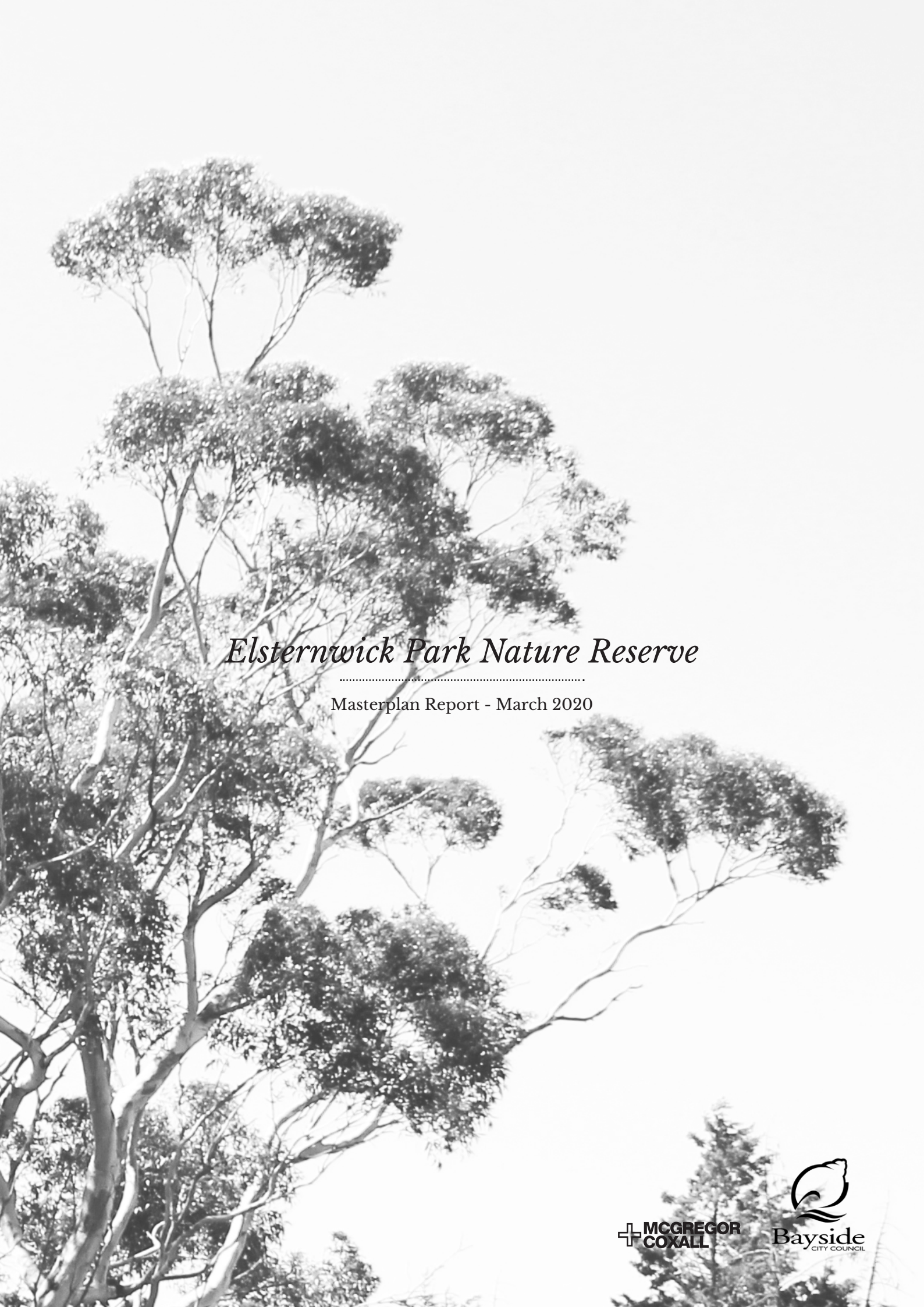

Elsternwick Park Nature Reserve

Masterplan Report - March 2020

MCGREGOR COXALL

Bayside CITY COUNCIL

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Acknowledgement of Country

Bayside City Council acknowledges the Traditional Owners and custodians of this land, the Boon Wurrung people, and we pay our respects to their Elders past, present and emerging.

Bayside City Council

Chapter 1

The Project Story

-01-

Introduction

Bayside City Council is committed to developing the Elsternwick Park Nature Reserve, a former golf course, into an environmental park that delivers significant environmental and social benefits for the community.

McGregor Coxall was engaged in November 2019 to work closely with Council and the community reference panel to develop this masterplan.

This masterplan is a major milestone for the Council and community. It is the first piece of work that brings together the plethora of work, investigations and energy put into the Reserve and presents an integrated, holistic design reflecting the priorities and principles of Bayside City Council, the Elsternwick Park Association, the community and the broad range of stakeholders.

Elsternwick Park Nature Reserve will be a story of repair, engagement and education. The Reserve will seek to repair and enhance ecologies, habitat, and Indigenous connection; to engage communities with each other, with ecologies and with traditional owner stories; and, to educate visitors to understand and appreciate ecologies, cultural values and Traditional Owners past, present and future.

Already a prominent environmental destination, the Reserve will be transformed into a cherished local community asset and a regional and national visitor attraction, allowing people to have a deep engagement with the site to inspire a philosophy of Caring for Country in the community, young and old, to help secure a more resilient future.

The stewardship of the Reserve will continue to be a joint effort between Bayside City Council, the passionate surrounding community and Melbourne Water, ensuring that the vision for the site continues to be realised through the design and delivery process, and well into the Reserves future.

-02-

The Site

Prior to colonisation, the Bayside area was part of a coastal marsh ecosystem of meandering waterways, billabongs and undulating topography. It was, and still is, land of the Boonwurrung people. The history of the Boonwurrung people dates back thousands of years. This strong underlying indigenous history, that has been both diverse and complex, has often been hidden, and for many, unknown.

Colonisation of Melbourne saw the continual urbanisation and clearing of land. As the city developed, these areas of ecological value continued to diminish, making way for urban infrastructure and housing.

The Reserve has been extensively modified through clearing of remnant vegetation and alterations to the waterway and topography. While this is the case, small remnants of three Ecological Vegetation Classes (EVCs) are found onsite – Tall Marsh (EVC 821), Aquatic Herbland (EVC 653) and Grassy Woodland (EVC 175).

Situated in a highly urban context between Port Phillip Bay and Nepean Highway, Elsternwick Park Nature Reserve is Crown Land and from 1910 until recent years was a 9-hole golf course. The Reserve is part of the larger Elsternwick Park which, as a municipal/regional open space, is a major destination that should be catering to local residents, the broader community and tourists, and for a diverse range of interests.

Currently the Reserve is a vast open space and functioning flood retention basin with long vistas and shimmering grasslands. Its character has been shaped by its history, in particular its past life as a golf course. The golf course saw the planting of many native and exotic trees in defined lines across the Reserve – many of these are now large, impressive specimens that provide crucial habitat, high value flora, as well as shade and amenity value.


CRAIGIEBURN
YARRA RANGES
LILYDALE
MELBOURNE CBD
WERRIBEE
BAYSIDE
PORT PHILLIP BAY
FRANKSTON
Greater Metropolitan Melbourne
Bayside City Council
Built Environment
Forests
Water course
Water bodies
0
5
10 km

Bisecting the Reserve is Elster Creek, which is the only remaining significant semi-natural waterway within Bayside. While Elster Creek is highly modified and most of it is now piped underground, with only approximately five kilometres of its lower reaches open, the portion within the Reserve is one of the only areas that is not concreted and maintains a more naturalistic character – a unique landscape within the Bayside urban fabric. As an urban waterway with a large catchment, the creek is prone to flooding downstream and is of poor ecological and water health. The low water quality of the creek discharges into Port Phillip Bay in Elwood, just downstream of the Reserve.

The Project Brief

Declining golf patronage and profitability along with a golf course in poor repair were the impetuses for Bayside City Council and the broader community to consider the future of the facility and the role it should play in the open space fabric of Bayside. This was resolved with the Council decision to create the Reserve. Spanning over a number of years, a significant amount of work was undertaken by Council and the community – including site investigations and extensive stakeholder and community engagement. Through this process a shared future vision for the Reserve was established which will see the transformation of this passive recreation space into a truly exceptional wetland and nature reserve, “this vision is not one of an ordinary suburban park. Rather it is of something stunning, unique and extraordinary.” [Elsternwick Park North Park Development - Proposed Principles and priorities- Elsternwick Park Association, September 2018]. The Reserve will be a unique open space diversifying and complementing the offer of the broader Elsternwick Park.


ELWOOD CANAL
NEPEAN HWY
ELSTERNWICK
ELWOOD
ELSTERNWICK STATION
ORMOND RD
1.0KM
0.5KM
ST KILDA ST
SITE
NEW ST
ORMOND ESPLANADE
LGA BOUNDARY
HEAD ST
BRIGHTON
Site extent
LGA Boundary
Train Station
Train Line
Water
Parks & Open Space
Special Building Overlay (Flooding)
Significant Vegetation
Commercial Land use
Schools
0 25 50 200m

The brief clearly articulates the goals and targets of the Reserve, both qualitatively and quantitatively, arranged under four key layers of thinking:

Environment
"Given the unique nature of the waterway in the municipality and consequently the only location where some habitats will be able to be found, the design goal is to maximise the aquatic environment within the reserve. The target is to achieve between 5.0 and 7.0 hectares of aquatic environment with the balance being terrestrial and hard infrastructure."

Community Amenity
"The design goal is to integrate the separate requirements in a harmonious and aesthetically pleasing manner."

Flood Mitigation
"Qualitatively, the design goal is to maximise the flood mitigation while showing consideration for the other reserve objectives. Quantitatively the target range is between 50,000m3 and 65,000m3."

Water Quality.
"Qualitatively, the design goal is to maximise the water quality improvement, which in turn means maximising the wetland footprint. Quantitatively the target range is the removal of between 1,400 and 2,000 kg of nitrogen per annum."

These four layers each have their own ambitious goals and targets – the masterplan has critically assessed the goals and targets to resolve a functional and spatial arrangement to best address all four within the site, around its constraints, through innovative and carefully considered design.

Existing Elsternwick Park Nature Reserve wetland

Chapter 2

The Masterplan

Design Vision

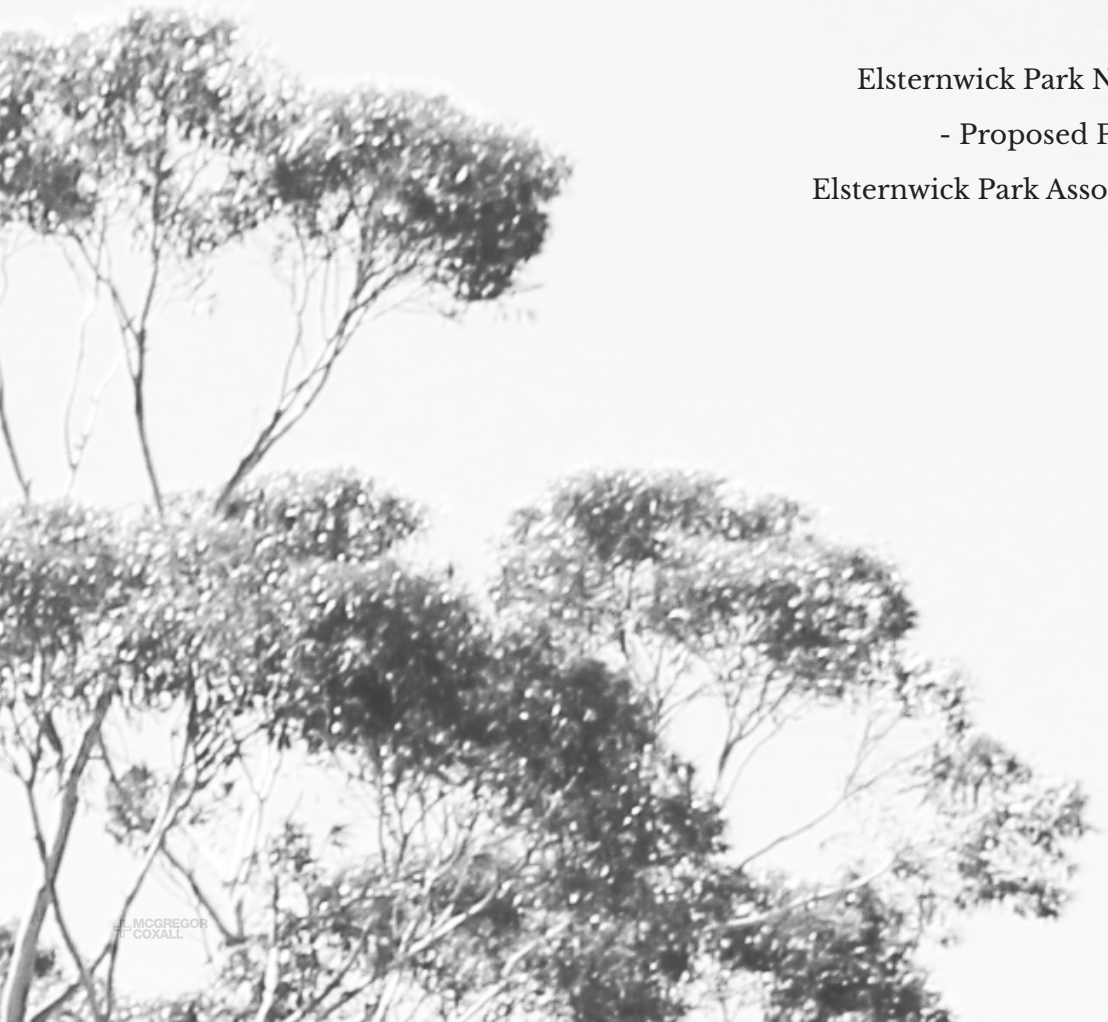
"A beautifully designed and maintained native parkland, wetland and urban forest. A place that echoes the beauty of the land before the invasion of concrete and asphalt. A place that provides refuge and tranquillity for people and wildlife ..."

"This vision is not one of an ordinary suburban park. Rather it is of something stunning, unique and extraordinary."

Elsternwick Park North Park Development

- Proposed Principles and priorities-

Elsternwick Park Association, September 2018



-01-

The Design Response

As curators of the masterplan, our role is to understand the brief and supporting documents such as the Principles and Priorities document prepared by the Elsternwick Park Association, Council Strategies and stakeholder strategies such as Melbourne Water's Healthy Waterway Strategy, understand the site at a macro and micro scale, its constraints and opportunities – then the challenge is to find a design that balances these shaping factors, and at times conflicting interests, in an cohesive way.

Prior to McGregor Coxall's engagement, an extensive amount of work was undertaken by Council and community. This deep and profound work set a very strong environmental agenda – and it is the driving force behind the design.

Key Drivers

In understanding this environmental agenda, the current age of climate crisis, and as custodians of the Reserve, it is our fundamental responsibility to ensure we are making a true contribution to climate action. For this we have identified two key drivers that underpin this masterplan. Ecology and Connection.

Ecology
First and foremost, the Reserve must repair ecologies through the establishment of robust and thriving habitat that celebrates the amazing biodiversity of our natural environment. To repair also means mitigating the impact we have on the natural environment with the cleansing of water, mitigation of floods, and the reuse of water.

Connection
The repair of ecologies will only be sustained and meaningful when the community understands and is engaged. We need to ensure that the Reserve provides spaces for people to enjoy and appreciate the inherent beauty of nature. It also must invoke conversation, questioning and intrigue so that education and appreciation extends beyond the site's boundary, continuing the conversation in people's homes and communities. To change something inside someone so they demand change and betterment of our relationship with ecologies beyond the site's boundaries of the Reserve. For this we must leave a lasting impression on visitors through subtle ways to engage people, hold their attention, give them opportunities to stop, pause, think and question.

The design must leverage off the site's location and urban context, utilising juxtaposition to convey the message and demand reflection over human impacts on the natural world.

Through engagement on varying levels and across the varying landscapes within the Reserve, the site must invoke a Caring for Country philosophy in visitors to inspire stewardship of both the Reserve and of our wider environment for future generations.

-02-

Design Objectives & Strategies

Adjacent are a set of Objectives and supporting Strategies that are used not only to set the design direction for the masterplan but provide a framework for future decision making as the Reserve and design develops.

Under the two key drivers of Ecology and Connection, objectives define what needs to be done to achieve the vision, and the Strategies identify how to achieve these objectives.

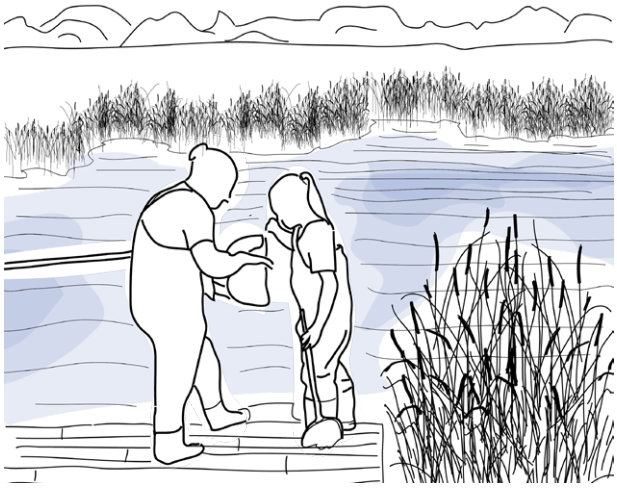
The overall ambition of the design, and challenge, is to balance the objectives in a cohesive way, creating a strong masterplan framework for the Reserve.

Objective 1:

Create a regional destination that fosters community learning and engagement with nature.

Strategies:

- Create opportunities for a broad variety of community groups, ages and backgrounds to participate within the reserve and connect with each other and to nature.
- Provide areas for visitors to occupy, linger and rest.
- Provide changing, dynamic, engaging education through a variety of mediums, both formally and informally.

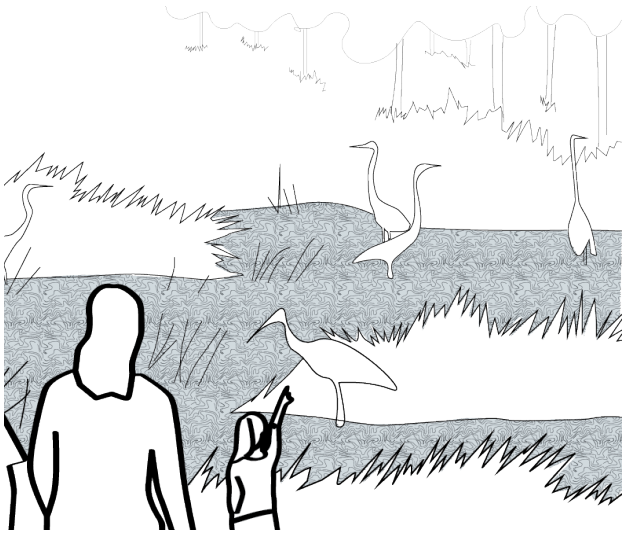


Objective 2:

Create a place that provides safe, abundant and diverse habitat for a range of native wildlife

Strategies:

- Create seven zones of terrestrial and aquatic landscape typologies as habitat for target native flora communities and native fauna species across the site.
- Manage the impact of human related disturbance on habitat through creation of a balanced ratio of no access, moderate access and high access areas in the Reserve.
- Create a conservation island of high value habitat that mitigates major threats such as dogs, foxes, cats.
- Design to allow for park closure at night to reduce risk of predation for nocturnal species.
- Retain existing high value flora as important habitat.

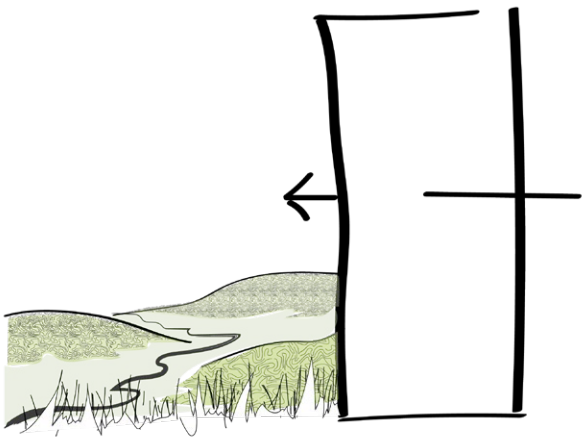


Objective 3:

Create an iconic, memorable place that people want to visit time and time again.

Strategies:

- Create an iconic gateway at the northern corner of the reserve that acts as an invitation for the reserve to the broader community.
- Create memorable transitions into the Reserve that juxtapose the urban landscape with a 'wilder', natural landscape.
- Create a Reserve that showcases the ephemerality and seasonality of nature that develops and changes over time.
- Create opportunities for users to experience varied levels of engagement with the Reserve and nature; from the large and obvious features to the micro and subtle details.
- Include an iconic 'centrepiece' within the reserve that speaks to the celebration and respect of environment and ecology.

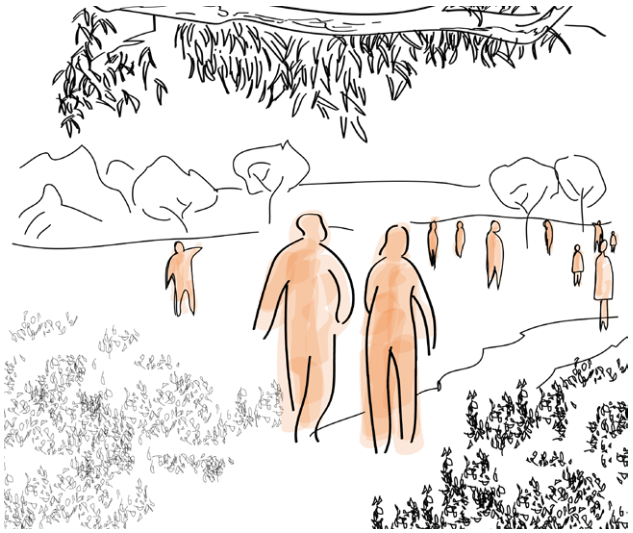


Objective 4:

Create a place for all, that is inviting, safe and inclusive for all community members.

Strategies:

- Create a programme offer that invites a broad range of users.
- Locate key facilities at points that are easily accessible and navigable.
- Create a logical movement system that allows for intuitive navigation and clarity of movement through the site.
- Apply appropriate safety in design principles particularly for primary access pathways.
- Utilise a strong structural framework within which is fine-grain movement and engagement.
- Retain existing high-quality trees for their high amenity value.
- Create clear, direct links to surrounding path networks and key pedestrian destinations.



Objective 5:

Create a place that respects and responds to the history and existing landscape of the site

Strategies:

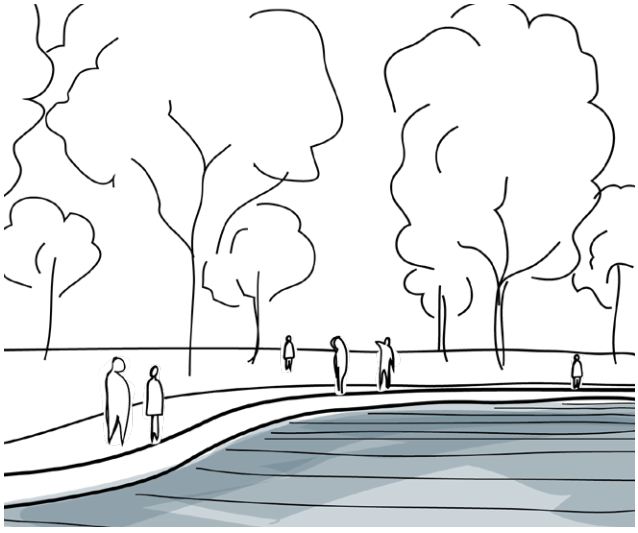
- Respond to all the layers of history of the site, with an emphasis on its time before colonial settlement.
- Respect the Traditional Owners of the land and their past, present and future connection to the site through continuous engagement with Traditional Owners.

Objective 6:

Create a system that maximises water quality and quantity management objectives

Strategies:

- Maximise functional treatment wetland area and diversion of water from Elster Creek within the site.
- Maximise opportunities for regional non-potable re-use opportunities to increase water harvesting, treatment and re-use from Elster Creek.
- Maximise the opportunity to contribute to flood mitigation.
- Combine water quality improvement infrastructure with flood retention basin to maximise function of both systems.



Achieving the vision and objectives:

Create an award-winning design that the community is proud of and is recognised nationally.

-03-

The Masterplan

This masterplan presents an opportunity to truly make Elsternwick Park Nature Reserve a much-loved community and environmental heart. A space that balances the needs of the community while significantly contributing the environmental values of Bayside.

The masterplan has been shaped by the principle design layers of Amenity, Environment, Water Quality Wetlands and Flood Mitigation. These have guided the structure, layout and key design elements for the site.

01. The Gateway
02. Major Entry
03. Secondary Entry
04. The Wetlands
05. The Chain of Ponds
06. The Woodlands
07. Conservation Island
08. The Community Edge
09. The Lookout Knoll
10. The Meeting Place
11. Picnic by the water
12. Bird hide
13. Maintenance Zone


NEPEAN HIGHWAY
GLEN HUNTLY ROAD
ST KILDA STREET
BAYSIDE GATEWAY
13
01
THE CHAIN OF PONDS
05
03
11
12
10
06
WETLANDS NORTH
04
08
NEW STREET
ISLAND CONSERVATION ZONE
09
07
WETLANDS SOUTH
02
BENT AVENUE
ELSTER CREEK
ELSTERNWICK PARK
0
25
50
75
100m

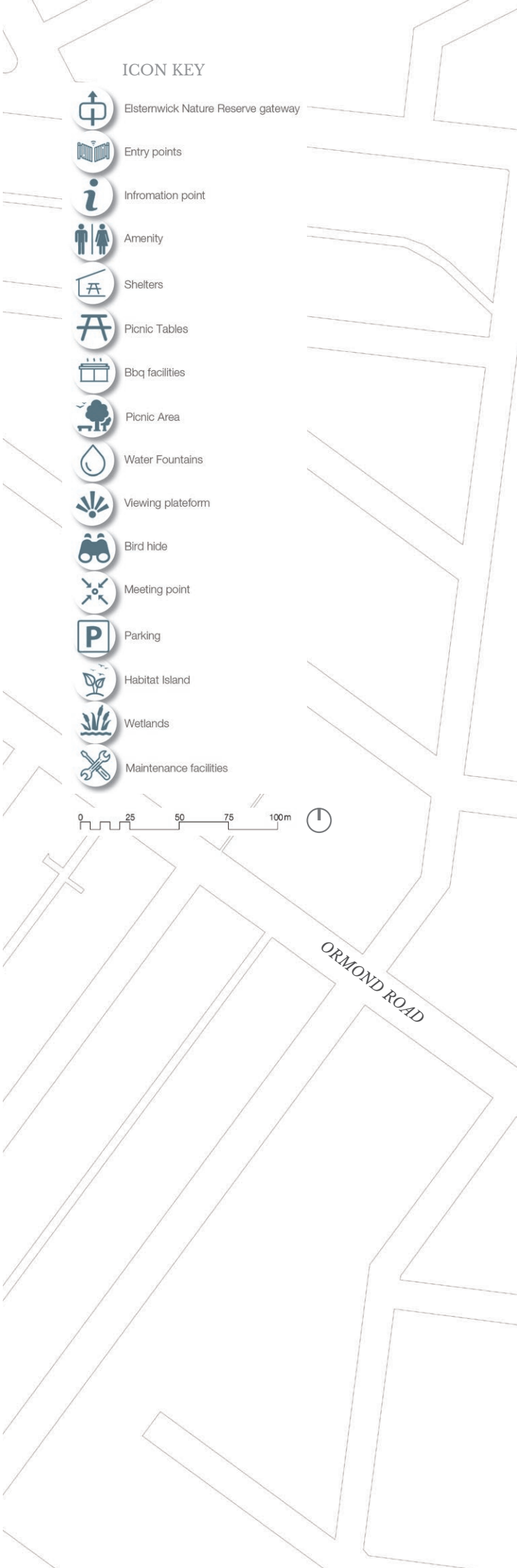
-04-

Journeys & destinations

The Reserve enables the curation of many different journeys and experiences. Catering to a broad cross-section of the community the Reserve provides:

- Different and clearly defined habitat and ecological zones to explore – such as the woody grasslands and the chain of ponds.
- Destination points across the site – such as the lookout knoll and entry gateway.
- Areas to passively observe nature – such as the bird hides.
- Areas to engage at a tactile level with nature – such as the stepping stones down to the water's edge.
- Places for groups to gather – such as the meeting place and mown grasslands.
- Places for solitude and contemplation – such as the boardwalk resting points overlooking the wetlands.

These enable flexibility and adaptability. Visitors are able to curate their visit based on their particular interests and intended length of stay. This includes community members as well as organised groups such as schools, senior citizens, community groups, Council groups and Traditional Owners who could organise talks, walks, performance and other events in the Reserve.




NEPEAN HIGHWAY
GLEN HUNTLY ROAD
ELSTERNWICK PARK NORTH
ST KILDA STREET
NEW STREET
BAYSIDE GATEWAY
Maintenance zone
THE CHAIN OF PONDS
Entry H
Woodlands picnic
picnic by the wetlands
Entry B
Meeting Place
THE GRASSLANDS
Elster Creek
Elster Creek Picnic
Entry G
WETLANDS NORTH
Wetland north sediment pond
The Community Edge
Amenity Block
The Lookout Knoll
ISLAND CONSERVATION ZONE
Wetland south sediment pond
Entry C
WETLANDS SOUTH
THE SCRUBLAND
Elster Creek
Entry F
BENT AVENUE
Entry E
Entry D
ELSTER CREEK
ELSTERNWICK PARK SOUTH

Chapter 3

Principle Design Layers

-01-

Amenity

Movement & Wayfinding

A intelligible path network enables users to intuitively navigate through the Reserve, reducing the need for signage and clutter.

Major entries are sited to collect pedestrians from connecting public transport and active transport routes, and are the bookends of the primary access paths.

Secondary entry points are for local users and provide direct access from other connections of the broader pedestrian, active and public transport network. These entry points provide the bookends for the secondary access paths.

The paths vary in width to define their hierarchy. Predominately a permeable surface, such as granitic sand, is utilised for paths. In areas subject to frequent flooding boardwalks are proposed to minimise maintenance and increase usability.

While formal paths move people through the site, it is the discovery trails, boardwalks and stepping stones that invite users to explore.

No lighting is provided within the Reserve to ensure no artificial light disturbs the fauna.

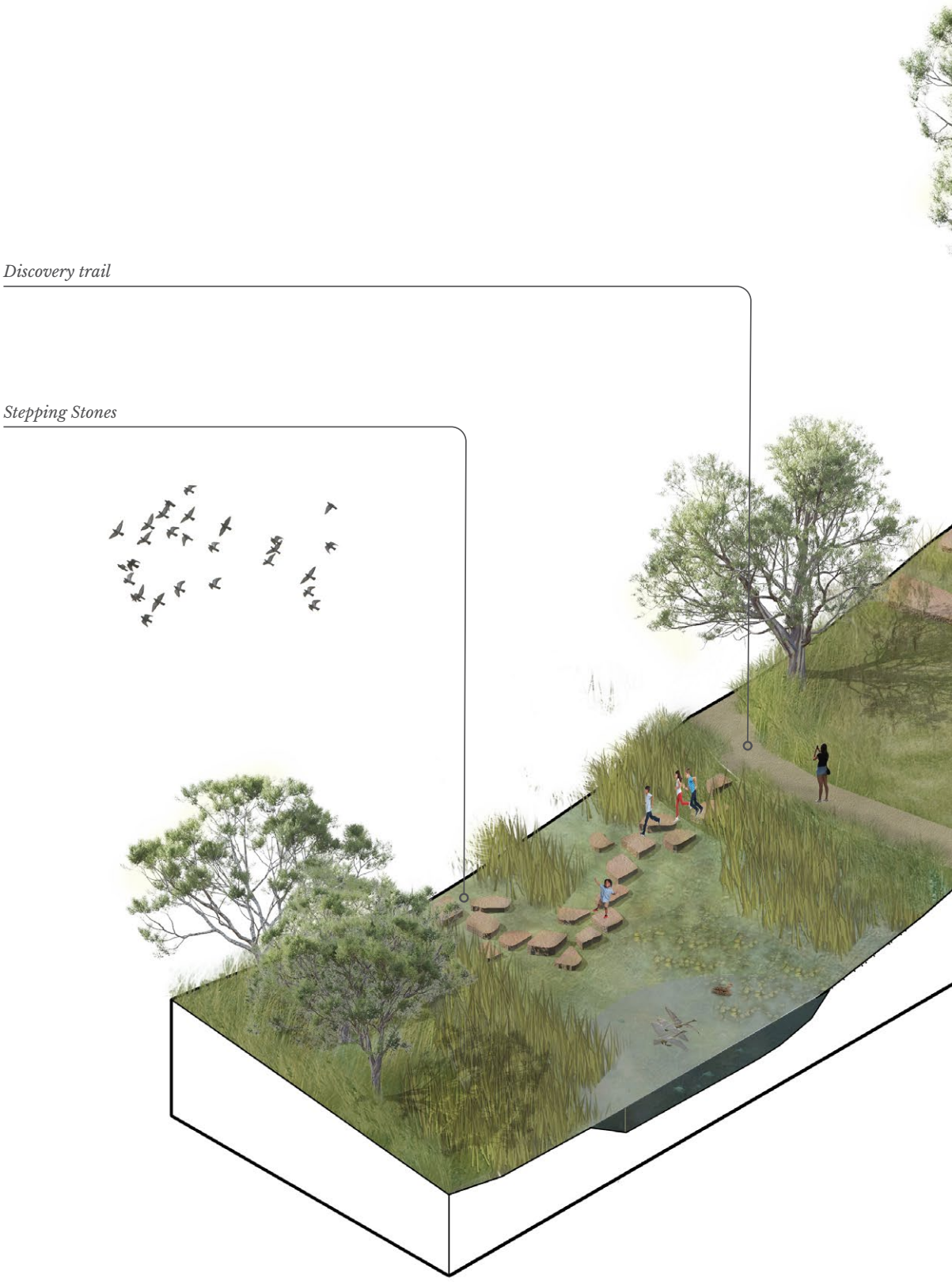
Built structures

An environmental agenda needs to be embedded in all the Reserve to ensure a holistic approach to the site as an environmental landscape.

From the design and construction of the site to the future uses of the Reserve, consideration needs to be given to items such as:

- Re-use site materials such as rock and felled trees for furniture, play elements and habitat.
- Building materials and their embodied energy and lifecycle, with a focus on natural, recyclable, eco-friendly materials.
- Use of permeable paving and/or passive irrigation to mitigate need for stormwater infrastructure and enable water to seep back into ground.
- Sustainable building methodologies.
- The ongoing use of renewable energies and recycled water.
- Potential for use of off-line services such as compostable toilets
- The generation of energy onsite for use onsite.
- Program and community events that must respect and celebrate the natural and cultural values onsite.


Legend
Primary entry
Secondary entry
Community Edge [Varies 5-10m zone]
Primary movement [5m zone]
Secondary movement - Discovery Trail [1.2m wide]
Secondary movement - Ephemeral mown paths
Secondary movement - Stepping stones
Habitat Island
Bridges
Observation platform
Bird hide
Meeting place
Off road shared user path
On road cycle route
Train station
Train line
Bus stop
Bus route
Tram stop
Tram route
0
25
50
75
100m
ISLAND
CONSERVATION
ZONE



Cross-section of access typologies


Primary movement - all-access path
Discovery trail

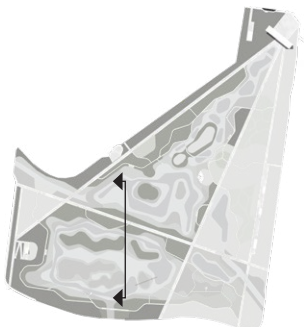
Access & conservation

As a nature Reserve there needs to be a balanced approach to access and engagement with the landscape.

While the site must enable people to closely engage with ecologies, it also needs to ensure it is a safe, attractive space for targeted species to inhabit. To achieve this, conservation is seen as the being at the heart of the site, centred around Elster Creek and the wetland, with Reserve infrastructure and greater activity and accessibility found closer to the perimeter.

Access, movement and active engagement is controlled through the Reserve through movement systems and environmental features such as thick, tall understory and open water, to create a hierarchy of conservation in the Reserve.

This ensures that while there are areas for visitors to actively engage in the parts of the Reserve, other areas are inaccessible to ensure their conservation, and in turn environmental value, is high. The highest area of conservation is an inaccessible island in the southern wetlands.




Legend
Highest conservation area
Conservation island
Conservation from distance
Conservation buffer
Passive open space
Active space
Lowest conservation area
0
25
50
75
100m
Inaccessible conservation island

-02-

Environment

Creating a thriving and diverse environment at Elsternwick Park Nature Reserve is a foundational part of this Masterplan. Extensive site investigations have been undertaken at the Reserve over the years which have brought to light the substantial existing ecological value of the site and its even greater environmental potential. These studies, compiled by community, council and specialist consultants have provided the strategic framework and approach to the environmental design of the Masterplan. Reports of particular note include:

- Elsternwick Park Nature Reserve – Habitat and Flora Strategy (Arcadis, 2019) and;
- Elsternwick Park North Nature Reserve DRAFT Fauna Report (Port Philip EcoCentre Inc. 2019)

Fauna and Flora

Seven Habitat Zones

In order to attract and accommodate the targeted fauna to Elsternwick Park Nature Reserve, seven habitat zones have been proposed (Arcadis, 2019) (explained in more detail below). These seven habitat zones have been adapted into the Masterplan with careful consideration as to the total area of the zones, and their positioning in relation to frequency of inundation and relationship to adjacent habitats. The seven zones can broadly be defined as aquatic or terrestrial habitats; with aquatic habitats being positioned in low lying areas of the Reserve that will be permanently or intermittently inundated, and terrestrial habitats that are situated at the fringes or outside of the flood impacted areas. The general arrangement of these distinct habitats for the masterplan is shown on the opposite page and explained in more detail on the following pages.

Target Fauna

Previous baselines ecological surveys at Elsternwick Reserve have identified 45 target and icon fauna species known or likely to occur within the Reserve or which have potential to occur in the Reserve should appropriate habitat be created. The full list of target species and their preferred food and breeding habitat and conditions are documented in the Habitat and Flora Strategy: Appendix A report (Arcadis, 2019). Based on the recommendations provided in the aforementioned report, this Masterplan proposes the following key fauna habitat creation strategies:

- Retention of existing native and mature trees;
- Provision of extensive and diverse planting mix including specific vegetation types for target species ;
- Inclusion of habitat elements such as logs, rocks, boulders, species specific nesting boxes; and
- Creation of diverse wetland habitats through varied water depths and bank gradients to encourage rich foraging, refuge and breeding habitat for aquatic species.

Planting Palette

A comprehensive planting palette has been designed for Elsternwick Park Nature Reserve for each of the seven habitat zones that provides a heterogeneous flora structure that is also nuanced and tailored to attract and accommodate target fauna. In addition, the planting palette considers the extensive opportunity for integration of indigenous, culturally significant flora that add depth to the opportunities for cultural storytelling about the site and greater region. The planting palette is provided in the Habitat and Flora Strategy: Appendix B report (Arcadis, 2019).


Legend
Aquatic [5.4ha]
Open Water [1.1ha]
Shallow Wetlands [1.4ha]
Tall Marsh [1.6ha]
Swamp Scrub [1.3ha]
Terrestrial [6.7ha]
Damp sands herb-rich woodland low density [1.5ha]
Damp sands herb-rich woodland high density [1.9ha]
Grassy Woodland – open grassy understorey [1ha]
Grassy Woodland – interconnected dense shrub understorey [1.1ha]
Grassland & lawn - Damp [0.6ha]
Grassland & lawn - Dry [0.6ha]
0
25
50
75
100m

Aquatic Habitats

Open Water

Large expanses of open water with varying depths and with sparse emergent vegetation, this environment provides foraging and breeding habitat for numerous waterbirds, fish, reptiles, turtles, invertebrates and bats and accounts for approximately 20% of the wetland area. Open water bodies have been designed with long lengths to accommodate take of and landing of larger birds such as pelicans. While greater depths would be desirable, due to the low topography of the site, it is not feasible to achieve water depths of >1m (assuming the current flood retention strategy). In order to deter emergent vegetation growth, open water bodies should generally range between approximately 0.5-1m depths.

Tall Marsh

Tall marsh habitat is proposed around the fringes of open water and islands and can be expected to self-establish where the water depth is <0.5m. This habitat is dominated by Tall Spike-rush, Cumbungi and Common Reed. Tall marsh habitat is important refuge, foraging and nesting habitat for a range of waterbirds, frogs and reptiles however the extent of possible habitat for tall marsh species should be limited through water depths and site management as they have a tendency to become over dominant. Tall marsh accounts for approximately 30-40% of the wetland area.

Shallow Wetland

Shallow wetlands comprise marshy, semi-ephemeral environments between 0-0.4m depth with shallow gradients and dense sedges, rushes and herbs. This environment provides very valuable foraging habitat as well as potential refuge and breeding habitat for waterbirds, frogs, skinks and rakali. The proposed shallow wetland area accounts for approximately 30-40% of the water quality treatment wetland area and is proposed as approximately 50% of the chain of ponds aquatic habitat.

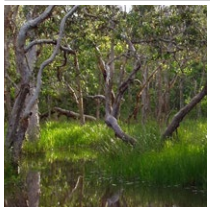
Swamp Scrub

Swamp Scrub habitat is transitional habitat between aquatic and terrestrial environments. It is characterised by tall scrub that is dominated by *Melaleuca ericifolia* with wetland species dominating the undergrowth. This habitat thrives in soils that are intermittently inundated. This habitat has been placed within the flood extent generally fringing the main wetland bodies. Swamp Scrub provides foraging habitat for a range of insects and insectivorous birds and some significant water birds such as the Nankeen Night Heron, as well as a number of small reptiles. The Swamp Scrub habitat can become invasive and is prone to out-competing shallow wetland habitats. The Swamp Scrub habitat has been limited to approximately 20% of the wetland area and is generally buffered from the shallow wetland habitat with tall marsh which are also vigorous and competitive habitats.

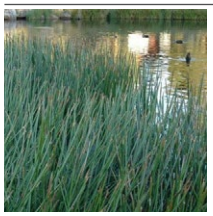
Transitional habitat

Shallow wetland

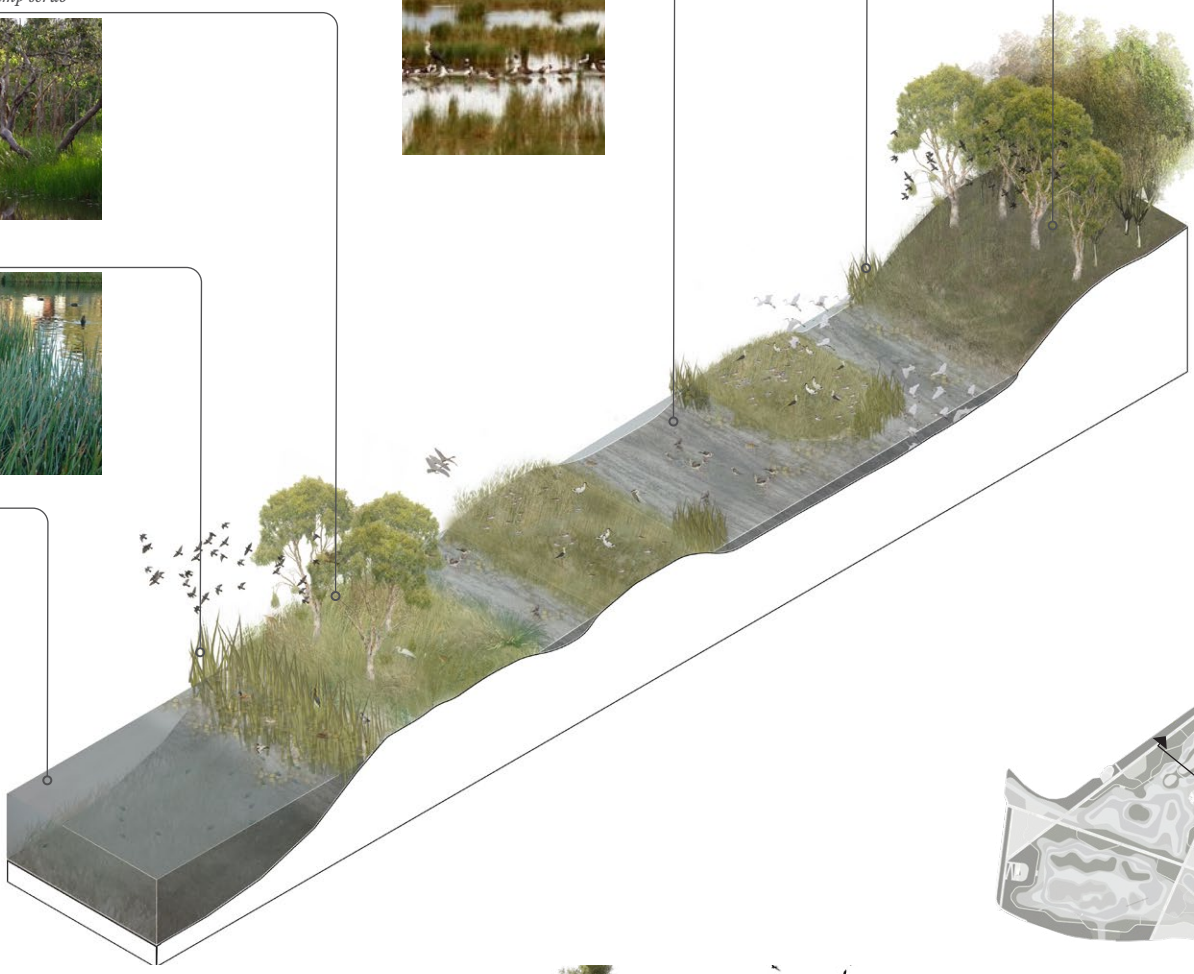
ISLAND Swamp scrub

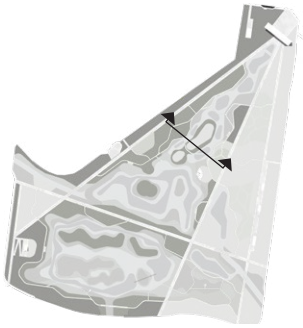


Tall marsh



Open Water



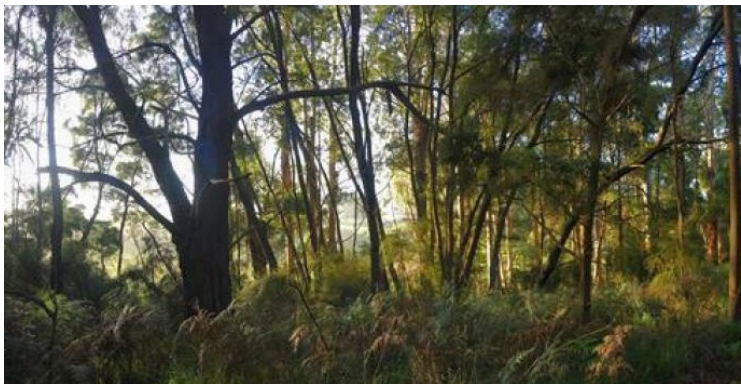


Typical aquatic vegetation typology characteristics.

Terrestrial Habitats

Damp Sands Herb-Rich Woodland

The Damp Sands Herb-Rich Woodland is lowland terrestrial woodland that tolerates damp soils and infrequent inundation. The habitat is characterised by Manna Gum tree canopy with a well-structured middle and lower story of shrubs, grasses and graminoids. These woodlands provide important and heterogeneous foraging and refuge habitat for a range of bird species, in particular small birds that can take refuge in the dense shrubs) and small reptiles. This transitional habitat is generally situated between grasslands upslope and marsh/wetland habitats downslope around the edges of the flood extent boundary and covers approximately 50% of the terrestrial environment on the site.



Herb-rich woodlands

Grassy Woodland

The Grassy Woodland is a terrestrial habitat dominated by River Red Gum canopy over an open grasslands understorey with clustered shrubs. These woodlands provide important foraging, nesting, breeding and roosting habitat for a wide range of woodland birds as well as insects, butterflies, moths and small reptiles. This habitat occupies approximately 25% of the terrestrial environment and has been located along the eastern portion of the Reserve, that is outside of the flood footprint.

Grassy Woodland - open grassy understorey

Grassy Woodland - interconnected dense shrub understorey

Grassland and Lawn

Creating Grasslands and Lawn habitat is an important opportunity to recreate the EVC critically endangered Natural Damp Grasslands of the Victorian Coastal Plains (NDGVCP). These open grasslands occupy approximately 25% of the terrestrial environment and island habitat within the wetlands. The habitat has very limited canopy to provide foraging habitat for numerous bird species including many insectivorous ground foraging birds. The Grasslands and Lawn environments have been subdivided into dry and damp grassland areas, which are guided by the proposed site topography. Damp grassland areas have been included to provide opportunity to recreate the endangered NDGVCP.

All habitat zones will utilise any felled trees on site to enhance habitats.

Masked Lapwig [grasslands]

Novel Habitat - Nesting box.

Managing Key Biodiversity Threats

Human Disturbance

Issue: The presence of humans can be a significant disturbance to sensitive fauna species that perceive us as a potential threat. In order to create quality habitats, it is important to create refuge environments that have controlled or limited access for public Reserve users.

Strategy Response: The Masterplan has been structured to provide:

- Approximately one third of the site that excludes humans (except for maintenance) through presence of waterbodies or fencing;
- Approximately one third of the site that allows for moderate or potential human access, and
- Approximately one third of the site that provides designated human access areas.

Domestic Dogs

Issue: Domestic dogs, when off-leash, are a common urban threat to native fauna, in particular aquatic birds. They cannot only affect the bird breeding and foraging behaviour but can also kill them.

Strategy Response: It is proposed that the whole of Elsternwick Park Nature Reserve becomes a formally dog-on-leash area. This should be continuously monitored and the public engaged and educated about the key benefits of creating a dog-on-leash only reserve.

Introduced Pest Species

Issue: Key introduced pest species at the Reserve include foxes, cats and mosquito fish. Foxes and cats are predators to the majority of species that inhabit the Reserve and are notoriously difficult to manage. Mosquito fish are present in abundance and are understood to arrive via Elster Creek making them effectively impossible to exclude from Reserve. These fish prey on native frog tadpoles and can also have a negative impact on water quality and native fish populations.

Strategy Response: While it is not possible to completely exclude these pest species from the Reserve, the Masterplan proposes the use deep water bodies and a portion of fencing surrounding the conservation island to provide a refuge habitat for aquatic bird species that are most vulnerable larger threats.

To encourage the development of native frog populations at the Reserve, it is proposed to create a Chain of Ponds environment that is disconnected from the water bodies where mosquito fish are present through maintaining controlled inlets and outlets to the Chain of Ponds and by maintaining them above the proposed flooding footprint.

Over Abundance Native Species

Issue: Over abundant native species can out compete other native species or in the case of fauna, harass and chase away native species, all of which can significantly diminish biodiversity.

Strategic Response: The Masterplan proposes strategic planting locations for some notoriously robust species and communities for example limiting Melaleuca dominated Swamp Scrub environments to islands and creating undulating water depths within the wetland to contain the spread of reed species such as Common Reed and Cumbungi.

To manage the impact of over abundant native fauna species such as noisy minors and possums, the Masterplan proposes inclusion of dense grassy tussock and mid-storey shrub planting and specifically design habitat boxes for that are not large enough for possums, and provision of habitat that encourages possum predators such as the Powerful Owl.

Note that in addition to the Masterplan design proposals, ongoing pest management strategies will need to be designed and budgeted for to ensure that key threats are monitored and managed into the future.

Key Biodiversity Threats - Noisy Miner

Key Biodiversity Threats - Fox preying

Key Biodiversity Threats - Domestic dogs off-lead

-03-

Water Quality Wetlands

Elster Creek carries urban stormwater and large volumes of common pollutants from a 3,200 ha urban catchment that discharge into Port Philip Bay which has negative impacts on the sensitive estuarine ecologies as well as the recreational value of the Bay.

This masterplan proposes a total wetland/ aquatic habitat area of 5.4ha, situated along the western portion of the site. A large percentage of the total wetland area has been specifically designed to treat baseflow and stormwater that enters the site from Elster Creek and to provide a storage water body to circulate water through the chain of ponds environment and to be harvested for regional non-potable water reuse.

In order to accommodate the multiple hydrological and water related objectives of the project, the wetland is situated within the flood retention basin footprint creating a special, ecologically focussed sunken landscape that is largely inaccessible to the public.

The wetland has been designed as two hydrologically discrete systems in order to minimise interference with the existing WAG pipeline that transects the site along Elster Creek and to improve maintenance control of the system. Water enters the system site at New St in the east before splitting into two shallow surface swales that drain to sediment inlet basins. A significant portion of the larger sediment grains will be deposited in these basins before entering the main treatment area.

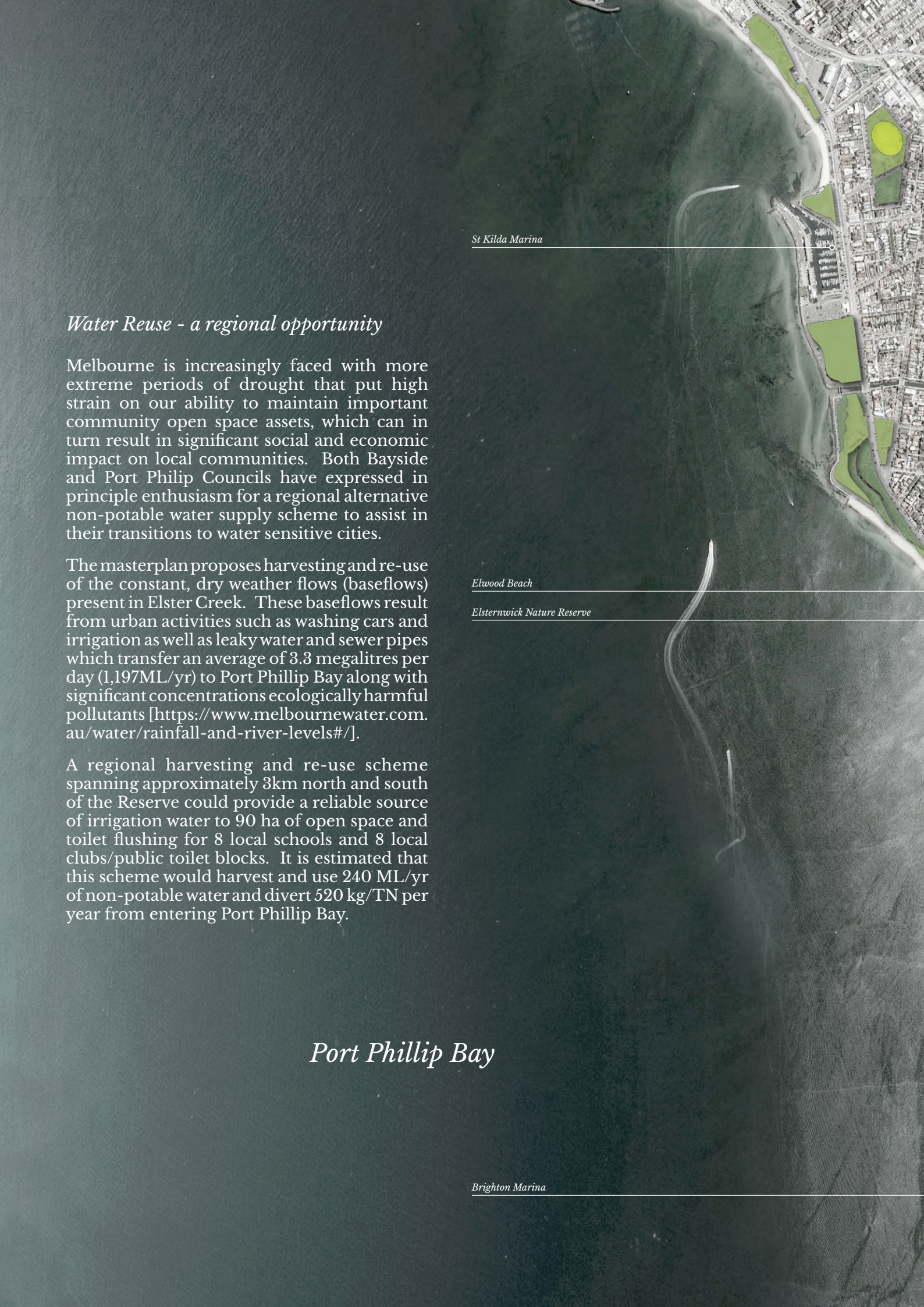
The internal layout of the treatment wetland has been carefully configured to maximise water quality improvement performance and provide a diversity of habitat zones for aquatic flora and fauna including refuge islands situated around existing trees to be retained, ephemeral bunds, shallow macrophyte areas and deep-water pools.

The northern wetland is proposed to drain to Elster Creek, and the southern wetland is proposed to drain to the existing flood diversion culverts. Note that levels and inlet/outlet configurations included in this masterplan are nominal and will be dependent on the flood retention works pathway and major site constraints including the WAG pipeline through the Reserve and Gas transmission line along Bent Avenue.

The proposed water quality treatment wetlands, inclusive of the harvesting and re-use scheme will have the potential to remove approximately 1,620 kg of Total Nitrogen (TN) per year from entering Port Phillip Bay. In line with Melbourne Water's Stormwater Offsets Program, which assigns a dollar value to annual kilograms of nitrogen removed, the proposed water quality treatment wetland and regional re-use scheme would therefore have a dollar value of approximately $10.8 million.

Further details regarding the water quality modelling of the treatment wetland and regional re-use scheme are included in Appendix A.


Legend
Primary treatment ponds
Chain of Ponds
Sediment ponds
Open water
Aquatic Vegetation
Ephemeral zones
Water flow path
High Flow diversion
Infrustrusture weir
Water diversion point
Chain of ponds water flow path
Water pumping
Head St Diversion
min SL - minimum surface level
ave SL - average surface level
ed - extended detension level
nwl - nominal wetland water level
Il - Pipe/pit invert level
0 25 50 75 100m
Wetland North
min SL ~ 0.0m
ave SL ~ 0.7m
ed = 1.2m
nwl = 1.0m
Wetland outlet structure
SL ~ 1.2m
GL ~ 1.3m
Il ~ 0.9m
Chain of ponds treatment train
Wetland outlet pipe
Il ~ 0.9m
Sediment Basins
Nominal area ~ 1000m2 each
Wetland South
min SL ~ 0.0m
ave SL ~ 0.7m
ed = 1.2m
nwl = 1.0m
Wetland outlet structure gate
SL ~ 1.2m
GL ~ 1.3m
Il ~ 0.7m
Wetland inlet flows split to avoid dead zones and short circuiting.
0 25 50 75 100m



Water Reuse - a regional opportunity

Melbourne is increasingly faced with more extreme periods of drought that put high strain on our ability to maintain important community open space assets, which can in turn result in significant social and economic impact on local communities. Both Bayside and Port Philip Councils have expressed in principle enthusiasm for a regional alternative non-potable water supply scheme to assist in their transitions to water sensitive cities.

The masterplan proposes harvesting and re-use of the constant, dry weather flows (baseflows) present in Elster Creek. These baseflows result from urban activities such as washing cars and irrigation as well as leaky water and sewer pipes which transfer an average of 3.3 megalitres per day (1,197ML/yr) to Port Phillip Bay along with significant concentrations ecologically harmful pollutants [https://www.melbournewater.com.au/water/rainfall-and-river-levels#/].

A regional harvesting and re-use scheme spanning approximately 3km north and south of the Reserve could provide a reliable source of irrigation water to 90 ha of open space and toilet flushing for 8 local schools and 8 local clubs/public toilet blocks. It is estimated that this scheme would harvest and use 240 ML/yr of non-potable water and divert 520 kg/TN per year from entering Port Phillip Bay.


Passive open space
Active open space
Vegetated open space
Schools
Bayside LGA

-04-

Flood Mitigation

The Masterplan responds to local concerns over flooding downstream of Elsternwick Nature Reserve. While the Reserve does currently function as a flood retention basin, downstream flooding issues persist and consequently Melbourne Water are investigating additional flood mitigation options. Preliminary modelling of scenarios to increase flood retention volume in the Reserve were undertaken by GHD (2019). These studies suggested that additional flood retention volume in the order of 50,000-60,000 m3 should be accommodated for in this Masterplan to provide for this potential flood mitigation pathway.

The flood retention design for the Masterplan achieves a nominal additional flood storage capacity of 50,000 m3 and is shown on the following page. The design of this footprint was driven by the following key site constraints and design considerations:

Location of mature and quality existing trees
The existing native and indigenous trees are an important element of the site's existing character and due to their size and maturity, will be important habitat and amenity features of the Reserve before new trees proposed in this Masterplan grow to mature height. All effort was made to retain mature trees, and those that are proposed for removal are Cypress and other exotic species with little ecological value and/or trees with less than 5 years functional life left.

Westernport-Altona-Geelong (WAG) Oil Pipeline
There is a 600mm diameter regional oil pipeline that traverses the site on the south side of Elster Creek. This pipeline provides a significant site constraint as permissible works within the 3m clearance boundaries of the pipeline are extremely limited. The retention basin has therefore been divided into two basins north and south of the pipeline with separate outlet configurations.

Requirement for retention basin to drain by gravity
The depth and therefore holding capacity of the retention basins was limited by downstream levels as the retention basin is required by Council and Melbourne Water to drain by gravity. Therefore, the base of the retention basin has been limited at 1.2 m AHD, below which proposed excavation is for the water quality treatment wetland (that does not drain by gravity). The Masterplan proposes that the northern basin drains by gravity down Elster Creek, and the southern basin drains by gravity to Elsternwick Park south of Bent Street and into the existing flood diversion culverts. It is noted that there is a Multinet Gas Network Gas Transmission Pipeline along Bent Avenue which the flood discharge would need to cross. The level of this pipeline is not confirmed and could have a significant impact on the flood retention storage of the southern basin.

While the Masterplan has been designed to accommodate this large retention volume, it is noted that Melbourne Water are also exploring alternative flood mitigation measures outside of the Reserve. The Masterplan has been designed so that if an alternative flood retention strategy is adopted, outside of the Reserve, the Masterplan would still function as described in this report with the wetland depths raised to be relative to existing surface levels.

An offsite flood retention strategy would be of significant benefit to the potential water quality improvement and ecological function of the main wetland as it would allow for a greater extended detention depth (increasing pollutant removal) and deeper open water pools which create improved water circulation and microhabitat diversity. Such a solution may also negate the need for removal and disposal the spoil that is expected to have varying levels of contamination.


Legend
Existing Tree Retained
Exotic trees. Removed for flood mitigation
Exotic trees. Removed over time
<5yrs useful life expectency - Removed for flood mitigation
Flood mitigation excavation extent
WAG oil line
0
25
50
75
100m
+3.25m ~ Existing level
+2.50m ~ Proposed flood excavation level
+2.25m ~ Existing level
+0.20m ~ Proposed flood excavation level
+3.00m ~ Existing level
+1.20m ~ Proposed flood excavation level
+2.50m ~ Existing level
+0.50m ~ Proposed flood excavation level
Gas Transmission
WAG line
+2.75m ~ Existing level
+1.20m ~ Proposed flood excavation level

-05-

Cultural Expression & Education

There is a need to connect the community to their land and be active members in Caring for Country; to understand the Aboriginal Culture as an integral part of the Australian Culture to provide a unified, shared future vision for Australians.

The Reserve needs to nurture Caring for Country for all and enable cultural expression, and this must happen at a design and a user level. Opportunities for this could include to:

- Provide long-term engagement with Country and culture for community members and visitors through Aboriginal walking tours, welcome & acknowledgement to Country, ceremonies and participation workshops of indigenous culture, artefacts, economics and inventions.
- Develop outdoor 'bush' classrooms for all ages and cultures to share knowledge of Country, environment, history, aboriginal dreaming, spirituality and botany.
- Promote and enable long-term opportunities for public art integration as a form of cultural knowledge sharing and increased awareness of indigenous culture and shared ownership. This could include ephemeral art, historic and future narratives.
- Utilise space for indigenous performance that allows for the sharing of knowledge in arts, dance, voice, workshops, talk and more.
- Provide bushfood throughout the Reserve to explore, learn and discover.
- Explore employment opportunities for local Aboriginals that may arise from the management and maintenance of the Reserve and activities within it.

Cultural and educational walks - community
Birrarung Wilam. Vicki Couzens, Lee Darroch and Treahna Hamm. 2006.

Discovery & intrigue

Caring for country

Generous donations of culturally significant seedlings have been pledged or agreed on for the Reserve. These include seedlings of the 'Ngargee' Tree and 100 seeds from the Separation Tree.

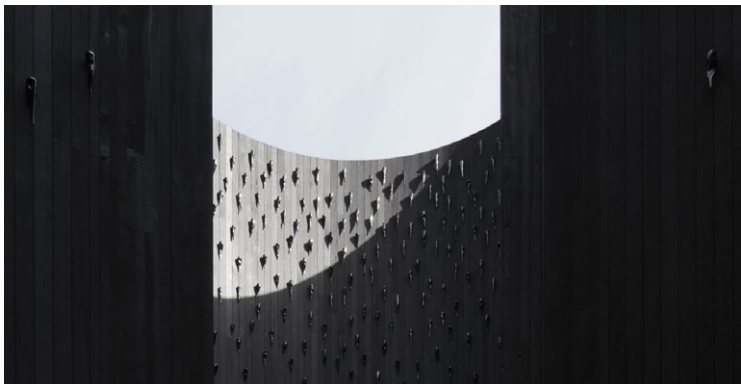
'One of Melbourne's oldest living things is the Boon Wurrung Corroboree Tree, or 'Ngargee' Tree. It is a towering old giant river red gum, thought to be between 300 and 500 years old, and is sacred to the traditional owners. For hundreds of years it has served as a meeting place for the Boon Wurrung people. The Boon Wurrung foundation, through Carolyn Briggs, have consented to seedlings of the culturally important Ngargee Tree being grown for planting in the Reserve. A respectful planting of these trees may be incorporated into a Ngargee Tree meeting place'.[1.]

'The Separation Tree was a heritage listed river red gum, located in the Royal Botanic Gardens and was one of two original river red gums that were along the banks of the swampy billabong'. [1.]

[1. Elsternwick Park North Park Development - Proposed Principles and priorities - Elsternwick Park Association, September 2018]

The curation of the seeds and seedlings within the reserve needs to be undertaken in conjunction with the Boon Wurrung peoples.

Continuous, ongoing engagement with the Boon Wurrung people is crucial to ensure the Reserve is a place that truly expresses its cultural values.



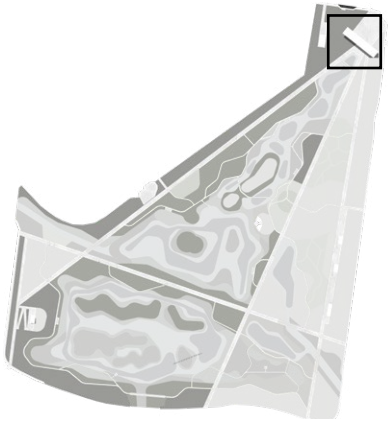
Cultural reinterpretation
In Absence. Yhonnie Scarce & Edition Office. 2019.

Meeting places
Krakani Lumi. Taylor and Hinds Architects. 2018

Small Discoveries
Chevron parkland perth. hassell. 2018.

Chapter 4

Key Design Elements



01 *The Gateway*

The Gateway will be the major symbolic entry into the Reserve, providing a threshold as one moves from the busy urban Nepean Highway to the unique tranquillity of Elsternwick Nature Reserve.

A granitic sand forecourt, with dappled tree shade, provides an apron for an elegant, landmark eco-building providing a framed view of the wetlands.

The building has the opportunity to provide an elevated view – a vantage point where one can view both the Reserve and the Nepean Highway simultaneously, providing a striking juxtaposition. This juxtaposition in itself invokes questioning, and the view to the Reserve ignites excitement for exploration.

The Gateway will be a major meeting, gathering point , particularly for organised groups such as school groups, senior citizen walks, community activities, in close proximity to bus drop off and the tram, train and bus stops on Glen Huntly Road.

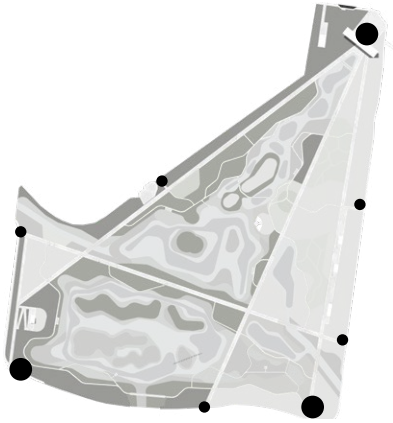
The Gateway can provide information and interpretation to inform people before they enter into the Reserve.

From the gateway the two primary paths that run south and provide key access to the rest of the Reserve.

A framed view and portal in a natural landscape.
Maitland Riverlink. CHROFI, Mcgregor Coxall. 2018

The Major meeting and entry point into the park, the urban forecourt and amenities, quickly dissolve into to the soft natural environment.
Maitland Riverlink. CHROFI, Mcgregor Coxall. 2018

Gateway portal transporting you from the busy urban environment to the tranquil nature reserve beyond, capturing the long vistas over the wetlands.
Maitland Riverlink. CHROFI, Mcgregor Coxall. 2018



⑵⑶ *Major and secondary entries*

As a fully fenced and gated Reserve, major and secondary entries are provided into the Reserve to control access and facilitate movement through the site.

Similar to the gateway, the entries need to provide a sense of arrival and transition into this new world.

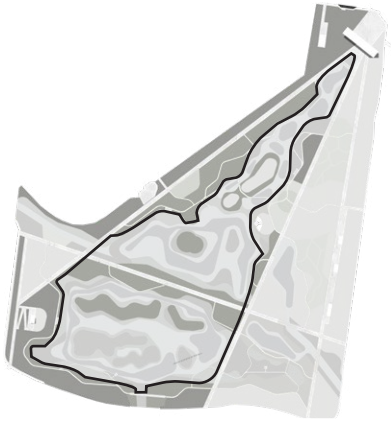
Entry points could include community and place initiatives that provide an exchange beyond the Reserve. For example, they could include seed collection stalls inviting people to take home seeds and propagate them, to return and plant the seedling in the Reserve, or to plant at home and extend the native palette to the backyards of residents.

Each of the entry zones will provide bicycle parking, seating and drinking fountains where appropriate.

Major and secondary entry points celebrating the local area character, suppling structure & amenity for park visitors. Ballast Point Park. Mcgregor Coxall. 2009

Inviting the community to take ownership and engage in the natural environment. Entry points can facilitate programs such as plant & seed swaps/sales.
Addison Rd Community Centre.

Entry points supplying space for the community to come together, share, learn and engage.
Addison Rd Community Centre.



04 *The Wetlands*

Occupying over 40% of the site is a large expanse of wetlands providing tranquillity for users, critical habitat and significant water quality improvements.

From the Reserve gateway, a long vista is provided of the wetlands which extend from the north to the south of the site.

Different path typologies, bridges and water-crossing stepping stones invite visitors to explore the wetlands, with different levels of engagement provided for the intrepid and those less able.

Visitors can explore the varying ecologies that make up the wetlands and provide critical habitat, including ponds free of mosquito fish to allow frog spawning, permanent habitat for bird and fish species as well as migratory species.

Ephemeral zones provide a changing landscape with the climate, mimicking natural processes.

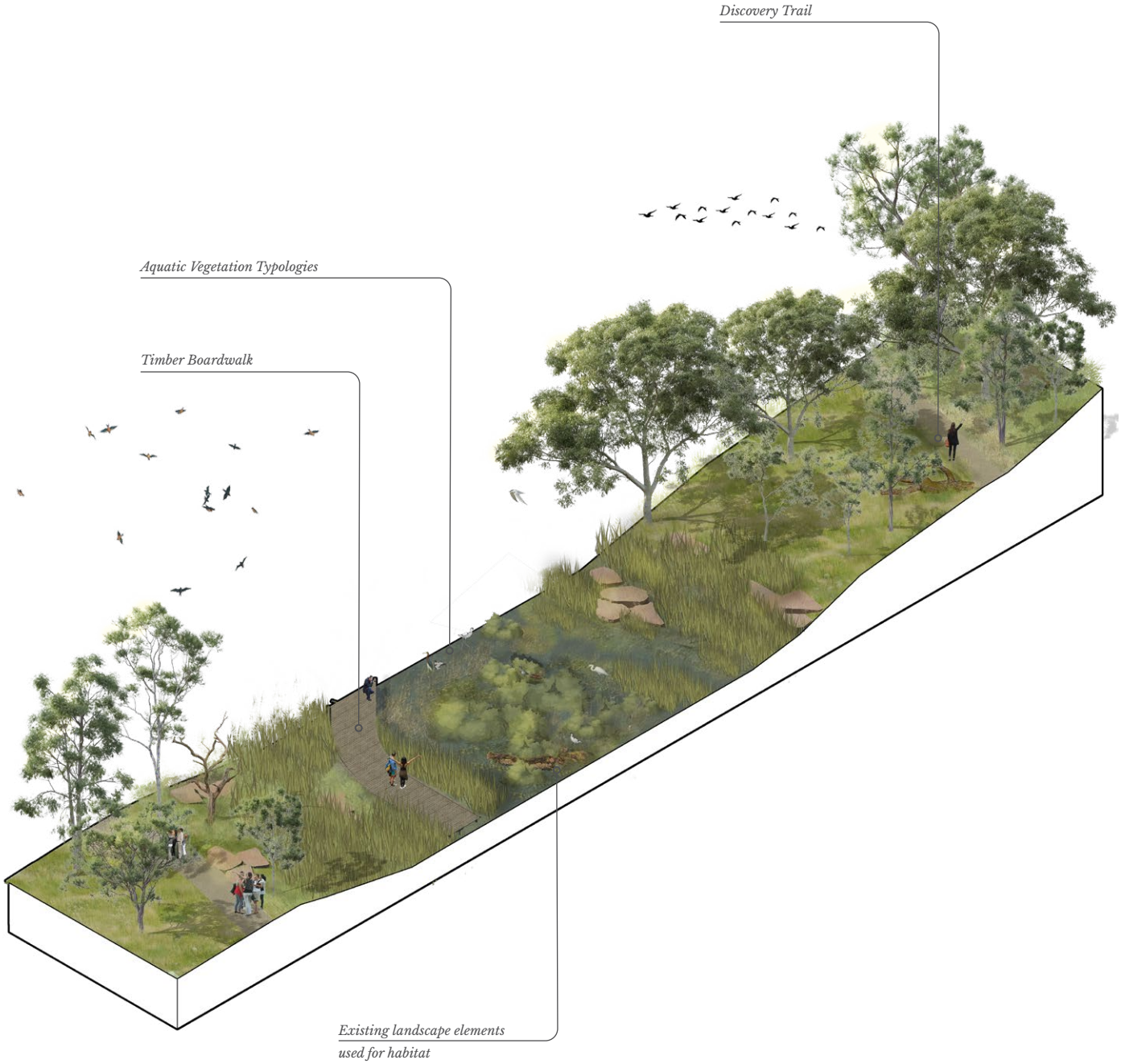
These wetlands also play an important role in water cleansing to significantly improve the water quality of Elster Creek before it is discharged into Port Phillip Bay.

While areas of the wetalnds invite people to engage at an intimate and tactile level, other areas, such as the conservation island, are retained for passive engagement only and the conservation of ecologies and their fauna.

Large expanses of functional wetlands, providing critical habitat is a highly urban environment and improving water quality.
Trin Warren Tam-boore Wetlands. Rush Wright Associates. 2006

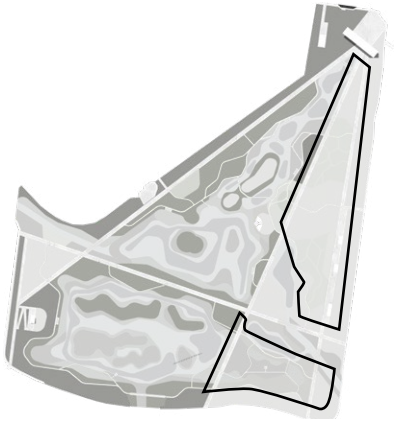
Wetland systems offer a range of engagement, with different path topologies configured around the site enabling visitors to interact with the waters edge or admire from a distance.

Wetlands providing water quality improvements, critical habitat, and public amenity, ensuring balance is provided to provide areas of respite for flora & fauna.
Martin Luther King Park. Atelier Jacqueline Osty. 2014



Typical wetland typology characteristics.

Jumping across the Chain of Ponds wetlands



06 *The Woodlands*

Shimmering grasslands and tall stands of native trees make up the open woodlands of the Reserve. Mown paths, that change to provide new routes and desire lines, provide intrigue and invite visitors to ramble and explore.

Incidental nature play and intimate recluse spots can be found for visitors to discover. These open woodlands provide habitat for bird species as well as important insects such as butterflies and honeybees.

The dense woodlands have thick low and mid understory perfect for small birds.

Celebration of existing vegetation classes (EVC's) found within the local area. The woodlands area an open and accessible zone will broad sightlines and rich ecology and an ever changing environment.
Grassy Woodlands B.

Boardwalks floating above delicate vegetation allowing public engagement with and access to damp zones within the woodlands.
Watercolor. Nelson Byrd Woltz. 2007

Large expanses of grasslands, winding ephemeral mown paths capture the parks rich history and culture.
Elsternwick Nature Reserve. 2019

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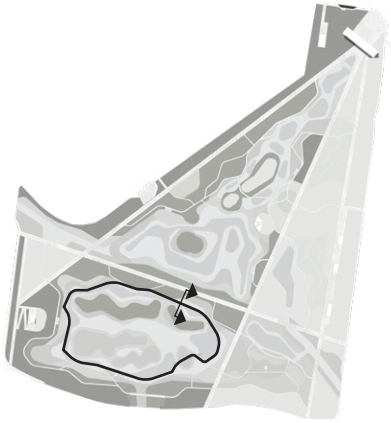
A walk through mown paths of the woody grasslands



07 *Conservation Island*

At the highest level of conservation is the island. This island is surrounded by water and is inaccessible for visitors who will move around the perimeter of the waters, able to observe the abundant wildlife from a distance.

The water provides a natural barrier that mitigates threats such as foxes and cats, providing a conservation sanctuary for targeted species. Within the conservation sanctuary are a wide cross-section of aquatic and terrestrial ecologies.

The water barrier is part of the wetland water cleansing system. Where space allows, a shallow graded wetland edge is used to maximise the ecological and foraging quality of the edge. Where space is limited (due to terrain, retention of high-quality existing trees), the use of a Ha-Ha retaining wall is proposed to gain sufficient depth quickly, this is illustrated in the bottom section on the adjacent page.

Habitat island with urban surrounds

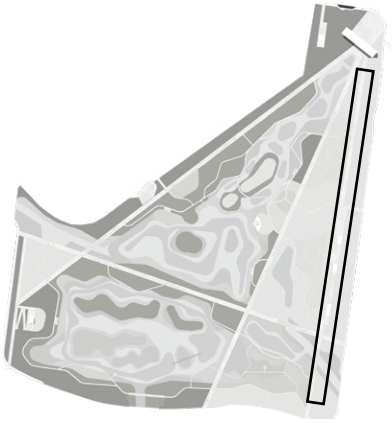
Seaford Wetlands island habitat

Island conservation zones - a habitat sanctuary

Typical Conservation Island typology characteristics.

Conservation Island - cross-section showing narrow water barrier with Ha-Ha walls.

An early morning view to the Conservation Island



08 *The Community Edge*

The Reserve should be inviting a broad range of users, and the active edge provides that invitation to the wider community.

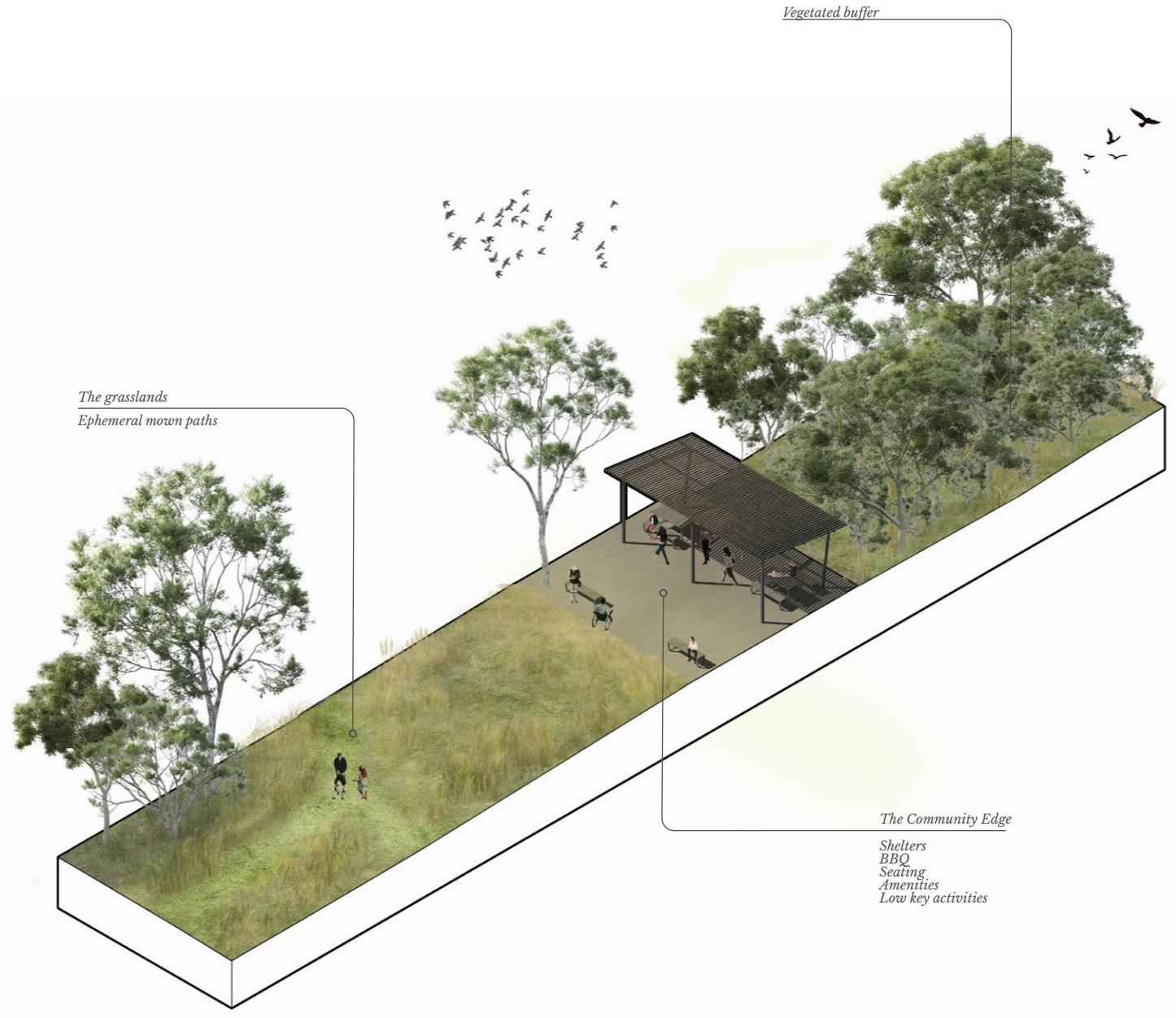
The widest and most accessible path, the Community Edge site on the edge of the 'wilds', and provides a social, community spine. This cater for those less willing, or with less of an appetite to engage with the wilds but welcomes them as a community place for all.

The long 'edge' provides a comfortable space for low-key activities such as chess, boules, with ample seating under dappled light to enable people to relax and view the woodland wilds.

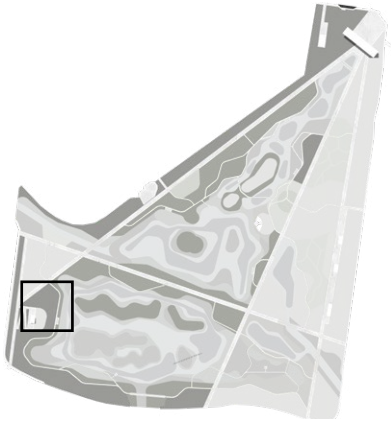
It is also the host of the picnic and barbecue facilities, and southern amenities block.

Generous all access path way, providing amenity and activity for the whole community. The edge supplies low key activity opportunities with stunning views onto the nature reserve.
Lingang Bird Airport. Mcgregor Coxall. 2017

Shelters and amenity buildings paired with bbq, seating, bike hoops, and drinking fountains located along the edge provide for the park users whist keeping higher activity park functions to the outer edge of the reserve.
Lizard Log. Mcgregor Coxall. 2010



Typical community edge typology characteristics.



09 *The Lookout Knoll*

Perched on a hill the Lookout Knoll is a destination for all those who want to view the wetlands at a vantage point. The lookout could be raised structure capitalising on the already high topographic point to gain a captivating view.

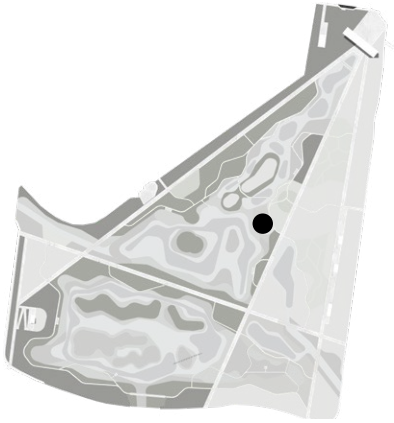
Catering for small and large groups, the zone includes gives the ability to host sustainability programs, picnic shelters, and lawn space.

The lookout knoll could provide a destination point and flexible community space (e.g. for educational programs, sculpture exhibition).

Perched upon the existing elevated knoll sits a breathtaking view over the Nature Reserve.
Valley Lake Lookout. Mcgregor Coxall. 2018.

A destination point, light, unintrusive structure and seating enable visitors to linger.
Paddocks Precinct. Mcgregor Coxall. 2015

A place for small groups and individuals to survey to Nature Reserve, spotting wildlife and learning about the history and culture of the site.
Seaford Wetlands.



⑩ *The Meeting Place*

The Meeting Place is quiet, contemplative area where people can meet, learn and tell stories.

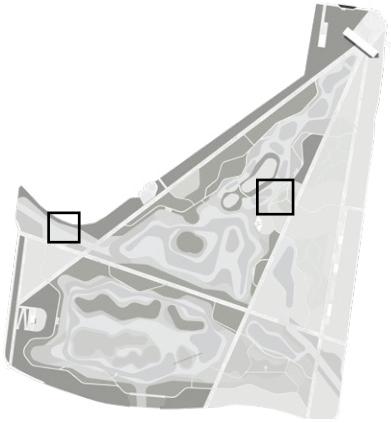
As an amphitheatre leading down to the wetlands, the space provides a cool, tranquil green environment, enclosed by mature trees that looks out over the wetlands.

Located centrally in the Reserve, the space is removed from the urban sounds and replaced with the sounds of running water, birds singing and frogs calling. An ideal place for a 'bush' classroom.

Naturalised amphitheatre providing a place to gather, learn, and share. Wiradjuri Amphitheatre. 2018.

The quiet contemplative area within the reserve, hidden amongst the large native vegetation. Schwäbisch Gmünd. A24 Landschaft. 2014.

Overlooking the wetlands the meeting place offers breathtaking views of the large expanse of wetlands enabling engagement with the wetland edge.



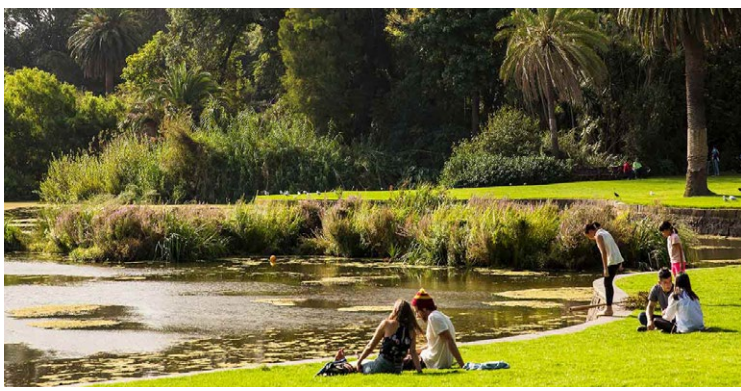
(11) *Picnic by the water*

Two informal picnic areas are found in the Reserve, one down by the wetlands and the other by Elster Creek.

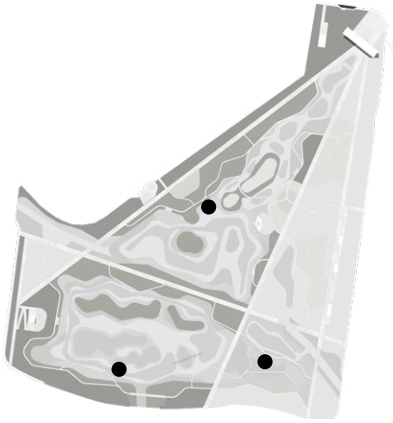
Here the lawn is surrounded by mature trees, and runs down to the water's edge, creating a tranquil environment to read a book, roll out the picnic blanket and rest by the water's edge.

Tranquil waterside lawn areas, nestled in-between large native vegetation. Lizard Log. Mcgregor Coxall. 2010

Light public amenity site naturally within the landscape, facilitating the community to enjoy the environment around them.



Access down to the waters edge provide a tranquil setting for relaxation with a picnic or book.



⑫ *Bird hides*

Three bird hides are found in the Reserve, each providing a different experience to see and spot a range of wildlife.

One bird hide sits within the northern wetland zone enabling visitors to spot aquatic bird species and other timid aquatic species.

The second bird hide sits within a large patch of swamp scrub, enabling visitors to spot the small birds that thrive in this dense scrub.

The third bird hide sits south of the southern wetland zone and provides views into the conservation island - a chance to view both aquatic and terrestrial species.

Experts to advise on precise location and design.

Bird hides nestled amongst the landscape and vegetation providing viewing of the varied native fauna for tourist, twitchers, and researches alike.

Bird hides should use natural materials and dissolve into its surrounding landscape. Kongsfjord wind shelter & bird hide. Biotope architecture. 2015.

A bird hide hidden and obscured in vegetation.

Chapter 4

Supporting Information

-01-

Staging Plan

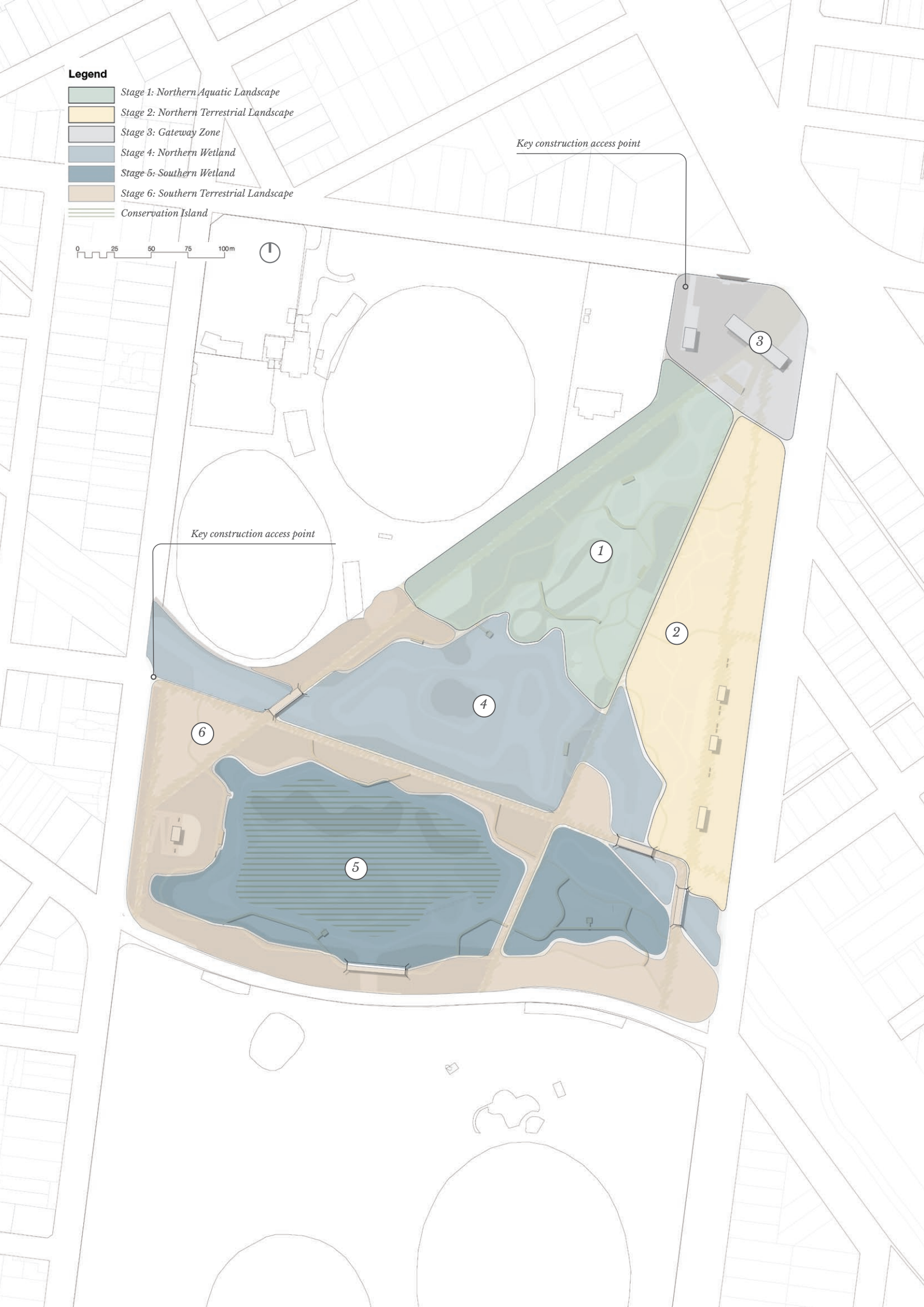
The staging plan is a proposed delivery order for Bayside City Council.

Whilst this plan looks at the construction staging, the design of the Reserve needs to be considered as a whole to ensure a holistic, integrated design.

Key factors and considerations shaping this staging plan is the order of construction from a functionality point of view, the need for construction access, the protection of recently installed planting, the accessibility of stages once open to the public, and potential lengthy design, documentation and approval processes and the need for 'quick wins'.

A major factor that will influence the staging and design will be Melbourne Waters decision to include, or otherwise, addition flood mitigation within the Reserve.

Stage number	**Action description**	**Priority**	**Agency responsible for approval** [excluding services approvals]	**Construction & operational considerations**
1.0	**NORTHERN AQUATIC LANDSCAPE**			
	Chain of Ponds	High	BCC	Temporary pump system into the chain of ponds would need to be installed to direct water from Elster Creek. Entry water pond to be installed with Gateway - considerations on design and temporary measures.
	Revegetation	High	BCC	To be undertaken at the end of hardscape works
	Picnic by the Wetlands	High	BCC	
	Boardwalks and access paths	High	BCC	Footings of boardwalks and construction methodologies and programme need to be considered.
	North eastern secondary entries [2 x entries]	Low	BCC	
	Western Primary Path [northern extent only]	Low	BCC	Consider future construction access impacts


Legend
Stage 1: Northern Aquatic Landscape
Stage 2: Northern Terrestrial Landscape
Stage 3: Gateway Zone
Stage 4: Northern Wetland
Stage 5: Southern Wetland
Stage 6: Southern Terrestrial Landscape
Conservation Island
0
25
50
75
100m
Key construction access point
Key construction access point
1
2
3
4
5
6

Stage number	Action description	Priority	Agency responsible for approval [excluding services approvals]	Construction & operational considerations
2.0	**NORTHERN TERRESTRIAL LANDSCAPE**			
	Vegetation upgrades	High	BCC	
	Central north-south secondary path [northern section only]	Low	BCC	Consider future construction access impacts
	The Community Edge [northern portion]	Medium	BCC	Consider future construction access impacts
	Secondary discovery paths	Low	BCC	
	Nature play elements	Medium	BCC	
	Western secondary entries [2 x entries]	High	BCC	
3.0	**GATEWAY ZONE**			
	The Gateway building and forecourt	Medium	BCC	Note design, documentation and construction process should be considered and aligned with stage 1 and 2.
	Maintenance zone	Low	BCC	
	Vegetation upgrades	Medium	BCC	
4.0	**NORTHERN WETLAND**			
	Northern Wetland System	High	BCC Melbourne Water	All works for the northern wetland system is within the Reserve. Northern and southern wetlands are separate systems so can be staged. For economy of scale and reduced disturbance time, if feasible, it is recommended that the northern and southern wetlands are designed and constructed concurrently.
	Water Harvesting System	Medium	BCC Melbourne Water	Costing includes the setup of the system within the Reserve. Connections to BCC sites will be subject to additional City of Port Philip funding. Connections to site outside BCC will be subject to City of Port Philip funding. Water harvesting system can be retrofitted if funding streams are not aligned however the benefit of at least installing pumps/irrigation lines/water quality treatment (UV and filter) infrastructure within the Elsternwick Reserve Boundaries are that you do it while the earth is turned. Pipe laying that effects the Reserve needs to be considered.
	The Meeting Place	High	BCC	
	The Aquatic Bird Hide	Medium	BCC	

Stage number	Action description	Priority	Agency responsible for approval [excluding services approvals]	Construction & operational considerations
5.0	**SOUTHERN WETLAND**			
	Southern Wetland System	High	BCC Melbourne Water	Works would extend to flood culverts or alternatively it would require reconfiguration of southern park (such as lowering of normal water level). alternatively reconfiguration of southern park pond and lowering of normal water level.
	The Aquatic Bird Hide	Medium	BCC	
6.0	**SOUTHERN TERRESTRIAL LANDSCAPE**			
	The Lookout Knoll	Low	BCC	
	The Woodlands South	Medium	BCC	
	Revegetation	High	BCC	
	The Community Edge [southern portion]	High	BCC Melbourne Water	Bridges requiring Melbourne Water approval High priority for connectivity
	Western north-south primary path [southern section only]	High	BCC Melbourne Water	Bridges requiring Melbourne Water approval High priority for connectivity
	Central north-south secondary path [southern section only]	Low	BCC Melbourne Water	Bridges requiring Melbourne Water approval
	East-west central secondary path	Low	BCC Melbourne Water	Bridges requiring Melbourne Water approval
	Southern Major entries [2 x entries]	High	BCC	High priority for connectivity
	Southern secondary entry	Low	BCC	
	Western secondary entry	High	BCC	
	Picnic area by Elster Creek	Medium	BCC	
	The Terrestrial Bird Hide	Low	BCC	

-02-

Key Reference Documents

- GHD - Contaminated Land Assessment Report (2019).
- GHD - Flood Mitigation Concept Design Report (2019).
- EPN-Additional Flood Mitigation-RA Options
- EPN - Draft Fauna Report (2019).
- Arcadis - Elsternwick Park Habitat and Flora Strategy (2019).
- Alluvium - Water quality & recycling improvement options assessment (2019).
- Elsternwick Park Association - Priorities + Principles (2018).
- EPNR - Consultation Summary.
- Bayside - Open Space Strategy (2012) .
- Melbourne Water - Healthy Waterways Strategy (2018)
- Boon Wurrung Foundation website - www.boonwurrung.org

Thank you.

MCGREGOR
COXALL