



**Ecological Impact Assessment**

# **Whisper Creek, Spencerville, PPC**

**Prepared for: LMM Investments Limited**

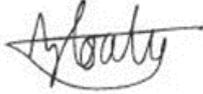
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**Cover photo:** Typical pasture habitat within the PPC site.

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# 1 INTRODUCTION

LMM Investments Limited (LMM) engaged Viridis Limited to undertake an ecological impact assessment of a proposed Private Plan Change (PPC) application.

The Plan Change Area (PCA) comprises around 170 hectares of land located in the north east portion of Christchurch, near the suburb of Spencerville. The area is currently zoned Rural Urban Fringe, Specific Purpose (Golf Resort), and Open Space Water and Margins under the Christchurch District Plan. The site is bounded by Teapes Road, Turners Road, Spencerville Road and the Styx River.

The terrestrial ecological value of the site was low due to the dominance of grazed pasture. Fauna habitat was present on the site, though limited, however there is the potential for At Risk – Declining lizards to be present in areas where habitat is suitable. Waterway values ranged from high for the Styx River, to negligible for the ephemeral farm drains. Five natural inland wetlands were present within the site. Wetland values were generally low due to the dominance of exotic species.

The assessment has been informed by relevant regulations, including the National Policy Statement for Indigenous Biodiversity (NPS-IB), the National Policy Statement for Freshwater Management 2020 (NPS-FM) the National Environmental Standards for Freshwater 2020 (NES-F), the Christchurch District Plan and the Canterbury Land and Water Regional Plan.

## 1.1 Overview

This Ecological Impact Assessment (EclA) has been prepared to inform a PPC application proposed by LMM on the site located at 21 and 24 Teapes Road, 144, 156 and 176 Turners Road, and 174, 220 and 240 Spencerville Road, Spencerville. The site is approximately 170 ha in area and is currently developed as rural and lifestyle properties, with various residential houses and associated outbuildings.

The PCA is referred to as ‘the site’ in this report. The location of the site is shown in Figure 1 and Figure 2.

## 1.2 Report Scope

Viridis Limited (Viridis) was engaged by the client to undertake an EclA for the PPC application under the Christchurch District Plan. This ecological assessment has been prepared to inform the assessment of environmental effects that will support the PPC application.

The overarching approach of this EclA is to ascertain the existing terrestrial and freshwater ecological values on the site and determine the impact of the proposed land use change and associated activities on those values. Recommended measures to avoid, remedy, or mitigate adverse effects on terrestrial and freshwater ecology are provided as required. Recommendations for addressing anticipated residual adverse effects on the ecological values of the site through enhancement are also made where applicable.



Figure 1. Site location (map source: LINZ, NZ Topo50).



Figure 2. Site location with surrounding landuse (aerial source: Nearmap.co.nz 2024).

## 2 METHODOLOGY

### 2.1 Overview

The assessment involved a desktop review and site visit, undertaken by suitably qualified a ecologist from Viridis. The desktop review involved an examination of current and historical aerial imagery of the site, during which factors such as changes in vegetation and surface water were noted. A review of data on Canterbury Maps (such site topography, waterways, springs and wetlands) was also undertaken. Previous ecological reporting undertaken by consultants for the site have been drawn upon where applicable.

A site assessment was undertaken in February 2025, during which the presence and extent of freshwater and terrestrial features within the property and surrounding area were recorded and the quality of associated habitat (if any) was visually assessed, in accordance with the methodology detailed in Sections 2.2 through 2.3, below. The four lifestyle properties in the north west corner (156 and 176 Turners Road and 174 and 220 Spencerville Road) were assessed via a desktop study and from the roads and neighbouring properties only. Photographs and notes were taken on-site, and key points/features were marked using cell phone based GIS application where relevant.

### 2.2 Terrestrial Ecology

During the site visits, terrestrial vegetation and associated fauna habitat values were assessed. The extent of indigenous and exotic vascular vegetation was recorded, and botanical ecological values were considered.

A desktop review of terrestrial characteristics was undertaken, which included consideration of connectivity to surrounding terrestrial features. Habitats for indigenous fauna (lizards, bats, and avifauna) were qualitatively assessed alongside reviews of wildlife databases of local records where applicable (e.g., Department of Conservation databases, Bioweb, eBird, iNaturalist). Opportunistic sightings of avifauna were recorded, and the conservation status of the species, as defined in Robertson et. al. (2021), was noted.

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

### 2.3 Freshwater Ecology

#### 2.3.1 Waterways

During the site assessment, the presence and extent of streams and wetlands on site (if any) were noted and the quality of any freshwater habitat was visually assessed. Waterways were classified as per the definitions within the Canterbury Land and Water Regional Plan to determine, in accordance with the definitions in this plan, the ephemeral, intermittent or permanent status of the watercourse. Ecological factors such as hydrological regime, aquatic habitat and riparian environment were assessed. Modifications to natural flow paths or the presence of artificial drainage channels were also noted. Riparian and catchment information was also reviewed and the NIWA New Zealand Freshwater Fish Database (NZFFD) was examined for fish species potentially present within the site.

### 2.3.2 Wetlands

The Ministry for the Environment (MfE) wetland delineation protocols (MfE 2022a) were used to determine whether an area met the definition of a 'natural inland wetland' under the National Policy Statement for Freshwater Management 2020 (NPS-FM). Assessments were carried out within the 'growing season' for the Christchurch region (MfE, 2021). As per the Clarkson (2014) vegetation tool methods, plant species within putative wetlands were identified, and each species was assigned one of the below wetland indicator status ratings (Clarkson *et al.*, 2021):

- Obligate (OBL) – almost always in wetlands, rarely in drylands;
- Facultative wetland (FACW) – usually in wetlands but occasionally found in drylands;
- Facultative (FAC) – commonly occurs in both wetlands and drylands;
- Facultative upland (FACU) – occasionally in wetlands but usually in drylands; or
- Upland (UPL) – rarely in wetlands, almost always in drylands.

Based on the dominance and prevalence of hydrophytic (wetland) species, natural inland wetland presence/absence was determined. Where results of the vegetation assessment remained uncertain or conditions were modified or atypical, hydric soils and hydrological assessments were undertaken.

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

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

## 2.4 Ecological Impact Assessment

The ecological value of the site, relating to species, communities and systems, were determined as per the EIANZ Ecological Impact Assessment guidelines (EciAG) for use in New Zealand (Roper-Lindsay *et al.* 2018). This report also identifies statutory guidelines and regulation with respect to ecology (such as watercourses, wetlands, high value vegetation and habitats) where relevant to the proposed development. Using this framework, the EciAG describes a simple ranking system to assign value to species as well as other matters of ecological importance such as species assemblages and levels of organisation. The overall ecological value is then determined on a scale from 'Negligible' to 'Very High'.

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

**Table 1. Criteria for describing the level of effects (from Roper-Lindsay et al. 2018).**

Magnitude of Effect	Ecological Value				
	Very High	High	Moderate	Low	Negligible
<b>Very High</b>	<i>Very High</i>	<i>Very High</i>	<i>High</i>	<i>Moderate</i>	Low
<b>High</b>	<i>Very High</i>	<i>Very High</i>	<i>Moderate</i>	Low	Very Low
<b>Moderate</b>	<i>High</i>	<i>High</i>	<i>Moderate</i>	Low	Very Low
<b>Low</b>	<i>Moderate</i>	Low	Low	Very Low	Very Low
<b>Negligible</b>	Low	Very Low	Very Low	Very Low	Very Low
<b>Positive</b>	Net Gain	Net Gain	Net Gain	Net Gain	Net Gain

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

## 3 SITE ENVIRONMENT

### 3.1 Ecological Context

The site is situated in the Low Plains Ecological District of the Canterbury Plains Region. The District comprises the majority of coastal and lowland Canterbury. It is characterised by alluvial flood plains from braided rivers with a generally dry climate. Historically (pre-human) vegetation would have included a combination of tussockland with some floodplain forest and swampland. However, in more modern times, forest has been cleared either by fire or for farming, and now very little naturally occurring native vegetation remains. Landuse within the district is largely rural, with small to large urban areas including the city of Christchurch.

The site itself contains two distinct land types. The area adjacent to the Styx River is characterised by poorly drained, silty soil, while the slightly higher area in the western part of the site is characterised by historic sand dunes. Vegetation in the area would likely have included a mixture of duneland grasses and riparian/wetland forest, depending on soil types.

The Styx River is listed as a Site of Ecological Significance (SES) in the Christchurch District Plan (SES/LP/23). The river is considered to be an SES because *“the site contains remnant wetland vegetation that is representative of the natural diversity of the Low Plains Ecological District, and supports the At Risk longfin eel.”* The SES covers the width of stream bed, flowing water, and extends to at least top-of-bank along both sides of the river to include the associated marginal riparian vegetation, however it extends further in select locations along the river length. The SES boundary does extend into the site at a number of locations along the river boundary, however the overlaps are relatively small.

### 3.2 Local Context

The site consists of largely flat land, slightly elevated in the western part of the site where sandy soils dominate. The Spencerville Drain flows through the site and a network of smaller farm drains is present connected either via surface flow or through small culverts to the Spencerville Drain. The site is rural, and contains a small number of residential houses, outbuildings including farm outbuildings, and miscellaneous rural infrastructure such as fences, water troughs, yards and outbuildings. The site is close to, but not directly adjacent to the existing Spencerville residential area.

A review of historical aerial imagery indicates that the site, and much of the surrounding landscape, was cleared of native vegetation over 80 years for agriculture. A review of Christchurch’s Black Maps (historical survey data) indicates that the site did not contain significant areas of forest, rather it was characterised by low scrub including ferns, flax, tutu, and toetoe, with areas of surface water, mainly along the river in the lower lying parts of the site.



## 4 TERRESTRIAL ECOLOGY

### 4.1 Terrestrial Vegetation

Utilising observations from the site visit and aerial images, the vegetation has been classified and mapped and is presented in Figure 7.

#### 4.1.1 Exotic vegetation

The ecological and botanical value of the vegetation within the site was considered to be low.

The site was essentially devoid of native vegetation with the exception of occasional cabbage trees (*Cordyline australis*), and a small area of scrambling pohuehue (*Muehlenbeckia complexa*) which was located on the true right bank of the Spencerville Drain at the northern end of the site (Figure 17a). Both species are Not Threatened, and common in the ecological district.

Vegetation was largely limited to rows of shelter providing exotic trees including poplar (*Populus* sp.), macrocarpa (*Cupressus macrocarpa*), eucalypts (*Eucalyptus* sp.), pine (*Pinus* sp.) and willow (*Salix* sp.) (Figure 17b, Figure 5a). A small stand of pine trees was present along Spencerville Road (Figure 5b) and a stand of wattle (*Accacia* sp.) was present within the property at 176 Turners Road (Figure 6a). Other areas included areas of mixed exotic dominated vegetation mostly around existing houses (Figure 6b).

Vegetation along the Styx River is discussed in section 5.1.1 below.

a)



b)



**Figure 4. a) Area of scrambling pohuehue on Spencerville Drain and b) shelterbelt.**

a)



b)



**Figure 5. a) Shelterbelt within the site, and b) stand of pine trees on Spencerville Road.**

a)

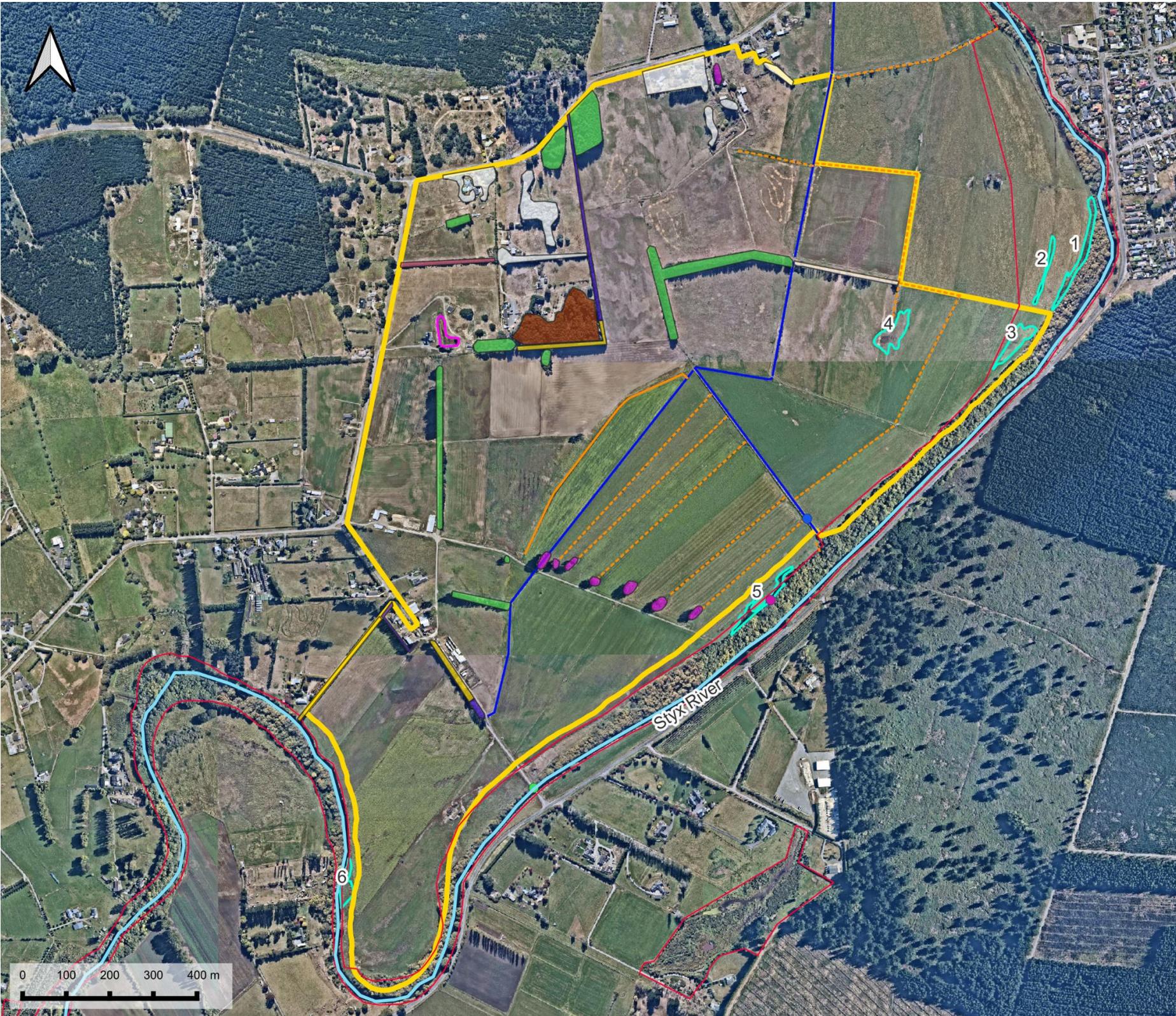


b)



**Figure 6. a) Stand of wattle within the property at 176 Turners Road and b) Mixed exotic and native vegetation within the lifestyle blocks.**

Figure 7 - Ecological features of the PPC site



	Site boundary
	SES
	Bridge
	Pump station
	Surface water take
<b>Vegetation</b>	
	Eucalypt
	Macrocarpa
	Mixed exotics
	Pine
	Poplar
	Wattle
	Willow
<b>Waterways</b>	
	Spencerville Drain
	Drain
	Ephemeral drain
<b>Wetlands</b>	
	Wetland
	Constructed pond

SOURCES  
Nearmap.com 2024

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

SCALE **1:11,000** @ A4

PROJECT NO. 10328  
DRAWN BY: AJC  
DATE: 04/03/2023

### 4.1.2 Pasture

The ecological value of the pasture within the site was considered to be low.

The majority of the site was dominated by pasture, as typical of a rural environment (Figure 8). The site was currently being grazed, and it is expected it will continue to be grazed until the site is developed (Figure 8a). Part of the site contained a winter feed crop (fodder beet) and it is expected normal paddock rotation will continue until the site is developed (Figure 8b). Other areas of the site may be used for crops depending on farm planning and conditions.

a)



b)



*Figure 8. a) Pasture was the dominant vegetation type, and b) fodder beet paddock in the southern part of the site.*

### 4.1.3 Terrestrial connectivity and ecological function

The connectivity and ecological functioning values of the site were considered to be low.

Connectivity between areas of vegetation is important to facilitate ecological function. Edge communities are heavily influenced by increased exposure to light, drying winds, and competitive weeds. This 'edge effect' restricts some native flora and fauna to forest interiors. Patch fragmentation increases the edge effect and decreases the availability of habitat for interior species. Loss of ecological connectivity can also impair reproductive function for both flora and fauna.

All areas of vegetation present within the site were small. While the Low Plains ecological district largely lacks significant areas of vegetation, the site is located between two large pine plantations (Chaney's Forest to the west and Bottle Lake to the east). The small areas of vegetation within the site may provide some linkage habitat for birds moving between the two forests, however the distance between the plantations is small (~1.2 km) and therefore birds are expected to easily move between the two plantations regardless of the vegetation within the site itself. The vegetation along the Styx River provides a good level of longitudinal connection between the Brooklands Lagoon and Waimakariri River mouth, and the rural urban fringe areas within Marshland. All areas of vegetation will be subject to edge effects.

## 4.2 Terrestrial Fauna Habitat

### 4.2.1 Avifauna (birds)

The ecological value of the site for birds, including as habitat for birds, was considered to be conservatively moderate, due to the potential for At Risk and Threatened birds to utilise the site periodically.

Habitat within the site for birds was limited to the shelterbelts and areas off exotic vegetation. Habitat included various roosting and nesting areas, as well as some limited foraging either directly on the trees (for fruit, berries, and seeds), and around the trees (for insects), however lack of fruiting/flowering trees limited this habitat.

No specific bird surveys were undertaken, however observations while on site recorded the presence of Australasian harrier (*Circus approximans*), fantail (*Rhipidura fuliginosa*), paradise shelducks (*Tadorna variegata*) and pūkeko (*Porphyrio porphyrio*), as well as various exotic species such as magpie (*Gymnorhina tibicen*), blackbird (*Turdus merula*), skylark (*Alauda arvensis*) and a large flock of Canada geese (*Branta canadensis*). Records from online databases such as eBird.org and iNaturalist show the presence of common native and exotic species.

There are records in the wider area for species including the New Zealand pipit (*Anthus novaeseelandiae novaeseelandiae*; At Risk – Declining) and Australasian bittern (*Botaurus poiciloptilus*; Threatened – Nationally Critical). It is possible both species may be present within the site occasionally. Pipit are generally found along rivers and coastlines, and in farmland adjacent to these. Bittern are generally found in wetland areas, however they are known to inhabit vegetated margins along drains that flow through agricultural areas. Habitat for both species is present within the site though it is noted records for the wider area show they have only been recorded within reserves or natural areas such as the Otukaikino Wetland, Brooklands Lagoon, Waimari Beach Park and Travis Wetland.

### 4.2.2 Herpetofauna (lizards)

The ecological values of the site for lizards, including lizard habitat, were considered to be conservatively moderate due to the potential for At Risk – Declining lizards to be present in suitable habitat within the site.

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

Records of lizard presence within the site, and within 10 km of the site were retrieved from DOCs ARDS. Five lizard species have been recorded within 10 km of the site. However, not all species recorded are expected to be present within the site. Habitat for southern grass skink (*Oligosoma aff. polychroma* Clade 5; At Risk – Declining) and McCaan's skink (*Oligosoma maccanni*; Not Threatened) was present within the site (Figure 17). Both are found in long grass, scrubby vegetation and under debris (both natural and manmade). While the majority of the site was grazed, there were pockets of suitable habitat mainly around the exotic shelterbelts and around some of the farm outbuildings. In these areas

the value of the site was considered to be moderate, however the grazed/cultivated portions of the site were considered to be of low value.

There were a small number of records of jewelled gecko (*Naultinus gemmeus*; At Risk - Declining) and waitaha gecko (*Woodworthia cf. brunnea*; At Risk - Declining). No habitat was suitable for these species within the site. Jewelled gecko can be terrestrial and can be found in tussocklands, however at lower altitude, such as the site, they are almost exclusively arboreal, inhabiting scrublands. This was not present in the site. Waitaha gecko are primarily terrestrial and are generally found close to their retreats. Retreats are generally within rocky outcrops, scrubby vegetation, duneland and under the bark of dead trees. No such habitat was present within the site.

A single record of the northern spotted skink was noted. The record was within the Bottle Lake plantation, however it was dated 1965. Northern grass skink are not known to be present in the South Island, therefore it is assumed this record is now more appropriately considered to be the Canterbury spotted skink (*Oligosoma lineocellatum*; Threatened – Nationally Vulnerable). Habitat within the site may be suitable (grassland) however they are generally found in areas with rocky habitat which provides basking habitat. It is considered very unlikely they are present in the site.

a)



b)



**Figure 9. Examples of potential lizard habitat within the site.**

## 5 FRESHWATER ECOLOGY

### 5.1 Waterways

#### 5.1.1 Styx River

The ecological value of the Styx River was considered to be high.

The Styx River is one of the main waterways in the Christchurch area. It originates in Harewood, near Nunweek Park, and meanders in an east, then north east direction before discharging to the Brooklands Lagoon. The upper reaches flow within urban areas, while downstream of the Christchurch Northern Corridor (SH74) it is largely within a rural landscape.

Within the site, the Styx River formed the southern and eastern site boundary, with the site located on the river's true left bank. Adjacent to the site the river was approximately 15 m in width, and too deep to wade. Riparian vegetation included dense willow growth with blackberry (*Rubus fruticosus*) and areas of *Juncus sorophorus*, *J. effusus*, and *Carex* sp. (Figure 10). On the true right of the river was Lower Styx Road. There was essentially no riparian vegetation on the true right of the river. The vegetation on the true left provided moderate levels of shade (depending on the time of day) and good levels of organic matter input. A single lane vehicle bridge was present on the site. It connects Teapes Road to Lower Styx Road, through is not publicly accessible.

Instream habitat was varied, as is typical of larger rivers. Substrates are known to be a combination of soft sediment, gravels and occasional cobbles. Macrophytes were also prevalent (Figure 17). As a result, diverse fish and invertebrate habitat was present. Records from the NZFFD for the Styx River show the presence of various fish species (Table 2).

Ecological monitoring undertaken for Christchurch City Council at a site adjacent to the Teapes Road bridge shows the river, adjacent to the site, is generally considered to have low quality habitat as indicated by low MCI, QMCI and EPT scores (Instream Consulting 2018). However, the river is relatively deep here and therefore does not provide ideal habitat for sensitive macroinvertebrates. The upper reaches of the Styx River, where both depth and width are smaller (and the river is wadeable), show the river to be of fair to good quality.

The presence of various At Risk – Declining fish species, along with the size of the river, the diversity of habitat means it is considered to be of high ecological value.

**Table 2. Fish species present in the Styx River (from the NZFFD).**

Common name	Species name	Conservation status
Shortfin eel	<i>Anguilla australis</i>	Not Threatened
Upland bully	<i>Gobiomorphus breviceps</i>	Not Threatened
Longin eel	<i>Anguilla dieffenbachii</i>	At Risk – Declining
Inanga	<i>Galaxias maculatus</i>	At Risk – Declining
Giant bully	<i>Gobiomorphus gobioides</i>	At Risk – Declining
Common bully	<i>Gobiomorphus cottidianus</i>	Not Threatened
Brown trout	<i>Salmo trutta</i>	Introduced and Naturalised

a)



b)



**Figure 10. Vegetation along the Styx River.**

a)



b)



**Figure 11. a) The Styx River adjacent to the site (the photograph has been taken within the site) and b) The Styx River, looking downstream from Teapes Road bridge.**

### 5.1.2 Spencerville Drain

The ecological value of Spencerville Drain was considered to be conservatively moderate, due to the possibility of At Risk – Declining longfin eels being present.

The Spencerville Drain originates within the site near the southern extent (Figure 12). It flows in a generally northerly direction through the middle of the site. A branch turns southeast discharging to the Styx River approximately half way along the site's south eastern boundary (Figure 13a). Here, the discharge is controlled by a pump station (Figure 13b). Beyond the site, the drain continues to flow northwards through paddocks, and discharges to the Styx River in the 'red zoned' suburb of Brooklands.

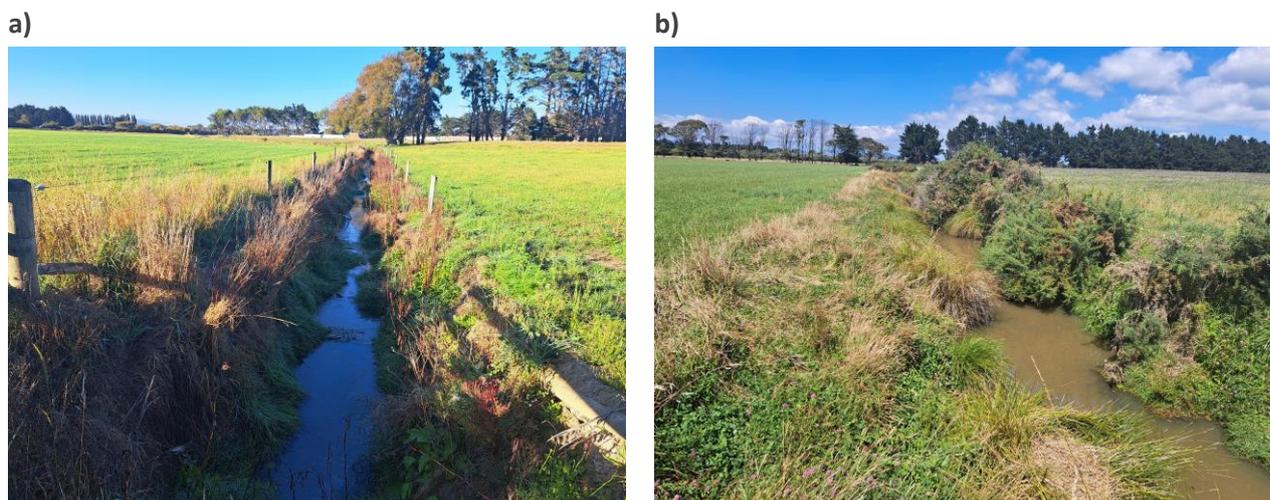
Aerial imagery from 1940-1944 shows the drain was present and established at this time. No earlier aerial images are available for the area. It is considered likely the drain is entirely artificial, therefore meeting the definition of an artificial watercourse in the Canterbury Land and Water Regional Plan

(LWRP)<sup>1</sup>, however, it is also considered likely the drain was established in an area that was historically wet, and therefore acts as a natural drainage channel, albeit highly modified. It is therefore considered appropriate to classify the Spencerville Drain as a highly modified natural watercourse. No springs were identified within the site and no springs are noted on Canterbury Maps.

Within the site, the drain contained water at the time of the site visit, however no flow was discernible at any location within the site. The water level upstream of the pump station was significantly lower than downstream of the pump. The main channel was moderately incised, through this was expected to be the result of drain construction and maintenance rather than periodic high flows. The topography of the site was essentially flat, therefore it was not capable of generating the type of flow required to develop natural incision. The branch leading to the pump station was at least partially timber lined, through overhanging vegetation meant it could not be confirmed if it was timber lined in its entirety. A bund was present on the true right bank of the branch leading to the pump station.

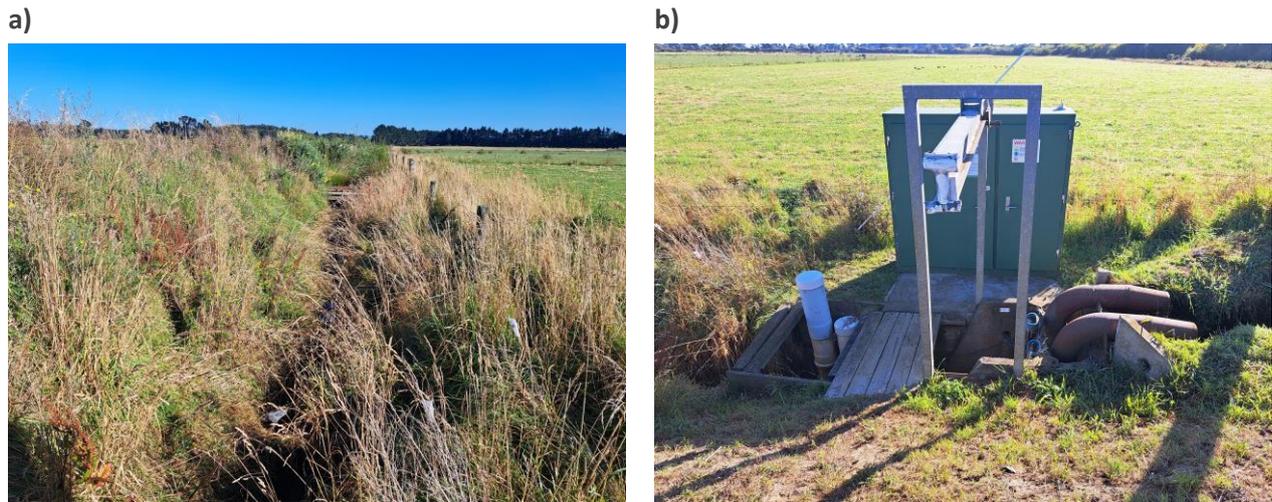
Riparian vegetation was essentially absent along the drain. Occasional single willows were present along with an approximately 50 m reach in the northern extent of the site where scrambling pohuehue was present on the true right bank. Otherwise, vegetation was limited to pasture grasses and pasture associated weeds, with occasional *Carex* sp. The vegetation provided little to no shading, and only limited organic matter input. Instream habitat was not directly observable due to discoloured and moderately deep water, however it was assumed to be dominated by soft fine sediment.

There are no records in the NZFFD for the waterways within the site. It is feasible any fish present within the Styx River could be present within the Spencerville Drain, providing fish passage is present. The pump station represented a barrier to most fish passage, however access from the main discharge point into the drain is expected to be possible. It is therefore possible that At Risk – Declining longfin eels may be present within the Spencerville Drain.



**Figure 12. Spencerville Drian a) near the upstream extent and b) near Spencerville Road.**

<sup>1</sup> A watercourse that is created by human action. It includes an irrigation canal, water supply race, canal for the supply of water for electricity power generation, and farm drainage canal channel. It does not include artificial swales, kerb and channeling or other watercourses designed to convey stormwater.



**Figure 13. a) The branch of Spencerville Drain leading to the pumpstation and b) The pump station.**

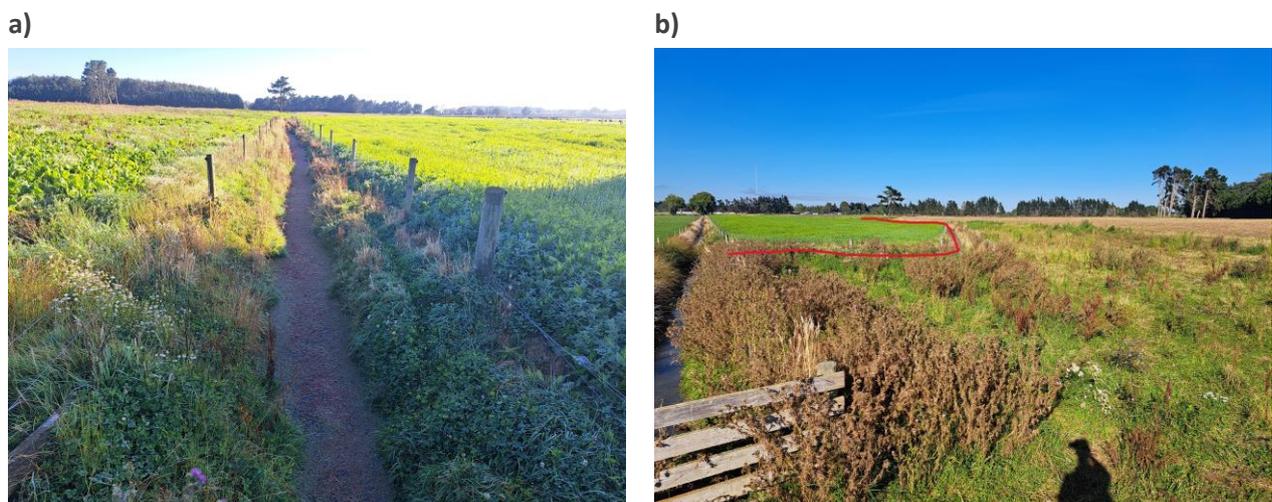
### 5.1.3 Permanent drain (Artificial watercourses)

The ecological value of the permanent drain was considered to be low.

A single permanent drain was present within the site (Figure 14a). It was located at the point in the site where soils transitioned from sandy soils in the slightly elevated part of the site, to where heavy soils dominated in the lower part of the site. It is not visible in the 1940-1944 aerial image but it is present in the 1955-1959 aerial images. It is therefore considered to be constructed, and meet the definition of an artificial watercourse.

The permanent drain was directly connected to the Spencerville Drain (Figure 14b). It contained water, but no flow was present and the surface of the drain was almost entirely covered with *Lemna* sp. and *Azolla* sp. Riparian vegetation was limited to pasture species and associated weeds. Substrates were assumed to be soft fine sediment.

Instream habitat was homogenous, and limited to stagnant water. It is expected water temperatures would be high during warmer months as little shade was provided by the drain banks. It is possible any fish from the Styx River could be present within the drain, however it is considered likely only shortfin eels will be present due to the low quality habitat and likely compromised water quality.



**Figure 14. a) Permanent drain looking downstream from the upper reaches and b) alignment of permanent drain (red line) as it flows into Spencerville Drain.**

#### 5.1.4 Ephemeral drains (Artificial watercourses)

The ecological value of the ephemeral artificial drains within the site was considered to be negligible.

A network of artificial drains was present within the site. At the time of the site visit, no water was present in any of the drains, and they were almost entirely vegetated with terrestrial pasture grasses (Figure 15). All drains followed fencelines and discharged into Spencerville Drain. Some of the channels are present in aerial images from 1955-1959 onwards, however they are not visible in the earliest images and therefore it is considered they meet the definition of an artificial watercourse.

The presence of established terrestrial vegetation within the channels suggests they are only occasional inundated. All channels also lacked clear signs of erosion or scour. It was therefore considered the channels were likely to be ephemeral. The lack of permanent or even regularly intermittent habitat means the ecological value the ephemeral drains provide is limited.

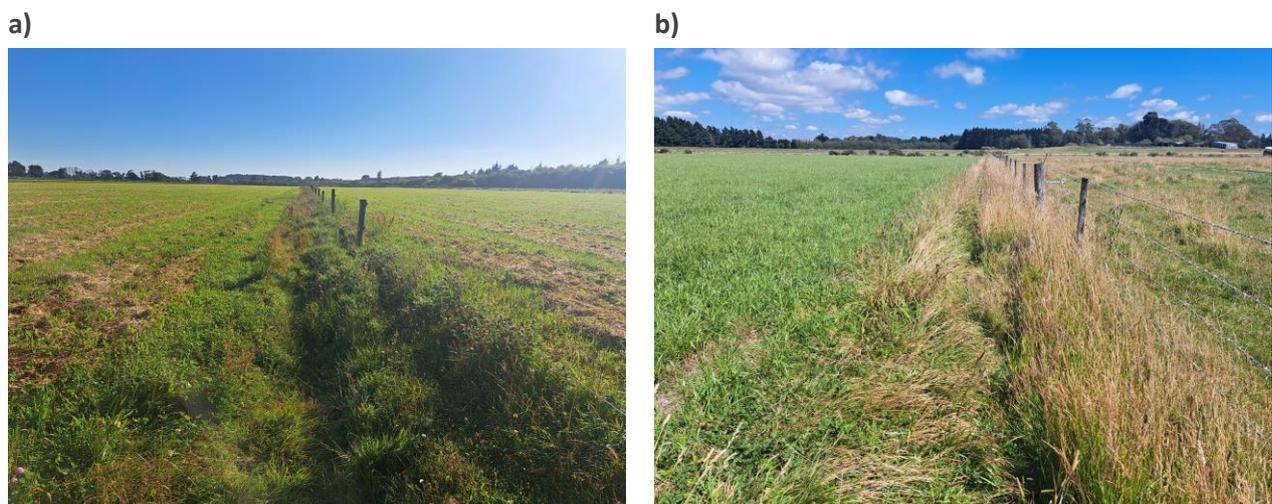


Figure 15. Ephemeral drains within the site.

#### 5.2 Constructed pond

The ecological value of the constructed pond was considered to be low.

A constructed pond was present in the property at 156 Turners Road. Review of aerial images shows the pond originated as a depression in the mid 2000s following the removal of a stand of pine trees that was present in the area. Further excavation occurred in 2015 which cleared the scrub (expected to be willows) that was growing in the depression. Following 2015, water accumulated in the depression, thus forming a pond.

The pond was entirely isolated from any other surface water. Riparian vegetation was absent. Water levels at the time of the site visit were low, though aerial images do suggest water levels fluctuate. The lack of connection and fluctuating water levels means aquatic habitat value is limited. It is possible shortfin eels may be present, however if they were, they would have had to negotiate over 350 m of farmed land from the closest surface water (the permanent drain). This is considered unlikely.

#### 5.3 Wetlands

Several areas within the site were investigated to determine if they met criteria to be considered natural inland wetlands. Six areas of natural inland wetland were identified within, or within 100 m of, the site.

### 5.3.1 River associated wetlands

The ecological value of the wetlands associated with the Styx River was considered to be low.

Wetlands 1, 5 and 6 were all formed in areas where the water from the Styx River was spilling into the site (Figure 17). In these areas primary indicators of wetland hydrology were present, namely the presence of surface water, and vegetation was dominated by creeping bent (*Agrostis stolonifera*; FACW). Wetland 5 was slightly more diverse, and a small number of *Carex secta* were present around the edges, mostly on the boundary between the riparian vegetation and grazed paddocks. The boundaries of these wetlands were easily identifiable by the edge of the saturated ground. Beyond this, UPL pasture species were dominant.

The Canterbury Maps Wetland GIS layer suggests a number of wetlands are present along the boundaries of the river, however they have been identified via aerial images, and have not been ground truthed. Wetlands 1 and 5 were located in roughly the same areas as two indicative wetlands (according the GIS layer). The boundaries provided by this assessment have been ground truthed and are therefore considered to be more accurate than the GIS layer. The remaining indicative wetlands were not identified on site and no evidence of wetland hydrology or hydrophytic vegetation was found.



**Figure 16. a) Wetland 5 and b) wetland 6.**

### 5.3.2 Intermittent wetlands

The ecological value of the intermittent wetlands was considered to be negligible.

Wetlands 2, 3 and 4 were all located within grazed paddocks. They were characterised by shallow concave surfaces that were either sparsely vegetated or entirely vegetated with hydrophytic species. Wetland 3 occupied a concave surface and was almost entirely vegetated with bachelor's button (*Cotula coronopifolia*; FACW). Wetland 5 occupied another concave surface, however the area contained limited vegetation. Where vegetation was present, bachelors button dominated. Area 4 was beyond the site boundaries but appeared to be a concave surface dominated by bachelor's button, with occasional bare areas. No native species were present. All wetlands were subject to stock grazing.

These wetlands are considered to be seasonally intermittent and therefore the boundaries are likely to fluctuate seasonally. The boundaries have therefore been delineated conservatively and it is expected they can be refined at a later date when resource consents are sought, if necessary.

a)



b)



**Figure 17. a) Wetland 3 and b) wetland 4.**

## 6 ASSESSMENT OF ECOLOGICAL EFFECTS

### 6.1 Proposal

The proposal seeks to rezone approximately 170 hectares of land from Rural Urban Fringe and Specific Purpose (Golf Resort) to Residential – New Neighbourhood under the Christchurch District Plan. The part of the site that is zoned Open Space Water and Margins will remain with this zoning. An outline development plan (ODP) will limit residential development to the upper terrace of the site and require that the lower terrace remain as open space or rural use. All relevant zone provisions will apply to the rezoned land to enable Council to exert control over subdivision development. Where relevant, national environmental standards and legislation (such as the Wildlife Act 1953) will also apply to development activities.

The main threats to the long-term viability of ecosystems in Christchurch include habitat destruction, fragmentation, edge effects and invasion by pest plants and animals. These threats are often augmented through an increase in urban development.

This section assesses the potential effects of the proposed private plan change on the current and potential ecological values within the site and the associated wider landscape.

### 6.2 Impact on Terrestrial Ecology

#### 6.2.1 Vegetation and terrestrial ecological connectivity and function

Vegetation values within the site were limited and characterised by exotic shelterbelts and amenity planting. It is expected the majority of the vegetation beyond the riparian vegetation will be removed, however this can already be removed as a permitted activity. When the original plan change was undertaken to rezone the part of the site to Specific Purpose (Golf Resort), the effect of removal of much of the vegetation would have been assessed.

The change in land use from rural and Specific Purpose (Golf Resort) to residential will also provide opportunities for enhancement of vegetation through the development of subdivisions. Significant portions of the site will be set aside for wetlands and recreational uses which provides significant opportunities for ecological enhancement and restoration, particularly along the boundary with the Styx River. This level of restoration is unlikely to occur under the current zoning. The rural zoned portion of the site is currently being managed as lifestyle blocks which are dominated by grazing and exotic species. The Specific Purpose (Golf Resort) portion of the site is currently being managed as productive farming land. If a golf resort was to be developed, there would be less opportunity for revegetation due to the requirement for open areas to house golf fairways.

The lower part of the site where undesirable land conditions are present means it is not appropriate to develop for housing, has been set aside for greenspace, wetlands and recreation uses. An ODP will formalise this control. This area is extensive, covering approximately 75 ha of the site and it borders the existing SES. Approximately 2.5 ha of the site overlaps with the SES, however this is on the boundary of the Styx River and would ultimately be included in any esplanades that are developed at subdivision stage. This presents an excellent opportunity for restoration and/or enhancement of the riparian area adjacent to the Styx River. The heavy soils make this area ideal for development of wetlands and lowland forest such as kahikatea forest. It is likely that kahikatea was prevalent in the area pre-human. Any restoration along the banks of the Styx River should be in line with the Vision 2000-2040: The Styx,

which includes visions such as to achieve a viable spring-fed ecosystem and to create a source to sea experience.

Detailed design, including species selection, numbers of plants, and ecosystem restoration will be provided during any future resource consenting stages.

### **6.2.2 Pest animals**

Rezoning the site from rural and golf resort land use to urban land use is expected to significantly increase human population density in the area, due to the current undeveloped nature of the site. While the Specific Purpose (Golf Resort) zoning would provide a limited number of residential areas, the majority of the space would be open land uses (i.e a golf course).

An increase in human population density often brings an increase in rat and mice abundance, however it is also expected there will be an increase in pest control where currently it may be limited. The pest animal abundance within the site will likely currently be at carrying capacity so no increase in effect is expected within these areas. Potentially significant increases in domestic cat numbers may occur due to the increase in residential development in an area where there are only two current dwellings, however wild cats are expected to be present at the moment.

No changes in the number of possums are expected. Possums are expected to be present, though in low numbers due to the limited arboreal habitat. Given the surrounding land is likely to stay rural at this stage, and the close proximity to Chaney's Forest, it is likely possums will continue to be periodically present in the site unless pest control occurs. Numbers of mustelids and rabbits are expected to decline due to the change in land use decreasing the suitability of the habitat for them within the site.

Overall, it is considered that the rezoning of the site will result in a negligible increase of pest animal effects, however the community composition of the pest population is expected to change.

### **6.2.3 Terrestrial indigenous fauna**

Due to the low adverse effects on vegetation and the low effects of pest animals, it is considered that the re-zoning will result in a low adverse effect on native terrestrial habitat. There is the potential for a loss of low quality lizard and bird habitat through the removal of vegetation within the site, however this habitat could be impacted through activities currently taking place on the site (farming) and would have been assessed during the original plan change to rezone part of the site as Specific Purpose (Golf Resort). It is expected if the development of a golf resort had gone ahead, habitat would have been lost, at least temporarily, as vegetation was cleared and before new landscaping established.

Any potential direct adverse effects on native terrestrial fauna as a result of subsequent development works (e.g. earthworks) would be assessed at the resource consenting phase and can be appropriately mitigated through the implementation of fauna management plans and development of extensive greenspaces within the wider site.

## **6.3 Impact on Freshwater Ecology**

The Styx River was considered to be of high ecological value, while the Spencerville Drain, permanent drain and ephemeral drains were considered to be of moderate, low and negligible ecological value respectively. The Styx River and the Spencerville Drain will currently be subject to existing District Plan and Canterbury LWRP policies and rules.

The main threats to freshwater ecology as a result of a change to Residential zones are:

- The potential for increased impervious surfaces as a result of residential development
- The potential change in contaminant runoff as a result of residential development

All threats can be effectively managed during development with appropriate controls such as erosion and sediment control plans, appropriate design and riparian planting and management. It is expected that any specific potential adverse effects resulting from future development will be addressed and managed during future consenting processes, including through detailed design (e.g. for culverts and outfalls) and through mitigation such as planting.

Activities in relation to development near natural waterways (e.g., earthworks, stream reclamation or realignment) will require assessment at the resource consent stage. It is worth noting that the proposed scheme plan for the site locates the residential area in the western part of the site on the sandy soils, while all aquatic habitat with the exception of the constructed pond is located in the eastern part of the site. It is considered that the effects management hierarchy will be appropriate for managing adverse effects of future proposals and mitigating/offsetting where required. As such, the proposed rezoning is not anticipated to result in residual adverse effects on the freshwater values of the site.

The artificial drains may be reclaimed during future works, or incorporated into the future stormwater network. Artificial channels are not subject to protection or management therefore no change in effects is anticipated. However, as noted they are located in the area identified for wetlands and recreational uses, therefore their reclamation is not strictly necessary at this stage.

Changing from rural to residential land use can be associated with changes in contaminants.

Contaminants can have detrimental effects on aquatic flora and fauna. Residential activities such as use of road (and contaminants associated with cars on road e.g. hydrocarbons, zinc, lead) are expected to be managed through stormwater treatment devices. Addition of nutrients, such as through use of fertiliser on residential gardens, already occurs through regular farming practices which requires fertilisation of pasture, and would have occurred should the site have been developed into a golf resort. Changing to residential land use is expected to result in a decrease in certain contaminants, such as those associated with stock effluent runoff.

### **6.3.1 Water and stream quality**

The natural waterways (Styx River and Spencerville Drain) within the site were of high to moderate ecological value. The waterways are already subject to existing Canterbury wide LWRP rules, policies and rules.

No significant changes are expected as a result of changing the land use from rural and golf resort to residential land use, providing development occurs in an organised and well designed manner. It is expected an esplanade strip will be established along the Styx River when the site is subdivided. There is extensive area within the site set aside for the development of wetlands and recreation spaces, as well as stormwater infrastructure within the residential portions of the site.

Any threats to the permanent waterways can be effectively managed during development with appropriate controls such as erosion and sediment control plans, appropriate design and riparian planting and management. It is expected that any specific potential adverse effects resulting from future development will be addressed and managed during future consenting processes, including through detailed design (e.g. for culverts and outfalls) and through mitigation such as planting, though the

permanent waterways are not located within the area identified for residential development as a result of undesirable land conditions.

Activities in relation to development near the waterways will require assessment at the resource consent stage. It is considered that the effects management hierarchy will be appropriate for managing adverse effects of future proposals and mitigating/offsetting where required. As such, the proposed rezoning is not anticipated to result in residual adverse effects on the freshwater values of the site.

### **6.3.2 Wetlands**

There are two wetlands within the site and four additional wetlands within 100 m of the site boundaries. There is the potential for wetlands to be affected by future land use changes, in the same manner as waterways. Wetlands are also protected from development by the Canterbury LWRP and the NES-F and any future earthworks within 100 m of any wetland (if any wetland drainage may occur), or works or vegetation removal within or within 10 m of a wetland will be require a resource consent as a restricted discretionary activity. Identification of the wetlands at this stage allows future development to be designed around the wetlands and their catchments to ensure no complete or partial drainage occurs.

Regardless of their current classification, all wetlands within the site would be required to be reassessed at resource consent stage prior to future development.

### **6.3.3 Stormwater**

The proposed zone change is expected to result in an increased coverage of impervious surfaces from development such as buildings and roads and paths. Increased levels of impervious surfaces have the potential to result in increased adverse stormwater effects on the receiving environment such as scouring, erosion, and increased levels of contamination.

The scheme plan currently provides provision for stormwater wetlands and basins within the residential area. The area identified for open space and recreation uses is also expected to include wetlands which will help to mitigate the detrimental effects of increased stormwater generation within the site.

## **6.4 Relevant Policies**

### **6.4.1 National Policy Statement for Indigenous Biodiversity 2023**

The National Policy Statement for Indigenous Biodiversity (NPS-IB) sets out objectives, policies and implementation requirements to manage natural and physical resources to maintain indigenous biodiversity under the Resource Management Act 1991 (RMA). It outlines a system for the management of biodiversity outside of public conservation land.

There is essentially no indigenous vegetation present on the site. Habitat for indigenous fauna is limited, with the highest value habitat being the Styx River, which is not within the site itself. The PPC will provide opportunities to increase indigenous cover through planting and enhancements of riparian areas and open green space.

### **6.4.2 National Policy Statement for Freshwater Management 2020 and National Environmental Standards for Freshwater 2020**

The NPS-FM provides national direction for decisions regarding water quality and quantity, and the integrated management of land, freshwater and coastal environments under the RMA. The NPS-FM contains national objectives for protecting ecosystems, indigenous species and the values of outstanding

water bodies and wetlands. The NES-F provides the rules governing various activities that may have a detrimental effect on freshwater environments.

Waterways and wetlands are not within the area currently identified for residential development due to unfavourable land conditions. Wetlands, the Styx River, and Spencerville Drain can all be significantly enhanced through the plan change through the removal of farming activities and the provision of extensive green space and revegetation.

Future resource consents required for the development of the site will require compliance with relevant NES-F regulations in relation to natural inland wetlands, noting that a consenting pathway is provided for urban development (refer Regulation 45C).

### **6.4.3 Canterbury Land and Water Regional Plan**

This section addresses the objectives and policies set out in the LWRP pertaining to ecology.

In line with the objective of the LWRP freshwater features will be protected, and the opportunity for enhancement provided. Various stormwater management options will be provided for through development which will help to protect the quality of water within wetlands, the Styx River and Spencerville Drain.

Various policies within section 4 of the LWRP are applicable, including policies discharge of water, stormwater, and wetlands and riparian margins. The indicative scheme plan considers the relevant policies as they relate to ecology.

Various rules within the LWRP will be applicable to the site. These are applicable regardless of the district plan zoning.

### **6.4.4 Christchurch District Plan**

Chapter 9 (Natural and Cultural Heritage) of the Christchurch District Plan manages ecological values within the Christchurch City boundaries. It contains objectives, policies and rules regarding the protection of significant indigenous vegetation and significant habitats of indigenous fauna.

One Site of Ecological Significance is present within/adjacent to the site, however only a very small amount is actually within the site (Styx River corridor). Provision of the green space between the river and the residential area provides significant opportunities to enhance the natural values of the area for vegetation and indigenous species.

## 7 SUMMARY AND RECOMMENDATIONS

LMM investments are applying to Christchurch City Council for a PPC to rezone 170 hectares of land located in the north east portion of Christchurch, near the suburb of Spencerville, from Rural Urban Fringe, Specific Purpose (Golf Resort) to Residential – New Neighbourhood. The portion of the site currently zoned and Open Space Water and Margins will remain with this zoning.

The existing terrestrial and freshwater ecological values of the site have been identified and assessed. It is considered the PPC is appropriate for the area from an ecological perspective and can protect and enhance indigenous biodiversity values of the site in accordance with the outcomes of relevant plans and policy documents, while providing for efficient development.

The site contains limited terrestrial values for vegetation, however it does provide some habitat for indigenous birds and At Risk – Declining indigenous lizards. Freshwater values are mainly attributed to the potential for At Risk – Declining species to be present within Spencerville Drain, and the values associated with the Styx River, which forms the eastern boundary of the site. Wetlands and waterways were limited to the area of the site that has been identified as being unsuitable for residential development, and therefore they are unlikely to be detrimentally impacted by the plan change.

Overall, it is considered that the proposed PPC can effectively manage any adverse effects of urban development on the natural environment through the existing planning provisions and policy framework within the Christchurch District Plan and Canterbury LWRP. Any potential adverse effects can be adequately mitigated through appropriate stormwater design, fauna management plans, restoration and riparian planting, and detailed design.

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