

Technical Implementation Report

Draft Master Plan

Camellia – Rosehill Place Strategy

Report prepared by Narla Environmental

for Department of Planning, Industry and Environment c/o COX Architecture

December 2021



NARLA environmental

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Glossary

Acronym/ Term	Definition
ASL	Above Sea Level
BAM	Biodiversity Assessment Method
BC Act	New South Wales Biodiversity Conservation Act 2016
BCAR	Biodiversity Certification Assessment Report
BDAR	Biodiversity Development Assessment Report
DA	Development Application
DAWE	Department of Agriculture, Water and the Environment
	The use of land, and the subdivision of land, and the carrying out of a work, and the
	demolition of a building or work, and the erection of a building, and any other act, matter
Development	or thing referred to in section 26 that is controlled by an environmental planning
Development	instrument but does not include any development of a class or description prescribed by
	the regulations for the purposes of this definition (Environmental Planning and
	Assessment Act 1979).
DoEE	Department of Environment and Energy
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment
ECA	Ecological Constraints Assessment
EP&A Act	Environmental Planning & Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
FFA	Flora and Fauna Assessment Report
FM Act	Fisheries Management Act 1994
GPOP	Greater Parramatta and Olympic Peninsula
ha	Hectares
km	Kilometre
LEP	Local Environmental Plan
LGA	Local Government Area
Locality	The area within a 10 km radius of the Subject Site. The same meaning when describing a
LOCAIILY	local population of a species or local occurrence of an ecological community.
m	metres
mm	millimetres
NSW	New South Wales
OEH	Office of Environment and Heritage (now known as the DPIE)
PDCP	Parramatta Development Control Plan 2011
PLEP	Parramatta Local Environmental Plan 2011
SEPP	State Environmental Planning Policy
Subject Site	The Camellia – Rosehill Precinct
REF	Review of Environmental Factors
Threatened entities	Species, populations and ecological communities specified in Schedules 1 and 2 of the BC Act 2016



Executive Summary

Cox Architecture has engaged Narla Environmental on behalf of the Department of Planning, Industry and the Environment (DPIE) to deliver technical studies for Package A, to assesses the overall strategy from an ecological perspective and provides advice on any likely ecological impacts (adverse and positive), and identifies future works that may be required to deliver the preferred development scenario with respect to ecology.

Despite the historic industrial land uses associated with the current Precinct, a series of unique and diverse ecological features were identified. These included a variety of state and federally listed threatened ecological communities. numerous historical records of threatened flora and fauna species, and areas of unique key fish and migratory shore bird habitat.

The Draft master plan has been analysed in this report from an ecological perspective, to identify any areas that are likely to be impacted, as well as those that will see an overall improvement by the strategy as a whole. This report also outlines recommendations in which the strategy could implement to further improve aspects of biodiversity within the Precinct in the future.

The main impacts to ecology associated with the Draft master plan are those associated with the proposed crossings of Parramatta River and Duck River. These works are likely to require the removal of mangrove vegetation and shorebird habitat and will result in a localised impact on the riparian corridor.

The Draft master plan and overall strategy however also implements a series of measures that are likely to result in a positive increase to the ecology of the Precinct, including:

- The implementation of the 40m riparian buffer along all foreshore areas;
- The continued protection of the wetland area;
- The creation of new areas of open space; and
- The proposed greening and remediation strategies.

Narla have also identified a number of opportunities to improve biodiversity across the Precinct, including:

- All river crossings should be strategically located as best as possible in already cleared areas or designed to minimise impacts on the foreshore environment;
- Creating a buffer area around the wetland area comprising of recreational space and limiting public access to these newly acquired areas;
- If ownership of the wetland transfers to Council then a specific management plan should be prepared to
 ensure the ongoing survival and enhancement of the wetland area. This should be in line with the
 objectives of the current Plan of Management for the wetland (Biosphere 2014) and enhanced where
 needed;
- Mangrove revegetation should happen in areas along the foreshore that are not being utilised for river crossings. Areas that have been historically cleared or have been identified in the remediation plan should be prioritised;
- Locally indigenous street tree plantings should be utilised for the greening strategy along all roads in the Precinct to improve canopy cover connectivity;
- Future development should aim to avoid the removal of vegetation and should incorporate locally indigenous species into all landscape plans to improve the general ecology across the Precinct;
- Future development in the vicinity of wetlands and riparian corridors should incorporate a mandatory setback to managed under a vegetation management plan, to minimise edge effects and to protect and enhance the sensitive vegetation nearby; and
- Areas of greenspace should be created within the Precinct utilising locally indigenous flora species to provide increase foraging resources for native species.



1. Introduction

1.1 **Project Description**

New South Wales Department of Planning, Industry & Environment (DPIE), in collaboration with City of Parramatta Council (Council), industry, the community and state agencies, is leading the development of the Camellia-Rosehill Place Strategy and Master Plan for the Camellia –Rosehill Precinct (the Precinct). The Precinct is defined by Parramatta River to the north, Duck River to the east, the M4 Motorway to the south and James Ruse Drive to the west, all of which form physical boundaries to the Precinct.

The Camellia Rosehill Precinct (the Precinct) is presently dominated by industrial activity, with large amounts of land also allocated to Rosehill Gardens Racecourse and stabling yards for Parramatta Light Rail and Sydney Metro. Its industrial legacy means that soils are heavily contaminated across most of the Precinct.

Located in the geographic heart of Sydney, the Precinct has an important strategic role in the Greater Parramatta and Olympic Peninsula (GPOP). Previous investigations have identified that the area should be retained for urban service land with a town centre, but that the costs of infrastructure and remediation should be carefully considered when making future land use decisions.

This Place Strategy and Master Plan is being prepared for the whole Precinct and draws on the substantial body of previous investigations, including ongoing collaboration with industry, the community and state agencies.

The overarching objective of the Place Strategy is to provide an integrated 20-year vision, which recognises the strategic attributes of the Precinct, guides future land use and infrastructure investment decisions and which can be delivered with the support of state and local agencies.

DPIE has engaged Narla Environmental to deliver technical studies for Package A, to assesses the overall strategy from an ecological perspective and provides advice on any likely ecological impacts (adverse and positive), and identifies future works that may be required to deliver the preferred development scenario with respect to ecology.

An Enquiry by Design (EbD) process was undertaken to inform the preparation of the Place Strategy. The EbD was an interactive process which explored a number of master plan options for Camellia-Rosehill which could deliver the vision for the Precinct, and resulted in a Draft master plan which was the subject of public consultation as part of the Camellia-Rosehill Directions Paper. The Draft master plan was further refined following exhibition of the Directions Paper and consideration of the submission received.

1.2 Project Background

The Camellia Rosehill Precinct (~321ha) plays a strategic role in the Greater Parramatta and the Olympic Peninsula (GPOP). Camellia was identified by the NSW Government as a priority growth area in 2014, resulting in Precinct wide Land Use and Infrastructure Strategy in 2015 and subsequently development of a Town Centre Master Plan in 2018. Work on the Town Centre was paused pending outcomes of Greater Sydney's 2019 Draft Place-based Infrastructure Compact (PIC) Pilot which aimed to ensure infrastructure delivery was matched with growth across the 26 precincts in the GPOP corridor. The PIC recommended that Camellia be retained for urban service and industrial land, however, should the Government seek to progress a town centre (in the form of the 2018 plan or a modified form), before any rezoning a number of issues had to be resolved. It was determined that a coordinated and strategic approach was required, and a place strategy be prepared for the whole Precinct, drawing on previous work and including ongoing collaboration with industry, the community and state agencies.



A range of technical services have been engaged to determine opportunities and challenges at the site. These technical studies have informed the development of the place strategy and master Plan for the Precinct.

1.3 Existing Ecology within the Precinct

The Precinct is currently dominated by large scale industrial operations, with ecological features being limited to a wetland area in the east, remnant and mangrove vegetation around the periphery and scattered urban/native exotic vegetation (**Figure 1**). The native ecological communities that were identified within the Precinct, despite being historically disturbed by historic land use, are protected under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act [Commonwealth]), the *Biodiversity Conservation Act 2016* (BC Act [State]) and also the *Fisheries Management Act 1994* (FM Act [State]) including:

- Estuarine Swamp Oak Forest (*EPBC Act* Endangered; *BC Act* Endangered);
- Estuarine Mangrove Forest (FM Act Protected);
- Estuarine Reedland (*BC Act* Endangered); and
- Estuarine Saltmarsh (EPBC Act Vulnerable; BC Act Endangered; FM Act Protected).

A variety of threatened species have also been historically recorded within the Precinct, which are also protected under the *EPBC Act and* the *BC Act 2016* (Figure 2). Such species include:

- Downy Wattle (*Acacia pubescens*), most recently recorded in 2008 (*EPBC Act* Vulnerable; *BC Act* Vulnerable);
- Eastern Osprey (Pandion cristatus), most recently recorded in 2008 (BC Act Vulnerable);
- Green and Golden Bell Frog (*Litoria aurea*), most recently recorded in 2005 (*EPBC Act* Vulnerable; BC Act Endangered);
- Grey-headed Flying-fox (*Pteropus poliocephalus*), most recently recorded in 2013 (*EPBC Act* Vulnerable; *BC Act* – Vulnerable);
- Masked Owl (*Tyto novaehollandiae*), most recently recorded in 2012 (*BC Act* Vulnerable);
- Narrow-leaf Wilsonia (Wilsonia backhousei), most recently recorded in 2008 (BC Act Vulnerable); and
- Migratory shorebird habitat for Bar-tailed Godwit (*Limosa lapponica*) and Curlew Sandpiper [(*Calidris ferruginea*); *EPBC Act* Migratory].

1.4 Potential Opportunities for Ecology

A number of opportunities and objectives were identified during workshops which have helped frame the Draft master plan including:

- Ecological regeneration as a key driver for the future identity and purpose of the Precinct;
- Ecological restoration as opportunity for connection with country;
- Opportunities for future development to also improve ecological outcomes as part of site development;
- Environmental management partnerships with industry;
- Large scale water management and quality improvements across the peninsula;
- The need for better environmental quality to support amenity, identity and change in the Precinct; and
- The need for green cover across the peninsula given deficits and the significant contribution this would make to the region.



1.5 Relevant Legislation and Policy

The legislation and policies that are addressed in this report are listed in Table 1.

Table 1. Relevant Legislation and Policy Addressed.

Legislation/ Policy	Relevant Ecological Feature on Site	Triggered	Considerations
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Commonwealth)	 Mangrove and Saltmarsh habitat provides foraging habitat for <i>EPBC</i> listed threatened and migratory species. Three (3) threatened species listed under the EPBC Act have been historically recorded within the Precinct: Acacia pubescens (Downy Wattle; Vulnerable); Litoria aurea (Green and Golden Bell Frog; Vulnerable); and Pteropus poliocephalus (Grey-headed Flying Fox; Vulnerable). The precautionary principle was utilised for sections of Swamp Oak Floodplain Forest and Coastal Saltmarsh as their condition could not be appropriately survey therefore, they have been assumed to meet the <i>EPBC</i> listing criteria for: Endangered Ecological Communities: Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland endangered ecological community; and Subtropical and Temperate Coastal Saltmarsh vulnerable ecological community. 	Yes	An assessment of significance of impact from the proposed works on Matters of National Environmental Significance (MNES) against the <i>EPBC Act</i> Assessment of Significant Impact Criteria. This is to be included within the appropriate environmental impact assessment should future proposed works be likely to impact on any EPBC listed threatened species.
Biosecurity Act 2015 (Bio Act) (Commonwealth)	 Four (4) priority weed for the Greater Sydney region was identified on the Precinct: Anredera cordifolia (Madeira Vine); Cortaderia species (Pampas Grass); Lantana camara (Lantana); and Olea europaea subsp. cuspidata (African Olive). 	Yes	Listed priority weeds must be managed in accordance with the <i>Biosecurity Act</i> 2015.
Environmental Planning and Assessment Act 1979 (EP&A Act) (New South Wales)	 Objectives of the Act that apply to the Precinct: to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats; and to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State. 	Yes	Future developments will be required to provide the appropriate environmental impact assessment depending on which assessment pathway is followed under this act.

Legislation/ Policy	Relevant Ecological Feature on Site	Triggered	Considerations
Biodiversity Conservation Act (BC Act) (New South Wales)	 Six (6) threatened species listed under the BC Act have been historically recorded within the Precinct: Acacia pubescens (Downy Wattle; Vulnerable); Pandion cristatus (Eastern Osprey; Vulnerable); Litoria aurea (Green and Golden Bell Frog; Endangered); Pteropus poliocephalus (Grey-headed Flying Fox; Vulnerable); Tyto novaehollandiae (Masked Owl; Vulnerable); and Wilsonia backhousei (Narrow-leaved Wilsonia; Vulnerable). Three (3) endangered ecological communities listed under the BC Act were located within the Subject Site: Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregion; Sydney Freshwater Wetlands in the Sydney Basin Bioregion; and Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions. 	Yes	A Test of Significance or offsets may be required for any works that impact on threatened entities under the BC Act. Depending on the nature of the development this will be included within a Flora and Fauna Assessment Report (FFA), Biodiversity Development Assessment Report (BDAR) or Review of Environmental Factors (REF).
Fisheries Management Act 1994 (FM Act) (New South Wales)	Mangrove and Saltmarsh habitat was recorded within the Subject Site which is listed as marine vegetation under Part 7, Division 4 of the <i>FM Act</i> . Parramatta River and Duck River is listed as Key Fish Habitat under the <i>FM Act</i> .	Yes	A permit will need to be acquired from the Department of Primary Industries for any works that will impact on the marine vegetation or key fish habitat.
Water Management Act 2000 (New South Wales)	Parramatta River, Duck River, Duck Creek and A'becketts Creeks and their associated riparian corridors are mapped as occurring on the fringes of the Subject Site.	Yes	Works occurring within the associated riparian buffers of each watercourse are considered a Controlled Activity under the <i>WM Act</i> . Applicants must obtain a controlled activity approval from the NRAR before commencing the controlled activity.
State Environmental Planning Policy No 19– Bushland in Urban Area	Sections of the Precinct contain areas zoned for public recreation,	Yes	Future developments within or neighbouring on lands zoned for public recreation may be required to prepare a plan of management to protect and preserve bushland.



Legislation/ Policy	Relevant Ecological Feature on Site	Triggered	Considerations
State Environmental Planning Policy (Coastal Management) 2018	 The Precinct is mapped as containing areas mapped as: Coastal Wetlands; Proximity to Coastal Wetlands; Coastal Environment Area; and Coastal Use Area. 	Yes	Future works within these areas must be conducted in in accordance with the relevant components of the SEPP.
Sydney Regional Environmental	Sections of the Precinct are located within the Foreshores and Waterways Areas	Yes	Future developments must take into
Management Plan (Sydney	Boundary as mapped by the SREP.		account the objectives of the SREP.
Harbour Catchment) 2005			
Parramatta Local Environmental	As the Precinct is located within the Parramatta LGA, future developments will need to	Yes	Future developments must take into
Plan (LEP) 2011	consider the objectives of the Parramatta LEP, and the objectives of each zone. The		account the relative objectives of the
	Precinct contains the following zoning:		LEP.
	 B5: Business Development; 		
	IN1: General Industrial;		
	IN3: Heavy Industrial;		
	RE1: Public Recreation;		
	RE2: Private Recreation;		
	SP2: Infrastructure;		
	W1: Natural Waterways; and		
	W2: Recreational Waterways.		
	The Precinct also includes land that are mapped under the LEP as "Biodiversity" and as		
	"Riparian Land and Waterways".		





Figure 1. Historically mapped and field validated ecological communities within the Precinct.





Migratory Shorebird Important Areas (Bar-tailed Godwit and Curlew Sandpiper; EPBC Act- Migratory)

Threatened Species Recorded within the Precinct

Downy Wattle (BC Act- Vulnerable; EPBC- Vulnerable; Recorded: Most recently in 2008)

Eastern Osprey

(BC Act- Vulnerable; Recorded: 2008) Green and Golden Bell Frog (BC Act- Endangered; EPBC- Vulnerable; Recorded: Most recently in 2005)

- Grey-headed Flying-fox (BC Act- Vulnerable; EPBC- Vulnerable; Recorded: Most recently in 2013)
- Masked Owl (BC Act - Vulnerable; Recorded: 2012)
- Narrow-leafed Wilsonia (BC Act- Vulnerable; Recorded: Most recently in 2008)



Figure 2. Threatened species historically recorded within the Precinct.



2. Draft master plan

2.1 Vision

Camellia-Rosehill has an important strategic role as an industry and employment hub within the Greater Parramatta and Olympic Peninsula (GPOP) Economic Corridor. By 2041, the Precinct will be enhanced with service and circular economy industries and new recreational and entertainment facilities, all enabled by better transport access via light rail, active transport and road connections.

A well-designed town centre next to the light rail stop will be the focus of community activity. New homes will be close to public transport supported by walking and cycling paths and new public spaces, including the Parramatta River foreshore.

Key environmental features such as Parramatta River, Duck River and their wetlands will be protected and enhanced. Camellia's rich heritage will be interpreted, celebrated and promoted. Country and culture will be valued and respected with the renewal guided by Aboriginal people.

The Precinct will set a new standard for environmental sustainability with embedded renewable energy networks, integrated remediation and water management strategies, circular economy industries and a commitment to achieve net zero by 2050. Recycled water will be connected to all residences, businesses and public spaces and will support the integrated network of green infrastructure.

Camellia will be a showcase of recovery and restoration – a place of economic prosperity but also a place where people love to live, work and enjoy

2.2 The Camellia-Rosehill Draft Master Plan

The Draft master plan is shown in Figure 3 and forms the basis of the Place Strategy.

Key features of the master plan include:

- Provision for approximately 9000 dwellings within a Town Centre serviced by light rail;
- Provision for approximately 14,500 jobs;
- A new primary school and primary and secondary high school;
- District and regional open space facilities;
- Introduction of a new entertainment precinct and an urban services area;
- Initiatives to Care for Country and continued protection of heritage listed sites;
- Retention of the existing state heritage sewerage pumping station (SPS) 067 within the town centre;
- Measures to mitigate land use conflicts and risks including buffers and setbacks from existing fuel pipelines and between the existing sewerage pumping station and future surrounding residential uses;
- Access to the Parramatta River, Duck River and Duck Creek foreshores and potentially the wetland;
- New transport infrastructure including a local road network, potential bus services, additional connections into and out of the Precinct, and opportunities to integrate with Parramatta Light Rail Stage 2;
- An extensive active transport network;
- A comprehensive remediation strategy; and
- A sustainability strategy and integrated water cycle management strategy.





Figure 3. Master plan diagram, showing proposed land uses, movement and access across the Precinct.



2.3 Ecological impacts

2.3.1 Direct Impacts

The proposed transport crossings (Figure 3) over Parramatta River in the north and Duck River in the south of the Precinct are likely to require the removal of mangrove vegetation and shorebird habitat (mudflats) to facilitate. Any impacts to mangrove vegetation will require a permit and approval from the Department of Primary Industries (Fisheries) and the likely preparation of mangrove restoration plan.

The proposed land uses under the Draft Maser Plan (**Figure 3**), in particular the proposed establishment of the urban services and primary school, will be located in close proximity to areas of *EPBC Act* and *BC Act* listed Estuarine Swamp Oak Forest (**Figure 4**). Future developments in these sections should be conducted in a manner that does not require the removal of this community. Further removal may result in a significant impact on this community within the locality. These areas of vegetation should be protected as part of the overall place strategy.

2.3.2 Prescribed Impacts

Certain projects may have impacts on biodiversity values in addition to, or instead of, impacts from clearing vegetation and/or loss of habitat. For many of these impacts, the biodiversity values may be difficult to quantify, replace or offset, making avoiding and minimising impacts critical. Prescribed biodiversity on the potential impacts on the habitat of threatened species or ecological communities associated with the Draft master plan is discussed in **Table 2**. More detailed assessments and considerations will be required for any potential future DAs.

Is there likely to be impacts on any of the following?	Likelihood of Increased Impact (relative to current land use)	Explanation
 Habitat of threatened entities including: karst, caves, crevices, cliffs, rocks and other geological features of significance, or human-made structures, or non-native vegetation. 	Yes	 There are no karsts, caves, crevices, cliffs, rocks and other features of geological significance within the Precinct. The Precinct contains a number of occupied and unoccupied buildings that may be required to be demolished as part of the Draft master plan. A number of threatened microbat species may utilise these human-made structures for roosting and/or breeding, including: <i>Falsistrellus tasmaniensis</i> (Eastern False Pipistrelle); <i>Micronomus norfolkensis</i> (Eastern Coastal Freetailed Bat); <i>Miniopterus australis</i> (Little Bent-winged Bat); <i>Saccolaimus flaviventris</i> (Yellow-bellied Sheathtail-bat); and



Is there likely to be impacts on any of the following?	Likelihood of Increased Impact (relative to current land use)	Explanation
		 Scoteanax rueppellii (Greater Broad-nosed Bat). Non-native vegetation was present within the Precinct in the form of exotic grass areas and landscaped vegetation, as this vegetation provides the majority of the foraging habitat within the Precinct large scale removal may impact potential threatened species.
On areas connecting threatened species habitat, such as movement corridors.	No	Despite the likely removal of select areas of native and exotic vegetation, the proposed introduction of new areas of open space as well as the implementation of a Greening strategy which would provide at least 25% canopy cover across the Precinct (Kinesis 2021) will result in a likely improvement of connectivity across the Precinct.
That affect water quality, water bodies and hydrological processes that sustain threatened entities (including from subsidence or upsidence from underground mining).	Yes	 Four ecological communities located within the Precinct are influenced by hydrological processes: Estuarine Swamp Oak Forest (EPBC Act – Endangered; BC Act – Endangered); Estuarine Mangrove Forest (FM Act – Protected); Estuarine Reedland (BC Act – Endangered); and Estuarine Saltmarsh (EPBC Act – Vulnerable; BC Act – Endangered; FM Act – Protected). The Draft master plan will likely require the removal of areas of mangrove vegetation and has the potential to increase runoff, contamination and impacts to groundwater systems which may negatively impact on the ecological communities present within the Precinct who depend on them. The remediation strategy proposed for the Precinct (Golder 2021), as well as the greening strategy (Kinesis 2021) are likely to substantially mitigate impacts associated with tree loss and contamination which would result in an overall improvement of the condition of the Precinct.



Is there likely to be impacts on any of the following?	Likelihood of Increased Impact (relative to current land use)	Explanation
On threatened species or fauna that are part of a TEC from vehicle strikes.	Yes	The existing Precinct has a high level of vehicle traffic and the Draft master plan is unlikely to significantly increase this.





Protected Vegetation with Potential to be Impacted by Future Works

The Precinct

Narla Field Validated Vegetation S_FoW08: Estuarine Swamp Oak Forest

Historically Mapped Vegetation Communities

S_FoW08: Estuarine Swamp Oak Forest (Biosis 2018) Wetland and Mangrove Vegetation (SREP 2005)



Figure 4. Threatened terrestrial vegetation with potential to be impact by future works using the precautionary principle, under the Draft master plan.



2.3.3 Indirect Impacts (Negatives and Positives)

Indirect impacts occur when the construction or operation of a development affect native vegetation, threatened ecological communities and threatened species habitat beyond the areas being directly impacted. Indirect impacts may also result from changes to land-use patterns, such as an increase in vehicular access and human activity on native vegetation, threatened ecological communities and threatened species habitat. The potential indirect impacts (positive and negative) associated with the Draft master plan are outlined in **Table 3**. All indirect impacts that will result in a negative outcome will be required to be assessed in more depth for any future DA submissions within the Precinct.

Potential Indirect Impact	Extent	TEC's and/or Threatened Species and Their Habitat with potential to be Impacted	Potential Negative Impacts (relative to current land use)	Potential Positive Impacts (relative to current land use)
(a) Areas of adjacent habitat or vegetation	Vegetation and habitat directly adjacent to any proposed works has the potential to experience ongoing indirect impacts as a result of the Draft master plan. The disturbance caused during construction may increase weed infestations within adjacent vegetation, which in turn would decrease its habitat value. In the Draft master plan this becomes increasingly more likely in areas of vegetation bordering heavy industrial activities (e.g., Viva Energy), and the areas immediately surrounding the proposed Parramatta and Duck River Crossings. The riparian buffer however, surrounding the Precinct will help reduce inadvertent impacts on the adjacent foreshore habitat and vegetation excluding areas in the immediate vicinity of the proposed crossing.	Estuarine Swamp Oak Forest (EPBC Act – Endangered; BC Act – Endangered) Estuarine Mangrove Forest (FM Act – Protected) Estuarine Reedland (BC Act – Endangered) Estuarine Saltmarsh In addition, there are numerous threatened and migratory species that have been recorded within the Precinct that may be impacted by inadvertent impacts on adjacent habitat.	There is potential for areas of vegetation situated in the vicinity of areas proposed for development to see a reduction in habitat viability. This, however, is not expected to be a significant decrease owing to the already heavily disturbed nature of the Precinct.	The establishment of the riparian buffer around the Precinct will significantly reduce the inadvertent impacts that the foreshore environment is currently experiencing, by providing a buffer area between the vegetation and surrounding land uses.
(b) Edge Effects	Future construction and on-going operations may lead to an increase in weed infiltration into adjacent habitats due to enhanced edge effects.	Estuarine Swamp Oak Forest (EPBC Act – Endangered; BC Act – Endangered)	There is potential for areas of vegetation situated in the vicinity of areas proposed for development to see an increase in	Edge effects within the Precinct are likely to be reduced across the Precinct as a result of the Draft master plan, due to the increased

Table 3. Indirect impacts associated with the Draft master plan.



Potential Indirect Impact	Extent	TEC's and/or Threatened Species and Their Habitat with potential to be Impacted	Potential Negative Impacts (relative to current land use)	Potential Positive Impacts (relative to current land use)
	The most likely area to experience increased edge effects as a result of the Draft master plan is the mangrove vegetation and mudflat habitat along Parramatta River and Duck River, located in the vicinity of the proposed crossings.	Estuarine Mangrove Forest (FM Act – Protected) Estuarine Reedland (BC Act – Endangered) Estuarine Saltmarsh In addition, numerous threatened and migratory species have been confirmed within the Precinct. These protected species may be impacted by edge effects leading to a reduced viability in habitat.	edge effects. This, however, is not expected to be a significant decrease owing to the already heavily disturbed nature of the Precinct.	areas of foreshore habitat and other open spaces.
(c) Habitat Viability (noise, dust or light spill)	It is not anticipated that there will be an increase in these factors by Draft master plan. The heavily industrial nature of the Precinct is already experiencing high levels of noise, dust and light spill into the remaining areas of habitat present within the Precinct. The introduction of the riparian buffer is likely to improve foreshore habitat viability excluding areas in the immediate vicinity of the proposed crossing.	Estuarine Swamp Oak Forest (EPBC Act – Endangered; BC Act – Endangered) Estuarine Mangrove Forest (FM Act – Protected) Estuarine Reedland (BC Act – Endangered) Estuarine Saltmarsh In addition, numerous threatened and migratory species have been confirmed within the Precinct. These protected species may be	There is potential for areas of vegetation situated in the vicinity of areas proposed for development to see a reduction in habitat viability. This, however, is not expected to be a significant decrease owing to the already heavily disturbed nature of the Precinct.	The implementation of a riparian buffer surrounding the Precinct is likely to significantly improve the viability of the foreshore habitat outside of the areas in the vicinity of the proposed crossings. The implementation of the greening strategy and the creation of new vegetation corridors has the potential to reduce the immediate impacts of dust.



Potential Indirect Impact	Extent	TEC's and/or Threatened Species and Their Habitat with potential to be Impacted	Potential Negative Impacts (relative to current land use)	Potential Positive Impacts (relative to current land use)
		impacted by noise, dust or light spill leading to a reduced viability in habitat.		
(d) Transport of weeds and pathogens	Future construction and continued land use may lead to an increase in weed infiltration into adjacent habitat due to enhanced edge effects. The most likely area to experience increased edge effects as a result of the Draft master plan is the mangrove vegetation and mudflat habitat along Parramatta River and Duck River, located in the vicinity of the proposed crossings.	Estuarine Swamp Oak Forest (EPBC Act – Endangered; BC Act – Endangered) Estuarine Mangrove Forest (FM Act – Protected) Estuarine Reedland (BC Act – Endangered) Estuarine Saltmarsh In addition, numerous threatened and migratory species have been confirmed within the Precinct. These protected species may be impacted by the transport of weeds and pathogens leading to a reduced viability in habitat.	There is potential for areas of vegetation situated in the vicinity of areas proposed for development to see an increase in the presence of weeds and pathogens. This, however, is not expected to be a significant decrease owing to the already heavily disturbed nature of the Precinct.	NA
(e) Risk of starvation, exposure and loss of shade or shelter	The removal of areas of vegetation to accommodate certain land uses has the potential to increase exposure for threatened fauna within the Precinct. However, the creation of a riparian buffer and revegetation through the proposed	Numerous threatened and migratory species have been confirmed within the Precinct. These protected species may be impacted by the increased risk of starvation, exposure and loss of	Due to the areas of vegetation still present around the periphery of the Precinct, it is unlikely that this impact will be significant as such habitats will continue to provide	The implementation of the proposed greening strategy as well as the creation of the riparian buffer will result in a significant



Potential Indirect Impact	Extent	TEC's and/or Threatened Species and Their Habitat with potential to be Impacted	Potential Negative Impacts (relative to current land use)	Potential Positive Impacts (relative to current land use)
	greening strategy is likely to significantly mitigate this risk.	shade or shelter leading to a reduced viability in habitat.	food resources and shelter for fauna species.	increase in available habitat across the Precinct.
(f) Breeding habitats	Historical records do indicate a population of Green and Golden Bell Frogs within the Precinct as recently as 2008. Furthermore, important migratory shorebird habitat is mapped as occurring along Parramatta River and Duck River.	Green and Golden Bell Frogs Migratory Shorebirds	Due to the already highly disturbed nature of the Precinct, it is unlikely that areas outside of the wetland are being utilised as breeding habitat. However, if the population of Green and Golden Bell Frogs present continue to experience indirect impacts from heavy industries in the surrounding areas it could result in the reduction or loss of breeding habitat. There is also the potential for areas of migratory shorebird habitat to be impacted in the areas immediately surrounding the proposed pedestrian and road crossings.	The continued protection and restoration of the wetland area, will result in the conservation of the most suitable area of potential Green and Golden Bell Frog breeding habitat. The implementation of the 40m riparian buffer surrounding the Precinct, will reduce indirect impacts to important foreshore habitat.
(g) Trampling of threatened flora species	 Two (2) threatened flora species (Downy Wattle and Narrow-leaf Wilsonia) have been historically identified within the Precinct. The most likely area to experience an increased risk of trampling in the Draft master plan, is the mangrove vegetation and mudflat habitat along Parramatta River and Duck River, located in the 	Downy Wattle Narrow-leaf Wilsonia	The utilisation of the foreshore has the potential to impact areas of potential habitat for these species.	The area for foreshore utilisation currently proposed in the Draft master plan does not currently intersect areas where these species have been historically recorded. If long-term active transport is proposed targeted surveys should be conducted to

Potential Indirect Impact	Extent	TEC's and/or Threatened Species and Their Habitat with potential to be Impacted	Potential Negative Impacts (relative to current land use)	Potential Positive Impacts (relative to current land use)
	vicinity of the proposed crossings and foreshore utilisation for pedestrians.			confirm there locations and ensure they are appropriately protected.
(h) Nitrogen fixation and increased soil salinity	It is unlikely that the inhibition of nitrogen fixation will affect vegetation adjacent to the Precinct based on the Draft master plan.	N/A	Negligible	Negligible
(i) Fertiliser drift	This issue is not likely to affect the vegetation within or surrounding the Precinct based on the Draft master plan.	N/A	Negligible	Negligible
(j) Rubbish dumping	Due to the potential increase in population numbers proposed under the Draft master plan, there is a likelihood that occurrences of rubbish dumping may increase.	Numerous threatened and migratory species have been confirmed within the Precinct. These protected species may be impacted by the increased rubbish dumbing leading to a reduced viability in habitat.	Due to the already heavily disturbed nature of the Precinct, it is unlikely that the Draft master plan would result in an extensive enough increase in rubbish dumping such that any threatened or protected species were likely to be significantly impacted.	NA
(k) Wood collection	This issue is not likely to affect the vegetation within or surrounding the Precinct based on the Draft master plan.	N/A	Negligible	Negligible



Potential Indirect Impact	Extent	TEC's and/or Threatened Species and Their Habitat with potential to be Impacted	Potential Negative Impacts (relative to current land use)	Potential Positive Impacts (relative to current land use)
(I) Bush rock removal and disturbance	No areas of bush rock is proposed to be removed based on the Draft master plan.	N/A	Negligible	Negligible
(m) Predatory species	There is the possibility that other indirect impacts, such as rubbish dumping, which may be increased under the Draft master plan may encourage predatory species into the area.	Numerous threatened and migratory species have been confirmed within the Precinct. Such species may be impacted by an increase in predatory species populations.	The introduction of the riparian buffer, as well as the greening strategy has the potential to increase the occurrences of predatory pest species due to the increase in potential habitat and cover. However, it is unlikely to be a significant increase due to the nature of the site.	NA
(n) Pest species	There is the possibility that other indirect impacts, such as rubbish dumping may be increased under the Draft master plan, may result in an increase in pest animal populations.	Numerous threatened and migratory species have been confirmed within the Precinct. Such species may be impacted by an increase in pest animal populations.	The introduction of the riparian buffer, as well as the greening strategy has the potential to increase the occurrences of predatory pest species due to the increase in potential habitat and cover. However, it is unlikely to be a significant increase due to the nature of the site.	NA
(o) Risk of fire	It is unlikely that the Draft master plan will result in an increased risk of fire.	N/A	Negligible	Negligible



Potential Indirect Impact	Extent	TEC's and/or Threatened Species and Their Habitat with potential to be Impacted	Potential Negative Impacts (relative to current land use)	Potential Positive Impacts (relative to current land use)
(p) Specialist breeding and foraging habitat, e.g., beach nesting for shorebirds.	Shorebird habitat is currently present in the mangrove mudflats around the periphery of the Precinct. The Parramatta River and Duck River crossings, as well the proposed utilisation of the foreshore for pedestrians has the potential to disturb this habitat. Introduction of the riparian buffer is likely to improve foreshore habitat viability excluding areas in the immediate vicinity of the proposed crossing.	Migratory shorebirds	The Parramatta and Duck River Crossings have the potential to negatively impact foreshore habitat for migratory shorebirds.	Excluding areas for the proposed crossings. The implementation of the riparian buffer will improve the viability of specialist shorebird habitat available around the periphery of the Precinct, by reducing potential negative indirect impacts associated with surrounding land uses
(q) Vehicle movement.	Future use of the land does have the potential to impact upon threatened species located within the adjacent habitat as a result of intensified vehicle movement.	Numerous threatened and migratory species have been confirmed within the Precinct. Such species may be impacted by the intensification of vehicle movement.	Due to the current nature of the Precinct and high levels of constant vehicle movement, it is not anticipated that intensification of vehicle movement would significantly impact threatened species.	NA



2.4 Ecological Opportunities and Benefits

2.4.1 Wetland

The wetland area is protected under the State Environmental Planning Policy (Coastal Management) 2018 as a coastal wetland as well as other planning instruments and the Viva Plan of Management. The most apparent ecological positive associated with the Draft master plan is the continued preservation of the wetland area inline with these policies. This wetland consists of numerous threatened communities, records of threatened species and provides suitable habitat for a suite of protected and threatened species. It is recommended that rehabilitation occurs within this area through the removal of priority weeds, with infill plantings using locally indigenous wetland species. The wetland area is also proposed to be rezoned as E2, from its current IN3. This will see greater protection for the wetland area, with restrictions placed on the types of works that can be done in the vicinity.

2.4.2 Foreshore

The foreshore utilisation proposed in the Draft master plan for active transport, provides an opportunity for the current foreshore environment to be enhanced whilst providing a recreational area for the public. With strategic locally indigenous landscaping, as well as the maintenance and planned remediation of the certain areas of foreshore vegetation, this has the potential to increase the viability and connectivity of the habitat surrounding the Precinct.

It is recommended that the foreshores active transport, be constructed in a similar fashion to pedestrian cycleway and walking tracks on the opposite side of Parramatta River. On this side of the river the outer 50% of the riparian corridor has been utilised, to avoid impacts to mangroves and mudflats (**Photo Plate 1**), and recreational areas have been used as a buffer between the industrial business and foreshore environment. Any impacts to mangroves would need to be assessed at the development stage, with a fisheries permit produced and restoration plan likely to be needed.





Photo Plate 1. Raised pedestrian cycleway and walking track on foreshore opposite the Precinct.

2.4.3 Remediation and Greening Strategies

The proposed remediation strategy (Golders 2021) will aid in the management of the impacts of contamination across the Precinct, which will severely benefit the Precincts groundwater and the ecological communities that rely on them. The greening strategy (Kinesis 2021) as well as the finer grain street network of the master plan will see a increase in canopy cover across the Precinct, stating that it should account for at least 25% cover. This will provide valuable canopy connectivity across the Precinct and will increase the availability of foraging and nesting resources for the Precincts native birds and mammal species. It is acknowledged that owing to the contamination currently present across the Precinct, planting locations are restricted. Areas where remediation has been proposed as a possibility should be prioritised and filled out with vegetation as much as possible. It is recommended that the species utilised to increase canopy cover should be locally indigenous species.

2.4.4 Public Recreation and Open Space

The Precinct in its current state is lacking areas of public open space and public recreation. The Draft master plan introduces new areas of open space and public recreation both close to the foreshore, as well as in the centre of the Precinct and along its western boundary. These open spaces provide opportunities for habitat enhancement through landscaping using locally indigenous species, which will provide additional habitat for native species.

Within these open space areas there is also the opportunity to enhance the habitat features of the Precinct further through the installation of nest boxes, which will provide habitat to avian, marsupial and microbat species.



Hollows are an important feature of the ecology of any site, and one that is currently lacking within the Precinct. This could also provide an opportunity for education within the public recreation areas of Australia's native fauna.

2.5 Future Works

2.5.1 Threatened Species Targeted Surveys

Any proposed future works, particularly those relating to future active transport along the foreshore, in the vicinity of historically recorded threatened species should conduct the appropriate targeted surveys in line with state and federal government guidelines and survey periods. This is of particular importance for:

- Litoria aurea (Green and Golden Bell Frog);
- Wilsonia backhousei (Narrow-leaded Wilsonia); and
- Acacia pubescens (Downy Wattle).

These species are locally significant with suitable habitat currently still present within the Precinct. If these species are identified, they should be avoided where possible with management plans put in place to ensure their continued survival.

2.5.1 Foreshore and Wetland Edging

Foreshore riparian corridors and wetlands should have clear edges to contain adjoining land uses and minimise indirect impacts to the sensitive vegetation. The ideal outcome would be for any future works in the vicinity of these areas to need to incorporate a minimum set back, where the distance is between is managed by a Vegetation Management Plan. This would minimise edge effects, whilst also protecting and enhancing areas of sensitive vegetation across the Precinct.

2.5.2 Mangrove Revegetation

Due to the proposed crossings of the Parramatta and Duck Rivers, it is likely that mangrove vegetation will be impacted to facilitate this construction. As removal of mangrove vegetation is likely to require removal to facilitate the Parramatta River and Duck River crossings, mitigation measures need to be considered to ensure significant impacts do not occur to the fragile ecosystem. Sections of the Parramatta River foreshore that were recorded as being historically cleared and absent of significant vegetation, these areas are prime places to conduct mangrove revegetation, which could be used to offset potential impacts associated with the crossings (**Figure 6**). In addition to these areas, 181 James Ruse Drive and 1 Grand Avenue, could be ideal locations for mangrove revegetation, once remediation works have been conducted. Mangrove revegetation can be conducted through either natural recruitment, planting with seeds or transplanting.

2.5.3 Wetland

2.5.3.1 Expansion and buffer areas

The possibility of expanding the wetland area into the area surplus to Viva Energy Land should be considered. By expanding this wetland area, it would provide a substantial increase in the naturally occurring biodiversity features within the Precinct, whilst also providing a buffer zone, protecting the core of the wetland from the impacts of edge effects associated with the surrounding areas heavy industrial operations. Potential expansion areas are shown in **Figure 6**. These expansion areas are purely indicative of areas where could be achieved. It is acknowledged however that these areas cover existing businesses and might not be practical for the area.

Due to the highly sensitive nature of the wetland, public access should be restricted to the buffer areas. Enabling public access to the wetland itself is likely to result in an increase in both direct and indirect impacts



such as increased waste into the area, potential introduction of pathogens such as *Phytophthora cinnamomi*, accidental trampling of vegetation and habitat and increased run off into the wetland through the creation of footpaths and tracks. Buffer areas can be created to provide an educational space for the public, without impacting on the wetland itself.

2.5.3.2 Wetland Specific Vegetation Management Plan

Due to the significance of the wetland area located within the Precinct. A specific Vegetation Management Plan should be conducted detailing how this area will be protected and enhanced in perpetuity. The management plan should as a minimum include guidelines for weed removal, erosion control, revegetation works and habitat enhancement. Viva energy currently have a Plan of Management for Green and Golden Bell Frogs 2019, which details habitat creation and restoration actions currently being undertaken within the wetland site. It is recommended that if this land was taken over by Council then a site specific Plan of Management should be prepared in keeping with the plan of management currently enacted by Viva energy to ensure the long term survival of this important ecological area.

2.5.4 Streetscaping

In areas where biodiversity features are lacking, such as the Precinct, streetscaping can be a unique tool to provide canopy connectivity across a large area, where complete revegetation is not a viable option. It is highly recommended that the Draft master plan utilises this technique using locally indigenous native species as they provide the greatest resources for native species and are naturally adapted to local conditions requiring less maintenance. The greening strategy proposed by Kinesis (2021) aims at providing at least 25% canopy cover across the entire Precinct. It is recommended that greening workings should focus on areas that also provide habitat connectivity across the Precinct (**Figure 6**). It is acknowledged that the Precinct is highly constrained in area terms of contamination, therefore streetscaping should be emphasised in areas considered low-risk in terms of contamination (Golders 2021).

2.5.5 Potential Open Space Areas and Ecological Restoration

The land use map (**Figure 3**) associated with the Draft master plan, lists two areas of potential further open and recreational space, within and surrounding the current Rosehill Racecourse. The area around the periphery of the racecourse should be prioritised as it provides the greatest potential to enhance ecological values within the Precinct and they have been identified as being low risk in terms of contamination (Golders 2021). If this area could be utilised it would also provide a large corridor through the centre of the Precinct which is currently lacking. This area already contains several native and urban species, and would be a cost-efficient location of habitat enhancement.

2.5.6 Future Development

Future development within the Precinct should aim to improve ecological values. This can most easily be achieved by the avoidance of removing native vegetation to facilitate works and through the incorporation of locally indigenous flora species into any associated landscape plans.





Figure 5. Areas of Biodiversity Values within the Precinct.





Figure 6. Potential areas for future ecological enhancement.

2.6 Future Assessments and Approvals

Appropriate ecological impact assessment will be required for future DAs, especially where they are likely to involve the removal or indirect impacts to native vegetation. The specific ecological impact assessment will depend on whether the assessment are conducted during the planning phase (Biodiversity Certification) or later during the DA stage, depending on the assessment pathway under the *EP&A Act* 1979, undertaken by each future proposal.

2.6.1.1 Biodiversity Certification under Part 8 of the Biodiversity Conservation Act 2016

Biodiversity certification offers a streamlined biodiversity assessment process for areas of land that are proposed for development under part 8 of the BC Act. The process identifies areas that can be developed after they are certified and measures to offset the impacts of development. Where land is certified, development may proceed without the usual requirement for site-by-site assessment. It is particularly suitable when strategic land use planning at a landscape scale is proposed or underway (DPIE 2021b).

The Biodiversity Certifications process is broken down into the following six steps:

- Step 1: Plan and design the project before applying.
 - Planning and design involves identifying the assessment area to which the Biodiversity Certification will apply. This should be conducted in accordance with the local government agencies (Parramatta Council) as well as DPIE. Areas proposed for biodiversity certification should be located to avoid and minimise impacts on native vegetation and threatened species. Areas containing Swamp Oak Floodplain Forest, Mangroves and wetland vegetation should not be certified.
- Step 2: Apply the Biodiversity Assessment Method (BAM) and prepare a Biodiversity Certification Assessment Report
 - A BAM accredited assessor will assess the biodiversity values within the proposed Biodiversity Certification Area. The accredited assessor will then assess the impacts of proposed development within the area proposed for certification and identify the biodiversity credits needed to offset the impacts. The BCAR will reflect the credit requirement generated by the BAM. The BCAR must identify the credits proposed to be retired to offset the impact.
- Step 3: Formal consultation with Council
 - This step only applies if an applicant is not a planning authority.
- Step 4: Submit the application to DPIE and notify the public
 - After consultation with council, the applicant must invite the public to make submissions on the application. to the application after it has gone on public exhibition.
 - The applicant must provide a report to DPIE that includes the applicant's response to any submissions from the public.
- Step 5: The Minister for the Environment considers and determines the application
 - When the application has been received and the council consultation and public notification processes have been completed, DPIE reviews the application materials against the legislative requirements of the *BC Act 2017* and *Biodiversity Conservation Regulation (BC Reg) 2017*, and the technical requirements of the BAM. This includes a detailed review of the BCAR.
 - DPIE then makes a recommendation to the Minister for the Environment on whether to confer biodiversity certification. The Minister must consult the Minister for Planning before determining the application. The Minister for the Environment has the final responsibility for the decision to confer biodiversity certification
- Step 6: Ongoing review and compliance checks



• DPIE, on behalf of the Minister, will undertake periodic reviews of conferred biodiversity certifications. It will also undertake compliance activities to ensure that parties to biodiversity certifications comply with the conservation measures required by the certification.

2.6.1.2 Development Applications Assessed Under Part 4 of the Environmental Planning and Assessment Act 1979

The requirements of the *BC Act 2016* and *BC Reg 2017* are mandatory for all future developments (DA) assessed pursuant to Part 4 of the *EP&A Act* submitted in the City of Parramatta Local Government Area, where there are potential impacts to native vegetation as well as flora and fauna.

The BC Act and its regulations stipulate clearing 'area threshold' values (**Table 4**) that determine whether a development is required to be assessed in accordance with the 'Biodiversity Offset Scheme' (BOS). Minimum entry thresholds for vegetation clearing depend on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan (LEP)), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP).

Table 4	. Biodiversity	Offset Scheme	Entry Thresho	olds.

Minimum lot size associated with the property	Threshold for clearing, above which the BAM and offsets scheme apply
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.50 ha or more
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

Additionally, any future works conducted in mapped areas of 'Biodiversity Value' (**Figure 5**) that are prepared in accordance with Part 4 of the EP&A Act will in addition, under the BC Act, automatically require the preparation of a Biodiversity Development Assessment Report (BDAR) and entry into the BOS. If future developments remain underneath this threshold and avoid areas mapped as containing 'Biodiversity Values' then all that would be required is the production of a Flora and Fauna Assessment.

2.6.1.3 Proposals Assessed Under Part 5 of the Environmental Planning and Assessment Act 1979

The requirements of the *BC Act 2016* and *BC Reg 2017* are mandatory for all activities assessed pursuant to Part 5 of the *EP&A Act*.

The test of significance (under s.7.3) determines whether the proposed activity is likely to significantly affect threatened species or ecological communities, or their habitats. If the activity is likely to have a significant impact, or will be carried out in a declared Area of Outstanding Biodiversity Value (AOBV), the proponent must apply the BOS.

The environmental impact of activities that will not have a significant impact on threatened species will continue to be assessed under s.5.5 of the *EP&A Act 1979*. This is shown through the production of Review of Environmental Factors (REF).

2.7 Conclusion

The Draft master plan results in a number of impacts on the ecology of the Precinct including the likely need to impact the mangrove vegetation and shorebird habitat for the creation of the Parramatta River and Duck River crossings. Additional impacts associated include the potential removal of sections of Threatened Ecological Communities to accommodate certain future land uses.

The Draft master plan does also achieve positive ecological outcomes through the continued protection of the wetland and riparian corridor and the enhancement of habitat features through the introduction of open spaces across the Precinct as well as the proposed remediation works and greening strategy.

Narla have also identified a number of opportunities to improve biodiversity further across the Precinct including:



- All river crossings should be strategically located as best as possible in already cleared areas or designed to minimise impacts on the foreshore environment;
- Creating a buffer area around the wetland area comprising of recreational space and limiting public access to these newly acquired areas;
- If ownership of the wetland transfers to Council then a specific management plan should be prepared to ensure the ongoing survival and enhancement of the wetland area. This should be in line with the objectives of the current Plan of Management for the wetland (Biosphere 2014) and enhanced where needed;
- Mangrove revegetation should happen in areas along the foreshore that are not being utilised for river crossings. Areas that have been historically cleared or have been identified in the remediation plan should be prioritised;
- Locally indigenous street tree plantings should be utilised for the greening strategy along all roads in the Precinct to improve canopy cover connectivity;
- Future development should aim to avoid the removal of vegetation and should incorporate locally indigenous species into all landscape plans to improve the general ecology across the Precinct;
- Future development in the vicinity of wetlands and riparian corridors should incorporate a mandatory setback to managed under a vegetation management plan, to minimise edge effects and to protect and enhance the sensitive vegetation nearby; and
- Areas of greenspace should be created within the Precinct utilising locally indigenous flora species to provide increase foraging resources for native species.

If the recommendations suggested in this report are able to be incorporated in a final master plan, then the Precinct would be able to achieve a significant positive outcome in terms of ecology.



3. References

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