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Note: Terms in bold throughout the text in this document are defined in the Glossary (pages 36-37).

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Council acknowledges we are on the ancestral lands of the Gunung-Willam-Balluk. Council passes on respect to the elders of traditional family clans, past and present.
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Glossary
1. INTRODUCTION


- The concept of the city as a catchment, integrated water cycle management and development of legislation and policy direction at a Federal and State level
- Current and projected growth in Hume
- Climate change
- The identified needs to protect and improve community assets including waterways, native habitat and recreational opportunities.

1.1 Structure of the Integrated Water Management Plan

Hume’s water management is organised throughout this plan based on the following themes:

1. Council water management in open space;
2. Council water management in the built environment;
3. Community water efficiency; and
4. Hume’s waterways.

These themes are explored further under the following headings:

- **Background**: Provides a brief overview of each of the themes
- **Opportunities for improvement**: Outlines the opportunities for Council to address key issues and improve the management of each theme.

The **IWMP 2014-2017** includes the following documents:

1. Hume Integrated Water Management Plan (this document);
2. Hume Integrated Water Management Plan: Action Plan; and

The Hume Integrated Water Management Plan: Technical Background Study (Design Flow 2012) has provided the technical detail and modelling data on which many of the strategies and actions of the **IWMP 2014-2017** are based.

The plan sets out objectives and actions for each theme:

- **Excellence in integrated water management**: Achieving positive integrated water management outcomes through Council’s own actions.
- **Community learning and action**: Maintaining and spreading awareness of water efficiency, human influences on waterway health and the environment and taking positive actions as a result.
- **Influence and advocate**: Influencing the actions of other organisations and advocating for support and the policy and regulatory environment that supports integrated water management.

The technical background study and appendices contain supplementary information and background work that has gone into the production of the **IWMP 2014-2017**.
1.2 Aims and guiding principles

The aims of the IWMP 2014-2017 are consistent with Council’s overarching environmental policy, *Pathways to Sustainability: an Environmental Framework (Pathways)*. As stated in the objectives of Pathway 1: Create sustainable places and Pathway 2: Support communities to live and work sustainably, the IWMP 2014-2017 aims to:

- Future proof design - places capable of adapting to change and responsive to current and future risk and need;
- Help our communities use water, energy and other natural resources as efficiently as possible;
- Reduce demand for water in products (buildings, equipment etc.) and service delivery; and
- Close the loop - maximise re-use of water and materials.

The following principles underpin the IWMP 2014-2017:

**Principle 1 - A green, healthy, productive and more liveable city**

Water is vital to the health, prosperity and biodiversity of Hume. By using water efficiently and effectively for sports grounds and green spaces, leisure and community facilities, and in homes and businesses, Council can create healthy and liveable places people want to be.

The strategic use and re-use of water, and increased uptake of alternative water sources in the city, will provide improved green space for relaxation and recreation, healthier ecosystems for indigenous plants and animals, improved waterways for biodiversity and amenity, shade and cooling from the ‘urban heat island effect’ in summer, better quality and more resilient sports grounds and improved flood mitigation. Each member of the community has a responsibility to use water wisely.

**Principle 2 - Wise water use and sound planning for a sustainable future**

Australia is the driest inhabited continent on Earth and a land of extremes. Having endured a prolonged period of drought, heavy rainfall in late 2010, early 2011 and again in early 2012 brought flooding to many areas. Climate projections indicate an increasing risk of below average rainfall for southern and eastern mainland Australia, higher temperatures and evaporation, and below average runoff. In particular there is a significant projected increase in frequency of extremely hot years and extremely dry years (CSIRO, 2011).

These circumstances suggest water should be valued highly; the National Water Commission states that “governments, regulators and water businesses should adopt approaches to urban water pricing that better signal the value of the resource” (National Water Commission, 2011). Good planning and water management and diversifying supplies will create many benefits; a more liveable city, increased water supply security for growing communities and the economic benefits of using a diverse supply of water sources that are fit for their purpose.

**Principle 3 - Hume’s waterways – valuable community assets**

Hume’s creeks are an integral part of the landscape, providing natural features in urbanised and modified rural environments. They support remnant vegetation communities, provide links to ‘flagship’ ecosystems and amenity values and recreational opportunities to residents and visitors. The urban area of Hume is forecast to almost double by 2030 meaning waterways in currently undeveloped catchments are likely to be impacted by significantly increased volumes of stormwater runoff and associated pollutants.

Implementing strategies to enhance the use of rainwater and stormwater will mitigate against the effects of urban growth by reducing pollutant loads to waterways and retaining more natural flow patterns. Additional benefits include flood mitigation and better quality green spaces providing biodiversity, amenity and aesthetic values.
2. BACKGROUND

2.1 What is integrated water management?
Integrated water management or integrated water cycle management is about managing all elements of the water cycle as a single (integrated) system. It is a departure from the traditional approach to managing water where drinking water, wastewater (sewerage) and stormwater (drainage) have all previously been treated as separate systems.

By considering all streams of water, including rainwater and groundwater, this plan aims to respond to the issues of water security, environmental protection of receiving waterways (water quality and quantity) and provision of high quality open space.

2.2 What is water sensitive urban design?
Water Sensitive Urban Design (WSUD) is the integration of urban planning and the urban water cycle, ensuring development is sensitive to waterways and ecosystems.

This means managing urban development with consideration for natural processes and environments, including creeks, lakes and the bays. There are different elements to WSUD, for example, using rain gardens, bioretention systems and wetlands etc. to remove pollutants from stormwater prior to it entering waterways; stormwater harvesting – the treatment and utilisation of stormwater for non-drinking purposes e.g. irrigation and rainwater harvesting; the collection of rainwater from roofs for purposes such as irrigation, toilet flushing and laundry use.
### 2.3 Why does Hume need an integrated water management plan?

Melbourne relies upon water from six reservoirs to the east and north to supply water from protected catchments closed to the public, predominately in the Yarra Ranges.

The recent long term drought across Victoria brought great concern about the security of Melbourne’s water supply. Years of drought saw Melbourne’s water storages decline rapidly. Low rainfall and very low inflow into catchments and streams, meant that in 2007 storages fell to less than 28% (Figures 2 and 3, Melbourne Water 2010).

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**Figure 2: Melbourne’s water storage 2004 – 2008** *(Source: Melbourne Water, 2010)*

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**Figure 3: Inflows to Melbourne’s main supply reservoirs** *(Source: Melbourne Water, 2013)*
Climate change is expected to reduce rainfall over south east Australia. Victoria has experienced a 20% rainfall decrease since the mid 1990s, translating into an inflow reduction of about 40% (CSIRO, 2007). Less rainfall means:

- Less water in reservoirs and rivers;
- Less water for homes, businesses, gardens and sports grounds;
- Increased risk of bushfires in catchments with possible impacts on water supply;
- Impacts on the health of rivers and streams (Melbourne Water, 2010).

It therefore makes sense to increase Melbourne’s water security by diversifying and making better use of alternative sources such as rainwater, stormwater, recycled wastewater and other sources and not relying solely on a single, centralised system supplied by existing catchments.

The cost of drinking water is set to continue increasing over the coming years. Under the National Water Initiative signed by all Australian Governments, water suppliers must move towards recovering the full cost of water supplied. Upgrades to water supply and sewerage infrastructure have led to increased costs for water retailers. Many growth areas are a long way from catchments making the transport of water and sewerage expensive. It makes economic sense to only use drinking water for drinking and to use lesser quality and locally available water for other uses, for example, rainwater for toilet flushing.

Population growth is predicted to increase steadily over the coming years, particularly in Melbourne’s north, west and south-east. This includes Craigieburn, Greenvale, Sunbury, Kalkallo and Mickleham. Hume is currently home to over 178,000 people and is expected to exceed 210,000 by 2020 (Forecast ID, 2011). Total water consumption in Hume can therefore be expected to rise, placing increasing pressure on Melbourne’s catchment supplies.

Hume’s waterways are an important aspect of the landscape and provide natural habitats and values in an otherwise modified environment. However, they have been affected by drought, pollutants and nutrients in poor quality runoff from urban and agricultural land, modified flows due to urbanisation (increased peak flows) and land clearance for agriculture, pest plants and animals and loss of in-stream habitat.

These factors have contributed to the condition of key values such as platypus, fish, birds and vegetation all being rated as low (Melbourne Water, 2013b)(see Table 1 below). Figure 4 below shows that although waterways in Hume (and Melbourne as a whole) may be in poor health, they are still significant in a regional context and should be protected and enhanced where possible.
Table 1 - Condition of key values in the upper Maribyrnong (Jacksons, Deep and Emu creeks).
(Source: Melbourne Water, 2013b)

<table>
<thead>
<tr>
<th>Key value</th>
<th>Condition</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platypus</td>
<td>Very Low</td>
<td>Platypus populations are very vulnerable, and have declined significantly since 1998.</td>
</tr>
<tr>
<td>Fish</td>
<td>Low</td>
<td>Fish populations have been fairly stable since the 1990s. There is a diverse community of fish, but only a moderate proportion of these are native.</td>
</tr>
<tr>
<td>Frogs</td>
<td>High</td>
<td>There is a high number of frog species, though this has declined as recently as the 1990s.</td>
</tr>
<tr>
<td>Birds</td>
<td>Low*</td>
<td>The abundance and variety of waterway-dependent bird species is low.</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Low**</td>
<td>Most streamside vegetation is of very low to moderate quality; however some small areas (mostly in the hilly headwaters) are very high.</td>
</tr>
<tr>
<td>Macro-invertebrates</td>
<td>Moderate</td>
<td>Macro-invertebrate conditions have remained stable since the 1990s – though this varies, with the highest being in forested waterways.</td>
</tr>
<tr>
<td>Amenity</td>
<td>Moderate</td>
<td>Amenity of the area.</td>
</tr>
</tbody>
</table>

* Streamside birds only - does not include wetlands
** Limited data used to determine this rating
Implementing integrated water management through the use of WSUD and stormwater harvesting in suitable locations would benefit Hume’s waterways by returning flows in developed catchments towards a more natural state, reducing pollutant loads in stormwater reaching receiving waterways, and providing flood mitigation through water retention and retardation.

The best quality waterways within Hume are located in undeveloped catchments. Waterways in the Sunbury growth corridor (the Jacksons, Deep and Emu Creeks) as well as the Kalkallo Creek are considered highly likely to be degraded if development proceeds within their catchments without the consideration of stormwater flows (velocity, duration and frequency of flows).

2.4 A snapshot of Hume

Hume City is located on the urban-rural fringe, between 15 and 45 kilometres north-west of Melbourne’s CBD. The municipality is bounded by the Macedon Ranges and Mitchell Shires to the north, the City of Whittlesea in the east, the Cities of Moreland, Brimbank and Moonee Valley in the south and Melton City to the west. Land uses within the municipality are diverse and include established residential areas, large industrial areas and areas committed for future urban growth (see figure 5 below). The majority of the municipality remains rural in nature. It is a large municipality covering 504km².

2.4.1 Strategic location

The City is renowned for its strategic positioning, located at the crossroads of the Hume Highway, Calder Highway, Hume Freeway and Metropolitan Ring Road. Melbourne Airport, the second busiest airport in Australia, is located within Hume and is a cornerstone of industry and employment within the municipality.

2.4.2 Population

Hume is home to over 178,000 people and growing (Forecast ID, 2011). Established suburbs in the south include Broadmeadows, Jacana, Dallas, Campbellfield, Coolaroo, Gladstone Park, Attwood, Westmeadows, and Meadow Heights.

Suburbs in the northern growth corridor are expanding substantially such as Greenvale, Craigieburn, Kalkallo and Mickleham. Sunbury in the west of Hume is also experiencing significant growth. The population of Hume is expected to exceed 210,000 by 2020 and 274,000 by 2030 or 2.38% growth per year (Forecast ID, 2011).

2.4.3 Rural landholders

The city comprises 65% rural land, 25% urban land and 10% is occupied by Melbourne Airport. There are over 1,900 rural land and house properties across Hume.
2.4.4 Natural heritage and environment

Hume supports many natural values including parks, bushland, threatened grasslands and waterways of national, state and regional significance. These include Organ Pipes National Park, Woodlands Historic Park, Emu Bottom Wetlands, Mt Holden Reserve, Evans Street Grasslands and the Merri, Moonee Ponds, Jacksons, Deep and Emu Creeks.

2.4.5 Hume catchments

The vast majority of Hume lies in the Yarra and Maribyrnong catchments, both of which flow to Port Phillip Bay. The Maribyrnong River is formed at the junction of Deep Creek and Jacksons Creek. The Emu, Blind and Kismet Creeks are smaller upstream tributaries. The Moonee Ponds Creek connects with the Maribyrnong River at its lower reaches. Smaller waterways upstream include the Yuroke and Attwood Creeks.

Merri Creek forms the municipal boundary between Hume and Whittlesea. Upstream tributaries in Hume include the Malcolm, Kalkallo and Merlynston Creeks.

These waterways are varied in characteristics and development. Some catchments are highly modified or fully urbanised including the Merri, Moonee Ponds and Steele Creeks. Some are in relatively good condition but may be impacted by future urban growth such as the Emu and Kalkallo Creeks.
3. **LEGISLATION AND POLICY**

### 3.1 Federal, State and Regional Policy

*Water for the Future* is the Federal Government's ten year, $12 billion plan to provide national leadership in water management based around the four priorities of taking action on climate change, using water wisely, securing water supplies and supporting healthy rivers. The plan includes a range of policies and plans including the National Urban Water and Desalination Plan and the Water Efficiency Labeling Scheme (WELS).

The *National Water Initiative (NWI)* was signed in 2004 at the Council of Australian Governments meeting and is “Australia’s blueprint for water reform” (National Water Commission 2011). By 2006 all Australian States and Territories had signed up to a “shared commitment to increase the efficiency of Australia’s water use, leading to greater certainty for investment and productivity, for rural and urban communities, and for the environment” (National Water Commission 2011).

State water planning includes:

- *Port Phillip and Westernport Regional Catchment Strategy* (2013)
- *Melbourne Water Healthy Waterways Strategy 2013*
- *Melbourne Water Stormwater Strategy 2013*

Melbourne’s Water Future has a vision to deliver an integrated and resilient water system, which is planned and managed to support liveable and sustainable communities, protect the environmental health of the urban waterways and bays, provide secure water supplies efficiently, protect public health and deliver affordable essential water services.

Under this overarching strategy, regional integrated water cycle management plans are being developed, two of which will cover parts of Hume (Water Future West and Water Future North).

### 3.2 Hume’s water policies

#### 3.2.1 Stormwater Management Plan 2000

The *Stormwater Management Plan* was adopted in 2000. It aims to improve the environmental management of stormwater to protect and enhance the beneficial uses and environmental values of receiving environments (such as the Yarra River). Council was supported by Melbourne Water, the Environment Protection Authority Victoria and the Municipal Association of Victoria under a State initiative to produce stormwater management plans for metropolitan Melbourne.

#### 3.2.2 Integrated Sustainable Water Management Plan 2004

In 2004, Council developed and adopted the *Integrated Sustainable Water Management Plan 2004*. This plan focussed on reducing Council’s drinking water consumption at facilities, ovals and reserves.
3.2.3 Hume Local Water Action Plan 2007: Milestone 3 of the ICLEI Water Campaign

The Hume Local Water Action Plan 2007 was developed based on its predecessor, the Integrated Sustainable Water Management Plan 2004. This plan was developed as a result of Council participating in the Water Campaign™ program, delivered by the International Council for Local Environmental Initiatives (ICLEI). This program aimed to improve municipal water management by addressing water conservation and quality within Council and the residential community sectors by implementing a five point (milestone) program.

The plan contained a target to reduce Council water consumption by 10% based on 2002-2003 figures.

3.3 Local policy

Locally relevant strategies related to waterway environments in Hume are the Moonee Ponds Creek Strategic Plan 2011 (Moonee Ponds Creek Coordination Committee) and Merri Creek Environs Strategy 2009-2014 (Merri Creek Management Committee). These creeks are major waterways in Hume.

3.4 Hume’s Strategic background

Appendix 1 outlines adopted Hume City Council plans, strategies and policies supporting the direction and implementation of the IWMP 2014-2017.
4. HUME’S PROGRESS SO FAR

4.1 Water efficiency in open space management

Since the adoption of the Local Water Action Plan 2007, various projects and programs have been implemented resulting in Council’s water consumption falling from 442ML per annum in 2006 to 224ML in 2013. The adopted target of reducing overall water consumption by 10% from 2002-03 figures has been exceeded.

Council’s greatest use of drinking water is sports ground irrigation. Water restrictions in place from August 2006 to December 2012 reduced the volume of water available for irrigation. To maintain sports grounds during the drought, strategies were adopted including the conversion of playing surfaces from cool season grasses to drought tolerant warm season grasses, upgraded irrigation infrastructure and increased use of alternative water sources, particularly recycled water. The irrigation of non-sporting grounds and garden beds ceased and both the number of sports grounds irrigated and the volume of water applied was reduced. The drought adversely impacted on Council’s ability to deliver playable sports grounds, some grounds could no longer be used for competitive sports and some green spaces in Hume degraded as a result.

The use of alternative water sources has increased steadily and is a major factor in Council’s reduced drinking water consumption. Recycled water is used at eleven sports grounds and the Craigieburn and Goonawarra golf courses. Stormwater is used to irrigate two sports grounds and groundwater used to irrigate a further two grounds. In addition, all new street trees are now irrigated with recycled water during establishment. Approximately 80ML of alternative water is in use at sports facilities in Hume. Appendix 2 shows a full list of alternative water use at Council owned sports facilities.

The new Hume community gardens have been developed with drinking water conservation in mind. Meadows Community Garden is connected to the large capacity rainwater tanks at Meadows Primary School and the Homestead, Craigieburn and Goonawarra Community Gardens all make use of harvested rainwater.

Figure 6: Trends in Council water use since 2000
4.2 Water efficiency in the built environment

The second highest users of water are the three public swimming pools; Broadmeadows Leisure Centre, Craigieburn Leisure Centre and Sunbury Aquatic and Leisure Centre. The Council Offices, Hume Global Learning Centre Broadmeadows and Hume Global Learning Centre Craigieburn are also all significant water users.

Upgrading Council buildings to improve their environmental performance is ongoing. Many facilities have large capacity rainwater tanks fitted for toilet flushing and other uses including Sunbury Aquatic and Leisure Centre, Craigieburn Leisure Centre, Broadmeadows Basketball Stadium and the Sunbury Depot. Tanks have been installed at over fifty small sites including club rooms, childcare and community centres. Extensive retrofitting to replace old taps, toilet cisterns and showerheads has also been completed. Rainwater tanks for toilet flushing, waterless urinals and 3 star rated showerheads and tap fittings were fitted in the Council Offices in Broadmeadows when built, helping it achieve a 5 star Green Star rating.

The future challenges are many. Continuing growth across many communities will mean that existing facilities will become more intensively used, some will be expanded where possible and new facilities built in order to provide quality services to new residents. This will need to be achieved against the projected impacts of climate change. It is expected that overall water consumption will rise so efficient water use will become increasingly vital.

4.3 Water efficiency in the community

The figures below demonstrate how everyone in the Hume community has substantially reduced their water use in response to severe drought. The Hume community has reduced its water use by over 10,500ML or 42% since 2000 (the equivalent of 4,200 Olympic swimming pools).

Figure 7 shows that the majority of drinking water in Hume is used in homes. In Australia 44% of drinking water is used outdoors for non-drinking purposes. (ABS, 2005).

![Water Use in Hume (2012-2013)](image)
Figures 8 to 10 show further details. Hume residents have reduced their water use by 60% from 452KL per household in 2001 to 160KL per household in 2012 (Figure 9). Hume businesses have cut their water use by 33% from 566KL per business to 496KL per business (Figure 10).
4.4 Hume’s waterways

Although urbanisation and agricultural land use have significantly affected waterways throughout Hume, they still support valuable indigenous flora and fauna and are often linked to remnant areas of vegetation which were once widespread. As such, Council, partner organisations, community groups and landowners have all worked to conserve and improve their condition.

4.4.1 Water sensitive urban design, structural works and revegetation

- Council manages forty eight WSUD systems, which help to remove pollutants and sediment from stormwater flows, reducing pollution loads to local waterways and Port Phillip Bay. The majority of these systems have been built as part of new developments in Sunbury and Craigieburn.
- In Broadmeadows town centre, the extension of Tanderrum Way was opened in May 2010. The extension links Pearcedale Parade to Dimboola Road past the recently completed Hume Central Secondary College. This street is a showpiece for WSUD and features a central swale, raingardens and permeable paving. New raingardens have also been planted along Pearcedale Parade opposite the Broadmeadows Shopping Centre, in the new car parks at Broadmeadows Leisure Centre and Youth Central.
- Council has installed and maintains over sixty gross pollutant traps to trap and prevent large pollutants, such as bottles and plastic wrapping from entering waterways.
- The Land and Agricultural Land Use Rate Rebate schemes are offered to rural landholders to help them manage their land productively and sustainably. Managing pest plants and animals on rural properties also has many positive benefits for local waterways.
- The Community Greening program offers a chance for residents to revegetate reserves and riparian zones in their local area.

Figure 11: An example of WSUD at Highlands, Craigieburn
4.4.2 Planning

- Developers are subject to Clause 56.07 (Integrated Water Management) in the *Hume Planning Scheme* which requires residential development sites to meet best practice conditions for stormwater flow and pollutant load reduction to receiving waters.

- The *Industrial Stormwater Code of Practice* was adopted into the *Hume Planning Scheme* in 2012. It applies to specific industrial developments and must be followed under planning permit conditions. It is designed to protect waterways from pollution arising from industrial development.

- Planning scheme overlays such as Environmental Significance Overlays (ESOs) are used to provide additional protection to waterways. Currently ESOs cover parts of the Jacksons, Deep, Emu, Merri and Moonee Ponds Creeks.

4.4.3 Education and enforcement

- Developers and builders are required to produce and implement a Site Environmental Management Plan (SEMP) during construction works. The SEMP covers all aspects of site management including sediment and run-off controls. Developers can be penalised under the *Planning and Environment Act 1987* for failing to meet the requirements of their SEMP.

- Council has a dedicated officer to provide litter and waste education services to the community, a key target for this work being to reduce the volume of litter in the municipality and therefore reducing volumes of litter entering waterways.

- Development sites are regularly inspected by Council officers to ensure compliance with planning permit conditions relating to site management including litter and sediment runoff.
5. HUME’S WATER AND POLLUTANT BALANCE

To improve the way in which water is managed in Hume, Council needs to understand Hume’s Water and Pollutant Balance.

5.1 What is a water and pollutant balance?

In a municipal context, a water balance describes the continuous movement of water in the municipality; where it comes from and flows to, in what form and what quantity, and what it is used for. It includes:

- The flow of water into, out of and throughout Hume, including rainfall, evapotranspiration, stormwater and wastewater;
- Examining these flows of water and examining their potential for use or re-use; and
- Quantifying the pollutants associated with stormwater in particular so that treatment can occur prior to entering waterways.

By managing all aspects of the water balance, Council can manage water in a truly integrated way to deliver multiple benefits over what could be achieved with the traditional approach. Hume’s water and pollutant balance diagram is shown in Figure 13 (this diagram shows the best understanding of the water balance as of 2012).

Figure 13: Hume Water and Pollutant Balance at 2012
5.2 What does the Hume water and pollutant balance tell us?

The water balance tells us that:

- Approximately 14,000ML of drinking water is used in Hume every year. Of this, only 5,645ML is actually used for human consumption. The rest is used for watering gardens, showering and flushing toilets.

- 31,200ML of stormwater flows down the drain and into waterways and Port Phillip Bay every year. Only 17ML is used by Council for irrigation.

- 9,600ML of wastewater flows from homes, businesses, commercial buildings, schools, community facilities etc. per year to be treated at Melbourne’s water treatment plants before discharge to Port Phillip Bay. Only 360ML is recycled.

- 61,300ML of rain falls on Hume every year. 28,200ML returns to the atmosphere through evapotranspiration but only 450ML per year is captured for use.

- The Hume municipality is 51% impervious. This means that just over half the city is covered in hard surfaces i.e. roads, roofs, pavements etc. These impervious surfaces cause stormwater and its associated pollutants to be carried directly into the stormwater drainage network without treatment.

It is clear that in theory there are considerable potential alternative water sources that could be exploited for appropriate uses, where the water quality is fit for the required purposes.

Note: These figures are derived from the *Hume Integrated Water Management Plan: Technical Background Study* (Design Flow, August 2012). The study area included the developed areas of Hume and those zoned for development under the Urban Growth Boundary (as of March 2012). Outlying semi-rural and rural areas were not included.

5.3 What are the main pollutants to Hume waterways?

The *Urban Stormwater – Best Practice Environmental Management Guidelines* (Victorian Stormwater Committee 1999) recognise three main pollutants as threats to aquatic environments; Total Suspended Solids (TSS), Total Nitrogen (TN) and Total Phosphorous (TP). Under the planning scheme, Victorian Planning Provisions Clause 56.07 requires that stormwater run-off from new residential subdivision developments meets the current best practice water quality objectives as stated in the guidelines. Current best practice is:

- 80% retention of typical urban annual suspended solids;
- 45% retention of typical urban annual total phosphorous load;
- 45% retention of typical urban annual total nitrogen load;
- 70% retention of typical urban annual litter load.

However, gross pollutants (litter) and sediments are also significant pollutants in urban waterways.
5.4 Where do these pollutants come from and what are their effects?

The water and pollutant balance tells us:

- 43% of TSS comes from industrial land use;
- 54% of TP and TN comes from residential land use;

**Total Suspended Solids (TSS)**

TSS are solids in water that can be trapped by a filter, including silt, plant material and pollutants. They are too small to settle out and remain in suspension. High concentrations cause problems for aquatic life by blocking light from reaching submerged vegetation. This slows down photosynthesis and so reduces dissolved oxygen released into the water. Depending on the scale of the problem, the result can be plant, invertebrate and fish deaths.

As plants decay, bacteria use up even more oxygen in the water, exacerbating the problem. High TSS can also increase water temperature because the suspended particles absorb heat from sunlight. This can cause dissolved oxygen levels to fall even further because warmer water holds less dissolved oxygen.

Heavy metals are also associated with TSS and include copper, lead, cadmium and zinc. These metals and others can be present in urban runoff in concentrations exceeding Australian guidelines. They are priority pollutants due to their toxicity to both animals and plants (Wendelborn et al, 2005).

**Total Phosphorous (TP)**

High TP levels, in conjunction with other nutrients and in the right conditions, can result in algal blooms including toxic blue-green algae. This excessive algal growth blocks sunlight which can cause some of the problems described above. Blue-green algae can be hazardous to human health and poisonous to domestic animals and stock.

**Total Nitrogen (TN)**

Like TP, TN is a nutrient. In rivers and lakes TN (ammonia, nitrate and nitrite) will become available for algal growth. High TN together with high TP and favourable conditions may result in algal blooms.

**Litter and Sediment**

Litter in the environment, as well as being unsightly and potentially polluting, can also cause problems for wildlife. Birds and other animals such as platypus can become entangled in items such as plastic bags.

Excessive sediment levels are a major contributor to loss of stream life and **biodiversity** (Melbourne Water, 2007). Additionally heavy sediment loads can block stormwater drains leading to an increased chance of flooding.
6. OPPORTUNITIES FOR IMPROVEMENT

Each of the themes holds challenges and opportunities for improvement. Actions to address these opportunities, when implemented together, will ensure that water is managed in an integrated way. The summary below highlights the challenges and opportunities under each theme. Actions identified to meet these opportunities are documented in the action plan.

6.1 Council water management in open space

- **Growth** – Hume is continuing to grow meaning greater volumes of water will be needed. This growth has supply, cost and environmental implications. The standard to which water needs to be treated depends on its purpose; not all water needs to be treated to drinking standard (e.g. toilet flushing does not require high quality water). Council uses the majority of its drinking water for irrigation (78%). Making full use of the alternatives (rainwater, stormwater, recycled water etc.) by investing in the necessary infrastructure will result in water savings, cost savings and many other benefits.

- **Climate change** – Climate change is expected to have impacts on open space management in the form of rising temperatures, increased evaporation and an increase in weather extremes such as very hot days and storms. This has implications for selection of plant species, water use and grounds maintenance. Using water efficiently is important but it does not mean stopping the watering of garden beds or other passive open space. Sites should be considered on an individual basis to ensure green spaces and attractive landscapes remain available for communities and are manageable, even in dry conditions. This will lead to health and social benefits, for example, usable sports grounds year round, and greater shade and cooling from the urban heat island effect.

![Figure 15: Recycled water mains at Highgate Recreation Reserve, Craigieburn](image)
### 6.2 Council water management in the built environment

- **Education** – Ultimately, Council’s water management is dependent on the behaviours and habits of staff and facilities users. The most up to date irrigation system or Green Star rated building is only as efficient as the people operating it. Relevant and engaging education programs are required to ensure systems operate to their full potential.

- **Data management** – “You can’t manage what you can’t measure” is an old management saying that still rings true. Accurate (water) data management is required to understand performance. Three water retailers provide Council with consumption data over hundreds of sites, Improving the way Council manages data will improve our understanding of water consumption and therefore management.
Building standards – Council has a large building stock, many of which are used or leased by the community and/or managed by other groups. This can be challenging from the point of view of maintaining consistent standards. Opportunities arise from the potential of engaging a large number of users in education programs, by retrofitting existing buildings, providing incentives for building users to use resources efficiently and ensuring new buildings have environmentally sensitive design and development principles incorporated from the outset.

Purchasing – is a decentralised function carried out by staff across numerous sites, purchasing a wide variety of products and services. The challenge is to maintain consistent standards. Opportunities exist to provide training and resources to ensure consistency in purchasing, including water efficient products and services.

6.3 Community water efficiency

Education and capacity building – Engaging an audience and building interest in water efficiency can be difficult. Opportunities exist for Council to influence and better demonstrate leadership by providing good examples of sustainable water use in public spaces including buildings and parks through relevant and accessible education and capacity building programs.

Communication and reporting – Communicating accessible, accurate and relevant information via the correct channels, to a diverse audience, can be demanding. There are often ways to improve the way Council provides environmental information. Good communication can change behaviour and perceptions of sustainability, including water consumption.

Working together – Achieving municipal wide goals requires close cooperation between many stakeholders. Productive partnerships take time and effort to foster and it is important to invest this time and energy to achieve the best results. The successful showerhead exchange program is just one example of a successful partnership program.

6.4 Hume’s Waterways

Education and interpretation – The long term drought rightly focussed attention on water conservation. However, as a result there has been less focus on waterway condition and the effect of the community’s actions on them. Education, incentives and interpretation focussing on waterways and WSUD in collaboration with the community could provide a better understanding of their importance and improve their condition.

Figure 18: Rainwater tanks at Sunningdale Children’s Centre, Sunbury
- **Poor stormwater quality** – Although education is a valuable tool to be used in environmental management, there also needs to be an effective deterrent against deliberate and inappropriate behaviours which increase pollution and are harmful to the environment. Consistent and regular inspection and where necessary enforcement activities should be an ongoing focus targeted at stormwater pollution including runoff from development sites, illegal dumping and poor stormwater controls on industrial premises.

- **Pest plants and animals** – If left unchecked, pest plants and animals can pose significant threats to indigenous wildlife, the health of stock and crops and neighbouring properties. Opportunities exist to improve sustainable land management activities on public and private land, an important tool in preventing damage to waterways. Weed management, erosion control, stock access, revegetation and preventing pollutants from entering the stormwater system are all vital to in-stream water quality.

- **WSUD and integrated water management** – There are obstacles to be overcome if the potential of integrated water management is to be fully realised. Methods of protecting wetlands and raingardens from building works and a better understanding of maintenance and resourcing requirements in particular is needed. Beneficial effects for waterways include the reduction of nutrients, sediments and pollutants from stormwater flows entering creeks, reducing peak flows (and therefore lessening the impacts of erosion and scouring of creek beds) and flood mitigation.

- **Land use planning** – Economic, social and environmental requirements need to be balanced. Effective planning to ensure development is more sustainable (e.g. Hume Planning Scheme Amendment C134 - Industrial Stormwater Code of Practice) is vital. Designing sustainability into development from the outset is considerably more efficient than doing so at a later stage.

---

**Figure 20:** Tanderrum Way extension launch event – the extended main street in Broadmeadows town centre incorporates significant WSUD elements
- **Environmentally Sensitive Design and Development (ESD)** – Opportunities exist to ensure development consistently aligns with ESD principles in the planning scheme for new subdivisions and infill areas, beyond the minimum requirements. A balance is needed so developers are able to implement requirements whilst homes and housing lots remain affordable.
7. **WHO IS RESPONSIBLE FOR MANAGING HUME’S WATER?**

The responsibilities for water management are wide ranging. The following tables (2 and 3) outline these responsibilities.

**Table 2 – Internal (Council) Water Management Responsibilities**

<table>
<thead>
<tr>
<th>Department</th>
<th>Structural Responsibilities</th>
<th>Non Structural Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parks and Open Space</td>
<td>Turf management.</td>
<td>Parks and open space policy development and review.</td>
</tr>
<tr>
<td></td>
<td>Irrigation infrastructure maintenance and upgrade.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>WSUD and wetland maintenance.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Open space and garden bed maintenance and design.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tree planting and maintenance.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Waterway revegetation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parks and open space policy development and review.</td>
<td></td>
</tr>
<tr>
<td>Strategic Planning</td>
<td>Water planning at a precinct scale.</td>
<td></td>
</tr>
<tr>
<td>Statutory Planning</td>
<td>Approval of planning permit applications.</td>
<td></td>
</tr>
<tr>
<td>Leisure and Youth Services</td>
<td>Aquatic, leisure, recreation and youth centre management.</td>
<td>Leisure policy development and review.</td>
</tr>
<tr>
<td></td>
<td>Sports and club room management and leasing.</td>
<td></td>
</tr>
<tr>
<td>Family and Children's Services</td>
<td>Maternal and child health centre and pre-school management.</td>
<td></td>
</tr>
<tr>
<td>Finance and Property Development</td>
<td></td>
<td>Property leasing agreements.</td>
</tr>
<tr>
<td>Subdivisions</td>
<td>Drainage, WSUD and landscape design planning</td>
<td>Planning future Council infrastructure requirements.</td>
</tr>
<tr>
<td></td>
<td>Referrals and approvals.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitoring and inspections.</td>
<td></td>
</tr>
<tr>
<td>Infrastructure Planning</td>
<td>Planning future Council infrastructure requirements.</td>
<td></td>
</tr>
<tr>
<td>Engineering and Assets</td>
<td>Construction of drainage infrastructure.</td>
<td>Design of drainage and WSUD infrastructure and asset management planning.</td>
</tr>
<tr>
<td></td>
<td>WSUD construction.</td>
<td></td>
</tr>
<tr>
<td>Capital Works</td>
<td></td>
<td>Capital Works program management.</td>
</tr>
<tr>
<td>Sustainable Environment</td>
<td>Community Greening Program.</td>
<td>Internal and external education programs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Environmental policy development and review.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Native vegetation planning referrals, offset management and enforcement.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stormwater planning referrals.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction site environmental management plan inspection and enforcement.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agricultural Land Use and Land Rate Rebate Schemes.</td>
</tr>
<tr>
<td>Services</td>
<td>Maintenance of drainage infrastructure.</td>
<td>Waste minimisation, litter and recycling policy development.</td>
</tr>
<tr>
<td></td>
<td>Facilities management of Council properties.</td>
<td>Recycling and litter education programs.</td>
</tr>
<tr>
<td></td>
<td>Domestic and commercial waste and recycling collection.</td>
<td>Building inspection, approval and enforcement.</td>
</tr>
<tr>
<td></td>
<td>Litter management.</td>
<td>Local law enforcement.</td>
</tr>
<tr>
<td></td>
<td>Landfill and resource recovery.</td>
<td></td>
</tr>
</tbody>
</table>
## Table 3 – External Agency Water Management Responsibilities

<table>
<thead>
<tr>
<th>Agency</th>
<th>Structural Responsibilities</th>
<th>Non Structural Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Melbourne Water</strong></td>
<td>Manage water supply infrastructure in Melbourne. Managers of waterways and drainage infrastructure for catchments greater than 60ha. Waterway revegetation programs. Regional drainage and WSUD schemes.</td>
<td>Bulk water suppliers to water retailers. Waterway, drainage and floodplain planning referral authority for the Port Phillip and Westernport Bay region. Stormwater and WSUD education and capacity. building to local government.</td>
</tr>
<tr>
<td><strong>Yarra Valley Water</strong></td>
<td>Water retailer - supply water and sewage services to all suburbs except Tullamarine, Sunbury, Bulla and Diggers Rest. Operator of Craigieburn water treatment plant.</td>
<td>Delivery of community education programs. Delivery of business programs.</td>
</tr>
<tr>
<td><strong>Western Water</strong></td>
<td>Water retailer - supply water and sewage services to Sunbury, Bulla and Diggers Rest. Operators of Sunbury water treatment plant.</td>
<td>Delivery of community education programs. Delivery of business programs.</td>
</tr>
<tr>
<td><strong>City West Water</strong></td>
<td>Water retailer - supply water and sewage services to Melbourne Airport and parts of Tullamarine</td>
<td>Delivery of community education programs. Delivery of business programs.</td>
</tr>
<tr>
<td><strong>Merri Creek Management Committee</strong></td>
<td>Facilitation of landscape restoration projects.</td>
<td>Implement regional catchment strategy.</td>
</tr>
<tr>
<td><strong>Moonee Ponds Creek Coordination Committee</strong></td>
<td>Advocacy for the protection and sustainable development of the Moonee Ponds Creek. Project implementation with partner organisations.</td>
<td></td>
</tr>
<tr>
<td><strong>Port Phillip and Westernport Catchment Management Authority</strong></td>
<td>Various voluntary activities including community planting, litter collection etc.</td>
<td>Monitoring activities.</td>
</tr>
</tbody>
</table>
8. LOOKING TO THE FUTURE

Hume will be impacted by both climate change and population growth. This has potential implications for the whole community, placing greater pressure on water supplies, open spaces and natural environments. Change and adaptations need to be made to avoid adverse impacts.

8.1 How much water will the Hume community need in the future?

By 2030, the developed / urbanised area of Hume will be almost double the current area. Consequently, drinking water use in the municipality will increase from around 14,000ML in 2012 to about 20,000ML by 2030, assuming 100% development out to the current urban growth boundary.

8.2 How much water will Council need in the future?

It is impossible to determine exactly how much water Council will need, but consumption will certainly increase as existing facilities are used more intensively and new facilities are built to cater for the growing community. In 2013-13 alone, new developments included the completion of the new Broadmeadows Community Hub, the extension of Boardman Stadium, Sunbury and construction starting on the new Hume Regional Tennis and Community Centre in Craigieburn. Council has a good history of embracing new technologies to reduce water consumption and a continuation of this approach will result in water being used more efficiently per capita.

8.3 What implications will this have for the water cycle and pollutant balance?

The water and pollutant balance demonstrates (assuming development proceeds as planned) unmitigated stormwater runoff would increase by approximately 45% by 2020 (relevant to 2012) and pollutant loads by a similar amount if no action was taken. By 2030 this would increase to 90% (relevant to 2012).

8.4 What will the effects on Hume’s waterways be?

The catchments which will be most impacted by development are those which have little current development i.e. the currently rural and semi-rural catchments. These are the Emu and Kororoit Creeks in Sunbury and the Malcolm and Kalkallo Creeks in the Hume growth corridor. If no mitigation action is taken, a 90% increase in stormwater flow by 2030 would have a significant impact on these waterways, as would the associated stormwater pollutants.

However, because these catchments aren’t isolated, increased flows and pollutants will also affect downstream catchments such as the Moonee Ponds and Merri Creeks and the Deep and Jacksons Creek catchments. This is important because the Merri Creek has already suffered from poor water quality caused by industrial pollutants and high sediment loads from construction sites. The Deep and Jacksons Creek are still in relatively good condition and it is desirable to protect these areas as community assets.
9. GOALS, OBJECTIVES AND TARGETS

The following goals represent Council’s strategic direction for water management in Hume over the next four years. They are set out under the four themes of Council water management in open space, Council water management in the built environment, Community water efficiency and Hume’s waterways.

**Goal 1: Excellence in Integrated Water Management**

Council aims to demonstrate excellence in integrated water management by implementing projects and programs that progress towards the achievement of long term targets. Council will need to work in collaboration with others to meet these targets.

**Goal 2: Community Learning and Action**

Municipality wide progress towards integrated water management requires community support. A range of practical on ground projects, education and capacity building will contribute to the goal of improving all aspects of water management.

**Goal 3: Influence and Advocate**

This includes influencing the actions of external organisations and advocating for improved support and the regulatory environment that supports integrated water management.
## GOAL 1: Excellence In Integrated Water Management

### Council Water Efficiency In Open Space Management

<table>
<thead>
<tr>
<th>Our objectives</th>
<th>Our commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve water management in Hume’s open space</td>
<td>Improve the efficiency of outdoor water use.</td>
</tr>
<tr>
<td>Reduce drinking water use in open space</td>
<td>Increase use of non-drinking water sources (stormwater, recycled water etc).</td>
</tr>
<tr>
<td>Improve data management and increase understanding of water use in open space</td>
<td>Ensure water is managed in a responsible way and reduce unnecessary consumption.</td>
</tr>
<tr>
<td>Gain support for and create awareness of Hume projects at a state/federal level</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KPI</th>
<th>KPI measure</th>
<th>KPI baseline</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPI 1: Increase use of alternative water sources (e.g. recycled water, stormwater).</td>
<td>Percentage of total water use.</td>
<td>2011 (33% of total water use from alternative sources)</td>
<td>T1: Increase proportion of non-potable water use to 36% of Council total by 2016, 40% by 2020 and 50% by 2030.</td>
</tr>
</tbody>
</table>

### Council Water Efficiency In The Built Environment

<table>
<thead>
<tr>
<th>Our objectives</th>
<th>Our commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve water efficiency of Council buildings</td>
<td>Efficient use of water to improve environmental performance and minimise costs.</td>
</tr>
<tr>
<td>Improve water management in Council buildings</td>
<td>Avoid unnecessary water consumption.</td>
</tr>
<tr>
<td>Improve data management and increase understanding of water use in the built environment</td>
<td>Council investment in water management has optimal economic, environmental and social outcomes.</td>
</tr>
<tr>
<td>Ensure water efficiency is integral to procurement and development decisions</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KPI</th>
<th>KPI measure</th>
<th>KPI baseline</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPI 2: Improvement in Council’s water use efficiency.</td>
<td>Reduction in Council’s drinking water consumption.</td>
<td>2011</td>
<td>T2: Reduce Council’s average annual water use by 10% per capita by to 2016.</td>
</tr>
</tbody>
</table>

### Community Water Efficiency

<table>
<thead>
<tr>
<th>Our objectives</th>
<th>Our commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase availability and uptake of non-drinking water sources in Hume</td>
<td>Explore ways of making non-drinking water and water efficient technologies more accessible.</td>
</tr>
<tr>
<td>Improve the sustainability of homes in Hume</td>
<td>To manage water in a responsible way and assist Hume residents to do likewise.</td>
</tr>
<tr>
<td>Continue to promote the message of efficient water use to the Hume community</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KPI</th>
<th>KPI measure</th>
<th>KPI baseline</th>
<th>Target</th>
</tr>
</thead>
</table>
### Hume’s Waterways

#### Our objectives

**Improve waterway quality in developed catchments by addressing stormwater runoff and associated pollutant loads**

**Mitigate the effects of urban growth in Hume’s undeveloped catchments**

- Achieve better WSUD design and function
- Achieve better accountability, coordination of activities and maintenance
- Improve monitoring of WSUD and progress towards targets
- Review targets and actions to ensure relevancy
- Improve corporate knowledge and skills

#### Our commitment

- Take action to improve stormwater flows and mitigate stormwater pollutants.
- Ensure developers deliver effective water quality infrastructure.
- Ensure priority waterways in currently undeveloped catchments are protected from future urbanisation.
- Improve quality of WSUD systems in Hume.

#### KPIs

<table>
<thead>
<tr>
<th>KPI</th>
<th>KPI measure</th>
<th>KPI baseline</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>KPI 4:</strong> WSUD systems constructed by Council.</td>
<td>Number of WSUD systems.</td>
<td>2011</td>
<td><strong>T4:</strong> Complete the 23 WSUD systems (or equivalent projects) recommended in Technical Background Study by 2030 (two by 2016)</td>
</tr>
<tr>
<td><strong>KPI 5:</strong> Prevent TSS, TP and TN from reaching Hume’s waterways.</td>
<td>Kilograms of pollutants (modelling of systems).</td>
<td>2011</td>
<td><strong>TS:</strong> Reduction of TSS of 36%, TP by 25% and TN by 21% from stormwater flows by 2020. Reduction of TSS by 47%, TP by 31% and TN by 27% from stormwater flows by 2030.</td>
</tr>
</tbody>
</table>
## GOAL 2: Community Learning And Action

### Council Water Efficiency In The Built Environment

<table>
<thead>
<tr>
<th>Our objectives</th>
<th>Our commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate leadership in responsible water management</td>
<td>Demonstrate Council commitment to responsible water management.</td>
</tr>
<tr>
<td><strong>KPI</strong></td>
<td><strong>KPI Measure</strong></td>
</tr>
<tr>
<td>KPI 6: Public buildings with implemented demonstration projects.</td>
<td>Number of projects</td>
</tr>
</tbody>
</table>

### Community Water Efficiency

<table>
<thead>
<tr>
<th>Our objectives</th>
<th>Our commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build community capacity and knowledge of water use efficiency and Hume’s waterways</td>
<td>Develop and run ongoing community water education. Build community interest in Hume’s waterways.</td>
</tr>
<tr>
<td><strong>KPI</strong></td>
<td><strong>KPI Measure</strong></td>
</tr>
<tr>
<td>KPI 7: Increase number of opportunities for residents to take part in water themed education.</td>
<td>Number of events</td>
</tr>
</tbody>
</table>

### Our objectives                                                                 | Our commitment                                                                 |
| Improve water education in Hume                                                | Support Hume schools to deliver and demonstrate water education.               |
| **KPI**                                                                        | **KPI Measure** | **KPI baseline** | **Target** |
| KPI 8: Schools participating in recognised water education program.            | Number of schools | 2012             | T8: Support two schools per year to complete recognised water program by 2016. |
**Hume’s Waterways**

<table>
<thead>
<tr>
<th>Our objectives</th>
<th>Our commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve community understanding of waterway issues and WSUD</td>
<td>Implement WSUD interpretation projects.</td>
</tr>
<tr>
<td></td>
<td>Promotion of WSUD and related activities, implement community planted rain gardens.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KPI</th>
<th>KPI Measure</th>
<th>KPI baseline</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPI 10: Community planted WSUD systems.</td>
<td>Number of community planted systems</td>
<td></td>
<td>T10: Two WSUD community planted projects by 2016.</td>
</tr>
</tbody>
</table>

**Our objectives**

Improve site environmental management practices at industrial and residential development sites

<table>
<thead>
<tr>
<th>KPI</th>
<th>KPI Measure</th>
<th>KPI baseline</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPI 11: Industrial premises engaged.</td>
<td>Number of industrial premises</td>
<td></td>
<td>T11: 90% of industrial premises engaged per year.</td>
</tr>
<tr>
<td>KPI 12: Residential development sites engaged.</td>
<td>Number of residential sites engaged</td>
<td></td>
<td>T12: 90% of residential development sites engaged per year.</td>
</tr>
</tbody>
</table>

**GOAL 3: Influence And Advocate**

**Hume’s Waterways**

<table>
<thead>
<tr>
<th>Our objectives</th>
<th>Our commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous improvement in water management reporting and promotion</td>
<td>Monitor, review and assess programs and make improvements as necessary.</td>
</tr>
<tr>
<td>Advocate to Federal and State Government agencies regarding circumstances affecting Council’s ability to deliver integrated water management</td>
<td></td>
</tr>
</tbody>
</table>
### Appendix 1: Strategic Background

<table>
<thead>
<tr>
<th>Council Plan/Strategy</th>
<th>Key Actions Associated with the Integrated Water Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hume City Plan 2030</strong></td>
<td></td>
</tr>
<tr>
<td><em>The Natural Environment</em>: Hume City is committed to sustainable development and aims to be a leader in environmental sustainability. Land use change, the drought, water restrictions and climate change are just some of the challenges currently facing Hume. These challenges highlight the importance in planning for a sustainable future and improving the efficiency of our assets and infrastructure.</td>
<td>By 2016: Establish and participate in programs to reduce stormwater pollution from industry and residents. By 2016: Advocate to all levels of government to set best practice standards and targets for protecting and enhancing our environment, and include these in the Municipal Strategic Statement. By 2016: Encourage the use of water harvesting, reuse and recycling systems in new subdivisions and other redevelopments. By 2030: Ensure that landscaping and parks are designed to minimise the use of irrigation water and establish systems to use alternative water sources whenever possible.</td>
</tr>
<tr>
<td><strong>Hume City Council Plan 2009-2013</strong></td>
<td>Strategic Objective 4.3.5: Reduce potable water consumption across parks and recreation facilities through efficiency measures, rainwater harvesting and use of recycled water, develop and implement programs that improve the quality of water, develop water use reduction targets and programs and incorporate environmentally sustainable design (ESD) aspects into all major buildings.</td>
</tr>
<tr>
<td><strong>Hume Natural Heritage Strategy 2011 – 2015</strong></td>
<td>W3: Undertake catchment management in collaboration with other Council’s and organisations. W4: Strengthen Council guidelines to enhance protection of waterways in Hume. W5: Build the capacity of rural landowners to manage waterways on their land.</td>
</tr>
</tbody>
</table>

---

**Note:** This text represents a snapshot of the original content, focused on providing a clear and readable format suitable for text-based analysis and extraction.
**Council Plan/Strategy** | **Key Actions Associated with the Integrated Water Management Plan**
---|---
The *Hume Greenhouse Action Plan for Council Operations 2009 – 2011* (GAP) is located within the context of the strategic priorities of Council’s Pathways to Sustainability Framework. The GAP contains actions to achieve sector based targets for building design, waste management and recycling, and greenhouse gas emission reductions from Council’s six largest buildings, public lighting and fleet. | **Buildings Objective 2:**
Finalise the Capital Works Approval Form and process to ensure ESD (and other considerations such as Maintenance and Social Justice) are integrated into Capital Works planning.

Finalise the ESD Assessment process (for new large facilities) and ESD Checklist / Tender Schedule (for new small facilities).

ESD training undertaken by relevant staff (e.g. Capital Works, Services, Leisure and Youth Services, Environmental Sustainability).

Continue to select and purchase new appliances with high energy ratings, where possible.

Integrate energy and water considerations into Council’s five-yearly Building Service Audit (due 2016).

**Buildings Objective 5:**
Develop signage at one or more of Council’s largest facilities and priority small (community) facilities outlining environmental features.

**Data Management Objective 3:**
Set up an internal dashboard reporting process, whereby facility managers of key facilities will receive regular energy, water and greenhouse performance data for their facility.

**Live Green Work Green Program: 2010 – 2013**
*Live Green* is Council’s community environmental education program. This strategy contains the approach Hume City Council will take to ensure the program is delivered effectively for Live Green participants. It includes the Live Green program themes, objectives, key performance indicators, initiatives, communication approach, as well as monitoring and evaluation. | **Objective 2.2:**
Deliver interactive environmental workshops to community groups and individuals.
## Appendix 2: Existing alternative water schemes

<table>
<thead>
<tr>
<th>Reserve</th>
<th>Location</th>
<th>Grounds Irrigated</th>
<th>Water Source</th>
<th>Average Annual Usage (ML)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunbury Recreation Reserve</td>
<td>21-43 Riddell Road Sunbury</td>
<td>1x oval</td>
<td>Class B recycled</td>
<td>15</td>
</tr>
<tr>
<td>Langama Park</td>
<td>109 Mitchells Lane Sunbury</td>
<td>5x ovals</td>
<td>Class B recycled</td>
<td>15</td>
</tr>
<tr>
<td>Boardman Reserve</td>
<td>Mitchells Lane / Wilsons Lane Sunbury</td>
<td>3x ovals</td>
<td>Class B recycled</td>
<td>15</td>
</tr>
<tr>
<td>Goonawarra Golf Course</td>
<td>2 Francis Boulevard Sunbury</td>
<td>18 hole golf course</td>
<td>Class B recycled</td>
<td>150</td>
</tr>
<tr>
<td>Highgate Recreation Reserve</td>
<td>Cleveland Drive Craigieburn</td>
<td>2x ovals</td>
<td>Class A recycled</td>
<td>20</td>
</tr>
<tr>
<td>Lakeside Drive Reserve</td>
<td>55-73 Lakeside Drive Roxburgh Park</td>
<td>2x ovals</td>
<td>Stormwater</td>
<td>10</td>
</tr>
<tr>
<td>Greenvale Recreation Reserve</td>
<td>185-195 Section Road Greenvale</td>
<td>2x ovals</td>
<td>Stormwater / potable water recycling</td>
<td>7</td>
</tr>
<tr>
<td>J Laffan Reserve</td>
<td>670 Donnybrook Road Kalkallo</td>
<td>2x ovals</td>
<td>Groundwater</td>
<td>7</td>
</tr>
<tr>
<td>Craigieburn Golf Course</td>
<td>Craigieburn Road West Craigieburn</td>
<td>18 hole golf course</td>
<td>Class B recycled</td>
<td>100</td>
</tr>
</tbody>
</table>

**Total:** 340
References


Forecast ID, 2011. Hume City Council Population Forecasts


Melbourne Water, 2013b. Healthy Waterways Strategy


**Glossary**

**Biodiversity**: Biological diversity – the number and types of plant and animal species that exist in a particular environmental area or in the world generally.

**Black water**: The waste water flushed from toilets.

**Ecosystems**: A community of living organisms (plants, animals and microbes) in conjunction with the nonliving components of their environment e.g. air and water interacting as a system.

**Ecologically Sensitive Design and Development (ESD)**: A building designed to be environmentally sound using sustainable design principles e.g. efficient resource use, renewable energy sources, low energy use, recycled and recyclable construction materials, and blending in with the local environment. The aims are to reduce to a minimum the environmental impact, and to take human health factors into consideration.

**Flagship**: An area identified within Hume containing large patches of native vegetation or waterway environments that provide habitat for a range of indigenous flora and fauna species.

**Grey water**: Water that has been used previously for laundry uses or washing (bath or shower, not kitchen) that can be reused for another use, either with or without treatment.

**Gross Pollutant Trap (GPT)**: A structure designed to filter and trap large pollutants (>5mm) such as litter from stormwater prior to discharge to waterways.

**Ground water**: Water accumulated below ground in an aquifer.

**Integrated Water Management**: A whole-of-cycle approach to water resource management, considering environmental, economic and social issues. It incorporates adaptive management, participation and a holistic approach to planning, development and implementation.
**Liveable / Liveability:** Encompasses the characteristics or qualities that make a place worth living in; related to quality of life.

**Recycled Water:** Wastewater that has been treated to a standard suitable for re-use for beneficial purposes. It is treated and supplied (either through a reticulated network or carted) to different standards for different purposes.

**Stormwater:** Rainfall runoff from impervious surfaces in urban areas e.g. roads, pavement, roofs that flows to stormwater drains.

**Stormwater harvesting:** Rainwater that runs off impervious surfaces and is collected and treated for subsequent re-use.

**Urban Heat Island effect:** The phenomenon whereby urban areas are warmer than the non-urban surrounds due to concrete and asphalt absorbing heat.

**Wastewater:** Any water which has been used at least once and cannot be used again without being treated. Treated wastewater can often be recycled for various purposes, depending on the level of treatment (Developing a Strategic Approach to WSUD Implementation – Guidelines for Councils, Melbourne Water 2011).

**Water Sensitive Urban Design (WSUD):** Embraces a range of measures that are designed to avoid, or at least minimise, the environmental impacts of urbanisation. WSUD recognises all water streams in the urban cycle as a resource. Rainwater, stormwater, drinking water, greywater, and blackwater possess an inherent value (Developing a Strategic Approach to WSUD Implementation – Guidelines for Councils, Melbourne Water 2011).