Creamery Ponds Reserve

# Ecological restoration plan

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Christchurch City Council

| Approvals panel | | | |
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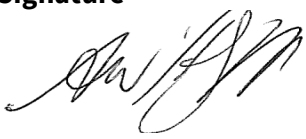
| **Reviewed by** | **Al Hardy**<br>Manager - Community Parks<br>Parks Unit. | **Date**<br>17/03/26 | **Signature**<br>  |

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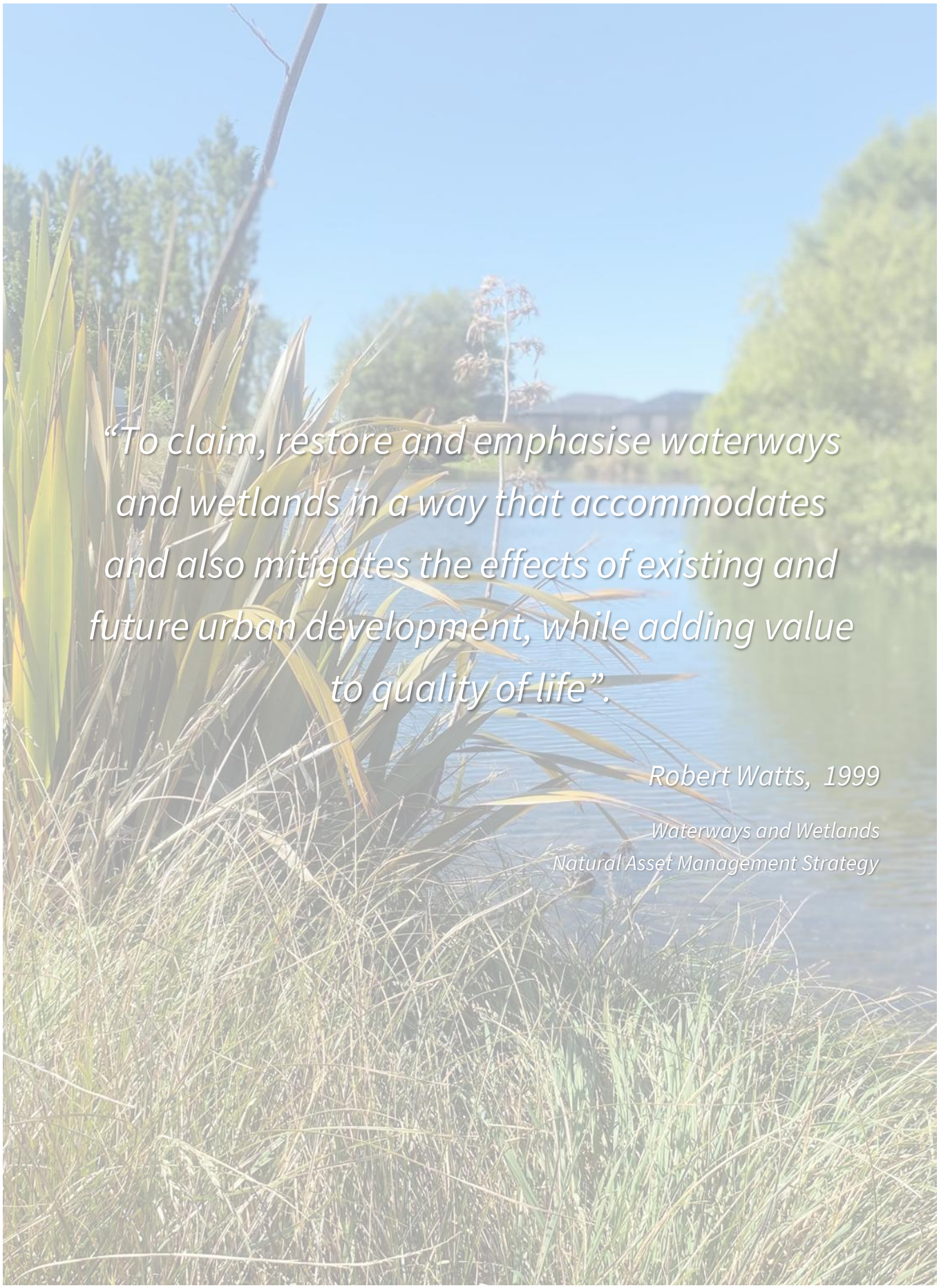


*"To claim, restore and emphasise waterways and wetlands in a way that accommodates and also mitigates the effects of existing and future urban development, while adding value to quality of life".*

*Robert Watts, 1999*

*Waterways and Wetlands*
*Natural Asset Management Strategy*

# Introduction

Creamery Ponds Reserve is a Schedule-A Site of Ecological Significance in the Christchurch District Plan on account of its significant native waterbird populations. As surrounding land is progressively developed for greenfield subdivisions, these values come under increasing threat from disturbance, leading to potential population decline and loss of biodiversity.

As well as being an SES, the reserve is also one of a number of proposed native forest reserve sites spread across Ōtautahi-Christchurch that achieve the aspirations of Council's **'Our Urban Forest Plan'.** This urban forest plan seeks to create an optimal native bush patch network across the city (and beyond) to support viable populations of native bush birds at a landscape scale. Ponds and waterways within the reserve are also important elements of a wider stormwater management system. This system is designed to protect and maintain water quality in downstream, spring-fed natural waterways that support significant freshwater aquatic values, by reducing the impacts of urban development.

This restoration plan seeks to prevent loss of biodiversity through design interventions and ecological restoration that will enable indigenous species to persist and increase their populations whilst still allowing local residents and the public quality access to wilderness and enjoyment of nature.

## Vision

**Creamery Ponds Reserve will be valued as an important community asset that people of all ages and backgrounds will be actively involved in managing and nurturing. People will visit the reserve regularly for the enjoyment of nature, passive recreation, education, and for social interaction without impacting the sites ecologically significant wildlife populations. Native forest, shrubland, lakes, and waterways will be representative of formerly widespread indigenous ecosystems that once occurred in Ōtautahi-Christchurch and will be used by native birds, lizards, invertebrates and fish as an important feeding and breeding resource in a city-wide network of natural areas.**

## Objectives

Continuing to restore and enhance forest and freshwater ecosystems at Creamery Ponds Reserve will have the following ten key objectives:

- ✓ Optimise the ecological roles and functions of Creamery Ponds Reserve,
- ✓ Protect native wildlife populations from the effects of residential development,
- ✓ Manage a range of other threats that are impacting on natural values of the reserve,
- ✓ Provide important resources for native wildlife as part of a city-wide forest patch network,
- ✓ Act as a 'lifeboat' for biodiversity by establishing new populations of indigenous flora and fauna ,
- ✓ Provide manawhenua with opportunities to exercise Matauranga Māori and support mahinga kai,
- ✓ Provide opportunities for people to experience and interact with urban wilderness,
- ✓ Reduce ongoing operational costs and carbon emissions associated with managing mown turf,
- ✓ Manage the reserve as an iconic landscape feature that contributes to community identity, and
- ✓ Continue to meet a critical need to provide quality habitat for translocated lizard populations.

# Supporting manawhenua values

We have also included in our planning the relationship of Māori, their culture, traditions and connection to ancestral land, water, sites, wāhi taonga, fauna and flora. We can help achieve this through both providing opportunities for tangata whenua to exercise kaitiakitanga, and by 're-indigenising' our landscapes.

Mana whenua objectives that should guide the restoration and development of Creamery Ponds Reserve include:

- ✓ Local authorities must acknowledge and safeguard Ngāi Tūāhuriri's tino rangatiratanga over its taonga, including rights of use and access,
- ✓ Mana whenua must be actively involved in the development, management, and decision-making processes for reserves,
- ✓ Ki uta ki tai is embedded as the framework for the management of natural and physical resources in policies, methods, and decision-making, to sustain the integrity and function of the environment as an interdependent whole,
- ✓ Mātauranga Māori leads and informs innovation in addressing environmental degradation and climate change,
- ✓ Wai Māori, indigenous species, mahinga kai, and their associated cultural and spiritual values are considered taonga to Ngāi Tūāhuriri,
- ✓ Health of mahinga kai is recognised as a key cultural and environmental indicator, reflecting the cultural health of waterways and the relationship of Ngāi Tahu to water,
- ✓ The integrity and resilience of wāhi tapu and wāhi taonga are protected through adaptation and environmental regeneration,
- ✓ Water quality and quantity is protected and enhanced to support indigenous species and ensure mahinga kai are safe for consumption,
- ✓ Existing wetlands are maintained and new ones protected, restored, and expanded to enhance ecological health, improve water quality, and support stormwater management,
- ✓ Indigenous vegetation is established, especially alongside waterways, to support biodiversity, erosion control, and nutrient absorption. Indigenous vegetation of local genetic origin is prioritised,
- ✓ Invasive species are controlled, with a focus on riverbeds and other ecologically sensitive areas,
- ✓ Indigenous ecosystems are recognised as natural capital, providing essential ecosystem services, enhancing climate and weather resilience, and contributing to high levels of amenity and ecological value,
- ✓ Healthy indigenous ecosystems support thriving fauna and enable migration across connected landscapes, through their abundance, diversity, and intact habitats, and
- ✓ Integrated management of the environment is focused on future conditions, and responsiveness to the dynamic state of natural processes and conditions created by climate change.

# Location

Creamery Ponds Reserve is an approximately 5.4-hectare Community Park located at 150 Sabys Road in the rural Ōtautahi-Christchurch area of Halswell. The reserve is bordered by a 120 m long road frontage along Sabys Road on its south side, rural land to the west and north, and by the new 'Country Downs' greenfield subdivision to the east (Figure 1).

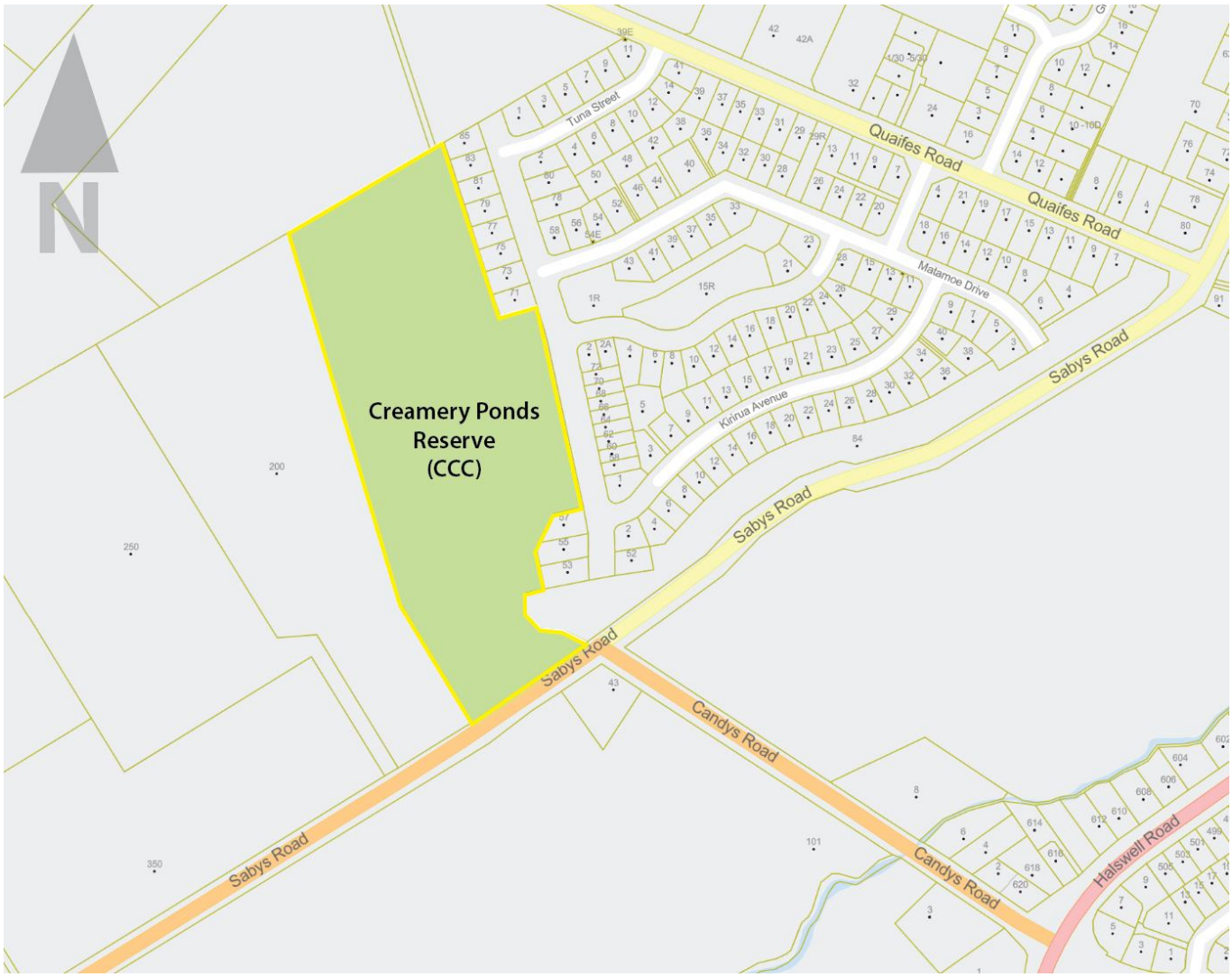



***Figure 1:*** *Location of Creamery Ponds Reserve (green) bordered by Sabys Road on the south, rural land to the west and north, and a new 'Country Downs' greenfield subdivision to the east.*

# Previous development

A series of ponds were excavated in the early 2000s by Council's Waterways and Wetland Team and gazetted as a Local Purpose (Wetlands) Reserve. The balance of the land was managed for a short time under a horse grazing lease by Councils Regional Parks Team while Council's 3-Waters team continued to manage the ponds and waterways within the reserve. Although only minimal planting was done at the time, in 2014 the waterbodies of the site were designated as a Schedule-A Site of Ecological Significance (SES) in the Christchurch District Plan - mostly on account of their value to significant populations of indigenous waterbirds.

## Stormwater system

As part of the Country Downs development, in 2023 and 2024 an upgrade on the existing Creamery Ponds was undertaken to provide treatment and storage for post development run off flows. A first flush basin was created by separating off a portion of the existing Creamery Pond where Paynes Drain enters the ponds. This was done by building up cut-off bunds that allowed a first flush containment volume capable of treating the first 25mm of runoff from each rainfall event[1].

Stage 5 of the nearby Sabys Estate completed the last of the stormwater upgrades to the Creamery Ponds. This involved the construction of a slot weir (Figure 2) at the downstream end of the main storage pond. The slot weir has been designed to allow the base flow of the Creamery Ponds (emanating from the Creamery Drain) to continue to flow through the pond, then during a storm event provide detention for storm flows to ensure the 60hr 2% AEP storm event is released over a 5-day period.

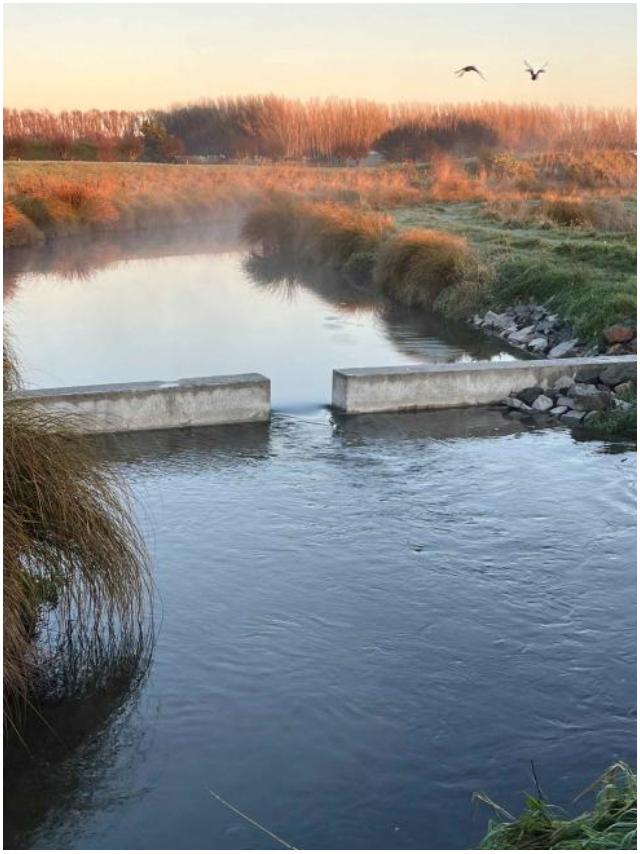


***Figure 2:*** *Slot weir at downstream end of main pond (Source Davie Lovell-Smith, 2024)*

The slot weir has also been sized to allow discharges from the Coxs Quafies Stormwater Facility and Longhurst Stormwater Facility that enter the Creamery Ponds during a storm event to continue through the weir ensuring they aren't being detained a second time.

As such, the first flush basin has now been relieved of providing storage for the previously developed catchment and is now solely a first flush basin with the wider Creamery Ponds facility now providing treatment and storage for the entire 32-hectare catchment.

A new drain has been built along the reserve's western boundary to alleviate higher flood levels during storms that were backing up into two farm drains and onto private land to the west as a result of the weir installation. This new drain carries water from the farm drains, along the western edge of the reserve, under Sabys Road, and into the Creamery Drain on the south side of the road so that the farm drains are now separate from Creamery Ponds and are unaffected by its higher flood levels.

Figure 3 shows a schematic of how the ponds and waterbodies at Creamery Ponds Reserve function (See also **Appendix 5**).

[1] Davie Lovell-Smith (2024).

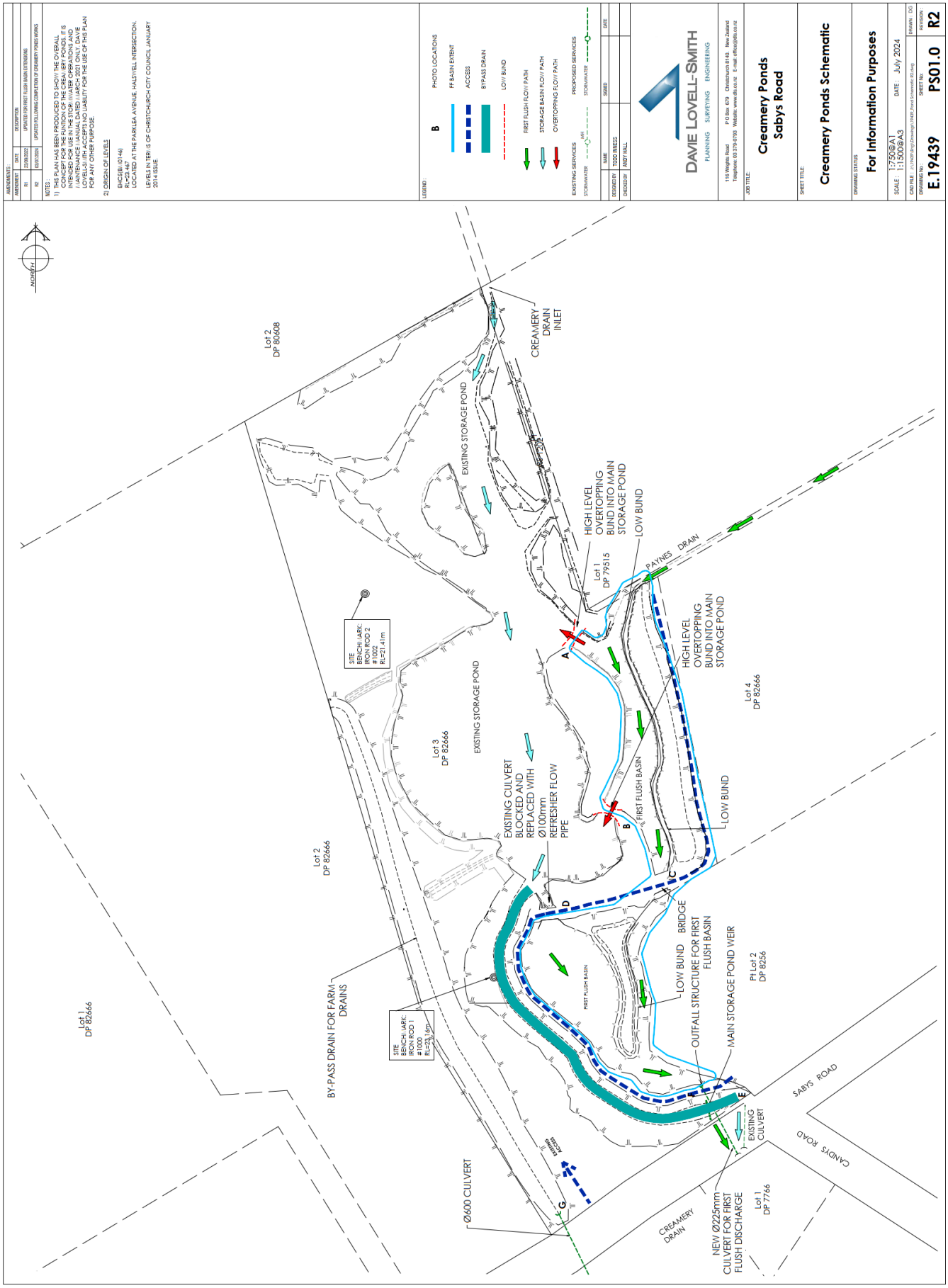



***Figure 3**: Schematic of how the ponds and waterbodies at Creamery Ponds Reserve function from a stormwater management perspective.*

# Biodiversity management issues

## Wildlife disturbance

The main management issue at Creamery Ponds Reserve is increasing pressure and human-related disturbance on significant native wildlife populations living on naturalised constructed ponds and waterways within the reserve. These disturbances include:

- ✓ Increased wildlife disturbance resulting from increasing frequency of recreational use,
- ✓ Human access to isolated/ wildlife refuge areas,
- ✓ Use of motorised and non-motorised watercraft (including kayaks and model yachts),
- ✓ Predation of wildlife by increasing numbers of domestic cats,
- ✓ Disturbance of wildlife by dogs,
- ✓ Artificial light spill from nearby houses and streetlights (E.g., Figure 4, top),
- ✓ A community desire for increased levels and frequency of maintenance around lakes, and
- ✓ Use of motorised vehicles in and around ponds.

***Figure 4:*** *Close proximity of human activity and artificial light (top) to wildlife habitat (e.g. nesting white swan, below) (Photographs, A. Shadbolt 2025).*

## Pest plants

Most of the reserve is currently managed as mown turf and has few pest plant issues. However, once planted as native forest and shrubland we can expect pest plants to invade. In similar native forest reserves in Ōtautahi-Christchurch (E.g., Te Waoku Kahikatea Reserve, The Groynes, Travis Wetland, and Styx Mill Conservation Reserve), native plantings are thriving under a low-level maintenance regime, but exotic pest plants can dominate the young forest understory if left un-checked (E.g., European ivy), and species like old man's beard can smother even well-established plantings. Other woody weeds we can expect to invade our plantings - particularly the riparian margins – may include willow (Figure 5), alder, sycamore, elderberry, and blackberry.

Pest plants likely to be a management problem at Creamery Ponds Reserve are listed in Table 1. These species have the potential to dominate the established forest and spread into new planted areas where they will displace indigenous plant communities and the indigenous fauna those communities' support. Luckily, most problematic pest plants are either still absent from Creamery Ponds Reserve or still remain relatively sparse and are able to be controlled cost effectively compared to if they are left to establish further.

***Figure 5:*** *Pampas grass growing on riparian margin at Creamery Ponds Reserve (Photograph A. Shadbolt 2025)*

***Table 1:*** *Biodiversity pest plants and other undesirable plant species occurring, or likely to occur, at Creamery Ponds Reserve and prioritised recommended control actions.*

| Species | Common name | Present (2026) | Recommendation |
|---|---|---|---|
| *Alnus spp.* | alder | yes | Completely eradicate from reserve – particularly waterway corridor and follow up control of new seedling growth. **HIGH PRIORITY** |
| *Calystegia vulgaris* | convolvulus | no | Ongoing control in young plantings until such time that convolvulus does not pose a significant threat to restoration success. **LOWER PRIORITY** |
| *Clematis vitalba* | old man's beard | no | Ongoing surveillance and eradication reserve and nearby sites. **HIGH PRIORITY** |
| *Conium maculatum* | hemlock | no | Chemical control or physical removal and re-plant areas with dense native vegetation to reduce future extend of this species. **MEDIUM PRIORITY** |
| *Cortaderia selloana* | pampas grass | yes | Completely eradicate from reserve, waterway corridor and lake margins. **HIGH PRIORITY** |
| *Hedera helix* | European ivy | yes | Completely eradicate new occurrences and progressive control of established areas through ongoing hand weeding and herbicide application. **HIGH PRIORITY** |
| *Maytenus boaria* | Chilean mayten | yes | Completely eradicate from reserve – particularly waterway corridor and follow up control of new seedling growth. **HIGH PRIORITY** |
| *Rubus fruiticosa* | blackberry | no | Ongoing control of blackberry, particularly at eastern end of reserve in forest understorey. **Medium PRIORITY** |
| *Salix fragilis* | crack willow | yes | Completely eradicate from waterway corridor and lake margins. **HIGH PRIORITY** |
| *Salix cinerea* | grey willow | yes | Completely eradicate from waterway corridor and lake margins. **HIGH PRIORITY** |
| *Sambucus nigra* | elderberry | yes | Completely eradicate from reserve, waterway corridor and lake margins. **HIGH PRIORITY** |
| *Ulex europaeus* | gorse | yes | Completely eradicate from reserve – particularly waterway corridor and follow up control of new seedling growth. **HIGH PRIORITY** |

# Pest animals

## Mammalian pests

The Council has prepared an 'Operational Pest Animal Management Plan' (CCC 2024c) for parks in response to its statutory obligations to 1) halt the decline of indigenous biodiversity, 2) mitigate biosecurity threats, and 3) maintain the integrity of public infrastructure. The plan gives the highest priority to sites that have high biodiversity values that are being significantly impacted by pest animals resulting in ongoing biodiversity decline, and particularly where it is agreed that urgent control action is needed to halt and ideally reverse this decline. Although Creamery Ponds Reserve does not yet meet this level or urgency, it does meet the second priority of being a Site of Ecological Significance with high biodiversity values that will significantly benefit from animal pest control.

Table 2 lists species either occurring or likely to occur at Creamery Ponds Reserve, including their RPMP designation and control approach for this specific site. For Te Waoku Kahikatea Reserve, in order of priority: **Total Control** means the eradication of all individuals of a pest animal species as soon as possible; **Progressive Control** means control of all individuals with the aim of eradication over the medium term; **Containment Control** means control all individuals to contain the species' spread immediately and reduce its population over the long term, and **No Control** means that no control is currently required.

***Table 2:*** *List of biodiversity pest animals likely to occur and/or have the potential to occur at Creamery Ponds Reserve by Canterbury Regional pest Management Plan (RPMP) designation and control approach.*

| Common name | Scientific name | RPMP designation | Control approach |
|---|---|---|---|
| Feral rabbit | *Oryctolagus cuniculus* | Declared Pest | Progressive control |
| Brown hare | *Lepus europaeus* | Organism of interest | Progressive control |
| Possum | *Trichosurus vulpecula* | Declared Pest | Containment control |
| Hedgehog | *Erinaceus europaeus* | Organism of interest | Containment control |
| Feral cat | *Felis catus* | Organism of interest | Total control |
| Ferret | *Mustelo furo* | Organism of interest | Progressive control |
| Stoat | *Mustelo ermine* | Organism of interest | Progressive control |
| Weasel | *Mustelo nivalis* | Organism of interest | Progressive control |
| Norway rat | *Rattus norvegicus* | Organism of interest | Containment control |
| Ship rat | *Rattus rattus* | Organism of interest | Containment control |
| House mouse | *Mus mus* | - | Containment control |

In the early stages of forest and shrubland restoration, the main threats to their establishment are likely to be from rabbits, hares and possums.

For further information on the Council's obligations and approach to animal pest control, please refer to the **Christchurch City Council Operational Pest Management Pan 2023 – 2033**[2].

[2] Christchurch City Council 2023

## Canada geese

City-wide Canada goose populations have been monitored up to four times each year since 2003. They are present on city waterways year-round but with substantial seasonal increases in autumn and winter when birds from inland breeding areas migrate in to spend the colder months in the coastal lowlands. At peak autumn-winter seasons, populations in and around the Ōtautahi-Christchurch urban area reach between 4000 and 5000 birds, and in the spring breeding season numbers fall to less than 1000.

Numbers of Canada geese in the city are increasing year-on-year and have become a nuisance. Birds have become habituated to people and now actively seek supplementary feeding at many locations including in the central city. They have become a nuisance species and are becoming an increasingly problematic threat to habitat values and indigenous biodiversity values on waterways and riparian habitat across Ōtautahi-Christchurch.

Canada geese have been monitored at Creamery Ponds Reserve since 2008. The first Canada goose was recorded in 2014, followed by sporadic occurrences over the following years that have increased in both frequency and population over time, peaking at 95 birds in November 2025 (Figure 6).

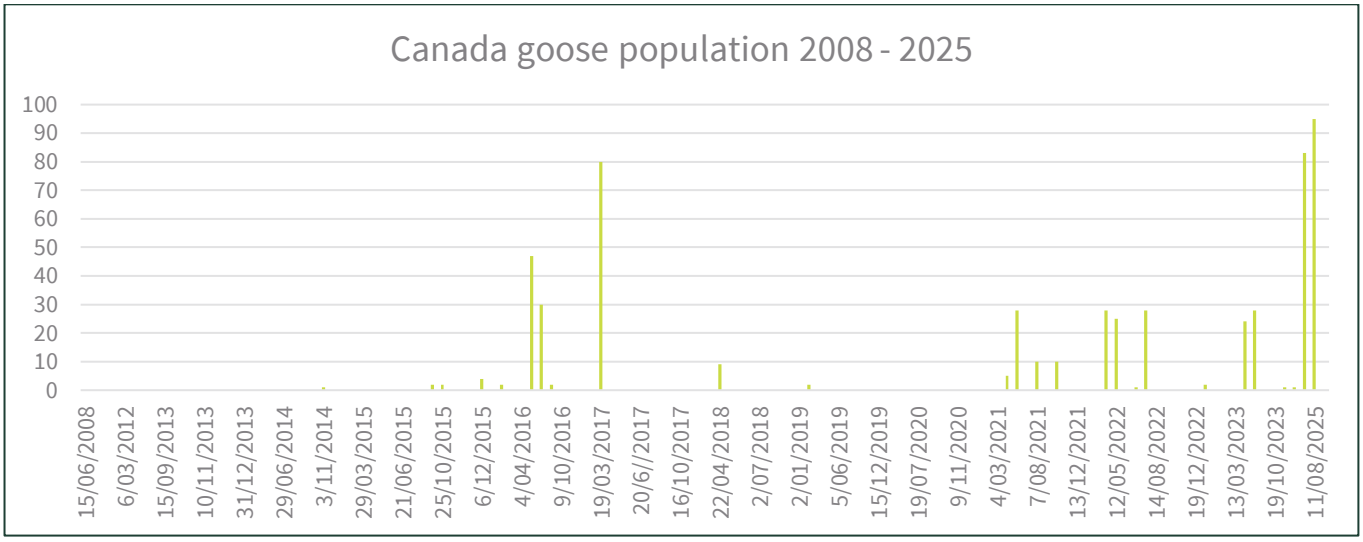



***Figure 6:*** *Canada goose populations at Creamery Ponds Reserve between 2006 and 2025 (Source: Christchurch City Council).*

***Figure 7:*** *Canada goose nest at Cranford Basin (left) and adults with recently fledged goslings at Horseshoe Lake Reserve (right) (Photographs A. Shadbolt 2025)*

## Goose management options

While there are many methods used to control Canada goose populations (e.g., poisoning, large moult culls, shooting , capture and relocation, non-lethal chemical treatment of feeding areas, or bird scarers etc), most are not suitable, nor practical for use at locations like Creamery Ponds Reserve where we are likely limited to methods that pose less disturbance and risk to park users, local residents and other wildlife using the waterbodies. These methods may include:

- ✓ **Prohibiting goose (and duck) feeding:** Prohibiting goose and duck feeding will help reduce the food supply for geese and the progressive habituation of local birds. This option would require ongoing proactive ranger involvement and effective signage and interpretation and may initially be unpopular with the public and local residents.

- ✓ **Modifying riparian vegetation:** Canada geese prefer short turf beyond waterbodies for grazing, and prefer to roost and defecate on short turf, bare earth or artificial surfaces. If mown turf at Creamery Ponds Reserve is replaced by tall native riparian vegetation, we expect goose numbers to decline over time.

- ✓ **Nest control:** A method widely used across Ōtautahi-Christchurch for more than ten years involves egg pricking – where goose nests are located and all except one egg in the nest is pricked rendering them unviable. The pricked eggs do not hatch, and the parent(s) then raise just a single gosling instead of a clutch of up to ten young. But if all eggs in a nest are treated, the pair will re-nest and there's a risk with this second full brood will avoid detection and control.

  Another nest control method is to oil eggs by way of either spray or immersion and then return the eggs to the nest. The parent birds will sit for many weeks before they realise that the eggs are un-viable.

- ✓ **Discrete methods of night control:** Nighttime (E.g., 2 - 4 am) shooting of small numbers of geese by experienced pest control operators using high powered air rifles with silencers could minimise public awareness, concern, and risk. This method would likely require many nights of activity to reach desired target levels.

- ✓ **Response to goose nuisance issues only:** This option would focus on a response to goose nuisance issues instead of proactive goose control. This may include increasing resources and improving methods of (E.g.) cleaning goose droppings from paths and amenity areas. For this approach to be effective, an increase in the number of dedicated staff and/or contractor hours and/or improved equipment may be required.

## Dominance of mallard and mallard - grey duck hybrids

Managing mallard and mallard–grey duck hybrid (Figure 8) populations is important for protecting water quality and indigenous biodiversity in small lake ecosystems such as the Creamery Ponds Reserve. Waterbird monitoring carried out by Council ecologists since 2008 shows a relatively large and stable population of mallards and mallard–grey duck hybrids. These birds typically peak at around 200–300 individuals each year, with the highest count recorded in February 2015 (510 birds; Figure 9), and they continue to dominate the waterbird community at the Reserve.

***Figure 6:*** *Mallard (left) and mallard-grey duck hybrids (right) can dominate the lakes at Creamery Ponds Reserve particularly during winter (Photographs, A. Crossland).*

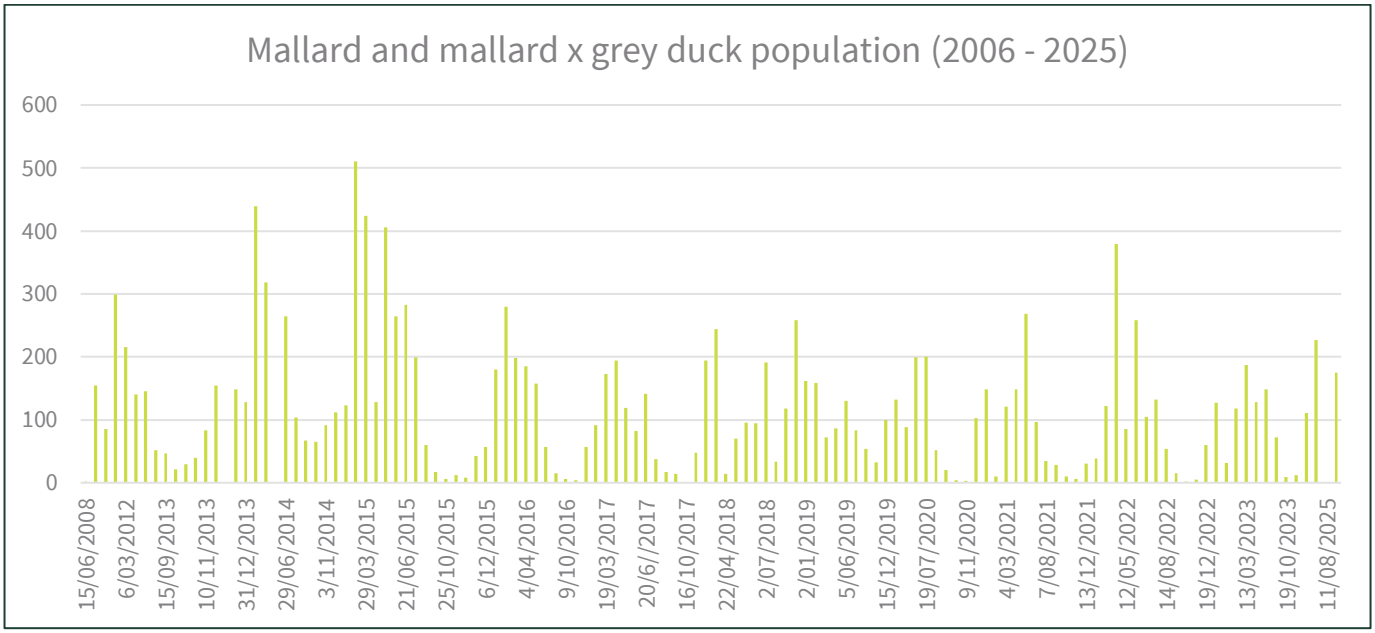



***Figure 7:*** *Mallard & mallard x grey duck populations at Creamery Ponds Reserve between 2006 and 2025 (Source: Christchurch City Council).*

Large numbers of mallards and mallard-grey duck hybrids have a range of impacts on water quality and other native waterbirds, including:

- ✓ **Nutrient loading and eutrophication:** Mallards contribute to nutrient enrichment in water bodies through their faeces, which are rich in nitrogen and phosphorus. This nutrient input can accelerate eutrophication, leading to algal blooms, decreased oxygen levels, and overall deterioration of water quality. Because the waterbodies at Creamery Ponds Reserve are part of a wider stormwater quality management facility, large numbers of mallards need to be avoided.
- ✓ **Physical damage to aquatic vegetation:** High densities of mallards can physically damage submerged and emergent vegetation through foraging and movement, disrupting habitat structure and further impacting water quality.
- ✓ **Hybridization with native species:** Mallards readily hybridise with native dabbling ducks, such as the critically endangered New Zealand grey duck *(Anas superciliosa)*, leading to genetic dilution and potential loss of unique native species. This hybridisation can threaten the genetic integrity and survival of native duck populations.
- ✓ **Competition for resources:** Mallards are aggressive and adaptable, often outcompeting native waterbirds for food, nesting sites, and habitat space. Their dominance can lead to declines in native species populations and reduced biodiversity.
- ✓ **Disease transmission:** Dense congregations of mallards can serve as reservoirs for pathogens, increasing the risk of disease transmission to other waterfowl and potentially to humans.

## Mallard and mallard - grey duck hybrid management options

A number of possible control strategies for mallard ducks are outlined in Table 3.

***Table 3:*** *Suggested control methods for mallard and mallard-grey duck hybrids at Creamery Ponds Reserve.*

| Control method | Description | Priority |
|---|---|---|
| Enhance riparian vegetation cover | Plant and bolster dense native vegetation around lake margins to reduce open water areas and roosting areas favoured by mallards. | **High priority** |
| Avoid artificial feeding areas | Continue to restrict peoples access to the water's edge to discourage the creation of feeding spots that can attract large flocks of mallards. | **High priority** |
| Create shallow, vegetated wetlands | Over time, manage lakes to transition toward wetlands with shallow depths and abundant emergent plants to support species like (E.g.) New Zealand scaup and paradise shelduck, which prefer such environments. | **Medium priority** |
| Microhabitat diversification | Create a wider variety of microhabitats, such as shallow pools with dense vegetation, to provide suitable nesting sites for native species, potentially giving them a competitive advantage over mallards | **Medium priority** |
| Restrict access to-and-from water | Design pond margins to restrict areas where ducks have direct access from the water to grass and/or paths, and where humans have direct access to the water where they could feed ducks | **High priority** |
| Educational signage | Install 'no feeding' signs and raise public awareness by installing interpretation about the importance of native waterbirds and the issues caused by mallard hybrids. | **Medium priority** |
| Citizen science | Support community volunteers to carry out monthly counts and reporting to monitor population dynamics and inform management decisions | **Medium priority** |

# Ecological values

Despite its human-constructed nature, in 2014 Creamery Ponds Reserve was evaluated against the criteria for determining significant indigenous vegetation and significant habitat of indigenous fauna listed in Appendix 3 of the Canterbury Regional Policy Statement (Environment Canterbury, 2013). Under these criteria the site was ecologically significant because it met representativeness (criteria 1), rarity/distinctiveness (criterion 4), and ecological context (criterion 8) criteria. Details of this assessment is provided in **Appendix 1**. Today the site still remains significant under these criteria and in-fact Australian coot and NZ scaup numbers have increased.

## Botanical values

No original remnant indigenous vegetation occurs at this site. All other indigenous plants throughout the reserve have either been planted as part of programmes of riparian planting (Figures 10 & 11), lizard habitat establishment (Figure 12), or amenity planting associated with the new subdivision (Figure 13).

***Figure 10:*** *Established riparian planting on wester side of main pond at Creamery Ponds Reserve (Photograph A. Shadbolt 2025).*

***Figure 11:*** *Narrow riparian planting as part of recent upgrade of Creamery Ponds stormwater facility (Photograph A. Shadbolt 2025)*

***Figure 12:*** *Planting associated with lizard habitat establishment at Creamery Ponds Reserve (Photograph A. Shadbolt 2025).*

***Figure 13:*** *Recent amenity plantings along Creamery Ponds Reserve interface with new subdivision (Photograph A. Shadbolt 2025)*

# Avifauna values

Fifty bird species - including 30 indigenous species - have been recorded in Creamery Ponds Reserve since 2005 **(Refer Appendix 2)**. These include eight resident indigenous species, and 15 resident introduced species. Seasonal/regular visitors (occurring annually, in certain seasons or sporadically over the year) include 11 indigenous/migratory and two introduced species, and irregular visitors (which occur annually or near-annually with no obvious pattern or frequency) comprise five indigenous species. Vagrants (those recorded less often than once every five-years) include three indigenous species (Table 4).

***Table 4:*** *Status of bird species recorded from Creamery Ponds Reserve (Source Christchurch City Council 2025).*

| Status | Indigenous & migratory species | Introduced species | Total |
|---|---|---|---|
| Resident | 2 | 4 | **6** |
| Resident with seasonal pop. influxes | 8 | 13 | **21** |
| Seasonal/regular visitor | 11 | 2 | **13** |
| Irregular visitor | 6 | 1 | **7** |
| Vagrant | 3 | 0 | **3** |
| **Total** | **30** | **20** | **50** |

## Bush birds

Currently there is no significant habitat for indigenous bush birds at Creamery Ponds Reserve, apart from a small number of mature large exotic trees scattered along the eastern and northern perimeters of the reserve that may support common visitors like New Zealand fantail, silvereye or grey warbler. Even once c.1.5 ha native forest and shrubland is established, Creamery Ponds Reserve would not support viable bush bird population in the long term on its own, however, it would be a key contributor to a city-wide bush bird meta-population **-** a population of populations that allows for some dispersal between patches (see also Meurk & Hall 2006). Because several native bush birds have already been recorded at restored sites of similar sizes across Ōtautahi-Christchurch, native bush birds can be expected to increase in both diversity and abundance as habitat restoration is carried out and as the habitat matures.

## Waterbirds

To-date, 24 indigenous and four exotic waterbird species (including gulls, waders, kingfishers, cormorants, harriers, swallows, and waterfowl) have been recorded at the site **(refer Appendix X)**, Of the exotic species, mute swans - a totally protect species – have been regular visitors for many years and breed on the ponds.

### Grey duck/pārera

There remains a small but often overlooked resident breeding population of grey duck/pārera (Threatened – Nationally Vulnerable) (Figure 14) surviving locally in saltmarshes and densely vegetated freshwater wetlands across Ōtautahi-Christchurch. The council's ornithologist has highlighted the ponds at Te Waoku Kahikatea Reserve in the Marshland area as one of the sites with the most regular occurrences of this species in the city and has similar sized waterbodies as Creamery Ponds Reserve (Refer Figure 15). This reinforces the opportunity and need to continue to develop optimum habitat for this species and other indigenous waterbirds and to protect them from human disturbance. A threatened species recovery plan for grey duck/pārera is currently being prepared by Council's Parks Biodiversity Team and will contain a range of recommendations that can be applied to Creamery Ponds Reserve.

***Figure 9:*** *A pair of grey duck/pārera at The Groynes Reserve, Northwest Ōtautahi-Christchurch (Photograph A. Crossland 2005).*


***Figure 8:*** *Te Waoku Kahikatea Reserve (left) in the Marshland area has one of the most regular occurrences of grey duck/ pārera in Ōtautahi-Christchurch and has similar sized areas of open water (c.1.09 ha) compared to Creamery Ponds Reserve (right) with c.1.05 ha open water.*

## Actions

- ✓ Bolster lake margin planting (including in-filling areas of open exotic grass and establishing emergent rushes) to remove optimum habitat for mallard and Canada geese,
- ✓ Design and install fine-scale habitat features such as roosts and emergent logs around lake margins to favour (E.g.) grey teal and cormorants,
- ✓ Maintain an effective vegetated buffer between the ponds, walkway and residential land uses to minimise wildlife disturbance,
- ✓ Construct viewing hide at strategic location to provide optimal low/no impact wildlife viewing,
- ✓ Designate and enforce Creamery Ponds Reserve as a dogs-on-lead only site,
- ✓ Implement the recommendations of the planned grey duck threatened species recovery plan, and
- ✓ Continue to carry out predator and pest animal control in collaboration with community partners and reserve neighbours.

# Herpetofauna values

The greater Ōtautahi-Christchurch area provides habitat for up to five species of native lizard (Table 5), all of which are 'absolutely protected' under the Wildlife Act 1953, s63 (1) (c), and lizard habitats are protected by the Resource Management Act (1991). At any site where lizards and/or their habitat has been identified, we are required to adhere to legislation outlined in the Wildlife Act, and the Christchurch City Councils Biodiversity Strategy to protect rare and threatened native biodiversity; understanding that it is unlawful to disturb or destroy protected wildlife or any protected game species.

***Table 5:*** *Five indigenous lizard species occurring on the greater Ōtautahi-Christchurch area.*

| Common Name | Scientific Name | Conservation Status |
|---|---|---|
| Southern grass skink | *Oligosoma aff. polychroma*, Clade 5 | At Risk - Declining |
| McCann's skink | *Oligosoma maccanni* | Not Threatened |
| Canterbury spotted skink | *Oligosoma aff. lineoocellatum* | Threatened - Nationally critical |
| Waitaha gecko | *Woodworthia cf. brunnea* | At Risk - Declining |
| Jewelled gecko | *Naultinus gemmeus* | At Risk - Declining |

Indigenous lizard species often occupy habitats of otherwise low ecological value (i.e., weedy vegetation and vegetation margins) and are very cryptic species, making them difficult to detect and identify. Areas of vegetation such as exotic grasses, vines, shrubs, trees, and dense vegetation such as toetoe and harakeke often provide suitable habitat for indigenous lizards. Animals may also be found sheltering beneath objects (natural or manmade) that provide cover, such as pieces of wood, rocks, bricks etc.

In 2021, a lizard survey carried out as part of the adjacent Sabys Estate subdivision detected the presence of southern grass skink (Figure 16) in an area proposed for extension of the ponds for stormwater purposes. As a result, the developer was required to design and establish an appropriate lizard habitat on an island area **(Refer Appendix 6)** to enable salvage from the impacted area, release onto the island, and management of the population in the short term. This work involved:

- ✓ Creation of rock piles and stacks to create basking habitat and shelter,
- ✓ Stacks of logs salvaged from site demolition to provide refugia,
- ✓ Establishing appropriate indigenous vegetation to the area, planted densely in places to provide habitat for skinks with an area of open grassland at the island's centre, and
- ✓ Predator control.

***Figure 16:*** *Southern grass skink (Photograph A. Shadbolt 2025).*

As part of these conditions, predator proof fencing was proposed to be installed at both ends of the island to help prevent and/or reduce predation of the skinks. The fence was to include pedestrian access gates to allow access for maintenance only. This fencing was never installed, leaving translocated lizards exposed to increased disturbance and predation as the Sabys Estate and other residential developments establish and grow.

As part of further planning for further lizard translocations to Creamery Ponds Reserve, a lizard survey will need to be completed. This survey will determine the size of the existing population which will in-turn inform how many animals we will be able to release so that we do not exceed the sites carrying capacity.

### Actions

- ✓ Optimise lizard carrying capacity at key locations through planting of lizard supporting species, creating fine scale habitat features, and carrying out targeted pest animal contro,
- ✓ Limit domestic and feral cat access to lizard habitat by constructing two short sections of pest proof fence across headlands, and
- ✓ Incorporate signage and interpretation at strategic locations highlighting the importance of the site for native lizards.

## Freshwater aquatic values

Although no aquatic ecology surveys have been done within the reserve's ponds and naturalised waterways, they link to Knights Stream – a tributary of the Huritini-Halswell River - which has high ecological values. Aquatic fauna (fish and aquatic invertebrates) have unrestricted access to the reserve's ponds and further upstream to a network of spring-fed farm drains and watercourses.

### Actions

- ✓ Conduct survey of aquatic fauna,
- ✓ Commence a programme of regular water quality monitoring of ponds, including pond inflow and outflow, and
- ✓ Work with freshwater ecologists to design and incorporate various habitat modifications and fine scale features to support indigenous aquatic fauna.

## Invertebrate values

No formal systematic invertebrate surveys have yet been carried out at Creamery Ponds Reserve. There may be opportunities to conduct formal invertebrate surveys to collect baseline species composition and population data either through engaging a specialist entomologist(s), supporting student research programmes or by including the site in annual city-wide bio-blitz or similar event. As new plantings at Creamery Ponds Reserve establish and begin to provide appropriate habitat, re-introductions/ translocations of appropriate invertebrate species could be carried out.

### Actions

- ✓ Work with community partners (e.g., Lincoln University, a future Huritini-Haswell River Stream-care Group) to design and commence a programme of terrestrial invertebrate monitoring using such techniques as (E.g.) sweeping & beating, pitfall traps, malaise traps and light traps,
- ✓ Continue to enhance habitat to support indigenous terrestrial invertebrates through the planting of specific native plants and introduction of fine scale habitat features, and
- ✓ Work with entomologist(s) to develop a terrestrial invertebrate reintroduction plan.

# Proposal

The main developments (Refer Table 6 & Figure 17) we propose for Creamery Ponds reserve include ecological restoration of the pond margins, island, lizard habitat (including short sections of pest proof fence), proposed forest ad shrubland areas, and the construction of a series of recreational paths and boardwalks.

These pathways will be complemented by a series of visitor experience features including entry signs, park maps, wayfinding markers, novel interpretation features, a picnic area and bird hide.

**Table 6:** Prioritised development projects for the Creamery Ponds Reserve.

| Item | Key | Quantity | Priority |
|---|---|---|---|
| **Access** | | | |
| Construct 2.6 m wide chip surfaced paths | B | 640 m | 2 |
| Construct timber boardwalks | G | 100 m | 2 |
| Plan for future walkway link upstream along Creamery Drain | J | - | 3 |
| Maintain maintenance vehicle access and provide open space beside lake | D, E | 1 | 1 |
| Remove and/or upgrade/replace old wooden farm bridge | Q | 1 | 3 |
| Maintain maintenance access to weir area, including weed stockpiling/removal | R | 1 | 1 |
| Maintain foot access for maintenance along wetland bund (not public access) | S | 1 | 1 |
| **Visitor experience** | | | |
| New road frontage gates with integrated artwork | A | 2 | 3 |
| Install new entrance sign and park map southern reserve entry points | A | 2 | 2 |
| Install interpretation on slot weir and function of stormwater facility | O | 1 | 2 |
| Install new entrance sign and park map at eastern reserve entry points | K | 2 | 2 |
| Construct bird viewing hide, picnic area and interpretation | E | 1 | 3 |
| **Habitat restoration** | | | |
| Plant native shrubland along Sabys Road frontage | A | 750 $m^2$ | 2 |
| Plant 10 m wide forest edge plant assemblage | P | 5000 $m^2$ | 2 |
| Naturalise and plant swale along western boundary of reserve | C | 170 m | 2 |
| Establish dense riparian margin planting | F | 10,000 $m^2$ | 1 |
| Naturalise drain and establish riparian woodland/shrubland | T | 1000 m2 | 2 |
| Plant dense native forest and shrubland | H | 14,000 $m^2$ | 1 |
| Underplant willows with native trees/eventual removal of willows | I | 800 $m^2$ | 2 |
| Bolster residential interface plantings to create effective buffer | L | 3800 $m^2$ | 1 |
| Construct short sections of pest proof fence | M | 2 | 2 |
| Enhance lizard habitat with enrichment planting and habitat features | N | 1900 $m^2$ | 2 |
| Place logs and stumps in/around ponds and roosting & habitat features | F | 20 | 1 |

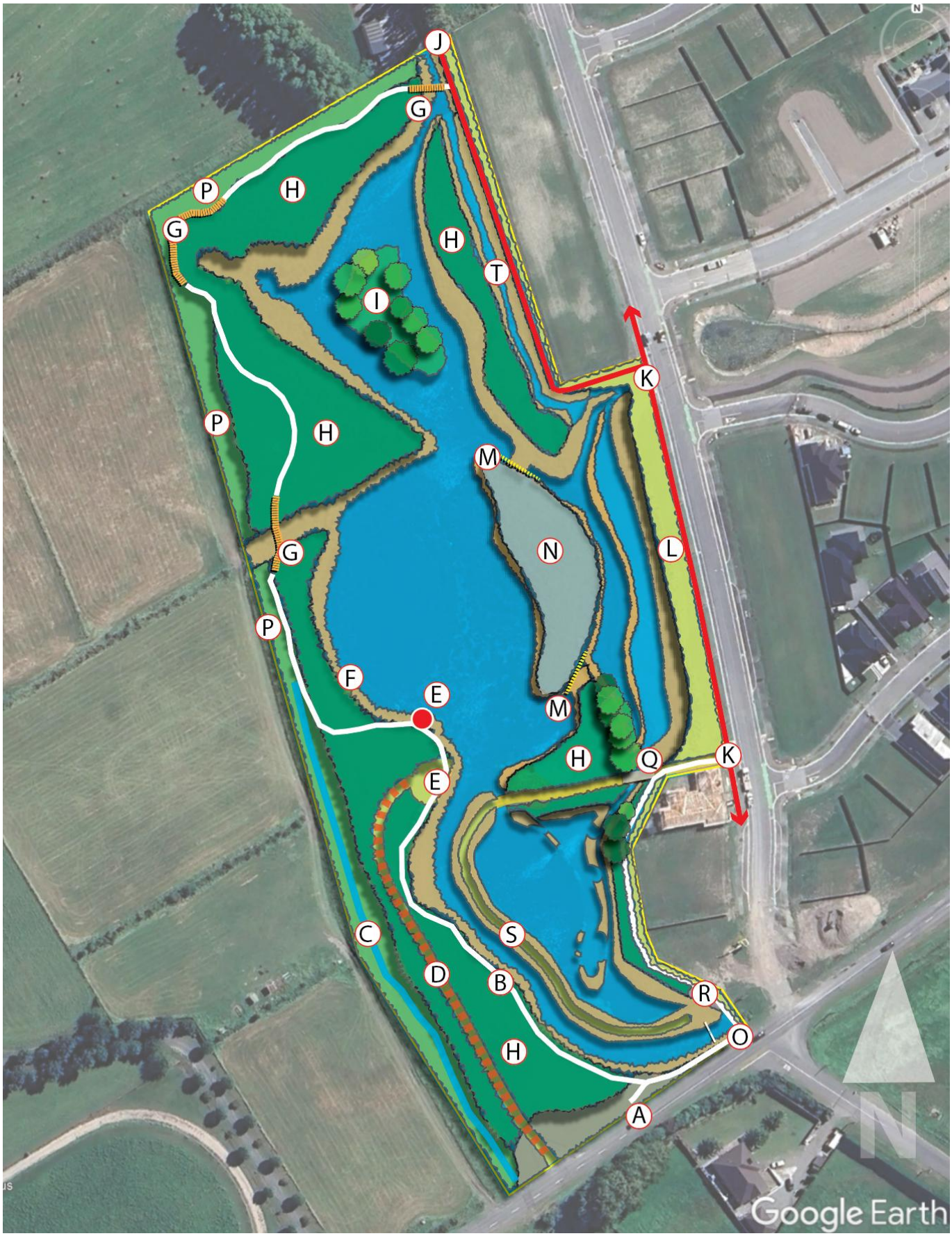



***Figure 10:*** *Development plan for Creamery Ponds Reserve.*

# Ecological restoration

Successful restoration of Creamery Ponds Reserve sees the entire site restored as an authentic indigenous forest dominated riparian ecosystem. This will involve:

- ✓ **Restoration planting:** Planting large mown grass areas with native forest and shrubland, thickening riparian buffers, and bolstering the eastern residential interface.
- ✓ **Managing lizard habitat:** Managing open areas on the reserve as lizard habitat through managing exotic grass, establishing suitable groundcover and shrub species, and providing lizard refuge areas of woody debris and rock/stone.
- ✓ **Buffering reserve from adjacent land-uses:** We will bolster the eastern boundary of the reserve by supplementing existing planting areas with dense native trees and shrubs to mitigate human disturbance and artificial light impacts on the wildlife. We will also establish dense buffers around west and north boundaries ahead of future residential development.
- ✓ **Managing human disturbance:** We will construct a series of walkways and boardwalks around the reserve that provide visitors with good access to urban wilderness while preserving large undisturbed/inaccessible areas for significant wildlife populations to be maintained.
- ✓ **Interpretation and wayfinding signage:** As part of developing Creamery Ponds Reserve, we will design and install a range of visitor experience features that help to educate visitors about the ecological values and vulnerabilities of the site.
- ✓ **Controlling dogs:** Because dogs pose a significant risk to wildlife (both disturbance and predation), at the time of the next dog control bylaw review we propose to designate Creamery Ponds Reserve as either a 'dogs prohibited' area, or dogs to be strictly on leash throughout the reserve.
- ✓ **Pest plant control:** Surveillance and eradication of pest plant species and exotic woody vegetation throughout the reserve.
- ✓ **Pest animal control:** As habitats mature and begin to support wildlife populations that are at risk of predation, we will consider pest animal control.
- ✓ **Managing domestic cats:** We will investigate a range of novel solutions to increases in domestica cats as residential subdivisions expand in the vicinity of the Reserve. This may include managing effective moating around key wildlife areas, installing cat-proof *'gated bridges',* or other emerging cat deterrence technologies that are being researched by Manaaki Whenua Landcare Research and others.
- ✓ **Problem waterfowl:** Through considerate design and habitat manipulation we hope to discourage problem waterfowl like Canada geese and large population of mallard whilst encouraging smaller but more diverse populations of native waterbirds and bush birds.
- ✓ **Fine-scale habitat features:** We will incorporate and maintain a range of fine-scale habitat features throughout the reserve and pond areas to support waterbirds, bush birds, invertebrates and lizards.
- ✓ **Enrichment planting:** Once planted areas have established we will commence a programme of enrichment planting with under-represented species, and introduction of with new species (as appropriate microclimates develop.
- ✓ **Reintroduction of invertebrates:** Once established, we will work with community partners to reintroduce a range of suitable indigenous invertebrates into Creamery Ponds Reserve.

## Restoration zoning

To aid planning, the reserve area has been separated into seven distinct zones (Figure 20), based on distinct ecosystem types or other characteristics. These zones include:

1) **Lake and riparian margins (10,000 m²):** The reserve contains almost two kilometres of riparian margin that is dominated by areas of planted and self-established pukio sedges and rushes, and long stretches of mown turf to near the water's edge. We will continue to plant the remaining unplanted areas and bulk up other areas to create an average 5 m width of (e.g.) sedges, harakeke, and manuka that grade into taller forests beyond providing an effective buffer and habitat.

2) **Island (800 m²):** An island in the northern arm of the main lake is characterised by its coverage of crack willow trees which provide valuable cover for native waterfowl including Australian coot and grey teal. We will continue to manage these willows for their important wildlife habitat values, and underplant with a selection of native trees that will be capable of one day replacing the willows.

3) **Residential interface (3800 m²):** The entire 420-metre eastern side of Creamery Ponds Reserve is dominated by new residential development including houses, residential streets, street lighting, amenity-style planting, and small areas of mown roadside berm. We will bolster this planting with trees and shrubs capable of screening residential activities and artificial light to minimise wildlife disturbance. Over time we will also replace exotic, non-local natives, and/or native cultivar plant species with eco-sourced native species along this interface to better blend with the wider reserve.

4) **Lizard habitat (1900 m²):** A former island has been linked to the adjacent land as part of a stormwater management scheme and developed as an area for release of salvaged lizards with lizard-friendly planting and fine-scale habitat features. We will construct two short sections of predator proof fence at the headlands where the former island now connects to land to prevent domestic cats from accessing the island. We will also continue to enhance lizard habitat and lizard populations through enrichment planting, providing additional fine-scale habitat features, and carrying out predator control.

***Figure 18**: From top: lake margins, island (rear-ground), residential interface, and lizard habitat at Creamery Ponds Reserve (Photographs, A. Shadbolt, November 2025).*

5) **Native forest (14,000 m²):** Aside from the ponds and waterbodies, the most dominant feature of the reserve is the wide, open area of regularly mown grass. These areas will be restored as native forest and shrubland to complement other ecological values of the reserve and contribute to a city-wide native forest patch network. Prior to planting, we will deep rip the compacted soils to aid tree root development and improve plant establishment, carry out fine-scale earthworks to create diverse ground profiles, and import logs and tree stumps for fine scale habitat.

6) **Rural interface - including southwestern drain (5000 m²):** The 515-metre length western and northern boundaries abut private grazed pastureland. We will plant a wide band (average ten-metre) of forest edge species along these boundaries and naturalise the drain running along the western boundary with fine-scale earthworks and riparian planting. Naturalisation of the drain will involve minor re-grading to achieve more natural stream and a riparian planting design that mimics authentic plant compositions but still provides effective drainage.

7) **Sabys Road frontage (750 m²):** The 120-metre Sabys Road frontage is characterised by relatively high fill material excavated from ponds within the reserve and/or material imported from nearby sites, limiting views into the reserve beyond. We will plant this area out with drought tolerant native shrubland and low groundcovers as an attractive entrance to the reserve.

8) **Northeast drain (1000 m2):** This 150 m length wet swale is the former channel of Creamery Drain prior to excavation of the Creamery Ponds. We will plant this ephemeral waterway with sedge, harakeke and mikimiki -dominant riparian vegetation to form a dense buffer between houses and the forest and wetland complex beyond.


***Figure 11:*** *From top: Open grass areas to be planted as native forest, the rural interface along the western and northern boundaries, and the Sabys Rad frontage (Photographs, A. Shadbolt, November 2025).*

**Note:** Species lists for each of the seven zones are provided in **Appendix 3**, including a list of species to be planted as enrichment plantings as the forest and riparian areas mature

Guidelines for staff and volunteers for planting establishment are included in **Appendix 4**.

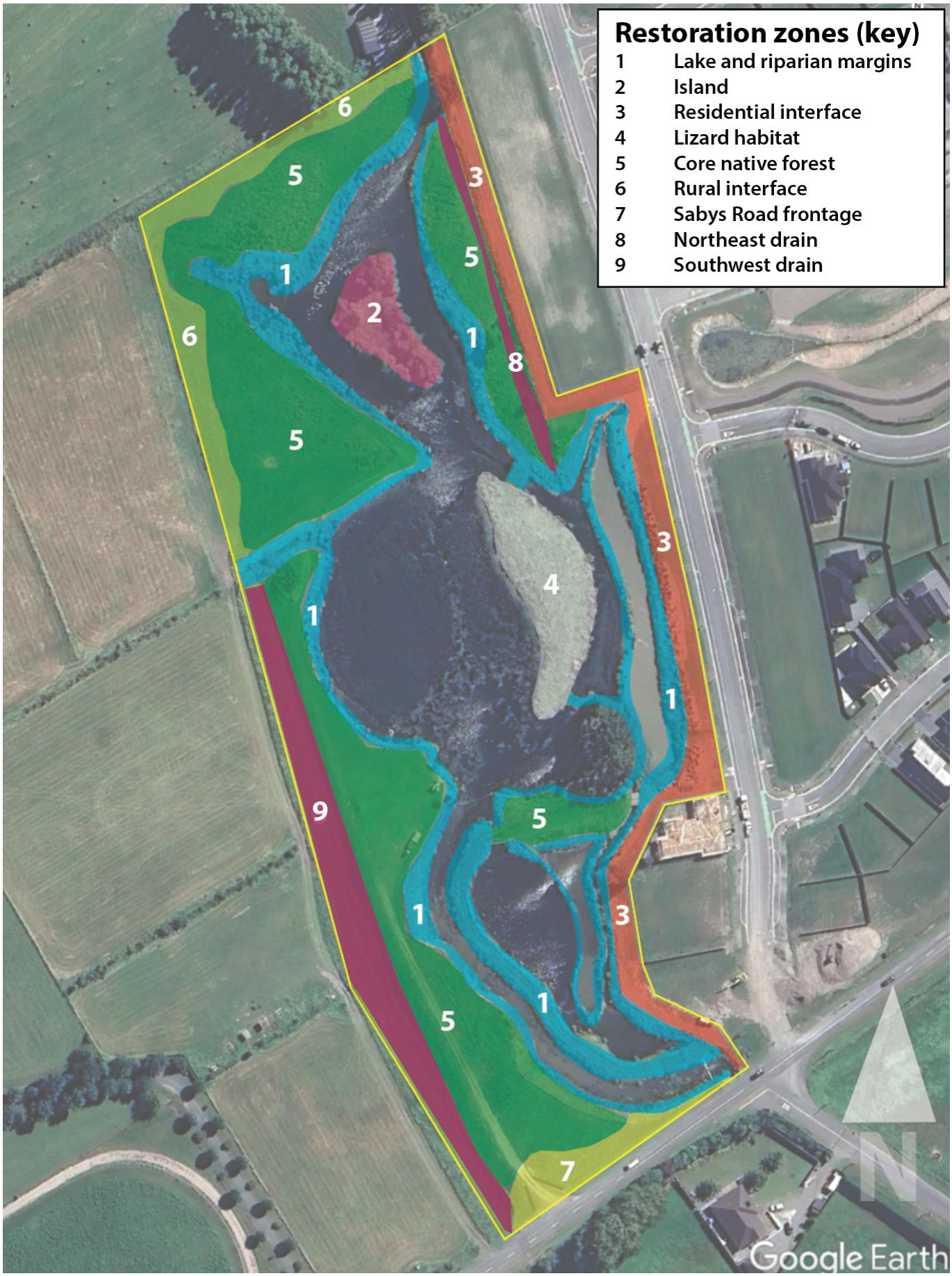



***Figure 20:*** *Restoration zoning plan for Creamery Ponds Reserve.*

# Planting

## Species selection

As part of the Council's 'Agenda 21' project undertaken by Lucas and Associates[3], the land surfaces of Ōtautahi-Christchurch were mapped for their approximate age, soil development, drainage, analogy with surviving remnants and historic accounts of the former natural mature vegetation/ecosystems. Each area was reconstructed as a model to be used as a guide for restoration, and plant lists were compiled for each of the ten original indigenous ecosystems including trees, shrubs, scramblers and ground covers.

The Lucas & Associates maps show the Creamery Ponds Reserve mostly located on moist and deep Kaiapoi soils to the northwest and moist and deep Waimakariri soils to the south (Figure 21). In reality though, these soils have been significantly modified by historic farming practices and by subsequent earthworks associated with creating constructed ponds and waterways since the early 2000s. The soil types described in Lucas and associates should therefore be used as a guide only, and further restoration activities will be guided by fine-scale site assessment. However, species likely suitable for planting at Te Waoku kahikatea will be selected from two key Lucas and Associates lists, including:

- ✓ **'Houhere/Piwakawaka – Kōhūhū'** mid age plains ecosystem, and
- ✓ **'Totara/Bellbird – Matai'** older plains ecosystem

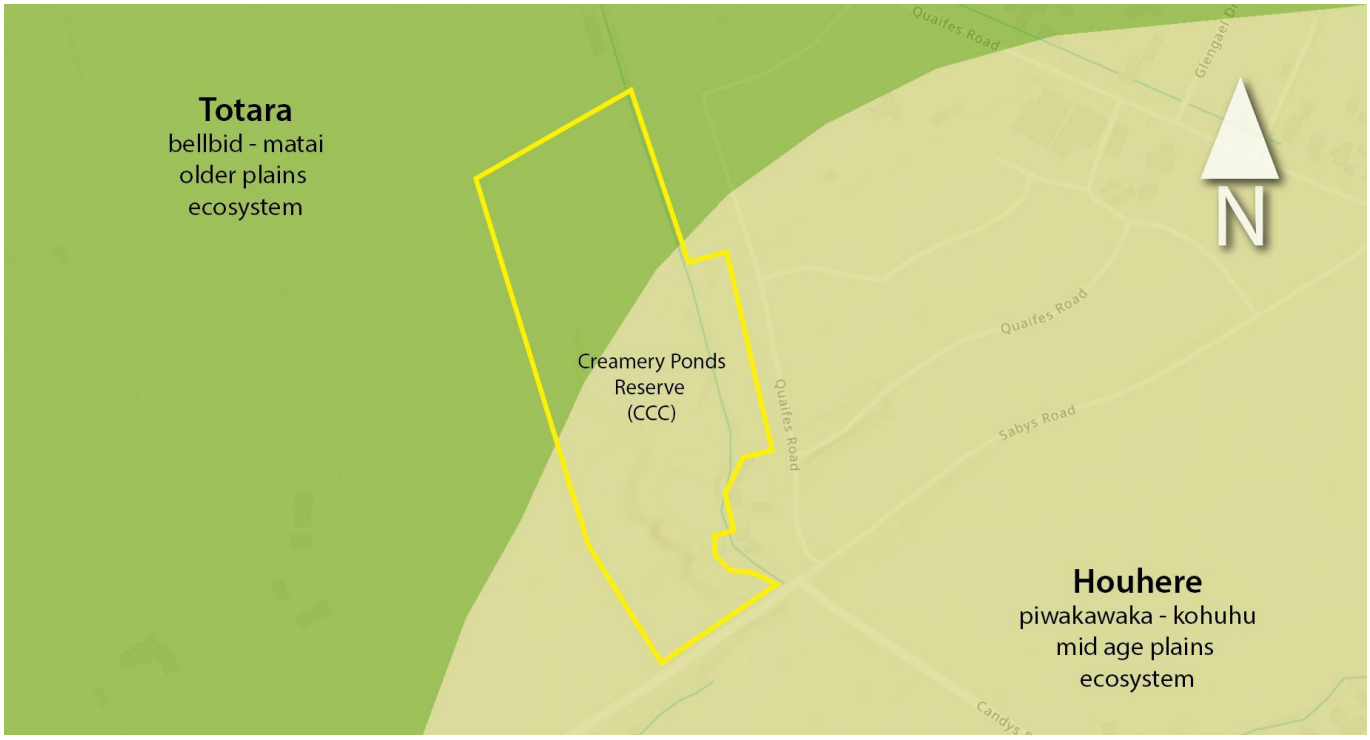



***Figure 21:*** *Location of Creamery Ponds Reserve (yellow polygon) in relation to various ecosystem types based on underlying soils (Source: Lucas and Associates Indigenous Ecosystems of Ōtautahi Christchurch).*

**NOTE: All species used for forest restoration planting at Creamery Ponds Reserve shall be eco-sourced from naturally occurring vegetation remnants found on the Low Plains Ecological District or nearest appropriate location as approved by Council's parks ecologist.**

oveler[3]https://www.lucas-associates.co.nz

## Path edge planting

Because wildfire ignition susceptibility is often more a result of lower levels of management of long exotic grass growing along path edges rather than fuel loads produced by the restoration plantings themselves, we intend to plant path edges relatively densely with indigenous vegetation that will smother exotic grasses. This will remove an ongoing source of exotic weeds and increase indigenous vegetation and habitat throughout the reserve.

Densely planting these margins will also result in lower maintenance requirements for these areas. As forest plantings mature and form a closed canopy across pathways, rank exotic grasses will be shaded out helping further reduce ignition susceptibility.

Species suited to path-edge planting include (but not limited to) those listed in Table 7 (below). This list is based on species' fire risk ratings from Lucas Associates Indigenous Ecosystems of Ōtautahi-Christchurch. Note that at the time of writing, only around 1/3 of the species in the Lucas Associates lists have fire risk ratings, and therefore there are likely to be other species from those lists that could be used also but will need to be assessed on a species-by-species and specific location/setting basis.

***Table 7:*** *Low and medium fire risk species suitable for path edge planting as listed in Lucas Associates Indigenous Ecosystems of Ōtautahi-Christchurch.*

| Botanical name | Common name | Fire risk |
|---|---|---|
| *Aristotelia serrata* | wineberry | Low |
| *Carpodetus serratus* | marbleleaf | Low |
| *Coprosma crassifolia* | thick-leaved mikimiki | Medium |
| *Coprosma propinqua* | mikimiki | Low |
| *Coprosma robusta* | karamū | Medium |
| *Fuchsia excorticata* | tree fuchsia | Low |
| *Griselinea littoralis* | kāpuka/broadleaf | Low |
| *Hoheria angustifolia* | houhere/South Island lacebark | Medium |
| *Leucopogon fasciculatus* | dwarf mikimiki | Medium |
| *Leucopogon fraseri* | patotōtara (a dwarf heath) | Medium |
| *Melicytus ramiflorus* | māhoe/whiteywood | Low |
| *Myrsine australis* | red maupo | Low |
| *Pennantia corymbosa* | kaikōmako | Low |
| *Pittosporum eugenioides* | lemonwood | Medium |
| *Pittosporum tenuifolium* | kōhūhū | Medium |
| *Plagianthus regius* | mānatu/lowland ribbonwood | Low |
| *Prumnopitys ferruginea* | miro | Medium |
| *Prumnopitys taxifolia* | matai | Medium |
| *Pseudopanax arboreus* | five-finger | Low |
| *Pseudopanax crassifolius* | lancewood | Low |
| *Rubis cissoides* | tataramoa | Medium |
| *Schefflera digitata* | seven-finger | Low |
| *Sophora microphylla* | South Island kowhai | Low |

## Fine-scale habitat features

Over the years, a number of fine scale habitat features can be designed and incorporated into Creamery Ponds Reserve. These features will be developed and installed under the supervision of Council's ecologists, and may include:

- ✓ **Incorporation of woody debris, logs, and stumps into planting areas.** Because natural forests and woodlands have a high proportion of downed woody debris in their understories, it is desirable to arrange for logs and stumps to be placed prior to planting. Supply of this type of material can normally be easily arranged with local arboricultural contractors who are working in the area, as dropping it at convenient pre-arranged locations often helps them avoid transportation and disposal costs.
- ✓ **Artificial roosts and shoreline complexity.** We will incorporate a range of waterbird habitat features around the margins of the larger ponds. This may be as simple as pushing large logs out into the lake - perpendicular with the shoreline - for roosting or installing specially designed natural wood features.
- ✓ **Retention of dead tree spars to replicate storm damage in forests.** Natural forests and woodlands also typically have a high proportion of standing deadwood (dead trees and spars). We can incorporate these elements where they do not pose a safety risk by either intentionally killing selected exotic trees and leaving them standing, or by not removing them if/when they die naturally.
- ✓ **Fine-scale excavations to create damp hollows.** Often when we plant native forests and shrublands, we do not consider fine scale variation in topography. It is important to consider and incorporate this prior to planting with the intention of creating (E.g.) the types of humps and hollows created by up-turned root plates or other natural disturbances in natural ecosystems.
- ✓ **Creation of small islets.** Instead of having a uniform lake margin, we can easily create shoreline complexity by either constructing small islets out from the lake margins, or by encouraging rushes and sedges to establish on (E.g.) emergent ponga logs dug into the lakebed that will coalesce to form small islands over time This technique has been successfully used at Te Waoku Kahikatea Reserve.

***Figure 22:*** *Retaining standing deadwood (top) and fine-scale excavations (bottom) in restoration sites add to habitat structural complexity (Photographs A. Shadbolt).*

- ✓ **Wood and stone piles for lizards.** Wood and stone piles have already been incorporated into the lizard habitat area at Creamery Ponds Reserve. While the stone piles are not likely to need replacement, the wood piles will eventually break down over time and need replenishment. We will also incorporate wood and stone piles into the forest and shrubland plantings throughout the reserve – particularly around the forest margins – so that the wider reserve area can better cater for lizards.

***Figure 23:*** *Ancient totara stumps installed throughout the lower sections of Te Waoku Kahikatea Reserve, Marshland, are now supporting native seedling growth (Photograph: A. Shadbolt 2024).*

## Enrichment planting

Typically, many species in restoration plantings are represented by only a small number of individuals. While some species may have been naturally rare in local native forests, we have the opportunity to establish larger, more viable populations of under-represented species through enrichment planting.

We will also establish populations of locally appropriate species that will have not yet been planted at the site and would also be unlikely to establish on their own due to the absence of nearby seed sources. Enrichment species may include:

- ✓ Forest floor species,
- ✓ Understorey species,
- ✓ Sub-canopy species,
- ✓ Canopy and emergent species,
- ✓ Climbers, and
- ✓ Epiphytes.

Enrichment planting will be undertaken once our plantings have matured further and are providing sheltered micro-climates that can support these types of enrichment plantings.

They will generally be planted in clusters of 3 – 7 individuals, comprising either single species or complementary species combinations, to establish a series of micro-refugia.

Clusters will be spaced at intervals of 4 – 6 metres, replicating natural regeneration patterns and enhancing local microclimates, while also supporting understorey connectivity and allowing for ongoing canopy regeneration.

Within each cluster, plants will be spaced 0.5 – 2 m apart depending on the types of plants, for example:

- ✓ Ground/low ferns & small seedlings: 0.5 – 1.0 m,
- ✓ Small shrubs and juvenile understorey trees: 1.0 – 2.5 m, and
- ✓ Climbers: within 1.0 m of a support tree/shrub.

***Figure 24:*** *Early enrichment plantings of native clematis* (Clematis paniculata) *at Te Waoku Kahikatea Reserve, Marshland (Photograph: A. Shadbolt 2025).*

***Figure 25:*** *Seven-finger* (Schefflera digitata) *planted as part of enrichment planting at Te Waoku Kahikatea Reserve, Marshland (Photograph: A. Shadbolt 2025).*

***Figure 26:*** *Planting enrichment species in the forest understorey at Te Waoku Kahikatea Reserve, Marshland (Photograph: A. Shadbolt 2025).*

## Ongoing management

Ongoing management of the site following the initial 24-month maintenance period shall be limited to the following activities.

- ✓ Managing the ponds and waterways as part of a wider stormwater management system in a manner compatible with wildlife management objectives, including programmed removal of aquatic weed by Councils Land Drainage Team contractors
- ✓ Ongoing planting of understorey species and enrichment plantings as appropriate microclimates develop,
- ✓ Encourage the establishment and growth of podocarps, other emergent species, and under-represented tree species by creating canopy openings through the selective removal or pruning of competing trees,
- ✓ Control of woody weeds and vines throughout planted areas (E.g., karo, grey willow, sycamore, Chilean mayten, cherry, North Island lacebark, old man's beard, ivy),
- ✓ Control of grass and herbaceous weeds around the periphery of the forest areas, and particularly along pathways for both aesthetics and wildfire mitigation,
- ✓ Ongoing pest animal control as required (including community-led pest control),
- ✓ Monitoring of lizard populations and pest animal control as required by Lizard Management Plans,
- ✓ Removal and disposal off-site (or re-use on-site) of plant guards, rubbish and debris, and
- ✓ Careful pruning/vegetation clearance along the walkway to ensure the walkway remains un-obstructed whilst still maintaining the natural character of the reserve.

***Figure 12:*** *Volunteers assisting with ongoing maintenance at Te Waoku Kahikatea Reserve, Marshland (Photograph A. Shadbolt 2024).*

# Implementation

We intend to continue to establish and further enhance restoration plantings and wildlife habitat at Creamery Ponds Reserve through various funding streams, including:

- ✓ Council's capital (CAPEX) budgets for Regional Park green assets (E.g., planting new areas),
- ✓ Council's operational (OPEX) budgets for Regional Parks management (E.g., in-fill and weed control),
- ✓ Council's 3-Waters capital (CAPEX) budgets for waterway restoration and enhancement,
- ✓ Council's Land Drainage operational (OPEX) for general waterway maintenance and pest plant control,
- ✓ Council's rolling programme of urban forest planting,
- ✓ Council's programme of establishing habitat for translocated lizard populations.
- ✓ Potential third-party funding and/or in-kind support, for example:
    - ✓ New Zealand Conservation Trust,
    - ✓ Conservation Volunteers New Zealand,
    - ✓ Trees for Canterbury,
    - ✓ Schools,
    - ✓ Corporate support,
    - ✓ Rotary,
    - ✓ A future Huritini-Halswell River stream care group,
    - ✓ Local developers needing to salvage and release lizards, and
    - ✓ Others.

***Figure 13:*** *Old farm bridge and eucalyptus trees on the eastern side pf Creamery Ponds Reserve (Photograph A. Shadbolt 2026).*

**Note: All activities and proposals listed in the restoration/development plan will be subject to Council's Long-Term Plan (LTP) and Annual Plan budgets, and/or third-party support.**

# References

Allibone, R., David, B., Hitchmough, R., Jellyman, D., Ling, N., Ravenscroft, P. & Waters, J. (2010). Conservation status of New Zealand freshwater fish, 2009. New Zealand Journal of Marine and Freshwater Research, 44(4): 271-287.

CCC (2004a) *Ōtautahi-Christchurch proposed lizard translocation release sites.* Christchurch City Council, Christchurch, New Zealand

CCC (2024a) *Ōtautahi-Christchurch (excluding Port Hills) native forest network.* Christchurch City Council, Christchurch, New Zealand

CCC (2024c) *Christchurch City Council operational pest animal management plan 2023 – 2033.* Christchurch City Council, Christchurch, New Zealand.

Crossland, A. C., and Crutchley, P. (2025) *Creamery Ponds Reserve Avifauna.* Christchurch City Council, Christchurch, New Zealand. (TRIM Reference 25/2543887).

Crossland, A. C. (2014a) Creamery *Reserve bird monitoring.* Unpublished Dataset, Christchurch City Council. (TRIM Reference 14/608059).

Crossland, A. C. (2014b) *Association of indigenous species; all species that are residents or regular visitors to a given habitat type in Christchurch/Banks peninsula.* Christchurch City Council. (TRIM Reference 14/756446).

Davie Lovell-Smith (2024) *Stormwater Operations and Maintenance Manual Creamery Ponds Stormwater Facility Country Downs & Sabys Estate.* Prepared for Christchurch City Council. Davie Lovell Smth, Christchurch, New Zealand.

de Lange, P. J., Rolfe, J. R., Champion, P. D., Courtney, S. P., Heenan, P. B., Barkla, J. W., Cameron, E. K., Norton, D. A., and Hitchmough, R. A. (2013) *Conservation status of New Zealand indigenous vascular plants, 2012.* New Zealand Threat Classification Series 3, Department of Conservation.

Environment Canterbury. (2013). *Canterbury Regional Policy Statement 2013.* Environment Canterbury.

Goodman, J. M., Dunn, N. R., Ravencroft, P. J., Allibone, R. M., Boubee, J. A. T., David, B. O., Griffiths, M., Ling, N., Hitchmough, R. A., and Rolfe, J. R. (2014) *Conservation status of New Zealand freshwater fish, 2013.* (New Zealand Threat Classification Series No. 7). Department of Conservation, Wellington

Harding, M. A. (2009) *Canterbury land protection strategy; a report to the nature Heritage Fund committee.* Nature Heritage Fund, Wellington, New Zealand

Lloyd, K., McClellan, R., Hutchison, M., Patrick, B., and Shaw, W. (2013) *Guidelines for the application of ecological significance criteria for indigenous vegetation and habitats of indigenous fauna in Canterbury region.* Report prepared for Environment Canterbury by Wildlands Consultants, Rotorua, New Zealand.

Lovis, J. (1995) Native ferns. In Molloy, B. (Ed) *Riccarton Bush: Pūtaringamotu.* Riccarton Bush Trust, Christchurch, New Zealand. Pp 116 – 143.

McCarthy, T. (2024) *Fire safety by design; development and application of a surface fuel loading assessment to determine ignition susceptibility of native recreational reserves.* Dissertation, University of Canterbury, NZ School of Forestry, Christchurch, New Zealand.

Meurk, C. D., and Hall, G. M. J. (2006) *Options for enhancing forest biodiversity across New Zealand's managed landscape based on ecosystem modelling and spatial design.* New Zealand Journal of Ecology 20 (1):

Molloy, B. (1995) *Records of native conifers and flowering plants.* In Molloy, B. (Ed) Riccarton Bush: Pūtaringamotu. Riccarton Bush Trust, Christchurch, New Zealand. Pp 116 – 143.

Robertson, H., Dowding, J., Elliott, G., Hitchmough, R., Miskelly, C. O'Donnell, C., Powlesland, R., Sagar, P., Scofield, P., Taylor, G. (2013) *Conservation status of New Zealand birds, 2012.* New Zealand Threat Classification Series 4, Department of Conservation.

Taylor, M. and W. Blair (2012). *Halswell and Heathcote aquatic values.* Christchurch, Aquatic Ecology LTD.

# Appendix 1: Ecological significance assessment

The Creamery Ponds Site of Ecological Significance (SES/LP/38) was assessed as significant in 2014 because it provided habitat for an assemblage of indigenous birds that are representative of freshwater lakes and ponds including two threatened and at-risk species and also supports at-risk longfin eel.

## Site description

The site includes a series of constructed ponds within a CCC reserve (Creamery Ponds Reserve), and their marginal vegetation, including both native sedges and rushes, and also rank grasses that are used for nesting and cover. Indigenous plant species within the reserve area are limited to those that have either been planted or naturally established around the margins of the lakes, while the balance of the reserve area remains undeveloped rank exotic pasture grasses. Downstream from Sabys Road, Creamery Stream is a natural but degraded watercourse that passes through private farmland before discharging into Knights Steam approximately 200 m upstream with its confluence with Halswell River.

## Extent of site of ecological significance

The SES area covers approximately three hectares and encompasses all the waterbodies within the Creamery Ponds Reserve. The SES extends back from the water's edge to the limit of the regularly mown grass areas, measuring approximately 10 m in width along the margins of the two northern ponds, and approximately 6 m in width along the margins of the southern pond as shown on the location map below. The width of the Creamery Stream SES downstream from Sabys Road is defined by the width of the stream between the top of banks to include the area of flowing water and marginal vegetation. Here the approximate width of the SES is ten metres.

## Assessment summary

The Creamery Pond site has been evaluated against the criteria for determining significant indigenous vegetation and significant habitat of indigenous fauna listed in Appendix 3 of the Canterbury Regional Policy Statement (Environment Canterbury, 2013) (see below) referring also to the Wildland Consultants (2013) Guidelines and advice from the relevant Specialist Ecologist Groups. Under these criteria the site is ecologically significant because it meets representativeness (criteria 1), rarity/distinctiveness (criterion 4), and ecological context (criterion 8) criteria.

## Representativeness

**Criterion 1:** *Indigenous vegetation or habitat of indigenous fauna that is representative, typical or characteristic of the natural diversity of the relevant ecological district. This can include degraded examples where they are some of the best remaining examples of their type or represent all that remains of indigenous biodiversity in some areas.* **The site is significant under this criterion.**

This site regularly hosts a representative assemblage (15 species) of native birds that are associated with freshwater lakes and ponds (Crossland 2014b) in the Low Plains Ecological District (Refer Appendix 1; Crossland 2014a). Refer Table 8 (below).

**Criterion 2** *Indigenous vegetation or habitat of indigenous fauna that is a relatively large example of its type within the relevant ecological district.* **Does not meet criterion**

## Rarity/Distinctiveness

**Criterion 3:** *Indigenous vegetation or habitat of indigenous fauna that has been reduced to less than 20% of its former extent in the Region, or relevant land environment, ecological district, or freshwater environment.* **Does not meet criterion**

**Criterion 4:** *Indigenous vegetation or habitat of indigenous fauna that supports an indigenous species that is threatened, at risk, or uncommon, nationally or within the relevant ecological district.* **The site is significant under this criterion.**

The Creamery Ponds SES supports At Risk/Declining pied stilts (Himantopus himantopus leucocephalus), and the At Risk/Naturally Uncommon Black Cormorant (Phalacrocorax carbo novaehollandiae) (Refer Crossland 2014; Robertson et al. 2012). Creamery Drain supports longfin eel (Anguilla dieffenbachia) (Taylor and Blair 2012) which is classified as At Risk -Declining (Allibone et al. 2010). Lonfin eels were recorded in Creamery Drain in several locations as far upstream as the upper pond in Creamery Reserve. Because longfin eel are a migratory species, they require migration routes to the sea, and therefore the length of Creamery Drain downstream of the sampled locations to its confluence with Knights Stream SES is included as part of this SES.

**Criterion 5:** *The site contains indigenous vegetation or an indigenous species at its distribution limit within Canterbury Region or nationally.* **Does not meet criterion.**

**Criterion 6:** *Indigenous vegetation or an association of indigenous species that is distinctive, of restricted occurrence, occurs within an originally rare ecosystem, or has developed as a result of an unusual environmental factor or combinations of factors.* **Does not meet criterion.**

## Diversity and pattern

**Criterion 7:** Indigenous vegetation or habitat of indigenous fauna that contains a high diversity of indigenous ecosystem or habitat types, indigenous taxa, or has changes in species composition reflecting the existence of diverse natural features or ecological gradients. **Does not meet criterion.**

## Ecological context

**Criterion 8:** *Vegetation or habitat of indigenous fauna that provides or contributes to an important ecological linkage or network or provides an important buffering function.* **The site is significant under this criterion.**

This site supports longfin eel (Anguilla dieffenbachia) (Taylor and Blair 2012). Because longfin eel are a migratory species, they require migration routes to the sea, and therefore the length of Creamery Drain downstream of the sampled location to its confluence with Knights Stream is included as part of this SES. Note that both Knights Stream and the Halswell River downstream of Creamery Drain are contained within other proposed SES's, facilitating a continuous ecological linkage to the sea.

**Criterion 9:** A wetland which plays an important hydrological, biological or ecological role in the natural functioning of a river or coastal system. **Does not meet criterion.**

**Criterion 10:** *Indigenous vegetation or habitat of indigenous fauna that provides important habitat (including refuges from predation, or key habitat for feeding, breeding, or resting) for indigenous species, either seasonally or permanently.* **Site not assessed under this criterion.**

***Table 8:*** *Creamery Ponds Reserve waterbird monitoring (Andrew Crossland 2014).*

| Species | 9/2/2014 | 5/5/2014 | 29/6/2014 | 20/8/2014 | 240/8/2014 | 26/10/2014 | 3/11/14 |
|---|---|---|---|---|---|---|---|
| **Black cormorant** | 0 | 1 | 0 | 0 | 0 | 1 | 2 |
| **Little cormorant** | 1 | 0 | 2 | 1 | 1 | 0 | 0 |
| **Black swan** | 2 | 2 | 1 | 0 | 0 | 0 | 2 |
| **Paradise shelduck** | 9 | 4 | 1 | 0 | 0 | 0 | 2 |
| **New Zealand shoveler** | 2 | 29 | 27 | 9 | 7 | 4 | 9 |
| **New Zealand scaup** | 54 | 31 | 22 | 22 | 22 | 40 | 36 |
| **Grey teal** | 5 | 3 | 4 | 2 | 0 | 0 | 0 |
| **Australasian harrier** | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| **Pukeko** | 5 | 0 | 15 | 11 | 15 | 6 | 8 |
| **Australian coot** | 0 | 0 | 0 | 0 | 0 | 2 | 3 |
| **Pied stilt** | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| **Spur-winged plover** | 0 | 0 | 0 | 0 | 2 | 2 | 0 |
| **New Zealand kingfisher** | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| **Welcome swallow** | 2 | 1 | 2 | 0 | 2 | 6 | 9 |

# Appendix 2: Bird species

***Table 9:*** *Bird species r4ecorded from long term monitoring at Creamery Ponds Reserve. Species in bold indicate indigenous species. Source Christchurch City Council 2025).*

| Species | Common name | Status |
|---|---|---|
| Greylag goose | *Anser anser* | Irregular visitor |
| Canada goose | *Branta canadensis* | Seasonal or regular visitor |
| **Black swan** | *Cygnus atratus* | Resident with seasonal influxes |
| Mute swan | *Cygnus olor* | Seasonal or regular visitor |
| **Paradise shelduck** | *Tadorna variegata* | Resident with seasonal influxes |
| **Australasian shoveler** | *Spatula rhynchotis* | Seasonal or regular visitor |
| **Grey duck** | *Anas superciliosa* | Seasonal or regular visitor |
| Mallard x grey duck hybrid | *Anas platyhrynchos x superciliosa* | Resident with seasonal influxes |
| **Grey teal** | *Anas gracilis* | Seasonal or regular visitor |
| **New Zealand scaup** | *Aythya novaeseelandiae* | Resident with seasonal influxes |
| Rock pigeon | *Colomba livia* | Seasonal or regular visitor |
| **Shining cuckoo** | *Chalcites lucidus* | Irregular visitor |
| **Australasian little grebe** | *Tachybaptus novaehollandiae* | Irregular visitor |
| **Eurasian coot** | *Fulica atra* | Seasonal or regular visitor |
| **Pūkeko** | *Porphyrio melanotus* | Resident with seasonal influxes |
| **Pied stilt** | *Himantopus leucocephalus* | Seasonal or regular visitor |
| **South Island pied oystercatcher** | *Haematopus finschi* | Seasonal or regular visitor |
| **Spur-winged plover** | *Vanellus miles* | Resident |
| **Southern black-backed gull** | *Larus dominicans* | Seasonal or regular visitor |
| **Black billed gull** | *Chroicocephalus bulleri* | Seasonal or regular visitor |
| **Red billed gull** | *Larus novaehollandiae* | Irregular visitor |
| **Pied cormorant** | *Phalacrocorax varius* | Vagrant |
| **Little pied cormorant** | *Microcarbo melanoleucos* | Seasonal or regular visitor |
| **Black cormorant** | *Phalacrocorax carbo* | Irregular visitor |
| **Little black cormorant** | *Phalacrocorax sulcirostris* | Vagrant |
| **White-faced heron** | *Egretta novaehollandiae* | Seasonal or regular visitor |
| **Royal spoonbill** | *Platalea regia* | Vagrant |
| **Australasian harrier** | *Circus approximans* | Resident |
| Little owl | *Athene noctura* | Resident |
| **Sacred kingfisher** | *Todiramphus sanctus* | Irregular visitor |
| **Bellbird** | *Anthornis melanura* | Seasonal or regular visitor |
| **Grey warbler** | *Gerygone igata* | Resident with seasonal influxes |
| Australian magpie | *Gymnorhyna tibicen* | Resident with seasonal influxes |
| **New Zealand fantail** | *Rhipidura fuliginosa* | Resident with seasonal influxes |
| Skylark | *Alauda arvensis* | Resident with seasonal influxes |
| **New Zealand pipit** | *Anthus novaeseelandiae* | Irregular visitor |
| **Welcome swallow** | *Hirundo neoxena* | Resident with seasonal influxes |
| **Silvereye** | *Zosterops lateralis* | Resident with seasonal influxes |
| European starling | *Sturnus vulgaris* | Resident with seasonal influxes |
| Song thrush | *Turdus philomelos* | Resident with seasonal influxes |
| Eurasian blackbird | *Turdus merula* | Resident with seasonal influxes |
| Dunnock | *Prunella modularis* | Resident with seasonal influxes |
| House sparrow | *Passer domesticus* | Resident with seasonal influxes |
| Common chaffinch | *Fringilla coelebs* | Resident with seasonal influxes |
| European greenfinch | *Chloris chloris* | Resident with seasonal influxes |
| European goldfinch | *Carduelis carduelis* | Resident with seasonal influxes |
| Common redpoll | *Acanthis flammea* | Resident with seasonal influxes |
| Yellowhammer | | Resident |
| Californian quail | *Callipepla californica* | Resident |
| Chinese ring-necked pheasant | *Phasianus colchicus* | Resident |

# Appendix 3: Restoration planting species lists

## Zone 1: Lake & riparian margin species (10,000 m2 at 1.2 m centres)

| Species | Common name | Number | Grade |
|---|---|---|---|
| *Astelia grandis* | swamp astelia | 100 | RX1L |
| *Austroderia richardii* | toetoe | 200 | RX90 |
| *Carex secta* | pukio sedge | 2000 | RX90 |
| *Carex virgata* | pukio sedge | 500 | |
| *Coprosma propinqua* | mikimiki | 500 | 2.5L |
| *Cordyline australis* | ti kouka/cabbage tree | 200 | TY |
| *Cyperus ustulatus* | umbrella sedge | 500 | RX90 |
| *Dacrycarpus dacrydioides* | kahikatea | 200 | 2.5L |
| *Juncus edgariae* | wiwi | 500 | RX90 |
| *Juncus pallidus* | wiwi | 500 | RX90 |
| *Leptospermum scoparium* | manuka | 700 | RT |
| *Myrsine divaricata* | weeping maupo | 200 | 2.5L |
| *Phormium tenax* | harakeke/New Zealand flax | 500 | RX1L |
| *Polystichum vestitum* | prickly shield fern | 200 | RX1L |
| *Schoenoplectus tabernaemontani* | lake clubrush | 200 | RX90 |
| *Schoenus pauciflorus* | bog rush | 200 | RX90 |
| **TOTAL** | | **7200** | |

## Area 2: Island (800 m2 at 1.7 m centres)

| ~~Species~~ | ~~Common name~~ | ~~Number~~ | ~~Grade~~ |
|---|---|---|---|
| *Coprosma propinqua* | mikimiki | 15 | 2.5L |
| *Cordyline australis* | ti kouka/cabbage tree | 40 | RT |
| *Dacrycarpus dacrydioides* | kahikatea | 20 | 2.5L |
| *Elaeocarpus dentatus* | hinau | 10 | 2.5L |
| *Elaeocarpus hookerianus* | pokaka | 10 | 2.5L |
| *Griselinea littoralis* | kapuka/broadleaf | 20 | RX1L |
| *Kunzea serotina* | kanuka | 40 | RT |
| *Myrsine divaricata* | weeping maupo | 10 | 2.5L |
| *Pennantia corymbosa* | kaikomako | 20 | 2.5L |
| *Phormium tenax* | harakeke/New Zealand flax | 40 | RX1L |
| *Plagianthus regius* | ribbonwood | 20 | RT |
| *Podocarpus totara* | totara | 10 | 2.5L |
| *Prumnopitys taxifolia* | matai | 10 | 2.5L |
| *Pseudopanax arboreus* | fivefinger | 15 | RX1L |
| *Sophora microphylla* | South Island kowhai | 20 | 2.5L |
| **TOTAL** | | **300** | |

## Area 3: Residential interface (3800 m2 at 1.7 m centres)

| Species | Common name | Number | Grade |
|---|---|---|---|
| *Coprosma propinqua* | mikimiki | 100 | RX1L |
| *Cordyline australis* | ti kouka/cabbage tree | 100 | 2.5L |
| *Elaeocarpus dentatus* | hinau | 50 | 2.5L |
| *Elaeocarpus hookerianus* | pokaka | 50 | 2.5L |
| *Grislelinia littoralis* | kapuka/broadleaf | 100 | RX1L |
| *Hebe salicifolia* | koromiko | 100 | RX90 |
| *Hoheria angustifolia* | houhere/South Island lacebark | 100 | RT |
| *Kunzea serotina* | kanuka | 100 | RT |
| *Lophomyrtus obcordata* | rohutu | 100 | RX1L |
| *Myrsine divaricata* | weeping maupo | 100 | RX1L |
| *Phormium tenax* | harakeke/ New Zealand flax | 100 | 2.5L |
| *Pittosporum eugenioides* | tarata/lemonwood | 100 | RT |
| *Pittosporum tenuifolium* | kohuhu | 50 | RT |
| *Plagianthus regius* | marata/lowland ribbonwood | 100 | RT |
| *Podocarpus totara* | totara | 50 | 2.5L |
| *Prumnopitys taxifolia* | matai | 25 | 2.5L |
| *Sophora microphylla* | South Island kowhai | 75 | 2.5L |
| **TOTAL** | | **1400** | |

## Area 4: Lizard habitat establishment (1900 m2 at 1.7 m centres)

| ~~Species~~ | Common name | ~~Number~~ | ~~Grade~~ |
|---|---|---|---|
| *Anemanthele lessoniana* | wind grass | 50 | RX90 |
| *Austroderia richardii* | toetoe | 25 | RX90 |
| *Carmichaelia australis* | New Zealand broom | 100 | RX1L |
| *Coprosma propinqua* | mikimiki | 100 | RX1L |
| *Discaria toumatu* | matagouri | 100 | 2.5L |
| *Kunzea serotina* | kanuka | 25 | RT |
| *Melicytus alpinus* | porcupine shrub | 50 | RX1L |
| *Muehlenbeckia axillaris* | pohuehue | 25 | RX90 |
| *Muehlenbeckia complexa* | pohuehue | 25 | RX90 |
| *Poa cita* | silver tussock | 200 | RX90 |
| **TOTAL** | | **700** | |

## Area 5: Forest (15,000 m2 at 1.5 m centres)

| Species | Common name | Number | Grade |
|---|---|---|---|
| *Austroderia richardii* | toetoe | 200 | RT |
| *Carpodetus serratus* | marbleleaf/putaputaweta | 100 | 2.5L |
| *Coprosma crassifolia* | stiff-stemmed coprosma | 100 | RX1L |
| *Coprosma linariifolia* | long-leafed coprosma | 100 | RT |
| *Coprosma propinqua* | mingimingi | 400 | RX1L |
| *Coprosma rhamnoides* | twiggy coprosma/mingimingi | 100 | RX1L |
| *Coprosma robusta* | karamu | 500 | RT |
| *Coprosma rotundifolia* | round leaved coprosma | 50 | RX1L |
| *Cordyline australis* | cabbage tree/ti kouka | 1000 | RT |
| *Dacrycarpus dacrydioides* | kahikatea/white pine | 100 | 2.5L |
| *Elaeocarpus dentatus* | hinau | 100 | 2.5L |
| *Elaeocarpus hookerianus* | pokaka | 50 | 2.5L |
| *Griselinia littoralis* | broadleaf/kapuka | 200 | RX1L |
| *Hebe salicifolia* | koromiko | 400 | RT |
| *Hoheria angustifolia* | narrow leaved lacebark/houhere | 500 | RT |
| *Kunzea serotina* | white tea tree | 500 | RT |
| *Leptospermum scoparium* | manuka | 200 | RT |
| *Lophomyrtus obcordata* | New Zealand myrtle/rohutu | 100 | RT |
| *Melicope simplex* | poataniwha | 20 | RX1L |
| *Myrsine australis* | red matipo | 20 | RX1L |
| *Myrsine divaricata* | weeping maupo | 50 | RX1L |
| *Neomyrtus pedunculata* | New Zealand myrtle/rohutu | 20 | RX1L |
| *Pennantia corymbosa* | kaikomako | 20 | RX1L |
| *Phormium tenax* | harakeke/New Zealand flax | 200 | RX1L |
| *Pittosporum eugenioides* | lemonwood/tarata | 150 | RT |
| *Pittosporum tenuifolium* | kohuhu/black matipo | 100 | RT |
| *Plagianthus regius* | ribbonwood/manatu | 400 | RT |
| *Podocarpus totara* | totara | 450 | 2.5L |
| *Prumnopitys taxifolia* | matai/black pine | 50 | 2.5L |
| *Pseudopanax arboreus* | five-finger/pauhou | 50 | RX1L |
| *Pseudopanax crassifolius* | lancewood/horoeka | 50 | RX1L |
| *Sophora microphylla* | South Island kowhai | 200 | 2.5L |
| *Streblus heterophylla* | turepo/milk tree | 20 | RX1L |
| **Total** | | **6500** | |

## Area 6: Rural interface (5000 m2 at 1.2 m centres)

| Species | Common name | Number | Grade |
|---|---|---|---|
| *Austroderia richardii* | toetoe | 100 | RX90 |
| *Carex secta* | pukio sedge | 1000 | RX90 |
| *Coprosma propinqua* | mikimiki | 350 | 2.5L |
| *Cordyline australis* | ti kouka | 200 | RT |
| *Cyperus ustulatus* | umbrella sedge | 150 | RX90 |
| *Dacrycarpus dacrydioides* | kahikatea | 50 | RX1L |
| *Grislelinia littoralis* | kapuka/broadleaf | 50 | RX1L |
| *Hebe salicifolia* | koromiko | 200 | RX90 |
| *Juncus edgariae* | wiwi | 400 | RX90 |
| *Leptospermum scoparium* | manuka | 400 | RT |
| *Myrsine divaricata* | weeping maupo | 100 | 2.5L |
| *Phormium tenax* | harakeke/ New Zealand flax | 300 | RX1L |
| *Podocarpus totara* | totara | 50 | 2.5L |
| *Prumnopitys taxifolia* | matai | 50 | 2.5L |
| *Pseudopanax arboreus* | five-finger | 50 | RX1L |
| *Pseudopanax crassifolius* | lancewood | 50 | 2.5L |
| *Sophora microphylla* | South Island kowhai | 100 | 2.5L |
| **TOTAL** | | **3600** | |

## Area 7: Sabys Road frontage (750 m2 at 0.8 m centres)

| Species | Common name | Number | Grade |
|---|---|---|---|
| *Anemanthele lessoniana* | wind grass | 200 | RX90 |
| *Carmichaelia australis* | New Zealand broom | 100 | RT |
| *Coprosma crassifolia* | mikimiki | 100 | 2.5L |
| *Coprosma propinqua* | mikimiki | 100 | 2.5L |
| *Coprosma rhamnoiodes* | twiggy coprosma | 100 | 2.5L |
| *Discaria toumatu* | matagouri | 100 | RX1L |
| *Muehlenbeckia complexa* | pohuehue | 100 | RX90 |
| *Poa cita* | silver tussock | 380 | RX90 |
| *Sophora microphylla* | South Island kowhai | 20 | 2.5L |
| **TOTAL** | | **1200** | |

## Enrichment planting (37,250 m2 at 3 m centres)

| Species | Common name | Number | Grade |
|---|---|---|---|
| **Trees & shrubs** | | | |
| *Alectryon excelsus* | titoki/New Zealand ash | 100 | 2.5L |
| *Fuchsia excorticata* | tree fuchsia/kotukutuku | 100 | 2.5L |
| *Hedecarya arborea* | porokaiwhiri, pigeonwood | 100 | 2.5L |
| *Melicytus ramiflorus* | mahoe/whiteywood | 100 | 2.5L |
| *Neomyrtus pedunculata* | rōhutu, New Zealand myrtle | 100 | 2.5L |
| *Prumnopitys ferruginea* | miro/brown pine | 100 | 2.5L |
| *Pseudowintera colorata* | pepper tree/horopito | 100 | 2.5L |
| *Schefflera digitata* | seven-finger | 100 | 2.5L |
| *Urtica ferox* | tree nettle/ongaonga | 100 | 2.5L |
| **Climbers & scramblers** | | | |
| *Brachyglottis sciadophila* | climbing groundsel | 100 | RX1L |
| *Clematis paniculata* | New Zealand clematis/puawananga | 100 | RX1L |
| *Clematis quadribracteolata* | | 100 | RX1L |
| *Metrosideros diffusa* | white rata | 100 | RX1L |
| *Muehlenbeckia australis* | pohuehue/Maori vine | 100 | RX1L |
| *Muehlenbeckia axillaris* | pohuehue | 100 | RX1L |
| *Muehlenbeckia complexa* | shrubby pohuehue | 100 | RX1L |
| *Muehlenbeckia ephedroides* | leafless pohuehue | 100 | RX1L |
| *Parsonsia capsularis* | kaiwhiria, New Zealand jasmine | 100 | RX1L |
| *Parsonsia heterophylla* | kaiwhiria, New Zealand jasmine | 100 | RX1L |
| *Passiflora tetandra* | kōhia/native passionfruit | 100 | RX1L |
| *Ripogonum scandens* | supplejack | 100 | RX1L |
| *Rubus australis* | bush lawyer/tataramoa | 100 | RX90 |
| *Rubus cissoides* | bush lawyer/tataramoa | 100 | RX90 |
| *Rubus schmidelioides* | bush lawyer/tataramoa | 100 | RX90 |
| *Urtica persconfusa* | swamp/climbing nettle | 100 | RX90 |
| **Monocot herbs, sedges & rushes** | | | |
| *Astelia fragrans* | bush flax/kahaka | 100 | RX1L |
| *Astelia grandis* | swamp astelia | 100 | RX1L |
| *Astelia nervosa* | bush flax/kahaka | 100 | RX1L |
| *Carex fosteri* | forest sedge | 100 | RX90 |
| *Carex lambertiana* | forest sedge | 100 | RX90 |
| *Carex solandri* | forest sedge | 100 | RX90 |
| *Libertia ixioides* | mikoikoi | 100 | RX90 |
| *Microlaena stipoides* | rice meadow grass | 100 | RX90 |
| *Uncinia uncinata* | hook sedge | 100 | RX90 |
| **Ferns** | | | |
| *Austroblechnum penna-marina* | kiokio-little hard fern | 100 | RX1L |
| *Cyathea dealbata* | ponga/silver fern | 100 | 2.5L |
| *Dicksonia fibrosa* | wheki ponga/tree fern | 100 | 2.5L |
| *Dicksonia squarrosa* | wheki/rough tree fern | 100 | 2.5L |
| *Hypolepis ambigua* | rough pig fern | 100 | RX1L |
| *Microsorum pustulatus* | maratata/hounds tongue fern | 100 | RX1L |
| *Pteridium esculentum* | rahurahu/bracken fern | 100 | RX1L |
| **TOTAL** | | **4100** | |

## Summary

| Zone | Area | Approximate number of plants required |
|---|---|---|
| Lake and riparian margins | 10,000 m2 | 7200 plants at 1.2 m centres |
| Island | 800 m2 | 300 plants at 1.7 m centres |
| Residential interface | 3800 m2 | 1400 plants at 1.7 m centres |
| Lizard habitat | 1900 m2 | 700 plants at 1.7 m centres |
| Native forest | 15,000 m2 | 6500 plants at 1.5 m centres |
| Rural interface | 5000 m2 | 3600 plants at 1.2 m centres |
| Sabys Road frontage | 750 m2 | 1200 plants at 0.8 m centres |
| Enrichment planting throughout | 37,250 m2 | 4100 plants at 3.0 m centres |
| **Total** | **37250 m2** | **25,300 plants** |

# Appendix 4: Planting & establishment guidelines

## Site preparation

### Herbicide application

- ✓ Spray all proposed forest/woodland areas with a broad-spectrum herbicide to achieve total kill of all grass and broadleaved weeds.
- ✓ Contractor to follow all best-practice agrichemical application procedures and council guidelines for working in parks.
- ✓ Where possible, use a **stale seedbed** methodology whereby two applications of herbicide are done, consisting of 1) an initial application to achieve total kill of existing weeds, and 2) a second follow-up application (e.g. 6 – 8 weeks later) to kill any new weed-cover that has established resulting from seeds that have germinated following the first herbicide application.

### Supply & spread mulch

- ✓ Where funding allows, arrange for the supply, delivery and spreading of 100 mm compacted/settled depth of arbor mulch across new forest/woodland areas within the site. Mulch will help suppress further weed growth and help retain soil moisture.
- ✓ Where available budget will not allow for the entire site to be mulched, recommend limiting mulch to a 5 – 10 m wide band around the edges of the planted areas, and particularly along pathways. Mulching these areas will help the site look tidy and cared-for, making the restoration plantings more acceptable to the public.

## Planting

### Plant collection and delivery

- ✓ Contractors, staff, and/or volunteers collecting plants from nurseries must contact the nursery ten working days prior to plant pick-up to allow for their planting stock to be sorted and weeded before dispatch.
- ✓ Where contractors, staff or volunteers are concerned about the size of nursery plants being too small (or of otherwise poor quality/health) to establish well, they should contact Council's parks ecologist for advice.
- ✓ Ensure that only the number of plants that can be planted on the day are collected unless the contractor, staff or volunteers have facilities to ensure plants are watered and remain in good health prior to planting.
- ✓ When transporting plants to the planting site, foliage should be covered with (e.g.) hessian or wind break material to reduce wind damage and excessive transpiration/water loss.

### Plant set-out

- ✓ Contractors, staff, and/or volunteers shall contact Council's parks ecologist to meet on site at time of planting to assist with set-out and/or provide plant set-out advice.
- ✓ All plants to be laid out in natural/random patterns, avoiding straight lines.

- ✓ Shrubs such as harakeke/lowland flax *(Phormium tenax),* small-leafed coprosmas *(Coprosma propinqua & C. rubra)*, toetoe *(Austroderia richardii),* korimiko *(Hebe salicifolia)* and korikio *(Corokia cotoneaster)* shall be planted towards the edges of new plantings to achieve a natural forest edge ecosystem.
- ✓ Ensure that harakeke/lowland flax is planted no closer than 3 m from the edge of any path to maintain sightlines and avoid tripping hazards from their long strappy leaves.
- ✓ Climbers and scramblers, including NZ jasmine *(Parsonsia spp.)*, bush lawyer/tataramoa *(Rubus spp.)* and clematis *(Clematis paniculata)* will require mature plants to support them and will therefore need to be planted at the bases of existing trees and large shrubs that can offer them structural support to eventually climb.

### Planting

- ✓ Planting must follow industry best-practice for restoration plantings whereby holes are sufficiently wider than the plant container size, straight sided, deep enough and having broken though any sub-surface pans or compacted soils beneath the level of the pot.
- ✓ Where local schools with younger children (<10-year-olds) are involved with planting, recommend that holes are pre-dug by others prior to the planting event, and that follow-up planting checks are carried out and any issues rectified immediately.
- ✓ Ideally, all plants (except for grasses) should have cardboard plant protectors installed, including bamboo stakes and wool mulch mats to assist their establishment and enable easier location line-trimming and/or follow-up herbicide application.
- ✓ Where cardboard plant guards are not used, each plant shall have a one-metre above-ground length bamboo cane installed to help contractors, staff and/or volunteers find plants amongst weeds. Suggest that all stakes are installed on the (e.g.) north side of each plant to further aid in plant location amongst weeds.
- ✓ Fertliser tabs shall be added to the base of each planting hole according to manufacturer's recommendations to help sustain healthy and vigorous plant growth.

## 24-month establishment period

### Weed control

- ✓ Contractors, staff, and/or volunteers shall ensure that weed growth at the site does not compromise native plant health and vigor, and that the site is maintained in a tidy state that is accepted by the community.
- ✓ Recommend site receives a minimum of four maintenance passes per year during the 24-month establishment period involving (where necessary) locating and hand releasing plants where they have become overrun with weeds, and an application of an approved systemic herbicide to control weeds throughout site.

### Watering

- ✓ Even given the dry nature of the reserve, based on experience at nearby sites (e.g., McLeans Island Grassland Park), it is not anticipated that plantings at Te Waoku Kahikatea Reserve will require watering. Instead, plants shall be selected based on their ability to withstand Canterbury's harsh and droughty conditions.

### Pruning

- ✓ Pruning shall not be carried out on any plantings during the 24-month maintenance period.

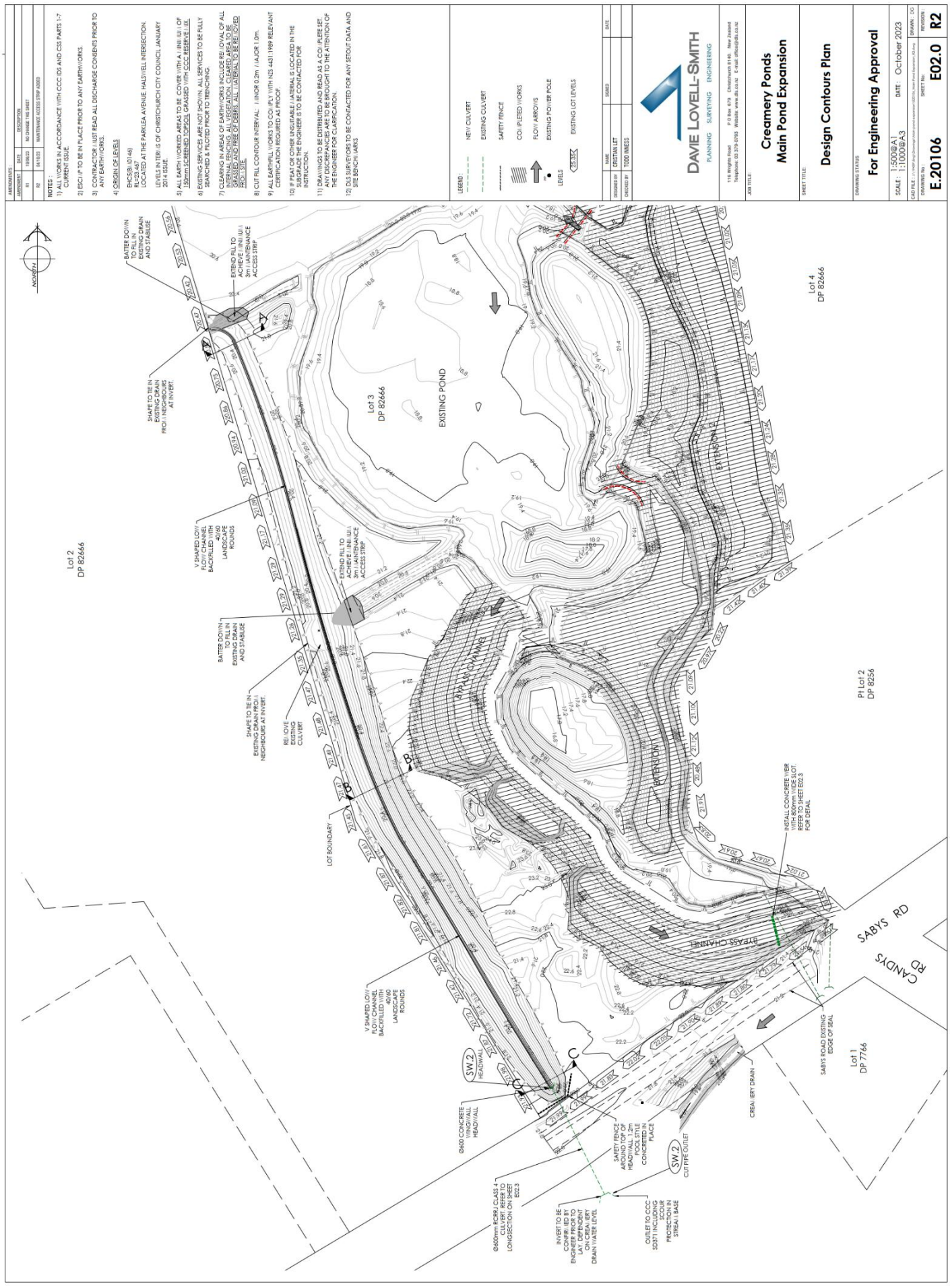
### Pest animals

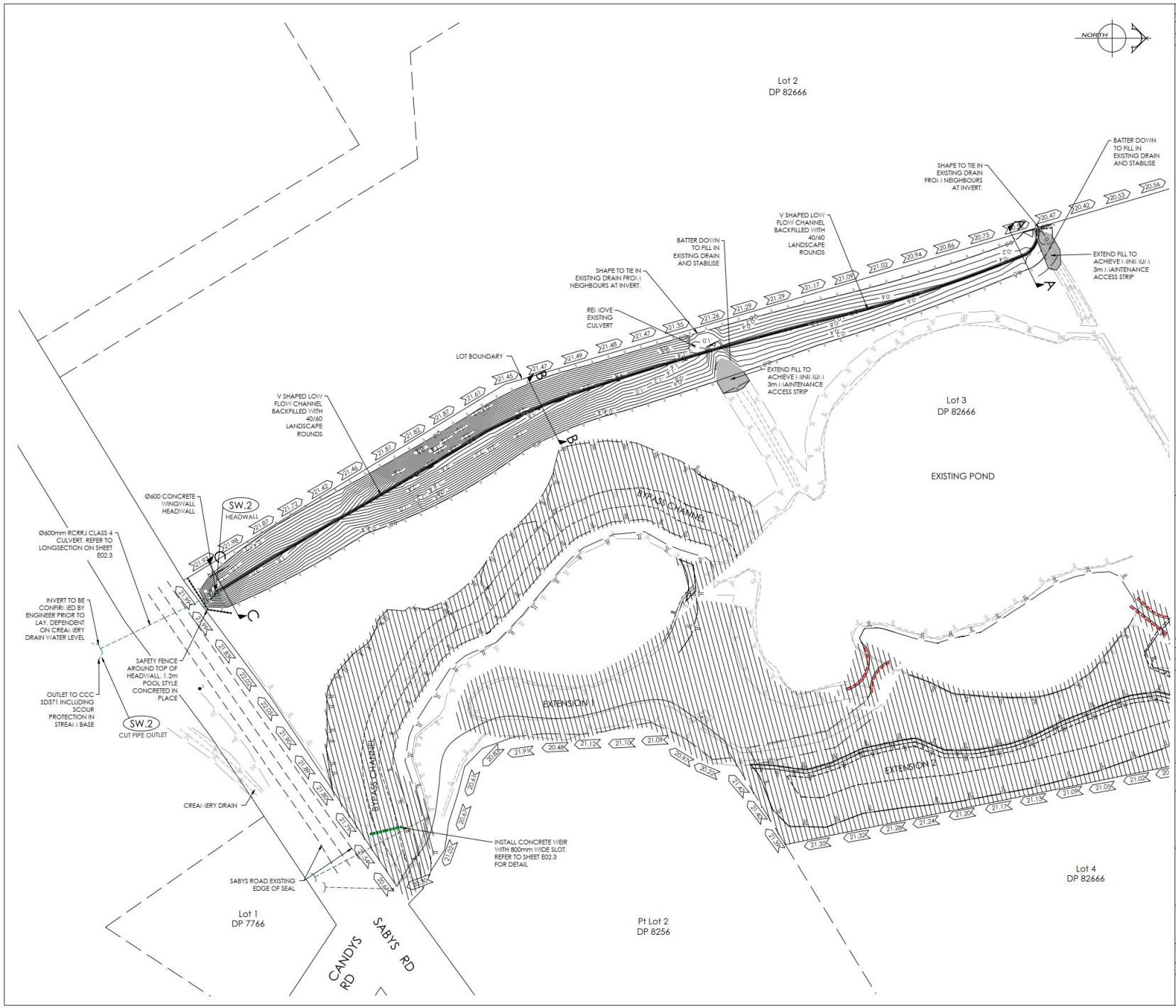
- ✓ Often restoration plantings are impacted by pest animals such as rabbits, hares, possums and pūkeko. Given the rural nature of Te Waoku Kahikatea Reserve, it can be expected that such pest animals will be an ongoing threat to native plantings at the site, and control measures may need to be initiated as damage becomes evident.

### Rubbish removal

- ✓ In some situations, restoration plantings can trap rubbish (E.g., plastic bags, paper, or even plant guards) that is discarded or blows through sites. Although it is expected that this will be minimal at Te Waoku Kahikatea Reserve, any rubbish or other debris encountered during routine maintenance shall be collected and disposed of off-site appropriately.

# Appendix 5: Engineering plans






AMENDMENTS :

| AMENDMENT | DATE | DESCRIPTION |
|---|---|---|
| R1 | 19/06/23 | NO CHANGE THIS SHEET |
| R2 | 04/10/23 | MAINTENANCE ACCESS STRIP ADDED |

NOTES :

1) ALL WORKS IN ACCORDANCE WITH CCC IDS AND CSS PARTS 1-7 CURRENT ISSUE.

2) ESCP TO BE IN PLACE PRIOR TO ANY EARTHWORKS.

3) CONTRACTOR MUST READ ALL DISCHARGE CONSENTS PRIOR TO ANY EARTHWORKS.

4) ORIGIN OF LEVELS

EHCS(BM 10146)
RL=23.467
LOCATED AT THE PARKLEA AVENUE, HALSWELL INTERSECTION.

LEVELS IN TERMS OF CHRISTCHURCH CITY COUNCIL JANUARY 2014 ISSUE.

5) ALL EARTH WORKED AREAS TO BE COVER WITH A MINIMUM OF 150mm SCREENED TOPSOIL GRASSED WITH CCC RESERVE MIX.

6) EXISTING SERVICES ARE NOT SHOWN. ALL SERVICES TO BE FULLY SEARCHED & PILOTED PRIOR TO TRENCHING.

7) CLEARING IN AREAS OF EARTHWORKS INCLUDE REMOVAL OF ALL INTERNAL FENCING, ALL VEGETATION, CLEARED AREA TO BE GRASSED AND FREE OF DEBRIS. ALL MATERIAL TO BE REMOVED FROM SITE.

8) CUT FILL CONTOUR INTERVAL: MINOR 0.2m MAJOR 1.0m.

9) ALL EARTHFILL WORKS TO COMPLY WITH NZS 4431:1989 RELEVANT CERTIFICATION REQUIRED AS PROOF.

10) IF PEAT OR OTHER UNSUITABLE MATERIAL IS LOCATED IN THE SUBGRADE THE ENGINEER IS TO BE CONTACTED FOR INSTRUCTION.

11) DRAWINGS TO BE DISTRIBUTED AND READ AS A COMPLETE SET. ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION.

12) DLS SURVEYORS TO BE CONTACTED FOR ANY SETOUT DATA AND SITE BENCHMARKS

LEGEND :

- NEW CULVERT
- EXISTING CULVERT
- SAFETY FENCE
- COMPLETED WORKS
- FLOW ARROWS
- EXISTING POWER POLE
- LEVELS
- 25.35 EXISTING LOT LEVELS

| | NAME | SIGNED | DATE |
|---|---|---|---|
| DESIGNED BY | CRISTIAN LET | | |
| CHECKED BY | TODD INNESS | | |


DAVIE LOVELL-SMITH
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Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz


JOB TITLE:

**Creamery Ponds**
**Main Pond Expansion**

SHEET TITLE:

**Cut Fill Contours Plan**

DRAWING STATUS

**For Engineering Approval**

SCALE : 1:500@A1 1:1000@A3 DATE : October 2023

CAD FILE : J:\17439\Eng\Drawing\Main pond expansion\E20106_Main Pond Expansion_R2.dwg DRAWN : DG

| DRAWING No : | SHEET No: | REVISION : |
|---|---|---|
| **E.20106** | **E02.1** | **R2** |

Parks Biodiversity Team | Creamery Ponds Ecological Restoration Plan


AMENDMENTS :

| AMENDMENT | DATE | DESCRIPTION |
|---|---|---|
| R1 | 19/06/23 | NO CHANGE THIS SHEET |
| R2 | 04/10/23 | NO CHANGE THIS SHEET |

NOTES :

1) FOR INFORMATION ONLY TO SHOW THE FLOODED AREA OF THE POND IN THE 2% AEP, 60HR EVENT FOR THE CREAMERY PONDS CATCHMENT.

2) ORIGIN OF LEVELS

EHCS(BM 10146)
RL=23.467
LOCATED AT THE PARKLEA AVENUE, HALSWELL INTERSECTION.

LEVELS IN TERMS OF CHRISTCHURCH CITY COUNCIL JANUARY 2014 ISSUE.

LEGEND :

- COMPLETED WORKS
- FLOW ARROWS
- EXISTING POWER POLE
- LEVELS 25.35 EXISTING LOT LEVELS
- 2% AEP, 60HR EVENT FLOODED AREA

| | NAME | SIGNED | DATE |
|---|---|---|---|
| DESIGNED BY | CRISTIAN LET | | |
| CHECKED BY | TODD INNESS | | |

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JOB TITLE:

**Creamery Ponds Main Pond Expansion**

SHEET TITLE:

**Flooded Area Plan**

DRAWING STATUS

**For Information**

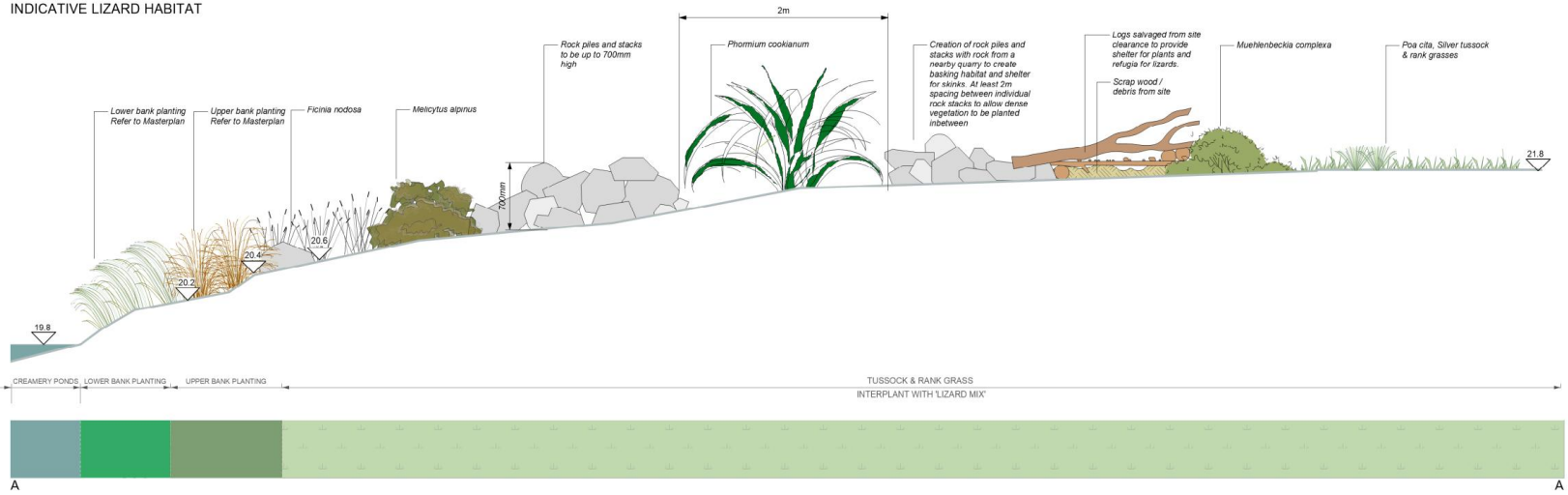
SCALE : 1:750@A1 1:1500@A3 DATE : October 2023

CAD FILE : J:\1409\dwg\Drawings\Main pond expansion\E20106_Main Pond Expansion_R2.dwg DRAWN : DG

DRAWING No : **E.20106** SHEET No: **E06.0** REVISION : **R2**

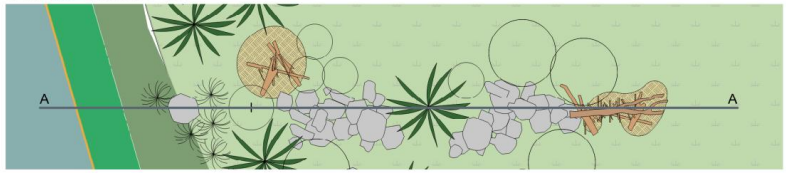
# Appendix 6: Sabys Estate lizard habitat plans

## SECTION
## INDICATIVE LIZARD HABITAT




***Section:***
Lizard habitat detail
1:25 @A1

## SECTION LOCATION PLAN




***Section location plan:***
Lizard habitat detail
1:50 @A1

## NOTES

Site observation to be carried out by Landscape Architect and Wildlands Consultants

Timing for the release site is as follows under Schedule 3.15 of the Wildlife Act Authority:

*15- The relocation habitat enhancement work should be completed as per the LMP and as far as possible in advance of the salvage operation or at least two weeks prior to the salvage being undertaken to allow the site to bed in.*

**Refer to Wildlands Consultants: "Lizard Management Plan for the Creamery Ponds, Halswell Christchurch" May 2021*

## MATERIALS PALETTE

***Hard materials***


Local stone


Logs salvaged from site clearance


Scrap wood / debris from site

***Plants***


***Ficinia nodosa***
Wiwi, knobby club rush


***Melicytus alpinus***
Porcupine shrub


***Melicytus crassifolius***
Thick-leaved mahoe


***Muehlenbeckia complexa***
Small-leaved pohuehue


***Phormium cookianum***
Wharariki


***Pimelea prostrata***
*Pinatoro, New Zealand daphne*


***Poa cita***
*Silver tussock*


***Rank grasses***

NORTH:



REVISIONS:

| No | Revision | Date |
|---|---|---|
| 01 | 00 | 28.10.21 |
| 02 | 01 | 02.11.21 |
| 03 | 02 | 03.11.21 |

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CLIENT:
**DANNE MORA RESIDENTIAL**

PROJECT:
**SABYS ESTATE**

DWG TITLE:
**LIZARD HABITAT SECTION**

| | | | |
|---|---|---|---|
| DESIGNED BY: | M+P | SCALE @ A1: | AS SHOWN |
| DRAWN BY: | M+P | DATE: | 03/11/21 |
| REVIEWED BY: | JL | | |
| JOB NO: | DWG NO: | REVISION: | |
| 1482 | LH 02 | 02 | |

ISSUED FOR:
**FOR CONSENT**



Christchurch City Council


Christchurch
City Council