3 Vision, issues and opportunities

3.1 VISION FOR YERAMBA CATCHMENT

The vision is to:

> *Enhance environmental conditions and amenity in Yeramba Lagoon and surrounding bushland by re-establishing estuarine processes and open-water areas in the lower part of Yeramba Lagoon and improving pollution management in the upper catchment.*

3.2 DEFINING THE VISION

A vision for the catchment was developed through community and stakeholder consultation. The vision reflects the priorities, values and desires for the future of the area.

Values are the qualities of the area that are significant, special or important, or that the community wishes to protect or enhance. Through community consultation and site assessment, Environmental Partnership (2001) identified values that relate to the Georges River community open space (which includes bushland around Yeramba Lagoon) as:

- Recreational opportunities
- Image/visual quality
- Vegetation
- Bird life
- Water quality
- Mangroves
- Environmental quality
- Open space
- Biological diversity
- Biological integrity
- Aboriginal values
- Threatened species
- Air quality

Values which were highlighted during stakeholder consultation for this Masterplan were:

- Ecological and economic sustainability
- Passive recreation
- Natural environment
- Visual quality and amenity

3.3 ISSUES AND OPPORTUNITIES

The following tables summarise the main issues and opportunities relevant to management of the catchment, particularly Yeramba Lagoon. The issues and opportunities have been grouped into ecology, pollution, and recreation and amenity.

3.3.1 Ecology

ISSUE	OPPORTUNITY
Mosquitoes	Reduce health risk associated with mosquito-borne disease
Aquatic weeds	Replace aquatic weeds with indigenous species Improve habitat and biodiversity Reduce biomass and nutrient cycling within the lagoon Satisfy statutory obligations under the *Noxious Weeds Act*
Terrestrial weeds	Improve current bush regeneration practices (i.e. start in areas of least weed invasion, employ practices and methods that do not increase erosion risk) Community education and action to reduce weeds (e.g. garden escapes and dumping)
Introduced fauna	Increase frog population by reducing habitat for *Gambusia holbrooki (*Mosquito fish) Complete removal of *Trachemys scripta elegans* (Red-eared Slider Turtles) from lagoon to reduce competition with native species and prevent spread into other areas Improve habitat for native waterfowl and reduce risk of disease from introduced species
Weir	Remove weir to restore estuarine processes and ecology (e.g. salt marsh communities) in the lower part of the lagoon, improve fish passage, provide a nursery for native fish Removal is consistent with NSW Weirs Policy
Threatened species and communities	Provide a good baseline for management by consolidating sources of ecological data from BCC, NPWS, community and others in the NSW Wildlife Atlas Database Protect, enhance and restore habitat Ensure bushfire regime is consistent with protection of threatened species and communities

3.3.2 Pollution

ISSUE	OPPORTUNITY
Sewage overflows	Work with Sydney Water to minimise sewage overflows in the catchment to improve water quality and reduce the risk to human and ecosystem health
Stormwater	Implement WSUD and stormwater harvesting to reduce pollution at source, reduce potable water consumption, reduce minor localised flooding (particularly overland flooding) and reduce the dependence on centralised water supply network Implement community education to reduce stormwater pollution at the source and increase stormwater harvesting measures Install new stormwater controls and upgrade, expand and improve maintenance of existing gross pollutant trap and pond at Amberdale Avenue, and trash rack at Kennedy Street Expand stormwater treatment train along the drainage line from Amberdale Avenue Do not increase flood risk
Rubbish dumping (e.g. livestock, waterfowl, cars, landscaping material) especially at car park	Community education, enforcement, regular clean-up and monitoring of 'hot spots' to prevent pollution and maintain good aesthetics
Contaminated sediment & acid sulphate soils (ASS)	Minimise contaminated sediment inputs (from sewage and stormwater) by pollution controls and system upgrades/repair to prevent further siltation and contamination of lagoon Investigate ASS and need to keep sediments inundated to prevent acid formation Improve bush regeneration and construction practices to minimise erosion and sedimentation

3.3.3 Recreation and amenity

ISSUE	OPPORTUNITY
Odour	Minimise generation of odours by draining water slowly or waiting for a dry season prior to weir removal to prevent sudden extensive death of weeds and exposure of sediments
Visual	Utilise rock outcrops adjacent to the loop track to obtain views across the lagoon A boardwalk across part of the lagoon would offer a different perspective and attract more visitors to the area

ISSUE	OPPORTUNITY
Recreational tracks	Consistent with NPWS policies and guidelines, improve the main track network and install signage to improve recreational amenity, and reduce erosion and risk to public safety Rehabilitate tracks that are actively eroding or in ecologically sensitive areas
Picnic areas	Consistent with NPWS policies and guidelines, provide picnic areas along the foreshore and rehabilitate degraded foreshore areas
Bushfire hazard	Consistent with NPWS policies and guidelines, protect people and buildings by maintaining asset protection zones
Carpark	Consistent with NPWS policies and guidelines, upgrade carpark

4 Objectives and actions

4.1 OBJECTIVES

In recognition of the degraded state of the lagoon and its drainage lines to the north, and the significant resources that would be required to achieve the vision, the Masterplan proposes that rehabilitation be implemented progressively over the next ten years. The objectives will be to:

- Reduce pollution sources
- Protect threatened species and communities
- Maintain or improve bushland
- Restore estuarine communities in the lower part of the lagoon
- Rehabilitate freshwater ecosystems in the upper part of the lagoon
- Improve water quality
- Consolidate and improve recreational facilities such as walking trails, rest areas and signage
- Increase community involvement in environmental management of the catchment

4.2 ACTIONS

Actions to address masterplan objectives are presented as:

- Catchment-wide actions in **Section 4.5**
- Location-specific actions in **Section 4.6**
- **Section 4.7** lists actions that require further investigation and design prior to implementation

Each action is prioritised, costed and has performance measures and responsibilities allocated. Priorities and responsibilities are discussed below.

4.3 PRIORITIES

Priorities have been allocated as follows:

- High priority – to be completed within two years
- Medium priority – to be completed within three to five years
- Low priority – to be completed within ten years
- Ongoing - The catchment lies within metropolitan Sydney so pressures will continue to escalate and maintenance will be ongoing (e.g. weed removal, rubbish collection, track grading)

It is easier and more effective to prevent degradation than to restore ecosystems that become degraded. Therefore highest priority is given to maintaining or improving areas that are in the best ecological condition.

Medium and low priority actions need to be initiated in the next two years through further investigation and design, and on-ground work where possible. Medium and low priority actions are typically more complex and will take time to implement and resolve.

4.4 RESPONSIBILITIES

A cooperative effort will be required to effectively implement actions arising from the Masterplan. Primary responsibilities are identified in the action table and essentially are as follows:

- Department of Environment, Climate Change and Water (DECCW) (National Parks and Wildlife Service) will be responsible for implementing actions within Georges River National Park
- Bankstown City Council (BCC) will be responsible for implementing actions outside the national park
- Sydney Water will be responsible for sewerage systems, including overflows

It is recommended that agreement be obtained from each party to implement the actions proposed in this Masterplan.

4.5 CATCHMENT-WIDE ACTIONS

Catchment-wide actions (e.g. community education and involvement, planning instruments) are summarised in **Table 4** and described below**.**

Table 4: Catchment-wide actions

NO.	ACTIONS	PRIORITY	COST	PERFORMANCE MEASURES	RESPONSIBILITY
A	Continue native plant give-away program (four plants per household; plus educational brochures)	Ongoing	N/A	Increasing uptake of offer by residents	BCC
B	Use local provenance terrestrial and aquatic plants for revegetation and rehabilitation activities; stocktake nursery supplies and increase tubestock and seed supply to enable revegetation in accordance with the Masterplan	High	$30,000	Plants available as required	BCC/DECCW
C	Monitor and enforce track use to prevent illegal/unwanted activities (e.g. motorbike riding, dog walking)	Ongoing	<$5,000 pa	Prevent erosion and ecosystem damage	DECCW
D	Incorporate WSUD provisions in planning instruments to target proposed redevelopment areas	High	<$5,000	Best practice planning provisions	BCC

NO.	ACTIONS	PRIORITY	COST	PERFORMANCE MEASURES	RESPONSIBILITY
E	Establish Bushcare groups to target edge of APZ and walking track rehabilitation. Generate interest by holding guided walking trips (link to Education Consultancy). Work with local residents to establish Bushcare sites in high priority areas	Ongoing	$10,000 pa	Sustained Bushcare activities; improve habitat; reduce weeds and rubbish; improve amenity	BCC (DECCW)
F	Replace grass verge at the front of residential properties with vegetated swale or filter strip (using local provenance ground covers and grasses). Select sites by invitation to interested residents. Demonstration sites to inspire others.	Med	$50,000 to design & construct demo sites; subsequent costs to be borne by residents	Gradual replacement of grass verges with vegetated swales. Improve aesthetics, stormwater management and habitat, and reduce mowing costs	BCC
G	Education to encourage rainwater tanks, reduced use of lawn fertilisers and greater use of native plants in gardens	Med	Incl. in Education Consultancy	Link education to Education Consultancy activities, including demonstration sites (see above)	BCC
H	Consult Dept of Health about mosquito education	Med	<$1,000	Information for education program to link to Education Consultancy	BCC/DECCW
I	Letterbox drop about the risks of dumping garden clippings and rubbish in the bush (e.g. weed proliferation, bushfire, poor amenity), pest animals and mosquitoes	High	Incl. in Education Consultancy	Brochure to change behaviour - link to Education Consultancy	BCC
J	Liaise with residents who are known to dump rubbish	Ongoing	<$1,000	Cessation of dumping by identified residents; fine repeat offenders	DECCW, BCC
K	Develop and implement a feral animal control plan, targeting high frequency areas for feral animals such as near the carpark.	High	$25,000 pa	Reduce threats to native species	DECCW
L	Update NSW Wildlife Atlas records based on existing records and ongoing monitoring	Ongoing	<$1,000 pa	Consolidated records can be used as basis for better management	DECCW/BCC
M	Negotiate access arrangements to enable BCC to clean & maintain BCC stormwater infrastructure within the national park	High	<$1,000 pa	Agreed framework for access arrangements	DECCW/BCC

4.5.1 Community education and participation

Strong interest in the Yeramba catchment was evident at the community consultation forum held for this Masterplan. Many local residents use the area for recreation (e.g. walking, bird watching, fishing) and are keen to support programs that improve environmental conditions and opportunities for passive recreation. There is an excellent opportunity to build on existing community interest through environmental education programs and public participation (e.g. bushcare, guided walks).

4.5.2 Planning instruments

Action 2.1.1 of the Metropolitan Strategy requires that stormwater and catchment objectives and targets be incorporated into local planning instruments, such as Local Environmental Plans (LEPs). BCC is revising its LEP in line with the Standard LEP template. This presents an opportunity for BCC to incorporate best practice planning provisions in the revised LEP to protect waterways such as Yeramba Lagoon and the Georges River.

Improved stormwater management planning policies are expected to result in:

- Greater use of water sensitive urban design (WSUD) by council, developers and residents
- Reduced peak stormwater flows and sedimentation of waterways
- Reduced contamination of receiving environments (e.g. weed propagules, pollutants associated with roads and gardens)
- Reduced use of mains water for irrigation and domestic activities

The Botany Bay Coastal Catchments Initiative (BBCCI) provides guidance to Councils on how to incorporate appropriate stormwater management and WSUD requirements into LEPs.[7] The BBCCI encourages local councils to incorporate provisions relating to the following matters in the LEP:

- The stormwater impacts of proposed urban land uses and zonings upon waterways
- Promotion of the principles of water sensitive urban design (WSUD) in the design and assessment of new urban development (including re-development)
- The adequacy and suitability of stormwater management systems proposed for new urban developments, in terms of complying with stormwater objectives or targets detailed in a consolidated council Development Control Plan (DCP)

A model clause has been drafted by BBCCI for consideration and possible inclusion in Council's LEP, either in Part 3: Special Provisions or in Part 2: General Restrictions on Development. It is provided in **Appendix D.**

4.6 LOCATION-SPECIFIC ACTIONS

Location-specific actions are provided in **Table 5** and **Figure 5.**

[7] Interim guidance is provided by the BBCCI until DECCW and the Department of Planning finalise requirements for Local Environmental Plans (LEPs), in the form of a Section 117 Direction (*Environmental Planning and Assessment Act 1979*) and supporting material.

Table 5: Location-specific actions to accompany Masterplan*

NO.	ACTION	PRIORITY	COST	PERFORMANCE MEASURES/OUTCOME	RESPONSIBILITY
1	Implement sewerfix program to reduce infiltration/exfiltration of sewage and stormwater, and minimise sewage overflows	High	N/A - funded by Sydney Water	Reduction in sewage/stormwater pollution (e.g. nutrients, pathogens) entering bushland and lagoon	Sydney Water
2	Remove weeds and built-up sediment associated with existing stormwater pollution control devices (i.e. detention pond and trash rack)	High	$5,000	Improve function and prevent devices becoming a source of pollution and flooding	BCC
3	Maintain existing stormwater pollution control devices immediately after heavy rainfall (or at least every year)	Ongoing	$5,000 pa	Optimise efficiency of stormwater pollution control devices	BCC
4	Repair fence around detention pond	High	<$5,000	Improve public safety and amenity	BCC
5	Vegetated swales (with local provenance groundcover and grasses) and pervious pavement driveways in areas on eastern side of Henry Lawson Drive where there is no kerb and gutter	Low	TBA	Improve stormwater management and aesthetics	BCC
6	WSUD at Sylvan Grove Native Garden - rainwater tank for main building	Low	$10,000	Rainwater supply	BCC
7	Install no dumping signs in areas of frequent dumping	High	$5,000	Reduced rubbish dumping and associated costs	BCC/DECCW
8	Install direction signage for main walking tracks (e.g. loop track around the lagoon, fire trail)	High	$10,000	Well-maintained track network, improved public safety	DECCW
9	Install informative signage at key locations and links to the Great Kai-Mia Way	Med	$10,000	Signage consistent with other signs for Georges River National Park, as specified in the BCC Education consultancy	DECCW
10	Close and revegetate/rehabilitate unwanted tracks and adjacent areas, giving priority to closing areas of sensitive habitat e.g. boggy areas close to foreshore or areas experiencing erosion	High	$20,000	Habitat protection, reduced erosion and improved public safety	DECCW
11	Maintain footbridge	Ongoing	No short term cost	Maintain access and public safety, protect habitat	DECCW

NO.	ACTION	PRIORITY	COST	PERFORMANCE MEASURES/OUTCOME	RESPONSIBILITY
12	Terrestrial weed control/bush regeneration near weir pumping station	Med	$10,000	Improved aesthetics and ecological value	DECCW
13	Upgrade the carpark within the existing footprint, including bush regeneration/weed removal in surrounding areas, maintain pervious ground surface for carpark	Med	$20,000	Upgraded carpark and landscaping	DECCW in consultation with RTA
14	Close carpark gate each night to prevent rubbish dumping (including abandoned cars)	Ongoing	<$5,000 pa	Prevent rubbish dumping (reduce environmental damage and costs for removal of rubbish)	DECCW
15	Investigate safety issues associated with informal car parking along southern edge of Henry Lawson Drive	High	<$5,000	Address public safety issue	DECCW in consultation with RTA
16	Remove rubbish from the lagoon (e.g. tyres, carpet rolls), integrate action with implementation of lagoon habitat restoration	Med	$10,000	Reduce pollution and improve amenity	DECCW
17	Remove dilapidated bird hide and rehabilitate surrounding bushland	High	<$5,000	Restore bushland	DECCW
18	Remove car wreck	High	<$5,000	Reduce pollution and improve amenity	DECCW
19	Construct boardwalk over drainage line	Med	$10,000	Reduce impact on habitat and improve amenity	DECCW
20	Construct boardwalk/viewing platform over lagoon	Low	$20,000	Improve amenity	DECCW
21	Follow-up maintenance of replanting sites until established (e.g. weeding, plant replacement)	High	$10,000 pa	Full restoration of cleared areas	DECCW
22	Maintain asset protection zone in accordance with Bushfire Protection Plan for Georges River National Park	Ongoing	$20,000	Satisfy requirements under the *Georges River National Park Bushfire Management Plan* and *Planning for Bushfire Protection 2006*	DECCW
23	Weed control on margin of APZ and bushland (with local bushcare groups, if possible)	Ongoing	$10,000 pa	Reduce fire hazard, improve amenity and habitat	DECCW/BCC

NO.	ACTION	PRIORITY	COST	PERFORMANCE MEASURES/OUTCOME	RESPONSIBILITY
24	Weed control and bush regeneration in Kennedy Street drainage line to allow native canopy trees and understorey to regenerate; revegetate areas that have been cleared of heavy weed infestation (e.g. near the trash rack) using species from the Upper Georges River Sandstone Woodland Community	High	$30,000 for professional bush regeneration contractors over two years then $5,000 pa for maintenance	<10% weeds after two years and ongoing; improving habitat over time	DECCW
25	Bush regeneration in Amberdale Avenue drainage line in accordance with a detailed vegetation management plan (VMP). Will involve staged clearance of heavy weed infestation and replanting; weed control has started at top of the drainage line. Revegetate using species from the Alluvial Woodland vegetation community. Consider earthworks to create a chain of ponds to manage stormwater quality and quantity to lagoon	High	$10,000 for VMP; $100,000 for professional bush regeneration contractors over two years then $15,000 pa ongoing maintenance; optional $50,000 to incorporate chain of ponds design and construction	<10% weeds after two years and ongoing; no erosion into lagoon; re-establish Alluvial Woodland plant species, with improving habitat over time (i.e. greater species diversity)	DECCW
26	Fitzpatrick Park (Georges River foreshore) – construct new concrete slab as base for picnic shed and BBQ facilities. Provide rubbish and fishing tackle bins nearby	Med	$20,000 then <$5,000 pa	Designated, well maintained picnic areas and facilities	DECCW
27	Fitzpatrick Park - revegetation (up to 20 plants) using local provenance tree species (e.g. *Casuarina)*	Low	$5,000	Improve connectivity and amenity	DECCW
28	Fitzpatrick Park - remove damaged table/chairs and BBQ	High	$1,000	Improve amenity	DECCW
29	Georges River foreshore - monitor tidal range. NB: parkland is already partly inundated by Xmas king high tides	Ongoing	$1,000	Data to inform management regarding sea level rise	DECCW
30	Monitor sea wall along Georges River (e.g. erosion, structural integrity) & restore degraded seawalls in accordance with DECC's (2009) *Environmentally Friendly Seawalls* guide	Ongoing - Medium	$100,000	Identify need to stabilise wall before a major problem develops. Replacement will improve public safety & amenity	DECCW

NO.	ACTION	PRIORITY	COST	PERFORMANCE MEASURES/OUTCOME	RESPONSIBILITY
31	Weir removal and lagoon rehabilitation - concept provided in Figure 6 of Masterplan	High	Breakdown indicated in Table 6 of Masterplan	Improve and maintain freshwater habitat in the upper lagoon; restore estuarine habitat in the lower lagoon; improve amenity and water quality; reduce aquatic weeds and fauna pests	DECCW
32	Initial harvest of aquatic weeds (mainly *Salvinia* and *Nymphaea mexicana*) in the lagoon while longer term management measures are being developed	High	$100,000	Removal of current infestation to improve ecological function and remove biomass/nutrients from system	DECCW

*Refer to Figure 5: Masterplan

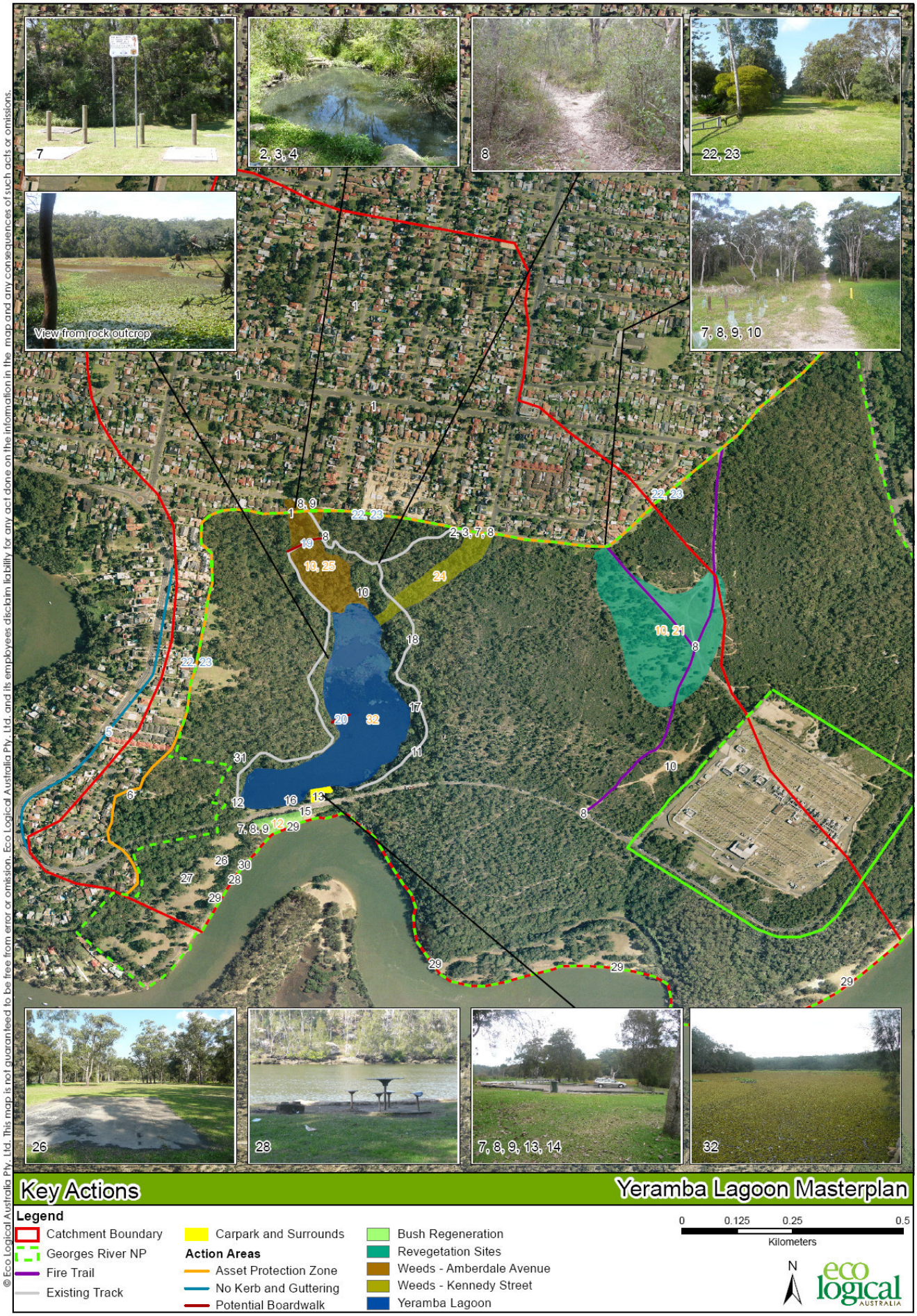

Figure 5: Masterplan

4.7 FURTHER INVESTIGATION AND DESIGN

Actions that require further investigation and design are identified in **Table 6.** These primarily relate to drainage lines north of the lagoon, the lagoon itself and the weir. A concept design for the lagoon is given in **Figure 6.**

Aquatic weeds and aquatic fauna pest species need to be managed in conjunction with other lagoon restoration activities. Management approaches outlined below need to be integrated in a detailed habitat restoration plan for the lagoon.

Table 6: Further investigation and design actions

STEP	ACTIONS	COST	OUTCOMES
M	Investigate capability of existing pump	<$1,000	Advise if pump will be available for weir removal activities
N	Bathymetric survey of lagoon, with detailed investigation just upstream of the weir	$25,000	Bathymetric data to inform proposed weir removal, including engineering, impact assessment, and habitat restoration
O	Ecological survey of the lagoon and fringing habitat	$20,000	Ecological data to inform proposed weir removal, including engineering, impact assessment, and habitat restoration
P	Assess acid sulphate soils (ASS) in the lagoon and near the weir in accordance with the ASS Manual (Stone et al 1998)	$15,000	Determine if an ASS Management Plan is required
Q	Prepare an ASS Management Plan if ASS are confirmed to be present and are to be disturbed near the weir or in the main body of the lagoon	$10,000	ASS Management Plan to inform design, construction and management
R	Prepare habitat restoration plan for the lagoon including proposed habitat changes, aquatic weed management, aquatic fauna pest removal, reintroduction of tidal flows to the lower part of the lagoon by removing the weir, reconfiguration of the lagoon floor by dredging and reclamation	$20,000	Detailed habitat restoration plan to be used as basis for impact assessment, approvals, on-ground works and monitoring; include transition management
S	Engineering investigation and design for weir removal; also consider predicted sea level rise	$30,000	Integrated design with habitat restoration plan to include staged removal of weir, expand mouth of lagoon, grade from base of culvert into lagoon body, use dredged sediment to create mounds in adjacent areas within the lagoon, and possibly increase the number of culverts
T	Environmental impact assessment and approvals for proposed weir removal and habitat restoration	$15,000 for REF informed by specialist studies	Obtain approvals and satisfy statutory obligations (e.g. *Noxious Weeds Act, Water Management Act, Fisheries Management Act, Threatened Species Conservation Act* and *Environmental Protection and Biodiversity Conservation Act*)
U	Implement habitat restoration plan for the lagoon and remove weir	$250,000	Improve water quality, freshwater and estuarine habitat and amenity in lagoon
V	Monitoring and ongoing adaptive management for the lagoon, including aquatic weeds and pest fauna management	$10,000 - $30,000pa	Maps and lists of habitat and species over time; water quality reports for the lagoon and receiving waters in the Georges River

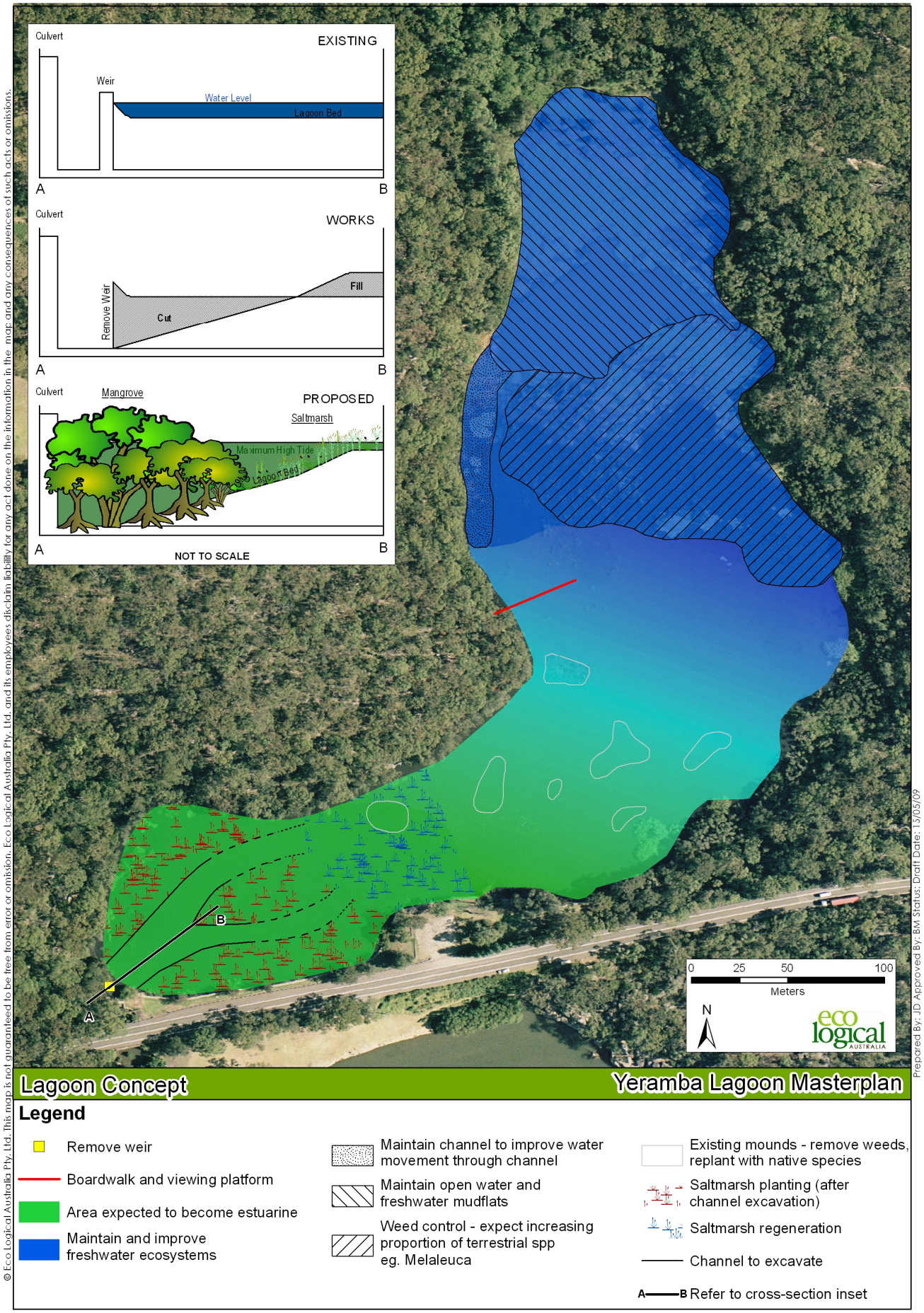

Figure 6: Lagoon restoration concept

4.7.1 Aquatic weed control

Salvinia molesta (Salvinia), *Nymphaea mexicana* (Yellow Waterlily) and *Alternanthera philoxeroides* (Alligator Weed) are the main aquatic weed species in Yeramba Lagoon. In May 2009, *S. molesta* covered the entire lower lagoon, with small infestations of *N. mexicana* on mounds. Species diversity (including weed species) is greater in the upper lagoon and access for management is more difficult.

S. molesta and *A. philoxeroides* are noxious weed under the *NSW Noxious Weeds Act 1993* and both species are classified as a Weed of National Significance because of their invasiveness and severe environmental, economic and social impacts. Control manuals have been prepared for these weeds (NSW Department of Primary Industries (DPI) 2006 and 2007).

Under Section 13 of the NW Act, the Department of Environment, Climate Change and Water is required to prevent the spread of aquatic weeds from the national park into adjoining areas.

Successful management of aquatic weeds is best achieved through integrating several control methods, with consistent follow-up. Controls that have been used to successfully treat aquatic weed infestations throughout Australia (NSW DPI 2006, 2007) include:

- Booms and containment fences – allows treatment of discrete patches of infestation
- Herbicide – variety of herbicides and application techniques. Multiple applications will be required. Cannot treat whole infestation at once due to effects of mass vegetation die-off on aquatic ecosystem
- Physical removal – mechanical removal is expensive, but useful for large infestations. Manual removal is labour intensive, but useful for small infestations or sensitive areas. Alligator Weed must be treated before disposal
- Biological control – Salvinia weevil (*Cyrtobagous salviniae*) and the Flea Beetle (*Agasicles hygrophila*) (climate and time-frame considerations). Note that this is not the most preferred option in the Sydney region due to low success rate of previous trials.
- Saltwater treatment – has been used successfully in Western Australia to control Salvinia (CRC Weed Management 2003)

The following actions are recommended for management of aquatic weeds in Yeramba.

Table 7: Aquatic weed management

ACTION	PERFORMANCE MEASURES
Initial harvest of *S. molesta* in the lower lagoon, removal of biomass from the lagoon and disposal (dried then buried or burnt) at an appropriate waste facility.	Reduce biomass[8] and nutrients in the lagoon Provide open water habitat Improve aesthetics Reduce mosquito habitat
Immediately after harvest, manually remove N. *mexicana* from small mounds in the lower lagoon and replant mounds with native species	Replace weeds with native species Improve habitat
Manual removal of weed species (other than *S.molesta which will be attacked by the Salvinia Weevil*) from the upper lagoon and large central	Replace weeds with native species Improve habitat

[8] *S.molesta* infestation can reach up to 400 t of wet weight per hectare

ACTION	PERFORMANCE MEASURES
mound. Replant with native species where it is unlikely that natives will regenerate unassisted	
Fortnightly follow-up for two years after initial harvest to prevent re-infestation. Use floating booms to contain re-infestation prior to manual removal	Minimise reinfestation and biomass to be removed
Biological control of *S.molesta* in the upper lagoon. Spring is the best season to introduce the Salvinia weevil. Monitor the effectiveness of biological control and its geographic spread throughout the lagoon	Usually takes one to three years to control an infestation by biological control (although this technique is usually more effective in warmer climates)
Remove weir and reintroduce tidal flows to the lagoon. Salt water will kill *S. molesta*. However, the tidal influence is likely to be small and will not be sufficient in itself to control aquatic weeds in the lagoon	Additional, sustainable control
Depending on the effectiveness of controls, reduce follow-up action to monthly	
Public education campaign to be run in conjunction with on-ground actions.	Raised public awareness about the problems associated with weeds and need for preventative management

4.7.2 Aquatic fauna pest management

Red-eared Slider Turtles (*Trachemys scripta elegans)* and Mosquito Fish (*Gambusia holbrooki*) are pest species inhabiting the lagoon.

NPWS has trapped and removed Red-eared Slider Turtles from the lagoon over the last five years. Monitoring by University of Western Sydney honours student James Robey, found that the Red-eared Slider Turtle population in Yeramba Lagoon comprises few individuals. No female turtles were found in the lagoon during monitoring. However, it is recommended that monitoring be continued to confirm the population is in decline.

Monitoring is needed to confirm the extent of infestation by Mosquito Fish in the lagoon. As a Class 3 noxious fish under the *Fisheries Management Act*, public education is needed to discourage possession and sale of this species. Improving habitat for native aquatic species will help to reduce the numbers of noxious species in the lagoon.

An aquatic species survey at locations throughout the upper and lower lagoon is required prior to removal of the weir and channel dredging. It is recommended that monitoring be undertaken after the initial harvest of aquatic weeds, and include consideration of Red-eared Slider Turtles and Mosquito Fish.