

DRAFT WATER SERVICES DEVELOPMENT PLAN FOR CITY OF CAPE TOWN 2006/07

Status: Text base WSDP Draft

Link to the WSDP on the Internet: [GOTO 1.1](#)

Link to the 2006/7 Executive Summary: [GOTO a1](#)

Link to the 2004 WSDP Review: [GOTO 1.2](#)

Link to the 2001 WSDP: [GOTO 1.3](#)

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1. INTRODUCTION

1.1 PURPOSE OF THE WSDP

With the publication of the Water Services Act 108 of 1997 and as called for in Chapter III, Sections 12 to 18, all water services authorities (WSAs) were required to prepare a Water Services Development Plan (WSDP). Thereafter WSAs have to periodically review, update and adapt the plan as well as report annually on progress with its implementation. This report forms the 2006/07 to 2011/12 updated version of the City of Cape Town's 2002/03 to 2007/08 WSDP ([GOTO 1.3 Web](#) or [GOTO 1.3](#)). The 2004 review ([GOTO 1.2 Web](#) or [GOTO 1.2](#)) reports on progress with the issues identified in the 2001 WSDP.

The main objectives of the Water Services Act ([GOTO 1.4 Web](#) or [GOTO 1.4](#)), as stated in Chapter 1, Section 2, are to provide for:

- The right of access to basic water supply and the right to basic sanitation necessary to secure sufficient water and an environment not harmful to human health or well-being;
- The setting of national standards and norms and standards for tariffs in respect to water services;
- The preparation and adoption of water services development plans by water services authorities;
- A regulatory framework for water services institutions and water services intermediaries;
- The establishment and disestablishment of water boards and water services committees and their duties and powers;
- The monitoring of water services and intervention by the Minister or by the relevant Province;
- Financial assistance to water services institutions;
- The gathering of information in a national information system and distribution of that information;
- The accountability of water services providers; and
- The promotion of effective resource management and conservation.

In summary, the WSDP is a 5 year business plan setting out the way in which the water services authority must plan and deliver services to individuals and businesses in its area of jurisdiction.

It must also describe the current and future consumer profile, the type of services which are provided, the infrastructure requirements, a water balance, organisational and financial arrangements to be used, an assessment of the viability of the approach, and an overview of environmental issues.

Following these analyses, important issues that may impact on the provision of effective and sustainable water and sanitation services need to be identified and strategies must be formulated to improve service provision. Apart from the above service provision objectives, the WSDP products also serve as monitoring tools for DWAF and provide important planning information to be included in a national database.

Updating of the plan is necessary to keep it relevant to changing circumstance, while the annual review of progress made serves the monitoring function.

1.2 DRAFTING TEAM

The WSDP was compiled by a team of City of Cape Town Staff led by Mr Zolile Basholo (Manager: WDM & Strategy) and Mr Jaco de Bruyn (Manager: Water Services Development Planning):

Mr Julian Daniels, Mr Gerhard de Swardt, Ms Candice Haskins, Mr Michael Killick, Mr Pieta le Roux, Mr Nazeem Marlie, Mr Alan Maxwell, Mr Heinrich Mostert, Mr Jaco Muller, Mr Carl Schneider, Mr Anic Smit, Mr Francois van Niekerk, Mr Johan de Wet, Mr Keith Wiseman and Mr Barry Wood.

Financial input was obtained from Palmer Development Group (Mr Rolfe Eberhard) while Community Engineering Services (CES: Dr Leon Geustyn, Dr Alex Sinske and Mr John Frame) developed and provided the Document Builder software used to compile the document and was of assistance in finalising the document.

1.3 STATUS OF THE WSDP AND PROGRAM

This WSDP is the 2nd comprehensive WSDP of the CCT since 2002, following on a Review Document in 2004. The program followed for the WSDP process is shown in [Table 1.1](#):

TABLE 1.1 WSDP SCHEDULE / PLAN OF ACTION

Reviewed 22 Aug 05

ITE DESCRIPTION M	TARGET
1 Feedback on DWAF checklist	19-Aug-05
2 Complete WSDP 2005/06 document	2-Sep-05
2a Present Exec Summary to Ikhwezi team	7-Sep-05
3 Get comments from depts on 10-year capital plan, priorities, suburbs, saving measures	15-Sep-05
4 Request DWAF evaluation of 2005/06 document	15-Sep-05
5 Circulate all departments for comment	15-Sep-05
6 IDP 2006/07 review of vision, themes, direction	20-Sep-05
7 Present WSDP 2005/06 and Checklist to Council (PC and Mayco) in Oct 05	29-Sep-05
8 Input into IDP 2006/07	29-Sep-05
9 Presentation on MTIEF input to IDP	29-Sep-05
10 IDP 2006/07 analysis of needs, challenges and MTIEF	30-Sep-05
11 Write WSDP review 2004/05 in WS Audit/guidelines format, to be bulk of Annual report	30-Sep-05
12 IDP 2006/07 public part - wards, subcouncils, groups	30-Oct-05
13 IDP 2006/07 Complete 1st draft	30-Nov-05
14 Budget 2006/07 complete 1st draft	30-Nov-05
15 IDP 1st feedback used to revise WSDP 2006/7, esp budget, in time for inclusion in IDP public hearings	30-Nov-05
16 IDP 2006/07 and budget submission 1st draft to Council	15-Dec-05
17 Revise strategic plan - current KPI's, vision and mission, project priority	31-Dec-05
18 IDP 2006/07 Public regional assemblies	15-Feb-06
19 IDP 2006/07 and budget submission draft to Council	31-Mar-06
20 IDP 2006/07 and budget public hearings	15-Apr-06
21 IDP 2006/07 and budget submission final approval by Council	31-May-06
22 IDP 2006/07 send up to MEC	16-Jun-06
23 Advertise rates and tariffs	20-Jun-06
24 SDBIP's approved Mayor	28-Jun-06

1.4 PROCESS

The process used to compile the WSDP was based on Section 14 to 18 of the Water Services Act (Act 108 of 1997). The methodology adopted was to update the content of the successful 2002 WSDP, taking into account the latest strategic thinking, the current status of issues affecting Water Services as listed in the 2004 WSDP Review and updating old base information.

Individual responsibility for sections or even paragraphs within the report has been assigned to suitable officials, bearing in mind the interim reporting structure operating within Water Services. This process as well as the monitoring of progress made and compilation of the report was made easier by utilisation of the software “DocBuilder” as developed and supplied by the consultants Community Engineering Services (CES), augmented by spreadsheet tables.

From this document an Executive Summary [GOTO 1.0](#) was compiled. This Executive Summary was used as input to a Stakeholder workshop in October 2005. For the outcome of this Workshop refer [GOTO 1.5](#)

This WSDP, as submitted to the DWAF and incorporated into the Cape Town IDP, is available in three formats:

- A CD with the full report with links to related studies, detail reports, policies and databases;
- A website version without the links; ([GOTO 1.1 Web](#))
- A printed version without the links.

These three formats together will form the basis for further discussions and the public participation process as part of the IDP process.

A technical analysis has been performed by consultants Community Engineering Services (CES), which included an overview of infrastructure planning as based on the best available information contained in the water and sewer master plans as well as a quality control step. Financial planning has been based on a Financial Study as compiled by the Palmer Development Group.

Information presented in this report has been included with the emphasis on the identification of issues effecting water and sanitation services provision.

1.5 INTEGRATION WITH IDP

Water Services have contributed input to and comment on the Draft IDP 2006/2007 ([GOTO 1.6GOTO 05_IDP 200607 DRAFT 4. 01.11.05.doc](#)), to ensure that its issues are incorporated in the Corporate Plan and also that its own Strategic Plans are in alignment. This alignment is expanded on in Chapter 9: Strategic Planning.

1.6 ACCURACY OF INFORMATION

The data and information included in this report has been consolidated from various sources, which individually report in detail on many of the issues required by the Act. For the purposes of this report not all details will be repeated, but references to these sources have been provided for further reading in a hyper-link live form where possible.

Some of these sources are:

- The City Map GIS which incorporates various City-wide spatial information, as well as Water Services' own GIS;
- Various Reports, including Water Services' Strategic Documents, expanded on in Chapter 9;
- Master Plans of the different Departments;
- Input from various Directorates and Departments outside Water Services, especially those dealing with Stormwater and Informal housing;
- Statistics SA (1996 and 2001 Census);
- Various websites including the City of Cape Town's (CCT) official website [GOTO 1.7 Web](#) and that of Water Services [GOTO 1.8 Web](#);
- The City's Integrated Development Plan (IDP) of 2005/06 ([GOTO 1.9](#)) and Draft of 2006/07 ([GOTO 1.6](#)).

As expected, there are some differences in the accuracy and format of available information. Consolidating this data into a single report requires a certain degree of interpolation and estimation where necessary. Therefore, the level of information contained in the WSDP should be understood in this context.

2. SETTING THE SCENE

2.1 PHYSICAL DESCRIPTION OF THE AREA SERVED

The CCT is located in the Western Cape Province on the south-eastern corner of South Africa as indicated on [Figure 2.1](#). The total area is approximately 2 474 km² and its coastline is 371 km long.

The area consists of varying topography which includes flat plains, hills and mountains. High mountains are located fairly close to the sea; e.g. Table Mountain which exceeds 1 000 m in elevation. Other high mountains on the perimeter include the Hottentots-Holland, Helderberg, Stellenbosch, Jonkershoek, Franschhoek, Wemmershoek, Du Toits, Paarl, Slanghoek, Limiet and Elandskloof mountains. These mountains form an eastern perimeter of mountains around the CCT, as shown on [Figure 2.2](#).

A major portion of the CCT consists of the area known as the Cape Flats, which has an elevation of between 20 and 45 m above sea level. This area is relatively low-lying and can be supplied via the bulk supply network from large reservoirs with top water levels at 110 m above sea level (ASL). The mountainside developments in Somerset-West, along Table Mountain and the Peninsula mountain range, as well as the hilly development in Durbanville, Brackenfell-north, and the Atlantis area are at elevations which are too high to be supplied from the 110 m ASL reservoirs. Very few areas with water demand are located at elevations higher than 200 m ASL.

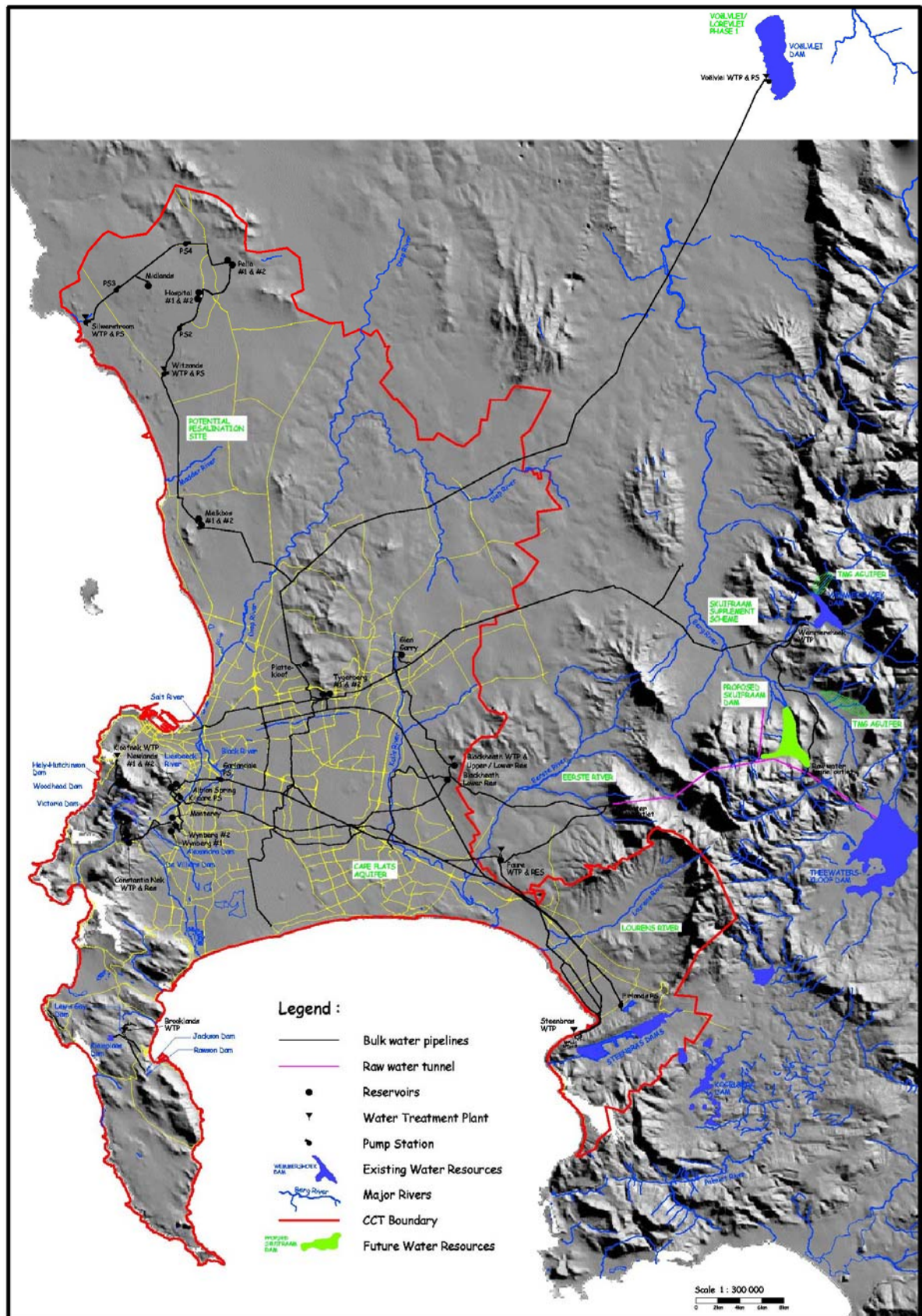
The rivers in the CCT are relatively small. Some rivers worth mentioning are the Salt-, the Diep-, the Black-, the Eerste-, Kuils-, Moddergat- and Lourens rivers. The rivers which are utilised as water sources lie mostly outside of the CCT. These are the tributaries to the Berg River namely the Wolwekloof and Banhoek tributaries, Sonderend-, Palmiet-, Klein Berg- and Leeu rivers. Of these, the Berg river which flows in a northerly and later westerly direction, is by far the largest.

The major dams from which the CCT is supplied are situated outside (except for the Steenbras Upper and the Steenbras Lower Dams) the mountainous eastern perimeter of the area. The Theewaterskloof dam near Villiersdorp is the major water source of the CCT and forms part of a large inter-basin water transfer scheme that regulates the flow from the Sonderend-, Berg- and Eerste rivers. The Voëlvlei dam is the furthest north near Gouda and relies on diversion works in the Klein Berg, Leeu and 24 Rivers for its water supply. The Wemmershoek dam is situated in the mountains near Franschhoek and is supplied from various small rivers in the Wemmershoek mountains (e.g. Tierkloof- and Olifants rivers). The Steenbras Upper dam and Steenbras Lower dam are situated in the Hottentots-Holland mountain range near Gordon's Bay, and serve a dual purpose of providing an upper reservoir for the Steenbras Pumped Storage Scheme and for supplying water for domestic/industrial use to the CMA. Other smaller dams include the dams on Table Mountain (Woodhead, De Villiers, Hely Hutchinson, Victoria and Alexandra) which are used to supply water to the southern suburbs and the Peninsula, and the dams at Simons Town (Kleinplaas and Lewis Gay) which provide water to the Peninsula.

Figure 2.1 Locality Plan



Figure 2.2 Topography



Cape Town has a mean annual rainfall of 515mm/annum and an average temperature of 16,7 °C. The CMA is a winter rainfall area. The meteorological depressions that typically bring rain to this area during winter move past to the south of the area (and the land mass) during summer; resulting in long dry spells. It is during the dry summer that the water demands are highest, due to the higher temperatures and the fact that watering of gardens is the norm in almost all residential areas. This contrast complicates the management of a bulk water supply system, as sufficient run-off needs to be stored during winter in order to meet the increased water demand in the hot and dry summer months.

Further information on the physical attributes of the area, the history, main features and attractions are presented on the CCT's website [GOTO 2.1 Web](#) (or [GOTO 2.1](#))

2.2 POLITICAL CONTEXT OF EXISTING WATER SERVICES SITUATION

The CCT, like the rest of South Africa, has undergone some significant changes in political structure over the last decade. Prior to 1994, the area consisted of a large number of smaller municipalities, or councils. The dominant municipality was the Cape Town City Council (CCC), which at the time also owned and operated the bulk water supply system. Outside of the CCC area, the bulk supply system and the secondary distribution systems of the various municipalities were separated, with metered bulk off-takes used by the CCC for billing purposes. Within the CCC area however, the bulk- and secondary systems were integrated, since all its consumers were billed directly.

With the political changes in 1994, the smaller municipalities in the CMA were amalgamated into 6 Metropolitan Local Councils (MLC's), with the Cape Metropolitan Council (CMC) as a regional local authority in charge of bulk services. This prompted a separation of the bulk- and secondary systems in the old CCC area.

In December 2000, the unified City of Cape Town (CCT) was formed, by the amalgamation of the six short-lived MLC's and the former CMC. As at November 2005, the restructuring of the City including the Water Services Directorate is not yet complete with only positions down to level 4 having been filled.

The Bulk Water Department within the new CCT operates the bulk water supply system, and currently supplies water in bulk to the Reticulation Department's eight reticulation districts (refer to [Figure 2.3](#)), who in turn distribute the water to the end users. The number of districts has only recently been reduced from ten ([Figure 2.3](#)) to eight, to match those of the Transport, Roads and Stormwater Directorate, to improve administrative co-ordination and integration. This differs slightly from the Corporate standardized district model..

The eight districts are required to interact with 20 sub-councils ([Figure 2.4](#)) from a political perspective to ensure co-ordination and integration at political level.

The Drakenstein (including the towns of Paarl and Wellington) and Stellenbosch Municipalities located outside the CCT area, also purchase water in bulk from the CCT.

Raw water is treated at water treatment plants which are operated by the Bulk Water Department, from where it is distributed via a network of large diameter pipelines and reservoirs to the districts. The bulk networks are operated by the Bulk Water Department up to the metered connection points of the ten districts. Downstream of the meters, the secondary distribution networks are operated by the respective districts.

Wastewater collection and treatment is also carried out in-house, with the wastewater collection function falling under the Reticulation Department, whilst treatment is undertaken by the Wastewater Treatment Department.

Figure 2.3 : Previous 10 District and new 8 District Model

Interim Reticulation District Model



New Reticulation District Model

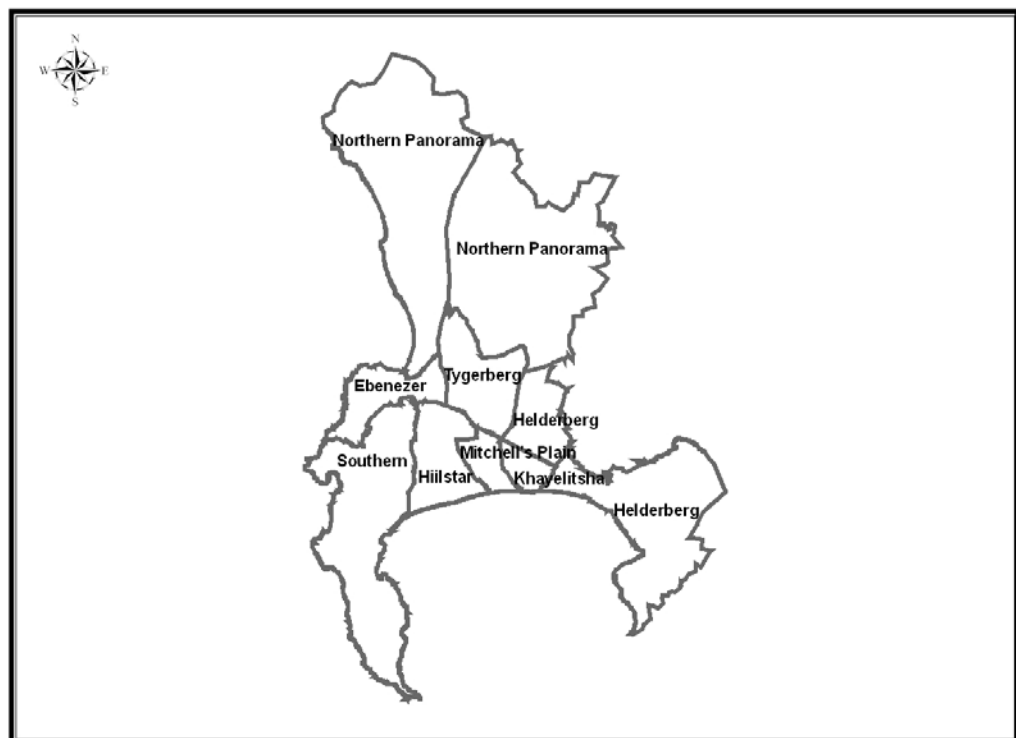
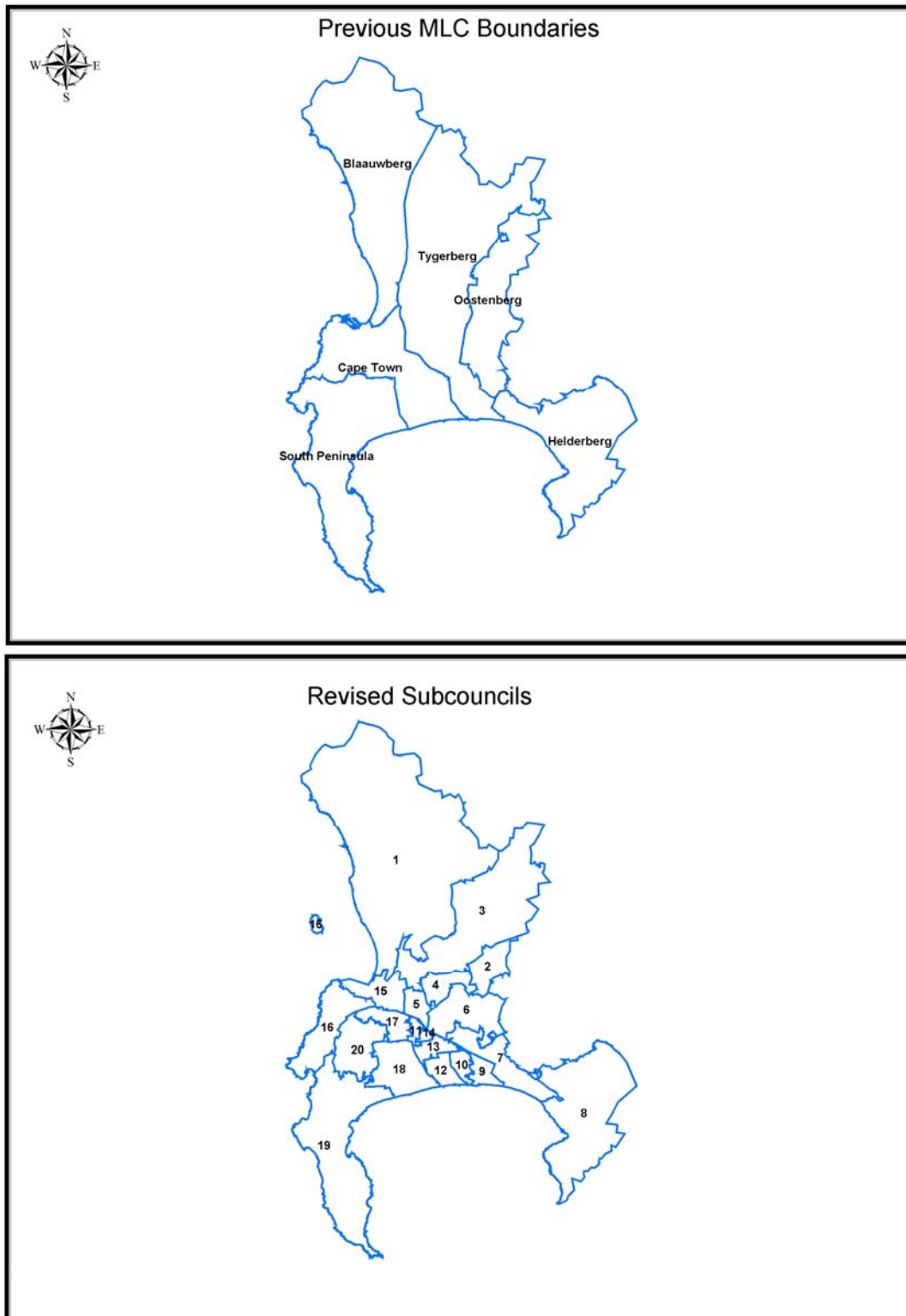


Figure 2.4 : Previous MLCs and new Sub-Councils

3. CUSTOMER PROFILE, SERVICE LEVELS AND CUSTOMER MANAGEMENT

3.1 CURRENT CUSTOMER PROFILE

The following section briefly describes the demographic and economic profile of the City of Cape Town (CCT).

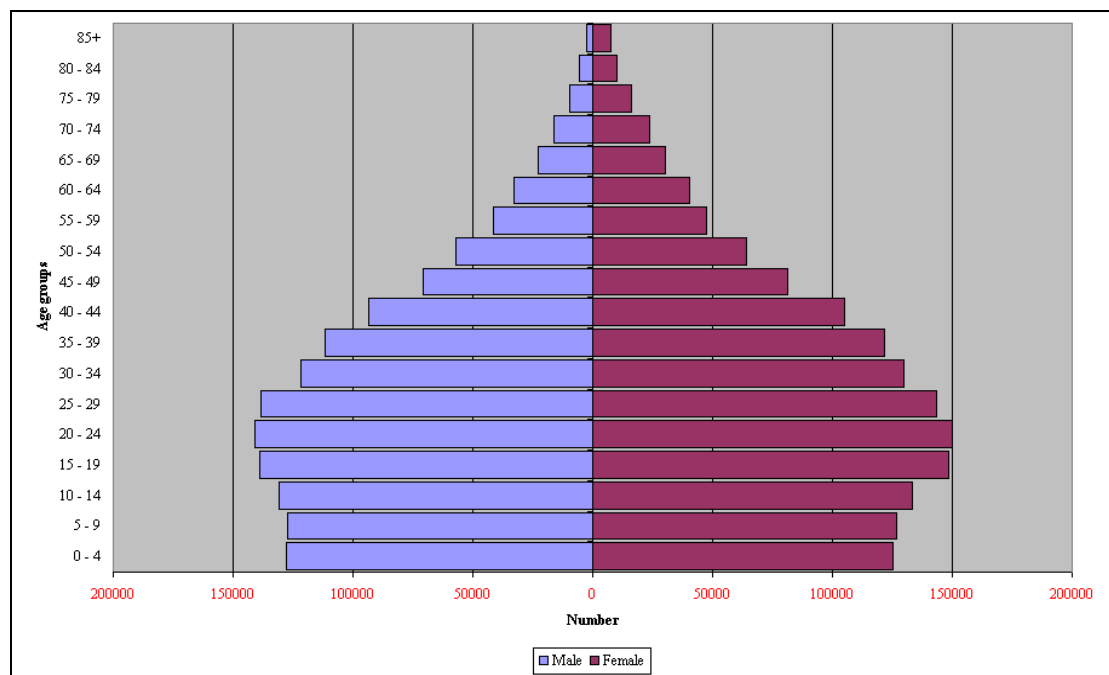
3.1.1 Population

The 2001 Census recorded the size of the metropolitan population at 2 893 251 people living in 759 765 households. By comparing this to the 1996 figure of 2 563 095, a growth rate of 2,6% per annum is found between 1996 and 2001.

The population previously projected for the Cape Metropolitan Area for 2001 was 3 154 238 (Dorrington, 1999). The actual census figure is therefore 8,27% lower than the projected population. Further analysis is needed to reconcile the actual census figure with the projected figure.

The 2001 population pyramid ([Figure 3.1](#)) is showing a distribution reduction towards the younger age groups, highlighting a tapering in birth rates and future stabilization in population growth. This, together with a future estimated HIV-incidence rate of 5% (i.e. one in every 20 people are estimated to be HIV-infected), could constrain future population growth even further, together with an expected reduction of rural in migration.

Figure 3.1 Age – Sex Distribution of Population



Compiled by Strategic Information, CCT, from Statistics SA Census data

For more details on the socio-economic profile including statistics on age, gender, race, migration patterns, employment etc. refer to a report as compiled by the Directorate of Strategic Information, "City of Cape Town: A Population Profile of the City of Cape Town August 2003" (to view the MS Powerpoint report: [GOTO 3.1](#)).

3.1.2 Economic profile

The economy of the City of Cape Town and surrounds, have shown a robust growth rate of about 3% since 1994. This exceeds the national average of 2.5% (Wesgro, 2005) for the same period. The economic growth rate for 2002 was 3,8% (IDP, 2005) and is expected to rise to around 4% in 2006.

However, Cape Town's economic growth needs to be accelerated even further to around 6-7% annually in order to reduce current unemployment levels. The biggest economic growth constraint is the low skills levels of the labour force. It is estimated that more than 60 % of adults do not have a matric qualification. (IDP, 2005)

In 2002, Cape Town contributed 12% to South Africa's gross domestic product (GDP), which included R 91 billion in goods and services produced. This represents an annual growth rate of 2.8% in GDP since 2000 (Wesgro, 2005).

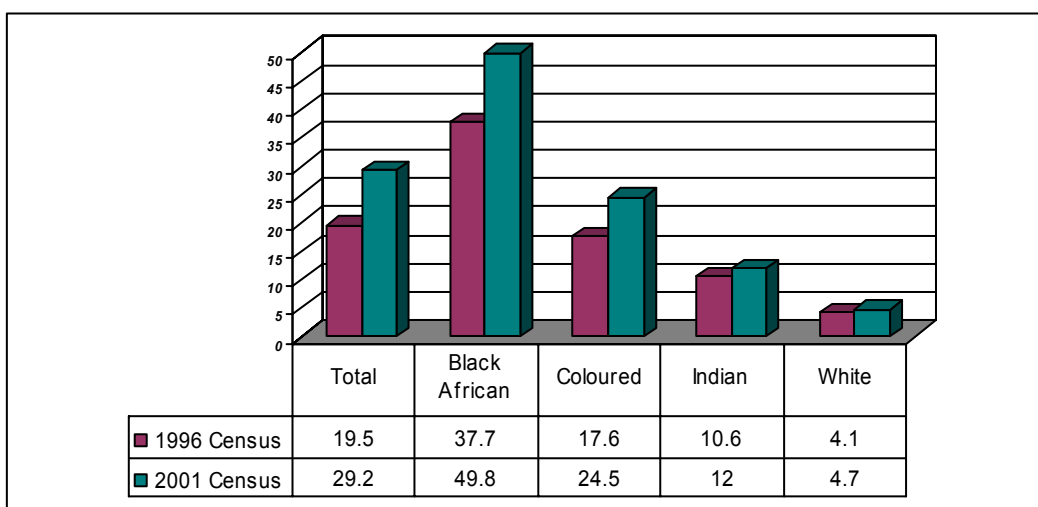
3.1.3 Income distribution

Although the City of Cape Town has the highest average per-capita income in the country, the current high poverty levels is indicative of the inequality in income distribution. Approximately 33% of households are estimated to be earning incomes below the Household Subsistence Level (< R 1 600 per month).

Unemployment rates have increased consistently from 1996 to 2001. In [Figure 3.2](#) the unemployment rate is compared by population group between the 1996 and 2001 census data. This is in contrast to the rising cost of water as a basic commodity over the same period.

In an effort to address the affordability of water and sanitation as basic services, free basic services have been implemented.

Figure 3.2: Unemployment rate by population group:1996 vs. 2001



Compiled by Strategic Information, CCT, from Statistics SA Census data

3.1.4 Current number of consumers

From the Land Information System (LIS), which is updated regularly from the Surveyor General it is estimated that the number of formal serviced erven (all land uses) is currently 560 000, with about 540 000 of these registered and billed as consumers on SAP.

The housing backlog is summarised in the 2006/07 IDP document and can be listed as:

• Informal settlements	115 000
• Overcrowded housing stock and backyard shacks	<u>150 000</u>
TOTAL	265 000

The challenge that the City faces is emphasized by the fact that the current backlog represents about a third of the total of 835 000 households (refer to table 3.4) in the City of Cape Town. In addition, the Housing Department calculates the backlog growth per annum at 15 000 units.

3.2 FUTURE CUSTOMER PROFILE

3.2.1 Population Projections

The future customer profile for the City of Cape Town will be outlined by highlighting the main determining factors:

- Future population growth projections.
- Current housing backlog to upgrade informal settlements and overcrowded housing stock to individually-serviced sites.

The Dorrington report: *Projection of the Population of the Cape Metropolitan Area 1996-2031* (Dorrington, 2000), is a widely accepted source of growth statistics for the City of Cape Town. Findings of the report were updated per suburb by the CMC Spatial Planning Department in 2003 to take cognisance of the latest HIV/AIDS and migration trends (Refer to Table 3.1 [GOTO 3.3](#)).

[Table 3.2](#) provides a summarized overview of the expected Cape Town population growth for each of the previous MLC districts.

Table 3.2: Projected Population Growth for the City of Cape Town

City of Cape Town	Pop 2001	Pop 2006	Avg Growth % 2001 - 2006	Pop 2016	Avg Growth % 2006 - 2016	Pop 2031	Avg Growth % 2016 - 2031
Cape Town	1,130,175	1,187,229	1.0	1,253,867	0.6	1,280,143	0.1
Tygerberg	976,412	1,075,394	2.0	1,174,194	0.9	1,214,732	0.2
Blaauwberg	173,452	271,370	11.3	374,080	3.8	433,181	1.1
South Peninsula	406,354	437,676	1.5	481,640	1.0	519,724	0.5
Oostenberg	319,710	389,351	4.4	470,436	2.1	525,466	0.8
Helderberg	148,114	186,084	5.1	243,517	3.1	282,601	1.1
Total	3,154,217	3,547,104	2.5	3,997,734	1.3	4,255,847	0.4

Compiled by the CMC Spatial Planning Department (revised by Water Services)

The geographic location of highest growth is mainly determined by two factors:

- The active property market, driven by the favourable economic conditions and the emerging black middle class. These type of middle- to high income developments contribute to urban spread and is concentrated in the following areas: (on [Figure 3.3](#)).
 - northern portion of Durbanville;
 - north of Table View;
 - north of Kraaifontein;
 - north-east of Strand;
 - west of Strand and Somerset West.
- State-funded large scale housing developments to alleviate overcrowded housing stock and relocate informal settlements from environmentally sensitive and unsafe areas. These developments are of an urban infill nature (close to urban opportunities for socio-economic upliftment) and mainly concentrated in:
 - Southern areas of Tygerberg;
 - South-western portion of Oostenberg.

3.2.2 The metropolitan spatial development framework (MSDF)

The Metropolitan Spatial Development Framework (MSDF) is an extension of the IDP, to guide the management of future settlement development, in order to promote integration, equity, redistribution, environmental protection and quality of life. The SDF sets out the spatial implications of concepts highlighted in the IDP, which should direct decisions on public capital and operating expenditure, as well as private development proposals. The MSDF is shown in [Figure 3.4](#).

The legislative requirement for the spatial component of the IDP is well developed but fragmented. These include:

- The Metropolitan Spatial Development Framework
- The Tygerberg Spatial Development Framework
- The City of Cape Town Draft Spatial Development Framework
- The Blaauwberg Spatial Development Framework
- The South Peninsula Spatial Development Framework
- The Draft MOSS

In addition more than 200 local development frameworks are available, covering most local priority areas.

In view of above, the requirements of the IDP with regard to spatial and environmental products can not be met with the current spatial frameworks available. Tasks identified in the IDP to rectify above include:

- Incorporate the needs of all important role players in city development and management;
- Integrate existing plans with all municipal functions to implement the spatial proposals;
- Integrate plans by changing the historic spatial organisation of the City to address critical “hot spots” for immediate and concerted urban renewal.

This WSDP endeavours to integrate with Sakha iKapa: the 20 year Human Settlements Plan, which is currently under development by the City.

Figure 3.3 Existing Land Use and Potential Future Development Areas

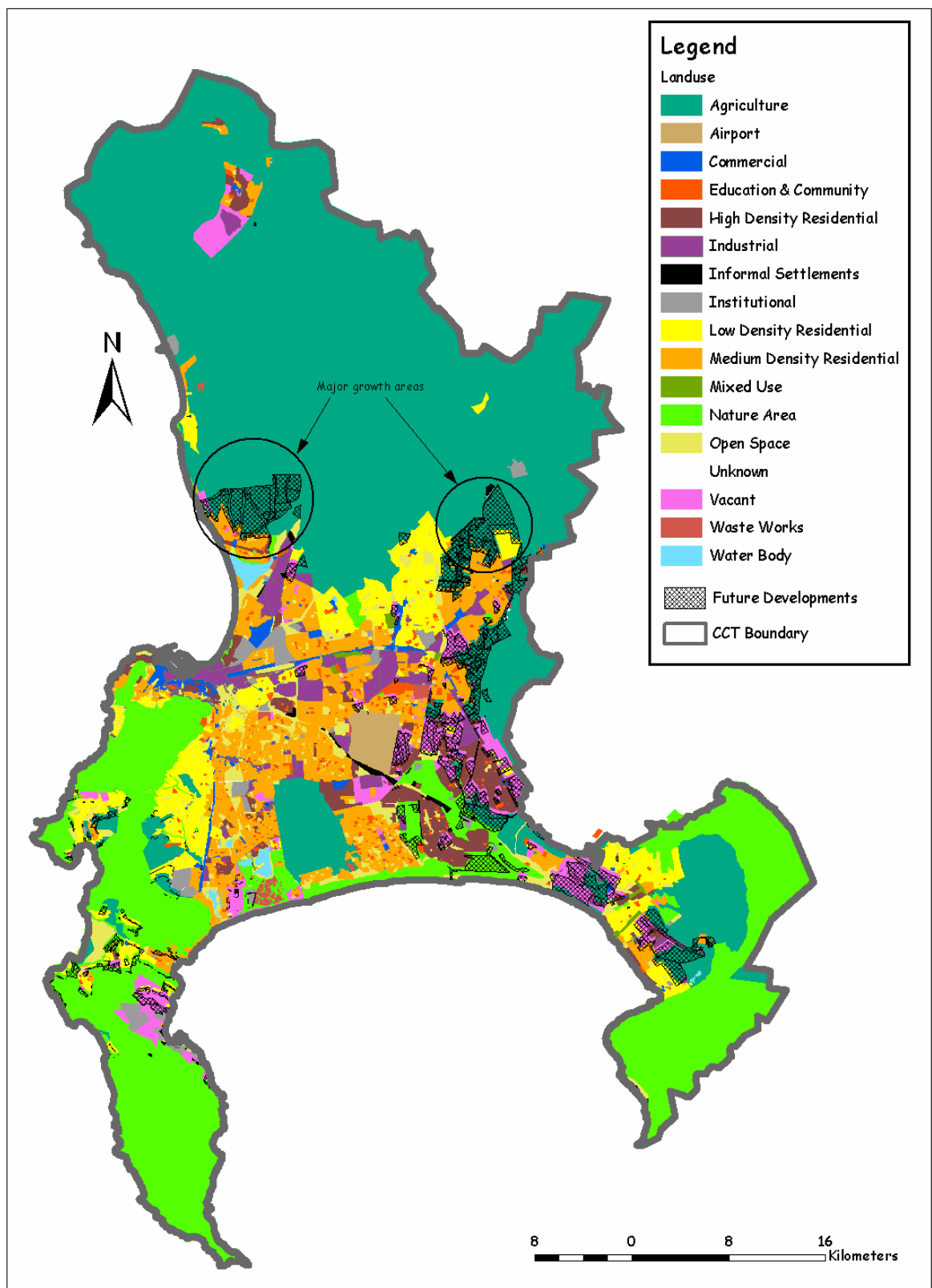
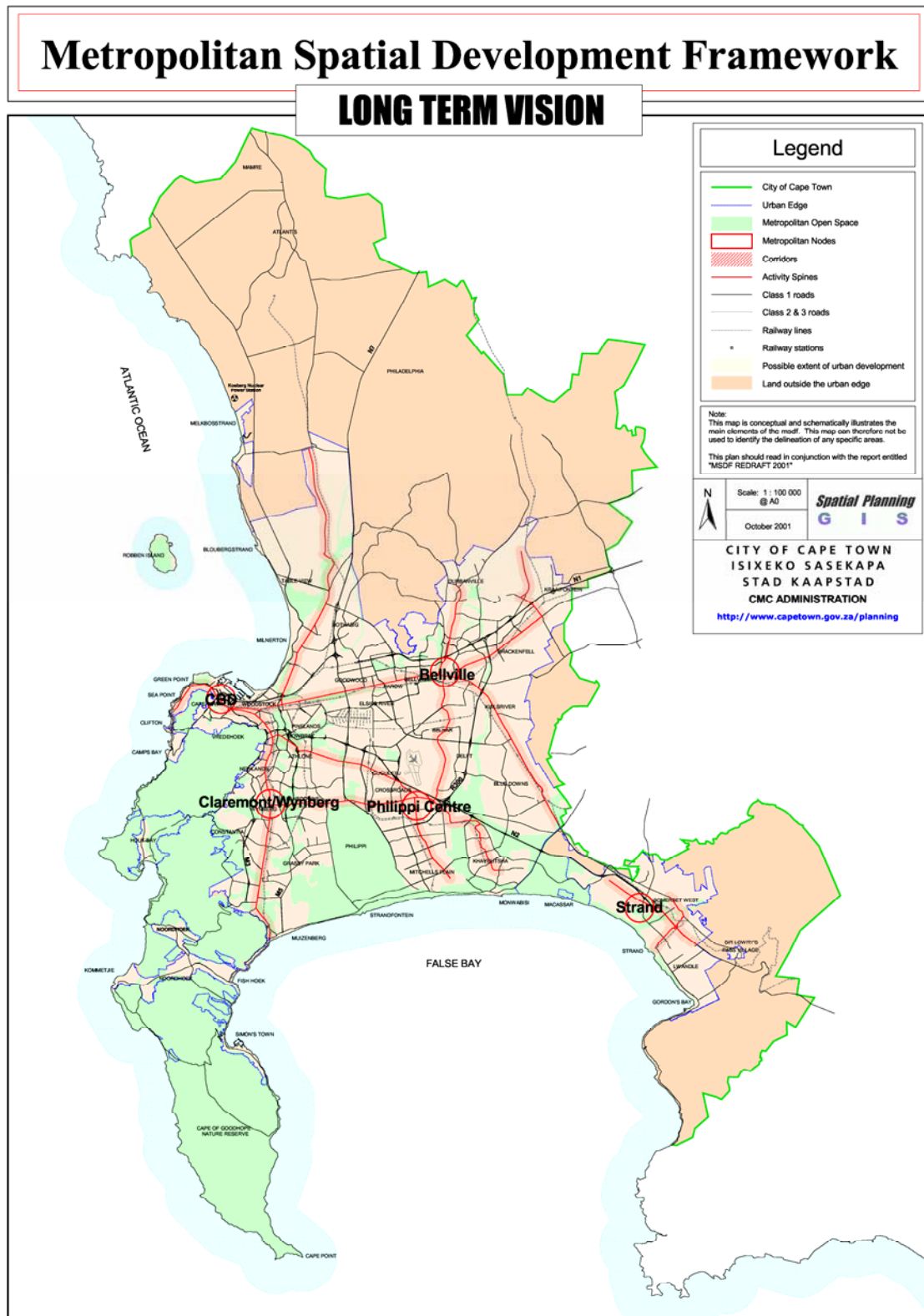


Figure 3.4: Draft Metropolitan Spatial Development Framework



3.3 CURRENT SERVICE LEVELS

3.3.1 Service Level Categories

Service levels of existing formal developed areas (excluding rural areas) generally meet the minimum standards as required by the Water Services Act 108 (of 1997), i.e. a communal standpipe within 200 m walking distance (with a minimum supply rate of 25 litres per person per day at 10 litres per minute), and at least a ventilated improved pit latrine (VIP) or equivalent. The general percentage distribution of households with inadequate water and sanitation services correlate to a large extent with the location of informal settlements as determined through aerial and on-site surveys and depicted in [Figure 3.5](#) and [Figure 3.6](#).

[Table 3.3](#) defines the Service Level Categories as used by the City of Cape Town:

Table 3.3: Service Level Categories

Category	WATER
Inadequate	No access to basic water supply as defined below. (Water would generally be obtained at great difficulty from other residents supplied at an emergency, basic or full level of supply.)
Emergency	Partial access to basic water supply, as dictated by site-specific constraints (e.g., high dwelling densities).
Basic	a) The provision of potable water (usually through communal taps/standpipes): • within 200 metres of a household; • at a ratio of not more than 25 households per tap (based on 25 litres per person per day at a flow rate of 10 litres per minute); • with an effectiveness of not more than 7 days interruption supply to any consumer per year; and b) the provision of appropriate education in respect of effective water use.
Full	House connection
	SANITATION
Inadequate	No access to sanitation as defined below. (Residents would either share with other residents, supplied at a basic or full level of supply, their sanitation facilities, or would provide for themselves – often through unhygienic means. In many instances these residents are being serviced by the CCT through the weekly removal of 20 litres open sterco “black bucket” containers, a service which is to be replaced.)
Emergency	Partial access to sanitation, as dictated by site-specific constraints (e.g., high dwelling densities),
Basic	a) The provision of a shared toilet (at a ratio of not more than 5 families per toilet) which is safe, reliable, environmentally sound, easy to keep clean, provides privacy and protection against the weather, well ventilated, keeps smells to a minimum and prevents the entry and exit of flies and other disease-carrying pests; and b) the provision of appropriate health and hygiene education.
Full	On-site Waterborne, Septic Tank or French Drain

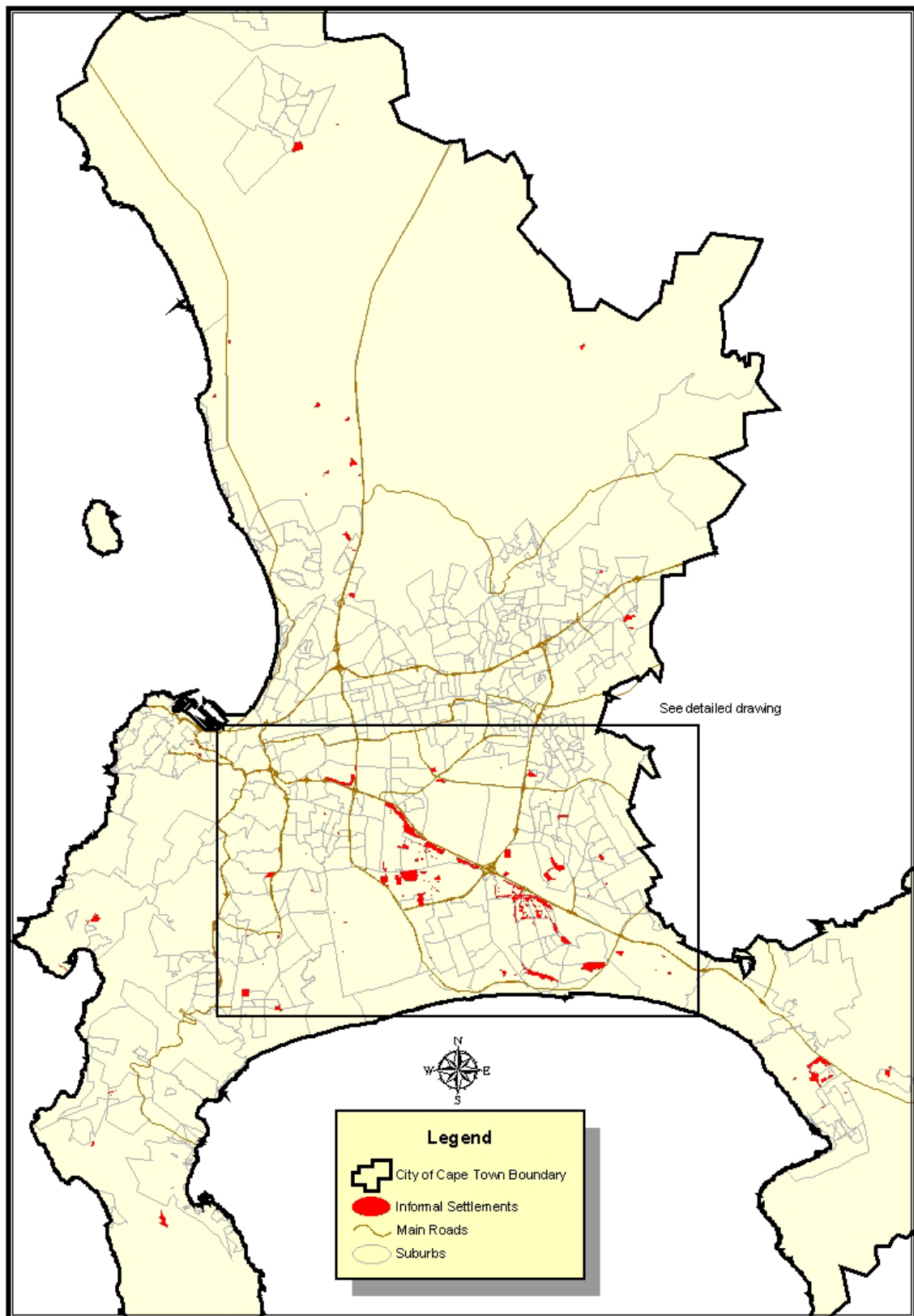
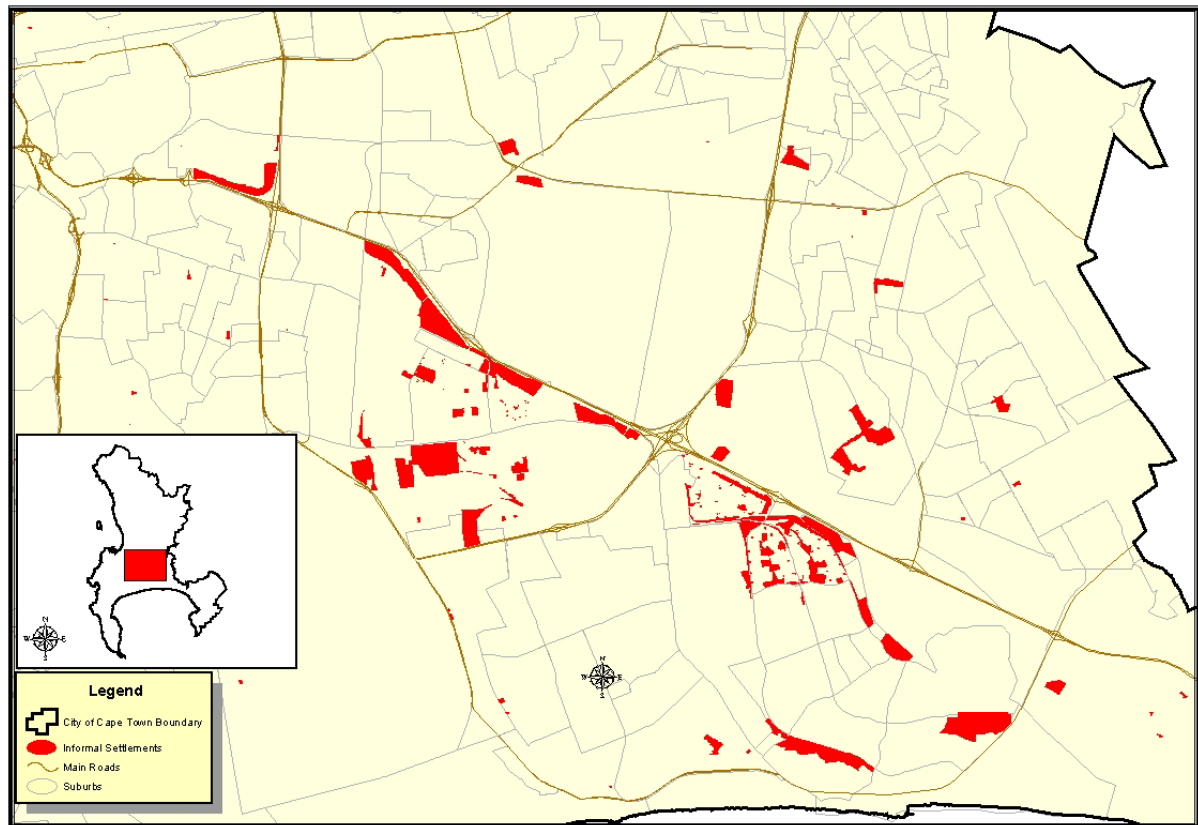
Figure 3.5 : Location of Informal Areas

Figure 3.6 : Location of Informal Areas near N2



1.1.1

3.3.2 Full Level of Service

Formal households have either a metered water connection to the house or to a yard toilet with water tap. The first 6 kilolitres per month are supplied at no charge (free basic).

These households generally have water-borne sewer connections with the first 4,2 kilolitres of sewerage conveyed at no charge (free basic) although households with a property value of greater than R100 000 pay a fixed charge dependent on the value of the property.

Poor households are currently defined as those in properties valued at less than R100 000. They do not pay the fixed charge for sewer. In addition they receive a monthly credit of R20 on their accounts. A recent study of household demands has shown that, provided they do not have plumbing leaks, it should be possible for these households to maintain their consumption at less than 10 kilolitres per month.

Issues to be resolved

Septic Tank removal programme – efforts in this regards will be discussed in a later version of this report.

Backyard dwellers – issue of free basic water and sewer will be investigated

Farm dwellers – will investigate water and sanitation on farms

3.3.3 Basic and Emergency Level

Basic and emergency level services are provided to households in informal settlements. Generally water consumption per household in these areas is less than 6 kilolitres per month. Water and sanitation is provided free of charge to all households in informal settlements.

3.3.4 Backlogs

A closer look at informal settlements indicates that there are still significant backlogs with respect to service delivery in informal settlements. The lack of services in the informal settlements and certain rural areas are mainly due to the following:

- the uncontrolled mushrooming of new settlements, and expansion and densification of existing settlements - all on unprepared or un-serviced land,
- consumers located in rural areas where there is no access to bulk water and sanitation services,
- the typically very high dwelling densities in informal settlements (on average about 140 dwelling units per hectare) make it impossible in many instances to provide either services inside settlements or access into the settlement for operation and maintenance purposes (In these instances it would normally not be possible to provide services at an acceptable level.),
- the lack of willingness by some land owners to allow the provision of services on their land as they may not support or want to encourage the settling of informal residents on their land.

Whilst most informal settlements, with the exception of less than 7%, have access to an emergency level of service, these services are not yet at an acceptable level for reasons mentioned above. The services are therefore shared by a large number of people, which in turn lead to a further lack of ownership, more misuse and vandalism requiring a higher than normal level of maintenance.

In line with City practice and its legal obligation to provide services to all its residents, an emergency or basic level of water, sanitation and solid waste service is being

provided to informal settlements located on private land, subject to the owner's consent being obtained.

In keeping with "the water ladder" concept as proposed in DWAF's "Strategic Framework for Water Services, September 2003" ([GOTO 3.3](#)), the City's priority is to first provide an emergency level of service to all households in all settlements, before extending the coverage and density of services to the basic level as soon as possible.

The 2001 Census figures indicate that a significant number of un-serviced erven are located along the N2 corridor near the Cape Town International Airport. These areas are now being addressed through the N2 Gateway project which is set to accommodate all these residents in new housing developments targeted for completion by end June 2006.

If it is assumed that all formal households, as well as households in backyards and overcrowded hostels, have access to at least a basic level of service, the current provision of water services can be summarised as shown in [Table 3.4](#).

Table 3.4: Current extent of basic water services

Household group	Measure		Water	Sanitation
Established areas	Estimated total no. of households		732 000	
	Households with access to basic services	No.	732 000	732 000
		%	100 %	100 %
Informal settlements	Estimated total no. of households		115 000	
	Accessible settlements with access to emergency services or better (basic)	%	95 %	91 %
	Households with access to basic services	No.	85 000	42 000
		%	73,9 %	36,5 %
Total	Estimated total no. of households		847 000	
	Households with access to basic services	No.	817 000	774 000
		%	96,5 %	94,7 %

As depicted above, out of an estimated total of 115 000 households in informal areas, on average about 30 000 do not have access to basic water and 73 000 do not have access to basic sanitation. Many of these households in informal settlements share the available facilities whilst others rely on the availability of services from nearby established areas.

3.3.5 Current Policies

Convergence of the different tariffs between the previous separate Administrations has been achieved for Water since 1 July 2001 and Sanitation since 1 July 2002 respectively. For the latest water and sewer tariffs [GOTO 3.4](#) and for the Consumptive Water Tariff Policy [GOTO 3.5](#).

For the latest Credit Control Policy [GOTO 3.8](#)

3.4 FUTURE SERVICE LEVELS

3.4.1 Obligations of the water services authority to provide water services

Every Water Services Authority has a duty to all consumers or potential consumers in its area of jurisdiction to progressively ensure efficient, affordable, economical and sustainable access to water services. This is set out in Section 11(1) of the Water Services Act.

3.4.2 Achieving equity

The principles of equity are contained in the Constitution of South Africa (Act No. 108 of 1996), the Municipal Systems Act (Act No. 32 of 2000) and the Water Services Act (Act No. 108 of 1997; [GOTO 1.4 Web](#) or [GOTO 1.4](#))

In terms of Section 11(1) of the Water Services Act “Every Water Services Authority has a duty to all consumers or potential consumers in its area of jurisdiction to progressively ensure efficient, affordable, economical and sustainable services.” This duty is subject to finding a balance amongst, inter alia:

- the availability of resources
- the need for equitable allocation of resources
- the need to regulate access equitably

The principles of equity are guiding the establishment of service levels as well as tariffs within Water Services. Full domestic connections are currently available to all formal erven within the CMA, while the City's Service Delivery Strategy is addressing the backlog in servicing the growing informal areas.

Tariff convergence between that previously applicable to different Administrations in the CMA has been achieved for both water and sanitation services before 2002.

3.4.3 Future service level strategy

The area of jurisdiction of the CCT can be categorised according to the access to services as follows:

- Urban Areas: Characterised by the availability of bulk water and sanitation services and formal and informal nature of the urban settlements.
- Urban Periphery: By far the minority, these areas are characterised by scattered communities on agricultural holdings or farm portions with limited access to water and sanitation services. These consumers located mainly in the areas north of Table View and Durbanville generally make use of on-site water and sanitation services usually provided through own incentives.

Section 3 of the Water Services Act [GOTO 1.4](#) states that “*Everyone has a right of access to basic water supply and basic sanitation*”, subject to certain limitations as set out in the Act including “*the availability of resources*” as indicated in section 11.2. The CCT's service delivery strategy for the provision of basic services is to extend water services as rapidly as possible to all potential customers. These initial service levels include the following:

- On-site water and waterborne sanitation to all formal sites;
- A basic level of water to all households within 200 m;
- Within informal areas, provide access to either communal toilet blocks or some form of shared toilet, depending on local conditions.

A free basic water and sanitation service to all service points has already been achieved. The provision of the initial service levels in informal settlements has essentially been completed in that an emergency service level has been provided to about 95% of the accessible informal settlements with respect to water and 91% with

respect to sanitation. The final implementation of a more adequate basic level of service is however mainly dependant on:

- the relocation of some of the residents from too dense settlements (to other suitable locations/developments), to provide space for the provision of improved services; and
- permission from private land owners to allow the provision of services on their land.

The provision of waterborne sanitation, which is the aim for all formalised households, also results in increased water consumption. As all elements of the infrastructure system come under increased load it is necessary to increase capacity, which underlines the need for the service to stay sustainable through the recovery of costs.

3.4.4 Policy development

There is an investigation underway as to whether free basic water and sanitation should only be for indigents.

Conveyance of grey water from standpipes is a problem in informal settlements. It is receiving attention for health and amenity reasons through a pilot project which, if successful, will be rolled out to other informal settlements.

3.5 CUSTOMER AND METER MANAGEMENT

The CCT is committed to providing efficient, uninterrupted and affordable services, which are clean and safe to all consumers. It plans to enhance this by extending the implementation of the ISO 9001 Quality Management System throughout Water Services now that the new organisation structure is being populated.

3.5.1 Customer/Consumer Charter

Key elements of the extended implementation of ISO 9001 Quality Management System are:

- Communication including the Customer Charter and Opinion Surveys
- Revenue collection including data rectification, informative and accurate billing
- Quality management, which includes the improvement of service levels and the implementation of benchmarking, procedures and Audits

The ISO 9001 Quality Management System will:

- assist integration of previous administrations
- help ensure better customer service
- improve safety
- improve efficiency/production- lower costs
- facilitate performance management

The Customer Charter introduced as part of this process during 2001 (see [Figure 3.7a](#)), has been updated to the following, on which comment is currently invited ([GOTO 3.10](#)):

Figure 3.7 Draft Consumer Charter 2006/07

Draft

WATER SERVICES CONSUMER CHARTER

PURPOSE

- to demonstrate the City's commitment as both Water Services Authority and Water Services Provider to work as a team to provide service excellence to the community

VISION

- to become leaders in the provision of equitable, sustainable, people-centred, affordable and credible water services to all

PLEDGE TO OUR CONSUMERS

- ensure availability and reliability of water resources at all times
- build consumer satisfaction and an enabling environment for the development of meaningful relationships with all stakeholders
- build community awareness, knowledge transfer and other skills
- establish a fair tariff that ensures all residents have access to basic water and sanitation, including indigent households
- ensure the implementation of best management practices in the provision of water services
- provide 6 000 litres of free water and 4 200 litres of free sanitation per month as determined by tariff policy ("Note: This policy is currently being considered for revision – any changes will be communicated to our customers beforehand")
- resolve technical complaints within 24 hours
- minimise the impact on the environment by ensuring efficient operation of the wastewater system
- promote use of alternative water sources for irrigation and industry

CONSUMER RESPONSIBILITIES

- adhere to acts, municipal ordinances, by-laws and water restriction notices
- be water conservation conscious and make saving water a way of life
- do not flush foreign objects, used oil and materials into the sewer system
- do not discharge rain / surface water to the sewer system
- pay for services over and above any free allocation
- report by-law contraventions to the Water Hotline number
- ensure that your water meter and sewer boundary chamber are always accessible

In order to maintain the above consumer charter and continuously improve consumer service, we are installing a Quality Management System to meet the requirements of ISO 9001:2000.

Please direct all comments and suggestions, as well as to report a blocked sewer, a burst water main, a leaking pipe or a taste complaint to our Water Hotline number on
0860 10 30 54

Date: 12 December 2005

3.5.2 Consumer Surveys

Since 2002, Water Services have been commissioning research on an annual basis, to discover what the needs and perceptions of the consumers of water were.

The findings from the research are being used:

- as input to the ISO 9001:2000 certification auditing, helping to ensure that an acceptable level of service satisfaction is achieved and maintained
- to uncover needs not currently being addressed, especially informal areas
- to uncover needs among specific groups, such as business and commerce
- to prepare input for updating the Water Services Customer Charter to measure the level of satisfaction with the service

Information is being gathered from a range of users in the CCT by a professional market research consultant. Samples taken are statistically representative of all the users, which implies that the findings are taken seriously.

The following issues are mainly addressed:

- Perception of services received: drinking water, effluent water or sewer(sanitation) drainage
- Evaluation of services rendered when reporting problems or enquiring about water services
- Awareness of environmental initiatives, including water conservation or restrictions
- Effectiveness of marketing drives such as around Water Week
- Issues relating to payment and billing procedures for services
- Importance rating and evaluation of services supplied
- Demographics of the market

Presentations on all the findings are given on the Cape Town website [GOTO 3.9 Web](#) or the PDF document [GOTO 3.9](#).

3.5.3 Customer and Meter Management Strategy

In terms of Chapter 9 Section 95 of the Local Government Municipal Systems Act 2000, the CCT is required to establish a Sound Customer and Revenue Management System. Over the years Local Government has had a wide variety of service policies, service practices and levels of resources in the previous seven Administrations. Water Services is committed to addressing these aspects within an integrated comprehensive Customer and Meter Management Strategy for Water Services to ensure a focussed, effective and efficient service delivery on an equitable basis to all our communities across the City of Cape Town. The strategic issues, policies, objectives and initiatives of the Customer and Meter Management Section are herewith briefly discussed:

Key Strategic Issues

There are seven key strategic issues on which a sound Customer and Meter Management System should be based:

- An Effective Debt Management Process
- Meter Verification and Meter Accuracy
- Meter Management and Billing
- Meter Reading
- Technical Operation Centre (24hr Emergency Service)
- Corporate Call Centre

- Customer Interaction

Debt Management Process

The main objective of the policy is to promote a culture of good payment habits and instil a sense of responsibility towards the payment of Water Services and reducing debt. The City's Indigent policy makes adequate provision for credit control.

The co-ordination and administration of the disconnection and reconnection process is done under this functional area while the physical disconnections and reconnections are carried out by the Reticulation depots.

Meter Verification and Meter Accuracy

The CCT is committed to ensure through its accredited Meter Verification Laboratory that each metered customer has the right and recourse to challenge the accuracy of its meter through a process as provided for in terms of the Trade Metrology Act and the SABS 1529-1:2003.

Meter Management and Billing

The CCT is committed to reading and billing all consumers monthly and has provided a line of communication for customers to lodge any queries in respect of their accounts through the Corporate Call Centre. Water Services deal with the management of the water meter, its accuracy and the preparation of the customers account before invoicing by the Corporate Finance Directorate.

Meter Reading

The CCT currently reads approximately 87% of 588 000 water meters and 86 000 electricity meters monthly, while approximately 13% are estimated. As there are major advantages to the customer in a read versus an estimated meter reading, among these paying for actual usage and greater confidence in the account figure, Water Services has implemented a project and set a target to read 95% of the meters and reduce the number of estimates to 5% by 2010.

Technical Operation Centre (24hr Emergency Service)

During 2004, Water Services has set up a centralised Technical Operation Centre (Tel. 086 010 3054) to respond to all technical complaints and enquiries such as:

- Burst, leaking and damaged water and mains/leadings and meters
- Water taste and discoloration problems
- Low water pressure or interrupted supply
- Water restriction contravention reporting or advice

As part of the ISO process, reactionary processes in the different districts are currently being standardised, on the basis of different levels of response urgency.

Water restrictions are policed and monitored by Water Officers who not only respond to complaints but also pro-actively investigate suburbs where water wastage is detected.

Corporate Call Centre

A Corporate Call Centre (Tel 086 010 3089, Fax 086 010 3090, e-mail accounts@CapeTown.gov.za) has been established by the City, which will receive most complaints and requests, also those in respect of water account queries. Any

technical complaints or others related to water that cannot be dealt with by the Corporate Call Centre, is forwarded via an electronic notification to the Technical Operation Centre for action.

Customer Interaction

This function includes engaging the public and educating them in the awareness of Water Conservation, Water Pollution and Water Demand Management. It also deals with broad-impact citizen queries and correspondence as well as matters that are logged at the Corporate Call Centre but which require specialist investigations.

Customer education, communication and liaison is accepted as a key strategic issue and will be afforded a high priority in the future structure of Water Services. Water conservation, water pollution, water ingress and payment habits, among others, will all be addressed in a comprehensive and sustainable fashion.

3.6 WATER BYLAWS

In terms of the Water Services Act, Section 21 [GOTO 1.4](#):

“21. (1) Every water services authority must make bylaws which contain conditions for the provision of water services, and which must provide for at least:

- the standard of the services;
- the technical conditions of supply including quality standards, units or standards of measurement, the verification of meters, acceptable limits of error and procedures for the arbitration of disputes relating to the measurement of water services provided;
- the installation, alteration, operation, protection and inspection of water services works and consumer installations;
- the determination and structure of tariffs in accordance with section 10;
- the payment and collection of money due for the water services;
- the circumstances under which water services may be limited or discontinued and the procedure for such limitation or discontinuation; and
- the prevention of unlawful connections to water services works and the unlawful or wasteful use of water.”

The City still has several bylaws inherited from the erstwhile administrations, the Cape Town administrations' Water by-law (Prov. Gazette 5014, Notice 30, February 1996) being an important example still being applied.

A newer *"City of Cape Town: Water Services Bylaw to limit or restrict the use of water"*, Government Gazette 5994, March 2003, page 352, was utilised to enable the 2004 drought water restrictions.

A consolidated Water Bylaw for the CCT has been drafted, is under legal consideration and is still to be advertised for public comment.

The Wastewater Bylaw will soon be advertised for Public Comment.

For detail on the state of Environmental bylaws, see chapter 6.

4. WATER BALANCE, RESOURCE PLANNING & MANAGEMENT

4.1 WATER BALANCE

4.1.1 Water resources

One of the major issues facing CCT in the future is the task to reduce water demand through the implementation of water demand management initiatives in order to ensure a sustainable supply of water for the future. The limited nature of the available water resources and the shortage of raw water storage capacity have increased the risk of water shortages occurring in the Cape Metropolitan Area prior to the construction of the Berg Water Project, which is scheduled for completion by the end of 2007. Two successive years of well below the long term average rainfall in 2003 and 2004 led to DWAF imposing restrictions on the users of water from the Western Cape Water System in October 2004 (20% reduction in water demand required in 2004/2005). In order to understand the limitations of existing water resources a description of the existing water resources are herewith provided, where after details on future schemes/options will be discussed. For a more detailed description of the available existing water resources, possible future water resources as well as water resource planning issues, refer to the document entitled "Water Resources and Water Resource Planning" [GOTO 4.1](#).

The CCT is aware of the studies that are being conducted on the impact of global warming. The issue of global warming and the possible effect it could have on water consumption is being monitored. The impact of longer term global warming needs to be addressed within the Western Cape Systems Model.

4.1.2 Groundwater

The four groundwater resources in the City of Cape Town (CCT) are summarised in [Table 4.1](#). The volume of groundwater abstracted by consumers residing in the urban peripheral areas that do not have access to bulk water services is unknown.

Table 4.1: Groundwater Resources

Aquifer	No. of Boreholes	Firm Yield (1:50 yr) Mm ³ /year	% of Total Requirements
Albion Spring	Not applicable	Approx. 1.64	1.46% of total resources
Atlantis	44	5	
Cape Flats	Not yet developed	18	
Newlands	Not yet developed	10	
Total		6.64	

4.1.3 Surface water

Most of the water resources serving the CCT are stored in dams during the wet winter months in order to ensure a continuous water supply during the dry summer months. The CCT utilises water from various dams within the CMA and also from dams outside the CMA. Some of the dams are operated and controlled by the CCT, whilst the other dams are operated and controlled by the Department of Water Affairs and Forestry (DWAF). The CCT currently obtains approximately 70 to 75% of its raw water requirements from DWAF and the remainder from its own sources. Approximately 15% of the raw water requirements are obtained from sources within the CMA. The following dams and rivers are utilised as shown on [Table 4.2](#) below.

Table 4.2: Surface Water Resources

DAMS/RIVERS	OWNED & OPERATED BY	APPROXIMATE % OF TOTAL SUPPLY REQUIREMENTS**	FIRM YIELD* (1:50 YEAR) M m ³	CCT Registered Usage M m ³
Major Sources		%		M m ³
Theewaterskloof Dam/ Kleinplaas Dam	DWAF DWAF	48.3%	219	120
Voëlvlei Dam	DWAF	23.2%	105	70.5
Palmiet River	DWAF	5%	22,5	22.5
Wemmershoek Dam	CMC	11.9%	54	54
Steenbras Upper and Steenbras Lower Dam	CMC	8.8%	40	40
Total		97.1%	440.5	307
Minor Sources			Approx. yields	
<u>Simon's Town:</u> Lewis Gay Dam Kleinplaas	CMC	0,4%	1,85	1.85
Land en Zeezicht Dam (From Lourens River)	CMC	0,1%	0,5	0.5
<u>Table Mountain:</u> Woodhead Hely-Hutchinson De Villiers Dam Victoria Dam Alexandra Dam	CMC	0.88%	4	4
Grand Total		98.5*	446.86	313.35*

* Excludes the Atlantis Aquifer and Albion Springs

** Approximate % of total supply requirement and firm yield includes Agriculture and other Water Service Authorities.

On an annual basis the usage from the various sources may vary. The Western Cape Water System (WCWS) is operated so as to minimise spillage by placing a water demand on the dams that are most likely to spill during the wet winter period.

4.1.4 The Berg Water Project

Implementation and financing of the Berg Water Project (BWP), which comprises a dam on the farm Skuifraam, a supplemental scheme and ancillary works, was approved by National Cabinet on 30 April 2002. The City's increasing demand for water, although significantly tempered by a successful Water Demand Management Policy and Strategy, requires the urgent implementation of Cabinet's decision if the City is not to be compromised with regard to future water supply and exposed to possible more severe water restrictions in the short to medium term.

The Minister of Water Affairs and Forestry has directed the Trans-Caledon Tunnel Authority (TCTA) to finance and implement the BWP in terms of Section 103(2)(b) of the National Water Act. TCTA will own the land and infrastructure until the loans raised by TCTA have been redeemed, whereafter the land and infrastructure will revert back to the Department of Water Affairs and Forestry (DWAF). It is intended that users of the water will fund the BWP which in today's terms will cost between R1,4 billion and R1,5 billion. Other users who are allocated water from the BWP will pay a third party capital charge (for information [GOTO 4.2](#)), based on their water allocation and the CCT will receive a credit from DWAF for this amount.

It is important to note that the Department of Water Affairs and Forestry only approved the implementation of the Berg Water Project when they were satisfied that the City had made progress with respect to the implementation of water demand management (WDM). The construction of the Dam was to proceed as a parallel process to the City implementing WDM.

4.1.5 TMG Aquifer Feasibility and Pilot Study

The TMG Aquifer Feasibility Study and Pilot Project was awarded to the TMG Aquifer Alliance (TMGA Alliance) by the Executive Committee of the City of Cape Town on the 23 April 2002. The primary objective of the Study is to determine the viability of the TMG aquifer as a potential future water resource for the City of Cape Town. An incremental and precautionary approach has been adopted in the Study as there is uncertainty regarding the potential environmental impacts of abstracting water from the aquifer.

Due to the nature of the project, the Study was broken up into 4 discreet phases. This flexible approach allows for a significant amount of interaction with the City of Cape Town and enables the CCT to play a key role in the decision making process throughout the Study. Provision has been made in the Project for the CCT to be able to terminate the project at the end of the Preliminary and Exploratory Phases and during the Pilot Phase of the Study should it become evident after reviewing the progress and the feasibility of the various phases that the desired outcomes will not be achieved.

The outcome of the Preliminary Phase was the identification of 26 potential target sites suitable for exploratory drilling to gain a better understanding of the properties of the aquifer. These 26 target sites have been subjected to an environmental scoping process and now require authorization from the Department of Environmental Affairs and Development Planning (DEA&DP) prior to commencing with exploratory drilling. The Preliminary Phase concluded that, based on a regional desktop assessment of the Table Mountain Group Aquifer, that the TMG Aquifer would most likely be a viable water resource that could significantly augment the City's current water resources in the future.

4.1.6 Desalination

Desalination (or desalting) is generally understood to be the removal of dissolved salts from seawater and in some cases from brackish waters of inland seas, highly mineralised groundwater and municipal wastewaters. Desalination with to-day's technologies, however, can remove minerals and most biological or organic chemical compounds. A more appropriate term for desalination could be "de-mineralization" or "purification" of water.

Desalination as a possible water supply (resource) for the City of Cape Town was first investigated as part of the Western Cape Systems Analysis and then investigated at pre-feasibility level as part of the "Integrated Water Resource Planning Study" undertaken by the City of Cape Town from 1999 through to 2001.

Advances in desalination technology over the last decade have meant that the cost of desalination has decreased significantly. It is currently estimated that the cost of water from a desalination plant would be in the order of R5 /m³.

The decreasing costs of desalination, together with the fact that desalination could provide a more environmentally-acceptable solution, could result in desalination being implemented prior to some of the conventional water resource schemes which have been identified. Given the abovementioned situation and the fact that the City has adopted a "conservative and precautionary" approach to water resource development, the City has taken a decision to further investigate desalination technologies and establish a pilot desalination plant well in advance to large scale desalination being required in order to be in a position to utilise the technology when required.

[GOTO 4.13](#) and [GOTO 4.14](#) for reports on desalination.

4.1.7 Future Water Resource Development

One of the major issues facing the City of Cape Town in the medium- to long term is the limited nature of the available surface and ground water resources. If the City wants to ensure an adequate security of supply to all its water users, it is important that the demand for water is managed in an integrated manner with the need to develop new water augmentation schemes and bulk water supply infrastructure. This will ensure that the risk of having to impose water restrictions is minimized.

The Department of Water Affairs and Forestry is currently in the process of reviewing and updating the Western Cape Systems Analysis. This "Reconciliation" Study ([GOTO 4.15GOTO 4.3 IWRP-STUDY.MK.doc](#)) will re-assess all the water resource options available for the City of Cape Town, neighbouring local authorities and the agricultural sector. The Study will utilize information from the City's "Integrated Water Resource Planning Study" and the City's "Review of Long term Urban Water Demand Study", as well as other studies which DWAF has undertaken in the Breede Valley and Lower Berg River Area. Effluent re-use schemes are also becoming an important consideration. The Study will also compare the latest information on desalination to all the other water resource options available to DWAF and the City. The outcome of the Reconciliation Study will be a shortlist of options to be studied at Feasibility level, and associated with each will be a legal requirement to undertake an Environmental Impact Assessment process. The Reconciliation Study will also develop a strategy to guide future water resource development for the City of Cape Town (CCT), surrounding local authorities and agriculture.

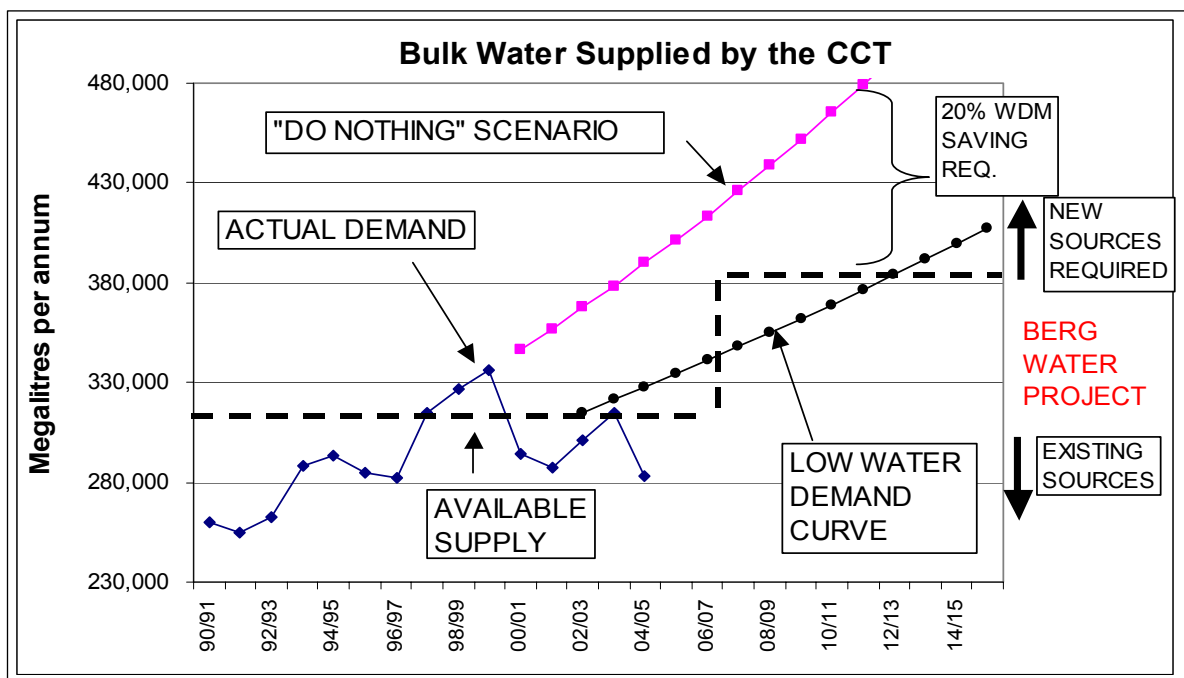
Assuming the City achieved its WDM objective, it is then anticipated that a new water resource, after the Berg Water Project, will only be required in approximately 2013. It is imperative that planning commences at an early stage as the lead time to implement a water resource scheme is approximately 6 to 7 years.

Further water augmentation schemes that could possibly be implemented in the short- to medium term include the Voëlvlei/Augmentation Scheme Phase I, the Table Mountain Group Aquifer, the Cape Flats Aquifer, the Lourens River Diversion Scheme and the Eerste River Diversion Scheme.

[Figure 4.1](#) illustrates diagrammatically when a new water resource is required. From the figure it is clear that there is a higher risk of having to impose water restrictions before the summer of 2007 when water from the Berg Water Project becomes available.

There are a number of factors which could bring forward the timing of new water augmentation schemes e.g. possible climate change, decrease in system yield due to environmental reserve requirements. Given the abovementioned factors, the Mayoral Committee of the City of Cape Town resolved to follow a “precautionary and conservative” approach to water resource planning and implementation in order to ensure that water restrictions are not unnecessarily imposed on the water consumers within the Cape Metropolitan Area.

Figure 4.1: Bulk Water Demand Curves 1



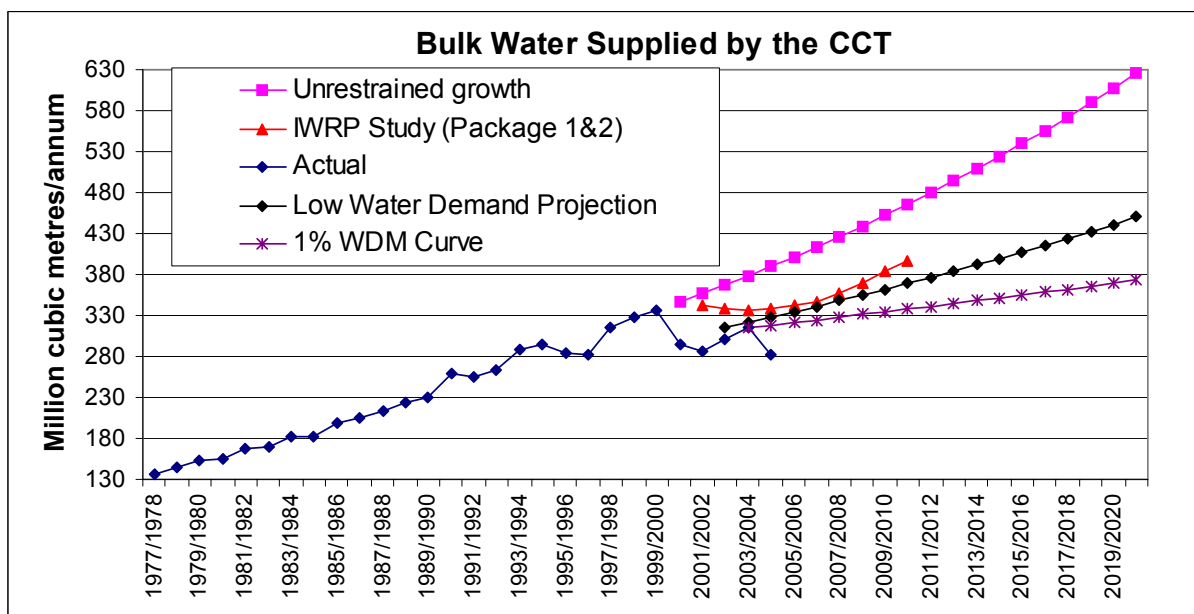
4.1.8 Current and future water demands

In 1998/99 the Department of Water Affairs and Forestry (DWAF) commissioned Ninham Shand together with sub-consultants Palmer Development Group (PDG) and the Institute of Futures Research (IFR) to analyse the past-, present- and future urban demand for water in the Cape Metropolitan Area. In order to better assess and understand current and future demand, this study was updated in 2003/2004 by the City of Cape Town. Based on the potential economic growth and population growth it is estimated that the unconstrained water demand growth in the City will vary between 2,7% and 3,7% per annum.

The historic growth rate of the total bulk water supplied by the CCT between 1973 and 2000 was 3% to 4% per annum. In order to ensure a sustainable supply of water for the future, the CCT initiated an “Integrated Water Resource Planning (IWRP) Study” [GOTO 4.3](#) to best assess how to manage its water demand. The

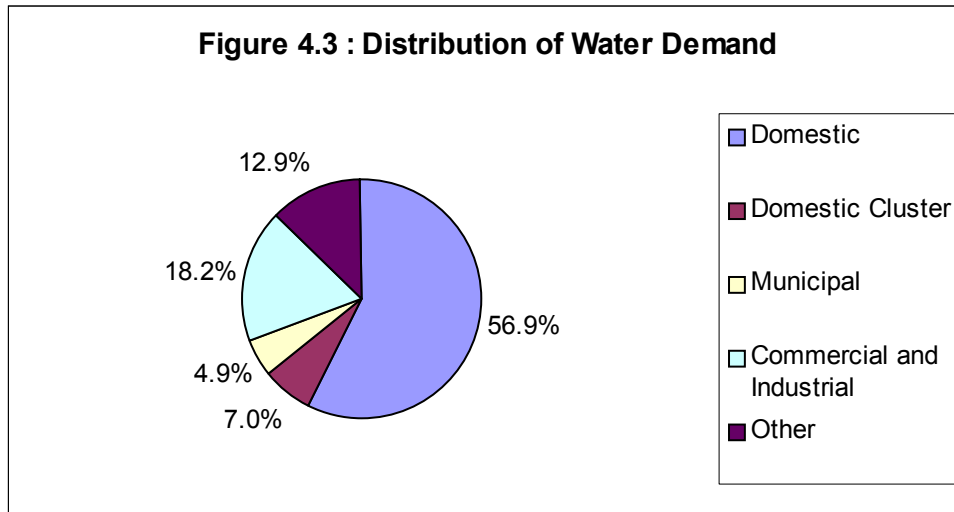
results of the IWRP Study indicated that the CCT has to actively implement Water Demand Management (WDM) measures, whilst simultaneously investigating and implementing additional water augmentation schemes. The implementation of the WDM recommendations contained in the IWRP Study include *inter alia* pressure management, user educational, elimination of automatic flushing urinals, leakage repair, tariffs, metering and credit control. The CCT through its WDM strategy and programme, which has been accepted and adopted by Council, has committed itself to the implementation of the recommendations emanating from the IWRP Study. The objective of the WDM Policy and Strategy is to reduce the projected demand for water by 20% by the year 2010. The CCT through its Water Services Development Plan (WSDP) has also committed itself to ensuring a sustainable supply of water for the future. [Figure 4.2](#) below shows the historic growth in water demand and the low water demand projection for the CCT. The low water demand projection ties in with the 20% reduction in water demand objective stated in the WDM Policy and Strategy.

Figure 4.2: Demand growth projections



The total bulk water supplied within the Cape Metropolitan Area for the financial year ending June 2005 was 263 million cubic metres (average 721 MI/day). This includes Unaccounted-for-Water (UAW) and bulk losses in bulk pipelines. The City also supplies approximately 55 MI/d to Water Services Authorities and other minor consumers outside its area of jurisdiction, for a total of 776 MI/d. For a summary of bulk water treated [GOTO 4.16](#)

The distribution of water demand is given in Figure 4.3 below. For the spreadsheet of calculations [GOTO 4.7](#).



4.1.9 Effluent returned to source

It should be borne in mind that only the Wesfleur Treatment Works at Atlantis returns effluent to the source from which it was extracted (groundwater). All other treatment works have exemptions (in terms of the 1956 Water Act) from this requirement.

For the year ending June 2005, the total wastewater flow generated within the CCT (including for stormwater infiltration) amounted to 206 764 Ml/a, an average of 580 Ml/d. This is less than the 2001/02 figure of 211 565 Ml/a. It is evident that despite the City's growth in population, successes with Water Demand Management have played a part. However, rainfall variations also account for this.

For a table of monthly total flows since 1 July 1997 [GOTO 4.5](#) and for a table of flows from each wastewater treatment plant [GOTO 4.6](#).

The wastewater flow is approximately 79% of the total bulk water demand of 714 Ml/day. This is significantly more than the 66% of the total bulk water demand of 803 Ml/d for the previous financial year. It would indicate an significant increase in household grey water and other recycling that took place during the restrictions.

Other statistics concerning wastewater are:

- Approximately 31,0 Ml/d (5,9%) of wastewater is discharged directly via marine outfall sewers
- 53 000 tonnes/annum of dry sludge is estimated to be produced
- Approximately 31 Ml/d (6%) of treated effluent is re-used (refer to Table 4.12)

4.1.10 Non-revenue water and water losses

Unaccounted-for Water (UAW) has historically been calculated on an annual basis by comparing the cumulative treasury-supplied billing data of individual meters to bulk delivery figures.

The last calculation of UAW making use of data as described above was done for the 2001/2002 financial year. Data was used from the legacy Financial computer systems of the 6 erstwhile Local Authorities and bulk consumption as per the CMC Bulk Supplier water book. The result of the calculation for UAW was 18%, which looks favourable in comparison to the figure of 23% calculated by the "Integrated

Water Resource Planning Study” for the year before. These figures exclude the smaller bulk losses during treatment and delivery to Reticulation.

Since 2001/2002 the financial system of Council has been migrated to the new unified SAP environment. No more legacy data are kept, and the only source of data is the Utilities information system of SAP (Revenue and Consumption Report).

The data from the Utilities information system was used to calculate the traditional UAW for the 2003/2004 financial year, but due to various uncertainties in the data, the calculated result is not considered reliable. For the interim the previously calculated value of 18% is being used until the data from SAP can be verified.

The total UAW is about 23%. This figure is currently being verified as there appears to be errors. For spreadsheet calculations [GOTO 4.7](#).

The use of percentages to express real losses is increasingly recognised internationally as being potentially misleading when used as a measure of efficiency of managing real losses in comparing distribution systems with different levels of consumption.

It is recommended that the City of Cape Town should follow the recommendations made by the International Water Association Task Force, which have been developing “best practice” approaches to this topic. They have demonstrated that it is appropriate to now improve on the terminology, calculation process and performance indicators traditionally used for calculating water losses in public water supply systems.

However, a transition from traditional familiar terminology and methods is never easy to accomplish, and a commitment is needed from Water Services Management to effect the changes. For example, the terms “Non-Revenue water” and “Water losses” should replace the familiar term “Unaccounted-for-Water”.

4.2 INTEGRATED WATER RESOURCE PLANNING

The Integrated Water Resource Planning approach integrates critical planning criteria and activities into one systematic planning process. It involves the concurrent consideration of water supply and water demand management options. It is conducted using an open and participatory approach involving all stakeholders. IWRP also identifies and attempts to quantify the external costs and benefits and inherent uncertainties associated with each alternative.

With the realisation that water demand management was becoming increasingly important in order to ensure future sustainability and affordability, the former Cape Metropolitan Council (CMC) decided to adopt an integrated approach to water demand management and water augmentation. Towards the end of 1999, the CMC initiated an “Integrated Water Resource Planning” (IWRP) Study. [GOTO 4.3GOTO IWRP-STUDY.MK.doc](#)

The aim of the Studies was to investigate at pre-feasibility level various water demand management initiatives along with various water supply augmentation schemes. Recommendations were to be made to the City of Cape Town (CCT) on where to focus their resources and attentions with the aim of meeting and managing the water demand within the Cape Metropolitan Area (CMA). The study considered the technical, institutional, socio-economic, environmental and financial aspects of the options using a multi-criteria decision making analysis.

The results of the Studies indicated that a significant saving in water demand could be achieved through the implementation of certain water demand management initiatives. In comparison to the water supply options, certain water demand management initiatives would have a significantly lower implementation cost, could be implemented in a shorter time frame and were generally more environmentally and socially acceptable. The IWRP Study informed the WDM Ten-point Strategic Plan as discussed in the next section of this document.

A full suite of the Reports detailing the various investigations carried out under the IWRP Study are available for scrutiny in the offices of the Bulk Water Department of the City of Cape Town.

4.3 WATER DEMAND MANAGEMENT

4.3.1 Introduction

Water is a scarce resource in South Africa and also in Cape Town. For more than a century there have been periods of water restrictions followed by the development of new schemes to expand the city's water supply, usually through the building of a dam. Until 1995 the focus was primarily on managing the supply of water by developing new schemes to meet the growth in water demand.

Cape Town is a growing city of approximately 3,2 million people and it is expected that over the coming years it will continue to grow and to consume more water. Not only because it will house more people, but also because of a growing economy. Current research, which takes into account demographic shifts, including the impact of HIV/AIDS and in-migration of people to Cape Town, shows that demand is set to grow in the future.

The City of Cape Town recognises that if the population are to make use of its water resources in a sustainable manner, the growth in water demand will have to be carefully managed. Ways will have to be found to reduce demand, primarily by changing the behaviour of consumers of water.

The current drought, which has been proven to be one of the worst in recorded history, has sharpened the focus on water demand management. The possible causes of the drought also point to the need for long-term water demand management and behaviour change. One possibility is that this is a cyclical drought, and follows a pattern. The other possibility is that Cape Town has entered a period of climate change, brought on by global warming. This possibility has long-term implications for water management.

The City of Cape Town's approach to water demand management is based on three broad principles, namely that water is a strategic, precious and scarce resource; that there should be no wastage of water; and that all water used should be measured and accounted for. The principle of measurement is critical to ensure that water is managed effectively as a strategic, precious and scarce resource.

The City's aim, as set out in the Integrated Development Plan (IDP) is to reduce the actual demand for water by 20% from the projected unconstrained demand scenario, by the year 2010.

The finite nature of Cape Town's water supply impacts on all Capetonians and their future generations. As such the City seeks to work in partnership with citizens and stakeholders to develop a long-term strategy to safeguard its water resources. The aim is to work with communities, civil society and the private sector, and to modify consumption patterns so that water is used wisely and more efficiently.

Recognising that there are many ways in which this can be achieved, the City seeks to develop its Water Demand Management Strategy in a participative and inclusive way, building on what has already been achieved. This will build ownership by all communities and produce the best results possible, based on consensus.

4.3.2 Focus areas

In order to ensure public and Council involvement and commitment in reducing water demand, a ten-point strategy aligned to the following five focus areas or objectives is proposed:

- CCT must by 2010 reduce and maintain the non-revenue demand of water to below 25% of the total average demand;
- Consumers must not waste water and should endeavour to use water efficiently;
- Ensure effective management and implement Integrated Water Resource Planning in all decisions regarding water resources augmentation, bulk infrastructure development and water efficiency projects;
- Adopt Water Care (WC)/WDM as a key service delivery strategy and give priority to its implementation;
- Reduce the projected potable water demand derived from existing surface runoff water resources by 20% by the year 2010 and by 2020? and conserve Cape Town's Water Supply.

[GOTO 4.11](#) for the Comprehensive WC and DM Strategy and [GOTO 4.12](#) for Strategy Tables

4.3.3 The ten-point strategic plan

1) *Reduce Network and Commercial Losses*

It has been said that one of the biggest challenges facing the civil engineering profession internationally is the rehabilitation of an aging reticulation system in many cities around the world. The problem is that rehabilitation has not been implemented progressively and now many cities are faced with the almost impossible task of having to replace or rehabilitate most of the reticulation system in a very short period of time.

This problem is also true in Cape Town where many parts of the reticulation system are more than 40 years old. Although the reticulation system of CCT is not at a critical point at this stage, it needs to initiate a proactive and ongoing programme soon. Failure to do so will result in progressive increase in distribution losses and more frequent pipe bursts.

Some of the initiatives

- Pressure Management
- Identification and repair of leaks on the distribution system
- Adoption of a proactive approach to handling of complaints
- Monitoring, measurement and continuous assessment of water usage and metering devices at commercial properties

2) *Reduce low-income household leaks*

All households will be encouraged to repair water leaks, effecting savings for the City and its consumers. Building on successful campaigns to repair water leaks in poor households already undertaken, the focus will be on townships where infrastructure is of a poor quality and were under-serviced in the past. Households should be encouraged to re-use grey water (water that has been

used for washing and bathing, but can be re-used to water gardens and flush toilets).

Re-using grey water and rainwater means that households can save thousands of litres of clean potable water supplied by the municipality.

Some of the initiatives

- Leak detection and repair programmes
- Encouraging a leak-free household environment
- Measurement, monitoring and continuous assessments

3) *Reduce Council consumption*

The concept 'lead by example' shall be adopted by the City in terms of reducing the current use of water. The Open Space and Nature Conservation Department needs to make use of boreholes and treated effluent, and custodians of all council-owned buildings need to implement measures to achieve water efficiency.

Water-wise plants should over time replace others that consume large quantities of water in public places. The City remains mindful of the role that Cape Town's natural beauty plays in economic development and tourism, and seeks to enhance this still further, but in a water-wise manner.

Some of the initiatives

- To radically reduce the water consumption by the Open Space and Nature Conservation Department
- Installing water saving devices in all council-owned buildings

4) *Ensure equitable tariffs*

Water tariffs charged in the City of Cape Town are amongst the cheapest when compared to the other Metro Councils in South Africa. Water tariffs will be modelled to ensure that they are affordable to the poor, financially sustainable and will encourage efficient water use by consumers.

Some of the initiatives

- Revision of Water tariffs
- Putting incentives in place for water-wise consumers
- Informative Billing Systems

5) *Control water wastage through by-laws and ensure that all new developments are water-wise*

WC/WDM strategies often focus exclusively on increasing the water efficiency of existing consumers, neglecting the large number of new consumers who are getting water service connections every year, due to the current high development growth and backlog of services. It is obviously cheaper and easier to install water-efficient fittings rather than retrofit existing ones.

Some of the initiatives

- Set up of a Forum to assess and reconsider By-Laws
- Enforcement of By-Laws

6) *Promote retrofitting and capacity-building programmes*

Analyses have shown that there is significant water saving opportunities in the retrofitting of plumbing fittings. The added benefit of such measures is that they may also significantly reduce the hydraulic loading on the wastewater system.

Some of the initiatives

- Implementation of Plumbing Retro-Fit Programme
- Encouraging the use of water-saving devices through the media

7) *Communicate, educate and provide Informative Billing*

The City will embark on ongoing communication and public education campaigns to encourage responsible water consumption. This has short-, medium- and long-term objectives. In the short term a considerable reduction in water consumption is to be effected, while in the medium- to long term a change in behaviour around water consumption is to be achieved. Media campaigns will be based on and reflect the growing public consensus about the need to use our water in a more sustainable way. They will aim to change people's behaviour and their water consumption patterns.

Communication and public education needs to include practical information about how households can save water, how they can recycle water and how they can use it most efficiently. Communication needs to take into account the different needs and practices of different water users.

As all Capetonians, rich and poor, are dependent on water and have a vested interest in conserving this resource; managing water demand needs to be a uniting and not a divisive effort. A central message of the communication is that The City and its people are all in this together and united fronts and partnerships are needed to take this forward.

Some of the initiatives

- Special Events e.g. Water Week
- Initiating Sector Forums such as Large Users and Greening Forums
- Education at Schools
- Informative Billing
- Consumer-Awareness Programme via media and face-to-face

8) *Promote alternative technologies and launch water-saving campaigns*

The City is currently investigating alternate technologies to augment water supply, including inter alia: effluent recycling, boreholes and grey water re-use.

The City is also looking at initiating Rain Harvesting Projects for the purpose of supporting communities to grow their own foods.

Some of the initiatives

- Promotion of the use of Grey Water
- Promotion of local borehole extraction for small users
- Recycling of water

9) *Conserve CCT's water supply*

The short- to medium-term water demand management strategy is in line with the City's long-term commitment to conserving Cape Town's water supply.

Measures include supporting and working with "*Working for Water*" to clear invasive alien plants in water catchments and in the city as a whole. This is

proving to be a cost-effective intervention. The work also creates much-needed employment and empowerment and is partially funded through water tariffs.

Some of the initiatives

- Supporting “Working for Water” Programme
- Clean-up River Campaigns
- Management and monitoring of ground water extraction
- Supporting Catchment Management initiatives

10) Create an enabling environment for long term effective WC/WDM

The City’s short- to medium-terms goals are:

- Must by 2007 ensure and maintain ongoing effective management systems and implement Integrated Resource Planning in all decisions regarding water resources augmentation, bulk infrastructure development and water efficiency projects.
- Must adopt WC/WDM as one of the key water service delivery strategies, and must give priority to its implementation and ensure ongoing adequate enabling environment.

Some of the initiatives

- Effective monitoring of zones, ensuring integrity
- Upgrading Telemetry Equipment
- Water Balances and Audits
- Promotion of cooperation partnerships with other government bodies, e.g. DWAF
- Ensuring adequate transparency and public participation

4.4 WATER RESTRICTIONS

4.4.1 Introduction

Water is a scarce resource in the Western Cape, and historically there have been periods of water restrictions followed by the development of a new water augmentation schemes. [Table 4.4](#) below depicts when water restrictions have been imposed on the waters users within the Cape Metropolitan Area (CMA).

Table 4.4: History of Water Restrictions

YEAR/S	RESTRICTIONS IMPOSED
1872	Waterworks Committee reports supply not equal to demand. Temporary suspensions.
1881	Report in press referring to daily suspensions of supply
1902	Summer restrictions imposed
1904 (- 1921)	Restrictions imposed due to insufficient summer supply. Supply frequently interrupted for up to 15 hours per day
1949	Restrictions imposed on garden watering for 2 months preceding completion of Steenbras 840 mm diameter pipeline
1956	Restrictions imposed preceding construction of Wemmershoek Dam
1971 - 1973	Water Restrictions imposed preceding completion of Voëlvlei Dam and a severe drought

1993	Water Restrictions imposed on garden water for 2 months preceding the completion of Faure Water Treatment Plant
2000	Water restrictions imposed for 10 months due to low winter rainfall
2004	Restrictions imposed due to low rainfall in the winters of 2003 and 2004

The table illustrates that the timeous planning, design and construction of bulk water supply and water resource infrastructure is imperative in order to avoid water restrictions being imposed.

There are generally four main factors that could lead to water restrictions, these are:

- periods of low winter rainfall (droughts) inadequate water resource development (resulting in insufficient storage capacity in the mountains)
- the water treatment capacity in the System has been overtaken by the demand for water, and;
- the capacity of the infrastructure such as pipes delivering the water to the consumers is inadequate. This usually leads to more localised restrictions.

Water restrictions can also occur if certain of the available resources become unusable due to pollution.

4.4.2 Determination of water restrictions

Water resources in the Western Cape are normally assessed at the end of the hydrological year, after the normal winter rainfall period (end October) and at the onset of the winter rainfall period (end May). The assessment is done by means of a sophisticated stochastic computer model, jointly set up by the Department of Water Affairs and Forestry and the City of Cape Town. The model assesses the total demand for water in the region i.e. urban and agriculture over a number of years against the expected inflow into the various dams during drought years at various risks of occurrence. On the basis of the planning model results, informed decisions are made in order to optimise existing resources, on the need for water restrictions and the required severity thereof in order to avoid failure of supply in the short term. Based on this analysis, the levels in the dams are managed through the curtailment of water demand, in order to ensure that the dams will not empty and will recover over time. A progressively severe water restriction may have to be imposed should the drought continue or should less rainfall occur in future years.

The modelling carried out at the end of the winter of 2004 predicted that a 20% curtailment in water demand would have to be imposed on all water users between October 2004 and September 2005 in order to manage the recovery of the dams over the next 2 to 3 years.

The need for water restrictions is determined not only by the level of the water in the dams, but also by factors such as the projected growth in water demand, and the implementation date of future water resource augmentation schemes. Level 1 water restrictions (approximate 10% saving required), are applied earlier rather than later, in order to ensure that the City of Cape Town would have sufficient water to last through a drought cycle (a number of very dry winters). Level 2 water restrictions would require a water saving of approximately 20% and Level 3 water restrictions would require the City to save approximately 30% of its projected demand for water. It is better to introduce Level 1 restrictions at an early stage than reach a situation where it may be necessary to implement Level 2 or even Level 3 water restrictions.

The drought which has occurred from 1 November 2002 through to 31 October 2004 is assessed to be a 1:100-year drought. This implies that there was a 1 in a 100

chance of this event occurring over the 2 year period. The previous worst droughts in history in the Western Cape occurred in the 1930's and the early 1970's. These occurrences were both in excess of 1:200 year droughts.

One must not confuse water restrictions with water demand management. Water restrictions are punitive measures to reduce water demand and should be applied judiciously when circumstances such as droughts necessitate the implementation thereof. Water demand management on the other hand comprises good water demand practices and is the responsibility of all the authorities and water users. Good water demand practices, which will be contained in the proposed City of Cape Town Water By-laws, will also lead to a reduction in water consumption.

4.4.3 Legislative Requirements

The City of Cape Town has drafted Bylaws under Section 21 of the Water Services Act, 108 of 1997, which enables the City to impose water restrictions on all its consumers within its area of jurisdiction. A Bylaw entitled "Municipality of the City of Cape Town: Water Services Bylaw to limit or restrict the use of Water" was promulgated in the Government Gazette

4.5 **RE-USE OF TREATED WASTEWATER EFFLUENT**

The "Integrated Water Resource Planning Study" determined the potential for effluent re-use at a pre-feasibility level. The City of Cape Town has adopted a Water Demand policy and strategy to reduce the use of potable water. The re-use of Treated Effluent is one of the alternatives pursued by the policy

The CCT has appointed consultants to determine the feasibility of redistributing treated effluent from all its treatment plants. The project investigated the refurbishment and capacity of the treated effluent systems at the waste water treatment works (WWTW). The project has been initiated with the aim of increasing availability of effluent to the present consumers and also encourage others to use it as alternative supply to meet their water needs.

The interest from potential consumers has been overwhelming, to the extent that the City needs to expand the treated effluent infrastructure to serve the demand of the consumers.

The first extension was completed at the Bellville Waste Water Treatment Works and supply network during the 2003/2004 financial year. The extension included additional filtering capacity, disinfection, and connections to council parks, schools and Industrial users. The first phase of the project increased the available treated effluent by 5 MI/day. All the effluent used from Bellville WWTW replaces potable drinking water use.

A project completed in the 2004/2005 financial year increased the reuse of effluent at the Parow and Kraaifontein WWTW to approximately 3,7 MI/day. Two mayor Football Clubs close to the Parow WWTW as well as the Durbanville sports fields to be supplied from Kraaifontein WWTW are the new consumers. All these consumers were using potable water.

An existing treated effluent pumping scheme is in operation at the Potsdam WWTW. It serves council parks and is used for dune stabilization at Table View. The pump station has limited capacity and requires upgrading. The Century City private development has installed their own private pump station with sand filters which are governed by a long-term agreement with Council. Their demand is 2,4 MI/day and is used for water features, canals and irrigation.

The upgrading of the treated effluent supply from Potsdam will be completed in January 2006. The project will increase the effluent use from Potsdam by 17 MI/day for the first phase of the project, of which 9 MI/day of will replace fresh water.

Feasibility studies have been completed for systems at all the WWTW. The report has identified potential consumers and quantified their estimated demand from the various plants.

[Table 4.5](#) below gives a picture of current usage as well as potential demand, determined in terms of present economical viability, which will be pursued in order to achieve the objective of water conservation.

Table 4.5: Current and Potential Treated Effluent Supply

EFFLUENT RE-USE		
WWTW	Present (MI/day)	Potential (MI/day)
Athlone	3,0	15,0
Bellville	6,5	19,0
Borchard's Quarry	2,0	2,0
Cape Flats	4,5	14,0
Gordon's Bay	0,5	2,0
Kraaifontein	1,4	3,0
Macassar	2,1	12,0
Melkbosstrand	2,0	2,0
Mitchell's Plain	0,0	4,0
Parow	1,2	2,0
Potsdam	7,0	24,0
Scottsdale	0,3	3,0
Atlantis Wesfleur	0,3	5,0
Wildevoevlei	0,0	5,0
Zandvliet	0,0	5,0
TOTAL	30,8	117,0

Note: These figures exclude unformalised downstream use, where users could be withdrawing a large proportion of the dry weather summer flow.

Based on a 2004/05 summer 6-month average effluent production of 503MI/day, present re-use equates to 6% while the potential is 23% of the current flow. The potential re-use is a good indicator of what can be achieved even if it takes 10 years to implement.

The planning and construction of future extensions will be determined by available budget and the cost of treated effluent to the consumers. Currently the marginal cost of treated effluent is in excess of 50% that of potable water. A converged tariff model has been developed all user categories across the City of Cape Town [GOTO 4.10GOTO Tariffsanitation-20%.xls](#).

A policy is required for consumers who want to fast track projects and contribute to the capital expense or alternatively, would like to install their own private equipment at the WWTW. The policy should cover the agreement required between Council and the Consumer for the taking over of privately-funded infrastructure in lieu of a special tariff for a number of years.

5. DESCRIPTION OF EXISTING WATER SERVICES INFRA-STRUCTURE

A summary of the existing water supply and wastewater infrastructure as well as the estimated replacement cost is provided in [Table 5.1](#) (excl. consumer connections)

Water Supply Infrastructure	Replacement Value R mil
Dams and catchments	932
Treatment Works	1 021
Water Reticulation	8 073
Water Pump Stations	314
Reservoirs	1 268
Depots (shared)	30
Sub Total	11 638
Wastewater Infrastructure	
WW treatment works	1 420
Sewer Reticulation	4 159
Sewer Pump Stations	284
Depots (shared)	30
Sub Total	5 893
Total	17 531

For a full inventory of the main infrastructure refer to the infrastructure database [GOTO 5.1](#). A detailed description of the bulk system and internal systems is not pertinent to the identification of issues and performance indicators and is therefore not described in detail. For further information refer to the various Master Plans and the studies on the bulk systems:

Bulk Water : “Computer Analysis and Master Plan for Bulk Water Supply System”

Bulk Wastewater : “Strategic Evaluation of Bulk Wastewater” [GOTO 5.2](#)

[Figure 5.1](#) and [Figure 5.2](#) shows the main components of existing bulk water and bulk wastewater infrastructure in the City of Cape Town (CCT). A Geographical Information System (GIS and Geodatabase is on operation and maps the majority of the infrastructure along with related data.

5.1 GENERAL DESCRIPTION OF EXISTING WATER SUPPLY INFRASTRUCTURE

The water supply infrastructure is historically and logically categorised into two groups, namely the Bulk water supply system and the internal distribution system (Reticulation). The former system is generally in good order with sufficient capacity to meet the current required demand. Water gravitates from the majority of the dams, located mainly outside of the Cape Metropolitan area, via a number of large diameter pipelines to the water treatment works and bulk storage reservoirs from where water is distributed directly, but also via internal service reservoirs to consumers via bulk connections to the Reticulation system. A number of pumping stations are also required to boost supply in the higher lying areas.

For a more detailed description of the Bulk water supply infrastructure refer to a document entitled “Bulk Water Supply Infrastructure” [GOTO 5.3](#).

Figure 5.1 : Main Components of Bulk Water Supply Infrastructure

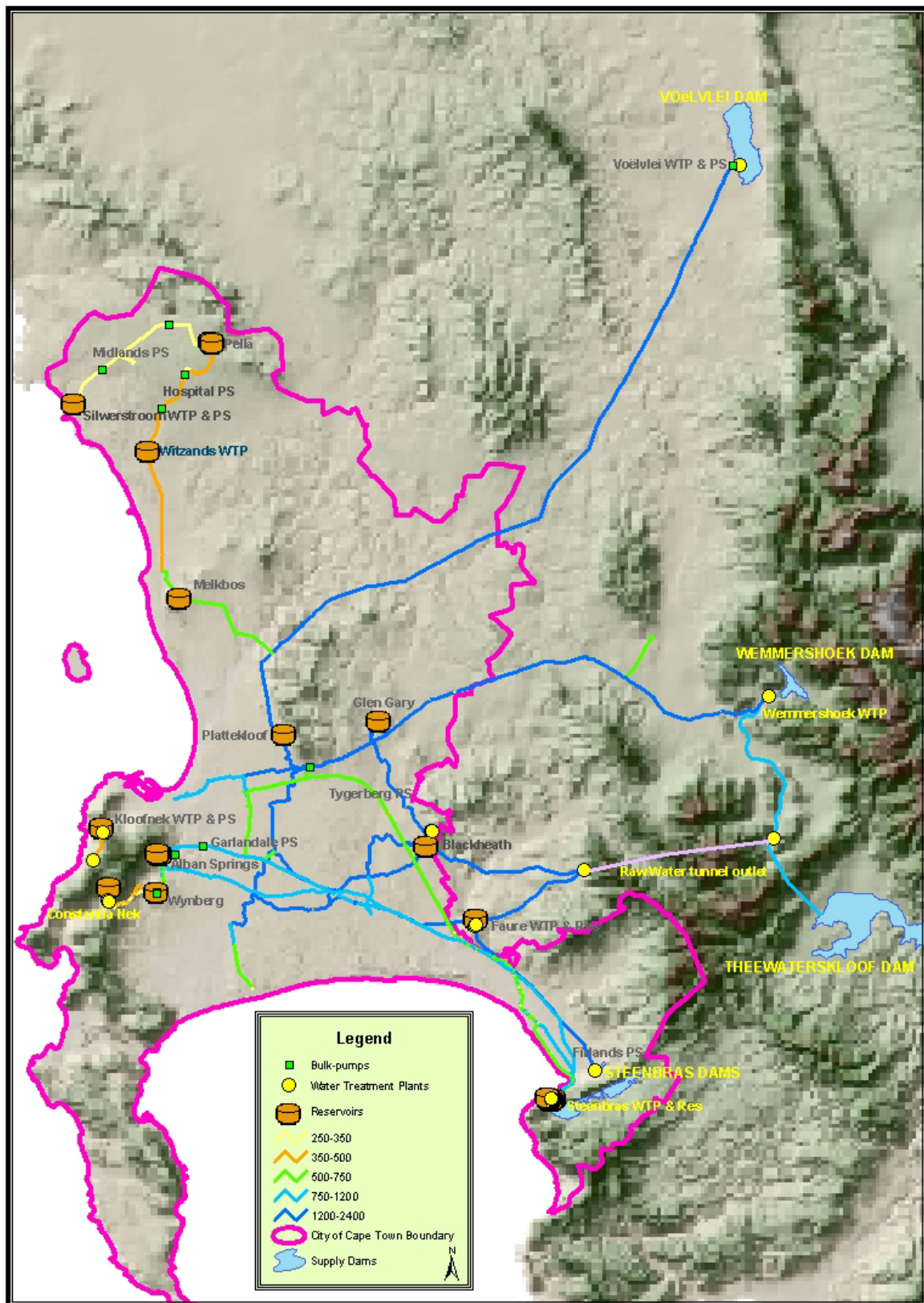
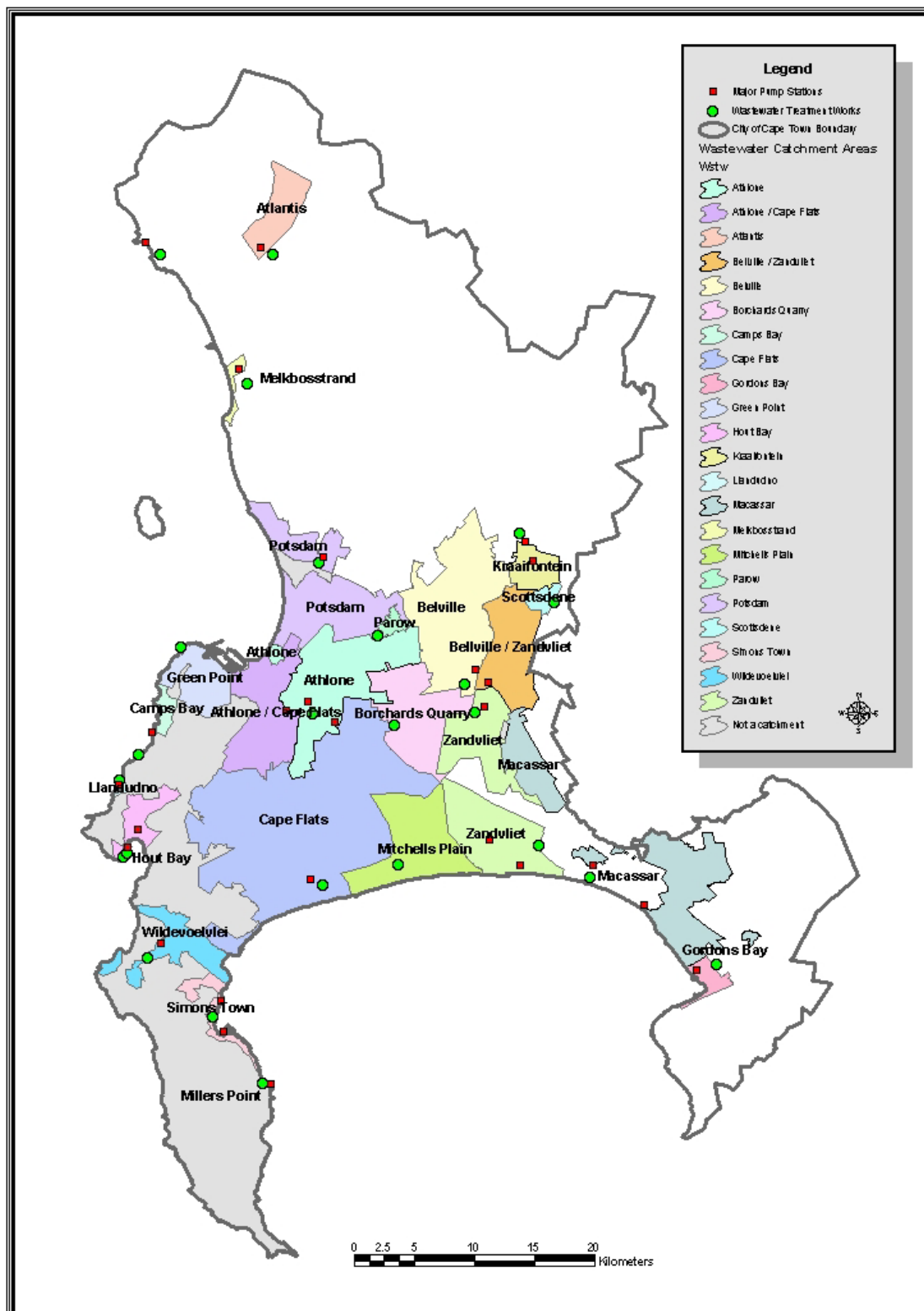


Figure 5.2 Main components of Wastewater Treatment Infrastructure showing Catchments



5.2 GENERAL DESCRIPTION OF EXISTING WASTEWATER INFRASTRUCTURE

The wastewater system, similar to the water system, consists of a bulk system and an internal Reticulation system. Tygerberg Hill forms the watershed, with wastewater draining towards the wastewater works, many of which are located next to the coast. The drainage areas and the location of pumping stations and wastewater works are indicated on [Figure 5.2](#).

The Strategic Bulk Wastewater Study completed in June 1999 [GOTO 5.2](#) is continuously used to assess performance of existing wastewater equipment, processes and management systems and identify where improvements are necessary for more effective performance.

For a more detailed description of the bulk wastewater infrastructure refer to a document entitled “Bulk Wastewater Infrastructure” [GOTO 5.4](#)

5.3 ASSET MANAGEMENT

One of the important issues identified, as part of the WSDP is the lack of proper asset management strategy. This has inevitably lead to the deterioration of infrastructure and service provision.

As a result of the lack of a proper asset management strategy, a project ([GOTO 5.5](#) for Project Definition Report) was set up to develop a Framework for a Strategic Municipal Asset Management Plan [AMP]. It encompasses stages one, two and three as listed below and forms the basis of a Basic Asset Management Plan [BAMP]. The implementation of stages 4, 5, and 6, will form the basis of a further project dependent upon the satisfactory progress of this project.

Stage 1:	Improvement Strategy Development
Stage 2:	Basic Asset Register
Stage 3:	Basic Asset Management
Stage 4:	Improved Maintenance Management
Stage 5:	Introduce Advanced Asset Management Techniques
Stage 6:	System Optimization

Water Services is now focusing on growing its “asset management maturity” with the implementation of a strategic municipal asset management programme (SMAM), facilitated through the creation of an asset care centre (ACC). The ACC is being managed through a bureau arrangement with asset performance management specialist PRAGMA Africa since March 2004.

SMAM, which outlines ways of implementing asset management principles in municipal environments, was implemented at Cape Flats Wastewater Treatment works as a pilot project for Water Services.

The programme requires the adoption of a continuous improvement process. For this the CCT bought PRAGMA’s asset management improvement programme (AMiP). An AMiP base line assessment was conducted to first establish a point of reference for future assessments. The analysis determined that the critical problem areas in the department included:

- a lack of asset management planning through uncontrolled and uncoordinated performance of maintenance work,

- a reactive rather than proactive approach to maintenance, and
- poor asset lifecycle management.

The ACC was established to address these issues. The ACC is essentially a central hub where all maintenance- and asset-related information is recorded, analysed and stored while maintenance schedules, budgets and contractors are managed and proper work execution ensured. Work requests are called in and logged onto an asset management software system. These requests, along with preventative maintenance work, are then assigned to staff.

Asset histories are built up, providing valuable data for future procurement decisions. The centralisation of maintenance enforces tight adherence to service level agreements and affords the CCT improved control and negotiating power when dealing with service providers. The ACC also ensures compliance with statutory requirements and safety, health and environmental regulations.

The pilot programme was launched in March 2004 at Cape Flats Wastewater Treatment Works Mechanical Workshop. The ACC site, which is situated off-site in Haardekraaltjie, Bellville captures and records all required work as well as preventative maintenance schedules, generating reports including details of failure analysis.

The ACC procedure is designed to ensure work is planned to effectively utilise resources and ensure all necessary spares are available to conduct maintenance work. Through a series of workshops, work planning and control procedures and policies are developed and implemented.

The implementation of the ACC has resulted in:

- improved productivity at the site and
- improved the proactive versus reactive maintenance ratios in the division from the initial figure of 1:1 to around 5:1 – a significant improvement.
- improved planning and co-ordination
- resulted in consolidation and maximisation of shared best practices.

The ACC is integrated with the SAP ERP system and the Work Scheduler/Planner decides whether identified work needs to be part of a maintenance plan or a reactive job.

The success of the pilot has seen the implementation of the ACC extended to cover the Wastewater Department sites, together with the Bulk Water Department. Reticulation will be incorporated during 2005.

Water Services has extended PRAGMA's services to September 2006 to allow for a skills transfer process to train municipal staff to take over the ACC function.

In terms of stage 2 "Basic Asset Register" [GOTO 5.6](#) for the latest information on "Asset Databases in Water Services – their State and Condition from an Infrastructure Asset Management Perspective."

Reticulation

The overall condition of the water and wastewater reticulation pipe network has not yet been quantified on a Metro basis. This quantification is considered to be a task of immediate urgency. In some former MLC areas, conditions of networks are known and these records need to be amalgamated in order to focus expenditure. Some networks are showing signs of weakness that require addressing. Condition records of other networks are non-existent. It is proposed that meticulous records of burst

mains and blockages, on a Metro basis, be introduced and maintained. Burst main and blockage incidents are proposed to be reported under the following topics:

- Street address of burst locality including locality sketch
- GIS code/SAP Asset Code
- Pipe details (size, type, lining, sheathing etc.)
- Ground conditions
- Details of fracture/blockage

Progress

Nine of the previous ten Reticulation Districts have provided marked up drawings of the Estimated Remaining Life [ERL] of the underground network in three categories, namely, ERL between 0 – 9 years [ERL0-9], ERL between 10 – 19 years [ERL10-19] and ERL greater than 20 years [ERL>20]. This information has been captured into GIS. Plots will be made of the ERL0-9 for the District Supervisors to prioritise the replacement order as well as plots of the ERL10-19 for the prioritisation of scientific condition assessment and maintenance prioritisation. Once the ERL0-9 and ERL10-19 processes have been completed the ERL>20 network will be reviewed along similar lines.

Bulk Water

Currently the Maintenance Tactics is under development and will be completed early in the early 2006. A project has been undertaken to address the shortfalls in the SAP PM Master data. The project will update the SAP PM Master data with condition of the asset, remaining life, estimate replacement cost and attribute data (name plate information). This will be used to determine CAPEX replacement program for Bulk water by updating the WADMS.

Progress

The Water Asset Database Management System [WADMS] is in the process of being updated. This will then be used to inform the long term CAPEX programme.

The following Bulk Water plants are within the Care Zone and have first draft Asset Management Plans:

- Atlantis Water Scheme
- Faure Water Treatment Plant

Wastewater Treatment

Maintenance Tactics for the Wastewater sites have been developed and implemented into SAP PM. A project has been undertaken to address the shortfalls in the SAP PM Master data. The project will update the SAP PM Master data with condition of the asset, remaining life, estimate replacement cost and attribute data (name plate information). This will be used to determine CAPEX replacement program for Wastewater by updating the WADMS.

Progress

The Water Asset Database Management System [WADMS] is in the process of being updated. This will then be used to inform the long term CAPEX programme.

The following Wastewater Treatment plants are within the Care Zone and have first draft Asset Management Plans:

- Cape Flats Wastewater Treatment Plant and satellites
- Athlone Wastewater Treatment Plant and satellites

5.4 STORMWATER INGRESS INTO SEWERS

Stormwater ingress into sewers is one of the major problems facing Water Services in CCT. The ingress negatively impacts on the capacity of the conveyance system, as well as that of the wastewater works.

The causes of the ingress can be summarized as follows:

- The sewerage network is aging and starts to fail.
- A big portion of the network was constructed with pitch fibre pipes, in conditions which are not suitable for this type of pipe material. The result is that the pipes will not reach their expected design lifespan. The pipes fail unpredictable and progressively which leads to groundwater ingress for years before the pipe finally fails completely. Only then does the problem become visible and can be repaired.
- In some catchments, glazed clay pipe was used. CCTV inspections have shown that root ingress into the joints is a problem. The biggest problem with the pipes is that the pipes fail at the ogee but don't collapse. The failure creates a big opening for water to enter or exit and sand and roots to enter.
- Poorly constructed manholes leads to ingress through the joints. Where sewerage gasses are a problem, the mortar in the concrete has been dissolved which leads to leaking joints.
- Theft of manhole covers, especially in low-lying areas, leads to storm water ingress
- House-connections which are usually constructed by contractors are not completed with the correct materials or skill and lead to open joints.
- In some of the older areas, the storm water from the property cannot drain to the street. The result is a flooded back yard and proof was found that the consumers will lift the sewer manhole covers to drain the water away.
- A problem across the City is the connection of roof water down pipes to the sewerage system.

The network-related problems can only be resolved by proactive maintenance if the required funds are available.

The consumer-related problems could be addressed by education programs, pamphlets and frequent inspections. However, it is not possible to adjust the plot levels if it was originally too low. In these areas the problem is not easy to resolve. Mid-block storm-water systems could be investigated.

No future developments should be allowed that cannot drain to street level. Where possible it will be beneficial to the sewerage system if no trees are planted directly above the pipe. In economical developments, the sewerage pipes should be installed under the road and no mid-block sewers should be allowed.

6. ENVIRONMENTAL ISSUES

6.1 ENVIRONMENTAL MANAGEMENT INITIATIVES

6.1.1 Introduction

The unique environment of Cape Town is its greatest asset, both economically, and for prosperity and wellbeing of current and future generations. The effective management and enhancement of this unique environment is the responsibility of the City of Cape Town. The “Environment” in this context must be understood in a wide sense to include biophysical, social, economic and cultural heritage issues.

Management of the environment of the City of Cape Town (CCT) area is guided by emerging national as well as international law and legislation, together with the City’s own environmental policy principles and tools. The South African statutes which are relevant to environmental policy and management at the local government level are:

- The Constitution of South Africa, (Act No. 108 of 1996)
- Local Government: Municipal Systems Act, (Act No. 32 of 2000)
- National Environmental Management Act (NEMA), (Act 107 of 1998)
- Environmental Conservation Act, (Act No. 73 of 1989)
- Atmospheric Pollution Prevention Act, (Act No. 45 of 1965)
- Hazardous Substances Act, (Act No. 15 of 1973)
- National Water Act, (Act No. 36 of 1998)
- Biodiversity Act (Act No. 10 of 2004)

For further information on the abovementioned legislation refer to the document entitled “Environmental Legislation” [GOTO 6.1](#).

6.1.2 Environmental Policies

On the 31st October 2001 the City of Cape Town (CCT) officially adopted the Integrated Metropolitan Environmental Policy (IMEP) together with an implementation plan, called the Integrated Metropolitan Environmental Management Strategy (IMEMS) [GOTO 6.2 Web](#) or [GOTO 6.2](#). The development of IMEP followed an extensive and rigorous public process over a period of two years.

When adopting IMEP, the City committed itself to addressing priority environmental issues by developing and implementing detailed strategies, as well as implementing environmental management tools such as Environmental Impact Assessment (EIA) and State of Environment (SoE) reporting. IMEP provides a vision for the environment of Cape Town in the year 2020, as well as policy principles which are intended to achieve the vision of a sustainable future.

The Year 2020 Vision for the Environment in the City of Cape Town includes the following:

- There will be a high expectation of the authorities in respect of environmental management, monitoring, auditing, as well as accountability. Environmental issues will be dealt with in a structured and efficient way, and impact studies will have ensured a better aesthetic and ecologically balanced City of Cape Town.

- There will be a positive relationship between local government and civil society, collective responsibility for the environment, and an ethic of partnership building.
- The City of Cape Town population will be environmentally educated, aware and conscious. Equitable environmental education will have ensured that people care for and respect their environment.
- The environmental quality will have improved in terms of air, water, land and sea.
- Environmental poverty will no longer exist and all communities will live in an environment that is not detrimental to their health or well being.
- Wastewater treatment facilities will be efficient and comply with legislative requirements.
- Water and energy resources and utilisation will be optimally and efficiently managed.

6.1.3 City of Cape Town: Environmental initiatives

The City of Cape Town has lead the way in environmental reporting, producing a comprehensive State of Environment (SoE) report each year since 1999 [GOTO 6.3 Web](#). The SoE report *aims to look at the relationships between various Economic, Biophysical and Social Indicators* and provides detailed information on the current status of the environment, the pressures causing change and the emerging trends revealed by selected indicators. This allows the City to assess management responses to changes in our environment and informs decision-makers, the public and other interested parties in an accessible way. Relevant sections of the SoE report for this WSDP include Inland Waters, Health, Infrastructure and Education.

State of River Reports

Since 2003, the City of Cape Town (in collaboration with DWAF, Western Cape Nature Conservation Board and University of Stellenbosch) has conducted several River Health Programme surveys of rivers in the greater Cape Town area. These surveys made use of biological monitoring techniques in order to determine the ecological health of rivers. The first survey addressed the health of the Diep, Hout Bay, Lourens and Palmiet River systems; the second focused on the Berg River system and the third, for which field work is nearing completion, assessed river health in the remaining rivers in the City of Cape Town. Examples of these and other State of River reports and posters are available at Scientific Services or DWAF offices [GOTO 6.4 Web](#). The sites located within the City of Cape Town which were established during these surveys will be re-assessed annually.

Integrated Environmental Management (IEM)

The CCT subscribes to the philosophy of Integrated Environmental Management, meaning that the environment must be considered at all stages of service delivery, from planning to implementation, and monitoring. The City's IEM guidelines subscribe to the "cradle-to-grave" approach, requiring environmental input from conceptualisation to decommissioning for all its operations.

During 2004, the city trained and established a multidisciplinary Environmental Audit Team under the auspices of the Environmental Management Department, Development Directorate. Six-monthly internal audits have been scheduled for a selection of the city's facilities (Water Treatment Plants, Wastewater Treatment Works and Solid waste Disposal Sites). The audits are designed to compliment and support internal and external audits. They will flag in particular environmental issues of compliance or best practice relevance.

Environmental Impact Assessment regulations

The National Minister of Environmental Affairs & Tourism has identified various activities in terms of section 21 of the Environment Conservation Act (Act No. 73 of 1989) which may have a substantial detrimental effect on the environment and which therefore require prior written authorisation from the relevant authority. A Record of Decision authorising or refusing an application shall only be issued after consideration of reports concerning the impact of the proposed activity and of alternative proposed activities, as prescribed by the Environmental Impact Assessment ("EIA") Regulations, (Rf Gn No R1183 of 5 September 1997, as amended).

A number of City responsibilities for water services fall within the scope of the activities identified in the EIA regulations. They include:

- canals and channels, including structures causing disturbances to the flow of water in a river bed, and water transfer schemes between water catchments and impoundments
- dams, levees and weirs affecting the flow of a river
- reservoirs for public water supply
- schemes for the abstraction or utilisation of ground or surface water for bulk supply purposes
- sewerage treatment plants and associated infrastructure

In order to comply with the EIA regulations and ensure environmental impacts are kept to a minimum, the City has developed environmental assessment procedures for all the river maintenance / upgrading activities as well as bulk wastewater activities. A checklist answer sheet and description form applicable to the capital works is completed to identify the category of the proposed works relative to the environmental requirements. Thereafter the necessary environmental procedures are followed, if necessary by appointing independent environmental consultants.

Environmental Management Programme for Civil Engineering Works

Environmental Management Programmes (EMPs) are a tool that facilitates appropriate environmental input during the construction phase of civil engineering projects, and thus form a crucial component of the IEM process and the ultimate attainment of sound environmental practice. Accordingly, the City has developed a state-of-the-art generic Environmental Management Programme, including Standard Environmental Specifications, Detailed Environmental Specifications and a range of supporting tools to facilitate the implementation of civil projects.

This EMP is included as an integral component of the Contract Documentation of all construction contracts, initiated by the City's line function that oversee construction activities, where there is a risk of environmental degradation or there is uncertainty regarding the environmentally sensitivity of the activity. Ultimately this approach will ensure the practical and effective implementation of environmental controls for these activities.

Integrated Metropolitan Environmental Policy (IMEP)

The sectoral strategy for water services based on the IMEP is given below:

A commitment to ensuring that the quality of coastal, marine and inland waters of the CCT is suitable for the maintenance of biodiversity, the protection of human health and a commitment to the principle that all CCT inhabitants have the right to clean, potable and adequate water sources. This commitment includes:

- Recognising that water is a scarce and valuable resource, which sustains communities, ecosystems and economic development.
- Recognising the importance of groundwater as a water resource.
- Management of water demand to ensure the long term sustainability and affordability of water resources and the environment.
- Ensuring water quality, at a minimum, meets national standards as established by the Department of Water Affairs and Forestry.
- The effective management of all wastewater systems.

6.2 WATER CONSERVATION AND QUALITY ISSUES

6.2.1 Quality of Raw Water Resources

The removal of tastes and odours from drinking water costs several million Rand per annum. Algal blooms are caused by inputs of nutrients into dams. This situation could escalate in the future if it is not addressed.

In order to at least stabilise and hopefully reduce the influx of nutrients and subsequent algal blooms, serious and urgent catchment management is required by the responsible authorities.

6.2.2 Potable Water

The quality of treated water is strictly monitored/controlled by the water treatment division and complies to SABS 241 and other guidelines. The Scientific Services Department conduct weekly visits to each WTP to test the water, inspect the process, retrieve various samples and analyse them. The results are then scrutinised, evaluated and compiled as a weekly report with comments. The WTP manager is given a copy of the results, one copy is sent to the Head of Bulk Water Operations and one is kept by Scientific Services. Composite sampling is carried out by the WTP on a weekly basis and these samples are also analysed by the Scientific Services Department and a monthly report is generated. *Odour and toxin producing Cyanobacteria (blue green algae) remain a threat to raw water supplies. Blooms are monitored according to World Health Organisation protocols and water treatment processes are accordingly adjusted.* Immediate response to operational problems and consumer complaints is affected by suitable experienced and qualified staff from Water Services. For details on raw water quality and treated water quality refer to table entitled "Water Treatment Data" [GOTO 6.5](#).

Weekly sampling is also undertaken jointly by the Health Department and Scientific Services. Samples are taken at various locations throughout the distribution network.

6.2.3 Implementation of Fluoridation Regulations

In terms of Regulations No. R823, dated 8 September 2001, promulgated under Health Act 63 of 1977, all water services providers are required to ensure a fluoride concentration of 0.7 mg/l in potable water for the purposes of reducing dental caries. Fluoridation is complex, expensive and a potentially hazardous undertaking and required the implementation of new infrastructure by September 2003 at an estimated cost of R11 mil, since the natural concentration of fluoride in CCT's water resources is insufficient. This issue has been put on hold. The running cost of fluoridation is estimated at R10mil per annum. Skilled operators required to manage the fluoride concentration are currently inadequate, and requires the training of additional staff. CCT have embarked on a public participation process. A report as tabled to the Trading Services Portfolio Committee gives more background [GOTO 6.6](#).

6.2.4 Treated sewage effluent released into Urban River Systems

Although it was previously an urgent requirement to adhere to the proposed 2010 standards, the implementation of these standards is currently being delayed by DWAF on the grounds that they are unaffordable. The City has been asked by DWAF to ensure that its WWTP comply with the 1984 Standards. However, Each application for upgrading existing and building new WWTPs is being assessed on its merit and the reserve determination of the receiving water body.

Water Services will ensure that 90% of treated effluent is in compliance with current DWAF standards (1984 standards) by 2010.

Scientific Services generates quarterly and annual aggregate assessments of compliance for each individual treatment works and an overall summary for all facilities. Graphical representation of these statistics gives a visual “dashboard” of compliance for the key constituents stipulated in the permit is given in Table 6.1. For a comprehensive spreadsheet of results at each wastewater treatment plant for the year 2004/05 [GOTO 6.7](#).

Table 6.1
FINAL EFFLUENT QUALITY COMPLIANCE WITH STANDARD (%)

CAPACITY >15 MI/d	YEAR TO MAY 2005			
	Susp Solids	Chem Ox Demand	Ammonia	E.coli
Athlone	96	98	96	0
Bellville	86	82	66	2
Borcherds Quarry	98	96	77	74
Cape Flats	44	48	100	100
Macassar	96	94	85	75
Mitchells Plain	92	92	88	32
Potsdam ASP	92	90	94	2
Potsdam BIO	88	10	12	0
Zandvriet	98	98	98	96

MORE THAN 90% COMPLIANCE

75% - 90% COMPLIANCE

LESS THAN 75% COMPLIANCE

[GOTO fe compliance year to 2005.06.xls](#)

A network of monitoring stations on Cape Town's rivers and wetlands is maintained with monthly chemical and bacteriological analyses being undertaken by Hydrobiology and Microbiology laboratories at Scientific Services. Sample locations are determined by the presence of potential sources of major pollution as well as various ecological criteria.

A team of trained biomonitoring practitioners from the City of Cape Town (Scientific Services), Department of Water Affairs and Forestry and CapeNature implement the River Health Programme (<http://www.csir.co.za/rhp/>) in the Western Cape. Under the umbrella of this nationally supported programme, the ecological health of the City's rivers is assessed annually. The health of rivers downstream of final effluent discharges from Wastewater Treatment Works is “poor” to “bad”, and only pollution tolerant organisms are generally found at these locations. Discharges from wastewater treatment works unnaturally augment river flows (particularly during low flow summer months) and this degrades instream habitat quality. “State of Rivers” reports documenting the ecological health of rivers in the greater Cape Town area were produced in 2003 and 2005. A similar report addressing the health of the Berg River was produced in 2004.

The suitability of the receiving environment for recreational use is influenced by the presence of pollutants from a variety of sources including treated sewage effluent. Several of Cape Town's Wastewater Treatment Works have reached or are approaching their design capacities due to burgeoning development which is placing increasing pressure on the service. Bacterial water quality has a direct effect on the potential risks posed to users of water bodies e.g. recreational vleis and coastal bathing areas. In addition, high nutrient concentrations can result in growth of aquatic plants and algae that rapidly reach nuisance proportions and thus affect aesthetic enjoyment of water bodies. Some algae belonging to the Cyanophyceae ("blue-green algae") can produce toxins which are harmful to humans.

River, wetland and coastal monitoring results are discussed with inter-disciplinary teams at quarterly Catchment Management Team meetings chaired by Catchment, Stormwater and River Management, (Roads and Stormwater Directorate).

During 2004, an Environmental Management System was established for the Potsdam Wastewater Treatment Works by the Environmental Planning Directorate. The development of an EMS for the Mitchells Plain Wastewater Treatment Works is planned for 2006.

6.2.5 Impact of Industrial Consumers and Potential Pollution Sources

Effluent from industrial consumers generally is discharged into the sewage system and treated at the wastewater treatment works and is therefore not considered as a pollution threat.

However, that which ends up in the stormwater system presents a real and serious threat. Containment of chemicals in storage and during transportation presents a definite risk to the stormwater system and hence the environment at large. The Water Pollution Control Inspectorate and Tradewaste Laboratory are equipped to monitor industrial effluents and provide assistance with containment during pollution incidents.

6.2.6 Removal of Alien Vegetation

The CCT has an ongoing programme for the removal of alien vegetation in the catchment areas of their dams. This programme will have the effect of increasing available run-off. The CCT also contributes towards the removal of alien vegetation in DWAF catchments through a catchment management charge.

The City's Integrated Aquatic Weed Control Programme aims to assist with management of alien aquatic weeds which occur in rivers, canals, wetlands, dams and treatment ponds. Depending on conditions prevailing in the target water body, mechanical, manual, chemical or biocontrol methods may be recommended.

The national departments of Agriculture and DWAF have established regional aquatic weed management groups (the City of Cape Town is represented on the Western Cape Regional Aquatic Weeds group) which advocate this approach.

Mechanical removal methods which are sometimes combined with litter or silt removal activities can be destructive to rivers or wetlands since habitats and sediments tend to be disturbed. Timing of such activities outside of bird and frog breeding seasons is important. Chemical control methods involve the use of herbicides which have been registered for use in water and which are intended for use on the target weed. Trained operators should be used and it is useful to provide information to the public or erect signage to help with alleviating potential concerns about spraying herbicides over aquatic ecosystems. Biocontrol agents are generally insects which are natural enemies of the alien plant species. Introduction of

biocontrols onto host plants can result in moderate to complete control of the nuisance plant population. Biocontrol agents are available in South Africa for control of water hyacinth (*Eichhornia crassipes*), water lettuce (*Pistia stratiotes*), parrots feather (*Myriophyllum aquaticum*), South American water fern (*Azolla filliculoides*) and kariba weed (*Salvinia molesta*). An addendum to the Catchment, Stormwater and River Management's River Maintenance Guidelines entitled "Decision Support Guide for the Control of Aquatic Weeds" is available and additional advice regarding integrated aquatic weed control can be obtained from Scientific Services or Catchment, Stormwater and River Management.

6.2.7 Atlantis Aquifer

An Environmental Management System (EMS) has been completed for the Atlantis Aquifer System, and an environmental consultant audits the EMS on an annual basis. In addition an environmental officer for the area was appointed in July 1999, to safeguard the environment, water supply infrastructure and to educate the public. The Council for Scientific and Industrial Research (CSIR) assist in monitoring water quality and aquifer levels on a regular basis. In terms of the National Water Act (1998), aquifers are protected by law.

Silwerstroom Spring which arises on the edge of the Atlantis dunefield is an important component of the Atlantis Aquifer water supply scheme: good quality water from the spring is used to blend with aquifer water. Abstraction of water at the Silwerstroom weir results in drastic daily water level fluctuations which has had a negative impact on the ecological health of the system and may have contributed to the growth of filamentous algae in the pool upstream of the weir. This practice has however recently stopped due to clogging of pump equipment by algae. A consequence of this has been that the Silwerstroom Spring now overflows the weir and is permitted to flow down to the sea thus restoring some of the ecological functioning of the system.

The spring is also unique since it supports a population of the endemic fish species, *Galaxias zebratus* (Cape galaxias). This Gondwanaland relic's closest genetic family is located in South America! The Water Department and ecologists from Scientific Services and DWAF are seeking solutions which will alleviate algae growth, allow sustainable abstraction and leave sufficient flow for the system and the *Galaxias* population to remain healthy.

6.3 **STORMWATER MANAGEMENT (INCORPORATING CATCHMENT & RIVER MANAGEMENT)**

Catchment, stormwater and river management in Cape Town involves both the quantitative and qualitative management of urban runoff in a manner that ensures public health and safety as well as conservation and enhancement of both the built and natural environments. This approach was formalized in 2002 by adoption of a comprehensive five year strategy formulated to guide improvement and enhancement of the service [GOTO 6.8](#).

6.3.1 Service Overview

Cape Town's stormwater management system comprises an extensive network of underground pipes and surface features such as rivers, canals and ponds as follows:

- 1 200 km Rivers and streams (of which 300km are maintained annually)
- 5 500 km of Underground Pipes and Culverts
- 650 Detention and Retention Ponds

- 150 000 Gullies and Intakes
- A vast and presently indeterminate network of informal or private channels and ponds

The current service delivery model comprises centralised strategic planning, monitoring, information management and community outreach support services with decentralised service provision, upgrading and maintenance of stormwater infrastructure and river systems including community/user interaction.

During the 2003/2004 financial year R48,4M was allocated to stormwater capital projects. Approximately three quarters of this budget related to public housing projects. During the corresponding period, repair and maintenance expenditure totalled R49M for both in-house and contract works. Although funding for stormwater has increased since the previous financial year, it is still far less than generally-accepted norms based on replacement values for the infrastructure currently estimated as R5B. This under-investment will ultimately result in deterioration of assets and reduced levels of service delivery.

6.3.2 Strategic Planning and Management

The work of the service is structured around various strategic focus areas and support programmes identified in the five year strategy referred to above. Progress on each aspect of the strategy is itemized in the tabulation below.

Strategic Focus Area	Priority Programme	Performance Target	Actual Performance
Holistic Planning and Management	Catchment, Stormwater and River Planning	Complete and adopt at least two plans per annum. Eleven plans required by July 2007	Two plans completed and approved to date.
		Complete master plans covering at least 1000 ha p.a/	59 659 ha completed to date
	Integrated Urban Water Management	Establish fully representative multi-disciplinary co-ordinating team by July 2003	Integrated urban water management matters dealt with on an ad-hoc basis
		Convene meetings of co-ordinating team at least twice annually	
System Development, Upgrading and Maintenance	Stormwater Management Planning and Design Guidelines for New Developments	Completion by December 2002	Complete July 2002.
	Risk Based Approach for Upgrading and Maintenance	Develop and implement system by July 2005	Maintenance management system currently under development.
	Infrastructure Management System	Develop and implement system by July 2007	Initial investigations commenced
	Environmentally Sensitive River Maintenance Guidelines	Guidelines completed by June 2002	Completed December 2002
		Fully implemented at operational level during 2002/2003 financial year	Complete
Public Safety and Environmental Protection	Flood Disaster Mitigation	Prepare Stormwater component of Corporate Disaster Plan	No progress
	Water Pollution Abatement	Define and implement generic protocols for water pollution abatement by June 2003	No progress
Information Management	Information Systems	Complete network data capture by December 2004	On target. 85% of area captured
		Finalise monitoring information system by June 2005	Slow progress due to technical and software difficulties
Regulatory	Control of Development near Watercourses	Upgrade draft guidelines to policy by January 2003	Completed September 2003
	By-Laws	Promulgate by July 2003	Still underway. Adoption anticipated in December 2004.
	Tariff Funding options	Report to Council on findings and recommendations by January 2004	No progress

Relationship Management	Management Integration Mechanisms	Monitor and improve running of catchment management teams	Four teams established June 2003. Teams reviewed and reorganised
		Convene quarterly meetings	On target
	Customer Care	Undertake biennial customer satisfaction surveys	No progress
	Staff Development	Three seminars	Three seminars held
	General Education Initiatives	Programmes run at various locations	Programmes conducted at Water Week, Youth Environmental School, Zeekoevlei Environmental Education Centre and at the Two Oceans Aquarium
	Partnership Development	Formulate guidelines	Proposal for funding submitted. Approval provisionally granted.

6.3.3 Service Outcomes and Performance Evaluation

Performance in terms of the desired service outcomes is monitored and evaluated by means of various key performance indicators. These measure and track the extent and nature of flooding and key water quality determinants in both inland and coastal waters.

Additional details and other pertinent information are contained in the 2003/4 annual report for the service [GOTO 6.9](#).

6.3.4 Future Outlook

Flood risk reduction for vulnerable communities will remain a top priority over the next five years given the adverse socio-economic impacts of flooding. A formal flood risk reduction and mitigation program is under development to deal with these problems in a systematic way.

Although the City's recreational waters are generally considered safe for contact recreation, water quality in many of the major watercourses is of concern. This is primarily due to rapid urbanization and capacity constraints on both water services and waste management infrastructure and services. Closer co-operation at a strategic level between those responsible for all three sectors of the urban water cycle (water supply, wastewater, stormwater) in accordance with the principles of integrated urban water management (IUWM) is required to effect change in this regard.

6.4 RELATED ACTS

6.4.1 The occupational Health and Safety Act 85 of 1993

The Directorate Water Services has a Health and Safety Management system in place entitled the Safety, Health and Environment Policy and Procedure Manual ([GOTO 6.10](#)). Its final version was approved in 2005.

The aim of this document is to outline the procedures that are required to be developed and put into practice to fulfil the requirements of the Occupational Health and Safety Act No 85 of 1993 [GOTO 6.13](#) or [GOTO 6.13 Web](#). Its key policy is to create and maintain a safe and healthy work environment for all Water Services employees.

The NOSA Management System has been adopted as a framework for this policy on occupational safety, health and the environment. The OHSAS 18001:1996 system is operative in respect of the Bulk Water Department, but not yet so for the other Departments.

The City of Cape Town's Vision Statement as follows, refers to two key elements of this policy:

"Develop and maintain a *safe, healthy* and clean city".

The following principles as prescribed in Section 8 of the OH&S Act guides the Directorate's approach and the Employer, inter alia:

- Must identify health and safety hazards and take the necessary precautions to protect employees;
- Should provide whatever is needed by employees to comply with the OH&S Act;
- Should provide employee training and guidance to improve productivity, safety and health;
- Should continually educate employees, cultivating safe working habits and a positive attitude towards health and safety practices.

Responsibility for Health and Safety

The assignment of Responsibility for Health and Safety in the City has followed the procedure spelt out in the OH&S Act [GOTO 6.11](#).

The City Manager as Employer as well as all Management levels downwards in the structure, down to Supervisory level (as Responsible Persons), have formally accepted responsibility for the health and safety of the employees. A Competent Person is functioning and has appointed Subordinate Competent Persons at each of the Directorate's facilities. The duties of Coordinator and Advisors are being discharged. There are also Health-and-Safety Representatives, Health-and-Safety Committee Members, First Aiders and Floor Marshalls at each of these sites. This operational structure functions to assist line management with proper execution of the duties involved in the Policy.

Environmental Management

The Bulk Water and Wastewater Departments have made good progress with the implementation of the ISO 14001 Environmental Management System. The Reticulation Department still has to implement it.

The Scientific Services Department is monitoring all operations by analysing samples from the various facilities regularly. Similar monitoring at strategic points for river-, lake-, vlei-, sea- and air samples is also undertaken.

The wastewater from critical industries is being monitored by the Industrial Effluent Section in the interest of the wastewater treatment plants and the environment in general.

The results of the relevant analyses are regularly made available to DWAF and the City's management for any corrective action.

The Scientific Services Department is also offering a service to the public for the disposal of hazardous and toxic substances.

6.4.2 National Water Act

The CCT has registered its bulk water use in terms of Section 4 (Use of Water) of the National Water Act (1998). [GOTO 6.12GOTO NWA.doc](#). The registration application includes the registration of bulk water supplied to consumers outside the CMA.

The CMA falls within the Berg River Water Management Area. Approximately half of the CCT's raw water supply requirements originate from water sources within an adjacent Water Management Area (i.e. the Breede River Water Management Area). The CCT is represented on both these Catchment Management Agencies which have been created in terms of the National Water Act.

6.4.3 Water Services Act

In terms of the Water Services Act, every Water Services Authority has to:

- promulgate Water Bylaws, which set out conditions for the provision of water services. CCT is in the process of complying with this requirement. Refer to Section 3.6
- draft a Water Demand Management Strategy and Policy. CCT complies with this requirement. Refer to Section 4.3.

7. FUTURE INFRASTRUCTURE REQUIREMENTS

7.1 STATUS OF EXISTING MASTER PLANS

Previous master plans for Bulk Water and Wastewater Treatment were updated during 2005. Reticulation's Master Plans have not yet been integrated for CCT, although developed for most of the previous Administrative areas.

An integrated Master Planning Team has been set up during 2005 to improve integrated planning across the City and across the Departments.

7.2 OVERVIEW OF PROPOSED EXPANSION TO BULK INFRASTRUCTURE

7.2.1 Bulk water

Planning of the bulk water distribution (refer to Computer Model Analysis and Master Plan for Bulk Water Supply System, March 2001 held by the Bulk Water Department) system has been based on a future AADD of 1350 MI/d.

Conceptual planning of bulk water supply infrastructure has however been carried out up to an AADD of 1850 MI/d. The timing of the bulk water infrastructure required is dependent on the growth in water demand and the effectiveness of the WDM strategy being implemented.

Bulk Water Planning Investigations

The planning and development of major water resource schemes, like the Berg Water Project, is usually complemented by the planning and development of additional bulk water supply infrastructure needed to convey the raw water to water treatment plants, the treatment of the raw water into potable water and then the conveyance and bulk storage of the treated water.

Planning for all future bulk water supply infrastructure is currently being carried out in accordance with the Low Water Demand Curve of the City. The date for constructing a new 500 MI/day water treatment plant (see below) will be reassessed 2008 depending on whether water demand growth is below the low water demand curve.

The former CMC appointed specialist consultants in 1998 to conduct a Bulk Water Supply Master Plan (and development of a computer model) for the City. The objectives of the Study were to:

- optimize the operation of the existing bulk water supply system
- assist with the maximization of existing and future water resources
- assist in making optimal decisions when constraints on the bulk water supply system necessitate operational changes
- to assist in the planning and optimization of future capital works

The Bulk Water Master Plan identified that a new Water Treatment Plant (WTP) and associated bulk water pipelines and bulk reservoirs would have to be constructed within the next 8 years in order to meet the demand of water. The new water treatment plant would be linked to the Berg River Dam currently under construction.

In 2003, the Bulk Water Department initiated an environmental process as part of a feasibility study (including route selection and location of infrastructure) to ensure

timeous development of a new 500 ml/d Water Treatment Plant (WTP), 300 MI bulk water supply reservoirs and associated pipe work in order to meet the future growth in water demand for the City.

Should the new WTP and associated infrastructure not be constructed timeously, water restrictions would have to be imposed in the dry summer months in order to ensure that the peak water demand does not exceed the CCT's available WTP capacity.

Areas that were identified for the possible location of a future water treatment plant include the Dwars River Valley, Franschhoek, Klapmuts/Simondium, Wemmershoek, and Muldersvlei/ Joostenberg. The current preferred location for the new WTP is in the Muldersvlei\Joostenberg Vlake\Klapmuts area.

A WTP abstracting water from the Dasbos Portal and the Berg River Dam is the preferred for the following reasons:

- A new WTP in the vicinity of the Berg River Dam will reduce the reliance which the CCT currently places on the RSE Tunnel System (security of supply);
- A WTP abstracting water from the Dasbos Portal and the Berg River Dam could cater for the growing water demands of Drakenstein and Stellenbosch Municipalities and make available currently under-utilised capacity in the existing pipeline from the Wemmershoek WTP;
- The WTP could feed the areas of high growth (i.e. Durbanville North) directly.
- It would provide an alternate source of supply to Glen Garry Reservoir and possibly enable the Wemmershoek WTP to be shut down for repairs or maintenance for a longer duration;
- Water from some of the sources could be gravitated to Glen Garry Reservoir
- Increased flexibility in the bulk supply system.

In addition to the proposed new Water Treatment Plant, additional bulk water reservoirs are required in the Blaauwberg area (Contermanskloof Reservoir) and in the Helderberg area (Steenbras Bulk Reservoir). Additional bulk water supply infrastructure may also be required in order to boost bulk water supply to Houtbay.

Timing, Phasing and Cost of the new Infrastructure

The timing and phasing of the construction of the new bulk water supply infrastructure would be dependent on the growth in peak week water demand in the area served by the bulk water supply infrastructure as well as factors such as security of supply. It is proposed that the infrastructure be phased in, in such a way so that it can be utilised as part of the bulk water supply system upon completion and commissioning.

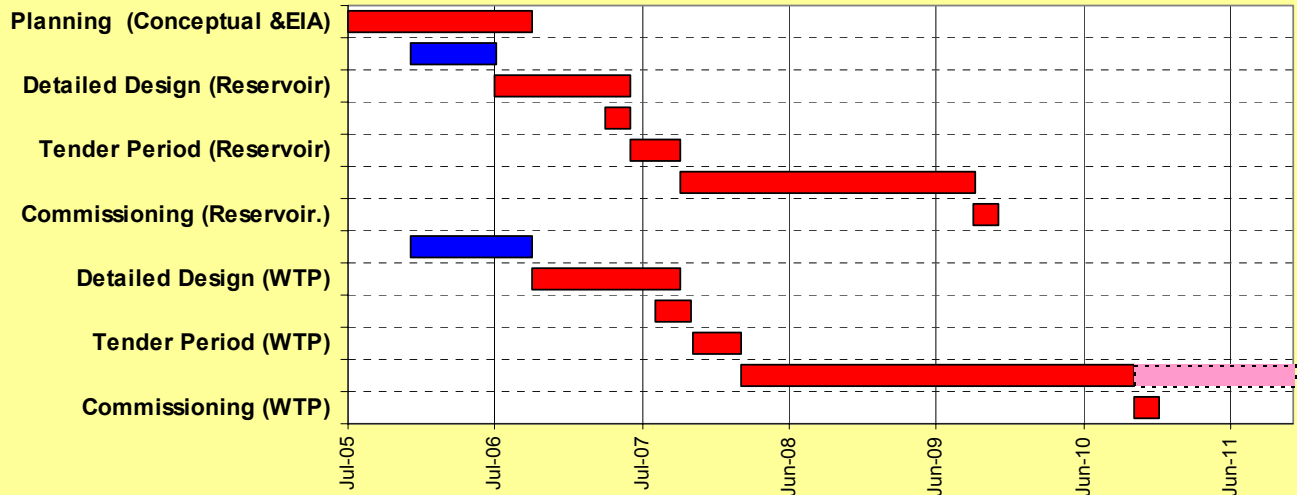
It is currently estimated that a 300 MI bulk water supply reservoir (and associated interlinking pipe work) will be required to provide balancing storage on the Wemmershoek pipeline by the end of 2009. The completion of the proposed water treatment plant will be required by the end of 2010, with the remainder of the bulk water supply infrastructure connecting the proposed WTP to the proposed Spes Bona Transfer Reservoir and the existing Glen Garry Reservoir being required shortly after this point in time. ([Figure 7.1](#))

The cost of the new water treatment plant and associated bulk reservoirs and bulk pipelines (including the Voëlvei to Glen Garry Transfer Scheme) is in the order of R1,4 Billion.

Should the imposition of the water restrictions in 2004 and the water demand management strategy put forward, change consumer behaviour with regards to water

consumption, the implementation date of the new water treatment plant will have to be revised accordingly. This will however have to be monitored on an annual basis.

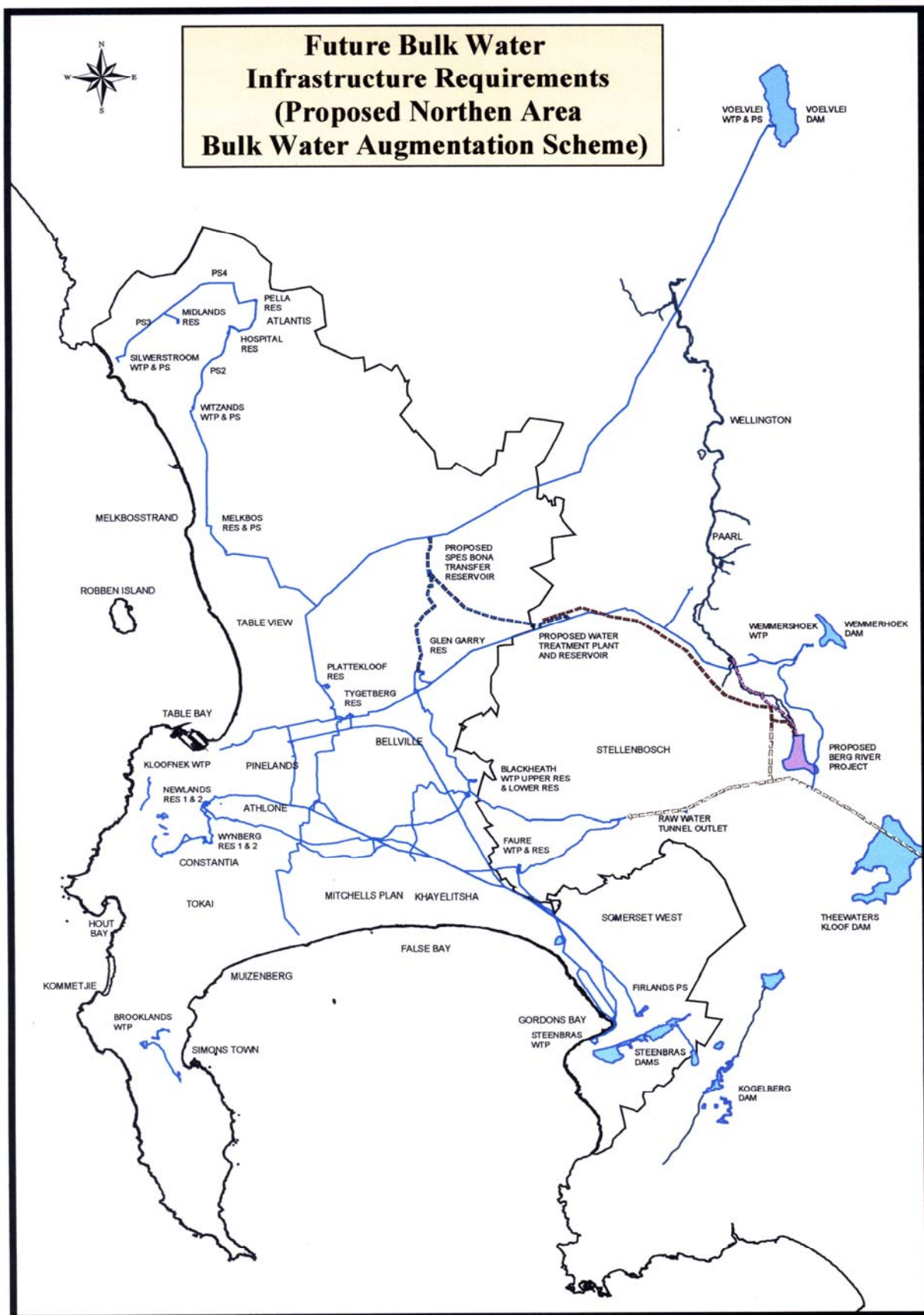
Figure 7.2 Programme to implement Bulk Water Infrastructure.



A Schematic layout description of required bulk water supply infrastructure is given in [Figure 7.2](#) while a detailed description is available at the offices of the Bulk Water Department.

It must be noted that the description, phasing and costing of the bulk water supply infrastructure described in all the text above is provisional and is also subject to the outcomes of various further planning initiatives.

Figure 7.2 Future Bulk Water Infrastructure Requirements



7.2.2 Wastewater

The Bulk Infrastructure Programme has been updated in the form of a Master Plan which summarises the sewage infrastructure requirements to meet future growth. Although it was previously an urgent requirement to adhere to the proposed 2010 standards, the implementation of these standards is currently being delayed by DWAF and each application for upgrading is being assessed on its merit and the reserve determination of the receiving water body.

Financial investment into wastewater treatment infrastructure has been lacking historically due to the high demand on capital throughout the city and this is affecting essential maintenance and upgrading which results in further deterioration of the infrastructure or “asset stripping”. If this tendency continues, a major problem would arise as far as future capital requirements are concerned since the demand escalates at a much higher rate while the investment backlog grows.

Where investment has taken place, benefits are notable from the improved effluent quality at these works for example at Macassar, Zandvliet, Wildevoëlvlei and Kraaifontein Wastewater Treatment Works effluent quality is now totally compliant with permit requirements. This in turn improves the re-use potential of wastewater effluent.

Staff reduction has continued over the past five years and increased use is made of consultants to implement capital improvements.

It is also foreseen that there are potential benefits in outsourcing some operational functions as is seen in the case of Zandvliet Wastewater Treatment Works, which is successfully operated by a private company. Such alternative service delivery mechanisms may be considered in future especially in the case of new treatment works.

During 2004/05 the Wastewater Department has experienced significant success in sludge-to-land/ composting as a means of beneficial sludge disposal. This project is an example of private-public partnership for mutual benefit and has led to soil enrichment of farming land as well as reduced the uptake of valuable space on landfill sites. This initiative is being carried out with the approval of DWAF.

Strategic Bulk Wastewater Study

The Strategic Bulk Wastewater Study (1999) ([GOTO 5.2](#)) assessed the performance of existing wastewater infrastructure, processes and management systems and identified where improvements were necessary for more effective performance. In addition the development predicted to take place in the CMA over the next 20 years, identified the need for facilities to be extended or new ones to be put in place. This study formed the basis of the more recent 10 Year Master Plan.

The Wastewater Department's Master Plan was compiled as an easy reference document giving general information on Departmental issues, the comprehensive Bulk Wastewater Strategic Study organizational structures and flow predictions. The document reflects the latest statistical information and includes a 10 year capital programme which is based on prioritizations to achieve improved compliance of effluent quality and/ or increased treatment capacity to keep pace with development.

The Master Plan is a living document which will be updated on a regular basis as priorities change and issues emerge which influence strategic plans. It is a useful tool especially with regards to flow predictions and capital improvement intentions and will serve the Department well as a basic planning document.

7.3 OVERVIEW OF PROPOSED EXPANSION TO RETICULATION INFRASTRUCTURE

The growth rate of the City is driving the need for new infrastructure. However, over the last few years the financial situation and priorities of the City of Cape Town has created a scenario where it is not in a position to timeously provide the required bulk pipeline infrastructure. During 2004, mostly at the insistence of the Water Services and Transport Directorates, a City-wide Development project process was started to address the situation. A key element of this current initiative is a partnership approach with developers, to ensure that development can continue. Development contributions from the developers are determined and agreed on for each Development Node or Corridor and which funds can be used to provide the required infrastructure.

The development areas are described below.

7.3.1 West Coast/Parklands development corridor

This is one of the fastest growing areas in the City of Cape Town. The Services Master Plan for this area is updated on a regular basis through a Bureau system.

Apart from the normal reticulated infrastructure internal to the development parcels, a number of larger pipes are required.

Water

A 1000mm diameter main feeder from a new connection on the bulk Voëlvlei pipeline will be constructed within the next 2 years, leading to 1 or 2 new reservoirs as described under Bulk Water. General upgrades and extension of networks will continue, to match parcel development.

Sewer

Various upgrades are still required in the system, while phase 1 of the bulk sewer to Potsdam WWTW was completed. When – is this part of the 47Ml/day cap? The 2nd phase will start in the next financial year. The need to convey wastewater to Melkbos is under investigation as it will drain the Western area of Parklands/Sunningdale.

7.3.2 De Grendel / N7 development corridor

This area is one of the latest development corridor additions. The area is on the East of the N7 between Platteklouf township and Contermanskloof. The proposed developments in this area are intended to be fast-track and the Master Plans for this area are nearing finalisation.

Water

The need for a reservoir will be confirmed at a later stage. Water will be supplied via the Voëlvlei system.

Sewer

The area will drain to the Potsdam WWTW and all spare capacity in the existing infrastructure will be optimally utilised. The need to cross the N7 with one new sewer pipe is under investigation. A Master Plan for this new area is in progress.

7.3.3 Northern development corridor

This area north and north-east of Durbanville and Kraaifontein is in desperate need of infrastructure in order to continue with development.

Water

The Master Plan for this area was implemented over the last few years. Two reservoirs will need replacement in future. The new supply system from the Voëlvlei pipe is already in operation.

Sewer

The need for the new Fisantekraal WWTW has reached a critical stage as discussed under Wastewater Treatment. A bulk pipe is needed to convey sewerage to the new Plant. Its design will start in the 2005/06 financial year. Major upgrades will take place at bottlenecks in built-up areas to reduce overflows.

7.3.4 Bottelary development corridor

This area between Brackenfell and Kuilsriver along the Bottelary Road was one of the first identified nodes.

Water

A reservoir, feeder main and new bulk connection will be constructed soon. Apart from the normal reticulation required as per the Master Plan, a number of bulk connections will be required.

Sewer

The Master Plan for this area is up-to-date and indicates that major infrastructure is required. A new bulk sewer, a new bulk pump station and upgrading of the Bellville WWTW will be required. Scoping for these projects has started.

7.3.5 Maccassar / AECl development corridor

The development of this area has already been delayed due to a lack of infrastructure. The area is vast and major infrastructure is required.

Water

The Master Plan for this area is updated on a regular basis to ensure that required infrastructure is identified timeously. In general, the water reticulation can cater for this area.

Sewer

Major infrastructure is required to provide capacity for the proposed development as well as backlog capacity for existing areas already approved. The existing infrastructure is in a very bad condition and major pipe collapses occurred in sensitive areas during the last year. The planning of new infrastructure has been delayed and will commence soon.

7.3.6 Fast-track and In-fill housing projects

The City's priority N2 Gateway housing project opens up a number of places where new infrastructure is required. The development in Delft where more than 9 000 houses need to be built has highlighted the need for a new bulk sewer to serve the entire catchment. The planning process for providing the required infrastructure has started.

The proposed development at Wingfield will require the completion of the final phase of the Northern area sewer to Langa Pump Station.

8. FINANCIAL AND INSTITUTIONAL

8.1 FINANCIAL

As part of the review of the WSDP, and in the context of important financial constraints on the City, Water Services commissioned a study to undertake a financial assessment of its services. The high level purpose of the study was to assess an affordable and sustainable level of capital expenditure for water services and to determine the implications of this for future operations.

The primary objectives of this study were to:

- To determine an indicative affordable and sustainable capital expenditure programme for the City of Cape Town water services;
- To determine the implications of the capital programme on:
 - Financing (how funds are secured),
 - The service (what can and cannot be done), and
 - Tariffs (the impact on the customer); and
- To identify the key strategic issues facing the service in order to ensure water services were provided in a sustainable manner into the future.

The Financial report from Palmer Development group is still in draft form (Draft 2 - dated 17 November 2005 [GOTO 8.3](#)). The financial strategy therefore still needs to be development. The report outlines “Strategic Issues and Choices” as detailed below:

1. A sustainable capital programme must cater for three important elements simultaneously: (1) elimination of backlogs and provision for new demand (2) bulk expansion to cater for new demand, and (3) rehabilitation and replacement of existing infrastructure.
2. An affordable long term capital expenditure programme appears to be in the region of R500 million per annum (smoothed over time), though it is recognised that actual expenditure will be “lumpy”.
3. At present there is an inadequate provision for depreciation of assets. This must change to ensure sustainability. Depreciation should encompass all assets, including grant funded assets and assets fully paid for.
4. At present there is inadequate maintenance of infrastructure. Expenditure (and efficiency in spending) must increase significantly in real terms. It is not clear by how much without more detailed study.
5. Adequate cash collections is critical to the business. This is not in the control of the business and failure to perform in this area could seriously jeopardise the business.
6. In all of the scenarios modelled, there is a need to increase tariffs significantly in real terms to ensure sustainability.
7. Much more attention needs to be given to the financial aspects of the business. This is a R1.5 billion per annum (or more) business. It needs dedicated attention from a high level financial person adequately resourced with skilled staff such as cost accountants to improve the overall financial performance and efficiency of the business. Joburg Water, arguably the best performing water services utility in the country, have about 40 staff dedicated to the finances of the business, under a senior Chief Financial Officer.
8. The current tariff structure is in need of urgent reform. It is an inherently unstable tariff structure and places the water services business in potential financial jeopardy. See inter-city comparison of tariffs for more detail.

9. Much more attention needs to be given to data integrity (see separate report produced during the long term water demand study for more detail).

8.2 INSTITUTIONAL

8.2.1 Introduction

The new City of Cape Town and the Water Services entity was formed with the amalgamation of the Cape Metropolitan Council and the 6 metropolitan local councils in December 2000. Water Services has been in a holding structure with interim reporting lines since then. However, there has recently been a process to fill the organizational structure. The finalization of the restructuring process will be complete once all staff have migrated to the new organizational structure. [GOTO 8.6](#)

On 28 November 2001 Council authorized Water Services to operate as fully fledged and functional internal business unit in order to ensure maximum independence and minimum constraints.

During the establishment period, Council underwent political and strategic changes. As a result of these changes ODA, aloeCap and Africon were appointed between October 2003 and March 2004 using USAID funding. The appointment was to review the decisions taken and propose a way forward. This culminated in a report entitled "High level review of the project to establish internal business units for Electricity, Water and Sanitation and Solid Waste Management Services" (C07/06/04) dated 24 June 2004 which was adopted by Council in June 2004.

The recommendations of this report were:

- The creation of an appropriate service authority mechanism for the City of Cape Town
- The establishment of a Water Services Authority (WSA) and Water Services Provider (WSP) arrangement.

8.2.2 Current Institutional Arrangements and Organizational Structure

Despite the fact that posts are currently being filled, Water Services still finds itself in a holding structure with interim reporting lines, a situation that has prevailed since December 2000. During this time the Council decision to establish a Water Services Authority (WSA) and Water Services Provider (WSP) arrangement could not be implemented.

Posts down to level four have now been filled. However, the City's process has now been delayed due to a dispute with one of the major Trade Unions, IMATU. This will affect level four posts and has delayed the process of filling the rest of the structure. This is a major concern because this has the potential to further delay the establishment and full functioning of the Water Services Authority (WSA) and Water Services Provider (WSP) arrangement.

- Water Services faces major challenges (refer to 9.3) to transform into a world class water services provider which is people-centred, credible, efficient and sustainable in line with its vision in section 9.4.3 - "To become leaders in the provision of equitable, sustainable, people-centred, affordable and credible water services to all".

8.2.3 Human Resources

The delay in the transformation process has had a significant effect on staff moral. There has also been a significant loss of staff as part of the City's strategy to reduce the staff levels through natural attrition.

As an example of this the Wastewater Treatment Department staff levels have reduced from 449 in December 1997 to 308 in June 2005 – almost a 32% reduction.

For this department, significant losses have been experienced in the following groups:

Table 8.1 - Staff Losses in Wastewater Treatment Department

Group	December 1997	June 2005	Percentage Decrease
Professional	20	11	45%
Managers / Process Controllers	76	57	25%
Process Assistants	136	95	30%

For an in depth analysis of the Wastewater Department staff reduction [GOTO 8.1](#)

There is an urgent need to attract, develop and retain skilled staff in Water Services.

8.2.4 Institutional Reform

The national agenda is to set up public services (and tariff services in particular) in a manner that is both predictable in terms of availability and competitive in terms of pricing so that

- There is a platform for economic growth and job creation. (well functioning city attracts investment etc)
- There is a platform to create opportunities for Black Economic Empowerment (BEE).
- There is a platform to enhance operational and financial performance which leads to sustainable funding for the service.
- This sustainable funding leads to sufficient (sustainable) infrastructure asset replacement and expansion.
- Sustainable water services delivery will enhance the municipality's ability to provide equitable and affordable water and sanitation services through cross-subsidization.

The City's strategic intent, aligned with the national agenda and as stated in the IDP, is universal access to basic services and to achieve operational, financial and other efficiencies which will enhance equitable, affordable and effective service delivery and sustainable development. There is a high priority for economic growth and job creation, and ensuring a sustainable city.

Water Services' institutional reform process is also guided by the Strategic Framework for Water Services (SFWS) dated September 2003. [GOTO 3.3](#). For an extract from the SFWS on the institutional reform of water services provision [GOTO 8.2](#).

The objectives of the reform process are given in [Figure 8.1](#) below:

In order to bring effect to national and City's strategic intent and the Council resolution in June 2004 (refer to Section 8.2.1), the necessary mechanisms need to be established. The intent is that the process of separating of the WSA and WSP

begins immediately with the view that a separate Water Services Authority and Water Services Provider will be fully operational by 1 July 2006.

Figure 8.1 Reform Objectives (Strategic Framework for WS)

The key objectives of reform are to:

- **ensure the provision** of an appropriate level of water and sanitation services that are sustainable to all households in South Africa and to implement the free basic water and sanitation policies effectively and efficiently;
- improve the **performance** of water services providers;
- improve the **financial viability and sustainability** of the water services sector by significantly enhancing revenue collection (from those who use in excess of a basic service) and improving consumer management;
- improve the **accountability** of water services providers to water services authorities and to consumers;
- use existing **capacity**, skills and resources in the water services sector in an integrated and optimal way and to attract, develop and retain the necessary professional and technical skills, and improve employment and gender equity;
- improve the **efficiency of water use** so as to ensure the wise use of South Africa's scarce water resources through appropriate demand management and conservation initiatives; and
- improve the **regulation** of water services providers to ensure technical and environmental standards are met, services are provided efficiently and services are appropriately priced.

Accountability for the entire service will rest with the Director: Water Services who will then be expected to deliver on the national and city strategic intent through a Service Provision Agreement (SPA) and a 3 year rolling business plan.

8.2.5 HR Strategy

Human resources definition

That function which concerns itself with the care, development, and advancement of its human resource base, by planning for and determining the quantitative needs of the organization and by assessing the qualities and characteristics that will be required to achieve the organizations overall objectives.

Primary Objective

The strategic provision, development and retention of a skilled-, motivated-, and economically-viable workforce for Water Services in the interests of the City of Cape Town, its residents and visitors, and aligned to the vision of the City.

Secondary objective(s)

- Ensure staff is orientated towards learning thus establishing a sustainable skills base.
- Introduce a performance-driven culture by developing appropriate reward strategies.
- Ensure employment equity by appropriate training programmes and staff assessments.
- Ensure effective personnel administration as set out in the Just Administration Act.
- Facilitating business process engineering / redeployment of staff by combining emergency repair gangs and eliminating duplication of functions.
- Establish Wellness coordination for Occupational Risk Management initiatives, for example HIV/AIDS/ TB/ EAP programmes.

- Develop and maintain a skilled and motivated workforce by retraining managers, attending to remuneration levels, and inspiring staff.

Human Resources Development programme

- By adopting and developing appropriate systems and procedures to ensure fair, efficient and effective personnel strategies and administration, in line with all relevant legislation directives.
- By monitoring, measuring and evaluating the performance of the staff compliment, correcting where necessary.
- Establish Science and Technology mentorship and job shadowing programmes.
- Loss of skills minimization programme. The high risk of losing the invested human capital of Science and Technology staff can be reduced through the implementation of a 3-5 year impact reduction programme, to arrest the intellectual drain.
- Multi-skilling existing staff thereby negating need for replacement staff and resultant reduction of manpower costs.

Implementation programme

- Multi-skilling existing staff through learnerships and other Tertiary education, therefore full impact of replacement staff can largely be negated and resultant financial sustainable manpower costs.
- Increase Training programmes and reduce labour and support costs.
- Actively head hunt – Humanity Science and Technology students via Tertiary Educational Institutions, build partnerships to “groom” designated students for the Water Services sector, e.g. by job shadowing.
- Establishing Science and Technology mentorships for in-house designated groups.
- Utilisation of a small Nucleus of well trained multi-skilled contract staff to supplement manpower resources.

Strategy review and monitoring

This strategy shall be reviewed each year at the end of the financial year as part of the business plan review and during August to accommodate Bursary applications in City and the student intake at Tertiary educational institutions.

8.2.6 ISO 9001:2000

To enhance the world class status of the water services unit, it is intended that all departments achieve ISO 9001:2000 accreditation. The process to achieve accreditation involves business process mapping and re-engineering which is being linked to the ERP implementation. Extensive staff training in Competency Based Performance Management (CPM) and other training is being embarked upon and change interventions undertaken to ensure business processes are optimised. ISO audits will be done annually. The Progress of each department is given below:

Bulk Water Department

During the 2002/2003 financial year the Bulk Water Department went through an intensive internal audit to identify areas of non-conformance with regard to the ISO 9001 Quality Management System, and to identify opportunities for continual improvement.

In June 2003, a formal assessment by an SABS accreditation body supported awarding the status to the Bulk Water Department, subject to all the audit findings being satisfactorily addressed and closed out. This was done, and in October, Bulk Water were the first Bulk Water Services Provider in the country to obtain the ISO: 9001: 2000 accreditation.

Central to the Bulk Water system is the use of ZIZO software, a web-based QMS system covering all documents and processes.

Wastewater Treatment Department

Planning commenced during 2002/2003 for the introduction of an Environmental Management System (EMS) at Potsdam Wastewater Treatment Works that will integrate treatment process requirements and operational control with environmental protection. Specialist consultants are assisting in this initiative which involves both operational and management staff. The EMS is based on best practice approach for such systems with ISO 14001 used as a guide. The EMS will be extended to incorporate the new sections of the Potsdam Works once constructed.

The goal to complete EMS for Potsdam by 2004 has not yet been achieved, mainly due to the final effluent quality not meeting the license application conditions. It is planned to roll the system out to three additional treatment works per annum until all works are included.

It is envisaged that ISO 9001:2000 will be implemented at all works during 2005/06.

Reticulation Department

The existing ISO Quality Management System certification at South Peninsula (SPA) Water Division is being maintained.

Since 2001, some progress has been made with preparations for certification of the whole of Reticulation. However, the delayed staff placement placed a damper on progress.

In anticipation of placement completion during 2005/06, all Reticulation processes are currently being optimized by a working group who are also documenting it on the Intranet and on Sharepoint (the City's shared Document Management System).

It is envisaged that certification could be achieved by 2007.

Asset Management Services

During the first quarter of 2004, the Electrical Engineering Maintenance workshop embarked upon obtaining the SABS standardization in order to benchmark themselves against an acceptable quality standard.

During December 2004 the workshop was audited for ISO 9001 and at the same time pre-audited for ISO 14001 & 18001. During February 2005, ISO 9001 accreditation was achieved while 14001 & 18001 final audit took place in July 2005.

9. STRATEGIC PLANNING

9.1 DEVELOPING STRATEGY

Step 1

The process is outlined in Figure 9.1 “The Strategic Planning Process”. [Figure 9.1](#) This is an ongoing process and happens at both a “micro” and “macro” level of strategic planning.

- Data is captured in terms of the various chapter headings of the Water Services Development Plan. These chapter headings identify the key components of the water services business.
- The data is analysed and the current state of the key components was identified.
- The national agenda as contained in the Water Services Act (Act 109 of 1997) and the Strategic Framework for Water Services (September 2003), and the City’s Integrated development Plan (IDP) informed the desired future state or vision for Cape Town Water Services.
- From the current state and desired future state a strategic gap analysis is done and the challenges determined.
- Goals and objectives are set
- The options to achieve these goals and objectives are identified
- The options are investigated and the constraints of each option identified
- The most suitable option is chosen and action steps to implement the option identified.
- The implementation of the strategy and action steps then follows.
- Monitoring and evaluating the effectiveness of the strategy is ongoing. (Is the gap closing?)
- Gap closing? – continue with strategy. Gap not closing or is not closing sufficiently fast? – revise strategy
- Go through the cycle again.

Step 2

The key components (from the Chapter headings) were then reduced to 5 main components [Figure 9.2.](#)

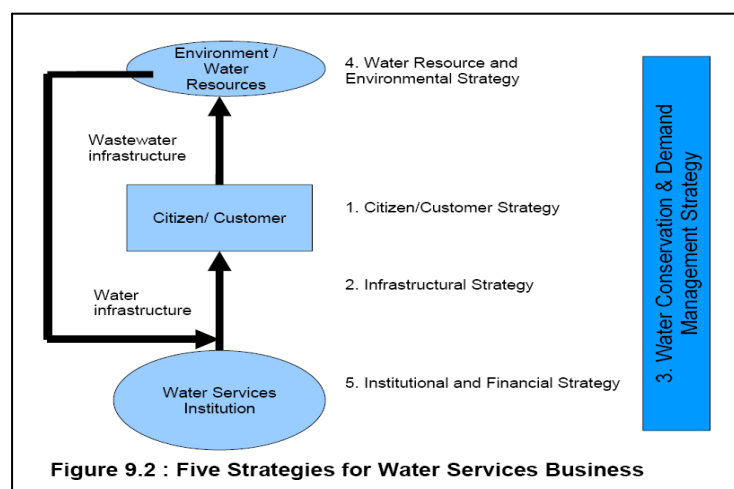
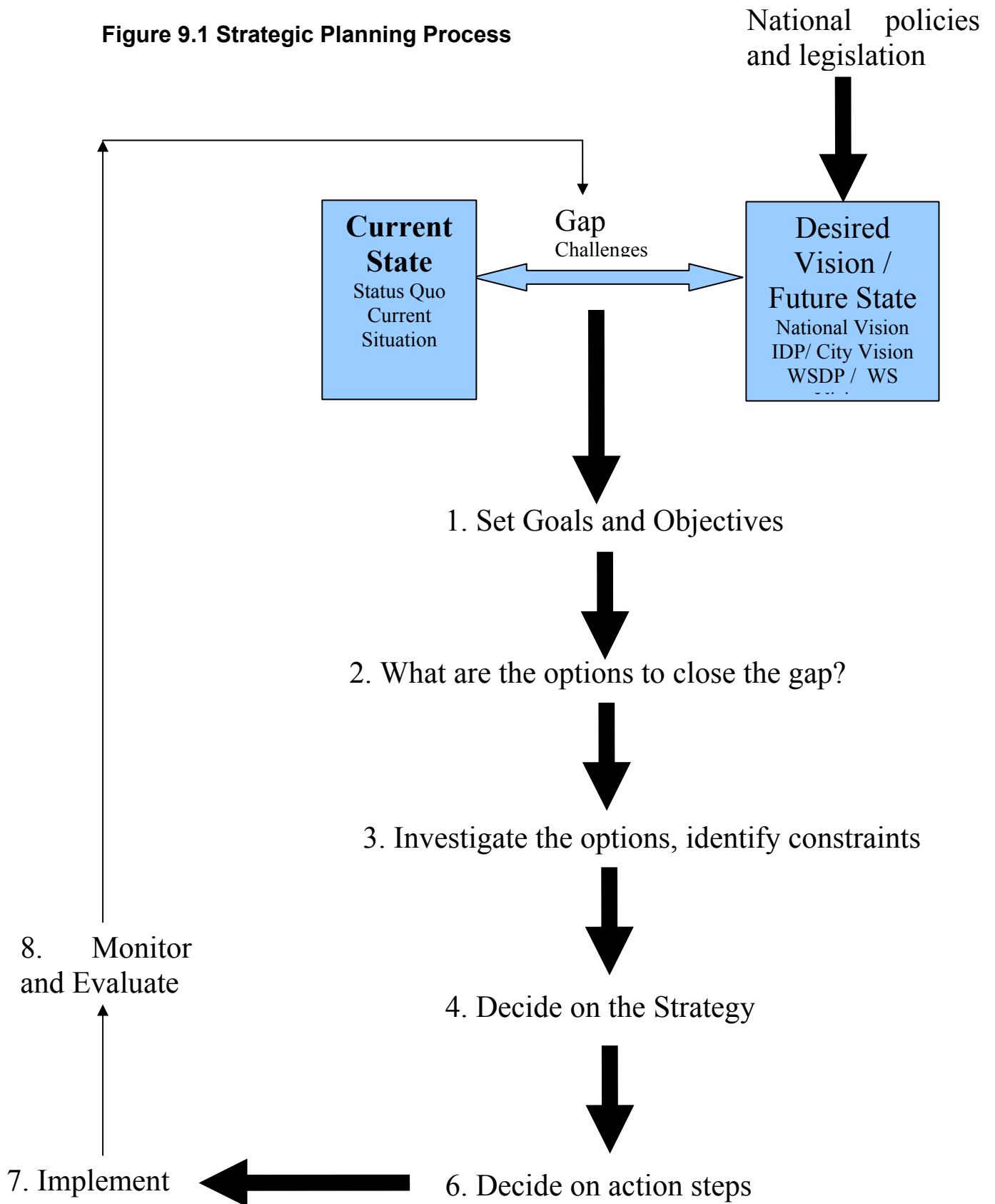
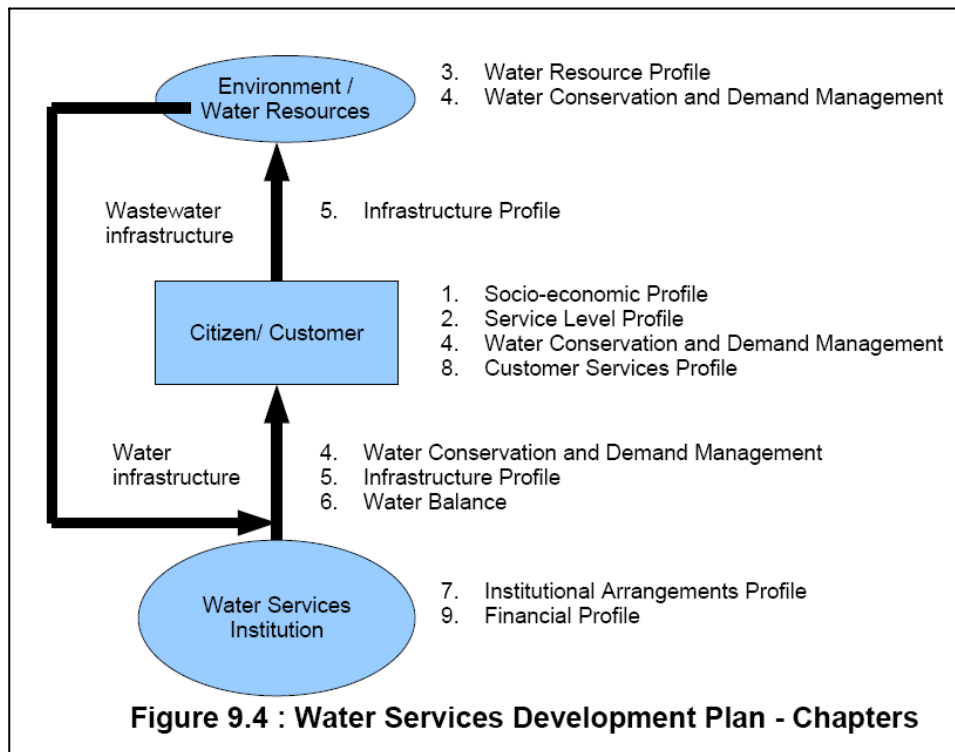


Figure 9.1 Strategic Planning Process



A strategy was then developed for each component ensuring that each key component was identified under one of the main components ([Figure 9.4](#)). Water Conservation and Demand Management, an important strategy cuts across all the other four strategies.



Step 3

For each of these components / strategies the challenges were highlighted ([Figure 9.3](#)) and objectives determined.

Step 4

Throughout the process and at the end ensure that all five strategies align with each other and IDP.

Step 5

Combine the strategies, strategic goals and strategic objectives into a strategy map. Refer to [Figure 9.6](#)

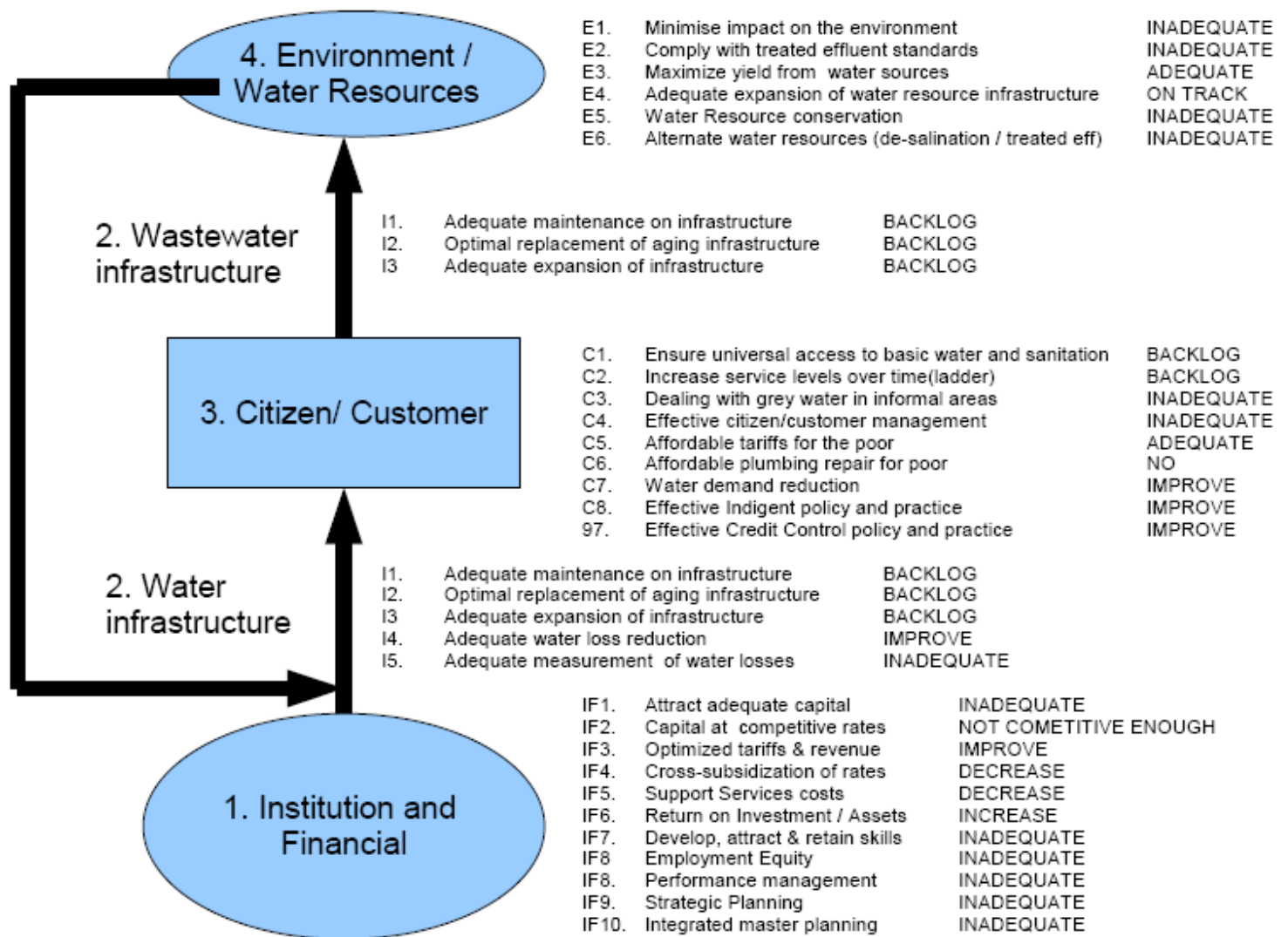


Figure 9.3 : "Current State"

9.2 CURRENT STATE

The current state of Cape Town Water Services is given in [Figure 9.3](#). From this it can be identified that there are major challenges that need to be overcome.

9.3 SUMMARY OF STRATEGIC ISSUES / CHALLENGES

There are a number of challenges facing Water Services, which could prevent it from meeting its vision. These are:

- Eradication of basic services backlog in a fast-track manner
- Successful implementation of Water Demand Management Strategy and achieving the targeted reduction
- Finding a balance between the unaffordable proposed stricter National standards for Wastewater effluent and the impact on the water quality of rivers and water bodies
- Standpipe greywater runoff quality
- Timely provision of infrastructure to meet development growth needs
- Maintenance of infrastructure to ensure continued operation
- High financial requirements
- Financial sustainability of the service and Cost recovery and debt management
- Service Affordability
- Increased performance
- Establishing a new institutional arrangement

The 2004 WSDP Review [GOTO 1.2 Web](#) or [GOTO 1.2](#) as well as the Financial Planning Study of 2005 [GOTO 8.3](#) has highlighted some specific issues.

9.4 VISION

9.4.1 National

The Strategic Framework for Water Services (September 2003) [GOTO 3.3](#) is a critical policy document setting out the vision, goals and targets as well as the approach to the provision of water services.

The Vision of the Strategic Framework is “Water is Life, Sanitation is dignity” which has implications as set out in [Figure 9.7](#) below.

Figure 9.7 Sector Vision from the Strategic Framework for Water Services

Sector vision: Water is life, sanitation is dignity

All people living in South Africa have access to adequate, safe, appropriate and affordable water and sanitation services, use water wisely and practise safe sanitation.

Water supply and sanitation services are provided by effective, efficient and sustainable institutions that are accountable and responsive to those whom they serve. Water services institutions reflect the cultural, gender and racial diversity in South Africa.

Water is used effectively, efficiently and sustainably in order to reduce poverty, improve human health and promote economic development. Water and wastewater are managed in an environmentally responsible and sustainable manner.

9.4.2 City / IDP

The City's vision as set out in the IDP 2005/06 and 2006/07 is shown in [Figure 9.10](#)

Figure 9.10 Vision for the City of Cape Town (IDP 0506 and 0607)



9.4.3 Water Services Vision

The Vision for Cape Town Water Services is aligned to the national and City vision:

“To become leaders in the provision of equitable, sustainable, people-centred, affordable and credible water services to all”

9.5 GOALS AND OBJECTIVES

9.5.1 National

The goals and targets for Water Services in South Africa are set out in the Strategic Framework. For a comprehensive list of the goals refer to [GOTO Figure 9.8](#) and for a list of the targets refer to [GOTO Figure 9.9](#)

The most significant targets impacting Cape Town are:

- All people are to have access to functioning basic water supply by 2008
- All people are to have access to functioning basic sanitation by 2010
- Investment in water services infrastructure should total > 0,75% of GDP
- Institutional reform of regional water services providers to be completed by 2013.
- Annual reporting on key performance indicators

9.5.2 City / IDP

The City's 2020 goals are set out below:

The City's 2020 Goals

- 100% improvement in key human development indicators
- <5% of population in informal settlements
- Universal access to basic services

- Levels of violent crime reduced by 90%
- Water use and waste production down 30%
- Access to safe green space within walking distance
- Renewable energy share equal to 10% of energy consumed
- Average real per capita income doubled while reducing inequality
- Unemployment <8%
- <5% population illiterate

Water Services have contributed input to and comment on the Draft IDP 2006/2007 ([GOTO 1.6](#)), to ensure that its issues are incorporated in the Corporate Plan and also that its own Strategic Plans are in alignment.

The City's Strategic Framework

In support of the vision and goals, five themes focused on socio-economic development and improved service delivery are set out below:

- Integrated Human Settlement
- Economic Growth and Job Creation
- Access and Mobility
- Building Strong Communities
- Equitable and Effective Service Delivery

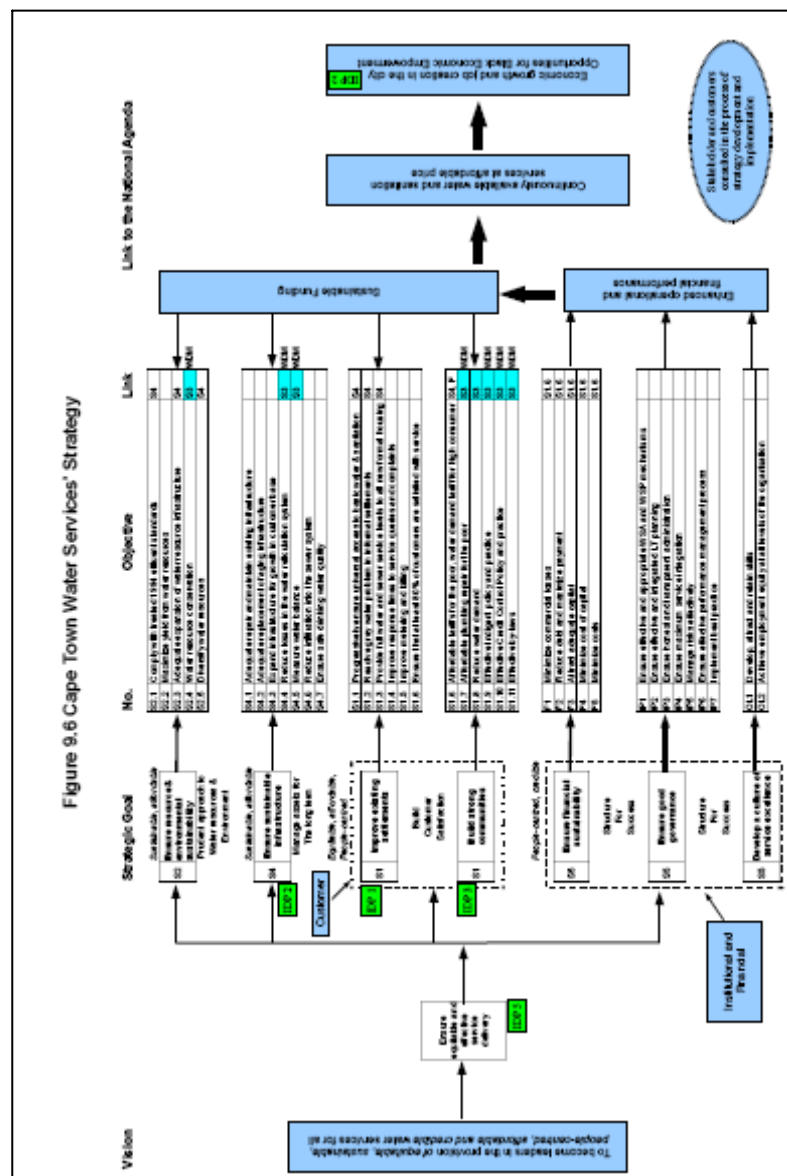
9.5.3 Water Services Strategic Goals

- **EQUITABLE**
 - To ensure access to a basic water supply to all informal settlements is ensured by 2008.
 - To ensure access to a basic sanitation service to at least 70% of all informal settlements by 2010.
- **AFFORDABLE**
 - To establish fair tariff that ensures all residents have access to basic water and sanitation services, including indigent households.
 - To ensure that tariffs are fair and in line with comparable organisations and cities.
- **PEOPLE-CENTRED**
 - To ensure that we reach 80% satisfaction of all customers with the provision of basic water services annually.
 - To create an environment that develops and utilises the skills, competencies and innovation potential of all employees are developed and utilised to meet the objectives of the organisation.
 - To create an enabling environment that ensures devolvement of meaningful relationships with all stakeholders.
- **CREDIBLE**
 - To ensure the implementation of international best management practices in the provision of water services.
 - To become the organisation as the preferred water services institution for all customers.
- **SUSTAINABLE**
 - To ensure the availability and reliability of water resources at all times.

- To ensure the supply of safe drinking water that meets quality standards at all times.
- To ensure the protection of the environment and that 90% of treated effluent is in compliance with current (1984) DWAF standards by 2010.

9.6 STRATEGY MAP

The above strategic goals and objectives are incorporated into the Strategy Map in [Figure 9.6](#). This Strategy Map shows the link to the IDP Strategic Framework.



The goals in the IDP 2005/06 that are set for achieving by 2020 and that are applicable to Water Services are:

- Universal access to basic services. Current levels are 96% of households to water and 91% to sanitation.
- Water use down by 20% on the unconstrained projected demand by 2010.

Water Services contribute to 4 of 5 of the City's strategic themes:

- Theme 1 : Integrated human settlement
 - Area-based urban-renewal projects such as the N2 gateway will reduce the number of informal households which are difficult to service cost-effectively to more than basic or rudimentary level.
 - Increasing service provision to new or upgraded low-income household areas. City aims to upgrade all informal settlements within next 10 years.
 - Improving settlement planning includes optimizing regional infrastructure capacity to meet the need for water services.
 - Combining development of the urban core to higher density with decentralized industrial and commercial development close to existing settlements, does mean that infrastructure have to be provided and upgraded throughout the City.
- Theme 2 : Economic growth and job creation
 - The City is committed to making use of the Expanded public works programme in the provision of infrastructure, in order to create employment and build skills.
 - Supporting economic urban developments by the timeous and assured provision of bulk infrastructure through partnerships with the private sector developer as well as own funding of regional infrastructure.
- Theme 3 : Access and Mobility
 - Not applicable
- Theme 4 : Building strong communities
 - Targeted social support by way of the Indigent Tariff policy (6 000 litres free water and 4 200 litres free sanitation removal per month to all households).
 - The stepped tariff encourages the user to manage his service account by saving water.
 - Provision of sanitation services helps to prevent the spread of water-borne diseases.
- Theme 5 : Equitable and effective service delivery
 - Underpinning all social and economic development is the need for the extension and maintenance of the services infrastructure required.
 - Managing water supply and demand to meet future need:
 - ❖ Cape Town is a water-scarce region with the recent drought highlighting the need to implement strategies to increase water supply and reduce consumption.
 - ❖ A new Water Demand Management Strategy has been developed in conjunction with DWAF, aiming to achieve a continual reduction in the projected consumption. Apart from increasing water-saving awareness, the eradication of inefficient fittings, leak reduction and increased use of treated effluent for irrigation and industry is being pursued.
 - ❖ The large Berg River Project is being built by DWAF and paid for by the City and will be commissioned by 2007, to provide an acceptable assurance of supply for at least another six years.
 - ❖ Additional water sources are being investigated, such as deep ground-water extraction from the large area Table Mountain Group Aquifer and the desalination of sea water.
 - ❖ Pipelines, reservoirs and treatment plants have to be maintained on an ongoing basis to prevent service interruptions and failure due to ageing infrastructure. There is a large backlog in this area due to funding constraints in the past.

- ❖ The upgrading and provision of new infrastructure to meet urban growth is also proving to be a financial challenge. A new reservoir and treatment plant is needed for development of the northern and west coast areas.
- Managing wastewater treatment
 - ❖ The upgrading and expansion of wastewater treatment capacity and bulk sewerage conveyance is needed to meet development pressures. Projects include work on Athlone, Potsdam, Borchers Quarry and Zandvliet WWTWs. A new works is needed in the Fisantekraal area to the north.
 - ❖ Financial analysis has shown that conventional funding is insufficient to address the infrastructural needs demanded by city growth.
 - ❖ The standards of treated effluent discharged into rivers and streams are proving difficult to maintain due to the funding constraints. This has an environmental impact on river health and that of people coming into contact with the water.

9.7 WATER SERVICES STRATEGY

The key to addressing the challenges that Cape Town Water Services face and achieving Water Services' vision and goals is to ensure that Water Services is structured financially and institutionally to achieve enhanced operational and financial performance. The foundation of the Water Services Strategy is therefore to effectively separate the Authority and Provider roles and to structure the provider (Financial and Institutional Strategy) in a way that achieves this. This will result in sustainable funding and sustainable institutional mechanisms to ensure that the other strategies, namely Customer, Water Resource and Environment, Infrastructure and Water Conservation and Demand Management can be optimised.

The strategy is shown diagrammatically in [Figure 9.5](#) below:

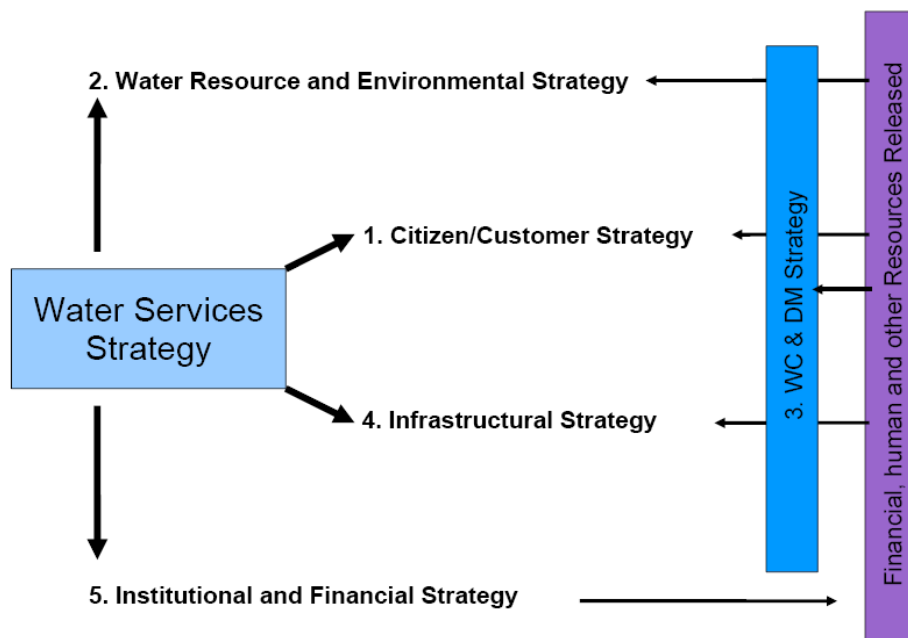


Figure 9.5 Water Services Strategy

The key indicators as to whether the service is effectively structured will be determined by whether it is enabled to achieve the above and whether it is able to

- attract adequate loan capital,
- attract this capital at competitive rates,
- source adequate government funding (MIG),

- deal effectively with the equitable share allocations,
- reduce costs over time,
- attract, develop and retain skilled staff,
- integrate with other council services,
- plan effectively for the long

9.7.1 Strategy 1 : Customer : Build Customer Satisfaction

The strategy will ensure that the majority of customers are satisfied with the service.

9.7.1.1 Levels of Service

Basic and Emergency Level of service

Emergency and Basic levels of service are described in Section 3.3 and listed in Table 3.3. The current coverage of basic services is given in Table 3.4. Basic and emergency level services are provided free to households in informal settlements until such time that they can be accommodated in formal housing in accordance with the City's housing programme.

The strategy has been, and still is to provide a very basic (emergency) level of service as quickly as possible to about 95% of the approximately 195 informal settlements. The emergency service is below the basic level of service in terms of distance from household or household ratios/service point.

The City prescribes to "the water ladder" concept (as proposed in DWAF's "Strategic Framework for Water Services, September 2003"). So while the City's priority is to first provide an emergency level of service to all households in all settlements, it is also extending the coverage and density of services to the basic level.

Upgrading on an annual basis for informal areas on developable land is proceeding as funds are obtained. The estimated cost for upgrading informal settlements to a basic level of service and to provide for the influx is given in Table 9.1a below;

Table 9.1a Informal Settlements: Backlog Costing

	WATER (Rands)	SANITATION (Rands)
<u>BACKLOG</u>		
Informal households without basic services	30 000	70 000
Standard of service (hh/service)	25	5
No of services needed (standpipes and toilets)	1 200	14 000
Unit cost of service provision	R 1 500	R 4 000
Total cost of service provision	R 1 800 000	R 56 000 000
Years to provide	2	5
Total annual cost of service provision	R 900 000	R 11 200 000
<u>INFLUX</u>		
Influx informal households/annum	15 000	15 000
No of services needed/annum	600	3 000
Total cost of service provision/annum	R 900 000	R 12,000 000

A programme to eradicate the backlogs and keep up with the influx is outlined in outlined in Table 9.1b below:

TABLE 9.1b - INFORMAL SETTLEMENTS PROGRAMME (Costs in R mil)										
	05/06	06/07	07/08	08/9	09/10	10/11	11/12	12/13	13/14	14/15
Water backlog eradication (2 yrs)	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sanitation backlog eradication (5 yrs)	11.2	11.2	11.2	11.2	11.2	0.0	0.0	0.0	0.0	0.0
Water influx sustain	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Sanitation influx sustain	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
TOTAL	25.0	25.0	24.1	24.1	24.1	12.9	12.9	12.9	12.9	12.9

Conveyance of grey water, which has been a problem in informal settlements, is receiving attention for health and amenity reasons through a pilot project which, if successful, will be rolled out to other informal settlements.

Full Level of Service

The full level of service applies to formal households and is described in Section 3.3.

Eradicating the Housing Backlog

The ultimate aim is to provide all customers living in informal settlements and in backyard shacks with a full level of service on a formal site. This is however dependent on the City's housing programme.

The N2 Gateway ([GOTO 9.5](#)) is an example of the City's housing programme. The 2001 Census figures indicated that a significant number of un-serviced erven are located along the N2 corridor near the Cape Town International Airport. This project is set to accommodate all these residents in new housing developments targeted for completion by end June 2006.

For an extract from the draft 2006/07 IDP that gives the housing project targets for the next 5 years [GOTO 9.6](#).

The cost to eradicate the backlog is given in Table 9.2a below. [GOTO 9.1](#) for the spreadsheet calculations.

TABLE 9.2a – SERVICING HOUSING DEVELOPMENTS	
	Amount(in R)
<u>BACKLOG</u>	
Informal households	115,000
Backyard dwellers, others	150,000
Total backlog	260,000
Unit cost of service provision, water and sanitation	R 10 000
Total cost of service provision, water and sanitation/annum	R 2 600 000 000
Years to provide	20
Total annual cost of service provision	R 130 000 000
<u>INFLUX</u>	
No of houses needed/annum	15 000
Total cost of service provision, water and	R 150 000 000

TABLE 9.2a – SERVICING HOUSING DEVELOPMENTS	
	Amount(in R)
sanitation/annum	

A possible programme to eradicate the backlog of the full level of service for water and sanitation over a 20 year period is given in Table 9.2b below:

TABLE 9.2b : POSSIBLE HOUSING DEVELOPMENT PROGRAMME (Costs on R mil)										
	05/06	06/07	07/08	08/9	09/10	10/11	11/12	12/13	13/14	14/15
Water and sanitation backlog eradication (20 yrs)	130	130	130	130	130	130	130	130	130	130
Water and sanitation influx sustain	150	150	150	150	150	150	150	150	150	150
TOTAL	280	280	280	280	280	280	280	280	280	280

This programme would be funded through the City's housing programme. Depending on the speed of implementing this programme, the informal settlement programme would be changed to align the two.

Free Basic Services

Due to the financial constraints, it is proposed that free basic water and sanitation only be provided for in informal settlements and for indigents in formal housing.

Issues to be resolved

Septic Tank removal programme – this will be discussed in a later version of this report.

Backyard dwellers – issue of free basic water and sewer will be investigated

Farm dwellers – will investigate water and sanitation on farms

9.7.1.2 Quality of Service

Water Services is committed to providing efficient, uninterrupted and affordable services, which are clean and safe to all consumers.

Customer satisfaction on the quality of service will be achieved by “over-delivering” on the Customer Charter. [Figure 3.7](#) The standards will be set at a level that can be achieved within a reasonable period of time and at least at the minimum level expected. This will achieve the goal of under-promising and over-delivering – a key ingredient to achieving customer satisfaction.

Knowledge of water services customer will be progressively improved over time to ensure an increasing level of customer satisfaction. As customer satisfaction is improved it is likely that their response to reducing their water demands, their willingness to pay, etc will improve.

There are ten key strategic issues on which a sound Customer and Meter Management System is based:

- Effective Processes
- Customer Surveys
- Affordable tariffs
- An Effective Debt Management Process

- Meter Verification and Meter Accuracy
- Meter Management and Billing
- Meter Reading
- Technical Operation Centre (24hr Emergency Service)
- Corporate Call Centre
- Customer Interaction and Communication

Effective Processes

Water Services plans to extend the implementation of the ISO 9001 Quality Management System throughout Water Services now that the new organisation structure is being populated. Refer to Section 9.7.5 b.

Customer Charter and Surveys

The Customer Charter (refer to [Figure 3.7a](#)) introduced during 2001 as part of the ISO 9001 process, will be updated during 2006.

Since 2002, Water Services has been commissioning research on an annual basis, to discover what the needs and perceptions of the consumers of water are.

The findings from the research are being used:

- as input to the ISO 9001:2000 certification auditing, helping to ensure that an acceptable level of service satisfaction is achieved and maintained
- to uncover needs not currently being addressed, especially informal areas
- to uncover needs among specific groups, such as business and commerce
- to prepare input for updating the Water Services Customer Charter
- to measure the level of satisfaction with the service

Information is being gathered from a range of users in the CCT by a professional market research consultant. Samples taken are statistically representative of all the users, which implies that the findings are taken seriously.

The following issues are addressed:

- Perception of services received: drinking water, effluent water or sewer (sanitation) drainage
- Evaluation of services rendered when reporting problems or enquiring about water services
- Awareness of environmental initiatives, including water conservation or restrictions
- Effectiveness of marketing drives such as around Water Week
- Issues relating to payment and billing procedures for services
- Importance rating and evaluation of services supplied
- Demographics of the market

Presentations on all the findings are given on the Cape Town website [GOTO 3.9 Web](#) or for the latest 2004 findings, the PDF document [GOTO 3.9](#).

Affordable Tariffs

Refer to 9.7.1c – Service Affordability

Debt Management Process

The main objective of the policy is to promote a culture of good payment habits and instil a sense of responsibility towards the payment of Water Services and reducing debt. It is reliant on effective and enforceable Indigent and Credit Control Policies. The Integrated Water Leaks Project will ensure that poor and indigent household's

monthly consumption is brought to affordable levels and that ongoing plumbing repairs are affordable.

Meter Verification and Meter Accuracy

The CCT is committed to ensure through its accredited Meter Verification Laboratory that each metered customer has the right and recourse to challenge the accuracy of its meter through a process as provided for in terms of the Trade Metrology Act and the SABS 1529-1:2003.

Meter Management and Billing

The CCT is committed to reading and billing all consumers monthly and has provided a line of communication for customers to lodge any queries in respect of their accounts through the Corporate Call Centre. Water Services deal with the management of the water meter, its accuracy and the preparation of the customers account before invoicing by the Corporate Finance Directorate.

Meter Reading

The CCT currently reads approximately 87% of 588 000 water meters and 86 000 electricity meters monthly, while approximately 13% are estimated. There are major advantages to the customer in a read versus an estimated meter reading. Water Services has implemented a project and set a target to read 95% of the meters and reduce the number of estimates to 5% by 2010.

There is concern that meter readings are not always done especially on poor communities. Meter reading quality checks will therefore be instituted by 1 July 2006.

Technical Operation Centre (24hr Emergency Service)

During 2004, Water Services set up a centralised Technical Operation Centre (Tel. 086 010 3054) to respond to all technical complaints and enquiries such as:

- Burst, leaking and damaged water and mains/leadings and meters
- Water taste and discoloration problems
- Low water pressure or interrupted supply
- Water restriction contravention reporting or advice

As part of the ISO process, reactionary processes in the different districts are currently being standardised, on the basis of different levels of response urgency.

Water restrictions are policed and monitored by Water Officers who not only respond to complaints but also pro-actively investigate suburbs where water wastage is detected.

Corporate Call Centre

A Corporate Call Centre (Tel 086 010 3089, Fax 086 010 3090, e-mail accounts@Cape_Town.gov.za) has been established by the City, which receives most complaints and requests, also those in respect of water account queries. Any technical complaints or others related to water that cannot be dealt with by the Corporate Call Centre, is forwarded via an electronic notification to the Technical Operation Centre for action.

Customer Interaction

The public is engaged and educated in the awareness of Water Conservation, Water Pollution and Water Demand Management. The broad-impact of citizen queries and correspondence as well as matters that are logged at the Corporate Call Centre but which require specialist investigations are dealt with.

Customer education, communication and liaison is a key strategic issue and is afforded a high priority in the new organizational structure of Water Services.

Poor communities will be a special focus area due to the more complex nature of delivery (plumbing leaks, inferior plumbing, inferior infrastructure, access to services such as telephones etc).

9.7.1.3 Service Affordability

The lower steps of the water and sewer tariffs, and the zero fixed charge and R20 grant for property values less than R100 000 are mechanisms to ensure that water and sanitation is affordable to the poor and indigent. Under conditions of no plumbing leaks, they would consume a relatively low quantity of water. The Integrated Leaks Project is a major initiative to ensure that these household plumbing leaks are minimized and therefore that the cost of these services is affordable for them.

The water conservation and demand management strategy, besides being necessary due to the Western Cape being a water scarce region, will also reduce the cost of the service in the long term by postponing new resource and bulk infrastructure schemes. Reductions in water consumption in the higher steps will result in the need for upward adjustments in the tariff steps but on their own will not result in an increase in the average water and sewer bill to the consumer.

In terms of the asset management strategy as part of the Infrastructure Strategy there will be increased costs and therefore tariffs in the short term but the strategy will ensure service affordability in the long term.

The Financial and Institutional Strategy should result in reduce costs for running the organisation.

9.7.2 Strategy 2 : Conservative Approach to Water Resources and the Environment

9.7.2.1 Water Resources

To reduce over-exposure to climate change and the potential decrease in system yield due to environmental reserve requirements, the strategy is to diversify water resources to lessen the dependence on surface water schemes. Schemes to be pursued under this strategy are Table Mountain Group Aquifer, other ground water schemes, desalination, and treated wastewater effluent re-use.

As part of this diversification strategy the City will strengthen its partnership with Department of Water Affairs and Forestry in the process of reviewing and updating the Western Cape Systems Analysis ("Reconciliation" Study)

9.7.2.2 Environment

In partnership with DWAF, alien vegetation will continue to be removed from the dam catchment areas.

The upgrading of and the operational improvement programme (see Infrastructure Strategy) for the wastewater treatment plants (WWTPs) and the introduction of the

Environmental Management System (EMS) for each WWTP will ensure that the current impact on the environment is reduced over time.

Water Services will ensure that 90% of treated effluent is in compliance with current DWAF standards (1984 standards) by 2010 and will work in partnership with DWAF to ensure this.

9.7.3 Strategy 3 : Sustainable Water Demand

A comprehensive Water Conservation and Demand Management Strategy ([GOTO 4.11](#)) with detailed programmes and budgets has been developed. This has been summarised into a Ten-Point Plan. As mentioned previously, the WC and DM Strategy cuts across the other four strategies as outlined in Table 9.3 below:

Table 9.3 Alignment of 10 Point Plan with other Water Services' Strategies

	10 Point Plan	WS Strategy
1	Reduce Network and Commercial Losses	Institutional and Financial - Strategy 5 and Infrastructure – Strategy 2
2	Reduce low-income household leaks	Customer - Strategy 1
3	Reduce Council consumption Losses	Institutional and Financial - Strategy 5
4	Ensure equitable tariffs	Customer - Strategy 1
5	Control water wastage through by-laws and ensure that all new developments are water-wise	Customer - Strategy 1
6	Promote retrofitting and capacity-building programmes	Customer - Strategy 1
7	Communicate, educate and provide Informative Billing	Customer - Strategy 1
8	Promote alternative technologies and launch water-saving campaigns	Customer - Strategy 1
9	Conserve CCT's water supply	Water Resources and the Environment – Strategy 4
10	Create an enabling environment for long term effective WC/WDM	Institutional and Financial - Strategy 5

In terms of each of the four Water Services Strategies:

- Institutional and Financial (Strategy 5): The City and Water Services will lead by example by reducing its demand and will commit the necessary financial and human resources to achieve the water conservation and water demand reduction objectives (Points 3 and 10). Commercial losses will be reduced through a comprehensive meter management programme (Point 1).
- Customer (Strategy 1): Customers will be encouraged to reduce their water demand. The mechanisms currently being used will be enhanced:
 - education and communication campaigns – Point 7,
 - five-step tariff – Point 4, and
 - special projects in poor communities – Point 2

Programmes to be introduced:

- retrofit programmes (Point 6),
- water conservation measures in the Water By-laws (Point 5), and
- informative billing (Point 7)

The education and communication campaigns encourage the wise use of water, retrofitting with water wise fittings and the use of alternative water resources such as grey water and borehole water (Point 8).

- Infrastructure (Strategy 2): The Water Leakage Detection and Reduction and the Pipe Network Replacement Programmes in the Reticulation systems will be enhanced. (Point 1)
- Water Resources and the Environment (Strategy 4): In partnership with DWAF, alien vegetation will continue to be removed from the dam catchment areas. The upgrading of and the operational improvement programme for the wastewater treatment plants will ensure that the current impact on the environment is reduced over time. (Point 9)

9.7.4 Strategy 4: Infrastructure : Manage Assets for Life

Water Services is an asset (Infrastructure and other assets) intense business. Assets are therefore a major cost driver.

9.7.4.1 Existing Infrastructure

The Strategic Municipal Asset Management Programme is based on asset management principles and the requirements of asset management, and utilizes PRAGMA's asset management improvement programme (AMiP).

The Strategic Municipal Asset Management Plan [AMP] encompasses stages one, two and three, listed below and forms the basis of a Basic Asset Management Plan [BAMP]. The implementation of stages 4, 5, and 6, will form the basis of a further project dependent upon the satisfactory progress of this project.

Stage 1:	Improvement Strategy Development
Stage 2:	Basic Asset Register
Stage 3:	Basic Asset Management
Stage 4:	Improved Maintenance Management
Stage 5:	Introduce Advanced Asset Management Techniques
Stage 6:	System Optimization

The programme will continue to be facilitated through the asset care centre (ACC)¹ [Footer](#) and managed through a bureau arrangement with asset performance management specialist PRAGMA Africa. Water Services has extended PRAGMA's services to September 2006 to allow for a skills transfer process to train municipal staff to take over the ACC function.

Maintenance Tactics for the Wastewater sites have been developed and implemented into SAP PM. They are under development for Bulk Water and will be completed early in the new year. A project has been undertaken to address the shortfalls in the SAP PM Master data. The project will update the SAP PM Master data with condition of the asset, remaining life, estimate replacement cost and attribute data (name plate information). This will be used to determine CAPEX replacement program for by updating the WADMS.

In terms of stage 2 "Basic Asset Register" [GOTO 5.6](#) for the latest information on "Asset Databases in Water Services – their State and Condition from an Infrastructure Asset Management Perspective."

The implementation of the ACC has been extended to cover all the Wastewater Department and the Bulk Water Department sites. Reticulation will be incorporated during 2006.

The replacement value of the Infrastructure assets is given in [Table 5.1](#). From this table it can be seen that the water and sewer reticulation network make up R12.2 (approximately 70%) of the total R17.5 billion replacement value. In terms of minimizing the long term costs of owning the assets, therefore, the replacement programme for these networks is very significant.

Therefore condition records of the networks will be dramatically improved. Meticulous records of burst mains and blockages, on a Metro basis, will be introduced and maintained. Burst main and blockage incidents are proposed to be reported under the following topics:

- Street address of burst locality including locality sketch
- GIS code/SAP Asset Code
- Pipe details (size, type, lining, sheathing etc.)
- Ground conditions
- Details of fracture/blockage

From these records, investigations and tools such a CCTV cameras for sewer pipes, a comprehensive pipe replacement programme will be developed.

9.7.4.2 New Infrastructure

Lead times for planning bulk infrastructure is up to 7 years. It is therefore critical that the growth (including the areas that the growth is taking place) in water demand and wastewater production is well forecast. Effective integrated planning with other departments is therefore critical. It is also critical that projects approval be obtained to ensure that the project does not “stop and start”.

In order to improve integrated masterplanning a Bureau arrangement, similar to that in Blaauwberg will be investigated and, if feasible, will be implemented.

The partnership approach with developers will be continued. Development contributions from the developers are determined and agreed on for each Development Node or Corridor and which funds can be used to provide the required infrastructure. This will ensure that development can continue. An outstanding issue that needs to be resolved is bridging finance as the funds are not all made available to the City upfront.

9.7.5 Strategy 5 : Structure for Success

9.7.5.1 Financial

The Financial report from Palmer Development group is still in draft form (Draft 2 - dated 17 November 2005). The financial strategy therefore still needs to be development. The report outlines “Strategic Issues and Choices” as detailed below:

- A sustainable capital programme must cater for three important elements simultaneously: (1) elimination of backlogs and provision for new demand (2) bulk expansion to cater for new demand, and (3) rehabilitation and replacement of existing infrastructure.
- An affordable long term capital expenditure programme appears to be in the region of R500 million per annum (smoothed over time),, though it is recognised that actual expenditure will be lumpy.

- At present there is an inadequate provision for depreciation of assets. This must change to ensure sustainability. Depreciation should encompass all assets, including grant funded assets and assets fully paid for.
- At present there is inadequate maintenance of infrastructure. Expenditure (and efficiency in spending) must increase significantly in real terms. It is not clear by how much without more detailed study.
- Adequate cash collections is critical to the business. This is not in the control of the business and failure to perform in this area could seriously jeopardise the business.
- In all of the scenarios modelled, there is a need to increase tariffs significantly in real terms to ensure sustainability.
- Much more attention needs to be given to the financial aspects of the business. This is a R1.5 billion per annum (or more) business. It needs dedicated attentions from a high level financial person adequately resourced with skilled staff such as cost accountants to improve the overall financial performance and efficiency of the business. Joburg Water, probably the best performance water services utility in the country have about 40 staff dedicated to the finances of the business with a senior Chief Financial Officer.
- The current tariff structure is in need of urgent reform. It is an inherently unstable tariff structure and places the water services business in potential financial jeopardy. See inter-city comparison of tariffs for more detail.
- Much more attention needs to be given to data integrity (see separate report produced during the long term water demand study for more detail).

9.7.5.2 Institutional

Institutional Arrangements and Mechanisms

In order to bring into effect the national and City's strategic intent and the Council resolution of June 2004 (refer to Section 8.2.1), the necessary mechanisms need to be established. The process of separating the WSA and WSP should begin immediately with the view that a separate Water Services Authority and Water Services Provider can be fully operational by 1 July 2006. Information on the WSA and WSP and the regulatory Framework are contained in the Strategic Framework for Water Services September 2003. For an extract of the regulatory Framework [GOTO 9.7](#). For a document outlining the roles and definitions of the WSA and WSP [GOTO 9.8](#)

Accountability for the entire service will rest with the Director: Water Services who will then be expected to deliver on the city's strategic goals through a Service Provision Agreement (SPA) and a 3-year rolling business plan. This WSDP and annual updates thereof will form the basis for the 3-year rolling business plan.

The Water Services Provider will be set up in such a way to enable it to:

- attract adequate loan capital,
- attract this capital at competitive rates,
- source adequate government funding (MIG),
- deal effectively with the equitable share allocations,
- reduce costs over time,
- attract, develop and retain skilled staff,
- integrate with other council services,
- plan effectively for the long

The adequacy of the WSP arrangement will determine whether or not it can achieve these goals. Close monitoring is called for to determine whether or not other external mechanisms will have to be explored in the future. It is considered that achievement of these goals will ensure a solid foundation for achieving Water Services' Vision, overcoming its challenges and reaching the City's Strategic goals

Organisational Structure

For the current macro Water Services' organisation structure in the context of that of the City, [GOTO 9.9](#)

HR Strategy

The strategy is to attract, develop and retain the appropriate skilled staff:

- Develop and adopt appropriate systems and procedures to ensure fair, efficient and effective personnel strategies and administration, in line with all relevant legislation directives.
- Monitor, measure and evaluate the performance of the staff compliment, correcting where necessary.
- Establish a "Loss of skills minimization" programme
- Science and Technology
 - Establish Science and Technology mentorship and job shadowing programmes.
 - Science and Technology staff impact reduction programme.
 - Actively head hunt – Humanity Science and Technology students via Tertiary Educational Institutions, build partnerships to "groom" designated students for the Water Services sector, e.g. by job shadowing.
- Multi-skilling of staff
 - Multi-skill existing staff through learnerships and other Tertiary education.
 - Utilisation of a small Nucleus of well trained multi-skilled contract staff to supplement manpower resources.
- Examine HR policies and make changes appropriate to the Water Services Strategy.

Business Process Improvement : ISO 9001:2000 and ISO 14001

To enhance the world class status of the water services unit, it is intended that all departments achieve ISO 9001:2000 accreditation. The Progress of each department is given below:

Bulk Water Department

In October 2003, Bulk Water were the first Bulk Water Services Provider in the country to obtain the ISO: 9001: 2000 accreditation. Continue.

Wastewater Treatment Department

Planning for the introduction of an Environmental Management System (EMS) based on ISO 14001 at Potsdam Wastewater Treatment Works commenced during 2002/03 and will be completed in xxxx when the upgrade and extensions are complete and the final effluent quality meets the license application conditions.

The plan is to roll the system out to three additional treatment works per annum until all works are included.

The implementation of ISO 9001:2000 will commence at all works during 2005/06.

Reticulation Department

The existing ISO Quality Management System certification at South Peninsula (SPA) Water Division is being maintained.

All Reticulation processes are currently being optimized by a working group who are also documenting it on the Intranet and on Sharepoint (the City's shared Document Management System).

It is planned to achieve certification by 1 July 2007.

Asset Management Services

During December 2004 the workshop was audited for ISO 9001 and at the same time pre-audited for ISO 14001 & 18001. During February 2005, ISO 9001 accreditation was achieved while 14001 & 18001 final audit took place in July 2005.

9.8 10 YEAR MASTER PLANS

The 10 year master plan of capital requirements is made up of from those of the respective departments. The overall plan is shown in the Executive Summary.

For details of the following departmental financial plans as well as the overall plan [GOTO 9.3](#).

Asset replacement

Bulk water

Reticulation including Basic Services and Meter Management

Support Services

WDM

Wastewater treatment

9.9 THREE-YEAR ROLLING BUSINESS PLAN AND CAPITAL BUDGET

The three-year rolling business plan, a requirement of the Service Provision Agreement between the Water Services Authority (WSA) and the Water Services Provider (WSP), will be developed and implemented with effect from 1 July 2006 in line with the effective date for the fully functioning WSA and WSP.

This plan will contain a three-year operating and capital development plan for each of the five strategies. It will be based on this WSDP and will be updated annually, similar to the WSDP, to take into account changing circumstances.

The key indicators which indicate whether or not the service is correctly structured will be closely monitored.

The 2005/06 three-year capital budget as approved and extracted from the SAP Management Information System is shown in Table 9.4 and [GOTO 9.4](#). This will be updated during the 2006/07 budgeting cycle which forms part of this WSDP process.

Table 9.4 Three year capital plan

WATER SERVICES - CAPITAL BUDGET 2005/06 – 3-YEAR PLAN WATER SERVICES - CAPITAL BUDGET - 2005/2006 – TABLE 9.4

DEPARTMENT	PROJECT (WBS ELEMENT) DESCRIPTION	2005/2006	2006/2007	2007/2008	Future Years	Fund Source	Geographic Location	Investment Profile
HR MANAGEMENT SERVICES	& N2 Gateway Project (Delft sewer and Zandvliet WWTW)	43,860,000	500,000	0	0	1 EFF	Multi Ward	Infrastructure Assets
HR MANAGEMENT SERVICES	& N2 Gateway Project (Delft sewer and Zandvliet WWTW)	167,783,000	3,813,000	0	0	4 MIG		Infrastructure Assets
HR MANAGEMENT SERVICES	& IT Equipment Replacement	1,500,000	1,500,000	1,750,000	6,000,000	3 AFF: Water	Multi Ward	Other Assets
BULK WATER	Atlantis - Administrative building upgrade and refurbish	800,000	160,000	0	0	1 EFF	Atlantis	Other Assets
BULK WATER	Bulk Water Infrastructure Upgrade	150,000	0	0	0	1 EFF	Multi Ward	Infrastructure Assets
BULK WATER	Servitudes – Payment for usage/property rights linked to Water Infrastructure Upgrades	100,000	100,000	100,000	200,000	1 EFF	Multi Ward	Other Assets
BULK WATER	Atlantis: Witzands & Hospital reservoir	10,000	0	0	0	1 EFF	Atlantis	Infrastructure Assets
BULK WATER	Atlantis : Rehabilitation of Silwerstroomstrand	50,000	0	0	0	1 EFF	Atlantis	Infrastructure Assets
BULK WATER	Cathodic protection equipment Faure	50,000	0	0	0	1 EFF	Multi Ward	Infrastructure Assets
BULK WATER	Bulk Water Infrastructure Replace/Refurbishment	2,000,000	3,162,155	7,000,000	0	1 EFF	Multi Ward	Infrastructure Assets
BULK WATER	Extension of Bulk Water Pipeline	650,000	735,000	240,000	0	1 EFF	Multi Ward	Infrastructure Assets
BULK WATER	Brooklands WTP: access road upgrade	100,000	0	0	0	1 EFF	Multi Ward	Other Assets
BULK WATER	Voëlvele : replace LLPS Pipeline	14,416,417	7,767,845	505,000	0	1 EFF	Multi Ward	Infrastructure Assets

BULK WATER	TMS Aquifer Deep Borehole	8,300,000	12,300,000	9,104,000	2,902,000	1 EFF	Multi Ward	Infrastructure Assets
BULK WATER	Infrastructure Replace/Refurbish BW	14,500,000	15,000,000	15,000,000	0	3 AFF: Water	Multi Ward	Infrastructure Assets
BULK WATER	Replacement of Plant & Equipment-BW	500,000	300,000	200,000	0	3 AFF: Water	Multi Ward	Other Assets
H/O: SUNDRY EMERGENCY REPAIRS	Infrastructure Replace/Refurbish – WWT	20,000,000	15,000,000	15,000,000	0	3 AFF: Sanitation	Multiward	Other Assets
ATHLONE WWTW	Athlone Wastewater Treatment Works	4,000,000	0	0	0	1 EFF	Athlone	Infrastructure Assets
BELLVILLE WWTW	Bellville Wastewater Treatment Works	1,000,000	3,500,000	10,500,000	71,750,000	1 EFF	Bellville South	Infrastructure Assets
BORCHERDS QUARRY WWTW	Borcherds Quarry Wastewater Treatment Works	1,500,000	1,700,000	0	13,000,000	1 EFF	Airport Industria	Infrastructure Assets
CAMPS BAY OUTFALL	Camps Bay Outfall	250,000	0	0	0	1 EFF	Camps Bay	Infrastructure Assets
CAPE FLATS WWTW	Cape Flats Wastewater Treatment Works	1,000,000	1,500,000	2,000,000	12,000,000	1 EFF	Zeekoevlei	Infrastructure Assets
GREEN POINT OUTFALL	Green Point Outfall	2,700,000	3,500,000	100,000	20,900,000	1 EFF	Green Point	Infrastructure Assets
KRAAIFONTEIN WWTW	Kraaifontein/Fisantekraal Wastewater Treatment Works	500,000	0	0	1,000,000	1 EFF	Kraaifontein	Infrastructure Assets
KRAAIFONTEIN WWTW	Kraaifontein/Fisantekraal Wastewater Treatment Works	3,000,000	0	0	0	4 PAWC - CMIP	Kraaifontein	Infrastructure Assets
MELKBOSSTRAND WWTW	Melkbos Wastewater Treatment Works	1,100,000	10,000,000	12,000,000	6,000,000	1 EFF	Melkbosstrand	Infrastructure Assets
MITCHELLS PLAIN WWTW	Mitchells Plain Wastewater Treatment Works	4,300,000	1,000,000	0	21,500,000	1 EFF	Mitchells Plain	Infrastructure Assets
POTSDAM WWTW	Potsdam Wastewater Treatment Works	40,000,000	45,000,000	27,000,000	6,000,000	1 EFF	Milnerton	Infrastructure Assets
POTSDAM WWTW	Potsdam Wastewater Treatment Works-MIG	10,194,400	0	0	0	4 MIG	Milnerton	Infrastructure Assets
SCOTTSDENE	Scottsdene Wastewater Treatment	1,500,000	1,300,000	3,000,000	32,000,000	1 EFF	Scottsdene	Infrastructure

WWTW	Works									Assets
WESFLEUR WWTW	Wesfleur Works	Wastewater Treatment		350,000	0	0	9,000,000	1 EFF	Atlantis	Infrastructure Assets
ZANDVLIET WWTW	Zandvliet Works	Wastewater Treatment		1,500,000	0	0	52,500,000	1 EFF	Khayetlisha	Infrastructure Assets
NEW NORTHERN WWTW	Fisantekraal Works	Wastewater Treatment		3,000,000	2,000,000	0	0	1 EFF	Fisantekraal	Infrastructure Assets
ELECTRICAL MAINTENANCE	Tools & Sundry Equipment			200,000	500,000	800,000	0	1 EFF	Multi Ward	Other Assets
WATER FLEET SERVICES	Replacement of Vehicles			900,000	6,160,000	6,720,000	0	1 EFF	Multi Ward	Other Assets
WATER FLEET SERVICES	Replacement of Plant & Equipment			250,000	2,500,000	4,000,000	0	1 EFF	Multi Ward	Other Assets
WATER FLEET SERVICES	Replacement of Vehicles & Accessories			19,000,000	15,000,000	10,000,000	0	3 AFF: Water	Multi Ward	Other Assets
MECHANICAL MAINTENANCE	Replacement of plant, tools & equipment			1,200,000	1,500,000	1,500,000	0	3 AFF: Water	Multi Ward	Other Assets
MECHANICAL MAINTENANCE	Depot Rationalisation for transformation			3,000,000	3,500,000	4,000,000	0	3 AFF: Water	Bellville	Other Assets
RETIC DISTRICT 3	Silvertown Bulk Water			829,638	0	0	0	4 MIG	Khayelitsha	Infrastructure Assets
RETIC DISTRICT 4	The construction of a new reservoir midway between Somerset West and Sir Lowry's Pass village to balance water supply to the Sir Lowry's Pass Village area.			3,000,000	0	0	4,500,000	1 EFF	Somerset West/Gordon's Bay	Infrastructure Assets
RETIC DISTRICT 4	Construction of new water main to service a new low cost housing project (200-300 erven) at the Somerset West 10Ha site.			226,900	0	0	0	4 MIG	Somerset West/Macassar	Infrastructure Assets
RETIC DISTRICT 4	The construction of a new 300mm water main for the new High Risers under construction in the Beach Road corridor – Strand			2,500,000	3,700,000	0	0	3 BICL Water:Hel	Beach Rd - Strand	Infrastructure Assets

RETIC DISTRICT 5	Flood Disaster Wallacedene- New water reticulation for Wallacedene development	1,960,000	1,800,000	0	0	4 MIG	Wallacedene	Infrastructure Assets
RETIC DISTRICT 5	~Protea Heights Water Sup New infrastructure to supply new development.	4,000,000	0	0	0	3 BICL Water:Oos	Protea Heights	Infrastructure Assets
RETIC DISTRICT 5	Design Aandrag Supply System	4,000,000	2,000,000	700,000	0	3 BICL Water:Oos	Multi Ward	Infrastructure Assets
RETIC DISTRICT 5	New Zevenwacht Heights Reservoir and Pumpstation	350,000	2,000,000	1,500,000	0	3 BICL Water:Oos	Multi ward	Infrastructure Assets
RETIC DISTRICT 6	Informal Settlement Proj – Standpipes	800,000	600,000	600,000	0	1 EFF	Melbosstrand/Atlantis area	Infrastructure Assets
RETIC DISTRICT 6	Informal Settlement Proj – Standpipes	50,000	300,000	200,000	0	4 STATE DEPT: DWAF	Melbosstrand/Atlantis area	Infrastructure Assets
RETIC DISTRICT 6	~Install New Infrastructure	2,000,000	2,000,000	2,000,000	0	3 BICL Water:Blg	Parklands	Infrastructure Assets
RETIC DISTRICT 6	Incremental Upgrade Areas – Standpipes	2,030,000	4,500,000	6,700,000	0	1 EFF	Melbosstrand/Atlantis area	Infrastructure Assets
RETIC DISTRICT 7	Brown's Farm Water	1,318,500	0	0	0	4 MIG	Phillippi	Other Assets
RETIC DISTRICT 9	Installation of New Infrastructure - Supply to Bellville North As per Masterplan	2,000,000	3,000,000	1,800,000	0	3 BICL Water:Tyg N	Bellville North	Infrastructure Assets
RETIC DISTRICT 9	Installation of New Infrastructure - Supply to Bellville North As per Masterplan	300,000	500,000	1,000,000	0	1 EFF	Bellville North	Infrastructure Assets
RETIC DISTRICT 10	Remove midblock water network-Bishop Lavis Phase 4	450,000	1,000,000	1,500,000	0	1 EFF	Bishop Lavis	Infrastructure Assets
RETIC PLAN & DESIGN (WATER)	Water Infrastructure - Master Planning	200,000	500,000	1,000,000	0	1 EFF	Multiward	Infrastructure Assets
RETIC PLAN & DESIGN (WATER)	Water Demand Management -	20,000,000	25,000,000	25,000,000	0	3 AFF: Water	Multiward	Infrastructure Assets
RETIC PLAN & DESIGN (WATER)	Replace & Upgrade Water Network	33,000,000	35,000,000	24,000,000	0	3 AFF: Water	Multi Ward	Infrastructure Assets
RETIC PLAN &	Upgrade & Replacement Watermeters	4,000,000	4,000,000	4,000,000	0	4 PRIVATE	Multiward	Infrastructure

DESIGN (WATER)						SECTOR FIN		Assets
RETIC PLAN & DESIGN (WATER)	Water Demand Management - Water saving devices and leak detection equipment	250,000	4,000,000	5,500,000	20,000,000	1 EFF	Multi ward	Infrastructure Assets
RETIC PLAN & DESIGN (WATER)	Informal Settlements Water (Incremental Upgrade)	540,000	300,000	200,000	0	4 MIG	Multi ward	Infrastructure Assets
RETIC DISTRICT 3	Silvertown Bulk Sewer	681,200	0	0	0	4 MIG	Khayelitsha	Infrastructure Assets
RETIC DISTRICT 3	Monwabisi Pumpstation-Sewer	1,000,000	0	0	0	1 EFF	Monwabisi	Infrastructure Assets
RETIC DISTRICT 4	Construction of new sewer pump station and sewer mains to service a new low cost housing project at the Somerset West 10Ha site.	378,350	0	0	0	4 MIG	Somerset West/Macassar	Infrastructure Assets
RETIC DISTRICT 4	The replacement of an existing sewer main along Beach Road - Strand. Existing pipe absolute due to sand infiltration and the current development of 15 High Rise Apartment blocks.	800,000	0	0	0	1 EFF	Beach Rd - Strand	Infrastructure Assets
RETIC DISTRICT 4	The rehabilitation of a concrete pipe line from Gant's to the Beach Road Corridor in Strand for the sewer outfall from Somerset Business Park, Sir Lowry's Pass, etc.	800,000	0	0	0	1 EFF	From Gant's Center to Beach Rd	Infrastructure Assets
RETIC DISTRICT 4	The construction of a new Main sewer for the Somerset West Business Park to serve developments under construction and the Sir Lowry's Pass community.	2,800,000	1,400,000	0	0	3 BICL Sewer:Hel	Between TR2 and Sir Lowry's Pass Rd	Infrastructure Assets
RETIC DISTRICT 5	Installation of New Sewer Infrastructure	1,500,000	1,000,000	1,000,000	0	3 BICL Sewer:Oos	Brackenfell/Scotts dene areas	Infrastructure Assets
RETIC DISTRICT 5	~Flood Disaster Wallacedene Sewer upgrade	500,000	476,000	0	0	4 MIG	Wallacedene	Infrastructure Assets

RETIC DISTRICT 6	~New Infrastructure:Sewage Parklands/Sunningdale Councils Share of costs	15,850,000	16,150,000	5,650,000	0	3 BICL Sewer:Blg	Parklands	Infrastructure Assets
RETIC DISTRICT 6	Melkbos Outfall - Parklands	1,000,000	1,000,000	800,000	0	1 EFF	Parklands	Infrastructure Assets
RETIC DISTRICT 6	Potsdam Outfall - Parklands	500,000	0	0	0	1 EFF	Parklands	Infrastructure Assets
RETIC DISTRICT 8	Brown's Farm Sewer	2,532,000	0	0	0	4 MIG	Brown's Farm	Infrastructure Assets
RETIC DISTRICT 9	Sewer Infrastructure - Master Planning	500,000	1,000,000	1,000,000	0	1 EFF	Multiward	Infrastructure Assets
RETIC DISTRICT 9	Installation of New Sewer Infrastructure	300,000	700,000	1,000,000	0	1 EFF	Durbanville	Infrastructure Assets
RETIC DISTRICT 10	Remove midblock sewer network- Bishop Lavis	500,000	1,500,000	2,500,000	0	1 EFF	Bishop Lavis	Infrastructure Assets
RETIC PLAN & DESIGN (SEWER)	Replace & Upgrade Sewer Network	33,000,000	40,000,000	7,000,000	0	3 AFF: Sanitation	Multiward	Infrastructure Assets
RETIC PLAN & DESIGN (SEWER)	~Basic Sanitation: Informal Settlements	3,000,000	1,000,000	1,000,000	0	1 EFF	Multi Ward	Infrastructure Assets
RETIC PLAN & DESIGN (SEWER)	~Basic Sanitation: Informal Settlements	1,620,000	4,000,000	4,500,000	0	4 STATE DEPT: DWAF	Multi Ward	Infrastructure Assets
RETIC PLAN & DESIGN (SEWER)	New Sewer Line - Northern Area - Thornton	960,000	8,235,000	4,000,000	0	1 EFF	Athlone	Infrastructure Assets
RETIC PLAN & DESIGN (SEWER)	Cape Flats Sewer System Upgrade sand and rag traps	960,000	5,000,000	4,000,000	0	1 EFF	Multi Ward	Infrastructure Assets
RETIC PLAN & DESIGN (SEWER)	D'urbanville Collectors Sewers	10,000,000	12,000,000	0	0	3 BICL SWater: Tyg N	Multi Ward	Infrastructure Assets
RETIC PLAN & DESIGN (SEWER)	Sanitation:Informal Settlements	3,140,000	6,300,000	9,500,000	0	1 EFF	Multi Ward	Other Assets
RETIC PLAN & DESIGN (SEWER)	Infomal Settlements Sanitation Project	9,144,000	5,000,000	5,500,000	0	4 MIG	Multi Ward	Infrastructure Assets
RETIC PLAN & DESIGN (SEWER)	Replace & Upgrade Sewer Pumpstations	10,000,000	10,000,000	0	0	3 AFF: Sanitation	Multi Ward	Infrastructure Assets

RETIC PLAN & DESIGN (SEWER)	Fisantekraal Main Sewer	5,000,000	24,000,000	13,000,000	0	3 BICL Sewer:Tyg N	Multi Ward	Infrastructure Assets
RETIC PLAN & DESIGN (SEWER)	Helderberg / AECI Macassar system	15,000,000	15,000,000	15,000,000	0	3 BICL Sewer:Hel	Multi Ward	Infrastructure Assets
RETIC PLAN & DESIGN (SEWER)	Bottelary Bulk Sewer System	3,000,000	20,000,000	12,000,000	250,000	3 BICL Sewer:Oos	Multi Ward	Infrastructure Assets
		583,484,405	422,959,000	293,669,000	279,502,000			

10. BENCHMARKING AND KEY PERFORMANCE INDICATORS

Indicators chosen for the 2002 WSDP have been discarded in the interest of aligning the chosen set to (1) mandatory indicators in DWAF's National Framework, (2) the City's Key Performance Indicators in the IDP and (3) the Department's Business Plan and new Balanced-Scorecard Performance Indicators. Although Scorecards exist for each departmental manager, an important driver for the service is that of the Director as shown in Table 9.6 ([GOTO Table 9.6](#)).

The previous set of indicators measured during 2004 can be found in the 2004 WSDP Review: [GOTO 1.2 Web](#) or [GOTO 1.2](#)

Recent initiatives from (4) the City Water Manager's Forum (CWMF) as well as (5) the Water Research Commission are also being taken into account in order to rationalise on the measurement systems required. SALGA (6) has launched a national Municipal standard which will include all of the indicators from (1) along with a selection of others.

Once the set of indicators have been fixed, measurement systems need to be put in place to measure the values on an ongoing basis. This work is being planned for 2006.