



City of  
Wanneroo

**LOCAL ENVIRONMENTAL STRATEGY**

**A NEW DIRECTION**



## **MAYORS FOREWORD**

It is with pleasure that I present the City of Wanneroo's Local Environmental Strategy. This document outlines critical environmental issues that face the City and ways in which we can maintain and preserve our precious environment.

We live in a large metropolitan municipality with a current population of 83,000 and with a very rapid growth. Wanneroo in recent months has had more than 34 per cent of all lots sold in Perth.

With this rate of growth it is even more important that we plan to protect the significant parts of the environment.

The City of Wanneroo contains diverse land structures with a mixture of rural, agricultural, industrial, and urban areas as well as wetland, bushland and coastal zone areas. It contains a rich and unique flora and fauna, which is susceptible to pressure from increasing urban development.

As we face conflicting land use pressures the Local Environmental Strategy aims to develop priorities to enhance, protect and manage the natural beauty of our region.

The Local Environmental Strategy was formed after extensive consultation with community representatives on the City's Conservation Advisory Committee, with their input having been most important and valuable. The City recognises that a lot of community support exists for environmental initiatives and would like to encourage this.

The City is committed to implementing the Strategy and providing a healthy, natural environment for all to appreciate and enjoy.

The Local Environmental Strategy is a very important document as it provides strategic direction and focus, to enable the conservation of the natural environment for future generations to enjoy.

JON KELLY, JP  
**MAYOR**

## **ACKNOWLEDGEMENTS**

The preparation of this Local Environmental Strategy (LES) has involved Elected Members, City staff and community members on the City's Conservation Advisory Committee. Their input enabled a greater degree of consideration of the full range of issues facing the City.

The City's Conservation Advisory Committee gave freely of their own time to attend workshops, provide feedback and recommend modifications and alternatives. The community members, Councillors and staff on the Committee are;

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Cover photo: A Spoon Winged Lacewing in Koondoola Regional Bushland by Phylis Robertson 2/12/01, Member of the Friends of Koondoola Regional Bushland and the City's Conservation Advisory Committee

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## 1.0 INTRODUCTION

### 1.1 THE CITY'S STRATEGIC PLAN AND OTHER INITIATIVES

The City has recently prepared a Strategic Plan to identify those matters requiring priority attention, and also establish the goals and strategies that will form the basis of the City's activities between 2002 - 2005. Similarly the preparation of Directorate and Business Unit Plans by each Directorate and Business Unit is intended to ensure that the Strategic Plan is implemented. The Strategic Plan has identified 5 Key Success Factors to enable the City to measure its long-term success and ensure its continual improvement. The Key Success Factors are;

- Environment
- Community
- Economic Management
- Development; and
- Organisational Management

The Strategic Plan has further identified 4 goals which are the broad outcomes that the City must achieve in the long term to achieve its vision and mission. The Plan notes that *"the triple bottom line of cultural, economic and environmental sustainability is a core theme that unites all of our goals and strategies"*. The goals are;

- Environmental Sustainability
- Healthy Communities
- Economic Development; and
- Corporate Management and Development

The goal of "Environmental Sustainability" aims to *"value, protect and enhance our natural environment in harmony with the growth and progress of our city"*. The strategies it has identified to achieve this are;

- Conserve and enhance environmental assets
- Develop sustainable waste management options
- Support efficient use of water, energy and other resources; and
- Foster a culture of environmental awareness, ownership and action within the community and the organisation.

The City of Wanneroo adopted a Local Conservation Strategy (LCS) in 1995 following an extensive period of nearly two years of community consultation. This was intended to be a two stage strategy, with the first stage identifying the major issues faced by Wanneroo and the second stage being the phase where specific actions were recommended. However, little work was done on the second stage, resulting in few actions being developed and little work occurring.

To help the City of Wanneroo deal with the many pressing environmental issues facing it, a Conservation Advisory Committee (CAC) was established in April 2001 by the City to facilitate direct communication between the City and community. The CAC is comprised of City Administration, Councillors and members of the community. The

broad objectives of the CAC are to identify environmental issues affecting Wanneroo and recommend strategies that will assist the Council to deal with them. The LES has been prepared to help chart the City of Wanneroo's future environmental direction. It has built upon the work undertaken in the previous LCS, and has adapted it to reflect changes in environmental awareness and knowledge.

## **1.2 PREPARATION PROCESS OF THE LES AND ITS FOCUS**

As everybody has an impact upon the environment to varying degrees, it follows that everybody has the potential to improve their actions and be a part of the solution. To achieve this and make the LES a "living" document used and referred to regularly, a whole of Council approach was used with extensive input obtained from the community. A working group of the CAC was formed to assist in the preparation of this document for consideration by the Council. This approach recognises that environmental issues are broad ranging with many people having specific knowledge in certain areas and hence able to propose the best resolution. It was hoped therefore that the proposed format would enable the LES to snare a comprehensive listing of actions to be taken.

The LES is intended to have a lifespan of 3-5 years with the recommended action targets intended to be challenging but achievable. As our knowledge and awareness of environmental systems is constantly evolving, the LES will need to be revised and updated from time to time. To ensure that the strategy is kept up to date a mini annual review should take place, with a major review within 3-5 years.

Six Key Focus Areas have been identified representing broad environmental issues affecting the City of Wanneroo, with Action Items being assigned to each of these areas. The Key Focus Areas are:

- Biodiversity (Bushland Wetland and Coastal Zone Management);
- The Enhanced Greenhouse Effect;
- Waste (Reduction, Re-use, Recycling, Cleaner Production);
- Resource Conservation and Management,;
- Community Participation and Environmental Awareness; and
- Sustainability.

The LES proposes 62 actions for the City to undertake, with each of the actions being allocated a responsible business unit and priority status. This will occur by including the relevant Action Items on the relevant Directorate or Business Unit Plan. Where more than 1 business unit is identified as being responsible for the implementation then the first unit mentioned will take primary responsibility for ensuring that the action is completed.

Each action item has been allocated an implementation priority timeframe of between 1-5 years. Three main timeframe periods have been proposed to enable each item to be appropriately considered, with high priority items to be investigated within 1-2 years, medium priority items within 2-3 years and low priority items within 3-5 years. This does not necessarily mean, however, that action should not be taken on an item ahead of schedule as required.

### 1.3 LOCAL SETTING

The City of Wanneroo represents most of the north-west corridor of the Perth Metropolitan Region. It covers an area of 687Km<sup>2</sup> with a coastline of 32Km and is bordered by the Cities of Joondalup, Stirling and Swan, and the Shires of Chittering and Gin-Gin.. The City is one of Australia's largest population growth areas, with the current population of about 83,000 people projected to increase up to 260,000 by 2030.

Most of this growth is projected to take place in a narrow coastal strip approximately 3km wide stretching from Tamala Park in the south to the boundary of the Metropolitan Region at Two Rocks in the north. Other centres of urban development are planned to the east of Wanneroo Road, with the localities of Neerabup and Wangara and part of Landsdale set aside for industrial development. A major regional landfill site also exists at Tamala Park, surrounded by urban development to the north and south and remnant native vegetation to the east and west. A strip of land zoned for rural activities, including agriculture and quarrying (sand and limestone), lies to the east of Wanneroo Road, and also overlies important karstic and water features.

The eastern portion of the City is mainly reserved for State Forest, which is comprised of a mix of pine plantation and remnant native vegetation and managed by the Department of Conservation and Land Management (CALM). A strip of land reserved mainly for Parks and Recreation forms a broken corridor of remnant native vegetation, stretching from Lake Goollelal in the south through Lake Joondalup, Neerabup National Park and on to Yanchep National Park and beyond (linear lakes). Several of the wetlands of east Wanneroo bordering the State Forest are also reserved for Parks and Recreation (circular lakes).

A stretch of remnant native vegetation in the Eglinton-Yanchep area forms the only east-west link that is reserved for Parks and Recreation in Wanneroo, though Tamala Park was also originally considered for this purpose. The Coastal Zone provides a narrow setback for urban infrastructure against natural coastal processes, and also provides an important regional social, economic and environmental asset.

The zoning and reservation of land throughout Perth for urban, industrial, rural purposes etc is controlled by the Metropolitan Region Scheme (MRS – fig. 1), which is managed by the Western Australian Planning Commission (WAPC). The City of Wanneroo also manages local zoning and development through the City's District Planning Scheme 2 (DPS 2). The amount of land reserved or zoned for some of the land uses in the City of Wanneroo (as of March 2002) is noted below (some minor zones have been left out for ease of reference);

Parks and Recreation	14.5%
Local Parks and Recreation	0.7%
State Forest	38.9%
Residential (includes special residential)	4.7%
Urban Development	13.1%
Rural (includes special rural, general rural, rural resource and rural community)	18.2%
Industrial (includes service and general industrial)	1.1%
Industrial Development	1.4%
Centre (includes commercial and business zones)	1.4%

#### **1.4 GEOMORPHOLOGY AND SOILS**

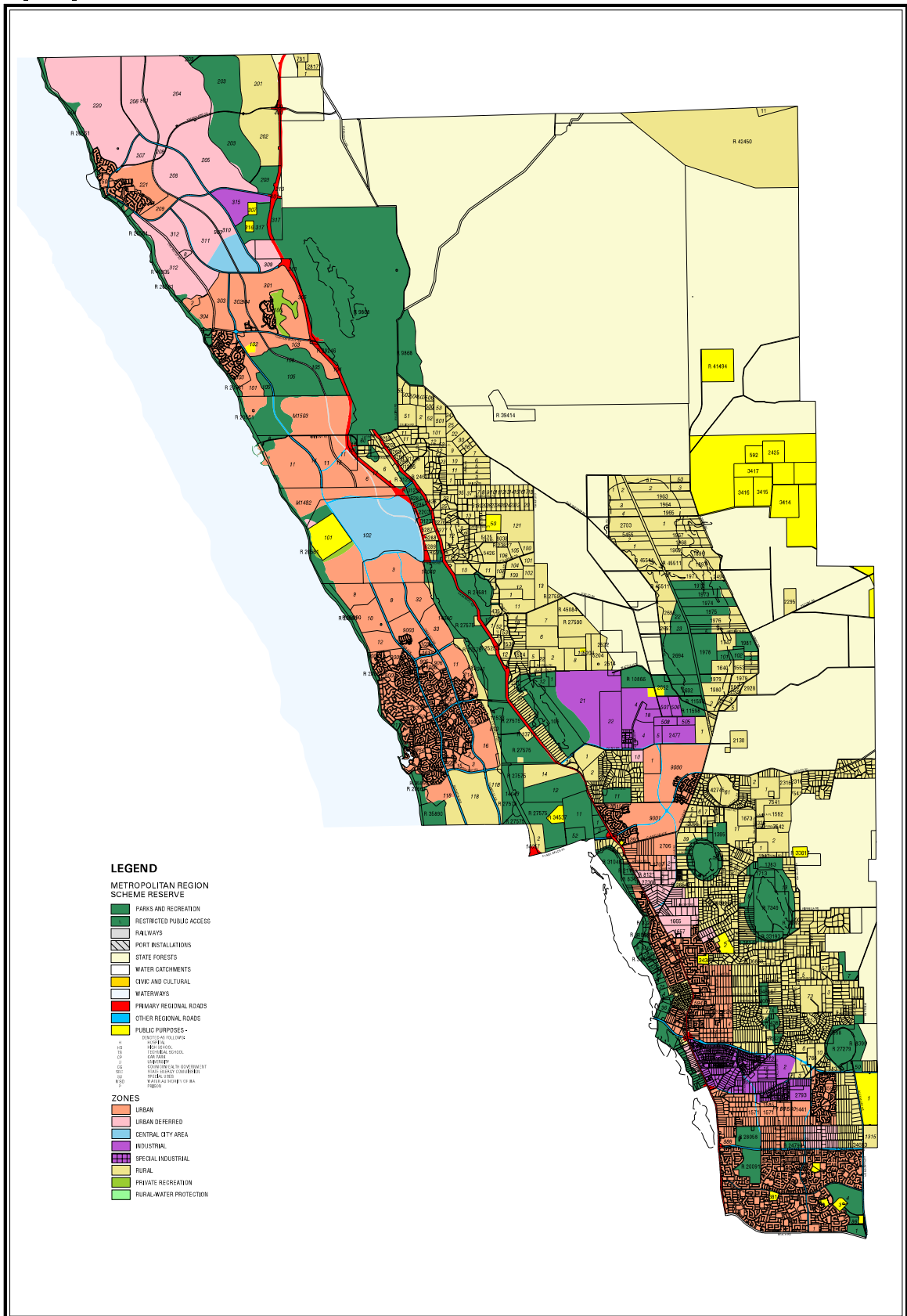
The distribution of the flora and fauna of Perth and Wanneroo is influenced by climatic factors (a Mediterranean climate of warm, dry summers and cool, wet winters), and the geomorphology of the Swan Coastal Plain. The plain extends from Busselton in the south to Jurien in the north and east for up to 30km to the Yilgarn Block (Darling Scarp). There are 5 major geomorphological systems of the plain, which have formed under varying climatic conditions over the last 2.5 million years, with 3 of these (Quindalup, Spearwood and Bassendean Dunes) in Wanneroo (McArthur and Bettanay, 1974). Sea level fluctuations over this period have seen the coastline extend out to Rottnest between 15,000-20,000 years ago, with sea levels also having been up to 2.5m higher than present 7,000 years ago (Balla, 1994).

The Quindalup dunes are the youngest on the Plain, closest to the coast comprised of loose grains of quartz and calcareous sand, are very free draining and easily eroded by the wind when cleared of native vegetation. The Spearwood dunes are older than the Quindalup dunes, more fertile and consist of yellow to brown calcareous sands overlying limestone. The Bassendean dunes are the oldest and have been heavily leached of nutrients. Variations also exist in soil type within the various dune systems, so forming different units (ie the Cottesloe and Karrakatta units in the Spearwood Dunes - McArthur and Bettanay, 1974).

#### **1.5 WETLANDS**

Over 25% of the Swan Coastal Plain is covered by wetlands (Balla 1994), with the City having a chain of linear lakes (including Lake Joondalup, Nowergup, Neerabup and Carabooda) and a chain of circular lakes (including Gnangara, Pinjar, Mariginiup and Jandabup). Wetlands of the Swan Coastal Plain are very different to the "traditional" large, deep lakes of Europe and North America. Swan Coastal Plain wetlands are surface expressions of the groundwater level with their depth fluctuating according to the season. They are comprised of a variety of forms including permanently inundated lakes, seasonally inundated swamps and seasonally waterlogged damplands.

Up to 70-80% of the wetlands of Perth have been lost to development, with many of the remaining wetlands having been substantially degraded by various means including clearing, filling, draining, market gardening and altered hydrological regimes (Balla, 1994). Protection and management of the remaining wetlands is therefore of high importance. In recognition of this, the Environmental Protection Authority (EPA)



CITY of WANNEROO - Met Region Scheme

October 31, 2001

Scale-1:175000

Fig. 1 Metropolitan Region Scheme for the City of Wanneroo

adopted the Environment Protection (Swan Coastal Plain Lakes) Policy in 1992 to protect specified lakes over 1000m<sup>2</sup>. The Policy has several significant shortcomings, including its failure to consider wetlands other than lakes, and is in the process of review by the Department of Environmental Protection (DEP). The Government of WA (1997) has also adopted a Wetlands Conservation Policy in recognition of the value and importance of wetlands throughout WA, while the Water and Rivers Commission is currently working on a Wetlands Restoration Manual.

## 1.6 BUSH FOREVER

There are 38 recognised vegetation complexes associated with particular soil units on the Swan Coastal Plain, with 26 of these being present in the Perth Metropolitan Region and 12 in the City of Wanneroo. The State Government has prepared a 10 year strategic plan, called Bush Forever, to protect at least 10% of the original extent of each vegetation complex on the Perth Metropolitan Region portion of the Swan Coastal Plain. However, owing to the extent of historic clearing 7 complexes have already fallen below the minimum 10% level, and a further 3 will not achieve the target (Govt. of WA. 2000a).

Bush Forever is the most significant proposal to date for the protection of Perth's remnant native vegetation, and has been endorsed by the Environmental Protection Authority (EPA) as such (EPA, 2001). It follows on from other initiatives including the System 6 (Red Book) Report, Perth Environment Project and Urban Bushland Strategy, all of which had the aim of securing bushland reserves for Perth. It intends to protect what it considers to be regionally significant vegetation and has used the following criteria to determine this;

- Representation of ecological communities
- Diversity
- Rarity
- Maintenance of ecological processes or natural systems
- Scientific or evolutionary importance
- General criteria for protecting wetland, streamline and estuarine fringing vegetation and coastal vegetation;
- Other Criteria not relevant to regional significance, but which may be applied when evaluating areas having similar significance.

Bush Forever acknowledges that in some instances, sites have been selected on the basis of ease of protection (eg. in relation to existing zoning or development approvals) rather than providing the best representation of complexes. Of the 51,220Ha of bushland which is proposed for protection (excluding Wilbinga), 33,423Ha (or approximately 2/3's) already has some existing form of protection. Of the 17,800Ha (approx.) which is not currently protected, approximately 4,600Ha is privately owned. The balance is mainly in some form of government ownership.

**There are 82 Bush Forever Sites (out of a total 287) either wholly or partly within the City, totalling an area of approximately 22,630Ha (approx. 33% of the area of the City of Wanneroo). The City represents 24% of the total Bush Forever study area and contains 44% of the total bushland proposed for protection.**

Bush Forever will not result in the protection of all bushland identified as being of regional significance owing to the proposed methods of implementation. One of these involves the purchase of land and reserving under the MRS for Parks and Recreation. However, only \$100 million has been allocated for this purpose over 10 years, which is insufficient to protect all the identified regionally significant vegetation. To achieve protection for some of the other sites, limited development or development trade-offs have been proposed which will result in the loss of some bushland.

Bush Forever partially supercedes System 6 in the portion of System 6 described as the Swan Coastal Plain in the Perth Metropolitan area. It is important to note that Bush Forever only applies to terrestrial systems and not estuarine or marine systems. Bushland initially identified in System 6 and now not considered significant under Bush Forever carries the status of being of local significance and therefore may be considered for protection under the City's planning and policy provisions. Bush Forever also notes that further regionally significant bushland may be identified in the future and has left open the possibility of modifications to the areas proposed for protection.

While Bush Forever focuses on regionally significant vegetation it notes that all existing remnant native vegetation has significance and that consideration should also be given to the protection of "locally significant" vegetation. A programme called the Perth Biodiversity Project (PBP) has recently been established by the Western Australian Local Government Association, with support from the DPI and Natural Heritage Trust. The aim of the PBP is to promote long-term protection and rehabilitation of environmental habitats by providing funding for on ground works and biodiversity planning programmes (called "capacity building").

The level of 10% protection under Bush Forever has been the subject of considerable debate, with the original figure having been proposed to enable an estimate as to how much of each complex existed and could be protected. The EPA has issued a Position Statement on land clearing (EPA, 2000a) which notes that;

- i) *"The threshold level" below which species loss appears to accelerate exponentially at an ecosystem level is regarded as being at a level of 30% of the pre-clearing extent of the vegetation type;*
- ii) *A level of 10% of the original extent is regarded as being a level representing endangered;*
- iii) *Clearing which would put the threat level into the class below should be avoided."*

These figures themselves can be considered to be arbitrary, as instances may arise where a population is of such natural limited distribution that protection of the entire community is warranted. Notwithstanding this it can be seen then that the proposed level of protection of 10% should be considered to be an absolute minimum.

Bush Forever is considered important for the long-term sustainability of the biodiversity of the Perth Metropolitan area. Objectives for protecting regionally and locally significant bushland may be achieved by amending the City's planning provisions and improving management practices.

## 1.7 PLANNING FRAMEWORK

Environmental issues are affected considerably by planning and development decisions, which are guided by a series of statutory and non-statutory documents. The State Planning Strategy was prepared by the WAPC in 1996 as a whole of government approach to guide land use planning throughout the state, with more specific plans and strategies prepared for some regions. Similarly Metroplan is used to guide broad scale land use planning in the Perth Metropolitan Region and describes the location of urban areas, strategic regional centres, major industry etc. The WAPC's Future Perth project is in the process of revising this document. The North-West Corridor Structure Plan considers in more detail the area north of Hepburn Avenue, east to the State Forest and north to Yanchep. The WAPC is primarily responsible for these broad scale planning documents.

The WAPC has proposed to develop a hierarchical framework of Statements of Planning Policy (SPP) to guide planning and development decision-making throughout the State. The SPP's are being developed as overriding or broad level policies for application at a strategic direction through to operational and implementation level. Five major issue areas have been identified by the WAPC, with the Environment and Natural Resources being one of these. Several supplementary SPP's have been proposed to provide guidance on specific areas with the existing and draft policies applicable to, and for consideration by, the City of Wanneroo including;

- Gnangara Mound Crown Land
- Basic Raw Materials
- State Coastal Planning
- Public Drinking Water Source
- Agricultural and Rural Land Use Planning.

On a more local scale the City may prepare Local Laws, Policies and planning strategies to manage particular issues. For example the City has prepared a draft Local Rural Strategy to provide further direction on land use in rural zoned areas of Wanneroo.

Planning decisions on land use and development are therefore influenced by a series of legislative and non-legislative documents, with the degree of input and management responsibility of the City varying with the scale of the proposal. The main tool used by the City in making decisions on planning and development and zoning and reservations is DPS 2. This describes the permitted land uses for each zone and the processes that the City must follow. The City may modify or amend DPS 2 if it is considered necessary. However, this is usually a fairly lengthy process involving public comment periods, controlled by State legislation and requiring the approval of the WAPC.

## **2.0 KEY FOCUS AREA: BIODIVERSITY (BUSHLAND, WETLAND AND COASTAL ZONE MANAGEMENT)**

### **2.1 BIODIVERSITY AND THE LEGAL SYSTEM**

Biological diversity (biodiversity) is the variety of all life on earth including genetic, species and ecosystem diversity. The preservation of biodiversity is important for its own altruistic sake as well as for environmental, social and economic reasons.

The Commonwealth Government recognised this by enacting the Environment Protection and Biodiversity Conservation (EPBC) Act (Commonwealth of Australia, 1999a). The Act defines biodiversity as “*the variability among living organisms from all sources (including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part) and includes:*

- (a) *diversity within species and between species; and*
- (b) *diversity of ecosystems.”*

While the EPBC Act is a significant improvement in environmental protection, it is limited in its application to matters of national significance or Commonwealth land. This is because the Commonwealth Government has limited power over the environment under the Australian Constitution, which has led to a range of responses to environmental issues around Australia. The main State legislation aimed at environmental and biodiversity protection include the Environmental Protection Act 1986, the Wildlife Conservation Act 1950 and the Conservation and Land Management Act. Many others such as the Metropolitan Region Town Planning Scheme Act 1959 and Environmental Protection Policies also influence environmental outcomes.

### **2.2 BIODIVERSITY IN AUSTRALIA AND WA**

Australia’s flora and fauna has developed in isolation for at least 50 million years which has resulted in a high degree of endemism (species restricted to a particular area). For example 85% of our flowering plants, 84% of our mammals, 45% of our birds, 89% of our reptiles and 93% of our frogs are found only in Australia (SOEAC, 1996).

The south-west of Western Australia is considered to be a global “hotspot” for biodiversity, having the worlds eighth highest number of endemic flora species as shown below (Brown et al, 1998), and also 1/3 of Australia’s plants (SOEAC, 1996).

<u>Region</u>	<u>Higher Plants Endemic to the Region</u>
Cape Region (South Africa)	6,000
Upland Western Amazon	5,000
Atlantic Coastal Brazil	5,000
Madagascar	4,900
Phillipines	3,700
Borneo (north)	3,500
Eastern Himalaya (India)	3,500
South Western WA	2,830



Photo of Koondoola Regional Bushland (Biodiversity in Bushland) by Phylis Robertson 26/11/01, Member of the Friends of Koondoola Regional Bushland and the City's Conservation Advisory Committee

A survey of the southern portion of the Swan Coastal Plain (Gibson et al, 1994) found 1,485 taxa in a study of 509 survey sites. This compares to an estimated 1,500 species for the entire British Isles (Brown et al, 1998). Our level of knowledge of Australia's biota and the resultant interconnected processes is, however, considered to be fairly low, with it being estimated that Australia has the world's second highest number of threatened or poorly known flora (Brown et al, 1998).

The degree of discovery and naming of new species reflects how much remains to be learned about our local ecology. Over 100 new plant taxa were described from Western Australia in the year 2001. Also since the Swan Coastal Plain survey of 1995, 8 new species, 3 sub species and 3 other plant taxa have been named on the Swan Coastal Plain (Gibson, N., 2002, Pers. Comm.).

### **2.3 THREATS TO BIODIVERSITY**

Australia's flora and fauna has suffered from extensive extinctions since European settlement, with many of the remaining species also suffering from vastly reduced ranges (also referred to as being locally extinct). There have been many causes of extinctions, however, the primary cause, or threatening process, has been land clearing - a process which continues today.

The EPBC Act recognises that the key threatening processes leading to extinctions must be controlled if further extinctions (both local and total) are to be avoided. The Act considers a process to be a threatening process "*if it threatens or may threaten the survival, abundance or evolutionary development of a native species or ecological community.*" Additionally, a process may be further defined as being a key threatening process if;

- a) "it could cause a native species or an ecological community to become eligible for listing in any category, other than conservation dependent; or
- b) it could cause a listed threatened species or a listed threatened ecological community to become eligible to be listed in another category representing a higher degree of endangerment; or
- c) it adversely affects 2 or more listed threatened species (other than conservation dependent species) or 2 or more listed threatened ecological communities."

There are 11 Key Threatening Processes currently listed by the EPBC Act, these being (Environment Australia, 2001a);

- 1) Competition and land degradation by feral Goats
- 2) Competition and land degradation by feral Rabbits
- 3) Dieback caused by the root-rot fungus (*Phytophthora cinnamomi*)
- 4) Incidental catch (bycatch) of Sea Turtle during coastal otter-trawling operations within Australian waters north of 28 degrees South
- 5) Incidental catch (or bycatch) of seabirds during oceanic longline fishing operations
- 6) Land clearance
- 7) Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases
- 8) Predation by feral Cats
- 9) Predation by the European Red Fox (*Vulpes vulpes*)
- 10) Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs
- 11) Psittacine Circoviral (beak and feather ) Disease affecting endangered psittacine species

The processes threatening WA's flora have been considered by Brown et al (1998) who considered the following were significant;

- 1) Land clearing and accidental destruction
- 2) Invasive weeds and habitat degradation
- 3) Salinity
- 4) Plant diseases
- 5) Feral herbivores
- 6) Herbicide use
- 7) Lack of pollinators
- 8) Inappropriate fire regimes

The causes of, or threats of, extinction can be synergistic, acting together to produce a greater threat. For example a species may exist in a small roadside remnant threatened by salinity and the greenhouse effect. The environmental protection legislation of WA does not yet recognise the concept of threatening processes, though a proposed legislative review may amend this.

## 2.4 ECOLOGICAL COMMUNITIES

Concepts of environmental protection have moved beyond individual species to protection of ecological communities, (groupings of native species). The EPBC Act has acknowledged this by affording both recognition and protection to listed Threatened Ecological Communities (TEC). State legislation does not yet recognise these concepts though a planned legislative review may do so.

Bush Forever notes that there are 24 threatened ecological communities (and one data deficient) on the Swan Coastal Plain, with 20 of these in the Perth Metropolitan Area (Govt. of WA, 2000a). Eight of these TEC's have been listed for protection under the EPBC Act, with several known to exist within the City of Wanneroo (Environment Australia, 2001a).

## 2.5 THE NATIONAL STRATEGY FOR CONSERVATION OF AUSTRALIA'S BIOLOGICAL DIVERSITY

The Commonwealth Government and the State and Territory Governments signed the National Strategy for the Conservation of Australia's Biodiversity (NSCABD) in 1996 (Commonwealth of Australia, 1996). The Strategy identified 9 principles to be used as a guide for implementation of the strategy, these being;

1. *“Biological diversity is best preserved in-situ.*
2. *Although all levels of government have clear responsibility, the cooperation of conservation groups, resource users, indigenous peoples, and the community in general is critical to the conservation of biological diversity.*
3. *It is vital to anticipate, prevent and attack at source the causes of significant reduction or loss of biological diversity.*
4. *Processes for and decisions about the allocation and use of Australia's resources should be efficient, equitable and transparent.*
5. *Lack of full knowledge should not be an excuse for postponing action to conserve biological diversity.*
6. *The conservation of Australia's biological diversity is affected by international activities and requires actions extending beyond Australia's national jurisdiction.*
7. *Australians operating beyond our national jurisdiction should respect the principles of conservation and ecologically sustainable use of biological diversity and act in accordance with any relevant national or international laws.*
8. *Central to the conservation of Australia's biological diversity is the establishment of a comprehensive, representative and adequate system of ecologically viable protected areas integrated with the sympathetic management of all other areas, including agricultural and other resource production systems.*
9. *The close, traditional association of Australia's indigenous peoples with components of biological diversity should be recognised, as should the desirability of sharing equitably the benefits arising from the innovative use of traditional knowledge of biological diversity.”*

The review of the Strategy concluded that “*substantial progress has been made towards achieving the Strategy's aims*” (ANZECC 2001), however, this does not

necessarily imply that the aims have been achieved or that further progress is not needed. In particular, objective 7.1 of the strategy required that Australia will have “*arrested and reversed the decline of remnant native vegetation*”. The review concludes that while Victoria and South Australia have made some progress in arresting the decline of remnant native vegetation that “*it is unlikely to be achieved on an Australia wide basis if current practices continue*”. **It is essential that this objective is achieved if further extinctions are to be prevented.**

As part of the review process an update to the Strategy (National Objectives and Targets for Biodiversity Conservation and Research 2001 – 2005) was prepared and committed to by the Federal Government and 5 State and Territory Governments, including WA. The 10 priority actions identified were (Environment Australia, 2001b);

- 1) *“Protect and restore native vegetation and terrestrial ecosystems;*
- 2) *Protect and restore freshwater ecosystems;*
- 3) *Protect and restore marine and estuarine ecosystems;*
- 4) *Control invasive species;*
- 5) *Mitigate dryland salinity;*
- 6) *Protect ecologically sustainable grazing;*
- 7) *Minimise impacts of climate change on biodiversity;*
- 8) *Maintain and record indigenous peoples’ ethnobiological knowledge;*
- 9) *Improve scientific knowledge and access to information; and*
- 10) *Introduce Institutional reform.”*

## **2.6 ACTION ITEMS 1 – 19**

### **BIODIVERSITY**

#### **ACTION ITEM 1 – MAINTAIN THE CITY’S PRESENCE ON EXTERNAL ADVISORY COMMITTEES**

By maintaining a presence on external advisory committees the City can assist in addressing environmental issues more effectively and holistically and promote the City’s views on preferred management directions. A presence on these committees also enables a more effective exchange of information and awareness of issues in order to achieve cooperative regional and global objectives

#### **ACTION ITEM 2 - WORK WITH THE DEPARTMENT FOR PLANNING AND INFRASTRUCTURE, DEPARTMENT OF ENVIRONMENTAL PROTECTION AND THE WEST AUSTRALIAN LOCAL GOVERNMENT ASSOCIATION TO FIND IMPLEMENTATION PROTECTION MECHANISMS FOR REGIONALLY AND LOCALLY SIGNIFICANT SITES.**

Under the provisions of the Acts relevant to the above Agencies, the City shall work with the relevant agencies to identify and improve provisions for protection of bushland on private land, management of public bushland, and for utilising external funding for implementing both.

Bush Forever acknowledges that not all bushland identified as being of regional significance will be protected owing to the proposed implementation mechanisms.

The Department for Planning and Infrastructure (DPI) has the primary responsibility for implementing Bush Forever and reserving other regionally significant features such as marine reserves and karstic and wetland systems. Maximisation of bushland retention can be achieved by working with the DPI.

The City should also investigate other options for environmental outcomes/preserving bushland, including covenants on titles, provisions in the District Planning Scheme on new Special Rural developments, consideration of conservation zones and State taxation and rates incentives. This is likely to be an ongoing process that will evolve and closely tie in with other objectives of this strategy.

### **ACTION ITEM 3 – PREPARE A CITY-WIDE PLAN TO INCREASE BIODIVERSITY PROTECTION**

The unique biological diversity in the form of bushland, wetlands and coastal features within the City shall be identified, prioritised and managed for present and future generations.

#### **1. Identify Special Environmental Areas**

The City of Wanneroo is responsible for many areas of bushland, which are largely unmanaged, with little generally known about these areas, including where any sites of special environmental significance may be. The sites may be considered of special significance for a variety of reasons including the presence of rare flora and fauna, threatened ecological communities, providing linkages between bushland areas etc. It will be necessary to co-operate with the Roadside Conservation Committee in identifying SEA's on roadsides. Identifying the location of such areas will show priority sites and enable the City to more appropriately consider how it can best manage those under its management. The inventory will build on work already undertaken and will utilise data management systems already in place.

#### **2. Prepare a Local Greening Plan**

The management of public owned bushland and wetlands can be achieved holistically through the development of an inventory of present vegetation and its features to map vegetation management units. A set of objectives and recommended conservation and management measures for each unit is stated, including vegetation restoration, fire management, water quality, fauna protection, etc.

The resultant document can be used to inform the City regarding development and land use decisions within the one reference plan, legislative and policy document. The scope of the document will include all land within the City, and cover the following areas; :

- Identifying the most appropriate managing Agency for bushland areas currently managed by the City (while acknowledging that the City has a role to play in bushland management)
- Prioritising sites managed by the City for protection and management based on criteria such as health, significance, likely impacts (threats) and community support etc.

- A Greenways Strategy (DPI) linking areas of conservation and landscape value to facilitate better water quality, recreation, heritage, aesthetics and to assist with ameliorating urban impacts.
- Generic management objectives and methods for all wetland, bushland and coastal areas
- A report card of implementation status for annual review and monitoring
- Consideration of a Tree Preservation Policy

#### **ACTION ITEM 4 - PREPARE A CITY-WIDE STRATEGIC FIRE MANAGEMENT PLAN**

While the bushland of Perth is adapted to disturbance events such as fire, and the ecosystem alteration and devastation they bring, the level of adaptation and response varies between species and communities. The natural frequency and intensity of fires has been greatly altered by human settlement, with the subsequent ability of species to recolonise having also been affected. Recolonisation has also been affected by other disturbance events including fragmentation, feral species, weeds, human activity etc. From a human perspective bushfires have the potential to impact upon property, livelihoods, health and lives as is evidenced on an annual basis in summer bushfires.



Photo of Koondoola Regional Bushland following fire by Phylis Robertson 26/11/01, Member of the Friends of Koondoola Regional Bushland and the City's Conservation Advisory Committee

Whilst fire can be seen as being a natural and inevitable part of the environment, inappropriate fire regimes can have devastating effects, and it is therefore desirable that appropriate fire management programmes are implemented. Appropriate fire management programmes will need to consider factors such as;

- The substantial area of bushland managed by bodies other than the City (eg private property, CALM land)
- Fire prevention strategies (eg public information, preparation and distribution of resident information packs etc)
- Fire control strategies (eg location and appropriate width of firebreaks, weed control, fire detection and rapid suppression)
- Mapping the frequency and intensity of fires.
- The location of rare and priority flora and fauna
- The location of threatened ecological communities

#### **ACTION ITEM 5 - DEVELOP A CAVES AND KARSTIC FEATURES POLICY**

The City of Wanneroo contains a broad belt of caves and other karstic features such as dolines (depressions). These features have significance for their geological, cultural and environmental values. Some of the caves contain fauna that has specifically adapted to cave environments (troglobitic fauna), with the most sensitive of these being stygofauna (animals that are restricted to aquatic environments).

Environment Australia has recognised the conservation value of the caves by their being listed as a Threatened Ecological Community under the EPBC Act. The fauna within these caves are considered to be largely dependent on root mats formed by tuart trees and are poorly understood (Jasinska, 1997). The continued existence of the communities, and a species confined to one cave, are known to be under threat due to groundwater decline. CALM is preparing a recovery plan aimed at ensuring the long-term survival of the species.

The City of Wanneroo has acknowledged the value of karstic features in its interim Local Rural Strategy and proposes measures to achieve some protection. The strategy is, however, restricted to Rural zoned land, whilst a broader based policy may provide direction throughout the City.

#### **ACTION ITEM 6 - DEVELOP A POLICY FOR THE DEVELOPMENT AND MAINTENANCE OF PUBLIC OPEN SPACE**

The City has a substantial number of developed parks and open space areas that are irrigated and fertilised. The City also has a substantial number of wetlands that are highly susceptible to degradation from excessive nutrient input. Public Open Space management has the potential to considerably impact on wetland and adjacent bushland areas and should therefore be considered in any management programme. Consideration of appropriate best practice construction methods, materials and maintenance including a fertiliser regime may consider factors including;

- Wetland quality and management objectives
- Distance from wetland and direction of groundwater flow
- Soil type and nutrient attenuation factors
- Purpose and intensity of use of the public open space
- Government agency guidelines (WRC and DEP)

- Use of environmentally sensitive methods and materials for construction and maintenance.
- Use of appropriate grass species in public open space and road reserves

### **ACTION ITEM 7 - IMPLEMENT METHODS TO MANAGE OFF-ROAD VEHICLES**

Large parts of the City of Wanneroo currently suffer from uncontrolled vehicular access. This can create social problems in terms of clashes with pedestrians, horse riders, other recreational users and by creating noise or nuisance value to surrounding landholders. It can also create environmental problems through track creation and bush fragmentation, risk of lighting fires, spreading of weeds and dieback, dumping of rubbish and groundwater mound pollution..

Many of the areas affected are owned or managed by private landowners or other government agencies, possibly limiting actions the City may take and requiring close co-operation. The City of Wanneroo already co-operates with CALM, EPA and WRC through the Gnangara Park Pollution Control Taskforce to control public access in the Gnangara pines and prevent pollution. It is important that further options continue, including close liaison with private landowners, be examined for their potential to reduce this problem. Such options may include public education, provision of alternative off-road vehicle sites, access control, fines etc.

### **ACTION ITEM 8 - EMPLOY A DEDICATED BUSHCARE OFFICER TO ACHIEVE BUSHLAND MANAGEMENT OBJECTIVES**

Bushcare is the physical day to day management of bushland and involves rehabilitation, weed management, erosion control and liaison with community groups involved in similar activities through Operational Administration. It is an essential requirement of conservation and led to the establishment of the Australian Assoc. of Bush Regenerators and the Environmental Weeds Action Network (Inc.).

It is standard practice in West Australian Local Governments to engage professional Bushcare teams to manage their bushland. Such authorities include the Shires of Kalamunda, Mundaring and Serpentine-Jarrahdale, and the City's of Albany, Fremantle, Joondalup, Melville and Nedlands. , Other Councils also have dedicated workforce Supervisors and Administrative Coordinators to manage the implementation, monitoring and revision of such important initiatives. Persons with an understanding of the Australian flora and fauna will be necessary owing to the great complexity and diversity of our bushland. While one Bushcare Officer will not be able to manage all the bushland areas of the City, it will represent a vast improvement in the capacity of the City to support the community and appropriately manage bushland areas.

### **ACTION ITEM 9 - INVESTIGATE THE IMPLICATIONS FOR THE CITY OF THE MANUFACTURE AND USE OF GENETICALLY MODIFIED ORGANISMS**

The use of Genetically Modified Organisms (GMO's) is becoming increasingly common in food production and other areas. It involves combining portions of the genetic material from different species to create a new organism with different properties. The reasons for doing this may include;

- Faster growth,
- Higher tolerance of drought conditions,
- Improved flavour,
- Higher nutritional content,
- Improved resistance to pests and diseases requiring less chemicals to be used.
- Increased yields

It is important to recognise that while GMO's have potential advantages that there are also potential disadvantages that should be fully evaluated. Some potential disadvantages of GMO's include;

- Overuse of gene technology could lead to diminished benefits and increased environmental risks – such as pests no longer being affected by pest resistant crops.
- Some markets may not buy genetically engineered products
- Cross pollination may occur between genetically modified crops and conventional or organic crops
- New toxins or allergens may be created
- The stability of the introduced genes is not fully known
- Genetic modification to create pest resistant crops may have effects on non-target species
- Outcrossing of herbicide tolerance genes from crops may lead to the development of herbicide tolerant weeds

The Australia and New Zealand Food Authority is the regulatory agency responsible for ensuring that GMO's are safe for consumption, while the Office of the Gene Technology Regulator regulates gene technology research. It is envisaged that a first step in the investigation will be the preparation of an issues paper for discussion to enable the City to make an appropriate decision on its position.

## **INTRODUCED SPECIES CONTROL**

### **ACTION ITEM 10 - INVESTIGATE POTENTIAL STRATEGIES TO CONTROL THE IMPACT OF CATS ON NATIVE FAUNA**

Predation by feral cats has been listed as a Key Threatening Process likely to cause extinctions under the EPBC Act (Environment Australia, 2001b). A Threat Abatement Plan has been prepared by Environment Australia to combat the threat posed by cats. The plan acknowledges that feral cat populations are essentially self-sustaining. The plan also notes that domestic and stray cats also impact on native fauna, even though predation per cat may be relatively low, owing to their high density.

It is acknowledged that cats are a sought after companion animal that provide a source of comfort to many people and that issues relating to their management are likely to be contentious, owing to the emotions involved. However, it is also acknowledged that cats do have a significant impact on native fauna and the effect of their predation also raises similar emotions in others. In examining potential cat control strategies it may be appropriate to prepare an issues paper investigating

potential options. The areas of greatest concern are likely to be in or adjacent to areas of high conservation value where the impact of cats is likely to be greater.

The City of Bunbury and Shire of Mundaring have taken an approach of preparing Local Laws for the welfare and management of cats. Other potential strategies include community education, and incentives for sterilisation.

## **ACTION ITEM 11 - DEVELOP A WEED MANAGEMENT STRATEGY**

The National Weed Strategy defines a weed as “*a plant which has, or has the potential to have a detrimental effect on economic social or conservation values*” (Agriculture and Resource Management Council of Australia and New Zealand, Australia and New Zealand Environment and Conservation Council and Forestry Ministers, 1999). The Strategy has 3 broad goals;

- To prevent the development of new weed problems
- To reduce the impact of existing weed problems of national significance
- To provide the framework and capacity for ongoing management of weed problems of national significance.

A State Weed Plan has recently been prepared for WA with the goal of achieving “*co-ordinated, collaborative and effective weed management throughout Western Australia*” (SWPSG, 2001). A State Weed Co-ordinating Council has been proposed to lead the implementation of the Plan, with Local Government identified as a potential partner. Similarly an Environmental Weed Strategy for Western Australia was prepared for CALM in 1999 (Ecoscape (Aust.) Pty Ltd. et al). The strategy focuses on weeds that may impact substantially on remnant native bushland and notes that impacts of environmental weeds may include;

- Resource competition
- Prevention of seedling recruitment
- Alteration to geomorphological processes
- Alteration of hydrological cycle
- Changes to soil nutrient status
- Alteration of fire regime
- Changes to the abundance of indigenous fauna, and
- Genetic changes.”

The Department of Agriculture may, under the Agriculture and Related Resource Protection Act, proclaim a plant as “Declared”, or a “Pest”. Pest plants are to be listed for control within a Municipality. Land owners, including Local Governments, are obliged to implement a program for eradication of Declared plants.

The need to appropriately manage weeds has also been recognised at the Local Government level, with, for example the City of Albany (2001) having implemented an Environmental Weed Strategy.

A weed management strategy for the City of Wanneroo will be aligned with the State Weed Plan and Environmental Weed Strategy and information already available and include consideration of the following issues;

- Identifying the major weeds present in Wanneroo, their populations, locations and invasiveness;
- Identifying and implementing methods of management;
- Other potential impacts (environmental, economic and social); and
- Fire implications.

### **ACTION ITEM 12 - IMPLEMENT A POLICY FOR IDENTIFYING AND MANAGING CAUSES OF PHYTOPHTHORA DIEBACK**

An important cause of Dieback in the Perth metropolitan area is *Phytophthora cinnamomi*. It is an introduced root pathogen that can cause the death or decline of susceptible plants, with up to 25% of WA's flora considered susceptible. This can change the abundance and composition of flora and fauna. The optimum conditions for the pathogen are warm, moist soils, under which spores can be produced, which may then spread to infect other plants. Above and below-ground water flows enable rapid spread downslope, while the rate of spread upslope, and on flat ground is slower – approx. 1m/year. The pathogen is spread more rapidly by activities that disturb or transport infected soil, such as vehicle movement or inappropriate bush regeneration (Dieback Working Group, 2000).

The pathogen is recognised as a Key Threatening Process likely to cause extinctions by Environment Australia under the EPBC Act, with a Threat Abatement Plan having been prepared to minimise potential impacts.

It will be necessary to prioritise sites for mapping as proposed by Action Item 3. By knowing the location of dieback affected areas appropriate hygiene measures can be taken to control its spread. The City of Wanneroo has representation on the Dieback Working Group who can provide assessment services, technical advice, educational material and a model Policy and work practices manual for Council adoption.

### **BIODIVERSITY ENHANCEMENT**

#### **ACTION ITEM 13 - DEVELOP AND IMPLEMENT MANAGEMENT AGREEMENTS WITH THE DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT FOR THE RECOVERY AND MANAGEMENT OF RARE FLORA/FAUNA AND THREATENED ECOLOGICAL COMMUNITIES IN CITY MANAGEMENT**

The City of Wanneroo is responsible for management of several populations of Declared Rare Flora listed under the Wildlife Conservation Act and Threatened Ecological Communities (TECs) listed informally in WA or under the EPBC Act. It is also host for many more populations of priority listed flora and fauna. It is essential that these areas and populations are managed appropriately, including on ground implementation of required measures, to ensure their long term survival and further distribution. This will require co-operation with the Department of Conservation and Land Management (CALM), as the State's foremost body on flora, fauna and

ecological community management, to ensure that best management practices are implemented, in keeping with 's CALM's policy on rare species.

#### **ACTION ITEM 14 - PREPARE LANDSCAPING POLICY AND DESIGN GUIDELINES TO PREFERENTIALLY USE LOCAL NATIVE PLANTS.**

The City has recognised the beauty and value of the regions indigenous flora by the adoption of the Red and Green Kangaroo Paw as its emblem. However, to date little use has been made of the region's flora in landscaping programmes, with the emphasis being on introduced plants. The benefits of using local native plants for the City's landscaping programme include;

- Locally occurring ecologies are consolidated and enhanced
- Providing community leadership;
- Using less water and fertiliser thus requiring less maintenance;
- Contributing to biodiversity preservation and enhancement;
- Providing roosting, feeding, nesting habitat for bird life and other fauna; and
- Establishes greenways or links to other bushland areas.

#### **ACTION ITEM 15 - PROMOTE THE USE OF LOCAL NATIVE PLANTS IN LANDSCAPING OF PRIVATE PROPERTY AND NEW DEVELOPMENT AREAS**

This is a counterpart to Action Item 14 for privately owned land, with similar potential benefits and can be achieved by undertaking Action Item 50 (prepare a new homeowners pack). Methods by which this can be achieved should be investigated and may include;

- Provide a pamphlet advising all new home owners of local plants and where they may be purchased – it may be possible to use or modify existing information sources;
- Providing new homeowners with vouchers for local native species to encourage planting of natives; and
- Encouraging developers to plant new areas with local native plants.
- Provide for seed of local provenance to be collected and plant relocations to occur prior to development works.

#### **ACTION ITEM 16 - INVESTIGATE THE NEED FOR A REGIONAL HERBARIUM**

Many community groups actively participate in bushland management including weeding and revegetation activities, with the City also undertaking limited bushland restoration of selected areas. A herbarium of local plants accessible to the public may be of assistance in increasing the knowledge base of persons involved in bushland management and restoration. Such a herbarium would be intended to complement others in Perth, particularly the State Herbarium of CALM.

## **ACTION ITEM 17 - DEVELOP A SET OF STANDARD DEVELOPMENT APPROVAL CONDITIONS FOR DEVELOPMENTS NEAR WETLANDS**

In order to protect wetland health the Water and Rivers Commission recommends that minimum buffer distances be applied depending on wetland category (ie conservation, resource enhancement or multiple use) and land use. These can vary from 50m for construction type development to up to 1000m to minimise influence of nuisance insects (eg midge). By applying appropriate development conditions the City may be able to alert purchasers and developers to potential problems and also to reduce the intensity of these problems.

The need for such conditions arises from the large amounts of land in private ownership surrounding wetlands. In these instances a balance needs to be considered between reasonable wetland protection and reasonable development rights. Development approval conditions would be subject to the normal requirements and would include the right of appeal by the applicant should a condition be considered onerous or unreasonable.

Development conditions may include items such as covenants on titles on prospective subdivisions notifying of potential midge problems. Such development approval conditions would be subject to the normal requirements for application, including the right of appeal by the applicant should a condition be considered onerous or unreasonable. It is essential to ensure that developers maintain their commitment to conservation/rehabilitation works.

## **COASTAL ZONE**

### **ACTION ITEM 18 - REVIEW FORESHORE MANAGEMENT PLANS**

The Coastal Planning Study Burns Beach to Jindalee (1992) prepared for DPI and the City, guides appropriate recreational facility development within the foreshore reserve. This plan needs to be reviewed and increased in scope to address the entire coastline within the City of Wanneroo and current policy initiatives. The City has several localised foreshore management plans and assessment reports of varying age and effectiveness. They have generally been prepared to control the impacts of adjacent development following urbanisation, risk management and infrastructure protection from erosive processes.

As referred to in Section 1.6 Planning Framework, the DPI released the Draft State Coastal Planning Policy (SCPP) for public comment (until April 2002), in addition to the Draft Coastal Zone Management Policy (2001). It is intended that the principles of the final SCPP will be adopted through the City's statutory planning provisions and operational policies. The principles of the SPP and Management Policy shall be used to review existing plans and amend them through the development process or directly by the City as appropriate.

**ACTION ITEM 19 - SEEK SUPPORT AND FUNDING FROM STATE GOVERNMENT AGENCIES FOR THE PROTECTION AND MANAGEMENT OF THE COASTAL ZONE**

The overriding development control Agency for most coastal reserves within the City is the DPI, with operational responsibilities for construction, management and safety lying with the City of Wanneroo.

Developments in scientific and management knowledge regarding the coastal foreshore is ongoing. For example, works undertaken in the past combined with a limited appraisal of coastal processes has resulted in some clashes of urbanisation against natural processes of sand accretion and erosion. The City is seeking assistance from State and Commonwealth agencies for advice and funding to protect infrastructure and improve new development outcomes.

## 2.8 ACTION ITEM PRIORITISATION LIST (1 – 19)

Action	Responsibility	Timeframe (years)
<b>BIODIVERSITY</b>		
1) Maintain the City's presence on external advisory committees	Relevant Business Unit	Ongoing
2) Work with The Department for Planning and Infrastructure, Department of Environmental Protection and West Australian Local Government Association to find implementation protection mechanisms for Bush Forever sites.	Planning Services/ Infrastructure Services	Ongoing
3) Prepare a city-wide plan to increase biodiversity protection	Planning Services/ Infrastructure Services	In progress 1-3
4) Prepare a City-wide strategic fire management plan	Ranger Services/ Planning Services/ Infrastructure Services/ Operational Services	1 - 2
5) Develop a caves and karstic features policy	Planning Services/ Infrastructure Services	2 - 3
6) Develop a policy for development and maintenance of public open space	Infrastructure Services/ Operational Services/ Planning Services	2 - 3
7) Investigate methods to manage off-road vehicles	Ranger Services/ Planning Services/ Infrastructure Services	1 – 2
8) Employ a dedicated bushcare officer to achieve bushland management objectives	Operational Services	1 - 2
9) Investigate the implications for the City of the manufacture and use of genetically modified organisms	Planning Services	3 - 5
<b>INTRODUCED SPECIES CONTROL</b>		
10) Investigate potential strategies to control the impact of cats on native fauna	Planning Services	3 - 5
11) Develop a weed management strategy	Infrastructure Services/ Planning Services/ Operational Services	1-2

12) Implement a Policy for identification and managing causes of <i>Phytophthora</i> dieback	Infrastructure Services/ Operational Services/ Planning Services	In progress 2-3
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**BIODIVERSITY ENHANCEMENT**

13) Develop and implement Management Agreements with CALM for the recovery and management of rare flora/fauna and Threatened Ecological Communities in City management	Planning Services	1 - 2
14) Prepare a landscaping policy and design guidelines to preferentially use local native plants.	Infrastructure Services/ Planning Services	In progress 1-2
15) Promote the use of local native plants in landscaping of private property and new development areas	Infrastructure Services/ Operational Services/ Planning Services	In-progress 1-2
16) Investigate the need for a regional herbarium	Planning Services/ Infrastructure Services	3 - 5
17) Develop a set of standard development approval conditions for developments near wetlands	Approvals Services/ Planning Services	1 - 2

**COASTAL ZONE**

18) Review foreshore management plans	Planning Services/ Infrastructure Services	1-2
19) Seek State government assistance for managing the development and protection of Coastal facilities and services	Operational Services/ Planning Services	In progress 1-2

### **3.0 KEY FOCUS AREA: ENHANCED GREENHOUSE EFFECT**

#### **3.1 WHAT IS THE ENHANCED GREENHOUSE EFFECT?**

The greenhouse effect is the rise in temperature caused by atmospheric gases. These gases allow the short wave radiation of the sun to penetrate the earth's atmosphere where part of the solar energy is converted into heat and part into long wave radiation. The long wave radiation is then "trapped" by certain gases before it can be reflected back out into space. This process is responsible for warming the earth from an average of what would be -18°C to 15-16°C (SOEAC, 1996). The enhanced greenhouse effect (also just called the greenhouse effect) is an artificial raising in temperature caused by increased amounts of greenhouse gases from human sources.

Many gases have greenhouse potential to varying levels and include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrogen oxides (NO<sub>x</sub>), water vapour (H<sub>2</sub>O<sub>g</sub>), Sulphur hexafluoride (SF<sub>6</sub>), chlorofluorocarbons (CFC's) and hydrochlorofluorocarbons (HCFC's). The last two are also responsible for ozone layer depletion (IPCC, 2001a and SOEAC, 1996).

While there are sources for greenhouse gases there are also "sinks" in which the gases may be stored including vegetation and the ocean. Multiple actions affect the ability of sinks in their capacity to store greenhouse gases so they may become a source if situations alter. For example;

- CO<sub>2</sub> storage in oceans is affected by temperature, acidity, volume of water, plant and animal respiration, chemical reactions etc).
- Vegetation represents a store of CO<sub>2</sub>, therefore increasing or decreasing the amount (and possibly type) of vegetation may alter the amount of stored CO<sub>2</sub>. Temporary vegetation planting programmes (such as forestry) will not lead to permanent storage owing to their removal and subsequent release. Permanent programmes (such as rehabilitation) may contribute to a one off storage event.

Owing to some of these complexities, the international community has not yet reached agreement on many of the aspects of what constitutes a carbon sink.

The Australian Greenhouse Office (AGO) estimates that Australia's emissions rose by 17.4% between 1990 and 1999, although this does not represent Kyoto Protocol reporting requirements or the effects of land clearing owing to uncertainty associated with these processes. The main gases released were CO<sub>2</sub> (68.4%) and CH<sub>4</sub> (25%) (AGO, 2001). Table 1 (CSIRO, 2001) shows the increase in concentration of greenhouse gases since the industrial revolution, their rates of increase and atmospheric lifetime.

Table 1: Atmospheric concentrations of several greenhouse gases (CSIRO, 2001)

	Carbon dioxide	Methane	Nitrous oxide	CFC-11
Current concentration	370 ppmv	1720 ppbv	312 ppbv	260 pptv
Pre-industrial concentration (~1700s)	288 ppmv	850 ppbv	285 ppbv	0
Annual rate of increase	0.4%	0.6%	0.25%	0*
Atmospheric lifetime	50-200 years	12 years	120 years	50 years

\*Ozone depleting substances such as CFC-11 are not found naturally and the concentrations of many these is now declining owing to application of the Montreal Protocol.

### 3.2 INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)

The IPCC was established by the United Nations in 1988 to assess the scientific, technical and socio-economic aspects of climate change. It has 3 working groups and a task force examining different aspects;

- Working Group I assesses the scientific aspects of the climate system and climate change;
- Working Group II addresses the vulnerability of socio-economic and natural systems to climate change, negative and positive;
- Working Group III assesses options for limiting greenhouse gas emissions and otherwise mitigating climate change; and
- The task force on National Greenhouse Gas Inventories oversees the National Greenhouse Gas Inventories Programme (IPCC, 2001b)

The average global surface temperature has risen by 0.6°C over the 20<sup>th</sup> Century, with Working Group 1 attributing this rise to anthropogenic (human) emissions of greenhouse gases. Rises of between 1.4 – 5.8°C are projected by the year 2100 (IPCC 2001a). It is worth noting that even should greenhouse gas emissions be halted, that temperature will continue to rise until a new dynamic equilibrium level is found owing to environmental inertia, and thus the effects of global warming will continue for centuries.

### 3.3 THE POSSIBLE EFFECTS

A rise in global temperature does not just mean that Perth will be warmer.

A rise in global temperature does mean amongst other things that;

- Rainfall patterns will change – the south west of WA is predicted to get drier with more extreme variations. A greater proportion of this will fall in summer and will therefore not be available for groundwater recharge or plant usage – the status for most of the interior is uncertain (IPCC 2001a and Hennessy 2001).
- Changing rainfall patterns will lead to change in suitable habitats for species – many species will become extinct as a direct result, others will colonise new

areas. Hennessy (2001) notes that a rise in temperature of 0.5°C will cause the extinctions of 3 frog, 26 *Dryandra* and 1 *Acacia* species, while a 2°C rise will cause the extinction of 61 *Dryandra* and 27 *Acacia* species.

- The productive agricultural zones will alter
- Sea levels are projected to rise between 0.09 and 0.88m by 2100 – many low lying islands (and some countries) will disappear. There are resultant implications for coastline stability and development issues – ie marinas may have to be raised or abandoned due to coastal flooding (IPCC 2001a)
- The potential distribution of diseases will alter (Hennessy, 2001).
- The thermohaline circulation will weaken and possibly collapse after 2100 – this oceanic current is responsible for heat transport between the poles and the equator. A weakening or collapse of this current can lead to further temperature increases (IPCC 2001a).

### 3.4 CERTAINTY AND THE PRECAUTIONARY PRINCIPLE

Analysis of ice cores from the polar regions and other methods have shown that there is 30% more carbon dioxide in the atmosphere than there was in the 1700's, before the industrial revolution. Concentrations of greenhouse gases are higher now than at any time in the previous 420, 000 years, and probably also in the last 20 million years (CSIRO, 2001). Studies have shown a high degree of correlation between historical CO<sub>2</sub> concentrations and temperature as shown in Fig. 2 and 3 (CSIRO, 2001).

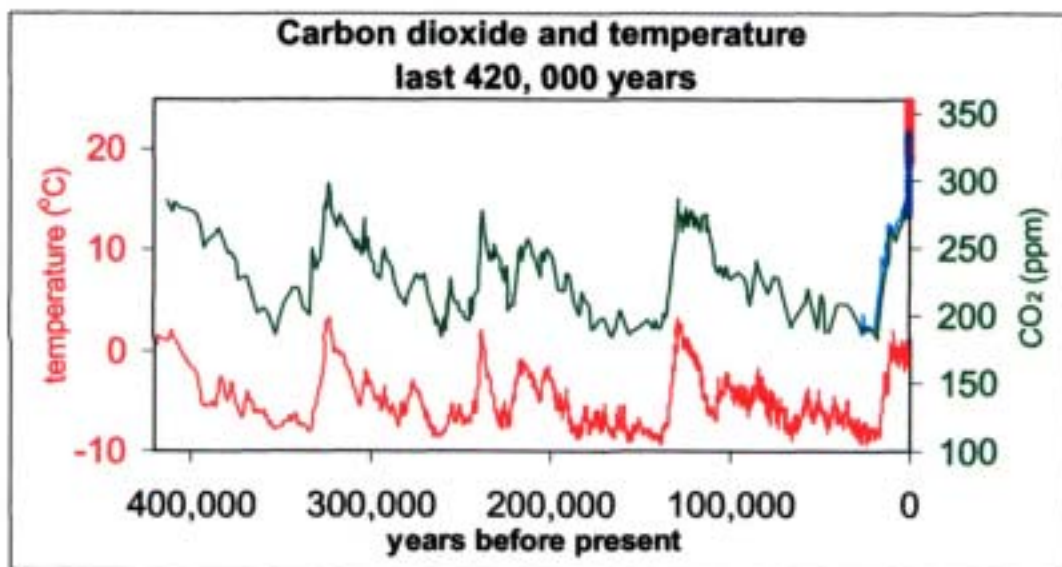


Figure 2 – Changes in temperature (bottom) and CO<sub>2</sub> concentrations (top) over the past 420, 000 years, derived from bubbles of air trapped in polar ice.

There is a degree of uncertainty associated with the measurements and projected impacts, which is unavoidable to a degree. However, the evidence that has been collected identifying human activities as being responsible for global warming is very strong. The Precautionary Principle, as adopted by the Commonwealth Government under the EPBC Act, requires Australia to take action owing to the extreme threat posed.

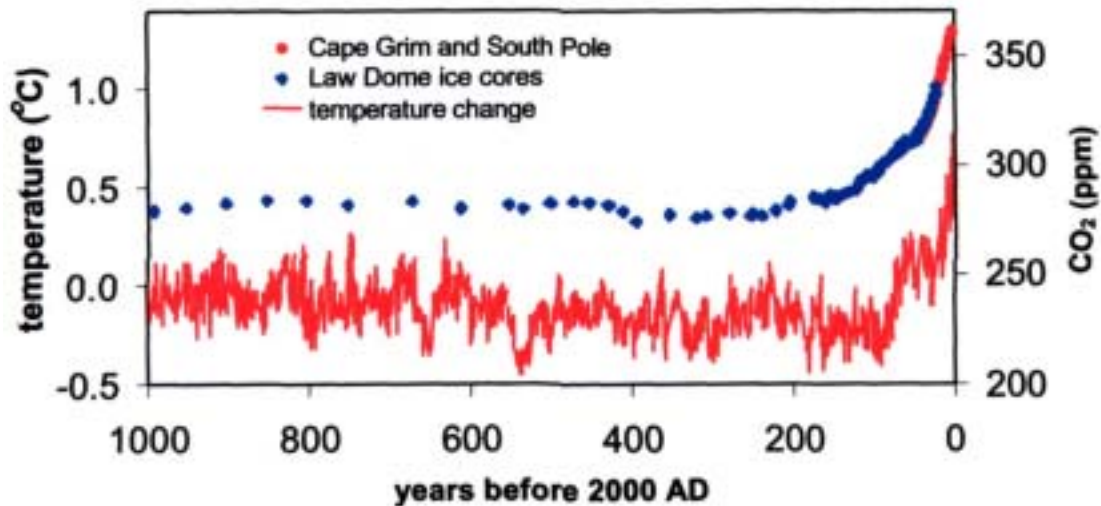


Figure 3 – Changes in CO<sub>2</sub> and northern hemisphere surface temperature over the last 1, 000 years.

### 3.5 THE KYOTO PROTOCOL AND UNFCCC

Australia is a signatory to the 1992 United Nations Framework Convention on Climate Change (UNFCCC). The objective of the Convention is to stabilise “greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system.” The Convention requires that “such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.” (UNFCCC, 2001).

Under the Kyoto Protocol the Commonwealth Government committed Australia (signed 29/4/98 but not yet ratified) to limiting growth of Greenhouse gases by 8% above 1990 levels by 2008-12. It is worth noting that Australia was given special case status, with most other developed nations being required to reduce their greenhouse gas emissions by at least 5% (developing nations were excluded from the Protocol). For the Protocol to come into effect it must be ratified by at least 55 countries representing 55% of the worlds emissions. If Australia adopted the business as usual approach then our emissions would have increased by 35% by 2010 (PMSEIC, 2001).

It is important to realise that controlling growth of emissions to the levels proposed by the Kyoto Protocol will not stop global warming, but is merely a first step in what will ultimately have to be greater global reductions. Hennessy (2001) notes that even if emissions are reduced to the level proposed by the Protocol that the effect on global CO<sub>2</sub> concentrations will be small – a reduction of the projected CO<sub>2</sub> concentration of some 40ppm by 2100. He further notes that it will be impossible to stabilise CO<sub>2</sub> concentrations at today’s levels of 370ppm due to its long atmospheric lifetime. Simulations have shown that immediate reductions of 50% below 1990 levels will stabilise CO<sub>2</sub> concentrations at 550ppm by 2150 (this is nearly twice the pre-industrial revolution levels). There will be considerable global impacts associated with stabilisation at this level. The growth of emissions is intrinsically linked to population growth and the level and type of economic development.

### 3.6 WHAT CAN AUSTRALIA/WANNEROO DO? (THINK GLOBALLY - ACT LOCALLY)

Australia's contribution to total global greenhouse gas emissions is estimated at 1.4% (458.2 million tonnes of CO<sub>2</sub> equivalent in 1999 excluding land clearing), and it will therefore take more than just the efforts of Australia alone to make a difference (PMEIC, 1999 and AGO, 2001). Australia does, however, have amongst the highest per-capita emissions in the world (16 tonnes – CSIRO, 2001), and therefore has a chance to demonstrate socially and environmentally responsible attitudes to the world. The AGO (2001) has estimated Australia's greenhouse emissions and notes that by far the greatest contributor to emissions is energy production, of which electricity production is the single greatest contributor.

Table 2: The change in Australia's greenhouse emissions by sector (adapted from AGO, 2001)

Emissions Sector	1990 Emissions	1999 Emissions	Change from 1990
Stationary Energy (includes Electricity production)	208.5Mt	259.8Mt	24.6% increase
Transport	58.9Mt	73.9Mt	20.3% increase
Fugitive Emissions	29.5Mt	30.8Mt	4.4% increase
Industrial Processes	12.1Mt	9.7Mt	19.8% decrease
Agriculture	91.2Mt	93.8Mt	2.9% increase
Forestry	24.6Mt sink	23.1Mt sink	6.2% lower
Waste	14.9Mt	16Mt	7.6 increase
Land Clearing	103.5Mt	71.7Mt	30.7% decrease

Mt = Million tonnes

Note: Land clearing does contribute to greenhouse emissions but does not contribute to the emissions accounting employed by the Australian Greenhouse Office

The National Greenhouse Strategy (Commonwealth of Aust., 1998) was prepared by the Commonwealth, State and Territory Governments to identify approaches that could be used to meet the Kyoto Protocol requirements. The goals of the Strategy are;

- 1) *“To limit net greenhouse gas emissions, in particular, to meet our international commitments.*
- 2) *To foster knowledge and understanding of greenhouse issues*
- 3) *To lay the foundations for adaptation to climate change.”*

### 3.7 ACTION ITEMS 20 - 26

#### **ACTION ITEM 20 - DEVELOP A GREENHOUSE GAS REDUCTION STRATEGY BY JOINING THE CITIES FOR CLIMATE PROTECTION PROGRAMME**

The Cities for Climate Protection (CCP) programme is an initiative of the International Council for Local Environmental Initiatives (ICLEI) run in collaboration with the

Commonwealth funded Australian Greenhouse Office (AGO). The programme requires a resolution from Council to join and involves progression through a series of milestones noted below;

- Milestone 1 - Establishing an inventory and forecast for key sources of greenhouse gas emissions in the council and community (ie energy use audit);
- Milestone 2 - Setting an emissions reduction goal;
- Milestone 3 - Developing and adopting a local greenhouse action plan to achieve those reductions;
- Milestone 4 - Implementing the local greenhouse action plan;
- Milestone 5 - Monitoring and reporting on greenhouse gas emissions and implementation of actions and measures.

There is a one-off \$2,000 fee for membership of the CCP programme (\$1,500 for members of ICLEI), with a \$4,000 grant available to help complete Milestone 1. It would be expected that some of the changes proposed as a result of the CCP programme will cost the City, while others will lead to cost savings with other indirect benefits such as better air quality. The ultimate costs/savings are not identifiable at this point in time. Currently there are over 140 Councils in Australia on the programme, representing 56% of the population, with 28 Councils from WA.

It is envisaged that by developing a comprehensive greenhouse gas reduction strategy, as outlined above, the City will be able to target the area in which it will be able to get the best outcome. This means that Action Item 20 should be the main goal and that Action Items 21 - 27 should be considered as being subsidiary. Action Items 21 - 27 have been included in the strategy as it is thought that they could have a potential impact and they may be implemented relatively easily.

#### **ACTION ITEM 21 - INVESTIGATE MEANS TO ENCOURAGE LOCAL INDUSTRY TO JOIN GREENHOUSE GAS REDUCTION PROGRAMMES AND ALSO ENCOURAGE NEW GREENHOUSE AND ENVIRONMENTALLY FRIENDLY INDUSTRY**

Developing means to combat the greenhouse effect is resulting in the creation and expansion of new industry types (eg carbon credit trading and carbon sequestration) that will be likely to become in greater demand throughout Australia and the world. By encouraging the development of such industry the City can continue its objectives of economic development while also pursuing beneficial environmental outcomes. The AGO encourages large and small businesses to reduce emissions by joining its greenhouse challenge and greenhouse allies programmes. Ideally this option would be developed as part of an integrated package aimed at the community sector and may include consideration of incentives.

#### **ACTION ITEM 22 - INVESTIGATE THE POTENTIAL FOR VEHICLE FUEL CONVERSIONS FOR THE CITY'S FLEET**

Reductions in greenhouse gas emissions can be achieved by choosing to use alternative fuels with lower greenhouse gas potential such as compressed natural gas (CNG) or liquefied petroleum gas (LPG). While use of these fuels still contributes to the greenhouse effect they do so at a lower level. The AGO has developed

programmes with financial incentives aimed at encouraging the conversion of medium to heavy road vehicles to such fuel types. The City should investigate the implications of, and potential for, such conversions and any potential grants programmes that may be of assistance.

### **ACTION ITEM 23 - PURCHASE NEW VEHICLES ON THE BASIS OF GREENHOUSE EMISSIONS/FUEL EFFICIENCY**

Transportation represented 16.1% of Australia's greenhouse emissions in 1999 (AGO, 2001) and it may be presumed also represents a significant source of the City of Wanneroo's emissions. The fuel consumption and energy efficiency of the City's vehicle fleet therefore represents an area of considerable potential savings. By purchasing new vehicles on the basis of fuel efficiency the City may be able to reduce its emissions, save money from lower fuel consumption and encourage the use of fuel efficiency in the community when fleet upgrades occur.

### **ACTION ITEM 24 - INVESTIGATE SOURCING ALTERNATIVE ENERGY SOURCES SUCH AS "NATURAL" POWER FOR THE CITY'S BUILDINGS AND OPERATIONS**

Electricity providers are required by Commonwealth legislation (the Renewable Energy (Electricity) Act 2000) to source a minimum of 2% of their power from renewable energy sources by 2010. Western Power provides an option for consumers to pay a premium of 3 cents per kilowatt hour on their "Natural Power" product. Western Power have advised that they will provide assistance on energy efficiency and energy audits should "Natural power" be bought by the City. Investigations should also consider purchasing power from private renewable energy providers.

### **ACTION ITEM 25 - PURCHASE EQUIPMENT ON THE BASIS OF ENERGY EFFICIENCY WHERE POSSIBLE**

It is compulsory for new household type appliances to be marked with energy efficiency labels, which can give an indication of power used and hence running costs. This system has been operating for more than a decade and has recently been revised to reflect the increases in efficiency that have occurred since its inception. When the City needs to make such purchases they should be made on the basis of energy efficiency where possible.

### **ACTION ITEM 26 - INVESTIGATE RETROFITTING EXISTING AND NEW CITY BUILDINGS FOR ENERGY EFFICIENCY**

The City has a considerable number of building assets of varying ages, with it likely that they are also of varying energy efficiency. An energy use and efficiency audit may identify measures by which existing buildings could be modified to save energy. Investigation of such options would be expected to have more benefit following preparation of an energy use audit for the City as required by Milestone 1 of the Cities for Climate Protection programme.

### 3.8 ACTION ITEM PRIORITISATION LIST (20 – 26)

Action	Responsibility	Timeframe (years)
20) Develop a greenhouse gas reduction strategy by joining the Cities for Climate Protection programme	Planning Services	1 - 2
21) Investigate means to encourage local industry to join greenhouse gas reduction programmes and also encourage new greenhouse and environmentally friendly industry	Economic Development/ Planning Services	ongoing
22) Investigate the potential for vehicle fuel conversions for the City's fleet	Building and Fleet Maintenance Services	2 - 3
23) Purchase new vehicles on the basis of greenhouse emissions and fuel efficiency	Building and Fleet Maintenance Services	Ongoing
24) Investigate sourcing alternative energy sources such as "Natural" power for the City's buildings and operations.	Planning Services/ Finance	2-3
25) Purchase equipment on the basis of energy efficiency where possible	All Business Units	Ongoing
26) Investigate retrofitting existing and constructing new City buildings for energy efficiency	Building and Fleet Maintenance Services/ Infrastructure Services	1 – 5

## **4.0 KEY FOCUS AREA: WASTE (REDUCTION, RE-USE, RECYCLING, CLEANER PRODUCTION)**

### **4.1 ZERO WASTE 2020**

The State Government's Zero Waste 2020 initiative was released in April 2001 with the intention of sending zero waste to landfill by 2020.

*"The achievement of Zero Waste depends on five overarching goals:*

- *Sustainability: choosing environmentally, socially and economically sustainable options.*
- *Commitment: commit to the vision.*
- *Prevention: redesign our products, processes and practices to eliminate waste.*
- *Resource Recovery: transform waste streams into resources.*
- *Integration: The appropriate administrative structure to unite us all in achieving the vision." (Waste 2020 Taskforce, 2001).*

It is recognised that all sectors of the community, including the business sector, have a role to play in waste reduction. The local government sector has been recommended to follow a number of Key Actions to help achieve this goal.

Under the Health Act 1911, local government is responsible for the collection and disposal of domestic solid waste. The City of Wanneroo currently operates its own fleet of vehicles that service household bins and provide recycling services to residents. The City also operates under contract to the City of Joondalup, providing weekly collections to over 82,000 households. The Council is responsible for the payment of the cost of disposing of all its waste at Tamala Park landfill site. Thus, any efforts made to reduce the amount of waste being created and disposed of will directly benefit the City.

Tamala Park is operated by the Mindarie Regional Council (MRC), and has adopted a regional waste management plan that makes a number of recommendations for waste management in the region. The City has recently produced an integrated waste management strategy to better coordinate with these recommendations.

The City currently offers recycling services for all 'standard' household items (bottles, aluminium cans, newspaper, etc). In addition, efforts have been made to divert green waste from landfill by provision of the weekend greens area at Wangara and the annual bulk verge collections. The City remains committed to its current recycling programs, having recently expanded its Materials Recovery Facility (MRF) to accept material from other Councils.

Waste management over the long-term, however, will depend largely upon decisions made by the MRC. The City of Wanneroo, as a member of the MRC, must make every effort to ensure that future decisions about waste management in the region are made with an emphasis on producing the best outcomes for both the City and the natural environment.

## **4.2 ACTION ITEMS 27 - 34**

### **ACTION ITEM 27 - ESTABLISH AND PUBLISH BENCHMARKS TO MONITOR CHANGES IN BEHAVIOUR WITH REGARDS TO WASTE AND RECYCLING. DEVELOP SPECIFIC WASTE REDUCTION TARGETS.**

To allow the City to measure the effectiveness of its waste reduction programs, and to measure progress toward Government targets. Specific targets to act as incentives and help establish priorities for different waste areas such as domestic and commercial waste.

### **ACTION ITEM 28 - DEVELOP AN EDUCATION PROGRAM TO ENCOURAGE RECYCLING AND WASTE MINIMISATION EFFORTS BY RESIDENTS AND BUSINESSES**

Effective waste minimisation should involve consumers, as well as waste managers. To encourage residents and businesses to become more responsible for the waste they produce, and to promote the continued strong growth of recycling by residents, and provide education on the true value of recycling to the community. The City should explore options to increase the awareness of consumers for the waste products they create, and thus help foster alternative attitudes to that of the 'throwaway society'.

### **ACTION ITEM 29 - OPERATE AND IMPROVE COUNCIL-OWNED GREENS RECYCLING FACILITY AND MATERIAL RECOVERY FACILITY**

To implement the best available and most appropriate technology and practices in Council recycling facilities, ensuring the most efficient use of recovered materials. In particular, to provide further opportunities for residents to reduce the amount of green waste they send to landfill.

### **ACTION ITEM 30 - PROVIDE RECYCLING OPPORTUNITIES TO SCHOOLS AND BUSINESSES**

To expand the current program of recycling to include other important sections of the community, comparable to current domestic programs. To provide opportunities for businesses and schools to minimise the amount they send to landfill, and to help maximise the volume of material recovered for recycling.

### **ACTION ITEM 31 - ENCOURAGE 'CLOSING THE LOOP' MENTALITY WITHIN THE CITY AND COMMUNITY - 'BUY RECYCLED, USE RECYCLED'.**

To educate and promote the value of buying and using recycled products, and to make this an important factor in the City's purchasing decisions. This will help encourage market acceptance of recycled materials and to dispel the 'second-rate' stigma attached to some recycled material.

### **ACTION ITEM 32 - DEVELOP SECONDARY WASTE TREATMENT FACILITY**

To minimise the amount of waste sent to landfill and to promote the philosophy of waste being a useful resource. To prolong the lifetime of existing landfill sites by

active support of the Mindarie Regional Council's development of a Secondary Waste Treatment Facility for the region.

### **ACTION ITEM 33 - ENCOURAGE THE RECYCLING OF BUILDING WASTE**

A significant component of municipal waste includes the byproducts of the construction and demolition industries. The City should take appropriate steps to encourage these industries to recycle as much of their waste as possible.

### **ACTION ITEM 34 – FACILITATE ALTERNATIVE APPLICATIONS FOR RAW POULTRY MANURE**

The application of raw poultry manure is banned from the months of September to April within the City of Wanneroo. There are few appropriate processing facilities operating within the City, increasing the financial burden of its disposal on poultry producers. In addition, no similar organic fertilisers are available to produce growers, forcing a switch to expensive, potentially harmful artificial fertilisers.

The City shall make efforts to facilitate the establishment of alternative treatment options for poultry manure, with the intention of an affordable organic fertiliser being produced. The intention is to assist local businesses in creating a sustainable method of managing poultry manure that is compatible with other parts of the community and environmental objectives.

#### 4.3 ACTION ITEM PRIORITISATION LIST (27 –34)

Action	Responsibility	Timeframe (years)
27) Establish and publish benchmarks to monitor changes in behaviour with regards to waste and recycling. Develop specific waste reduction targets.	Environmental Waste/Marketing	1 – 2
28) Develop an education program to encourage recycling and waste minimisation efforts by residents and businesses.	Environmental Waste/Marketing	1 – 2
29) Operate and improve Council-owned greens recycling facility and MRF.	Environmental Waste/Marketing	ongoing
30) Provide recycling opportunities to schools and to businesses.	Environmental Waste/Marketing	2 – 3
31) Encourage ‘closing the loop’ mentality within the City and community - ‘Buy recycled, use recycled’.	Environmental Waste/Marketing	ongoing
32) Develop secondary waste treatment facility.	Environmental Waste	ongoing
33) Encourage the recycling of building waste	Approvals Services/ Planning Services/ Marketing	ongoing
34) Facilitate alternative applications for raw poultry manure	Environmental Waste/ Approvals Services	1 – 3

## **5.0 KEY FOCUS AREA: RESOURCE AND CONSERVATION MANAGEMENT**

The City has a number of important regional and local natural resources that require protection and sustainable use for future generations. The City of Wanneroo's history is built on many of these resources, which provide for its social identity, economic foundations and important landscape values. The recommendations listed in this section mainly pertain to actions that the City can take to improve operational policies and planning provisions.

### **5.1 WATER SOURCES**

Water is a limited resource upon which society and the natural environment is reliant. The wise use and management of this resource is essential if we are to preserve the bushland and wetlands of Perth and maintain our high standard of living.

Perth is located on the edge of a semi-arid low rainfall region, with rainfall in the south-west and Metropolitan Region varying considerably. Rainfall in the south-west has been considerably less (approx. 70mm) than the long term average over the past 25 years (Welker Environmental Consultancy, 2001). Declines in rainfall are also expected as a result of the greenhouse effect. Potential water availability is therefore subject to the influences of the natural environment (rainfall) and beyond our control, however, we can manage rates of usage, impacts on the environment from abstraction and impacts on water quality.

Perth obtains approximately half of its scheme water from dams in the Darling Range and half from groundwater, of which the Gnangara mound is part (Water Corp. 2001b). The Gnangara mound is mainly under some form of Government ownership with the primary land uses being pine plantations and remnant native vegetation. Groundwater abstraction results in a lowering of the groundwater levels, the effects of which extend westwards to the coast. Remnant vegetation in the area affected by this abstraction includes National Parks, Nature Reserves, a Regional Park, local and regional reserves and cave systems with groundwater dependent species. Groundwater extraction from the mound has to be carefully managed to ensure that vegetation communities and wetlands are not substantially affected.

### **5.2 GNANGARA LAND USE AND WATER MANAGEMENT STRATEGY**

The Gnangara Land Use and Water Management Strategy (GLUWMS) is a State Government programme with the aim at protecting the groundwater resource of the Gnangara Mound (Government of WA, 2001). The Strategy recommends several actions to maintain groundwater quality, which are primarily the responsibility of State Government agencies including;

- 1) Amend the Metropolitan Region Scheme to place a Rural Water Protection Zone over designated Priority 2 areas and a Water Catchment Reservation over designated Priority 1 areas on Crown Land and areas in private ownership on the Gnangara Mound as soon as possible.
- 2) Review and update the existing Statement of Planning Policy No. 3 (Gnangara Mound Crown Land) as soon as possible to reflect proposed land use guidelines.

- 3) Finalise the Draft Environmental Protection Policy (State Groundwater) 1998 and the environmental impact assessment guidelines for Environmental Management Areas associated with the public water supplies as soon as possible.
- 4) Reserve land to be included in the proposed Gngangara Park for Parks and Recreation.
- 5a) Amend the statutory Underground Water Pollution Control Area (UWPCA) boundary to accord with the revised scientifically determined boundary in conjunction with the proposed Metropolitan Region Scheme Amendment
- 5b) Refine as required the groundwater source protection area boundaries to account for detailed wellfield design
- 6) Modify the Metropolitan Water Supply, Sewerage and Drainage Act, 1909 by-laws to reflect the recommended priority classifications.
- 7) Agree on a referral process and policy application approach for the assessment of planning applications within the revised UWPCA with the Local Governments, WA Planning Commission, Water and Rivers Commission and the Environmental Protection Authority to ensure a co-ordinated whole of Government approach.
- 8a) Amend local Town Planning Schemes within the Metropolitan Region to accord with the Metropolitan Region Scheme amendment within the statutory time frame.
- 8b) In areas outside the Metropolitan Region, amend the local Town Planning Schemes as soon as possible to recognise the revised UWPCA and priority classifications with scheme provisions to reflect the objectives of the Statement of Planning Policy and Environmental Protection Policy.
- 9) Prepare strategies, development plans and Town Planning Scheme reviews in the context of the strategy text and recommendations.

### **5.3 LANDSCAPE**

Development should take into consideration landscapes as having high geological, geomorphological and aesthetic value. The capacity of a landscape to absorb a new activity needs to be determined prior to development. The City of Wanneroo prides itself on it's unique sense of place. Important landscape values and features should be identified, preserved and enhanced through planning provisions and operational policies.

Currently there are three important Landscapes identified in the City's Policy 4.3.11 as referred to in Section 1.1 *Local Setting*, The eastern chain of lakes flanked by rural properties and recreation reserves is known as the circular lakes Landscape Enhancement Area and includes Little Coogee Swamp, Pinjar Mariginiup, Jandabup, Badgerup and Gngangara Lakes. The corridor of remnant native vegetation from Lake Goollelal through Lakes Joondalup Neerabup, Nowergup, Carrabooda, Neerabup National Park and on to Yanchep National Park and beyond is referred to as the linear lakes Landscape Enhancement Area. The third Landscape Enhancement Area is for the Coast and Reef. The Policy recognises that these areas are environmentally *"important and sensitive enough to warrant special consideration such that any development shall enhance and not degrade the environment of the area and will be in accord with, and not contrary to, the nature of the environment of the area"*.

## **5.4 ACTION ITEMS 35 – 41**

### **ACTION ITEM 35 - UNDERTAKE AN AUDIT OF COUNCIL'S WATER USE AND DEVELOP MEASURES TO REDUCE THIS.**

The City of Wanneroo is a significant user of both scheme and bore water for facilities such as parks, buildings and public swimming pools. It could be expected that the efficiency of use would vary considerably amongst the various use types with potential for reductions in usage. By examining the potential for such reductions the City can contribute to conserving our water resources, protecting our environment and demonstrate leadership to the community.

The City may be able to link up with existing water conservation programmes such as the Water Campaign developed by ICLEI which has the objective of encouraging sustainable use of freshwater resources. The Water Campaign progresses through a series of milestones similar to the CCP programme, and is currently being trialled by five WA Councils.

### **ACTION ITEM 36 - ENCOURAGE WATER CORPORATION TO IMPROVE ITS TREATMENT OF WASTEWATER, AND TO CONTINUE RESEARCH INTO ALTERNATIVE METHODS OF WASTE TREATMENT AND DISPOSAL**

Much of Perth's wastewater is disposed of via diffuser units in Marmion Marine Park after treatment at the Beenyup wastewater treatment plant. An additional effluent disposal facility is planned for Alkimos in 2005. Effluent is disposed of to standards set by the Environmental Protection Authority, with a maximum disposal of 3.6 tonnes of nitrogen and 1,500kg of phosphorous per day. The latter was recently increased following a modification of the ministerial conditions, following Water Corporation assertion that nitrogen is the limiting nutrient in coastal waters (Water Corporation of WA, 2001a).

It is acknowledged that the treatment of wastewater is a difficult issue and that viable alternatives to use or treat the vast quantities produced by Perth are limited. It has been estimated by Water Corporation that should a land based method of disposal be used that 25,000 Ha would be required and that even with best available management practices it would result in unacceptable impacts on groundwater quality (Stokes, 2001). It is, however, possible that ongoing research could identify alternative uses and/or improved methods of treatment or disposal.

### **ACTION ITEM 37 - INVESTIGATE THE FEASIBILITY OF USING GREYWATER AND/OR STORMWATER IN THE CITY'S RETICULATION**

The City uses a substantial amount of water for irrigation of its parks, and so contributes to the strain upon Perth's water resources and environment. By investigating re-using greywater (water that has already been used for a purpose) the City may be able to reduce the demand and pressure upon the water supply system. Such investigations will need to consider factors including the source of the greywater and distance to irrigation areas, potential contaminants and associated health and environmental affects, relevant legal requirements and positions of State Government agencies and associated financial factors.

### **ACTION ITEM 38 - PARTICIPATE IN THE SECTION 46 REVIEW OF THE MINISTERIAL CONDITIONS FOR GROUNDWATER EXTRACTION FROM THE GNANGARA MOUND**

The Minister for the Environment has requested a review of the Ministerial conditions relating to groundwater abstraction from the Gnangara mound under S. 46 of the Environmental Protection Act. The WRC is undertaking this review for consideration by the EPA.

The review intends to investigate the conditions by which groundwater abstraction will be permitted and is expected to take at least a year to finish. It will consider environmental, climatic and developmental issues including water sensitive urban design, the implications of Gnangara Park, and management of abstraction from public and private uses and the Gnangara pines (Welker Environmental Consultancy, 2001). The City has participated in early stages of the review, and it is essential that this is continued owing to the direct implications for the environment and private users.

### **ACTION ITEM 39 - DEVELOP A WHOLE OF CATCHMENT APPROACH TO STORMWATER MANAGEMENT**

Methods of treatment of stormwater have improved considerably in recent years. This has seen a shift from an "end of pipe" approach where the water is moved from its source to a disposal location (ie disposal to a wetland or drainage sump) to a Water Sensitive Urban Design (WSUD) approach where the quality of the water is treated. Many different methods of stormwater treatment have been developed with varying degrees of efficiency, water quality improvement standards, maintenance requirements and costs (Evangelisti and Assoc. 1998).

By considering drainage strategies on a whole of catchment basis, water quality, water quantity, conservation and amenity may be addressed in a holistic way. A three staged approach to assessing current systems and improving for best practice can be undertaken as:

- Asset Inventory and Review

The City needs a better record of the location and type of stormwater disposal systems. This will enable the preparation of a maintenance and management schedule, avoiding such work being done on an ad hoc basis when the City responds to unexpected events. By establishing an inventory of such units the City will be able to consider the most appropriate maintenance and management measures to avoid water quality and quantity issues.

- Upgrade existing stormwater systems as required

Stormwater control units in the older suburbs were constructed according to the requirements of the time, which may not be appropriate anymore. It is important to recognise that potential redevelopment to more appropriate standards is likely to be constrained by availability of suitable area and cost. It would be expected that such a

review would take place following a review of the location of stormwater treatment units.

- Upgrade existing systems discharging directly into water bodies

Untreated drainage directly into fresh water lakes and the ocean directly impacts on water quality and ecosystems. Some ramifications of changes to water quality can be identified, for example in Lakes Joondalup and Goollelal within Yellagonga Regional Park.

The wetlands of Yellagonga Regional Park are suffering from eutrophication (nutrient enrichment) caused by surrounding land use activities. The sources of pollutants to the wetlands have not been quantified but include fertiliser from domestic gardens and market gardens, septic systems and stormwater runoff. The symptoms of eutrophication include algal blooms, change in flora and fauna composition and abundance and midge plagues. A study commissioned by the Water and Rivers Commission (Chapman and Horwitz, 2001) noted that *“Lake Joondalup appears to be in health decline as a result of high levels of nutrient input, and the compounding implications of spraying insecticide for midge control”*. The report further recommended that *“further development around this or any other Gnangara mound wetland be firmly discouraged in order to prevent declines in water quality and associated management conflicts”*.

There are currently 31 stormwater outlets draining into the wetlands of Yellagonga Regional Park, with the City of Wanneroo being responsible, either jointly with the City of Joondalup and Main Roads WA or solely for 21. These outlets have long been recognised as being a major source of pollutants, with a report commissioned by the City in 1994 (Ove Arup and Partners) to examine the issue. The report made several recommendations including the following;

- *“No further direct drain outlets to the lakes to be constructed;*
- *Reduce or preferably stop surface water inflows directly entering the Lakes;*
- *Direct stormwater discharges on the western side of the Lake to recharge basin, to be located outside or at least on the outer periphery of the Lakes boundary; and*
- *Develop a treatment train that incorporates sedimentation basins and shallow artificial wetlands with emergent vegetation on the eastern side of the park.”*

The City intends to upgrade an outfall at Ariti Avenue in the summer of 2001- 02, with a comprehensive water quality monitoring programme to take place before and after modification to enable quantification of improvements and possible design modifications for future outlet upgrades. The upgrade and monitoring programme for this one outfall is expected to be approximately \$300,000.

Future upgrades are planned to take place at the rate of 1 per year, owing to the costs involved. The City recognises that the wetland will continue to decline while the upgrades continue and that financial assistance from other parties is essential in increasing the rate of outlet upgrade. To this end the City intends to engage a consultant in the financial year 2001 – 02 to advise on possible design modifications and indicative costs associated with the development for the outlets under the City’s

management. Similarly a joint study with the City of Joondalup is proposed for the year 2002 – 03 for outlets under joint management responsibility.

**ACTION ITEM 40 - CONTINUE RESEARCH WITH THE CITY OF JOONDALUP AND DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT INTO WATER QUALITY CONTROL AND MIDGE MANAGEMENT METHODS**

Midge are a natural part of wetland systems with their eradication neither desirable nor feasible. They may become a nuisance when water quality declines, with their presence indicative of poor wetland health. Spraying a wetland to control midge may provide short-term benefits for adjoining residents but does not provide a long term solution to the problem. If midge are to be controlled in the long-term then water quality issues need to be addressed.

The City of Wanneroo has committed to a Midge Management Strategy (appendix 1) with the City of Joondalup and CALM. The Strategy has been based upon knowledge gained from a report commissioned by the City's of Wanneroo and Joondalup (Lund et al, 2000) on midge management in Lakes Joondalup and Goollelal. The Strategy identifies several focus areas including research, monitoring, nutrient reduction activities and midge nuisance reduction programmes.

The only chemical currently registered by the National Registration Authority for control of midge is Abate. The City allocates up to \$25,000 per year for 4 treatments with Abate under the Strategy, however, this is not considered an appropriate long term strategy owing to the build-up of resistance and the effects on non-target species. It is worth noting that the chemical Methoprene, which is under trial as a potential future alternative, would be likely to cost 2-3 times as much as Abate. Chapman and Horwitz (2001) have noted that non-target species have declined, or are now absent, resulting in an increased algal food source for midge, which may lock "*authorities into a spraying regime to control midge*". As midge plagues are a direct consequence of wetland eutrophication it is essential that inputs to the wetlands are reduced.

**ACTION ITEM 41 - REVIEW THE CITY'S LANDSCAPE ENHANCEMENT POLICY AND ENSURE ITS APPLICATION THROUGH THE CITY'S PLANNING PROVISIONS AND OPERATIONAL PRACTICES.**

The City's Landscape Enhancement Policy provides a method for the City to identify, protect and enhance what it considers to be special or significant areas. This will enable the City to enhance its reputation for the features for which it has become known throughout the Perth Metropolitan Area. The Policy is due for review in July 2002.

## 5.5 ACTION ITEM PRIORITISATION LIST (35 – 41)

Action	Responsibility	Timeframe (years)
35) Undertake an audit of Council's water use and develop measures to reduce this	Building and Fleet Maintenance Services/ Infrastructure Services/ Operational Services/ Planning Services	2 - 3
36) Encourage Water Corporation to improve its treatment of wastewater, and to continue research into alternative methods of waste treatment and disposal	Planning Services	Ongoing
37) Investigate the feasibility of using greywater and or stormwater in the City's reticulation	Infrastructure Services/ Operational Services	3 – 5

### **GNANGARA MOUND**

38) Participate in the Section 46 Review of the Ministerial Conditions for groundwater extraction from the Gnangara mound	Planning Services	Ongoing
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### **STORMWATER MANAGEMENT**

39) Develop a whole of catchment approach to stormwater management	Infrastructure Services/ Planning Services/ Operational Services	2 – 5
40) Continue research with the City of Joondalup and Department of Conservation and Land Management into water quality control and midge management methods	Approvals Services/ Planning Services/ Infrastructure Services	Ongoing
41) Review the City's Landscape enhancement Policy and ensure its application through the City's planning provisions and operational practices	Planning Services/ Infrastructure Services/ Operational Services	2 – 3

## **6.0 KEY FOCUS AREA: COMMUNITY PARTICIPATION AND ENVIRONMENTAL AWARENESS**

### **6.1 THE VALUE OF COMMUNITY PARTICIPATION**

The City of Wanneroo faces many different challenges in achieving responsible environmental management, with everyone benefiting from a healthy natural environment. Local Government is often considered to be the sphere of Government that is closest to the people and should therefore be most responsive to the needs and interests of the community.

Community interest in environmental issues has been developing rapidly in recent years with factors such as environmental education in schools being responsible for generating this momentum. A recent survey of residents of the City confirmed that the environment was a high priority issue, with it being likely that in the future the community will request more from Local Government, and will also wish to participate in decision making to greater degrees.

The community represents an extensive source of local knowledge about local areas, with some members holding specialist knowledge that is not commonly available. By encouraging the development and sharing of such knowledge the City can promote environmental awareness and enable best practice environmental management to occur.

### **6.2 ACTION ITEMS 42 - 53**

#### **ACTION ITEM 42 - INTRODUCE AN ANNUAL AWARD AND GRANTS SCHEME FOR ENVIRONMENTAL WORK UNDERTAKEN IN WANNEROO**

Community groups and individuals have been active in Wanneroo for many years on many different environmental issues. The voluntary work done by these community groups can lead to significant environmental improvement and save the City considerable sums of money and resources. The City recognises the importance of volunteers and the work they do, and will reward this participation by developing an annual grants scheme specifically for environmental purposes, and an annual award for a community group or individual which has undertaken significant environmental work.

#### **ACTION ITEM 43 - PROVIDE AND REGULARLY UPDATE INFORMATION ON SOURCES OF FUNDING FOR ENVIRONMENTAL ACTIVITIES**

There are many sources of funding available to community groups doing environmental activities. Locating these funds is, however, sometimes difficult owing to lack of awareness of their presence. The City can act as an information provider on sources of funding, which can further assist community groups to do volunteer work. It is possible that this Action Item could be a part of the normal duties of a Bushcare Officer as recommended in Action Item 8.

#### **ACTION ITEM 44 - ESTABLISH AND ASSIST COMMUNITY ENVIRONMENTAL GROUPS**

In order to achieve the objectives of Action item 3, local ownership for management of identified and prioritised areas shall be facilitated by the establishment of a community support group. Many community groups have “adopted” local areas of bushland, resulting in increased knowledge, awareness and management than may have otherwise been possible with only the City’s resources. The core activities of these groups have included community education, rehabilitation, wetland protection and enhancement and management plan review. By promoting the establishment of such groups the City can co-operate on a partnership basis to undertake activities that may not otherwise have been possible by either the City or community alone. It is envisaged that such promotion would come from a Bushcare unit within City Administration.

#### **ACTION ITEM 45 - COUNCIL INITIATE AND PROMOTE COMMUNITY PARTICIPATION IN ENVIRONMENTAL AWARENESS EVENTS**

The City’s involvement and fostering community environmental awareness events has been somewhat ad hoc and sporadic with limited success. By supporting and promoting awareness events the City can continue to foster within the community an awareness of environmental issues and help foster development of a community environmental ethic. This may be facilitated through the City’s current web site and associated links to relevant sites.

#### **ACTION ITEM 46 - ENCOURAGE DIALOGUE BETWEEN COUNCIL AND THE COMMUNITY VIA THE CONSERVATION ADVISORY COMMITTEE**

Promotion of constructive dialogue between the City and the community can enhance environmental management and community awareness. The City has responded to the Community’s concerns by establishing the Conservation Advisory Committee (CAC) with the broad objectives of;

- Providing a forum for two-way communication between the City and the community.
- Assisting and advising the City on development of strategies for conservation and management priorities thereof.
- Identify environmental problems and formulate strategies to deal with them.

The CAC has been involved with the preparation of the Local Environmental Strategy as a way of implementing the objectives of the Committee. It is expected that the CAC will be extensively involved in future environmental initiatives.

#### **ACTION ITEM 47 - DEVELOP AN ENVIRONMENTAL SECTION TO THE CITY’S WEBSITE**

The Internet represents a potential source of information that the City can use to raise awareness on environmental matters and to advise of the City’s current activities or programmes. The environmental section could include information on things such as how to grow local native plants or where to obtain them, the location of bushland

reserves, community events, major initiatives, links to other sites of environmental significance etc.

#### **ACTION ITEM 48 - INVESTIGATE THE POTENTIAL FOR A NORTHERN SUBURBS ENVIRONMENT CENTRE IN ASSOCIATION WITH ENVIRONMENTAL GROUPS**

Several community groups have recently expressed a desire to have a northern suburbs environment centre. This revives an idea that was originally raised in the early 1990's and from which a feasibility study was prepared for a site adjacent to Lake Joondalup (James and LRM Aust. Pty. Ltd. 1992). Several other environment centres exist in the Perth Metropolitan Region including centres at Piney Lakes and Star Swamp and the development of a facility for regional use should be considered. An environment centre would require substantial funding to initiate and need community ownership and co-operation to work. However, it could be expected to provide benefits including;

- Promoting environmental awareness
- Promoting Ecologically Sustainable Development
- Providing a forum for community education
- Providing environmental services
- Providing a centre for research opportunities

It would be expected that the preferred site of the centre and all other requirements would need to be resolved by a committee formed for the purpose of which the community would be the major participant.

#### **ACTION ITEM 49 - PREPARE AN ANNUAL REPORT ON ENVIRONMENTAL OBJECTIVES ATTAINED**

The City prepares an Annual Report to identify the objectives achieved and the financial situation for the previous 12 months. In the same way it is envisaged that an annual report identifying progress with achieving environmental objectives will be beneficial to both the City and wider community. It will also enable the community to know exactly what achievements have been made on environmental issues and identify areas that are still be outstanding.

#### **ACTION ITEM 50 - DEVELOP A NEW HOMEOWNERS PACK**

The continuing rapid urban development of Wanneroo places extreme pressure upon the environment, however, this can be used as an opportunity by advising new homeowners of ways in which they can make a difference. This could be done via a new homeowners pack which could include information on;

- Bush fire management (for those in rural areas);
- Wise water use - including information on garden design and the use of local native species to conserve water and encourage native fauna to visit;
- Energy efficiency (including appliances and housing);
- Vouchers for free local native plants to encourage landscaping with native species

## **ACTION ITEM 51 - PREPARE A TRAILS MASTER PLAN**

As the population of Perth expands and environmental awareness increases, cultural and natural heritage including the remnant native vegetation of Perth is coming under increasing pressure for use as walk, bike and bridle trails. These trails can be important in increasing environmental awareness as well as providing recreational and tourist potential. These groups do have different requirements and different levels of impact and use. A Trails Master Plan can identify optimum locations for trails including the potential for linkage with existing trails on CALM land and with adjoining Councils. The City has allocated \$10,000 in the 2001/'02 budget to develop a trails master plan and it is intended to supplement this with a grant of a similar size.

## **ACTION ITEM 52 - DEVELOP AND IMPLEMENT A RANGE OF COMMUNITY EDUCATION AND AWARENESS PROGRAMMES RELATED TO COMPLIANCE WITH RELEVANT LEGISLATION AND INTRODUCE COMPLIANCE PROGRAMMES**

The City is responsible for regulating land use activities in many areas which have environmental sensitivity. Landowners may have an expectation of development rights, which may need to be carefully balanced against the need to provide adequate environmental protection. By providing information and education material on land use impacts on the environment, the City may ensure that development is environmentally sensitive and reduce possible environmental degradation. The City may also be able to undertake compliance auditing of conditions of approvals relating to large scale development.

### 6.3 ACTION ITEM PRIORITISATION LIST (42 – 52)

Action	Responsibility	Timeframe (years)
42) Introduce an annual award and grants scheme for environmental work undertaken in Wanneroo	Planning Services/ Marketing	1 - 2
43) Provide and update regularly Information on sources of funding for environmental activities	Planning Services/ Marketing	Ongoing
44) Establish and assist community environmental groups	Planning Services/ Operational Services/ Marketing	Ongoing
45) Council initiate and promote community participation in environmental awareness events	Operational Services/ Planning Services/ Marketing	Ongoing
46) Encourage dialogue between Council and the community via the Conservation Advisory Committee	Planning Services/ Infrastructure Services	Ongoing
47) Develop an environmental section to the City's website	Information Services/ Planning Services/ Marketing	1 - 5
48) Investigate the potential for a northern suburbs environment centre in association with environmental groups	Planning Services	3 - 5
49) Prepare an annual report on environmental objectives attained	Marketing and Planning Services (co-ordination)	Annual
50) Develop a new homeowners pack	Marketing	1 - 2
51) Prepare a trails master plan	Leisure Services/ Planning Services/ Infrastructure Services	1 – 2
52) Develop and implement a range of community education and awareness programmes related to compliance with relevant legislation and introduce compliance programmes	Approvals Services/ Planning Services/ Marketing	1 – 3

## **7.0 KEY FOCUS AREA: SUSTAINABILITY**

### **7.1 THE NEED FOR SUSTAINABILITY PLANNING**

The development of sustainability planning was spurred by the United Nations Conference on Environment and Development in 1992 (though the history of sustainability pre-dates the conference). Agenda 21 of this conference established actions that everyone could take to contribute to global sustainability. It recognised that most global environmental issues have local causes and encourages local solutions to these challenges, hence the name of Local Agenda 21 (LA21). The mantra of “think global – act local” encourages this sort of issue resolution.

Sustainability planning arose from the recognition that our current society is not sustainable and must change if serious and irreversible environmental, social and economic impacts are to be avoided. It recognises that a healthy economy and society is dependent on a healthy natural environment, and aims to ensure that that human society can exist indefinitely in a way that does not damage the natural environment. By considering the environmental, social and economic costs of decision making (the Triple Bottom Line) a more accurate determination of the true costs is possible.

### **7.2 ECOLOGICALLY SUSTAINABLE DEVELOPMENT**

Ecologically Sustainable Development is “*the use of natural resources within their capacity to sustain natural processes, while maintaining life support systems of nature, and ensuring that the benefit of the use to the present generation does not diminish the potential to meet the needs and aspirations of future generations*” (Commonwealth of Aust., 1999a).

The Commonwealth Government has encouraged Councils to become sustainable by releasing an information and support manual through Environment Australia (Commonwealth of Australia, 1999b). The manual considered that there are six key principles of sustainability, being;

- Integration of environmental, social and economic factors (called the Triple Bottom Line)
- Community involvement - recognises that the support of the community is necessary to achieve or make progress to sustainability
- Precautionary principle - where threats of serious or irreversible environmental damage occurring exist, then lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
- Intergenerational equity - the same number of choices and access to resources and opportunities should be left for future generations as exists for the current generation
- Continual improvement - A declining environmental situation means that immediate action is necessary and will require continual improvement
- Ecological integrity - protection of biodiversity and maintenance of ecological processes is essential

Similarly the EPBC Act, (Commonwealth of Aust. 1999) considers that there are 5 principles of ESD, these being;

- a) *“Decision making processes should effectively integrate both long and short term economic, environmental, social and equitable considerations;*
- b) *It there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation {Precautionary Principle};*
- c) *The principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;*
- d) *The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making;*
- e) *improved valuation, pricing and incentive mechanisms should be promoted.”*

The City of Wanneroo recognises the Triple Bottom Line principles of Ecologically Sustainable Development, and will use them to guide its future decision making.

### **7.3 ACTION ITEMS 53 - 62**

#### **ACTION ITEM 53 - DEVELOP AND IMPLEMENT AN ECOLOGICALLY SUSTAINABLE DEVELOPMENT STRATEGY.**

The City of Wanneroo engaged consultants Galloway and Chambers in 1998 to advise Council on how it could implement a sustainability strategy. Unfortunately the strategy was not implemented at that time owing to the split of the City into the Cities of Joondalup and Wanneroo. While the ecological sustainability of the City will be enhanced by many of the Action Items proposed in this strategy, a specific integrated strategy may be able to address areas that have not been covered (ie specific community or economic development outcomes). The City's Strategic Plan has acknowledged the importance of Environmental Sustainability by identifying it as Goal Number one (of four goals)for action.

#### **ACTION ITEM 54 - INVESTIGATE THE ESTABLISHMENT OF AN ENVIRONMENTAL MANAGEMENT SYSTEM TO ISO 14000 SERIES CERTIFICATION**

An Environmental Management System (EMS) is a process which leads to continuous improvement in environmental management by addressing environmental issues and obligations during routine operations. It is closely related to the sustainability process and consistent with other best practice procedures including quality assurance/quality control, health and safety. Assessment and certification of an EMS may be done to the Australian and New Zealand Standard ISO 14000.

The Environmental Protection Authority (2000b) has produced a Guidance Paper (No. 43) to assist in the development of such systems, and considers that there are 10 factors which comprise a sound EMS. These being;

- An environmental policy to provide direction and a corporate commitment to it;
- An environmental review (identification of environmental impacts);
- An environmental management program (with specific plans to address the environmental impacts);
- The setting of appropriate objectives and targets;
- The creation of appropriate management structures and responsibilities
- Training (including induction) in environmental management procedures;
- Development of communication procedures;
- Development of performance monitoring and measurement procedures;
- Development of corrective and preventative procedures; and
- Development of management review and feedback procedures.

An EMS may eliminate the need for several of the individual actions proposed by this strategy as they will be covered through normal operational processes. It may also be possible link in with Occupational Health and Safety requirements thus increasing its effectiveness.

#### **ACTION ITEM 55 – REVIEW POLICY ON ENVIRONMENTAL SUSTAINABILITY**

The City adopted a policy on Environmental Sustainability in July 1999, with the policy recommending a review by July 2001. It would be appropriate to review the policy to take into consideration developments in environmental awareness and understanding since the policy was drafted, the direction proposed by this strategy and the City's Strategic Plan.

#### **ACTION ITEM 56 - PREPARE STATE OF THE ENVIRONMENT/SUSTAINABILITY INDICATOR REPORTS (AT 3-5 YEAR INTERVALS).**

State of the Environment/Sustainability Indicator (SOE) reporting involves examining a series of indicators for their current status. By reviewing such reports on a regular basis, a determination can be made on the amount of progress being made on environmental and sustainability issues. Such reviews can assist in identification of problem areas and assist with resource allocation.

The list of indicators that may be used in SOE reporting is very large and may vary between areas and time frames. The Australia and New Zealand Environment Conservation Council (a non-statutory body of state and federal environment ministers from Australia, New Zealand and Papua New Guinea) has prepared a listing of what it considers to be core indicators (2000). It covers six of the themes identified by the 1996 SOE report (State of the Environment Advisory Council), being atmosphere, biodiversity, the land, inland waters, estuaries and the sea and human settlements.

The then combined City of Joondalup and Shire of Wanneroo engaged consultants Galloway and Chambers to prepare a State of the Environment/Sustainability Indicators Report in 1999. The report considered 36 key indicators including

bushfires, water use and crime. It would be appropriate to review this report after 3 – 5 years (between 2002 – '04).

#### **ACTION ITEM 57 - PREPARE A LOCAL HOUSING STRATEGY**

The style and form of housing available in a locality can dramatically affect local sustainability. This can be through associated flow-on affects such as energy efficiency, workplace proximity and providing suitable housing types for a broad cross spectrum of society for current and future generations. As the City of Wanneroo is in a phase of rapid population expansion then decisions on housing types now will have permanent implications for the local society. It is therefore essential that the principles of sustainability are considered in new housing development and implemented through the relevant planning provisions.

#### **ACTION ITEM 58 - ENCOURAGE LAND DEVELOPERS TO IMPLEMENT THE PRINCIPLES OF SUSTAINABILITY CONTAINED IN LIVEABLE NEIGHBOURHOODS**

Liveable Neighbourhoods is a draft planning policy document of the WA Planning Commission (WAPC) that aims to create more sustainable communities through addressing subdivision design requirements (Government of WA, 2000b). The design principles are voluntary at this stage, though developers are encouraged by the WAPC to implement the policy through development incentives. Encouraging developers to implement the principles of sustainability in Liveable Neighbourhoods can assist in the City's long-term goal of achieving sustainability.

#### **ACTION ITEM 59 - INVESTIGATE THE ADOPTION OF A GREEN PURCHASING POLICY.**

Development of a green purchasing policy would enable Council to express its environmental credentials on a daily basis. The rationale behind such a policy being that where alternatives products exist that are environmentally friendly, or have lower impacts, then preference should be given to those products. By expressly using its purchasing power the City may contribute to the greening of local businesses.

#### **ACTION ITEM 60 - INVESTIGATE THE NEED FOR AN ADDITIONAL ENVIRONMENTAL OFFICER**

Adoption of this strategy will result in a substantial number of new initiatives to be developed. The extent to which a full and adequate consideration of these strategies is possible is limited by the number of staff available to work on the programmes. An increase in the number of Officers cognisant of Environmental issues could greatly improve the rate of adoption of these programmes. This Action Item should be considered along with the objectives of Action Item 8, recognising the very different skills required in facilitating sustainability and environmental programmes and separate to, but complementary of, bushland management.

## **ACTION ITEM 61 - REVIEW THE CITY'S MUNICIPAL HERITAGE INVENTORY**

The City of Wanneroo drafted a Municipal Heritage Inventory in 1994 to promote and protect its cultural heritage. A review of the inventory is planned for 2001/2002. Under the provisions of the W.A. Heritage Act significant sites, including individual trees and stands of vegetation may be registered and protected.

## **ACTION ITEM 62 - INVESTIGATE THE POTENTIAL FOR ADOPTION OF AN ENVIRONMENTAL LEVY**

The Action Items proposed for investigation by this Strategy will lead to a substantial change in direction for the City and require a financial commitment to ensure their effective implementation. While some Actions may be achievable within current resourcing levels, others will be require additional funding to achieve.

An environmental levy may be used to raise funds to assist with achieving the proposed outcomes. The City of Bunbury have applied an environmental levy on rateable properties at the rate of 0.165 cents in the dollar and expect to raise between \$250,000 - \$300,000 per year. Areas for investigation include the legality of such a levy and the level of public input into allocation of funding (this may be achievable partly through the adoption of this Strategy and partly through the activities of the CAC).

#### 7.4 ACTION ITEM PRIORITISATION LIST (53 - 62)

Action	Responsibility	Timeframe (years)
53) Develop and implement an Ecologically Sustainable Development strategy	Planning Services	2 - 3
54) Investigate the establishment of an Environmental Management System to ISO 14000 series certification	Planning Services/ Infrastructure Services/ Operational Services	3 - 5
55) Review policy on Environmental sustainability	Planning Services	1 - 2
56) Prepare State of the Environment/Sustainability Indicator Reports (at 3-5 year intervals).	Planning Services	Ongoing
57) Prepare a Local Housing Strategy	Planning Services	2 – 3
58) Encourage land developers to implement the principles of sustainability contained in “Liveable Neighbourhoods”	Planning Services/ Infrastructure Services	Ongoing
59) Investigate the adoption of a green purchasing policy.	Planning Services/ Contracts and Purchasing	1 – 5
60) Investigate the need for an additional environmental officer	Planning Services	1 - 2
61) Review the city’s municipal heritage inventory	Planning Services/ Library and Heritage Services	1 - 2
62) Investigate the potential for adoption of an environmental levy	Planning Services	1 - 2

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## APPENDIX 1 - MIDGE MANAGEMENT STRATEGY

As adopted by the City of Wanneroo at its meeting of 14 November 2000

Action	Responsible body	Timing	Cost
<b>Co-ordination</b>			
State and Local Governments have agreed to allocate additional funding for midge nuisance control, monitoring and research.	CALM, WRC, WC City of Wanneroo, City of Joondalup	October 2000	As proportioned below
A steering committee has been established between the Cities of Wanneroo and Joondalup and the State Government agencies of the Department of Conservation and Land Management (CALM), the Water and Rivers Commission (WRC) and Water Corporation (WC).	CALM, WRC, WC City of Wanneroo, City of Joondalup and community groups	November 2000 then ongoing	Officer time within existing departmental budgets
Land owners, managers and community groups will focus efforts towards the overall care of the catchment	CALM, WRC, WC City of Wanneroo, City of Joondalup, private landowners and residents	Ongoing	Some funds provided in already established projects. Specific programs will require additional funding
Liaison and partnerships with other midge research groups will be enhanced	CALM, WRC, WC City of Wanneroo, City of Joondalup and community groups	Ongoing	Calm currently allocates \$15,000 annually. City of Wanneroo allocate some funds to research groups.

<p><b>Nuisance Reduction</b></p> <p>The Steering Committee have agreed that up to 4 spraying treatments per year will be undertaken. Treatments will be initiated following results from the larval monitoring program. The City of Wanneroo will co-ordinate the midge treatment operations. Funding of the treatments will be equally shared between the State Government and the two Cities.</p>	<p>CALM, WRC, WC City of Wanneroo, City of Joondalup and nominated research group</p>	<p>September – February</p>	<p>4 Treatments per year @ \$25,000 per treatment</p> <p>Annual total = \$100,000. \$50,000 from State Government</p> <p>\$50,000 from Cities of Wanneroo and Joondalup</p>
<p><b>Improved Efficiency and Knowledge</b></p> <p>Monitoring</p>			
<p>The larval monitoring program will be refined to make it more accurate so we can better predict when treatments will be most effective. The monitoring program will be consistent with other programs on the Swan Coastal Plain.</p>	<p>CALM, WRC, WC City of Wanneroo, City of Joondalup and nominated research group</p>	<p>Currently undertaken by City of Wanneroo. Review by Steering Committee December 2000. Implemented May 2001.</p>	<p>Included within \$30,000 programmed above.</p>
<p>Improve monitoring through purchase of craft suitable for access to this large and often shallow lake.</p>	<p>CALM, WRC, WC City of Wanneroo, City of Joondalup</p>	<p>By April 2001</p>	<p>Estimate \$20,000. \$10,000 from State Government &amp; \$10,000 from Cities of Wanneroo and Joondalup.. Annual maintenance \$5,000</p>

<p>Research</p> <ul style="list-style-type: none"> <li>• Research influence of water quality and habitat on the midge life cycle</li> <li>• Develop a research program that will provide predictive capabilities for midge emergence for better control</li> <li>• Develop an understanding of the nutrient budget of the lake and linkage with nutrient contributors within the catchment</li> <li>• Evaluate feasibility of various intervention strategies such as phosphorous and light reduction techniques</li> </ul>	CALM, WRC, WC City of Wanneroo, City of Joondalup an nominated research group	Aim to establish program by April 2001	Estimate annual \$50,000. \$25,000 from State Government \$25,000 from Cities of Wanneroo and Joondalup
<b>Other Actions</b>			
Sewerage connection provided on the eastern side of the lake (north of Church St.) by Water Corporation	WC	Initiated January 2001	No additional funds required. Within WC infill program budget.
Extension of the Perth Coastal Underground Water Pollution Control Area to ensure adequate control of catchment land uses	WRC	Initiated 2001	No additional funds required. Within WRC project budget
Implementation of the Yellagonga Regional Park management Plan	CALM, City of Wanneroo, City of Joondalup	Ongoing	As required
Produce public information brochure	CALM, WRC, WC City of Wanneroo, City of Joondalup	Mid November 2001	Estimated \$5,000. \$2,500 from State Government \$2,500 from Cities of Wanneroo and Joondalup

## APPENDIX 2 - ABBREVIATIONS

AGO	Australian Greenhouse Office
CAC	Conservation Advisory Committee
CALM	Department of Conservation and Land Management
CCP	Cities for Climate Protection
CoW	City of Wanneroo
DEP	Department of Environmental Protection
DoT	Department of Transport
DPS 2	District Planning Scheme 2
DPI	Department for Planning and Infrastructure
EPA	Environmental Protection Authority
EMS	Environmental Management System
ESD	Ecologically sustainable development
FPC	Forest Products Commission
GLUWMS	Gnangara Land Use and Water Management Strategy
GMO	Genetically Modified Organism
ICLEI	International Council for Local Environmental Initiatives
IPCC	Intergovernmental Panel on Climate Change
LCS	Local Conservation Strategy
LES	Local Environmental Strategy
MfP	Ministry for Planning
NSCABD	National Strategy for Conservation of Australia's Biological Diversity
PBP	Perth Biodiversity Project
PMSEIC	Prime Ministers Science, Engineering and Innovation Council
SOEAC	State of the Environment Advisory Council
SPP	Statement of Planning Policy
SWPSG	State Weed Plan Steering Group
TEC	Threatened Ecological Community
WAPC	Western Australian Planning Commission
WC	Water Corporation
WRC	Water and Rivers Commission
WSUD	Water Sensitive Urban Design