

Te mahere whakawhanake i te papa rēhia o Te Wai Ōrea  
*Western Springs Lakeside Te Wai Ōrea*  
*park development plan*

FINAL FOR ADOPTION | AUGUST 2020



## Revisions:

Initial draft (V.1)	October 2017
Draft for consultation (V.2)	November 2017
Revision incorporating consultation and local board feedback (V.3)	February 2019
Revision incorporating additional changes (V.4)	June 2019
Revision incorporating additional changes (V.5)	August 2019
Final for adoption (V.6)	August 2020

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# Western Springs Lakeside Park



## In 1861

The waters of the city  
The development of this area  
In 1861 Auckland's water supply from  
the Western Springs was supplemented  
with water from the voluntary  
contribution from the voluntary  
members from the Auckland's water  
works. By 1910 the  
Municipal Council was providing  
all Auckland's water supply, and the  
Western Springs supply was used only  
during times of drought. It ceased to be  
used regularly in 1926, although in  
1943 during an acute water shortage  
Western Springs water was used for  
the city's needs.

The Western Springs water area  
was owned and managed by the Auckland  
City Council in 1925. The area was  
administered and the taxes raised in  
the maintenance of a private house in  
1848. The responsibility was taken by  
an important building building named  
as "MOTAI".



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## 1.0 Tirohanga whānui *Vision*

This section outlines the purpose of the document, visionary objectives for park improvements, mana whenua direction, gives a brief overview of the park, and outlines the consultation process for preparing this development plan.



# 1.1 Tirohanga whānui *Vision*

## Purpose of the development plan

This development plan has been commissioned by the Waitemata Local Board for the purpose of providing a vision and action plan to guide improvements to Western Springs Lakeside Te Wai Ōrea Park (Western Springs) and its interfaces with neighbouring reserves and facilities over the short, medium, and long-term.

The management and development of Western Springs is guided by the Western Springs Lakeside Park Plan (produced in 1995) and the Western Springs Lakeside Te Wai Ōrea park development plan (2020).

The outcomes in the development plan largely complement the 1995 Western Springs Lakeside Park Plan. The 2020 development plan focuses specifically on priorities that have been articulated by mana whenua, stakeholders and the community as identified through consultation carried out in 2017 and 2018. The development plan works to align future investment with objectives linked to these priorities.

In the event of any inconsistency between the two documents, the Western Springs Lakeside Te Wai Ōrea park development plan (2020) will prevail.

## Western Springs Lakeside Te Wai Ōrea

Western Springs Lakeside Te Wai Ōrea is a busy, well-used park. Initial consultation and visitor surveys have indicated that visitor satisfaction with the park is high. Therefore this plan does not propose significant changes to the park's use or visual amenity. It does seek to make improvements to water quality, circulation and wayfinding, and event infrastructure.

The water quality of the lake is poor, which is of concern to the Waitemata Local Board, mana whenua, stakeholders, and the community. Mana whenua and stakeholders have guided the direction of the plan to focus on improving the Mauri of the water. The water quality issues are complex and will involve ongoing collaboration between mana whenua, Auckland Council, and the community to address the causes. This plan considers the catchment wide issues and what can be done within the park to improve the water quality of the lake and Motions Creek.

## Vision

The vision was developed through consultation with mana whenua and stakeholders and drives all proposed improvements.

Section two (Development Plan) outlines improvements to the park in relation to the vision. Improvements proposed in the development plan are programmed over the short, medium and long term to deliver the vision.

The development plan will be monitored over time, to ensure all improvements are aligned with the vision, make sure the plan is still relevant, monitor the delivery of projects, and review whether new projects should be investigated and explored to achieve the vision.

Restoring the Mauri of the water at Western Springs Te Wai Ōrea is the key focus of this development plan. However, the issues are complex and require research and investigation. Realising the plan's vision will be an iterative process, with the results of research and other water quality projects in the catchment potentially changing water quality outcomes proposed within this plan.

Western Springs Lakeside Te Wai Ōrea is a healthy destination that provides a refuge from the city. The following is the vision for the development plan:



**Wai** – Kua ora anō te mauri o te wai e hua ai he papa rēhia toko orange ā-tangata, ā-kararehe hoki  
**Water** - *The water is restored to create a healthy park for people and fauna*



**Ruruhau** – Ka tiakina a Western Springs Te Wai Ōrea hei ruruhau mai i te tāone nui  
**Refuge** - *Western Springs Lakeside Te Wai Ōrea is retained as a refuge from the city*



**Tūhononga** – He kōtuinga āwhio noa tūturu nei tō Western Springs Te Wai Ōrea e tūhono ai ia ki ōna whakaurunga me ōna hapori  
**Connected** - *Western Springs Lakeside Te Wai Ōrea has a clear circulation network, that connects to surrounding facilities and communities*



**Ngā whakahaerenga** – He ahunga whakahaerenga hiranga a Western Springs Te Wai Ōrea  
**Events** - *Western Springs Lakeside Te Wai Ōrea is a significant event destination*



**Tāhuhu kōrero tuku iho** – Ka whakanui a Western Springs Te Wai Ōrea i tōna tāhuhu kōrero tuku iho, hiranga ki te mana whenua hoki  
**History** - *Western Springs Lakeside Te Wai Ōrea celebrates its history, and its significance to mana whenua.*

## 1.2 Mana Whenua

Historically, Te Wai Ōrea was a significant site for mana whenua to harvest tuna (eels). Because of the site's significance, mana whenua have played a key role in directing the development plan.

The focus of the engagement to date has been on water quality. The water quality issues mean that the lake is no longer a sanctuary for tuna. In response, the development plan focuses on Te Aranga values of Taiao and Mauri Tu. These values are woven into the vision for the park:

- **Taiao - *The Natural Environment***

Outcome: The natural environment is protected, restored and/or enhanced.

- **Mauri Tu- *Environmental Health***

Outcome: Environmental health is protected, maintained and/or enhanced.

Collaboration with mana whenua will be ongoing as the water quality issues are better understood. Mana whenua will be involved in the realisation of projects that are delivered as a consequence of this plan and understanding improvements to water quality that are achieved.

Although the focus is on Taiao and Mauri Tu, the development plan does consider all of Te Aranga principles to ensure the plan leads to holistic outcomes for the park and the area.



# 1.3 Kupu Whakataki *Introduction*

## Regional context

The lake at Western Springs Lakeside Te Wai Ōrea is spring-fed from Te Tātua a Riukiuta Western Spring-Meola-Three Kings aquifer. The lake then feeds Motions Creek.

The Greater Western Springs Te Wai Ōrea aquifer is a large volcanic lava flow, resulting from Te Tātua a Riukiuta / Three Kings, Ōwairaka / Mount Albert, and Maungawhau / Mount Eden eruptions.

Western Springs Te Wai Ōrea contains exposures of the natural edge of Auckland's longest lava flow, with excellent examples of columnar jointing, vesicles and small lava tongues, some with pahoe-hoe (smooth undulating) surfaces. Natural springs flow from cracks in the lava flow. These features were much more common prior to the urban development of Auckland.



LEGEND:

- |  |  |  |
|--|--|--|
|  Site location                  |  Sub catchment boundary |  Volcanic aquifer |
|  Motorways                      |  Streams                |  Parkland         |
|  Waitematā Local Board boundary |  Wastewater pipes       |  |



Scale: 1:50,000 @ A3

## Ecological context

Under the Auckland Unitary Plan (AUP), Western Springs Te Wai Ōrea is considered a site of regional ecological significance, for both its flora and fauna.

The Western Springs Lakeside Park Plan (1995) states '*The wetlands, the lake, the forest areas are all inextricably linked. When viewed as various components of the one system the combined values of these areas stand out to create a site of regional ecological significance and of much conservation value*'.

The regional importance of the site is recognized in the Auckland Unitary Plan (AUP) by the Significant Ecological Area status that has been applied to the whole of the park. This status provides for the protection and enhancement of significant indigenous vegetation and significant habitats of indigenous fauna.

The importance of Western Springs in terms of ecology is based on:

- The presence of the threatened long fin eel, and occurrences of various other threatened fish, bird and plant species
- The presence of important vegetation and ecosystem types, such as wetland and lava rock forest
- The presence of creeks, lake, wetlands and other important habitat for aquatic fauna and flora which act as corridors for aquatic species plus insectivorous birds and terrestrial plants
- The site's potential to sustain large blocks of native vegetation that can support a range of indigenous plants and animals
- The site's role as an existing and future ecological corridor – ecological corridors allow for the movement of flora and fauna, expanding their range and hence increasing the sustainability of the population as well as the sustainability of biodiversity across the region as a whole.

Western Springs provides crucial biodiversity functions which include supplying roosting, nesting, breeding habitat; feeding sites and resources and migration corridors for native fauna; habitat and dispersal corridors for native flora. It is important to maintain and enhance the biodiversity potential of sites such as Western Springs since they have the capacity to increase the colonisation and dispersal of indigenous biodiversity across the city.

Western Springs is very well placed in this regard. It provides key linkages to other open space parks in the area, with either high ecological values or potential. Auckland Zoo, Jagers Bush, Seddon Fields, Lemington Reserve, Te Tokaroa / Meola Reef forms a linked corridor of sites through to the Waitematā Harbour to the west. To the east a corridor exists through Arch Hill and along the North-Western motorway revegetation corridors to Symonds St Cemetery and Auckland Domain. Biodiversity corridors also exist along Motions and Meola Creek and there are wider connections to Chamberlain Park, Pasadena Intermediate School and Western Springs College.

This development plan includes aspirations and actions for improvement to habitat and ecosystem health at Western Springs through the phasing out of noxious and invasive weeds, conserving indigenous habitat, improving water quality and rehabilitating the lake, wetlands and rock lava forest areas with enhancement planting.

The different eco zones within the site will play an important part in creating self-sustaining habitat and ecological corridors that are integrally linked in terms of their ecological values and functions. Consideration of how these areas interact and enhance each other's values has been considered in the planning of ecological enhancements proposed

in this plan. This is in alignment with the connectivity and ecological enhancement recognized and envisaged by the Western Springs Lakeside Park Plan (1995) as well as more recent strategies such as Auckland's Urban Ngahere (Forest) Strategy (March 2019).

The community benefits of this ecological enhancement are not just environmental but also social (e.g. health and wellbeing), cultural (e.g. cultural heritage) and economic (e.g. reduced flood risk) and the ecological benefits from the plan are best realized by looking at the sites importance in both a local and regional context.



Indicative ecological corridors

## Local context

The park is 4.5km from Auckland City Centre, surrounded by the popular regional facilities of Auckland Zoo, MOTAT, and Western Springs Stadium. There are a number of educational facilities near the park including, Pasadena Intermediate, Western Springs College, and The Auckland Performing Arts Centre (TAPAC).

The major organisations in Western Springs precinct have formed a Stakeholder Group. The Stakeholder Group has contributed to the development of the plan from its earliest stages. Carparking is a key issue in the precinct and is being investigated by the group.

Western Springs Te Wai Ōrea sits within a green corridor that extends from Meola Reef to Chamberlain Park.

In 2013, Auckland Council's biodiversity team undertook a review of local parks and reserves to prioritise where ecological restoration works could take place within the Waitematā Local Board area. Out of 150 local reserves assessed, Western Springs Te Wai Ōrea ranked first in priority for management, scoring highly for ecological values and potential of both its flora and fauna.

There is potential for both wetland and forest ecosystems to be subject to ecological restoration or enhancement at this site, increasing their ecological value and potentially bringing them closer to their natural or historic state.



LEGEND:

 Site boundary	 Motorway	 Tramline
 Lake	 Primary Road	 RFA facilities
 Creek	 Secondary Road	 Educational facilities
	 Tertiary Road	



Scale: 1:8000 @ A3

## Site description

Western Springs Lakeside Te Wai Ōrea is a popular park that visitors from across the Auckland region enjoy. Visitors use the park for a range of activities, including walking, connecting with nature, peace and quiet, feeding waterfowl and eels, and entertaining children.

Western Springs Lakeside Te Wai Ōrea is 26 hectares in size. The general character of the park is made up of four broad area types;

- Rehabilitated natural area with a large wetland, island, open water, the springs, and regenerating native and lava rock forest
- Parkland areas which have been developed as a 'picturesque' parkland with large specimen trees, shrubberies, gardens and open space
- The Quarry
- The Lake.

Western Springs Lakeside Te Wai Ōrea is a complex ecosystem due to its urban setting and combination of native and exotic flora and fauna. Water quality, eel habitat, pest fish, and the health of waterfowl are all issues within the park.

The park has a network of paths that provide a variety of experiences. A wide path circumnavigates the lake and connects to main entrances, while informal predominantly gravel paths weave through the more natural areas.

Western Springs Lakeside Te Wai Ōrea is a popular place to host events, being located close to the central city and without the limitations of other central city parks that host events. There are a number of events that take place in the park, usually during summer, with some regular events that run through the year. Events range in scale, from events such as Pasifika that occupy the whole park to open air cinemas that occupy only the quarry.



### LEGEND:

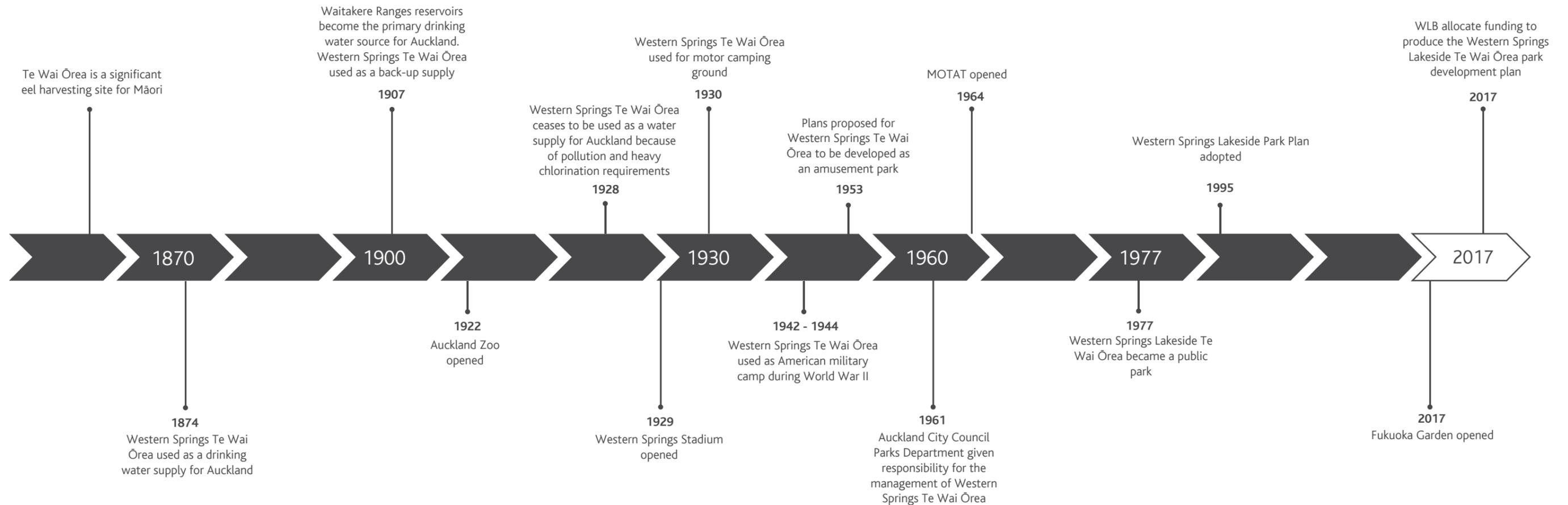
	Site boundary		Lake
	Natural area		Path network
	Parkland		Playground
	The quarry		Toilets



Scale: 1:4000 @ A3

## Brief site history

As a public park, Western Springs Lakeside Te Wai Ōrea is relatively new. It opened to the public around 1977. The area was first used for municipal benefit in 1874, when it provided drinking water supply to the growing city.



## 1.4 Whakawhitiwhiti kōrero *Consultation*

### Consultation process

The development plan was consulted in three distinct phases:

**1. Phase 1: Pre-design consultation** was undertaken with known stakeholders to learn what needed to be considered through the development plan process, to understand what was valued about the park and needed to be retained, and what were key concerns and ambitions that would guide improvements and change to Western Springs Lakeside Te Wai Ōrea. During this phase the project team worked with council staff and key stakeholders via a series of meetings, workshops and site walkovers. These occurred in late August / early September 2017.

Stakeholders included Western Springs Stakeholders Group, Auckland Transport, MOTAT, Auckland Zoo, Western Springs Stadium, ATEED, Friends of Fukuoka Garden, and council staff.

#### Summary of phase 1 pre-design consultation

##### General park feedback

- the park is very popular and busy, with numbers of visitors increasing significantly in recent years
- the park is a key asset for the city with environmental (a 'green corridor' 'the lungs of the city'), scientific, recreational and cultural values
- the lake brings life to the park.

##### Circulation

- the proposed greenway location was generally supported (particularly by AT). The proposed greenway crosses over RFA land and Stadium Road. The connection would need to be closed during some events
- the current path network and land bridge in particular does not comply with modern accessibility standards
- lighting the paths for safety should be considered
- informal mountain bike tracks are being built by the community in the vegetation adjacent to Bullock Track
- visitors typically don't cycle to the Western Springs Te Wai Ōrea area as it is surrounded by busy roads
- connections (walking/cycling) beyond the park towards Motions Road Reserve, Grey Lynn and Kingsland should be improved.

##### Ecological improvements

- strong feedback that water quality needs to be improved

- manage existing birdlife in the park to achieve a more balanced environment for all users to enjoy
- excessive birdlife affects the visitor experience with birds being aggressive during breeding season, excrement being left on paths and grassed areas, and birds dying of avian botulism
- the birdlife enlivens the park.

##### Events and event infrastructure

- improve drainage at the quarry
- provide 3 phase power supply for events
- provide appropriate surfacing to allow for event vehicles, including hard surfacing and removable bollards
- widen the bridge connections between the park and the stadium (8m optimal width)
- Fukuoka Garden and its surrounds could become a community centre with a focus on Japanese culture and cross cultural understanding.

##### Security/boundary treatments

- there have been minor security breaches at the zoo, MOTAT, and major events
- the zoo is currently looking at fence treatments along their boundary to promote the zoo and screen 'back of house' activities. The zoo plans to retain the playground kiosk in its current location
- MOTAT is looking at providing access directly into MOTAT from the park, with a café that services both MOTAT and the park.

##### Car parking

- there is a general lack of parking in the Western Springs precinct.

##### Wayfinding/interpretation improvements

- the path network is confusing
- more historical information is needed
- there are opportunities for the park to become more educational (given its context).

##### Playground improvements

- general support for the playground to be kept in its current location (no reason for change)
- support for a themed playground.

**Fukuoka Garden**

- include a grove of flowering cherry trees adjacent to the Fukuoka Garden, to soften the exterior walls, and improve the amenity value of the area.

**2. Phase 2: Initial draft development plan review** was undertaken to test the initial draft development plan with stakeholders to ensure that improvements appropriately addressed key concerns and ambitions for Western Springs Lakeside Te Wai Ōrea.

Stakeholders included Western Springs Stakeholders Group, MOTAT, Auckland Zoo, Western Springs Stadium, ATEED, Friends of Fukuoka Garden, council staff, mana whenua, and Waitematā Local Board.

**Summary of phase 2 initial draft development plan review**

**General feedback**

- Support for the plan, with only minor amendments suggested
- There was a lot of enthusiasm for the water quality improvements, particularly the bird feeding areas.

**3. Phase 3: draft development plan public consultation** was undertaken to test the draft development plan with the public to get their feedback on the proposed improvements for Western Springs Lakeside Te Wai Ōrea.

In February 2018 the Waitemata Local Board approved the draft Western Springs Lakeside Te Wai Ōrea Development Plan for public consultation. This consultation was carried out in July / August 2018 and generated over 200 responses which identified park improvements that are a priority for the community.

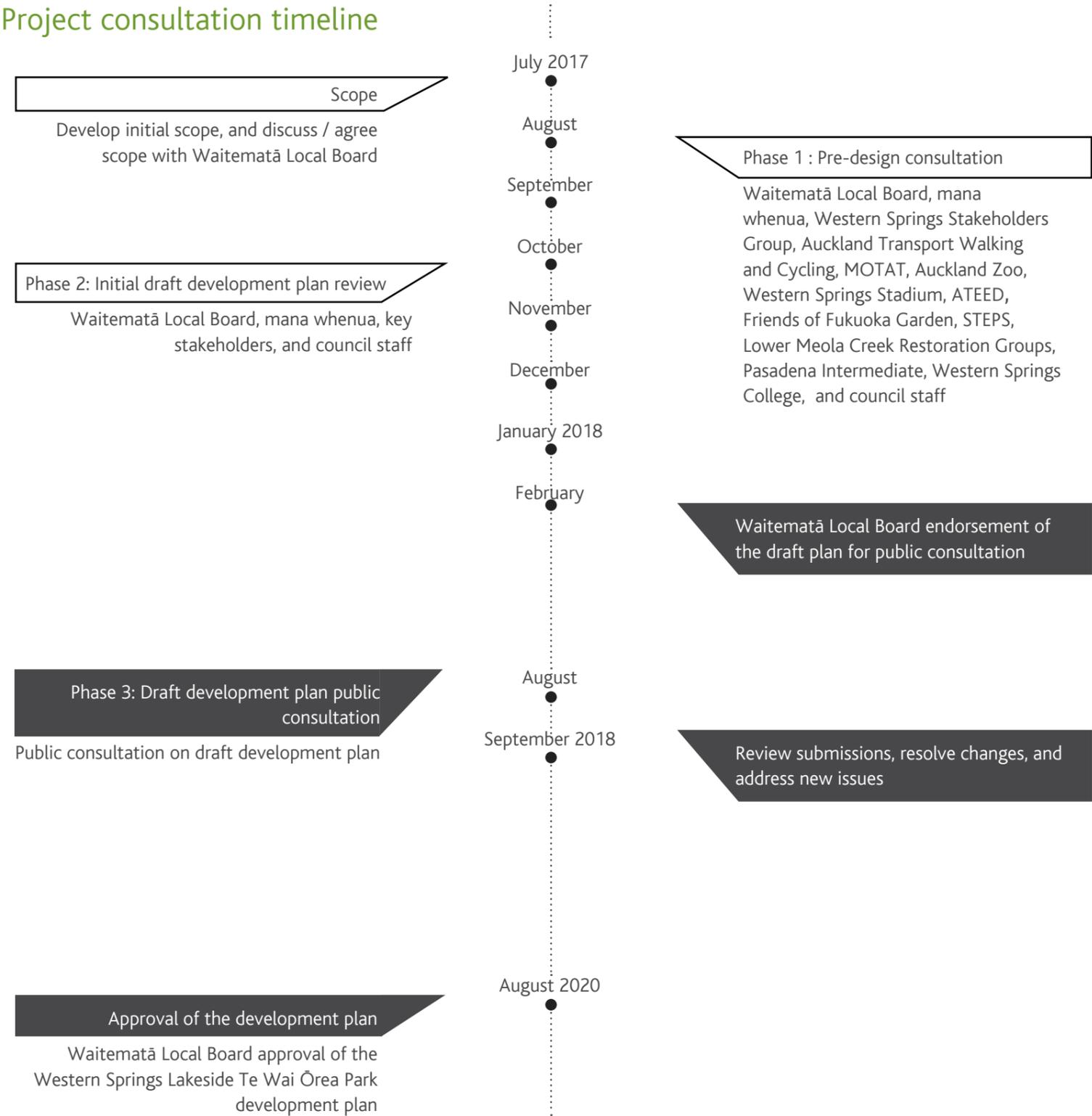
**Summary of phase 3 draft development plan public consultation**

A total of 196 survey forms were returned and seven submissions made.

**General feedback**

- Support for the plan, with minor amendments suggested
- Ecological and water quality improvements identified as high priorities
- High level of satisfaction with the means by which the plan aims to improve key service outcomes covering water quality, refuge, connectivity, celebration of the site's history and provision for events.

**Project consultation timeline**





## 2.0 Mahere Whakawhanake *Development Plan*

This section provides a summary of the proposed key improvements to Western Springs Lakeside Te Wai Ōrea. It includes the Te Aranga Māori Design Principles, the Concept Plan, and precedent imagery and diagrams outlining how the concept plan relates to the development plan vision.

## 2.1 Ngā Mātāpono Hoahoa Māori a Te Aranga *Te Aranga Māori Design Principles*

Te Aranga design principles have been considered and applied in this development plan, and will continue to be applied as the outcomes of the plan are realised. The design principles, Tohu, Taiao and Mauri Tu are integral to this plan and underpin visionary objective one: water.



### **Mana - Rangatiratanga, Authority**

#### Outcome:

The status of iwi and hapū as mana whenua and as council partners is recognised and respected.

#### Attributes:

- Recognises Te Tiriti o Waitangi / The Treaty of Waitangi and the Wai 262 Ko Aotearoa Tēnei framework for Treaty Partnerships in 21st Century Aotearoa New Zealand as the basis for all relationships pertaining to development
- Provides a platform for working relationships where mana whenua values, world views, tikanga, cultural narratives and visual identity can be appropriately expressed in the design environment
- High quality Treaty based relationships are fundamental to the application of the other Te Aranga principles.



### **Whakapapa - Names & Naming**

#### Outcome:

The rich cultural history is celebrated and integrated within the concept plan.

#### Attributes:

- Recognises and celebrates the significance of mana whenua ancestral names
- Recognises ancestral names as entry points for exploring and honouring tūpuna, historical narratives and customary practises associated with development sites and their ability to enhance sense of place connections.



### **Tohu - The Wider Cultural Landscape**

#### Outcome:

Mana whenua significant sites and cultural landmarks are acknowledged.

#### Aspirations:

- Acknowledges a Māori world view of the wider significance of tohu / landmarks and their ability to inform the design of specific development sites
- Supports a process whereby significant sites can be identified, managed, protected and enhanced
- Celebrates local and wider unique cultural heritage and community characteristics that reinforce sense of place and identity Tohu.



### **Taiao - The Natural Environment**

#### Outcome:

The natural environment is protected, restored and / or enhanced.

#### Aspirations:

- Sustains and enhances the natural environment
- Local flora and fauna that are familiar and significant to mana whenua are key natural landscape elements within urban and / or modified areas
- Natural environments are protected, restored or enhanced to levels where sustainable mana whenua harvesting is possible.





### **Mauri Tu - Environmental Health**

#### Outcome:

Environmental health is protected, maintained and / or enhanced.

#### Aspirations:

- The wider development area and all elements and developments within the site are considered on the basis of protecting, maintaining or enhancing mauri
- The quality of wai, whenua, ngāhere and air are actively monitored
- Water, energy and material resources are conserved
- Community well-being is enhanced.



### **Mahi Toi - Creative Expression**

#### Outcome:

Iwi / hapū narratives are captured and expressed creatively and appropriately.

#### Aspirations:

- Ancestral names, local tohu and iwi narratives are creatively reinscribed into the design environment including: landscape; architecture; interior design and public art
- Iwi / hapū mandated design professionals and artists are appropriately engaged in such processes



### **Ahi Ka - The Living Presence**

#### Outcome:

Iwi / hapū have an enduring living presence and are secured and valued within their rohe.

#### Aspirations:

- Mana whenua live, work and play within their own rohe
- Acknowledges the post Treaty of Waitangi settlement environment where iwi living presences can include customary, cultural and commercial dimensions
- Living iwi / hapū presences and associated kaitiaki roles are resumed within urban areas



## 2.2 Mahere Takinga Whakaaro *Concept Plan*

This plan provides an overview of the proposed improvements to Western Springs Lakeside Te Wai Ōrea, and five vision objectives that underpin the design. The following focus plans provide more detail on specific areas.

### **Wai Water**

In order to improve water quality large-scale improvements are proposed to the park. These include buffer and emergent planting to the lake edge (while retaining viewshafts to the lake).

### **Ruruhau Refuge**

The northern side of the lake is where real refuge from the city is experienced, being buffered from traffic noise and providing excellent views of the lake and trees within the park, and Auckland Zoo. This plan proposes to enhance this experience by leveraging the existing facilities i.e. Fukuoka Garden, playground, and naturalised wetland area.

### **Tūhononga Connected**

The existing path network has generally been retained, with a main path that circumnavigates the lake and minor paths which lead off it to explore the park. A clear path hierarchy has been proposed, to promote legibility. The main path circles the lake and connects to the main entrances. The secondary path provides a wider network through the wetland area and connects to secondary entrances. Gravel paths allow access to more rugged and remote areas of the park, further into the wetland and the native forest area.

Connections to MOTAT and Auckland Zoo have been enhanced and proposed greenway routes as per the Waitematā greenways plan have been included.

It is proposed that footbridges be renewed over time to meet modern accessibility standards. This is with the exception of the double humped bridge on the western side of the lake. The double humped bridge will be

retained because of its iconic form and because there is an alternative all accessible route option in close proximity that provides a similar connection outcome.

### **Whakahaerenga Events**

Open areas of grass and specimen trees have been retained in the plan. Infrastructure is proposed that will assist running of events, including hardstand and removable bollards at pack-in / pack-out locations, three-phase power and water connections, and improved drainage at the quarry.

### **Tāhuhu kōrero tuku iho History**

The lake is central to the park's history and significance to mana whenua, and is the focus of this plan.

Articulating the park's history and significance to mana whenua is going to be the key component of the proposed signage and wayfinding improvements.

#### LEGEND:

-  Parkland
-  Proposed waterfront platform
-  Footbridge
-  Main and secondary footpath (asphalt)
-  Gravel path
-  Hardstanding (e.g. Gobi blocks)
-  Main public entrance
-  Secondary public entrance
-  Restricted public entrance
-  Key viewshafts
-  Existing toilet
-  Proposed new toilet location
-  Upgraded playground
-  Proposed tuna (eel) themed bridge
-  Native forest
-  Proposed buffer planting
-  Proposed emergent planting
-  Garden planting
-  Proposed cherry trees
-  Focus Area A
-  Focus Area B



AUCKLAND ZOO

WESTERN SPRINGS STADIUM

WESTERN SPRINGS OUTER FIELDS

MOTAT



MOTIONS ROAD

GREAT NORTH ROAD

NORTH WESTERN MOTORWAY



Scale: 1:3250 @ A3

Precedent imagery



Water



Refuge



Events



Connected



Refuge



History



## Wai Water

The mauri of the water is restored to create a healthy park for people and fauna.

Proposed water quality improvements include:

- buffer planting on the lake edge, typically between the existing path and the lake edge
- buffer planting along Motions Creek
- emergent planting within the pond
- regulatory / interpretative signage where access to the lake is provided
- removal of filter pond and development of a naturalised wetland
- restoration of degraded remnant wetland areas through weed management and restoration planting.



### LEGEND:

- Parkland
- Proposed buffer / riparian planting
- Proposed emergent planting
- Proposed path network

- Proposed regulatory sign (e.g. no dogs / liquor ban / no bird feeding)



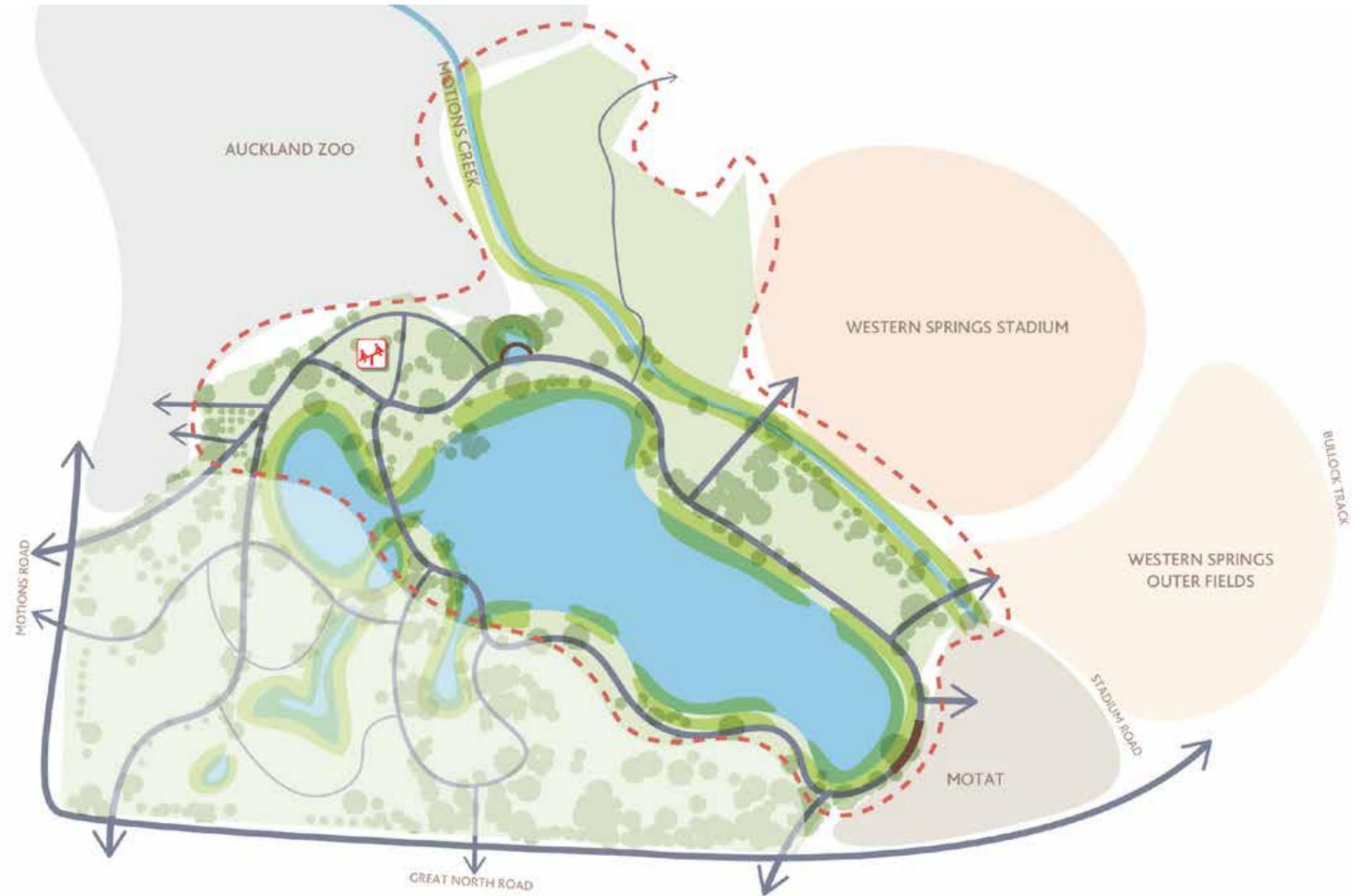


## Ruruhau Refuge

Western Springs Te Wai Ōrea is retained as a refuge from the city. Key assets such as toilets, picnic tables and play elements will be designed so that they are usable by people with the widest possible range of abilities.

Proposed improvements to retain the park as a refuge from the city include:

- cherry tree grove planted adjacent to the Fukuoka Garden
- renewed playground with an appropriate theme and improved equipment
- naturalised wetland in the location of the existing filter pond
- the forest (pines with native understorey) restored to a podocarp-broadleaf forest
- Motions Creek rehabilitated
- access to MOTAT created.



### LEGEND:

 Parkland	 Proposed waterfront platform	 Proposed tuna (eel) themed bridge
 Proposed buffer / riparian planting	 Proposed wetland	 Proposed cherry trees
 Proposed emergent planting	 Proposed path network	
 Native forest	 Renewed playground	





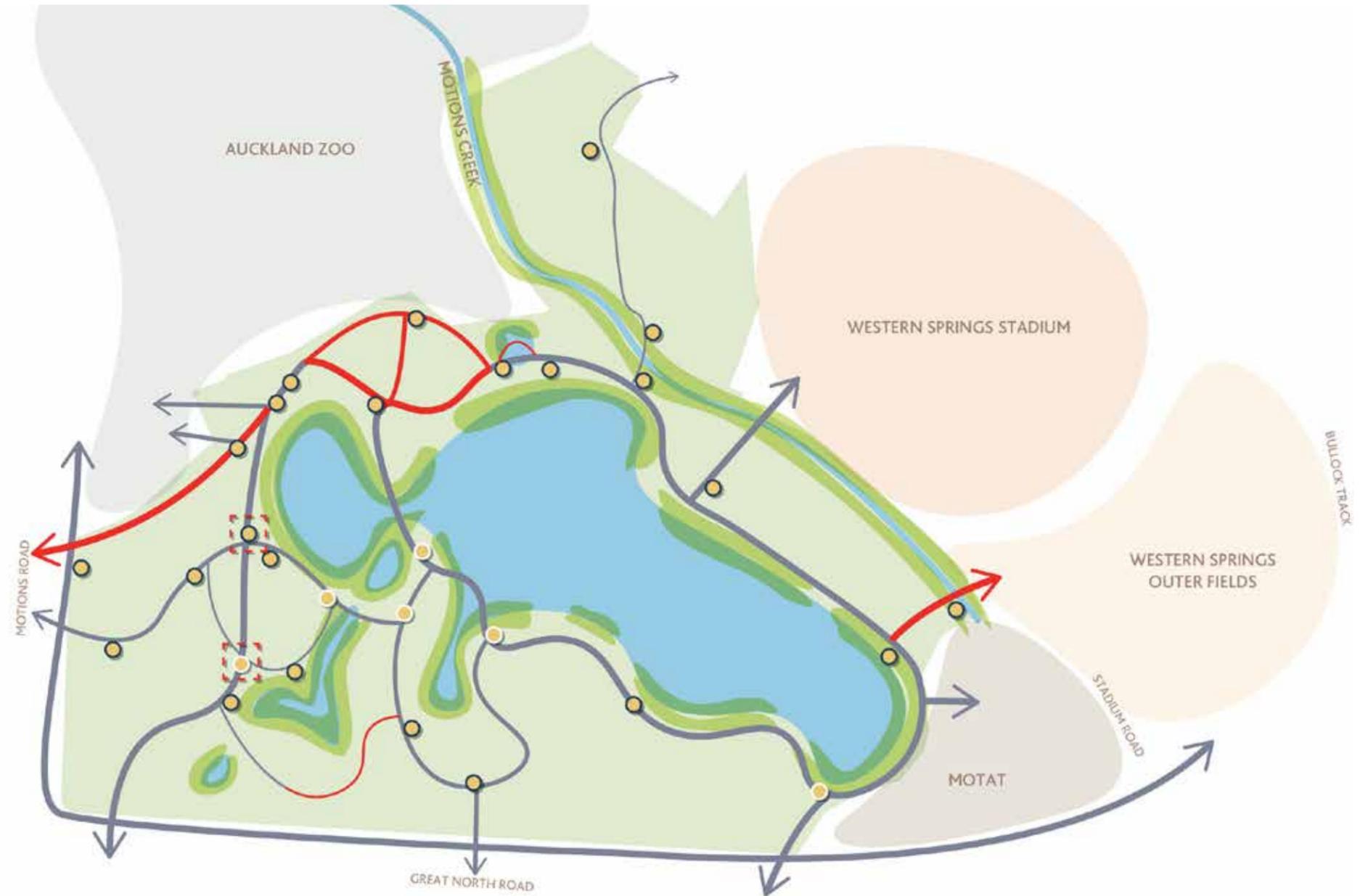
## Tūhononga Connected

Western Springs Lakeside Te Wai Ōrea has a clear circulation network, that is well connected to its surrounding facilities and communities. All primary and secondary footpaths and associated bridges will be fully accessible.

Proposed improvements to the circulation network include:

- greenway connection between Stadium Road, Fukuoka Garden, and Motions Road
- promote connections to the zoo along key footpaths by means of design features and / or signage
- realigned footpaths surrounding the playground
- improved internal footpath intersections
- extend existing 'dead end' path to connect with an existing path
- realign entrance path at Stadium Road entrance
- wayfinding signage.

New footpath connections and any upgrade to the existing path through the forest area (pines with native understorey) will only be considered once the management regime for the pines has been confirmed and after full consultation on route options with relevant stakeholders, including residents of West End Road neighbouring community, has been undertaken.



### LEGEND:

	Parkland		Existing wayfinding sign
	Realigned intersection		Proposed wayfinding sign
	Proposed path network		
	Realigned / new path		





## Whakahaerenga Events

Western Springs Lakeside Te Wai Ōrea is a significant event destination.

Proposed improvements for events include:

- drainage at the quarry and playground
- hardstand (e.g. Gobi blocks) at pack-in / pack-out locations
- removable bollards at pack-in / pack-out locations
- 3 phase power and water supply at the quarry, playground, and Stadium Road entrance.



### LEGEND:

- |   |   |
|---|---|
|  Parkland                              |  Proposed power outlet         |
|  Proposed drainage improvements        |  Proposed potable water supply |
|  Proposed path network                 |   |
|  Proposed hardstand (e.g. Gobi blocks) |   |
|  Proposed removable bollards           |   |





## Tāhuhu kōrero tuku iho *History*

Western Springs Lakeside Te Wai Ōrea celebrates its history, and its significance to mana whenua.

Proposed improvements include:

- restoration of the native forest, Motions Creek, wetland, and the lake (ecological heritage)
- interpretative signage (ecological, mana whenua, and post-colonisation heritage)



### LEGEND:

 Parkland	 Proposed path network	 Existing historical plaque
 Proposed buffer / riparian planting	 Existing interpretation sign	 Proposed historical plaque
 Proposed emergent planting	 Proposed interpretation sign	





## 3.0 Mahere Whakawhanake Āmiki *Detailed Development Plan*

This section provides a detailed analysis of the site and its surrounds. It also outlines all of the improvements that are proposed for the park.

## 3.1 Tātaritanga āmiki *Detailed Analysis*

### 3.1.1 Tāhuhu kōrero tuku iho *History*

#### Māori history

Historically, Western Springs Te Wai Ōrea was highly valued for the clean, clear spring water and tuna (eels) that lived in the stream. It was one of the two major wetlands in the central Auckland region and an important location for the harvesting of eels. The lake was named Te Wai Ōrea, which means the waters of the eel.

Tāmaki Makaurau was home to many hapu who tended to follow a continuing cycle of bush clearance for cultivation of new gardens and return to old gardens. Seasonal and other changes in food supplies dictated movement of these groups. In addition, changing relationships between hapu resulted in occasional occupation of fortified pa.

During one of the battles fought in the Tāmaki area, Kawharu (a warrior raised in the Manukau) fought local iwi at a site overlooking Western Springs Te Wai Ōrea. On the ridge, today traced by Surrey Crescent, Te Raeokawharu (Kawharu's brow) marks the spot where the invading chief rested. In 1830-1840, during the Māori musket wars, Ngati Tahinga, Waiohua, and a smaller number of Te Taou lived in the wider area, called Te Rehu.

#### Park history

In the mid 1800s, the area was part of a block of land farmed by William Motion, a Scottish settler. Quarrying has previously been undertaken over part of the site, and this activity has had an effect on lava substrate in that area. In the late 1800s, as Auckland was starting to expand and with water demand increasing, pumping facilities were installed at Western Springs Te Wai Ōrea. The swampy ground was made into an artificial lake to assist with water supply. However, as the cost of operation and maintenance increased over time, new reservoirs were built in the Waitakere Ranges in the early 1900s. By 1928 the lake was abandoned as a water supply source. Over the next 30 years the land deteriorated and was used for illegal rubbish dumping. In 1951 a plan to turn the site into an amusement park

was tabled. The plan was abandoned due to lack of funding. In 1961 Auckland Council started to redevelop the park, concentrating on enhancing the natural values of the 'native area'. By the 1980s, major landscaping work had transformed the park into one of Auckland's most attractive parks. In 2017, the Fukuoka Garden was added to the park in the western area, next to the zoo entrance.

#### Natural history

Basalt lava from an eruption of the Auckland volcanic field forms the main substrate for the Western Springs Te Wai Ōrea area. Current evidence suggests that the source of the lava at Western Springs Te Wai Ōrea is likely to be from Mount Saint John / Te Kōpuke. This volcano erupted approximately 75000 years ago and produced the longest known lava flow in the Auckland volcanic field, extending approximately 11km from the volcano to the end of Meola Reef / Te Tokaroa in the Waitematā Harbour. As molten basalt lava flows, cools and solidifies, joints and fractures form leaving the rock quite porous to the flow of groundwater. Western Springs Te Wai Ōrea forms a natural low-point where free-flowing groundwater emerges at the surface. The springs are now mostly submerged beneath the lake, the current extent of which is the result of artificial damming.

Western Springs Te Wai Ōrea is one of the best remaining examples of Auckland's once-extensive lava outcrops, and the best remaining natural springs associated with the Auckland volcanic field. The importance of maintaining these values is recognised with the site being scheduled for protection as an Outstanding Natural Feature in the Auckland Unitary Plan. The combination of bare lava rock and natural springs has resulted in a complex of forest and wetland areas which support interesting and distinctive ecosystems and associated wildlife. Historically these lava rock forest and associated wetland ecosystems would have been much more common across the Auckland volcanic field, and Western Springs Te Wai Ōrea remains as one of the few locations where these systems have not been lost beneath urban development.



Figure 1. Paratene Ngata of the Ngāti Porou tribe (left) is weaving a hinaki. He is being observed by anthropologist Te Rangi Hiroa (Peter Buck), right, with notebook



Figure 2. 1965 - Western Springs Te Wai Ōrea aerial photograph



Figure 3. 1890 - Looking south across Western Springs Te Wai Ōrea Lake



Figure 4. 1924 - View of the lake

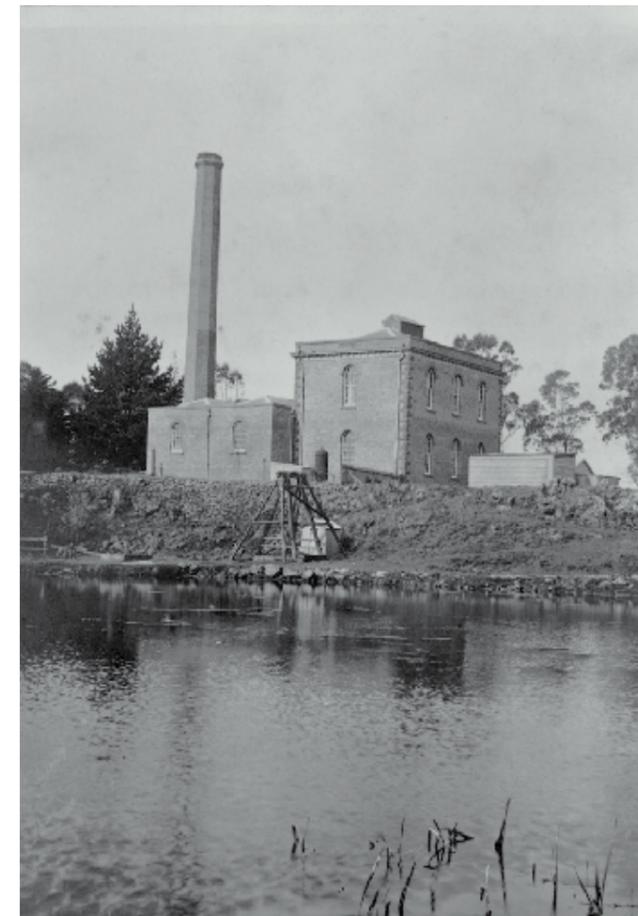


Figure 5. 1920 - Looking across the lake, showing the Auckland City Council's pumping station



Figure 6. Ca. 1933-1945 - Rubbish tip at Western Springs Te Wai Ōrea, Auckland



Figure 7. 1950 - Bathers and pleasure boats with pumphouse in the background



Figure 8. 1960 - Photograph of the lake



Figure 9. 2014 - Aerial view of Western Springs Lakeside Te Wai Ōrea Park and its vicinity

## 3.1.2 Kounga wai Water quality

The water within Western Springs Lakeside Te Wai Ōrea and wetlands is of very poor quality. Factors within the lake, park and catchment all contribute to the poor water quality. The lake is spring fed and it is suggested that activities in the wider catchment are a contributing factor to the high nutrient levels observed in the lake.

Other factors that contribute to poor water quality include activities within the lake, for example; waterfowl, pest fish and sediments / nutrients entering the lake from along the lake edge or from park drainage.

Western Springs is a site of ecological significance, both regionally and locally.

### Trophic Level Index (TLI)

The Trophic Level Index (TLI) is a measurement used in New Zealand to indicate the health of lakes.

The number is calculated using four separate water quality parameters – total nitrogen, total phosphorous, water clarity, and chlorophyll-a.

Total nitrogen and total phosphorous are nutrients that plants thrive on. Large amounts of these nutrients in the lakes encourage the growth of algae and aquatic weeds, which can lead to poor water quality.

Water clarity is a measurement of how clear the water in the lake is.

Chlorophyll-a is the green colour in plants. Knowing how much chlorophyll-a is in a lake gives us a good idea of how much algae the lake has. It is okay to have algae in a lake, just not too much. The more algae there is, the poorer the water quality.

These four measurements are combined into one number which is the TLI.

### Trophic Level Index at Western Springs Lakeside Te Wai Ōrea

The TLI for Western Springs Lakeside Te Wai Ōrea is Supertrophic with a rating of 5.5, which indicates that the water quality at Western Springs Lakeside Te Wai Ōrea is poor.

1	Ultra microtrophic	0.0-1.0
2	Microtrophic	1.0-2.0
3	Oligotrophic	2.0-3.0
4	Mesotrophic	3.0-4.0
5	Eutrophic	4.0-5.0
6	<b>Supertrophic</b>	<b>5.0-6.0</b>
7	Hypertrophic	6.0-7.0

The following is a description of the TLI water ratings:

- microtrophic (TLI < 2; very good) lakes are very clean and often have snow or glacial sources (eg Lake Pukaki in Canterbury)
- oligotrophic (TLI 2–3; good) lakes are clear and blue, with low concentrations of nutrients and algae (eg Lake Rotoma in Bay of Plenty)
- mesotrophic (TLI 3–4; average) lakes have moderate concentrations of nutrients and algae (eg Lake Rerewhakaaitu in Bay of Plenty)
- eutrophic (TLI 4–5; poor) lakes are murky, with high concentrations of nutrients and algae (eg Lake Rotoroa in Northland)
- supertrophic or hypertrophic (TLI > 5; very poor) lakes have extremely high concentrations of phosphorus and nitrogen, and are overly fertile; they are rarely suitable for recreation and lack habitats for desirable aquatic species (eg Lake Forsyth in Canterbury, Western Springs Te Wai Ōrea).

### Ecological significance

#### Biodiversity Focus Area:

The Auckland Council Biodiversity team has recently identified areas that are of regional significance in ensuring we protect the long term viability of each ecosystem type found in Auckland. These sites are called Biodiversity Focus Areas (BFAs) and Western Springs Lakeside Te Wai Ōrea is one of them. The ecosystems of particular interest at Western Springs Lakeside Te Wai Ōrea are the wetlands. Of particular note, the flaxland wetland present at the site is a critically endangered ecosystem type in the Auckland region. Although now absent, historically parts of the site were under the cover of pūriri lava rock forest – also a critically endangered ecosystem type in the Auckland region.

#### Significant Ecological Area within Auckland Unitary Plan:

Factors contributing to Western Springs Lakeside Te Wai Ōrea being a Significant Ecological Area include

2B – Threatened Species Long fin eel, *Fissidens berteroi* (moss), *Sparganium subglobosum*.

2E – Rare species short-hair plume grass (*Dichelachne inaequiglumis*)

#### Local Board Parks Prioritisation Plan:

Western Springs Lakeside Te Wai Ōrea is considered the highest priority local park for ecological restoration in the Waitemata Local Board area.

## Water catchment source

Western Springs Te Wai Ōrea lake is fed by a natural spring. The main source of the water feeding the spring is rain falling on the slopes of the volcanoes Te Tātua a Riukiuta / Three Kings, Ōwairaka / Mount Albert and Maungawhau / Mount Eden.

The water runs underground for several kilometres through lava flows known as the Greater Western Springs aquifer, and emerges from the ground via a spring located on the southern edge of the park.

### Issues:

- The water arriving at Western Springs Lakeside Te Wai Ōrea has high nutrient levels, which is a main contributor to the low water quality at Western Springs Lakeside Te Wai Ōrea
- The source of the contamination in the Greater Western Springs aquifer is unknown and very difficult to identify and fix with the scale of the aquifer. Possible contamination sources could be leakages from ageing wastewater assets and / or historical industrial use.



### LEGEND:

- Sub catchment boundary
- Volcanic aquifer
- Wastewater pipes
- Streams



Scale: 1:40,000 @ A3

## Waterways

The spring enters at an inlet in the southern part of the lake, flowing on into the main body of the lake and finally the wetland at the western end of the lake.

The main lake discharges to Motions Creek through three outlets, two with weir systems and one with a "filter" pond (located in the north boundary of the lake, near the elephant enclosure of the zoo). The water level is controlled by timber weirs at the outlet points.

Much of the pond edge is dominated by outcrops of basalt.

The estimated discharge is between 1-2 million gallons / day.

Motions Creek extends from Western Springs Lakeside Te Wai Ōrea to Waitematā Harbour, discharging along the eastern side of Meola Reef Reserve. The majority of the stream has vegetated banks with the exception of the section through Auckland Zoo which is in a concrete channel.

Through Western Springs Lakeside Te Wai Ōrea, Motions Creek has steep eroding grass banks with pockets of native shrubs (mainly harakeke), and exotic specimen trees.

The pockets of wetland which are found at the western end of the lake are typically dominated by exotic plant species at present and are candidates for ecological restoration through weed management and planting of suitable native species.



LEGEND:

- |   |   |
|---|---|
|  Site boundary |  Lake    |
|  Spring        |  Wetland |
|  Outlet        |  Stream  |
|  Filter pond   |   |



Scale: 1:4000 @ A3



View of the lake from north-east



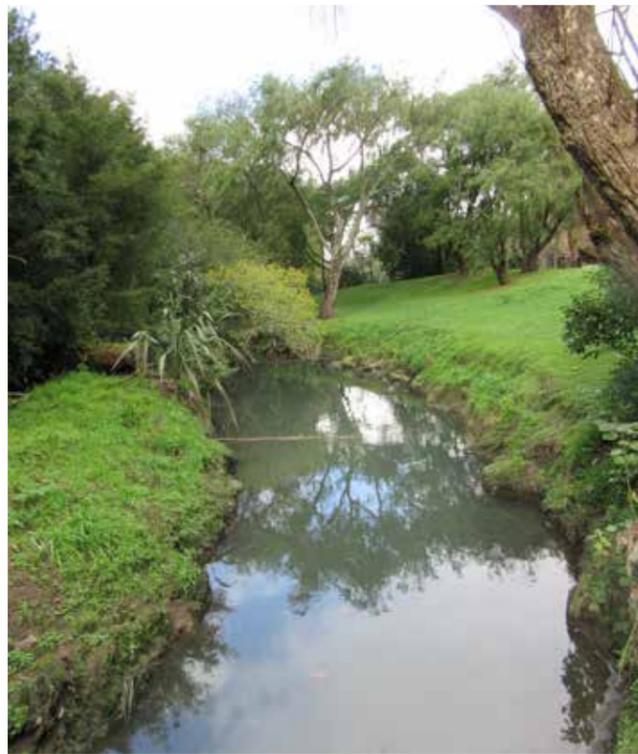
East part of the lake



Filter pond on the north side of the park



Motions Creek adjacent to native forest



Motions Creek adjacent to Auckland Zoo



Motions Creek adjacent to Western Springs Stadium

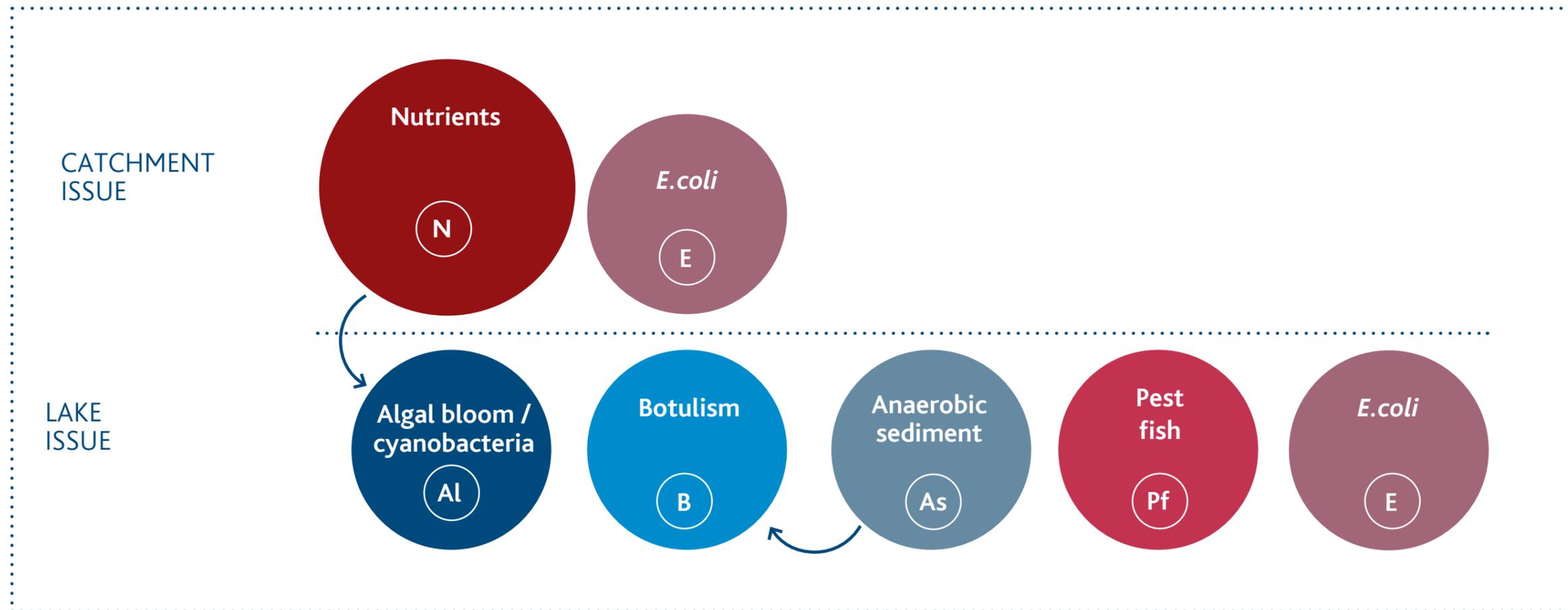


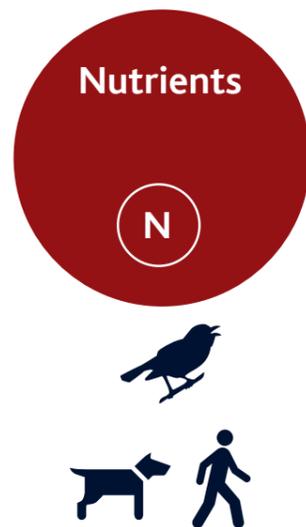
Wetland adjacent to Great North Road (courtesy Wildland Consultants Ltd)

## Water quality issues

As previously outlined, the water quality at Western Springs Lakeside Te Wai Ōrea is rated as 'very poor'. The 'issues' outlined below contribute to, and result from, poor water quality.

These issues are impacting on the health of waterfowl and visitor experience. The water quality within Western Springs Lakeside Te Wai Ōrea is also having flow-on impacts to Auckland Zoo, which is located next to the lake. Lake water is used in some animal enclosures and has been suspected to have impacted animal health there. Birds within the zoo are inoculated to protect them from botulism.





#### Nutrients

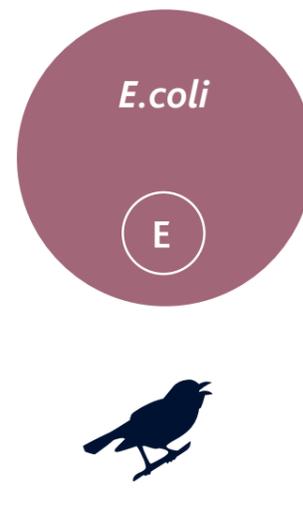
- The term nutrients usually refers to nitrogen (N) and phosphorous (P) as these are usually the limiting nutrients for nuisance plant growth
- Nutrients can come from a number of sources including bird faecal matter and anthropogenic sources
- Nitrogen and phosphorous are also naturally found in water, soil and in the atmosphere
- Excess nutrients can cause unwanted macrophyte growth and also unwanted algae growth.

#### Nutrients at Western Springs Lakeside Te Wai Ōrea

- Both nitrogen and phosphorous are elevated at Western Springs Te Wai Ōrea Lake
- A number of sources for elevated nutrients exist, including from the wider catchment
- The spring water is contributing high levels of N and P into the lake
- The sediment at Western Springs Te Wai Ōrea is also a source of nutrients.

#### Managing Nutrients

- Planting along the margins and reducing the number of birds will help to control nutrients from the shore
- Minimising disturbance to the sediment will reduce the risk of sediment runoff into the lake
- To manage nutrients at Western Springs Te Wai Ōrea research is needed looking at the wider catchment to understand groundwater and background nutrient loading, as well as research into innovative methods for mitigating nutrients in the lake.



#### *Escherichia coli* (*E.coli*)

- *E.coli* is common bacteria that live in the gut of warm-blooded animals, including humans
- It is used as an indicator of how much sewage or faecal matter enters the waterway
- Some *E.coli* species of bacteria can be harmful to humans.

#### *E.coli* at Western Springs Te Wai Ōrea

- *E.coli* levels at Western Springs Te Wai Ōrea are often elevated
- The cause is unclear, possibly human, avian, dogs or a combination is causing the elevated levels. Further tests can confirm this
- Avian and dog sources are most likely, given their high numbers at the park.

#### Options to manage *E.coli* at Western Springs Te Wai Ōrea

- Reducing the large number of birds that reside at the park
- Undertaking investigations of sources of *E.coli* that enter the lake and then mitigation of the identified issue
- Planting along the margin of the lake in places will help filter surface water runoff
- Improve signage relating to disposing dog litter.



#### Algal blooms

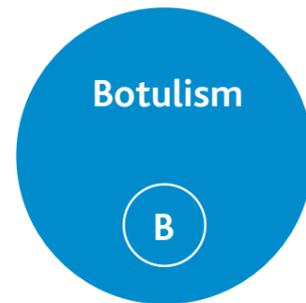
- Algal bloom is a term used to describe large masses of microscopic plants that float within the water column
- Algal blooms can sometimes turn the water cloudy, green and even other colours
- Blooms of certain species of blue-green algae, also known as cyanobacteria, can sometimes produce an odour and can be harmful to humans and aquatic species
- Excess nutrients are a major contributor to algal blooms.

#### Algal blooms in Western Springs Te Wai Ōrea

- Blooms within the lake have occurred in the past
- Auckland Council will monitor for cyanobacteria species as and when they occur.

#### Managing algal blooms at Western Springs Te Wai Ōrea

- Short-term options for managing blooms include immersing hay bales in the water, and increasing circulation in the water
- Long term solutions need to be investigated further, as the main source of nutrients is from the spring originating from the Greater Western Springs aquifer.



#### Avian botulism

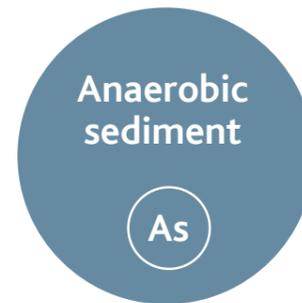
- Avian botulism is a disease causing birds to be paralysed which often results in death
- Birds contract botulism by consuming Clostridium botulinum bacteria, which can occur in the sediment of ponds and wetlands, as well as in some insects in the park.

#### Avian botulism at Western Springs Lakeside Te Wai Ōrea

- Avian botulism at Western Springs Lakeside Te Wai Ōrea occurs most summers when the right environmental conditions are present
- The close proximity of the Zoo to the lake threatens the welfare of the birds at the Zoo.

#### Managing avian botulism at Western Springs Lakeside Te Wai Ōrea

- Eliminating the bacteria is difficult because of the amount of sediment within Western Springs Lakeside Te Wai Ōrea
- Educating people not to feed the birds bread as bread which has not been eaten and remains in the lake can promote the growth of bacteria as it breaks down
- Removal of the dead birds is necessary to stop the spread of the bacteria.



#### Anaerobic sediment

- Anaerobic sediment is organic sediment that is absent (or nearly absent) of oxygen
- This sediment is usually fine and can be disturbed easily by birds, fish or humans
- The sediment can be the incubator for the botulism bacteria.

#### Anaerobic sediment at Western Springs Lakeside Te Wai Ōrea

- Sediments within Western Springs Lakeside Te Wai Ōrea lake are anaerobic
- The anaerobic sediment contributes to the botulism and nutrient issues
- Birds and fish exacerbate the anaerobic sediment, including feeding of bread which enters the water.

#### Managing anaerobic sediment at Western Springs Lakeside Te Wai Ōrea

- Plant along some of the lake margins to help retain sediment from entering the lake, and reducing bird feeding on water
- Dredging the sediment from the lake
- Capping the sediment or adding oxygen in the sediment through a fountain or other circulation. Research would need to be done to assess each of these options further.



#### Pest Fish

- Pest fish are unwanted species introduced from one ecosystem into another
- New Zealand has a high number of pest fish
- All species of pest fish are detrimental to New Zealand aquatic environments. Both native fish and native vegetation can go extinct with pest fish
- Pest fish are so common in New Zealand that native and endemic fish are often overlooked and undervalued.

#### Pest fish at Western Springs Lakeside Te Wai Ōrea

- Pest fish disturb the sediment of the lake floor
- Contribute to algae blooms directly and indirectly by disturbing the lake floor and adding nutrients to the water column
- May be caught and released by the public to other waterways.

#### Managing pest fish

- Underwater fences or enclosures to preserve some parts of the lake
- Education programmes, preventing further spread into Western Springs Lakeside Te Wai Ōrea and also other areas
- Pest fish eradication programmes. Research would need to be done to assess this option further.

### 3.1.3 Hauropi Ecology

#### Waterfowl

This plan recognises that the bird life in Western Springs Lakeside Te Wai Ōrea is a core component of the park's character and will be managed by balancing recreation plus environmental outcomes and applying sound ecological principles.

Historically, one of the major attractions to the park has been bird feeding, typically using leftover bread. It is now understood that the artificially high numbers of waterfowl in the park is not only impacting on the visitor experience but also on good environmental outcomes.

The park appears dirty with bird excrement, making it unattractive to users. The waterfowl can also be aggressive, particularly when they are breeding, and exotic species are being favoured to the detriment of native bird species.

The feeding of birds at the park artificially raises the bird population and leads to a number of poor amenity and ecological park outcomes including:

- An unhealthy bird population - despite education and signage there remains a risk that the wrong kind of foods, including bread, are given to birds. A poor diet reduces body condition and makes the birds more vulnerable to parasites and diseases.
- Changing natural behaviour - feeding the birds changes their natural behaviours and makes them aggressive to both people and other birds.
- Reduction of native bird numbers - at Western Springs Lakeside the birds that benefit from feeding are those that are already abundant and generally exotic.
- Water and landscape pollution - the unnaturally high level of bird droppings foul the footpath and grass areas and impact water quality.

These negative impacts are considered to outweigh the amenity benefits associated with bird feeding and therefore the activity will be discouraged by means of education and interpretation signage.

It is also proposed that some waterfowl species are managed at more sustainable levels.

#### Fish

There are a significant number of eels in the park, which is reflected in the lake's Māori name: 'Te Wai Ōrea' (The water of the eels). The lake contains two native species of eel: the short-finned (*Anguilla australis*) and long-finned (*Anguilla dieffenbachii*). The long-finned eel has been identified as a species that is in decline and could become extinct within the next 50 years.

It is the council's Biodiversity team's view that there may be some value in managing Western Springs Lakeside Te Wai Ōrea as an eel sanctuary, to highlight the spring's importance as rearing habitat. While making the springs an eel sanctuary would not confer any greater legal protection (i.e. over and above the protection the reserve status already affords) it would draw the public's attention to the eel fishery's cultural and ecological values.

There are a number of other fish species also present in Western Springs Lakeside Te Wai Ōrea. Species include tench, perch, catfish, goldfish, koi and grass carp.

Grass carp were introduced into Western Springs Lakeside Te Wai Ōrea in 2005 to control submerged invasive pest plant species. The pest plant species is no longer visible in the lake, and some grass carp were removed. However grass carp likely remain in the lake and could still be controlling pest plant species.

#### Pest fish - koi carp

Koi carp (*Cyprinus carpio*) are present in Western Springs Lakeside Te Wai Ōrea.

Koi are listed as an unwanted organism under the Biosecurity Act. Their pest fish status stems from the species' high fecundity (and therefore their potential to reach high numbers), and tolerance of poor water quality which they themselves exacerbate because of their damaging feeding action.

Koi disturb large quantities of sediment as they feed, destabilising bed material and undermining stream banks, which in turn diminishes habitat for submerged

plants, native fish, and aquatic invertebrates. Potential for significant water quality deterioration increases as koi numbers increase.

#### Mammalian pest

In addition to managing pest fish and waterfowl, there is also a significant value to manage mammalian pests, including rabbits in particular, as these have impacts on the native terrestrial and wetland systems present at the site and population numbers are known to erupt from time to time.



Duck



Pukeko



Coot



Swan



Eel

## Flora

The current vegetation within the park consists of riparian planting around the water bodies, pine trees with a native understorey in the forest area and specimen trees (native and exotic) through the more formal parkland areas.

The long term goal for the forest is to develop a native forest eco system and landscape.

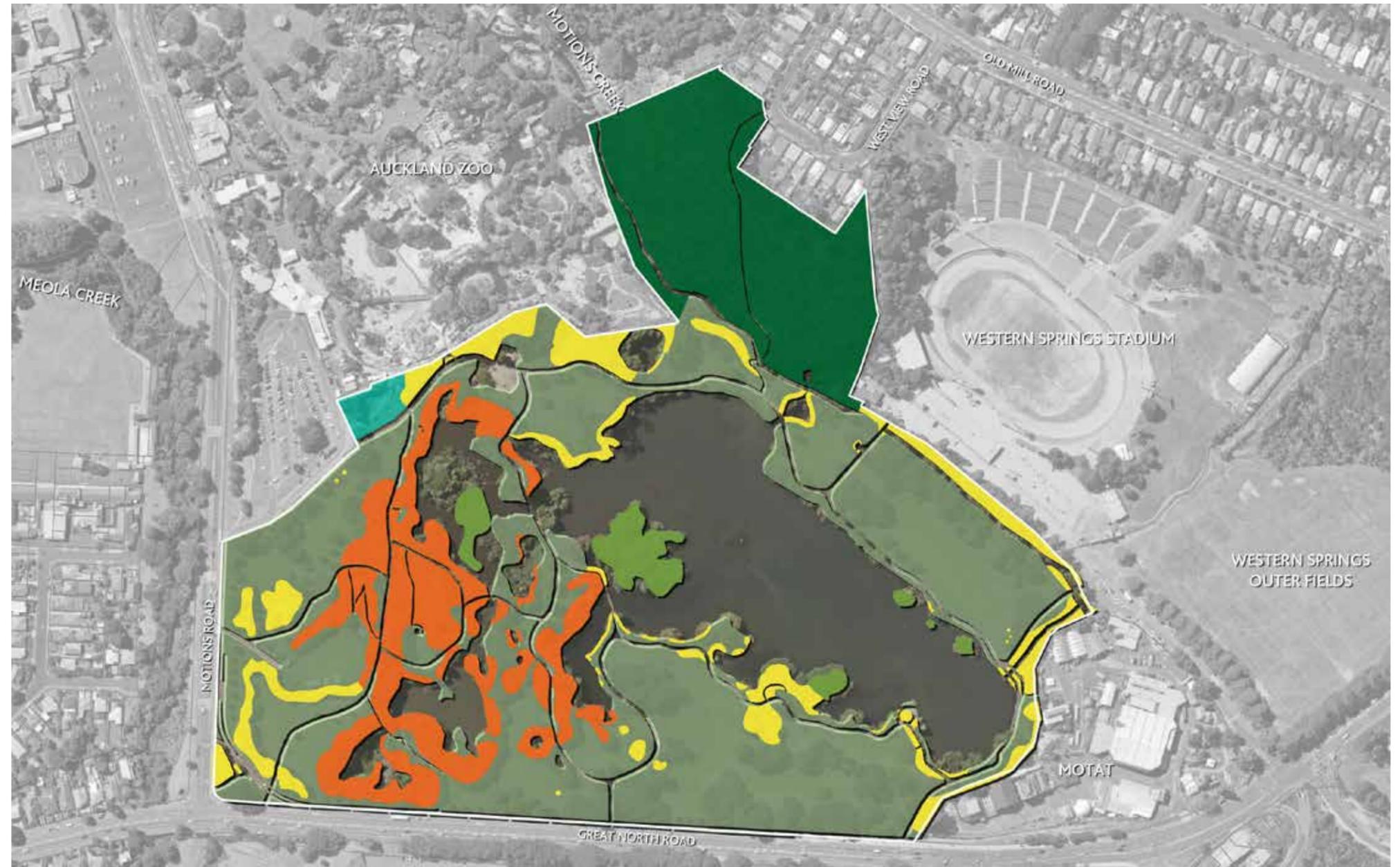
Although now absent, historically parts of the park were under the cover of pūriri lava rock forest. There is potential to utilise future enhancement planting of existing native and garden planting areas to move towards a composition more typical of pūriri lava rock forest, especially surrounding the western wetland areas where this ecosystem type was historically present.

Any planting undertaken in and around the lake edge, wetland, rock lava forest and forest (defined as 'natural' areas within the plan) will all be with native species. The majority of planting undertaken in the parkland and quarry areas will also be with native species but noting that in some instances, exotics will be used where relevant to the landscape and outcomes desired. This applies particularly to the area adjacent to the Fukuoka Garden where cherry tree planting has been identified and potentially in some playground areas where shade is desirable during the summer only, with deciduous trees being preferred in this instance.

The Fukuoka Garden is a fusion of Japanese and New Zealand native species.

There are threatened, rare and type locality species in Western Springs Lakeside Te Wai Ōrea that need to be protected with any developments in the park, including:

- Threatened Species: *Fissidens berteroi* (moss)
- Rare species: short-hair plume grass *Dichelachne inaequiglumis*, mawhai *Cassytha paniculata*
- Type locality: *Pseudocercospora dianellae*, *Pseudocercospora myopori* (two species of fungi).



LEGEND:

 Site boundary	 Garden planting	 Potential lava rock forest restoration area (indicative only, subject to Western Spring Lakeside Te Wai Ōrea restoration plan)
 Native forest	 Fukuoka Garden	
 Native planting	 Grass	



Scale: 1:4000 @ A3

## Existing vegetation

The photos below represent typical planting within the park. This vegetation is a mix of old and new, exotic and native specimen trees, shrubs, and riparian planting.



### 3.1.4 Kōtuinga āwhioranga kua tū kē, kua marohitia hoki *Existing and proposed circulation network*

#### Local context

Western Springs Lakeside Te Wai Ōrea is connected to public transport networks, AT cycleways and the Waitematā Greenways network.

There is a regular bus service that runs along Great North Road, running west from Auckland city centre with a number of bus stops adjacent to the park.

Auckland Transport’s northwest busway project proposes dedicated busways along the northwestern motorway. Draft proposals include a bus station at Western Springs Lakeside Te Wai Ōrea that would service the area and cater for large events.

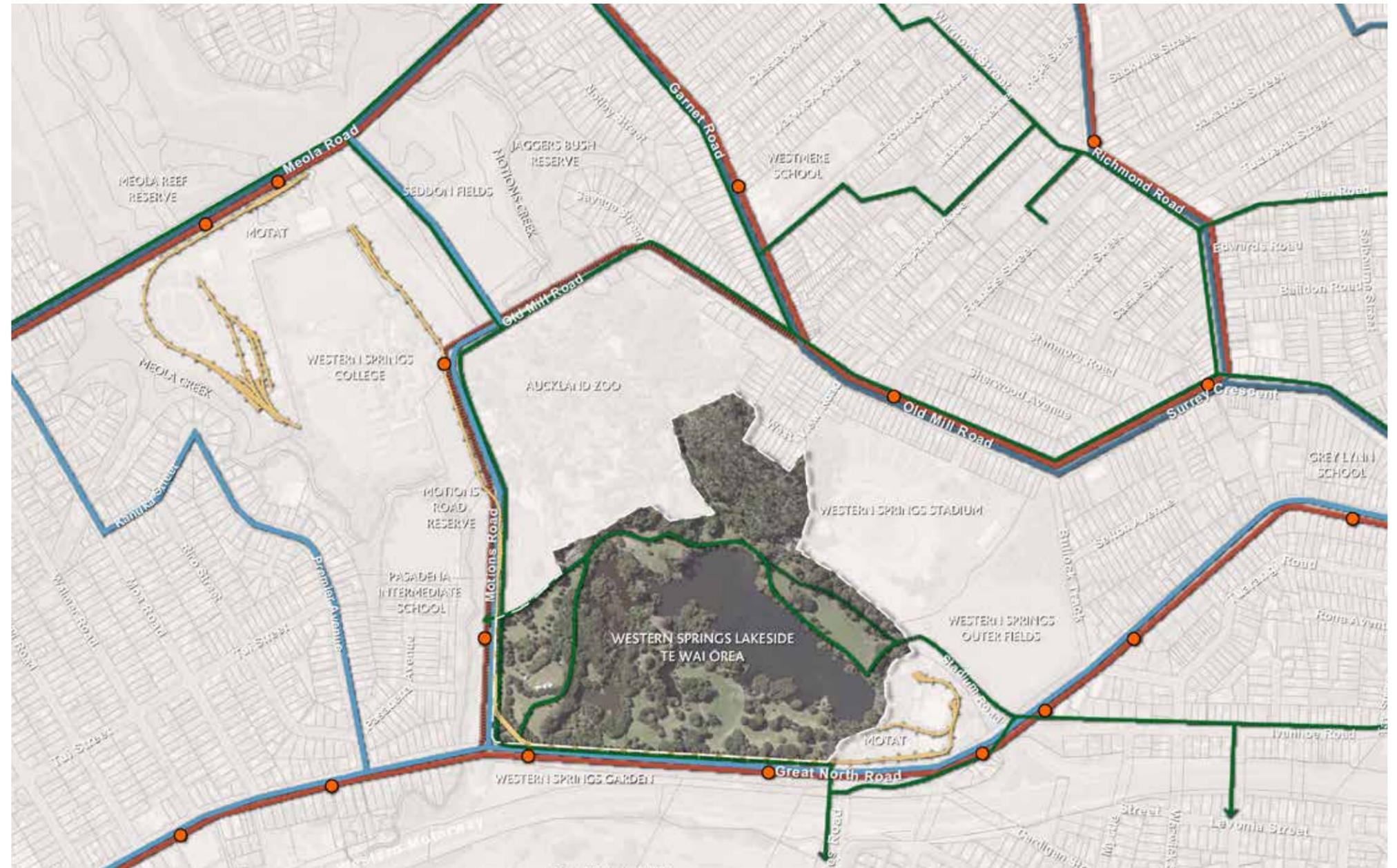
Auckland Transport’s cycle network envisages a commuter network of cycleways for all ages and abilities.

The Waitematā Greenways Plan envisions a greenway (cycling and walking route) through Western Springs Lakeside Te Wai Ōrea around the north side of the lake joining MOTAT and the Zoo.

Recent visitor surveys indicate that few visitors currently cycle to the park. This situation is also the same at Auckland Zoo and MOTAT. Busy roads in the area deter families from cycling to the park. In addition, there are currently no bike stands in the area.

Issues:

- Busy roads are daunting and unattractive to cyclists, particularly families
- The significant level change between Western Springs Lakeside Te Wai Ōrea and Old Mill Road, make cycling for all abilities and ages not achievable to and from the north.



LEGEND:

- |                                  |   |          |
|----------------------------------|---|----------|
| Site boundary                    | Proposed greenway (from Waitematā Greenways Plan) | Bus stop |
| Tramline                         | Bus network                                       |          |
| Auckland Transport cycle network |   |          |



Scale: 1:4000 @ A3

## Existing footpaths and current greenway plan

Western Springs Lakeside Te Wai Ōrea has a good network of paths. A main path circumnavigates the lake, with more informal, self-discovery paths providing connections through the more natural areas of the park.

The main pathway network connects with the zoo and MOTAT. Secondary and informal paths provide access to viewing spots, the wetland area, picnic areas, and artworks. A gravel path links through the native forest to the residential area on the northern boundary.

### Issues:

- The existing path network is confusing, with no clear path hierarchy, and no wayfinding signage at intersections
- Bridges do not meet current accessibility standards and create congestion during events.



### LEGEND:

 Site boundary	 Proposed greenway (from Waitematā Greenways Plan)	 Restricted access
 Main pathway	 Public entrance	
 Secondary pathway	 Residential entrance	
 Informal paths		



Scale: 1:4000 @ A3

## Path network condition

There are two types of pathways within the park; asphalt pathways (some have a basalt edge) and gravel pathways. Some of the asphalt pathways are in disrepair being uplifted by tree roots, especially the eastern part by the lake next to MOTAT café, creating trip hazards.



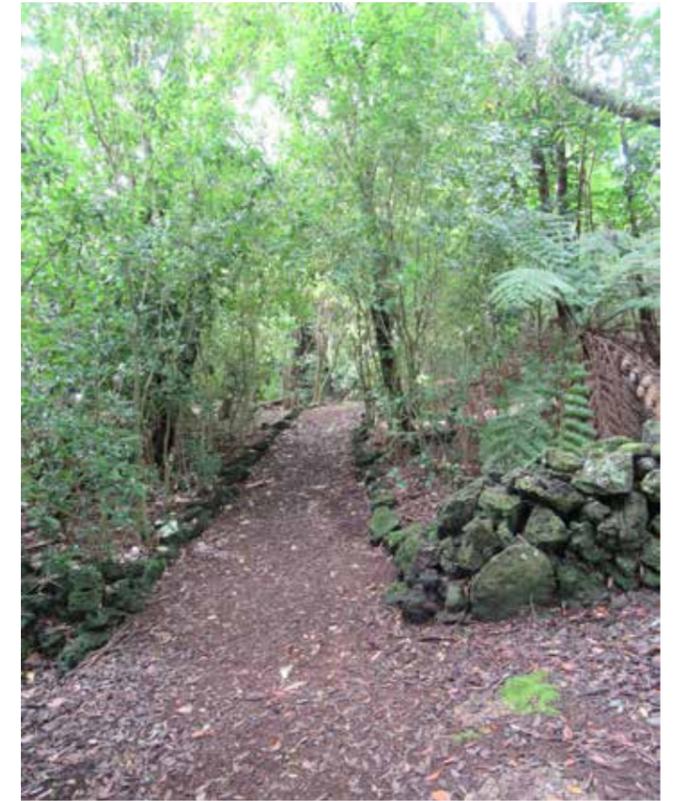
Cracks on some sections of main pathway



Cracks on some sections of main pathway due to tree roots



Main pathway is covered with bird excrement



Gravel path through lava rock forest

### 3.1.5 Papa tākaro kua tū kē *Existing playground*

#### Playground

The playground is scheduled for renewal in 2018 / 19 due to the age and deteriorated quality of the play equipment. It is to be upgraded to a destination playground standard.

The playground is currently shaded and damp particularly in winter with large evergreen trees along its northern side.

There are areas where water pools and drainage will need to be considered within the renewal project.

The upgraded playground should reflect the site's unique environment and location.



Current play equipment



Evergreen trees on the northern edge of the playground, with the zoo kiosk in the background

### 3.1.6 Whakahaerenga Events

#### Event spaces

Western Springs Lakeside Te Wai Ōrea is a popular park to hold events, being a large relatively flat park close to Auckland city centre. It has the added advantage of not being a sports park like other popular inner city event parks such as Victoria Park.

Western Springs Lakeside Te Wai Ōrea holds the Pasifika Festival annually. It is the largest festival of its type in the world. During this event, most (if not all) of the park's open spaces are used, and attracts over 225,000 visitors.

The festival is a Pacific Island themed event, presenting a wide variety of cultural experiences, including traditional cuisine and performances.

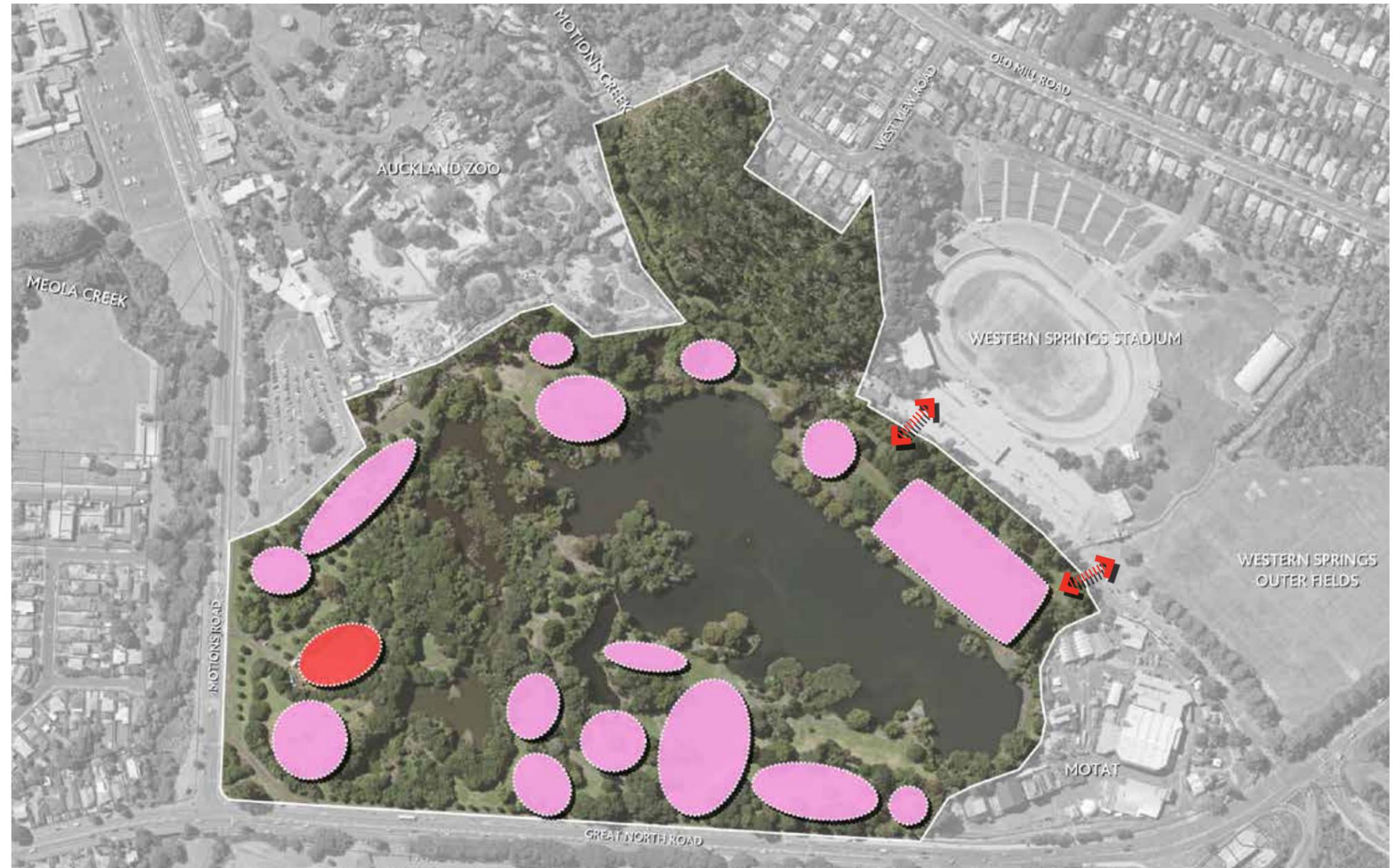
A number of other events use the entire park, these include running events, orienteering, and more recently Wanderlust, a yoga festival.

The park also accommodates the spillover crowd during major events at Western Springs Stadium, such as Auckland City Limits.

The quarry is very popular for smaller / private events, such as fire nights, open air cinema, and teddy bears picnic.

#### Issues:

- all grassed areas with specimen trees need to be retained to accommodate events
- the quarry currently has drainage issues that can impact on reinstatement after events and have flow on impacts to other booked events
- infrastructure for events could be improved to reduce reinstatement works and ongoing costs in providing temporary infrastructure.



#### LEGEND:

- |  |  |
|--|--|
|  Site boundary  |  The quarry                                 |
|  Areas commonly used for events within Western Springs Lakeside Te Wai Ōrea |  Access from/to stadium during major events |



Scale: 1:4000 @ A3

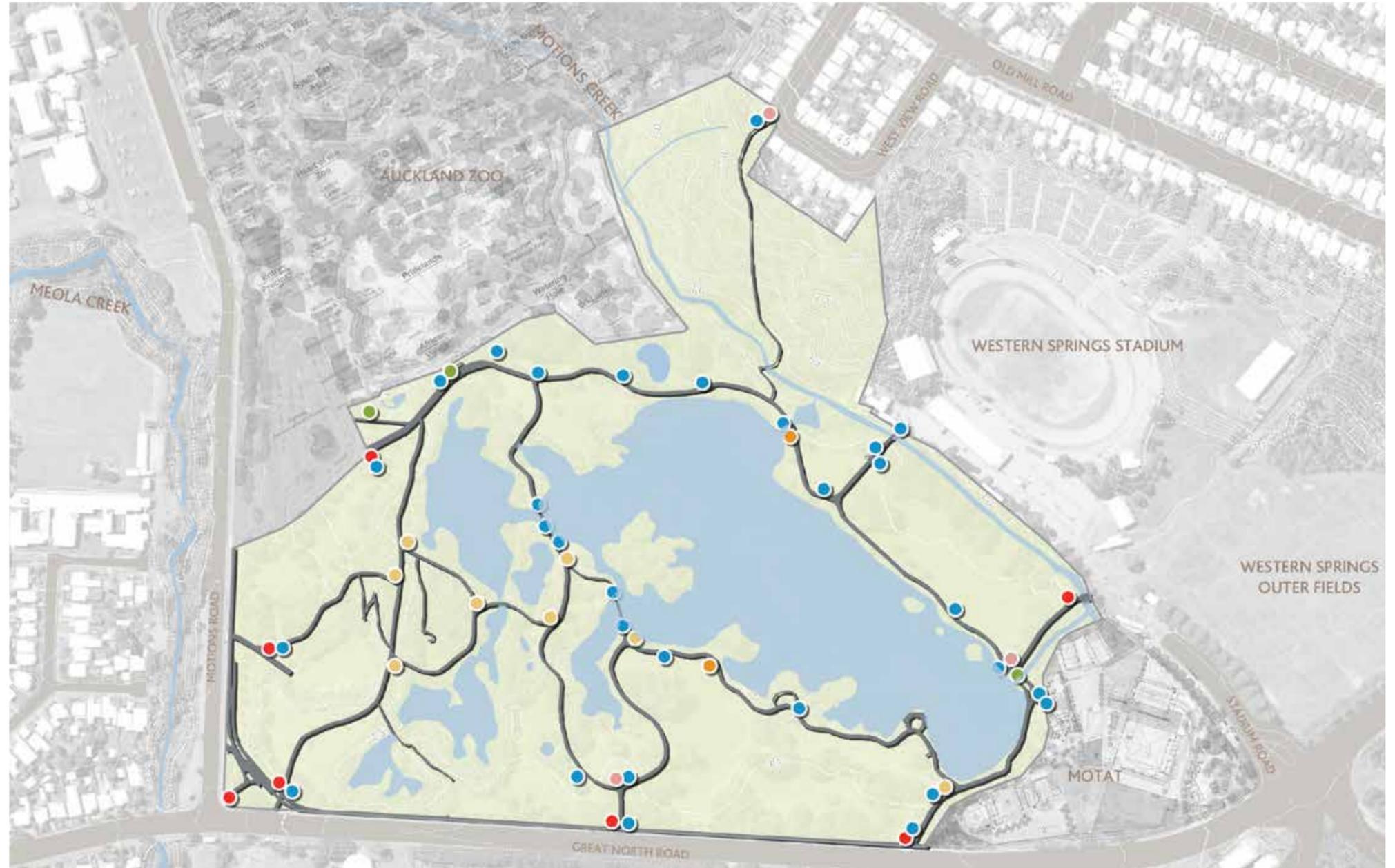
### 3.1.7 Ngā rawa ā-papa rēhia *Park assets*

#### Existing signage and interpretation

The signage in the park is a mix of interpretive, wayfinding and functional signage. Currently the wayfinding signs are confusing and there is a lack of historical information presented. Historical plaques are not in the most obvious locations. The signage follows the former Auckland City Council branding and needs to be updated to the current Auckland Council brand. In doing so, there is the potential to review both the interpretive and wayfinding signs with the aim of achieving better design outcomes.

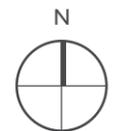
Issues:

- signage is outdated and there is no consistency in signage across the park
- visitors currently find themselves lost in the park, therefore existing wayfinding signage is not adequate
- functional signage such as “don’t feed the birds bread” is inadequate and visitors do not follow the advice.



LEGEND:

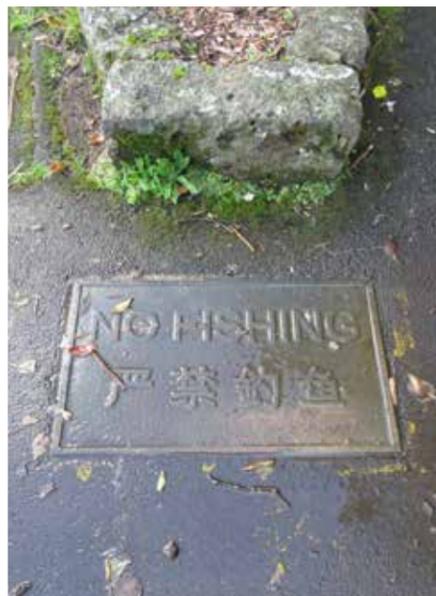
- |   |  |
|---|--|
| Parkland  | Existing interpretation sign   |
| Existing pathways   | Existing wayfinding sign   |
| Existing main entrance / wayfinding / interpretation sign | Existing regulatory sign (e.g. no dogs / liquor ban / no bird feeding) |
| Existing minor entrance / wayfinding sign                 | Existing historical plaque   |



Scale: 1:4000 @ A3

## Signage and interpretation condition

Some historically significant signs are placed poorly. Many signs are in poor condition and need to be replaced.



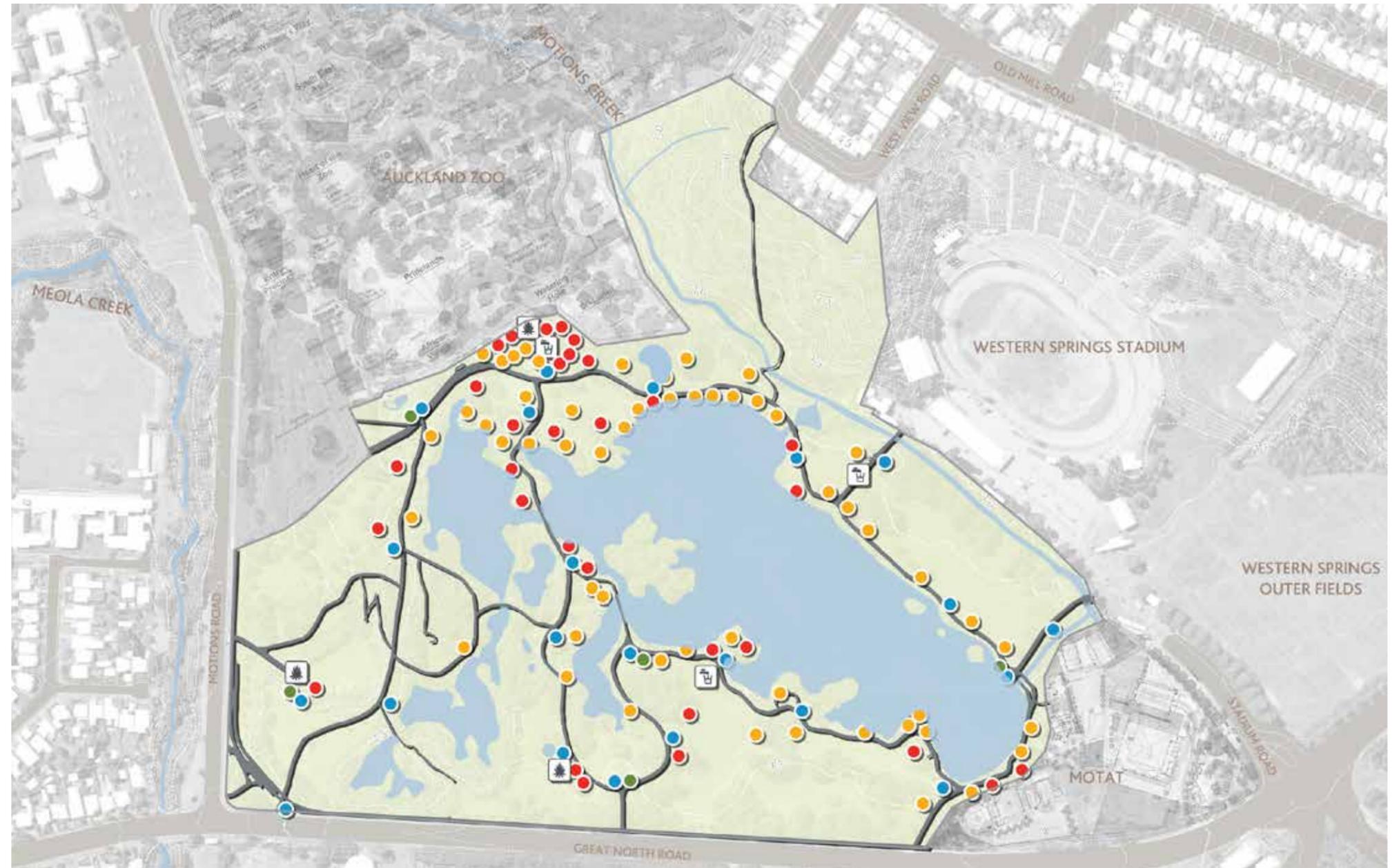
## Existing park furniture

In general the furniture within the park is in relatively good repair and is appropriately sited throughout the park.

There are three BBQs within Western Springs Lakeside Te Wai Ōrea; at the quarry, by the zoo boundary near the playground, and in the southern part of the park, near the park's middle entrance from Great North Road.

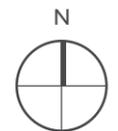
There are three drinking fountains in the park; one is at the BBQ / picnic area by the zoo, the second at the original toilet building, and the third is on the southern side of the lake.

The park benches and the picnic tables in the park are a relatively informal 'macrocarpa slab' style. They are spread out around the park, mostly around the lake with the exception of a group of picnic tables arranged adjacent to the zoo kiosk.



### LEGEND:

 Parkland	 Existing drinking fountain	 Existing rubbish bin
 Existing pathways	 Existing picnic table	 Existing dog litter bin
 Existing BBQ	 Existing park seat	



Scale: 1:4000 @ A3

## Park furniture condition



Typical picnic table in the park



Park bench with back rest



Park bench with no back rest



Picnic spot at the quarry



Barbecue facility at picnic spot near playground



Typical drinking fountain in the park



Typical rubbish and dog litter bins in the park

## Existing built forms

There are currently two toilets located within Western Springs Lakeside Te Wai Ōrea. One is a pair of dual pan modular systems by the playground and the second is an old building near Western Springs Stadium. The second toilet is decorated with bird murals on its outside and inside walls.

There are eight footbridges that are paved with asphalt and have metal railings. There are two bridges with a discernible character - one is a double bridge on the east side of the park adjacent to MOTAT and one is the double humped bridge located in the south west corner of the lake.

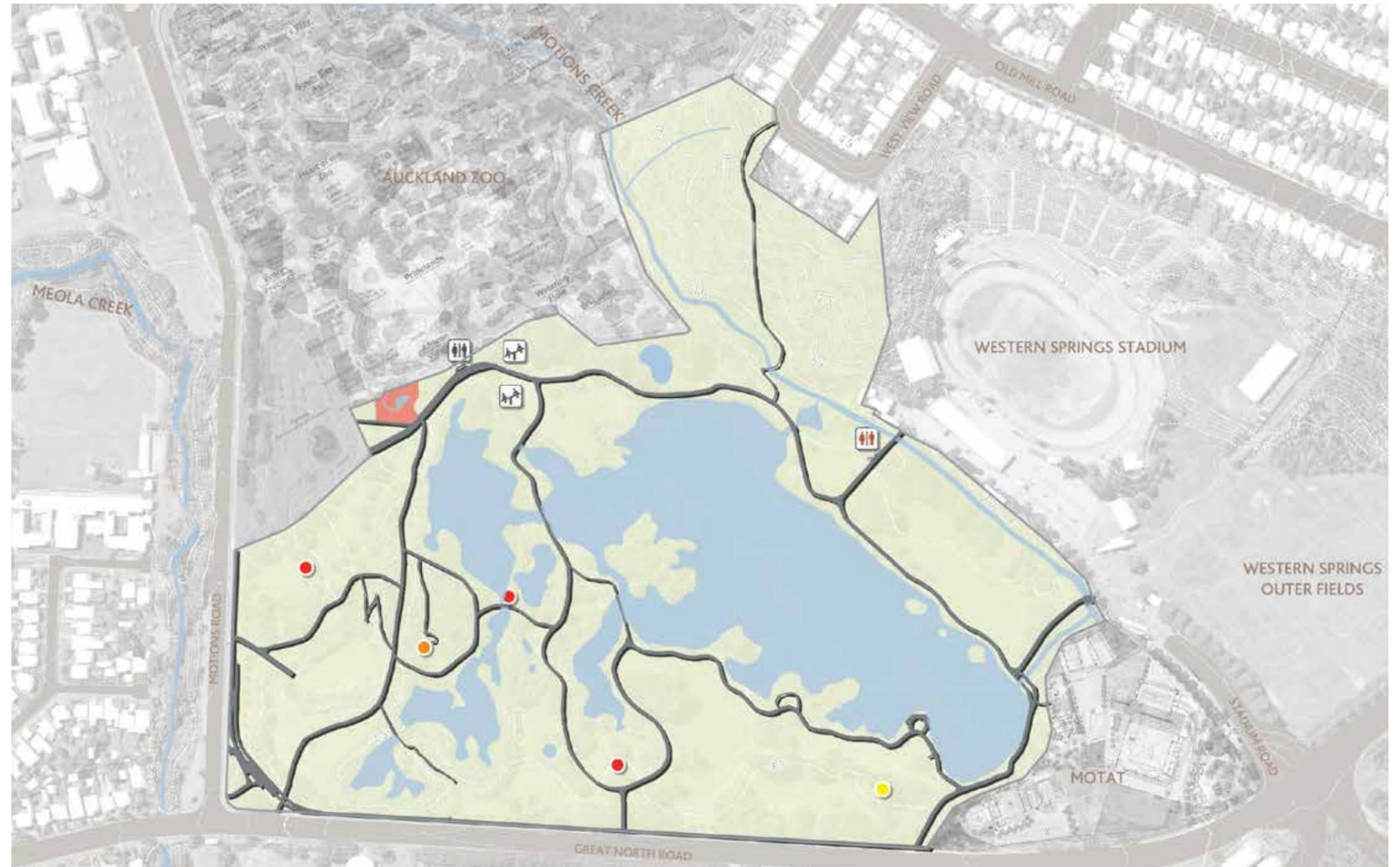
Two weirs are located on the northern edge of the lake, one is adjacent to MOTAT and the other close to the original toilet.

There are three stone sculptures acquired from the 1985-1986 stone symposium located in the western part of the park and two art installations - one is 'The Marble Table' by Campbell Leavis Ewing, located in the southeast near MOTAT entrance and the second one is 'Circle of Friends' monument in the west side of the park.

The latest addition to the park is the Fukuoka Garden, located next to the zoo entrance which was opened in April 2017. The garden has a tea pavilion, waterfall and pond. It features over 1800 native Japanese and New Zealand species and incorporates items preserved from the original garden including four bonsai trees, paving stones, lanterns, a water basin and the entrance.

### Issues:

- the toilet block adjacent to the stadium is not visible, off the main circulation network, and covered in vegetation
- the weirs are aged, difficult to use and unattractive
- the bridges are narrow and create congestion.



### LEGEND:

 Parkland	 Existing art installation - 'The Marble Table'	 Stone sculptures from 1985-1986 Stone Symposium	 Existing playground
 Existing pathways	 Existing monument - 'Circle of Friends'	 Modern toilet	
 Existing footbridge	 Original toilet		
 Fukuoka Garden			



Scale: 1:4000 @ A3

## Built form condition



Modern dual pan toilets near playground



Original toilet building near stadium



Playground adjacent to zoo boundary



One of the lake's weirs



Pedestrian bridge



Fukuoka Garden



Stone sculptures from 1985-1986 Stone Symposium



'The Marble Table' by Campbell Leavis Ewing



'Circle of Friends' Memorial

## Existing boundary treatments

In general the park boundaries are fit for purpose, and are hidden by vegetation and therefore not visually dominant within the park.

The site has direct boundaries with MOTAT, Auckland Zoo, and Western Springs Stadium.

The zoo boundary is generally a tall chain-link fence. The boundary that is facing the playground has zoo advertisements on the fence. The fence that is facing the native forest is a plain chain-link fence and this continues along the boundary with residential properties.

The zoo is currently working on a project that would upgrade the fence adjacent to the playground, so that it has permanent advertising material and provides a predator proof barrier.

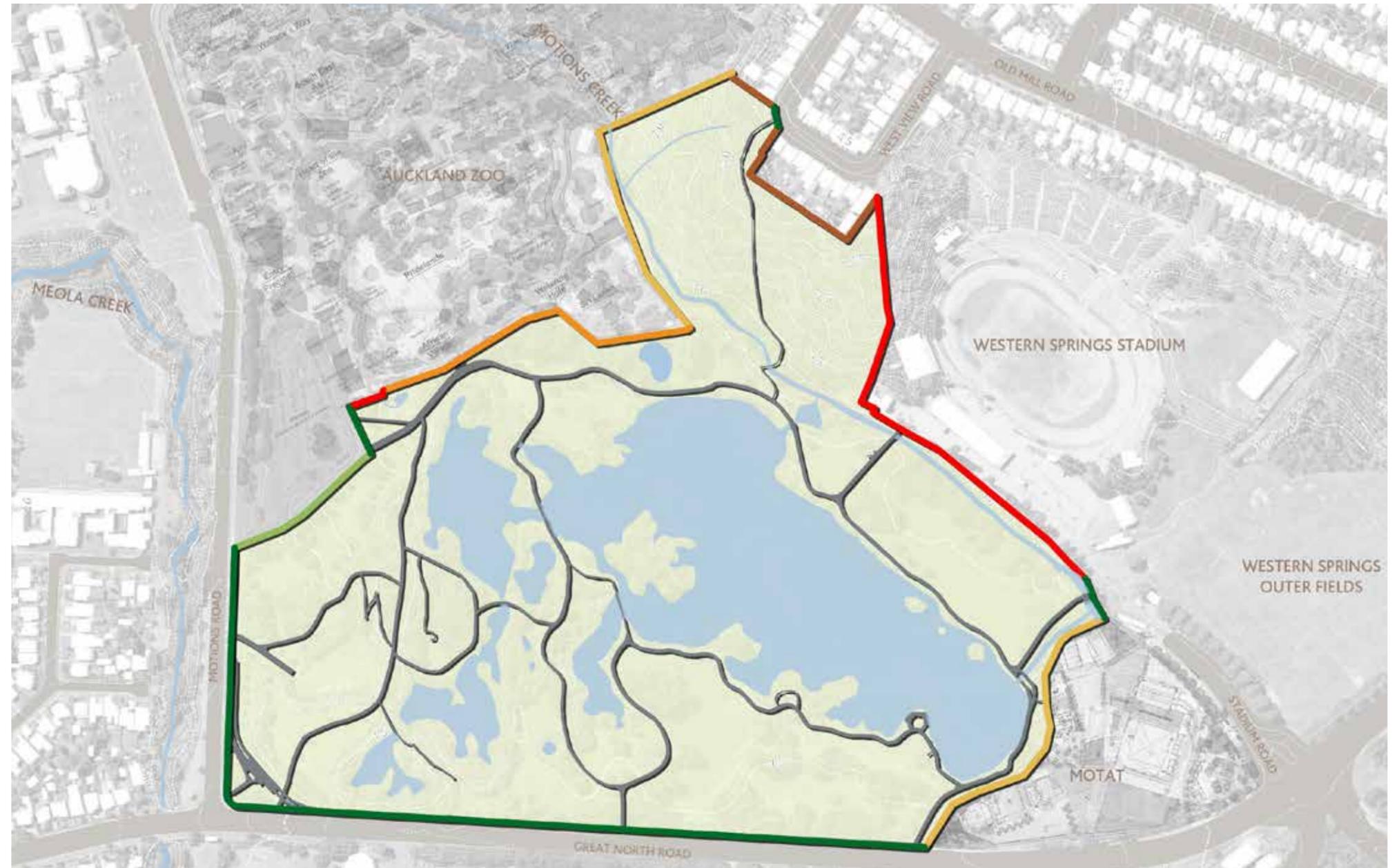
A stretch of concrete wall forms the boundary with Western Springs Stadium.

At MOTAT, the park is generally bounded by chain-link fence with the exception of a short segment by the café where there are natural boulders separating the properties.

The boundaries with the Great North Road and Motions Road are unfenced, allowing views into the park while the part that is facing the zoo carpark has a low timber fence to exclude cars.

### Issues:

- minor security breaches from the park into Auckland Zoo and Motat, and from outside the park in to events held within the park
- vegetation within the park and along the zoo boundary makes it challenging for the zoo to form a predator proof barrier
- the low timber fence creates a trip hazard and does not allow for access for all abilities, and should be replaced with bollards.



### LEGEND:

	Parkland		Chain-link fence
	Existing pathways		Chain-link fence with zoo advertisement
	Open boundary		Residential fence
	Timber fence		Solid wall boundary



Scale: 1:4000 @ A3

## Boundary treatments

There are reports of minor security breaches at the zoo, MOTAT, and during major events in the park. The vegetation along the boundary with the zoo increases the risk of security breaches and allows pests to enter the zoo.



Park boundary along Motions Road



Park boundary facing zoo carpark



New bollards in front of Fukuoka Garden



Zoo boundary along picnic spot adjacent to playground



The Watering Hole café facing the park



Boundary fence along zoo's back of house



Boundary wall with Western Springs Stadium



Natural rock outcrop next to MOTAT café



Boundary fence next to MOTAT (Walsh Memorial Library)

## 3.1.8 Mahere uara papa rēhia *Park values plan*

As outlined in the introduction, the aspiration of this plan is to not propose wholesale changes to the park in either its appearance or its use. The park has a distinct character and visitor satisfaction is high. The purpose of this plan is to identify character areas, to ensure that all proposed park improvements do not adversely impact on key characteristics or values.

The whole park is a highly valued event space, and existing open grassed areas with specimen trees should be preserved.

The diagram overleaf sets out the park's various character areas, and ascribes values to these. The ratings are high, moderate and low, and have been determined by initial consultation, historical visitor surveys and site assessments of visitor use.

---

### LEGEND:

---

-  1 Area 1 - The lake  
High value for its significance to mana whenua, and for the amenity and potential ecological values that it brings to the park, its reflective qualities, rippling, sounds, and habitat that it provides to tuna (eels) and waterfowl.
-  2 Area 2 - Natural area (vegetated wetland and native forest surrounds)  
High value and high potential for wetland and terrestrial ecological values, habitat for tuna (eels), native birds and waterfowl, and sense of retreat and opportunity for exploration.
-  3 Area 3 - English picturesque  
High value for its open views across the lake. The park's biggest passive audience is commuters along Great North Road.
-  4 Area 4 - Open grassland with mature specimen trees  
High value for its openness with expansive views across the lake. Also valued for the quiet retreat that it provides from the surrounding urban environment.
-  5 Area 5 - Motions Creek  
Low value as it is a degraded watercourse that is eroding, has weed species, and poor quality water.
-  6 Area 6 - Native forest  
Moderate value as it is a revegetating steep hillside with pine trees and a deteriorated gravel track to Old Mill Road.
-  7 Area 7 - Filter pond  
Low value as a stagnant pond. It has some nice Swamp Cypress specimens surrounding the pond.
-  8 Area 8 - Playground  
High value for its opportunity for play, picnicking and BBQs, and long views over the lake and on to MOTAT. This area is serviced by the zoo kiosk. The playground is currently due for renewal as a result of its age and safety requirements. The renewal of the playground will further increase the value of this area.
-  9 Area 9 - Elevated lake views  
High value for its elevated views across the lake and on to MOTAT. This area also provides a relatively flat area for passive recreation.
-  10 Area 10 - Fukuoka Garden  
High value, opened this year the Fukuoka Garden celebrates the sister relationship between Auckland and Fukuoka. This garden replaces the original Fukuoka Garden which was located within Auckland Zoo.
-  11 Area 11 - Enclosed grasslands  
Moderate value for its opportunity to escape from the city in enclosed grassed areas surrounded by predominately native vegetation. These areas are relatively under used and are not particularly well integrated with the rest of the park.
-  12 Area 12 - Former quarry  
High value as a flat enclosed space, making it an ideal location of medium sized events. The quarry currently has drainage issues.



AUCKLAND ZOO

WESTERN SPRINGS STADIUM

WESTERN SPRINGS OUTER FIELDS

MOTAT



Scale: 1:3250 @ A3

## 3.1.9 Tarāwaho ā-ture - Mahere Kotahitanga o Tāmaki Makaurau Regulatory framework - Auckland Unitary Plan

### Zoning

#### Open Space - Informal Recreation

These areas are used for a variety of outdoor informal recreation activities and community uses, such as walking, running, cycling, relaxing and socialising, picnics, playing and enjoying the environment.

##### H7.5.2. Objectives

- (1) The open and spacious character, amenity values and any historic, mana whenua, and natural values of the zone are maintained.
- (2) Informal recreation activities are the predominant use of the zone.
- (3) Buildings and exclusive-use activities are limited to maintain public use and open space for informal recreation.
- (4) Small-scale, informal land-based water-related recreational facilities are provided for while maintaining and enhancing public access to and along the coast.

### Overlays

#### Natural Resource - Urban Lake Management Areas Overlay and Significant Ecological Area Overlay

The Urban Lake Management Areas Overlay comprises Lake Pupuke and Western Springs Te Wai Ōrea lake. Under the Unitary Plan, Western Springs Lakeside Te Wai Ōrea "derives its water source from groundwater flow, and has an outlet via a weir to Motions Creek. Western Springs Te Wai Ōrea lake is surrounded by a public reserve' and "has a lower water quality mainly due to contamination from faecal matter associated with the waterfowl population". Unitary Plan Objectives and Policies for the Western Springs Lakeside Te Wai Ōrea are:

##### D6.2. Objectives

- (1) Open-space, recreational and amenity values of urban lake management areas are maintained or enhanced.
- (2) Water quality of lakes in urban lake management areas is maintained where it is excellent or good and progressively improved where it is degraded to support ecosystem health, recreational and amenity values.
- (3) Margins of lakes in urban lake management areas are maintained or enhanced.

##### D6.3. Policies

- (1) Maintain or enhance open space, recreational and amenity values of the urban lake

management areas by minimising structures in, on or over the bed of lakes, rivers, streams and wetlands.

- (2) Minimise discharges of contaminants to urban lake management areas.

(3) Avoid significant disturbance of lake beds to minimise suspended sediment and nutrients in the water.

(4) Recognise that stormwater maintains water levels in urban lake management areas, and support initiatives to treat these discharges.

(5) Maintain and protect wetland vegetation in urban lake management areas by minimising as far as is practicable the disturbance from structures and vegetation clearance associated with infrastructure maintenance.

##### D9.2. Objectives

(1) Areas of significant indigenous biodiversity value in terrestrial, freshwater, and coastal marine areas are protected from the adverse effects of subdivision, use and development.

(2) Indigenous biodiversity values of significant ecological areas are enhanced.

(3) The relationship of Mana Whenua and their customs and traditions with indigenous vegetation and fauna is recognised and provided for.

##### D9.3. Policies

(1) Manage the effects of activities on the indigenous biodiversity values of areas identified as significant ecological areas by:

(b) avoiding other adverse effects as far as practicable, and where avoidance is not practicable, minimising adverse effects on the identified values;

(3) Enhance indigenous biodiversity values in significant ecological areas through any of the following:

(a) restoration, protection and enhancement of threatened ecosystems and habitats for rare or threatened indigenous species;

(b) control, and where possible, eradication of plant and animal pests;

(c) fencing of significant ecological areas to protect them from stock impacts;

(d) legal protection of significant ecological areas through covenants or similar mechanisms;

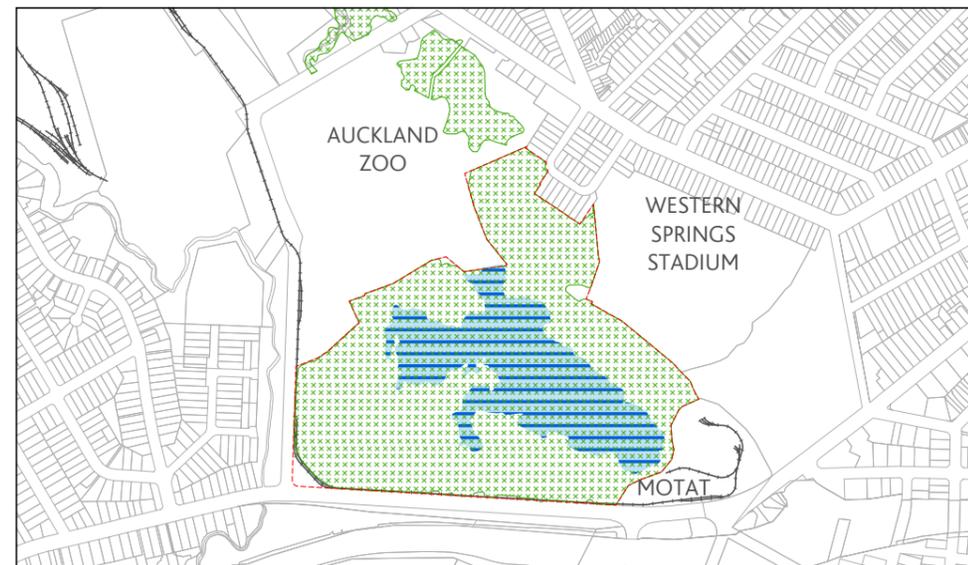
(e) development and implementation of management plans to address adverse effects;

(f) re-vegetating areas using, where possible, indigenous species sourced from naturally growing plants in the vicinity with the same climactic and environmental conditions; or

(g) providing for the role of Mana Whenua as kaitiaki and for the practical exercise of kaitiakitanga in restoring, protecting and enhancing areas.

(4) Enable activities which enhance the ecological integrity and functioning of significant ecological areas including:

(a) the management and control of pest species that threaten indigenous biodiversity.



#### Natural Resource

##### LEGEND:

-  Significant Ecological Areas Overlay (terrestrial)
-  Urban Lake Management Areas Overlay

## Natural Heritage

Protecting outstanding natural features and landscapes and the natural character of the coastal environment, wetlands, lakes and rivers from inappropriate subdivision, use and development, and maintaining the contribution of landscape values to high amenity values, all need active stewardship if these qualities are to survive to meet the needs of future generations.

### B4.2. Outstanding natural features and landscapes

#### B4.2.1. Objectives

(1) Outstanding natural features and landscapes are identified and protected from inappropriate subdivision, use and development.

(2) The ancestral relationships of Mana Whenua and their culture and traditions with the landscapes and natural features of Auckland are recognised and provided for.

(3) The visual and physical integrity and the historic, archaeological and cultural values of Auckland's volcanic features that are of local, regional, national and/or international significance are protected and, where practicable, enhanced.

#### B4.2.2. Policies

(6) Protect the physical and visual integrity of Auckland's outstanding natural features from inappropriate subdivision, use and development.

(7) Protect the historic, archaeological and cultural integrity of regionally significant volcanic features and their surrounds.

(8) Manage outstanding natural landscapes and outstanding natural features in an integrated manner to protect and, where practicable and appropriate, enhance their values.

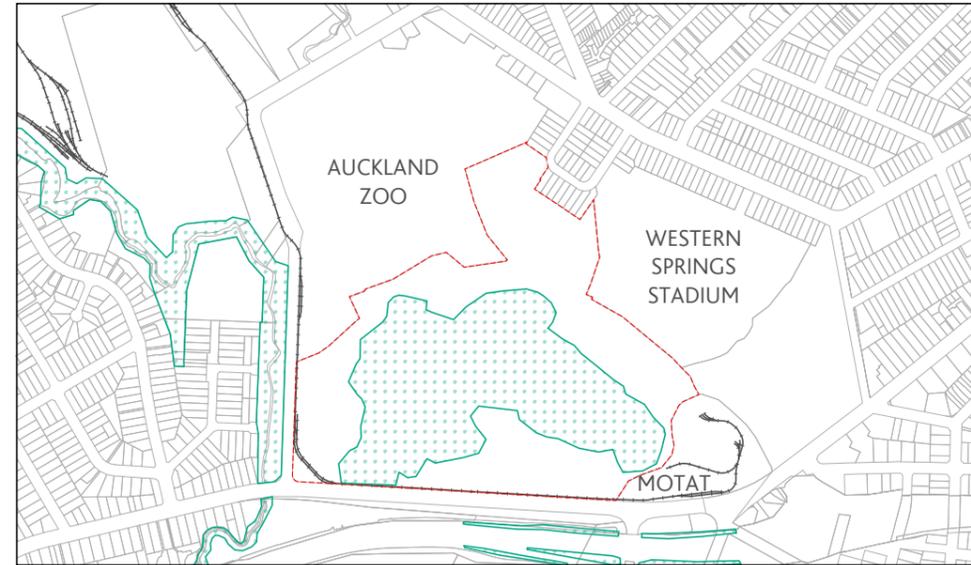
## Sites and Places of Significance to mana whenua

The Sites and Places of Significance to mana whenua Overlay applies to sites and places that have been scheduled and protected for their significance to mana whenua.

### D21.2. Objective

(1) The tangible and intangible values of scheduled sites and places of significance to mana whenua are protected and enhanced.

(2) Scheduled sites and places of significance to mana whenua are protected from inappropriate subdivision, use and development, including inappropriate modification, demolition or destruction.

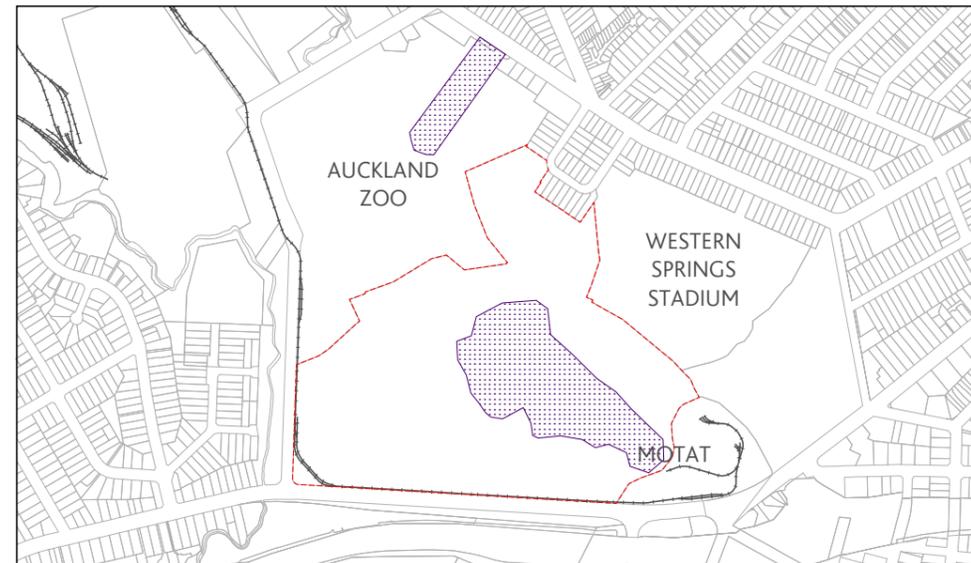


## Natural Heritage

LEGEND:



Outstanding Natural Feature Overlay



## Mana Whenua

LEGEND:



Sites and Places of Significance to Mana Whenua Overlay

## 3.2 Mahere Whakawhanake Āmiki Detailed Development Plans

### 3.2.1 Hauropi Ecology

#### Improving water quality

Improving water quality will have the biggest impact on improving visitor experience in Western Springs Lakeside Te Wai Ōrea.

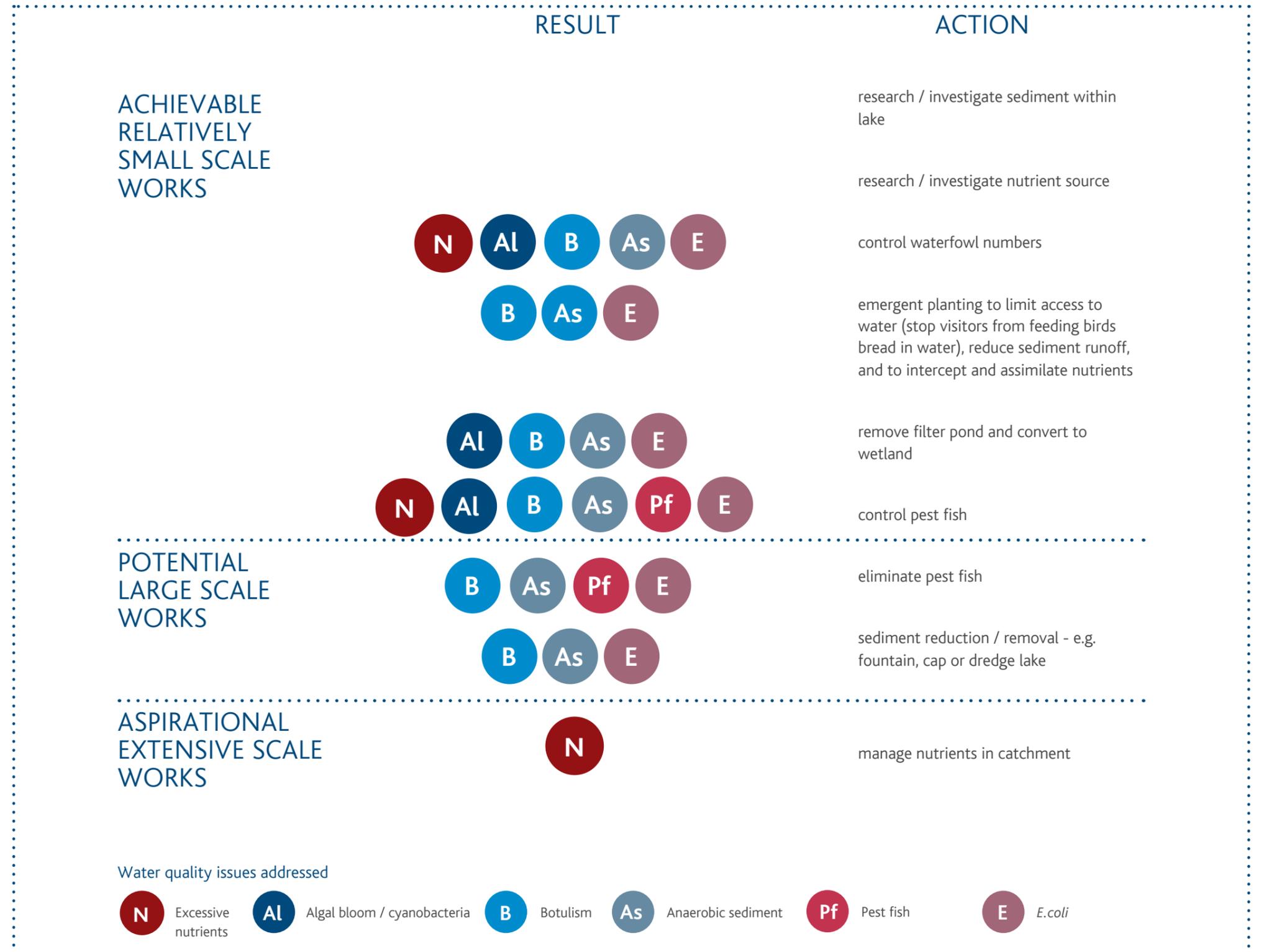
This chart sets out a spectrum of works for improving water quality to address the issues within the lake, and links back to the water quality issues outlined within section 3.1.2.

The spectrum of works that could be undertaken to improve water quality, ranges from 'achievable relatively small-scale works' to 'aspirational extensive scale works'. Large-scale and extensive scale works require further research to ensure feasibility, but with current known information it is likely that these works would have significant impacts on the park (the park could be closed for extended periods of time), and cost implications.

As discussed in section 3.1.2, nutrients within the lake are coming mainly from the Greater Western Springs aquifer via the spring to the lake, though the source of these nutrients to this aquifer is not known. Therefore more investigation and research needs to be undertaken so that we can understand the problem and identify the best and most effective management strategy. Research/ investigation may present other innovative 'works' for improving water quality, that are currently unknown, that are not included within this chart, that may be more feasible/cost effective.

It is therefore recommended that the first body of works undertaken in relation to improving water quality is investigation into the nutrient source and the sediment within the lake, as well as investigation of potential innovative ways to address these issues.

This plan includes proposals for all works outlined within the 'achievable relatively small scale works'.

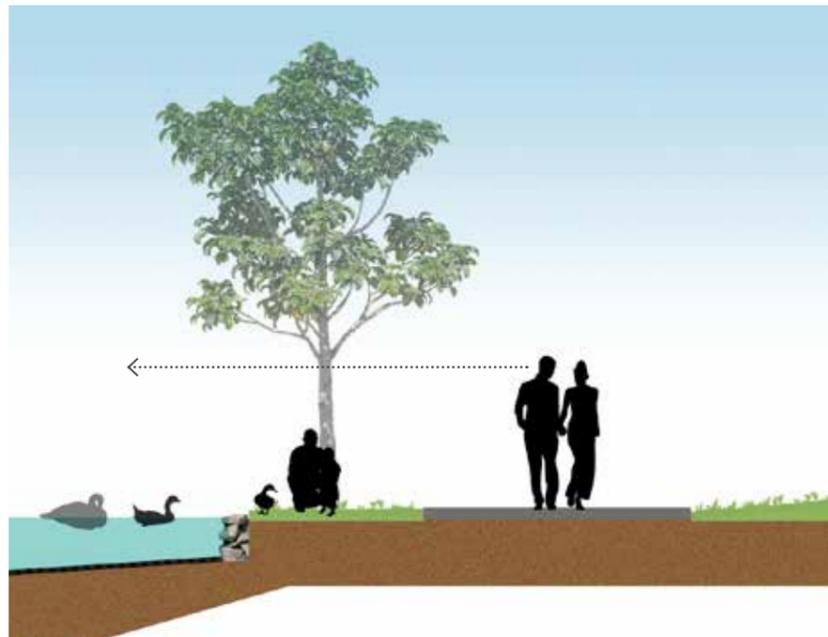


## Lake cross sections

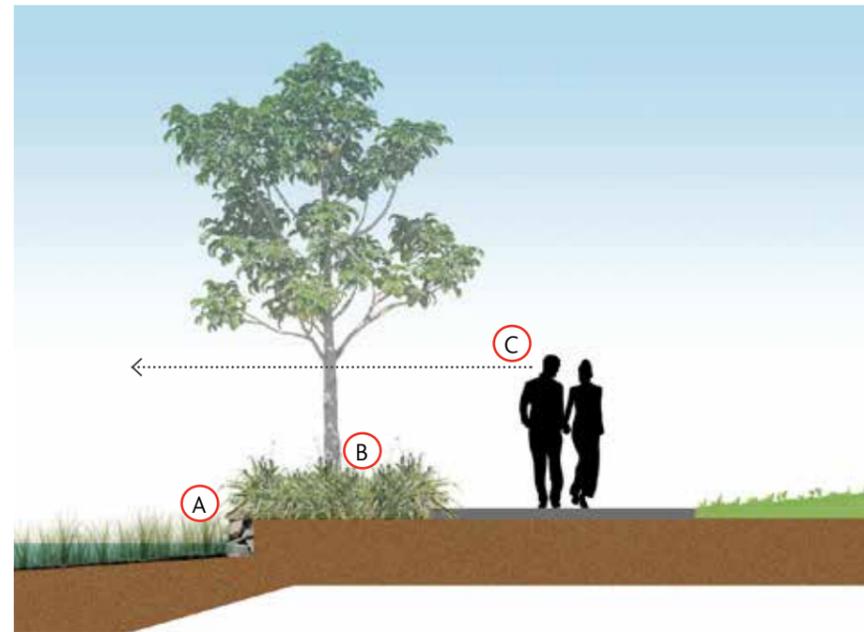
To improve water quality, and in particular manage botulism and sediment within the lake, emergent planting within the lake and riparian planting on the lake edge is proposed. This planting will reduce access to the lake to discourage bird and eel feeding, and also reduce sediment run-off into the lake.

Trials to test the success of emergent planting at current water levels will be carried out. The results of this trial will then inform decisions around the extent of emergent planting and any requirement to reduce lake water levels on a permanent basis.

Riparian planting will include low native shrubs and groundcovers that will retain views of the lake.

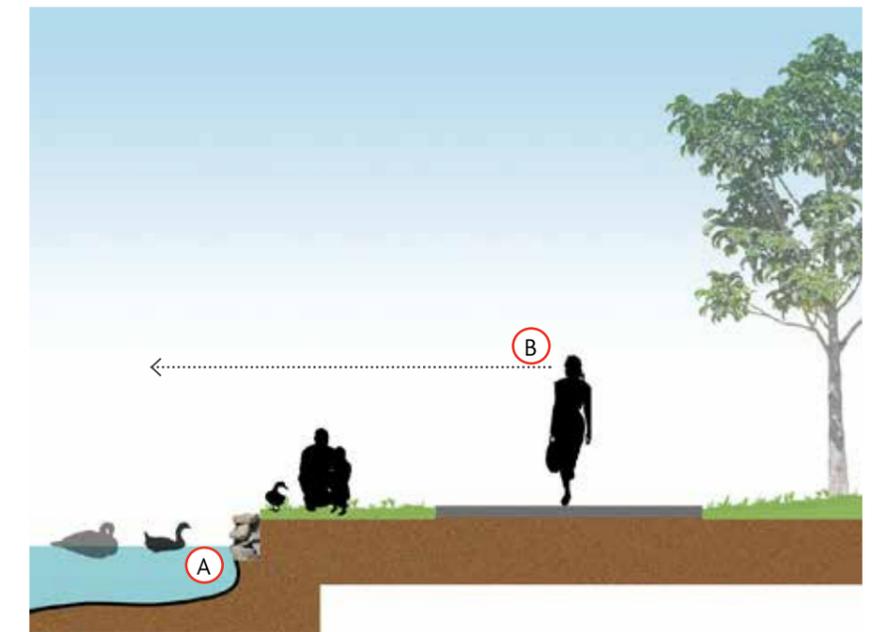


Existing condition



Condition where access to water is not allowed

- (A) Emergent plant species will establish to approximately 1m depth
- (B) Low growing native shrubs / groundcover planting to discourage bird feeding at the lake margin
- (C) Retain views of the lake



Condition where access to water is allowed and open views

- (A) Recontour ground level to 1.5m below water level so emergent plants do not establish
- (B) Retain view of the lake

## Fish and eel management

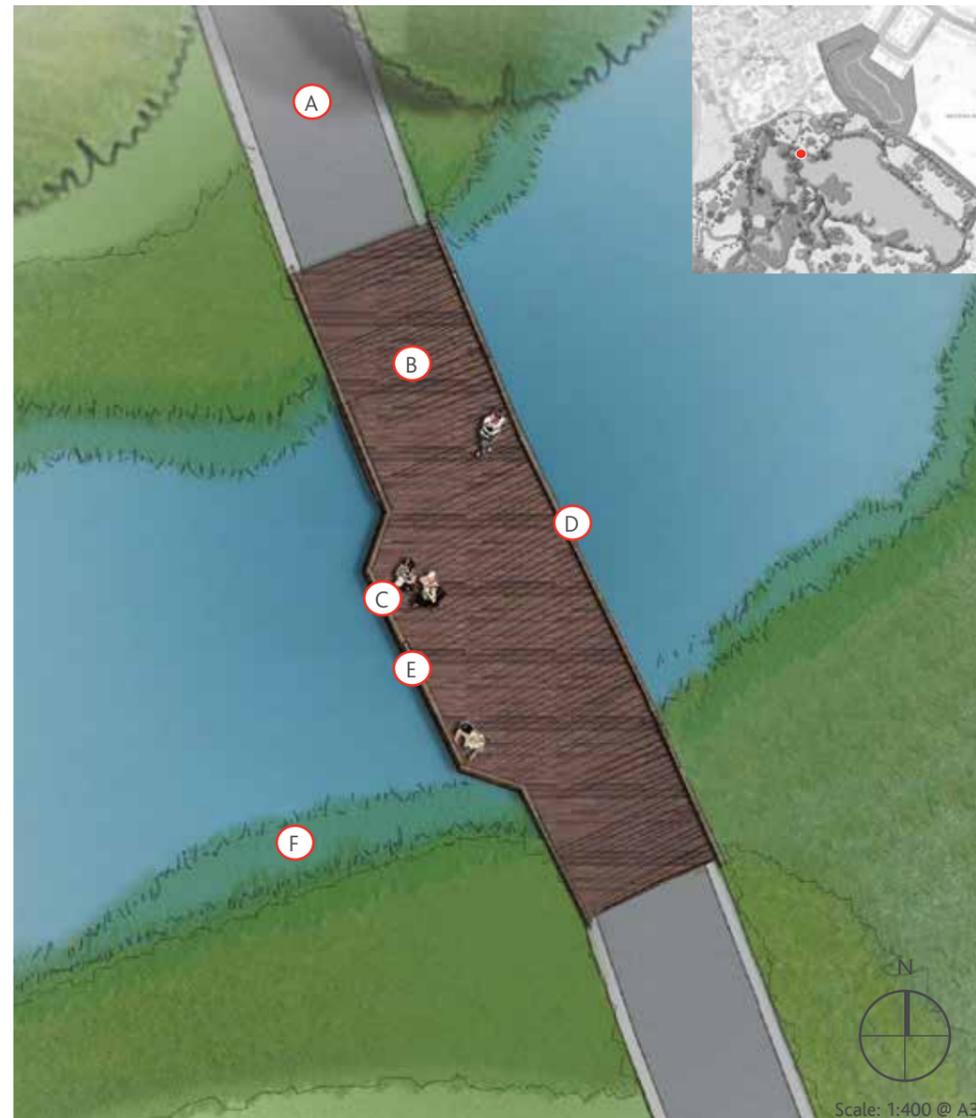
It is proposed that pest fish, especially koi carp be managed out of the lake, and active engagement and preservation of tuna (eels) is encouraged.

An eel themed bridge is proposed where the wetland enters the main lake.

The purpose of the bridge, is to promote the presence of the tuna (eels) and its significance to mana whenua.

One-way fish nets will be set below the bridge and managed feeding by council will enable the trapping of exotic fish within the wetland area. The nets will be designed to allow for the free movement of the eels between the lake and the wetland.

The bridge could be designed to incorporate artistic elements that celebrate the significance of the lake and tuna (eels) to mana whenua.

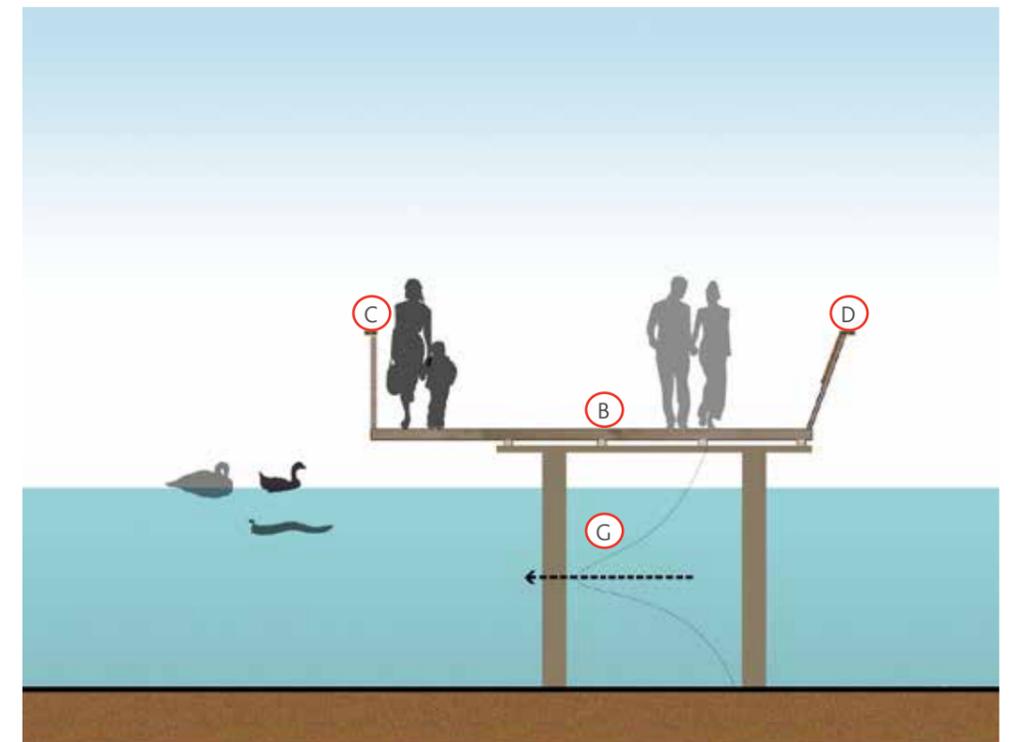


### LEGEND:

- |  |                      |
|--|----------------------|
| (A) Main path                                  | (F) Emergent plants  |
| (B) Footbridge                                 | (G) One-way fish net |
| (C) Views of lake and wetland to be enjoyed    |                      |
| (D) Angled railing to deter bird / eel feeding |                      |
| (E) Interpretation sign                        |                      |



Precedent Image - Eel themed bridge



Cross section  
Scale: 1:40 @ A3

Photo visualisation - Tuna (eel) themed bridge



## Focus area A

Connecting the park and MOTAT directly would create significant benefits for both facilities. The area provides excellent views across the lake but is a congestion point during large on-site events.

### Wai Water

The proposed boardwalk is located by the lake, with an angled handrail keeping the public away from lake edge to discourage feeding water fowl directly on the water.

The handrail will include educational material to further discourage bird feeding.

### Tūhononga *Connected*

A connecting footpath with MOTAT will provide direct access to MOTAT's cafe. It is proposed that vegetation between MOTAT and the park be thinned to improve the visual connections between the facilities.

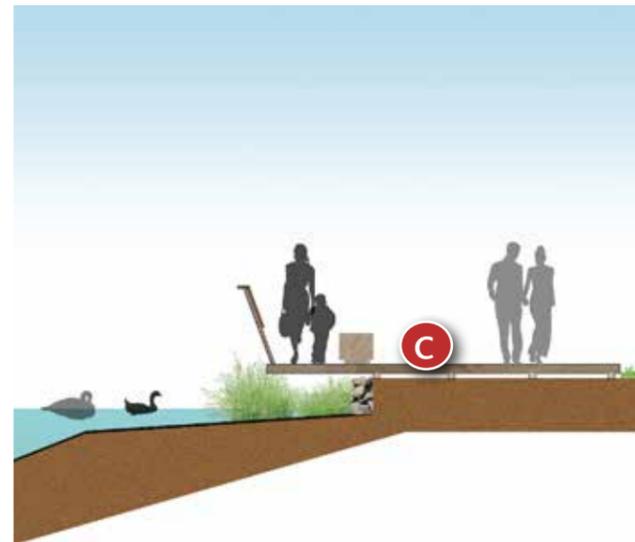
It is proposed to reduce the twin footbridges across the creek to a single footbridge that meets current accessibility standards.

### Ngā whakahaerenga *Events*

This area is a pinch point during events, with only a narrow area between MOTAT and the lake. A cantilevered boardwalk has been proposed to create more land area and ease congestion.

#### LEGEND:

-  Park boundary
-  Footbridge
-  Main path
-  Raised boardwalk
-  MOTAT entrance
-  Relocated Sri Chimnoy plaque
-  Picnic table
-  Park bench
-  Existing boulder wall
-  Emergent planting
-  Low shrubs
-  Grass
-  A Replace double footbridge with single accessible footbridge
-  B Path connecting to MOTAT
-  C Cantilevered boardwalk with angled handrail and interpretation sign



Cross section  
Scale: 1:100 @ A3

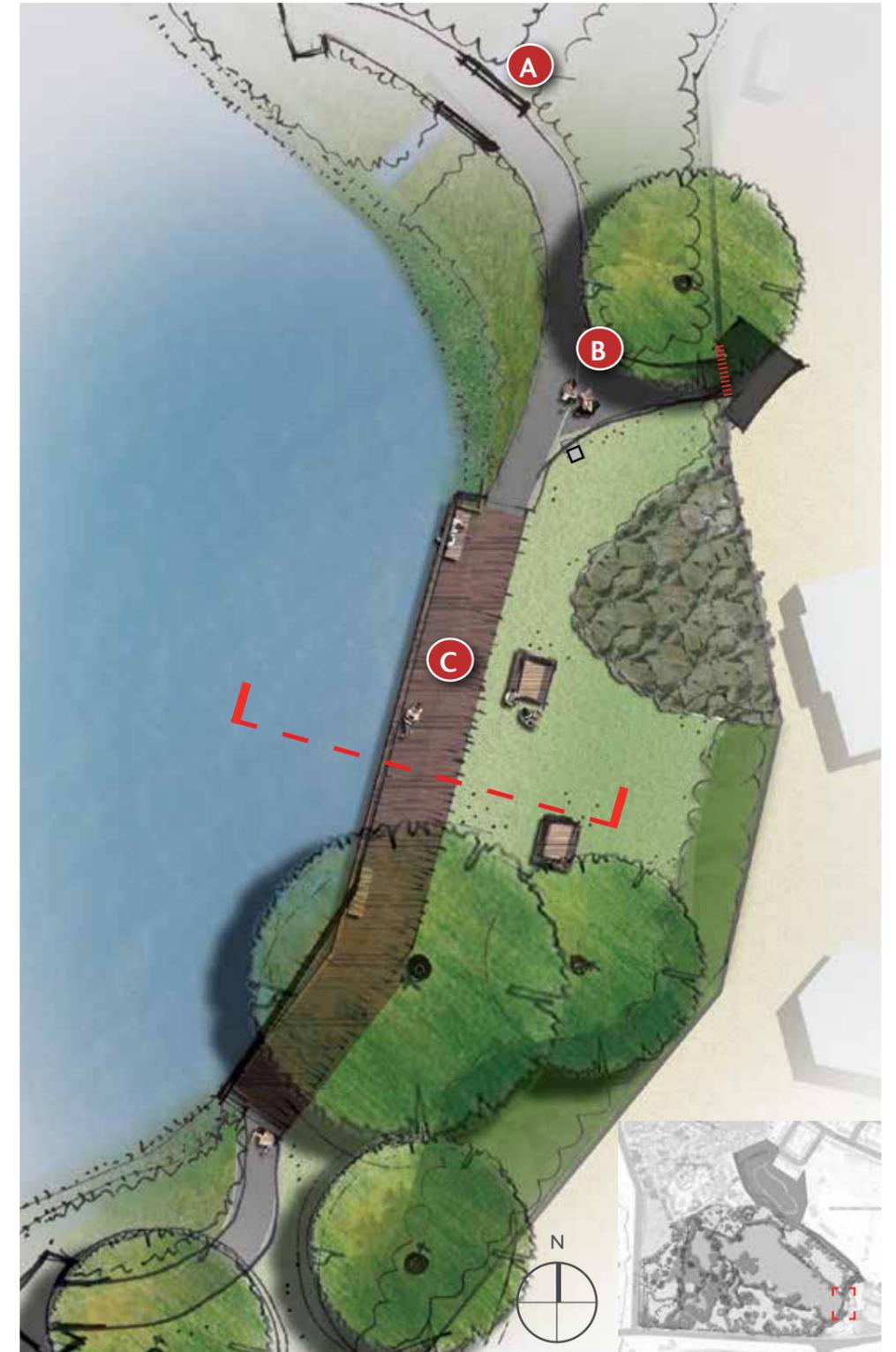


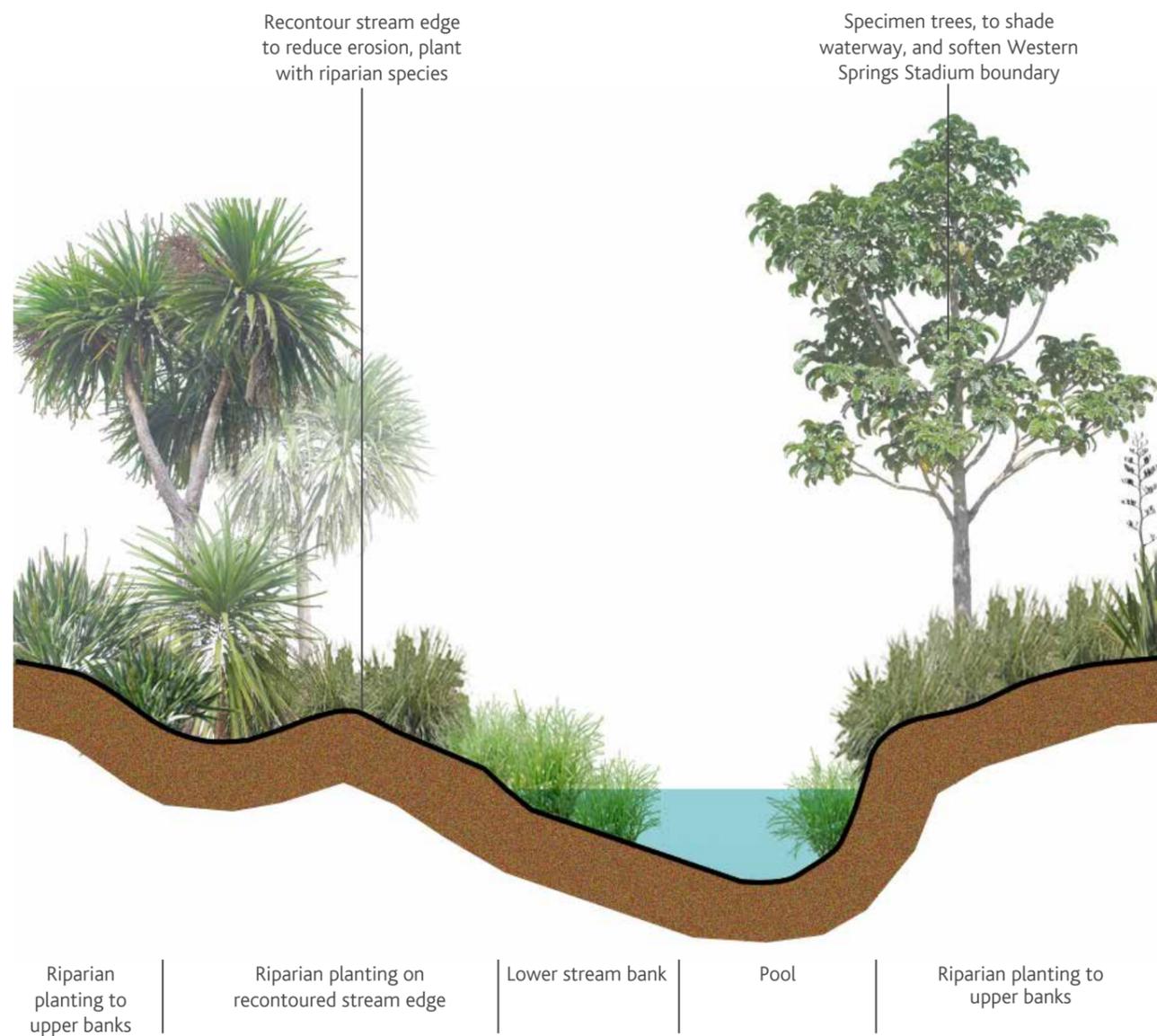
Photo visualisation - lookout boardwalk adjacent to MOTAT entrance



## Motions Creek rehabilitation

It is proposed that Motions Creek is rehabilitated with riparian vegetation, to stabilise the stream edges and reduce sediment runoff entering the stream.

Planting the stream will also visually soften the concrete wall that forms the boundary between Western Springs Lakeside Te Wai Ōrea and Western Springs Stadium.



## Wetland and lava rock forest rehabilitation

It is proposed that the western wetland areas are restored with management of weedy exotic species and planting of suitable native wetland species, to provide higher ecological and habitat values for native species, including tuna (eels) and native birds.

The surrounding terrestrial vegetation is also proposed to be enhanced with planting designed to reference or move towards a composition more typical of the historically-present pūiri lava rock forest at this location and increase habitat value for native birds.



### 3.2.2 Kōtuinga āwhioranga kua marohitia *Proposed circulation network*

A hierarchy of paths, of varied widths and materials, is proposed to create a legible path network that will assist with wayfinding.

The main path on the northern side of the park follows the proposed Waitematā Greenways network, which includes a new path connection between the existing zoo entrance and Motions Road. The path entering at Stadium Road has been realigned to provide a more direct path and view shaft to the lake.

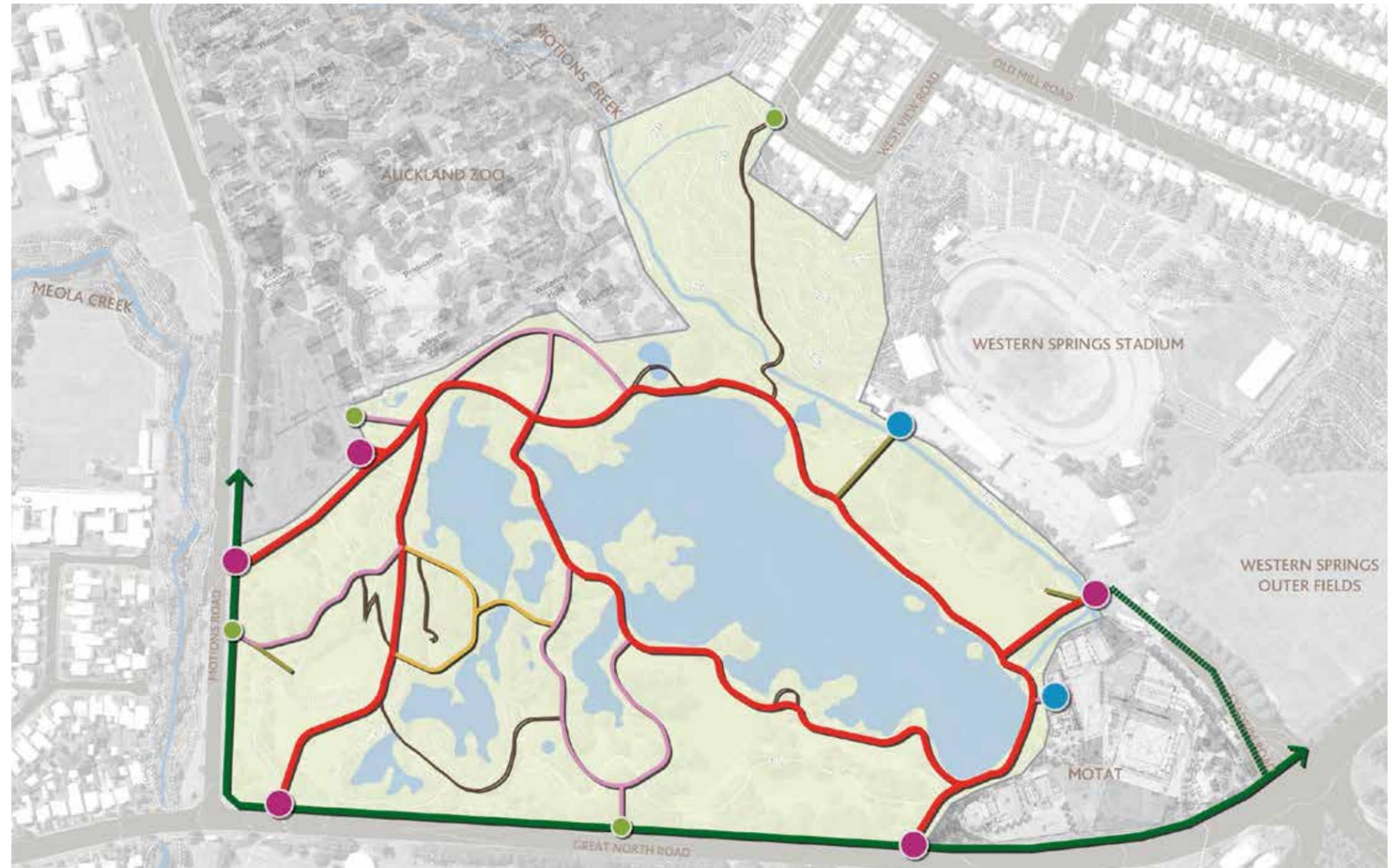
The main path connects to either traffic lights and pedestrian crossings to provide safe connections beyond the park.

Secondary paths are accessed off the main path and connect to secondary entrances.

Formed and gravel paths are informal paths located in the more 'natural' areas of the park, and have a sense of discovery to them.

Entry and exit points between informal paths have been realigned to create intersection points to reduce confusion. Informal paths have also been extended to connect with other paths where they were 'dead end' paths.

Some sections of the main path are currently lit at night. This is not a safe place for people at night, as there are no neighbouring residential properties or road frontages to provide 'after hours' passive surveillance. It is proposed that the lighting be removed when it is due for renewal.



LEGEND:

- |  |                            |
|--|----------------------------|
| Parkland   | Gravel path - 1.8m         |
| Proposed Greenway (from Waitematā Greenways Plan)      | Hardstand - 3m             |
| Main path - all abilities (walking and cycling) - 3.5m | Main public entrance       |
| Secondary path - 1.8m                                  | Secondary public entrance  |
| Formed path - 1.8m                                     | Controlled public entrance |



Scale: 1:4000 @ A3

# Surface treatment

A hierarchy of path surfaces has been proposed to improve wayfinding in the park. The path surfaces have been chosen to provide legibility, assist with navigation, signify entrances and park features, improve park quality, and provide robustness and durability. The proposed surfaces maintain some consistency with the existing path.



■ Main path - all abilities (walking and cycling) - 3.5m  
Asphalt with double basalt edge

■ Secondary path - 1.8m  
Asphalt with single basalt edge

■ Formed path - 1.8m  
Asphalt with timber edge  
Use / location:  
Tertiary pathway

■ Gravel path type one - 1.8m  
Compacted gravel with rock edge  
Use / location:  
Informal pathway



Gravel path type two - 1.8m

Compacted gravel with rolled edge

Use / location:

Informal route



Junction type one

Asphalt with double and single basalt edge

Use / location:

Intersections / changes in primary / secondary route



Junction type two

Asphalt with single basalt and timber edge

Use / location:

Intersections / changes in secondary / tertiary route



**T** Junction type three

Asphalt with single basalt edge and compacted gravel with timber edge

Use / location:

Intersections / changes in secondary / informal route

**T** Junction type four

Asphalt with timber edge and compacted gravel with rock edge

Use / location:

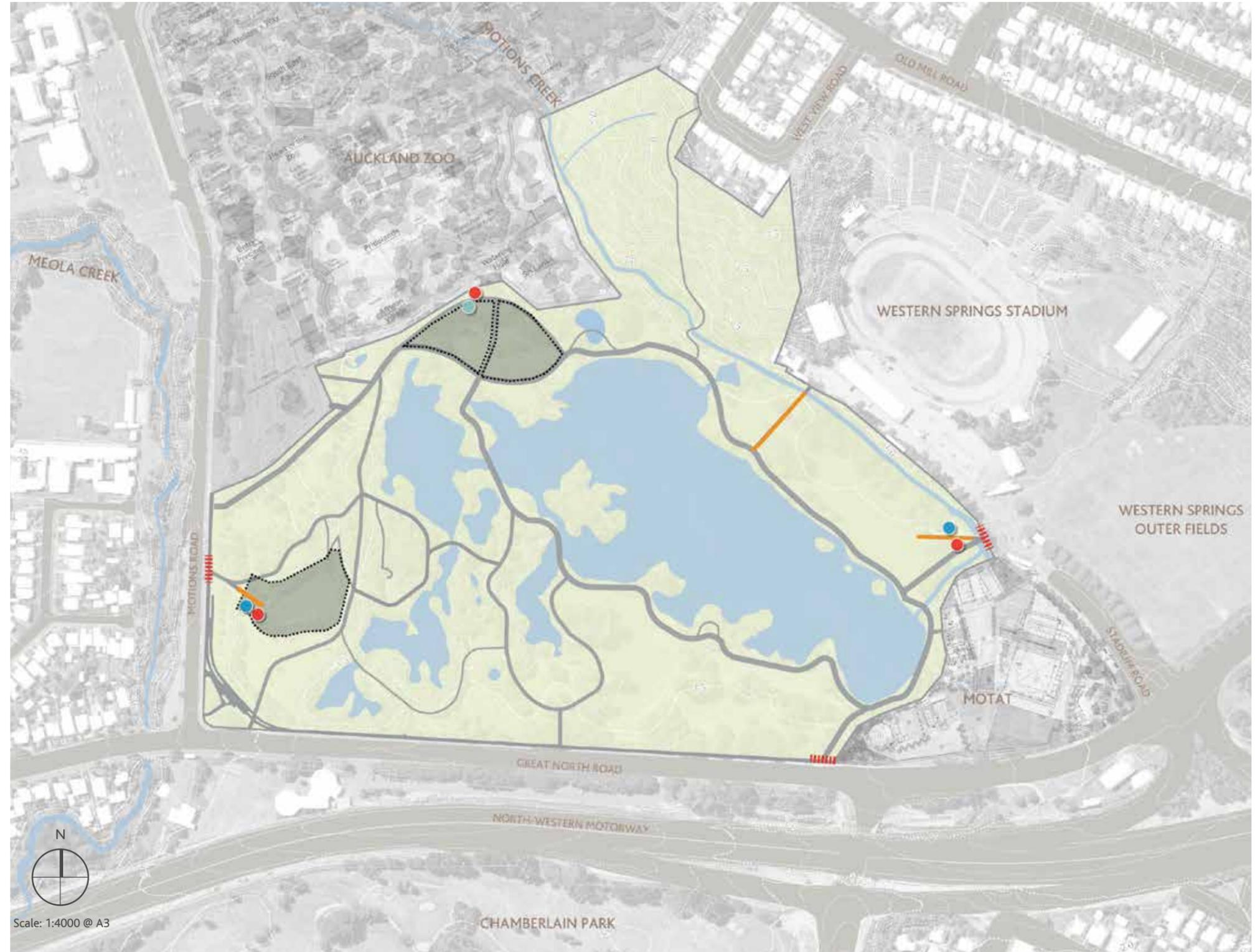
Intersections / changes in formed/informal route

Timber bridge

### 3.2.3 Ngā rawa ā-papa rehia kua marohitia *Proposed park assets*

#### Event infrastructure and drainage

It is proposed to improve event infrastructure, reduce the need for temporary infrastructure for individual events, and related remedial works.



LEGEND:

- Parkland
- Proposed hardstand (e.g. Gobi blocks)
- Proposed drainage improvements
- Proposed power outlet
- Existing potable water supply
- Proposed potable water supply
- Proposed Removable bollards

## Signage and interpretation

The hierarchy of footpaths should be supported with wayfinding signage. Wayfinding signage is proposed at all entrances and path intersections and will include directional signage and distances to entry and exit points.

A suite of code of conduct and safety signage should be developed for Western Springs Lakeside Te Wai Ōrea. Clear educational information needs to be presented in an engaging, easily understood way to change behaviour around bird and eel feeding.

A suite of interpretive signage should be developed for the park to explain and celebrate the park's history, ecology, geology and hydrology. This could include interactive and interpretive artwork.



### LEGEND:

 Parkland	 Existing minor entrance / wayfinding sign	 Existing regulatory sign (e.g. no dogs / liquor ban)	 Proposed minor entrance / wayfinding sign	 Proposed regulatory sign (e.g. no dogs / liquor ban / no bird feeding)
 Pathways	 Existing interpretation only sign	 Existing historical plaque	 Proposed interpretation only sign	 Proposed historical plaque
 Existing main entrance / wayfinding / interpretation sign	 Existing wayfinding only sign	 Proposed main entrance / wayfinding / interpretation sign	 Proposed wayfinding only sign	



Scale: 1:4000 @ A3

## Park furniture and amenities

The existing suite of furniture should be retained in the park including picnic tables, bench seats, park benches and rubbish bins. The park already has a good provision of park furniture, however some may need to be relocated around the playground area as this is developed.

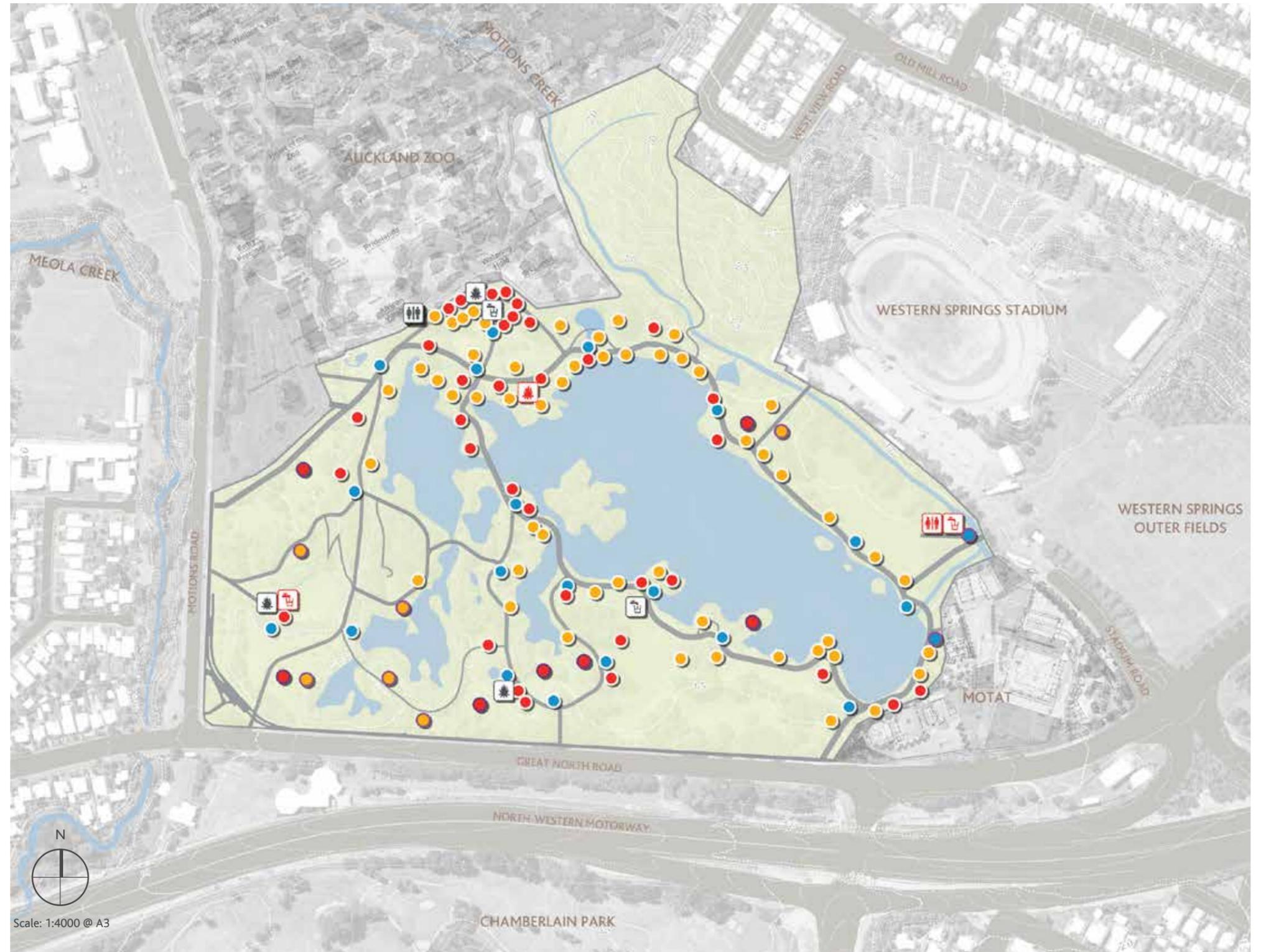
Rubbish bins are proposed inside the park close to all main park entrances.

Additional drinking fountains are proposed and should include water supply for events.

The proposed toilet block is timber clad, and this could include interpretive or artistic material.

### LEGEND:

	Parkland		Existing picnic table
	Existing BBQ pit		Existing park seat
	Existing drinking fountain		Existing rubbish bin
	Existing toilet block		Proposed picnic table
	Proposed BBQ		Proposed park seat
	Proposed drinking fountain		Proposed rubbish bin
	Proposed toilet block		

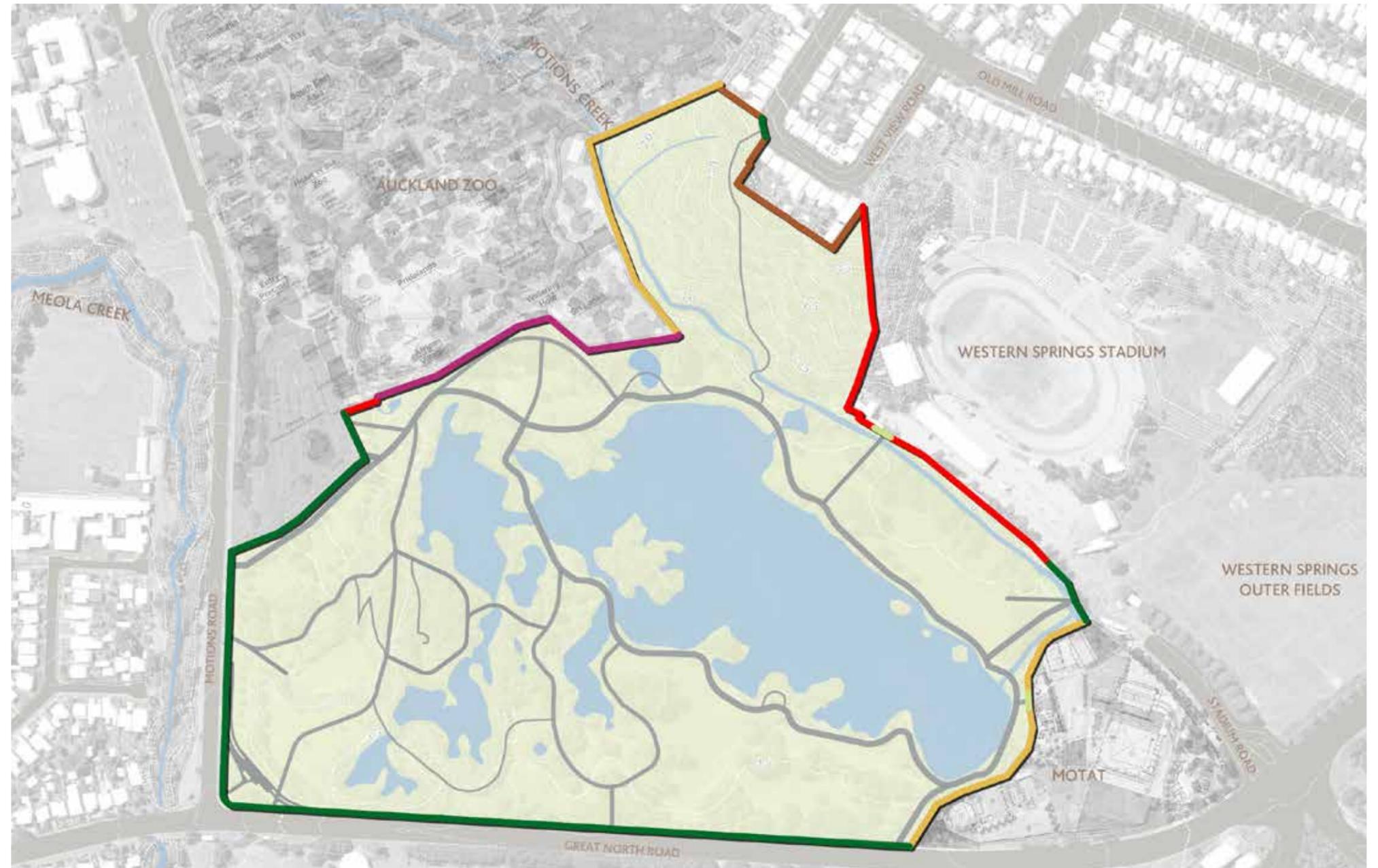


## Boundary treatments

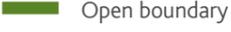
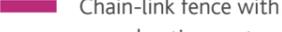
Only minor change is proposed to the existing boundary treatments.

Bollards are proposed adjacent to the zoo carpark to replace the low timber fence that is a trip hazard and to provide all abilities access.

Auckland Zoo is currently working on proposals for the fence line adjacent to the playground that will include information about the zoo and the park.



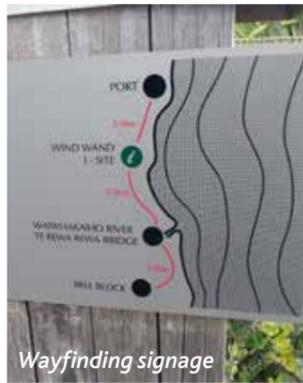
### LEGEND:

 Parkland	 Gated boundary	 Solid wall boundary
 Proposed pathways	 Chain-link fence	
 Open boundary	 Chain-link fence with zoo advertisement	
 Low boundary	 Residential fence	



Scale: 1:4000 @ A3

Precedent imagery - park assets



### 3.2.4 Kaupapa ā-papa tākaro *Playground theme*

The playground is scheduled for renewal in 2018 / 19 because of its age and the deteriorated quality of the play equipment. It is to be upgraded as a destination playground.

The upgraded playground should take advantage of the existing location which is adjacent to the zoo boundary.

Two themes were proposed during public consultation that reflect the site and its surrounds, 'Urban Park' and 'Ecological Escape'. The majority of the public preferred the 'Ecological Escape' theme.

#### 'Ecological Escape'

- The playspace is to be a retreat or refuge from the city and have a more natural focus
- Natural theme would tie the playspace into its landscape context
- Predominant use of natural materials such as timber, stone, sand and rope
- Provide opportunities for informal and unprogrammed play
- The inclusion of water play would allow children to interact with the water
- Planting would consist of hardy native shrubs and groundcovers
- Ecological and educational focus
- Opportunities to integrate the site's cultural and natural history i.e. tuna (eels) found in the lake.



#### Indicative planting palette



Precedent imagery



## Focus area B

The playground and surrounding area is a significant destination. Park users find refuge from the city here, being located some distance from busy roads. The position provides views over the lake and is surrounded by large trees. It is the busiest entrance to the park, located next to the zoo car park. It is also connected to the zoo via the Watering Hole kiosk.

### Wai Water

Removing the filter pond will assist in improving water quality within the park. It is currently a stagnant pond that contributes to botulism.

### Ruruhau Refuge

From this entrance a series of facilities and experiences is proposed, leveraging the existing facilities of the Fukuoka Garden, playground, and lake, and developing a new wetland area (removing the existing filter pond), and upgrading the playground.

The recently completed Fukuoka Garden is an inward facing reflective space. The garden is yet to soften in to its environment, and currently stands out, particularly its large exterior walls. A grove of cherry trees is proposed, to soften the entrance from the zoo carpark.

The existing playground is programmed for renewal. This is a great opportunity to create an exciting playspace based on a local theme. The existing playground is shaded and damp in winter. The development plan proposes that the evergreen trees are thinned and deciduous trees planted to provide summer shade and winter sun.

A passive recreation space will be retained next to the playground and upgraded with drainage improvements to create an ideal spot for ball sports, games, and picnicking.

The proposed wetland will be developed with planting and a boardwalk connection that will allow visitors to enjoy New Zealand's unique flora and a healthier park.

### Tūhononga *Connected*

A proposed change in surface treatment is recommended within the zoo carpark, to improve the safety of pedestrians moving between the park and cars.

The main footpath through the playground area has been realigned for better connections to the zoo kiosk. The new path runs closer to the zoo boundary and the secondary path running north / south is orientated with the kiosk.

The realignment of these paths will create larger open spaces for both the playground and passive recreation space.

A new secondary path is proposed along the lake edge. This area is elevated and has views across the lake of the historic pump house within MOTAT.

### Tāhuhu kōrero *tuku iho History*

It is proposed to reinstate the filter pond as a naturalised wetland area, reminiscent of what would have once been on this site before development, creating a habitat for native flora and fauna.

#### LEGEND:

-  Park boundary
-  Lake
-  Boardwalk
-  Main and secondary footpath (asphalt)
-  Key viewshafts
-  Existing toilet
-  Existing drinking fountain
-  Existing BBQ
-  Proposed BBQ
-  Upgraded playground
-  Proposed buffer planting
-  Proposed emergent planting
-  Proposed specimen trees
-  Proposed cherry tree grove
-  Key picnicking areas
-  A Fukuoka Garden
-  B Auckland Zoo Watering Hole kiosk
-  C Filter pond / proposed wetland
-  D Playground area
-  E Passive recreation area
-  F Proposed tuna (eel) themed bridge



A

B

C

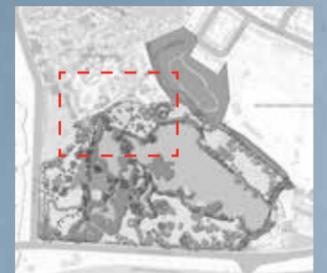
D

E

F



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## 4.0 Mahere ā-Mahi *Action plan*

This section outlines the projects that will deliver the improvements proposed within this development plan.



## 4.1 Raupapa wātaka me ngā aronga matua *Timeframes and Priorities*

Item / Project / Opportunity / Initiative	Mana whenua collaboration	OUTCOME	TIMELINE			POTENTIAL FUNDING SOURCE					
		Visionary objective applied	Short-term priority (1-3yrs)	Medium-term priority (4-6yrs)	Long-term priority (7-10yrs)	LDI	Maintenance	Renewals	AT	Growth	Other
1. Remove filter pond and reinstate naturalised wetland	✓		✓			✓					
2. Commission a planting plan for emergent and lake edge planting and a and restoration plan for the wetland areas and surrounding terrestrial vegetation	✓		✓			✓					✓
3. Develop eel themed bridge	✓				✓	✓		✓			
4. Rehabilitate Motions Creek	✓				✓	✓					✓
5. Commission wildlife management plan	✓		✓			✓	✓				
6. Investigation / research into sediment removal	✓				✓						✓
7. Investigation / research into nutrient removal	✓				✓						✓
8. Water quality monitoring and reporting	✓		✓								✓
9. Forest restoration	✓		✓			✓	✓				
10. Undertake path renewals and upgrades			✓	✓	✓	✓		✓	✓		
11. Upgrade bridge connections	✓		✓	✓	✓	✓		✓	✓		
12. Provide new path connections				✓		✓					
13. Develop new path connection between Fukuoka Garden and Motions Road as part of greenways	✓			✓		✓			✓	✓	
14. Provide boardwalk adjacent to MOTAT					✓	✓					
15. Develop event infrastructure					✓	✓					
16. Undertake signage renewal, including the acknowledgement of mana whenua values and relationships with the park through interpretive signage and / or artwork	✓		✓	✓	✓	✓		✓			
17. Undertake playground renewal	✓		✓			✓		✓			
18. Develop cherry tree grove adjacent to Fukuoka Garden				✓		✓					
19. Demolish existing toilet adjacent to Western Springs Stadium and develop new toilet at Stadium Road entrance				✓		✓		✓			
20. Renewal of park furniture				✓	✓			✓			
21. Provide new park assets					✓	✓					

### Vision statements



Wai Water



Ruruhau Refuge



Tūhononga Connected



Ngā whakahaerenga Events



Tāhuhu kōrero tuku iho History



Ngā Āpitihanga *Appendices*

## A1 He āmiki tāhuhu kōrero tuku iho *Detailed History*

### Pump station history

During 1830-1860 Auckland was expanding outwards from its Shortland Street nucleus. Land was purchased by settlers in the County of Eden which included the present suburbs of Grey Lynn and Westmere.

By 1871, Auckland City Council was under pressure to provide an improved water supply. There was no significant river or lake within easy reach of the town and the geology placed limitations on options. Strong public opinion accelerated action and finally in 1874, the council decided to develop the source of supply known as the Western Springs Te Wai Ōrea. This necessitated the purchase of property, some 140 acres, from Low and Motions, who operated a mill on site. William Errington was engaged to prepare plans for the complete scheme, including beam engine, engine house, impoundment lake, service and main reservoirs, and the complete reticulation system. By July 1874 he had completed plans and specifications sufficient for tender purposes. He used his engineering and drafting skills to produce extremely detailed designs for; the beam engine, engine house, engine pond, boilers and boiler house, the Western Springs impoundment (now Western Springs Te Wai Ōrea Lake), the main reservoir (Ponsonby), the service reservoir (Khyber Pass) the valve house, pipes, valves, pipelines and a tramway to feed coal to the furnaces. Tenders were called in Australia and New Zealand in October 1874 and the necessary property purchases completed by February 1875. Tenders for plant and works finally closed on 22 March 1875.

Work began immediately on the Western Springs scheme, which was the largest civil engineering project under construction in the Auckland region. It involved not just the construction of the impressive brick engine house and the installation of the steam engine and pumps, but also the construction of concrete reservoirs at Ponsonby and Khyber Pass. The engine house, chimney, and pumphouse were built to Errington's specifications by local bricklayers who sub-contracted to T&S Morrin. Work on these buildings proceeded throughout 1875 and they were largely complete by 1876 when the engine and boilers began to be installed. The double compound condensing

steam engine, pumps and four "Lancashire" boilers were manufactured at John Key & Sons "Whitebank Foundry" in Kirkcaldy, Scotland, a large firm that employed 700 staff. On arrival in Auckland the machinery was transported to Western Springs Te Wai Ōrea where it was assembled, under the supervision of John Goodall and William Errington, by an Auckland engineering firm Masefield & Co.

Prior to 1875 the Western Springs Te Wai Ōrea were in their natural state. Two large springs were located on the eastern edge of the main Mount Eden-Mount Albert lava flow which extends into the Waitematā Harbour (Meola Reef). The water flowed into an extensive swamp on the site of what is now known as Western Springs Te Wai Ōrea Lake. The entire swamp was excavated using horse scoop and shovel under the supervision of Mr. J. Blewdon, a city contractor. A 300 yard long embankment was constructed along the eastern edge of the swamp creating a 15 acre (6ha) artificial lake six feet in depth and capable of holding 22 million gallons of water. The scale of this back-breaking work is revealed by the fact that Mr. Blewdon and his men removed 20,000 cartloads of spoil from the site and used 7850 cubic yards of earth to construct the embankment which was 40 feet wide at the base and nine feet wide at the crest. They also excavated the 25 feet deep engine pond and dug a 60 foot long tunnel between the lake and the engine house.

Throughout 1875 and 1876 work proceeded on the Main Ponsonby Reservoir and the Khyber Pass Reservoir, both constructed in concrete to the design of Errington. By late 1876 the main pipeline from the Western Springs Te Wai Ōrea to the main and service reservoirs had been laid and service mains were being laid throughout the city. By 1877, Branston and Forster, a leading Auckland plumbing and gasfitting firm, was advertising it was prepared to connect private homes and businesses to the service mains. They would also install hot water apparatus, baths, and 'water closets' on the "most reasonable terms." By early 1877 all mains and service pipes were tested under pressure and some faulty sections were replaced. By mid May, the reservoirs were full and all construction was complete, however Errington continued his thorough testing programme until early July when all was to his



Figure 10. Western Springs pumphouse (now part of MOTAT) 1970s



Figure 11. Western Springs pump station and the lake in 1890

satisfaction. Finally on the 10th July 1877 the Western Springs Water Works were formally opened in a small ceremony attended by the contractors, the mayor and the city council. The City of Auckland at last had a supply of pressurised reticulated water that encouraged the residential and commercial growth it experienced in the last two decades of the 19th century to proceed, and the city to become a major urban centre.

Despite an initial reluctance by ratepayers and consumers to the cost of installation of connections and the water rate, the demand for the service grew rapidly with a progressive reduction in costs to the ratepayer. The city also became a bulk supplier to neighbouring boroughs. Water consumption increased so rapidly that by 1886 Errington was instructed to prepare plans for a second reservoir at Ponsonby and a new reservoir at Mount Eden.

Within ten years between 1879 and 1889 consumer connections increased from 877 to 6248 and annual consumption from 55,302,000 gallons to 598,460,000 gallons. The draw off was such that the supply from Western Springs Te Wai Ōrea had to be augmented from neighbouring creeks. The pump had to lift water from various sources until, in 1907, water started to become available from the Waitakere Ranges.

From 1914 water from Western Springs Te Wai Ōrea continued to be used in times of shortage, but because of pollution it eventually required heavy chlorination. It ceased to be used regularly in 1928.

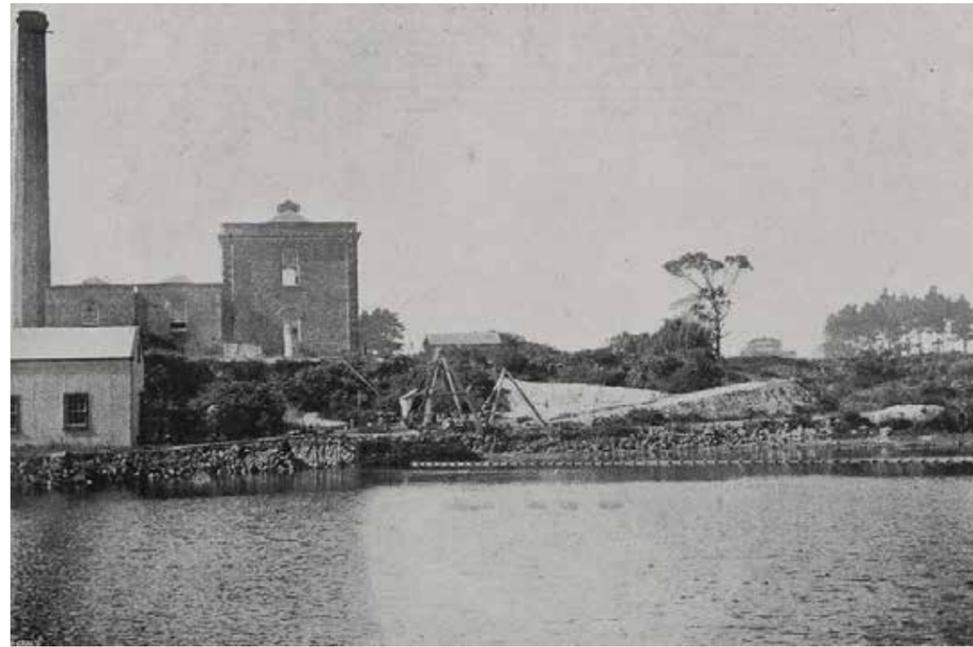


Figure 12. Western Springs pump station in 1900



Figure 13. Aerial view of Western Springs Stadium and lake in 1955



Figure 14. Aerial view of Western Springs Lakeside Te Wai Ōrea in 1960

## Further history

During the depression between 1930-1931, work began to develop a camping ground on 16 acres beside Motions Road. During World War II, the American Armed Services erected a personnel camp on the camping ground. While the land reverted to the council after the war, the camping ground never reopened. The war time buildings were finally demolished in the 1950s.

In 1951, the Auckland Public Relations Office was given the responsibility for developing the area, but apart from a small quantity of filling work along the north east bank, no further progress was made. As a result, the council resumed responsibility and produced plans for an ambitious development on the site. In 1953, an exhibition hall, theatre, dance hall, restaurant, funfair, water garden and skating rink were proposed to complement the existing zoo and stadium. By 1961, however, lack of money prevented the plan reaching fruition and a substitute plan was produced by the parks department. At this time, the park area was predominantly covered with exotic weeds and scrub vegetation. The area between the stadium and lake was densely vegetated, while on the opposite bank the marshy land was largely open. Since then, the council has been developing the park, concentrating increasingly on enhancing the natural values of the



Figure 15. Motor camp at Western Springs Lakeside Te Wai Ōrea in 1930s



Figure 16. Transit camp at Western Springs Te Wai Ōrea in 1960



Figure 17. Aerial view of Western Springs Lakeside Te Wai Ōrea in 1965



Figure 18. The iconic double humped bridge at Western Springs Lakeside Te Wai Ōrea in 1980s

'native area'. By the 1980s, major landscaping work had transformed the park into one of Auckland's most attractive parks.

In 1995, to improve the management practises at the park, Boffa Miskell was appointed by Auckland City Council as a consultant to prepare the Western Springs Lakeside Park Plan. It was adopted by the council in August 1995. Since then, the park has been maintained by general regular upgrades and renewals. In 2014, Wildlands Consultants prepared the Western Springs Pine Stand Restoration and Accessibility Plan for Auckland Council to address the degrading native forest on the north part of the park. In 2017, Fukuoka Garden was added to the park on the west area, adjacent to the



Figure 19. 1995 Western Springs Lakeside Te Wai Ōrea adopted concept plan

zoo entrance. It replaces the original Fukuoka Friendship Garden built in Auckland Zoo, which was given to Auckland in 1989 by Japan's Fukuoka City in recognition of the sister-city relationship.



Figure 20. 2014 Western Springs Lakeside Te Wai Ōrea ecological restoration plan of the native forest

## A2 Pūtaiao rerenga ā-wai Hydrology

Motions Creek runs along the northern boundary of the park, carrying water from upstream, occupying approximately one sixth of its perimeter. It is prone to flooding during heavy rain. Water quality is very poor and has influxes of industrial, traffic, and sanitary sewer runoff. Motions Creek is a highly degraded creek and therefore is not considered a good candidate for surface water harvest even though it has high base flow and is part of the greater watershed.

Water runoff from the north (native forest) occurs quickly from the other side of Motions Creek due to the Waitemata tight clay and sandstones having minimal storage and soakage potential. The dense forest mitigates this to a degree, however this mitigation is offset by the steep slopes.



LEGEND:

-  Site boundary
-  Flood plains
-  Flood prone areas
-  Overland flow paths

## A3 Rārangi tohu momo tipu *Indicative plant species list*

These lists shouldn't be treated as final, a full assessment of the site will need to be made as part of producing a site-tailored planting and restoration plan.

### Wetland plants

Species	Depth	Height	Form	Note
<b>Aquatic emergents</b>				
<i>Eleocharis sphacelata</i>	to 3m	2 - 3m	Rhizomatous sedge 0.3-1.2m emergent height	Plant into deep still water.
<i>Machaerina arthropylla</i>	to 0.5m	1.2m	Rhizomatous swathe forming sedge,	Shallow lake margins. Probably best to establish prior to permanent flooding at the same time keeping the substrate very moist.
<i>Machaerina articulata</i>	to 0.5m	2.5m	Rhizomatous swathe forming sedge	Plant into water. Sheltered margins best.
<i>Schoenoplectus tabernaemontanii</i>	to 1m	2.5m	Rhizomatous sedge	Aquatic in standing water, easily grown, tolerates fluctuating water levels.
<b>Marginal, semi aquatic or flaxland</b>				
<i>Austroderia fulvida</i>		1.5 - 2m	Dense tussock-forming grass	For flaxland area only.
<i>Carex lessoniana</i>		0.5 - 1.5m	Rhizomatous sedge	Does better than <i>C. geminata</i> in wetter acidic habitats. However, it may not establish well in fully aquatic conditions. May be useful if there is a transitional zone with fluctuating water levels between aquatic habitat and wet soil.
<i>Carex maorica</i>		1m	Dense tufted sedge	Usually a plant of periodic inundation, will not establish well in fully aquatic conditions. May be useful if there is a transitional zone with fluctuating water levels between aquatic habitat and wet soil.
<i>Carex secta</i>		1 -2m	Tussock forming sedge	Probably best to establish prior to permanent flooding.
<i>Carex virgata</i>		1m	Tussock forming sedge	High tolerances but prefers damp areas.
<i>Coprosma tenuicaulis</i>		3m	Erect bushy shrubs	For flaxland area only.
<i>Cordyline australis</i>		8m	Palm-like tree	For flaxland area only.
<i>Cyperus ustulatus</i>	to 0.1m	1m	Dense sedge	Plant into boggy ground with occasional standing water. Leaf edges very sharp.
<i>Eleocharis acuta</i>		0.2 - 0.9m	Rhizomatous sedge forming crowded tufts	Soil substrate must remain very damp, does not tolerate drying.
<i>Isachne globosa</i>		varies	Creeping grass	Creep through sedges, so height varies
<i>Isolepis prolifera</i>	to 0.2m	0.3m	Semi aquatic rafting sedge forms dense swathes	Plant into wet ground can cope with some flooding but more a plant of damp margins.
<i>Machaerina articulata</i>	to 0.5m	2.5m	Rhizomatous swathe forming sedge	Can be planted into shallow standing water. Sheltered margins best.
<i>Machaerina juncea</i>	to 0.5m	1m	Rhizomatous swathe forming sedge	Can be planted into shallow standing water. Sheltered margins best.
<i>Phormium tenax</i>		2m	Dense flax	For flaxland area only.
<i>Sparganium subglobosum</i>	to 0.5m	1m	Rhizomatous reed	Source local seed, this species recorded within the reserve.
<b>Aquatic herbs</b>				
<i>Azolla rubra</i>	floating, all depths	floating	Aquatic floating fern	Place on water surface.
<i>Lemna disperma</i>	floating, all depths	floating	Aquatic floating herb	Place on water surface.
<i>Myriophyllum propinquum</i>	to 3.5m	submerged or floating	Mat forming bottom rooted, sometimes emergent aquatic herb	Plant into water. Can be in water up to 3.5m deep but will tolerate shallow and at times loss of open water but substrate must remain wet.
<i>Myriophyllum triphyllum</i>	to 3.5m	submerged or floating	Mat forming bottom rooted, sometimes emergent aquatic herb	Plant into water.
<i>Potamogeton cheesmanii</i>	to 3.5m	submerged or floating	Aquatic Rhizomatous perennial herb	Plant into water.

## Rock forest plants

Species	Form and Height	Note
<b>Forest revegetation canopy and sub-canopy</b>		
<i>Alectryon excelsus</i>	Small tree between 10m and 20m tall	Prefers well drained, fertile soils in full sun or partial shade.
<i>Beilschmiedia tarairi</i>	Evergreen tree up to 22m tall, with very broad canopy crown	Requires a good moist soil and when young, can be frost tender.
<i>Beilschmiedia tawa</i>	Evergreen tree up to 35m tall	Likes a moist free-draining soil, but can tolerate drier conditions.
<i>Brachyglottis repanda</i>	Shrub to small tree up to 6m or more tall	Plant in a dry exposed site.
<i>Carpodetus serratus</i>	Monoecious small tree up to 10m tall	Prefers damp soils, sun or shade.
<i>Coprosma macrocarpa subsp. minor</i>	Shrub or small tree growing up to 4m	Moderately frost-tender.
<i>Corynocarpus laevigatus</i>	Leafy canopy tree up 15m tall	Frost-tender and cold-sensitive when young.
<i>Dysoxylum spectabile</i>	Tree up to 15m tall usually with abroad, spreading canopy	Provide shade, shelter and a good moist soil for best results. Frost tender.
<i>Geniostoma ligustrifolium var. ligustrifolium</i>	Bushy shrub up to 4m	Prefers semi-shade or deep shade. Tolerates quite dry conditions. Frost tender, otherwise hardy.
<i>Griselinia lucida</i>	Shrub grows to a height of 5m	Intolerant of waterlogged soils and grows best in free draining soils.
<i>Knightia excelsa</i>	Tall tree with columnar (fastigate) growth-form up to 30m tall	Thrives on poor free draining poor clay soils. Prefers full sunlight.
<i>Laurelia novae-zelandiae</i>	Slow growing tree, grows to 10m high	Requires plenty of moisture and is ideal for planting in damp areas or on the edges of lakes and streams.
<i>Litsea calicularis</i>	Stout, spreading tree up to 18m tall	Thriving best on limestone-derived soils or heavy clays,. Requires good drainage and has low tolerance of drought conditions. Young trees are very frost tender.
<i>Meliccytus ramiflorus</i>	Shrub or small tree up to 15m tall	Very fast growing. Good filler for shady sites. Very hardy.
<i>Piper excelsum</i>	Small tree to at least 5m tall	Does best in dappled light, within a free draining but permanently moist soil. Very shade tolerant. Cold sensitive and will not tolerate frost.
<i>Podocarpus totara</i>	Robust dioecious conifer up to 30m tall	Slow growing. Likes full sun to part shade.
<i>Pseudopanax lessonii</i>	Small tree to 6m tall	Requires full sun and semi-shade. Tolerates dry and wind. Damaged by heavy frosts.
<i>Rhopalostylis sapida</i>	Slow growing palm, grows to 15m tall	Prefers shaded gullies, depressions and at the bottom of steep slopes where moisture is abundant.
<i>Vitex lucens</i>	Tree up to c. 20m tall with a broad spreading canopy	Prefers a rich, deep, fertile soil but is surprisingly tolerant of a range of conditions including drought (once established).
<b>Forest revegetation ground layer</b>		
<i>Asplenium flaccidum</i>	Mostly epiphytic. Rhizome short, stout, erect, bearing dark brown subulate scales up to 20 x 2mm	Prefers semi-shade, and should be planted in a fertile, free draining soil.
<i>Asplenium lamprophyllum</i>	Rhizome creeping, up to 150mm long	Does best in a semi-shaded site, planted within a deep, rich, free draining soil.
<i>Astelia solandri</i>	Robust tufted epiphyte, but also growing on ground. Leaves mostly 100–200 x 2–3.5cm	Prefers semi-shade or deep shade, sheltered, dry conditions.
<i>Carex lambertiana</i>	Tufts robust, leafy, 0.6–1.0m tall	Does best in partial shade, within a rich, free draining soil.
<i>Carex solandri</i>	Dense yellow-green tufts, upper part of leaves and culms drooping. Culms 0.10–1.00m long, c.1mm diameter	Prefers a permanently damp, semi-shaded site but once established can tolerate full sun and dry spells.
<i>Dianella nigra</i>	Slender flax-like leaves. Grows to about 60cm high	Grows in sun or semi-shade and in a range of soil conditions in humid areas
<i>Doodia australis</i>	Low growing fern that forms clumps (0.3m high and a spread of 0.5m)	Reasonably frost-tolerant, and does best in full sun, especially on poorly drained clay soils. Drought tolerant.
<i>Microsorium pustulatum</i>	Rhizomes long-creeping, 4-10(-12)mm diameter	Easily established on the branches of suitable trees. Drought tolerant, disease and pest free.

## A4 Kōrero hāngai ki ngā whakaahua *References*

### Selected image references

- Figure 1. Paratene Ngata of the Ngāti Porou tribe (left) is weaving a hīnaki. He is being observed by anthropologist Te Rangi Hīroa (Peter Buck), right, with notebook, Alexander Turnbull Library, National Library of New Zealand
- Figure 2. 1965 - Western Springs Lakeside Te Wai Ōrea aerial photograph, Sir George Grey Special Collections, Auckland Libraries
- Figure 3. 1890 - Looking south across Western Springs Te Wai Ōrea Lake, Sir George Grey Special Collections, Auckland Libraries
- Figure 4. 1924 - View of the lake, Sir George Grey Special Collections, Auckland Libraries
- Figure 5. 1920 - Looking across the lake, showing the Auckland City Council's pumping station, Sir George Grey Special Collections, Auckland Libraries
- Figure 6. Ca. 1933-1945 - Rubbish tip at Western Springs Te Wai Ōrea, Auckland, Sir George Grey Special Collections, Auckland Libraries
- Figure 7. 1950 - Bathers and pleasure boats with pumphouse at the background, Auckland Museum Collections
- Figure 8. 1960 - Photograph of the lake, Sir George Grey Special Collections, Auckland Libraries
- Figure 9. 2014 - aerial view of Western Springs Lakeside Te Wai Ōrea park and its vicinity, Auckland Council stock photo
- Figure 10. Western Springs pumphouse (now part of MOTAT) 1970s, Auckland Libraries Heritage Collections, Auckland Libraries
- Figure 11. Western Springs pump station and the lake in 1890, Sir George Grey Special Collections, Auckland Libraries
- Figure 12. Western Springs pump station in 1900, Sir George Grey Special Collections, Auckland Libraries
- Figure 13. Aerial view of Western Springs Stadium and lake in 1955, Whites Aviation
- Figure 14. Aerial view of Western Springs Lakeside Te Wai Ōrea in 1960, Sir George Grey Special Collections, Auckland Libraries
- Figure 15. Motor camp at Western Springs Te Wai Ōrea in 1930s, photographer unknown
- Figure 16. Transit camp at Western Springs Te Wai Ōrea in 1960, Sir George Grey Special Collections, Auckland Libraries
- Figure 17. Aerial view of Western Springs Lakeside Te Wai Ōrea in 1965, Sir George Grey Special Collections, Auckland Libraries
- Figure 18. The iconic double humped bridge at Western Springs Lakeside Te Wai Ōrea in 1980s, Sir George Grey Special Collections, Auckland Libraries
- Figure 19. 1995 Western Springs Lakeside Te Wai Ōrea adopted concept plan, Auckland Council Western Springs Lakeside Park Plan 1995
- Figure 20. 2014 Western Springs Lakeside Te Wai Ōrea ecological restoration plan of the native forest, Western Springs Pine Stand Restoration and Accessibility Plan, Wildlands Consultants

