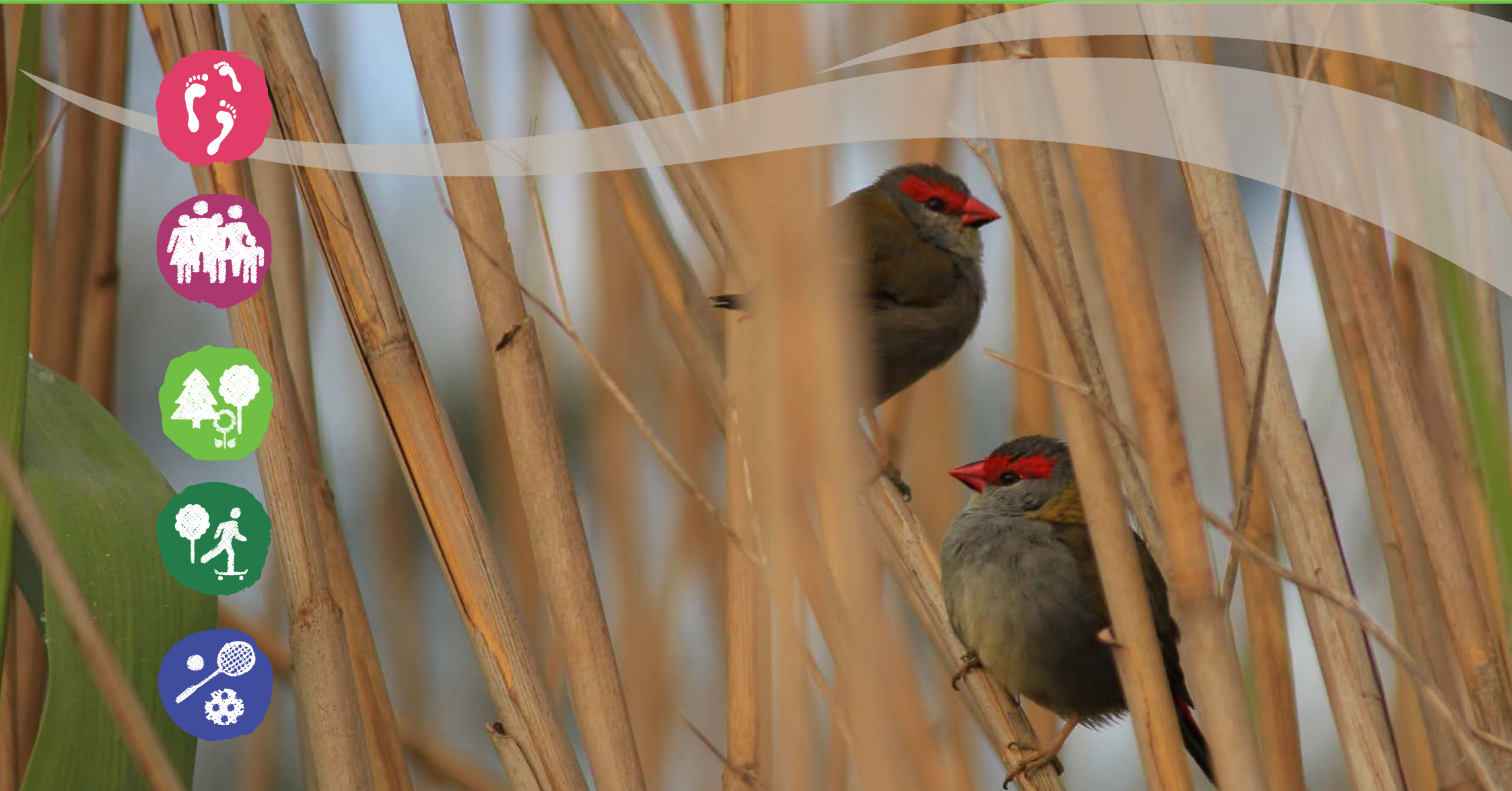




Bankstown City Council

Biodiversity Strategic Plan 2015-2025



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1

Introduction





Purpose of this Strategic Plan

This BSP has been prepared to ensure that Council is best able to meet its statutory obligations regarding biodiversity protection, as well as ensuring that the wealth of biodiversity that exists in Bankstown is protected for future generations. This BSP replaces the Bankstown Biodiversity Strategy of 2002 and links to the purpose and objectives of the Bankstown Community Plan and City Directions.

“We share the Earth with many other life forms that have intrinsic value and warrant our respect, whether or not they are of benefit to us” (Australia’s Biodiversity Conservation Strategy 2010-2030).

Defining Biodiversity

According to the Australian Government Department of Environment website “Biological diversity (or biodiversity) is the variety of all life forms - the different plants, animals and micro-organisms, their genes, and the ecosystems of which they form a part. It is not static, but constantly changing. Biodiversity is increased by genetic change and evolutionary processes, and reduced by processes such as extinction, population decline, and habitat degradation”.

Ecology is understood within the framework of biodiversity as “dealing with the relations of organisms to one another and to their physical surroundings” (Oxford Dictionary), this definition is not exclusive of the human species nor within an urban context such as the Bankstown Local Government Area (LGA).

The Department of Environment further defines that the concept of biodiversity emphasises the interconnectedness and interdependence of all life on earth and can be considered at three levels:

- Genetic diversity - the variety of genetic information contained in all of the individual plants, animals and microorganisms that inhabit the earth. Individual genes are the basic unit of biodiversity, and explain why there is so much variation amongst individuals of a particular species. For example, why some people have blue eyes and others have brown eyes – DNA replication (within the cell nucleus) is the primary determinant of genetic diversity;
- Species diversity – the variety of species on earth. It is the most common way people think about biodiversity. Estimates on the range of species on Earth vary but it is that 1.7 million species have been classified, estimates of total species number vary but 8.7 million species is an accepted figure although this could be as high as 30 million species or more. Locally, 80% of Australia's plants and mammals, and 45% of our birds are found nowhere else in the world. Australia is one of 17 'mega diverse' countries – the 17 countries combined harbour more than 70% of the Earth's species (WWF). It is estimated that Australia has over 1 million species of which 850,000 have yet to be identified. During the past 200 years the Australian environment has been drastically modified. Australia has lost 75% of its rainforests and has the world's worst record of mammal extinctions, having lost approximately 15% of mammals over

the last 200 years. Within NSW, biodiversity losses have also been substantial. In NSW over 80 species of plants and animals have become extinct, and more than 600 species are considered either endangered or vulnerable. 22% of NSWs' mammal species have become extinct and a further 41.5% are now considered threatened;

- Ecosystem diversity - the variety of habitats, biotic communities and ecological processes. Sydney has a broad range of ecosystem types ranging from the sandstone woodland vegetation and littoral rainforests, to the mangrove forests found in many of our estuarine waters.

In this BSP, biological diversity encompasses all native species, genetic variations, populations, ecosystems and ecological processes.

Biodiversity, often found in the urban bushland environment, as well as within the smallest nook of the city centre, is a major resource for local governments.

The services that biodiversity provide are real and meaningful and in nearly all cases have a significant dollar value or dollar saving associated with it. For example, when speaking of bushland, services provided include:

- reduction of noise, air and visual pollution;
- effective rainfall and/or flooding catchment zones;
- providing places for people to feel peace and space;

- creating suburb identity (most often increasing real estate value of the locality);
- breaking the urban concrete heat sink effect by providing cool, shady and heat absorbing areas (significantly reducing the need for expensive air-conditioning services);
- protecting natural and cultural (both pre and post-contact) heritage;
- reducing soil erosion and land degradation,
- provide habitat for wildlife;
- protecting the water quality of creeks, rivers and drinking water;
- sustaining recreational, scientific and educational activities;
- oxygen production; and
- carbon dioxide uptake.

Living with or close to biodiversity is shown to significantly improve health, lifespan and happiness. In areas of high biodiversity it has been recognised that the natural environment is more easily able to withstand significant environmental changes and disturbances. Biodiversity is often the originator of foods, medicines and often industrial products, and critical processes such as the maintenance of clean air, the pollination of plants and the production of oxygen further emphasises the importance of biodiversity. (Taylor & Hochuli, 2014)



Biodiversity of the Bankstown Local Government Area (LGA)

The Bankstown LGA is approximately 77 km² in size. There are approximately 525 hectares of bushland within its boundaries, consisting of ~276 hectares in Council reserves, ~174 hectares in the Georges River National Park and ~74 hectares on private land or other State Government land. The LGA is divided into seven Planning Areas which assist Council's strategic planning processes. (see Figures 1, 2 and 3)

Bushland is distributed throughout the LGA in reserves which vary greatly in size, shape and plant community. Through private property vegetation planting as well as Council plantings, particularly within the 'Conservation Corridors' biodiversity persists outside of designated conservation reserve areas.

Although Bankstown is generally a fully urbanised area, it still exhibits natural features that have environmental, social and financial value. This can be attributed to the location of Bankstown in a transition zone between the wetter, coastal areas of Sydney and the drier, rolling inland country of the Cumberland Plain. This has resulted in a variety of landscapes, soils, geological formations, habitats, and consequently, a unique variety of plants and animals.

The variety of vegetation communities, habitats and associated plant and animal species are attributable to the rivers and creeks that flow through the area. These impart a strong aquatic influence to the biodiversity of Bankstown,

as indicated by the presence of aquatic birds, including those listed under the Australia, Japan, China and Republic of Korea Migratory Bird Agreements.

The prevalence of large mangrove beds, which are important as a nursery for young fish, and unique river flat vegetation including sensitive salt marsh communities and Eucalypt forests also detail Bankstown's waterways significance.

The diverse range of ecosystems within Bankstown include aquatic ecosystems that centre around the Georges River and its tributaries (including river foreshore, tidal and littoral zones, rocky complexes and freshwater and estuarine wetlands and their associated vegetation), to terrestrial ecosystems ranging from Sydney Sandstone Woodland, tall forests (such as the Sydney Turpentine – Iron Bark Forest) to low forest (Cooks River/Castlereagh Ironbark Forest) to the rare shale woodlands of the Cumberland Plain.

This BSP is complimented with the Bankstown 'Catchment Management Strategic Plan'. The purpose of the Catchment Management Strategic Plan is to set a clear direction for the management of water and water-related resources. This includes water volume (including both flooding and environmental flows), water quality and aquatic and riparian health.

Figure 1: Map of Bankstown City Council Suburbs and Local Area Plan Area's.

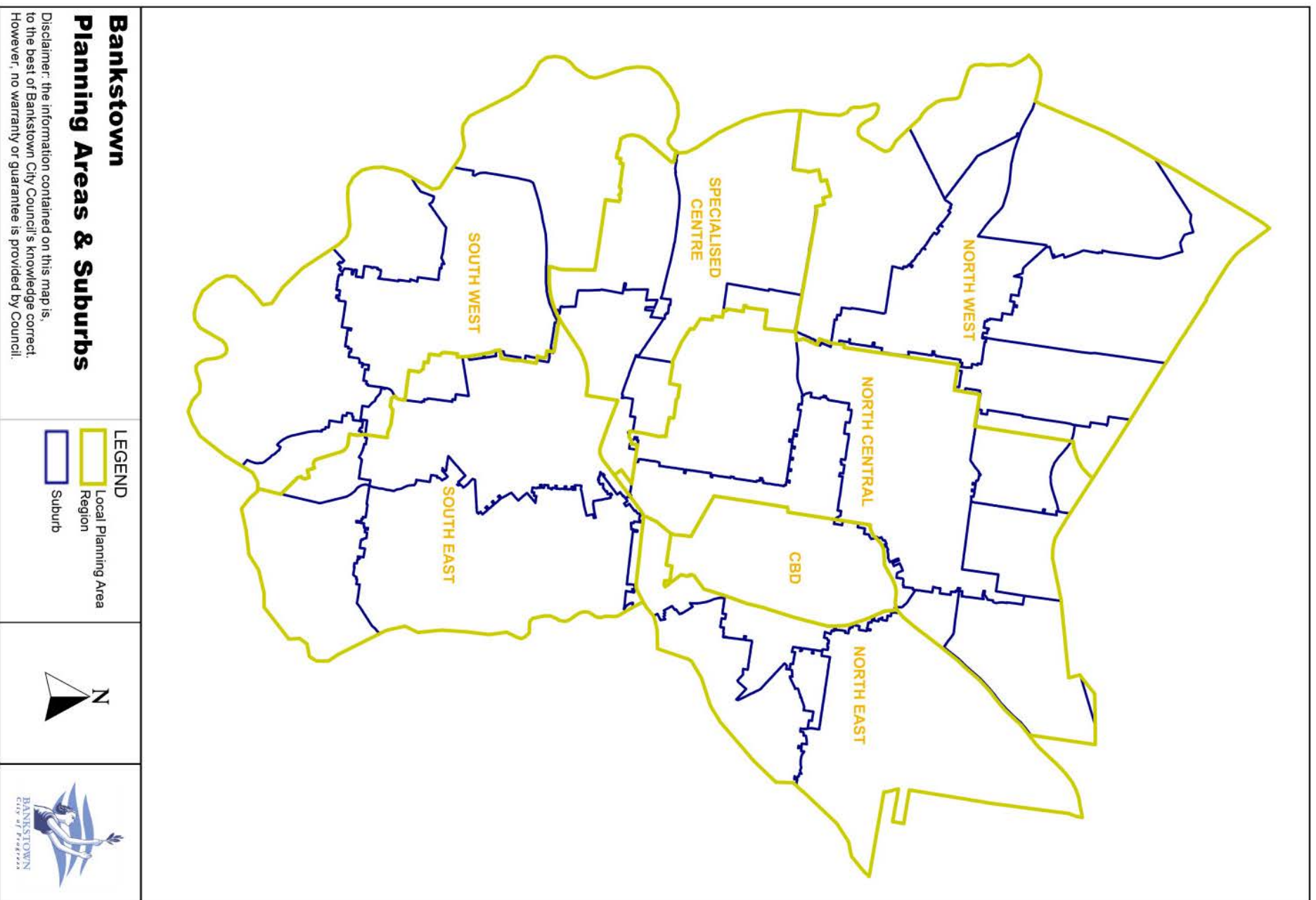


Figure 2: Map of Community Land and National Parks in the Bankstown LGA

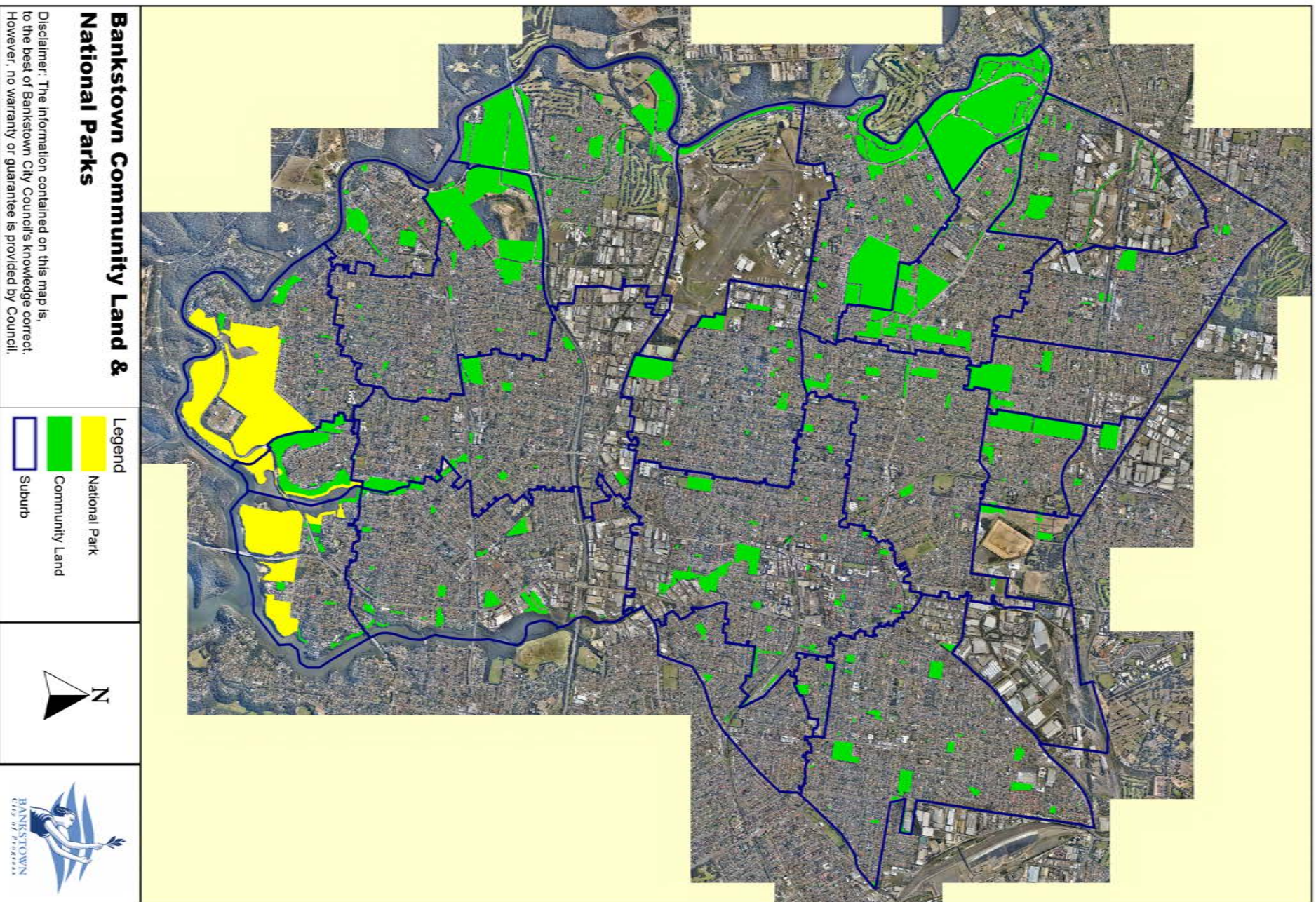
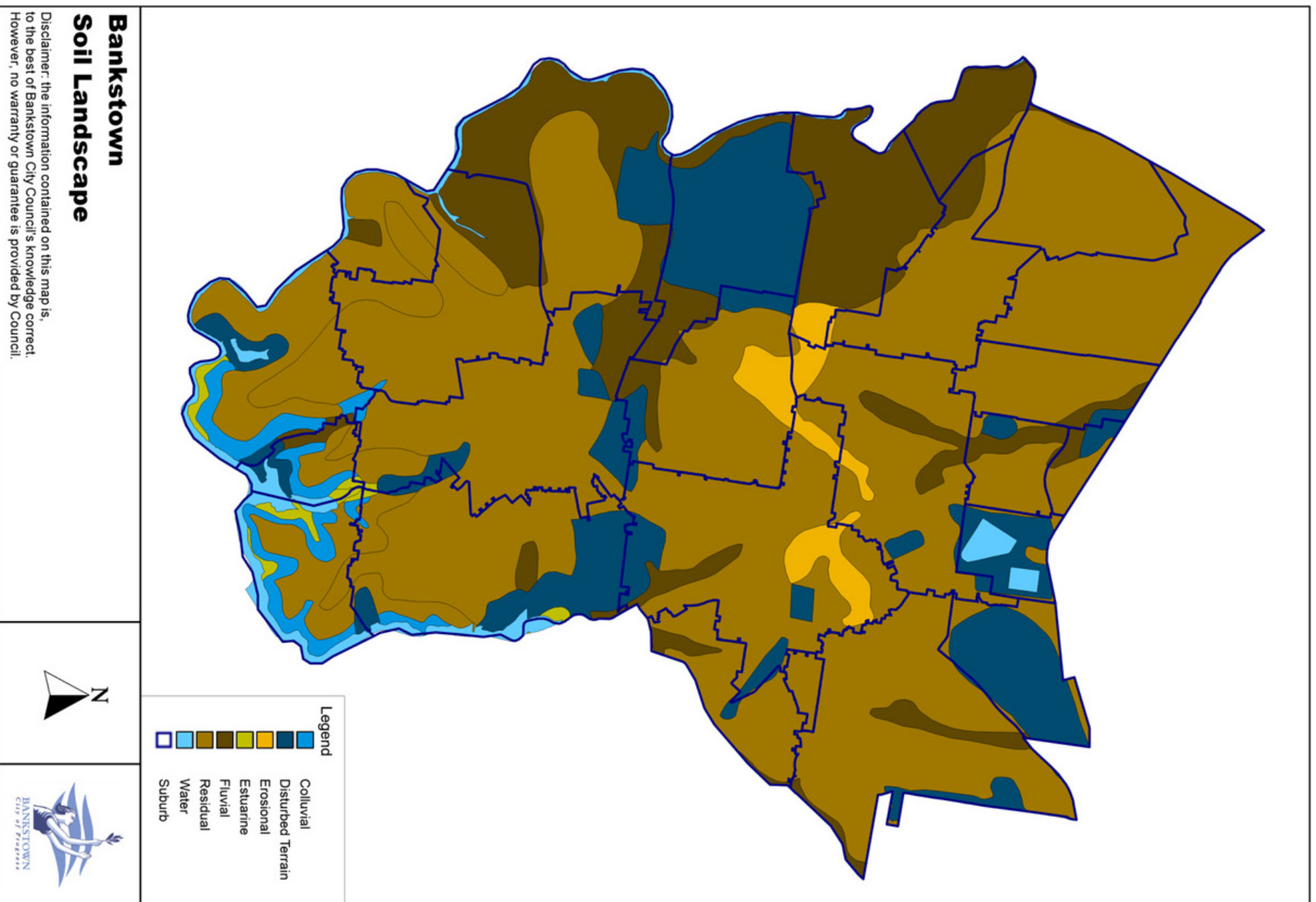


Figure 3: Map of Bankstown Soil Landscapes





Ecological Communities, Plants and Animals of Bankstown

Within Bankstown three sources are used to obtain knowledge on local plants, animals and ecological communities. These are BCC Bushland Mapping (Figure 4), BioNET and the Office of Environment and Heritage (OEH) Sydney Metropolitan Catchment Management Area (SMCMA) Vegetation Mapping. Commissioned flora and fauna surveys also provide valuable baseline information for the LGA.



Photograph: Mark Sweeney

It should be noted that the various sources identify different names of and numbers for the ecological communities found in the Bankstown LGA. These inconsistencies occur due to naming conventions and contemporary streamlining of biodiversity matters.

The following paragraphs, lists and numbers are meant as a guide and are not an exhaustive list. Further research, through local knowledge or expert opinion may be required to ascertain more accurately the precise facts.

Further research may also include ecological assessment by a suitably qualified ecologist.

Ecological Communities: BCC Bushland Mapping

BCC Bushland Mapping identifies 13 vegetation communities. Of these, 7 are classified as Endangered Ecological Communities under the Threatened Species Conservation Management (TSC) Act.

Bankstown is a critical area for the survival of many of these communities due to its location at the eastern and southern extent of their distribution.

Additionally the endangered Cooks River/ Castlereagh Ironbark Forest is not protected within any National Parks and has almost 56% of its remaining distribution within Bankstown. As will be seen there is a range of information regarding vegetation types in the Bankstown LGA, occasionally an ecological expert may be required to determine precisely which ecological community is present at any site. All mapping should be used as a guide with ground truthing the only sure way of determination.

The 7 endangered ecological communities as traditionally recognised within the LGA are:

- Coastal Saltmarsh;
- Cooks River/Castlereagh Ironbark Forest;
- River-flat Eucalypt Forest;
- Cumberland Plain Woodland;
- Shale/Gravel Transition Forest;
- Shale/Sandstone Transition Forest;
- Sydney Turpentine Ironbark Forest.

The remaining 6 identified ecological communities being:

- Seagrass;
- Castlereagh Scribbly Gum Woodland;
- Freshwater wetlands;
- Estuarine Complex;
- Western Sandstone Gully Forest;
- Upper George's River Sandstone Woodland.

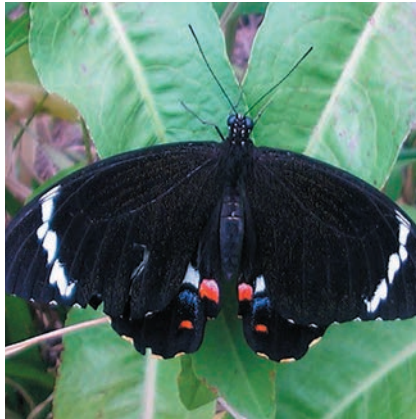
Ecological Communities: BioNET

The BioNet species and community data set (in May 2014) showed there to be 22 endangered ecological communities in the Bankstown LGA. Below are the communities from this data set that may exist in the Bankstown LGA:

- Bangalay Sand Forest of the Sydney Basin and South East Corner Bioregions;
- Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion;
- Castlereagh Swamp Woodland Community;
- Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions;
- Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion;
- Cumberland Plain Woodland in the Sydney Basin Bioregion;
- Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions;
- Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions;
- Moist Shale Woodland in the Sydney Basin Bioregion;

- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions;
- Shale gravel Transition Forest in the Sydney Basin Bioregion;
- Shale/Sandstone Transition Forest;
- Southern Sydney sheltered forest on transitional sandstone soils in the Sydney Basin Bioregion;
- Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions;
- Sydney Freshwater Wetlands in the Sydney Basin Bioregion;
- Sydney Turpentine-Ironbark Forest.

Further information and community profiles regarding these communities can be accessed on the OEH website, www.environment.nsw.gov.au.



Ecological Communities: OEH SMCMA Vegetation Mapping

Mapping from the OEH notes a number of ecological communities found within the Bankstown LGA. The Sydney Metropolitan Catchment Management Area (SMCMA) vegetation mapping (Figures 5, 6 and 7) is a Sydney wide map which took a number of years to compile and was done in conjunction with local government staff.

The resulting map is a live map which will draw subsequent OEH versions as minor discrepancies are ironed out. The mapping comes with two volumes of documentation, including a technical report on how the data was compiled, analysed and assessed and a volume detailing the vegetation community profiles. The communities mapped in the Bankstown LGA are listed below. Each vegetation community is assigned a 'Map Unit Code' which is noted below after the vegetation community name.

- Castlereagh Ironbark Forest (Cooks River/ Castlereagh Ironbark Forest – NSW EEC) - DSF01;
- Castlereagh Shale-Gravel Transition Forest (Shale Gravel Transition Forest – NSW EEC & Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest – Commonwealth EEC) - DSF02;
- Castlereagh Swamp Woodland (Castlereagh Swamp Woodland Community – NSW EEC) - DSF20;
- Sydney Turpentine-Ironbark Forest (Sydney Turpentine-Ironbark Forest – NSW EEC & Turpentine-Ironbark Forest – Commonwealth EEC) - WSF09;
- Cumberland Shale Plains Woodland (Cumberland Plain Woodland – NSW EEC & Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest – Commonwealth EEC) - GW03;
- Coastal Flats Swamp Mahogany Forest (Swamp Sclerophyll Forest on Coastal Floodplains – NSW EEC) - FoW02;
- Riverflat Paperbark Swamp Forest (Swamp Sclerophyll Forest on Coastal Floodplains – NSW EEC) - F0W05;
- Cumberland Riverflat Forest (River-flat Eucalypt Forest on Coastal Floodplains – NSW EEC) - FoW06;
- Cumberland Swamp Oak Riparian Forest (River-flat Eucalypt Forest on Coastal Floodplains – NSW EEC) - FoW07;
- Estuarine Swamp Oak Forest (Swamp Oak Floodplain Forest – NSW EEC) - FoW08;
- Coastal Swamp Paperbark – Swamp Oak Scrub (Swamp Oak Floodplain Forest – NSW EEC) - FoW12;
- Coastal Freshwater Wetland (Freshwater Wetlands on Coastal Floodplains – NSW EEC) - FrW03;
- Estuarine Reedland (Swamp Oak Floodplain Forest – NSW EEC) - FrW06;

- Estuarine Saltmarsh (Coastal Saltmarsh – NSW EEC) - SW02; and
- Castlereagh Scribbly Gum Woodland (Castlereagh Scribbly Gum Woodland – NSW VEC) - S_DSF19.

Non-threatened Communities:

- Coastal Enriched Sandstone Dry Forest - S_DSF04;
- Coastal Enriched Sandstone Moist Forest - S_WSF02;
- Coastal Escarpment Littoral Rainforest - S_RF07;
- Coastal Freshwater Swamp Forest - S_FoW03;
- Coastal Sandstone Gully Forest - S_DSF09;
- Coastal Shale-Sandstone Forest - S_WSF06;
- Estuarine Mangrove Forest - S_SW01;
- Seagrass meadows - S_SW03;
- Sydney Hinterland Apple-Blackbutt Gully Forest - S_DSF17;
- Sydney Hinterland Dwarf Apple Heath-Woodland - S_HL10;
- Sydney Hinterland Exposed Sandstone Woodland - S_DSF15;
- Artificial Wetlands;
- Plantations;
- Urban Native and Exotic Cover;
- Weeds and Exotics.

See Appendix 3 for an account of the Bankstown LGA from “Taken for Granted - The Bushland of Sydney and Its Suburbs” by Benson & Howell.

Plants and Animals: BioNET

The OEH’s BioNET database is a collection of information from various sources and surveys. Records in the database are of species both known and predicted to occur in the area. A 2015 search showed there to be 1,106 vascular plant species (including non-locally native species), 27 of these being of national significance (Environmental Protection & Biodiversity Conservation Act – EPBC Act), 48 listed as threatened within NSW and many more considered regionally significant.

A BioNET bird search for the Bankstown LGA was conducted in 2015 found there to be 202 bird species recorded in the Bankstown Council area, including 37 threatened species. These include the powerful owl, osprey, bush stone curlew, black bittern and the glossy black cockatoo. In addition, a further 6 species are protected under international treaties, and fly to Bankstown from China, Japan, Korea and Siberia.

BioNET (2015) also showed 17 frog species (including 5 threatened species).

BioNET (2015) also revealed that 42 mammal species have been recorded in the LGA with 16 considered threatened, this includes non-locally native species and species that predicted but not known to occur in the LGA.

A BioNET search also reveals four endangered populations as occurring in the LGA. These are:

- *Marsdenia viridiflora* R. Br. subsp. *viridiflora* (Native Pear) population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith Local Government Areas;
- Tadgell’s Bluebell in the Local Government Areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield;
- Gosford Wattle, Hurstville and Kogarah Local Government Areas;
- *Pomaderris prunifolia* (Plum-leaf Pomaderris) in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas.

Figure 4: Bankstown Bushland Map

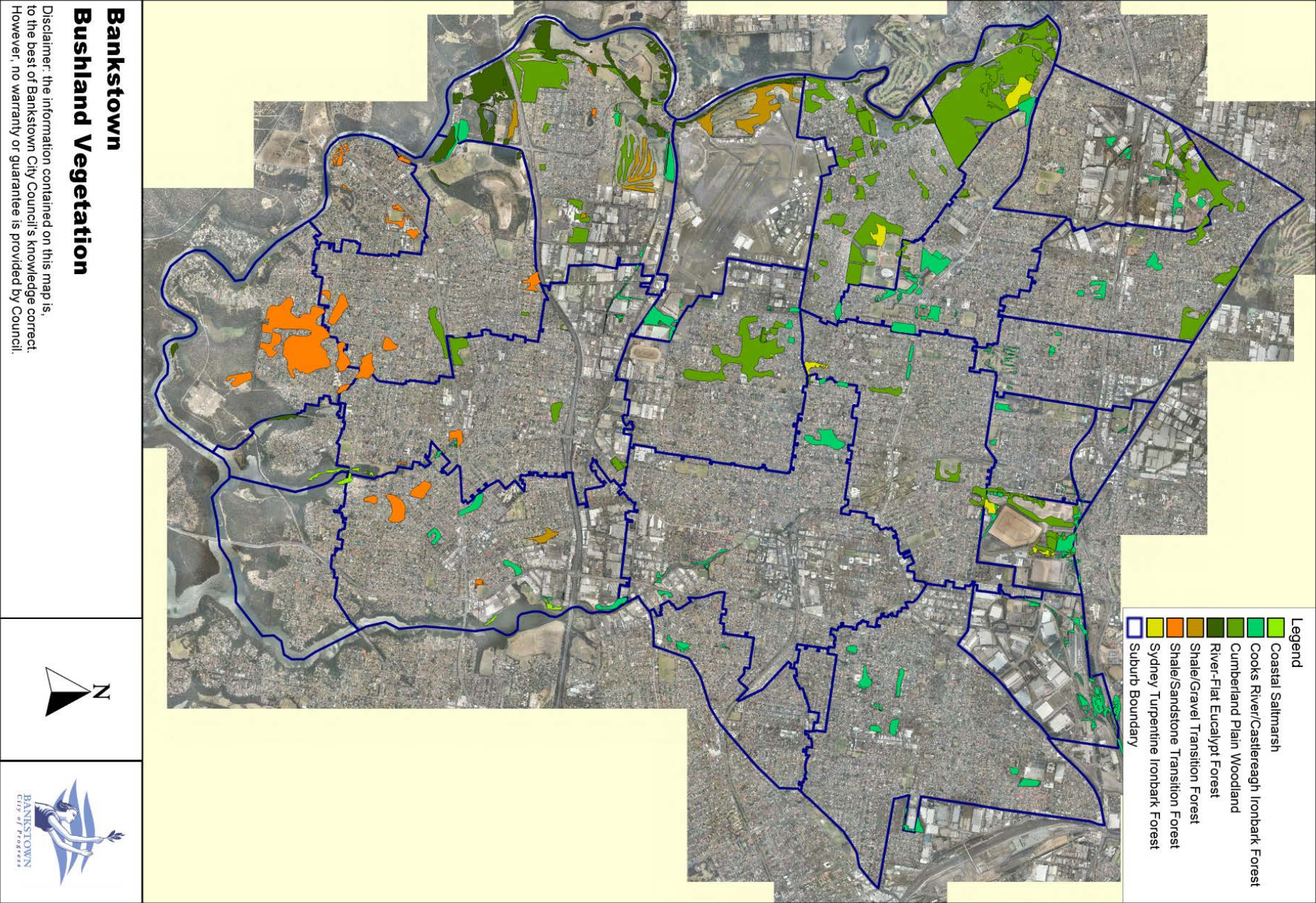






Figure 5: Legend to OEH SMCMA Veg Map I

	Artificial Wetlands	(23)		Coastal Freshwater Wetland	(11)		Estuarine Swamp Oak Forest	(108)
	Castlereagh Ironbark Forest	(87)		Coastal Sandstone Gully Forest	(2)		Plantations	(40)
	Castlereagh Scribbly Gum Woodland	(1)		Coastal Shale-Sandstone Forest	(12)		Riverflat Paperbark Swamp Forest	(5)
	Castlereagh Shale-Gravel Transition Forest	(35)		Coastal Swamp Paperbark-Swamp Oak Scrub	(8)		Seagrass Meadows	(14)
	Castlereagh Swamp Woodland	(9)		Cumberland Riverflat Forest	(118)		Sydney Hinterland Apple-Blackbutt Gully Forest	(16)
	Coastal Enriched Sandstone Dry Forest	(35)		Cumberland Shale Plains Woodland	(61)		Sydney Hinterland Dwarf Apple Heath-Woodland	(2)
	Coastal Enriched Sandstone Moist Forest	(4)		Cumberland Swamp Oak Riparian Forest	(8)		Sydney Hinterland Exposed Sandstone Woodland	(57)
	Coastal Escarpment Littoral Rainforest	(1)		Estuarine Mangrove Forest	(96)		Sydney Turpentine-Ironbark Forest	(7)
	Coastal Flats Swamp Mahogany Forest	(4)		Estuarine Reedland	(46)		Urban Native and Exotic Cover	(1773)
	Coastal Freshwater Swamp Forest	(6)		Estuarine Saltmarsh	(27)		Weeds and Exotics	(54)
	Suburb Boundary							

Note: figures in parentheses indicate number of sites within the Bankstown LGA

Figure 6: OEH SMCMA Vegetation Map I

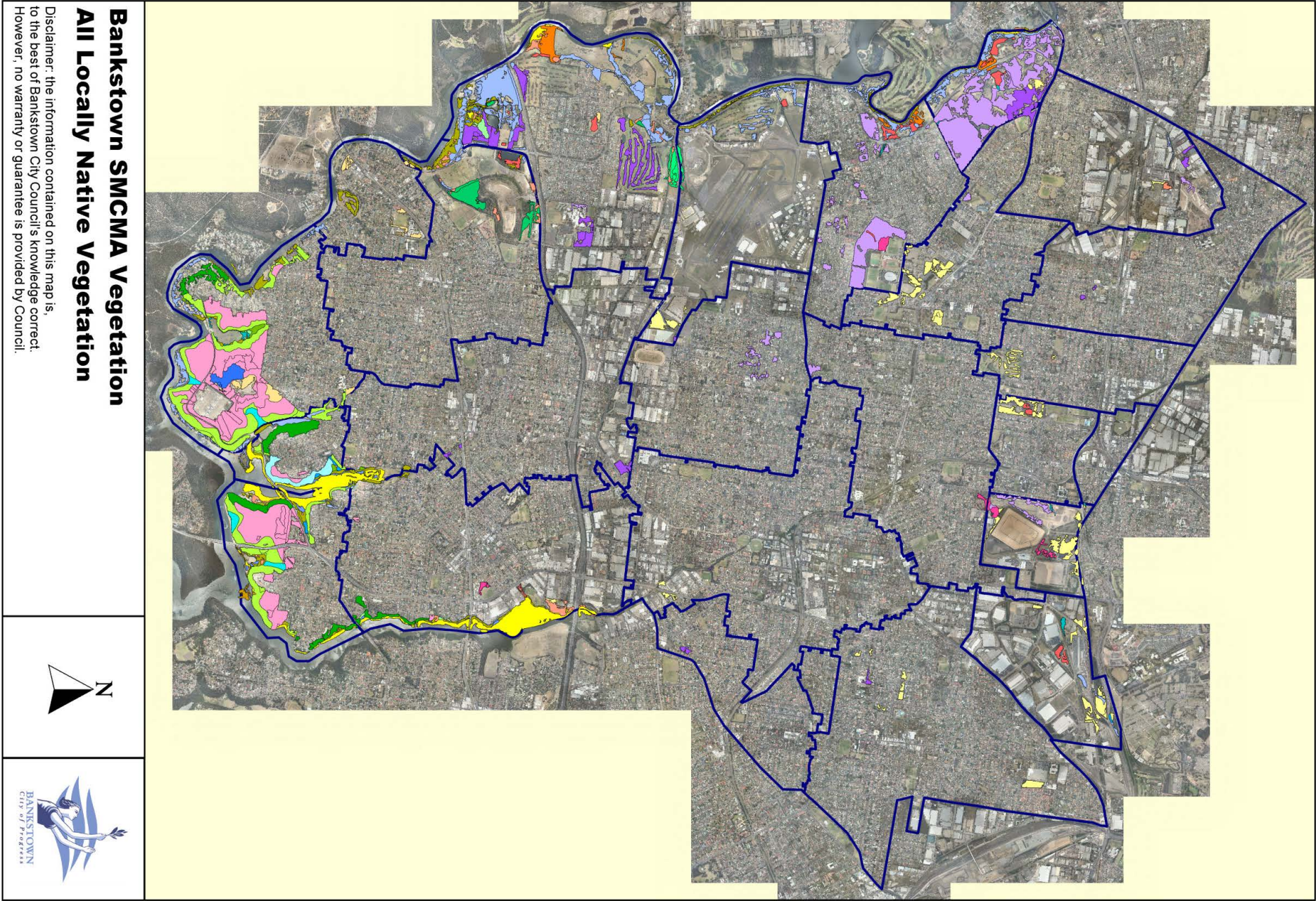
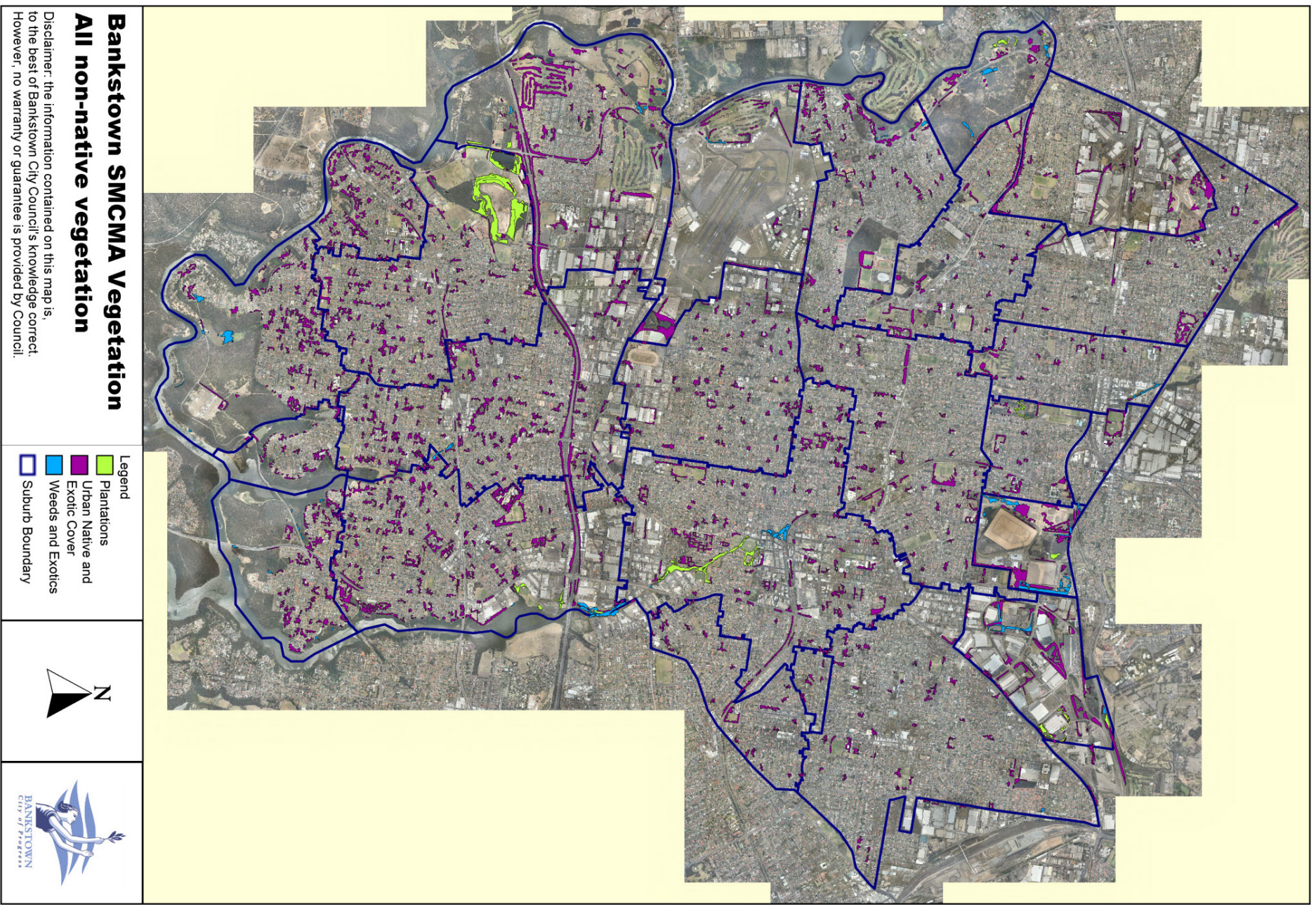


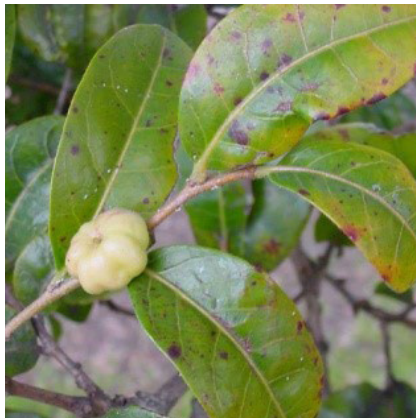
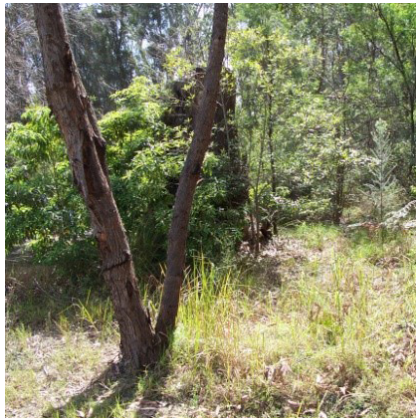
Figure 7: OEH SMCMA Vegetation Map 2



2

The Context





The Aichi Biodiversity Targets

The United Nations Convention on Biological Diversity has agreed to 20 targets aimed at reducing pressure on the earth's natural world. These targets were agreed upon in Nagoya, Japan, in 2010 and are known as the Aichi Biodiversity Targets and run timely with the United Nations 'Decade on Biodiversity'. Australia is a signed member to the Targets.

The goals cover a range of biodiversity issues from reforming, eliminating or phasing out of subsidies that are harmful to the environment, avoiding extinctions of threatened species, establishing a conservation target of 17% of terrestrial and inland water areas and 10% of marine and coastal areas and restoring at least 15% of degraded areas through conservation and restoration activities. Further targets include that by 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably. Additionally that "by 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification" (www.cbd.int/sp/targets/). Target 19 states "that by 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred,

and applied". There are other targets, equally engaging and relevant.

Achieving the targets has not been without difficulty with one of the major issues being the lack of understanding into how targets will cost countries, and this includes Australia. This BSP will outline new and innovative programs to help biodiversity 'pay for itself' or mechanisms aimed at achieving profits, while at its least providing an understanding of where the monetary value of biodiversity hides.

Australian National Strategy

Australia's Biodiversity Conservation Strategy 2010-2030 outlines three main priority actions while focussing on shared commitment and responsibility. The three main priorities are:

1. Engaging all Australians;
2. Building ecosystem resilience in a changing climate; and
3. Getting measurable results.

Australia's Biodiversity Conservation Strategy discusses a range of issues and details how we, as a nation "must accelerate action to address biodiversity decline" and that "business as usual is no longer an option." That biodiversity benefits all Australians and that all Australians should contribute to its well-being is an underlying ethos of the national approach to biodiversity. This Strategy acknowledges that traditional

approaches to biodiversity protection need to be reconsidered and that planning approaches need to work inside of a framework of 'adaptive management' while maintaining the use of the precautionary principle (www.environment.gov.au). This Bankstown Biodiversity Strategic Plan follows on with the themes of the National approach, moulding them to suit the needs of the Bankstown LGA.

Legislative, Planning Context

Bankstown City Council undertakes, or allows to be undertaken, numerous activities that have the potential to impact, either positively or negatively, on biodiversity and the natural environment. Significant roles undertaken by Council that could impact on the natural environment include the following:

- Its role for setting the framework for land management in Bankstown, through its environmental planning and development assessment processes;
- Its role as a land manager for the extensive lands under its ownership or care and control;
- Its role as a service provider, particularly in relation to parks and recreation, roads and waste management.

Council manages the natural environment abiding by the following legislation, strategies and plans.

International

- International Convention on Biological Diversity (Aichi Targets);
- Japan-Australia Migratory Bird Agreement (JAMBA);
- Republic of Korea-Australia Migratory Bird Agreement (RoKAMBA);
- China-Australia Migratory Bird Agreement (CAMBA).

Federal

- Environmental Protection and Biodiversity Conservation Management Act (1999);
- Australia's Biodiversity Conservation Strategy 2010 – 2030;
- National Framework for the Management and Monitoring of Australia's Native Vegetation;
- National Local Government Biodiversity Strategy.

State

- Threatened Species Conservation Act (1995);
- Fisheries Management Act (1994);
- Environmental Planning and Assessment Act (1979);
- National Parks and Wildlife Act (1974).

- Crown Lands Act (1989);
- Rural Fires Act (1997);
- Local Government Act (1993);
- Heritage Act (1977) and Heritage (Amendment) Act (1979);
- Water Management Act (2001);
- Coastal Protection Act (1979);
- Contaminated Land Management Act (1997);
- Soil Conservation Act (1938);
- Companion Animal Act (1998);
- Protection of the Environment Operations Act (1997);
- Noxious Weed Act (1993);
- State Environmental Planning Policy 19 Bushland in Urban Areas (SEPP 19);
- State Environmental Planning Policy 44 Koala Habitat Protection (SEPP 44);
- Greater Metropolitan Regional Environmental Plan No 2 – Georges River Catchment;
- NSW Invasive Species Plan 2008-2015;
- NSW Biodiversity Strategy;
- Local Land Services Act (2013);
- Recovery Plans;
- Threat Abatement Plans.



Regional

- A Vegetation Management Plan for the Sydney Region (Green Web Sydney);
- The Native Vegetation of the Sydney Metropolitan Area (Volume 1 & 2).

Bankstown

- Local Environment Plan (adopted);
- Local Area Plans (CBD and North West adopted);
- Bankstown Development Control Plan (adopted);
- Generic Plan of Management for Community Land;
- Georges River Community Open Space Corridor Plan of Management (adopted);
- Salt Pan Creek Floodplain Risk Management Study and Plan (adopted);
- Georges River Estuary Coastal Zone Management Plan;
- Mid Georges River Floodplain Risk Management Study and Plan;
- Salt Pan Creek Corridor Masterplan;
- Duck River Biodiversity Corridor Masterplan;
- The Crest to Lansdowne Biodiversity Corridor;

- Little Salt Pan Creek Biodiversity Corridor;
- Bushfire Risk Management Plan (adopted);
- Fire Trails Management Plan (adopted);
- Community Plan: Green.

The Inter-Governmental Agreement on the Environment has committed all Australian Governments to the concept of ecologically sustainable development in the assessment of natural resources, land use decisions and approval processes. Ecologically sustainable development is defined as an activity or development which "...meets the needs of the present without compromising the ability of future generations to meet their own needs." (Brundtland, 1987).

Processes Resulting in the Loss of Biodiversity

There are a range of processes that lead to a reduction in biodiversity and therefore emphasise a need to focus management on biodiversity. Most of these processes operate within Bankstown, and include the following:

- Habitat loss and fragmentation;
- Unsustainable use of resources;
- Pollution impacts;
- Impacts of introduced species;
- Lack of knowledge, education and communication;
- Physical damage from recreational activities;
- Rubbish dumping;
- Mowing;
- Intensification of development;
- Edge effects (rubbish, fire and weed invasion);
- Inappropriate reserve planning and management, including fire.

Many of these processes lead to a rapid loss in biodiversity, for example habitat loss and fragmentation, whilst the effects of others may happen over a substantially longer period of time. These processes have certainly been operating in the Bankstown area and this is likely to continue unless they are managed more effectively. Much work and effort has been expended into the

amelioration of these affects however continued vigilance is required. The NSW State Office of Environment and Heritage (OEH) further legislates the management of some of these processes which can provide as appropriate management tools and are noted in the following pages under 'Threat Abatement Plans' and 'Recovery Plans'.

Threat Abatement Plans (TAP)

The OEH prepares Threat Abatement Plans under the provisions of Part 5 of the Threatened Species Conservation Act 1995 for listed Key Threatening Processes. A Key Threatening Process is defined as "a process that threatens, or could threaten the survival or evolutionary development of species, populations or ecological communities".

A Threat Abatement Plan outlines actions to eliminate or manage the Key Threatening Process, and identifies the authorities, which will be responsible for carrying out those actions. The Key Threatening Processes that apply to the Bankstown LGA, of which the relevant Threat Abatement Plan is to be used as a management tool, where applicable, for the LGA, are:

- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands;
- Clearing of native vegetation;
- Bush rock removal;
- Ecological consequences of high frequency fires;
- Competition and land degradation by feral rabbits;
- Invasion of native plant communities by exotic perennial grasses;
- Invasion and establishment of exotic vines and scramblers;
- Invasion of native plant communities by African Olive;
- Predation by feral cats;
- Predation by the European red fox;
- Removal of dead wood and dead trees;
- Infection of frogs by amphibian chytrid causing the disease chytridiomycosis;
- Loss of hollow bearing trees;
- Predation by *Gambusia holbrooki* (mosquito fish).

The relevant Threat Abatement Plan can be found at the Office of Environment and Heritage website (www.oeh.nsw.gov.au)



Recovery Plans

The OEH has the responsibility to prepare and implement recovery plans for all species (other than those presumed extinct), populations and ecological communities listed in the Threatened Species Conservation Act 1995 (NSW).

Recovery Plans that are relevant to the Bankstown LGA and will be used for biodiversity management within the LGA include:

- Pimelea spicata Recovery Plan;
- Acacia pubescens Recovery Plan;
- Large Forest Owls Recovery Plan;
- Cumberland Plain Recovery Plan;
- Grey-headed Flying-fox Draft National Recovery Plan; and
- Green and Golden Bell Frog Recovery Plan.

The relevant Recovery Plans can be found at the Office of Environment and Heritage website (www.oeh.nsw.gov.au)

Saving our Species

The OEH 'Saving our Species' program "aims to maximise the number of threatened species that can be secured in the wild in NSW for 100 years". The OEH outlines the 'Saving our Species' program as:

- Aligning everyone's efforts under a single banner, so investment in threatened species conservation can be accounted for;
- Assigns threatened species to different management streams so the individual requirements of each species can be met;
- Invites the NSW community and businesses to participate, because projects to save threatened species are collaborative efforts.

The OEH identifies 5 threatened species and 6 management sites for the Bankstown LGA under the 'Saving our Species' program, these are outlined in the tables below (Figure 8 and 9). Fauna species are yet to be identified for the Bankstown LGA. Fauna species will come under the umbrella of 'landscape-managed' species.

Figure 8: ‘Saving our Species’ site managed species for the Bankstown LGA.

Common name	Scientific name	Type	Management stream	Conservation projects
Hibbertia puberula	Hibbertia puberula	Shrubs	Site-managed species	Hibbertia puberula conservation project
Sydney Plains Greenhood	Pterostylis saxicola	Orchids	Site-managed species	Pterostylis saxicola conservation project
Hibbertia sp. Bankstown	Hibbertia sp. Bankstown	Shrubs	Site-managed species	Hibbertia sp. Bankstown conservation project
Hibbertia stricta subsp. furcatula	Hibbertia stricta subsp. furcatula	Shrubs	Site-managed species	Hibbertia stricta subsp. furcatula conservation project
Downy Wattle	Acacia pubescens	Shrubs	Site-managed species	Acacia pubescens conservation project

Figure 9: 'Saving our Species: species level management for the Bankstown LGA.

Site name	Threatened species	Local Government Area (LGA)	Status	Site type
Bankstown-Liverpool	Downy Wattle (<i>Acacia pubescens</i>)	Auburn/ Bankstown/ Burwood/ Canterbury	Proposed	Management site
Bankstown Airport	Hibbertia sp. Bankstown (<i>Hibbertia</i> sp. Bankstown)	Bankstown	Proposed	Management site
Translocation site	Hibbertia sp. Bankstown (<i>Hibbertia</i> sp. Bankstown)	Bankstown	Proposed	Management site
Mill Creek	Hibbertia stricta subsp. furcatula (<i>Hibbertia stricta</i> subsp. furcatula)	Bankstown/ Liverpool	Active	Management site
Georges River	Sydney Plains Greenhood (<i>Pterostylis saxicola</i>)	Bankstown	Proposed	Management site
Yeramba Lagoon	Hibbertia puberula (<i>Hibbertia puberula</i>)	Bankstown	Proposed	Management site

Conservation Corridors – Previous Works

Conservation Corridors (also known as Biodiversity Corridors) are an important function within the urban landscape. Conservation Corridors are strategically located linear zones of land where-in vegetation is either present or re-established to connect isolated parcels of land. Corridor widths in urban areas are recommended between 25 metres to 500 metres.

The isolated (or island) patches of vegetation (within a corridor) can, in their present form act as stepping stones of habitat for wildlife to move to and from – the intention of the Conservation Corridor is to fill the areas between the ‘islands’ as possible. The purpose of Conservation Corridors is to allow movement of gene-flow among native fauna. The transfer of floristic genetics also occurs along the corridor through pollen spread by either wind or pollinator (insects, birds e.g. honeyeaters, or mammals e.g. fruit bats and sugar gliders).

A principle of ecology, and in turn Conservation Corridors, is that the larger the area of habitat the greater the area of core habitat will be; this results in increased biodiversity and resilience. ; Corridor widths in urban areas should be between 25 metres and 500 metres.

Conservation Corridors have been used by Bankstown City Council to guide tree/native vegetation plantings for National Tree Planting days and other community group planting /bush regeneration activities. Council tree planting from Council’s Park’s and Buildings Unit, often focusing on the less vegetated areas of the LGA or areas where links between isolated bushland pockets can be made is a regular aspect to Council corridor works.

Conservation Corridors also aid in development application assessment and approvals as well as guiding programs such as Bankstown’s nest box installation, frog pond installation program, creek line restoration, support for grant applications and are also applicable areas for carbon sequestration programs that are yet to be tested in the Bankstown LGA. Bankstown City Council’s only biobank site (offset site) is located in a Conservation Corridor and the OEH is promoting corridors as highly suitable locations for further biobanking opportunities. The OEH BioMap, a tool for offset site selection, synchronises with several of BCC’s Conservation Corridors.

There have been four Masterplans developed for actions to occur within Bankstown’s biodiversity corridors. These are:

- Salt Pan Creek Corridor Masterplan;
- Duck River Biodiversity Corridor Masterplan;
- The Crest to Lansdowne Biodiversity Corridor;
- Little Salt Pan Creek Biodiversity Corridor.

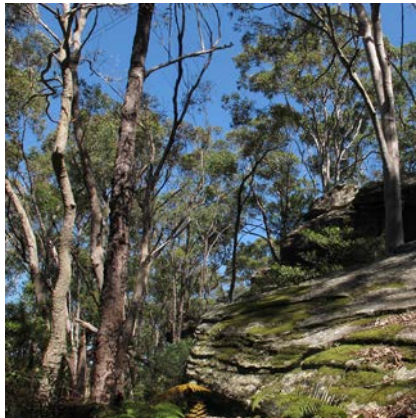
Most of the works proposed within these Masterplans have been executed over recent years and their relevance to this BSP is limited mainly to reference documents. The Salt Pan Creek Corridor Masterplan, which acts largely as a general management plan for the various reserves within this corridor is still used, although, will be upgraded by Reserve Action Plans resulting from Council’s Plan of Management processes as defined under the Local Government Act.

Furthermore, BCC currently protects sections of the Conservation Corridor through LEP provisions such as biodiversity protection mapping, zoning of land up to foreshore building line as Open Space as well as applying development controls within the foreshore building line.

3

Planning for Growth & Change





Planning for Growth & Change

The City of Bankstown is experiencing population growth with an expected 11,000 rise in the population by 2022. Infrastructure upgrades must keep pace with this expansion and an implicit look at how biodiversity is going to improve within this framework is crucial.

Within the current era of natural area management biodiversity is identified as a community asset (similar to roads, buildings and playing fields etc.). It is considered an asset under the Local Government Act (1993) and through programs such as bio-banking and carbon sequestration programs (such as the Emissions Reduction Fund under the Clean Energies Act). Council is required to value all of its assets, biodiversity is no different. Other mechanisms through which biodiversity can be assessed as having financial value include: climate amelioration potential, calculations in property value increase (due to the presence of trees/bushland) or storm water runoff/energy savings and air quality improvement cost benefits (from bushland/trees). It has been calculated that through these mechanisms the planting of 100,000 trees can save over one billion dollars over the course of the lives of those trees, or alternatively at \$1 per tree a ~\$60 return on investment can be achieved per tree (www.savatree.com). From a liveability perspective two canopy trees is enough to provide the oxygen needs of four people per year (breathing only), one tree produces ~130kg of oxygen per year and can absorb ~20kg of carbon dioxide per year.

Planning for growth and change within the LGA must focus on the wealth of what biodiversity currently exists and strive to improve, restore and recreate biodiversity where possible. As the City continues with development at a rapid pace, the loss of trees and bushland (and resulting biodiversity) becomes a serious concern for its inhabitants in what is known as the urban heat island effect (UHI). The UHI however can be offset by functions such as the Conservation Corridor concept, pre-determining vegetation protection areas and/or offsetting. These concepts are outlined as follows:

The Urban Heat Island Effect (UHI)

The Urban Heat Island (UHI) effect is the phenomenon whereby the large areas of low-albedo, impervious surfaces found in cities absorb solar radiation, heat up, and warm the surrounding air. This situation comes about due to the loss of trees and bushland, and through the increase in poorly considered development. The results are “heat islands”, or pockets of hot air. Such temperature anomalies are often exacerbated due to the high concentration of anthropogenic heat producing activities that occur within cities, including running car engines and air conditioners. Australia, being often under drought conditions, experiences this effect more than most countries.

Maintaining and increasing vegetation or tree cover in urban areas, including those provided by bushland pockets, parklands, street tree plantings, and green roofs and walls is considered to be an important means of mitigating the impacts of the urban heat island effect. This is due to the cooling and climate regulating ecosystem services provided by vegetation, including:

- Reflection and dispersion of solar energy back into the atmosphere;
- Absorption and use of solar energy in evapotranspiration, which regulates due to solar energy uptake and cools due to evaporation of water vapour from leaf surfaces;
- Canopy shading, which decreases local radiant temperatures and reduces energy consumption associated with air conditioning; and
- Promotion of stormwater retention in the soil, which cools due to evaporation of water from soil.



Current NSW Biodiversity Valuation Techniques and Offsetting

Offsetting

Offsetting, whether trees or bushland, open space or permeable soil landscapes (which take in rain water thus rejuvenating local aquifers and taking pressure off stormwater infrastructure) is the direction many government agencies are heading with respects to sustainable development.

Offsetting is the action taken whereby something counterbalances, counteracts, or compensates for something else, for example, one tree is removed and subsequently another tree is planted to replace it, the loss is therefore compensated. With respect to established offsetting schemes a generally accepted minimal area of one hectare is needed as a site to be offset. Areas of vegetation or tree loss less than such a size should ideally be dealt with on a local offsetting scale, and best addressed through Tree Preservation Orders (TPO) or similar documents.

Offsetting is an important mechanism to avert the 'cumulative impacts' that arise from urban land use activities, largely development based and incremental tree/vegetation loss particularly through the TPO process where sick or dying trees are removed and not replaced. Cumulative impacts are not adequately addressed in the current planning process. Negative impacts should be offset with the separate action of a 'positive impact'.

Australian state and federal government agencies are directing offsetting with respect to native vegetation removal. In particular the Biobanking framework (<http://www.environment.nsw.gov.au/biobanking/>) and the Draft NSW Biodiversity Offsets Policy for Major Projects are referenced by the NSW State Government as important directions forward for both State and Local Government scenarios. Biobanking is currently the most robust biodiversity valuation technique. At the time of writing the State Government was reviewing all NSW biodiversity related legislation with the possibility of a new Biodiversity Protection Act to be developed which combines several current biodiversity related Acts. Another highly likely outcome of the review will be further integration of offsetting (largely through the Biobanking scheme) into the NSW planning system.

Bio-banking

Biobanking is established under the Threatened Species Conservation Act (1995) and is an opportunity for Bankstown City Council to generate an income to manage local areas of bushland. Biobanking is the primary tool used for natural area offsetting (note: it is not a suitable mechanism for the offsetting of single trees as may be affected by BCC's TPO, another offsetting technique will need to be applied there).

Biobanking enables 'biodiversity credits' to be generated by landowners who commit to enhance and protect biodiversity values on their land through a Biobanking agreement. This is where Bankstown City Council has a range of opportunities. These credits can be sold, generating funds for the management of the site. Credits can be used to counterbalance (or offset) the impacts on biodiversity values that are likely to occur as a result of development (within or external to the LGA). The credits can also be sold to those seeking to invest in conservation outcomes, including philanthropic organisations and government.

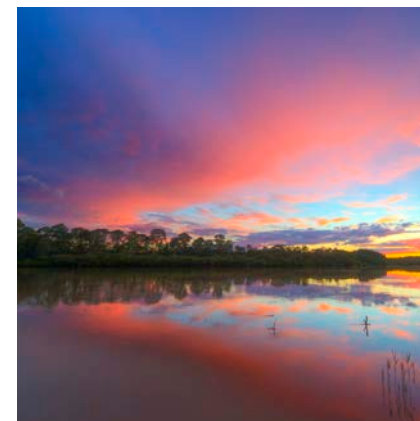
The annual payments provide funding for the landowner to undertake any management actions required to improve biodiversity values to the site. These may include fencing, signage, bush regeneration, weed control, revegetation, vertebrate pest control, fire management and track maintenance. The cost of these actions is based on quotes from commercial contractors and is indexed annually for inflation. The payment also includes funds to manage the project and undertake the monitoring and reporting required by the Biobanking agreement.

Carbon Sequestration

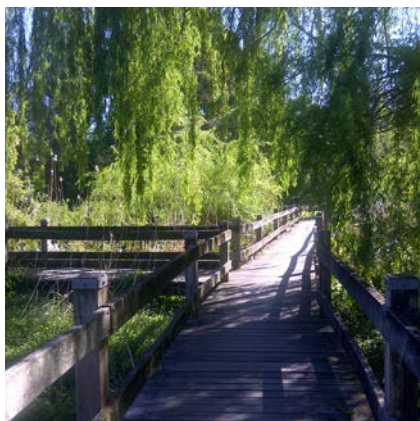
In today's political and practical climate, bushland is more often being viewed for its value to the community – this value can be considered in monetary terms – one such mechanism is the 'Emissions Reduction Fund' (formerly 'Carbon Farming Initiative'), an initiative of the Clean Energies Act 2011.

The Emissions Reduction Fund (ERF) allows land managers to earn carbon credits by storing carbon or reducing greenhouse gas emissions through actions taken on their land. These credits can then be sold to people and businesses wishing to offset their emissions. The ERF also helps the environment by encouraging sustainable land practises and by providing a source of funding for landscape restoration projects.

The ERF is a carbon offsets scheme that is part of Australia's carbon market. Legislation to underpin the ERF was passed by Parliament on 23 August 2011. There are many other carbon based programs in circulation. The ERF is applicable to urban Council's particularly where established Conservation Corridors exists, as in Bankstown. Under such circumstances native mixed vegetation plantings can be a financially viable operation. Other works under the ERF include, for example, herbivorous feral animal control, early dry season savannah burning and methane capture.



Photograph: Keng Lee Tan



Remnant Trees on Public Land

Many of the road reserves and community land reserves in Bankstown have areas of native trees that may not qualify as natural areas under the Plan of Management categorisations from the Local Government Act (1993). In some cases these trees may be deemed of little value as an individual tree; however new assessment tools for quantifying the multiple functions of urban vegetation including singular trees can now be accessed. For example by analysing such features as the structure, deposition of air pollutants, emission of biogenic volatile organic compounds (BVOC's), ultraviolet radiation reduction, building energy conservation, carbon store and annual carbon sequestration, or identifying those species which are most effective at improving local air quality a system of value can be understood. Assessment tools can further quantify tree value through calculations in relation to how trees increase property value, stormwater reduction and provide energy savings (through cooling and averting the 'heat sink' or 'urban heat island' phenomena).

Currently Australian companies and the Federal Government are working on ways to apply this type of program to Australian trees.

Further promotion of such projects are discussed and recommendations given in the 'Strategies' section of this document including reference to Singapore's 'City in a Garden' approach to greening the city of Singapore. This is particularly useful in the case of developing a Streetscape Greenery Master Plan (SGMP), which is concerned with creating a 'seamless green mantle' throughout an area (Singapore adopted such an approach) – a similar approach could be taken in Bankstown.

Meadow/Grassland Creation

Meadows or grassland style plantations (which are common practise in Melbourne) can be particularly good initiatives especially in replacement of areas of mown grass. This achieves several goals including providing areas for plant pollinators to flourish, such as butterflies, as well as creating aesthetic abodes for people and breaking up the monotonous landscape of mown grass. Financial savings can also be made in the reduction of mowing large areas of grass on a weekly basis (also reducing fossil fuel use).

Green Roofs and Permeable Surfaces

Green roofs and permeable surfaces are effective offsetting techniques that can provide excellent biodiversity outcomes. Both these mechanisms can also alleviate the urban heat island effect, while green roofs can provide modern, aesthetically pleasing gardens for residential use. When using low water use native plants, maintenance can be low, while also providing local avian and insect life with habitat and potential feeding grounds. Green roofs can filter rain water for use in an additional benefit, often green roofs are used as community gardens in which edible foods are grown and harvested. Permeable surfaces, such as those that can be used for footpaths and driveways allow rainwater/stormwater to return into the soil and underground aquifers. Permeable surfaces make available more water to vegetation as well as offsetting costs on the stormwater system. Green roofs and permeable surfaces are highly regarded functions recommended for implementation into BCC planning structures.

Community gardens and/or permacultural experiences are important educational avenues for the community by which to learn about ecological processes as well as sustainability. Native forest fruits (such as blueberry ash, Smilax sp. lilly pilly and wombat berry), can also be incorporated into such initiatives and shade provided by locally occurring native trees can benefit crops that require shade or pollination.

Community Gardens

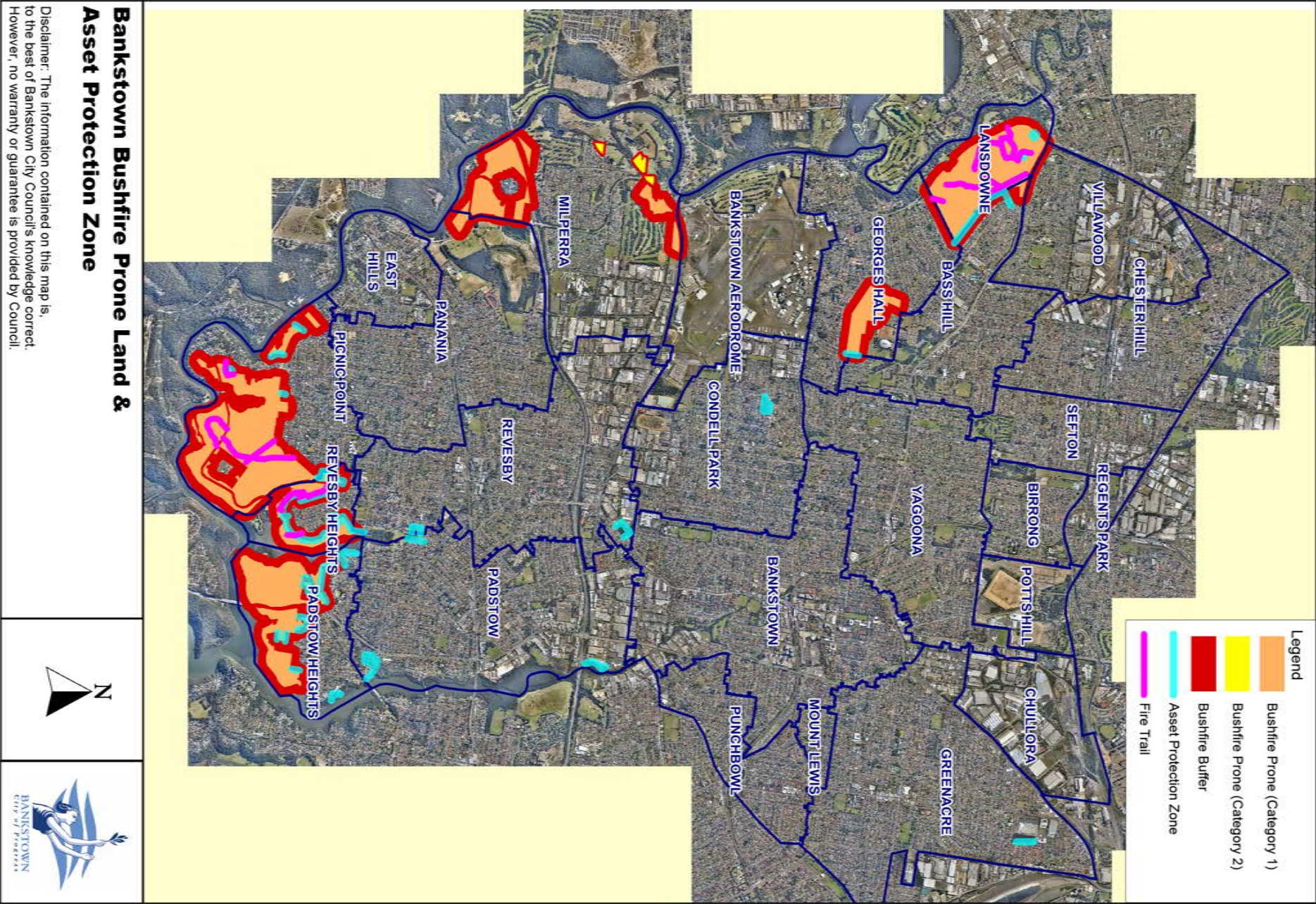
Community gardens can play an important role to improving biodiversity. Community gardens, often incorporating permaculture ideas which lend themselves to ecological processes, attract a variety of invertebrate life and often bird life. Community gardens can be effective places to provide education regarding biodiversity and ecology – in the growth of a tomato plant one can find many processes which rely on external factors to the plant itself. Community gardens are establishing themselves throughout the broader Australian landscape and their application within the Bankstown LGA is highly suggested.

Mapping: Current BCC Biodiversity Initiatives

Bankstown City Council uses several GIS (Geographic Information Systems) spatial layers to aid in its management of biodiversity. These layers include:

- Biodiversity Corridors layer as generated from the 2002 Biodiversity Strategy. This layer will be updated in accordance with the 2015 Biodiversity Strategic Plan, to be renamed 'Conservation Corridors' with minor changes to suit the needs of the LGA. A property affectation layer included with this;
- Bushfire Prone Lands Mapping as generated by the Bankstown/Hurstville Bushfire Management Committee (see map below);
- Asset Protection Zone layer as relates to bushfire protection and generated by Sustainable Development Unit SDU and Parks & Buildings (see map below);
- Fire Trails as based on BRIMS (Bushfire Risk Information Management System) listed fire trails (Figure 10);
- OEH BioNET layer which details threatened and non-threatened flora and fauna for the LGA. This information is now also available through the OEH BioNET website;
- OEH Sydney Metropolitan Catchment Management Area Vegetation Mapping (as provided by the OEH, compiled with the assistance of local councils). This 'Vegetation Layer' will be updated into Version 1.1, 1.2 etc. as such an open dialogue must be kept with the OEH so the updated layers can be incorporated into BCC's system. BCC will keep a list of vegetation plots that require correction on this map;
- BCC Bushland layer – the data from this layer was incorporated into the OEH SMCMA Vegetation Layer;
- Community Lands mapping detailing 'Natural Area' categories;
- Soil mapping;
- Other biodiversity lands such as national parks and waterways;
- Local Area Plans – Biodiversity Protection;
- Crown Lands.

Figure 10: Bushfire Prone Lands and APZ Map



Operations: Current BCC Biodiversity Initiatives

Currently BCC undertakes a range of projects with relation to biodiversity management. These works come from both on-ground works to long term strategic planning. Following is a list of projects/works that are currently being undertaken by BCC:

- Volunteers (bush regeneration);
- Bankstown Bushland Society (bush regeneration);
- Bush Regeneration Contracts;
- Weeds Education Program;
- BCC staff bush regeneration projects;
- Stormwater Levy Projects/Creek line Restorations;
- Habitat Box Project;
- Frog Pond Project;
- Education Trailer (interpretation);
- Street Tree Planting;
- Park Tree Planting;
- Native Plant Landscaping;
- Native Plant Holding Nursery;
- Draft Integrated Feral Animal Management;
- Biobanking Projects;
- Carbon Sequestration Projects (research phase);
- Asset Protection Zone Management;
- Fire Trail Management;
- Ecological and Hazard Reduction Burns;
- Communities Creating Corridors; and
- School and Resident Plant Giveaways.

Organisational Capacity

Bankstown City Council's biodiversity is managed by a variety of different units within its organisational structure. From an overall perspective this structure provides challenges but also enables cross organisation communication and change to take place.

The units of BCC involved in biodiversity include:

- Development Services, particularly through the Development Application process. (SDU) and the Parks & Buildings Unit with respects to bushland, biodiversity, tree preservation management and park and street tree planting programs;
- Resource Recovery Unit focuses on environmental education which plays an important role with respects to biodiversity conservation;
- The Parks & Buildings Unit undertakes Council's bush regeneration works, in conjunction with contractors who are managed under the same unit. Volunteers are also an integral part of bush regeneration works in the LGA and are managed largely by the Parks & Buildings Unit. Parks & Buildings as well as SDU also play an important role in bushfire prevention works for the LGA.

SDU has several resources dedicated to

biodiversity outcomes from planning, policy, procedural perspectives as well as project management, bushfire management and community works.

Other units whom have peripheral responsibilities regarding biodiversity management include the Strategic Asset Management team, Land Information Systems, Property Investment, The Recreation Team and Roads and Infrastructure.

All units are involved in inter-agency liaison including with such agencies as the National Parks and Wildlife Service, The Office of Environment and Heritage, NSW Fire & Rescue, Local Land Services, Catchment Committees, Department of Primary Industries, SSROC (Southern Sydney Regional Organisation of Council's), WSROC (Western Sydney Regional Organisation of Councils), local schools and other community groups and neighbouring councils to name but a few.

4

The Strategy





Bankstown Community Vision

Bankstown is a thriving centre of Greater Sydney. We enjoy the services and facilities of a prosperous, growing city with lively neighbourhoods and a proud history. Our diverse population live and work together in harmony. Bankstown is a modern, active community with quality transport infrastructure, clean waterways, pristine bushland and great community spaces and parks.

The Corporate Vision

A culture, place and City of excellence.

Bankstown Values

Council believes in:

- Fair, honest and open dealings;
- Consulting the community concerning our decisions and activities;
- Managing community assets responsibly;
- Caring for the natural environment;
- Promoting social justice and respect for cultural diversity;
- Treating customers with respect, courtesy, friendliness, and fairness;
- Ensuring services are of the highest possible quality and focused on community needs;
- Being creative and innovative; and
- Ensuring services cost no more than necessary.

Bankstown Biodiversity Vision

A green City that has balanced development with biodiversity and a built environment with green, living spaces. Planning for sustainable growth which enhances the natural environment (Bankstown Community Plan, 2023)

Goals and Objectives

The Goal

The goal of this Bankstown Biodiversity Strategic Plan is to manage an urban environment that synchronises with the natural landscapes, ecological communities and wildlife of the Bankstown LGA; to protect, rehabilitate and restore natural ecosystems within the Bankstown LGA; re-establish vegetation across the LGA, thus enhancing biological diversity and ecosystem health.

Bankstown City Council looks further to achieve its goal through integration with regional strategies and initiatives.

Bankstown City Council's Environmental Policy has dedicated principles of Ecological Sustainable Development (ESD), these principles underpin this BSP and are integral to the delivery of this Strategic Plan:

- **Conservation of Biological Diversity and Ecological Integrity:** Council will maintain and where possible enhance the range of native plants, animals and their habitats to protect the health of our natural environment;
- **Precautionary Principle:** Council will reduce the chance of serious environmental damage even when we are not sure whether damage will occur;
- **Inter-generational Equity:** Council will ensure that the health, diversity and productivity of our environment is maintained and/or enhanced for future generations;
- **Improved Valuation and Pricing of Environmental Resources:** Council will fully integrate environmental and economic considerations into its policies and decision making processes.

The Objectives: The BCC Biodiversity Strategic Plan 2015-2025

Biodiversity management has been a commitment of many local governments in NSW over the last two decades. Legislatively there are many requirements ensuring that conservation and enhancement of biodiversity is achieved.

The Biodiversity Strategic Plan objectives have been determined as follows:

- Maintaining and improvement of ecological processes, including with reference to indigenous flora and fauna species, populations and communities and other significant habitat, especially with relation to the *Threatened Species Conservation Act (1995)*;
- Develop new programs and initiatives available to local governments regarding biodiversity management which are underpinned by biodiversity being regarded as a financial asset;
- Establish, maintain and improve Conservation Corridors;
- Establish a net increase in vegetation across the LGA on both public and private land;
- Ensure that the protection of biodiversity and the principles of ESD are properly integrated into Council's land use planning, environmental management and other relevant areas of BCC's operational works;
- Provide guidelines, staff and resources to facilitate improved environmental management practices across Bankstown;
- Consult with the community and encourage participation in activities to improve the City's natural and built environment and enhancing community ownership and participation in protecting biodiversity;
- Reduce human impacts on Bankstown's unique diversity of plants and animals;
- Secure the funding (through grant opportunities or investment) and resources needed to implement this Biodiversity Strategic Plan.



Conservation Corridors

This 2015 Biodiversity Strategic Plan continues with the Biodiversity Strategy of 2002 corridor theme, with minor modifications. Formerly the Conservation Corridors were termed 'biodiversity corridors'.

The corridors identified and adopted by Bankstown previously provided a Core Corridor between 80 metres (for riparian zones, 40 metres on either side of the creek line or waterway – this is also in accordance with Water Management Act requirements) to 100 metres where the scenario is of a bushland/general vegetation type. A secondary corridor (from here-on termed a Transition Corridor) of an additional 200 metres either side of the Core Corridor was added to work as a buffer zone to the Core Corridor and in time allowing for the full width of the corridor to be realised.

Modifications to the 2002 corridor strategy are made for the entirety of this 2015 BSP and its implementation. The corridor widths are reduced for an easier transition to effective management while meeting the ecological and biodiversity expectations of a 'Conservation Corridor'.

The corridor science can never be exact but promotes best environmental practice.

This BSP identifies properties falling within the Core Conservation Corridor (see Figure 11) to include those within the 100 metre linear corridor zone (this now also equates to the total width of any riparian corridor for consistency

and ease of application) and will incorporate, on a parcel by parcel basis, any property that intersects with the Core Corridor.

The Transition Conservation Corridor (see Figure 11) is filled out to an extra 150 metres from both edges of the Core Corridor thus providing a total corridor width of approximately 400 metres. Any property intersecting the outer edge of the Transition Corridor will be included in this zone – this will mean that some properties will be highlighted to extend beyond the extent of the Transition Corridor. Conservation Corridor widths for the purposes of this Strategic Plan are:

- Core Conservation Corridor = 100 metres;
- Transition Conservation Corridor = 150 metres (either side of Core);
- Total Conservation Corridor width (Core plus Transition)= 400 metres.

The application of corridor principles (particularly through the development application process) will apply to the entire site.

Corridor selection for any given parcel will be taken from the closest point of a property to the inner most corridor – such that where a property touches both the core and the Transition Corridor the entire property will be classified as Core Corridor (inner most corridor). This includes the total of the public reserves and private properties or other land which falls, in any case, within that corridor.

Conservation Corridors and Section 149

Section 149 certificates in the EPA Act 1979 consist of the s149 (2) certificate and the s149 (5) certificate. A Conservation Corridor affectation can be applied under the relevant provisions of the s149, it is the recommendation of this Strategic Plan that such an affectation be added.

Wording to be applied on the relevant s149 certificate may entail the following:

149 Planning Certificates:

- 1) The land is affected by/located in a Conservation Corridor (Core)
- 2) That land is affected by/located in a Conservation Corridor (Transition)

Conservation Corridor Management Principles

Conservation Corridors have been identified as one of the cornerstones of this Strategic Plan. The corridors that are currently adopted into the BCC biodiversity enhancement framework are carried on by this Strategic Plan with minor modifications for a more practical outcome. The Conservation Corridors surround the city and criss-cross the LGA forming a network of biodiversity potential.

Adjoining Council areas and various levels of Government and Non-Government Organisations may also engage in conservation (or biodiversity) corridor creation and maintenance. The State Government BioMap (managed by the OEH) builds on these works linking regional and state-wide objectives for the enhancement of biodiversity. The BioMap, as well as BCCs' corridor system is designed to benefit landowners and BCC who may have interests in achieving financial gain through conservation management.

Conservation Corridors are promoted practically within an urban landscape like Bankstown by planting canopy trees and, where possible, understorey species (both on public and private land). This allows for the movement of insects, birds and bats and the various possum or glider species found in Bankstown. In addition the Conservation Corridor also relieves the

problematic Urban Heat Island effect and can qualify for financial asset evaluation through such programs as biobanking or carbon sequestration programs (e.g. as under the Clean Energies Act), meaning an income can be generated by both public and private land holders.

The Conservation Corridors of the Bankstown LGA use tracts of land that are already, as much as possible, vegetated. These areas are often found along water courses such as Prospect Creek, Georges River, Salt Pan Creek and Little Salt Pan Creek. Other corridors identified include areas where vegetation may even be lacking to an extent but where parcels of vegetation still relate to each other from a landscape scale.

Conservation Corridors involve the re-establishment of locally occurring trees, often determined by the soil type of the area. Planting native trees is a target of BASIX (the Building Sustainability Index) and is used in a two-pronged approach: firstly, native trees to the area are generally low water use species and secondly provide habitat for locally occurring wildlife. Low water use species are selected by the relevant local Council with Bankstown's list being available on the BASIX website (www.basix.nsw.gov.au). These should be used as a 'guide to planting' within the Conservation Corridor. However it should be noted that non-native trees still have value in a Conservation Corridor context. Furthermore, BCC has its own



native vegetation planting booklet (“Creating an Australian Native Garden”) which can be used (and/or modified) as an additional tool to Conservation Corridor management. A booklet such as this should be used to complement soil types within the corridor (and LGA).

Where properties can be acquired (or zoning changed) then this would be an additionally favourable outcome for the Conservation Corridor as these ‘properties’ could be further re-established as bushland/vegetated plots thus acting as more stepping stones to compliment the intent of the Conservation Corridor. However acquisition of land (and re-zoning) is not the main intent of Conservation Corridor management and will require further investigation. Community participation programs, development controls and Council plantings/restoration works are the obvious aspects to ‘growing’ the Conservation Corridor.

Undertaking specific mapping works to identify sites within the corridor for functions such as biobanking, carbon sequestration, community planting, Council plantings (fill in of edges along sportsgrounds/parks/road verges etc.) and/or ‘no mow zones’ are important aspects to Conservation Corridor management.

All lands within the identified corridors should be managed to enhance their corridor function. Strategic planning is the main discourse for corridors to be implemented beyond which on-ground works should continue to focus on key areas of the corridors providing vegetation planting, riparian and creek line improvement, sensitive and sustainable development and fauna habitat promotion through such programs as the nest box program, the feral animal control program and weed control programs.

Furthermore, the Local Environment Plan (LEP) and Development Control Plan (DCP) for Bankstown City should detail ‘Conservation Corridors’ across the LGA. The DCP should detail mechanisms as to how Bankstown’s biodiversity needs are to be met with regards to a harmonious advancement alongside development. DCP guidelines for private and public development should include offsetting principles in relation to the Conservation Corridor, habitat creation and where possible dedicating landscape strips of land to vegetation planting. Where such strips can link between land parcels the conservation outcome would be increased. Council’s Tree Preservation Order also assists greatly in biodiversity retention, Conservation Corridor management and long term strategic planning.

The BCC Local Area Plan (LAP) process informs Planning Proposals to amend the LEP. Through this mechanism Conservation Corridors can be included as a statutory conservation mechanism.

The identified corridors mapped for the LGA are:

- Water Pipeline to Lansdowne Corridor;
- The Crest to Lansdowne Corridor;
- Sydney Water Pipeline Corridor;
- Duck Creek to Lansdowne Corridor;
- North-east Stormwater Drain Corridor;
- Bankstown to Salt Pan Creek Corridor;
- M5 Motorway Corridor;
- The Crest to Little Salt Pan Creek Corridor;
- Georges River (Via Prospect Creek to Salt Pan Creek) Corridor; and
- Morgan's Creek (M5 Motorway to Georges River) Corridor.

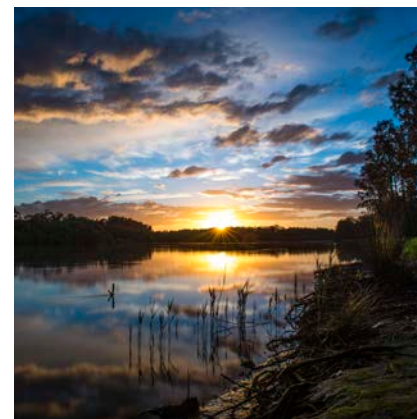
Priority Actions for Core and Transition Corridors

Core Corridor:

- Retain trees, apply BCC BSP offsetting principles;
- Where trees are removed (whether through DA, TPO or other) replace with locally occurring native trees on site at a ratio of 3:1. Trees shall be locally occurring canopy trees;
- Where offsetting cannot occur on site, consider offsetting through green roofs and offsetting within the Core Corridor on community lands, or as street trees, or RMS (road widening) lands. Tree replacement offsetting should be at a ratio of 3:1.

Transition Corridor:

- Retain trees, apply BCC BSP offsetting principles;
- Where trees are removed (whether through DA, TPO or other) replace with locally occurring native trees on site at a ratio of 3:1. Trees shall be replaced with locally occurring canopy trees or appropriate non-native canopy trees;
- Where offsetting cannot occur on site, consider offsetting through green roofs and offsetting within the Transition or Core Corridor on community lands, or as street trees, or RMS (road widening) lands. Tree replacement offsetting should be at a ratio of 3:1.

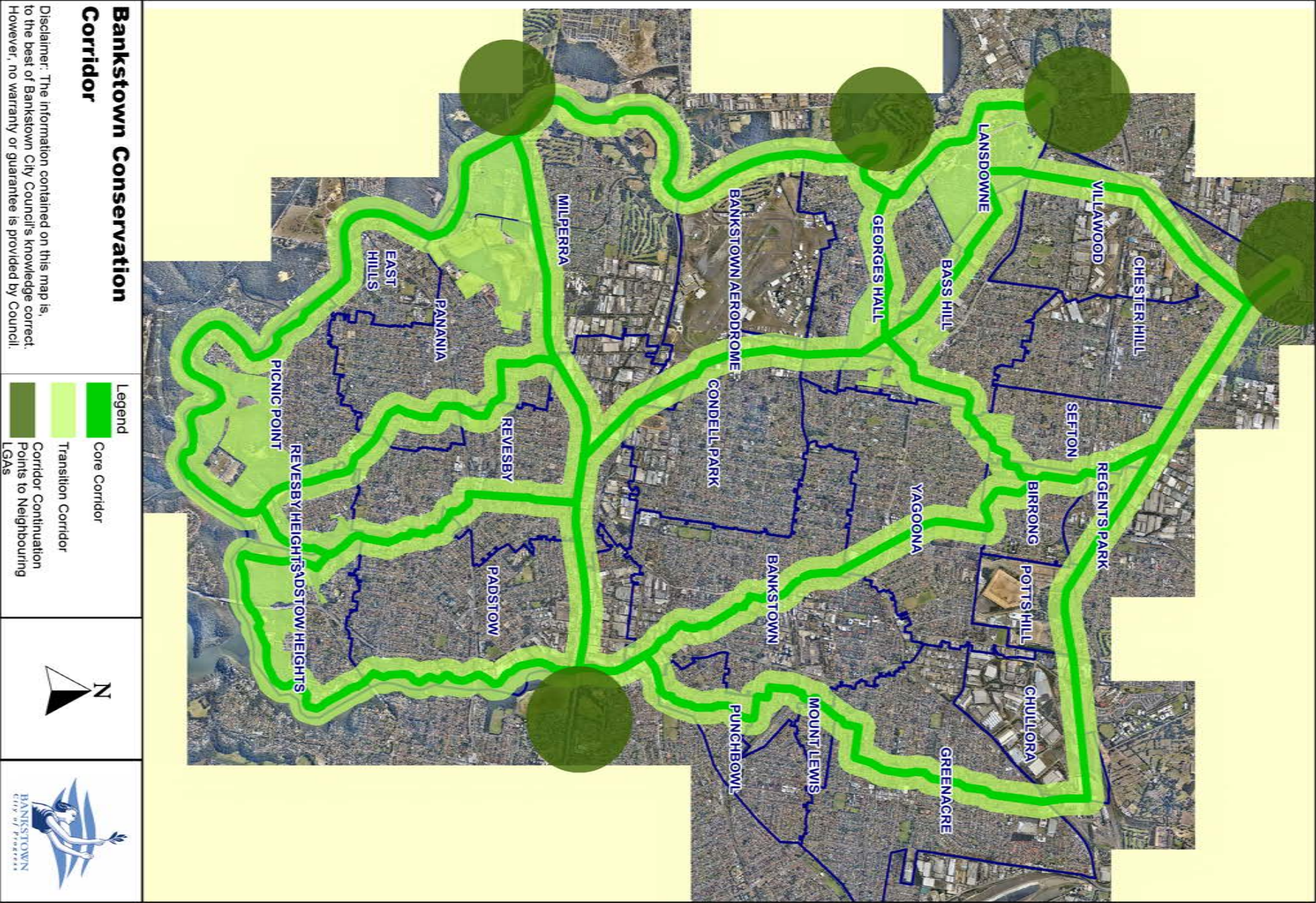


Photograph: Ken Lee Tan



Photograph: Kevin Julian

Figure 11: Conservation Corridor Map

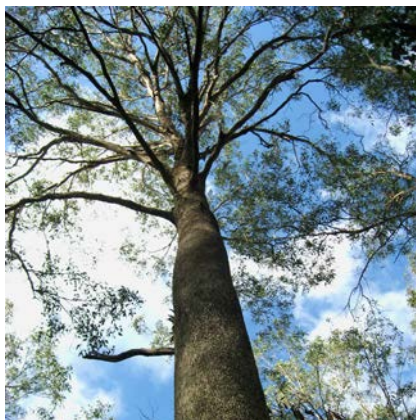


Biodiversity Protection Lands

Bankstown City Council has prepared Local Area Plans (LAP's) which break up the LGA into seven localities to provide a comprehensive strategic planning framework for the City of Bankstown till 2031. Biodiversity is incorporated significantly into these LAP's with a detailed 'Biodiversity Protection Map' proposed which focuses on land where significant threatened species or endangered ecological communities occur. The layer is sourced from reference material such as BioNET, OEH's Sydney Metropolitan Catchment Management Area (SMCMA) Vegetation Map, Bankstown City Council Bushland Vegetation GIS mapping layer and the 2002 Biodiversity Strategy (Priority Lands).

Assumptions made throughout the process of developing the 'Biodiversity Protection Lands' map:

- Include only NSW and Nationally listed vulnerable and endangered species, populations and communities as from the OEH SMCMA map;
- Exclude native animals classified as 'protected' in Australia such as the magpie from the BioNET Wildlife Atlas map;
- Discount sightings from the BioNET Wildlife Atlas Map of highly mobile animals such as birds which may have been identified at a private residence on one occasion in the past;
- Discount vegetation (from the OEH SMCMA map and the Bushland Vegetation GIS map) where it is clear from aerial photography that there is an extremely low to nil likelihood of it remaining on site as a viable population or community;
- Discount vegetation that is not listed as an Endangered Ecological Community unless it is connected to larger tracts of vegetation where EEC's are extant (from the OEH SMCMA map and the Bushland Vegetation GIS map and ground truthing where possible). SEPP 19 (Urban Bushland) was incorporated at this level also;
- Identify private property sites from the Biodiversity Strategy (2002), however still using other 'assumptions' include or discount the sites as appropriate;
- Sites on community land (and in some cases private land) that have a continuous canopy cover of endemic trees albeit with a manicured understorey where also included as important biodiversity sites. Generally these sites stood alone and isolated within the urban landscape. These sites would provide important 'stepping stones' of habitat for native birds, possums, gliders and bats to move between on their respective migrations.



The LAP's inform the Bankstown Local Environment Plan (LEP) which is the statutory land use and development plan for Bankstown. The BCC LEP upon which biodiversity management is largely reliant with respects to development, details the following clause to which the proposed 'Biodiversity Protection Lands Map' will apply

6.6 Biodiversity protection

(1) *The objective of this clause is to maintain terrestrial and aquatic biodiversity by:*

- (a) protecting native fauna and flora, and*
- (b) protecting the ecological processes necessary for their continued existence, and*
- (c) encouraging the conservation and recovery of native fauna and flora and their habitats.*

(2) *This clause applies to land identified as "Biodiversity" on the Biodiversity Protection Map.*

(3) *Before determining a development application for development on land to which this clause applies, the consent authority must consider whether or not the development:*

- (a) will cause any adverse impact on the condition, ecological value and significance of the fauna and flora on the land,*
- (b) will cause any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna,*

(c) has any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and

(d) will cause any adverse impact on the habitat elements providing connectivity.

(4) *Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:*

(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or

(b) if that impact cannot be avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or

(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.

Offsetting Principles for Bankstown

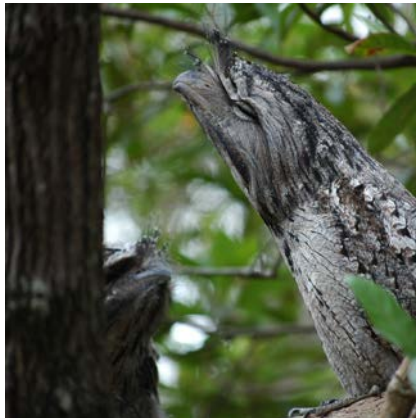
The principles by which offsetting should be taken within BCC, and indeed have been taken by Australian State and Federal Government agencies are outlined below. In particular the Biobanking framework (<http://www.environment.nsw.gov.au/biobanking/>) and the Draft NSW Biodiversity Offsets Policy for Major Projects are referenced. These standards shall determine the value direction that Bankstown City Council supports and adheres to as a guide for offsetting, in some cases the principles have been modified for practicality within a Local Government Area. The principles as relevant to Bankstown City Council are as follows:

Principle 1: Offsets should only be considered after all options to avoid impacts have been thoroughly explored and/or unavoidable impacts have been minimised. Offsets can then be considered for the remaining impacts.

Biodiversity offsets sit within a hierarchy of 'avoid, minimise, offset', much like the waste avoidance slogan of 'reduce, reuse, and then recycle'.

Taken from the 'Framework for Biodiversity Assessment (FBA)' as a standard, Principle 1 prioritises avoiding unnecessary impacts of a proposed development on biodiversity and where impacts cannot be avoided, a reasonable attempt should be made to make the impact less severe (minimise it). After this, where all feasible measures have been taken to avoid or minimise the impacts, offsets should be used to compensate for the remaining impacts. Proponents may be required to detail why impacts cannot be avoided or minimised.

Standard threatened species legislation (and local policies) will still need to be addressed, before offsets may be considered (including Section 79(c) of the EP&A Act). The Ecological Consultants Association of NSW (www.ecansw.org.au) as well as the OEHL website provide further information on biodiversity assessment and accredited ecological consultants. Most often the determination of impacts will be undertaken through an EA (Environmental Assessment). The FBA should be referenced to provide further background (<http://www.environment.nsw.gov.au/resources/biodiversity>).



Principle 2: Offsets must equate to, or achieve higher conservation outcomes, than to the biodiversity values being lost.

Offsets must have a relationship to the biodiversity values being lost and should be targeted to a higher conservation priority, for example:

- vegetation – the requirements for offsets should be ‘like-for-like’ and/or offsets can include similar vegetation types in the locality that are more highly cleared than the vegetation being impacted on. Additionally a non-native tree should be off-set by a locally native tree;
- threatened species – in certain circumstances a species can be offset on a basis that is not strictly like-for-like, provided it is not critically endangered or listed under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. In these circumstances, a species can be offset with a similar species in the locality that is under the same or a greater level of threat, but this will need to be approved by the consent authority;

- aquatic biodiversity – offsets can include similar aquatic habitat in the catchment that is more threatened than the habitat being impacted on. Broadening the scope of entities that can fulfil the offset requirements provides greater flexibility for proponents and recognises that exactly the same biodiversity is not always available for an offset. Further guidance on the like-for-like requirements is contained in the OEH Framework for Biodiversity Assessment (FBA) and, for aquatic biodiversity, Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management (Fisheries NSW policy and guidelines), visit www.dpi.nsw.gov.au.

The FBA should be referenced to provide further background (<http://www.environment.nsw.gov.au/resources/biodiversity>).

Principle 3: Offsets must be in addition to other legal requirements.

This outlines the general principle that improvements to biodiversity made through undertaking management actions on an offset site must be in addition to other legal obligations for conservation that are attached to the land. This is to ensure that the offset provides an actual addition to biodiversity rather than something that was going to occur anyway. For example, land may already have been set aside for management of biodiversity as part of a Biobanking agreement developed under the Threatened Species Conservation Act (1995) to obtain financial incentives for management of natural resources. The management actions required for the Biobanking agreement cannot count towards the offset. Any additional management actions on that piece of land can, however, be counted:

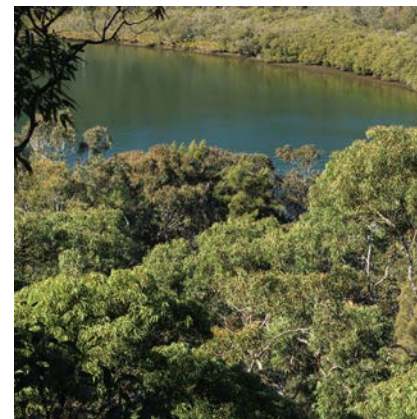
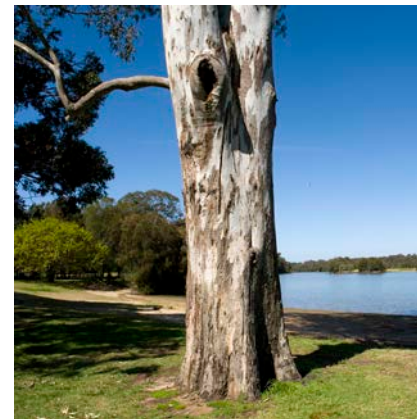
Public land

This principle is relevant for public land (and also Crown land) that has existing legal requirements for environmental management imposed upon it. These requirements are recognised under the FBA by reducing the number of biodiversity credits that can be generated under, for example, a Biobanking agreement (where a discount of 5-7.5% is applied to overall credits for each management action already legally required on the land, an accredited Biobanking consultant would need to assess this) (www.environment.nsw.gov.au).

Carbon credits

This primarily relates to the Emissions Reduction Fund (formerly the Carbon Farming Initiative) and is relevant to Bankstown's Conservation Corridor zone land management principles. The requirements for the purpose of creating carbon credits are not considered to be legal requirements for biodiversity management. This means that the same site can potentially generate both biodiversity credits and carbon credits through the same management actions (www.environment.nsw.gov.au).

The FBA should be referenced to provide further background (<http://www.environment.nsw.gov.au/resources/biodiversity>).



Photograph: Mark Sweeney



Principle 4: Offsets must be enduring, enforceable and auditable.

As detailed in the NSW Biodiversity Offsets Policy, “the aim of an offset site is to improve biodiversity to compensate for its loss on a development site. As the impact on biodiversity at the development site is usually enduring, the gain to biodiversity achieved through protection and management of an offset site must also be enduring. To provide confidence that the offset site will provide an enduring gain to biodiversity, management actions must be enforceable and auditable. The criteria below provide further details of appropriate mechanisms for securing offset”:

- a. the principal objective of ongoing site management is biodiversity conservation;
- b. management actions are undertaken in accordance with a management plan;
- c. there is reasonable likelihood that sufficient resources will be available to implement the management plan over time;
- d. there are appropriate accountability mechanisms in place to secure the outcomes, and these mechanisms cannot be altered without alternative and comparable offsetting arrangements being put in place;
- e. the arrangements are in perpetuity, and conservation obligations are transparently transferred and disclosed to any new owners of the land through appropriate administrative procedures.

A Biobanking agreement (discussed below) is the only mechanism tested in NSW that meets these criteria. Biobanking agreements provide the security and certainty that is necessary to ensure offsets achieve intended biodiversity gains. They ensure there is continuous funding available for management of the offset site and have clear monitoring and reporting requirements.

Other mechanisms to secure offset sites may be developed provided they meet the above criteria, BCC can work to offsetting with regard to individual trees (or small groups of trees whether native or non-native) in a similar fashion.

The FBA should be referenced to provide further background (<http://www.environment.nsw.gov.au/resources/biodiversity>).

Offsetting Individual Trees

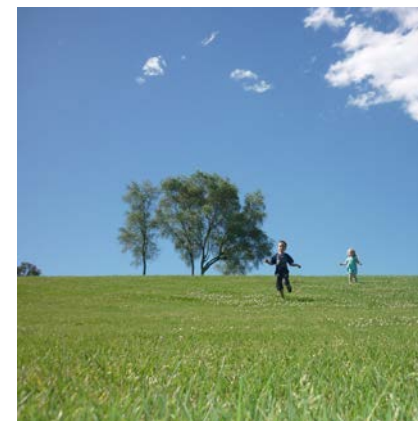
Where individual trees or small numbers of trees are required for removal a loss to biodiversity also results. In such situations standard offset mechanisms (such as biobanking) are generally insufficient or unable to be applied. A simple offsetting approach should in such situations apply. After applying the 'avoid, minimise, offset' principle, a certain number of trees can be planted to offset each removed, this is relevant to both private and public land. Where a scenario of 'net gain' is desirable a suitable number would be 3 trees for every 1 lost, this would also compensate for any tree death as they grow to maturity. Bankstown's Council's Tree Preservation Order is the suitable document to outline such offsetting techniques. Such a program will need to identify suitable sites (community land/street verge etc.), take into consideration tree type (species and sizes etc.), safety of people and protection of infrastructure, bushfire threats, financial impacts, and benefits such as potential fossil fuel use reduction due to a reduction in mowing requirement and potential noise reduction.

Aquatic Biodiversity Offsets

Impacts on water environments are more complex as they often require consideration of additional factors including water flow, connectivity of aquatic habitats, water pollution, downstream impacts, and impacts on other aquatic users and geomorphology of the area.

Avoidance and minimisation of impacts on aquatic habitats and their associated biodiversity may require further consideration by the consent authority who will need to weigh these impacts against the social and economic benefits of a project. With regard to aquatic biodiversity offset requirements, the NSW Fisheries Policy and Guidelines will classify the habitat types being offset. It will then apply a ratio and dollar value to determine the total dollar value of the offset required to be implemented by the proponent via on-ground protection or rehabilitation works, or placed into the aquatic biodiversity fund. The proponent will have the opportunity to reduce this cost through direct negotiation with Fisheries NSW, subject to meeting the minimum overall offset ratio requirements.

Generally, Fisheries NSW are the agency to consult with in respects to aquatic offsetting. The FBA should be referenced to provide further background (<http://www.environment.nsw.gov.au/resources/biodiversity>).



Photograph: Stacey Wilson

Bio-banking

Biobanking is a market-based scheme that provides a streamlined biodiversity assessment process for development and is a rigorous and credible offsetting scheme. See the Biobanking Handbook for Local Government (www.environment.nsw.gov.au). Biobank sites that could be established in the Bankstown Local Government Area include areas of community land (such as 'natural areas'), crown lands or land under environmental protection zoning. Larger reserves such as Norfolk, Deepwater, Lansdowne, The Crest and The River Reserve are obvious candidates (refer to Figure 12). There is also scope to incorporate sections of designated Conservation Corridors into Biobanking sites. Biobanking has been approved for much of the LGA as per BCC's Generic Plan of Management (for community lands). BCC currently has one Biobank site at the northern end of Lansdowne Reserve which has shown promise as BCC looks to develop further sites for biodiversity outcomes and significant financial savings for the LGA.

The promotion and undertaking of Biobanking is an important aspect of biodiversity management in the Bankstown LGA and further recommendations are discussed in the 'Strategies' section of this document.

Carbon Sequestration Initiatives

Carbon Sequestration can be undertaken in the Bankstown LGA, the main scheme under which this will work is the Emissions Reduction Fund (ERF) as under the Clean Energies Act. The main vegetation or planting requirements for the ERF include that the site must be:

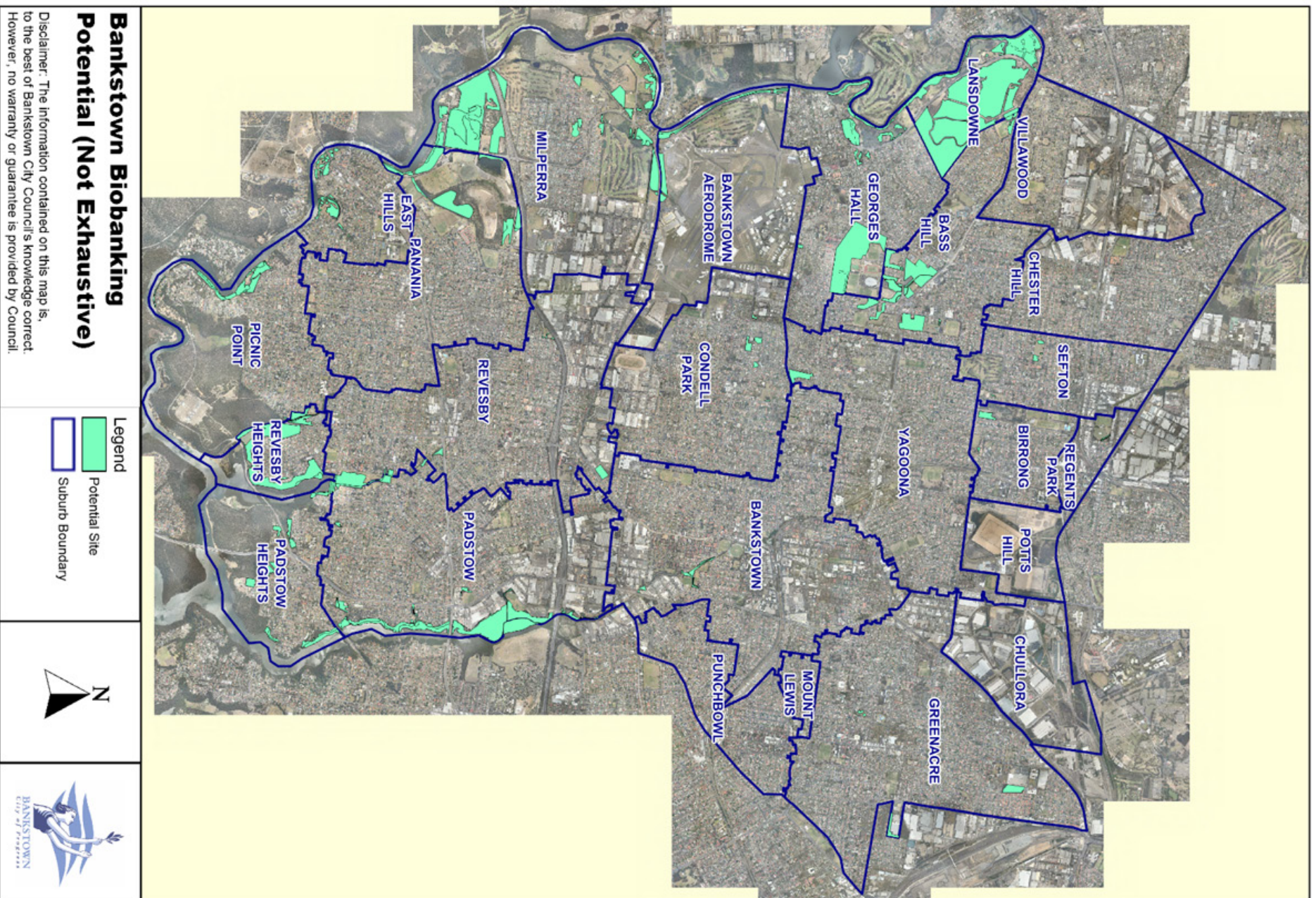
- at least 0.2 ha;
- at least 10 m wide;
- at least 80% clear of forest on 31 December 1989;
- be in NSW; and
- have the capacity to reach a canopy height of 2 metres and have a minimum crown cover of 20%.

These guiding principles have remained relatively constant over the years, even as the legislative contexts changed. The requirements link back to the Kyoto Protocol, in many regards the catalyst of such programs. It should be noted that credits can be generated from BCC plantings already in the ground, as of 31st December 1989, such as those in Carysfield Reserve which were planted as part of a National Tree Day planting project or creek line restoration projects as undertaken through Councils stormwater levy fund. The critical factor being that these sites sit in identified and adopted Conservation Corridors – an essential requirement for development of Carbon Sequestration sites.

The promotion and undertaking of carbon sequestration type projects is an important way forward for biodiversity management in the Bankstown LGA and is further expanded within the 'Strategies' section of this document.

Forethought of such projects may include the identification of potential sites within identified Conservation Corridors, as well as identifying parks which have had landscape planting applied to them in the structure of locally native bushland. Additionally, it is in the interest of this Strategic Plan that in the future more of such bushland landscape gardens be planted. Such landscaped bushland would provide a rewarding work practise in maintenance and would not require the level of maintenance and machinery costs that mown areas do therefore would be cost effective over the longer term. As Bankstown moves towards a more 'sustainable' and 'green' living space, as leaders of progress in the Sydney metropolitan area, such practises will further heighten the reputation of BCC.

Figure 12: Potential Biobanking Sites in Bankstown LGA



5 Strategies



Strategies

Set out in a series of tables, the following strategies have been identified to assist Council and the community meet their broader biodiversity vision, goals and objectives. Responsibility for each action has been allocated and the abbreviations below list the Unit/Team within Council that share responsibility for implementation of this Biodiversity Strategic Plan.

- Business Advisory Service (BAS);
- City Assets and Infrastructure (CAI);
- City Services (CS);
- Development Services (DS);
- Environmental Services (ES);
- Grants Officer (GO);
- Land Information Systems (LIS);
- Parks and Buildings (P&B);
- Property Investment (PI);
- Recreation Team (RT);
- Resource and Recovery (RR);
- Roads and Infrastructure (RI);
- Strategic Asset Management (SAM);
- Sustainable Development Unit (SDU).

Priority Implementation

Each action has been assessed based on the urgency required for its implementation. The level of priority has been allocated as follows:

H = High

Achievable in the short term 1 to 4 years

M = Medium

Achievable in the medium term 4 to 8 years

L = Low

Achievable in the long term 6 years onwards

O = Ongoing

Ongoing action will continue for the life of this document

The Strategies are grouped as followed:

- Planning;
- Bushcare and Vegetation Management;
- Bushfire Protection;
- Ongoing Conservation Management;
- Education and Community Participation;
- Funding, Research and Monitoring Strategies.

Planning

Bankstown City Council has incorporated many biodiversity protection strategies into its planning system. This is both a result of legislative and Council driven response to the biodiversity needs of the LGA. Some of the planning strategies outlined below are more generally to do with upkeep and maintenance of an already established system while others are raised where needs are yet unfulfilled or where new understanding through research, market based mechanisms or locality based gaps have been identified.

Proposed Implementation Schedule for Recommended Strategies

Ref.	Planning Strategies	Primary Role (Partner)	Priority
P1	Update BCC's Development Control Plan to incorporate natural resource issues including but not limited to tree retention, permeable surfaces, green roofs, bushfire management and water ways.	SDU, P&B	H
P2	Ensure biodiversity, natural resource and bushfire related GIS Mapping is maintained to promote best environmental management practise.	LIM, SDU (P&B)	H & O
P3	Identify and expand biobanking and other biodiversity investment opportunities (such as the Emissions Reduction Fund) as a source of revenue, and for biodiversity outcomes, through the development of working plans.	SDU	H
P4	Maintain the Community Land Generic Plan of Management and develop site specific Plans of Management and/or masterplans where necessary.	SDU	H
P5	Develop Reserve Action Plans to direct site specific management. Natural resource management objectives to include, but not limited to: no-mow zones, bush regeneration schedule, fencing plan, feral animal control, recreational activity plan, interpretation plan, compliance plan, planting schedule.	P&B	H
P6	Ensure that BCC complies with relevant biodiversity legislation.	SDU, P&B	H&O
P7	Advance Council's Conservation Corridor concepts into established planning structures, such as the BCC Development Control Plan, Local Area Plan's and the Local Environment Plan. A tree planting guide/list of suitable trees should be developed to assist the offsetting/replacement program. BCC Transport Strategy to incorporate cycle ways into Conservation Corridors.	SDU (PI, P&B, DS, RR, GO)	H
P8	Develop a plan to increase tree canopy cover by up to 30% across the LGA by 2025 (at review of this BSP). A strategic tree planting document should be created, this may take the form of a Streetscape Greenery Masterplan as undertaken by the Singapore government, a leader in greening landscapes.	P&B, SDU	H
P9	Update Council land acquisition layer to identify opportunities to improve biodiversity connectivity.	SDU	M&O
P10	Develop landscape/bushland management standards for public and private lands to protect and enhance biodiversity. This should include the recommendations of this Strategic Plan, including green roofs and permeable surface implementation.	DS, SDU, P&B	M&O
P11	Investigate opportunities to implement stormwater offsetting/credit schemes/tree planting credit schemes for private land.	SDU	M
P12	Develop and adopt an Integrated Feral Animal Management Plan.	SDU	M
P13	Review the BASIX vegetation planting schedule for BCC.	SDU (P&B)	O
P14	Maintain Council's DCP and LEP to reflect the recommendations of adopted environmental management strategies and policies.	SDU (P&B)	O

Bushcare and Vegetation Management

Bankstown City Council's Bushcare program is an integral part of the management of bushland in Bankstown that achieves the dual objectives of community participation and enhancement of biodiversity values. Together with the work carried out by volunteers and professional bush regenerators, bushcare is making a significant contribution to the conservation and management of Bankstown's valuable bushland.

Council generally provides funding and support for these groups, including supervision, on-going training, loan of tools and equipment. The scope of work could also be enlarged so that it is consistent with other findings of this Strategic Plan. Often grant funding is sought to assist in bush regeneration works and well as BCC staff who contribute daily to the improvement of Bankstown's bushland resource.

Proposed Implementation Schedule for Recommended Strategies

Ref.	Bushcare and Vegetation Management Strategies	Primary Role (Partner)	Priority
BCV1	Implement a comprehensive and systematic bush regeneration program (ref FRM1).	P&B	H&O
BCV2	Identify areas for revegetation (environmental type and tree planting). This should be undertaken in accordance with corridor, biobanking and carbon sequestration (ERF) initiatives.	P&B, SDU	H&O
BCV3	Encourage increased participation in the bushcare program.	P&B (SDU, EEP)	H&O
BCV4	Develop a noxious weed mapping procedure (ProMapp). Implement noxious weed mapping.	SDU (P&B, EEP, ES)	H&O
BCV5	Develop a 'quick response' procedure to eradicate new weed incursions (ProMapp).	P&B (SDU)	H&O
BCV6	Implement best practise in the application of fertiliser/pesticide/herbicide use in the maintenance of public open space and investigate opportunities to reduce reliance on chemical application.	P&B (SDU)	H&O
BCV7	Participate in the Sydney Weeds Committee and other relevant committees.	P&B, SDU, ES	O
BCV8	Ensure protection of old growth/hollow bearing trees and increase diversity of trees (city wide) and stagger tree plantings in revegetation programs.	P&B, SDU	O

Bushfire Protection

BCC's bushfire management is largely co-ordinated through the Bankstown/Hurstville Bushfire Management Committee which includes among others, NSW Fire & Rescue, the National Park & Wildlife Service and Hurstville Council. Bushfire management and protection can be a legally complicated arena and often involves referral to the Rural Fire Service, particularly with regard to development applications. Planning for Bushfire Protection documentation can be very helpful when determining what actions can and can't be undertaken – particularly with regard to development and Asset Protection Zone management.

Any bushfire management should balance ecological requirements of species and communities with community needs (protection of life and property).

Proposed Implementation Schedule for Recommended Strategies

Ref.	Bushfire Protection Strategies	Primary Role (Partner)	Priority
BF1	Implement and maintain the Bankstown/Hurstville Bushfire Risk Management Plan as developed through the Bankstown/Hurstville Bushfire Management Committee.	P&B, SDU	H&O
BF2	Maintain BRIMS registered Fire Trails as per the Fire Trails Management Plan. Update the Fire Trails Management Plan when it expires.	P&B	O
BF3	Develop and implement an Asset Protection Zone Management Plan and maintain GIS meta data. Inform BRIMS of all hazard reduction works.	P&B	O
BF4	Comply with threatened species legislation and the HRC process in the development of Asset Protection Zones.	DS (SDU, P&B)	O
BF5	Manage fire thresholds to within recommended tolerances. Undertake ecological burns where appropriate, particularly where weed control is an outcome.	P&B, SDU	O
BF6	Maintain the Hazard Reduction Certificate process on ProMapp (BCC program).	SDU, P&B	O
BF7	Develop a GIS layer detailing burn history for the LGA.	SDU	O

Ongoing Conservation Management Strategies

The strategic planning actions focus on mitigating key threats and addressing other issues relevant to biodiversity values. Many of the recommendations of this Strategic Plan will be implemented through Reserve Action Plans and agreements or vegetation/bushland management plans with private landholders and other Government Agencies where applicable.

Compliance activities are an important aspect of biodiversity protection works in the Bankstown LGA with illegal dumping of rubbish into bushland areas a major concern. Private property compliance issues include noxious weed control, encroachment, and habitat removal, polluting of waterways and soil as well as general threatened species and fisheries matters.

Proposed Implementation Schedule for Recommended Strategies

Ref.	Ongoing Conservation Management Strategies	Primary Role (Partner)	Priority
OM1	Implement the BCC Integrated Feral Animal Management Plan. Investigate the implementation of 'Wildlife Protection Area' classifications for reserves where feral animals are prevalent.	P&B, SDU	H
OM2	Facilitate the OEH 'Saving our Species' program. This program aligns everyone's efforts under a single banner, so investment in threatened species conservation can be accounted for.	SDU, P&B (RR)	H
OM3	Ensure OEH Recovery Plans are resourced and management obligations actioned. Relevant Recovery Plans to the Bankstown LGA include: <ul style="list-style-type: none"> Pimelia spicata Recovery Plan Large Forest Owls Recovery Plan Grey-headed Flying-fox Draft National Recovery Plan Acacia pubescens Recovery Plan Cumberland Plain Recovery Plan Green and Golden Bell Frog Recovery Plan 	P&B, SDU, DS, ES	M
OM4	Ensure biodiversity and natural area compliance is upheld as required.	ES	O
OM5	Maintain licences such as the OEH BioNet licence and licences as determined by the National Parks and Wildlife Act 1974, as required.	SDU, P&B	O
OM6	Map point sources of pollution and erosion sites within or bordering on bushland or affecting water courses and action as necessary.	SDU, P&B, RR, ES	O

Education and Community Participation Strategies

General community outreach that covers the entire LGA will be largely information-based, with management of Council's Environment web-pages to provide up-to-date information. This can be coupled with focussed publicity through local media outlets, letter box drops or posters, as required and can use BCC's new social media outlet as an innovative new way to bring biodiversity into the conversation.

Currently the draft Community Environmental Education Strategy (CEES) outlines many relevant education programs and proposals which relate to biodiversity in the Bankstown LGA. This Strategic Plan will continue to be a primary focus on achieving biodiversity outcomes through education.

Proposed Implementation Schedule for Recommended Strategies

Ref.	Education and Community Participation Strategies	Primary Role (Partner)	Priority
ED1	Make optimal use of existing infrastructure to enhance or support biodiversity education (e.g. interpretive signage, improved landscape works, meadow/grassland creation, construction of new pathways/walks, tree/bush plot planting).	RR ,P&B, SDU	H&O
ED2	Educate bushland neighbours on the impacts of dumping garden waste and predation by domestic pets on biodiversity. Provide support and/or incentives to alleviate this problem.	RR	H&O
ED3	Develop active partnerships with Aboriginal Land Councils, Local Environmental Groups, Local Schools and Tertiary Institutions that can enhance biodiversity outcomes.	RR, SDU, CS	M&O
ED4	Develop active partnerships with local business and commercial enterprises that can enhance biodiversity outcomes.	SDU (BAS, RR)	M&O
ED5	Review BCC's 'Creating an Australian Native Garden' booklet to be compatible with conservation corridor principles and BASIX.	SDU (RR)	M&O
ED6	Investigate opportunities for on-line educational material.	RR (SDU)	M&O
ED7	Pilot a series of walks and talks focused on selected topics, such as native birds, aquatic habitat, impacts of litter and weeds through stormwater runoff, or the value of native planting and weed control in gardens.	RR (SDU, P&B)	O
ED8	Involve the local community in bushland programs, align with significant national days such as tree planting days and Clean Up Australia Day and National Tree Day.	P&B, SDU, RR, RT	O

Funding, Research and Monitoring Strategies

The implementation of the recommendations made in this report will require that appropriate funding and other resources are committed. To minimise the resource burden on Council, strategies are proposed to ensure that funding can be accessed from other sources.

Monitoring is necessary to assess the effectiveness of the strategies, and more importantly, assess the impact of the strategies on biodiversity.

Proposed Implementation Schedule for Recommended Strategies

Ref.	Funding, Research and Monitoring Strategies	Primary Role (Partner)	Priority
FRM1	Establish an effective monitoring program for natural area management (BCVI), expenditure and to establish feasible benchmarks (KPI's).	P&B (SDU)	M&O
FRM2	Establish relationships with external partners, research agencies and educational organisations to ensure cross pollination of information and data.	SDU, P&B, RR	H
FRM3	Identify a future works plan, in relation to biodiversity, for Section 94 funds.	SDU, P&B	M
FRM4	Investigate the Urban Heat Island Affect and potential future impacts for the LGA.	SDU	H
FRM5	Undertake flora and fauna surveys throughout the LGA to further establish baseline data. All results to be submitted to the OEH BioNet service.	SDU (P&B, RR)	H
FRM6	Ensure Bankstown LGA vegetation mapping (comprised of Bankstown GIS Bushland Mapping and the OEH SMCMA Vegetation mapping) is accurate and current.	SDU, P&B, DS	L
FRM7	Investigate possibilities for corridor enhancement for the purpose of fauna movement (i.e. raptor poles/fauna bridges/nest boxes) and/or the translocation or reintroduction of native fauna to the LGA'	SDU (P&B)	M
FRM8	Develop a register of ecological studies/flora and fauna reports undertaken within the LGA to assist with data management and future planning. Ensure consultants upload their findings into the OEH BioNET system as a contractual obligation.	SDU, P&B, DS	O
FRM9	Periodically review the Biodiversity Strategic Plan (10 years).	SDU	O

6 Appendices





Appendix I: Abbreviations and Acronyms

APZ:	Asset Protection Zone
BCC:	Bankstown City Council
BFMC:	Bushfire Management Committee
BFRMP:	Bushfire Risk Management Plan
BRIMS:	Bushfire Risk Information Management System
CFI:	Carbon Farming Initiative
DCP:	Development Control Plan
DSEWPaC:	Department of Sustainability, Environment, Water, Populations and Communities
EA:	Ecological Assessment
ECA:	Ecological Consultants Association, of NSW
EEC:	Endangered Ecological Community
EP&A Act:	Environmental Planning & Assessment Act
EP&BC Act:	Environmental Protection & Biodiversity Conservation Act
ERF:	Emissions Reduction Fund
ESD:	Ecologically Sustainable Development
FBA:	Framework for Biodiversity Assessment (OEH)
GIS:	Geographic Information Systems
LGA:	Local Government Area
MNES:	Matters of National Environmental Significance
NPWS:	National Parks & Wildlife Service
OEH:	Office of Environment and Heritage
OoW:	Office of Water
POE&O Act:	Protection of the Environment & Operations Act
RC:	Riparian Corridor
SEPP:	State Environment Planning Policy
SIS:	Species Impact Statement
TSC Act:	Threatened Species Conservation Act
TPO:	Tree Preservation Order
VMP:	Vegetation Management Plan
VRZ:	Vegetation Riparian Zone
WM Act:	Water Management Act

Appendix 2: Glossary of Terms

Activity: (a) the erection of a building; (b) the carrying out of a work in, on, over or under land; (c) the use of land or of a building or work; (d) the subdivision of land; (e) any act, matter or thing prescribed in an environmental planning instrument under s26 of the EP&A Act as an activity, but does not include any act, matter or thing for which development consent under Part 4 is required or has been obtained or is prohibited under the environmental planning instrument.

Asset Protection Zone: an area surrounding an asset, such as a house, where fuel has been reduced to a level that will no longer support bushfires.

Bushland: Land on which there is vegetation which is either a remainder of the natural vegetation of the land or is still representative of the structure and floristics of the natural vegetation (as per SEPP 19).

Consent authority: In relation to a development application means: (a) the Council having the function to determine the application; (b) the Minister, public authority (other than Council) or Director-General of Urban Affairs and Planning where specified in an environmental planning instrument.

Conservation reserve: Those areas gazetted as National Parks, Regional Parks, Nature Reserves and State Recreation Areas under the National Parks and Wildlife Act (1974), and those areas designated as Flora Reserves under the Forestry Act (1916).

Critical habitat: Habitat declared to be critical under Part 3 of the TSC Act.

Critically endangered ecological community: As identified as such in Schedule 1 of the TSC Act.

Determining authority: Means a Minister or public authority: (a) by or on whose behalf an activity is to be carried out; or (b) whose approval is required in order to enable the activity to be carried out.

Development: In relation to land, means: a) the erection of a building on that land; (b) the carrying out of a work in, on, over or under land; (c) the use of land or of a building or work on that land; (d) the subdivision of land.

Development application: An application for consent under Division 1 of Part 4 of the EP&A Act, to carry out development.

Ecological community: An assemblage of species occupying a particular area.

Endangered ecological community: As identified as such in Schedule 1 of the TSC Act.

Endangered population: A population identified as such in Part 2 of Schedule 1 of the TSC Act.

Endangered species: A species identified as such in Part 1 of Schedule 1 of the TSC Act.

Fauna: Animal life

Flora: Plant life



Habitat: An area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community and includes any biotic or abiotic component.

Indigenous species: Flora and fauna that naturally occur at a particular locality.

Key threatening process: A threatening process identified as such in Schedule 3 of the TSC Act.

Likely: Is taken to be a real chance or possibility.

Lifecycle: The sequence of events from the origin as a zygote to the death of an individual.

Limit of its geographic range: the final or furthest boundary or point that a plant or animal species continues or extends to, in relation to the known geographical extent of distribution of that species.

Local population: a population that occurs within the study area, unless the existence of contiguous or proximal occupied habitat and the movement of individuals or exchange of genetic material across the boundary of the study area can be demonstrated.

Population: A group of organisms, all of the same species occupying a particular area.

Region: A bioregion defined in a national system of bioregionalisation that is determined (by the Director- General by order published in the Gazette) to be appropriate for those purposes.

Risk of extinction: A species is at risk of extinction if its numbers are reduced to such a critical level, or its habitats have been so drastically reduced, that it is in danger of becoming extinct.

Significant: Is taken to mean important, weighty or more ordinary.

Species: Animal or plant and includes any defined sub-species and taxon below a sub-species and any recognisable variant of a sub-species or taxon.

Study area: The subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly.

Threatened biota: Refers to all threatened species, populations and ecological communities listed under the TSC Act.

Threatening process: A process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities.

Viable population: A population that has the capacity to live, develop and reproduce under normal conditions.

Vulnerable species: As identified as such in Schedule 2 of the TSC Act.

Vulnerable ecological communities: As identified as such in Schedule 2 of the TSC Act

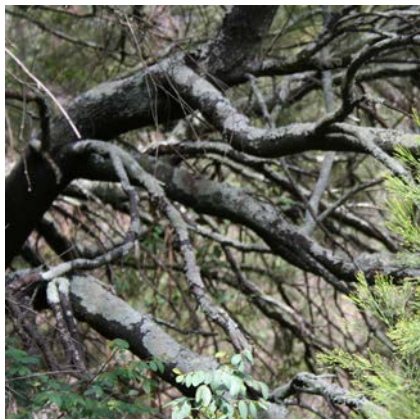
Appendix 3: An Historical Overview from “Taken for Granted: The Bushland of Sydney and Its Suburbs” by Benson & Howell

Benson and Howell (1990) in the publication “Taken for Granted - the Bushland of Sydney and Its Suburbs” (Kangaroo Press) provide an excellent overview of the topography, past land use and plant communities of the Bankstown Local Government Area. The following section is an extract from this publication.

“Bankstown is the largest and most western of the inner western municipalities, and like most others it is predominantly a landscape of gently undulating Wianamatta Shale soils, most of which has now been cleared of its native vegetation. In the north soils are on the Bringelly Shale subunit and in the south from the Ashfield Shale subunit of the Wianamatta Shale. The vegetation appears to have been mainly woodland of *Eucalyptus moluccana* and *Eucalyptus tereticornis* with a grassy understorey and thickets of *Bursaria spinosa* (Blackthorn). Most of the shale areas have been cleared of native vegetation but important remnants remain, for example in Lansdowne Park and the Crest of Bankstown.

Lansdowne Park is particularly important as it contains a very extensive area of this community with a diverse range of understorey species, including the now rare *Leichardtia leptophylla*, *Chorizema parviflorum*, *Pimelea spicata* and *Zornia dyctiocarpa*. This vegetation was similar to that of the Cumberland Plain Woodlands further west. Some interesting rainforest-type species still occur in sheltered gullies near Marion Street on the small escarpment between Milperra and Punchbowl. South of here appears to have been open forest of turpentine, *Syncarpia glomulifera* and broad-leaved ironbark, *Eucalyptus fibrosa*. Here the turpentine-ironbark forest reaches its western limit. Norfolk Reserve at Greenacre contains an interesting remnant with woollybutt, *Eucalyptus longifolia* and ironbarks, *Eucalyptus crebra* and *Eucalyptus fibrosa*, also part of this transitional vegetation. This vegetation has almost completely gone from Bankstown.

Perhaps the most interesting vegetation on the shale areas is found in the broad valleys of creeks such as upper Salt Pan Creek and Duck River. Here the trees were mainly *Eucalyptus fibrosa*-*Eucalyptus moluccana*, ironbark-grey box, but with a distinctive paperbark shrub layer of *Melaleuca decora* and *Melaleuca nodosa*. Also here were trees of *Eucalyptus longifolia*, *Eucalyptus sideroxylon*, *Eucalyptus parramattensis* and *Eucalyptus sclerophylla*, and a variety of small shrubs including *Pultenaea villosa*, *Hakea sericea*, *Kunzea ambigua*, *Acacia falcata*, *Epacris purpurascens*, green flowered *Callistemon pinifolius* in damp places, and



sometimes the now rare *Pultenaea pedunculata*, *Peersoonia nutans* and *Acacia pubescens*. Examples of this vegetation are still found in Carysfield Park at Bass Hill, Leightonfield and Condell Park. Small populations of *Acacia pubescens* may be seen along the railway line, on bare clay embankments, between Punchbowl and Regents Park.

Natural vegetation is also still found along parts of the Georges River, particularly in flood-prone sites unsuitable for residential development. At Deepwater Park, at East Hills, is a remnant of the River-flat Forest with a number of blue-box trees, *Eucalyptus bauerana*. Nearby patches of *Eucalyptus eugenioides*-*Eucalyptus fibrosa* woodland show how much diversity and interest the understorey plants can add to recreation areas. Here are small trees of *Backhousia myrtifolia*, used by Aborigines to make boomerangs, *Polyscias sambucifolia* with small flat purple fruits, and *Notelaea* with large olive-like ones. Crimson bells of *Correa reflexa*, bright orange *Pittosporum revolutum* fruits, and white sprays of *Rulingia pannosa* flowers are interspersed with feathery-leaved *Acacia decurrens*, *Dodonea multijuga* and *Pultenaea villosa* shrubs, and occasional patches of soft *Adiantum aethiopicum*, Maidenhair fern. There are some interesting floodplain thickets with *Melaleuca ericifolia* and *Melaleuca linariifolia* and patches of sedgeland accessible from well constructed boardwalks. Also along the Georges River are strips of mangroves, *Avicennia marina* and *Aegiceras corniculatum*, and small patches of swamp oak, *Casuarina glauca* forest. Further

downstream between Picnic Point and Lugarno, the alluvial flats have been developed as picnic areas. Saltpan Creek also has mangrove and saltmarsh areas, including the best population in Sydney of the rare creeping herb *Wilsonia backhousei*.

There are Hawkesbury Sandstone outcrops along the foreshores of the river below East Hills, and downstream from here the river has the typical 'drowned valley' appearance characteristic of Sydney Harbour and Broken Bay. Natural vegetation here is mostly woodland of smooth-barked *Angophora costata*, red bloodwood, *Eucalyptus gummifera* and grey gum, *Eucalyptus punctata*. On drier slopes are *Angophora bakeri* and *Allocasuarina littoralis*, while small patches of heath with *Angophora hispida* are found on some of the gravelly ridge tops. These sandstone areas were the last part of Bankstown to be developed and, with foresight, some of the hillsides have been included in the Georges River National Park."

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Bankstown City Council

PO Box 8 Bankstown NSW 1885
Phone: 02 9707 9484 Fax: 9707 9070
www.bankstown.nsw.gov.au