is present. It may also include degraded indigenous vegetation, ecosystems and habitats that are typical of what remains in depleted ecological districts. It is not restricted to the best or most representative examples, and it is not a measure of how well that indigenous vegetation or habitat is protected elsewhere in the ecological district.</p> <p>When considering the typical character of an ecological district, any highly developed land or built-up areas should be excluded.</p> <p>Needs to consider indigenous vegetation and habitats that are representative of the full range and extent of ecological diversity across all environmental gradients in an ecological district, such as climate, altitude, landform, and soil sequences. The ecological character and pattern of the indigenous vegetation in the ecological district should be described by reference to the types of indigenous vegetation and the landforms on which it occurs.</p>	<p>The degree to which indigenous vegetation has ecological integrity that is typical of the character of the ecological district</p> <p>The degree to which a habitat that supports a typical suite of indigenous fauna is characteristic of the habitat type in the ecological district and the species expected for that habitat type in the ecological district</p>	<p><b>High rating:</b> Old-growth forests typical of largely natural mountainous ecological districts throughout New Zealand, such as those of South Westland, NW Nelson and the Raukumara Range</p> <p><b>Medium rating:</b> Native shrublands of moderate diversity in gullies in ecological districts centred on foothills that have been peripherally oversown and/or topdressed</p> <p><b>Low rating:</b> Patches of cutty grass <i>Carex geminata</i> in developed paddocks of low-altitude NZ, such as the coastal hills and terraces of eastern Wairarapa</p>
Diversity & Pattern	The extent to which the expected range of	<p>Diversity of biological components is expressed in the variation of species, communities, and ecosystems.</p> <p>Biological diversity is associated with variation in physical components, such</p>	The degree of diversity of indigenous species, vegetation,	<b>High rating:</b> Complex mosaics of primary and secondary forests and shrublands across

Criterion	Definition	Key assessment principles	Assessment Attributes	Examples
	<p>diversity and pattern</p> <p>of biological and physical components within the relevant ecological district is present</p>	<p>as geology, soils/substrate, aspect/exposure, altitude/depth, temperature, and salinity.</p> <p>Pattern includes changes along environmental and landform gradients, such as ecotones and sequences.</p> <p>Natural areas that have a wider range of species, habitats or communities or wider environmental variation due to ecotones, gradients, and sequences in the context of the ecological district rate more highly under this criterion.</p>	<p>habitats of indigenous fauna or communities in the context of the ecological district</p> <p>The quality of indigenous ecotones, complete or partial gradients or sequences.</p>	<p>environmental gradients (e.g. altitude, rainfall).</p> <p><b>Medium rating:</b> Small kettlehole turfs with limited diversity of habitat and flora.</p> <p><b>Low rating:</b> Low-statured induced shrub monocultures (e.g. matagouri, mānuka, kānuka) with few other native plants, little habitat diversity and no indigenous vegetation sequences, e.g. dry eastern NZ hill country</p>
Rarity & Distinctiveness	The presence of rare or distinctive indigenous taxa, habitats of indigenous fauna, indigenous vegetation or ecosystems	<p>Rarity is the scarcity (natural or induced) of indigenous elements: species, habitats, vegetation, or ecosystems. Rarity includes elements that are uncommon or threatened.</p> <p>The list of Threatened and At Risk species is regularly updated by the Department of Conservation. Rarity at a regional or ecological district scale is defined by regional or district lists or determined by expert ecological advice. The significance of nationally listed Threatened and At Risk species should not be downgraded just because they are common within a region or ecological district.</p> <p>Depletion of indigenous vegetation or ecosystems is assessed using ecological districts and land environments.</p> <p>Distinctiveness includes distribution limits, type localities, local endemism, relict distributions, and special ecological or scientific features.</p>	<p>The degree to which:</p> <p>An area provides habitat for an indigenous species that is listed as Threatened or At Risk (declining) in the New Zealand Threat Classification System lists</p> <p>An indigenous vegetation type or an indigenous species occurs that is uncommon within the region or ecological district</p> <p>An indigenous species or plant community at or near its natural distributional limit occurs</p> <p>indigenous vegetation is present that has been reduced to less than 20 per cent of its pre-human extent in the ecological</p>	<p><b>High rating:</b> Kōwhai forest on coastal gravel ridges, Firth of Thames</p> <p><b>High rating:</b> Riparian willow woodlands in South Canterbury provide habitat for Critically Threatened long-tailed bats</p> <p><b>Medium rating:</b> Small refugia that support locally uncommon species such as the fern <i>Asplenium trichomanes</i> on Banks Peninsula bluffs</p> <p><b>Medium rating:</b> Low rear beach sand undulations with an extensive cover of marram grass, supporting At Risk (Declining) katipō spiders</p> <p><b>Low rating:</b> Induced young matagouri, mānuka or kānuka on hillslopes in land environments with &gt;30% indigenous cover, with no special features and no threatened, at risk, data deficient or locally uncommon species present.</p> <p><b>Low rating:</b> Where threatened or At Risk fauna only occur as vagrants, e.g. one white heron <i>Ardea modesta</i> in a farm</p>

Criterion	Definition	Key assessment principles	Assessment Attributes	Examples
			<p>district, region, or land environment</p> <p>indigenous vegetation or habitat of indigenous fauna occurs in naturally uncommon ecosystems</p> <p>The type locality of an indigenous species occurs</p> <p>a distinctive assemblage or community of indigenous species occurs</p> <p>a special ecological or scientific feature occurs</p>	paddock near Cape Foulwind on the West Coast
Ecological Context	<p>The extent to which the size, shape, and configuration of an area</p> <p>within the wider surrounding landscape contributes to its ability to maintain indigenous biodiversity or affects the ability of the surrounding landscape to maintain its indigenous biodiversity</p>	<p>Includes the characteristics that help maintain indigenous biodiversity (such as size, shape, and configuration) in the area</p> <p>Includes the contribution the area makes to protecting indigenous biodiversity in the wider landscape (such as by linking, connecting to or buffering other natural areas, providing 'stepping stones' of habitat or maintaining ecological integrity)</p>	<p>The degree to which an area:</p> <p>has a robust size and a compact shape</p> <p>is well-buffered</p> <p>Provides an important full or partial buffer to, or link between, one or more important habitats of indigenous fauna or significant natural areas, which is important for the natural functioning of an ecosystem relative to remaining habitats in the ecological district.</p>	<p><b>High rating:</b> Extensive old-aged matagouri on large terraces that are well buffered by adjacent floodplains and vegetated mountain slopes</p> <p><b>Medium rating:</b> Secondary podocarp-broadleaved forest fragments in lowland hill country, providing stepping stones between larger habitats (e.g. in Rodney ED, north Auckland)</p> <p><b>Low rating:</b> Small indigenous shrub remnants on a river terrace, where adjoining terraces have been cleared and developed for vineyards. They are highly vulnerable to edge effects and have no linkages to other remnants.</p>



