ACT Government

CANBERRA URBAN LAKES AND PONDS

LAND MANAGEMENT PLAN

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Contents

PART A: Plan Context and Development

1. How to use this plan

Readers of this Canberra Urban Lakes and Ponds Land Management Plan (the Plan) will have very different information needs, ranging from a general appreciation of the Plan as a whole to specific detail about a particular lake or pond. To enable readers to easily find relevant information, this Plan has been designed in the following way.

Part A: Plan Context and Development Describes:

- the vision for Canberra's urban lakes and ponds
- how to use this plan
- what the plan is for
- lake and pond functions in the urban landscape
- lake and pond values
- climate change implications for lakes and ponds
- the water bodies covered by this plan.

Part B: Planning Framework Sets Out:

- how the plan was prepared
- the policy framework and statutory requirements.

Part C: Management of Lakes and Ponds Details:

- who manages Canberra's urban lakes and ponds
- how Canberra's urban lakes and ponds will be managed
- the level of development and facility provision that can be expected
- how performance will be measured.

APPENDICES

The appendices provide essential information in support of the Plan. They help readers identify commonly used terms and abbreviations (Appendix A), and list all current Neighbourhood Ponds (Appendix B), key legislation (Appendix C) and policies or references readers may wish to consult for additional detail (Appendices D to F).

2. The Vision

The Vision for Canberra's Urban Lakes and Ponds

To enrich local communities through the aesthetic, recreational, sporting, tourism, cultural and ecological values of lakes and ponds, and to provide opportunities for people to be involved in their use, care and management.

A vision draws on people's imagination, insight and wisdom to identify a future of great inspiration and foresight. A vision statement positions an organisation to look beyond day-to-day services, initiatives and issues in order to spearhead what could be or should be in the future. It guides decision making by providing a framework in which objectives, strategies and services can be set.

How will the vision be realised?

Through the sustainable development and management of urban lakes and ponds, while meeting the management objectives as defined under the Planning and Development Act 2007. This will be done in a manner that provides opportunities for a diverse range of recreation, sporting and tourism activities, and by involving the community in the planning, management and care of lakes and ponds, their immediate surrounds and their environmental, social, cultural and heritage values.

3. Purpose of the Plan

This Plan aims to:

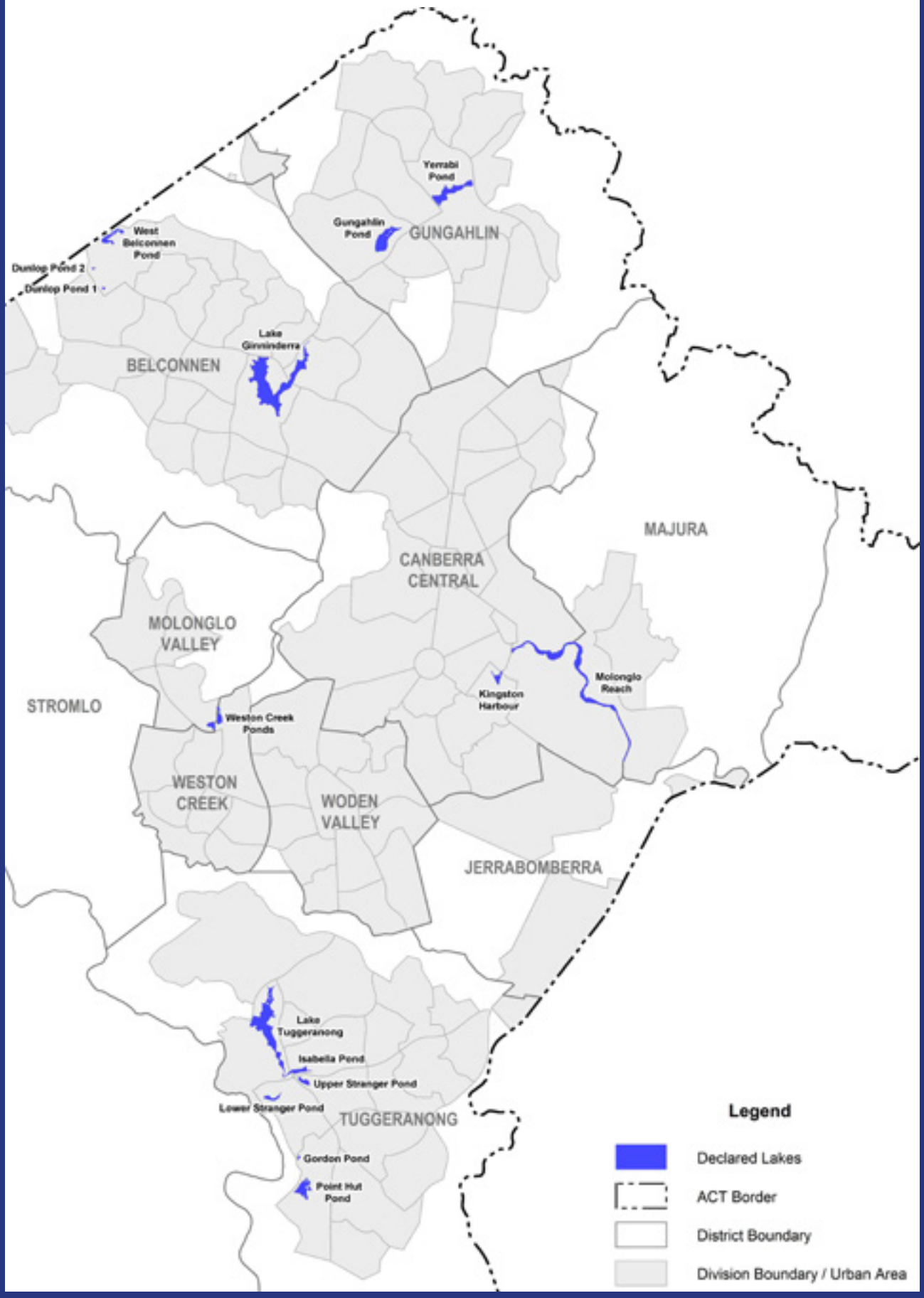
- present the framework guiding the management of Canberra's urban waterbodies in a manner responsive to a range of environmental and community values
- communicate management intentions associated with managing Canberra's urban waterbodies
- document the management vision, core values and services for Canberra's urban waterbodies
- complement other associated plans and strategies
- provide performance indicators to monitor the implementation of the Plan.

4. Waterbodies Covered by the Plan

The Plan covers lentic or still waterbodies (lakes, ponds and wetlands) within the Parks and Recreation Zones in the Territory Plan. However, this Plan does not include:

- Lake Burley Griffin, which is managed by the National Capital Authority (Lakes Ordinance 1976 (Cth))
- rivers, creeks or streams
- waterbodies on public land that have a reserve management plan under the Nature Conservation Act 2014 (Appendix C) and/or are covered by the ACT Aquatic and Riparian Conservation Strategy 2018
- waterbodies on private property
- small raingardens in road reserves or as part of road drainage.

Figure 1. The major urban lakes and ponds covered by this Land Management Plan



5. Water Quality and the Community

This Plan is informed by the community values that were identified in the report *Water Quality and the Community: understanding the views, values and actions of residents of the ACT and surrounding region* (Schirmer and Mylek 2016) that was commissioned by the ACT Government and prepared by the University of Canberra in February 2016. This report assessed the knowledge, attitudes and values of residents living in the ACT and nearby areas of NSW in regard to waterways, storm water issues and factors affecting water quality in the region.

Community perspectives

Schirmer and Mylek 2016 provides extensive data about everyday practices that negatively affect water quality.

The key survey results indicate that:

- waterways are well used and highly valued by the community for:
  - aesthetic qualities, particularly when water bodies are visible
  - appreciation of the existing natural systems and aquatic life
  - the wide range of available recreational opportunities, including fishing, swimming and boating
  - facilities for family and group gatherings, including barbeques
  - opportunities to interact with the natural environment
- most people rate water quality in most of Canberra's lakes as poor
- most people support actions to improve water quality
- awareness campaigns are required to help change behaviours.

While residents were most likely to consider packaging waste a big problem for local water quality, followed by blue green algal blooms and pest fish species, scientists considered leaf litter and grass clippings entering the stormwater system to be the biggest problem and that pest fish species made a relatively low contribution to water quality problems.

This suggests that well targeted and conceived community engagement and behaviour change campaigns, such as the H_2OK campaign as part of the ACT Healthy Waterways Project, along with appropriate management of suburban tree leaf drop and open space grass clippings, will help improve water quality, particularly through seeking to reduce the volume of leaf litter and garden clippings entering stormwater drains in urban areas.

The ACT's natural environment and access to open space and outdoor recreation opportunities are widely recognised as contributors to the livability of Canberra (ACT Commissioner for Sustainability and the Environment 2016).

6. Core Lake, Pond and Wetland Values

Core values relate to the degree of the various functions and services provided by Canberra's urban lakes and ponds. These values are identified below, while more specific values are listed for larger lakes and ponds in Part C Chapter 5 (Service Delivery). The icons used throughout Part C (Management of Lakes and Ponds) indicate the presence of these values at each lake or pond.

Table 1. Core values and symbols representing them

Icon	Core value	values associated
	Ecological environmental	» water quality » natural heritage » aquatic plants and animals
	Fish	» recreational fishing
	Visual landscape amenity	» those aspects which appeal to visual senses » vistas and views
	Aboriginal	» evidence of past Aboriginal occupation or use* » areas of significance to existing aboriginal comunites* » cultural heritage*
	Historic	» evidence of past European occupation or use » cultural heritage*
	Recreation	» a wide range of informal recreation activities which people associate with lakes and ponds
	Sport	» a limited range of facilities which cater for competitive water sport
	Tourism	» features which attract a high proportion of interstate and international visitors
	Commercial	» services which may be available to lake and pond visitors for a charge
	Flood management	» lake and pond aspects that serve a flood management function

* For further information please contact the Heritage Unit on 13 22 81

Lakes, ponds and wetlands are components of a highly integrated hydrological system

The water quality and ecology of urban lakes and ponds (including wetlands) is a reflection of the pond size, catchment condition and management regime.

Catchment land use (parklands, residential, industrial, commercial) and management practices (mowing, street cleaning, fertiliser application, etc.), including flow retardation and pollutant interception measures, will impact on the pattern and form of water delivery and pollutant loading on the lakes or ponds, driving their water quality and ecology. The shape and size of the lake or pond will further modify the dominant water quality and ecological processes.

More significant than their local provision of open space, landscape amenity and recreation values, lakes and ponds are key management components in respect to securing wider flood and pollution control objectives. They incorporate significant storage capacity for the retardation (detention) of stormwater discharges, thus mitigating some of the negative effects of urbanisation on catchment hydrology and providing flood protection to properties downstream. They enable the interception of urban stormwater pollutants, thereby protecting downstream waters from both pollution and flow disturbance.

Lakes and ponds add diversity to the built form of the urban landscape and can deliver economic benefits by increasing nearby land values and providing focal areas for community activities.

The catchment land use, management practice, drainage type, flow retardation and pollutant interception practices, and lake and pond water quality and ecology are all interlinked, and must be considered as an integrated whole.

A range of agencies coordinate to deliver services to particular standards in respect to the environmental and use values of lakes and ponds. These agencies have responsibilities for:

- catchment land use management and regulation
- urban development
- land and waterway management
- compliance and enforcement
- provision and maintenance of drainage and pollutant interception devices.

Physical, chemical and ecological processes in lakes and ponds

With more impervious surfaces in urban landscapes, stormwater run-off is characterised by shorter, more intense discharges compared to most non-urban areas, which have slower run-off because of interception by vegetation and permeable soils. The urban stormwater discharges are high in litter, suspended solids, organic matter, nutrients and bacteria (refer Figure 2).

During stormwater discharges, nutrients, organic material, bacteria and toxicants adhere quickly onto surfaces of suspended solids, and form sediment under the flow detention conditions in ponds and lakes. Litter discharged in storm events may be trapped in lake or pond vegetation, detracting from aesthetic values, while litter trapped in sediments may impact on micro-fauna.

Following a storm event, sediments and suspended organic material decompose, depleting oxygen in bottom waters and sediments, which changes some nutrients and toxicants to soluble forms, with their release back into the water column.

Most of Canberra's lakes and ponds have elevated nutrient levels, resulting in excessive algal and bacterial growth, which can lead to oxygen depletion and possible fish kills. These processes are symptoms of eutrophication and in the urban environment is often induced by the discharge of detergents and fertilisers into waterbodies. Stratification occurs in Summer when a warm layer of water sits on top of a cold, oxygen-depleted layer of water in deep waterways such as lakes and ponds. This can further exacerbate nutrient levels in urban waterways. Stratification can be broken down by either reductions in temperature, increased wind or stormwater.

Soluble nutrients released from the sediments are taken-up by algae and/or water plants.

The period of algal growth may be followed by growth in the numbers of micro-animals (zooplankton) grazing the algae. In turn, the zooplankton provide the food source for the crustacea (water fleas and shrimps) and higher vertebrates (fish). Under conditions of reduced light (elevated suspended solids or turbidity) and poor mixing, the blue-green algae, with their flotation capability, are likely to be the dominant algal group.

In ponds, subsequent storm event discharges may wash out a significant proportion of algae and other remobilised pollutants, while elevated suspended solids in lakes will temporarily reduce the bio-availability of nutrients and limit light required for algal photosynthesis (temporary reduction in algal levels).

In shallow waters (< 1.5 metre) with extensive emergent aquatic plants (macrophytes), the macrophytes enhance the sedimentation process and, by transferring oxygen through their stems to their root zones, offset the oxygen reducing conditions and phosphorus remobilisation. The high rates of detritus accumulation in the sediments of these zones supports a range of organic decomposers and detritus feeders (protozoa, midges). In turn, crustacea (copepods, shrimps) and insect larvae graze on the decomposers and detritus feeders, and provide the food source for the higher vertebrates (frogs, turtles, aquatic birds and fish).

Biofilm may develop on the surfaces of macrophytes and on the surfaces of sediments. Biofilm-based systems occur in situations of low-flow velocities, low suspended solids, with nutrients and organics in predominantly dissolved and colloidal forms.

The biofilm biologically takes up nutrients and fine organic colloids, transforms the organic material by enzyme processes, and transfers the nutrients to the sediments through settling. They may be observed in the higher water quality intermediate and downstream zones of the larger lakes during dry (few storm discharges) periods.

Because of the connectivity between ground and surface water, polluted groundwater can eventually result in lakes, ponds and other waterbodies becoming polluted, and vice versa (ACT Commissioner for Sustainability and the Environment 2016). However, lakes and ponds also play a role in aiding groundwater table recharge. This is of particular importance in urbanised environments where recharge patterns can be affected by infrastructure, such as roads, buildings and car parks, that makes the land surface less permeable (Lerner 2004). Canberra's water drainage network provides many natural, enhanced and constructed lakes, ponds, wetlands and raingardens that, among other things, allow for surface water recharge of the groundwater table.

In view of the storm event nature of lake and pond water quality and ecological processes, the water quality and ecology of lakes and ponds is highly variable, but ultimately reflects the combination of long-term climatic conditions, activities in the catchment, and in-lake ecological succession processes.

Figure 2. Lake and pond water quality and ecological processes

Lake, pond and wetland water management zones

Lakes and ponds are designed for a pattern of progressive water quality improvement downstream as water moves through the lake or pond (Figure 3), resulting in three distinct water management zones:

WATER MANAGEMENT ZONE 1

(Inlet zone) is high in suspended solids, nutrients, organic material and bacteria. Typically, this zone comprises the shallow water–emergent aquatic plant ecosystems described above. It is a highly productive zone, sustaining high biomass of plants, macroinvertebrates, fish and birds. This zone is primarily managed for water quality processes and conservation purposes. The prevailing water quality conditions prevent body contact recreational activities. Intensive management of aquatic plants and rubbish in this zone is critical to sustaining the water quality and ecology of downstream zones.

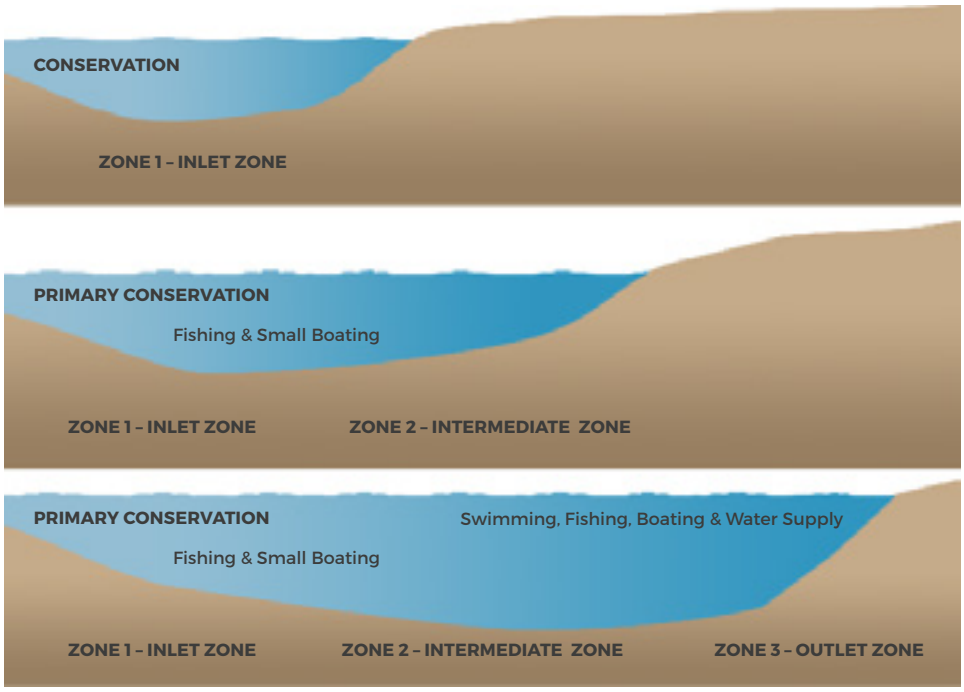
WATER MANAGEMENT ZONE 2

(Intermediate zone) includes the edge of the macrophytes and clear water, with reduced (fine) levels of suspended material, nutrients and bacteria. It typically comprises extensive submerged macrophytes and epiphytic and planktonic algae. This submerged vegetation may limit boating activities. Prevailing water quality conditions may periodically prevent body contact recreational activities.

WATER MANAGEMENT ZONE 3

(Outlet zone) is low in suspended solids, nutrients and bacteria, and low in planktonic algae. Typically, this zone comprises the deep water–planktonic algal ecosystems described above. This zone can accommodate a wide range of water-based recreational activities on a reasonably frequent basis.

Figure 3. Water management zones (Adapted from CRC for Freshwater Ecology)



Within the intermediate and inlet zones, most edge areas have emergent macrophytes, with a width of 2–4 metres. The edge area exhibits many of the characteristics of the shallow extensive emergent macrophyte ecosystem described above. In this case, suspended solids and organic material (algae) are washed into the macrophyte beds from the open waters by wave action, while run-off from the adjacent foreshore area discharges suspended solids, nutrients and organic material.

At times, water conditions such as algal blooms, fecal (sewage) pollution, toxic (chemical) spills and the like may require an entire water body to be closed temporarily in order to exclude body contact recreational activities. Closures are performed under provisions of the Lakes Act 1976 and the Public Health Act 1997. Warnings and closure for ACT lakes are also guided by ACT Health's ACT Guidelines for Recreational Water Quality, which address risks from blue-green algae as well as microbial pathogens.

Lake and pond cultural heritage significance

Waterways in the ACT, particularly main waterways such as the Murrumbidgee and the Molonglo rivers, are generally of high cultural significance to our Traditional Custodians. They are associated with pathways, songlines and important ceremonial areas and living places.

While this Plan addresses lakes, ponds and wetlands created through recent engineering, they still have Aboriginal cultural associations and can be of cultural significance to Traditional Custodians and post-contact history.

Additionally, many of the waterbodies contain Aboriginal heritage places of cultural and heritage significance that are protected by the Heritage Act 2004. Some lakes and ponds also have potential to contain unrecorded places and objects of heritage value which, if present, are also protected by the Heritage Act.

PART B: Planning Framework

1. How the Plan was Prepared

The format of this Plan complements the five other land management plans for public open space— Belconnen, Woden–Weston, Tuggeranong, Inner Canberra and Gungahlin—and will also complement the land management plan for the new urban area of Molonglo, once completed. These plans make up a family of plans that cover all public open space and sports grounds in urban parts of the ACT.

The content of this Plan reflects feedback on values and issues raised by stakeholders, including the ACT community, and directions from surveys of community values and uses of the ACT's lakes and ponds.

2. Statutory Requirements

This Plan has been prepared in accordance with the Planning and Development Act 2007 (the Act). In accordance with section 317 of the Act, if there is an inconsistency between the application of two management objectives, the objective appearing later in the schedule is to be read subject to the earlier objective, thus creating an hierarchy of management objectives.

The hierarchy of management objectives for lakes and ponds, as stated in the Act:

1. Prevent and control floods by providing a reservoir to receive flows from rivers, creeks and urban run-off.
2. Prevent and control pollution of waterways.
3. Provide for public use of the lake or pond for recreation.
4. Provide habitat for fauna and flora.

Appendix C details the requirements of the Act and how this Plan satisfies those requirements.

3. The Policy Framework

Land planning and management in the ACT is the responsibility of both the Commonwealth and ACT governments. The division of responsibilities is determined by the Australian Capital Territory (Planning and Land Management) Act 1988 (Cth), which provides for two categories of land in the ACT:

- National Land used by or on behalf of the Commonwealth and managed by the Commonwealth, including some centrally located parkland. In particular, the 'symbolic' open spaces associated with the Parliamentary Zone/War Memorial are National Land and, as such, are outside the scope of this Plan.
- Territory Land is all the remaining land of the ACT (i.e. land that is not declared National Land); it is managed by the ACT Government.

A feature of planning in the ACT is the existence of two planning bodies—the Commonwealth's National Capital Authority and the ACT Government's Planning and Land Authority.

The National Capital Plan, prepared and administered by the National Capital Authority (NCA), has the object of ensuring 'that Canberra and the Territory are planned and developed in accordance with their national significance'.

It sets out general land use and other planning policies for the Territory as a whole. It also specifies areas having 'the special characteristics of the National Capital' to be Designated Areas. The NCA has the planning responsibility for Designated Areas, which may be either national or territory land. In Designated Areas, all proposed works (building works, landscaping, tree-felling, excavations) managed by the ACT Government are subject to NCA approval.

Planning for areas that are not Designated Areas is the responsibility of the ACT Government, which prepares and administers the Territory Plan. The overall object of the Territory Plan is 'to ensure, in a manner not inconsistent with the National Capital Plan, that the planning and development of the ACT provide the people of the ACT with an attractive, safe and efficient environment in which to live, work and have their recreation'.

The Territory Plan assigns all land outside Designated Areas to one of seven major land use zones. The Territory Plan map identifies the land coverage for each land use zone. Planning and development of land within each land use zone is guided by the detailed principles set out in the Territory Plan Statement of Strategic Directions. The areas covered by this Plan are water bodies mapped as 'Urban Open Spaces' land use zone in the Territory Plan.

The Water Use and Catchment General Code in the Territory Plan identifies these water bodies in terms of the permitted uses and environmental values.

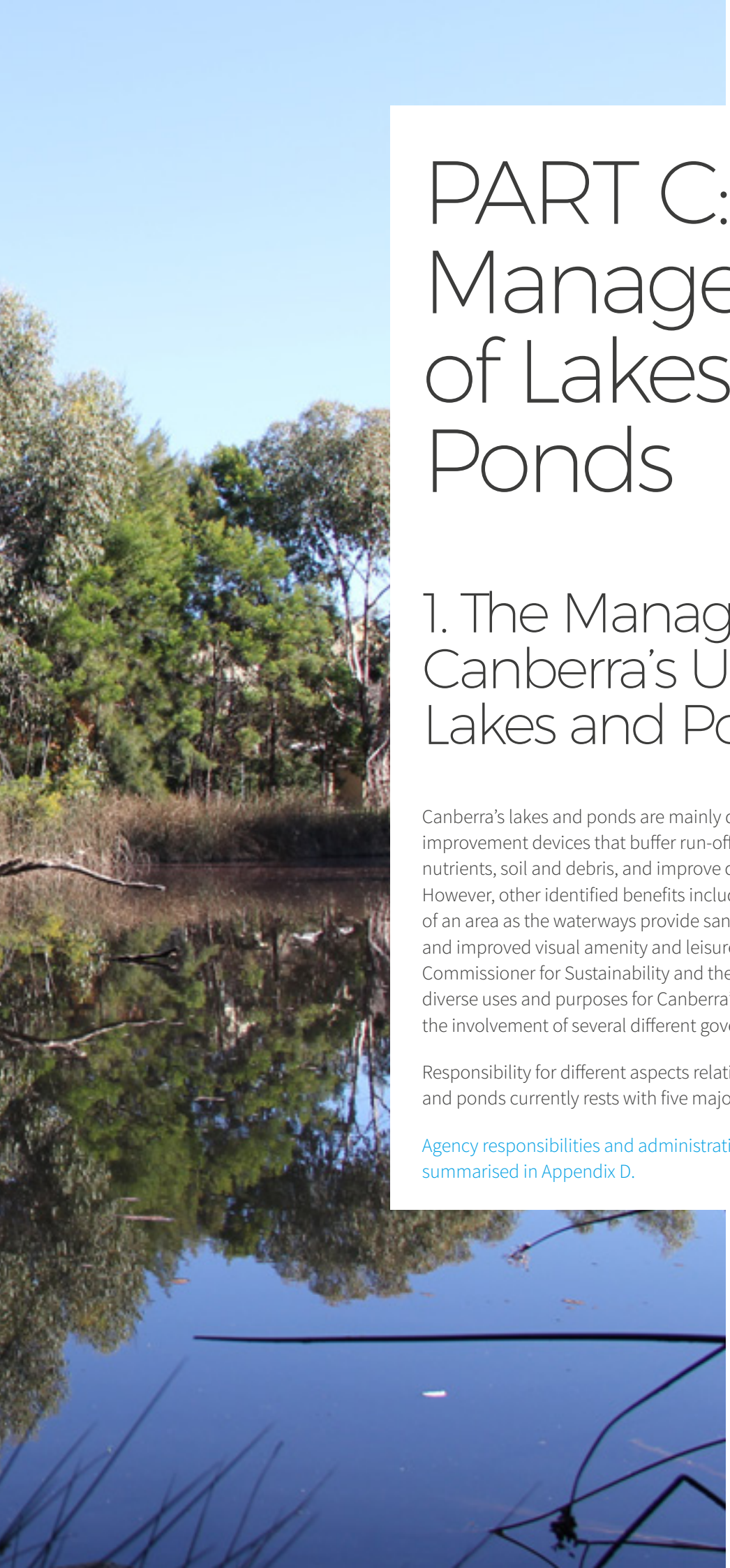
For the purposes of the Environment Protection Act 1997, 'Part 4 – Water' of the Environment Protection Regulations 2005 is known as the 'Water Quality Guidelines'. Schedules 3 and 4 of these regulations define environmental values or water uses consistent with the Water Use and Catchment General Code of the Territory Plan. Ambient environmental standards in relation to water quality for waterways are defined in Schedule 4 taking account of the environmental values present or water uses permitted.

The ACT Guidelines for Recreational Water Quality (ACT Health 2014) provide a framework for the management of health issues for the lakes, where primary contact (swimming) recreational activities are permitted. These guidelines support the requirements of the Public Health Act 1997 in which the Chief Health Officer has responsibility for issuing public health alerts and the Minister can declare public health risk activities and public health emergencies. Similarly, the Lakes Act 1976 has provisions for the Minister to prohibit the use of a lake, or parts of a lake, if the water conditions constitute a threat to human health.

The Chief Health Officer, in conjunction with the Environment Protection Authority (EPA) and Transport Canberra and City Services, provides advice on bacteria and blue-green algae risks to the public in relation to recreation on the lakes and ponds. The EPA provides advice on and investigates pollution incidents. This information is critical when Transport Canberra and City Services provides advice to the public on the health risks and possible closures of a lake. Warning signs are present at high-traffic water entry areas and designated recreational sites; they are changed to advise the primary contact status in conjunction with the Transport Canberra and City Services website.

The Lakes Act 1976 also regulates certain activities such as boating. At the time of preparing this Land Management Plan, 15 waterbodies were declared 'lakes' for the purposes of the Lakes Act 1976.

Other statutory instruments relevant to this plan are listed in the Appendix C.



PART C: Management of Lakes and Ponds

1. The Managers of Canberra's Urban Lakes and Ponds

Canberra's lakes and ponds are mainly designed as stormwater improvement devices that buffer run-off from urban areas, trap nutrients, soil and debris, and improve downstream water quality. However, other identified benefits include increases in the biodiversity of an area as the waterways provide sanctuary for plants and animals, and improved visual amenity and leisure areas for the community (ACT Commissioner for Sustainability and the Environment 2016). These diverse uses and purposes for Canberra's lakes and ponds necessitate the involvement of several different government agencies.

Responsibility for different aspects relating to Canberra's urban lakes and ponds currently rests with five major agencies.

Agency responsibilities and administrative arrangements are summarised in Appendix D.

2. Lakes and Ponds in a Changing Environment

Climate change and the forecasted increase in weather variability and associated extreme events presents many challenges for managing water assets (Neave et al 2015). Climate change is expected to have significant impacts on the ACT and broader region through lower than average and more erratic rainfall, resulting in an overall drying of the region and increased flash flooding (ACT Government 2019).

As living systems that can support dense plant life, lakes and ponds can help capture carbon dioxide and store carbon (a potent greenhouse gas that contributes to climate change), potentially slowing the rate of global warming. When managed appropriately lakes and ponds can offer benefits in reducing climate change impacts, namely: storing floodwaters, capturing carbon, providing shade from associated vegetation and sustaining biodiversity. However, climate change poses one of the greatest risks to sustainable water management as pressure mounts to allocate increasingly scarce water resources to competing uses (Neave et al 2015).

Constructed wetlands in the urban environment are a means to address human-induced water quality impacts. In addition, vegetation provides shade, cooling, protection from winds and noise buffering, all of which have heightened importance in a changing environment (Ely and Pitman 2014).

Urban lakes, ponds and wetlands can provide climate change adaptation benefits by helping to reduce urban heat pollution and the urban heat island effect. Urban waterbodies can also help improve local microclimates, making them critical components of Canberra's green infrastructure to maintain and improve the city's liveability.

The United Nations Inter-governmental Panel on Climate Change has projected that climate change will reduce water quality even with conventional treatment, due to the interaction of increased temperature and sediment loads, fertiliser-polluted run-off during high rainfall events, increased concentration of pollutants during droughts, and disruption of treatment facilities during floods. Additionally, as a result of climate change lakes and ponds may be under increasing pressure to provide irrigation to surrounding areas, particularly recreational zones. Lakes can allow for the absorption of more water into the surrounding soil, water table and the landscape in general, thus facilitating a reduction in the dispersion of polluted water, and more stored groundwater to further protect against drought impacts.

The ACT State of the Environment 2015 report found that overall the ACT's surface water quality is in a good condition and improving relative to the previous reporting period (2007–11).

This is probably due to higher rainfall during the 2011–15 assessment period of the current report, and the implementation of effective management practices. This report also found that the main pressures on the ACT's water resources are land-use change, climate variability and change, and water resource infrastructure. Climate change is expected to have a major impact on water resources in the ACT, exacerbating the existing effects of climate variability.

Forecasted climate change has the potential to affect more than just water availability, with many water quality indicators likely to be negatively impacted, resulting in significant negative impacts on both the environment and consumption (Neave et al 2015). Understanding the significance of climate change, and determining responses to it within the context of this variability, presents an ongoing challenge for water management (Neave et al 2015). Through the ACT Hydrogeological Landscapes project, a University of Canberra PhD student was commissioned to undertake a regional scale assessment of hydrological vulnerability to climate change. The Draft ACT Wetland Mapping, Classification and Assessment of Hydrological Vulnerability Report (Cowood 2015) found that the wetlands in the best condition and most resilient to climate change were typically located in the current reserves network (therefore not covered by this Plan) and are considered to be protected and under low land-use pressure.

Wetlands with the worst condition and least resilience to climate change were typically located in areas where urban development has occurred, or representing high land-use pressure. This suggests that while there are potentially many climate change benefits from having urban water bodies in the landscape, those in the urban environment are in a worse position than those in a more natural environment.

3. Objectives, Principles and Strategies

The Water Sensitive Urban Design General Code in the Territory Plan lists a number of key principles that underpin the implementation of water sensitive urban design, being:

- the principles of integrated catchment management
- protecting ecological and hydrological integrity
- integration of good science and community values in decision making
- management of stormwater as close to source as possible
- equitable cost sharing.

These key principles are secondary to the management objectives for lakes under the Planning and Development Act 2007 (see Part A: Statutory requirements). Within this policy framework, Table 2 below sets out the complementary management objectives and strategies derived from the issues, values and objectives detailed in Water quality and the community: understanding the views, values and actions of residents of the ACT and surrounding region, discussed in Part A, Chapter 5 of this Plan, together with suggested strategies for achieving them and related service delivery programs.

Table 2. Management objectives and strategies

Management objectives	Strategies for meeting objectives and actions
1. Prevent and control floods by providing a reservoir to receive flows	Flexibility to respond to emerging needs and issues » Establish administrative procedures, supervision and monitoring programs to ensure compliance with agreed uses and conditions of use
	Limit potential risks to acceptable levels » Risk/hazard inspections and assessments » Adopt designs that minimise risk » Exclude from hazard areas, provide information regarding hazards, use legal deterrents, introduce education programs » Develop contingency plans for major hazards
	Effective management and coordination » Integrate lake and pond development and management with the wider catchment land use and management » Describe the nature, value, condition and maintenance requirements of the assets » Have an ongoing maintenance program to maintain assets in serviceable condition » Augment or upgrade facilities to accommodate growth in demand or level of use
	Accountability » Establish performance monitoring programs and annual reporting against performance criteria
2. Prevent and control pollution of waterways	Protection/restoration of water quality » Implement catchment land-use and development controls, pollution control » Provide infrastructure » Maintain water quality zones through lakes and ponds
3. Provide for public use for recreation	Provision of a range of quality recreation opportunities » Implement water quality and ecology based determination of sustainable uses and levels of use » Provide clear information on permissible, conditional and non-permissible uses, location, quantum, water quality and service standards » Establish a system of zoning (location, time) to separate potentially conflicting uses (accommodate a range of uses) and assess ecologically sustainable uses » Provide access and other facilities enabling full enjoyment of scheduled uses » Augment or upgrade facilities to accommodate recreation demands and use levels » Stock selected lakes with native fish to maintain the recreational fishery
	Transparent, open and participatory processes » Use Land Management Plan as a vehicle for community partnership in the development of programs and agreed uses and conditions of use » Provide clear information on permissible, conditional and non-permissible uses
	Safe and convenient access for all permissible uses » Establish processes for new use applications and review allocation of resources across competing groups. » Assess access in relation to a comprehensive range of community groups
	Partnership with the community » Seek joint projects with community recreation, lake, pond, wetland, catchment, land care and Waterwatch groups and clubs » Encourage and support ‘Adopt-a-Wetland’ groups

Management objectives	Strategies for meeting objectives and actions
4. Provide habitat for fauna and flora	Provision and enhancement of landscape values » Assess existing qualities and enhancement opportunities » Consider as part of development and maintenance programs including mowing regimes
	Ecologically sustainable use and management » Ecological-based zoning and consideration of sustainable uses » Use conservation plans for select areas and/or species » Stock selected lakes with native fish
	Urban waterway restoration » Capture opportunities for conservation of aquatic ecology associated with lakes and ponds

4. Management Guidelines

This land management plan is one of six land management plans which, when considered as a full complement, cover the whole of urban Canberra (refer Figure 4). The land management plans are the key documents that guide all planning and management activities in all urban open space, lakes and ponds. While the plans are the primary reference documents in the management of Canberra's open spaces, the ACT Government and its agencies has adopted an adaptive management approach to the management of public assets in order to effectively and efficiently meet the community's expectations and requirements.

Figure 4. How this Plan relates to other planning and management systems.

To implement the objectives of the Territory Plan the ACT Government has developed a number of management guidelines. These guidelines detail the Government's position in relation to particular issues. They also guide management processes and are reflected in the contract specifications prepared for service providers.

In order to manage Canberra's urban lakes and ponds in a consistent way, management guidelines indicate clearly how particular matters will be managed. The matters covered by the current management guidelines are summarised in Appendix E.

As the management guidelines are updated from time to time, it is advisable to contact EPA (13 22 81 or www.accesscanberra.act.gov.au) if more detailed information is required.

5. Service Delivery

To achieve the management strategies and actions identified in Chapter 12, actions and services will be provided in five key areas:

1. aquatic plant and animal management
2. litter removal and cleaning
3. asset management
4. recreation and sporting use
5. water abstraction

The aim is to provide for the cost-effective delivery of these services while ensuring achievement of the overall vision and objectives. Several agencies deliver various services contributing to the vision and objectives, as detailed in Table 3.

Table 3. Services to be provided regarding Canberra's urban lakes and ponds.

Service	Responsible Agency	Statutory/Non-statutory
Activities and Uses		
Regulation of recreation and sporting use	AC	S
Lakeshore restoration	TCCS	NS
Lakes information services (website)	TCCS	NS
Monitoring visitor numbers and visitor satisfaction	TCCS	NS
Management policies	TCCS	S
Asset management and provision	TCCS	S
Community involvement/engagement	TCCS	NS
Wildlife management, feral animal control	EPSD	S
Dams/weirs safety inspections	TCCS	S
Emergency contingency plans	ESA	S
Lake closures	AC	S
Aquatic Plant Management		
Aquatic plant/habitat management	EPSD	S
Aquatic plant control at beaches etc. feral plant removal	TCCS	S
Water Quality		
Litter removal, cleaning	TCCS	NS
Blue-green algae monitoring	AC	S
Microbial monitoring	HD	S
Water quality monitoring	EPSD	NS
Water quality compliance	AC	NS
Water pollution monitoring	EPSD	NS
Pollution control from non-point sources	AC	S
Pollution control from point sources	AC	S
Gross pollutant trap maintenance	TCCS	S
Water quantity level monitoring	EPSD	NS
Animal Management		
Fish stock of lakes	EPSD	NS
Clean up of fish kills	TCCS	NS
Feral animal control	EPSD	S
Native animal protection	EPSD	S

Note:
AC Access Canberra
EPSD Environment, Planning and Sustainable Development Directorate
ESA Emergency Services Agency
HD Health Directorate
TCCS Transport Canberra and City Services Directorate

6. Overall Lake and Pond Management

Canberra's urban lakes and ponds will continue to be developed to cater for an appropriate range of the water-based recreation and sporting needs of existing and future communities, as well as sediment retention, water table recharge benefits and fit-for-purpose water supply. To ensure as wide a range of benefits and management objectives as possible, as envisaged by the vision statement, it will be necessary for parts of the lake and pond system to be developed and managed differently. Management should reflect the inherent values and functions of each individual lake and pond, and respond to the needs of surrounding and regional communities, while still being consistent with the management objectives as stated in the Planning and Development Act 2007.

The ACT State of the Environment 2015 report found that all lakes and ponds contribute positively to the ACT, largely because they add to Canberra's livability. However, their primary functions, particularly water quality improvement, mean that other direct human uses may need to be regulated. Such activities are prohibited in some ponds, and may be subject to closures in the large lakes. Water management zones have been determined for each ACT-managed water body, based on water quality and ecological criteria, with allowed activities being stated against each water management zone.

Facility and activity provisions

Initiatives are improvements or modifications that may be proposed to enhance the quality or use of Canberra's urban lakes and ponds. Various initiatives are proposed in this Plan, but will be subject to detailed assessment and funding. These initiatives have been categorised into broad headings, as identified in Table 4, and would normally apply within, or adjacent to, the indicated management zone.

Signage

Under the Lakes Act 1976 the minister may, by a sign erected or displayed within a lake area, give information or warning to people using the lake area, or specify an area in the vicinity of the sign as a:

- launching area
- mooring area
- beaching area
- swimming area
- area where boat embarkation/ disembarkation is not permitted
- area where the landing of boats is not permitted
- area where boat embarkation/ disembarkation, other than a boat of a kind specified in the sign, is not permitted
- area where bathing, swimming, diving is not permitted.

Table 4. Water management zone facility and activity icons

Initiative	Description	Zone 1	Zone 2	Zone 3
	Sandy Beaches			✔
	Water Access point / ramps			✔
	Swimming areas and pontoons			✔
	Jetties		✔	✔

✔ Indicates facilities would normally be provided, subject to funding.

Table 5. Uses of Canberra's lakes and ponds

Initiative	Description	Zone 1	Zone 2	Zone 3
	Car parking facilities			✔
	Pedestrian and cycling path system	✔	✔	✔
	Disabled facilities			✔
	Landscaping	✔	✔	✔
	Toilets			✔
	Barbecue and drinking fountain facilities		✔	✔
	Picnic facilities		✔	✔
	Play facilities		✔	✔
	Adventure play facilities			✔
	Community group			✔

✔ Indicates facilities would normally be provided, subject to funding.

Stormwater management

Stormwater run-off occurs when precipitation flows over the land surface. Roads, driveways, rooftops and other non-permeable surfaces prevent water from soaking into the ground and increase the run-off speed and volume to waterways. This run-off can pick up and carry pollutants such as sediment, nitrogen, phosphorus, bacteria, oil and grease, general waste, organic matter and pesticides. Alternatively, trees, shrubs and ground covering plants aid in intercepting and dispersing heavy rainfall. Sound stormwater management practices reduce the rate of water flow to help contain and remove pollutants by allowing the pollutants to settle and plants, soils and microbes to filter the water (Centre for Water Protection 2016).

The ACT stormwater network consists of minor and major drainage systems. The minor (piped) system is designed to mitigate nuisance flooding, while the major system is the continuous overland flow path or floodway system, including lakes and ponds, which is designed to accommodate less frequent large flood events and overflows from the minor system.

Canberra's network of drains, swales, channels and floodways have been designed and built to manage water in excess to the pipe capacity and direct this increased flow of stormwater to lakes and ponds for treatment before entering the Murrumbidgee River and exiting the ACT. Directing the flow of stormwater run-off away from development benefits residents of the ACT by:

- providing safety to the public
- protecting property
- stabilising the landform and providing erosion control
- optimising the land available for urbanisation.

Canberra's lakes and ponds play an important role in reducing the physical congestion and turbidity, nutrient and bacteria loading of downstream waterways. Under the Environment Protection Regulation 2005 a person commits an offence if they discharge stormwater from a sediment retention dam, footings or another stormwater retention area to a waterway.

Water abstraction

Water may be taken from lakes and ponds, generally under a licence, for uses such as irrigating surrounding parkland and nearby sport and recreation facilities. In issuing a licence under the Water Resources Act 2007, consideration must be given to the Water Resources Environmental Flow Guidelines, the Water Use and Catchment General Code, consistency with the Territory Plan, any adverse environmental impacts and any investigations undertaken by the EPA to determine sustainable yields for the water management area. The Water Resources Act and subordinate instruments provide for conditions, which among other things, may include defining when and where it is appropriate to extract water.

The Territory Plan's Water Use and Catchment General Code places lakes and ponds in the Drainage and Open Space category. A range of uses that are compatible with, but secondary to, the primary function of catchment drainage are allowed, including water supply for irrigation and stock watering as long as it is managed such that it is compatible with the primary function. Schedule 5 of this code limits water abstraction for these purposes, while Schedule 6 limits the locations from which water abstraction can be undertaken.

7. Management of Specific Lakes and Ponds

Ponds that are small in size and low in depth (Neighbourhood Ponds) have limited capacity for recreational activities within the water. Therefore, a general approach has been adopted that details what activities are permitted, and permitted with consent, at these ponds, while larger ponds and lakes are specifically addressed (Table 5). While recreational activities are significantly limited in Neighbourhood Ponds and most Zone I and II ponds due to their variable water levels, these ponds and wetlands provide significant benefits to the community in water quality improvements.

Appendix B lists the Neighbourhood Ponds by district along with the location and area of each pond.

Table 6. Uses of Canberra's central and northern urban lakes and ponds

Activities

✔ Permitted

Subject to permit

✖ Not permitted

Water Management Zones

I Inlet Zone

II Intermediate Zone

III Outlet Zone

Locality	Central Canberra		Belconnen			Gungahlin			
Lake or Pond	Kingston Harbour	Molonglo Reach	Lake Ginninderra			Gungahlin Pond		Yerrabi Pond	
Water Management Zones	III	N/A	I	II	III	I	II	I	II
Informal Recreation Activities									
Fishing	✔	✔	✔	✔	✔	✔	✔	✔	✔
Windsurfing	✖	✖	✖	✔	✔	✖	✔	✖	✔
Sailing		✖	✖	✔	✔	✖	✖	✖	✖
Jet skiing	✖		✖	✖	✖	✖	✖	✖	✖
Drones, airplanes and unmanned aerial vehicles		✖	✖	✖		✖	✖	✖	✖
Model boats (petrol)									
Model boats (electric)		✔	✔	✔	✔	✔	✔	✔	✔
Recreational boating (non-motorised) ~	✔	✔	✔	✔	✔	✔	✔	✔	✔
Recreational boating (motorised) ~ #			✖	✖		✖	✖	✖	✖
Swimming at designated beaches	✖	✖	✖	✖	✔	✖	✖	✖	✖
Water skiing	✖		✖	✖	✖	✖	✖	✖	✖
Scuba diving (training)	✖	✖	✖	✖	✔	✖	✖	✖	✖
Sport (Competitive) Activities									
Wind surfing regattas	✖	✖	✖			✖		✖	
Sailing regattas		✖	✖			✖		✖	
Rowing regattas	✖	✖				✖	✖	✖	✖
Triathlon swim course		✔				✖	✖	✖	✖
Water skiing	✖		✖			✖	✖	✖	✖
Support, Management and Emergency Activities									
Maintenance craft									
Motorised sport support or training craft						✖	✖	✖	✖
Motorised research craft									
Motorised emergency and patrol craft									

Locality	Central Canberra		Belconnen			Gungahlin			
Lake or Pond	Kingston Harbour	Molonglo Reach	Lake Ginninderra			Gungahlin Pond		Yerrabi Pond	
Water Management Zones	III	N/A	I	II	III	I	II	I	II
Special Events and Commercial Activities									
Special events	🗎	🗎	🗎	🗎	🗎	🗎	🗎	🗎	🗎
Commercial activities	🗎	🗎	🗎	🗎	🗎	🗎	🗎	🗎	🗎
Model boat regattas	🗎	✖	🗎	🗎	🗎	🗎	🗎	🗎	🗎

Note 1: all other potential uses are not permitted.

~ May be restrictions as to where these activities can occur within each waterbody

Motorised recreational boating that travel at less than 10 knots is a permitted activity, but steam and electric driven recreational boating that travels at more than 10 knots requires a permit under the Lakes Act.

Table 7. Uses of Canberra's southern urban lakes and ponds

Activities

✔ Permitted

Subject to permit

✖ Not permitted

Water Management Zones

I Inlet Zone

II Intermediate Zone

III Outlet Zone

Locality	**Tuggeranong**					**Woden, Western Creek and Molonglo**		**Neighbourhood Ponds***
Lake or Pond	**Lake Tuggeranong**			**Point Hut Pond**		**North Weston Ponds**		
Water Management Zones	**I**	**II**	**III**	**I**	**II**	**I**	**II**	**I**
Informal Recreation Activities								
Fishing	✔	✔	✔	✔	✔	✔	✔	✔
Windsurfing	✖	✔	✔	✖	✔	✖	✖	✖
Sailing	✖	✔	✔	✖	✔	✖	✖	✖
Jet skiing	✖	✖	✖	✖	✖	✖	✖	✖
Drones, airplanes and unmanned aerial vehicles	✖	✖	📄	✖	✖	✖	✖	✖
Model boats (petrol)	📄	📄	📄	📄	📄	📄	📄	📄
Model boats (electric)	✔	✔	✔	✔	✔	✔	✔	✔
Recreational boating (non-motorised) ~	✔	✔	✔	✔	✔	✔	✔	✖
Recreational boating (motorised) ~ #	✖	✖	📄	✖	✖	✖	✖	✖
Swimming at designated beaches	✖	✖	✔	✖	✖	✖	✖	✖
Water skiing	✖	✖	✖	✖	✖	✖	✖	✖
Scuba diving (training)	✖	✖	✔	✖	✖	✖	✖	✖
Sport (Competitive) Activities								
Wind surfing regattas	✖	📄	📄	✖	✖	✖	✖	✖
Sailing regattas	📄	📄	📄	✖	✖	✖	✖	✖
Rowing regattas	📄	📄	📄	✖	✖	✖	✖	✖
Triathlon swim course	📄	📄	📄	✖	✖	✖	✖	✖
Water skiing	✖	✖	✖	✖	✖	✖	✖	✖
Support, Management and Emergency Activities								
Maintenance craft	📄	📄	📄	📄	📄	📄	📄	📄
Motorised sport support or training craft	📄	📄	📄	✖	✖	✖	✖	✖
Motorised research craft	📄	📄	📄	📄	📄	📄	📄	📄
Motorised emergency and patrol craft	📄	📄	📄	📄	📄	📄	📄	📄

Locality	Tuggeranong					Woden, Western Creek and Molonglo		Neighbourhood Ponds*
Lake or Pond	Lake Tuggeranong			Point Hut Pond		North Weston Ponds		
Water Management Zones	I	II	III	I	II	I	II	I
Special Events and Commercial Activities								
Special events	✓	✓	✓	✓	✓	✓	✓	✓
Commercial activities	✓	✓	✓	✓	✓	✓	✓	✓
Model boat regattas	✓	✓	✓	✓	✓	✓	✓	✓

Note 1: all other potential uses are not permitted.

~ May be restrictions as to where these activities can occur within each waterbody

Motorised recreational boating that travel at less than 10 knots is a permitted activity, but steam and electric driven recreational boating that travels at more than 10 knots requires a permit under the Lakes Act.

* Neighbourhood Ponds are those ponds that are small in size and therefore only have one water management zone (zone 1). A current list of Neighbourhood Ponds is at Appendix B.

The information regarding each larger urban lake and pond covered by this Plan is presented in the following section.

Central Canberra – KINGSTON HARBOUR (4.95ha)

Prime management purpose (Water)

1. Prevent and control floods by providing a reservoir to receive flows
2. Prevent and control pollution of waterways
3. Provide for public use for recreation
4. Provide habitat for fauna and flora
5. Provide harbour for vessels

Prime management purpose (Lakeshore)

» Recreation, port facilities

General characteristics

» Attracts visitors from across the ACT and beyond because of the quality facilities and boat mooring facilities
» Receives intensive levels of use
» To be managed and maintained to an appropriate standard
» Contiguous with Lake Burley Griffin.

Tenure/Legal status

» Planning and Development Act 2007 - PRZ1 Urban Open Space Zone in the Territory Plan
» Lakes Act 1976 - Declared Lake

Activities

Permitted

» Fishing, recreational boating (non-motorised).

Subject to permit

» Sailing, drones, airplanes and unmanned aerial vehicles, model boats (petrol), model boats (electric), recreational boating (steam and electric) travelling over 10 knots, recreational boating (petroleum driven) travelling over 10 knots, triathlon swim course, maintenance craft, motorised sport support or training craft, motorised emergency and patrol craft, commercial activities, special events, motorised research craft, model boat regattas.

Values

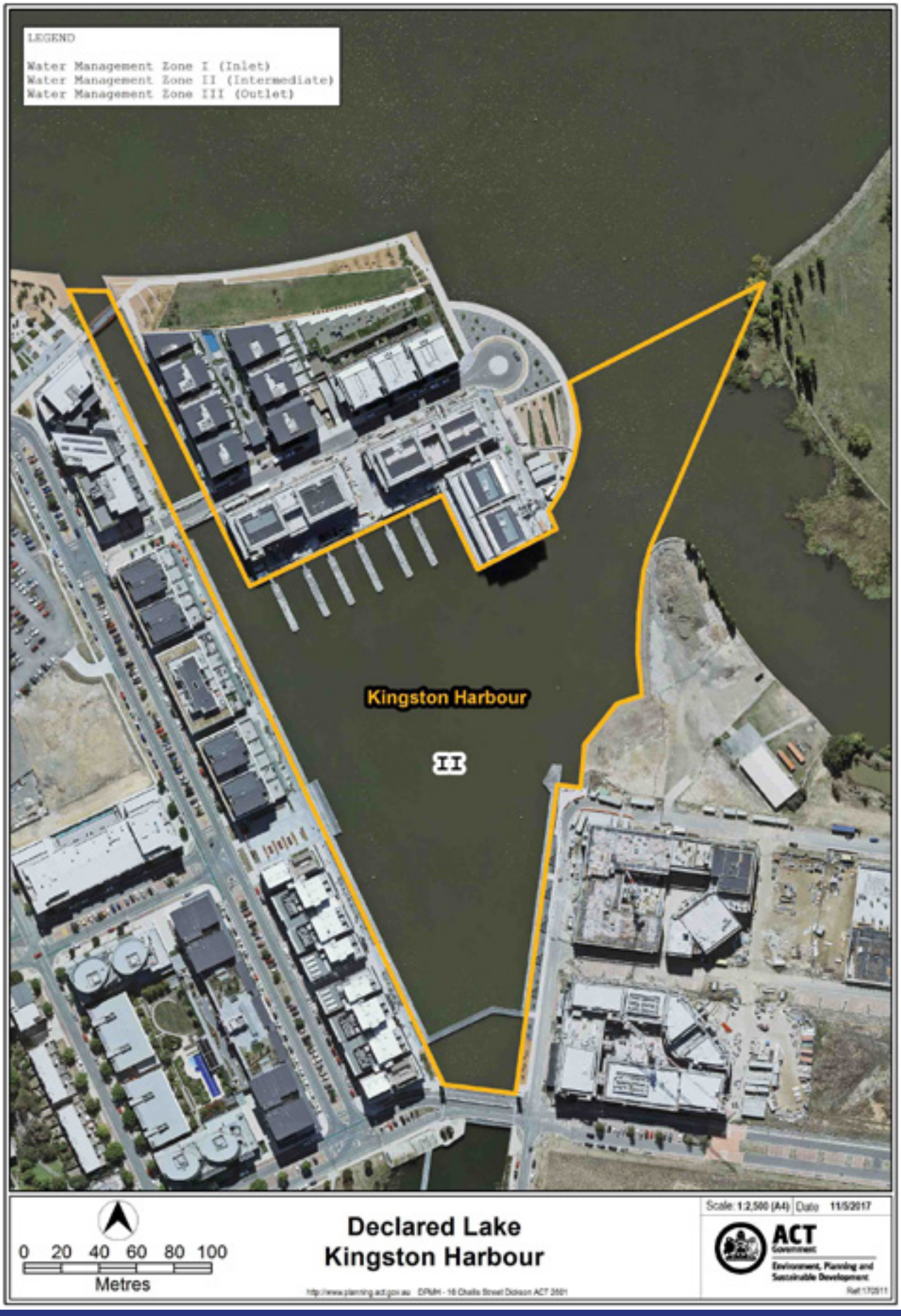
Values	Ecological	Fish	Visual landscape	Aboriginal	Historic	Recreation	Sporting	Tourism	Commercial	Flood management
Icon										
Status	Low/Not known	Low	Moderate	Low/Not known	Low/ Not known	Moderate	Low/ Not known	Moderate	High	High

Facilities (Water)

	Sandy Beach	Water /ramp access	Swimming area	Jetty
Icon				
Existing	No	No	No	Yes

Facilities (Lakeshore)

	Car parking	Walking/ cycling paths	Disabled facilities	Landscape	Toilets	BBQ / drinking	Picnic tables	Kids Playground	Adventure playground	Club house
Icon										
Existing	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes
Proposed	No	No	No	No	Yes	No	No	No	No	No


LEGEND
Water Management Zone I (Inlet)
Water Management Zone II (Intermediate)
Water Management Zone III (Outlet)
Kingston Harbour
II
0 20 40 60 80 100
Metres
Declared Lake
Kingston Harbour
Scale: 1:2,500 (A4) Date: 11/5/2017
ACT Government
Environment, Planning and Sustainable Development

Central Canberra - MOLONGLO REACH (64.33ha)

Prime management purpose (Water)

1. Prevent and control floods by providing a reservoir to receive flows
2. Prevent and control pollution of waterways
3. Provide for public use for recreation
4. Provide habitat for fauna and flora

Prime management purpose (Lakeshore)

» Ecological and cultural conservation, sport, informal recreation

General characteristics

» Attracts visitors from across the ACT and beyond because of the water skiing, quality facilities and boat launching facilities

» Receives intensive levels of use

» To be managed and maintained to an appropriate standard

Tenure/Legal status

» Planning and Development Act 2007 - NUZ4 River Corridor, Special Purpose Reserve Overlay

» Lakes Act 1976 - Declared Lake

Activities

Permitted

» Fishing, model boats (electric), recreational boating (non-motorised) in some areas.

Subject to permit

» Jet skiing, model boats (petrol), recreational boating (petroleum driven) travelling over 10 knots, recreational boating (steam and electric) travelling over 10 knots, water skiing, motorised sport support or training craft, maintenance craft, motorised research craft, motorised emergency and patrol craft, commercial activities, special events, motorised research craft.

Values

Value	Ecological	Fish	Visual landscape	Aboriginal	Historic	Recreation	Sporting	Tourism	Commercial	Flood management
Icon										
Status	Moderate	High	Moderate	High	High	High	Low	Low	Low	Low

Facilities (Water)

	Sandy Beach	Water /ramp access	Swimming area	Jetty
Icon				
Existing	Yes	Yes	No	No

Facilities (Lakeshore)

	Car parking	Walking/ cycling paths	Disabled facilities	Landscape	Toilets	BBQ / drinking	Picnic tables	Kids Playground	Adventure playground	Club house
Icon										
Existing	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Proposed	Yes	No	No	Yes	No	No	No	No	No	No


0.00 0.25 0.50 0.75 1.00
Kilometres
Declared Lake
Molonglo Reach
Scale: 1:20,000 (A4) Date 11/5/2017
ACT Government
Environment, Planning and Sustainable Development
http://www.planning.act.gov.au DPNH - 16 Challis Street Dickson ACT 2601
Ref:17/011

Belconnen - LAKE GINNINDERRA (105ha)

Prime management purpose (Water)

1. Prevent and control floods by providing a reservoir to receive flows
2. Prevent and control pollution of waterways
3. Provide for public use for recreation
4. Provide habitat for fauna and flora

Prime management purpose (Lakeshore)

» Recreation, environmental and cultural conservation and sport

General characteristics

» Attracts visitors from Belconnen and beyond because of the outstanding features, high quality facilities and good accessibility
» Receives intensive levels of use
» To be managed and maintained to an appropriate standard
» Stocked with native fish under the Fish Stocking Plan for the ACT 2015–20

Tenure/Legal status

» Planning and Development Act 2007 - PRZ1 Urban Open Space Zone in the Territory Plan
» Lakes Act 1976 - Declared Lake

Activities

Water management zone	I	II	III
Permitted			
Fishing, sport and recreational boating (non-motorised), model boats (electric).	Yes	Yes	Yes
Windsurfing, sailing.	No	Yes	Yes
Swimming, scuba diving.	No	No	Yes
Subject to permit			
Model boats (petrol), wind surfing regattas, sailing regattas, rowing regattas, triathlon swim course, motorised sport support or training craft, maintenance craft, motorised emergency and patrol craft, commercial activities, model boat regattas, special events, motorised research craft.	Yes	Yes	Yes
Recreational boating (steam and electric) travelling over 10 knots, recreational boating (petroleum driven) travelling over 10 knots, drones, airplanes and unmanned aerial vehicles	No	No	Yes

Values

Value	Ecological	Fish	Visual landscape	Aboriginal	Historic	Recreation	Sporting	Tourism	Commercial	Flood management
Icon										
Status	Moderate	High	High	Low	Moderate	High	Moderate	Moderate	Moderate	High

Facilities (Water)

	Sandy Beach	Water /ramp access	Swimming area	Jetty
Icon				
Existing	Yes	Yes	Yes	No

Facilities (Lakeshore)

	Car parking	Walking/ cycling paths	Disabled facilities	Landscape	Toilets	BBQ / drinking	Picnic tables	Kids Playground	Adventure playground	Club house
Icon										
Existing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Proposed	Yes	Yes	No	Yes	No	No	No	No	No	No


LEGEND
Water Management Zone I (Inlet)
Water Management Zone II (Intermediate)
Water Management Zone III (Outlet)
Lake Ginninderra
I
II
III
0 100 200 300 400 500
Metres
Declared Lake
Lake Ginninderra
Scale: 1:10,000 (A4) Date 11/5/2017
ACT Government
Environment, Planning and Sustainable Development

Gungahlin - GUNGAHLIN POND (23.8ha)

Prime management purpose (Water)

1. Prevent and control floods by providing a reservoir to receive flows
2. Prevent and control pollution of waterways
3. Provide for public use for recreation
4. Provide habitat for fauna and flora

Prime management purpose (Lakeshore)

» Water quality management, informal recreation

General characteristics

» Attracts visitors from adjacent suburbs because of the quality facilities and good accessibility
» Receives moderate levels of use
» To be managed and maintained to an appropriate standard
» Stocked with native fish under the Fish Stocking Plan for the ACT 2015–20

Tenure/Legal status

» Planning and Development Act 2007 - PRZ1 Urban Open Space Zone in the Territory Plan
» Lakes Act 1976 - Declared Lake

Activities

Water management zone	I	II
Permitted		
Fishing, sport, electric model boats.	Yes	Yes
Windsurfing, sailing.	No	Yes
Subject to permit		
Model planes and drones, motorised research craft, wind surfing regattas, maintenance craft, motorised emergency and patrol craft, special events, commercial activities, model boat regattas, model boats (petrol).	Yes	Yes

Values

Value	Ecological	Fish	Visual landscape	Aboriginal	Historic	Recreation	Sporting	Tourism	Commercial	Flood management
Icon										
Status	Low	Moderate	Moderate	Low	Not known	High	Low	Not known	Not known	High

Facilities (Water)

	Sandy Beach	Water /ramp access	Swimming area	Jetty
Icon				
Existing	No	No	No	No

Facilities (Lakeshore)

	Car parking	Walking/ cycling paths	Disabled facilities	Landscape	Toilets	BBQ / drinking	Picnic tables	Kids Playground	Adventure playground	Club house
Icon										
Existing	No	Yes	No	Yes	No	No	No	No	No	No
Proposed	No	Yes	No	Yes	No	No	No	No	No	No


LEGEND
Water Management Zone I (Inlet)
Water Management Zone II (Intermediate)
Water Management Zone III (Outlet)
I
II
Gungahlin Pond
0 50 100 150 200 250
Metres
Declared Lake
Gungahlin Pond
Scale: 1:5,000 (A4) Date: 11/5/2017
ACT Government
Environment, Planning and Sustainable Development

Gungahlin - YERRABI POND (26.4ha)

Prime management purpose (Water)

1. Prevent and control floods by providing a reservoir to receive flows
2. Prevent and control pollution of waterways
3. Provide for public use for recreation
4. Provide habitat for fauna and flora

Prime management purpose (Lakeshore)

» Water quality management, informal recreation, sport, ecological and cultural conservation

General characteristics

» Attracts visitors from adjacent suburbs and Gungahlin because of quality facilities and good accessibility

» Receives moderate levels of use

» To be managed and maintained to an appropriate standard

» Stocked with native fish under the Fish Stocking Plan for the ACT 2015–20

Tenure/Legal status

» Planning and Development Act 2007 - PRZ1 Urban Open Space Zone in the Territory Plan

» Lakes Act 1976 - Declared Lake

Activities

Water management zone	I	II
Permitted		
Fishing, sport and recreational boating (non-motorised), electric model boats, recreational boating (non-motorised).	Yes	Yes
Windsurfing, sailing.	No	Yes
Subject to permit		
Model boats (petrol), motorised research craft, wind surfing regattas, maintenance craft, motorised emergency and patrol craft, special events, commercial activities, model boat regattas.	Yes	Yes

Values

Value	Ecological	Fish	Visual landscape	Aboriginal	Historic	Recreation	Sporting	Tourism	Commercial	Flood management
Icon										
Status	Moderate	Moderate	Moderate	High	Not known	Moderate	Not known	Not known	High	High

Facilities (Water)

	Sandy Beach	Water /ramp access	Swimming area	Jetty
Icon				
Existing	No	No	No	No

Facilities (Lakeshore)

	Car parking	Walking/ cycling paths	Disabled facilities	Landscape	Toilets	BBQ / drinking	Picnic tables	Kids Playground	Adventure playground	Club house
Icon										
Existing	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Proposed	No	Yes	No	Yes	No	No	No	No	No	No


LEGEND
Water Management Zone I (Inlet)
Water Management Zone II (Intermediate)
Water Management Zone III (Outlet)
I
II
Yerrabi Pond
0 100 200 300 400
Metres
Declared Lake
Yerrabi Pond
Scale: 1:7,500 (A4) Date: 11/5/2017
ACT Government
Environment, Planning and Sustainable Development

Tuggeranong - LAKE TUGGERANONG (57.1ha)

Prime management purpose (Water)

1. Prevent and control floods by providing a reservoir to receive flows
2. Prevent and control pollution of waterways
3. Provide for public use for recreation
4. Provide habitat for fauna and flora

Prime management purpose (Lakeshore)

» Recreation, ecological and cultural conservation and sport

General characteristics

» Attracts visitors from Tuggeranong and beyond because of the high quality facilities and good accessibility
» Receives high levels of use
» To be managed and maintained to an appropriate standard
» Stocked with native fish under the Fish Stocking Plan for the ACT 2015–20

Tenure/Legal status

» Planning and Development Act 2007 - PRZ1 Urban Open Space Zone in the Territory Plan
» Lakes Act 1976 - Declared Lake

Activities

Water management zone	I	II	III
Permitted			
Fishing, sport and recreational boating (non-motorised), electric model boats.	Yes	Yes	Yes
Windsurfing, sailing.	No	Yes	Yes
Swimming, scuba diving.	No	No	Yes
Subject to permit			
Recreational boating (steam and electric) travelling over 10 knots, recreational boating (petroleum driven) travelling over 10 knots, model model boats (petrol), wind surfing regattas, sailing regattas, rowing regattas, triahlon swim course, motorised sport support or training craft, maintenance craft, motorised emergency and patrol craft, commercial activities, model boat regattas, special events, motorised research craft.	Yes	Yes	Yes
Recreational boating (steam and electric) travelling over 10 knots, recreational boating (petroleum driven) travelling over 10 knots, drones, airplanes and unmanned aerial vehicles	No	No	Yes

Values

Value	Ecological	Fish	Visual landscape	Aboriginal	Historic	Recreation	Sporting	Tourism	Commercial	Flood management
Icon										
Status	Moderate	Moderate	High	Moderate	Moderate	High	Moderate	Low	Low	Moderate

Facilities (Water)

	Sandy Beach	Water /ramp access	Swimming area	Jetty
Icon				
Existing	Yes	Yes	Yes	Yes

Facilities (Lakeshore)

	Car parking	Walking/ cycling paths	Disabled facilities	Landscape	Toilets	BBQ / drinking	Picinic tables	Kids Playground	Adventure playground	Club house
Icon										
Existing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Proposed	No	No	Yes	Yes	Yes	No	No	No	No	No


LEGEND
Water Management Zone I (Inlet)
Water Management Zone II (Intermediate)
Water Management Zone III (Outlet)
I
II
III
II
Lake Tuggeranong
0 100 200 300 400 500
Metres
Declared Lake
Lake Tuggeranong
Scale: 1:10,000 (A4) Date 11/5/2017
ACT Government
Environment, Planning and Sustainable Development

Tuggeranong - POINT HUT POND (16.7ha)

Prime management purpose (Water

1. Prevent and control floods by providing a reservoir to receive flows
2. Prevent and control pollution of waterways
3. Provide for public use for recreation
4. Provide habitat for fauna and flora

Prime management purpose (Lakeshore)

» Water quality management, informal recreation

General characteristics

» Attracts majority of visitors from adjacent suburbs and Tuggeranong because of the quality facilities and good accessibility
» Receives moderate levels of use
» To be managed and maintained to an appropriate standard

Tenure/Legal status

» Planning and Development Act 2007 - PRZ1 Urban Open Space Zone in the Territory Plan
» Lakes Act 1976 - Declared Lake

Activities

Water management zone	I	II
Permitted		
Fishing, sport and recreational boating (non-motorised), model boats (non-motorised).	Yes	Yes
Windsurfing, sailing.	No	Yes
Subject to permit		
Motorised research craft, maintenance craft, motorised emergency and patrol craft, special events, commercial activities, model boat regattas.	Yes	Yes

Values

Value	Ecological	Fish	Visual landscape	Aboriginal	Historic	Recreation	Sporting	Tourism	Commercial	Flood management
Icon										
Status	Low	Low	Moderate	Low	Not known	High	Low	Not known	Not known	Moderate

Facilities (Water)

	Sandy Beach	Water /ramp access	Swimming area	Jetty
Icon				
Existing	No	No	No	No

Facilities (Lakeshore)

	Car parking	Walking/ cycling paths	Disabled facilities	Landscape	Toilets	BBQ / drinking	Picnic tables	Kids Playground	Adventure playground	Club house
Icon										
Existing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Proposed	No	No	No	Yes	No	No	No	No	No	No


Point Hut
Pond
I
II
I
0
50
100
150
200
Metres
Declared Lake
Point Hut Pond
Scale: 1:4,000 (A4)
Date: 11/5/2017
ACT
Government
Environment, Planning and
Sustainable Development
http://www.planning.act.gov.au DPNH - 16 Challis Street Dickson ACT 2601
Ref:17/2/11

Woden, Weston Creek and Molonglo – NORTH WESTON PONDS (9.88ha)

Prime management purpose (Water)

1. Prevent and control floods by providing a reservoir to receive flows
2. Prevent and control pollution of waterways
3. Provide for public use for recreation
4. Provide habitat for fauna and flora

Prime management purpose (Lakeshore)

» Water quality management, cultural conservation, informal recreation

General characteristics

» Attracts visitors from adjacent suburbs and beyond
» Receives moderate levels of use
» To be managed and maintained to an appropriate standard

Tenure/Legal status

» Planning and Development Act 2007 - PRZ1 Urban Open Space Zone in the Territory Plan

Activities

Water management zone	I	II
Permitted		
Fishing, sport and recreational boating (non-motorised), model boats (non-motorised)	Yes	Yes
Subject to permit		
Motorised research craft, maintenance craft, motorised emergency and patrol craft, special events, commercial activities, model boat regattas.	Yes	Yes

Values

Value	Ecological	Fish	Visual landscape	Aboriginal	Historic	Recreation	Sporting	Tourism	Commercial	Flood management
Icon										
Status	Low	Not known	Moderate	Low	Moderate	Low	Not known	Not known	Not known	High

Facilities (Water)

	Sandy Beach	Water /ramp access	Swimming area	Jetty
Icon				
Existing	No	No	No	No

Facilities (Lakeshore)

	Car parking	Walking/ cycling paths	Disabled facilities	Landscape	Toilets	BBQ / drinking	Picnic tables	Kids Playground	Adventure playground	Club house
Icon										
Existing	Yes	Yes	No	Yes	No	No	No	No	No	No
Proposed	No	Yes	No	Yes	No	No	No	No	No	No


LEGEND
Water Management Zone I (Inlet)
Water Management Zone II (Intermediate)
Water Management Zone III (Outlet)
North Weston Ponds
II
I
0 50 100 150 200
Metres
Declared Lake
North Weston Ponds
Scale: 1:4,000 (A4) Date: 11/5/2017
ACT Government
Environment, Planning and Sustainable Development

Canberra Wide – NEIGHBOURHOOD PONDS (various)

Prime management purpose (Water)

1. Prevent and control floods by providing a reservoir to receive flows
2. Prevent and control pollution of waterways
3. Provide for public use for recreation
4. Provide habitat for fauna and flora

Prime management purpose (Lakeshore)

» Water quality management, informal recreation

General characteristics

» Attracts visitors from adjacent suburbs
» Receives moderate levels of use
» To be managed and maintained to an appropriate standard

Tenure/Legal status

» Planning and Development Act 2007 - PRZ1 Urban Open Space Zone in the Territory Plan
» Lakes Act 1976 – see Appendix B

Activities

Permitted

» Fishing, model boats (non-motorised) .

Subject to permit

» Model boats (petrol), motorised research craft, maintenance craft, motorised emergency and patrol craft, special events, commercial activities.

Values

Value	Ecological	Fish	Visual landscape	Aboriginal	Historic	Recreation	Sporting	Tourism	Commercial	Flood management
Icon										
Status	Varies	Varies	Moderate	Varies	Varies	Low	Low	Low	Low	High

Facilities (Water)

	Sandy Beach	Water /ramp access	Swimming area	Jetty
Icon				
Existing	No	No	No	No

Facilities (Lakeshore)

	Car parking	Walking/ cycling paths	Disabled facilities	Landscape	Toilets	BBQ / drinking	Picnic tables	Kids Playground	Adventure playground	Club house
Icon										
Existing	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Varies	No	No
Proposed	No	No	No	No	No	No	No	No	No	No

Note: see Appendix B for a list of Neighbourhood Ponds

8. Measuring Performance

Management actions on public land should be open, accountable and adaptive. They should also be measurable so they can be adequately reviewed and revised. As such, performance measures in five areas relating to stakeholders will be monitored, namely:

- performance in satisfying community needs
- performance in meeting agreements with the ACT Government
- performance in commissioning maintenance services
- lake and pond values and performance (quality) indicators
- performance in meeting mandatory responsibilities.

Each area will be measured and reported separately.

Satisfying community needs

The community is the most important stakeholder in the management of Canberra's lakes and ponds. Therefore, community satisfaction with the level of service is an important performance indicator. Transport Canberra and City Services receives a weekly Municipal Services Request Report from Access Canberra that allows monitoring of the community's expectations, satisfaction and levels of usage of Canberra's urban parks and open space, including lakeshore areas.

Delivering on our commitments

The Transport Canberra and City Services Directorate aims to deliver against commitments to the highest standard possible, given resource availability at any given time.

Conservation: Aquatic ecology

Shallow water: emergent macrophyte/detritus ecosystems, water quality, birdlife, fish (abundance/biomass, levels of genera, appropriate diversity of species).

Moderate depth: submergent macrophyte/detritus ecosystems, water quality, birdlife, fish (abundance/biomass, levels of genera, appropriate diversity of species).

Deep water: algal/grazing ecosystems, water quality, birdlife, fish (biomass, % BG, levels of genera, diversity of species).

Refer Tables 8 and 9 for specific water quality indicators.

Conservation: Cultural heritage

- Registered heritage sites maintained in an appropriate manner.
- The potential existence of unidentified heritage sites considered during the development application process.

Performance Measures

Landscape

- Wetland: water quality, emergent aquatic plants/riparian plants, open water areas, diversity/contrast, balance/harmony, visible animals (fish, mammals, reptiles, avifauna).
- Natural shoreline: water quality, emergent aquatic plants/riparian plants, diversity/contrast, balance/harmony, visible animals (fish, mammals, reptiles, avifauna), features (rock outcrops, jetties, beaches).
- Formal edge: water quality, form, texture, proximity to water.
- Waterscape: water quality, scale relative to shoreline vegetation and skyline.
- Odours.

Managed fishery

- Water quality, appropriate diversity, stocking density, stocked species survival and growth, fish biomass, fishing experience (surveys, community satisfaction).

Boating

- Clear of floating or submerged debris, free of nuisance plants across course and launching areas, water quality, width, course length, boats per hectare, management of other possible boating/recreational use conflicts.

Swimming

- Water quality, substrate (sand, silt, nuisance plants), safety (free of submerged rocks, logs, glass, deep holes, safe diving depth, elevated currents, boating activities), provision of barriers (children swimming areas), provision of diving platforms.

Water supply

- Water quality, provision of inlet and pump facilities, facilities flood and vandal proof, drawdown levels.

Stormwater quality improvement

- Percentage of discharge controlled by GPTs, percentage capture (volume) of catchment stormwater discharges, percentage area macrophytes, BOD load/m^2 of surface area, monitored interception (SS, TP, faecal coliform). Table 8 details the water quality indicators.

Drainage function

- Backwater for 1 in 100 ARI event clear of properties, maintenance of stormwater detention volume required for downstream flow amelioration (flood protection), stability of banks/shoreline and bed from erosion, maintenance of spillway and outlet hydraulic and energy dissipation functions.

Table 8. Water quality indicators: lake and pond environmental and use values

Indicators	Swimming	Boating	Managed Fishing	Landscape	Water Supply (irrigation)	Drainage (flood protection)	Pollution Control
SS (mg/L)					<500		
Turbidity (units)				<30			
Secchi depth (m)	>1.2						
Odour	Not objectionable	Not objectionable		Not objectionable			
Scums	None	None		None			
pH units	6.5 – 8.5		6.5-9.5		4.5-9.0		
Total Dissolved Solids (mg/L)					<3500		
Dissolved Oxygen (mg/L)			>4				
Total Phosphorous (mg/L)	<0.1	<0.1		<0.1			
N/P ratio	>12	>12		>12			
Ammonia (mg/L)			<1.0				
Chloraphyll a (ug/L)	<10	<10		<10			
BG algae Cells (No.)	<5000	<5000		<5000			
Zmix/Zeuph ratio							
Faecal (coliform/100ml)	<150	<1000			<1000		
SS retention (%)							>80
TP retention (%)							>70
Detention capacity (MI)						Specific to facility	
Emergent macrophytes: » Cover (% area) » Species diversity				10 – 3-% >3*			
Macrofauna: » Visible » Relative abundance (Golden Perch, Murray Cod)			>10% of catch in stocked lakes	Birds, fish			
Texture shoreline – Range of edge and vegetation composition(Outlet zone)				>4**			
Proximity walkway to water (length within 3 metres of water's edge				>50%			

Notes: * Species occupying greater than 10% of the total macrophyte area

** Edge and vegetation composition categories comprise

» Outcropping boulders, sand or gravel beaches

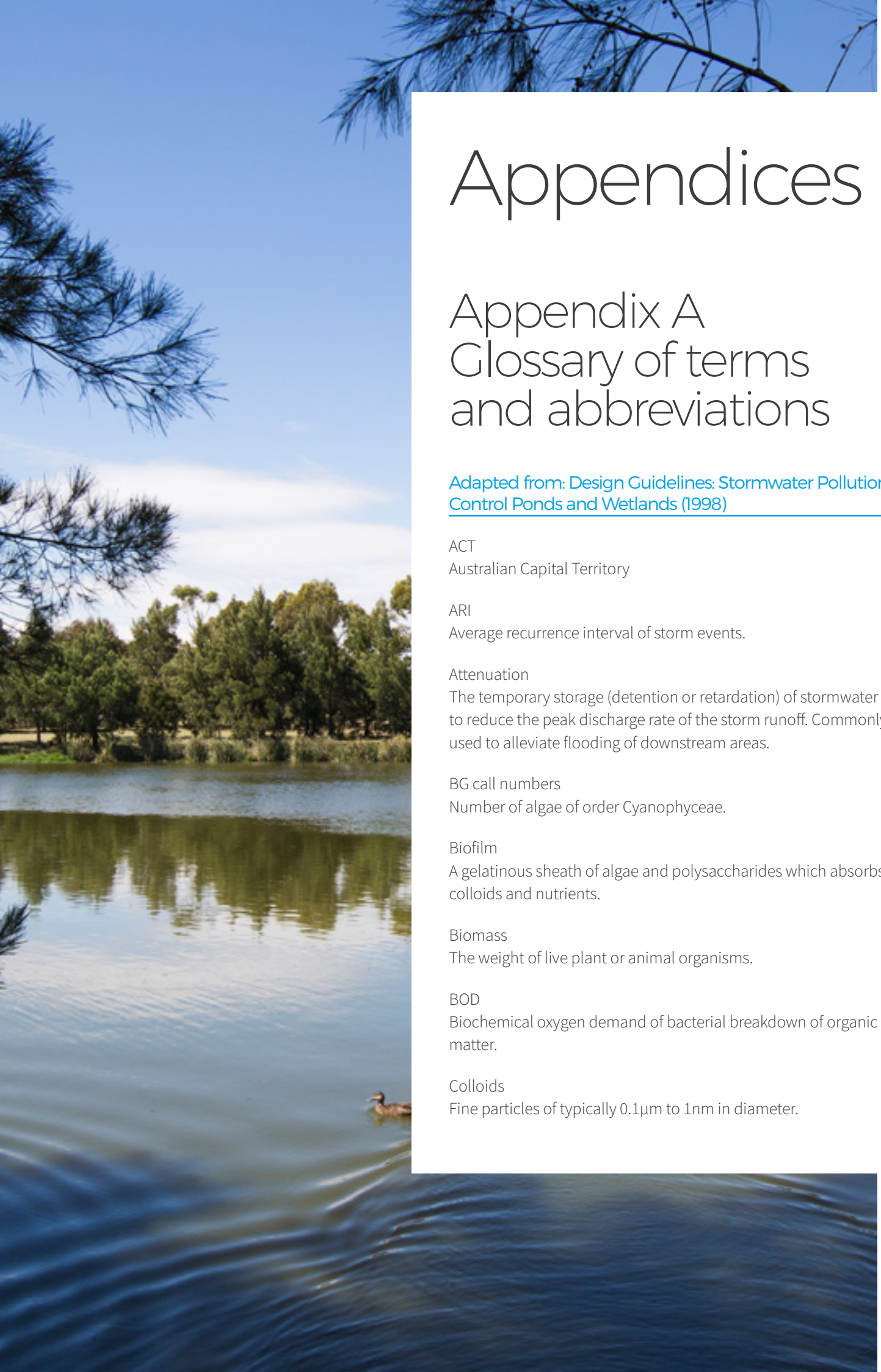
» Edge macrophyte—grassed foreshore or shrub and tree foreshore

» Hard edge—grass, shrubs and tree foreshore or buildings foreshore

Table 9. Ecosystem categories water quality indicators: lake and pond conservation values

Indicators	Ecosystem categories Shallow water – emergent macrophyte zone	Moderate water depth – submerged macrophyte zone	Deep water – algal and grazing zone
SS (mg/L)	<6.0	<40	<20
Turbidity (units)		<30	<30
Secchi depth (m)		>0.5	>1.0
pH units	6.5 – 8.5	6.5 – 9.0	6.5 – 9.0
Dissolved Oxygen (mg/L)	>4	>4	>4
Ammonia (mg/L)	<1.0	<1.0	<1.0
Total Phosphorous (mg/L)	<0.2	<0.1	<0.1
N/P ratio	>10	>8	>8
Z_{mix}/Z_{euph} ratio	1	>2	>3
Emergent macrophytes cover (%)	>30	>10	>5
Submergent macrophytes cover (%)		>30	
Algal biomass Chloraphyll a (ug/L)		<10	<10
Emergent macrophytes: » Diversity » Appropriate species	Dominant species <70% and free of exotics	Dominant species <60% and free of exotics	Dominant species <50% and free of exotics
Submergent macrophyte diversity		Dominant species <80%	
Number of waterfowl, fish and mammals	Extensive	Numerous	Few
Diversity of frogs, waterfowl, fish and mammals	» 4 frog species » 10 bird species	» 5 bird species and juvenile and adult stocked native fish species*	» >5 bird species and juvenile and adult stocked native fish species*

Notes: * Managed fisheries only



Appendices

Appendix A Glossary of terms and abbreviations

Adapted from: Design Guidelines: Stormwater Pollution Control Ponds and Wetlands (1998)

ACT
Australian Capital Territory

ARI
Average recurrence interval of storm events.

Attenuation
The temporary storage (detention or retardation) of stormwater to reduce the peak discharge rate of the storm runoff. Commonly used to alleviate flooding of downstream areas.

BG call numbers
Number of algae of order Cyanophyceae.

Biofilm
A gelatinous sheath of algae and polysaccharides which absorbs colloids and nutrients.

Biomass
The weight of live plant or animal organisms.

BOD
Biochemical oxygen demand of bacterial breakdown of organic matter.

Colloids
Fine particles of typically 0.1µm to 1nm in diameter.

Constructed wetlands
Small water bodies having an average depth of <2 metres and characterised by extensive macrophyte growth.

Detritus
Fine organic material suspended in water or sinking to sediment.

Epiphytes
Algae attached to the surfaces of other plants.

Event
A rainfall or discharge condition which is significantly different (>10 times) from the day to day background levels.

Faecal coliform
Gram negative bacteria, an intestinal bacterium in warm-blooded animals. Used as an indicator of possible faecal contamination.

Flow attenuation(see Attenuation).

Gross pollutant trap
(GPT) A trap designed to reduce flow sufficiently to enable sedimentation of the medium silt and larger suspended solids fraction, and to intercept (by screening) trash and debris entrained by stormwater.

Groundwater
Water found beneath the ground surface, in the soil and in rock aquifers.

Lake
An impounded body of water having a surface area greater than 30 hectares, or as declared under the Lakes Act.

Lakeshore
Land adjacent to a lake or pond.

Macrophytes
Large aquatic plants, either emergent or submerged.

N/P ratio
Ratio of Nitrogen/Total Phosphorus.

Overtopping
High discharge rates which exceed outlet pipe or primary spillway capacity, and flow over the top of the embankment or weir bounding the pond or wetland.

pH
Measure of acidity or alkalinity of water.

Planktonic algae
Algae suspended in water.

Pond
An impounded body of water having a surface area generally 4–30 hectares, and an average depth less than 2 metres.

Raingarden
An area designed for the treatment of stormwater runoff that consists of multi layered porous filter media, <2 metres in depth, $50m^2$ – $5000m^2$ in area, populated with macrophytes and having a extended detention zone for water. At times it may appear to be a wetland but its wetting/drying frequency and permanency of water as well as the main treatment process is different from a wetland.

Secchi disk depth
The depth beyond which a standard Secchi disk is no longer visible.

Sedimentation
Process of particles settling out of the water column onto the sediment below.

SS
Suspended solids.

Stratification
The density separation of layers of water vertically as a result of differences in temperature or salinity.

Substrate
Surfaces (sediments, rock, plants) upon which epiphytes (attached algae) are able to establish in water.

Swales
Shallow grassed drains.

Turbidity
A measure of light absorption by suspended particles in water.

Vegetated waterways
A natural or constructed channel, in which surfaces comprise natural grass, shrubs and aquatic plants rather than concrete lining.

Wetland
A shallow (generally less than 1m) body of water having an average depth <2 metres, and extensive emergent aquatic plants.

WSUD
Water sensitive urban design.

Appendix B
List of Neighbourhood Ponds by district

Name	Area (m^2)	Suburb
Central Canberra		
Banksia Street Wetland	1440.16	Banksia St, O'Connor
David Street Pond	1842.04	David St, O'Connor
Dickson Wetlands	11688.98	Hawdon St, Dickson
Lyneham Wetlands	12782.49	Goodwin St, Lyneham
Norgrove Pond	1355.25	Norgrove Park, Kingston
Roma Mitchell Crescent Pond 1	1200.16	Roma Mitchell Cres, Watson
Roma Mitchell Crescent Pond 2	3050.396	Roma Mitchell Cres, Watson
Tom Price Street Pond	6511.25	Tom Price St, Fyshwick
Belconnen		
Baudinette Circuit Pond	311.78	Baudinette Cct, Bruce
Dunlop Pond 1 -Jarramlee Pond *#	5703.53	Counihan Ct, Dunlop
Dunlop Pond 2 - Fassifern Pond*#	6786.52	Hugh Mckay Cr, Dunlop
Eardley Street Pond 1	5830.40	Eardley St, Bruce
Eardley Street Pond 2	4834.23	Eardley St, Bruce
Giralang Pond	15492.09	Dodwell St, Giralang
Glenloch Interchange Pond	3538.40	Glenloch Interchange
Heney Close Pond	8869.19	Heney Cl, McKellar
Hollows Circuit Pedestrian Parkland Pond	1180.57	Hollows Cct, Macgregor
Jeanne Young Circuit Pond	5392.34	Jeanne Young Cct, Mckellar
Kaleen Fauna Pond Sect 154	437.77	Gungahlin Dr, Kaleen
Lake Ginninderra Skate Park Wetland	8593.40	Eastern Valley Way, Belconnen
Masterman Street Pond	11425.54	Masterman St, Bruce
Pond 4 West Macgregor	2387.75	John James Loop, Macgregor
Refshauge Cresent Urban Pond	1652.07	Refshauge Cres, Macgregor
West Belconnen Pond*#	96506.99	James Harrison St, Dunlop
West Macgregor Pond 6	1189.59	Hilda Kincaid Semi Natural Open Space, Macgregor
Gungahlin		
Adventure Street Pond	194.68	Adventure St, Harrison
Adventure Street Pond	417.03	Adventure St, Harrison

Name	Area (m^2)	Suburb
Adventure Street Pond	1666.74	Adventure St, Harrison
Adventure Street Pond	136.82	Adventure St, Harrison
Adventure Street Pond	92.01	Adventure St, Harrison
Alice Cummins Pond	3095.59	Alice Cummins St, Gungahlin
Amaroo Oval Wetlands	1807.45	Block 4 Sect 109 Amaroo
Appleford Avenue Pond	145.55	Appleford Ave, Jacka
Beveridge Crescent Pond	1158.27	Beveridge Cres, Forde
Charles Perkins Circuit Pond	4086.37	Charles Perkins Cct, Bonner
Combo Court Pond	668.58	Combo Crt, Harrison
Crace Crip Pond	5041.67	Narden St, Crace
Crace Crip Wetland Pond	4396.15	Narden St, Crace
Drooka Crescent Pond	465.47	Drooka Cres, Crace
Evella Court Pond	7691.68	Evella Court Gungahlin
Flemington Road Pond	1175.56	Flemington Rd, Harrison
Forde Lower Pond#	11755.40	Lyall Gillespie Corridor, Forde
Foy Street Pond	2033.96	Foy St, Forde
Franklin Floodway Pond	1468.96	Gwen Meredith Loop, Franklin
Gell Street Pond	5384.87	Gell St, Moncrieff
Gold Creek Golf Course Pond	26028.25	Edie Payne Close, Nicholls
Gungaderra Creek Pond	8334.79	Oodgeroo Ave, Franklin
Gungaderra Creek Pond	2135.43	Jocelyn Brown Street, Franklin
Gungaderra Creek Ponds	39583.93	Dorothy Green Crescent, Franklin
Gungaderra Creek Ponds	9698.02	Christina Stead Street, Franklin
Gungaderra Creek Ponds	4543.76	Hewitt Cres, Franklin
Gungaderra Creek Ponds	4515.70	Hewitt Cres, Franklin
Gungaderra Creek Ponds	1545.78	Hewett Cres, Franklin
Gungaderra A15 Creek Pond	2860.57	Clare Burton Crescent, Franklin
Gungahlin Enclosed Oval Pond - North	454.36	The Valley Ave, Gungahlin
Gungahlin Enclosed Oval Pond - South	573.92	The Valley Ave, Gungahlin
Gungaderra Pond 1	8868.06	Sapling St, Harrison
Gungaderra Pond 2	11520.71	Katoomba St, Harrison
Gungaderra Pond 3	6214.75	Collaroy St, Harrison
Gungahlin Valley Frog Pond	784.14	The Valley Ave, Gungahlin
Gungahlin Valley Pond East	9667.23	The Valley Ave, Gungahlin
Gungahlin Valley Pond West	4409.60	The Valley Ave, Gungahlin
Helby Street Pond	3101.89	Helby St, Harrison

Name	Area (m^2)	Suburb
Horse Park Drive Pond	1126.83	Horse Park Dr, Forde
Ian Potter Pond North	1492.66	Ian Potter Cres, Gungahlin
Ian Potter Pond South	923.52	Ian Potter Cres, Gungahlin
Ida West Street Pond North	831.02	Ida West St, Bonner
Ida West Street Pond East	230.84	Ida West St, Bonner
Ida West Street Pond South	884.58	Ida West St, Bonner
Irinyili Street Urban Pond	3573.01	Irinyili St, Bonner
Kings Canyon Street Pond	1171.04	Kings Canyon St, Harrison
Kingsland Parade Pond	6272.17	Kingsland Parade, Casey
Laird Cresent	5305.99	Laird Cres, Forde
Loma Rudduck Street Pond#	1299.67	Lyall Gillespie Corridor, Forde
Mobourne Street Pond	2101.70	Mobourne St, Bonner
Mulligans Flat Road Pond	5121.40	Mulligans Flat Rd, Bonner
Mulligans Flat Urban Pond	7733.89	Mulligans Flat Pedestrian Parkland, Bonner
Pinnacle Street Pond	868.57	Pinnacle St, Harrison
Rochelle Street Pond	8272.22	Rochelle St, Moncrieff
Volpato Street Pond	501.86	Volpato St, Forde
Volpato Street Pond	566.75	Volpato St, Forde
Waddhir Place Pond	4956.67	Waddhir Pl, Ngunnawal
Yeend Avenue Pedestrian Parkland	6455.71	Yeend Ave, Casey
Yeend Avenue Pedestrian Parkland	1910.90	Yeend Ave, Casey
Zacharov Avenue Urban Pond#	5503.71	Lyall Gillespie Corridor#, Forde
Tuggeranong		
Fadden Pond	2897.24	Nicklin Cres, Fadden
Goodwin Village Pond	5393.83	Cockcroft Ave, Monash
Gordon Pond*	7115.85	Woodfull Loop, Gordon
Isabella Pond*#	60505.89	Isabella Dr, Monash
Lower Stranger Pond*#	42982.64	Bonython
Monaro Highway Pedestrian Parkland Pond	6758.74	Monaro Hwy, Hume
Pethard Road Pedestrian Parkland Pond	3115.47	Pethard Rd, Hume
Tom Roberts Avenue Pond 1	1942.97	Tom Roberts Ave, Conder
Tom Roberts Avenue Pond 2	1041.38	Tom Roberts Ave, Conder
Tom Roberts Avenue Pond 3	663.42	Tom Roberts Ave, Conder
Tuggeranong Weir	46074.16	Drakeford Dr, Greenway
Tuggeranong Parkway Rural Dam	2702.76	Kambah

Name	Area (m^2)	Suburb
Upper Stranger Pond*#	44076.29	Jondol Pl, Isabella Plains
Woden, Weston Creek and Molonglo		
Arboretum Back Dam	4312.99	Forrest Drive, Arboretum
Arboretum Transfer Pond	15059.08	Forrest Drive, Arboretum
Block 434 Rural Dam	1782.40	Chapman
Bushfire Memorial Pond	542.17	Stromlo
Coombs Pond A	17195.57	Terry Connolly St, Coombs
Coombs Pond B	44778.35	Edgeworth Parade, Coombs
Cotter Plot Equestrian Pond	5496.96	Cotter Rd, Curtain
Eddison Park Pond	1900.90	Eddison Park, Phillip
Eucumbene Drive Rural Dam	892.47	Eucumbene Dr, Duffy
Kilgariff Street Sediment Basin	1805.04	Kilgariff St, Coombs
National Arboretum Pond	12412.72	Molonglo Valley
Stromlo Forest Park Pond	8685.84	Stromlo

Due to the rapid urban development of Canberra, and the ongoing construction of suburb scale ponds and wetlands , all future waterbodies, while not necessarily listed in this document, will be managed in a manner consistent with this document.

Note 1: Neighbourhood Ponds with an * after their name are declared lakes under the Lakes Act.

Note 2: Neighbourhood Ponds and parks with an # after their name signifies official names under the Public Place Names Act.

Appendix C
Relevant legislation

Requirements of the Planning and Development Act 2007

General requirements

Description of the land for which the Plan has been prepared, section 320(a).

Relevant parts of this land management plan

- Part A briefly describes the land covered.
- Maps of each larger waterbody provided (Chap. 10).
- Environment, Planning and Sustainable Development Directorate's Asset Register and Geographic Information System contains details of land covered in this Land Management Plan.

Management objectives applying to the area

Objectives outlined in Schedule 3 of the Planning and Development Act, section 3(b).

Lake

1. To prevent and control floods by providing a reservoir to receive flows from rivers, creeks and urban run-offs.
2. To prevent and control pollution of waterways.
3. To provide for public use of the lake for recreation.
4. To provide a habitat for flora and fauna.

Relevant parts of this land management plan

Part A states:

- the statutory requirements relating to the management of lakes and ponds.

Part C identifies:

- management objectives and guiding management principles for the urban lakes and ponds.
- the services and levels of service to be provided for urban lakes and ponds in general.

Requirements of the Heritage Act 2004

General requirements

The Heritage Act affords protection to all places and objects of cultural significance in the ACT.

The Heritage Act also establishes the ACT Heritage Register, and affords protection to all registered places and objects.

The ACT Heritage Council is the independent statutory authority established by the Heritage Act. Other entities, such as the Planning and Land Authority, the Conservator of Flora and Fauna and the National Capital Authority also seek entity advice from the ACT Heritage Council on actions that may affect heritage places and objects.

Where development at a lake or pond is planned that could diminish the heritage significance of a place, Heritage Act advice or approvals should be sought from the ACT Heritage Council, in addition to any other legislative requirements.

Relevant parts of this land management plan

Part C identifies:

- management objectives and guiding management principles including heritage objectives and values.
- heritage values, where present, for each open space type.

Requirements of the Lakes Act 1976

General requirements

The Lakes Act 1976 provides for the administration, control and use of declared lakes in Canberra.

Section 15 defines areas in lakes where signs may be erected (eg. launching, mooring, beaching, embarkation, landing, swimming areas). Section 17 provides for the restriction of bathing swimming and diving. Section 21 allows declaration of a prohibited use area. Section 22 allows closing of a lake for regattas, exhibitions and sporting events. Section 27 places a general restriction on use of a power boat subject to penalty unless authorised by the Minister for sports club training or aquatic sports competitions or, on payment of a fee, (section 26). Section 33 authorises agreements by the Minister allowing commercial activities. Section 35 allows authorisation charging a fee for entry to a lake area. Part V, sections 36-50 provides comprehensive navigation rules. Section 56 grants a general power to make regulations, including with respect to equipment to be carried on boats and qualifications for persons navigating boats.

Relevant parts of this land management plan

Part C outlines:

- the management policies and guidelines for lakes and ponds including permitted and permitted with consent activities.
- the statutory requirements for advisory signs.
- the level of development and facility provision that can be expected.

Waterbodies covered

Waterbodies or waterways declared as lakes under the Lakes Act 1976.

Relevant parts of this land management plan

- Part C includes maps of the six largest declared lakes for the purposes of the Lakes Act (excludes the declared lake of Kingston Harbour, and North Weston Ponds is not a declared lake). The other seven declared lakes under this Act are listed with undeclared lakes and ponds as Neighbourhood Ponds in Appendix B.

Requirements of the Environment Protection Act 1997

General requirements

The Environment Protection Act 1997 aims to prevent environmental degradation through promoting pollution prevention, clean technologies, reuse, recycling and waste minimisation.

Part 8 of the Act requires that a person must not conduct an activity listed in schedule 1 of the Act unless the person holds an environmental authorisation in relation to that activity.

Relevant activities on Schedule 1 include, but are not limited to: the extraction of more than 100m^3 of material (other than water) from a waterway, sewage treatment if the activity involves the discharge of environmenttreated or untreated sewage or septic tank effluent to land or water, commercial aquaculture, the maintenance of urban parkland or other municipal landscapes, or the stormwater system, and wastewater recycling.

A pollutant shall have caused environmental harm if:

1. the pollutant entering the environment exceeds the prescribed measure; or
2. the pollutant is a prescribed pollutant (Environment Protection Regulations 1997).

Relevant parts of this land management plan

- Part C includes maps of the six largest d waterbodies, with all smaller (neighbourhood) ponds listed in Appendix B, which are subject to this Land Management Plan. These lakes and ponds act as detention (retardation) basins for stormwater arising from the surrounding urbanised catchments.
- Purchasers or providers of certain prescribed services are covered by the Act.
- Part C outlines the infrastructure and the types and levels of municipal maintenance services to be provided for urban lakes and ponds. These services may require an environmental protection agreement or authorisation under the relevant provisions of this Act.

Environment Protection Regulation 2005

Part 4 Water of the Regulation is known as the 'Water Quality Guidelines'. In Schedules 3 and 4 the environmental values or uses defined correspond with those in the Water Use and Catchment General Code, and the Waterways: WSUD General Code in Part 11 of the Territory Plan.

Schedule 3 prescribes the pollutants causing environmental harm if they enter a waterway.

Schedule 4 specifies ambient standards of water quality for waterways.

Relevant parts of this land management plan

Part C of this Plan of Management outlines the permitted and permitted with consent water uses in each urban lake or pond. These uses correspond with those defined in Part 11.8 Water Use and Catchment General Code of the Territory Plan.

Requirements of the Emergencies Act 2004

All emergency service bodies are established under the Emergencies Act 2004. This Act provides for different levels of special powers, and the capacity for escalation measures to be invoked to assist in the management of emergencies.

The Emergencies Act establishes the Emergency Services Authority. The authority is constituted by the Emergency Services Commissioner and vests simplified lines of communication, responsibility and accountability in the Commissioner.

The authority is responsible for the overall strategic direction and management of the four services (the Fire Brigade, Ambulance Service, Rural Fire Service and the State Emergency Service). Day to day performance of functions is under the direct management of the Chief Officers of the services who, as members of the authority's staff, are ultimately responsible to the Commissioner for the performance of functions.

The Emergency Management Committee is a planning body consisting of stakeholders, such as the Australian Federal Police, senior officers in the Emergency Services Bureau, the EPA, Chief Medical Officer and the Transport Canberra and City Services Directorate. This committee formulates and refines the Emergency Plan.

The Emergencies Act ensures that the advice of the council is sought by the minister or the authority in specified circumstances, and that it must be taken into account when making decisions about senior appointments, declaration of the bushfire season, the strategic bushfire management plan or rural fire fighting operations.

The objects of the Emergencies Act are:

1. to protect and preserve life, property and the environment; and
2. to provide for effective emergency management that;
    I. has regard to the need to prepare for, prevent, respond to and recover from emergencies; and
    II. takes an all-hazards approach to emergency management; and
3. to provide for the effective and cohesive management by the commissioner of the state emergency service, the ambulance service, fire and rescue and the rural fire service; and
4. to recognise the value to the community of all emergency service members, including volunteer members, and providers of operational and administrative support to the commissioner and the services.

Requirements of the Nature Conservation Act 2014

The following reserve management plans address waterbodies within the bounds of each plan's applicability, and therefore the Lakes and Ponds Land Management Plan does not apply in these areas:

- Namadgi National Park Plan of Management 2010
- Tidbinbilla Plan of Management 2012
- Jerrabomberra Wetlands Nature Reserve Plan of Management 2010
- Canberra Nature Park Plan of Management 1999
- Murrumbidgee River Corridor Plan of Management 1998
- Lower Molonglo River Corridor Plan of Management 2001
- Lower Cotter Catchment Strategic Management Plan 2007

Appendix D Management agencies and administrative arrangements

Transport Canberra and City Services Directorate

City Presentation

City Presentation is responsible for asset management and recreation services on lakes and ponds including:

- monitoring recreational and other use
- cleaning, rubbish removal and maintenance
- inspection of asset condition and maintenance of an asset database
- maintenance and creation of new lakes assets
- collection of needles, syringes and related chemical wastes
- approval for events
- public relations, media and promotional activities
- maintaining swimming areas and access for water craft.

City Places and Infrastructure

Roads and Infrastructure, within Transport Canberra and City Services Directorate, has responsibility for the provision, operation and maintenance of stormwater infrastructure throughout the ACT. Its major focus is on the design and construction of infrastructure, the hydrological assessment of existing and future development, the establishment of design standards, and ongoing review (monitoring) of performance of the stormwater system.

Chapter 1, Stormwater, of the Design Standards for Urban Infrastructure incorporates the design standards in respect to lakes and ponds. The Standards also integrate other chapters that may have some relevance to lakes, ponds and wetlands.

Environment, Planning and Sustainable Development Directorate

Planning and Development Act 2007

Requirement to establish a Territory Plan setting out permissible land and water uses and conditions of use.

Territory Plan 2008

Part 7 of the Territory Plan sets out the objectives of the Parks and Recreation Zones and the associated development code. While Part 11 includes the Water Use and Catchment General Code and the WaterWays: Water Sensitive Urban Design General Code.

Part 14 sets out Structure Plans, which set out principles and policies for development of future urban areas, and Part 15 sets out Concept Plans, which apply the principles and policies in the structure plan and guides the preparation and assessment of development in future urban areas. Both of these plans can allow for the planning of future waterbodies.

Lakes Act 1976

The Lakes Act 1976 provides for the administration, control and use of urban lakes in Canberra (other than Lake Burley Griffin). This Act is administered by EPA.

Water Resources Act 2007

The primary focus of the Water Resources Act 2007 is the allocation of water (including groundwater) across abstractors, and control of water control structures. Of particular importance to the Lakes and Ponds Land Management Plan is the provision under this Act for determining environmental flow guidelines (Part 3). The Environmental Flow Guidelines 2013 include extensive reference to urban lakes and ponds, in respect to maintaining values through the management of water abstraction. This Act is administered by EPA.

Water abstraction from urban lakes and ponds requires licensing under the Water Resources Act.
The Environmental Flow Guidelines 2013 also indicate a drawdown for urban lakes and ponds as a result of abstraction of 0.20m below the spillway

unless otherwise detailed in a specific abstraction management plan for a particular lake or pond. Conditions of a license issued under the Water Resources Act will regulate the volume and timing of water that can be taken from a waterbody.

Groundwater management is integrated in the instruments under the Water Resources Act. In view of the conjunctive surface water-groundwater nature of a number of the lakes and ponds, this represents an important component of overall resource management.

Environment Protection Act 1997

This Act establishes an EPA for the administration of the Environment Protection Act 1997, and incorporates the instruments for achieving the objects of the Environment Protection Act. This Act is administered by EPA.

Environment Protection Regulation 2005

The Environment Protection Regulation 2005, promulgated under the Act, identifies the environmental values set out in the Water Use and Catchment General Code under the Territory Plan as the object of pollution control in respect to lakes and ponds. Schedule 4 of the Regulation incorporates the water quality guidelines to be met, consistent with protecting the designated environmental and use values. These guidelines are those identified in the ACT Water Quality Guidelines under the Environment Protection Regulation 2005. This Regulation is administered by EPA.

Fisheries Act 2000

Recreational fishing in the ACT is governed by the provisions of the Fisheries Act 2000. This Act applies to all public waters in the ACT, including the lakes and ponds covered by this management plan. The Fisheries Act 2000 reflects community expectations for recreational fishing. Recreational fishing in the public waters of the ACT does not require a license, but you must comply with the Fisheries Act regulations, which aims to sustainably manage our fish populations.

Some of the larger lakes and ponds are actively managed as recreational fisheries and are part of the ACT Government fish stocking program (ACT Government 2015). The smaller ponds are considered unsuitable to sustain managed fisheries for a number of reasons including size, depth, fluctuating water levels and high summer water temperatures. Fishing is generally still permitted in these water bodies but stocking is not considered appropriate.

ACT and Region Catchment Strategy: 2016-46

The ACT sits within the broader catchment and drainage system of the Upper Murrumbidgee and has, in the past, had limited capacity to influence catchment management beyond its borders. The ACT and Region Catchment Strategy: 2016–46 provides a mechanism to resolve jurisdictional challenges and to capitalise on opportunities for improved catchment management outcomes. This strategy is also a vehicle for improved community partnership in overall catchment management.

The strategy was developed by the ACT and Region Catchment Management Coordination Group, which is a statutory body established to address the challenges in catchment management across jurisdictions, and includes executive representation from the Australian Government, ACT Government, NSW Government, local councils, Icon Water and the community.

ACT Guidelines for Recreational Water Quality

The ACT Guidelines for Recreational Water Quality (ACT Health 2014) provide a framework for the management of recreational water sites within the ACT. This document addresses risks from blue-green algae (cyanobacteria) as well as microbial pathogens. This document only applies to the sites where primary contact recreational activities are permitted. The assessment of the water quality adopts a preventative risk management approach. This document is based on the National Health and Medical Research Council's Guidelines for Managing Risks in Recreational Waters published in February 2008 and adapted for the ACT environment.

ACT Heritage Council

The ACT Heritage Council is an independent statutory body established to administer the provisions of the Heritage Act 2004. Part 13 of the Heritage Ac affords statutory protection to all culturally significant places and objects in the ACT, and to all places and objects registered on the ACT Heritage Register.

Where development is proposed that may diminish heritage values, or damage significant places, applications seeking approval for those activities can be made under Part 10 of the Heritage Act Under Part 10 of the Heritage Act, Council advice is also sought from the Council by other statutory entities, including the ACT Planning and Land Authority and the Conservator of Flora and Fauna.

Wildlife Research and Monitoring Program

The Conservation Research unit contributes important ecological research and data to agencies managing the ACT waterways, and to the Conservator of Flora and Fauna. Fish conservation and recreational fisheries monitoring and management are important components of this program related to the management of the lakes and ponds.

ACT Water Strategy 2014–44: Striking the Balance

The ACT Water Strategy sets out how the ACT Government will manage the ACT's water resources over the next 30 years to meet our urban and environmental needs and regional responsibilities. It covers the full breadth of water management activities in the ACT, including catchment management, stormwater and flood management, water supply and services, water for the environment, recreational water use and public health.

The strategy builds on the previous water strategy, Think Water, Act Water, and aims to deliver security of water supply, improved water quality and catchment health, and a 'water smart' community.

The strategy will provide a basis for ensuring the ACT Government can continue to support current and future growth, achieve desired environmental outcomes and be responsive to climate change through three key outcomes:

1. Healthy catchments and waterbodies
2. A sustainable water supply used efficiently
3. A community that values and enjoys clean, healthy catchments.

Water Act 2007 (Cwlth) and the Murray–Darling Basin Agreement

The Basin Plan, which is an instrument under the Commonwealth's Water Act, sets out a number of requirements for Basin States to meet including water resource plans, a water quality and salinity management plan, an environmental management plan and a long term watering plan. The ACT is required to have an accredited surface water resource plan and groundwater plan by 30 June 2019. The Basin Plan sets out net sustainable diversion limits for surface water groundwater which are required to be met.

Research and monitoring groups

- eWater, University of Canberra
- Institute for Applied Ecology, University of Canberra
- Fenner School of Environment and Society, Australian National University
- Centre for Resource and Environmental Studies, Australian National University
- CSIRO Land and Water
- Ecowise
- Waterwatch groups
- Catchment and Landcare groups.

Health Directorate

The Health Directorate administers the Public Health Act 1997, and undertakes water quality monitoring related to safety of swimming areas in Canberra's lakes and rivers. e.g. Lake Ginninderra and Lake Tuggeranong.

The ACT Guidelines for Recreational Water Quality (ACT Government 2014) is based on the National Health and Medical Research Council's Guidelines for Managing Risks in Recreational Waters and adapted for local conditions. These guidelines provide a framework for the management of recreational water sites within the ACT and addresses risks from blue-green algae and as microbial pathogens.

ACT Government agencies - shared responsibilities

Regulatory activities under the Environment Protection Act 1997, Water Resources Act 2007, Lakes Act 1976 and Fisheries Act 2000 are the responsibility of Access Canberra and Environment, Planning and Sustainable Development Directorate provided by these agencies include:

- wildlife management
- compliance and enforcement
- issuing boat permits and licenses
- regulating recreational use
- investigation of safety issues e.g. chemical spills; boating incidents; overhanging foliage; obstructions to movement and line of sight
- monitoring significant environmental incidents (e.g. blue-green algae) and impacts.

Appendix E
Management guidelines

Aquatic macrophyte management

Aquatic plants, including algae, not only serve an important role in the ecological functioning of urban lakes, they can also produce conflict with recreational activities.

One of the primary objectives in aquatic plant management is that of nuisance removal. To meet this objective, when necessary, plant shoot removal is performed by mechanical methods and the removed plant material is composted.

Commercial activities on lakes and ponds

Commercial leases are permitted, where and when appropriate, and are considered by Environment, Planning and Sustainable Development in consultation with Transport Canberra and City Services.

EPA policies and guidelines

The Environment, Planning and Sustainable Development Directorate develops and reviews several policies and guidelines that relate to water quality. Current documents include the:

- Water Quality Environment Protection Policy
- Environment Regulation and Protection Compliance and Enforcement Guidelines 2015
- General Environment Protection Policy, Information Sheets for Stormwater pollution from residential areas
- Discharge from sediment control ponds
- Site excavation and diversion or catch drains
- Sediment Control
- Requirements for the classification and reuse of drilling mud waste in the ACT
- Water laws in the ACT: surface and ground water use, Information about dams,
- Water laws in the ACT: work in a waterway
- Information for bore owners and drillers
- What is a water access entitlement
- Water resources regulation
- Efficient use guidelines – disallowable instruments
- Water meter requirements
- Water license register
- Water laws: compliance and enforcement
- ACT water management areas
- Buying a property with a groundwater bore
- Selling a property with a groundwater bore.

ACT Heritage Council Policies and Guidelines

Under the Heritage Act 2004, the ACT Heritage Council can make heritage guidelines and approve conservation management plans, which set out the heritage requirements to conserve and protect heritage places and objects. The Council has also developed policies on the assessment and management of culturally significant places, including the Heritage Assessment Policy and the Cultural Heritage Reporting Policy.

Domestic Animals

General

The control of domestic animals is managed by the registrar appointed under section 121 of the Domestic Animals Act 2000. Dogs are part of our community and every possible effort has been made to achieve a balance between the needs of dog owners and non-owners to enjoy Canberra's lakes and ponds.

Under this Act, dogs are permitted within most public places in the urban areas of the ACT while restrained by a leash and held by a competent person. Land most suited for dog exercise is usually the non-irrigated land within most suburbs, often found surrounding playing fields.

Dog swimming areas

Dogs are permitted to swim in most of Canberra's lakes, provided they are not within 10 metres of a sign-posted public swimming area. Warnings on lake conditions or closures should be considered by owners when recreating their dogs at lakes and ponds.

Feral species control

The control of feral plant and animal species in, on and around the lakes and ponds is undertaken where necessary in accordance with various strategies developed by the ACT Government. These strategies include the ACT Nature Conservation Strategy and the ACT Weeds Strategy. Additionally, The ACT Government is delivering works to support cross-jurisdictional pest control strategies, such as the Willow Management Strategy for the Upper Murrumbidgee Catchment and the National Carp Control Plan.

Feral animals include rabbits, cats, carp and domestic ducks where they have the potential to cross breed with native species. Feral plants include most willow species, blackberries and some introduced aquatic plants.

The Pest Plants and Animals Act 2005 is the legislation under which feral species control is undertaken in the ACT.

Fisheries management

Select urban lakes are stocked with native fish species to provide a recreational resource and help conserve native species by relieving fishing pressure on the more fragile natural fish populations in rivers and streams in the Canberra region. Recreational fish stocks are monitored by the ACT Government. Such species include Murray Cod and Golden Perch.

Litter and rubbish management

City Presentation endeavors to provide lake surfaces and shorelines free of litter and floating debris. Litter and rubbish standards are specified and a contractor has been engaged to achieve these service standards. The litter removal service is categorised into areas where litter removal has been identified as very high, high and medium. These priority areas have a specified frequency of inspections and actions are taken as required.

Major events on and surrounding lakes

Approval for major events may be obtained by submitting an application to the Licence and Compliance Land Use Unit (Transport Canberra and City Services) and/or Access Canberra (who administer the Lakes Act 1976).

Public safety (people and property)

Workplace Health and Safety Procedures set out the manner in which Transport Canberra and City Services ensures the protection of people and property. It includes references to hazards, obstructions, machinery in public places, and liaison with public utilities.

All due care is taken by Transport Canberra and City Services and maintenance contractors to ensure the safety of the public and their property.

Drainage infrastructure

Open space containing drainage infrastructure leading to lakes and ponds should be transitioned (over time) to forms that provide more benefits than the older designs (pollutant interception, flow attenuation, biodiversity, microclimate and amenity). For example:

- aged concrete trapezoidal channels that are due for replacement should not be replaced with like for like but have sections of the concrete panels replaced with alternative material (and form) that provides for safe and stable conveyance of the 1 in 5 year flow event and allows for attenuation and infiltration of lower flows.
- grassed swales may have trees incorporated into the channel; this will not affect flood conveyance but will provide a range of biodiversity and climate benefits. Trees could be actively planted or the maintenance regime could avoid removing self-seeding trees if the species type is appropriate.

Sports and recreation management

The lakes and adjacent parklands are available for general use by the community without charge. Special events and commercial uses may attract a fee. Access Canberra can be contacted for further details.

Aquatic values

Our objective is to conserve and encourage biological diversity and maintain and augment ecological processes and systems. An urban lake or pond is not intended to achieve a natural state comparable to an unmodified waterbody. The aim is for a resilient state that achieves defined values because of the occurrence of certain ecological, chemical and physical processes. There are a number of management actions that can influence ecosystem function and structure, such as:

- water abstraction
- vegetation management
- habitat creation (logs, fish breeding structures)
- water level control - pond drying for sediment consolidation, managed fluctuations to improve aquatic functions
- fauna controls (fish stocking or removal, fishing regulation)
- chemical control (dosing for water clarity or controlling algae)
- sediment removal.

Some management actions are routine and ongoing within current programs (i.e. fish stocking, water abstraction licensing, managed water level fluctuations). However some actions are infrequent, irregular and not directly assigned to a particular management entity (i.e. large environmentally-induced water level fluctuations, chemical dosing). The full range of management actions should be employed over time to achieve functional and diverse ecological processes and functions.

Water quality monitoring

The management of recreational activities in lakes is in accordance with the ACT Guidelines for Recreational Water Quality (ACT Health 2014). Primary contact recreation, where there is direct contact with the water, such as swimming, requires regular sampling during the swimming season of October through to April. Monitoring, as per these guidelines, is undertaken for two primary pollutants: blue green algae (undertaken by the EPA) and faecal coliforms (undertaken by ACT Health).

Ecological condition assessment of the lakes and ponds is undertaken by a range of monitoring programs.

- Waterwatch undertakes water quality, macro-invertebrate and riparian condition surveys at lakes and ponds across the ACT. Water quality is sampled monthly, macro-invertebrates twice a year, and riparian condition every two years. Results are published each year in the Catchment Health Indicator Program (CHIP) Report. The report can be found on the Upper Murrumbidgee Waterwatch website: http://www.act.waterwatch.org.au/
- Frogwatch undertakes a census each October to assess the diversity and abundance of frogs at ponds and wetlands across the ACT. Frogs are an excellent indicator of the condition of ponds and wetlands. Data can be viewed on the ACT Frogwatch website: http://www.ginninderralandcare.org.au/

Mowing management

In 2016 the Transport Canberra and City Services Directorate reviewed its mowing standards. The large amount of open space throughout urban Canberra means management practices can have a significant effect on how the landscape delivers material to the drainage network. Mowing is a significant land management practice on urban open space.

Practices that allow the development of deep soil profiles covered by well-vegetated swales, median strips and verges can promote a landscape that will absorb runoff and nutrients as well as slow down and reduce the delivery of pollutants to lakes, ponds and, ultimately, the Murrumbidgee River. Through a review of mowing practices the Conservator of Flora and Fauna made 29 recommendations, six of which relate to the management of lakes and ponds. Of these recommendations, five were accepted and are being implemented as management principles (Table 8), with Recommendation 6 (differential mowing heights and widths) being rejected due to public safety concerns and impracticalities.

Table 10. Mowing management principles to promote lake and pond health

Relevant waterbody	Management Action
All	Cut vegetation to be removed from guttering before leaving site. No cut vegetation is to be swept or blown down a stormwater culvert or sump.
All	Mowing will not occur within 5 metres of the high water mark of a water body other than in specified (marked) access zones or recreation areas.
All	Mowing will not occur where native grass forms the majority of the understorey. Bollards, markers or other barriers may be in place to exclude mowers from areas of native vegetation.
All	Mowing will not occur within heritage places, unless measures have been adopted to avoid damage to physical objects.
Isabella Ponds Monash Grassland	Mowing is to be excluded from the high diversity grassland patch. Mowing upslope of the bike path at this site is to be one mower width or in line with the street lights and the down slope side of the bike path should only be mowed one mower width to enable the creation of thicker grass which can filter runoff before it enters the pond.
Lake Ginninderra Foreshore	Mowing along the bike path to be one mower width either side of the path to protect significant vegetation and rare plants on the east side of path and to encourage thickening of the grass to filter runoff before it enters the lake.
Lake Ginninderra Foreshore, Lake Tuggeranong District Park (south) grassland and Isabella Ponds Grassland	Annual mowing operation plans to be referred to the Conservator of Flora and Fauna for advice.

Appendix F
Points of Contact

Access Canberra, Chief Ministers, Treasury and Economic Development Directorate
www.accesscanberra.act.gov.au

City Presentation, Transport Canberra and City Services Directorate www.tccs.act.gov.au

Environment Division, Environment, Planning and Sustainable Development Directorate
www.environment.act.gov.au

Roads and Infrastructure, Transport Canberra and City Services Directorate www.tccs.act.gov.au

Health Protection Services, Health Directorate
www.health.act.gov.au

National Capital Authority (for Lake Burley Griffin)
www.nationalcapital.gov.au

ACT Heritage Council
http://www.environment.act.gov.au/heritage

ACT Planning Authority
http://www.planning.act.gov.au/

For further information please call Access Canberra on 13 22 81

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