TOWN OF VINCENT

Water Conservation Plan

(WCP)

for the

Town of Vincent

October 2008

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1. Overview

The Town of Vincent conducted a Water Conservation Planning workshop on 14th November 2007 with representatives from the irrigation, parks and environmental sections attending. The aim of the workshop was to identify issues and develop objectives, strategies and actions to manage water more sustainably.

A component of a WCP is the collection, validation, collation and reporting of groundwater use and efficiency data. This data has been collected and a summary is presented in this report.

Groundwater resource summary

The breakdown of use and allocation by water resource for Town of Vincent's licensed allocation is shown in the following table for 2006/07:

Table 1.2 Water use

Water resource	**Superficial**
Water use (kl/yr 2007/08)	587,561
Allocation (kl/yr)	629,175
Over/under % (amount)	6.6% under
Irrigated area (ha)	83.20
Av water use/ha irrigated (kl/ha/yr)	7,060
# bores	63
# irrigated parks & reserves	58

2. Water demand

The demand for Groundwater within the Town of Vincent over the next 5 years is expected to remain the same as 2007/08 levels.

3. Major issues

The major groundwater issues facing the Town of Vincent over the next 3-10 years are listed below.

Table 3.1 Water Conservation issues

1. Do not have an accurate measurement of water use.
2. An accurate assessment of irrigated area is needed.
3. Around 10% of irrigation systems require an overhaul.
4. More accurate irrigation scheduling is required to ensure efficiency of water use. Some soil moisture monitoring is undertaken but will require a program and further training.
5. No centralised control systems for measuring and monitoring water consumption.
6. Lack of control over some leased premises - this requires monitoring and documentation.
7. Any cut back in water use will require community consultation.
8. Need to assess and address Hyde Park environmental issues.
9. Lack of resources (staff) to achieve the outcomes of the WCP
10. Some acid sulphate soils (Banks Reserve & Hyde Park) needs monitoring
11. Some areas do not have a water licence.
12. Turf matt layer compaction is reducing water infiltration.
13. Weeds (particularly Parramatta grass) become a problem with decreased water and increased use.

4. Water conservation goals and objectives

Goal

To maintain turf/garden areas within the Town of Vincent at a standard acceptable to the community and sporting clubs by applying groundwater efficiently and effectively in complying with the Department of Waters licenced allocation.

Objectives

The main groundwater conservation objectives for Town of Vincent to achieve over the next 10 years are listed in the table below:

Table 4.1 WCP Objectives

1. To measure the annual volume of groundwater being used to irrigated turf/gardens in the Town of Vincent and compare this with the licenced allocation – achieve this by 2017.

2. To measure accurately the total irrigated turf and garden areas within the Town of Vincent and compare this with the licenced irrigated area – achieve this by June 2008.

3. To have more control over the scheduling of irrigation to improve water and labour efficiencies – achieve this by 2012.

4. Review the Town of Vincent's Public Open Space (POS) with the intention of categorising all parks and reserves to assess the potential for saving water by hydrozoning and by improving the performance of irrigation systems – achieve this by 2010.

5. Establish a monitoring program for environmentally sensitive areas such as Hyde Park and Banks Reserve to include the monitoring of static bore levels, wetland and vegetation condition and water quality – achieve this by 2010.

6. To educate and inform the Council and the community of the Town of Vincent's Water conservation plan – achieve this by December 2008.

5. Water conservation strategies

The Town of Vincent has identified 8 strategies that will be undertaken to achieve the objectives outlined above. These strategies are listed below and are covered in detail over the remainder of this plan.

Table 5.1 WCP Strategies

1. Measure irrigated areas and record water consumption to accurately determine total "actual" water use.
2. The progressive incorporation of watering categories and hydrozoning across all irrigated areas within the Town of Vincent.
3. Improve the performance of irrigation systems.
4. Implement improved irrigation scheduling practices.
5. Maintain irrigation systems at optimum performance.
6. Prepare and implement "water conservation design guidelines" for the development of new turf/garden areas or the redevelopment of existing turf/garden areas.
7. Monitor the impact of groundwater abstraction on environmentally sensitive areas.
8. Communicate the outcomes of the WCP to the Council and the general community.

5.1. Strategy 1

Measure irrigated areas and record water consumption to accurately determine total "actual;" water use.

The purpose of this strategy is to accurately determine the Town of Vincent's actual groundwater use and actual irrigated area. This information will be used to determine baseline information from which conservation and efficiency measures can be compared against.

Current situation

The table below summarises Town of Vincent's water use and metered and non-metered irrigated area.

Table 5.1.1 Town of Vincent's water use and irrigated area.

Aquifer and sub-area	No of bores	# meters	% area metered	Water use (kl/yr)
Superficial	63	0	0	629,175

High quality data is required to accurately measure water use and irrigated areas. Town of Vincent's data quality ratings are listed below.

Table 5.1.2 Town of Vincent's data quality rating

Aquifer and sub-area	Water use data quality rating	Area data quality rating.
All licences and aquifers	**	****

The assessment of quality is described using the rating scale below:

Area		**Water Use**	
*****	CAD or GIS > 1:2000	*****	Approved meter
****	CAD or GIS < 1:2000	****	Non approved meter
***	From aerial photo	***	Central control – run times x pump output
**	Manual from maps	**	No control - run times x pump output
*	Licenced area	*	Educated Guess or don't know

A 5 star rating is required to ensure accuracy of areas and water use.

Planned targets

The Town of Vincent's 10 year target for water use and metering within the POS area is listed in the following table.

Table 5.1.3 Town of Vincent targets

Aquifer and sub-area	No of bores	# meters	% area metered	Water use (kl/yr)
Superficial	63	63	100	Less than 629,175

The Town of Vincent plans to have 100% of irrigated turf monitored using meters by 2017.

It is important that the Department of Water (DOW) is informed of the meter type and installation procedures before a metering program begins.

The Town of Vincent aims to achieve a 5 star data quality rating for the total irrigated area under management over a 10 year period. This will require using CAD or GIS at >1:2000 to calculate the areas of all irrigated turf.

Action	**Timeframe**
Verify with the Department of Water that all future flow meters fit their approval requirements.	Immediately
Map all irrigated area using GIS >1:2000 for all 25 leased and active reserves	Within 6 months
Install flow meters on all active reserves	Within 5 years
To complete the roll-out of flow meters across all bores in the Town of Vincent.	Within 10 years

5.2. Strategy 2

The progressive incorporation of watering categories and hydrozoning across all irrigated areas within the Town of Vincent.

Purpose of Strategy

The purpose of this strategy is to become site-specific with the allocation of groundwater to turf/garden areas within the Town of Vincent.

For example, being able to vary the amount of water being applied to different categories of parks such as major, minor, active and passive reserves.

Current practice

The Town of Vincent has to date not allocated specific categories/zones to reserves in terms of watering requirements, however in general active reserves receive more water than passive reserves and more high profile reserves receive more water than others.

Planned targets

A review of all POS will be undertaken with the aim of allocating parks a watering category/zone and identifying the potential for hydrozoning. The suggested categories and corresponding water allocation are listed below: (see appendix 1 for information on watering categories and hydrozoning)

Category or zone	Allocation
1. 1st grade and club sporting grounds	10,000 kl/ha/yr
2. Lower grade sporting activity or high profile high use areas such as LGA admin centres and parks with regular functions	7,500 kl/ha/yr
3. Low use low profile parks or areas surrounding active ovals/major passive areas	6,000 kl/ha/yr
4. Low use low profile parks or areas surrounding active ovals/major passive areas or verges	5,000 kl/ha/yr
5. Dry POS, bush, dry parks, dry verges etc.	0 kl/ha/yr

The following actions will be undertaken by the Town of Vincent to categorise and hydrozone all areas of POS.

Action	Timeframe
Apply categories to all POS across the Town of Vincent; complete this in conjunction with determining accurate irrigated turf areas.	Within 12 months
Investigate the opportunity to Hydrozone areas within all parks and reserves.	Within 12 months
Link category allocation to water budgeting, for example apply water to category allocation and monitor use on a monthly basis using flow meters.	Within 12 months

5.3. Strategy 3

Improve the performance of irrigation systems

Irrigation audits are the best way to assess the performance of an irrigation system.

Current practice

A limited number of system audits have been conducted on parks within the Town of Vincent. There is a requirement to undertake audits across all parks to determine the efficiency of systems and prioritise a replacement or retrofitting program for poor performing systems.

The new or retrofitted systems will be designed to achieve a CU of 85% or greater and will be audited by a certified irrigation auditor.

Table 5.3.1 Co efficiency of Uniformity and audits

Water source	**Performance**		
	Av DU	**Av. CU**	**No of audits**
Leederville	N/A	N/A	N/A
Superficial		71.4	1
Average			

Planned targets

The irrigation industry benchmark for irrigation systems in Perth is a CU of 85%. It is suggested that Town of Vincent aims for this level of performance across all major POS areas commencing with the high priority active and high priority parks.

Action	Timeframe
Complete audits across category 1 reserves to identify poor performing systems and establish a priority maintenance and system replacement program in order to achieve a CU of 85%.	Within 12 months
Complete audits across all remaining categories to identify poor performing systems and establish a priority maintenance and system replacement program in order to achieve a CU of 85%.	Within 3 years

5.4. Strategy 4

Implement improved irrigation scheduling practices.

This strategy aims to apply irrigation water efficiently and effectively. Irrigation scheduling involves matching the water used by the turf with the regular application of irrigation water (taking into account any rainfall events and prevailing weather conditions). Matching irrigation with turf water requirements will result in greater water use efficiencies and potential water savings.

Current practices

The Town of Vincent assess how much water and how often to apply it by using the following information

- Visual assesment
- Historical averages
- Soil moisture monitoring

The major watering decisions are mainly made by historical run times, some soil moisture monitoring and weather conditions. To be more efficient and conserve water the Town of Vincent may look at the following practices for irrigation scheduling:

- Compare actual water use against budgeted amount on a monthly basis and adjust usage based on targeted allocation for the hydrozone.
- Set run times monthly for each park based on historical evaporation data, the category, the irrigation system precipitation rate and the uniformity of the irrigation system.
- Monitor weather so that run times can be adjusted due to un-seasonal weather or rainfall.

Action	Timeframe
Review the scheduling of irrigation and consider the use of irrigation budgeting to monitor water use across category 1 parks on a monthly basis.	Immediately
Use station run times to estimate water use across category 1 parks.	Immediately
Town of Vincent irrigation staff to use moisture probes to monitor soil moisture content.	Immediately
Apply irrigation budgeting across all remaining categories.	Within 3 years

5.5. Strategy 5

Maintain irrigation systems at optimum performance.

For the same reasons outlined in Strategy 3 it is important that any irrigation system works at its peak performance, so that uniformity of application is maintained. In addition, any leaks in the system need to be identified early to stop wastage.

A well maintained irrigation system helps prevent problems occurring and reduces water loss.

Current practices

The following table outlines the maintenance program for the Town of Vincent.

Fault fixing	System checks	System audits	# parks not on centralised control	# parks on centralised control
Fortnightly	Weekly	Never	all	nil

Fault fixing – leaks, sprinklers not working etc, *System checks* – hydraulic, pressure, blockages, meters working etc, *System audits* – CU/DU, pressure tests system output tests.

The Town of Vincent is maintaining irrigation systems to an acceptable ~~good~~ standard. The main long-term focus is to introduce a centralised control system to save labour, identify faults and have more control over the watering regimes, irrigation scheduling and water conservation and efficiency.

Action	Timeframe
To identify a suitable centralised control system for the Town of Vincent	Within 3 years
To have all category 1 parks connected to the centralised control system.	Within 5 years
To have all category 2 parks connected to the centralised control system.	Within 10 years

5.6. Strategy 6

Prepare and implement "water conservation design guidelines" for the development of new turf/garden areas or the redevelopment of existing turf/garden areas.

It is important that a set of guidelines are available to assist park managers in the design of water efficient parks by providing specifications and standards required for the installation of efficient irrigation systems. These guidelines will aim to conserve water and maintain an area of turf/garden acceptable to the general community.

This strategy is important for the implementation of many of the preceding strategies.

Current practice

There are no water conservation specifications or guidelines for the development or redevelopment of turfed/garden areas within the Town of Vincent. To ensure new areas of turf/garden that are developed follow "waterwise" principals a set of guidelines or a basic checklist is required, for example:

1. When re-designing or constructing a new park, reduce the area of turf to be irrigated, and select low water use turf or plant species where practical.
2. Designing of the irrigation control system to accommodate hydrozones.
3. Use low water use plants.
4. A Coefficient of Uniformity greater than 85%.
5. A manageable number of stations per bore.
6. One main sprinkler type and nozzle size (ease of maintenance)
7. Stations should have similar numbers of sprinklers (ease of scheduling)
8. Flow meters should be fitted (this is considerably cheaper to undertake with bore headwork's)
9. Soil moisture meters should be fitted.
10. Minimizing water on paved surfaces
11. Audit of system performance at commissioning to the long term manager (Council)

Action	Timeframe
Develop irrigation system and park water conservation design policies for the establishment or redevelopment of new turf/garden areas.	Within 2 years

5.7. Strategy 7

Monitor the impact of groundwater abstraction on environmentally sensitive areas.

Purpose

To ensure that the abstraction of groundwater has a minimal impact on the environment.

Current practice

There is limited monitoring undertaken by the Town of Vincent in environmentally sensitive areas such as Hyde Park and Banks Reserve which are acid sulphate prone areas.

Action	Timeframe
The Town of Vincent develops a monitoring program for environmentally sensitive sites. Monitoring will include water quality, static bore water levels and vegetation condition.	Within 2 years

5.8. Strategy 8

Communicate the outcomes of the WCP to the Council and the general community.

Purpose of Strategy

The purpose of this strategy is to communicate the outcomes of the Town of Vincent's WCP to the Council and general community.

Current practice

There has been limited promotion of Town of Vincent's water conservation achievements. The adoption of the WCP by the Town of Vincent could be the first step in a promotional campaign.

Action	Timeframe
Develop a communication plan for informing the community on the Water Conservation achievements of Town of Vincent.	Within 12 months

7. WCP ACTION PLAN

The actions and associated costs required to achieve the Town of Vincent's goals and objectives.

Immediately	**Who is responsible**	**Budget**
Verify with the Department of Water that all current and future flow meters fit their approval requirements.	Technical Officer Parks Services	Nil
Within 6 months		
Map all irrigated area using GIS >1:2000 for all 25 leased and active reserves	Manager Parks Services	Nil
Review the scheduling of irrigation and consider the use of irrigation budgeting to monitor water use across category 1 parks on a monthly basis.	Technical Officer Parks Services	Nil
Use station run times to estimate water use across category 1 parks.	Manager Parks Services	Nil
Town of Vincent irrigation staff to use moisture probes to monitor soil moisture content.	Leading Hand - Reticulation	$1,000.00
Within 12 months		
Apply categories to all POS across the Town of Vincent; complete this in conjunction with determining accurate irrigated turf areas.	Manager Parks Services	Nil
Investigate the opportunity to Hydrozone areas within all parks and reserves.	Leading Hand - Reticulation	Nil
Link category allocation to water budgeting by applying water to a set category allocation and monitor monthly use using flow meters.	Manager Parks Services	Nil
Complete audits across category 1 reserves and establish a priority maintenance and system replacement program to achieve a CU of 85%.	Suitably Qualified Consultants	$2,500.00
Develop a communication plan for informing the community on the Water Conservation achievements of Town of Vincent.	Manager Parks Services	Nil
Within 2 years		
Develop irrigation system and park water conservation design policies for the establishment or redevelopment of new turf/garden areas.	Technical Officer Parks Services	Nil
The Town of Vincent develops a monitoring program for environmentally sensitive sites such as Hyde Park. Monitoring will include water quality, static bore water levels and vegetation condition.	Technical Officer Parks Services/ Environmental Officer	Nil
Within 3 years		

Complete audits across all remaining categories to identify poor performing systems and establish a priority maintenance and system replacement program in order to achieve a CU of 85%.	Suitably Qualified Consultants	$2,500.00
Apply irrigation budgeting across all remaining categories	Technical Officer Parks Services	Nil
To identify a suitable centralised control system.	Manager Parks Services	Nil
Within 5 years		
Install flow meters on all active reserves	Technical Officer Parks Services	> $100,000.00
To have all category 1 parks connected to centralised control system.	Manager Parks Services / Technical Officer Parks Services	> $250,000.00
Within 10 years		
To have all category 2 parks connected to the centralised control system.	Manager Parks Services / Technical Officer Parks Services	> $200,000.00
To complete the roll-out of flow meters across all bores in the Town of Vincent.	Technical Officer Parks Services	> $150,000.00

Appendix 1

Watering categories and Hydrozoning

Purpose of Strategy

The purpose of this strategy is to become site-specific in the allocation of groundwater to turf/garden areas. The total area of irrigated turf/garden needs to be divided into well-defined categories based on use and profile – these are termed Categories and apply across a park. For example a high use, high profile sports field would be designated Category 1, whilst a low use passive park or passive surround would be designated Category 2 or 3, with Category 1 having a higher water allocation compared to Category 2.

Water conservation can be achieved by moving more areas of turf into the medium and low categories or by discontinuing irrigation.

Hydrozoning applies within a park where active areas are separated from passive areas and irrigated differently.

Hydrozoning also gives a framework for making more major cutbacks in water usage if over allocation or allocations are cut back.

Best practice

The following is industry best practice for hydrozoning of turf:

- Parks unable to be hydrozoned are assigned a watering category. This may involve the review of all POS.
- Parks that can be hydrozoned have areas within the park assigned a hydrozone.
- If required, reduce water usage based on hydrozones.
- Rationalise lower priority categories or hydrozones if there is insufficient water for high priority categories or hydrozones.

Please refer to the Hydrozone information sheet to find out more about hydrozoning.

Suggested categories or zones

Based on UWA research and weather data from the Perth Airport, kikuyu will have the following quality when irrigated with the following amounts of water over the summer period.

Zone or category 11000 1st grade and club sporting grounds	
Zone or category 9000 lower grade sporting activity or high profile high use areas such as LGA admin centres and parks with regular functions	
Zone or category 7500 low use low profile parks or areas surrounding active ovals/major passive areas	
Zone or category 6000 low use low profile parks or areas surrounding active ovals/major passive areas	
Zone or category 4500 low profile areas	
Zone or category 0 Dry POS, bush, dry parks, dry verges etc.	