



Sinton Road & Clarks Lane - Private Plan Change

Ecological Impact Assessment

Prepared for: Cabra Developments Limited

August 2024



DOCUMENT CONTROL AND REVISION HISTORY

Document title	Sinton Road & Clarks Lane - Private Plan Change
	Ecological Impact Assessment
Prepared for	Cabra Developments Limited
Version	Final 1
Date	1 August 2024
Document number	10116-003-B

Version	Issue date	Document number
Draft A	10 June 2024	10116-003-A
Draft B	26 July 2024	10116-003-B
Final 1	1 August 2024	10116-003-1

Author(s)	
	Brittany Pearce
	Ecologist
Reviewer(s)	
	Mark Delaney
	Director / Lead Ecologist

Reference: Viridis 2024. Sinton Road & Clarks Lane - Private Plan Change Ecological Impact Assessment. A report prepared for Cabra Developments Limited by Viridis Limited. August 2024.

Cover photo: View showing exotic shelterbelt on the western boundary of 10 Sinton Road site, facing to the southeast (source: Viridis, May 2024).

© Viridis Limited 2024

This document has been prepared by Viridis Limited for Cabra Developments Limited. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

EXECUTIVE SUMMARY

Cabra Developments Limited, engaged Viridis Limited to undertake an Ecological Impact Assessment for the proposed Private Plan Change to rezone approximately 16 ha of land at Sinton Road and Clarks Lane, Hobsonville. The land is currently zoned as Future Urban Zone under the Auckland Unitary Plan (Operative in Part 2016) and is proposed to be rezoned to Residential - Mixed Housing Urban, with a lower intensity Residential - Mixed Housing Suburban along the coastal edge.

This report details the ecological assessment that was undertaken by Viridis to determine the ecological features within the site and the significance of those features. Within this assessment, Viridis has considered the ecological value of existing terrestrial and freshwater features on site and evaluated how the proposed land use change from rural to urban may impact these ecological values. Where required, recommendations are provided to aid in the avoidance, minimisation, or remediation of adverse effects. The assessment has been informed by relevant regulations, including the National Policy Statement for Indigenous Biodiversity, the National Policy Statement for Freshwater Management 2020, the National Environmental Standards for Freshwater 2020 and the Auckland Unitary Plan.

The terrestrial vegetation was limited to the north/north-western boundary of the PPC site, which consisted of exotic-native vegetation and exotic vegetation of low and low-moderate ecological value, respectively. The site also contained several exotic shelterbelts and amenity/garden plantings of low value. Outside of these areas the vegetation was pasture. The coastal marine area along the site boundaries is of moderate-high value due to potential presence of At Risk species. One natural inland wetland was identified on the site associated with a stream system and provides low ecological values. One permanent of moderate ecological value and two intermittent streams of low value were also identified. There are also two artificial drains present on the site.

The proposed zone change from FUZ to residential will provide for adequate protection and maintenance of ecosystem services, indigenous biodiversity and enhancement through revegetation planting, while enabling the appropriate future subdivision, use and development of urban land.

TABLE OF CONTENTS

1 Introduction..... 2

1.1 Report Scope2

1.2 Site and Project Overview2

2 Methodology 4

2.1 Overview4

2.2 Terrestrial Ecology.....4

2.3 Freshwater Ecology5

2.4 Coastal Ecology.....6

2.5 Ecological Impact Assessment.....6

3 Site Environment 7

3.1 Ecological Context7

3.2 Site and Local Context.....7

4 Terrestrial Ecology..... 9

4.1 Terrestrial Vegetation9

4.2 Terrestrial Fauna Habitat13

5 Freshwater Ecology 18

5.1 Watercourses18

5.2 Wetlands21

6 Coastal Environment 23

7 Summary of Ecological Values 24

8 Assessment of Ecological Effects..... 25

8.1 Proposal.....25

8.2 Impact on Terrestrial Ecology.....26

8.3 Impact on Freshwater Ecology28

8.4 Impact on Coastal Ecology30

8.5 Relevant Policies and Plans31

9 Summary and Recommendations 34

References 35

List of Tables

Table 1. Criteria for describing the level of effects (from Roper-Lindsay et al. 2018). 6

Table 2. Birds known to be present in the wider area. 13

Table 3. Summary of the ground-truthed ecological values within the site. 24

List of Figures

Figure 1. PPC site location as indicated by yellowed polygon (map source: Nearmaps 2024)..... 3

Figure 2. Lot boundaries within the PPC area, showing ground-truthed and non-ground truthed sites
(aerial source: Nearmaps, 2024). A paper road is located between 10 Sinton Road and 17/17a
Clarks Lane..... 3

Figure 3. Historical aerial of the site from 1940 (Retrolens). 7

Figure 4. a) Vegetation within the mapped exotic-native vegetation within 17 Clarks Lane, and b) within the riparian yard on the boundary between the 17 and 15 Clarks Lane sites.	10
Figure 5. a) Vegetation along the northern boundary of 15 Clarks Lane, and b) the northwestern boundary of 14 Sinton Road.....	10
Figure 6. a) Pines along western boundary at 10 Sinton Road, and b) Sheoak and coastal banksia shelterbelt along western boundary of 15 Clarks Lane.....	11
Figure 7. a) Sheoaks along the eastern boundary of 14 Sinton Road, and b) Redwoods and pines along the northern boundary of 16 Sinton Road.	12
Figure 8. a) Examples of pasture areas at a) 10 Sinton Road and b) 15 Clarks Lane.....	12
Figure 9. Locations of ABMs used in acoustic bat survey within the PPC area.....	16
Figure 10. Photos of the permanent stream, Watercourse A within the PPC.	19
Figure 11. a) Watercourse B facing downstream towards coastal environment, and b) Modified upper portion of Watercourse B showing deepened/straightened/widened channel.....	20
Figure 12. a) Watercourse C showing a dry channel under pine canopy, and b) Upper portion of Watercourse C showing erosion at fence line.....	20
Figure 13. a) Drain along western boundary of 10 Sinton Road, and b) drain with pipe along northeastern boundary of 16 Sinton Road.....	21
Figure 14. Examples of the vegetation present within the wetland alongside the permanent stream, including mercer grass and black taro.....	22
Figure 15. Views of coastal environment from 16 Sinton Road, showing mangrove scrub ecosystem. ...	23

List of Appendices

- Appendix A Map of Terrestrial Ecological Features
- Appendix B Map of Freshwater Ecological Features

1 INTRODUCTION

1.1 Report Scope

Viridis Limited (Viridis) was engaged by Cabra Developments Limited (Cabra) to undertake an Ecological Impact Assessment (EclA) for the Private Plan Change (PPC) application under the Auckland Unitary Plan – Operative in Part 2016 (AUP-OP) and other relevant statutory documents. 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 ecological values 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.

1.2 Site and Project Overview

The PPC area is located at Sinton Road and Clarks Lane, Hobsonville. It comprises seven individual properties and a paper road, totalling an area of approximately 16.8 hectares. These lots are collectively referred to as ‘the site’ in this report (Figure 1). Cabra currently owns four of the seven properties included in the PPC area (Figure 2). The lots included within the PPC area are detailed below.

Ground-truthed (Cabra owned) sites:

- 16 Sinton Road (Lot 9 DP 57408)
- 14 Sinton Road (Lot 8 DP 57408)
- 10 Sinton Road (Lot 25 Allot 2 SO 958)
- 15 Clarks Lane (Lot 2 DP 92753)

Non ground-truthed sites:

- 12 Sinton Road (Lot 7 DP 57408)
- 17 Clarks Lane (Sect 2 SO 532984)
- 17a Clarks Lane – Auckland Council owned (Sect 1 SO 532984)

The site is currently zoned as Future Urban Zone (FUZ), and the proposal seeks to rezone to Residential - Mixed Housing Urban (MHU), with a lower intensity Residential - Mixed Housing Suburban (MHS) along the coastal edge. Precinct provisions have been proposed to apply to the site, referred hereafter as the Whenuapai East Precinct. The proposal includes an esplanade reserve to be vested along the coast, as well as an 0.4 ha Open Space Zone – Informal Recreation (owned by Auckland Council). The proposal anticipates the creation of 20 m esplanade reserves adjacent the mean high water springs (MHWS) and stream between the properties at 15 and 17 Clarks Lane, which will be created at the time of subdivision as required by the Resource Management Act 1991 (RMA) and AUP-OP.

The PPC seeks to align with the key objectives of the Auckland Council Whenuapai Structure Plan 2016 (WSP).



Figure 1. PPC site location as indicated by yellowed polygon (map source: Nearmaps 2024).

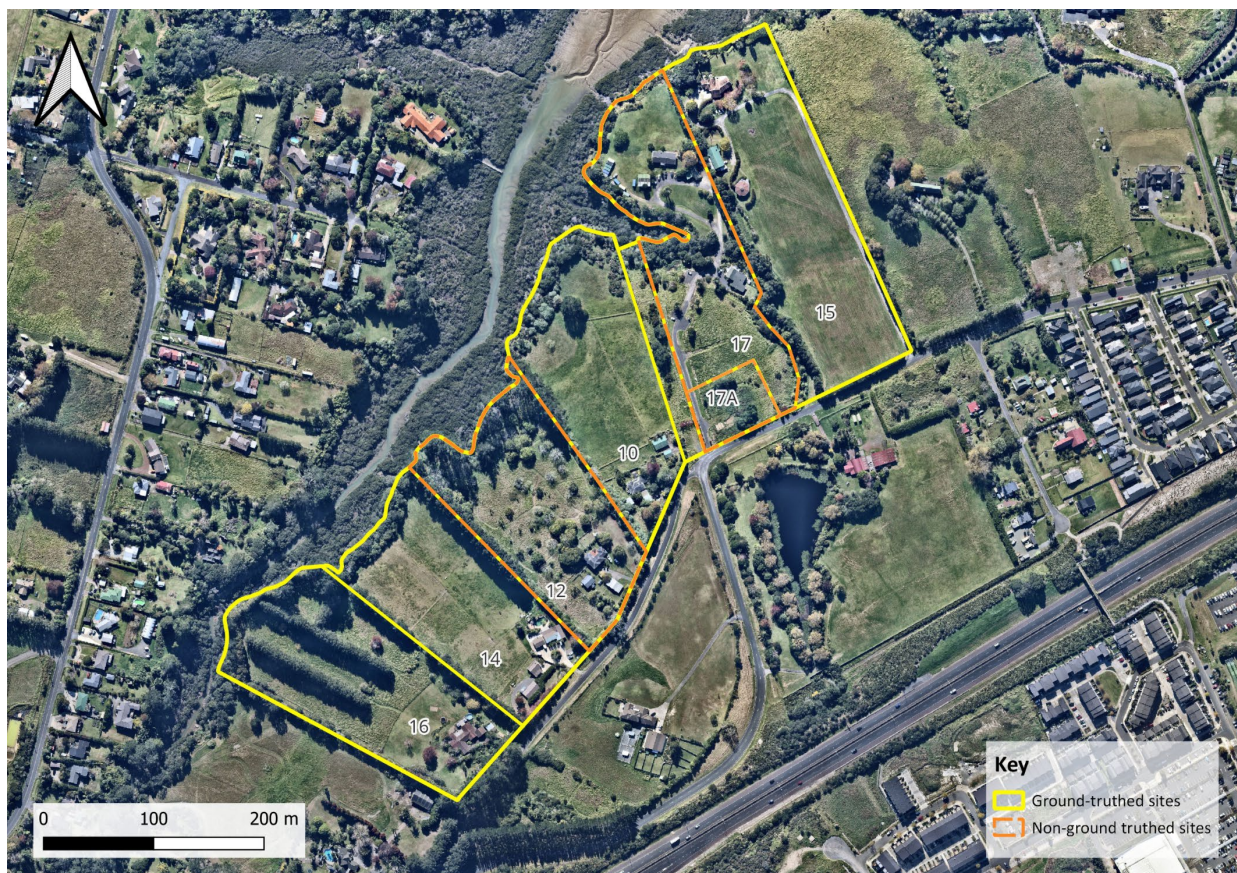


Figure 2. Lot boundaries within the PPC area, showing ground-truthed and non-ground truthed sites (aerial source: Nearmaps, 2024). A paper road is located between 10 Sinton Road and 17/17a Clarks Lane.

2 METHODOLOGY

2.1 Overview

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

Multiple site assessments were undertaken in October 2023, and April/May 2024. Only the Cabra-owned sites were visited, and the non-ground-truthed sites were viewed where possible from other sites and public areas, and otherwise desktop assessments were relied upon for these sites (Figure 2).

During site visits, the presence and extent of ecological 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 3.2 through 3.4 below. Photographs and notes were taken on-site, and key points/features were marked using a hand-held GPS unit 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 (DOC) 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 considered.

2.2.1 Acoustic bat survey

An acoustic bat survey using automatic bat monitors (ABMs) was undertaken within the PPC area to detect potential bat presence and inform the assessment. Four 'Song Meter Mini Bat Ultrasonic Recorders' were placed within the most likely areas of bat habitat across the PPC area between 22nd April to 22nd May 2024 (30 nights).

The survey occurred in line with DOC's bat inventory and monitoring toolbox (Sedgeley 2012). ABMs were deployed across the PPC area in locations where bat activity was considered most likely (e.g., mature trees, near watercourses and wetlands, or on the edge of natural corridors). Each ABM was set to record from 30 minutes before sunset until 30 minutes after sunrise.

There are no standardised environmental variables for acoustic surveys for long-tailed bat activity in New Zealand, and acoustic detection may only detect bats on a subset of surveyed nights, even in locations where bats are known to occur. Bat activity is generally known to be influenced by weather conditions such as temperature, rainfall, wind, humidity and moon phases (e.g., O'Donnell 2000; Borkin et al. 2023). The literature indicates that determining optimal weather conditions is complex, and can vary between species and regions (Borkin et al. 2023).

However, based on the best available data, the following key environmental conditions have been considered when assessing the number of optimal nights surveyed:

- Temperature of $\geq 10^{\circ}\text{C}$ within the first two hours following sunset
- Rainfall of < 2.5 mm within the first two hours following sunset
- No more than light average wind speeds (<10 km/hr)

Climatic information for these factors were reviewed using the NIWA CliFlo website from the nearest station to the site that provided the required data (Albany Station - 37852). It is acknowledged that this survey was undertaken at the end of the ideal season for monitoring bat activity. However, a total of 27 nights of optimal temperature and rainfall occurred within the survey period based on the above parameters.

Analysis of echolocation data files captured by the ABMs was carried out using Kaleidoscope Lite software, which allows for visual and auditory assessment of acoustic recordings.

It should be noted that acoustic surveys provide presence/absence and distribution data, rather than abundance information.

2.3 Freshwater Ecology

2.3.1 Watercourses

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. Watercourses were classified as per the AUP-OP definitions to determine, in accordance with the definitions in this plan, the ephemeral, intermittent or permanent status of the watercourse. Freshwater habitat was assessed, noting ecological aspects such as channel modification, hydrological heterogeneity, riparian vegetation extent, substrate type and any fish or macroinvertebrate habitat observed. Riparian and catchment information was also reviewed 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) and pasture exclusion assessment methodology (MfE 2022b) 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 Auckland 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 wetland (OBL) vegetation, which almost always is a hydrophyte (a plant which only grows in wet environments), rarely found in uplands (non-wetland areas).
- Facultative wetland (FACW) vegetation, which usually is a hydrophyte but can occasionally be found in uplands.
- Facultative (FAC) vegetation, which is commonly either a hydrophyte or non-hydrophyte.
- Facultative upland (FACU) vegetation, which is occasionally a hydrophyte but is usually found in uplands.
- Upland (UPL) vegetation, which is rarely a hydrophyte and is almost always found in uplands.

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.

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

2.4 Coastal Ecology

During the site visit, the coastal and estuarine environment was visually inspected and the extent of any wetland features were noted based on factors such as presence of hydrophytic vegetation, hydrological features and topography.

Vegetation was recorded and assessments of the intertidal zone were made, including records of any fauna species encountered and potential habitat for fauna. Opportunistic records of birds sighted in the coastal zone were made.

2.5 Ecological Impact Assessment

The ecological value of the site's features, relating to species, communities and systems, were determined as per the Environment Institute of Australia and New Zealand Ecological Impact Assessment guidelines (EclAG) 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 EclAG 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 EclAG. 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
Very High	<i>Very High</i>	<i>Very High</i>	<i>High</i>	<i>Moderate</i>	Low
High	<i>Very High</i>	<i>Very High</i>	<i>Moderate</i>	Low	Very Low
Moderate	<i>High</i>	<i>High</i>	<i>Moderate</i>	Low	Very Low
Low	<i>Moderate</i>	Low	Low	Very Low	Very Low
Negligible	Low	Very Low	Very Low	Very Low	Very Low
Positive	Net Gain	Net Gain	Net Gain	Net Gain	Net Gain

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

3 SITE ENVIRONMENT

3.1 Ecological Context

The site is situated in the Tāmaki Ecological District of the Auckland Region. This district comprises Takapuna, East Coast Bays, the Auckland isthmus and the Waitematā Harbour. The geology is largely Waitematā group sandstone, siltstone and minor limestone, with some basaltic scoria cones, tuff rings and lava flows and some alluvium. Soils are mainly volcanic ash soils of medium to high fertility. Most of the district is heavily modified by urban development.

Historically (pre-human), the site would have likely contained the ecosystem type ‘Pūriri forest’ (WF7-1). Native flora characteristic of this ecosystem type would have included pūriri (*Vitex lucens*) with occasional tōtara (*Podocarpus totara*), matai (*Prumnopitys taxifolia*), kahikatea (*Dacrycarpus dacrydioides*) and tītoki (*Alectryon excelsus*), locally with kōwhai (*Sophora* sp.) and taraire (*Beilschmiedia tarairi*) (Singers *et. al.* 2017). However, a review of historical aerial imagery indicates that the site, and much of the surrounding landscape, was cleared over 80 years ago for agricultural purposes (Figure 4).



Figure 3. Historical aerial of the site from 1940 (Retrolens).

3.2 Site and Local Context

The site is bounded by Sinton Road and Clarks Lane in the south, and the Waiarohia Inlet and associated Coastal Marine Area (CMA) in the northwest. The site is mainly flat and elevated above the CMA, with fairly steep banks around much of the coastal edge. Land use within the site is currently dominated by agriculture and horticultural activities. Land use within the general surrounding environment area is largely rural. The Royal New Zealand Air Force (RNZAF) Base Auckland is located less than 1 km to the

northwest. State Highway 18 is located in close proximity to the south, and the suburb of Hobsonville is to the east on the opposite side of the motorway.

Currently, most of the lots within the PPC area contain a small number of residential dwellings, and former farm buildings. The remainder of the site is mainly in pasture.

The vegetation along the coast of 14 and 16 Sinton Road properties is identified as terrestrial Significant Ecological Area (SEA) (SEA_T_4733). The SEA encompasses the terrestrial head of the Waiarohia Inlet. The adjacent marine environment is not identified as marine SEA.

The key ecological features on site and the surrounding landscape are presented in Appendix A and B.

4 TERRESTRIAL ECOLOGY

4.1 Terrestrial Vegetation

4.1.1 Overview

Utilising observations from the site visit and aerial images, the vegetation within the PPC area has been classified and mapped (Appendix A). The terrestrial vegetation present within the site was limited to a small amount of native vegetation mixed with exotic and/or listed pest plant¹ species. Weedy exotic and native vegetation was present around the coastal edge, and throughout the rest of the site were exotic shelterbelts and amenity plantings of native and exotic trees. The remainder of the terrestrial vegetation within the site was pasture.

4.1.2 Mixed exotic-native vegetation

There were areas of mixed exotic and native vegetation along the coastal edge, and in a few other small patches around the site such as planted amenity trees and riparian areas (Appendix A; Figure 4 & 5). These areas were typically comprised of common native species mixed with listed pest plants. Native species present included kānuka (*Kunzea robusta*), karamū (*Coprosma robusta*), māpou (*Myrsine australis*), māhoe (*Melicytus ramiflorus*), silver fern (*Alsophila tricolor*), and cabbage tree (*Cordyline australis*). A small number of semi-mature kauri (*Agathis australis* – Threatened, Nationally Vulnerable) were present across the PPC area (e.g., the coastal edge vegetation at 17 Sinton Road). Listed pest plants observed within the mixed exotic-native vegetation within the site included woolly nightshade (*Solanum mauritianum*), Chinese privet (*Ligustrum sinense*), agapanthus (*Agapanthus praecox*), periwinkle (*Vinca major*), phoenix palm (*Phoenix canariensis*), tree privet (*Ligustrum lucidum*), Tasmanian blackwood (*Acacia melanoxylon*) and gorse (*Ulex europaeus*). Other exotic garden escapees including yucca (*Yucca gloriosa*) and banana palm (*Musa* sp.) were occasionally observed (e.g., within 17 Clarks Lane’s coastal edge vegetation).

The exotic-native vegetation within the PPC site was considered to be of **low-moderate** ecological value overall. The abundance of pest plant and exotic species reduced the botanical value, however, it is expected that these areas would provide habitat for indigenous avifauna and potentially herpetofauna, and provide value as a buffer to the coastal environment. It should be noted that the quality of the vegetation along the entire coastal edge of the PPC area varied significantly in quality, with areas of exotic vegetation of lower value as an effective buffer and habitat (section 4.1.4).

¹ As per Auckland Regional Pest Management Plan 2020-2030.

a)



b)



Figure 4. a) Vegetation within the mapped exotic-native vegetation within 17 Clarks Lane, and b) within the riparian yard on the boundary between the 17 and 15 Clarks Lane sites.

a)



b)



Figure 5. a) Vegetation along the northern boundary of 15 Clarks Lane, and b) the northwestern boundary of 14 Sinton Road.

4.1.3 SEA vegetation

A terrestrial SEA overlay is applicable to an area on site which extends along the northwestern boundaries of the properties at 16 and 14 Sinton Road, adjacent to the coast (Appendix A). The vegetation within the SEA overlay contained common native species, planted exotic shelterbelts and scattered pest plants. Some of the mature pines were observed to be of fair-poor condition.

SEA_T_4733 is listed in Schedule 3 of the AUP-OP as meeting the criteria for 'Threat Status and Rarity', with īnanga (*Galaxias maculatus* – At Risk, declining) and long fin eel (*Anguilla dieffenbachia* – At Risk, declining) recorded under Auckland Council's SEA notes. However, there is a lack of suitable habitat within the terrestrial SEA vegetation to support these aquatic species. The SEA is also listed as meeting the 'Stepping stones, migration pathways and buffers' factor for "buffering an SEA". It should be noted that the adjacent Waiarohia Inlet is not identified as marine SEA under the AUP-OP. Nevertheless, the adjacent coastal environment is considered to be of moderate-high ecological value (section 6).

The ecological value of the SEA vegetation was considered to be **low-moderate**. The SEA vegetation is botanically degraded due to high edge effects (section 4.1.3) and some exotic species presence.

However, the vegetated margins of the coast provide value as a buffer to the marine environment, such as shading, bank stability, surface water filtration. The SEA vegetation may also provide habitat for At Risk indigenous fauna (section 4.2).

4.1.4 Exotic vegetation

Exotic vegetation on site generally comprised mature shelterbelts, isolated trees and small areas of weedy scrub (Appendix A). Shelterbelts consisted of species such as pine (*Pinus* sp.), sheoak (*Casuarina* sp.), coastal banksia (*Banksia integrifolia*), Japanese cedar (*Cryptomeria japonica*) and redwood (*Sequoia sempervirens*) (Figure 6). Many of the shelterbelts contained listed pest plants growing beneath them, commonly woolly nightshade and Chinese privet.

Other exotic vegetation within the site included isolated trees, and amenity/garden planting around dwellings. Species observed included alder (*Alnus* sp.), oaks (*Quercus* sp.), gum (*Eucalyptus* sp.), jacaranda (*Jacaranda mimosaeifolia*), Chinese fan palm (*Livistona chinensis*), Norfolk pine (*Araucaria heterophylla*), phoenix palm, Tasmanian blackwood, tree privet, magnolia (*Magnolia grandiflora*), ginkgo (*Ginkgo biloba*), and wattle (*Acacia* spp.). Scattered exotic trees present within 12 Sinton Road appeared to be remnants of an unkept orchard. Some areas of exotic scrub were also present, particularly along the northern boundary of 10 Sinton Road along the coast, dominated by gorse, woolly nightshade and Tasmanian blackwood.

The botanical value of the exotic vegetation was considered to be very low due to the lack of native flora and common presence of listed pest plants. However, the ecological value of the exotic vegetation within the site was conservatively considered to be **low-moderate** overall, as it may provide intermittent habitat for At Risk species such as bats or lizards. However, this habitat is considered to be low quality and not expected to be important for local fauna populations (section 4.2).

a)



b)



Figure 6. a) Pines along western boundary at 10 Sinton Road, and b) Sheoak and coastal banksia shelterbelt along western boundary of 15 Clarks Lane.

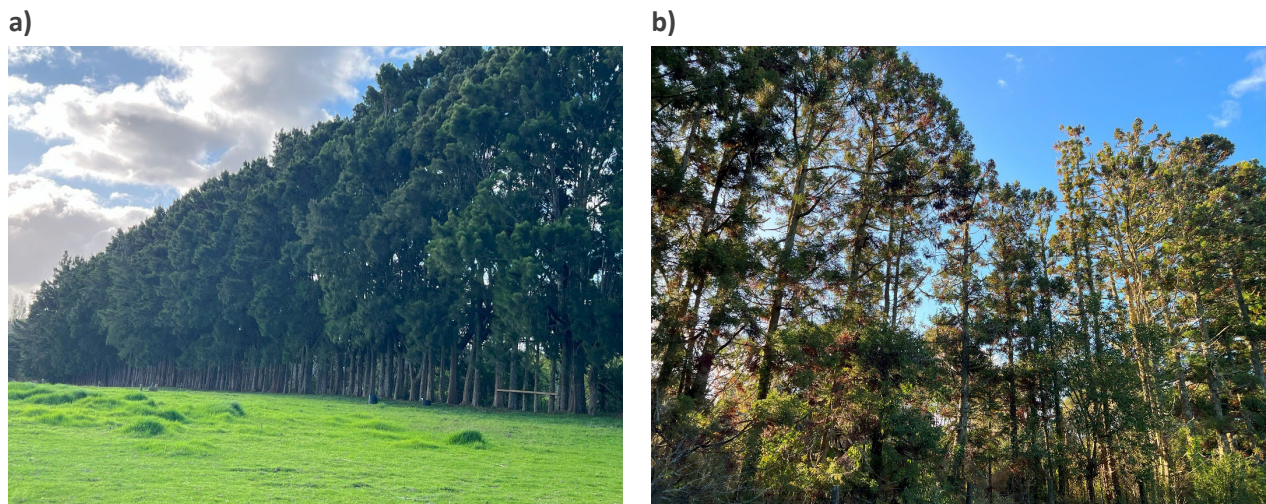


Figure 7. a) Sheoaks along the eastern boundary of 14 Sinton Road, and b) Redwoods and pines along the northern boundary of 16 Sinton Road.

4.1.5 Pasture

Most of the site is covered in exotic pasture, with the dominant species being kikuyu (*Cenchrus clandestinus* - FACU) and dallis grass (*Paspalum dilatatum* - FACU). Other common species included cocksfoot (*Dactylis glomerata* - FACU) and narrow-leaved plantain (*Plantago lanceolata* - FACU). Low density horse grazing occurs on the 10 and 14 Sinton Road properties. There were some areas of rank grass, particularly around the edges of coastal and shelterbelt vegetation and unoccupied buildings.

The ecological value of the managed pasture areas is considered to be negligible due to the lack of habitat diversity. It is however possible that areas of rank pasture grasses that are connected to areas of exotic or native vegetation within the site may provide habitat for native skinks.

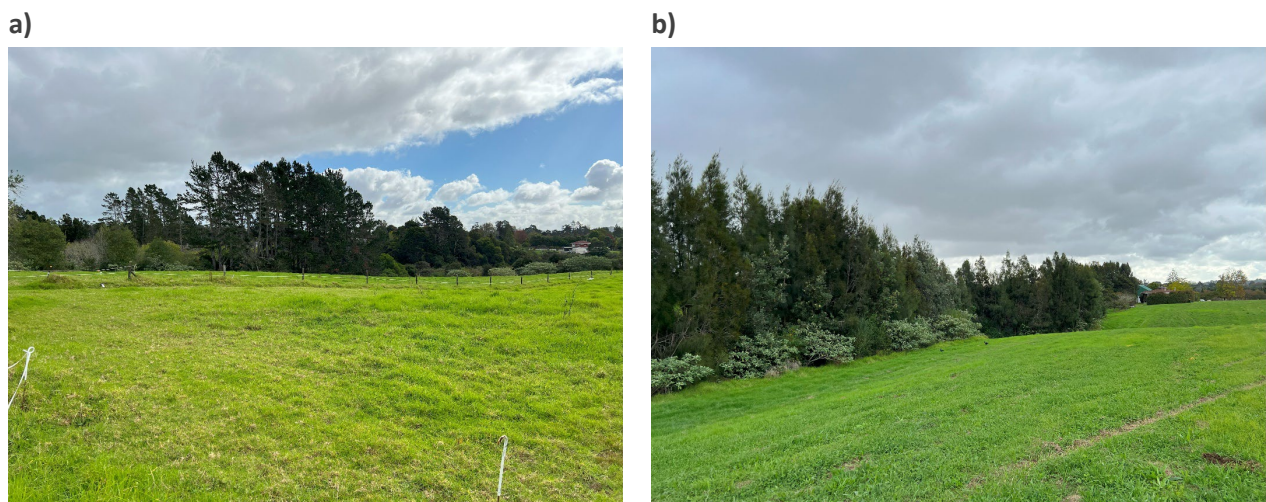


Figure 8. a) Examples of pasture areas at a) 10 Sinton Road and b) 15 Clarks Lane.

4.1.6 Terrestrial Connectivity and Ecological Function

The terrestrial vegetation on the site is limited and is confined mostly to vegetation along the coastal edge, shelterbelts, orchards and areas of amenity planting around houses. Edge communities such as these increase with fragmentation of native vegetation within a landscape, and are heavily influenced by increased exposure to sunlight, wind and competition from pest plants. These factors restrict establishment of some native flora and fauna to forest interiors. Fragmentation of native vegetation

increases the edge effect and decreases the availability of habitat for species that would normally occur in the interior of vegetated areas. Connectivity between areas of vegetation is important to facilitate ecological function, and loss of connectivity can impair reproductive function for both flora and fauna communities.

The extent of tree/shrub vegetation present within the site was generally limited, and these areas were generally long and narrow. As a result, all vegetation within the site is subject to very high edge effects and as such the resilience and integrity of these areas is low. This is clearly demonstrated by the abundance of exotic and pest plant species. Despite this degradation, the vegetated margins of the coast provide some buffer functions to the marine environment, such as shading, bank stability, erosion protection, surface water filtration, and potential habitat for fauna. However, the width of the buffer vegetation along the PPC area is inconsistent and the narrowest areas (e.g., less than 10 m wide in the north of 17 Clarks Lane site) contain weedy, low stature scrubs considered to provide little value as a buffer.

There is very little native terrestrial vegetation in the environment surrounding the PPC. This, combined with the fragmented and degraded nature of the vegetation on site, means that there are limited opportunities for the vegetation on site to provide connectivity for highly mobile terrestrial fauna, such as birds or bats that move between habitats, or for species such as arboreal geckos that require dense vegetation to disperse across the landscape.

The connectivity and ecological functioning values of the site were considered to be **low-moderate** because of the coastal edge vegetation providing some buffer function to the marine environment.

4.2 Terrestrial Fauna Habitat

4.2.1 Avifauna (birds)

Avifauna habitat within the site was fairly limited to isolated areas of mixed native/exotic scrub, along with amenity plantings, shelterbelts, and isolated trees. The limited tree and shrub vegetation within the site may provide low quality nesting and roosting habitat.

No formal avifauna surveys were undertaken, however birds seen/heard were opportunistically recorded during the site visit. Table 2 provides a list of species that are expected to be present, at least periodically, within the site. Records retrieved from eBird.org for nearby sites were used to indicate what other species may be present that were not observed during the site visit.

Table 2. Birds known to be present in the wider area.

Common name	Species name	Conservation status	Observed on site
Australian magpie	<i>Gymnorhina tibicen</i>	Introduced and Naturalised	✓
Australasian harrier	<i>Circus approximans</i>	Not Threatened	✓
Blackbird	<i>Turdus merula</i>	Introduced and Naturalised	✓
Black backed gull	<i>Larus dominicanus</i>	Not Threatened	
Black shag	<i>Phalacrocorax carbo</i>	At Risk – Relict	
Californian quail	<i>Callipepla californica</i>	Introduced and Naturalised	
Chaffinch	<i>Fringilla coelebs</i>	Introduced and Naturalised	
Eastern rosella	<i>Platycercus eximius</i>	Introduced and Naturalised	✓

Common name	Species name	Conservation status	Observed on site
Fantail	<i>Rhipidura fuliginosa placabilis</i>	Not Threatened	✓
Goldfinch	<i>Carduelis carduelis</i>	Introduced and Naturalised	
Greenfinch	<i>Chloris chloris</i>	Introduced and Naturalised	
Grey warbler	<i>Gerygone igata</i>	Not Threatened	
Kererū	<i>Hemiphaga novaeseelandiae</i>	Not Threatened	
Kingfisher	<i>Todiramphus sanctus vagans</i>	Not Threatened	✓
Little shag	<i>Microcarbo melanoleucos</i>	At Risk – Relict	
Little black shag	<i>Phalacrocorax sulcirostris</i>	At Risk – Naturally Uncommon	
Mallard duck	<i>Anas platyrhynchos</i>	Introduced and Naturalised	
Morepork / ruru	<i>Ninox novaeseelandiae</i>	Not Threatened	
Myna	<i>Acridotheres tristis</i>	Introduced and Naturalised	
Paradise shelduck	<i>Tadorna variegata</i>	Not Threatened	
Pheasant	<i>Phasianus colchicus</i>	Introduced and Naturalised	✓
Pied shag	<i>Phalacrocorax varius</i>	At Risk – Recovering	
Pied stilt	<i>Himantopus himantopus</i>	Not Threatened	
Pipit / Pīhoihoi	<i>Anthus novaeseelandiae</i>	At Risk – Declining	
Pūkeko	<i>Porphyrio melanotus melanotus</i>	Not Threatened	✓
Rock pigeon	<i>Columba livia</i>	Introduced and Naturalised	
Red-billed gull / Tarāpunga	<i>Chroicocephalus novaehollandiae</i>	At Risk – Declining	
Royal spoonbill / Kōtuku ngutupapa	<i>Platalea regia</i>	At Risk – Naturally Uncommon	
Silvereye	<i>Zosterops lateralis lateralis</i>	Not Threatened	
Shining cuckoo	<i>Chrysococcyx lucidus</i>	Not Threatened	
Skylark	<i>Alauda arvensis</i>	Introduced and Naturalised	
Song thrush	<i>Turdus philomelos</i>	Introduced and Naturalised	
Sparrow	<i>Passer domesticus</i>	Introduced and Naturalised	
Spotted dove	<i>Spilopelia chinensis</i>	Introduced and Naturalised	
Spurwinged plover	<i>Vanellus miles novaehollandiae</i>	Not Threatened	
Starling	<i>Sturnus vulgaris</i>	Introduced and Naturalised	
Tūī	<i>Prosthemadera novaeseelandiae novaeseelandiae</i>	Not Threatened	
Welcome swallow	<i>Hirundo neoxena neoxena</i>	Not Threatened	✓
White faced heron	<i>Egretta novaehollandiae</i>	Not Threatened	
White fronted tern	<i>Sterna striata</i>	At Risk – Declining	
Yellowhammer	<i>Emberiza citrinella</i>	Introduced and Naturalised	

The dominant avifauna community within the site is expected to contain a combination of common exotic and native species that are abundant in the wider Auckland region including urban, urban fringe, and rural areas. These may include the introduced magpie, fantail, skylark, black bird, finches, starling, thrush and myna and the native spur winged plover, paradise shelduck, Australasian harrier, king fisher, welcome swallow and ruaru.

Birds usually associated with forest habitat such as tūi and kererū are not expected to be abundant due to the lack of suitable habitat within the site. It is possible that kākā (*Nestor meridionalis* – At Risk, Recovering) may visit the area, although they would be expected to be present on occasion, if at all. While pipits (*Anthus novaeseelandiae* – At Risk, Declining) can occur in areas of rough pasture, however numbers are likely to be low if they are present.

Some birds associated with the adjacent CMA may also use the site from time to time. The trees and vegetation along the coastal edge may provide roosting or nesting habitat for At Risk coastal birds such as heron, royal spoonbill and shags. An unidentified shag was observed within the CMA.

Birds within the site are expected to provide limited ecological functions within the site itself (e.g., seed dispersal, flower pollination, predation) due to the limited habitat available.

The ecological value of the site for avifauna was considered to be **low-moderate** due to the potential presence of several At Risk species.

4.2.2 Herpetofauna (lizards)

Herpetofauna (reptiles and amphibians) comprise a significant component of New Zealand's indigenous terrestrial fauna. There is currently at least 135 endemic herpetofauna taxa recognised, 85.9% of which are considered 'Threatened' or 'At Risk' (Hitchmough et al. 2021). 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 RMA. Statutory obligations require management of resident reptile and amphibian populations if they are threatened by a disturbance i.e., land development.

A review of DOC's Bioweb herpetofauna database records within a 10 km radius of the site shows that the nearest indigenous lizard record is for a copper skink (*Oligosoma aeneum* – At Risk, declining), recorded five years ago approximately 1.1 km to the southeast. An elegant gecko (*Naultinus elegans*, At Risk – Declining) was recorded approximately 3 km to the south of the site within forested SEA habitat.

During the site visits, opportunistic observations of potential lizard habitat were made. The main potential skink habitat present was in the mixed exotic-native vegetation and pest plant dominated areas around the coastal edge, as well as areas of rank grass and low growing dense weeds such as periwinkle (*Vinca major*) associated with the edges of tree/shrub vegetation.

Copper skink may be present on site in suitable habitat (e.g., thick rank grass, log piles/weedy vegetation/rubbish debris), and the introduced plague skink (*Lampropholis delicata*) was observed during site visits. Given the scarcity of observations in the surrounding area, it is considered unlikely that the ornate skink (*O. ornatum*, At Risk – Declining) and moko skink (*O. moko*, At Risk – Relict) are present, although there is potentially suitable habitat along the coastal edge vegetation. The lack of mature native vegetation on the site, lack of connectivity to native bush, and the lack of observations in the surrounding area mean that it is unlikely that geckos are present on the site.

The ecological values of the herpetofauna habitat were conservatively assessed to be **moderate** due to the potential for the 'At Risk' copper skink to be present within the site.

4.2.3 Chiroptera (bats)

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

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

Bats roost in tree hollows and under split bark of native and exotic trees, and also in rocky overhangs. Over the breeding season, large communal roosts occur in similar habitat. Bats tend to utilise linear features in the landscape, including vegetation edges, gullies, waterways, and road corridors as they transit between roosts and foraging sites (O'Donnell 2010). Long-tailed bats in particular are known to be highly mobile, with large home ranges (>5,000 ha) and can travel large distances (~25 km) each night during foraging.

An acoustic survey using ABMs was undertaken on site during April and May 2024. ABMs were placed along potential habitat that included exotic shelterbelts and edge vegetation along the Waiarohia Inlet (Figure 9). Mature pine shelterbelts and coastal vegetation were targeted as potential habitat for foraging. The presence of bats on site was not detected during the acoustic surveys.

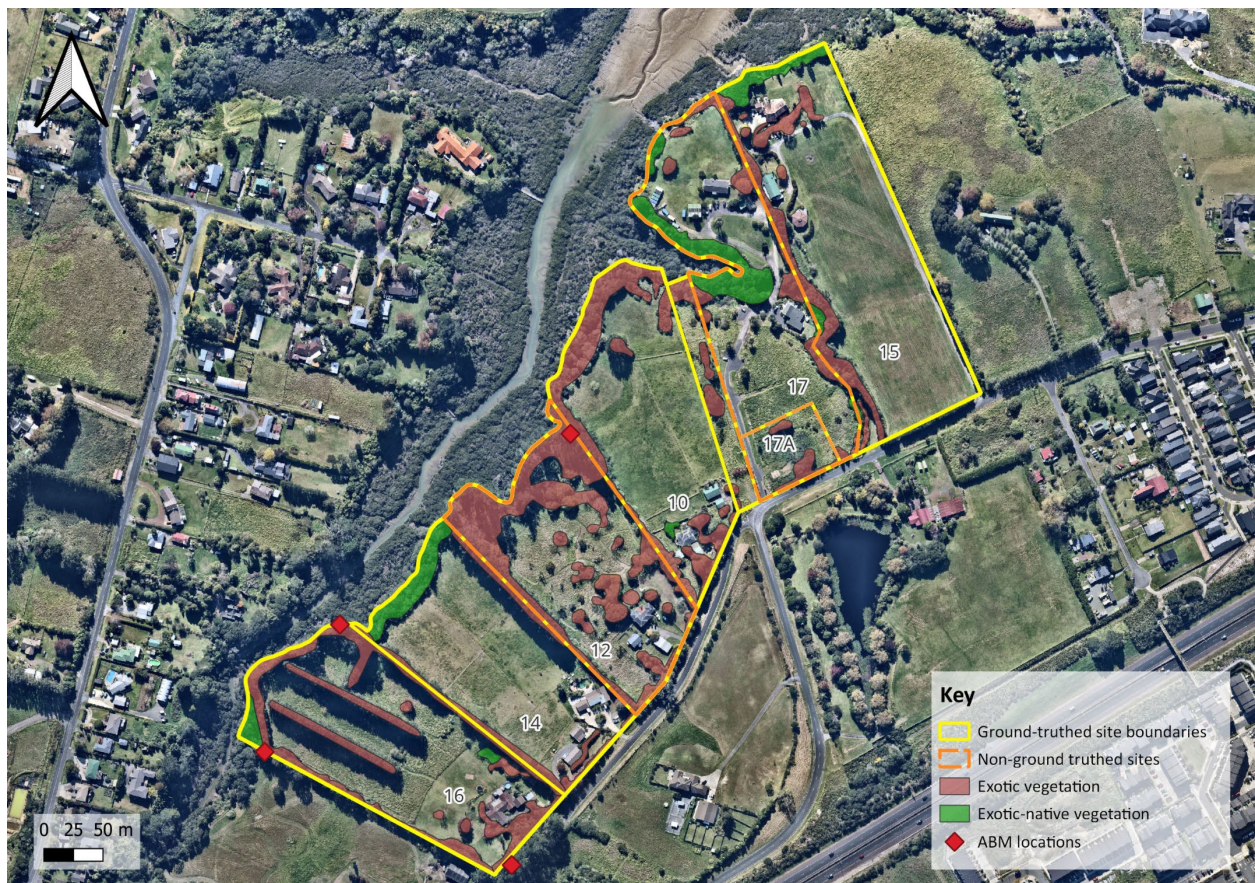


Figure 9. Locations of ABMs used in acoustic bat survey within the PPC area.

A review of data in DOC's bat database (accessed May 2024), found that the nearest records for long tailed bat were 2.7 km to the west and 5.5 km to the south-west.

The larger exotic trees on the site (e.g., pines) may provide some suitable roosting and/or nesting habitat (cavities, large sections of flaking bark) for bats. However, the lack of corridors or stands of significant indigenous vegetation and the dominance of agricultural land use in the surrounding environment reduces the suitability of the area for bats.

Despite no evidence of bat presence on site during the survey, it is possible that long tailed bats may periodically be present in the area. However, the low-value habitat is not expected to support regular visits or communal roosts. Therefore, the ecological value of the site for bats is conservatively considered to be **moderate**, as a small amount of vegetation may provide suitable habitat, and the presence of bats on site cannot be ruled out.

5 FRESHWATER ECOLOGY

5.1 Watercourses

All watercourses within the site were classified and mapped according to the definitions within the AUP-OP as either permanent streams, intermittent streams, or artificial drains (Appendix B). The nature and classification of the watercourses are described in this section. Maps with labelled watercourses are provided in Appendix B.

5.1.1 Permanent Stream

Watercourse A was the only permanent stream within the PPC area, with a catchment of approximately 16 ha. It flowed along the southern portion of 15 Clarks Lane western boundary before crossing the 17 Clarks Lane property and discharging to the coast (Appendix B). The stream appears to be fed via a culvert which drains the Clarks Lane roadside, and a large artificial pond on the southern side of the road. The margins of the southern reach within the site contained natural inland wetland (section 2.3.2).

Due to access constraints, only the reach within 15 Clarks Lane could be visually assessed. The stream reach was largely soft-bottomed due to fine sediment loading, however there was some gravel present towards the south of the reach near Clarks Lane.

The stream channel was well-defined and the observed reach was approximately 0.5-0.75 m wide. There was little hydrological variation with mostly run habitat present, although one small chute observed. Flow rates were low-moderate. Exotic vegetation and mixed exotic-native vegetation was present within the riparian margin which provided moderate-high shading to the stream. No macrophytes were observed during then site visits.

Some fish habitat was present in the form of organic debris and undercut banks. Fish and aquatic macroinvertebrate communities were not surveyed. The NZFFD did not contain any records within the catchment, however freshwater shrimp (*Paratya curvirostris* – not threatened), īnanga (At Risk, declining), short fin eel (*Anguilla australis* – not threatened), banded kōkopu (*G. fasciatus*), giant kōkopu (*G. argenteus* – At Risk, declining), and the pest fish gambusia (*Gambusia affinis*) have been recorded in nearby catchments that drain to the Waiarohia Inlet. If fish passage is possible downstream of the observed reach, it is expected that these species may be present within the site. It is expected that the stream could also provide suitable habitat for long fin eel (At Risk, declining).

The ecological value of the permanent stream is considered to be **moderate**. It has been influenced by modification and the history of agricultural land use within the catchment, however it is shaded by established riparian vegetation, contains moderate aquatic habitat and is expected to contain At Risk fish species.

There is potential to enhance the ecological value of this stream through infill riparian planting and weed control, and potentially through improved fish passage if barriers exist downstream. Figure 10 shows the nature of the permanent stream reaches and riparian on the PPC site.



Figure 10. Photos of the permanent stream, Watercourse A within the PPC.

5.1.2 Intermittent streams

Two short sections of intermittent streams were identified within the PPC area (Appendix B; Figure 11 & Figure 12). Both watercourses (B & C) discharge directly to the coast.

Watercourses B and C were located under mature pine canopies. At the time of the site visits there was no flowing or surface water present in either of the two watercourses, however the channels were well defined, and rooted terrestrial vegetation was not established across the entire cross-sectional width and both contained a cover of pine needles. Both watercourses would be expected to contain surface water more than 48 hours after rain, as well as temporary natural pools.

The upper portion of Watercourse B appeared to have been modified through widening, deepening and straightening, likely for farm drainage purposes. Significant erosion was observed at the upstream end of watercourse C where a fence line was present.

Given the intermittent nature of the streams and small catchment sizes, they are likely to be dry for much of the year and they do not provide suitable habitat for aquatic species. The channels were degraded due to erosion and/or modification. The ecological value of the intermittent streams was considered to be **low**.



Figure 11. a) Watercourse B facing downstream towards coastal environment, and b) Modified upper portion of Watercourse B showing deepened/straightened/widened channel.

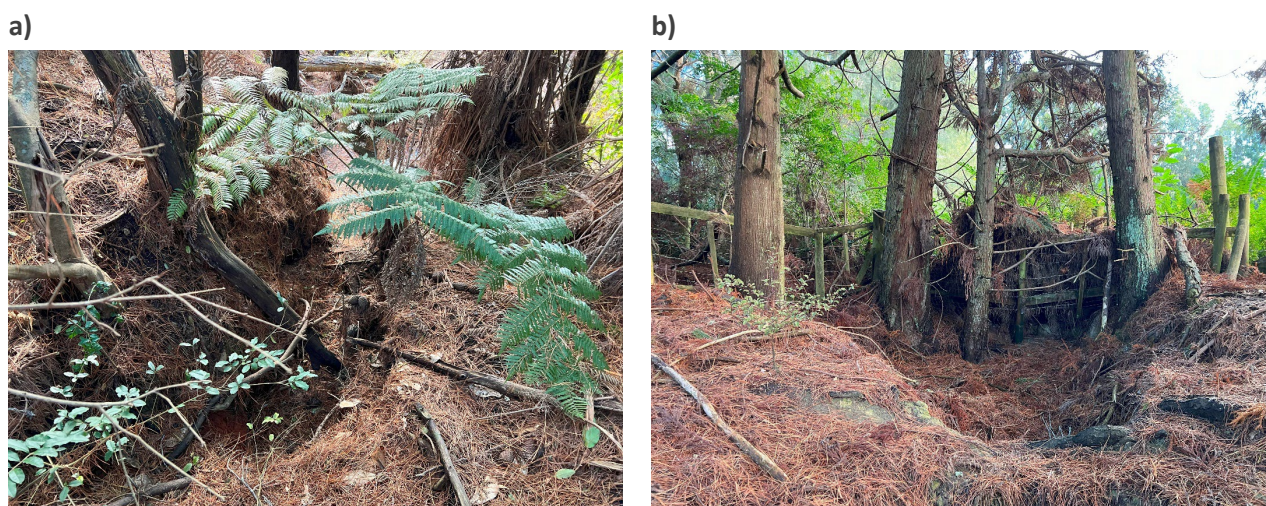


Figure 12. a) Watercourse C showing a dry channel under pine canopy, and b) Upper portion of Watercourse C showing erosion at fence line.

5.1.3 Artificial drains

Two artificial channels were present within the site (Appendix B). These features were constructed for drainage purposes. Drains were identified based on attributes such as alignment with natural topography, presence/absence of a historic natural channel, catchment size, and artificial characteristics such as deepening and straightening. As constructed features, artificial drainage channels are excluded from the relevant stream protection rules under the AUP-OP and the NPS-FM.

One drain followed the boundary and shelterbelt along the western boundary of 10 Sinton Road, and the other followed the northeastern boundary of 16 Sinton Road. Both drains were straight, narrow channels that ran parallel to boundary fence lines and shelterbelts (Figure 13a & b). The drains did not contain any surface water during any of the site visits. The 16 Sinton Road drain contained an above-ground pipe which crossed over Watercourse C and led to the coast (Figure 13b).

The lack of aquatic habitat within the drains means that these features did not have suitable habitat to support indigenous fish and there was no upstream habitat present. The ecological value of the drains was considered to be **negligible**.

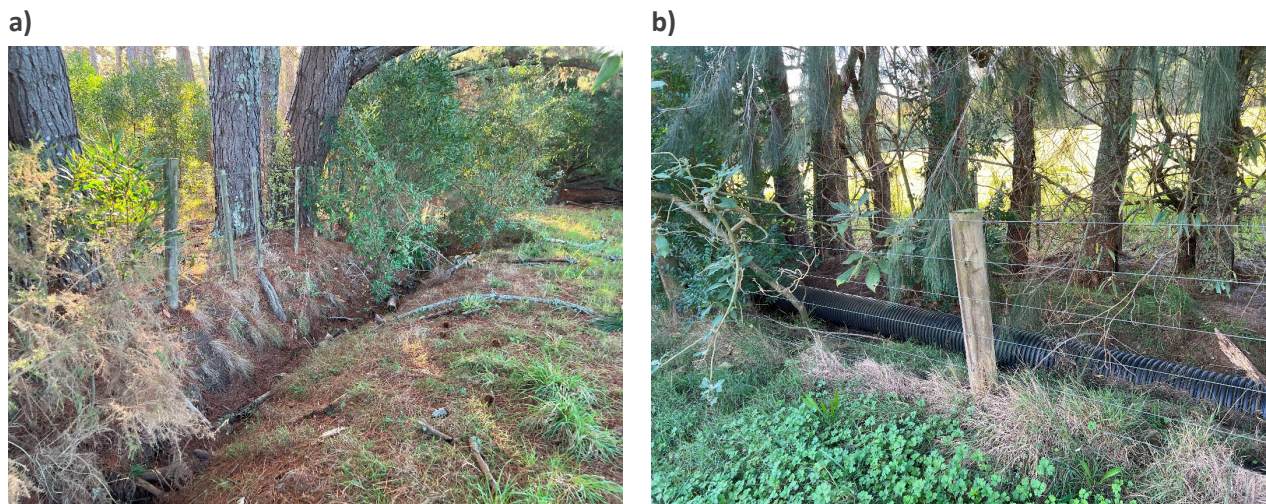


Figure 13. a) Drain along western boundary of 10 Sinton Road, and b) drain with pipe along northeastern boundary of 16 Sinton Road.

5.2 Wetlands

5.2.1 Natural Inland Wetlands

One natural inland wetland was identified in the PPC area, in the southwestern corner of 15 Clarks Lane property (Appendix B). This wetland was associated with the permanent stream and its low-lying margins. The wetland met the rapid vegetation test for wetland delineation due to a dominant cover of mercer grass (*Paspalum distichum* – FACW) and black taro (*Colocasia esculenta* – FACW) (Figure 14). Other less abundant species present were *Carex* sp., creeping buttercup (*Ranunculus repens* – FAC), water pepper (*Persicaria hydropiper* – FACW), and an invasion of Japanese honeysuckle (*Lonicera japonica* – FACU). Planted exotic trees were present on the edges of the wetland. Where FACW vegetation was dominant within the stream margins, the soils were observed to be saturated.

Due to the FACW vegetation dominance and permanent hydrological indicator presence, the area was classified as a natural inland wetland under the NPS-FM. The wetland's extent was delineated based on contours and/or a clear change in vegetation community from OBL/FACW dominant to FACU/UPL dominant vegetation.

The current ecological value of the wetlands was assessed as **low**, due to the small size of the wetland, the exotic species dominance, the low species diversity, the lack of aquatic habitat, and the limited habitat values for terrestrial fauna. However, as with the site's streams, there is potential to enhance the ecological value of these wetlands through riparian planting and managing runoff.



Figure 14. Examples of the vegetation present within the wetland alongside the permanent stream, including mercer grass and black taro.

6 COASTAL ENVIRONMENT

The northern/north-western boundaries of the PPC area are bounded by the Waiarohia Inlet of the Upper Waitematā Harbour. The coastal environment adjacent the PPC site is characterised largely by the mangrove scrub wetland ecosystem type (Singers et al. 2017; Figure 15). It should be noted that coastal wetlands are excluded from the NPS-FM regulations.

The CMA is not identified as a SEA in the AUP-OP. However, the Waiarohia Inlet is expected to provide an important pathway for migrating native freshwater fish.

Coastal wetlands provide important habitats for wildlife. Avifauna that may utilise the coastal area may include black shag (*Phalacrocorax carbo*, At Risk – relict), banded rail (*Gallirallus philippensis* – At Risk, declining), kingfisher, and royal spoonbill (At Risk, naturally uncommon), amongst others.

A fringe of mangroves surrounds the entirety of the coastal margin around the PPC site. Historic aerials show that the mangrove fringe has significantly increased in extent over time, likely reflecting the response of the mangrove community to sediment deposition from clearance of the original forest cover, land development and agricultural and horticultural practices.

The value of the coastal environment surrounding the site is considered to be **high** given the potential for threatened species to be present, the importance of the area for migrating fish, and the presence of extensive wetlands which provide a natural buffer to the coast and important fauna habitat.



Figure 15. Views of coastal environment from 16 Sinton Road, showing mangrove scrub ecosystem.

7 SUMMARY OF ECOLOGICAL VALUES

The ecological values of the features within the PPC are summarised in Table 3. The terrestrial ecological values of the site are generally low, except for the vegetation around the coast that is considered to be of low to moderate value and may provide some habitat for birds, bats and lizards. Very little native vegetation remains across the site to provide any significant habitat for indigenous fauna, with most of the site being covered in pasture. At Risk indigenous fauna may be present on an intermittent basis.

The natural inland wetland and intermittent streams present are of low value due to the exotic species present, lack of aquatic habitat and hydrological variation and the effects of agricultural land uses such as sedimentation. However, the permanent stream likely provides habitat for At Risk fish species and has been assessed as moderate value.

The adjacent coastal area is of high ecological significance, despite not being identified as marine SEA under the AUP-OP, it is expected to support At Risk/Threatened species.

Table 3. Summary of the ground-truthed ecological values within the site.

Ecological feature	Ecological Value
Mixed native-exotic vegetation – coastal edge	Low – Moderate
SEA vegetation	Low – Moderate
Exotic vegetation (shelterbelts, amenity, scrub)	Low – Moderate
Pasture	Negligible
Terrestrial connectivity and ecological function	Low – Moderate
Avifauna (birds)	Low – Moderate
Herpetofauna (lizards)	Moderate
Chiroptera (bats)	Moderate
Artificial drains	Negligible
Permanent stream	Moderate
Intermittent streams	Low
Natural inland wetland	Low
Coastal environment	High

8 ASSESSMENT OF ECOLOGICAL EFFECTS

8.1 Proposal

The PPC seeks to rezone approximately 16 ha of land from FUZ under the AUP-OP to MHU and MHS Zones (Figure 16). The MHU and MHS zone provisions of the AUP-OP will apply to the rezoned land and will enable Council to exert control over subdivision development. Where relevant, national environmental standards (e.g. NPS-FM and National Policy Statement for Indigenous Biodiversity (NPS-IB)) and legislation (e.g., the Wildlife Act 1953) will also continue to apply to development activities.

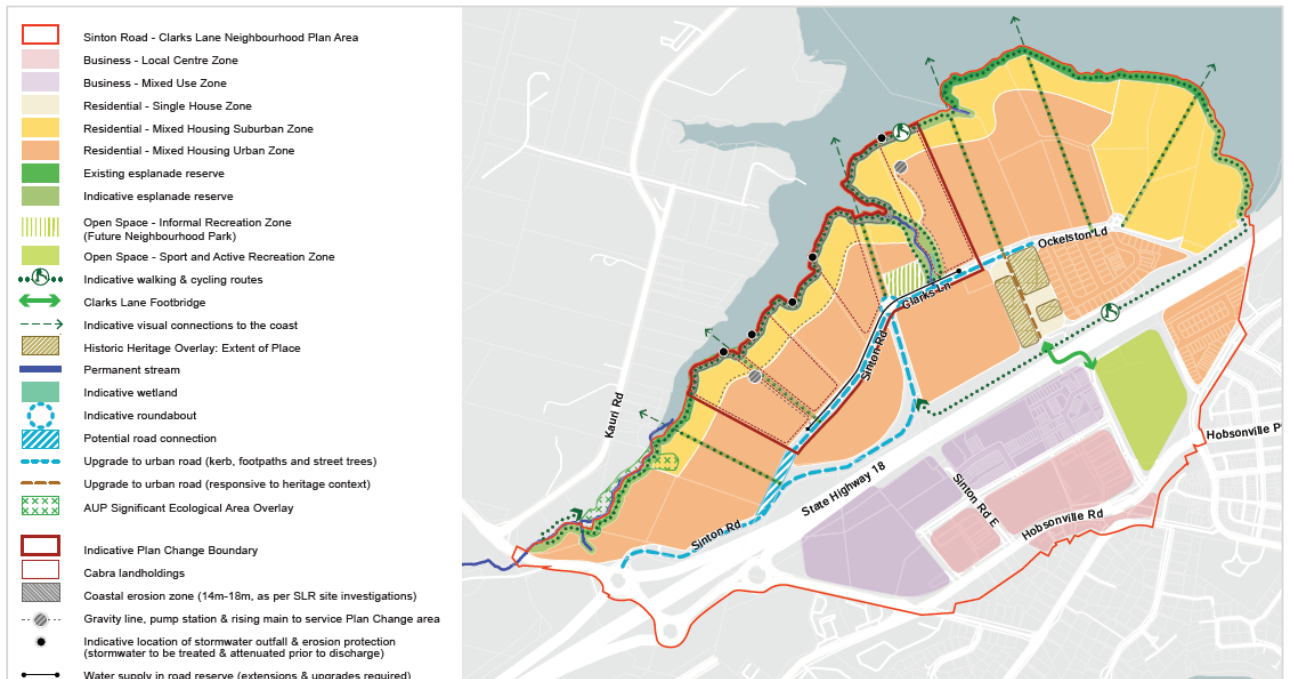


Figure 16. Map showing the PPC boundary and proposed zoning within the wider Sinton Road – Clarks Lane Neighbourhood Plan Area. Other key features relating to ecology include the proposed esplanade reserve (source: Boffa Miskell 2024).

The PPC proposal also includes site-specific provisions under the proposed Whenuapai East Precinct. These have been prepared in line with the WSP.

The key precinct provisions relating to ecology include:

- The ecological values of the precinct are recognised and maintained, and where practicable, enhanced;
- Allowance for a 20 m esplanade reserve along the coastal edge of the site and along each side of the permanent stream between 15 and 17 Clarks Lane;
- Requirement for the esplanade reserve to be planted within a 10 m setback of the MHWS and top of the permanent stream bank;
- Requirement for 10 m riparian yards each side of permanent and intermittent streams, and wetlands; and
- Requirements for restoration plans (to be implemented for a period of no less than five years) for all subdivisions that require an esplanade reserve or strip.

The remainder of this section assesses the potential effects of the proposed PPC on the current and potential ecological values within the site and the associated wider landscape.

8.2 Impact on Terrestrial Ecology

8.2.1 Vegetation

The main threats to the long-term viability of ecosystems in the Auckland region are often intensified by increases in urbanisation and human population density. These include habitat destruction, fragmentation, increased edge effects, and subsequent invasion by pest plants and animals. The clearance of native vegetation will be avoided where practicable during future development. Any proposed vegetation clearance within the PPC areas will be assessed at resource consent stage, and the effects management hierarchy applied to avoid, minimise, mitigate, or otherwise offset/compensate to address residual effects.

Botanical values within the site are limited due to the relatively small amount of trees and shrubs present and the dominance of exotic vegetation. Most of the native vegetation on the site is located within 20 m of the CMA and therefore would be protected from removal through the proposed coastal esplanade reserve or setback and the vegetation management (Chapter E15) rules of the AUP-OP.

No vegetation removal is required to occur as a part of the rezoning process. It is expected that vegetation outside of the coastal area, riparian yards and wetland margins (e.g. the shelterbelts and amenity planting) will be removed at future resource consent stage to facilitate urban development, however this can be removed as a permitted activity under the current rural zoning.

Landscaping and amenity planting will be included in any development of the site as required by the MHU/MHS zone provisions. This includes a minimum of 35% of the net site area as landscaped area in the MHU zone, and 40% in the MHS zone. It is expected that landscape planting will provide similar or increased species diversity compared to what is present, and will provide periodic areas of vegetation similar to or more than what is currently present on site.

As discussed in section 8.1 above, the proposed precinct provisions will require planting within the 10 m coastal esplanade reserve and riparian yards of streams and wetlands, which will increase the amount of riparian vegetation across the site, increase terrestrial ecological diversity, habitat and connectivity, and provide subsequent benefits to the coastal environment, streams and wetlands through shading, filtration and improved aquatic habitat values. Revegetation planting should be locally eco-sourced from the Tāmaki Ecological District, where possible.

The proposed rezoning will create future opportunity to remove weeds and exotic species along the coastal edge, and enhance native vegetation, including within the existing SEA during future development.

Overall, the PPC proposal is expected to have low effects on the terrestrial botanical values within the site, and likely provide positive outcomes for the terrestrial ecological values of the area through enhancement of botanical and fauna habitat values.

8.2.2 Terrestrial indigenous fauna

Due to the low adverse effects on vegetation, it is considered that the re-zoning will result in low adverse effects on native terrestrial habitat for indigenous fauna.

Most of the birds likely to be present on the site are common indigenous and exotic species that are abundant in the Auckland region. Any 'At Risk' species that may be present are likely to be within the coastal or wetland habitats that would be protected within the rules of the AUP-OP. The pipit is the only 'At Risk' species that is associated with open grass areas that may occasionally be present, however as discussed in section 4.2.1, most of the habitat on site is not suitable for them to nest and therefore they are only likely to be present in low numbers, if at all.

Much of the potential lizard habitat on the site is within the coastal protection yard, and therefore will be protected by the rules in the AUP-OP and the proposed 20 m esplanade reserve. Areas of rank grass, wood piles and debris associated with abandoned farm buildings could contain native skink species. When the PPC site is developed, resource consent applications will be required to consider the potential impact on lizards, and it is expected that consent conditions will require lizard management plans to mitigate any effects as appropriate.

There is the potential for a loss of low-quality bat habitat associated with removal of some of the larger exotic trees/shelterbelts. Assessment of ecological effects on bats will be required at resource consent stage, and where appropriate, bat management may be required to mitigate any effects. No bats passes were recorded during the recent survey in April-May 2024 (section 4.2.3).

Overall, any potential direct adverse effects on native terrestrial fauna as a result of subsequent development works (e.g., earthworks, vegetation clearance) would be assessed at the resource consenting phase. It is considered that adverse ecological effects on indigenous fauna can be appropriately mitigated through the implementation of consent conditions and/fauna management plans. As discussed, it is also expected that terrestrial habitat values will increase through the likely future enhancement of currently low-quality vegetation and habitat within the site, which would be expected to positively impact indigenous species.

8.2.3 Pest mammals

Rezoning the site from FUZ to residential zoning will increase human population density in the area.

An increase in human population density has been found to decrease possum and rodent numbers and, expectedly, increase domestic cats in residential areas (Miller, 2020). Due to the close proximity of the existing Whenuapai and Hobsonville medium-high density developments, roaming domestic cats and feral cats are likely already present within the site. However, increased numbers are expected as a result of the rezoning.

In turn, the number of mustelids can become very limited where cats are abundant. Hedgehogs are often common in urban areas due to the abundance of anthropogenic food and shelter (Miller, 2020). Rabbits are likely common within the site at present, however their populations are likely to decrease with a change to urban land use.

Scattered evidence of pest control was observed during the site visits (i.e., possum traps across multiple properties along the coastal edge). It is likely that pest control would be required as part of native vegetation protection and enhancement required with development of the site, which will aim to decrease possum, mustelid, hedgehog and rodent densities within the proposed ecological spaces.

Overall, it is considered that the rezoning of the site will result in negligible effects on pest animal presence.

8.3 Impact on Freshwater Ecology

8.3.1 Watercourses

The main threats to the intermittent and permanent streams as a result of the PPC and subsequent zoning change from rural to urban are:

- A decrease in the riparian yard set back requirement from 20 m to 10 m (noting that the current FUZ zoning already anticipates this effect as the land becomes rezoned to urban), excluding the identified permanent stream where a 20 m esplanade reserve is proposed;
- An expected significant increase in impervious surfaces as a result of residential development;
- The potential increase in contaminant runoff as a result of residential development; and
- Potential stream works (e.g. installation or replacement of culverts).

The permanent stream was assessed to be of moderate ecological value, improved by the established riparian native and exotic vegetation, presence of some aquatic habitat features and likely presence of At Risk fish species. The two intermittent streams on the site were considered to be of low ecological value given their small catchment sizes, lack of aquatic habitat and degradation due to erosion and channel modification.

Activities that may affect the streams (e.g. riparian yard infringements, riparian vegetation clearance, stream reclamation, discharges, in-stream works) will require assessment during future resource consenting processes. It is noted that the majority of the two intermittent stream reaches occur within the proposed 20 m esplanade reserve, thus it is unlikely they will be affected by future development.

It is considered that the effects management hierarchy will be appropriate for managing adverse effects of future development on the streams, and mitigating/offsetting where required. All adverse effects can be managed with appropriate measures/mitigation such as erosion and sediment control, stormwater management, riparian planting and management, and fish relocation if required. Stormwater runoff from new impervious areas will be treated prior to discharging to streams or the coast. As such, the proposed rezoning is not anticipated to result in residual adverse effects on the streams.

Furthermore, there is the opportunity for the ecological values of the streams to be increased through appropriate native riparian planting, ensuring fish passage and potential improvements to habitat features such as increasing instream habitat and hydrological heterogeneity.

It is expected that artificial drains on the site (all of negligible ecological value) will be removed during future works, or incorporated into onsite stormwater management. Artificial channels are not subject to protection or management rules under either FUZ or MHU/MHS Zones and therefore no change in effects is anticipated.

8.3.2 Wetlands

One natural inland wetland was identified within the site (Appendix B). Wetlands are protected from development by the AUP-OP (Chapter E3) and the National Environmental Standards for Freshwater 2020 (NES-F). Any future works within, or earthworks or vegetation removal within 10 m of any wetland (or works within 100 m if it will result in drainage of the wetland) will be subject to a resource consent application.

It is currently a prohibited activity under the NES-F to reclaim natural inland wetlands within the FUZ (treated as a rural zone). The proposed urban rezoning will provide a consenting pathway for wetland

reclamation under Regulation 45C of the NES-F. Compliance with relevant NES-F regulations in relation to natural inland wetlands will be required for subsequent development following rezoning. However, no reclamation is anticipated in the future consenting process. Notwithstanding the above, it is considered that any potential adverse effects on the natural inland wetland will be able to be assessed and managed appropriately at future resource consent stage.

Indirect adverse effects on the wetland such as sedimentation and stormwater contaminants are expected to be adequately mitigated through appropriate controls and following best practice guidelines, to ensure adverse effects on ecological values are low (section 8.3.3).

The identified wetland is associated with the upper reach of the permanent stream within the site, and therefore there is the potential to significantly increase the ecological values through appropriate native buffer and wetland planting.

8.3.3 Stormwater management

If not appropriately designed and mitigated, increased impervious surfaces as a result of urbanisation may threaten freshwater ecological values through greater runoff and increased contaminant input. Some contaminant inputs associated with rural land uses such as nutrients from fertiliser and stock inputs may decrease.

To minimise the effects of future development on downstream receiving environments, a Stormwater Management Plan (SMP) has been prepared by Capture Land Limited (Capture 2024) for the PPC area. The SMP (Capture 2024) proposes the following key stormwater management strategies for the PPC area, in accordance with GD01:

- Integrated stormwater management and water sensitive design;
- Retainment, enhancement and protection of streams and wetlands to minimise effects of development;
- Minimise changes to natural hydrology within the site;
- Retainment of overland flow paths where possible or redirection down roads/public access areas away from residential lots; and
- Minimisation of adverse effects on water quality of streams and the adjacent coastal environment, through the use of treatment devices in line with GD01.

In addition, the Whenuapai East Precinct provisions include but are not limited to the following requirements:

- The effects of runoff from all impervious surfaces will be minimised to protect water quality and the receiving environment;
- Requirement of appropriate design and sizing of stormwater outfalls;
- Stormwater runoff to be treated at-source or by a communal stormwater management device that is sized and designed in accordance with GD01; and
- Stormwater runoff from roofs must be from inert building materials.

To align with the NPS-FM and NES-F regulations, future stormwater design will be required to avoid adverse effects on freshwater features where practicable, by minimising erosion through appropriate setbacks and achieving net neutrality.

8.3.4 Erosion and sediment control

No earthworks are required at PPC stage. However, future bulk earthworks will be required to support urbanisation. Albeit, the topography within the site is generally flat to gently sloping and this is expected to minimise the volumes of earthworks to a maximum cut/fill of less than 1 m (Capture 2024).

The primary ecological concern when earthworks are undertaken is the potential release of fine sediment into the downstream freshwater environment. The site has direct freshwater connectivity to the coastal environment, and if not mitigated, the magnitude of effect of fine sediment release into the freshwater environment is expected to be moderate.

Future proposed earthworks will be supported by erosion and sediment control measures designed in accordance with the guideline document GD05 – Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (Auckland Council, 2016). The detail of these measures will be developed during future resource consent applications, and it is considered the effects of sediment deposition can be mitigated to low.

8.4 Impact on Coastal Ecology

The coastal environment will be protected from development by the proposed 20 m coastal esplanade reserve or set back requirements, which will keep works away from the coastline and allow for maintenance of a vegetated buffer. Native planting within 10 m of the MHWS is also proposed under the precinct provisions and will be specified at resource consent stage.

Light pollution has the potential to affect migratory birds that feed within the adjacent marine environment. Currently the PPC area produces a very low level of light during the night, however when the area is developed it is expected that the levels of light will increase with light from buildings and street lighting. This could potentially affect communication, feeding and migratory behaviour of birds using the adjacent coastal areas. The coastal setback and vegetation along the coast will help to reduce the amount of light pollution experienced in the coastal area. The potential impact of lighting on birds should be considered during the resource consenting phases of development and best practice lighting design approaches should be adopted.

It is also recommended that general best practice lighting design is adopted in future developments where practicable as follows (DCCEEW 2023):

- Adding light only for specific purposes;
- Use of adaptive light controls to manage light timing, intensity and colour;
- Light only the object or area intended – keep lights close to the ground, directed and shielded to avoid light spill;
- Use the lowest intensity lighting appropriate for the task;
- Use non-reflective, dark coloured surfaces; and
- Use lights with reduced or filtered blue, violet and ultraviolet wavelengths.

The following lighting standards have been included in the precinct provisions due to the proximity of the PPC site to the RNZAF Base Auckland, which will minimise light spill and benefit coastal and terrestrial fauna:

- Lighting should ensure that clear visibility of approach and departure path runway lighting is maintained;
- Lighting should avoid glare or light spill that could affect the flight safety or aircraft operations; and
- No searchlights or outside illumination of any structure or feature by floodlight that shines above the horizontal plane between 11pm and 6:30am.

Activities that may affect the coastal environment will require assessment during future resource consenting processes. It is considered that the effects management hierarchy will be appropriate for managing adverse effects of future proposals. All adverse ecological effects can be effectively managed with appropriate controls such as stormwater management plans, erosion and sediment control plans, appropriate development design, and enhancement planting and weed and pest control. As such, the proposed rezoning is not anticipated to result in residual adverse effects on the coastal environment. Further, the proposed planting within 10 m of the MHWS is expected to provide positive ecological benefits to the coastal environment through improved buffering, filtration and fauna habitat.

8.5 Relevant Policies and Plans

8.5.1 National Policy Statement for Indigenous Biodiversity 2023

The NPS-IB sets out objectives, policies and implementation requirements to manage natural and physical resources to maintain indigenous biodiversity in the terrestrial environment under the RMA. It outlines a system for the management of biodiversity outside of public conservation land.

The existing SEA vegetation will not be affected as a part of the PPC. The effects management hierarchy will be applied to manage residual ecological effects on the SEA and any areas that meet the definition of a Significant Natural Area (SNA) under Appendix 1 of the NPS-IB. The PPC will provide opportunities to increase indigenous vegetation cover through planting and enhancements of riparian areas, wetlands and the coastal margin.

8.5.2 National Policy Statement for Freshwater Management 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.

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).

8.5.3 Auckland Unitary Plan – Operative in Part 2016

The AUP-OP sets out a number of policies and objectives that give effect to the RMA to promote the sustainable management of natural and physical resources. This section addresses the objectives and policies set out in the AUP-OP pertaining to ecology.

Chapter B7 – Natural Resources

In line with the objectives and policies in this chapter, areas of significant indigenous biodiversity value and freshwater environments have been identified. Freshwater habitat will be protected from the potential adverse effects of subdivision use and development where practicable, or otherwise the effects management hierarchy applied to manage ecological effects. The proposed planting of riparian margins will improve the linkages between other surrounding areas and improve the ecological values of the streams and wetlands on the site.

Chapter E1 – Water Quality and Integrated Management

Consistent with Chapter E1, the development of the site will provide opportunities for the appropriate integrated management of water discharges, subdivision and greenfield development to maintain and/or enhance water quality, flows, intermittent/permanent streams and associated riparian margins.

Chapter E3 – Lakes, Rivers, Streams and Wetlands

All potential streams, rivers and wetlands have been identified within the sites in line with per Chapter E3. Additionally, significant adverse effects can be avoided though retaining all intermittent and permanent streams where practicable, and where avoidance cannot be achieved, through implementation of the effects management hierarchy. The PPC will also provide opportunities to improve the ecological values of these freshwater features through planting, enhancements and weed and pest control.

Chapter E15 – Vegetation Management and Biodiversity

Consistent with Chapter E15, the vegetation and biodiversity values of the site have been identified. Development of the site provides opportunities to maintain and enhance ecosystem services and indigenous biodiversity values, while providing for appropriate subdivision, use and development.

8.5.4 Auckland Plan 2050

The Auckland Plan is a long-term spatial plan that aims to ensure Auckland grows in a sustainable way that supports people and the local environment and ecosystems. When considering environmental outcomes, the plan seeks to preserve, protect, and care for the natural environment, and use development as an opportunity to do so, as well as future-proof Auckland's infrastructure.

The PPC aligns with the Auckland Plan, through incorporation of ecological and active mode corridors into the design (i.e., a walking pathway along the esplanade reserve), to connect Aucklanders to their environment. It will also incorporate sustainable infrastructure, while providing for appropriate development.

Consistent with the Auckland Plan 2050, the PPC provides opportunity to restore degraded ecosystems, while providing for appropriate development.

8.5.5 Auckland's Urban Ngahere (Forest) Strategy 2018

Auckland's Urban Ngahere (Forest) Strategy aims to promote the protection, expansion, management, and education around the network of vegetation within current and future urban Auckland. The includes remaining forest fragments, native trees, natural stormwater assets, community gardens and parks, and private gardens.

The vegetation within the PPC sites has been identified and classified, and the PPC provides opportunities that align with the strategy's nine principles: Right tree in the right place; Preference for native species; Ensure urban forest diversity; Protect nature, healthy trees; Create ecological corridors and connections; Access for all residents; Management urban forest on public and private land; and deploy regulatory and non-regulatory tools.

8.5.6 North-West Wildlink

The Forest and Bird North-West Wildlink Project is an on-going conservation project that has the aim of restoring and enhancing habitats for the movement of wildlife across ecological corridors between the Hauraki Gulf Islands and the Waitākere Ranges.

The proposed precinct provisions include ecological enhancement of the coastal esplanade, riparian margins and wetland buffer areas within the site, through native planting and protection. This proposed restoration is expected to improve the ecological values of the site for fauna movement across the landscape, in line with the objectives of the North-West Wildlink.

9 SUMMARY AND RECOMMENDATIONS

Viridis has assessed the proposed PPC area at Sinton Road and Clarks Lane, Hobsonville. The impact of rezoning from FUZ (with rural land use) to MHU and MHS zones (residential) has been considered in relation to the terrestrial, freshwater and coastal values present. It is considered that the proposed plan change will allow for the maintenance and enhancement of the existing ecological values of the site and adjacent coastal environment.

The most significant ecological values associated with the PPC area are the values of the adjacent coastal environment, the permanent stream, and the possibility of At Risk indigenous fauna to utilise the terrestrial and freshwater habitats within the site, albeit these are largely degraded at present.

The terrestrial ecological features within the site are largely degraded due to a history of agricultural land use and dominance by exotic species, however protection through exclusion of grazing animals and restoration planting and weed control has the potential to improve their ecological values, in particular the values of the coastal yard. Little native vegetation remains across the site and the terrestrial ecological values of the site are generally low, although habitat may be utilised by At Risk indigenous fauna (i.e., bats, skinks).

The recommended stormwater management will help to protect the site's wetlands, streams and adjacent coastal environment. Provisions relating to the coastal and riparian yards and landscaping are expected to maintain the current ecological values and provide the opportunity for an increase in indigenous biodiversity and improved habitat values for indigenous fauna. Light pollution may affect birds utilising the adjacent coastal environment, and this should be considered in the design of the future developments.

Overall, it is considered that the outcomes of the proposed PPC and precinct provisions are consistent with the objectives and policies of the AUP-OP. The AUP-OP, NPS-IB, NPS-FM, NES-F and the Wildlife Act 1953 provide a framework that manage any proposed future development at the resource consenting phase, to ensure any development aligns with the relevant policies and regulations. Future subdivision and development in accordance with the proposed zoning and precinct provisions is anticipated to result in the appropriate protection and enhancement of indigenous terrestrial, freshwater and coastal biodiversity values of the site.

REFERENCES

ArborConnect Limited 2024. Arboricultural Assessment Report for Sinton Road and Clarks Lane, Hobsonville, Auckland. Private Plan Change. Dated July 2024.

Auckland Council 2016. Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region. Guideline Document 2016/005 (GD05).

Auckland Council, 2020. Auckland Regional Pest Management Plan 2020 – 2030. Auckland Council.

Boffa Miskell 2024. Sinton Road Clarks Lane Neighbourhood Plan. Report by Boffa Miskell for Cabra Developments Limited. Dated June 2024.

Borkin KM, Giejsztowt J, McQueen-Watton J, Smith DHV 2023. Influence of weather on long-tailed bat detection in a North Island exotic forest. *New Zealand Journal of Ecology*, 47(1): 3546.

Capture Land Limited 2024. Infrastructure Report for Whenuapai Private Plan Change. Sinton Road & Clarks Lane, Whenuapai. Dated July 2024.

Clarkson BR 2014. A vegetation tool for wetland delineation in New Zealand. Landcare Research Contract Report LC1793 for Meridian Energy Limited.

Clarkson BR, Fitzgerald NB, Champion PD, Forester L, Rance BD 2021. New Zealand wetland plant list 2021. Manaaki Whenua - Landcare Research contract report LC3975 for Hawke's Bay Regional Council.

de Lange PJ, Rolfe JR, Barkla JW, Courtney SP, Champion PD, Perrie LR, Beadel SM, Ford KA, Breitwieser I, Schonberger I, Hindmarsh-Walls R, Heenan PB, Ladley K 2018. Conservation status of New Zealand indigenous vascular plants, 2017. *New Zealand Threat Classification Series 22*. Department of Conservation, Wellington. 82 p

DCCEEW 2023. National Light Pollution Guidelines for Wildlife, Department of Climate Change, Energy, the Environment and Water, Canberra, May. CC BY 4.0. Available:
<https://www.dcceew.gov.au/sites/default/files/documents/national-light-pollution-guidelines-wildlife.pdf>

Dunn NR, Allibone RM, Closs GP, Crow SK, David BO, Goodman JM, Griffiths M, Jack DC, Ling N, Waters JM, Rolfe JR 2018. Conservation status of New Zealand freshwater fishes, 2017. *New Zealand Threat Classification Series 24*. Department of Conservation, Wellington. 11 p

Grainger, N.; Harding, J.; Drinan, T.; Collier, K.; Smith, B.; Death, R.; Makan, T.; Rolfe, J. 2018: Conservation status of New Zealand freshwater invertebrates, 2018. *New Zealand Threat Classification Series 28*. Department of Conservation, Wellington. 25 p.

Hitchmough RA, Barr B, Knox C, Lettink M, Monks JM, Patterson GB, Reardon JT, van Winkel D, Rolfe J, Michel P 2021. Conservation status of New Zealand reptiles, 2021. *New Zealand Threat Classification Series 35*. Department of Conservation, Wellington. 15 p.

MfE 2021. Wetland delineation hydrology tool for Aotearoa New Zealand. Wellington: Ministry for the Environment.

MfE 2022a. Wetland delineation protocols. Wellington: Ministry for the Environment.

MfE 2022b. Pasture exclusion assessment methodology. Wellington: Ministry for the Environment.

Miller 2020. 'Bring me a shrubbery': Assessing the habitat preference of mammalian predators in the urban green spaces of New Zealand cities. Master's dissertation, University of Otago.

O'Donnell CF 2000. Influence of season, habitat, temperature, and invertebrate availability on nocturnal activity of the New Zealand long-tailed bat (*Chalinolobus tuberculatus*). New Zealand Journal of Zoology, 27(3), 207-221.

O'Donnell CFJ 2010. The ecology and conservation of New Zealand bats. In: Island bats: evolution, ecology and conservation. Chicago University Press, Chicago. 460-495 pp.

O'Donnell CFJ, Borkin KM, Christie J, Davidson-Watts I, Dennis G, Pryde M, Michel P 2023. Conservation status of bats in Aotearoa New Zealand, 2022. New Zealand Threat Classification Series 41. Department of Conservation, Wellington. 18 p.

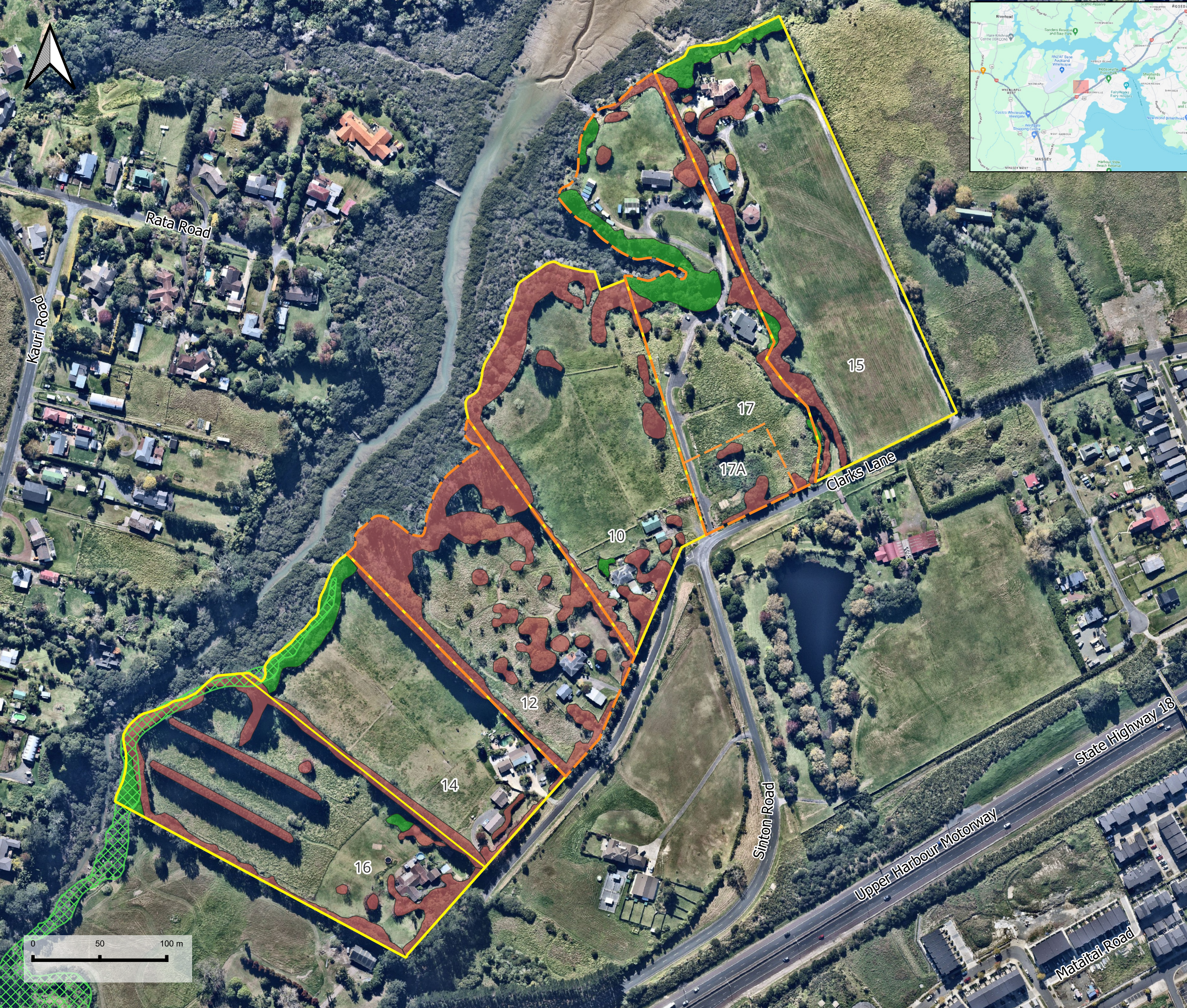
Robertson H A, Baird, KA, Elliott G, Hitchmough R, McArthur N, Makan T, Miskelly C, O'Donnell CF, Sagar PM, Scofield RP, Michel P 2021. Conservation status of birds in Aotearoa New Zealand, 2021. Department of Conservation, Te Papa Atawhai. 2021.

Roper-Lindsay J, Fuller SA, Hooson S, Sanders MD, Ussher GT 2018. Ecological impact assessment. EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems. 2nd edition.

Sedgeley J 2012. DOC DM-590733 Bats: Counting away from roosts – automatic bat detectors. Version 1.0. Department of Conservation, Wellington.

Singers N, Osborne B, Lovegrove T, Jamieson A, Boow J, Sawyer J, Hill K, Andrews J, Hill S, Webb C 2017. Indigenous terrestrial and wetland ecosystems of Auckland. Auckland Council.

Appendix A Terrestrial Ecological Features Maps



Sinton Rd & Clarks Ln

Terrestrial Vegetation - Overall Map
Cabra Developments Limited

- Legend**
- Ground truthed sites
 - Non-ground truthed sites
 - Terrestrial SEA
 - Exotic vegetation
 - Exotic-native vegetation

SOURCES
NearMaps

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
1:2,572.475 @ A3

PROJECT NO.	10116
DRAWN BY:	B.P
DATE:	27 May 2024

Sinton Rd & Clarks Ln

Terrestrial Vegetation - West

Cabra Developments Limited

Legend

-  Ground truthed sites
-  Non-ground truthed sites
-  Terrestrial SEA
-  Exotic vegetation
-  Exotic-native vegetation

SOURCES

NearMaps

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

1:1,400.475

@ A3

PROJECT NO.

10116

DRAWN BY:

B.P

DATE:

27 May 2024





Sinton Rd & Clarks Ln

Terrestrial Vegetation - East
Cabra Developments Limited

Legend

-  Ground truthed sites
-  Non-ground truthed sites
-  Terrestrial SEA
-  Exotic vegetation
-  Exotic-native vegetation

SOURCES
NearMaps

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
1:1,700.475 @ A3

PROJECT NO.	10116
DRAWN BY:	B.P
DATE:	27 May 2024

Appendix B Freshwater Ecological Features Maps



Sinton Rd & Clarks Ln

Freshwater Features - Overall Map

Cabra Developments Limited

Legend

- Ground truthed sites
- Non-ground truthed sites
- Intermittent stream
- Permanent stream
- Modified intermittent stream
- Artificial drain
- Natural inland wetland

SOURCES

NearMaps

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

1:2,572.475

@ A3

PROJECT NO.

10116

DRAWN BY:

B.P

DATE:

27 May 2024

Sinton Rd & Clarks Ln

Freshwater features - West

Cabra Developments Limited

Legend

-  Ground truthed sites
-  Non-ground truthed sites
-  Intermittent stream
-  Modified intermittent stream
-  Artificial drain

SOURCES

NearMaps

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

1:1,400.475

@ A3

PROJECT NO.

10116

DRAWN BY:

B.P

DATE:

27 May 2024





Sinton Rd & Clarks Ln

Freshwater features - East

Cabra Developments Limited

Legend

- Ground truthed sites
- Non-ground truthed sites
- Intermittent stream
- Permanent stream
- Modified intermittent stream
- Artificial drain
- Natural inland wetland

SOURCES

NearMaps

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

1:1,700.475 @ A3

PROJECT NO. 10116

DRAWN BY: B.P

DATE: 27 May 2024



Address | Unit A1, 72 Apollo Drive, Mairangi Bay, Auckland 0632

Post | PO Box 301709, Albany, Auckland 0752

Telephone | 64 9 475 5750

Email | contact-us@viridis.co.nz

www.viridis.co.nz
