WATER SERVICES DEVELOPMENT PLAN

FOR

CITY OF CAPE TOWN
2010/11 – 2013/14

(Status: Final Report)

As at December 2009

Follows DWA guidelines revision 10

City of Cape Town

WATER SERVICES DEVELOPMENT PLAN 2009/10 TO 2013/14

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ABBREVIATIONS AND DEFINITIONS

AADD	Annual Average Daily Demand
BH	Borehole
CMA	Catchment Management Authority
CU	Consumer Unit
DWA	Department of Water Affairs
EIA	Environmental Impact Assessment
GGP	Gross Geographic Product
IDP	Integrated Development Plan
incl.	Included
IWRP	Integrated Water Resource Planning
kℓ	kilolitre
Mℓ	Megalitre
MIG	Municipal Infrastructure Grant
n.a.	not available
N/A	Not Applicable
NBI	National Benchmarking Initiative
NIS	National Information Systems
PS	Pump Station
RES	Reservoir
SALGA	South African Local Government Association
SDF	Spatial Development Framework
SPA	Sanitation Promotion Agent
SSA	Support Services Agent
SW	Surface Water
UAW	Unaccounted Water
VIP	Ventilated Improved Pit Latrine
WC/WDM	Water Conservation / Water Demand Management
WfW	Working for Water
WRC	Water Resource Commission
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSP	Water Services Provider
WTW	Water Treatment Works
WWTW	Wastewater Treatment Works
%/a	Percentage per annum

KEY TERMS

TERM	INTERPRETATION
Basic Water Supply Facility	The infrastructure necessary to supply 25 litres of potable water per person per day supplied within 200 metres of a household and with a minimum flow of 10 litres per minute (in the case of communal water points) or 6 000 litres of potable water supplied per formal connection per month (in the case of yard or house connections).
Basic Water Supply Service	The provision of a basic water supply facility, the sustainable operation of the facility (available for at least 350 days per year and not interrupted for more than 48 consecutive hours per incident) and the communication of good water-use, hygiene and related practices.
Basic Sanitation Facility	The infrastructure necessary to provide a sanitation facility which is safe, reliable, private, protected from the weather and ventilated, keeps smells to the minimum, is easy to keep clean, minimises the risk of the spread of sanitation-related diseases by facilitating the appropriate control of disease carrying flies and pests, and enables safe and appropriate treatment and/or removal of human waste and wastewater in an environmentally sound manner.
Basic Sanitation Service	The provision of a basic sanitation facility which is easily accessible to a household, the sustainable operation of the facility, including the safe removal of human waste and wastewater from the premises where this is appropriate and necessary, and the communication of good sanitation, hygiene and related practices.
IDP	A municipal plan as defined in the Municipal Systems Act.
MIG	A conditional grant from national government to support investment in basic municipal infrastructure.
WSA	A water services authority is any municipality that has the executive authority to provide water services within its area of jurisdiction in terms of the Municipal Structures Act 118 of 1998 or the ministerial authorisations made in terms of this Act. There can only be one water services authority in any specific area. Water services authority area boundaries cannot overlap. Water services authorities are metropolitan municipalities, district municipalities and authorised local municipalities.
WSDP	A plan for water and sanitation services in terms of the Water Services Act.
WSP	A Water services provider is • Any person who has a contract with a water services authority or another water services provider to sell water to, and/or accept wastewater for the purpose of treatment from, that authority or provider (bulk water services provider); and / or • Any person who has a contract with a water services authority to assume operational responsibility for providing water services to one or more consumers (end users) within a specific geographic area (retail water services provider); or • A water services authority which provides either or both of the above services itself

PREFACE

The report is the 2010/11 to 2014/15 Water Services Development Plan (WSDP) for City of Cape Town, developed by the Water and Sanitation Department.

The 2010/11 to 2014/15 WSDP for the City of Cape Town (CCT) is presented in the format as required by the Department of Water Affairs (version 10) GOTO 7.

In addition, the Water and Sanitation Department is going through a process to apply the WSDP operationally. This document has gone some of the way towards that goal. It is intended that future updates would continue this process.

A. Introduction: Strategic Perspective and Methodology

A.1 General

For the purpose of a WSDP from the Preparation Guideline GOTO Ex1

The 2010/11 WSDP for the City of Cape Town (CCT) is presented below in the latest format (version 10) as required by the Department of Water Affairs. The CCT developed its own format for the first WSDP in 2001 but is now following the DWA format. While the general format is followed not all the formats of the tables are followed. In order to make the document more relevant to managers CCT has rather followed the approach of presenting tables that are used by managers in day to day operations e.g. tables generated from the computer system SAP. This will help to ensure that the WSDP becomes a useful management tool. By making these adaptations it is hoped that there will be greater buy-in and the document will become a useful planning tool.

The report was compiled using information extracted from a variety of sources, including

- Previous versions of the WSDP
- Previous versions of the IDP
- Previous versions of the City's Annual Report,
- The State of the Environment Report 2008
- The State of Cape Town Report 2006
- Departmental SDBIP's (Service Delivery Business Implementation Plans) and Performance Scorecards
- Information from the Integrated Master Plan
- Historical and future capital and operating budgets
- Census 2006
- Stakeholders and other sources

Historical information for previous financial years has been difficult to obtain in certain instances. Where historical information is provided it is not necessarily 100% accurate and should be used as a guide that identifies trends. This is particularly important in the case of financial information, which has not been extracted from the financial statements.

It is a concern that there is a lack of capacity in certain areas to collect the necessary information. Officials are in many cases stretched and have to fit the WSDP into their busy schedules. Officials currently spend an enormous amount of time collecting information for senior management and politicians. Much of this information is similar to what is required for the WSDP but in a different format and for different purposes. The more the general information gathering process can be streamlined with the WSDP needs taken into account the easier it will be to produce future updates.

A.2 Roadmap of Planning Framework

The roadmap of the planning framework is outlined in the table in section A.4.
For a diagram from the WSDP Preparation Guideline GOTO Ex2

A.3 Strategic Analysis and Methodology

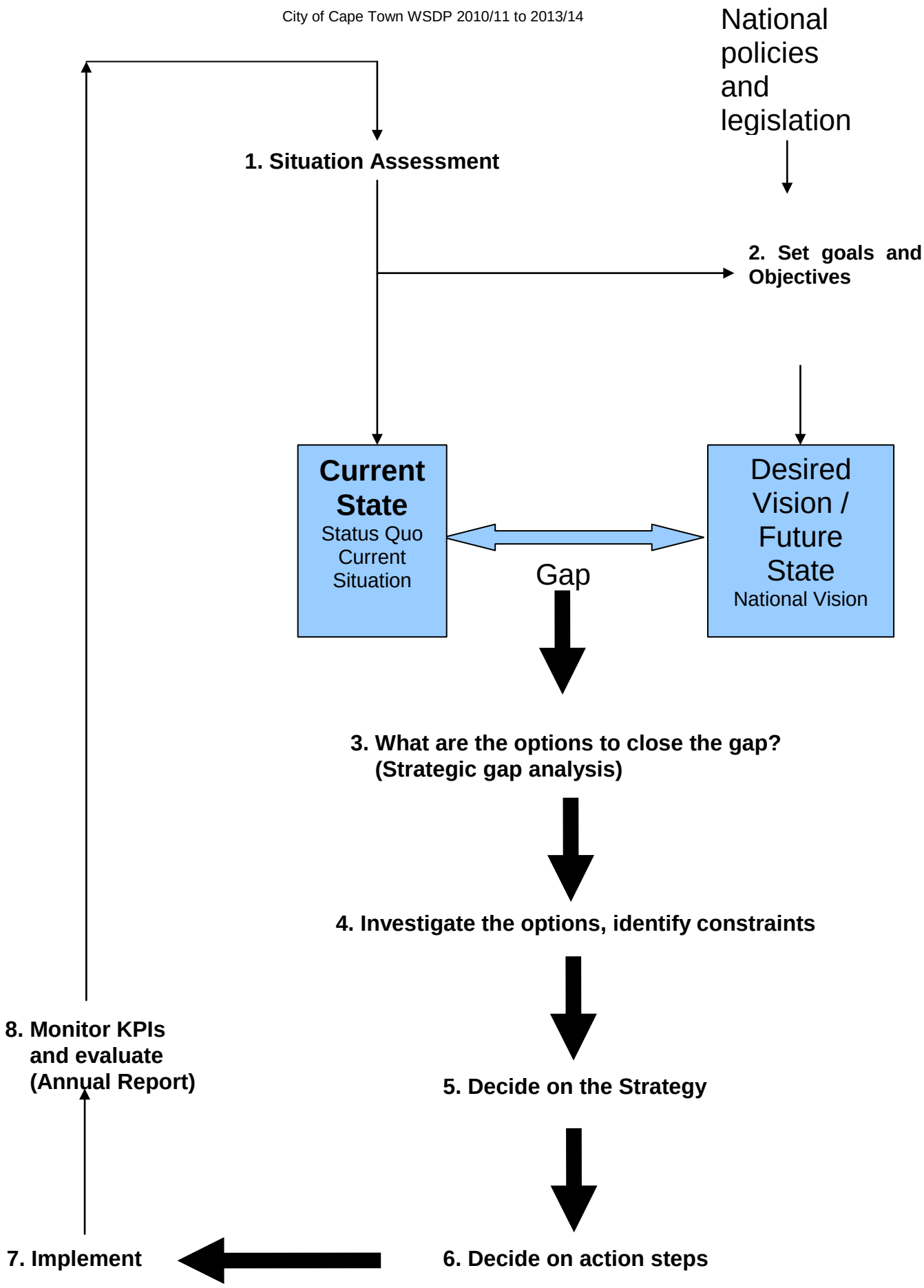
For a diagram from the WSDP Preparation Guideline GOTO Ex3

The strategic analysis and planning process is outlined in the flow chart below. This is an ongoing process and happens at both a “micro” and “macro” level of strategic planning.

- Situation Assessment
  - 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.

- Set Goals and Objectives
  - The national agenda as contained in the Water Services Act (Act 109 of 1997 GOTO A.1) 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.
  - Goals and objectives are set

- From the current state and desired future state a strategic gap analysis is done and the challenges determined.
- 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 KPIs and evaluating the effectiveness of the strategy is ongoing and included in the annual report. (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.


National policies and legislation
1. Situation Assessment
2. Set goals and Objectives
Current State
Status Quo
Current Situation
Gap
Desired Vision / Future State
National Vision
3. What are the options to close the gap? (Strategic gap analysis)
4. Investigate the options, identify constraints
5. Decide on the Strategy
6. Decide on action steps
7. Implement
8. Monitor KPIs and evaluate (Annual Report)

A.4 IDP Methodology

For a diagram from the WSDP Preparation Guideline GOTO Ex4

The Process of developing the WSDP is fully integrated into the IDP process The WSDP is a sector plan of the IDP.

A.5 Program Interaction and Data Exchange

For a diagram from the WSDP Preparation Guideline GOTO Ex5
The program interaction and data exchange is covered in section A.4

B. Administration

Water services authorities (metropolitan municipalities, some district municipalities and authorised local municipalities) are responsible for ensuring provision of water services within their area of jurisdiction.

Water services authorities have the constitutional responsibility for planning, ensuring access to, and regulating provision of water services within their area of jurisdiction.

B.1 Name of Water Service Authority

The Water Services Authority is the City of Cape Town.

1.	**Name**	City of Cape Town
2.	**Address**	Civic Centre, Hertzog Blvd, Cape Town

B.2 Status of the WSDP

This report is the most recent and comprehensive WSDP of the CCT since 2002.

From the DWA Guideline: The WSDP must be formally approved by the Council. Councillors must be aware of the targets and funding commitments made in the WSDP since they will be responsible for ensuring that these commitments are fulfilled. The WSDP will also serve as a project management tool to monitor the achievement of these commitments.

From Strategic Framework for Water Services: One of the visions of the Sector is that water supply and sanitation services are provided by effective, efficient and sustainable institutions that are accountable and responsive to those whom they serve.

One of the goals of the Sector is that all water services authorities are accountable to their citizens, have adequate capacities to make wise choices (related to water services providers) and are able to regulate water services provision effectively.

B.3 WSDP Drafting Team

B.3.1 Water services authority

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

For complete WSDP organogram GOTO B.3

B.3.2 Consultants

None.

B.4 Process Followed

The Preparation Guideline: Section 14 of the Water Services Act requires that the Water Services Authority must take reasonable steps to bring its draft WSDP to the notice of a number of different stakeholders so that they have the opportunity to comment on it. Section 15 of the Act requires that the WSA must supply a copy of the WSDP to the Minister of Water Affairs, Minister of Provincial and Local Government, the relevant Province and all neighbouring WSAs.

The process used to compile the WSDP was based on Section 14 to 18 of the Water Services Act (Act 108 of 1997) - GOTO A.1.

The update takes into account the gaps in the previous WSDP, the IDP process as outlined under section A.4, the latest strategic thinking**,** the current status of issues affecting Water Services and updating old base information.

From this document an Executive Summary (GOTO 1): WSDP 201011 Exec Sum 11may10 (1) print version was compiled, which was used as the Water Services sector plan in the IDP. This WSDP, as submitted to DWA and incorporated into the Cape Town IDP, will be available in three formats:

- A CD with the full report with links to related studies, detail reports, policies and databases;
- A website version;
- A printed version without the links.

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

Integration with IDP

The timeframes outlining the internal interaction with City officials and politicians and with the public is contained in the link found in section A.4.

B.5 Comments

Components	Interest Group	Considerations	Comments
N/A	N/A	N/A	N/A

Comments were recorded as part of the IDP process.

B.6 Adoption Record

Components	Action	Approval reference	Date
All	Drafting of WSDP	Manco	March 2010
All	Updating to final WSDP (2010/11)	Council Budget Meeting	May 2010

B.7 WSDP Coordinator

Name	Designation	Role	Telephone No / E-mail
J de Bruyn	WSDP Manager	Team Vice Captain	021 590 1424 jaco.debruyn@capetown.gov.za

B.8 Project Management Unit

The City's MIG Project Management Unit co-ordinates the allocation and distribution of MIG funds. Water and Sanitation Services' projects are managed by the department. Utility Services' PSU co-ordinates the Capital Project Budget for the Directorate.

B.9 DWA Asset Transfer

There are no assets that need to be transferred from DWA.

B.10 General

While the City does not have a separately approved Service Level Policy for Water and Sanitation the service level categories outlined under Service Level Profile (F2) have been incorporated into the WSDP since 2002.

Free basic levels and indigent subsidies are clearly spelt out under F2.

C. Executive Summary

Introduction

The Water and Sanitation Department has made significant progress in the provision of services since the formation of one City administration for Cape Town (CCT), but some critical challenges remain, as summarised below.

Institutional arrangements and strategies have been put in place to overcome the challenges and to meet key policy as well as legislative requirements. Progress on the objectives as set out in DWA's critical policy document, the National Strategic Framework for Water Services (September 2003), are measured in Table 1:

1. Table C.1: Water and sanitation service provision achievements for the City of Cape Town measured against DWA National Strategic Framework

1. All people are to have access to functioning basic water supply by 2008: Achieved in CCT in 2005/06						
	Performance	Actuals		Target	Change	
OBJECTIVE	Indicators	30-Jun-08	30-Jun-09	30-Jun-09	Year-on-year	Actual-to-target
(a) Access to basic level of water						
(i) % of households	–	100.0%	100.0%	100.0%	0.0%	0.0%
(ii) % of poor households	–	100.0%	100.0%	100.0%	0.0%	0.0%
2. All people are to have access to functioning basic sanitation by 2010: CCT is aiming for 2013/14 due the magintude of the requirement						
	Performance	Actuals		Target	Change	
OBJECTIVE	Indicators	30-Jun-08	30-Jun-09	30-Jun-09	Year-on-year	Actual-to-target
(a) Access to basic levels of sanitation						
(i) % of households	↑	97.1%	100.0%	97.5%	3.0%	2.6%
(ii) % of poor households	↑	92.5%	100.0%	89.7%	8.1%	11.5%
(b). Informal households ratios						
(i) The number of informal households		116 883	116 883	*This estimate will be updated from 1 July 2009*		
(ii) Households-to-working taps	↑	11.5	10.8	11.7	6.5%	8.3%
(iii) Households-to-working toilets	↑	6.4	4.7	6.6	36.2%	40.4%
(iv) Approximate number of working taps	↑	10 188	10 768	9 061	5.7%	18.8%
(v) Approximate number of working toilets	↑	18 280	24 594	16 234	34.5%	51.5%
3. Investment in water services infrastructure should total >0.75% of GDP						
	Performance	Actuals		Target	Change	
OBJECTIVE	Indicators	30-Jun-08	30-Jun-09	30-Jun-09	Year-on-year	Actual-to-target
(a) Level of investment						
(i) CCT's GDP (R'bn) - at basic prices (2007)		219.26	219.26			
(ii) Water and Sanitation actual capital expenditure (R'm)		475.90	696.94	100.0%		
(iii) Capital investment as % of GDP	↓	0.22%	0.32%	0.75%	46.4%	-57.6%

Source: GDP figures were provided by the Department of Economic Development. The Department of Economic Development sourced the numbers from Quantec's Western Cape Macro-economic Outlook Report

To ensure and to measure the level of progress, internal service level targets for the City of Cape Town had also been set:

- The target for providing access to basic water supply in the CCT was met in 2005/06 with further taps being installed to reduce the Household-to-Tap ratio, hence access to basic water supply exceeds 100%.

- By 2010, about 70% of CCT's population were to have access to basic sanitation services. This target has already been exceeded in 2007/08. By June 2009 this figure has reached 100% coverage, based on the minimum standard of at least 1 toilet per 5 households.

CAPE TOWN WATER AND SANITATION VISION, MISSION, VALUES AND STRATEGIC OBJECTIVES

VISION: TO BE A BEACON IN AFRICA FOR THE PROVISION OF WATER AND SANITATION SERVICES

MISSION STATEMENT

WE PLEDGE TO ACHIEVE OUR VISION BY CREATING A CENTRE OF EXCELLENCE IN WATER AND SANITATION DEPARTMENT THROUGH:

- ✓ Optimizing resources
- ✓ Implementing environmentally-sustainable interventions
- ✓ Continuous improvement and knowledge management
- ✓ Good governance
- ✓ Customer satisfaction and good stakeholder relationships

VALUES

- ✓ **Integrity**: We maintain the highest level of ethics and fairness in our interaction with each other, our customers and other stakeholders.
- ✓ **Respect:** We respect all our employees, customers and stakeholders. We have the highest regard for the dignity of all people.
- ✓ **Customer focus**: We meet customers' needs by providing excellent service, optimal product performance and efficient support system.
- ✓ **Trust:** Our business model is based on trust and integrity as perceived by our stakeholders and customers.
- ✓ **Transparency:** We operate safely, openly, honestly and with care for the environment and the community.
- ✓ **Professional:** We encourage innovation, teamwork and openness among our employees and reward performance excellence.

STRATEGIC OBJECTIVES

- To implement ISO 9001 for all our services in the next five years(2015/16);
- To achieve Green Drop status for 60% of the waste water treatment plants by(2015/16);
- To achieve 95% waste water effluent quality;
- To ensure the presence and dorminance in Africa of the water, wastewater and air pollution testing services;
- To reduce unaccounted for water to 15% in the next five years;
- To provide basic or emergency sanitation services to all residents of Cape town City by 2015/16;
- To provide basic water to all residents in the city by 2015/16;
- To increase productivity levels by 15% by 2015/16;
- To achieve 90% customer satisfaction levels in all our services by 2015/16;
- To establish an efficient and effective asset management program for the Department 2011/12;
- To be the reference City for water matters in the country;
- To grow the training school and achieve SETA accreditation for the training modules(eg process controllers, artisans) by 2012/13;
- To minimise river systems pollution by reducing sewage overflows by 20% 2015/16;
- To improve revenue collection to 96% by 2015/16;
- To construct an office block for the department by 2015/16;
- To be information efficient by 2012/13;
- To improve security of supply for water systems to 120% of average demand by 2016/17 in all areas;
- To increase the effluent re-use by 15% in 2015/16;
- To roll out automation and remote control pilots on treatments and pump stations.

SLOGAN PROPOSALS

- Cape town water a symbol of collective efforts
- Cape town water a symbol for quality life
- Cape town water a symbol for quality life, earn it!
- Cape town water is better than bottled water;
- Cape town water a scarce and well managed resource;
- Cape town water a symbol for human dignity
- Cape town water a pledge for human dignity
- Cape town water is the best in quality
- Cape town sanitation is better than bottled water
- Excellent water and sanitation for all in Cape Town
- Amanzi impilo
- Amanzi amahle

Critical challenges

Cape Town Water Services faces a number of critical challenges which can be clustered into four categories:

(a) Financial perspective
    a. Sustainability of the service
    b. Cost recovery
    c. High financial requirements
    d. High debt due to non-payment

(b) Customer perspective
    a. Provide basic services expansion
    b. Eradicate sanitation backlogs
    c. Provide affordable service

(c) Business process perspective
    a. Achieve water demand targets through intensified WDM strategy
    b. Meet wastewater effluent standards
    c. Provide infrastructure to meet City development/growth needs
    d. Maintenance of infrastructure to sustain operation

(d) Organisation and Learning perspective (internal)
    a. Establish effective institutional arrangement
    b. Sufficient staff resourcing, skills retention and development
    c. Increase performance and efficiency

The strategies to face these challenges are dealt with where appropriate under the following sections.

C.1 Essential Questions

C.1.1 What is the backlog of water services?

The majority of Cape Town's population, both in formal and informal settlements, receives service levels that generally meet the National minimum standards as required by the Water Services Act 108 (of 1997). As shown in Table 1, at the minimum standard of at most 5 households per toilet on average, all households can be expected to have access to a service point. The % households with access to sanitation as monitored on a quarterly basis along with other Key Performance Indicators for the Departmental Scorecard exceeded 100% at June 2009.

At 31 June 2009, 4.7 informal households shared one toilet. Table 1 shows the large number of toilets installed during the 2008/09 financial year which made this possible. The growing density in many informal settlements constrains Water and Sanitation's ability to adequately provide further sanitation services.

However it is acknowledged that many of the toilet types cannot comfortably sustain use by more than 3 households while others work best for only 1 household. Taking these variable servicing ratios and the variation in density of service points from settlement to settlement into account, it is estimated that households need to be serviced better with the addition of toilets.

At 31 June 2009, 10.8 informal households shared a tap. The maximum ratio is 25 informal households per tap (a standard set by the City of Cape Town).

The maintenance of these temporary services often carry high maintenance cost due to frequent cleaning and frequent repair or replacement due to vandalism. It is not financially sustainable and requires a National initiative or at the very least an order of magnitude improvement in the level of funding from the Equitable Share grant. The cost of these services is to a large extent being subsidised by the formal sector.

C.1.2 What is the status of supply to higher levels of service?

Service levels to all formal developed areas are, as far as can be determined, at the highest level of service: a flush toilet and water connection in-house or on-site.

C.1.3 Cost of eradicating backlogs

To eradicate the sanitation backlog and service the influx in informal settlements, the programme to service Informal Settlements originally started by the City's Housing Department to support the City's Housing Development programme, has been taken over by the Water and Sanitation Department to great success.

The total capital requirement over the 5 years from 2009/10 to 2013/14 of the informal settlements servicing programme is estimated at R236 million of which 53% needs to be directed to the replacement of buckets, 29% to sanitation backlog eradication and 18% to cater for in-migration (influx).

The City's Housing programme is funded through National grants. Servicing of the informal settlements is funded by the Water and Sanitation department with partial recovery of cost from the national Equitable Share. Depending on the speed of implementing this programme, as for in-situ upgrading or the "decanting" of such settlements to developed formal areas, the informal settlement programme needs to adapt.

C.1.4 What is the strategy to eradicate backlogs?

Up to and including 2009, the strategy has been to provide a basic level of service such that at most 5 informal households on average share one toilet. This target has now been achieved with a ratio of 4.7 households per toilet by June 2009. The strategy has been intensified during 2010 to achieve the minimum ratio for each type of toilet. For example, some toilet types can only sustainably support 1 household each, while others can service more.

Water and Sanitation Services are ideally opting for dehydration or flush toilets. A promising new prefabricated unit which can serve up to 17 households is being piloted. The use of pour-flush alternative technology is being discontinued due to operational problems. “Greenfields” housing projects are undertaken by the Housing Department to receive residents moved from land that cannot be developed.

The City subscribes to “the water ladder” concept (as proposed in DWA’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 in each settlement beyond the basic level as funds allow.

2. Table C1.4: Profile of all consumers

	Consumers with:		No of households
1	Bucket system (Informal settlements)		3 915
2	Consumer installations: Wet (Septic tank, digester or tanker desludge or effluent discharge to an oxidation pond at Works. Also pitliners, chemical toilets, container toilets or porta-potties)		66 688
	Consumer installations: Dry (including VIP toilets, Urine Diversion, composting systems)		918
3	Intermediate or Full waterborne (Informal Settlements)		28 855
4	Full waterborne (Formal developments)		759 496
5	Total serviced		859 872
6	Total population		902 279

C.1.5 What is the status of all water infrastructure?

The existing infrastructure condition, particularly the sewer system, is deteriorating due to under-provision for essential maintenance/ replacement of aging infrastructure over several years in the past. Major pipe collapses have occurred over the past years where such pipes are in urgent need of extensive repair or even replacement.

Increased investment during 2008/09 on water and sewer reticulation replacement (12km of sewer mains and 46km of water mains) has led to an approximate 10% reduction in both sewer blockages and water main bursts. Sustained financing to enable such Asset Management programmes will be required to keep the services operating at current levels.

The replacement cost of the water and wastewater pipe network (2008/09 values) is estimated at R19.5 billion. If all other plants, works, dams, reservoirs and pump stations are included, the figure is R27.1 billion.

Key components of existing infrastructure in rapidly-developing regions of the City do operate at peak level during periods of high demand. Capacity improvements will be required to enable development.

The bulk water system in the northern areas of the City is under increasing stress during peak periods due to the rapid growth in that area.

C.1.6 Effective management

The Bulk Water branch previously set the standard by achieving full ISO certification on ISO 9001:2000 and thereafter maintaining it as certified by independent audits. This certification was lost due to a minor technicality which is being addressed.

There is also an ISO certification evaluation being undertaken to quantify the status quo, define standard operating procedures and prepare for the ultimate achievement of ISO certification across the department.

This, together with the ISO 14001 of Wastewater Treatment and the Risk Management programmes being implemented, will ensure quality and minimise risks.

Scientific Services have embarked on a plan to achieve the ISO 17025 certification by 2010/11: a legal requirement for testing and calibration of the laboratory. Standard Operating Procedures (SOP's) have been defined and a process of auditing and refinement has commenced. In the meantime, national Inter-laboratory comparisons where the lab is consistently scoring in the top 5 ensures that standards are raised and maintained.

The following areas are receiving focused attention;

- Integration of Information Management Systems through development of a Data Integration and Monitoring System.
- Integration and standardisation of Automation control and monitoring of plants via Scada-telemetry.
- GIS geodatabase development for effective management and planning of the infrastructure.
- Water quality management through the Laboratory Information Management System (LIMS) .
- Maintenance and life-cycle of equipment.
- Capacity building and training of staff.
- Testing the viability of Automatic Metering Reading of consumer meters (AMR): the Pilot installation on 1 900 consumer meters was finalised and tested during 2009 and a recommendation report will be published in 2010.

- An Integrated Asset Management Plan is being developed on a coordinated basis across directorates in the City, based on establishing an accurate infrastructure asset register, geodatabase and master data.
- Integrated Risk Management.

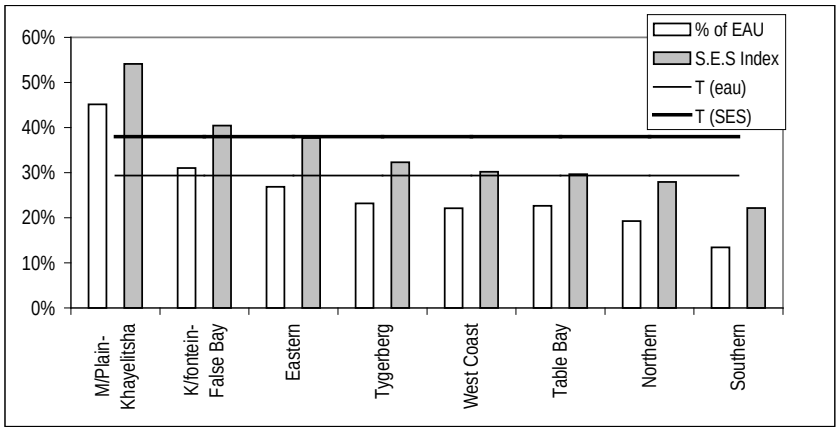
C.2 Water Services Business Element Summary

C.2.1 Socio-economic profile

Situation Assessment

At present the population of the CCT is estimated at 3,6 million. The City's population growth rate is expected to decline because of HIV/AIDS. It is estimated that the previous growth rate of 2.6% will reduce to 1.2% by 2010. Approximately 30% of households (almost 1 million people) in Cape Town live in inadequate housing and depressed physical environments.

1. Figure C.2.1: The Socio-Economic Status Index profile of Cape Town, by Health Department districts



Notes:
% of EAU - % of economically active unemployed
S.E.S - Socio-Economic Status Index
T (eau) - Total of unmployed = 29.38%
T (SES) - Total S.E.S

% of economically active unemployed		Socio-Economic Status Index (S.E.S)	
M/Plain-Khayelitsha	45.16%	M/Plain-Khayelitsha	54.12%
K/fontein-False Bay	31.05%	K/fontein-False Bay	40.43%
Eastern	26.85%	Eastern	37.71%
Tygerberg	23.19%	Tygerberg	32.28%
West Coast	22.11%	West Coast	30.22%
Table Bay	22.67%	Table Bay	29.67%
Northern	19.26%	Northern	27.94%
Southern	13.43%	Southern	22.16%
AVERAGE	29.38%	AVERAGE	37.97%

Source: Strategic Development Information and GIS Department

Figure C.2.1 shows Cape Town's socio-economic status (S.E.S) index, a tool used to measure social and economic well-being. It incorporates the following indicators: (a) the % of households earnings less than R19 200 per annum (2001), (b) the % of adults (20+ years) with the highest educational level below matric, (c) the % of the economically active population that was employed, and (d) the % of the labour force employed in elementary/unskilled occupations.

The Mitchell's Plain/Khayelitsha Health Department district has the highest score at the index level of 54.12 (worst off), while the Southern Health district has the lowest at 22.16 (best off). According to the Planning District's Socio-Economic Analysis Report of 2007, programmes to change poor socio-economic status should focus on districts which are "worst off" in terms of the S.E.S index.

Future trends, strategic gaps and implementation strategies

Strategic gaps:

There is a need for national guidelines on the provision of water and sanitation in the informal settlements but also to additional dwellings in backyards, for the want of which the the City has developed its own.

Water and Sanitation Services aim to provide an affordable service to poor households. A free basic service is provided, in the form of the first 6 kℓ/month water supply and the first 4,2kℓ of sewerage conveyance and treatment free of charge to all consumers per month.

The City's Indigent policy allows for a R30 grant in account reduction per month to qualifying ratepayers. Approximately 248 000 formal households currently qualify based on a property value less than R199 000 (2006 General Valuation).

The Water Demand Management Integrated Leaks Repair Projects, initiated at the end of 2005 and rolled out on a phased basis since then, are major initiatives to ensure that these household's plumbing leaks are minimized and hence ensure that monthly bills for these services become affordable.

With the implementation of a policy to install Water Management Devices on a prioritised basis, households defined as indigent now have a mechanism to prevent water consumption reaching unaffordable levels and also prevents leaks causing high water losses. It is being installed across a range of households income groups to the same end goal. More than 40 000 have been installed as at the end of 2009.

In order to improve and maintain the condition of the infrastructure, there will be pressure on tariffs to increase at or above inflation over the short- to medium-term. This coupled with the extraordinary burden of very high national electricity tariff increases, is making it extremely difficult for the City to address all needs.

C2.2 Service level profile

Situation Assessment

The City of Cape Town has approximately 902 279 households of which 785 396 (including approximately 150 000 backyard dwellers) are on formal erven and 116 883 households on informal sites. According to the City's billing systems (SAP), there are 604 248 registered water consumers with another 242 external to the City boundary, bringing the total of registered consumer units to 604 490 (refer to TABLE C.2.2a).

3. Table C.2.2a: Demographics and Customer Profile

	As at 2009
Population	3,572,221
Households	902,279
Household categories	
Formal including 150,000 backyard households	785,396
Informal	116,883
CCT Consumer units	
Commercial	12,537
Government	278
Industrial	4,205
Miscellaneous	5,547
School-Sportfields	1,447
Domestic Cluster	6,968
Domestic single residential	563,297
Departmental Cluster	2,970
Municipal Water	6,999
	604,248
External consumer units	
Bulk	242
Total consumer units	604,490

Source of Consumer Unit breakdown: Billing system (SAP)

Water and sanitation services cover 100% of the City's population, subject to the explanation on level of basic sanitation service described earlier.

Future Trends and goals

Residential consumer units

The formal (785,396) households have either a metered water connection to the house or to a yard toilet with water tap (uncontrolled volume supply). The first 6 kilolitres per month are supplied at no charge (free basic). Informal areas, with 116,883 households, have communal standpipes and water is provided free.

At 31 March 2009, out of the 902,279 households (for 0910), 886,940 households received at least a basic sanitation service.

Grey water management: Testing of appropriate solutions to grey water run-off in each informal settlement is continually being implemented. Wherever collection conduits are available, communal standpipes are equipped with catchpits and gullies in order to prevent ponding.

Public institutions and 'dry' industries; wet industries; industrial consumer units: all have connections on-site.

Strategic gaps

- Though the 2010 target for basic sanitation of 70% has been surpassed, there remains a gap to be covered in informal settlements to meet the national target.
- With respect to the effluent discharged from Industrial sites, non-complying and polluting trade effluent occasionally impacts heavily on the wastewater treatment process serving the catchment. The size and efficiency of the inspectorate has been increased over the past few years, while Water, Sanitation and Effluent By-laws have been consolidated and rewritten for the City. Nevertheless the challenge to obtain cooperation from consumers remains high.

Implementation strategies

- Residential consumer units: Water & Sanitation's informal settlement programme aims to eradicate the sanitation backlogs and maintain a minimum level of service to poor households.
- Industrial consumer units: The inspectorate is using an engaging, cooperative approach with consumers, more comprehensive integrated by-laws as well as more frequent inspections and measurements to improve the quality of industrial effluent and reduce water wastage.

C2.3 Water resource profile

Situation Assessment

The Western Cape Water Supply System

The Western Cape Water Supply System (WCWSS), comprising raw water storage and conveyance infrastructure, supplies water to Cape Town, surrounding towns and urban areas and agriculture. The various components of the WCWSS are owned and operated by the CCT, DWA and Eskom.

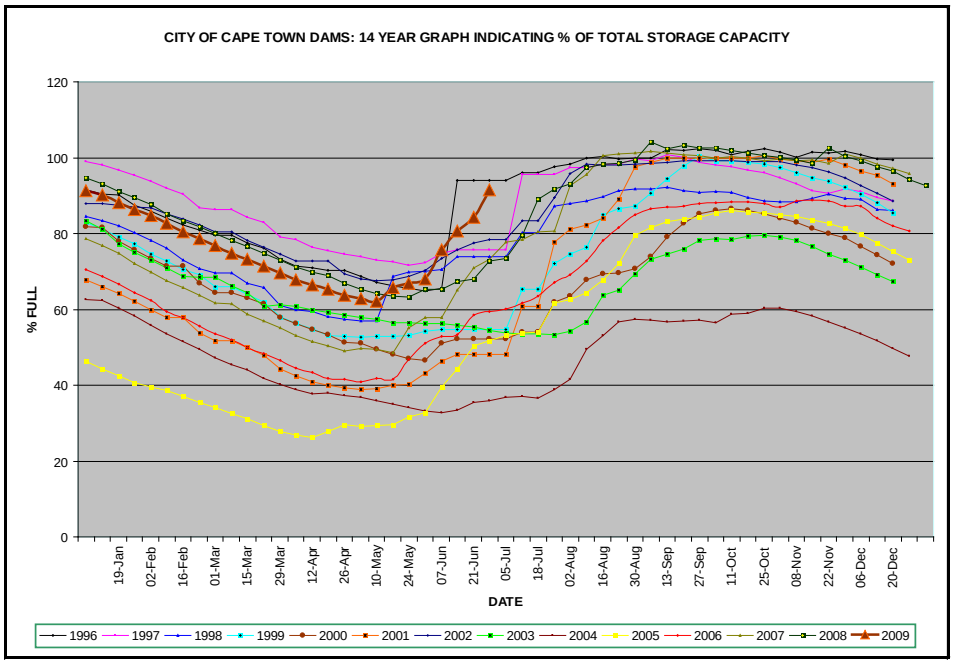
The CCT and DWA operate the WCWSS in an integrated manner to ensure that the storage of water is maximized during current and future hydrological years.

The annual yield of the WCWSS, including the recently completed Berg River scheme, is 556 million m^3 per annum.

The major raw water supply schemes of the WCWSS are the Riviersonderend, Voelvlei and Berg River Schemes, owned and operated by the DWA, and the Wemmershoek and Steenbras Schemes, owned and operated by the City of Cape Town. The total storage capacity of the six dams of these major supply schemes is 898 million m^3. The total storage of the six major dams on 29 June 2009 was 822 million m^3, or 91.6% of total storage capacity.

The longer-term 13 year record is as depicted in figure C2.3a. The 2009 trend is plotted in bold.

2. Figure C2.3a: Long term 13 year record of storage capacity



Water Resources Supplying Cape Town

The CCT's allocation of water from the WCWSS, with the additional yield of the Berg River scheme, is 398 million m^3 per annum. Including the Berg River scheme, the CCT obtains 74% of its allocated water from DWAF owned sources, with the balance of 27% from CCT owned sources. The resources supplying the CCT and its allocation from these resources are shown in Table C 2.3a.

The CCT produced 326 million m^3 of potable water during the 2008/09 financial year.

Water returned to the resource

The CCT obtains most of its raw water from mountainous catchments outside of its municipal area, and therefore most of the CCT's treated wastewater effluent is not returned to the raw water resource. A percentage of the effluent produced at the Westfleur Treatment Works at Atlantis is used to artificially recharge the aquifer from which water was abstracted for potable supply as part of the Atlantis Water Supply Scheme.

4. Table C 2.3a Cape Town's allocation from the WCWSS

	Million m^3/annum	*% of Total*
DWAF Owned Schemes		
Theewaterskloof	118	29.6%
Voelvlei	70.4	17.7%
Palmiet	22.5	5.6%
Berg River	81	20.3%
Subtotal DWAF Schemes	**291.9**	**73.2%**
CCT Owned Schemes		
Wemmershoek	54	13.5%
Steenbras	40	10.0%
Lewis Gay and Kleinplaas Dams	1.8	0.5%
Land en Zeezicht Dam	1	0.3%
Table Mountain Dams	3.5	0.9%
Albion Springs	1.5	0.4%
Atlantis Groundwater Scheme	5	1.3%
Subtotal CCT Schemes	**106.8**	**26.8%**
TOTAL ALLOCATION	**398.7**	

Quality of water

The quality of water produced at the CCT's water treatment plants is strictly monitored on a continual basis to ensure compliance with the South African National Standard 241:2005 on drinking water quality. The Scientific Services Branch conducts routine sampling and analysis of potable water produced at all water treatment plants, as well as inspection of treatment processes.

5. Table C.2.3b: CCT Compliance with SANS 241:2005

Month	Chemical %		12 month rolling ave		Micro %
	CLASS I	CLASSII	CLASS I	CLASSII	
Jul-08	93	100	95	100	100
Aug-08	96	100	95	100	100
Sep-08	94	100	95	100	100
Oct-08	96	100	96	100	100
Nov-08	98	100	96	100	100
Dec-08	98	100	96	100	99
Jan-09	98	100	96	100	100
Feb-09	96	100	96	100	100
Mar-09	98	100	97	100	100
Apr-09	98	100	97	100	100
May-09	98	100	97	100	98
Jun-09	97	100	97	100	99

Source: Scientific Services monthly reports

The values in Table C.2.3b are reported for samples from the distribution network. In terms of SANS 241/2005, the quality of the water produced is classified as excellent.

Future Trends and Goals

Cape Town and the surrounding region continues to experience both economic and population growth, with an associated growth in the demand for water. The challenge to the water sector is therefore to ensure that future supply can continue to meet the growing demand for water in the region.

The DWA and CCT in 2007 completed the WCWSS Reconciliation Strategy, a strategic planning study conducted to ensure that future supply and demand for water could be reconciled.

The Study looked at issues such as probable demand growth, available supply, water conservation and demand management and potential supply augmentation schemes. The outcome of the Study was a Strategy to be followed to ensure the reconciliation of future supply and demand for water. The Strategy included recommendations on interventions to be implemented and potential interventions (schemes) to be studied further so that sufficient information would be available to consider options and select appropriate interventions to implement and be operational when required.

The CCT is currently implementing its Ten Year Water Demand Management Strategy to reduce the rate of demand growth and to ensure that existing water resources and infrastructure are utilized efficiently.

Schemes that are being considered for future implementation to increase the supply capacity of the WCWSS include river diversion, dam height raising, groundwater abstraction, water re-use and sea water desalination schemes.

The WCWSS Reconciliation Strategy is being further developed and updated on an ongoing basis. The implementation and development of the Strategy is overseen by a Steering Committee, comprising representatives from DWA, users of water in the region including the CCT, other municipalities and the agriculture sector, and stakeholders from the water and related sectors.

Strategic gap analysis

The WCWSS Reconciliation Strategy included recommendations of interventions that needed to be implemented or studied further to ensure that potential schemes could be implemented in future when required. Table C2.3c summarises these interventions being implemented or studied further.6. Table C 2.3c: Interventions to be implemented or studied further.

Intervention	Study Level Required	Responsibility
Existing Feasibility Studies in Progress		
Water Demand Management	Intervention to be implemented	CCT
TMG Aquifer Feasibility Study	Feasibility	CCT
Pilot Desalination Plant	Feasibility	CCT
TMG Regional Monitoring	Monitoring	DWA
Invasive alien plant clearance	Ongoing	DWA
Voelvlei Phase 1	Update feasibility	DWA
Mitchell's Pass Diversion	Pre-feasibility/feasibility	DWA
Upper Wit River Diversion	Pre-feasibility	DWA
Raising Steenbras Lower Dam	Pre-feasibility	DWA
Upper Molenaars Diversion	Pre-feasibility	DWA
Water Re-use	Pre-feasibility	DWA/CCT
Future Studies Required		
Newlands Aquifer	Pre-feasibility	CCT
Cape Flats Aquifer	Feasibility	CCT
Lourens River Diversion Scheme	Pre-feasibility	CCT

C2.4 Water conservation and demand management

Situation assessment

Water Demand Management Interventions

The efficient use of scarce water resources for the City of Cape Town's growing needs and the aim to maximize on the use of existing infrastructure are critical factors that drive the Water Demand Management and Water Conservation Strategy.

Water and Sanitation Services are applying the resources required to implement water demand management interventions, including: (a) reduction of non-revenue water, (b) reduction of high pressure, minimum night flow for residential consumers, (c) education programmes, (d) plumbing leak and meter repair programmes, (e) pipe replacement, effluent re-use, water restrictions and stepped tariffs.

Trends and goals

Water Demand Management Interventions

Water demand management is an essential core requirement for sustainability of water supply to the City. In circumstance where water consumption is controlled to the levels expected in the Water Conservation and Water Demand Management strategy, deferment of the next water resource scheme to approximately 2029 can be achieved.

In the last four years a number of successful WC/WDM projects were implemented of which notable projects were:

- the Mfuleni and Protea Park Integrated Leak Repair Projects,
- the Fixit Project,
- the education campaigns,
- treated effluent recycling,
- extensive rollout of individual consumer Water Demand Management Devices allowing full flow of a daily allocation based on at least 350 litres, set higher by agreement with the consumer. More than 40 000 such devices have been installed. Organised rejection of the devices in some communities have occurred but is being dealt with responsibly.

- and various pressure management projects with the most recent implemented October 2008 for Mitchell's Plain, the third largest such scheme in the world.

The focus on these projects has reduced non-revenue demand. In addition the consumer contracts for treated effluent re-use were rationalised to generate additional income. The targeted savings for the coming year are 19.5 Ml/day or 7.0 million m^3 per annum, which is approximately 2.7% of the demand from all consumers.

Strategic gaps and goals

7. Table C.2.4a: Strategic gaps

Resources	Inadequate financial resources
	Inadequate human resources to implement WC/WDM strategy
	Water balance not developed to IWA standard.
Technical capacity and tools	Ineffective management information and monitoring systems
	Inadequate demand measurement systems and tools
	No detection programme in place to identify water leaks before they become bursts

The levels of demand reduction planned for to a levelling out at 0% growth has unfortunately not yet been reached, with a year-on-year growth in demand to June 2009 of 3.2% still occurring. If funding on WDM is not continually prioritised to enable the planned programmes, the factors of economic growth and consumer behaviour will outstrip the gains made.

Implementation Strategy

The Water Conservation and Water Demand Management Strategy is being followed in order to budget for and implement several initiatives in parallel. An update of the strategy and a detail review of progress made will be undertaken in 2010.

Top priority are the rollout of further Water Demand Management Devices on a prioritised suburb-by-suburb basis.

Further pressure reduction schemes are being designed for implementation.

The Automated Meter Reading Pilot installation on consumer meters is being finalised and evaluated early in 2010. Decisions on future roll-out options City-wide will follow and be considered for future budgets on a priority basis. Advantages indicated by preliminary evaluation include:

- synchronised simultaneous reading for an entire suburb
- more reliable readings with far fewer estimations
- Immediate loss detection at a consumer
- Immediate knowledge of a meter failure or tampering
- the ability to analyse water balance and losses by individual supply zones

C2.5 Water services Infrastructure profile

Situation assessment

The financial "book" value of the water and sewer infrastructure stood at R2.6 billion at 30 June 2008. However, because of inflation price increases over many years since these services were installed, the current June 2009 replacement value is estimated at R27.1 billion, about 10 times greater.

8. Table C.2.5a: Infrastructure of Water and Sanitation Services - Estimated Replacement cost

Description	Asset Count	Repl Value (R M)	Annual Maint Norm	Annual Maint req, Bulk Water seperate(R M)
Bulk Water (including water pump stations, water retic and reservoirs)				68.9
Dams and Catchments	12 No	1 322.5	0.50%	6.7
Water Treatment Works	13 No	1 449.0	1% Civil, 4% Mech/Elec	30.2
Waste Water Treatment Works incl Sea Outfalls	23 No	2 014.4	1% Civil, 4% Mech/Elec	41.8
Water Reticulation (incl Bulk Lines) (length escalated from 2003)	10 438	12 896.0	1%	58.6
Sewer Reticulation (length escalated from 2003)	9 021	6 643.9	1%	59.0
Depots	21 No	83.4	0.50%	0.4
Water Pump Stations	108 No	445.6	0.5% Civil, 4% Mech/Elec	7.1
Sewer Pump Stations	377 No	403.3	0.5% Civil, 4% Mech/Elec	10.5
Reservoirs	138 No	1 799.1	0.50%	3.7
		27 057.2		**287.0**

The City's water supply infrastructure has 11 dams, 12 water supply treatments works and a water supply reticulation network that is 10 400 kilometres long. There are 108 water pump stations, 138 water reservoirs and 21 depots. The wastewater infrastructure has 23 wastewater treatment works, a 9 000 kilometre sewer reticulation network, 377 sewer pump stations and 21 depots.

Trends and goals

The water supply and wastewater reticulation networks jointly account for 72% of the total replacement value. The water distribution networks experienced 5 237 bursts to water mains in 2008/09 compared to 6 080 in 2007/08. A drop in sewer burst incidents from 91 779 to 87 087 were experienced.

The operation and maintenance of the networks improved significantly in 2008/09, due to the allocation of more funding:

- 45.8 km of water mains were replaced in 2008/09 compared to 19.7 km in the previous year;
- 11.9 km of sewer mains were replaced in 2008/09 compared to a low 746 m in the previous year.

Strategic gaps

Historically, maintenance of infrastructure was mostly reactive. This is evidenced by the backlog of overdue maintenance and replacement projects.

There are areas where water and sewer infrastructure are severely stressed. The goal is to alleviate the overloading of infrastructure especially in growth areas, being mainly:

- West Coast / Parklands development corridor
- De Grendel / N7 development node
- Northern development/Fisantekraal corridor
- Bottelary development corridor
- Fast-track housing projects (e.g. N2 Gateway)
- Maccassar / AECI development node

The strong growth trend in the City is making it difficult to maintain a balance between requirements and available resources.

Implementation strategies

The City has undertaken an accelerated programme to improve the replacement of water distribution network mains, especially in areas that experience a high incidence of bursts, such as the Tygerberg district. More importantly, Water and Sanitation Services is implementing an Asset Management Programme (AMP). This will ensure that:

- Assets are maintained proactively rather than reactively,
- The total asset lifecycle is managed to maximise life of asset,
- Maintenance work is effectively coordinated,
- Operational downtime is significantly reduced.

The strategies for ensuring that wastewater treatment capacity is maintained include:

- Integrate planning for new works and extensions with the other branches and ensure that additional wastewater treatment capacity is provided where needed at the right time,
- Provide sufficient funding (EFF and MIG funds) to address the backlog in WWTW capacity and provide for growth.

To ensure long term sustainability, Water and Sanitation Services is developing an Integrated Master Plan for completion by 2010. The objectives of the master planning process are:

- To balance demand and capacity, all water and sanitation branches will use the same base data, assumptions and design parameters to ensure consistency,
- Infrastructure plans within Water and Sanitation Services are fully aligned,
- Alignment with the City's Spatial planning and IDP strategies are achieved,
- To provide sound information on which capital budgets for future years can be improved, and
- The plan is kept up to date annually to ensure reliable planning based on it.

An automation, monitoring and technology programme is being driven in the department towards achieving maximum efficiency and optimum utilisation of staff resources in a "smart" way. To this end, cooperation has been pursued with leaders in the field such as the Norwegian Oslo Waterworks and the Danish Hydraulic Institute.

The following framework plan indicates progress and future plans as at the end of 2009.

9. Table C.2.5b: Automation, monitoring and technology Framework plan

ACTION	PROGRESS	TIMEFRAME	IMPLEMENTATION COST
Plant SCADA upgrades. (Bulk, Wastewater, Pump stations).	SCADA upgrades completed at Atlantis, Blackheath and Steenbras WTP. Software and partial commissioning at Wildevoelvlei WWTW and Wemmershoek Dam WTW. Contract has been awarded to develop a new master station for all reservoirs and pump stations, including the supply of RTU's. Also included is the development of data from the new telemetry system to the database that DIMS will harvest.	5 years (2014)	R10M for current Reticulation system phase. Full system scope being developed.
Bulk & Zone meter automation	Loggers on all Treated Effluent bulk meters complete. Meter audit and logging of all Bulk Water Meters. Loggers on 40 water zone meters complete. Further zones delineated (201) and zone meters installed.	2008. All Bulk Water meters logged by mid 2010. All Water Zone meters logged by 2014.	R5M in 2008/09. Scope to be determined.
Customer meter automation	AMR pilot installation to be completed March 2010. Extensive testing undertaking in N2 Gateway, Sunset Beach and Epping Industria. Various technical, meter supply and process issues addressed. Evaluation report to follow.	AMR Phased rollout planned in priority areas. 20 year timeframe (2030) for entire City.	R1.5M pilot phase. R500M for entire City excluding meter replacement.

Integrated Information System	DIMS development (Danish Hydraulic Institute) with major DWA grant far advanced. Integrates all major Water and Sanitation information systems, showing key information in browser map-based dashboards. Server systems installed and cooperating with Corporate system. Workshop to follow 18 Feb 2010.	Completion May 2010.	R7M (R5M DWA grant)
Integrated Master Planning	Integrated Master Planning project far advanced. Already able to address planning for development and budget needs for large parts of the City. User training, software rollout to all users as well as central server installation underway.	Handover Sep 2010.	R14.5M
Technical Operating Centre process improvements	SAP-GIS Integration being implemented under control of SAP. Includes: GIS & SCADA integration in SAP, C3 Notifications, Tetra Radio comms and spatial tracking, Mobile Asset Management.	2010	R10M.
SCADA/Telemetry masterplan	Being developed.	2010	
Automated Water Analysis	Process lab Units already installed at 9 Bulk Water Depots. Installation of 8 computers and Connectivity testing to be in March 2010.	Completion end March 2010.	R693 000
Air Quality Monitoring System (Service provider to Health Dept.)	Tender to be awarded April 2010.	Completion June 2010.	R1M

The Data Integration and Monitoring System Project (DIMS) is being piloted on behalf of DWA, to be completed by May 2010. This will integrate various data real time monitoring sources including SCADA logged measurements. Also included will be summary information about the infrastructure or water and sanitation processes. Simultaneous integration of the separate SCADA systems at treatment plants and the addition of the dispersed Reticulation system (including Pump Stations) onto SCADA will be implemented over the next few years.

C2.6 Water balance

Situation assessment

Unaccounted for water (UAW) for the water supply system as a whole stood at a volume of 75 901 Ml/annum in 2008/09, made up of 53 476Ml/annum Reticulation Non-revenue demand and 22 425Ml/annum Bulk Water Non-revenue demand – at unit costs of R6.80/kl and R2.59/kl respectively, this places the rand value of 2008/09 non-revenue water at R421.7 million. (See Table C.2.6a)

Information is not currently available in order to provide detail allocation to loss areas in the IWA format, but such a measurement system is being developed. A first stage water balance based on balancing bulk water meters with consumer meters in 6 regional districts has shown a range of non-revenue demands from 19% to more than 30%, with higher problems in the more recently-developed regions. These high values are not expected to be due to leaks but rather coverage of the metering on the billing system, which is being investigated.

Information for June 2009 shows the total UAW expressed as a 12-month rolling average % for the Bulk Water (6.9%) and Reticulation branches (19.6%) separately, with 23.3% as well as for the overall process from Treatment to End Consumer sales.

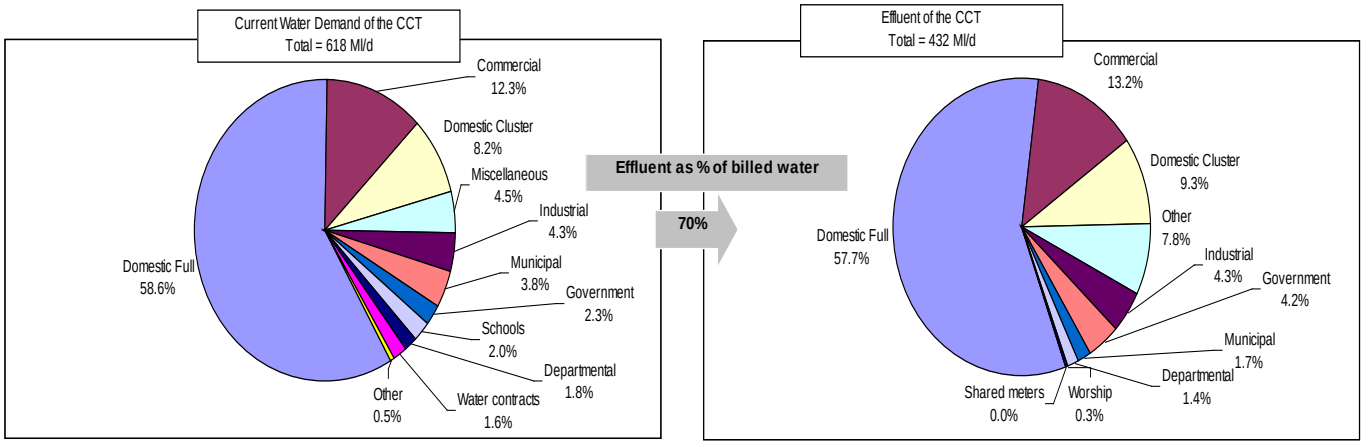
10. Table C.2.6a: Non-revenue water demand, 2008/09 Financial Year

Bulk Water Treated	Potable water supplied by Bulk	Potable water supplied to Reticulation	Reticulation end consumers sold
325 691 626	303 266 409	273 009 826	219 533 825
			Reticulation non-revenue demand 53 476 001
		Potable water supplied to external customers	
		30 256 583	
	Bulk non-revenue demand 22 425 217		

Future trends and goals

The City has in principle adopted international best practice with respect to reporting on water balance and will stop reporting on UAW once more accurate data is available.

3. Figure C.2.6: Current water Demand



Strategic gap analysis

The SABS 0306:1999 standard discourages the use of percentage losses to quantify water losses in the distribution network.

Implementation strategies

A very high priority is being given to a comprehensive Unaccounted for Water reduction strategy with detail action plans being developed for each of Technical losses (Pipe bursts, Leakage, Treatment losses, System losses), Apparent losses (illegal connections, metering inefficiencies, unmetered authorised consumption, unauthorised consumption, Billing/accounting, meter reading).

Phased Installation of more zone- and bulk supply meters are being implemented as well as automated remote logging thereof to accurately measure input into water supply zones.

An added benefit of the Integrated Master Plan project is the creation of an accurate and up-to-date historic record of consumption by erf that can be used to derive water and sanitation demands. The first comprehensive and reliable dataset became available in January 2010. This data will be used together with zone meters and bulk meters to achieve a water balance based on smaller pressure zones. This will enable losses to be pinpointed and reduced or eliminated.

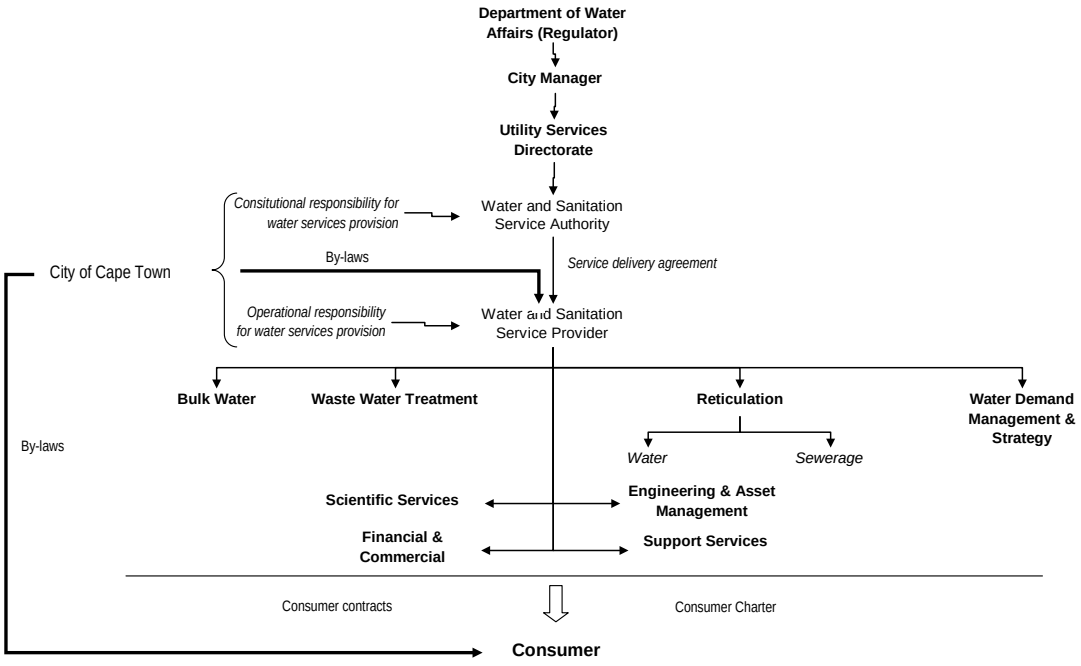
The DIMS project due to go-live in mid 2010 and mentioned earlier, has as a focus area the reporting of the latest Demand and Loss information to the IWA standard.

C2.7 Water services institutional arrangements

Situation assessment

The new City of Cape Town and the Water and Sanitation Services entity was formed with the amalgamation of the Cape Metropolitan Council and the 6 metropolitan local councils in December 2000.

11. Table C.2.7: Water Service Institutional Arrangements



Source: Water Demand Management Strategy

On 28 November 2001, Council authorized Water and Sanitation Services to operate as fully-fledged and functional internal business unit in order to ensure maximum independence and minimum constraints. In practice this has not been implemented further.

Risk Management: Work has started on an Integrated Risk Management Programme with the appointment of a Risk Manager and the development of a strategy.

Safety: All procedures were reviewed and risks still need to be identified.

Future trends and goals

The appointment and retention of technical staff (engineers, scientists and IT personnel) remains a high priority.

Strategic gap analysis

The City of Cape Town is currently undertaking the constitutional responsibility for water service provision (as the Water Services Authority (WSA)) as well as the operational responsibility (as the Water Service Provider (WSP)). The City has not separated the service authority and service provision function to establish a municipal entity, preferring to operate the service as an internal ring-fenced department. At the moment, there is no service delivery agreement between WSA and WSP in place.

Implementation strategies

Institutional reform: The City's strategic intent, aligned with the national agenda and as stated in the IDP, is:

- universal access to basic services;
- achieving operational, financial and other efficiencies which will enhance equitable, affordable and effective service delivery and sustainable development;
- the separation of WSA/WSP Powers and functions.

Human resources: It is the City's strategic intent to develop and retain a skilled and motivated staff according to the Staffing Strategy and the Workplace Skills Plan.

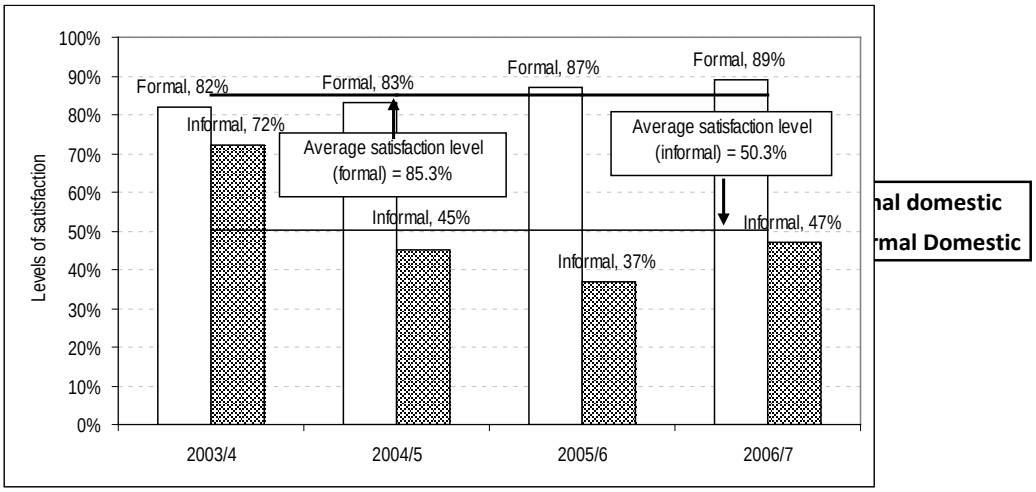
C2.8 Customer service profile

Situation assessment

Although under stress in certain regions, necessary infrastructure is in place to ensure an adequate quality of service to formal households. All customers receive water that is fully treated. There are mechanisms in place to attend to customer complaints and queries.

A survey is undertaken on an annual basis to gauge the customer satisfaction in formal domestic, informal domestic and business sectors and to identify specific issues of concern.

4. Figure C2.8: Customer satisfaction levels over time



The general conclusions are:

- The increasing satisfaction level for respondents living in formal residential areas has been reversed.
- Respondents living in informal residential areas are generally dissatisfied.
- 82% of business respondents are satisfied.

A possible cause for the drop is the introduction of the highest-ever tariff increase during the 2007/08 financial year, which precedes the latest survey.

Future Trends and goals

The goal is to ensure that the percentage of customers satisfied with the service continues to increase and reaches 95% within the next 5 years.

Strategic gap analysis

There is no consolidated information on response times to complaints and queries and to repairing water and sewer mains. An integrated information system dealing with these matters is under development by the Technical Operating Centre.

Implementation strategies

- Ensuring water pressure standards are maintained to improve areas of extreme high or low pressures.
- The Education and Awareness Campaign will be extended to affect behaviour change in residential customers towards reducing water consumption, and that all customers have a better knowledge of water efficient fittings.
- Establishment of a system at the Technical Operating Centre to ensure that customer complaints are measured and followed up.
- The AMR project promises to bring improved customer satisfaction around metering and billing.
- Appointment of staff for critical vacancies.

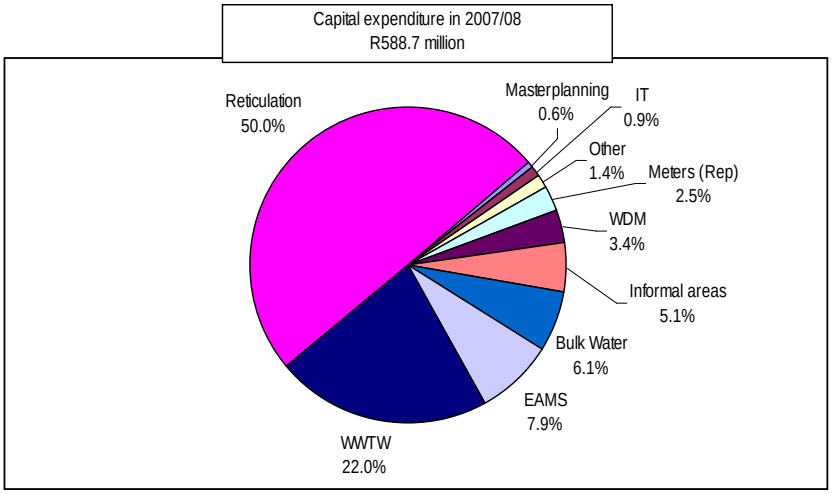
C2.9 Financial profile

Situation assessment

Capital expenditure and sources

Capital expenditure incurred during the year amounted to R696.9 million.

5. Figure C2.9a: Water and Sanitation capital expenditure



Capital expenditure is financed from

- CRR (Capital Replacement Reserve) a fund replenished from surplus in previous financial year,
- EFF (External Financing Funds) loans obtained by the City, attracting interest and depreciation charges and having a direct impact on the tariffs or
- CGD (Capital Grants & Donations).

Operating Costs and income

In 2007/08 operating costs amounted to R3.13 billion, equivalent to R4614 per household per annum.

12. Table C.2.9: Historic Operating costs - Water and Sanitation

	(R'000)	2005/06	2006/07	2007/08
1	Puchase of bulk water	171,191	229,695	227,535
2+3	Production costs (raw water + treatment system)	-	-	-
4	Operating costs	-	-	-
	Salaries and wages	263,488	273,702	359,686
	Maintenance and repairs	157,719	206,793	229,423
	Depreciation	126,703	142,208	161,439
5	Finance charges	117,239	117,444	117,231
6	Other	868,954	551,030	741,849
7	Total costs	1,705,294	1,520,872	1,837,163
	Add: Inter-Departmental Charges	905,127	1,020,672	951,903
	TOTAL COSTS	2,610,421	2,541,544	2,789,066
8	Operating costs per consumer unit (Rands)	2,821	2,516	3,039
	Opex per consumer unit including Inter-dept charges (Rands)	4,318	4,204	4,614

Source: Water and Sanitation Services 2006/07 & 2007/08 Annual Financial Statements

Tariffs and Charges

Figure C2.9b shows water and sanitation tariffs for recent years. The last increase in water user tariffs was 9.2% in 2008/09, while for sanitation it was 6.0%.

6. Figure C2.9b: Water and Sanitation tariffs trends

WATER TARIFFS (Rands)		2005/06	2006/07	2007/08	2008/09
0-6 kℓ		-	-	-	-
+6-12 kℓ		2.39	2.56	3.05	3.33
+12-20 kℓ		5.10	5.46	6.50	7.10
+20-40 kℓ		7.55	8.08	9.63	10.52
+40-50 kℓ		9.33	9.98	11.90	12.99
+50 kℓ		12.31	13.17	15.70	17.14
Domestic cluster	per kℓ	n/a	5.47	6.52	7.12
Commercial	per kℓ	5.45	5.83	6.52	7.59
Industrial	per kℓ	5.45	5.83	6.52	7.59
Schools/sport	per kℓ	4.81	5.15	6.14	6.70
Government	per kℓ	5.17	5.53	6.59	7.20
Municipality	per kℓ	4.81	5.15	6.14	6.70
Miscellaneous	per kℓ	5.17	5.53	6.59	7.20
Misc (external)	per kℓ	6.18	6.61	7.88	8.60
Bulk Tariff	per kℓ	1.98	2.21	2.37	2.59
SANITATION TARIFFS (Rands)		2005/06	2006/07	2007/08	2008/09
0-4.2 kℓ		-	-	-	-
+4.2-8.4 kℓ		1.60	1.68	3.78	4.01
+8.4-14 kℓ		3.90	4.10	8.04	8.52
+28-35 kℓ		n/a	n/a	9.23	9.78
Domestic Cluster (>4.2 kℓ)	per kℓ	3.85	4.04	9.10	9.65
Departmental/Municipal	per kℓ	2.09	2.31	5.20	5.51
Industrial & Commercial	per kℓ	2.39	2.51	5.65	5.99

Free Basic water and sanitation

The first 6 kilolitres of water supplied to all residential dwellings in the municipal area is free. There is no fixed charge. A R30 Indigent Grant (R20 prior to 2007/08 and applicable to sewerage) is applicable to the water tariff for qualifying households.

The first 4.2 kilolitres of sewerage removed from all residential dwellings in the municipal area is free.

Sales and income

Water and Sanitation income is combined under C.2.9b

13. Table C.2.9b: Income and Sales of Water and Sanitation Services

	Rands	2007/08
1	Total income (billed income and subsidies)	2,020,425,734
2	Actual income received	3,533,068,967
3	% non-payment	n/a
4	Non-payment residential consumers	n/a
5	Non-payment commercial consumers	n/a
6	Non-payment industrial consumers	n/a
7	Non-payment by other consumers	n/a
8	Total non-payment (4+5+6+7)	n/a
9	Operating expenditure	3,129,905,235
10	Capital expenditure	588,700,000
11	Total expenditure (9+10)	3,718,605,235
12	Equitable share allocated to water supply	
13	Surplus/(deficit) (2 minus 11)	-185,536,268

Trends

The annual Capital budget is expected to rise steadily to R1 billion by 2010/11

Operating budget will increase in line with the City's Medium-Term Revenue and Expenditure Framework (MTREF)

There is pressure on annual tariffs increases to equal or exceed inflation (see TABLE C.2.9c, below)

Increasing demands to supply new infrastructure and the resources to maintain and operate them are necessary

Strategic gaps

Capital budget:

The high requirement for necessary infrastructure driven largely by rapid growth and economic development but required before such development can contribute to its provision, puts pressure on the City's Capital Budget.

Operating budget:

It is difficult to cater for backlogs in infrastructure maintenance, to achieve optimum levels of staff and acceptable (lower) levels of bad debt within real financial constraints.

Implementation strategies

To achieve the required Capital Budget, it is necessary to maximise the use of Grant funding and to increase the Capital Replacement Reserve (CRR) via income and expenditure interventions.

The operating budget is being funded by ensuring revenue is increased for monies due to the City but not previously recovered and also ensuring payment of current accounts.

General strategies:

Financial planning to keep tariff increases at or below the inflation rate.

Making adequate provision for the poor by maintaining a stepped tariff cross-subsidising the shortfall in the free basic service.

Ensuring that adequate cash reserves are maintained to cover legislated funds.

D. Background to the area

D.1 Location

The City of Cape Town (CCT) is located in the Western Cape Province on the south-eastern corner of South Africa as indicated on Figure D.1. The total area is approximately 2 474 km^2 and its coastline is 371 km long.

7. Figure D.1.: Locality Plan

D.2 Water Services Authority Perspective

Brief history

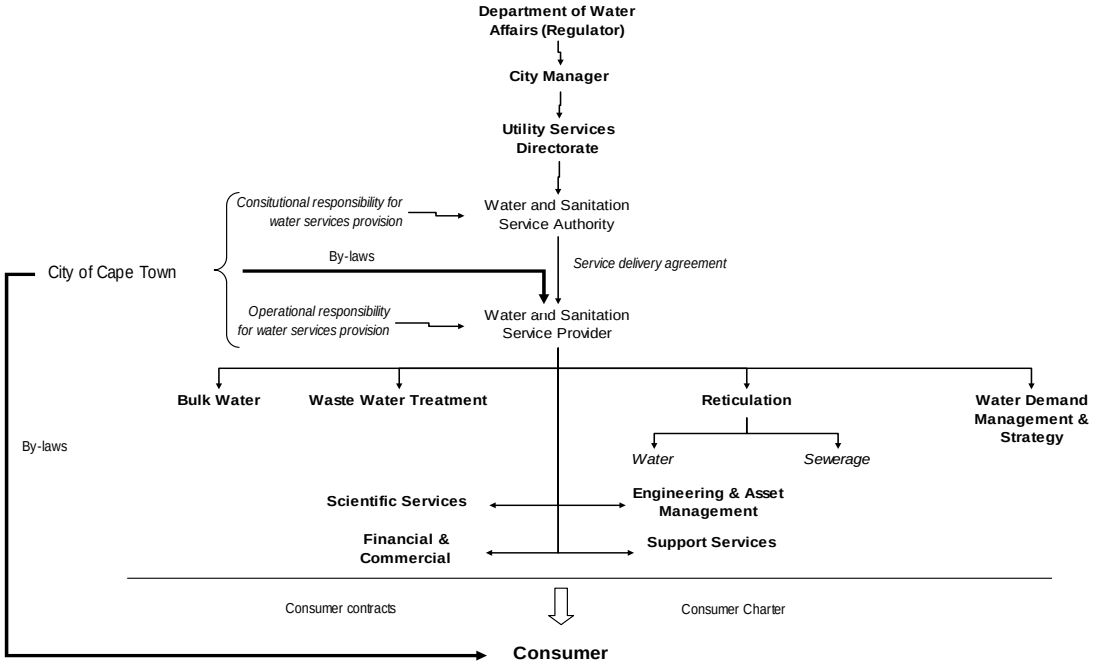
Before 1994, the CCT was an area that consisted of a large number of smaller municipalities, or councils. At the time, the dominant municipality, the Cape Town City Council (CCC) owned and operated the bulk water supply system. For billing purposes in the CCC area, the bulk and secondary systems were integrated. Outside of the CCC area, however, the bulk supply system and the secondary distribution systems of the various municipalities were separated – metered bulk off-takes were used by the CCC for billing purposes.

After 1994, the smaller municipalities in the Cape Metropolitan Area (CMA) were amalgamated into 6 Metropolitan Local Councils (MLC's), with the Cape Metropolitan Council (CMC). In December 2000, the City of Cape Town (CCT) was formed; it consisted of the six MLC's and the former CMC.

Situation assessment

Currently, the CCT carries both the constitutional responsibility for water services provision, as the Water Services Authority, and the operational responsibility, as the Water Services Provider, through the Water and Sanitation Services Department. There is no service delivery agreement in place, yet.

8. Figure D.2: The structure of the Water and Sanitation Department of the City of Cape Town



Source: Water Services and Sanitation

The Bulk Water Branch of the CCT operates the bulk water supply system. It supplies bulk water to the eight reticulation districts of the Reticulation Branch – the reticulation districts distribute the water to the end users. Reticulation plans to consolidate and reduce the districts from eight to four to improve operational efficiency – *(Plans for the 8 district and 4 region model GOTO D.1 and GOTO D.2.)*.

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

From a value-chain perspective, raw water is treated at water treatment plants; these water treatment plants are operated by the Bulk Water Branch. The bulk water is then distributed via a network of large diameter pipelines and reservoirs to the districts. The districts, thereafter, distribute the water through the secondary network to the end-users.

The Bulk Water Branch operates the bulk networks up to the metered connection points of the eight districts. The secondary distribution networks are operated by the respective districts.

Wastewater collection and treatment is also carried out by the Water and Sanitation Department. The wastewater collection function falls under the Reticulation Branch, whereas treatment is undertaken by the Wastewater Treatment Branch.

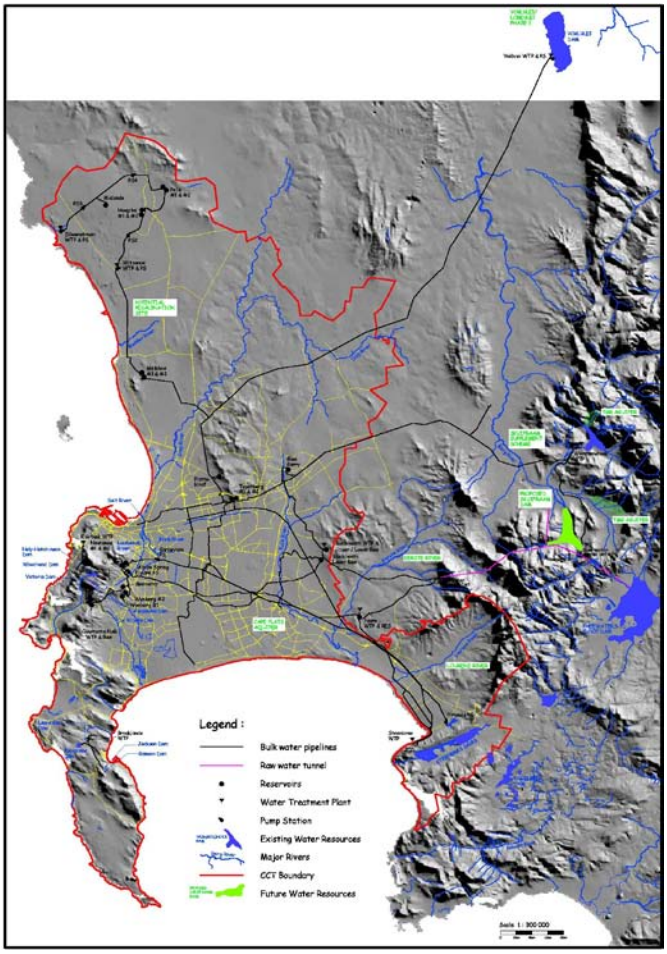
D.3 Physical perspective

Information on the physical attributes of the area, the history, main features and attractions are presented on the CCT's website (http://www.capetown.gov.za).

D.3.1 Topography

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 D.3.1.

7. Figure D.3.1: Topography



Source: City of Cape Town GIS

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 Dieppe-, the Black-, the East-, Quills-, Moderate- and Lorenz 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 that flows in a northerly and later westerly direction is by far the largest.

D.3.2 Climate

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 the 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.

D.3.3 Natural Environment

Cape Town is one of the most beautiful and diverse cities in the world. The city is located in a highly sensitive and vulnerable ecosystem is recognised as a global biodiversity hotspot and is fortunate to have a National park within its boundary. The environment is one of the strongest assets driving tourism and attracting skilled staff for the city's economy. Finding the balance for sustainable development and improving quality of life remains the challenge. Growing consumption, pollution (air, water, waste) and the protection of the city's biodiversity are key issues that must be addressed.

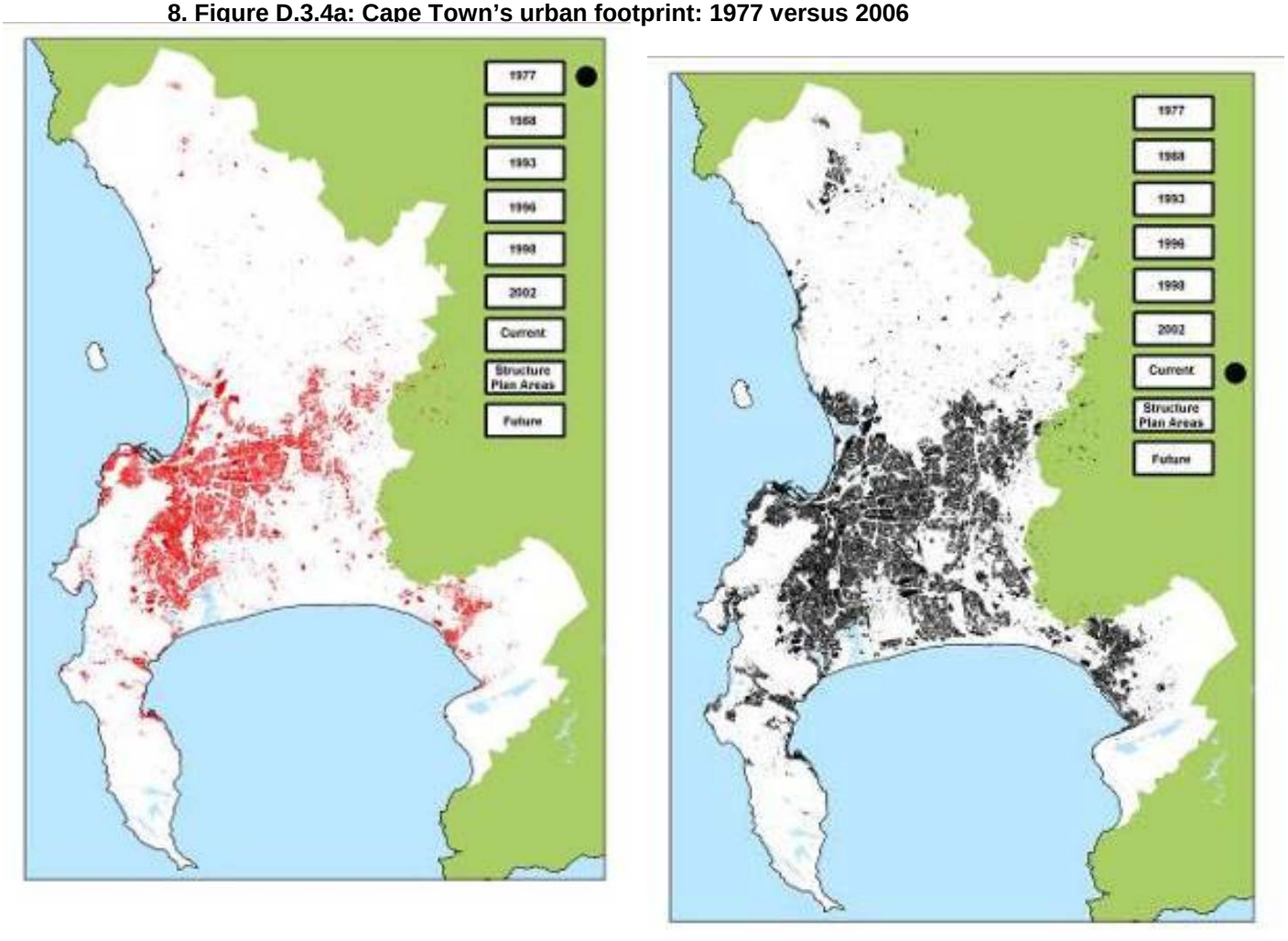
Cape Town is located within the Cape Floral Region, which is geographically the smallest of the world's six floral kingdoms, but supports the highest density of plant species. Over 9 000 different plant species occur in the Cape Floral Region, 70% of which are endemic (i.e. are confined to this region).

Cape Town supports 2 500 plant species, thus within the Cape Floral Region it is considered an area of particularly high floral diversity (or a local "hotspot" within a global "hotspot"). This floral diversity relates to the steep environmental gradients, including altitudinal, geological and rainfall gradients; that have combined to create a large number of different habitats. Six national vegetation types are found only within the City Of Cape Town's borders, and of these, five are classified as "Endangered" or "Critically Endangered". These vegetation types support species that are unique to Cape Town and many of these are under threat from extinction, owing mainly to habitat destruction and invasion by alien plants.

D.3.4 Main infrastructure development

Cape Town grew by 40% in developed land area in the period 1985-2005. Compared to the period 1977 to 1988, when the city developed by an average of 701 hectares per year; the city is now developing at an average rate of 1232 hectares per year (almost double previous averages) reflecting the tremendous development boom the city is currently experiencing (figure D3.4a).

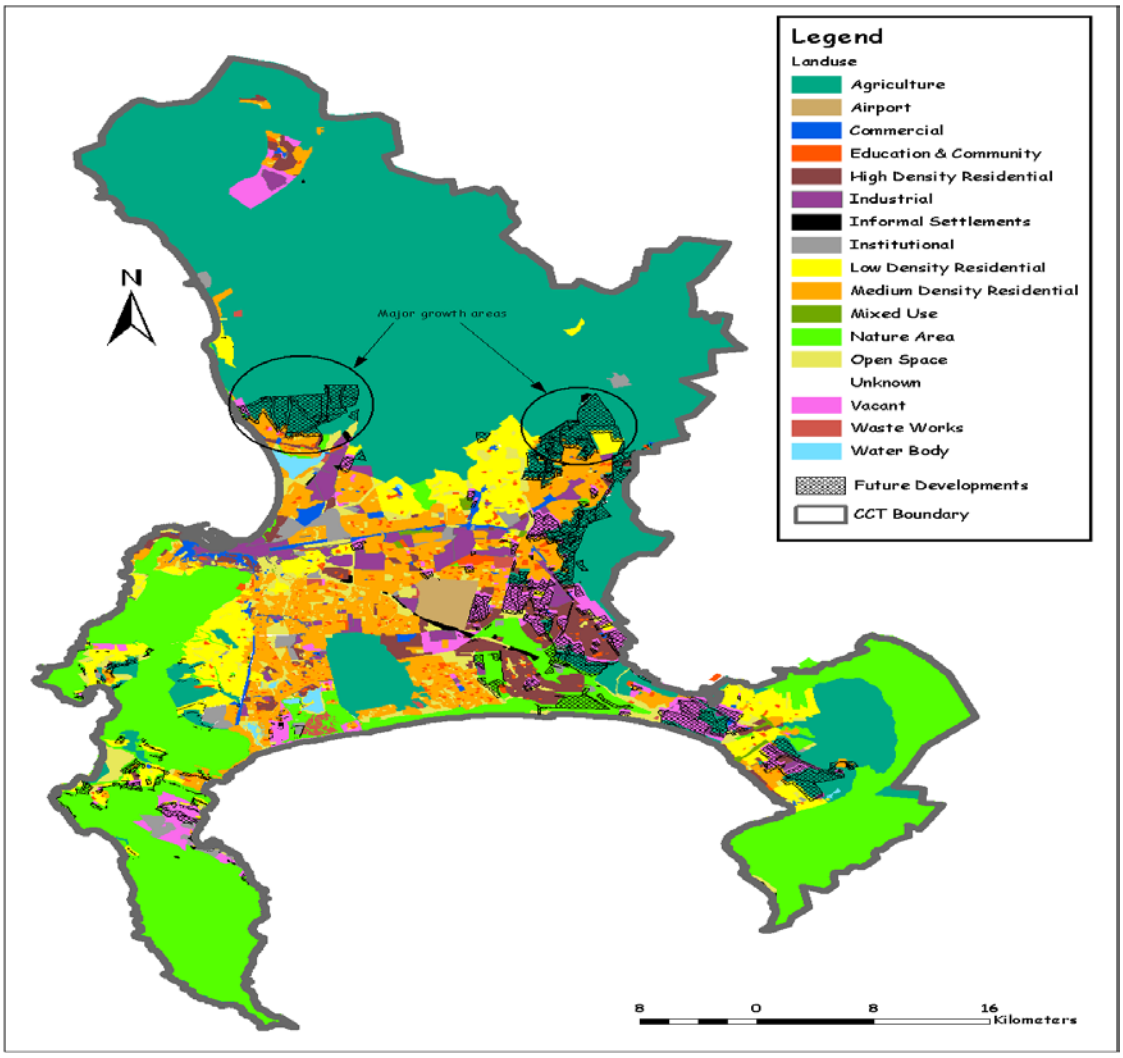
8. Figure D.3.4a: Cape Town's urban footprint: 1977 versus 2006



Sprawl contributes to increasing commuting times as well as the loss of valuable agricultural land and areas with high biodiversity conservation potential (City of Cape Town, 2006). Much of the recent growth has contributed to sprawl with relatively low density suburban residential development driving this process, although higher density, higher income residential development in the CBD has accelerated in the past few years. Concentration of populations in urban areas greatly reduces the unit cost of piped water, sewers, drains and roads. The use of environmentally friendly energy sources and transport can reduce these costs even further.

The existing land use and potential future development areas are shown in Figure D.3.4b below.

9. Figure 3.4.b: Existing Land Use and Potential Future Development Areas



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.

- The Berg River Dam is located in the upper reaches of the Berg River near Franschhoek.

- 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.

D.4 Demographic perspective

For the State of Cape Town report dated 30 October 2006 GOTO D.3 and for socio-economic profile GOTO D.4

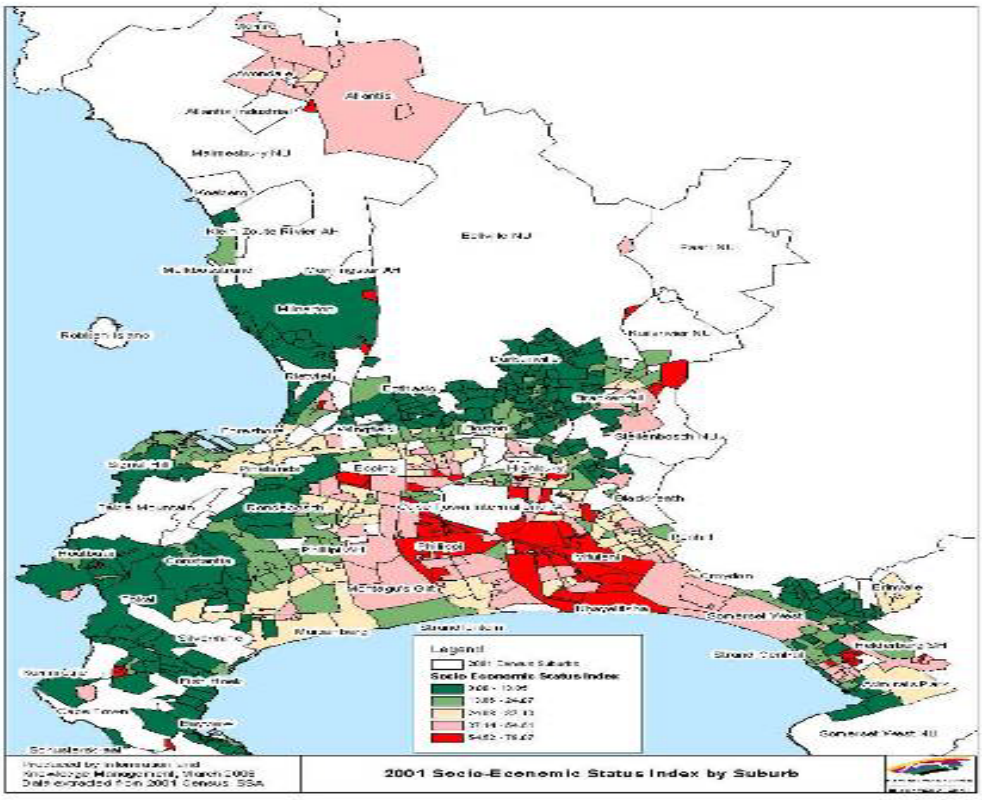
D.4.1 Economics

Between 1997 and 2007 Cape Town's economy grew at annual average rate of 4.36%. The GGP in 2007 stood at R198.5 billion (City of Cape Town statistics). National Treasury forecasts a growth rate of 1.7% for 2009.

The economy of Cape Town has been growing steadily, but change in unemployment has been marginal. The forecast contraction in economic activity is not expected to improve the level of unemployment. The unemployment rate in the third quarter of 2008 was 20.85% an improvement to the level of 24.5% recorded in February 2007.

At present the population of the CCT is estimated at 3.5 million (Strategic Development). The City's population growth rate is expected to decline because of HIV/AIDS. It is estimated that the current growth rate of 2.6% will reduce to 1.2% by 2010.

10. Figure D.4.1: Socio-economic status of the City of Cape Town

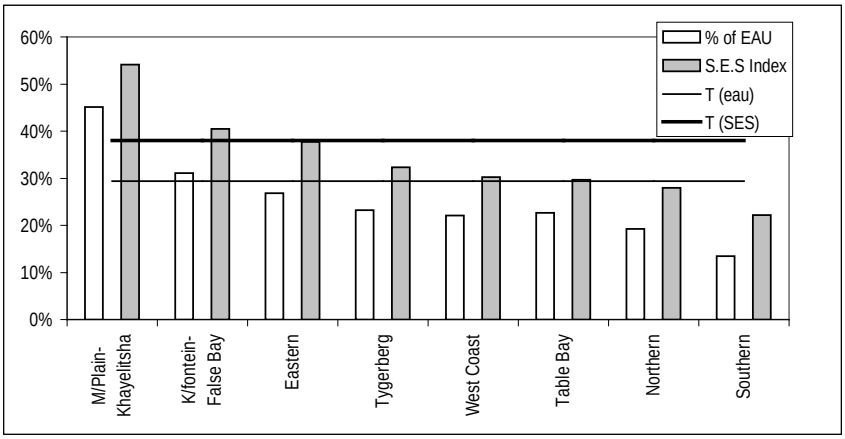


Suburbs in the city are characterized by major differences in housing quality, income, educational levels, access to services and work status. Figure D.4.1, based on the above key socio-economic variables, illustrates the spatial variations in levels of living.

D.4.2 Social

Approximately 30% of households (almost 1 million people) in Cape Town live in inadequate housing and depressed physical environments. A relatively large proportion of households experience absolute poverty. There are a large number of people with low educational levels earning low salaries in unskilled occupations (City of Cape Town 2006).

11. Figure 4.2a: The socio-economic profile of Cape Town



Notes:
% of EAU - % of economically active unemployed
S.E.S - Socio-Economic Status Index
T (eau) - Total of unmployed = 29.38%
T (SES) - Total S.E.S

	% of economically active unemployed		Socio-Economic Status Index (S.E.S)
M/Plain-Khayelitsha	45.16%	M/Plain-Khayelitsha	54.12%
K/fontein-False Bay	31.05%	K/fontein-False Bay	40.43%
Eastern	26.85%	Eastern	37.71%
Tygerberg	23.19%	Tygerberg	32.28%
West Coast	22.11%	West Coast	30.22%
Table Bay	22.67%	Table Bay	29.67%
Northern	19.26%	Northern	27.94%
Southern	13.43%	Southern	22.16%
TOTAL	29.38%	TOTAL	37.97%

Source: Strategic Information Department; GIS

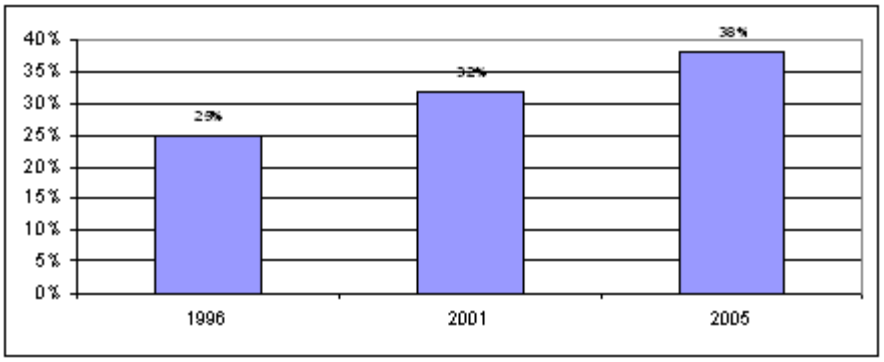
There are many areas that are characterised by severe social and economic conditions, high levels of poverty, unemployment, illiteracy, alcoholism, low health status and other deviant behaviour such as crime and delinquency. The health status of residents in informal settlements is low; this is partly due to poor living conditions.

There exists a need for Water and Sanitation to intervene by providing suitable access to suitable sanitation facilities.

Poverty

One measure of poverty is the household subsistence level, below which households are unable to meet their basic needs for clothing, food, cleansing and transport. In Cape Town, the rise in poverty is clearly evident from Figure D.4.2b below, with 38% of households (involving approximately 1.2 million people) currently living in poverty. Intra-city inequalities are even more stark with the 20% worst off areas in the city having an unemployment rate of between 40%-58%, comprising 40% of the city's population and 68% of the city's unemployed (City of Cape Town, 2005). In a study conducted in three informal settlements in the city, unemployment levels of 39.5% were recorded. The shocking reality of these statistics are borne out by the fact that 14.3% of households responded that they often went hungry and a further 39.4% of households sometimes went hungry (De La Harpe, 2005).

12. Figure D.4.2b: Households earning below Household Subsistence Level



Source: Statistics South Africa, 1996, 2001, and 2005

HIV/AIDS

For 2007, the National HIV Survey estimated HIV prevalence for the Western Cape at 12.6%, though it is believed to be 15.3% (Source: Department of Health: 2009). The City's average HIV prevalence among pregnant women grew at a geometric (CAGR – compound annual growth rate) rate of 0.3% between 2004 and 2007. In 2004 Cape Town's HIV prevalence stood at 17.8% this marginal increased to 18% by 2007 (Source: Depart of Health (2006 HIV Antenatal Provincial and Area Surveys); 2007 Antenatal HIV Prevalence Results).

The high prevalence on HIV/AIDS in informal areas of the city is explained by a range of factors. This includes poverty and unemployment which increases vulnerability to HIV, urbanisation resulting in social disintegration which increases risk-taking behaviour, inadequate services, sexual violence and rape, disempowerment of women, illiteracy and low levels of education (Bromfield, 2006).

Given the projection that 50% of the Cape Town's population will remain younger than 31 years in the future (as can be seen from the population projection in section 4: *'Cape Town's Developmental Context'*), there is a critical need for youth development strategies to be implemented to address future poverty, HIV/AIDS and unemployment and which relate to the social, economic and physical needs of the city's young.

D.5 Regional perspective

The City of Cape Town is the major economic hub of the Western Cape contributing 82% of the province's GDP. It is bordered by the West Coast DM to the north, the Cape Winelands District Council to the North East and Overberg DM to the South East.

Cities do not function in isolation, but form part of particular regions with a range of different stakeholders that influence their management. The key challenges for developing successful city-regions include securing balanced economic growth, appropriate governance systems to ensure effective cooperative decision-making, an entrepreneurial approach to facilitating investment, and the avoidance of competition between the cities and towns in the city-region system. This acknowledges that major development projects have to be coordinated effectively for the benefit of the city-region as a whole. An important aspect of this is 'spatial coalitions', which are meaningful partnerships with business, civil society and spheres of government, as valuable assets in fostering a competitive regionalism (South African Cities Network, 2006).

Two key strategies impact on the broader Cape Town context; namely, the National Accelerated and Shared Growth Initiative for South Africa (ASGISA), and the Western Cape Growth and Development Strategy (PGDS). ASGISA is a national framework to support a range of key policy thrusts, including macro-economic policy refinement, strategic infrastructure provision, sector investment strategy, labour market skills, small business and governance. Provincially, the PGDS is a strategy for the Province to achieve shared growth and integrated development. It is the core alignment mechanism for the province and a coordination and implementation strategy driven by the Provincial Government Western Cape. The objectives of the PGDS are:

- Identify appropriate levers to shift developmental path
- Identify location of regional development motors of shared growth
- Commit the Provincial Government to strengthen its contribution to shared growth and development
- Design institutional architecture and reforms necessary for achieving shared growth and development
- Focus, align and harmonise the Provincial Government planning, budgeting and implementation

- Provide a framework for improved collaboration and coordination of all stakeholders in the Province around a shared growth and the development agenda.

Strategies at a metropolitan level should take cognisance of and be aligned to these higher level strategies such as ASGISA and the PGDS, whilst focusing on the particular local challenges (City of Cape Town, 2006).

E. IDP and WSDP Goals and Integration

E.1 IDP Priority Issues Related to Water Services

Strategic Focus Area	Strategy / Objective	Water Services Business Elements									
		1. Socio - Economic Profile	2. Service Level Profile	3. Water Resource Profile	4. Water Conservation / Demand Management	5. Water Services Infrastructure Profile	6. Water balance	7. Water Services institutional arrangements Profile	8. Customer Service Profile	9. Financial profile	10. List of Projects
		Page Numbers									
1. SHARED ECONOMIC GROWTH AND DEVELOPMENT	No direct Water Service's objectives. However increased economic growth will require additional water and sanitation infrastructure and additional water resources. The Water Conservation and demand management strategy will become more important as a result.	X	X	X	X	X	X		X	X	
2. SUSTAINABLE URBAN INFRASTRUCTURE	**1. Reduce service backlogs for infrastructure-related services in accordance with national objectives**					X					X
	1.1 Access to basic sanitation services to all by 2012 (IDP targeted to be relaxed)					X					X
	1.2 Potable water services to all by 2008 (largely met)					X					X
	1.3 Bucket system sanitation services eradicated in all formal settlements by 2007 (informal settlements cannot be met within current financial constraints)					X					X

Strategic Focus Area	Strategy / Objective	Water Services Business Elements									
		1. Socio - Economic Profile	2. Service Level Profile	3. Water Resource Profile	4. Water Conservation / Demand Management	5. Water Services Infrastructure Profile	6. Water balance	7. Water Services institutional arrangements Profile	8. Customer Service Profile	9. Financial profile	10. List of Projects
		Page Numbers									
	2 **Develop demand management programmes for water, electricity, waste and transport and reduce attendant pollutants**										
	2.1 Introduce incentives to reduce demand										
	2.2 Facilitate the introduction of sustainable technologies										
	2.3 Focus more strongly on water and electricity demand management and waste minimisation in order to reduce pollution levels and reduce capital investment requirements										
	2.4 Improve environmental awareness										
	3 **Effective management of City's Infrastructure and Resources**			X	X	X					X
	1.1 Rehabilitation / replacement of failing water bulk infrastructure (minimum measured leakage)				X	X					X
	1.2 Installation and commissioning of new water systems			X		X					X
	2.3 Rehabilitation of failing wastewater treatment bulk infrastructure				X	X					X

Strategic Focus Area	Strategy / Objective	Water Services Business Elements									
		1. Socio - Economic Profile	2. Service Level Profile	3. Water Resource Profile	4. Water Conservation / Demand Management	5. Water Services Infrastructure Profile	6. Water balance	7. Water Services institutional arrangements Profile	8. Customer Service Profile	9. Financial profile	10. List of Projects
		Page Numbers									
	2.4 Rehabilitation / replacement of failing bulk infrastructure (or establishment and commissioning of new)				X	X					X
2 PUBLIC TRANSPORT SYSTEMS	No direct Water Services objectives										
3 INTEGRATED HUMAN SETTLEMENTS	1 Integrated Human Settlement Planning			X	X	X		X			
	2 Land release and incremental housing			X	X	X					
	3 Redressing the Housing Backlog			X	X	X					
	3 Informal settlement upgrade			X	X	X					
4. SAFETY AND SECURITY	No direct link to Water Services objectives										
5. ECONOMIC DEVELOPMENT	**1.** Local Economic Development	X									
6 SOCIAL AND HUMAN CAPITAL	1. Eradication of extreme poverty	X									
	2. Access to community facilities					X					
7. GOOD GOVERNANCE AND REGULATORY REFORM	**1.** Optimising the development of our Organisation staff structure, strategies, policies and promote skills development**.**							X	X		
	2. Enhance service delivery through exploring alternative service delivery mechanisms					X		X	X		

Strategic Focus Area	Strategy / Objective	Water Services Business Elements									
		1. Socio - Economic Profile	2. Service Level Profile	3. Water Resource Profile	4. Water Conservation / Demand Management	5. Water Services Infrastructure Profile	6. Water balance	7. Water Services institutional arrangements Profile	8. Customer Service Profile	9. Financial profile	10. List of Projects
		Page Numbers									
	3. Strategically utilise information technology, validated data bases and systems to support the transformation of public services to provide better and more efficient government and reporting structures							X	X		
	4. Improve the service culture and workplace ethics by accomplishing sound financial governance, improved accountability and transparency							X		X	
	5. Management of key financial areas such as income control, cash flow, indigent support, alternative income opportunities, asset management and risk management									X	
	6. Improve the regulatory environment (Bureaucratic red tape							X			
	7. Establishment of representative Ward Participatory Mechanisms							X	X		
	8. Improvement of Community satisfaction							X	X		

E.2 Sustainable Water Services Sub-goals

The vision of Water and Sanitation Services in Cape Town is:

TO BE A BEACON IN AFRICA FOR THE PROVISION OF WATER AND SANITATION SERVICES.

Mission Statement

WE PLEDGE TO ACHIEVE OUR VISION BY CREATING A CENTRE OF EXCELLENCE IN WATER AND SANITATION DEPARTMENT THROUGH:

- ✓ Optimizing resources
- ✓ Implementing environmentally-sustainable interventions
- ✓ Continuous improvement and knowledge management
- ✓ Good governance
- ✓ Customer satisfaction and good stakeholder relationships

The goals relating to sustainable water services are:

- To provide basic or emergency sanitation services to all residents of Cape town City by 2015/16;
- To provide basic water to all residents in the city by 2015/16;
- To achieve 90% customer satisfaction levels in all our services by 2015/16;
- To improve revenue collection to 96% by 2015/16;

E.3 Integrated Water Resource Management Sub-goals

- To achieve Green Drop status for 60% of the waste water treatment plants by(2015/16);
- To achieve 95% waste water effluent quality;
- To minimise river systems pollution by reducing sewage overflows by 20% by 2015/16;
- To increase the effluent re-use by 15% in 2015/16;
- To improve security of supply for water systems to 120% of average demand by 2016/17 in all areas;
- To reduce unaccounted for water to 15% in the next five years;

E.4 Efficient and effective Water Services Institutional Arrangements Sub-goals

- To implement ISO 9001 for all our services in the next five years(2015/16);
- To ensure the presence and dominance in Africa of the water, wastewater and air pollution testing services;
- To increase productivity levels by 15% by 2015/16;
- To establish an efficient and effective asset management program for the Department 2011/12;
- To be the reference City for water matters in the country;
- To grow the training school and achieve SETA accreditation for the training modules (e.g. process controllers, artisans) by 2012/13;
- To construct an office block for the department by 2015/16;
- To be information efficient by 2012/13;
- To roll out automation and remote control pilots on treatments and pump stations.

F Water Services Business Elements

F.1 Socio-economic profile

F.1.1 Demographics

F.1.1.1 Situation Assessment (demographics)

F.1.1.1.1 Current consumer profile

The Strategic Development Information Department placed the population figure for Cape Town at 3.5 million for 2008. There are 902,279 households; 785,396 formal and 116,883 informal. According to the SAP system, there were 604,490 water connections at 30 June 2008 – refer to TABLE F.1.1.1.1.

14. Table F.1.1.1.1: Demographics and Customer Profile

	2007/8
Population	3,572,221
Households	902,279
Household categories	
Formal	785,396
Informal	116,883
Total	902,279
Backyard dweller	150,000
CCT Consumer units	2007/8
Commercial	12,537
Government	278
Industrial	4,205
Miscellaneous	5,547
School-Sportfields	1,447
Domestic Cluster	6,968
Domestic single residential	563,297
Departmental Cluster	2,970
Municipal Water	6,999
	604,248
External consumer units	
Bulk	242
	604,490

Source: Strategic Development Information; Water and Sanitation Billing

The current demographic mix was affected by migration – people moving in search of better economic opportunities. According to Haskins and Smith (2006), the City had a net migration of 192,623 between 1996 and 2001 (Informal Dwelling Count for Cape Town (1993 – 2005)).

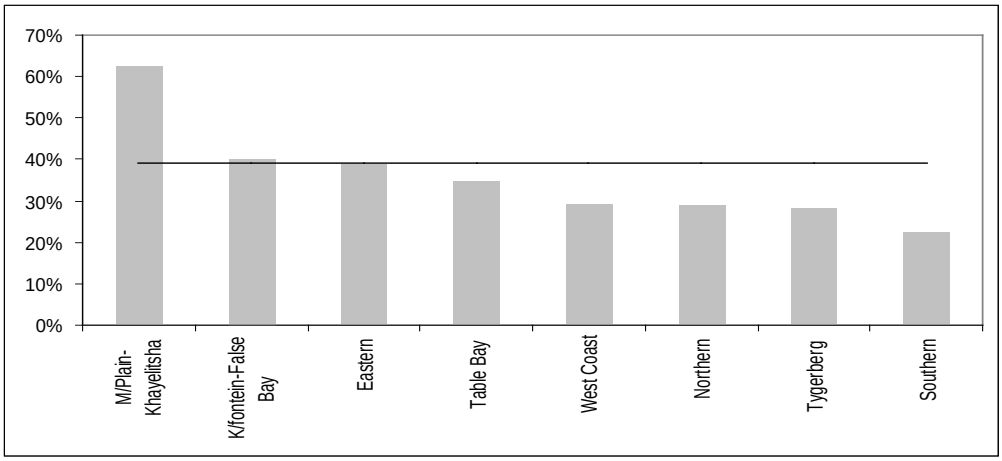
The number of households in informal settlements grew from 23,000 to 115,000, in 1993 and 2005, respectively – this translates to an average annual rate of 14.4% (Source: 2007/08 IDP *{IDP Draft 15.03.07vx2.2.doc}* – GOTO 1.1c).

Water and Sanitation services have adequately provided basic water supply services for both formal and informal dwellings. There still remains a gap for the provision of basic sanitation services in informal settlements. At present about 89% of households in informal settlements have access to basic sanitation services (4th Quarter SDBIP Review – 2007/08).

F.1.1.1.2 Poor household definition

According to the report on Planning Districts Socio-Economic Analysis, the percentage of households earnings less than R19,200 per annum (or R1,600 per month) in 2007 was 39%. A household is classified as indigent if the household's earnings are less than or equal to R1,600 per month; this increased to R20,400 per annum (or R1,700 per month) from 2007/8.

13. Figure F.1.1.1.2: Percentage of Households earning less than R19,200 per annum



Source: Planning Districts Socio-Economic Analysis (2007) (City of Cape Town – 2007b); Strategic Development Information and GIS Department

The greatest proportion of households that earn below the R19,200 per annum (R1,600 per month) level is in such areas as Mitchell's Plain and Khayelitsha.

F.1.1.1.3 Present population and projected population growth rates

The current population estimate for Cape Town is 3.572 million for the year 2008 – this exceeds the projected population figure of 3.393 million for 2011 (Population projections for Cape Town (2001 – 2021). Strategic Development Information Services, however, remains confident that population growth rates will stabilize to projected levels going forward.

14. Figure F.1.1.1.3: Projected Population Growth for the City of Cape Town

	1996	2001	2007	Avg annual growth	
Population				96-01	01-07
African	644,181	916,584	1,219,981	6.1%	4.2%
Coloured	1,239,943	1,392,594	1,538,315	2.0%	1.4%
Asian	37,882	41,516	62,354	1.5%	6.0%
White	543,425	542,555	676,447	0.0%	3.2%
Unspecified	97,664	-	-	n/m	n/m
	2,563,095	2,893,249	3,497,097	2.0%	2.7%

Source: Demographic and Socio-economic Trends for Cape Town (1996-2007)

According to conservative projections Cape Town's population should be 3.997 million by 2016 (Compiled by the CMC Spatial Planning Department (revised by Water and Sanitation Services Department) – *for spreadsheet GOTO 1.1a. For updated population projections GOTO 1.1b)*. This is equal to an annual average population growth rate of 0.83% when the current population estimate, of 3.572 million, is used as the base.

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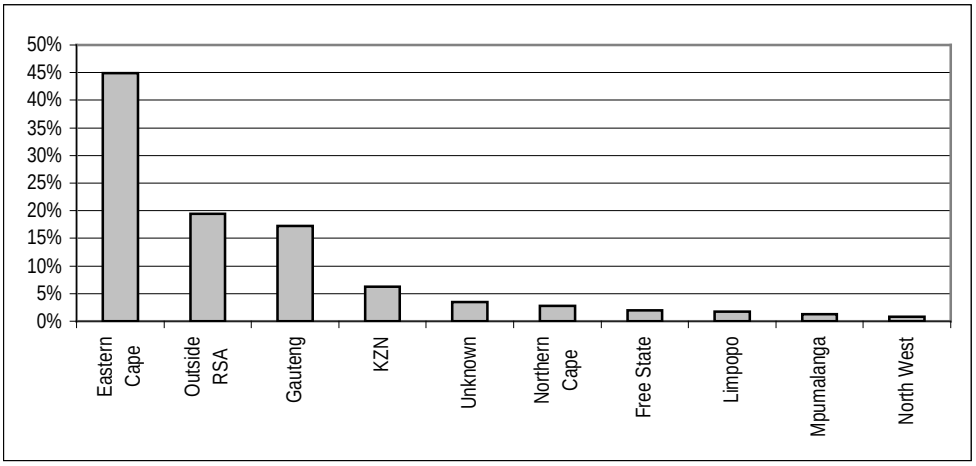
F.1.1.1.4 Demographic trends and migration patterns

According to the 2007 Community Survey Analysis of 2008, a total of 190,256 individuals migrated to Cape Town since 2001.

15. Figure F.1.1.1.4: Migration into Cape Town since October 2001



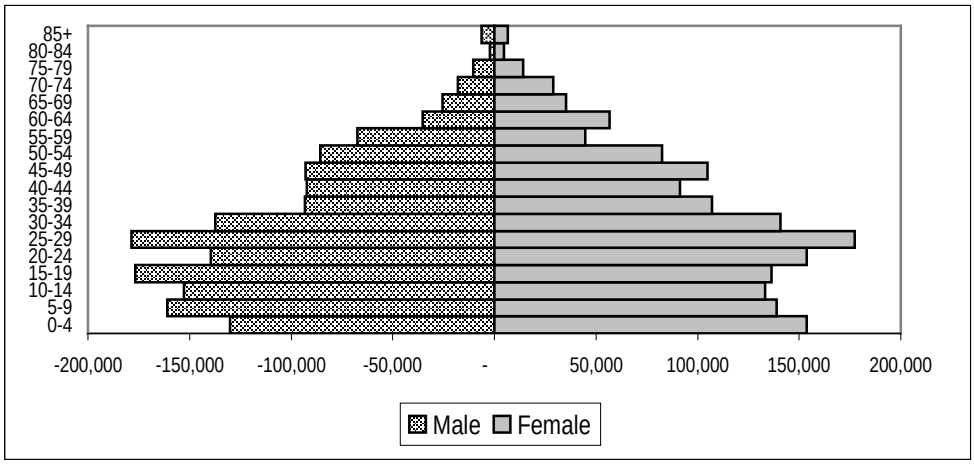
Source: 2007 Community Survey Analysis for Cape Town (Strategic Development Information and GIS Department

Migration levels have since subsided and as a result the growth rate of informal settlements has decreased significantly – current estimates place the annual growth rate at ±1.64%.

F.1.1.1.5 Age and gender profile

Figure F.1.1.1.5 shows the distribution of Cape Town's population as at 2007.

16. Figure F.1.1.1.5: Age – Sex Distribution of the Population



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

According to the 2007 Community Survey Analysis for Cape Town, the impact of migration on the pyramid structure was mainly felt in the age groups between 20 to 34 – people moving to Cape Town in search of work *(For more details on the socio-economic profile GOTO 1.2.).*

F.1.1.2 Future trends and goals (demographics)

F.1.1.2.1 Consumer profile

There is little information as to how the non-residential consumer profile will change over time.

F.1.1.2.2 Population and projected population growth rates

Cape Town's population is expected to grow at rates below historic average rates, because of the incidence of HIV together with a reduction in migrants from rural areas.

F.1.1.2.3 Demographic trends and migration patterns

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. This type of middle- to high-income development contributes to urban spread and is concentrated in the following areas: (on Figure D.3.4b under Chapter D.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)*

F.1.1.2.4 Age and gender profile

The reduction in the younger age groups 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.

F.1.1.3 Strategic gap analysis (demographics)

It remains a challenge to the correct profile of connected consumers on the SAP system.

The high growth in formal housing is putting a severe strain on the existing infrastructure particularly at the growth nodes. Investment in infrastructure over the last 10 years has not kept pace with this growth and the existing Bulk Infrastructure Contribution Levy (BICL) (DC) to fund connector infrastructure is not sufficient.

Wastewater infrastructure is particularly stressed and developments have had to be stopped from time to time while upgrading and capacity extensions are completed. Housing delivery has not kept pace with the high growth in the informal areas. Should current trends be maintained it is anticipated that there will be an increasingly greater percentage of indigent over time.

A data clean up of the SAP system is required in order to establish the correct number of consumers in each category. There is currently no split between wet and dry industrial consumer units.

F.1.1.4 Implementation strategies (demographics)

Basic services

The strategy is to provide emergency levels of service to all informal settlements and to move them up the “water ladder” over time, first to basic levels and then when they are accommodated in the state housing schemes to a full level of service.

Higher level, associated services and economic growth

For the strategy to deal with the high growth areas refer to Chapter 5 Infrastructure.

Effective resource management

Increased emphasis on water demand management will reduce pressure on water infrastructure.

Effective Management

The customer profile is examined during the tariff exercise every year. As the number of indigent consumers increases the extent of cross subsidisation between the high and low users is increased.

Work is required in the following areas:

- Clean up data on SAP system of the consumers in each category;
- Maintenance of accurate annual records and determine the trends in the consumer profile;
- Determine the split of wet to dry industrial consumer units

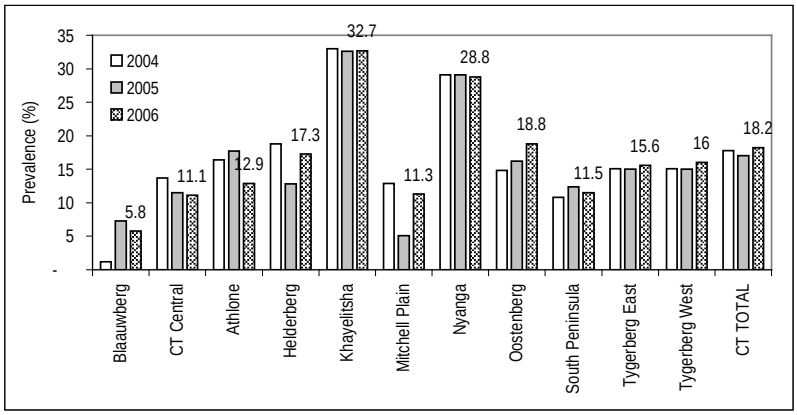
F.1.2 Health

F.1.2.1 Situation assessment (health)

F.1.2.1.1 Health profile

In 2006, HIV/AIDS was the leading cause of premature mortality, while Tuberculosis remains in third place (Source: Cause of Death and Premature Mortality in Cape Town, 2001 – 2006).

17. Figure F.1.2.1.1: HIV Prevalence for the Western Cape and Cape Town



Area Level Surveys: HIV Prevalance for the Westerb Cape by Are 2004 - 2006 (%)

	2004	2005	2006
Blaauwberg	1.2	7.3	5.8
CT Central	13.7	11.5	11.1
Athlone	16.4	17.7	12.9
Helderberg	18.8	12.8	17.3
Khayelitsha	33.0	32.6	32.7
Mitchell's Plain	12.9	5.1	11.3
Nyanga	29.1	29.1	28.8
Oostenberg	14.8	16.2	18.8
South Peninsula	10.8	12.4	11.5
Tygerberg East	15.1	15.0	15.6
Tygerberg West	15.1	15.0	16.0
TOTAL (Cape Town)	17.8	17.0	18.2

Source: Western Province Provincial Dept of Health

Area Level Surveys: HIV Prevalence 2005-2007 for the Metropole Sub-Districts (%)

	2005	2006	2007
Eastern	11.2	17.3	20.3
Klipfontein	24.5	32.7	21.8
Khayelitsha	32.6	21.6	31.1
Mitchell's Plain	5.1	11.3	11.7
Northen	20.6	23.1	22.0
Southern	12.4	12.5	9.8
Tygerberg	15.1	10.1	9.1
Western	10.1	16.2	18.2
TOTAL (Metropole)	17.0	18.2	18.0

Source: Western Province Provincial Dept of Health

Source: Western Cape Provincial Department of Health (Results of the 2006 HIV Antenatal Provincial and Area Surveys; Results of the 2007 HIV Antenatal Provincial and Area Survey

In 2007, the average HIV prevalence in pregnant women stood at 18% from 18.2% in 2006 (Source: Depart of Health (2006 HIV Antenatal Provincial and Area Surveys) and 2007 Antenatal HIV Prevalence Results). Nyanga and Khayelitsha show the highest levels of HIV prevalence at 28.8% and 32.7%, respectively (see table above). Poverty levels in Nyanga and Khayelitsha are relatively high and there is a large informal settlement component.

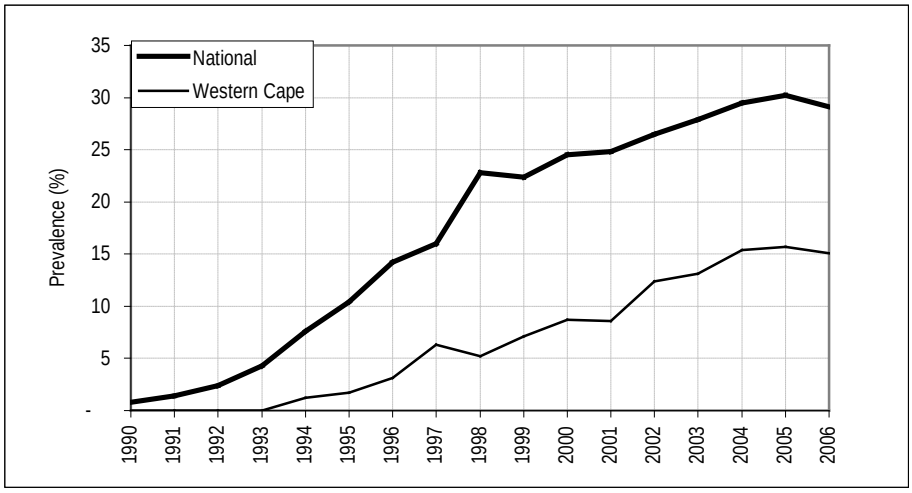
Damp and unsanitary conditions that are present in many informal settlements provide a breeding ground for the bacteria that causes TB; Nyanga and Khayelitsha also have the highest incidence of TB.

F.1.2.2 Future trends and goals (health)

F.1.2.2.1 Health profile

The prevalence of HIV and incidence of TB remain high, especially in the informal settlements. There are signs of a decline in the growth rate of HIV prevalence – this possibly demonstrates the impact of prevention of mother-to-child transmission (PMTCT) and antiretroviral (ARV) programmes (Source: Cause of Death and Premature mortality in Cape Town, 2001 – 2006).

18. Figure F.1.2.2.1: National HIV Survey (Prevalence amongst Public Sector Antenatal Clinic Attenders – National versus the Western Cape Trends 1990 – 2006))



Source: Western Cape Provincial Department of Health

HIV prevalence in the Western Cape is lower than the national average – the estimate for HIV prevalence in the Western Cape stand at 15.3% (2007 National HIV Survey, DoH).

F.1.2.3 Strategic gap analysis (health)

Damp and sometimes unsanitary conditions present in many informal settlements also provide an ideal breeding environment for the bacteria.

It is difficult to supply toilets to dense informal settlements.

Lack of sanitation; grey water pollution; grey water run-off from taps;

F.1.2.4 Implementation strategies (health)

Grey water pollution – there is a project by the CSIR, the City and DWA to deal with grey water in informal settlements.

A reduction of unsanitary conditions should be strived for by ensuring the maintenance and cleaning programme of toilets is maintained and improved.

Education programmes are presented on an ongoing basis.

F.1.3 Employment and income

F.1.3.1 Situation assessment (employment and income)

F.1.3.1.1 Employment profile

In September 2007, Cape Town's labour force stood at 1.5 million and 16.89% of that represented the unemployed (Source: Labour Force Trends in Cape Town (September 2005 to September 2007)).

15. Table F.1.3.1.1: Employment Profile of Cape Town

Labour Market Indicators	Sept 2005	Mar 2006	Sept 2006	Mar 2007	Sept 2007
Formal	985,587	1,031,105	1,037,483	1,014,271	1,058,971
Informal	122,280	138,105	148,203	170,220	118,161
Domestic Workers	62,302	50,751	69,263	75,333	71,785
Unknown	1,984	6,019	2,546	4,373	11,881
Employed	1,172,153	1,225,980	1,257,495	1,264,197	1,260,798
Unemployed	308,160	259,641	223,827	295,414	256,261
Labour force	1,480,313	1,485,621	1,481,322	1,559,611	1,517,059
Not Economically Active	682,147	680,553	678,356	683,339	728,916
Population between 15 and 64	2,162,460	2,166,174	2,159,678	2,242,950	2,245,975
Ratios					
% of unemployed to Labour force	20.82%	17.48%	15.11%	18.94%	16.89%
As % of Employed					
	Sept 2005	Mar 2006	Sept 2006	Mar 2007	Sept 2007
Formal	84.1%	84.1%	82.5%	80.2%	84.0%
Informal	10.4%	11.3%	11.8%	13.5%	9.4%
Domestic Workers	5.3%	4.1%	5.5%	6.0%	5.7%
Unknown	0.2%	0.5%	0.2%	0.3%	0.9%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%
Growth rate of the Employed		4.6%	2.6%	0.5%	-0.3%
Growth rate of the Employed between Sep 2005 and Sep 2007					2.5%

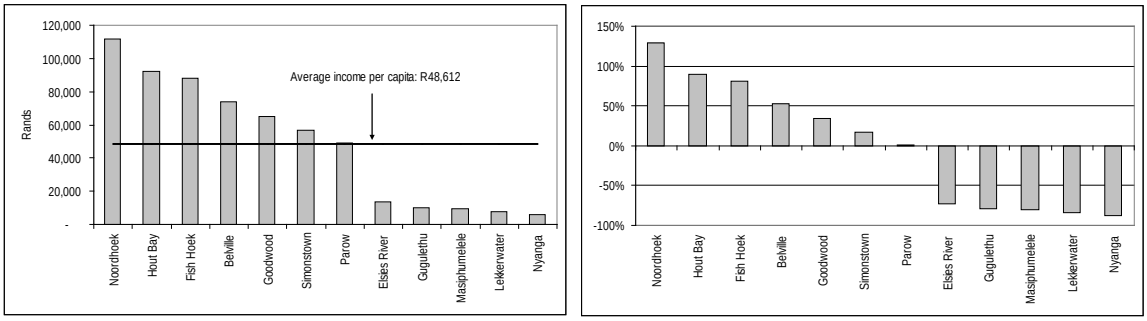
SOURCE: Labour Force Trends in Cape Town (September 2005 to March 2007)

The majority of Cape Town's labour force is employed in the formal sector and about 9.4% is in the informal sector (see above table).

F.1.3.1.2 Household income

Cape Town's poverty levels have been steadily increasing. The proportion of households earning below the subsistence level in 2005 stood at 36%, this comes from a level of 25% in 1996 (Household Subsistence Level of R 1,600 per month or R19,200 per annum) (City of Cape Town, 2005).

19. Figure F.1.3.1.2: Household Income per Capita (Selected regions)



Source: Department of Economic and Human Development

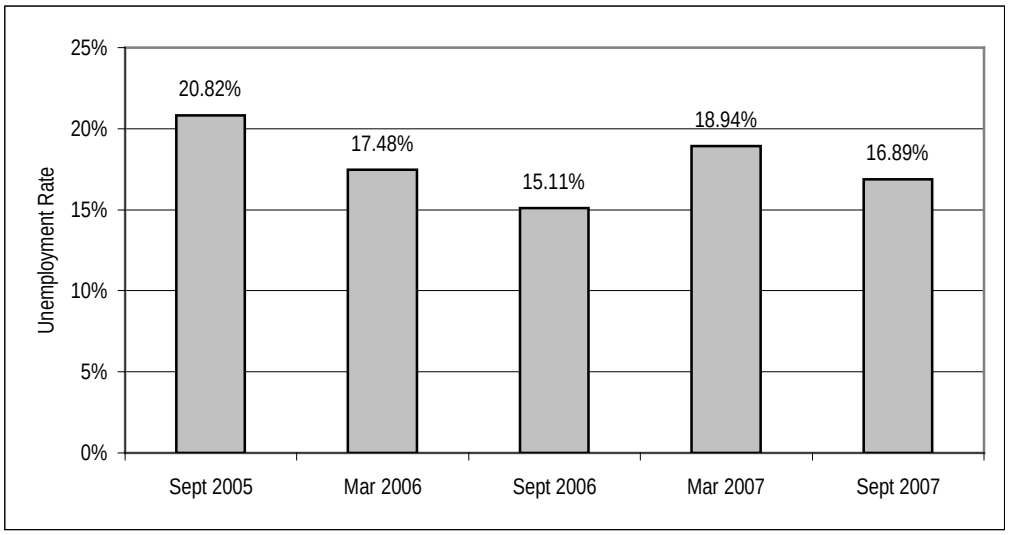
The above diagram shows the income per capita of selected areas in Cape Town – average income per capita stands at R48,612. Nyanga has the lowest per capita income, far below the average.

F.1.3.2 Future trends and goals (employment and income)

F.1.3.2.1 Employment profile

Labour Research shows a decline in the unemployment levels – from 20.8% in September 2005 to 16.9% by September 2007 (Source: Labour Force Trends in Cape Town (September 2005 to September 2007)).

20. Figure F.1.3.2.1: Unemployment levels from Sep 2005 to Sep 2007



Source: Labour Force Trends in Cape Town (September 2005 to September 2007)

This pattern is likely to be affected by the deteriorating economic stability in many employment sectors. Nevertheless, the City Cape Town has prioritised economic growth and job creation. It has set a goal to create at least 13,000 new jobs per annum.

F.1.3.2.2 Household income

It is not easy to predict growth in average incomes – given the current economic climate.

F.1.3.3 Strategic gap analysis (employment and income)

For middle to high income households, water is cheap and it is affordable to consume without considering savings methods. A great proportion of poor households, on the other hand, cannot afford to pay their water services debt.

Water leaks in private plumbing in poor areas renders water and sanitation unaffordable to residents in these areas.

F.1.3.4 Implementation strategies (employment and income)

Introduced WDM to reduce consumption and debt.

Installation of water demand management devices to manage actual consumption and reduce leakage.

Employ and train community people in assisting in repairing of leaks and education awareness.

Writing-off of bad debt of indigent households on the agreement that they start paying from then onwards.

The City's free basic services and Indigent Policies caters for a proportion of the population not able to afford water and sanitation services.

The proportion of the population who cannot afford water and sanitation is examined each year during the budgeting and tariff setting process and tariffs are adjusted accordingly. Households that cannot afford to pay can register with the City as Indigent. Water Leaks on properties with a municipal value less than R199,000 (previous to 2007/08 R100,000) are being dealt with through the Integrated Water Leaks Repair and Fixit Projects.

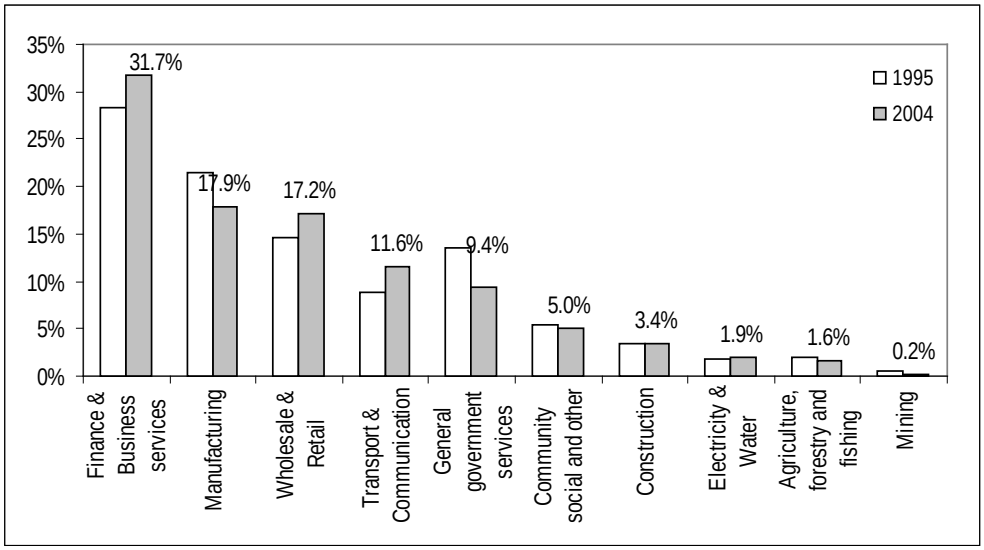
F.1.4 Economics

F.1.4.1 Situation assessment (economics)

F.1.4.1.1 Economic sectors, GGP contribution and employment

Cape Town accounts for 76-80% of the Western Cape's Gross Domestic Product (Source: Socio-Economic Profile of Cape Town, 2006). Informal trading comprises 10-20% of the economy (largely survivalist). The 10-year period between 1997 and 2007 saw Cape Town's economy grow at annual average rate of 4.36% – in 2007 a GGP of R130 billion was recorded (City of Cape Town statistics). Since then the level of growth has declined – National Treasury forecasts an annual growth rate of 1.7% for 2009.

21. Figure F.1.4.1.1: City's Sectoral contribution to GDPR (1995 & 2004)



Source: Socio-economic Profile of City of Cape Town (2006)

The main drivers of Cape Town's economy are Finance & Business Services, Manufacturing and Wholesale & Retail Trade sectors, at 31.7%, 17.9% and 17.2%, respectively.

Despite the economic performance of the 1997-2007 period, the City of Cape Town has not been able to adequately address the challenge of unemployment and poverty. The available figures place unemployment at 16.89% (Labour Force Research). The Finance & Business Services sector absorbs the majority of the City's skilled labour force – job creation in this sector is slow, it is estimated at 1% per annum.

The call centre industry is also a significant part of Cape Town's economy and it is aligned to the overall objective of job creation – absorbs the abundant supply of the City's semi-skilled labour.

The decline in the sector's formal employment contribution dropped from 21% in 1995 to 16% in 2003. In very capital-intensive sectors, such as basic chemicals and basic iron and steel, increased investment coincided with large reductions in employment. The most dramatic development since 1995 is the decline in employment in manufacturing and an increase in informal trade employment. The manufacturing sector has been overtaken from being the largest employer by general government services and community and social services.

An important factor for local economic development is the trend in the Small Micro and Medium Enterprises (SMME sector), which contributes significantly to overall employment. There are 23,000 established businesses in the Western Cape – this translates to 12% of Cape Town's businesses.

F.1.4.1.2 Economic trends

Small Micro and Medium Enterprises (SMMEs) account for up to 40% of the province's employment. SMME's are very important for local economic development and Cape Town has seen steady growth of owner-manager type of businesses.

From 1997 to 2002, the level of unemployment increased from the upper teens to 23.6%. Since 2005, the level of unemployment has been decreasing, but this may be affected the expected decline in economic growth.

Pressure on job creation is also exacerbated by the steady migration of individuals into the province – it is estimated that 48,000 individuals migrate to the province each year.

F.1.4.2 Future trends and goals (economics)

F.1.4.2.1 Economic sectors, GGP contribution and employment

Refer to F.1.4.1.1 & F.1.4.1.2

F.1.4.2.2 Economic trends

The slowing of economic growth in 2009 has improved in 2010.

16. Table F.1.4.2.2: Western Cape Macroeconomic Outlook

Western Cape Macroeconomic Outlook								Average
	2007 E	2008 E	2009 F	2010 F	2011 F	2012 F	2013 F	2008-13
GDPR *(Real % growth)*	6.10%	3.50%	1.70%	3.70%	5.10%	4.90%	4.90%	3.97%
GDPR by sector *(Real % change)*								
Agriculture, forestry & fishing	1.30%	10.00%	3.70%	1.80%	1.30%	1.30%	1.30%	3.23%
Mining & quarrying	-0.50%	-4.80%	-1.00%	0.50%	0.50%	0.50%	0.50%	-0.63%
Manufacturing	3.20%	1.70%	-2.10%	2.40%	3.10%	3.10%	3.20%	1.90%
Electricity, gas & water	3.80%	-0.90%	3.40%	1.30%	3.80%	3.60%	3.70%	2.48%
Construction	17.50%	9.50%	6.50%	8.50%	9.70%	9.90%	9.20%	8.88%
Wholesale & retail trade and hospitality	5.60%	0.90%	1.60%	5.30%	6.30%	5.90%	6.00%	4.33%
Transport & Communication	6.00%	4.70%	2.50%	3.10%	5.30%	5.30%	5.30%	4.37%
Financial & business services	8.20%	4.10%	1.30%	3.90%	6.10%	5.70%	5.80%	4.48%
Community, social & personal services	4.00%	3.30%	3.00%	1.60%	2.10%	1.80%	1.70%	2.25%
Government services	3.70%	3.50%	5.10%	2.70%	3.10%	2.90%	2.80%	3.35%

Source: National Treasury Western Cape Macroeconomic Outlook

The Western Cape's service industry is expected to continue performing well, while the retail & wholesale and possibly the financial services would take a dip because of the high level of interest rates (Cape Town Chamber of Commerce). Regional manufacturing has been under-performing, with the automotive and clothing sector experiencing negative growth rates – job losses are also a possibility. Tourism, construction, wine exports and call centres are expected to remain immune.

The fastest growth sectors are seen as construction, whole & retail trade and financial & business services – forecast average growth to 2013 is placed at 8.88%, 4.33% and 4.37%, respectively.

F.1.4.3 Strategic gap analysis (economics)

The water demand forecasts a factor of economic growth.

The City's ability to keep pace with the need to upgrade and extend the water and wastewater infrastructure is currently under severe strain. Increased economic growth will further exacerbate this.

Replacement and upgrading of infrastructure to provide for demand (upgrade and construction of WWTW).

F.1.4.4 Implementation and strategies

Water and Sanitation tariffs are to increase substantially over the next 5 year to ensure that the necessary infrastructure can be upgraded and extended. At the same time the WC/WDM Strategy will focus on reducing water demands. This will assist in postponing the implementation of new water resource schemes and reduce the hydraulic loading on wastewater treatment works.

F.2 Service Level Profile

The City has about 902,279 households and there are 604,490 formally registered water services customers. The coverage level for basic water supply is 100% that means all households receive the service. 885,136 households or 96.8% of households had access to basic sanitation services at December 2008.

22. Figure F.2: Service Level Profile

	Actual		Targets			
	June	Dec	Dec	Jun	Performance	
	2008	2008	2008	2009	Dec 08	Jun 09
Percentage of households with access to basic level sanitation	97.5%	98.1%	96.8%	97.5%		
Households						
Total		902,279	902,279	902,279		
Coverage		885,136	873,406	879,722	1.3%	0.6%
Percentage of poor households with access to basic level sanitation	89.7%	85.3%	89.0%	89.7%	-4.2%	-4.9%
Households						
Total		n/a	n/a	n/a	nm	nm
Coverage		n/a	n/a	n/a	nm	nm
Percentage of households with access to basic level water	100.0%	100.0%	100.0%	100.0%		
Households						
Total		902,279	902,279	902,279		
Coverage		902,279	902,279	902,279	0.0%	0.0%
Ratio of informal households per tap	11.9:1	11.2:1	12.2:1	11.7:1	-8.2%	-4.3%
Ratio of informal households per toilet	7.2:1	5.9:1	6.9:1	6.6:1	-14.5%	-10.6%

Source: Water Services and Sanitation

For informal settlements, the overall target of 25 dwellings per tap has been met – on average there were 11.2 informal households per tap at December 2008 (a target set by the City of Cape Town). The number of informal households per tap is 8.9% above target. The recorded average number of informal households per toilet, at December 2008, stood at 5.9 households per toilet (a target set by the City of Cape Town). The ratio decreased by 14.5% to the target ratio of 6.9 times, because the actual number of toilets provided was above target.

F.2.1 Residential consumer units

F.2.1.1 Situation assessment (residential consumer units)

The total number of formal and informal households is given below:

17. Table F.2.1.1-1: Residential consumer units (Formal & Informal)

	2007/8
Population	3,572,221
Households	902,279
Household categories	
Formal	785,396
Informal	116,883
Total	902,279
Backyard dweller	150,000

Source: Water Services and Sanitation; Strategic Information

18. TABLE F.2.1.1-2: Service Level Categories

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 stercus "black bucket" containers, a service which is to be replaced.)
Emergency	Partial access to sanitation (more than 5 households per toilet), 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

F.2.1.1.1 Residential consumer units for water

Service levels of existing formal developed and informal areas (excluding rural areas) generally meet the minimum standards as required by the Water Services Act 108 of 1997 (GOTO A.1).

Formal households have either a metered water connection to the house or to a yard toilet with water tap (uncontrolled volume supply). The first 6 kilolitres per month are supplied at no charge (free basic). Informal areas have communal standpipes and water is provided free.

19. Table F.2.1.1.1: Profile of consumers

	Consumers with:	2006/07	2007/08
1	None or inadequate	-	-
2	Communal water supply	115,000.00	116,883.00
3	Controlled volume supply	-	2,000.00
4	Uncontrolled volume supply	732,000.00	783,396.00
5	Total served (2+3+4)	847,000.00	902,279.00
6	Total (1+5)	847,000.00	902,279.00

Source: Water and Sanitation Services

F.2.1.1.2 Residential consumer units for sanitation

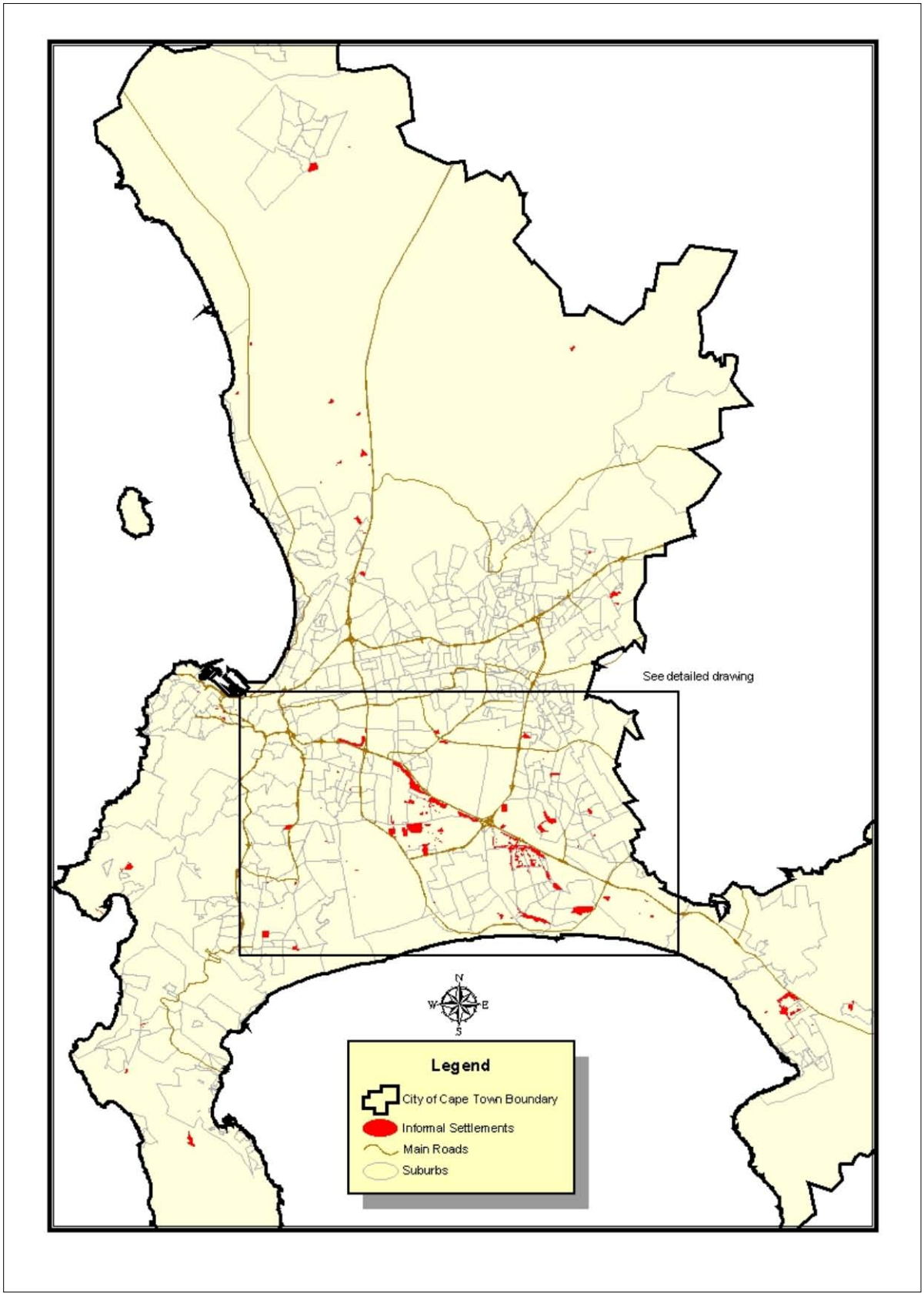
The general percentage distribution of households with inadequate sanitation services correlate to a large extent with the location of informal settlements as determined through aerial and on-site surveys and depicted in Figure F.2.1.1.2b and Figure F.2.1.1.2c.

20. Table F.2.1.1.2a: Profile of sanitation services to consumers

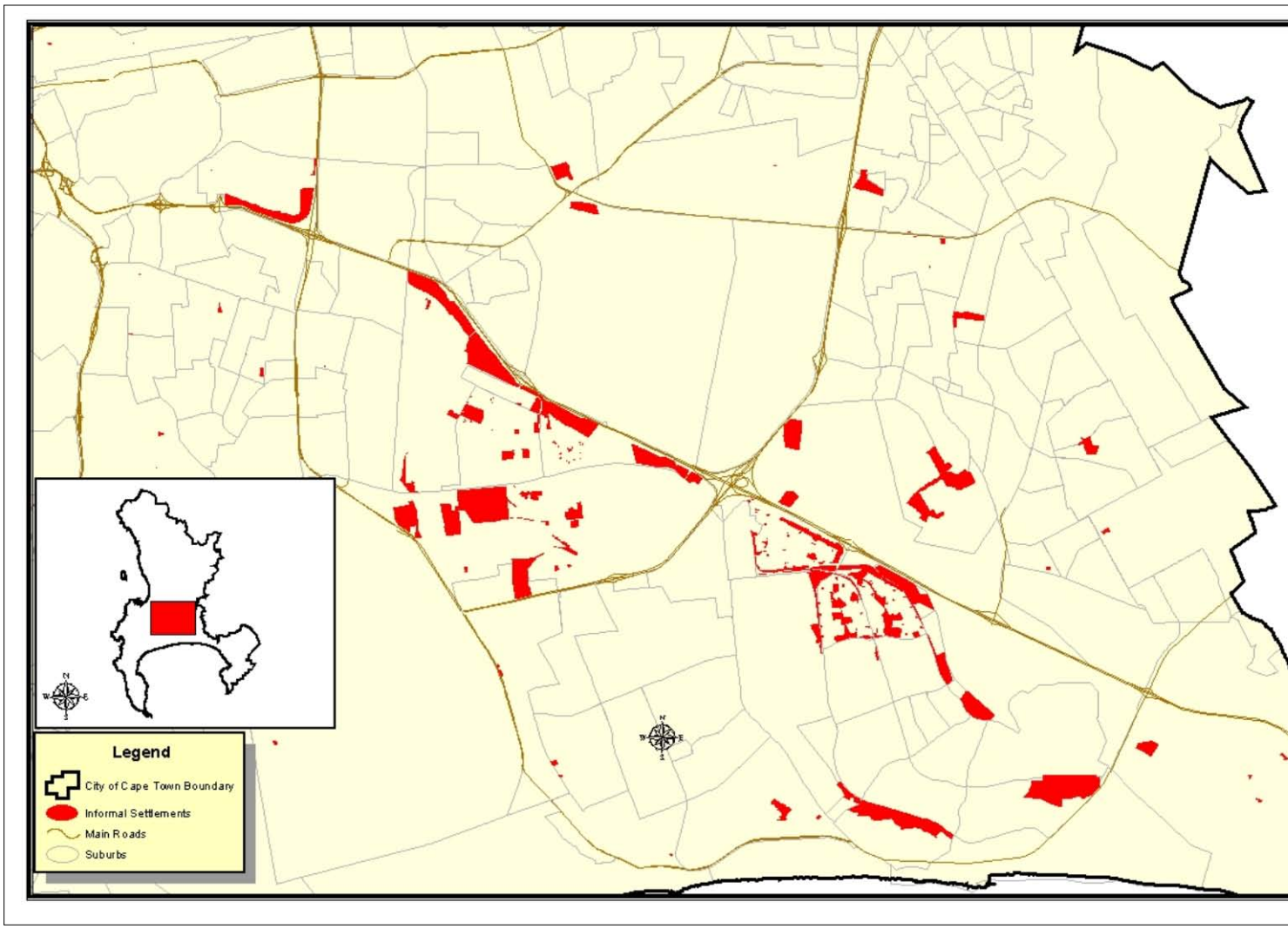
	Consumers with:		No of households
1	Emergency level waterborne		43,933
2	Bucket system		2,880
			46,880
3	Consumer installations: on-site dry or equivalent including VIP toilets, USD, composting system.		500
4	Consumer installations: Wet (Septic tank, digester or tanker desludge or effluent discharge to an oxidation pond etc or pitliners, chemical, container or portal potties)		69,570
5	Discharge to sewer treatment works (intermediate or full waterborne)		785,396
6	Total served (3+4+5)		855,466
7	Total (1+2+6)		902,279

Source: Water and Sanitation Services

23. Figure F.2.1.1.2b: Location of Informal Areas



24. Figure 2.1.1.2c: Location of Informal Areas Near N2



Formal households generally have water-borne sewer connections with the first 4,2 kilolitres of sewerage conveyed at no charge (free basic). Indigent formal households receive a monthly R30 Indigent Grant that is credited to their accounts.

In the informal areas a shared toilet is provided. The level of service is considered emergency when it is not provided at the ratio of 1 toilet to 5 families. The recorded average number of informal households per toilet, at December 2008, stands at 5.9 households per toilet. The ratio decreased by 14.5% than the target ratio of 6.9 times, because the actual number of toilets provided was above target. Sanitation is provided at no charge to these areas.

F.2.1.1.3 Residential Consumer Units for Sanitation

The types of sanitation are listed below in TABLE F.2.1.1.3, below.

21. Table F.2.1.1.3: Profile of consumers in informal settlements

TYPE OF SANITATION		
Bucket 25ℓ		2,024
Container 100ℓ		6,091
Chemical		811
Dry San		245
Pourflush		1,394
Fullflush		755
Anaerobic		10
VIP		108
PIT		5,313
Portapotti		206
Anaerobic		33
Unknown		1,734
Toilets		19,575

Source: Water and Sanitation Services

F.2.1.1.4 Grey water management

The CSIR is currently undertaking a pilot project to deal with grey water runoff in informal settlements.

F2.1.1.5 Pit emptying and sludge disposal

There are no VIP toilets in the City – these are not suitable given the ground conditions.

F.2.1.2 Future trends and goals (residential and consumer units)

- High density levels: 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. This makes it difficult to provide services at an acceptable level;

- Lack of co-operation from land owners: some land owners do not allow the provision of services on their land as they want to discourage the settling of informal residents on their land.

F.2.1.2.1 Residential consumer units for water

Refer to F.2.1.2

F.2.1.2.2 Residential consumer units for sanitation

Refer to F.2.1.2

F.2.1.2.3 Grey water management

A joint project with the CSIR is being undertaken.

F.2.1.2.4 Pit emptying and sludge disposal

Pit emptying is not applicable, while the disposal of container toilets is taken into the waste stream.

F.2.1.2.5 Types of sanitation technology options

Refer to F.2.1.1.3 above.

F.2.1.2.6 2010 target for basic sanitation

The target of 70% coverage by 2010, has already been met.

F.2.1.3 Strategic gap analysis (residential consumer units)

For explanation of minimum requirements from the SFWS GOTO Ex10.

Obtaining accurate information from the SAP system.

While it is generally accepted that farm dwellers are provided with water and sanitation this has not been quantified.

F.2.1.4 Implementation strategies (residential consumer units)

The backlog of basic water supply to informal areas has been eradicated. The City will continue to provide basic services required to keep pace with the influx and ensure that the backlog remains eradicated.

25. Figure F.2.1.4: The estimated cost of basic services for the informal settlement programme

(a) Informal Settlement Programme

(R'm)	2007/8	2008/9	2009/10	2010/11	2011/12	2007-17	TOTAL
Water hh influx sustain	0.6	0.6	0.6	0.6	0.6	3.0	6.0
Sanitation							
Backlog eradication	4.0	4.0	4.0	4.0	4.0	-	20.2
Bucket replacement	15.0	15.0	15.0	15.0	15.0	-	75.0
Household influx sustain	11.6	11.6	11.6	11.6	11.6	58.2	116.3
TOTAL (R'm)	31.3	31.3	31.3	31.3	31.3	61.2	217.5
Cumulative (R'm)	31.3	62.5	93.8	125.1	156.4	217.5	

(b) Cost of Basic Services for Informal Settlement Programme in (a) above

(i) Informal Settlement Sanitation Backlog	
Informal households without basic sanitation	15,339
Service Standards (hh/service)	5
No of new services needed	3,068
Unit cost of provision	R 6,584
Total cost of service provision	R 20,198,395
Years to provide	5
Total cost of new service provision (per annum)	R 4,039,679

(ii) Basic Services For Informal Settlement Influx	Water	Sanitation
Influx informal hh per annum	8,000	8,000
No of services needed per annum	400	1,767
Unit cost of provision	R 1,500	R 6,584
Total cost of new service provision (per annum)	R 600,000	R 11,633,928

Source: Water and Sanitation Services;

To eradicate the sanitation backlog and influx in informal settlements the Informal Settlements programme was set up – this programme is part of the housing development programme. A cumulative amount of R217.5 million will be directed to the informal settlement programme.

F.2.2 Public institutions and 'dry' industries

F.2.2.1 Situation assessment (public institutions and 'dry' industries)

All public institutions and 'dry' industries have on site connections.

F.2.2.2 Future trends and goals (public institutions and 'dry' industries)

The Water and Sanitation Services Department will be able to cope with the demand for new services for this sector.

F.2.2.3 Strategic gap analysis (public institutions and 'dry' industries)

None

F.2.2.4 Implementation strategies (public institutions and 'dry' industries)

New services are provided as part of normal business operations.

F.2.3 Wet industries

F.2.3.1 Situation assessment (wet industries)

All 'wet' industries have on site connections.

F.2.3.2 Future trends and goals (wet industries)

The Water and Sanitation Services Department will be able to cope with the demand for new services for this sector.

F.2.3.3 Strategic gap analysis (wet industries)

Database of all 'wet' industries required for water conservation and demand management purposes.

F.2.3.4 Implementations strategies (wet industries)

Identify top water consumers and identify which are 'wet' industries. The Water Conservation and Demand Management Strategy targets high water consumers.

F.2.4 'Raw' water consumers

F.2.4.1 Situation assessment ('raw' water consumers)

The City has very few 'raw' water consumers. These are mainly farmers on the raw water pipelines that feed Faure and Blackheath Water Treatment Plants. They are therefore not the City's consumers, but they share the same infrastructure. Since they are outside the Cape Municipal area there is no obligation on the City as Water Service Authority to provide them with water – potable or otherwise.

On the Wemmershoek 1,100 mm diameter raw water pipeline from Theewaterskloof there is at least one consumer that receives raw water from the line. This consumer is a Wemmershoek riparian who opted to draw water from the raw water pipeline rather than the riparian pipe network.

Apart from the Wemmershoek riparian obligations, CCT have no other potable water obligations to the farmers in other local authority areas.

F.2.4.2 Future trends and goals ('raw' water consumers)

It is not anticipated that there will be many future raw water consumers.

F.2.4.3 Strategic gap analysis 'Raw' water consumers: urban and rural

There is no strategic gap.

F.2.4.4 Implementation strategies ('raw water consumers')

No implementation strategies are required.

F.2.5 Industrial consumer units

F.2.5.1 Situation assessment (industrial consumer units)

F.2.5.1.1 Industrial consumer units for sanitation

The industrial consumer units and their current industrial effluent is given in the table below:

22. Table F.2.5.1.1: Industries and effluent treated 08/09

INDUSTRY TYPE	NUMBER OF SERVICE UNITS	MONTHLY WASTE WATER (kl)	MONTHLY SEWERAGE(kl)	TOTAL TREATED EFFLUENT(kl)
AIR-CONDITIONING BLEED-OFF	12	36,947.40	1,759.40	35,188.00
ANODISING	3	6,242.36	297.26	5,945.10
BAKERY	5	6,078.35	289.45	5,788.90
BEVERAGES	11	203,572.74	9,693.94	193,878.80
BOTTLING	1	1,060.50	50.50	1,010.00
BUILDING	1	978.60	46.60	932.00
CHEMICALS	4	264.08	12.58	251.50
CONSTRUCTION	1	114.77	5.47	109.30
CONTAINER	1	290.64	13.84	276.80
COSMETICS	2	1,183.35	56.35	1,127.00
DAIRY	7	39,420.26	1,877.16	37,543.10
ENGINEERING	12	1,480.40	70.50	1,409.90
ENZIMES	1	2,210.78	105.28	2,105.50
FOOD	38	141,853.32	6,754.92	135,098.40
FOOD/FISH	12	26,752.95	1,273.95	25,479.00
FOOD/SPICE	2	944.16	44.96	899.20
FUEL	1	374.85	17.85	357.00
GALVANISING	3	1,293.60	61.60	1,232.00
GAS	1	420.00	20.00	400.00
LABORATORY	1	1,205.61	57.41	1,148.20
LAUNDRY	21	2,662.17	126.77	2,535.40
MEAT	7	18,476.12	879.82	17,596.30
METAL	14	16,083.38	765.88	15,317.50
MOTOR	5	774.48	36.88	737.60
PACKAGING	6	7,598.33	361.83	7,236.50
PAINT	3	215.78	10.28	205.50
PAPER	2	31,385.55	1,494.55	29,891.00
PHARMACEUT	2	2,323.13	110.63	2,212.50
PLATING	13	8,586.59	408.89	8,177.70
PRINTING	12	6,162.98	293.48	5,869.50
RADIATOR	3	505.16	24.06	481.10
RAGS	1	2,478.00	118.00	2,360.00
TANNERY	1	8,484.53	404.03	8,080.50
TEXTILE	40	156,872.21	7,470.11	149,402.10
TISSUE	2	77,712.29	3,700.59	74,011.70
TRANSPORT	7	2,414.27	114.97	2,299.30
VEH/WASH	4	2,345.39	111.69	2,233.70
WINERY	3	1,198.05	57.05	1,141.00
TOTAL	**265**	**818,967.03**	**38,998.43**	**779,968.60**

The total monthly industrial effluent that is treated is 780 Ml per month or 26 Ml per day.

The operating costs for conveyance from source to the treatment works and the treatment costs at the works are recovered automatically via the sewerage charge for effluent up to a quality of 1000 mg/l as a percentage of the water consumed on site(first part of the charge formula below). For all effluents that are over and above the 1000 mg/l COD, but within the Schedule 2 limits, as set out in the Wastewater and Industrial effluent bylaw, are catered for in the charge formula, to cover the extra treatment costs (middle part of the charge formula).

For all other effluents that are not complying with Schedule 2, the extra treatment costs and potential risk to the infrastructure are covered in the penalty or surcharge factor (last part of the charge formula).

Industrial effluent charge formula = Vw(SVC) + VieT (COD – 1000)/1500 + VieT (SF)

Where :

Vw is the total volume, expressed in kilolitres; of wastewater discharged form the premises during the period.

SVC is the sewerage volumetric charge in terms of the sanitation tariff.

Vie is the total volume, expressed in kilolitres, of industrial effluent discharged from the premises during the period concerned.

T is the cost, as determined by the council, of treating 1kilolitre of wastewater.

COD is the chemical oxygen demand of the effluent in milligrams per litre. In the event of the COD being less than 1000, the COD factor falls away.

SF is SF = (X-L)/L

Where

X is the concentration of one or more of the parameters listed in Schedule 2.

L is the limit applicable to that particular parameter.

(i) No factor calculated by this may have a value less than zero;

(ii) In the case of the pH parameter X represents the pH value and, if (X-L) results in a negative value, a positive value of the same magnitude must be substituted.

F.2.5.2 Future trends and goals (industrial consumer units)

The increase in population has put a strain on the overall system, the sewer, storm water and the receiving environment. There has been an increase in sewer blockages caused mainly by foreign objects in the sewer. There is also an increase in backyard mechanical shops which end up illegally disposing of their oils in the storm water systems and consequently to the rivers.

The expansion of the food and catering industry has resulted in increased discharge of fats, oil and grease with associated blockages where grease trap facilities are not adequately provided nor is the industry not effectively and efficiently regulated.

The trend towards recycling of water at commercial vehicle wash-bays and waste minimisation continues as part the WC&DM Strategy.

Storm water ingress continues to have a negative impact on the treatment works, by increasing the hydraulic load, compromising the process, with the possibility of discharging substandard effluent back to the environment.

The goal is to ensure public awareness on best practices around these issues and the benefits thereof; and increased enforcement.

F.2.5.3 Strategic gap analysis (industrial consumer units)

The current tariffs do not adequately cater for the extra operational and remedial costs incurred by the City Of Cape Town due to the detrimental industrial effluents discharged into its systems.

The current bylaw lacks stringent powers to the officials ‘action on non-compliances. The fat/oil and grease facilities were not addressed in the bylaw so the food industry is not legally and adequately regulated.

Peace officer appointment delay is limiting the enforcement part of the storm water bylaw, having only 4 out of 25 staff who can issue fines. The training of which was conducted two years ago.

Most permitted industries do not have signed contracts in the form of permits, legally committing themselves to comply at all times with the conditions stipulated in their individual permits.

New dischargers are picked up from plans scrutiny, but many plans are “spec” plans and do not indicate future activities and processes to be undertaken in the buildings and thus need to be inspected once tenants move in. Many tenants do not know they need to apply for permission to discharge effluent; it therefore is a continuous inspection and education process for both the new and existing industrial/ commercial developments.

The current information management system is not producing the desired outcomes.

The lack of a tracking/telemetry system to monitor the quality of effluent inline, 24/7 is also a limiting factor.

F.2.5.4 Implementation strategies (industrial consumer units)

New tariffs have been proposed to Council for the next financial year which if approved will tackle the status quo.

The current bylaw is in the process of being repealed, some of the amendments include grease traps regulation and more powers to officials. The potential for increased discharge of fat, oil and grease from the food and catering industry expansion is being monitored as and when building plans are submitted to the City and forwarded to the Water Pollution Control (WPC) unit. Existing premises are being inspected for adequate grease trap facilities. The Environmental health Department is being brought on board regarding the issuing of their trade licenses, to alert the WPC unit for any potential generation of industrial effluent.

Senior management intervention has been requested to attend to urgent issuing of the peace officer cards for effective enforcement.

All industries are currently in the process of being re-issued with new permits that they must sign for to show commitment to the conditions imposed and hence be liable for any breach of the contract/permit.

Liaison with Planning and Development is ongoing in terms of them sending monthly approvals of all industrial / commercial plans to the WPC unit.

Research is being conducted in terms of a suitable database and telemetry system for WPC’s function.

Furthermore, planned inspections of the top water users in industrial areas serve to assist in the reduction of water consumption, consequently reducing the volume of effluent discharged. Waste minimisation, cleaner production and best available technology and practices are continuously promoted to all commercial and industrial units during inspections. Water pollution Control also working jointly with the DEADP on Chemical management and Waste minimisation.

There is prioritised monitoring of the top polluters for each of the respective parameters of concern, namely: Chemical Oxygen Demand, Dissolved Solids (Conductivity), pH, Metals, Chlorides, Sulphates and Cyanides. Emphasis has been put on pH and metals.

F.2.6 Industries and their permitted effluent releases

F.2.6.1 Situation assessment (industries and their permitted effluent releases)

F.2.6.1.1 Industries and their permitted effluent releases

The industries and the permitted industrial effluent volume is given in the table below:

23. Table F.2.6.1.1: Permitted industrial effluent volume 08/09

INDUSTRY TYPE	NO OF UNITS	PERMITTED VOLUME ML/YR
AIR-CONDITIONING BLEED-OFF	12	422.26
ABATTOIR	1	54.1
BATTERY	1	0.2
BOTTLING	2	20
BEVERAGE	2	158
CATERING	1	0.75
ENGINEERING	1	0.05
ENZYME	1	18.8
FISH	1	0.01
FOOD	14	227
GALVANIZING	1	8.76
METAL	2	1.45
MILITARY	1	1.61
MINERAL OIL	1	0.46
PACKAGING	1	10.25
PAINT	1	2.25
PAPER	1	4.59
PHARMACEUTICAL	1	7.9
PLASTICS	1	37.7
POULTRY	1	150.89
TEXTILE	5	148.78
TRANSPORT	2	38.63
WINERY	1	0.67
WOOD	1	0.12
TOTAL	**56**	**1315.23**

For spreadsheet version GOTO 2.2

The Prohibited Discharges into sewers is contained in the Wastewater and Industrial Effluent Bylaw (GOTO 2.3) and is outlined below:

Any radioactive wastes or isotopes of such nature or in such concentration as do not meet the requirements laid down by the Council for Nuclear Safety referred to in Section 24 of the Nuclear Energy Act (Act 92 of 1982) as amended.

F.2.6.2 Future trends and goals (industries and their permitted effluent releases)

Future trends suggest a decline in the textile industry, implying less dye problems in our receiving bodies; and an increase in food/catering sector, placing a burden in the sewer system from fats and oils. The goal is to ensure that all industries that discharge industrial effluent are on the City's database and continue to strive for self-regulation.

F.2.6.3 Strategic gap analysis (industries and their permitted effluent releases)

The gap with permitted effluent releases is that the permitted volumes and flows are not necessarily monitored and the permits they were issued with are not re-issued after the three years as stated in their permits. No audits are currently done for re-issuing.

Restaurants are currently not regulated in terms of the quality of industrial effluent they discharge to the sewer system, except for visual inspection of their grease traps.

Many industrial premises that discharge industrial effluent do not have permits because they are unknown and sometimes change occupancy to run away from being regulated.

F.2.6.4 Implementation strategies (industries and their permitted effluent releases)

Installation of loggers to keep track of the volumes and flows for identified consumers and dischargers.

Education and awareness campaigns on water saving/audits and waste management to be enhanced. Survey all dischargers, audit and reissue the permits, following the necessary processes.

F.3 Water Resource Profile

This section is closely related to the water balance, but where the balance deals with total amounts, this section deals with the conditions associated with use, both in terms of quantity and quality. The total water required as identified in the water balance based on the service level targets needs to be compared to permitted abstraction and return rights as stipulated in the permits. There is therefore some overlap in reporting requirements.

This section of the WSDP is driven by the National Water Act (Act 36 of 1998) and therefore will require dialogue with the Catchment Management Agency (CMA) (or DWA Regional Office until the CMA is established) and reference to the Catchment Management Strategy/ies (CMS) when these are in place.

It is important to note that all water used within the WSA area needs to be included, including those resources not managed by the authority (such as boreholes and those operated by other water services providers).

Water abstracted from sources:

There are three main sources of water:

- Abstraction from surface sources within the WSA area of jurisdiction (dams, springs, large rainwater collectors such as natural rock surfaces or streams);
- Abstraction from groundwater sources within the WSA area of jurisdiction (boreholes or dug wells);
- Purchase from external sources (e.g. a Water Board).

F.3.1 Water source

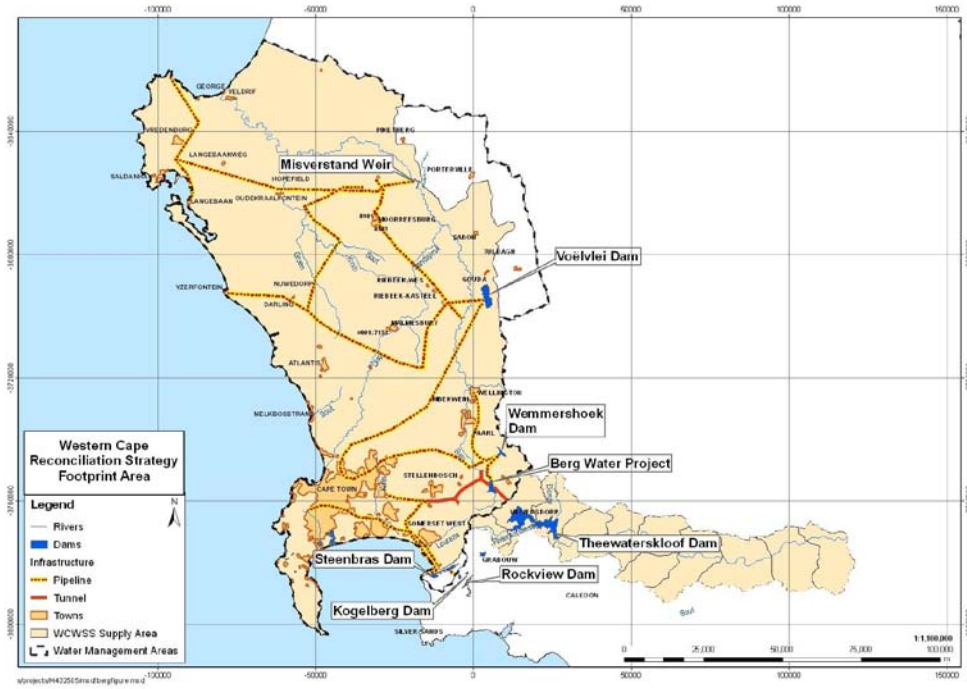
F.3.1.1 Situation assessment

Cape Town and its surrounds are situated in a winter rainfall area. Winter rainfall runoff therefore must be stored in raw water storage reservoirs for use throughout the year, especially for use in the hot dry summer months when the demand for water is at a peak.

The City obtains most of its raw water from surface water sources. Approximately 98.5% of the water allocated to the City is obtained from surface water resources, with the remainder obtained from groundwater resources.

The Western Cape Water Supply System (WCWSS), a network of dams and conveyance pipelines, supplies water to Cape Town, neighbouring towns and urban areas and agriculture. The various components of the WCWSS are owned and operated by the City, the Department of Water Affairs and Eskom.
The WCWSS is shown in Figure F.3.1.1.

26. Figure F.3.1.1a. Western Cape Water Supply System (WCWSS)



The major raw water supply dams of the WCWSS are the Riviersonderend, Voelvlei and Berg River Dams, owned and operated by the DWA, and the Wemmershoek, Steenbras Upper and Steenbras Lower Dams, owned and operated by the CCT. The main raw water storage dams and their capacities are shown in Table F.3.1.1.1.

24. Table F.3.1.1.1: Main raw water storage dams and capacities

Dam	Capacity (Ml)
Steenbras Upper	31 767
Steenbras Lower	33 517
Wemmershoek	58 644
Voelvlei	161 122
Theewaterskloof	480 250
Berg River	130 000
TOTAL STORAGE	898 300

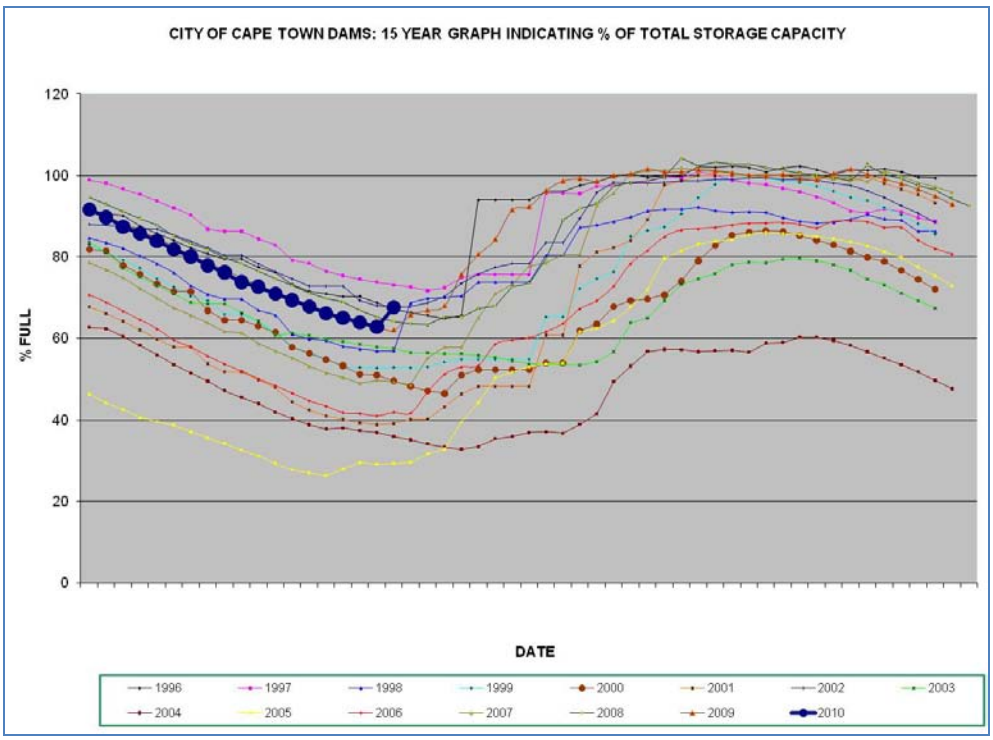
The City obtains 73% of its raw water allocation from schemes owned and operated by the Department of Water Affairs, with the remainder obtained from sources owned by the CCT.

Although owned and operated by the City of Cape Town and the Department of Water Affairs, the WCWSS is planned and operated in an integrated manner. The WCWSS, and the City's Bulk Water Supply System, is operated to minimise spillage from the dams in winter and to maximise storage in the dams over the hydrological year. The operation and future augmentation of the WCWSS is also co-operatively planned.

The annual yield of the WCWSS, including the recently completed Berg Water Scheme, is 556 million m^3 per annum. The City's allocation, including the Berg Water Scheme, is 398 million m^3 per annum. The remainder is allocated to other urban areas and agriculture.

A long-term 15 year record of the storage level of the WCWSS is shown below.

27. Figure F.3.1.1b: Long-term 15 year record of storage level of WCWSS



Water restrictions have been implemented at certain periods when supplies are reduced by droughts or when the demands outgrow the supplies before an additional source of supply is commissioned.

For a more detailed description of the available existing water resources, possible future water resources, refer to the document entitled “Western Cape Reconciliation Strategy” GOTO 3.1d and presentation GOTO 3.1e. For a previous studies refer to the “Water Resources and Water Resource Planning” GOTO 3.1a.

F.3.1.1.1 Surface water sources

Cape Town obtains 98.5% of its raw water from surface water sources. Water abstracted from these sources is stored in raw water reservoirs, from which the CCT is allocated a certain volume of raw water per annum. Cape Town’s allocation from the WCWSS is shown in the Table below.

Approximately 13% of the water supplied to Cape Town is obtained from sources within its municipal boundaries.

25. Table F.3.1.1.1: Surface water sources (DWA and CCT owned)

	Million m^3/annum	*% of Total*
DWAF Owned Schemes		
Theewaterskloof	118	29.6%
Voelvlei	70.4	17.7%
Palmiet	22.5	5.6%
Berg River	81	20.3%
Subtotal DWAF Schemes	**291.9**	**73.2%**
CCT Owned Schemes		
Wemmershoek	54	13.5%
Steenbras	40	10.0%
Lewis Gay and Kleinplaas Dams	1.8	0.5%
Land en Zeezicht Dam	1	0.3%
Table Mountain Dams	3.5	0.9%
Albion Springs	1.5	0.4%
Atlantis Groundwater Scheme	5	1.3%
Subtotal CCT Schemes	**106.8**	**26.8%**
TOTAL ALLOCATION	**398.7**	

F.3.1.1.2 Groundwater sources

The City obtains 1.7% of its total raw water use from groundwater. The Atlantis Water Supply Scheme abstracts groundwater from the Witsands and Silwerstroom Aquifers in the Atlantis area.

Although small in comparison to Cape Town's total raw water use, groundwater is used to supply approximately half of the water requirements of the Atlantis area, and is therefore an important local water source.

F.3.1.1.3 Groundwater monitoring

Refer to F.3.2.1.4 for monitoring of the Atlantis Aquifer.

F.3.1.1.4 External sources (where the WSA purchases water from others)

External sources are identified under section F.3.1.1.1.

F.3.1.1.5 Water returned to resources\

A schedule of WWTWs giving key data pertaining to the discharge of effluent returned to resources is given in the table under F.5.1.1.11. Relevant parameters are:

Type of process
Permit Volume
Design Hydraulic Capacity (Ml/day)
Present Hydraulic loading (Ml pa)
Design Organic Capacity (COD Kg/day and population equivalents)
Present Organic loading (COD Kg/day and population equivalents)
Percentage capacity available for development
Additional requirements within the next 5 years

For graphs of historical and projected flows GOTO 3.1b

For the quality of water returned to the resource refer to F.3.2.1.4

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 – GOTO 3.1c) from this requirement.
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
- Treated effluent is re-used in accordance with the table below:

	Peak daily summer re-use (ML/day)	% of current usage	% of Daily Dry Weather Flow
Formal network distribution	56.9	58.4%	13.1%
Private Supply Schemes	14.5	14.9%	3.3%
Informal downstream re-use	10.5	10.8%	2.4%
WWTW re-use	15.6	16.0%	3.6%
TOTAL CURRENT RE-USE	97.5		18.5%

F.3.1.2 Future trends and goals (water source)

Climate Change

Global impact

Over recent decades the impact of human influence on climate change has become more evident. Climate change models have predicted that continued unmitigated greenhouse gas emissions at or above current rates will cause further global warming and changes in the climate system. The models predict that there will be an increase in the mean global temperature. This will result in heat waves and temperature extremes that will become more prevalent. Global averaged mean water vapour, evaporation and precipitation are projected to increase. Intensity of global precipitation events (monsoons, El Nino) is projected to increase, particularly in tropical and high latitude areas. Even in areas where mean precipitation decreases (most subtropical and mid-latitude regions), precipitation intensity is projected to increase but there would be longer periods between rainfall events, i.e. indicating a greater risk of droughts in those regions.

Surface and atmospheric climate change observations in recent years show that the global mean temperatures have risen by about 0.8°C over the last 100 years. The rate of warming over the last 50 years is almost double that over the last 100 years. Other observations include the recording of the warmest years on record of global temperatures. These are 1998 and 2005. Eleven of the last 12 years (1995 to 2006) rank among the 12 warmest years on record. These are only some of the observations noted and it is increasingly clear that climate change and its impacts is becoming one of the biggest challenges facing the international community. Between what the climate models is predicting and recent observations it is becoming evident that despite the fact that a lot of attention has been focussed on the future impacts of climate change, scientific research and evidence has shown that the climate has already been changing.

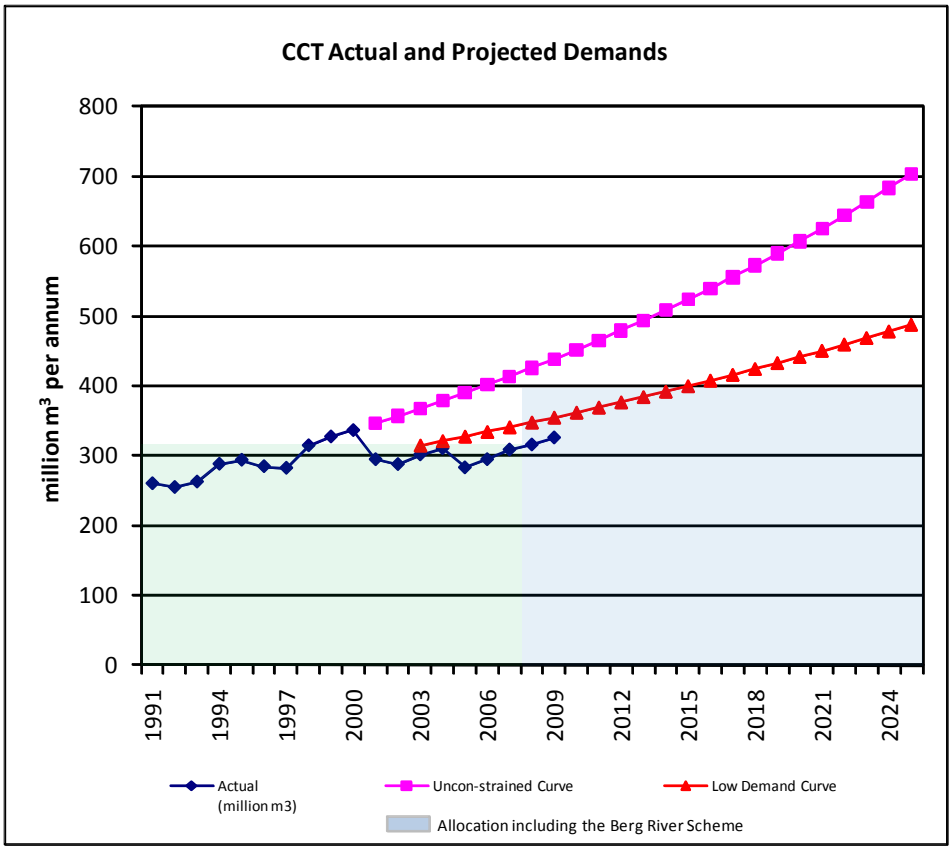
Regional and local impact

On a continental scale the impact of climate change on Africa could be severe, from an environmental, social and economical perspective. Climate change models predict that all of Africa is very likely to warm during this century. This warming is very likely to be larger than the global, annual mean warming throughout the continent and in all seasons, with drier subtropical regions warming more than the moister tropics. Annual rainfall is likely to decrease in much of Mediterranean Africa and northern Sahara, with the likelihood of a decrease in rainfall increasing as the Mediterranean coast is approached. Rainfall in southern Africa is likely to decrease in much of the winter rainfall region and on western margins. There is likely to be an increase in annual mean rainfall in East Africa.

The most recently produced climate scenarios produced for South Africa indicates that the mean temperature is likely to continue to increase across the country, with the greatest increases towards the interior, and strongest in the daily minimum. Average wind speed is likely to small increase across the region, most notably over the ocean. Rainfall scenarios project a general drying in most seasons in the SW parts of the Western Cape, particularly during autumn and winter months and in line with a shorter winter rainfall season. In summer and autumn the northern and eastern regions of the country are likely to become wetter, especially over regions of steep topography around the escarpment and Drakensberg. It is however noted that the projected changes in the intensity and frequency of precipitation events remain uncertain. It is increasingly clear Cape Town will experience some degree of climate change in the next 20 – 30 years.

For the period 1 July 2008 to 30 June 2009, the total volume of water treated and supplied by the City was 325.7 million m^3.

28. Figure F.3.1.2a: Demand growth Projections versus Supply Available



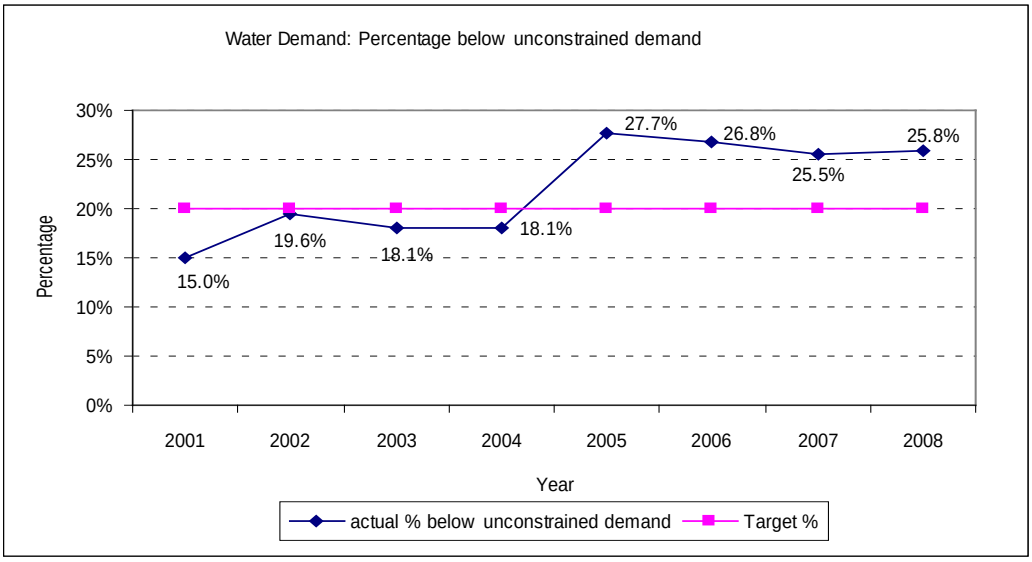
(For spreadsheet calculations GOTO 3.2b and Demand Forecasting Model GOTO 3.2c)

Source: Bulk Water; For a summary of bulk water treated GOTO 3.3

The volume of water supplied in 2008/09 was 25.7% below unconstrained demand.

29. Figure F.3.1.2b: Water Demand (Percentage below unconstrained demand versus target of 20%)

(For spreadsheet calculations GOTO 3.2b and Demand Forecasting Model GOTO 3.2c)



Source: Bulk Water; For a summary of bulk water treated GOTO 3.3

The distribution of water demand is given in the table below:

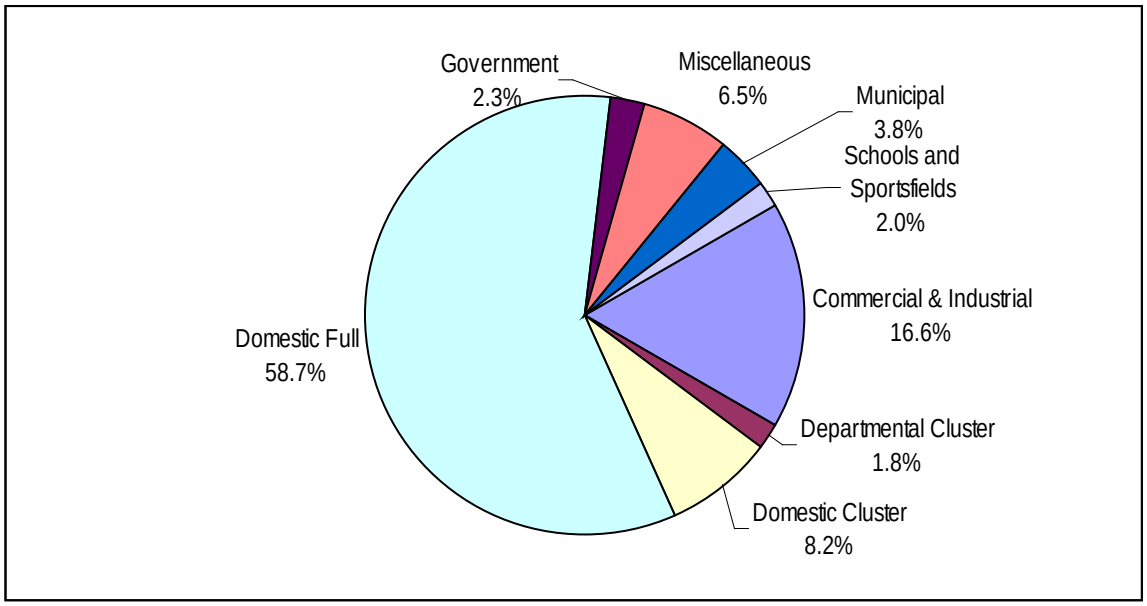
26. Table F.3.1.2: The distribution of water demand

	Water Usage Volume (m^3)		
Category	2005/06	2006/07	2007/08
Commercial & Industrial	39,604,273	39,935,953	37,522,479
Departmental Cluster	5,296,873	4,292,063	4,148,823
Domestic Cluster	15,085,701	17,158,456	18,495,461
Domestic Full	122,767,813	130,999,103	132,209,970
Government	4,337,839	5,191,773	5,289,177
Miscellaneous	14,003,230	16,687,710	14,598,306
Municipal	7,182,864	5,910,749	8,622,139
Schools and Sportsfields	5,284,754	3,588,272	4,517,055
Total	213,563,346	223,764,079	225,403,410
As % of Total			
	2005/06	2006/07	2007/08
Commercial & Industrial	18.5%	17.8%	16.6%
Departmental Cluster	2.5%	1.9%	1.8%
Domestic Cluster	7.1%	7.7%	8.2%
Domestic Full	57.5%	58.5%	58.7%
Government	2.0%	2.3%	2.3%
Miscellaneous	6.6%	7.5%	6.5%
Municipal	3.4%	2.6%	3.8%
Schools and Sportsfields	2.5%	1.6%	2.0%
Total	100.0%	100.0%	100.0%

Source: Water Billing

The pie chart of the distribution of water demand is given in Figure F.3.1.2c below:

30. Figure F.3.1.2c: The distribution of water demand



Source: Water Billing

For the spreadsheet of calculations GOTO 3.4a

Cape Town and its surrounds continue to experience both economic and population growth, with an associated growth in water demand. The challenge to the water sector is therefore to ensure that future supply can meet the growing demand for water in the region.

The demand for water for the period July 2008 to June 2009 was 325.7 million m3. This is 25% below the projected unconstrained demand i.e. what demand would have been if it had grown at the historic average growth rate after 2001, if water demand management and water restrictions had not been implemented.

The Department of Water Affairs and the City of Cape Town in 2007 completed the WCWSS Reconciliation Strategy, a strategic planning study conducted to ensure that future supply and demand for water could be reconciled. The Study considered issues such as probable demand growth, available supply, water conservation and demand management and potential supply augmentation schemes. The outcome of the Study was to identify potential schemes and interventions that needed to be studied further at a pre-feasibility or feasibility level, so that sufficient information would be available to select appropriate schemes and interventions to implement and be operational when required.

The CCT is currently implementing its 10 Year Water Demand Management Strategy with the objective of reducing the current use of water, and thereby the rate of demand growth. This will ensure that existing water resources and infrastructure is utilised as effectively as possible.

Schemes that are being considered for future implementation to increase the water supply to Cape Town include raising of existing dams, river diversion, groundwater, water re-use and sea water desalination schemes.

The WCWSS Reconciliation Strategy is being further developed and updated on an ongoing basis. The implementation of the Strategy is being guided by a Steering Committee, comprising representatives from the Department of Water Affairs, the City of Cape Town, other municipalities and users of water in the region and stakeholders from various sectors in the region. The Steering Committee is also being assisted by an Administration and Technical Support Group, responsible for conducting the detailed planning work providing the Steering Committee with necessary information and data for decisions and recommendations to be made.

F.3.1.2.1 Surface water source

The following surface water resources and schemes have been identified as possible future supply sources to augment the supply of the WCWSS:

- Voëlvlei Phase 1
- Michell's Pass Diversion
- Upper Wit River Diversion
- Raising Steenbras Lower Dam (including pre-feasibility of Upper Campanula Dam)
- Lourens River Diversion Scheme (as linked to Raising Steenbras Lower)
- Upper Molenaars Diversion

F.3.1.2.2 Groundwater sources-aquifer characteristics

The following groundwater resources have been identified as possible supply sources to augment the supply of the WCWSS:

- TMG Aquifer
- Cape Flats Aquifer
- Newlands Aquifer
- West Coast Aquifer Recharge (Langebaan)

F.3.1.2.3 Other potential resources

Other potential resources that have been identified as possible supply sources to Cape Town are the desalination of sea water and water re-use for potable use.

F.3.1.3 Strategic gap analysis (water source)

Climate Change uncertain impact

Although the impacts of climate change are not certain, impacts can be deduced from the modelling studies which would present a risk to the City. These are:

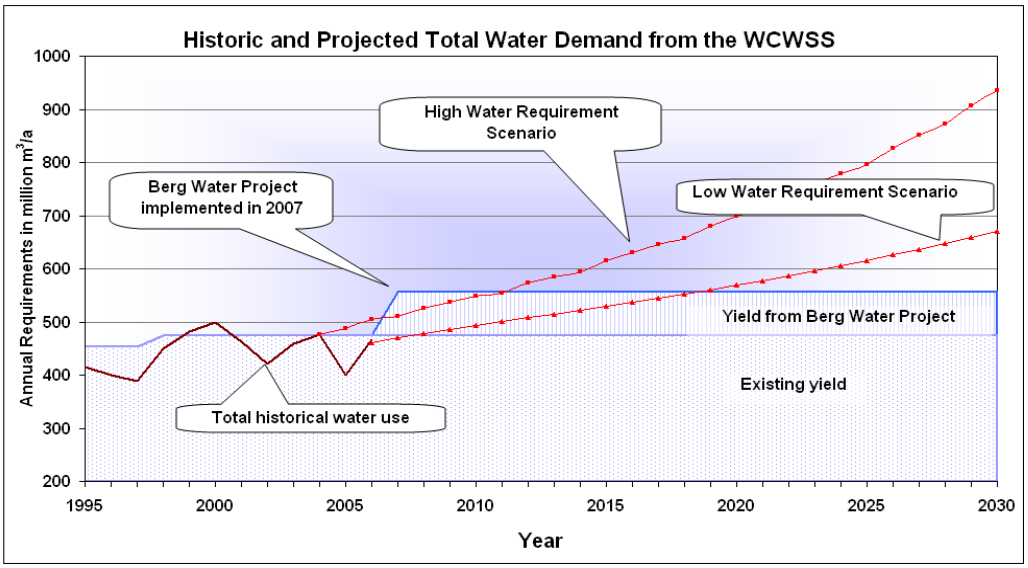
- An increase in the annual average temperature.
- Possible increase in the frequency and intensity of extreme weather events.
- An increase in conditions conducive to wildfires (higher temperatures and increased wind speeds)
- Reduced rainfall.
- Decreased water resources.
- Reduced soil moisture from an increase in temperature coupled with a decrease in average precipitation
- Temperature impacts on crop activities – crop burn, drought, pests and microbes resulting in yield reductions, and loss of rural livelihoods.

The anticipated higher temperature and wind speed (increasing evaporation from dam surfaces) and reduced rainfall causing decreased available water resources are considered the most important impact on the Water and Sanitation services.

However, the extent of that effect is not currently quantifiable as available research and model results refer to regional or continental scale and differ in output, dealing as they do with many uncertainties.

The Reconciliation Strategy Study investigated various scenarios that could affect the growth of demand and the yield of water from the WCWSS, including population growth, economic growth and climate change. High and low water demand growth scenarios were determined. These are shown for the WCWSS in the graph below.

31. Figure F.3.1.3: Historic and Projected Total Water Demand from the WCWSS



Based on the high and low demand requirements determined, an intervention would need to be implemented between 2011 and 2018.

Due to the unknown nature of demand growth, it is updated on an ongoing basis by the Reconciliation Strategy Administration and Technical Support Group to ensure that the latest demand data is available to be able to assess when the next water supply or demand management interventions would need to be implemented.

Water returned to resources

The Percentage compliance with respect to 4 critical DWAF effluent standards (E-coli count, Ammonia content, Oxygen demanding substances, Total suspended solids) remains unsatisfactory at 80%. Operational and maintenance problems also result in non-compliance of treated effluent.

F.3.1.3.1 Implementation strategies (water source)

Water and Sanitation's response to Climate Change

There are two key ways to respond to climate change. One is through **mitigation** — the reduction of the intensity of climate change effects by reducing greenhouse gas emissions. Cape Town has relatively low levels of greenhouse gas emissions when compared to other parts of South Africa, but it must continue to at opportunities to maintain low greenhouse gas emission levels. The Solid Waste Department has recognised that the City's landfill sites are of the biggest generators of methane. Methane is a much more potent GHG than CO2. As such they have initiated a gas monitoring plan that will inform a possible mitigation plan for methane and other GHG emanating from landfill sites. The City' IRT public transport plan is another initiative hoping to reduce the number of cars from roads. Vehicle emissions are a major source of GHG. These are just some of the activities that reduce the quantities of greenhouse gases we produce. Other measures include the use of cleaner fuels, the implementation of energy efficiency measures and the enforcement of fuel-efficient vehicles.

Another response to climate change is **adaptation**, which is the process of recognising the effects of climate change and adapting to these changed conditions. This implies behavioural changes in response to the changed conditions, such as the changes in demand side management practices and so on. Demand-side management is particularly important in the controlling of resources such as water, electricity and of utilities. This implies behavioural change by the consumer which is an important element in the City's Water Demand Management Strategy. The other prudent measure to take is to adopt an increased safety factor in the predicted future available water resource volumes to allow for the possible impacts of Climate Change. To achieve this, ongoing monitoring of rainfall, temperature, wind speed, dam volume and consumption patterns has to be undertaken.

The WCWSS Reconciliation Strategy included recommendations of interventions that needed to be implemented or studied further to ensure that potential schemes could be implemented in future when required. The Table below summarises these interventions being implemented or studied further.

27. Table F.3.1.3.1: Summary of WCWSS interventions

Intervention	Study Level Required	Responsibility
Existing Feasibility Studies in Progress		
Water Demand Management	Intervention to be implemented	CCT
TMG Aquifer Feasibility Study	Feasibility	CCT
Pilot Desalination Plant	Feasibility	CCT
TMG Regional Monitoring	Monitoring	DWA
Invasive alien plant clearance	Ongoing	DWA
Voelvlei Phase 1	Update feasibility	DWA
Mitchell's Pass Diversion	Pre-feasibility/feasibility	DWA
Upper Wit River Diversion	Pre-feasibility	DWA
Raising Steenbras Lower Dam	Pre-feasibility	DWA
Upper Molenaars Diversion	Pre-feasibility	DWA
Water Re-use	Pre-feasibility	DWA/CCT
Future Studies Required		
Newlands Aquifer	Pre-feasibility	CCT
Cape Flats Aquifer	Feasibility	CCT
Lourens River Diversion Scheme	Pre-feasibility	CCT

F.3.1.3.1.1 Table Mountain Group Aquifer Feasibility Study

The Table Mountain Group (TMG) Aquifer is currently being investigated at a feasibility level by the City of Cape Town in order to determine the Aquifer's potential yield and to assess the possible environmental impacts associated with utilising this resource as a water supply source for Cape Town. It has the potential to be a significant source of water.

As part of the Exploratory Phase of the City's feasibility study, in 2009 the City completed the drilling of 3000m of exploratory diamond core boreholes. The information collected from the rock cores and the geophysical logging will assist with the decision on a suitable location for a pilot wellfield.

A pilot wellfield, to be implemented as part of the planned Pilot Phase of the feasibility study, will involve the abstraction of water, and this will be used to assess the sustainable yield of a wellfield and the Aquifer. It will also be used to assess the potential impact of abstraction on the broader environment, learn from the implementation and operation of a wellfield and assess how to integrate a large groundwater resource into the operation of the WCWSS.

The City has also implemented an environmental monitoring protocol, with the objective of collecting background geohydrological, hydrological and ecological data that will be used to assess the impact on the environment of abstraction of groundwater from the TMG Aquifer in future.

F.3.1.2.3 Seawater Desalination

Sea water desalination in Cape Town has been studied at a pre-feasibility level.

Due to Cape Town growing northwards along its western coastline, a future desalination plant would probably be situated on this coastline and supply the rapidly growing areas north of Milnerton. Potential sites identified for a sea water desalination plant include sites at Melkbos, Silwerstroom and at the Koeberg Nuclear Power Station.

The City will be conducting a feasibility study of sea water desalination, including identifying a feasible location for a large-scale plant and conducting an environmental impact assessment for the preferred location.

F.3.1.2.3 Water Re-use

At present, about 60% of all the water used by CCT enters the sewer networks as wastewater. This wastewater is then treated and either re-used (currently estimated to be about 10%) or is discharged to the sea as treated effluent (currently 90%). The treated effluent that ultimately ends up in the sea is often disposed of through rivers and wetlands, with significant environmental impact.

Treated effluent is a valuable resource and needs to be integrated into the overall reconciliation process of water supply and requirement. Currently the 16 wastewater treatment works (excluding sea outfalls) in the City of Cape Town discharge approximately 500 Mℓ/day (184 Mm^3/a) into rivers and directly into the sea. This far exceeds the estimated yield of any of the prospective water resource schemes under consideration. The peak daily summer re-use is estimated to be approximately 80 Mℓ/day, or approximately 21 Mm^3/a.

A strategic assessment of the water re-use potential to augment the Western Cape Water Supply System was undertaken January 2009. The conclusion of this study was that there is a significant potential for water re-use as a major intervention to augment the WCWSS and that planned indirect potable re-use should be considered as the preferred way to implement a water re-use scheme. A detailed feasibility study will be undertaken by the City of Cape Town so that a comparative assessment of water re-use against other potential water resource development options can be undertaken.

F.3.1.2.4 Water Returned to Resources

There is an ongoing programme to upgrade and extend the Wastewater Treatment Works to increase their capacities and ensure that they comply with the 1984 DWAF Standards (refer to F.5 Infrastructure).

In addition water returned to resources will reduce as more treated effluent projects are implemented as part of the WC/WDM Strategy. (Refer to F.4)

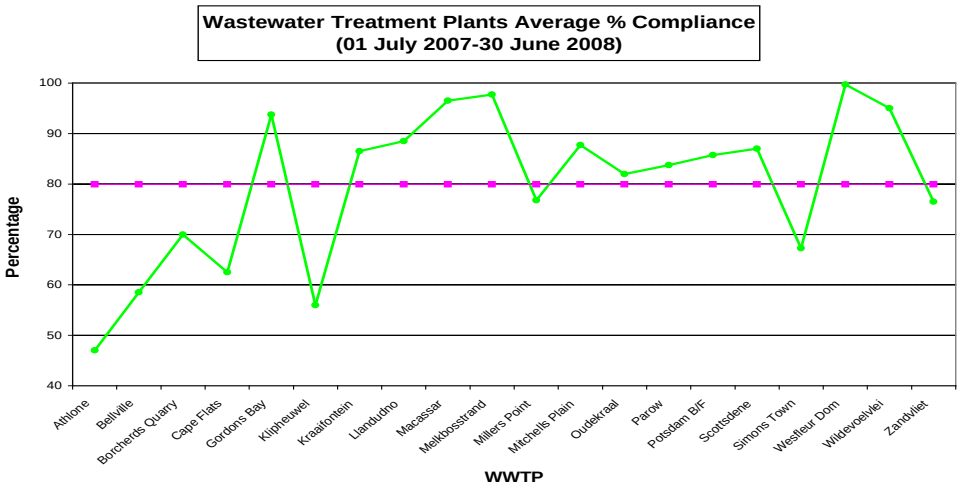
Both programmes need a significant amount of funds which the City is committed to ensuring becomes available as part of its financial strategy. Refer to Chapter 9 of Draft IDP. (GOTO 3.9)

Other strategies that are in place but that are currently being tightened up that should reduce non-compliance due to operational issues are:

- Pro-active maintenance of all mechanical and electrical equipment as well as civil structures as part of the Asset Management Strategy,
- Process optimisation, and
- Improved monitoring and operational control.

32. Figure F.3.2.1.4a: Wastewater Treatment Plants Average % Compliance

(1 July 2007 to 30 June 2008**)**

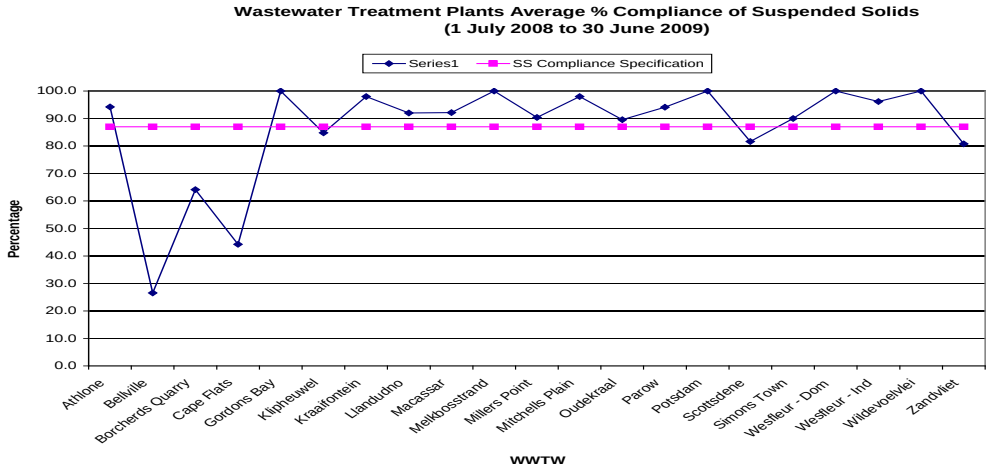


Source: Scientific Services

FIGURE F.3.2.1.4a shows the average compliance level of all wastewater treatment work plants – it stood at 80% for 12 months to 30 June 2008. It is eight of the 20 plants that reported below average compliance; these are: Athlone, Belville, Borcherds Quarry, Cape Flats, Klipheuwel, Millers Point, Simons Town and Zandvliet.

33. Figure F.3.2.1.4b: Wastewater Treatment Plants Average % Compliance of Suspended Solids

(1 July 2008 to 30 June 2009)



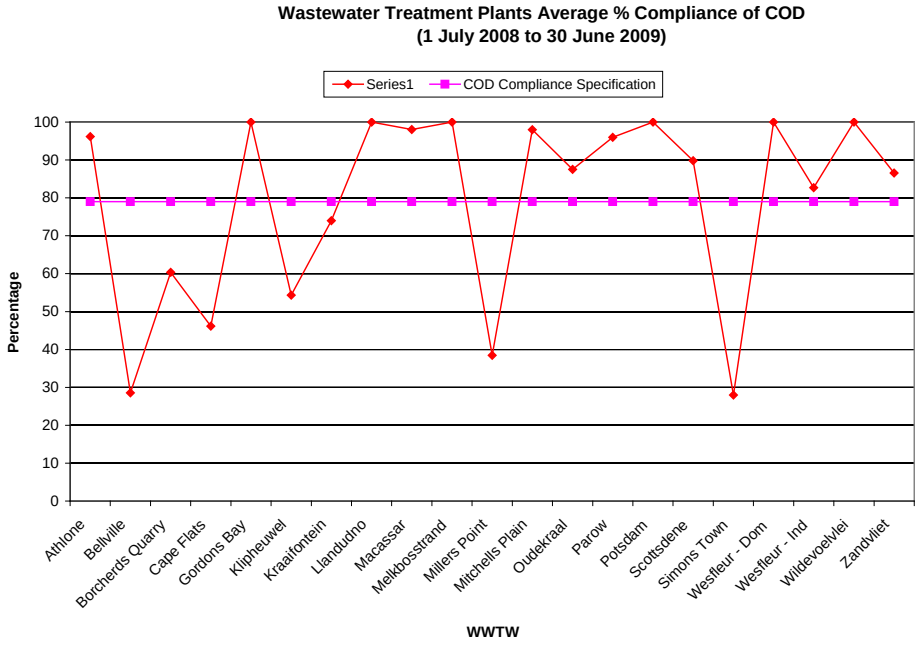
Source: Scientific Services

In FIGURE F.3.2.1.4b only 6 of the 20 plants reported below average compliance for suspended solids – these being the Belville, Borcherds Quarry, Cape Flats, Ouderkraal and Wildevoelvlei plants.

The average COD compliance level of the all the wastewater treatment plants stood at 78% and only 5 plants were below average compliance levels – see FIGURE F.3.2.1.4c.

34. Figure F.3.2.1.4c: Wastewater Treatment Plants Average % Compliance of COD

(1 July 2008 to 30 June 2009)

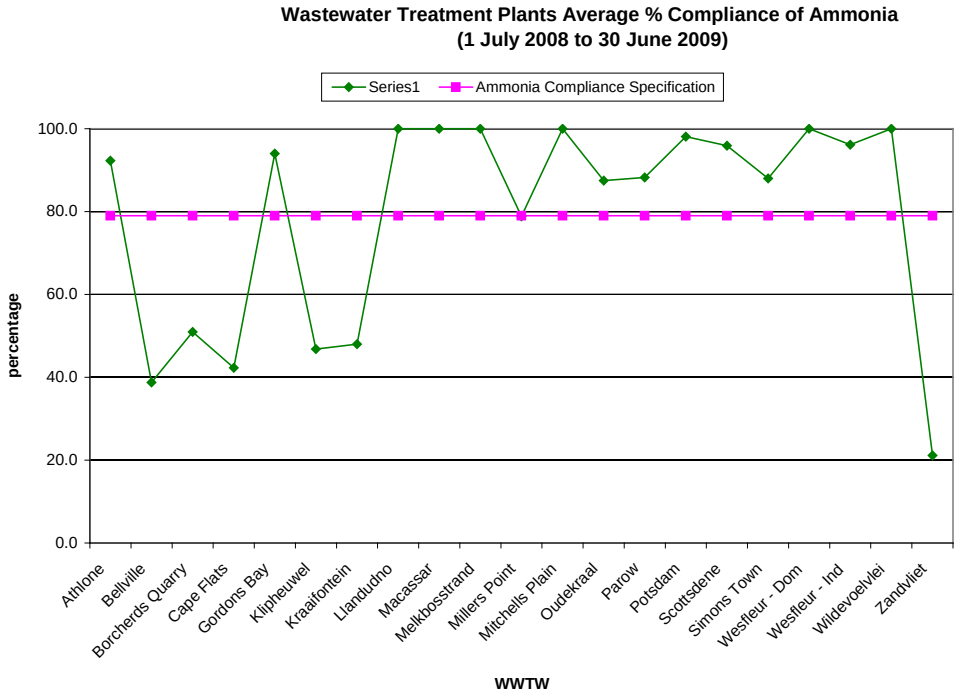


Source: Scientific Services

For ammonia, the average compliance level stood at 80% and only 5 plants were below that level – see FIGURE F.3.2.1.4d.

35. Figure F.3.2.1.4d: Wastewater Treatment Plants Average % Compliance of Ammonia

(1 July 2008 to 30 June 2009)

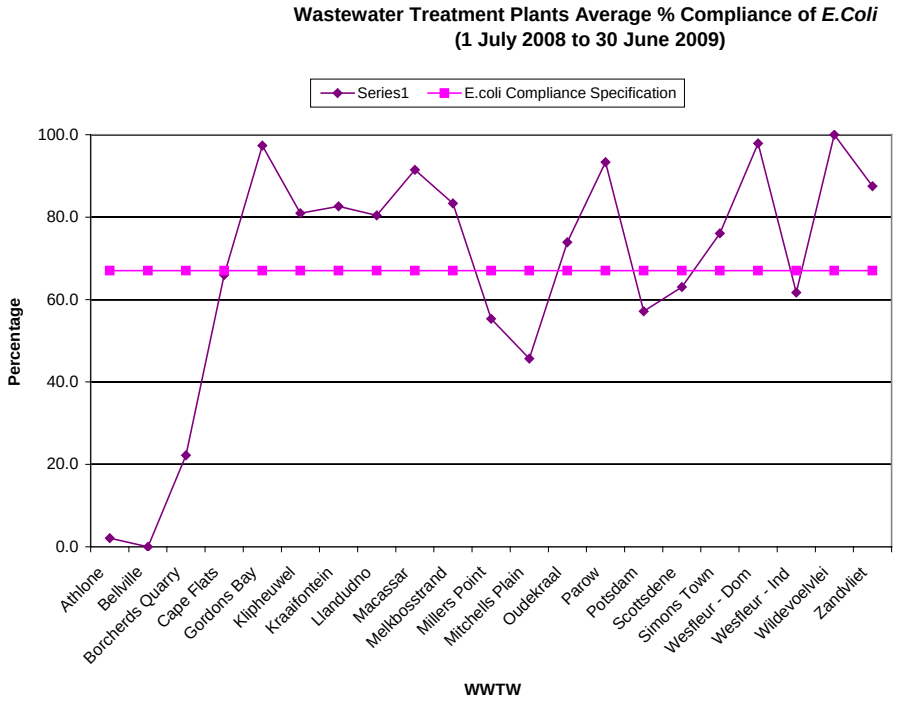


Source: Scientific Services

The percentage compliance for E.Coli was 72% and only four plants reported below average scores.

36. Figure F.3.2.1.4e: Wastewater Treatment Plants Average % Compliance of E.Coli

(1 July 2007 to 30 June 2008)



Source: Scientific Services

Various parameters, which include the physical, chemical, biological and aesthetic properties of the water, are evaluated against the applicable South African Water Quality Guidelines. For results for the 2006 Hydrological year refer to Inland and Coastal Water Quality Report produced by CSRM (GOTO 3.12). In addition, under the umbrella of the national River Health Programme (http://www.csir.co.za/rhp/) the ecological health of the City's rivers is assessed annually.

F.3.2.1.5 Quality of water returned to the resource: rural

Refer to F.3.2.1.4

F.3.2.1.6 Pollution contingency measures

It is important to indicate those resources which could potentially become polluted. The specific resource should be indicated, based on detail available to the municipality, for example the number of the borehole/s or the name of the river. All the potential sources of pollution should also be listed as well as an indication as to whether formal contingency measures are in place or not.

For explanation from the Preparation Guideline GOTO Ex13

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, effluent that ends up in the stormwater system presents a real and serious threat. The Wastewater Treatment Works' status (For plans GOTO 3.13) with respect to pollution contingency measures is tabulated below:

28. Table F.3.2.1.5: Status of Wastewater Treatment Works

Resource Description	Potential source of pollution	Formal contingency Measure?
Salt River	Athlone WWTW	Yes
Kuils River	Bellville WWTW	Yes
Salt River system	Borcherds Quarry WWTW	Yes
False Bay	Cape Flats WWTW	Yes
Atlantic Ocean	Camps Bay Outfall	Yes
Sir Lowry's Pass River	Gordons Bay WWTW	Yes
Atlantis Ocean	Green Point Outfall	Yes
Atlantic Ocean	Hout Bay Outfall	Yes
Diep River	Klipheuwel WWTW	No
Diep River system	Kraaifontein WWTW	Yes
Atlantic Ocean	Llandudno WWTW	No
Eerste River	Macassar WWTW	Yes
Kleine Zoute River	Melkbosstrand WWTW	Yes
False Bay	Millers Point WWTW	No
False Bay	Mitchells Plain WWTW	Yes
Atlantic Ocean	Oudekraal WWTW	No
Salt River system	Parow WWTW	No
Diep River	Potsdam WWTW	No
Kuils River system	Scottsdene WWTW	Yes
False Bay	Simons Town	No
Atlantis Aquifer	Wesfleur WWTW	Yes
Wildevoelvlei Vlei	Wildevoelvlei WWTW	Yes
Kuils River	Zandvliet WWTW	Yes

The word “system” indicates that the effluent is discharged into a tributary of this river

F.3.2.2 Future trends and goals (water quality)

F.3.2.2.1 Quality of water taken from source: urban

Algae blooms and geosmin in the raw water is a problem, specifically at Theewaterskloof, Voelvlei, Steenbras and Constantia Nek.

Microbiological and chemical compliance to SANS 241/2005 of the drinking water is expected to remain in the “Excellent” category.

Growth in the city will require increased monitoring in the new reticulation areas.

F.3.2.2.2 Quality of water taken from source: rural

Refer to F.3.2.2.1

F.3.2.2.3 Report on quality of water taken from source: urban and rural

There are no changes expected to the reporting system.

F.3.2.2.4 Quality of water returned to the resource: urban

There have been some improvements in the quality of water returned to resource from upgraded WWTWs. However, significant investment is still required for the overall water quality to improve and achieve 89% and 95% compliance by 2010 and 2012 respectively in accordance with the IDP document.

F.3.2.2.5 Quality of water returned to the resource: rural

Refer to F.3.2.2.4

F.3.2.2.6 Pollution contingency measures

Ensure that all WWTWs and sewer pumpstations have Pollution Contingency measures.

F.3.2.2.7 Strategic gap analysis (water quality)

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.

There are a number of strategic gaps:

- Ineffective catchment management at dams resulting in algae blooms and geosmin problems.
- Monitoring of drinking water quality in new areas of the reticulation is falling behind.
- The Program for upgrade and extension of Wastewater Treatment Works has fallen behind due to lack of funding in previous years. Overall effluent quality is still not to DWA standards. Percentage compliance is
  - 81% for treated effluent quality
  - 37% in rivers
  - 68% in coastal areas
- Lack of pro-active solutions to treated effluent quality issues that result from operational problems.
- Lack of community empowerment to ensure that the “polluters pays” principle is enforced.
- Some WWTWs and sewer pumpstations do not have pollution contingency measures.
- Lack of understanding by the community of the excellent drinking water quality
- Out of 289 industrial properties that are monitored for compliance with industrial effluent bylaw (GOTO 2.3) standards 25% are non-compliant.

F.3.2.2.8 Implementation strategies (water quality)

The following strategies have been or are in the process of being implemented:

- Extend reticulation network water quality monitoring.
- Provide sufficient capital and human resources for upgrading and extending WWTWs
- Pro-actively address operational problems so as to avert treated effluent quality.
- Examine and resolve treated effluent quality monitoring issues.
- CMAs need to be established in the catchment areas and wastewater charge discharge system needs to be implemented.

- Identify source and non-source points of pollution and implement strategy.
- Establish Pollution Contingency measures where there are none.
- Water Quality awareness campaigns (e.g. Hlonipha Amanzi for WDM)
- Water and Wastewater bylaws awareness campaigns (Raising the Citizen's Voice)
- Education of the consumer around the quality of drinking water in Cape Town. (e.g. improve consumer's level of understanding of the excellent drinking water quality)
- Increase monitoring of industrial effluent discharging into WWTWs
- Non-compliant industrial effluents – identify the worst offenders, enforce payment of penalties and encourage waste minimisation principles.

F.3.3 Waterborne Sanitation

F.3.3.1 Situation Assessment

The majority of the properties in the Cape Town area are already served by waterborne sanitation.

F.3.3.2 Future Trends and Goals

The City plans to implement waterborne sanitation throughout the municipal area. In informal settlements this takes the form of shared facilities (refer to Service Level Profile in Chapter 2) while in formal areas it takes the form of a house connection.

F.3.3.3 Strategic Gap Analysis

The ability of the City to provide full waterborne sanitation to those in informal areas and in backyard shacks is linked to its ability to provide state housing through the national subsidy scheme or to place households on serviced sites.

The ability of Water and Sanitation Services to provide households who currently have septic tanks is dependent on adequate finance being available.

F.3.3.4 Implementation Strategies

Waterborne sanitation is provided to all new formal residential properties. In the case of private developments it is the responsibility of the developer to provide all household connections while in the case of state housing it is funded through the housing subsidy.

Water demand and water resource planning by the City has factored in the installation of waterborne sewerage for all formal and informal households.

F.4. Water Conservation/Demand Management (WC/WDM)

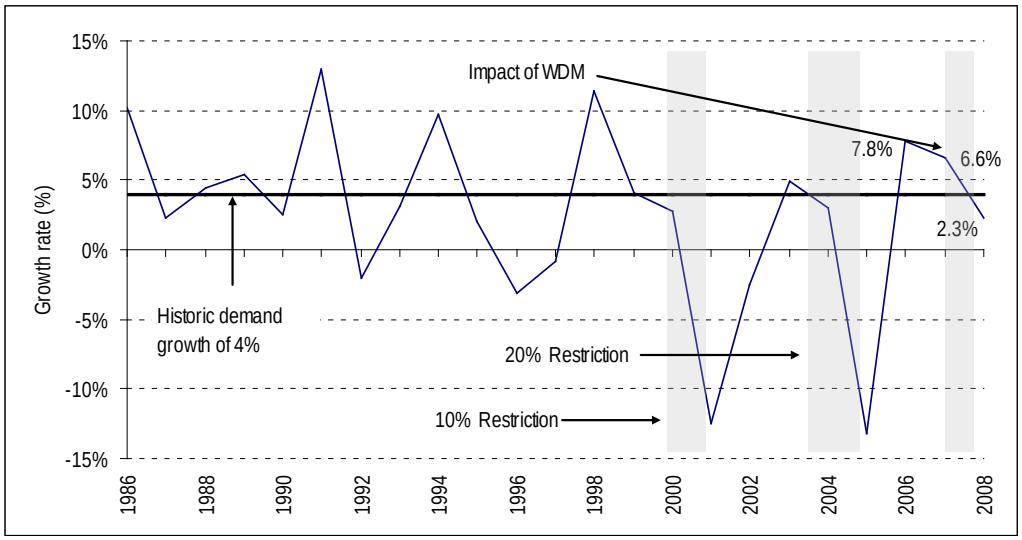
For explanation from the Preparation Guideline GOTO Ex14

F.4.1 Water Resource Management Interventions

Because water is a scarce resource, the City of Cape Town committed itself to a 10% saving on the historical demand growth rate of 4% per annum. This implies a future demand growth rate of 3.6% (4% - (4% x 10%)). There have been periods of water restrictions (For Water Restrictions Bylaw GOTO 4.1) and these were followed by the development of new schemes to expand the city's water supply.

In 2008 demand grew by 2.3%, about 10% lower than the historic demand average of 4% per annum.

37. Figure F.4.1a: Demand growth rate (1996 to June 2008)



Source: Bulk Water; GOTO In for Consultants spreadsheet (Place under 3.2 GOTO Ch4)

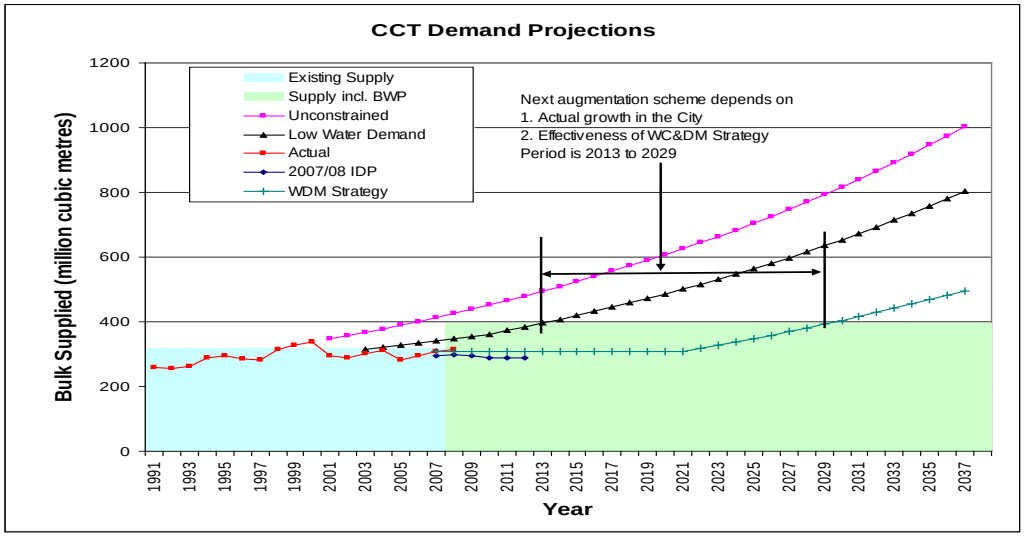
Water Conservation and Water Demand Management initiatives are the most feasible water augmentation options to meet the growing water demand for the city (SEE WATER DEMAND MANAGEMENT STRATEGY FOR NEED OF WC/WDM).

To ensure future sustainability of water demand management, the City adopted an integrated approach to water demand management and water augmentation – thus the "Integrated Water Resource Planning" (IWRP) Study. (GOTO 3.2a) (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 Branch of the City of Cape Town).

The study investigated at pre-feasibility level various water demand initiatives along with water supply augmentation schemes. GOTO IWRP-STUDY.MK.doc

One of the aims of WC/WDM is to postpone the need for further water resource augmentation scheme.

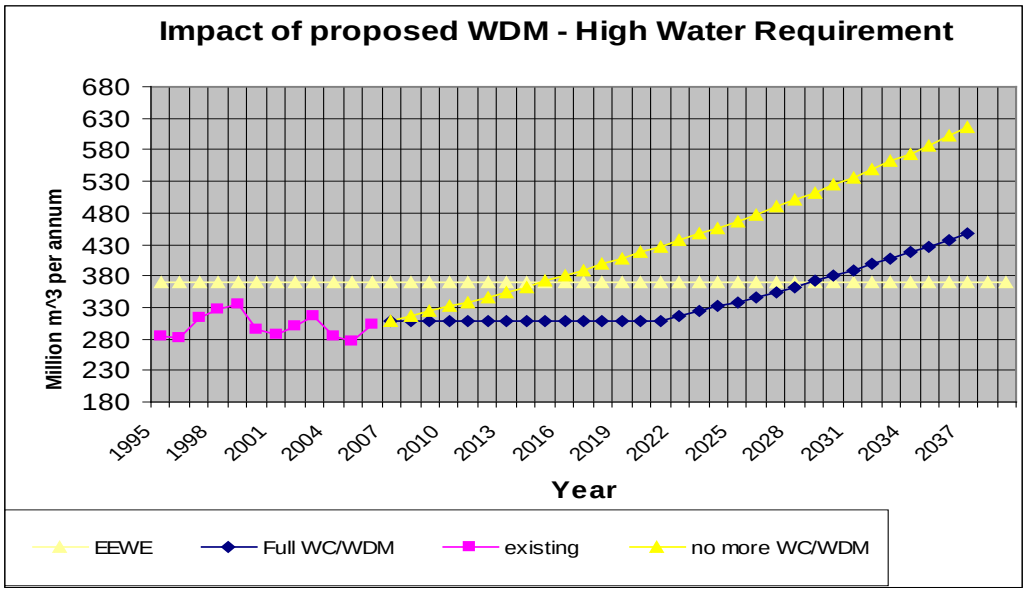
38. Figure F.4.1b: The impact of past restrictions and WC/WDM as well as proposed WDM and low water demand



Source: Bulk Water; GOTO Infor for Consultants spreadsheet (Place under 3.2 GOTO Ch4)

Bulk Water supplied a volume equal to 316 million m3 at the end of June 2008. This quantity was 79.4% of the available water supply, but 6.04% above the IDP water demand level of 298 mm3 for 2008 (FIGURE F.4.1b).

39. Figure F.4.1c: The impact of proposed WDM and high water requirements



Source: Bulk Water; GOTO Infor for Consultants spreadsheet (Place under 3.2 GOTO Ch4) ; NB: The graph was not updated for 2008 actual figures

The two figures (F.4.1b & c) indicate the requirement for a new water augmentation scheme may be postponed to 2013 (light blue line in figure F.4.1c) if water restrictions are sustained and existing water consumers push-up demand for water. In other words, If current consumption habits are maintained, then the proposed WC/WDM strategy could defer the next water augmentation scheme to **2029 (FIGURE 4.1b)**.

Based on the 2004 demand analysis and from the various discussions with various key role players it is estimated that the implementation of WC/WDM can achieve the following savings:

29. Table F.4.1a: The impact of proposed WDM and high water requirements

	From		To	
Reduction of water wastage	148	Mℓ/day	111	Mℓ/day
Reduction of inefficient water usage	210	Mℓ/day	147	Mℓ/day
Treated effluent use			65	Mℓ/day
Reduction of normal growth rate	3%		2%	

It is highly likely that the water demand can be reduced through WC/WDM by **323 Ml/day** (including 65.5 Ml/day from treated effluent re-use). The following table illustrates where the various opportunities exist within each sector. The savings achieved to date based on the 2004 demand are placed at **21 Ml/day** assuming a natural growth rate of 3.09% per annum. The savings achieved are a combination of the WDM interventions as well as the impact of the water restrictions.

The activities and the target savings that can be achieved are illustrated in the table below:

30. Table F.4.1b: The impact of proposed WDM and high water requirements

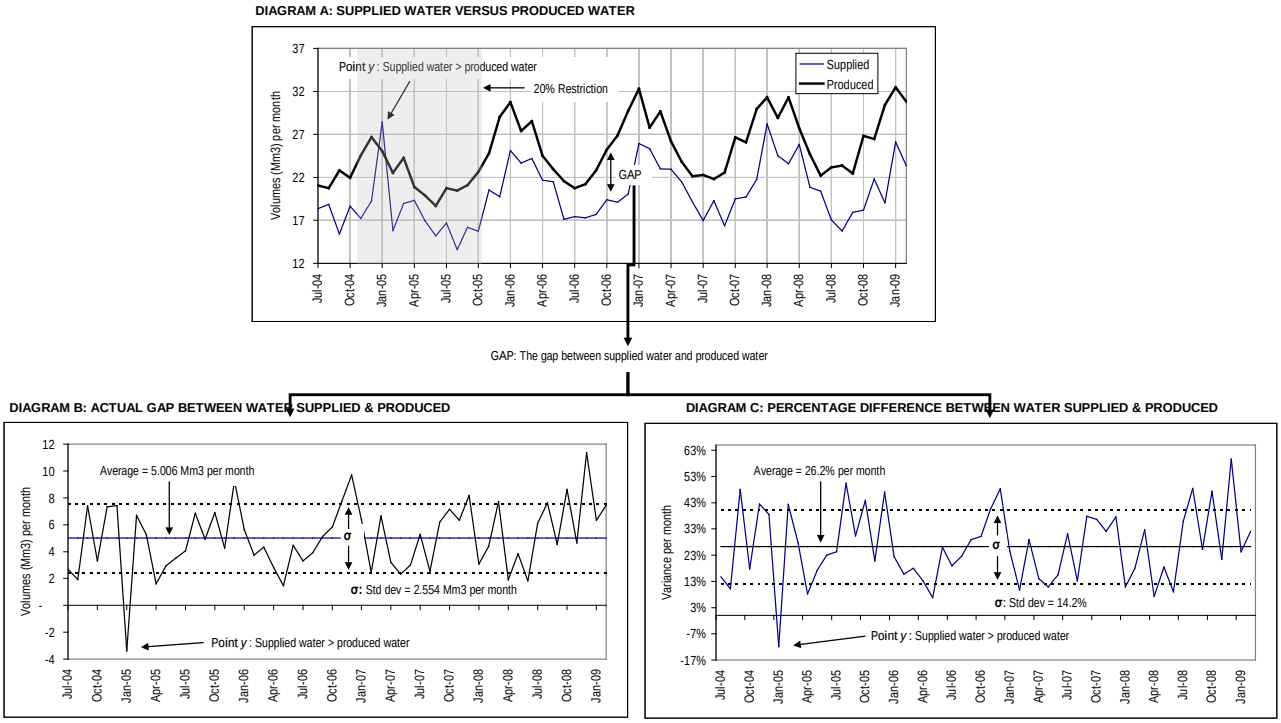
	Inefficiency component	Max Saving	% savings targetted	Target Savings (Ml/day)	Target Level (Ml/day)	Activity to achieve saving	Primary necessity
1	Reduction of UAW (leaks only)	93	40%	37.2	55.8	Comprehensive reticulation management programme	Financial sustainability of Council
2	Inefficient water consumption in poor areas	52.2	25%	13.05	39.15	Comprehensive management programme in poor communities	Financial sustainability of Council
							Affordability for consumer
3	Inefficient water consumption of business / industry	77	20%	15.4	61.6	Behaviour change Retro-fitting Leak repair	Water resource consideration
4	Inefficient water consumption of domestic	135.6	25%	33.9	101.7	Behaviour change Retro-fitting Leak repair Effective tariff	Water resource considerations
5	Recycling and alternative water resources	72	9%	6.48	65.52	Effluent recycling plants Well and bore holes rain harvesting	Water resource considerations
						Unconventional resources	
	Total	429.8	24.7%	106.03	323.77		

Source: Water Demand Management

F.4.1.1 Water resource management interventions: Situation Assessment and Implementation progress to date

The daily average water produced in 2004/5 stood at 747.7 Mℓ/day. The annual growth rate of the daily average declined from 9.4% to 2.3% in 2005/6 and 2007/8, respectively. On average, the volume of water produced has always been greater than water supplied. The gap between July 2004 and February 2009 stood around 5 Mℓ/day (FIGURE F.4.1.1a – Notes to diagram A, B & C).

40. Figure F.4.1.1a: Water produced versus water supplied (July 2004 to Feb 2009)



NOTES TO DIAGRAMS A, B and C

AVERAGES	Monthly			Daily		
	Supplied Volume m^3	Produced Volume m^3	Surplus/(deficit) Volume m^3	Supplied Volume m^3	Produced Volume m^3	Surplus/(deficit) Volume m^3
2005	18,538,994	22,429,772	3,890,778	617,966	747,659	129,693
2006	19,648,056	24,546,654	4,898,598	654,935	818,222	163,287
2007	20,731,421	25,703,957	4,972,536	691,047	856,799	165,751
2008	21,422,743	26,296,053	4,873,311	714,091	876,535	162,444

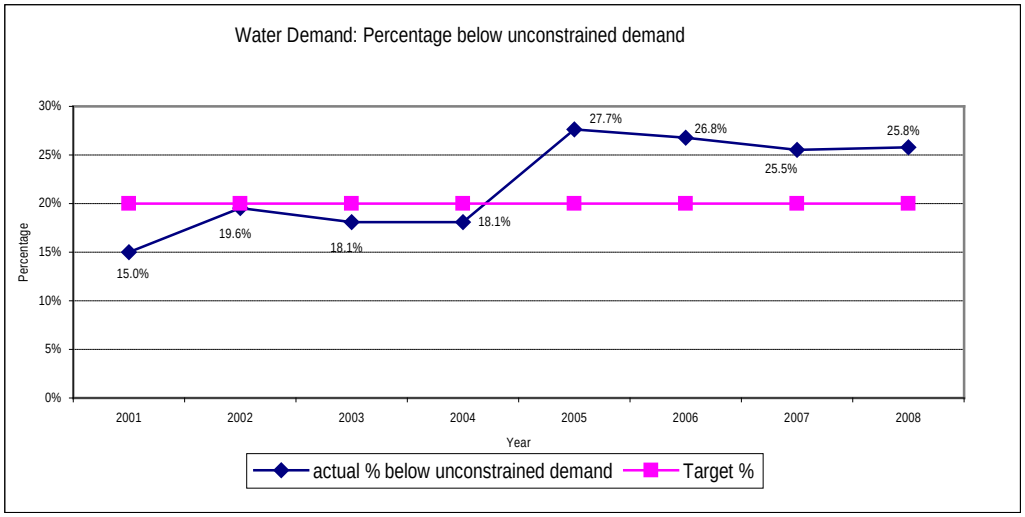
Source: Bulk Water; GOTO Infor for Consultants spreadsheet (Place under 3.2 GOTO Ch4)

The only time, where water supplied exceeded production was in January 2005 during a water restriction period (FIGURE F.4.1.1a – Diagram A). Nevertheless, water production steadily increased from an average of 22.4 Mℓ per month in 2004/5 to 26.3 Mℓ per month in 2007/8. The average monthly volumes of water produced in 2007/8 increased by 2.3%, significantly below the rate of 9.9% in 2005/6.

Diagram A in FIGURE F.4.1.1 also shows the seasonal cycles in demand – consumption peaks during summer periods, while decreasing to low levels during winter periods. The variation results from many factors including people's reaction to the variation in restriction levels, the amount of winter rains received as well as the WDM projects and programmes undertaken.

WDM aims to have actual demand below the forecast unconstrained water demand curve at the level of 20% by 2010. In 2007/8 the recorded percentage below unconstrained demand stood at 25.8%; marginally higher than the 25.5% of 2006/7.

41. Figure F.4.1.1b: The % of actual demand below unconstrained demand (2001 to 2008)



Source: Bulk Water; GOTO Infor for Consultants spreadsheet (Place under 3.2 GOTO Ch4)

The Water Demand Management Unit has initiated many projects with the intention of reducing the water demand. In addition, most of the maintenance activities of the Reticulation branch also have a Water Conservation/Water Demand Management impact, for example replacing a leaking water main.

Reduction of non revenue demand and reticulation management

F 4.1.1.1 Targets for reducing unaccounted for water and water inefficiencies

At 30 June 2008 unaccounted for water (UAW) stood at 18.8% (Source: Statistics in Monthly Report for Portfolio Committee). This is lower than level of 19.8% in 2005/6 and 19.3% in 2006/7. The target for 2010 is 16.3%.

F 4.1.1.2 Reducing high-pressures for residential consumers: urban

It is estimated that pressure reduction initiatives can lower the overall water demand by 25.02 Ml/day.

F.4.1.1.3 Reducing high pressures for residential consumers: rural

The City has a very small rural component and reducing pressures here will result in an insignificant water saving.

F4.1.1.4 Public information and education programmes

Consumers have been made aware of the need to save water through a variety of means. Many shopping malls have been targeted in the Metro together with the Airwave media. Display stands have been set up at most events held around the City including during Local Government-, Water- and Sanitation Weeks.

F4.1.1.5 Leaks Projects

The focus here was to fix leaks in domestic plumbing on private property. The following projects have been undertaken to date:

F.4.1.1.6 Leak and meter repair programme: rural

See urban.

F4.1.1.7 Working for water programme; 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 DWA 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.

F.4.1.1.8 Treated Effluent re-use

Two thirds of the City's water consumption ends up in the 22 Wastewater Treatment Works and from there the final effluent is discharged back into the environment. The opportunity for re-using the treated effluent has not yet been fully exploited. Thus far, the majority of

Golf Courses in the City are using treated effluent for irrigation purposes, as do parks and sport fields. A limited number of Industries are also benefiting from the lower tariff. The total existing average daily summer re-use as given in the "Treated Effluent Re-use Strategy April 2007" and updated with inclusion of the additional Potsdam Re-use Scheme (GOTO 4.5) is given in the table below:

31. Table F.4.1.1.8: Treated effluent re-use strategy

	Peak daily summer re-use	% of current usage	% of Daily Dry Weather Flow
Formal network distribution	56.9	58.4%	13.1%
Private Supply Schemes	14.5	14.9%	3.3%
Informal downstream re-use	10.5	10.8%	2.4%
WWTW re-use	15.6	16.0%	3.6%
TOTAL CURRENT RE-USE	97.5		18.5%

There still is a potential 62.3 ML/day to expand the use of treated effluent to more users now that Potsdam has been completed.

The major extension of the Potsdam Treated Effluent Re-use scheme has been completed. It includes a new intake chamber, two new pump stations, a filtration plant, 4km of pipeline and a 40Ml storage reservoir. This scheme is able to re-use 17Ml/day (up from the original estimated potential 12.5Ml/day) of treated effluent, saving on the same amount of potable water use. It was constructed at a cost of R19 million.

F.4.1.2 Water resource management interventions: Future trends and goals

F.4.1.2.1 Targets for reducing unaccounted for water and water inefficiencies: urban

As the implementation of the WC/DM Strategy intensifies the assumptions will be tested and the targets reviewed either up or down depending on the accuracy of the current assumptions. District management areas will be implemented throughout the Council by installing additional district meters. Leak detection activities will be intensified and a dedicated team will soon be established.

F.4.1.2.2 Leak reducing high pressures for residential consumers: urban

Further projects will be implemented and it is envisaged that pressure reducing valves will be installed in two more district management areas in the next financial year. One of the areas that will be target for pressure reduction is Atlantis (Protea Park). A city council assessment

for pressure reduction opportunities will also be carried out. The target assumptions stated above will be tested and the targets reviewed either up or down depending on the accuracy of the current assumptions.

F.4.1.2.3 Reducing high pressures for residential consumers: rural

Refer to F.4.1.2.2

F.4.1.2.4 Public information and education programmes

The following programmes/projects will be continued:

- Water and Sanitation Weeks
- Media Campaign
- School education programme and water audits
- Shopping Mall Promotions

F.4.1.2.5 Leak and meter repair programmes: urban

The following initiatives are planned for over the next two years:

- Further comprehensive demand projects will be identified and rolled out over the next 5 years. In Delft completion of project was planned for the end of 2008/09.
- The Fix-It leak projects will continue in various areas. The Fix-It leak projects targets high-volume consumers in low cost areas until such a time as a comprehensive demand project is implemented.
- A comprehensive debt management policy will begin to role out. Part of the debt management will be to introduce flow limiters (water demand management devices). The debt management policy will be implemented as part of the comprehensive demand management projects but also on an ad-hock basis for high-volume consumers in low cost areas as part of the Fix-It leak initiative.

F.4.1.2.6 Leak and meter repair programmes: rural

Refer to F.4.1.2.5

F.4.1.2.7 Working for water programme

The Working for Water Programme will continue in its current state.

F.4.1.3 Strategic Gap analysis (WRM interventions)

For explanation from SFWS GOTO Ex15

The WC/WDM strategy for Cape Town is quite a lot more challenging and comprehensive than in most other cities in South Africa. An estimated budget of over more than R 759 million of the next 10 years is envisaged to achieve the full economic potential of WC/WDM. Monitoring the effectiveness of the strategy is critical as it will impact planning for the next water resource and infrastructure schemes. The most key strategic gaps in the implementation of a WC/WDM Strategy are:

Resources

- Ensuing adequate financial resources
- Inadequate human resources to implement WC/WDM strategy
- Inadequate capacity to enforce by-laws

Technical capacity and tools

- Ineffective management information and monitoring systems
- Inadequate demand measurement systems and tools.
- Lack of key performance areas and benchmarks on a district management level and in accordance with other key classification parameters.
- Lack of adequate research on consumer behaviour and understanding.

F.4.1.4 Implementation Strategy: WC/WDM strategy

(For full document GOTO 4.2 and for Grey Water Guidelines GOTO 4.3)

The WC/WDM Strategy was developed to overcome the strategic gaps identified.

Strategy Summary Tables

32. Table F.4.1.4: The main programmes to achieve water savings.

Objective number		Programme
Objective A1	A1.1	Pressure reduction
	A1.2	Establishment of leak detection task teams
Objective A2	A2.1	Comprehensive water supply management projects in previously disadvantaged areas
	A2.2	Fix-it leak in low income areas
	A2.3	Implementation of debt management policy
Objective A3	A3.2	Preventative maintenance
Objective A4	A4.2	Meter management /replacement programme
Objective B1	B1.1	Consumer awareness campaign
	B1.2	Consumer education campaign
	B1.3	School education
	B1.4	Special events
	B1.7	2010 Soccer World cup
Objective B2	B2.2	enforcement of by-laws
Objective B5	B5.1	Implement a plumbing retro –fit programme
	B5.4	Implement an on-going support programme for large consumers
Objective E1	E1.1	Recycling of treated effluent - infrastructure
Objective E2	E2.1	Support working for water programme
Objective C1	C1.1	Establish District management areas
Objective C2	C2.1	Management Information System
	C2.2	Upgrading the telemetry system, remote communications (cell)

F.5 Water Service Infrastructure Profile

F.5.1. Water services infrastructure

F.5.1.1 Situation assessment (water services infrastructure)

Table F.5.1 shows a summary of the existing water supply and wastewater infrastructure. The current replacement value of the entire infrastructure is placed at R26 billion (see diagram A of Table F.5.1). The replacement value is about 10 times greater than reported book value of R2.6 billion (Water and Sanitation Services Annual Financial Statements, at 30 June 2008).

INFRASTRUCTURE OF WATER AND SANITATION AT BOOK VALUE AND REPLACEMENT COST

Water supply infrastructure accounted for 58.1% of book value, while wastewater infrastructure accounted for 41.9%. At replacement value, water supply infrastructure accounts for 66.35%, while wastewater infrastructure is 33.65%.

The water supply and wastewater reticulation networks jointly account for 72% of the total replacement value *(*For a full inventory of the main infrastructure, refer to the infrastructure database dated June 2003 GOTO 5.1.). The water distribution networks experienced 6,080 bursts to water mains in 2007/08 compared to 4,116 in 2006/07. The Tygerberg area suffered the most with 1,432 (or 23.55% of 2007/08 total) bursts followed by the South Peninsula region at the level of 1,258 (or 20.69% of 2007/08 total), while the Helderberg region experienced the least at 11.53% of 2007/08 total.

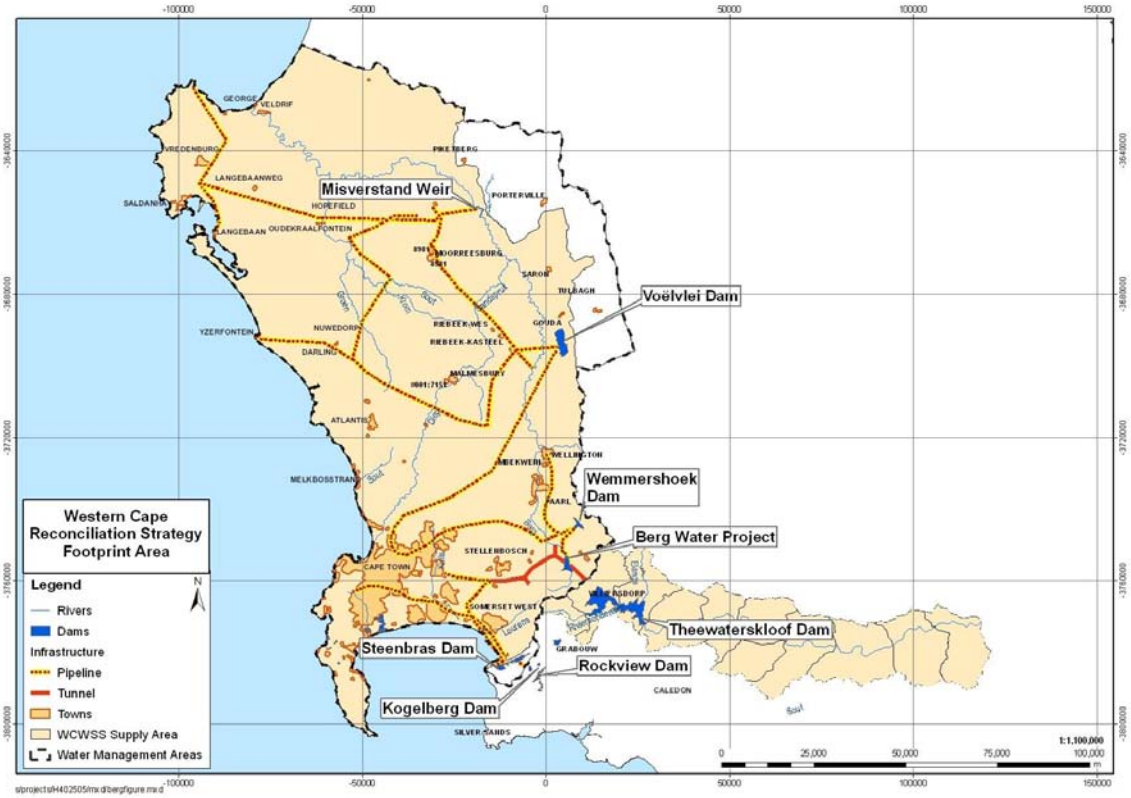
The operation and maintenance of the sewer networks improved in 2007/08:

- About 279 km of sewers were cleaned in 2007/08; this amount to a year-on-year improvement of 81.17%.
- Sand traps were cleaned 2 509 times compared to 543 in 2006/07; an improvement of 362.06%

The result was a decrease in the number of sewerage service interruptions

For further information refer to the various Master Plans and the studies on the bulk systems: (a) Bulk Water: “Computer Analysis and Master Plan for Bulk Water Supply System”; (b) Bulk Wastewater: “Strategic Evaluation of Bulk Wastewater” GOTO 5.2. Detailed reports are held at the offices of the Wastewater Treatment Branch.

42. Figure F.5.1(a) : Main Components of Bulk Water Supply Infrastructure



43. Figure F.5.1(b): Main components of Wastewater Treatment Infrastructure showing Catchments

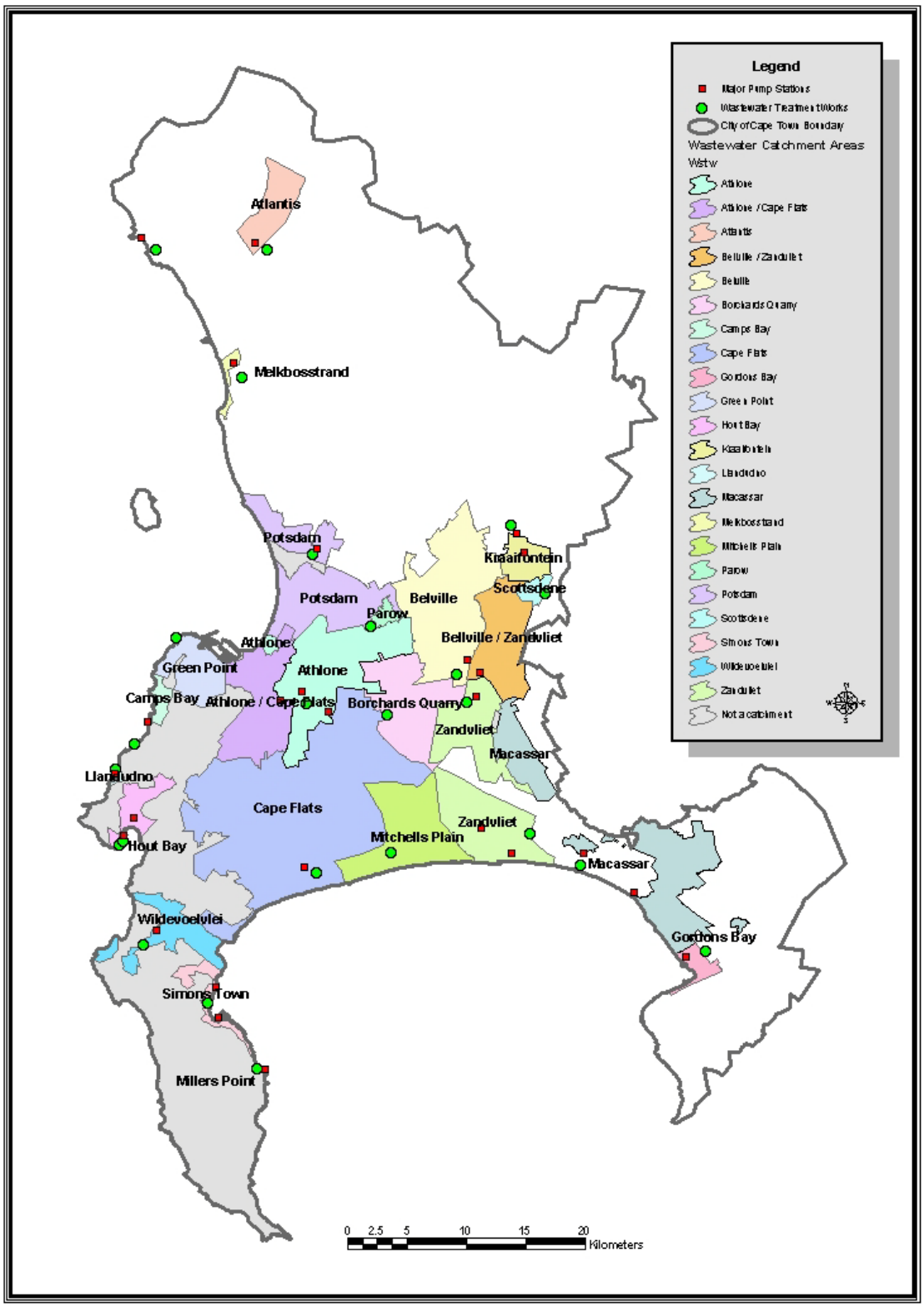


Figure F.5.1(a) and Figure F.5.1(b) shows the main components of existing bulk water and bulk wastewater infrastructure in the City of Cape Town (CCT). A Geographical Information System (GIS) and Geodatabase is on operation and maps the majority of the infrastructure along with related data.

F.5.1.1.1 Existing water supply services infrastructure

The water supply system comprises two functionally separate systems: the Bulk Water Supply System and the Reticulation distribution system. It has 12 dams, 13 water supply treatments works and a water supply reticulation network that is 10,400 kilometres long. There are 108 water pump stations, 138 water reservoirs and 21 depots.

Raw water supply is obtained from DWA and CCT owned dams and from groundwater sources.The water is directly distributed through a number of large diameter pipelines to the water treatment works and bulk storage reservoirs. The Bulk Water Supply System can be operated to minimise or maximise use from certain water resources, and this integration of operations with the Western Cape Water Supply System allows for the raw water storage to be maximised over a hydrological year. The flexibility of operation of the Bulk Water Supply System also ensures continuity of supply (within certain constraints) during planned or unplanned outages of parts of the System. This increases the overall security of supply of the water supply system.

Water is distributed from the Bulk Water System via bulk connections to the Reticulation distribution system, and then supplied to consumers through individual connections from the distribution system. There are a number of pumping stations that help 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 5.3a.

F.5.1.1.2 Brief functional description of existing main infrastructure components (urban and rural)

Refer to F.5.1.1.1

F.5.1.1.3 Existing groundwater infrastructure

Groundwater resources currently being utilised for potable water supply are Albion springs and the Atlantis Aquifers.

Albion Springs

Water from Albion Springs is treated with chlorine and lime and then pumped directly into the reticulation system of the City of Cape Town.

Atlantis Groundwater Scheme

The Atlantis Supply Scheme abstracts water from wellfields at Witsands and Silwerstroom.

The number of boreholes and abstraction potential is listed below:

33. Table F.5.1.1.3: Number of boreholes and abstraction potential for Witzands and Silwerstroom

AQUIFER	NO. OF BOREHOLES (APPROXIMATE)	ABSTRACTION POTENTIAL (MILLION m^3/a)
Witzands	30	5
Silwerstroom	14	

For a schematic of the scheme GOTO 5.5

The Witsands aquifer is artificially recharged using stormwater and treated effluent from the residential areas of Atlantis.

The Atlantis Groundwater Scheme supplies approximately half of the water demand of the Atlantis area, and is therefore a strategically important water supply scheme.

F.5.1.1.4 Existing surface water infrastructure

Only the major surface water infrastructure owned by CCT is included here in Table F.5.1.1.4. For further information on CCT (including the CCT's smaller dams) and DWA infrastructure GOTO 5.6.

34. Table F.5.1.1.4: Major surface water infrastructure

Component name	Steenbras Lower Dam	Steenbras Upper Dam	Wemmershoek Dam
Component ID			
Scheme name	Steenbras	Steenbras	Wemmershoek
Operation			
Dam safety registration?	Yes	Yes	Yes
% allocation of total consumption	8.8% for upper and lower	8.8% for upper and lower	11.9%
% of domestic allocation used	100%	100%	100%
Is the abstraction registered with DWAF?	Yes	Yes	Yes
Date of last dam safety inspection	Jan 2002	Jan 2002	April 2006
Date of last water restriction	2004/05	2004/05	2004/05
Number of water restrictions in last 5 years	1 but ongoing 10% for WC&DM purposes	1 but ongoing 10% for WC&DM purposes	1 but ongoing 10% for WC&DM purposes
Functionality			
Maintenance – none, infrequent, demand, planned	Planned	Planned	Planned
Are spare parts available?	Yes	Yes	Yes
Number of breakages / failures per year	nil	nil	Nil
Physical condition (in operation, poor, good)	Good	Good	Good
Cost of refurbishment required	t.b.d.	t.b.d.	R12m
Cost of infrastructure replacement required	n/a	n/a	n/a
Asset Assessment			
Date Constructed	1921, raised 1928, raised 1954	1977	1957
Expected total lifespan	78	78	90

Component name	Steenbras Lower Dam	Steenbras Upper Dam	Wemmershoek Dam
Estimated replacement value (Jan 2003)	R183m	R47m	R470m
Annual operating cost	t.b.d.	t.b.d.	t.b.d.
Annual maintenance cost	t.b.d.	t.b.d.	t.b.d.
Type and Capacity			
Catchment area ($km^{2)}$	68,6	29,7	86
Full supply storage capacity (m^3)	33.5 million	31.7 million	58,6 million
Type of structure (dam, rim of river, abstraction)	Dam	Dam	Dam
Spillway capacity (m^3 / sec)	600	800	770 (SEF)
Total annual assured yield (m^3 / annum)	40 million	Upper & Lower combined	54 million
Can the dam capacity be increased?	No	No	No
Capacity available for development (%)	WC System at capacity	WC System at capacity	WC System at capacity

The Berg River Dam

The Berg River Dam was completed in 2007. This was a public-private partnership (PPP) between DWAF, the City of Cape Town and TCTA. The dam is located in the upper reaches of the Berg River near Franschhoek. It has gross and net storage capacity of 130 Mm3 and 129 Mm3, respectively. The Berg River Dam increases the yield of the Western Cape Water System (WCWS) by 81 Mm^3.

Wemmerhoek Dam

The Wemmershoek Dam was completed in 1957 and is owned and operated by the City of Cape Town. The dam is situated on the Wemmershoek River in the mountains near Franschhoek and has a capacity of 58,6 Mm3. The dam has a gravel and boulder embankment with a sloping clay core.

The Wemmershoek Water Treatment Plant is situated at the base of the dam wall.

Wemmershoek Dam has a yield of 51 Mm^3/annum at 99% assurance of supply. When Wemmershoek Dam was constructed a compensation agreement involving an exchange of water rights for agricultural use, between Wemmershoek Dam and the RSE scheme was made and a 10 Mm^3 annual release is made into the Berg River from the RSE Scheme in lieu of that from the Wemmershoek Dam.

Table 3 in Annexure "A" in GOTO 5.6 sets out the main characteristics of the Wemmershoek Dam.

Steenbras Upper and Lower Dams

The construction of Steenbras Lower Dam was completed in 1921. In 1928 the dam wall was raised by 12,29 m and then raised again to its present height. The capacity of Steenbras Lower Dam is 36,2 Mm^3.

Steenbras Upper Dam was completed in 1977 and is situated 5 km upstream of Steenbras Lower Dam. Steenbras Upper Dam was constructed for a dual purpose of providing an upper reservoir for the City of Cape Town's Steenbras Pumped Storage Scheme and for supplying water for domestic/industrial use to Cape Town. The capacity of Steenbras Upper Dam is 31,7 Mm3. Both Steenbras Upper and Lower Dams are owned and operated by the CCT. Steenbras Water Treatment Plant is situated on the Western side of the Hottentots Holland Mountains and receives its water via a 752 m long tunnel from Steenbras Lower Dam.

Steenbras Upper Dam is also an integral part of the Palmiet Phase 1 system and stores water transferred via a canal from the Palmiet River.

Table 4 in Annexure "A" in GOTO 5.6 sets out the main characteristics of Steenbras Upper and Lower Dams.

The combined historic firm yield of both dams together is approximately 38 x 10^6 m^3.

Kleinplaas and Lewis Gay Dams

Kleinplaas and Lewis Gay Dams are both situated on the Woel River and have storage capacities of 1,36 Mm^3 and 0,18 Mm^3 respectively. Water is also pumped into Kleinplaas Dam from the small Rawson Reservoir in the adjacent Klawer River catchment. In 1996 the yield of the system was estimated to be 1,85 Mm^3/annum at 96% assurance. The dams are owned by the CCT and water from the two dams is treated at Brooklands Water Treatment Plant.

Table 5 in Annexure "A" in GOTO 5.6 sets out the main characteristics of the dam.

Table Mountain Dams

There are 5 dams utilised for water supply which are situated on the top of Table Mountain. All these dams are owned and operated by the CCT.

Woodhead Dam and Hely-Hutchinson Dam

The construction of Woodhead Dam was completed in 1897. The dam is on the Disa River and has a capacity of 0,955 Mm^3. The dam is a stone faced structure of cement mortar, and rubble fill.

Hely-Hutchinson Dam was completed in 1904. The dam also lies on the Disa River and acts as an extension to the Woodhead Dam. The dam has a capacity of 0,927 Mm^3. The outlet works on the Woodhead Dam feeds the water back into the Disa Gorge en route to the Twelve Apostle tunnel. Both dams are owned by the CCT and their water is treated at Kloof Nek Water Treatment Plant.

Table 5 in Annexure "A" GOTO 5.6 of sets out the main characteristics of the dams

De Villiers Dam, Victoria Dam and Alexandra Dam

The Victoria Dam was completed in 1895 and has a capacity of 0,128 Mm^3. Alexandra Dam was completed in 1903 and has a storage capacity of 0,126 Mm^3. The De Villiers Dam was completed in 1910 and holds 0,243 Mm^3 of water. All three dams are located on the Disa River, with water from Victoria Dam being discharged into the Alexandra Dam as the levels in that dam dropped, and from there into the De Villiers Dam.

F.5.1.1.5 (a) Existing wastewater treatment works infrastructure

There are 22 wastewater treatment works within CMA as tabulated below:

NAME OF WASTEWATER TREATMENT	CAPACITY (Ml/day)	% HYDRAULIC CAPACITY UTILISED (annual)	% HYDRAULIC CAPACITY USED (dry weather)	ORGANIC CAPACITY (pop equivs)	% ORGANIC CAPACITY UTLISED
Athlone	105	113	87	900 000	83
Bellville	55	114	100	581 000	90
Borcherds Quarry	33	110	107	360 000	103
Camps Bay Marine Outfall	5.5	42	40	-	-
Cape Flats	200	91	74	1 645 000	71
Fisantekraal (under construction)	24	-	-	218 000	-
Green Point Marine Outfall	40	68	64	-	-
Groot Springfontein	0.03	.01	.01	250	40
Gordon's Bay	3.1	113	94	14 000	186
Hout Bay Marine Outfall	9.6	60	55	-	-
Klipheuwel	0.05	.05	100	450	167
Kraaifontein	17.5	122	110	159 000	75
Llandudno	0.6	37	35	1 600	56
Macassar	57	59	47	370 000	39
Melkbosstrand	5.5	65	60	24 500	88
Miller's Point	0.03	100	100	600	100
Mitchells Plain	48	76	75	480 000	105
Oudekraal	0.03	100	100	300	100
Parow	1.2	83	83	6 800	93
Philadelphia	0.08	100	100	500	100
Potsdam	47	92	82	448 000	86
Scottsdene	7.5	123	123	58 000	107
Simon's Town	4	55	45	22 000	43
Wesfleur	14	71	67	152 000	56

For spreadsheet GOTO 5.3b

For a full description of bulk wastewater infrastructure GOTO 5.4a and for details of wastewater treatment works GOTO 5.4b

F.5.1.1.5 (b) Existing water treatment works infrastructure

There are 12 water treatment works owned and operated by the City of Cape Town:

35. Table F.5.1.1.5 (b): List of water treatment works owned by the City of Cape Town

WATER TREATMENT WORKS	CAPACITY (Ml/day)
Faure	500
Blackheath	420
Voelvlei	230
Wemmershoek	250
Steenbras	150
Witsands	14
Silwerstroom	3
Kloofnek	18
Constantia Nek	3
Brooklands	5
Helderberg	12
Albion Springs	4.5
TOTAL	1610

For spreadsheet GOTO 5.3.1

F.5.1.1.6 Existing pump stations infrastructure

The existing bulk water pump stations infrastructure is given below:

PUMP STATIONS ATLANTIS	NO. OF PUMPS	FLOW PER PUMP UNIT (Mℓ/day)	HEAD (m)	RATED MOTOR POWER (kW) EACH	REMARKS
Softening Plant Raw Water	3	8,4	50	55	
Softening Plant Product Water	3	9,1	8	15	
Witzands No. 1	3	7,8	120	185	
Witzands No. 2	3	7,8	120	185	
Witzands No. 3	2	8,6	71	160	
Silverstroom No. 1	2	6,0	18,5	18	

PUMP STATIONS ATLANTIS	NO. OF PUMPS	FLOW PER PUMP UNIT (Mℓ/day)	HEAD (m)	RATED MOTOR POWER (kW) EACH	REMARKS
Weir					
Silverstroom No. 2	2	5,7	110	110	
Silverstroom No. 3	2	5,7	110	110	
Silverstroom No. 4	2	5,7	110	110	
Proposed Witzands "A"	3	14,4	166	410	
Proposed Witzands "B:	3	13,9	240	575	

PUMP STATIONS	NO. OF PUMPS	FLOW PER PUMP UNIT (Mℓ/DAY)	HEAD (m)	RATED MOTOR POWER (kW) EACH	REMARKS
Wynberg No. 1	1 1	4,3 4,3	77,4	56	Pumping in parallel – 7,2 Mℓ/day
Wynberg No. 2	1	23,0	8,40	330	
Monterey	1 1	19,0 19,0	80,0 86,0	250 250	Pumping in parallel – 21,1 Mℓ /day
Garlandale	1	91,0	104,0	1 400	Variable speed motor
Kildare Road	1 1	65,4 65,4	43,6 87,2	400 400	Variable speed motor Pumping in series – 69,0 Mℓ/day
Albion Spring	1	4,8	100,00	90	
Newlands 535	1	50,0	50,0	373	
Voëlvlei Low Lift	3 2	68,1 79,5	24,0 29,0	306 429	Variable speed motor
Voëlvlei High Lift	5 1	68,1 22,7	120,0 125,0	1 313 429	Variable speed motor
Firlands	3 1	60-300	110	1 700	Variable speed motor. Maximum 300 Mℓ /day with 3 pumps

PUMP STATIONS	NO. OF PUMPS	FLOW PER PUMP UNIT (Mℓ/DAY)	HEAD (m)	RATED MOTOR POWER (kW) EACH	REMARKS
Wynberg No. 3	1	23	90	400	
	1	23	90	400	

For a full description of bulk water and bulk wastewater pumpstations GOTO 5.3a(need to be updated) and GOTO 5.4a(need to be updated) For a full description of the water and sewer reticulation pump stations refer to the individual master plans.

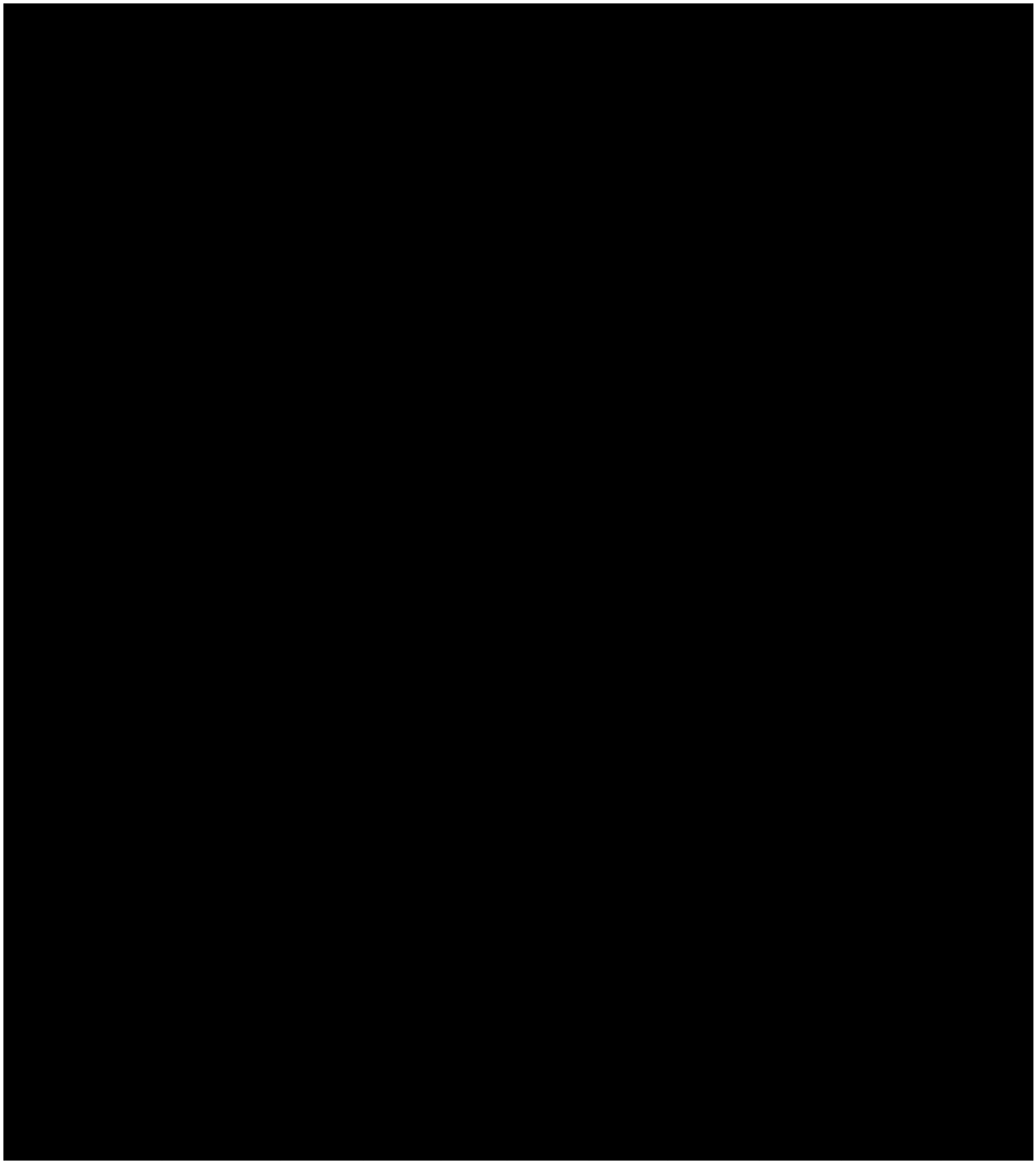
F.5.1.1.7 Existing bulk pipeline infrastructure

For a description of bulk water and bulk wastewater infrastructure GOTO 5.3a and GOTO 5.4a((need to be updated). For a full description of the water and sewer reticulation pipelines refer to the individual master plans.

F.5.1.1.8 Existing reservoir infrastructure

The main characteristics of the CCT's Bulk Water Service Reservoirs are listed in the table below:

36. Table F.5.1.1.8: Bulk Water Service Reservoirs



For a description of the reservoirs GOTO 5.3a. For a full description of the water and sewer reticulation reservoirs refer to the individual master plans.

F.5.1.1.9 Existing reticulation infrastructure (by supply zone)

The main supply zone for the city is the 110 meter system. There are a number of other water supply zones to higher areas. The supply zones also correspond to the areas of the pre-1997 local authorities.

There have been problems with the AC pipelines in Kraaifontien – this is due to the absence of slag.

F.5.1.1.10 Existing Sanitation Infrastructure

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

Replacing of stolen and broken covers is done on a routine basis and the replacement of pitch fibre replacement is approximately 25% complete.

Silt, in the Cape Flats sewers, remains a problem because of insufficient capacity.

The Lourens River to MACASSAR WWTW sewer has reached the end of its useful life and collapses are a regular occurrence.

F.5.1.1.11 Existing sewerage treatment works 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 F.5.1(b).

For a more detailed description of the bulk wastewater infrastructure refer to a document entitled “Bulk Wastewater Infrastructure” GOTO 5.4a. (The Strategic Bulk Wastewater Study completed in June 1999 GOTO 5.2 GOTO 5.2_Strategic evaluation of bulk wastewater.doc is still being used to assess performance of existing wastewater equipment, processes and management systems and identify where improvements are necessary for more effective performance)

The lack of sufficient financial investment into wastewater treatment infrastructure has had an effect on the essential maintenance and upgrading of infrastructure.

Growth in funding diverted to wastewater infrastructure has resulted in improved wastewater treatment processes, effluent quality, sludge management, effluent re-use and the creation of treatment capacity. This in turn improved the re-use potential of wastewater effluent.

37. Table F.5.1.1.11a: Wastewater Effluent Compliance (December 2009)

WASTEWATER TREATMENT: EFFLUENT COMPLIANCE WITH STANDARD - YEAR TO DEC 2009

	SUSPENDED SOLIDS			CHEMICAL OXYGEN DEMAND			AMMONIA			E COLI		
WWTW	Samples Taken	No. Complied	% Complied	Samples Taken	No. Complied	% Complied	Samples Taken	No. Complied	% Complied	Samples Taken	No. Complied	% Complied
Athlone	52	47	90.4	52	50	**96.2**	52	45	86.5	47	2	**4.3**
Bellville	50	17	***34.0***	50	26	***52.0***	50	27	***54.0***	39	0	**0.0**
Borcherds Quarry	52	33	***63.5***	52	33	***63.5***	52	27	***51.9***	44	12	**27.3**
Cape Flats	51	29	***56.9***	51	28	***54.9***	51	16	***31.4***	44	27	**61.4**
Gordons Bay	52	52	**100.0**	51	51	**100.0**	52	48	92.3	44	38	86.4
Klipheuwel	37	27	***73.0***	36	21	***58.3***	39	18	***46.2***	37	30	81.1
Kraaifontein	51	45	88.2	51	35	***68.6***	51	18	***35.3***	44	41	93.2
Llandudno	51	44	86.3	51	49	**96.1**	51	51	**100.0**	46	39	84.8
Macassar	52	46	**88.5**	52	51	**98.1**	52	48	92.3	44	41	93.2
Melkbosstrand	43	43	**100.0**	42	42	**100.0**	43	43	**100.0**	33	31	93.9
Millers Point	52	50	**96.2**	51	32	***62.7***	52	33	***63.5***	46	16	**34.8**
Mitchells Plain	52	49	94.2	52	50	**96.2**	52	50	**96.2**	44	22	**50.0**
Oudekraal	49	36	***73.5***	48	47	**97.9**	49	48	**98.0**	46	38	82.6
Parow	50	49	**98.0**	50	49	**98.0**	50	45	90.0	43	37	86.0
Potsdam	52	51	**98.1**	52	51	**98.1**	52	51	**98.1**	47	22	**46.8**
Scottsdene	51	23	***45.1***	50	30	***60.0***	51	46	90.2	44	17	**38.6**
Simons Town	52	51	**98.1**	52	17	***32.7***	52	46	88.5	44	32	**72.7**
Wesfleur - Dom	51	51	**100.0**	51	51	**100.0**	51	51	**100.0**	45	43	**95.6**
Wesfleur - Ind	51	51	**100.0**	51	44	86.3	51	49	**96.1**	45	35	77.8
Wildevoelvlei	52	52	**100.0**	52	52	**100.0**	52	52	**100.0**	46	46	**100.0**
Zandvliet	51	41	**80.4**	51	42	82.4	51	7	***13.7***	48	44	91.7
TOTAL/MEANS	1,054	887	84.2	1,048	851	81.2	1,056	819	77.6	920	613	***66.6***

NOTES:
1. Sea outfalls not included
2. Compliance of 95% or greater is shown in **bold**
3. Compliance of less than 75% is shown in ***bold***
4. No effluent discharged from Dover or Philadelphia - all lost by evaporation and seepage

			year to Dec 2008
MEAN COMPLIANCE - CHEMICAL PARAMETERS - %	**81.0**	simple mean	**80.6**
MEAN COMPLIANCE - BACTERIAL PARAMETERS - %	**66.6**	simple mean	**65.8**
MEAN COMPLIANCE - OVERALL - %	**77.4**	simple mean	**76.9**

(equal weighting used for parameters)

Source: Scientific Services

All of the City's 22 WWTWs have to be upgraded to meet the DWA's requirements. At the end of June 2008, the average compliance level of treated effluent quality stood at 80% - see table F.5.1.1.11. Wastewater treatment received an investment of R129.4 million in 2007/08; the budgeted wastewater capital investment for 2008/09 stands at R288.4 million.

The statistics applicable to the existing wastewater treatment works and sewer outfalls are contained in the following tables. For the spreadsheet of these tables GOTO 5.7a

A schedule of the Wastewater Treatment Works outline key characteristics and other data is given in the following tables. The following abbreviations apply to the tables that follow:

AS = Activated Sludge;

BF = Bio filters;

RDU = Rotating Disc Unit;

Ox Pond = Oxidation Ponds

LA = Land application;
Comp = composting
to other = liquid sludge take to another treatment works for handling
ind = industrial re-use;
irrig = used for irrigation
volume recycled is estimated
no (GA) = covered by General Authorisation
Wesfleur eff comp.: 1st fig = Dom, 2nd fig = Ind.
GW recharge = groundwater recharge

38. Table F.5.1.1.11a schedule of the Wastewater Treatment Works

Component name	Athlone	Bellville	Borcherds Quarry	Camps Bay	Cape Flats	Dover	Gordons Bay	Green Point	Hout Bay
Component ID	ATH	BEL	BOR	CBY	CAP	DOV	GOR	GRN	HBY
Scheme name									
Institutional status									
Current owner	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT
Current operator	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT
Future owner / WSA (If applicable)	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT
Future operator / WSP (If applicable)	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT
Asset assessment									
Date constructed	1920's	1950's	1973	1978	1960's	1984	1994	1985	1993
Expected total lifespan	>2020	>2020	>2020	>2020	>2020	>2020	>2020	>2020	>2020
Estimated replacement value (based on R7 million/Ml)	R700 M	R350 M	R210 M	R35 M	R1 400M	R0.1M	R25 M	R210 M	R63 M
Annual operating cost (2008/2009 FY)									
Annual maintenance cost (2008/2009FY)									
Cost per kl									
Type (process) & capacity									
Type of plant	AS	AS	AS	Sea Outfall	AS	Ox Pond	AS	Sea Outfall	Sea Outfall
Design Capacity - Hydraulic Load (Ml/day)	105	54.6	33	5.5	200	0.02	3.1	40	9.8
Present hydraulic loading (Annual daily average)	120	58.3	32.0	2.2	176	0.01	3.7	30.0	5.9
How much capacity is still available for development? (%)	NIL	NIL	3	60	12	50	NIL	33	40
Design Capacity - Organic Load (COD kg/day)	99,000	63,930	39,600	2,200	180,000	-	1,530	25,600	8,820
Design Capacity - Organic Load - population equivalents	900,000	581,182	360,000	40,000	1,650,000	-	13,909	232,727	80,182
Present Organic loading - pe's (annual daily average)	779,000	529,000	400,000	17,300	1,094,000	-	22,000	168,000	40,000
How much capacity is still available for development? (%)	13	9	NIL	57	34	50	NIL	28	50
Inlet meter (type)	Mag + flume	open flume	open flume	magnetic	open flume	none	magnetic	magnetic	Magnetic
Operation									
Permitted effluent volume (Ml/annum)	73,000	14,691	12,045	2,000	91,250	-	1,290	10,950	3,600
Total volume of water received and treated per year (Ml)	44,141	21.301	12,.863	906	64,325	2	1,349	10,227	2,161
Discharge volume (Ml/annum) (2008/2009)	44,141	20,469	11,174	804	53,303	2	1,048	9,841	1,731
Volume of effuent recycled (Ml/annum)	0	832	365	0	353	0	1	0	0
Applications of recycled effluent (i.e. irrigation, mining, etc)	-	ind + irrig	irrig	-	irrig	-	Irrig	-	-
Operating hours per day (manned hours per day)	24	24	24	0	24	0	8	8	8

Component name	Athlone	Bellville	Borcherds Quarry	Camps Bay	Cape Flats	Dover	Gordons Bay	Green Point	Hout Bay
Discharge into (description of source)	river	river	river	sea	sea	evap.	river	sea	Sea
Does raw wastewater contain industrial effluent?	yes	yes	yes	no	yes	no	no	no	Yes
Industrial Effluent control (by whom)	own staff	own staff	own staff	own staff	own staff	-	own staff	own staff	own staff
Solid waste disposal - grit& screenings (m^3/annum)	2,300	1,200	1,750	150	4,000	-	300	550	150
How is sludge dewatered	Prim to beds, Sec to Cape Flats	mech	mech	-	mech	-	To Macassar WWTW	-	-
Sludge produced (m^3/annum)	9,125	36,500	23,500	-	15,000	-	375	-	-
Solids content of sludge as removed offsite (%)	40	14	17	-	95	-	1	-	-
Annual mass on dry basis (Tons)	3,650	5,110	4,015	-	14,235	-	See Macassar	-	-
Is sludge used beneficially? If so how	Some is LA, rest stockpiled	LA	Compost + LA	-	fuel	-	-	-	-
How often is water quality monitored? (state frequency)	weekly	weekly	weekly	weekly	weekly	never	weekly	weekly	Weekly
What laboratory is used?	own	own	own	own	own	-	own	own	Own
Is stormwater infiltration an operating problem (yes/no)	no	yes	no	no	no	no	yes	no	No
Legislative requirements									
DWAF Permit Number	933B	476B	1457B	1527B	1504B	NONE	2097B	1474B	2070B
Date of issue	09/03/1981	11/10/1979	17/01/1991	24/06/1992	19/02/1992	-	18/10/2001	24/05/1991	01/09/2000
Still valid (yes/no)	Yes	Yes	Yes	Yes	Yes	-	No	Yes	No
Has licence ito National Water Act been applied for.	yes	yes	yes	yes	yes	no (GA)	yes	yes	Yes
Effluent Quality (Fin Year 2008/2009)									
Compliance with Suspended Solids Standard	94	27	64	-	44	-	100	-	51
Compliance with Chemical Oxygen Demand Standard	96	29	60	-	46	-	100	-	69
Compliance with Ammonia Standard	92	39	51	-	42	-	94	-	88
Compliance with E Coli Standard	2	0	22	-	66	-	97	-	-
Functionality									
Describe the physical condition (in operation, poor, good)	fair to good	fair to good	fair to good	good	reasonable	good	good	reasonable	Good
How well is the infrastructure maintained?	reasonable	reasonable	reasonable	good	reasonable	good	good	reasonable	Good
Are spare parts readily available? (Yes/No)	yes	yes	yes	yes	yes	N/A	yes	most yes	Yes
Number of breakages / failures per year	>10	>10	>10	<10	>10	nil	<10	>10	<10
What needs to be refurbished? (cost)	digesters	nil	mat. ponds	nil	digesters	nil	nil	fine screens	Nil
What needs to be replaced? (cost)	Digester mixing	inlet screens	belt press, centrifuge	nil	Blower filters, bridges	nil	nil	fine screens, pumps	Nil
What additional processes are required	Disinfection, sludge dewatering	maturation ponds, disinfection	disinfection	nil	nil	nil	nil	odour control	Nil
Does the works need to be extended within 5 years?	Yes, maybe	yes	no	no	no	no	yes	no	No

Component name	Klipheuwel	Kraaifontein	Llandudno	Macassar	Melbosstrand	Millers Point	Mitchells Plain	Oudekraal	Parow
Component ID	KLI	KRA	LLA	MAC	MEL	MIL	MIT	OUD	PAR
Scheme name									
Institutional status									
Current owner	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT
Current operator	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT
Future owner / WSA (If applicable)	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT
Future operator / WSP (If applicable)	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT
Asset assessment									
Date constructed	2000	1971	1973	1978	1977	1996	1976	1996	1976
Expected total lifespan	>2020	>2020	>2020	>2020	>2020	>2020	>2020	>2020	>2020
Estimated replacement value (based on R7 million/Ml)	R1 M	R100 M	R2 M	R350 M	R40 M	R1 M	R315 M	R1 M	R10 M
Annual operating cost (2008/2009 FY)									
Annual maintenance cost (2008/2009FY)									
Cost per kl									
Type (process) & capacity									
Type of plant	RDU	AS + BF	RDU	AS	AS	RDU	AS	RDU	AS
Design Capacity - Hydraulic Load (Ml/day)	0.07	17.5	0.3	57	5.4	0.06	45	0.03	1.2
Present hydraulic loading (Annual daily av.) (2008/09)	0.07	21.5	0.3	33.5	3.5	0.05	36.9	0.03	1.1
How much capacity is available for development? (%)	NIL	NIL	NIL	40	35	10	18	NIL	10
Design Capacity - Organic Load (COD kg/day)	50	17,500	175	40,755	2,700	66	52,800	33	748
Design Capacity - Organic Load - population equivalents	450	159,091	1,591	370,500	24,545	600	480,000	300	6,800
Present Organic loading - pe's (annual daily average)	450	138,000	880	134,000	21,800	550	442,000	300	7,300
How much capacity is still available for development? (%)	NIL	10	45%	65	11	10	8	NIL	NIL
Inlet meter (type)	Open flume	open flume	magnetic	open flume	open flume	none	open flume	none	open flume
Operation									
Permitted effluent volume (Ml/annum)	-	2,810	114	13,280	5,475	-	9,024	1	438
Volume of water received and treated per year (Ml)	30	7,846	106	12.243	1,288	22	13.472	22	413
Discharge volume (Ml/annum)	30	7,588	106	11,909	644	22	13,472	22	219
Volume of eff`luent recycled (Ml/annum)	0	*258*	0	334	644	0	0	0	194
Applications of recycled effluent (i.e. irrigation, mining)	0	irrig	-	irrig	irrig	-	-	-	irrig
Operating hours per day (manned hours per day)	0	24	0	24	8	0	24	0	8

Component name	Klipheuwel	Kraaifontein	Llandudno	Macassar	Melbosstrand	Millers Point	Mitchells Plain	Oudekraal	Parow
Discharge into (description of source)	evaporation	river	sea	river	river	sea	sea	Sea	stormwater
Does raw wastewater contain industrial effluent?	no	Yes	no	no	no	no	no	No	no
Industrial Effluent control (by whom)	-	own staff	-	-	-	-	-	-	-
Solid waste disposal - grit& screenings (m^3/annum)	12	620	25	500	300	12	2,000	12	50
How is sludge dewatered	to other	mech	to other	mech	beds	to other	Mech	to other	to other
Sludge produced (m^3/annum)	-	7,500	-	26,000	639	-	36,500	-	-
Solids content of sludge as removed offsite (%)	1	17	1	14	40	1	19	1	0.5
Annual mass on dry basis (Tons)	-	1,278	-	3,650	256	-	5,110	-	-
Is sludge used beneficially? If so how									-
How often is water quality monitored? (frequency)	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly	weekly
What laboratory is used?	own	own	own	own	own	own	Own	Own	own
Is stormwater infiltration an operating problem (yes/no)	no	yes	no	no	no	no	No	No	no
Legislative requirements									
DWAF Permit Number	Nil (GA)	459B	494B	904B	2026B	NIL (GA)	934B	1682B	456B
Date of issue	-	05-04-1988	08-05-1984	02-11-1988	20-01-2000	-	09-03-1981	22-07-1996	12-03-1987
Still valid (yes/no)	-	Yes	Yes	Yes	Yes	-	Yes	No	Yes
Has licence ito National Water Act been applied for.	NO (GA)	Yes	NO (GA)	Yes	Yes	NO (GA)	Yes	NO (GA)	NO (GA)
Effluent Quality (Fin Year 2008/2009)									
Compliance with Suspended Solids Standard	85	98	92	92	100	90	98	90	94
Compliance with Chemical Oxygen Demand Standard	54	74	100	98	100	38	98	88	96
Compliance with Ammonia Standard	47	48	100	100	100	79	100	88	88
Compliance with E Coli Standard	81	83	80	91	83	55	46	74	93
Functionality									
Describe the physical condition (in use, poor, good)	good	fair to good	good	fair	good	good	Fair, some poor	good	good
How well is the infrastructure maintained?	good	reasonable	good	reasonable	good	good	reasonable	good	good
Are spare parts readily available? (Yes/No)	yes	yes	yes	most yes	yes	yes	most yes	Yes	most yes
Number of breakages / failures per year	<10	>10	<10	>10	<10	<10	>10	<10	<10
What needs to be refurbished? (cost)		Mat. Ponds							aerators
What needs to be replaced? (cost)		Grit removal							
What additional processes are required	nil	Nil	nil	nil	nil	nil	disinfection	nil	Nil
Does the works need to be extended within 5 years?	yes	Yes	Yes	no	yes	yes	no	no	Yes

Component name	Philadelphia	Potsdam	Scottsdene	Simons Town	Wesfleur	Wildevoelvlei	Zandvliet
Component ID	PHI	POT	SCO	SI,	WES	WIL	ZAN
Scheme name							
Institutional status							
Current owner	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT
Current operator	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	WSSSA
Future owner / WSA (If applicable)	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT
Future operator / WSP (If applicable)	CoCT	CoCT	CoCT	CoCT	CoCT	CoCT	WSSSA
Asset assessment							
Date constructed	1996	1957	1976	1970	1978	1976	1989
Expected total lifespan	>2020	>2020	>2020	>2020	>2020	>2020	>2020
Estimated replacement value (based on R7 million/Ml)	R0.5 M	R330 M	R84 M	R35 M	R100 M	R100 M	R500 M
Annual operating cost (2008/2009 FY)							
Annual maintenance cost (2008/2009FY)							
Cost per kl							
Type (process) & capacity							
Type of plant	Ox Pond	AS	AS	BF	AS	AS	AS
Design Capacity - Hydraulic Load (Ml/day)	0.086	47	7.5	4	14	14	72
Present hydraulic loading (Annual daily average)	0.1	40.9	9.1	2.2	9.8	11.4	68
How much capacity is still available for development? (%)	NIL	13	24	45	30	9	NIL
Design Capacity - Organic Load (COD kg/day)	55	49,280	6,380	2,432	16,800	9,460	41,300
Design Capacity - Organic Load - population equivalents	500	448,000	57,955	22,113	152,727	86,000	375,455
Present Organic loading - pe's (annual daily average)	500	371,000	59,000	10,300	86,800	77,600	475,000
How much capacity is still available for development? (%)	NIL	17	NIL	50	43	10	NIL
Inlet meter (type)	none	open flume	open flume	open flume	open flume	open flume	open flume
Operation							
Permitted effluent volume (Ml/annum)	-	14,700	2,140	730	2,372	2,555	16,790
Total volume of water received and treated per year (Ml)	31	14,943	3,315	795	3,575	4,164	24,944
Discharge volume (Ml/annum)	31	9,659	3,227	795	0	4,164	24,944
Volume of effuent recycled (Ml/annum)	NIL	5,284	88	NIL	3,575	NIL	NIL
Applications of recycled effluent (i.e. irrigation, mining, etc)	-	ind + irrig	irrig	-	GW recharge	-	-
Operating hours per day (manned hours per day)	0	24	24	8	8	8	24
Discharge into (description of source)	evaporation	river	river	sea	GW recharge	vlei	river
Does raw wastewater contain industrial effluent?	no	yes	no	no	yes	no	no
Industrial Effluent control (by whom)	-	own staff	-	-	own staff	-	-

Solid waste disposal - grit& screenings (m³/annum)	-	1,000	300	150	300	300	3,000
How is sludge dewatered	-	mech	beds	beds	beds	mech	mech
Sludge produced (m³/annum)	-	27,800	2,050	200	2,500	5,700	37,200
Solids content of sludge as removed offsite (%)	-	18	40	40	40	14	14
Annual mass on dry basis (Tons)	-	5,000	820	75	1,000	800	5,200
Is sludge used beneficially? If so how (LA = land application)	-	composting, LA	LA	no	LA	no	LA
How often is water quality monitored? (state frequency)	Weekly	weekly	weekly	weekly	weekly	weekly	weekly
What laboratory is used?	own	own	own	own	own	own	own
Is stormwater infiltration an operating problem (yes/no)	no	yes	no	no	no	no	no
Legislative requirements							
DWAF Permit Number	NONE (GA)	2076B	1616B	372B	777B	754B	1507B
Date of issue	-	09/05/2000	20/01/1995	13/09/1983	01/03/1979	25/08/1978	30/04/1992
Still valid (yes/no)	-	No	Yes	Yes	Yes	Yes	Yes
Has licence ito National Water Act been applied for.	no (GA)	yes	yes	yes	yes	yes	yes
Effluent Quality (Fin Year 2008/2009)					Dom/Ind		
Compliance with Suspended Solids Standard	no effluent	100	82	90	100/96	100	81
Compliance with Chemical Oxygen Demand Standard	no effluent	100	90	28	100/83	100	87
Compliance with Ammonia Standard	no effluent	98	96	88	100/96	100	21
Compliance with E Coli Standard	no effluent	57	63	76	98/62	100	88
Functionality							
Describe the physical condition (in operation, poor, good)	good	fair to good	fair	fair	good	good	good
How well is the infrastructure maintained?	good	reasonable	fair	fair	reasonable	good	good
Are spare parts readily available? (Yes/No)	N/A	most yes	yes	most yes	yes	yes	yes
Number of breakages / failures per year	NIL	>10	<10	<10	>10	<10	<10
What needs to be refurbished? (cost)	nil	nil	reactors	Sed tanks	inlet mech's	nil	nil
What needs to be replaced? (cost)	nil	inlet works	inlet works	bio-filter medium	screens	nil	nil
What additional processes are required	pump to emergency pond	Chemical phosphate removal	sludge mechanical dewatering	recycle pumping system	Sludge mechanical dewatering	nil	Maybe chem. Phpsphate removall
Does the works need to be extended within 5 years?	yes	yes	In progress	no	yes	yes	being extended

Capacities versus flow/load for WWTWs

Catchment 1

Kraaifontein's flows are above the hydraulic capacity and Bellville's flows are above the hydraulic capacity; catchment 1 has very little spare capacity. GOTO F 5.1.1.11 a

Catchment 2

Construction of reticulation pipe network for the treated effluent from Athlone Waste Water Treatment Works -The project has progressed to its final stage, proposed dates for the completion and hand over is end June. Bocherds Quarry is near to its maximum capacity hydraulically and overloaded organically. The Cape Flats is at maximum hydraulic capacity. GOTO F 5.1.1.11 b

Catchment 3

Gordon's Bay has reached hydraulic capacity and is overloaded organically; Macassar is near its organic capacity and Zandvliet is near its hydraulic capacity (and is overloaded organically). GOTO F 5.1.1.11 c

Catchment 4

Catchment 4 has sufficient capacity for both hydraulic and organic load.

Potsdam WWTW:

The Upgrades of Pump station and arkal filtration tender of Treated effluent pump station at Potsdam WWTP, Project has come to a completion phase. The proposed date for the hand over is 28 June 2009.

Catchment 5

The WWTWs and the catchment have spare capacity hydraulically and organically.

F.5.1.1.12 Schemes to be transferred: water

There are no water schemes to be transferred.

F.5.1.1.13 Schemes to be transferred: sanitation

There are no sanitation schemes to be transferred.

F.5.1.1.14 Schemes to be rehabilitated

Many of the components of the existing wastewater treatment works need to be rehabilitated or upgraded while at the same time the works require extension. The following wastewater schemes are in the process of being rehabilitated and or extended:

Scottsdene WWTW: The installation of new mechanical screens and grit removal facilities commenced at the inlet works.

Mitchells Plain WWTW: The installation of an additional sludge dewatering belt press continued, together with the replacement of aeration pipework in four biological reactors, and mixers in the equalisation basins. R9 M was spent.

Operational performance

With regards to the operation of the wastewater treatment works, a progressive improvement in effluent quality is being achieved. The overall compliance with chemical and bacteriological parameters in 2007/08 is 80% compared to 81.3% in 2006/07. The target for compliance is a minimum of 95% in June 2012.

F.5.1.2 Future trends and goals (water services infrastructure)

Draft 15.03.07vx2.2 of the IDP states:

Strategic Focus Area 2: Sustainable Urban Infrastructure and Services

A small percentage of the city's increasing population does not have access to basic services. Increasingly-stressed infrastructure is impairing sustainable service delivery, social development and economic growth in Cape Town. The reality is that all the infrastructure requirements are constrained by the limitations of the current budget and the financing models. The City's Water and Sanitation objective includes:

2.1 Reduce backlogs in line with national objectives for basic services.
2.2 Large or bulk infrastructure programmes that are essential must receive priority.
2.3 Develop an integrated programme approach to infrastructure and service planning and budgeting.
2.4 Develop demand management programmes for water, electricity, waste and transport and reduce attendant pollutants.

F.5.1.2.1 New infrastructure to be built

The infrastructure to be built is contained in the Bulk Water, Wastewater Treatment and Reticulation master plans.

A summary of new infrastructure to be built is contained in the sections F.5.1.2.2, F 5.1.2.3 and F.5.1.2.4. For diagram of priority investment GOTO 5.7c

F.5.1.2.2 Future internal and connector infrastructure

The growth rate of the City is driving the need for new infrastructure. 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.

West Coast/Parklands development corridor

Apart from the normal reticulated infrastructure, a number of larger pipes are required.

Water

A 1,000mm diameter main feeder from a new connection on the bulk Voëlvlei pipeline will be constructed – leading to 1 or 2 new reservoirs as described under Bulk Water.

Sewer

The biggest constraint for development was wastewater treatment capacity at Potsdam WWTW – addition capacity of 7 Mℓ/day at Potsdam WWTW in 2007/8.

Additional capacity in the Blaauwberg area of 20 Mℓ/day will be required by 2013. An EIA is underway to review the Potsdam/Melkbos waste water treatment strategy; subject to the outcome either Potsdam to be capacitated to more than 47Mℓ/day or a new works to be constructed at Melkbos.

De Grendel / N7 development corridor

The area is on the East of the N7 between Plattekloof Township and Contermanskloof. The installations of services for the first two (of four) phases is complete.

Water

There is a need for a reservoir – it will be constructed closer to the time when the corridor is fully developed. In the interim the water will be boosted and the same booster installation will be used to pump water to the future reservoir. Water is supplied from the Voëlvlei system.

Sewer

The sewer master plan required a south western and north western bulk sewer to Potsdam for the corridor. Negotiations with the land owners have led to an upsized south western bulk sewer crossing the N7. The south western bulk sewer is more economical than the alternative and will be able to serve the whole corridor.

Northern development corridor

The area north and north-east of Durbanville and Kraaifontein is in desperate need of infrastructure to support development.

Water

Two reservoirs will need replacement in future. The new supply system from the Voëlvlei pipe is already in operation. A further requirement is to optimise pressure zones and to reduce the volume of water supplied by booster installations.

Sewer

The Fisantekraal WWTW to be operational by 2010/11.

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 as part of the new development.

Sewer

The master plan for this area indicates that major infrastructure is required. A new bulk sewer, a new bulk pump station and upgrading of the Bellville WWTW will be required.

Macassar / AECI development corridor

The area is vast and major infrastructure is required.

Water

The current water reticulation appears to be adequate for the needs.

Sewer

Major infrastructure is required to provide capacity for the proposed development as well as backlog capacity for existing areas already approved.

Fast-track, In-fill housing projects and growth

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 raises the need for a new bulk sewer to serve the entire catchment.
- The proposed development at Wingfield will require the completion of the final phase of the Northern area sewer to Langa Pump Station.
- The Ysterplaat proposed development will require bulk infrastructure to the Athlone WWTW.

F.5.1.2.3 Future bulk supply infrastructure

The planning and development of major water resource schemes, like the Berg Water Project, is usually followed 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 to produce potable water and then the conveyance and bulk storage of the treated water.

Specialist consultants were appointed to conduct a Bulk Water Supply System master planning study. 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;
- Assist in the planning and optimization of future capital works.

The Bulk Water Master Plan was reviewed and revised in 2005.

The following Bulk Water infrastructure is required to ensure that Bulk Supply System can continue to meet the future peak demand for water.

Bulk Water Augmentation Scheme

The construction of the Berg River Scheme was completed in 2008, increasing the raw water available to the City by 81 million m^3 per annum.

Bulk water supply infrastructure is now required to increase the water treatment, bulk storage and conveyance capacity of the City's bulk water supply system to ensure that this system can continue to supply water during peak demand periods.

The Bulk Water Augmentation Scheme (BWAS) has been proposed to increase the capacity of the City's bulk water supply system.

The BWAS essentially consists of a 500Ml/day water treatment plant (WTP), two 300Ml bulk storage reservoirs, a raw water pipeline supplying water from the Berg River Scheme to the new WTP and pipelines conveying water from the WTP into the existing bulk water supply system.

The new WTP and bulk storage reservoir will be situated in the Muldersvlei area. The final site will be determined at the completion of the environmental impact assessment process currently being conducted.

Although water can currently be supplied from the Berg River Scheme to Cape Town through the Riviersonderend (RSE) Tunnel System from the Theewaterskloof Scheme, the water cannot be fully or effectively utilised due to the treatment and conveyance capacity limits of the current bulk water system. Currently, 40% of the water supplied to the City is conveyed through the RSE Tunnel system. This represents a significant risk to the assurance of water supply to Cape Town should an event occur that results in the tunnel having to be shut down for an extended period.

The BWAS will be an alternative supply from both the Theewaterskloof and Berg River Schemes, significantly increasing the security of supply of water to the City, specifically during high demand periods. The Scheme will increase the operational flexibility of the City's bulk water supply system by allowing continuity of supply during unplanned system problems and outages, and enable better optimisation and maximisation of the raw water resources of the Western Cape Water Supply System during the hydrological year.

The City is conducting an environmental impact assessment for the WTP, bulk reservoir, pipelines linking the Berg River Scheme to the BWAS and pipelines linking the BWAS to the existing bulk water system.

The EIA process has identified three potential sites for the WTP and bulk reservoir. These sites are in the Muldersvlei / Joostenbergvlakte area. A fourth possible site was also identified in discussions with interested and affected parties. The EIA consultants are currently finalising specialist studies required for the environmental impact report. Subsequent to this, the City will follow an approach prescribed by the Department of Environmental Affairs and Development Planning (DEA&DP) for the remainder of the EIA Study of compiling a draft EIR, making this available for public comment, compiling a final EIR, making this available again for public comment and then submitting this to DEA&DP for consideration and approval. It is anticipated that the EIA will be completed and submitted to DEA&DP within the 2010/11 financial year.

The BWAS comprises the following infrastructure:

- 500Ml/day water treatment plant

- 300Ml bulk storage reservoir
- 300Ml transfer reservoir
- 30km pipeline from the Berg River Dam to the new WTP
- 13km pipeline from the bulk storage reservoir to the transfer reservoir
- 13km pipeline from the transfer reservoir to the Glen Garry reservoir
- Pumpstation
- Flow control installation

The table below summarises the intended phasing of implementation of the BWAS.

Component	10/11	11/12	12/13	13/14	14/15	15/16
Bulk storage reservoir						
Water treatment plant						
Pipeline Berg River Dam to WTP						
Pipeline WTP to transfer reservoir						
Transfer reservoir						
Wemmmershoek pipeline re-inforcement						
Pipeline transfer reservoir to Glen Garry						
Pumpstation						
Flow control						
Land acquisition						

The required phasing of the BWAS will be reviewed each year as the latest water demand data becomes available.

Contermanskloof Reservoir

The proposed 100Ml Contermanskloof Reservoir will provide bulk storage for the rapidly growing areas north of Table View.

Although not a typical Bulk Water System reservoir, it will provide flexibility in the operation of and supply from the Voelvlei pipeline, specifically under emergency conditions.

The Environmental Impact Assessment for the proposed reservoir has been completed, and the Environmental Authorisation obtained from the Provincial Department of Environmental Affairs and Development Planning.

Steenbras Reservoir

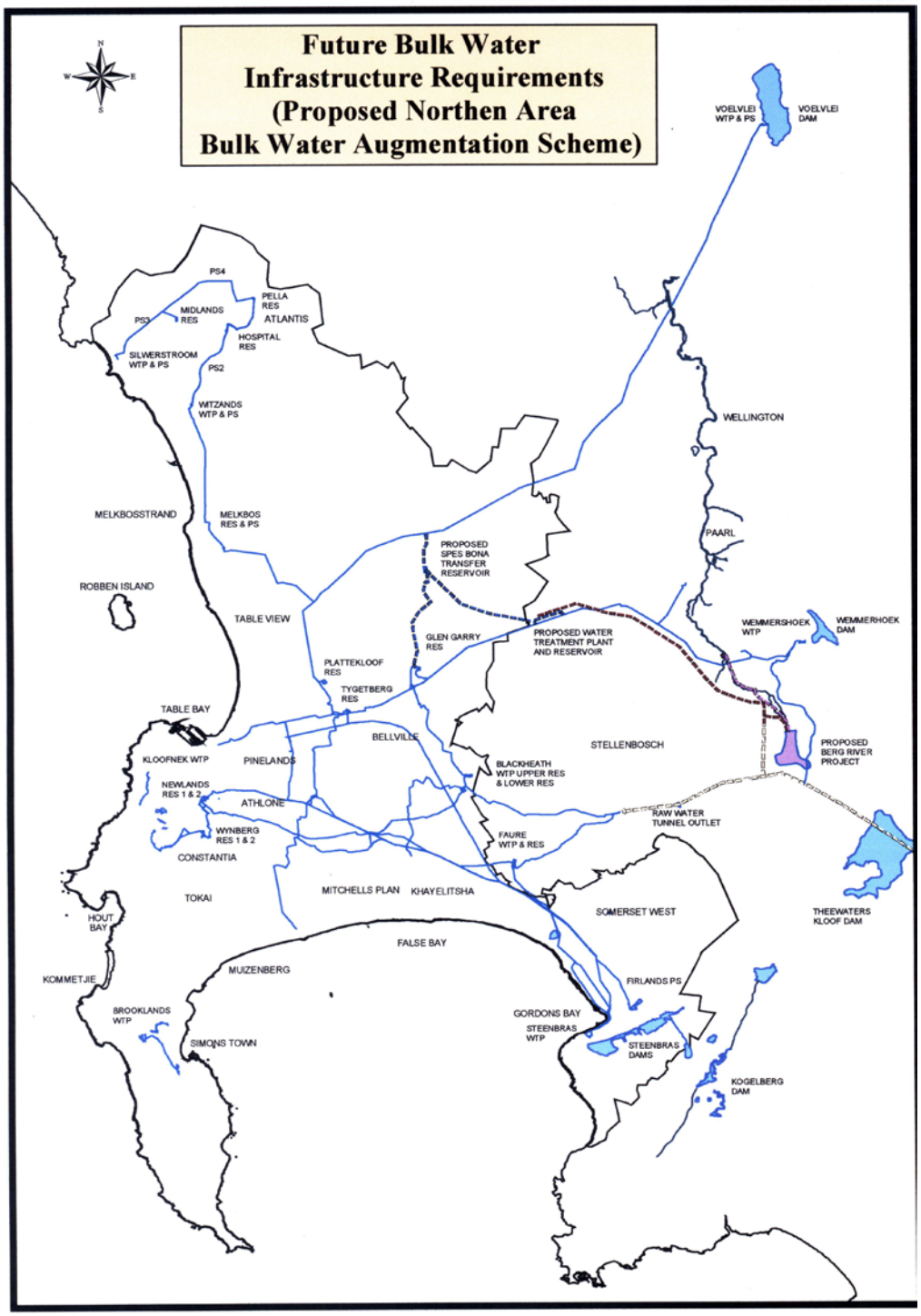
Currently, there is no bulk water storage reservoir to supply the rapidly growing Helderberg Basin area of Somerset West, Strand and Gordon's Bay. The Steenbras Water Treatment Plant directly supplies the Reticulation network in the area, requiring the plant to continuously adapt to the diurnal variation, or sudden changes, in water demand of the area.

A 100Ml bulk potable water reservoir has been proposed to act as balancing storage for the Steenbras WTP and bulk storage for the Helderberg basin.

F.5.1.2.4 Future bulk sanitation infrastructure

The Bulk Infrastructure Programme has been updated in the form of a master plan which summarises the sewage infrastructure requirements to meet future growth (GOTO 5.9 for 7 year program; For a spreadsheet outlining WWTPs with excess capacities and those with deficit capacities and their potential rationalisation GOTO 5.9a).

44. Figure F.5.1.2.3: Future Bulk Water Infrastructure Requirements



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. The highlights of the 10-year master plan with interim strategies to deal with overloading are given below with the wastewater treatment plants grouped in catchments.

39. Table F.5.1.2.4a: Upgrade of Wastewater Infrastructure

Catchment 1	2006/07	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13
Bellville	54.6						15.0
Kraaifontein	17.5						
Scottsdene	7.5			5.0			
Scottsdene	0.0				24.0		
TOTAL	79.6	0.0	0.0	5.0	24.0	0.0	15.0
Cum capacity	79.6	79.6	79.6	84.6	108.6	108.6	123.6
Loading	83.9	88.1	92.5	97.1	102.0	107.1	112.4
Catchment 2	2006/07	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13
Athlone	105.0						
Borcherds Quarry	33.0						
Cape Flats	200.0						
Parow	1.2						
TOTAL	339.2	0.0	0.0	0.0	0.0	0.0	0.0
Catchment 3	2006/07	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13
Gordons Bay	3.1						
Macassar	57.0						
Zandvliet	59.0	18.0					
TOTAL	119.1	18.0	0.0	0.0	0.0	0.0	0.0
Cum capacity	119.1	137.1	137.1	137.1	137.1	137.1	137.1
Loading	93.3	98.9	104.8	111.1	117.8	124.9	132.3
Catchment 4	2006/07	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13
Melbosstrand	5.4					20.0	
Potsdam	40.0	7.0					
TOTAL	45.4	7.0	0.0	0.0	0.0	20.0	0.0
Cum capacity	45.4	52.4	52.4	52.4	52.4	72.4	72.4
Loading	40.0	42.4	44.9	47.6	50.5	53.5	56.7

Source: Water and Sanitation

Catchment 1: Bellville, Kraaifontein, Scottsdene & Fisantekraal

This area requires additional capacity to meet demand from new property development.

- Bellville is the most overloaded WWTW and as a result, the effluent is largely non-compliant with standards. Kraaifontein and Scottsdene WWTW are at capacity and the proposed first phase of Fisantekraal WWTW (an intended 25 Ml/day) will only be constructed by 2010.

- An interim strategy to relieve the overload situation and allow limited development to take place is to divert some of the flow from the Bellville WWTW to Zandvliet WWTW. This appears possible for the next few years due to the slow pace of the N2 Gateway project. Once Fisantekraal WWTW is operational, some of the wastewater flow from the catchment areas of Bellville and Kraaifontein will be diverted to the new works, creating capacity at Bellville and Kraaifontein WWTW on a permanent basis.

Catchment 2: Athlone, Cape Flats, Borcherds Quarry and Parow

- Cape Flats WWTW has adequate capacity but requires improvements to certain critical structures.

- Parow is a small treatment facility the effluent from which is used for irrigation of the Parow Golf course.

- Borcherds Quarry is approaching capacity and a decision will need to be taken in the course of the next 5 years or so, whether to extend this works or by-pass the additional flow generated in the catchment to Athlone WWTW. Athlone WWTW has some spare capacity but needs mechanical sludge dewatering, effluent disinfection and odour control.

- There are no capacity extensions planned in this catchment. It is anticipated that within the next 6 -10 years additional capacity will have to be provided to deal with development in the catchment.

Catchment 3: Macassar, Zandvliet and Gordon's Bay

- Zandvliet WWTW: Construction of the 18 Ml/day capacity extension complete with the installation of the membrane filtration equipment is in the process of being developed. This technology will be a first for the City's wastewater treatment and will produce a high quality effluent, very suitable for effluent reuse. This capacity extension will accommodate the N2 Gateway development.

- Gordon's Bay is a further high growth area of the City and the WWTW serving this area is almost at capacity. Rather than extending the treatment works, which would mean purchase of privately owned land, new development will be accommodated by means of a proposed relief sewer which will connect to the Lourens River pump station and then onwards via a new reticulation system to Macassar WWTW where spare capacity is available.

- Macassar WWTW has spare capacity due to some of the wastewater inflow being diverted to the Zandvliet WWTW as part of the new bulk sewer installation to serve the N2 Gateway project.

Catchment 4: Melkbos and Potsdam

The Potsdam WWTW will be extended to 47 Ml/day to accommodate housing development in the Blaauwberg area. Projected continuing development in the area requires additional wastewater treatment capacity by 2011/12.

Catchment 5: Simon's Town and Wildevoelvlei

Both of these treatment works currently have spare capacity. Development potential in the Kommetjie area is high and the Noordhoek area requires waterborne sewage to replace the current septic tank system. It is therefore anticipated that the Wildevoelvlei WWTW will need to be extended within the next 6 years or so.

Catchment 6: Llandudno and Sea Outfalls

- There are no extensions required to the Llandudno WWTW. The sea outfall pumping stations at Hout Bay, Camps Bay and Green Point require upgrading of certain mechanical and electrical equipment. Due to the development in the catchment area of the Green Point outfall an application has been made to DWA to increase the capacity to 40 Ml/day.

F.5.1.2.5 Asset Management Plan

One of the important issues identified, as part of previous WSDPs was the lack of proper asset management strategy.

In 2003/04 a Framework for a Strategic Municipal Asset Management Plan (AMP) was set-up (GOTO 5.10 for Project Definition Report). This is the Basic Asset Management Plan (BAMP), which covers:

Stage 1: Improvement Strategy Development
Stage 2: Basic Asset Register
Stage 3: Basic Asset Management

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 4: Improved Maintenance Management
Stage 5: Introduce Advanced Asset Management Techniques
Stage 6: System Optimization

The Water and Sanitation Services is now focusing on growing its “asset management maturity” with the implementation of a strategic municipal asset management programme (SMAM). This is facilitated through Reliability Engineering (formerly Asset Care Centre or ACC).

Reliability Engineering, previously managed by PRAGMA Africa, is currently managed by Water and Sanitation staff. The City bought PRAGMA’s asset management improvement programme (AMiP). Reliability Engineering is the central hub where all maintenance and asset-related information is recorded. Centralised maintenance enforces tight adherence to service level agreements with service providers. Reliability Engineering also ensures compliance with statutory requirements and safety, health and environmental regulations.

The branch has achieved Stage 3 (Basic Asset Management), but there are still gaps in the equipment register and maintenance plans on SAP. This causes distortions in the assets management process.

Urgent actions that are required are detailed under F.5.1.4 Implementation Strategies.

Reticulation

The overall condition of the water and wastewater reticulation pipe network has not yet been quantified on a Metro basis. In some former MLC areas, conditions of networks are known.

40. Table F.5.1.2.5a: Repairs and upgrade to water supply network

2009/10 YEAR STATS AS AT END JANUARY 2010							Annual Comparison	
WATER NETWORKS	BLAAUWBERG	CAPE TOWN	HELDERBERG	KHAYELISTHA	SOUTH PENINSULA	TYGERBERG	YTD-2008/09	YTD-2007/08
Discoloured Water complaints	98	72	33	1	622	24	1 135	570
Repair to Burst Water Mains	687	971	350	10	675	677	5 237	6 080
Valves Marked / Plated	111	462	317	53	0	18	1 387	2 112
Valves Replaced / Renewed	28	47	68	23	10	64	784	475
Valves Repacked	78	109	110	13	234	210	1 386	1 305
Fire Hydrants Replaced / Renewed	30	44	94	10	66	38	536	589
Fire Hydrants Repacked	120	84	49	2	185	58	15	738
Fire Hydrant Nozzles Replaced	2	50	31	0	0	1	315	401
Fire Hydrants Installed	0	32	7	0	0	3	403	112
New Mains Installed (m)	382	0	2721	8	0	0	23 562	5 654
Water Mains Replaced (m)	1255	9393	5666	0	5860	2757	46 040	19 674
Water Mains Cleaned (m)	1347	0	0	0	0	00	2 587	4 072

Source: Report to Portfolio Committee (March 2009)

Burst mains and blockages are being rBurst pipes recorded and reported – see Table F.5.1.2.5a. For example 5,237 burst water supply mains were repaired in 2008/09 compared to 6,080 in 2007/08.

41. Table F.5.1.2.5b: CCTV Sewer Inspections

2009/10 STATS AS AT END JANUARY 2010							Annual Comparison	
SEWER BLOCKAGES INCIDENTS	BLAAUWBERG	CAPE TOWN	HELDERBERG	KHAYELISTHA	SOUTH PENINSULA	TYGERBERG	YTD-2008/09	YTD-2007/08
Building Material	156	16	563	9	20	1501	3 774	3 925
Collapses	26	44	258	0	95	377	1 032	824
Fats	1756	2371	2385	280	1368	2462	20 729	20 141
Other foreign objects	2206	7509	5662	484	3272	3871	35 897	40 848
Roots	883	1645	1253	1	2327	1959	15 344	18 670
Sand	310	3135	1416	413	266	627	10 311	7 371

Source: Report to Portfolio Committee (March 2009)

From such records, investigations and tools such as CCTV cameras for sewer pipes, a comprehensive pipe replacement programme will be developed which will need adequate funding and staffing to ensure success.

CP (Cathodic Protection) is being looked as an aid to extend pipeline life.

Bulk and Wastewater

An approach to maintenance of infrastructure has been completed. Information was provided by Pragma to the City of Cape Town about the nature of existing assets (asset class; asset type; asset description; cost centre; location; capitalization; GAMAP expected life; age of asset; replacement value; depreciation value and current book value). Water and Sanitation assets covered include: dams, depots, pump stations, reservoirs, sewer reticulation, water reticulation, water treatment plants and waste water treatment plants.

Challenges: Name plates are missing in some assets

F.5.1.3 Strategic gap analysis

Bulk Water Infrastructure

A significant amount of capital investment in infrastructure is required in the northern growth areas.

Wastewater Infrastructure

There has been a lack of sufficient financial investment into wastewater treatment infrastructure. This has affected essential maintenance and upgrading of ageing infrastructure.

Reticulation Infrastructure

Major funding is required to replace and extend the reticulation infrastructure especially in the growth areas.

Asset Management

It is essential for water services authorities to protect their assets by ensuring that an appropriate maintenance and rehabilitation plan is developed and implemented. This plan must be based on the principle of preventative maintenance in order to ensure that, as far as this is practical, damage to assets is prevented before it occurs. The water services authority must ensure that the maintenance and rehabilitation plan is part of the water services development plan and that this plan is implemented. Assets must be rehabilitated and/or replaced before the end of their economic life and the necessary capital funds must be allocated for this purpose.

The gap relates to capacity and skills: Capacity is required to ensure that the relevant skills are obtained so that the service graduates to stage 4: Improved Maintenance Management.

F.5.1.4 Implementation strategies (water services infrastructure)

Strategy for Growth areas

A partnership approach with developers was started to ensure that development could continue. The targeted areas are:

- West Coast / Parklands development corridor
- De Grendel / N7 development node
- Northern development corridor
- Bottelary development corridor
- Fast-track housing projects (e.g. N2 Gateway)
- Maccassar / AECI development node

Strategy for Wastewater Treatment Works

The strategies for ensuring that wastewater treatment capacity is sufficient are:

- Integrate planning for new works and extensions with the other branches and ensure that additional wastewater treatment capacity is provided where needed at the right time,
- Pro-active maintenance of all mechanical and electrical equipment as well as civil structures as part of the Asset Management Strategy,
- Process optimisation, and
- Improved monitoring and operational control.

Strategy for Bulk Water Infrastructure

The Bulk Water Augmentation Scheme must be implemented to avoid peak week water demand from exceeding the available supply capacity, which would result in water restrictions having to be implemented during peak demand periods.

The Contermanskloof and Steenbras bulk reservoirs are required to address supply constraints in certain sections of the water supply network.

Strategy for Long Term Integrated Planning

To ensure more effective long term integrated planning within Water and Sanitation Services, there is a study to identify existing information gaps in the current master plans.

Reference should be made to the Bulk Water, Wastewater Treatment and Reticulation master plans mentioned previously. For priority investment areas GOTO 5.7c

Strategy for Asset Management

The strategy is to move the entire Water and Sanitation Services Department up the levels of maturity in accordance with the AmIP (Asset Management Improvement Plan). A Reliability Engineering structure which will focus on CIP (Continuous Improvement Programme) has been agreed; it needs to be capacitated.

This will enable Water and Sanitation to be able to look beyond maintenance to condition based maintenance which is critical for most of the rotating equipment.

F.6 Water Balance

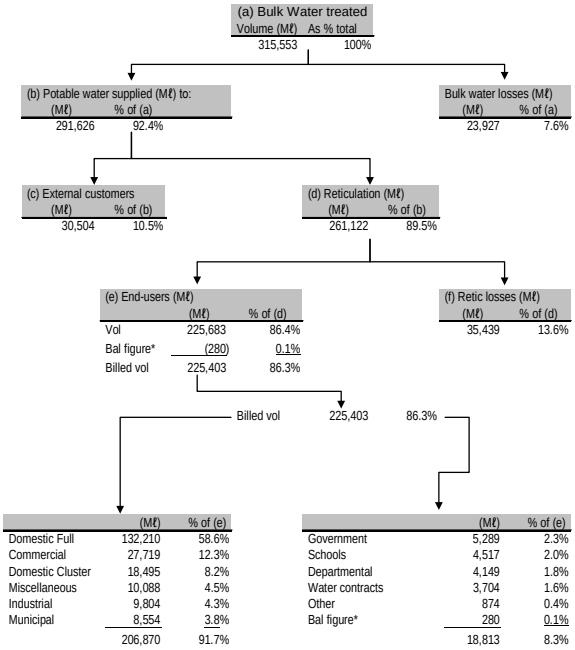
For explanation from the Preparation Guideline GOTO Ex17

F.6.1 Water balance

F.6.1.1 Situation assessment (water balance)

In 2007/08 Bulk Water treated a volume of 315,553 Mℓ of water to supply to the City of Cape Town. Of this 92.4% (or 291,626 Mℓ) potable water was supplied to external customers and reticulation, while 7.6% (or 23,927 Mℓ) was accounted for as bulk water losses.

42. Table F.6.1a: The Water Balance



(g) WATER BALANCE 2007/08

	Water treated		Water losses: Bulk		Water losses: Reticulation		Total	Consumed End-user
Volume (Mℓ)	315,553	-	23,927	+	35,439	=	59,366	256,187
As % of (a)	*100%*		*7.6%*		*11.2%*		*18.8%*	*81.2%*

(h) Revenue and non-revenue water

Authorised consumption (Mℓ) 2006/7	2007/08		2006/7	2007/08	
308,400	315,553	Billed Authorised Consumption			Revenue Water
		Billed Metered	249.0	256.6	
		Billed Unmetered	-	-	
			249.0	256.6	
		Unbilled Authorised Consumption			
		Unbilled Metered	6.0	6.0	Non-revenue Water
		Unbilled UnMetered	-	-	
			6.0	6.0	
			-	-	
Water losses (Mℓ) 2006/7	2007/08				
53,400	59,366	Apparent losses	2006/7	2007/08	
17.3%	*18.8%*	Illegal connections	-	-	
		Inaccuracies	-	-	
			-	-	
		Real losses			
		Main leaks	53,400	59,366	
		Reservoir leaks	-	-	
		Service connection leaks	-	-	
			53,400	59,366	
			53,400	59,366	
		Average consumption charge (Rands)	5.75	5.75	-
		Revenue foregone (R'm)	307.050	341.356	11.2%

Source: Bulk Water; Portfolio Committee Report (30 June 2008)

Reticulation received 89.5% (or 261,122 Mℓ) of the 921,626 Mℓ supplied, while 10.5% (or 30,504 Mℓ) was directed to external customers. Reticulation losses were 13.6% (or 35,439 Mℓ) of the 261,122 Mℓ, while 86.4% (or 225,683 Mℓ) went to the City's end-users. The amount that end-users were billed stood at 225,403 Mℓ.

In 2007/08 non-revenue water stood at 18.8%, compared to the level of 17.3% from 2006/07. The proportion of revenue foregone at the level of 18.8% for the 2007/08 period, amounts to R341.4 million, about 11% higher than the revenue of figure of R307.1 million for 2006/07 – see table F.6.1a ((h) Revenue and non-revenue water). The volume of effluent received at wastewater treatment plants was 157,672 Mℓ.

F.6.1.1.1 Amount of bulk water abstracted

Bulk water is abstracted from DWA and CCT dams which form part of the Western Cape System. TABLE F.6.1.1.1 shows the amount of treated water supply.

43. Table F.6.1.1.1: The amount of treated water supplied

million m3	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08
Water treated (Mℓ)	287.5	301.4	310.2	282.7	294.5	308.4	315.6
		4.8%	2.9%	-8.9%	4.2%	4.7%	2.3%

Source: Bulk Water;

F.6.1.1.2 Amount of bulk water purchased from others

Refer to notes under F.6.1.1.1

F.6.1.1.3 Water supply to consumers: urban

The water sold to consumers as extracted from the SAP system is given below:

44. Table F.6.1.1.3: Water sold to consumers

million m^3	2004/05	2005/06	2006/07	2007/08
Billed	222.5	235.8	249.0	225.4
Unbilled metered and unbilled unmetered	6.0	6.0	6.0	6.0
Total authorised	228.5	241.8	255.0	231.4

Source: Bulk Water; For the source of these figures GOTO 6.1; SAP installed in August 2003. Figures before this are unreliable. For source of these figures GOTO 6.2

About 23.5 (2006/07 is an estimate) million m^3 was sold to external customers in 2006/07, while this increased to 30.5 million m^3 in 2007/08.

F.6.1.1.3.1 Categorisation of residential uncontrolled volume supply

The statistics for this are not currently available.

F.6.1.1.4 Water supply to consumers: rural

Included under urban.

F.6.1.1.5 Total physical water losses

The total losses given below include a portion of the bulk losses and all the reticulation losses.

45. Table F.6.1.1.5: Physical water losses

million m^3	2004/05	2005/06	2006/07	2007/08
Total losses	54.2	52.7	53.4	-
Estimated Apparent Losses	5.4	5.2	5.2	5.2
Estimated Real Losses	48.8	47.5	48.2	-5.2
Estimated UARL	17.0	17.0	17.0	17.0

Source: Bulk Water; For the source of these figures GOTO 6.1; SAP installed in August 2003. Figures before this are unreliable. (For source of these figures GOTO 6.2; * SAP installed in August 2003)

The 12-month moving average for unaccounted water stood at 19.2% at 30 June 2008.

F.6.1.1.6 Total effluent received at treatment works

The total effluent received at the treatment works is given in the table below:

46. Table F.6.1.1.6: Treated effluent received at treatment works

million m^3	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08
Total (Mℓ)	192,083	195,865	196,214	196,498	198,891	218,903	-
Increase/(decrease)		2.0%	0.2%	0.1%	1.2%	10.1%	-100.0%
% of water supply				88.3%	84.3%	85.8%	-1093.9%

Source: Wastewater

The relatively high proportion of effluent received at the treatment works to the water supplied can be attributed to the stormwater ingress.

For a table of monthly and annual flows since 1 July 1997 for each WWTW GOTO 6.3

F.6.1.1.6 Total returns to the Water Resource System

The total returns to the water resource system are not currently recorded.

F.6.1.2 Future trends and goals (water balance)

F.6.1.2.1 Amount of bulk water to be abstracted

CCT currently obtains ±73.3% of its raw water requirements from DWA owned surface water sources, ±25.1% from CCT owned and 1.66% from underground.

The actual volume of water that the City abstracts from the various sources is not available at the moment.

F.6.1.2.2 Amount of bulk water to be purchased from others

The Western Cape System is a combination of CCT and DWA owned dams. The abstractions from both are managed as a whole so as to maximise the yield from the system.

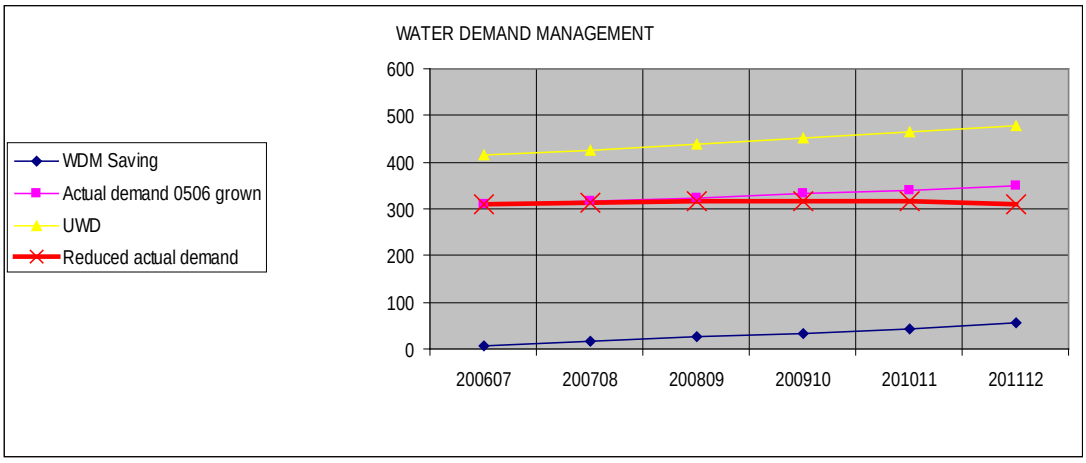
F.6.1.2.3 Water to be supplied to consumers:

The water supplied to consumers was 25.8% below unconstrained demand at 30 June 2008. At present there is no reason to believe significant deviation from the established trend.

F.6.1.2.4 Total physical water losses

The WC/WDM Strategy assumes that the total real losses will reduce from 47.5 to 27.2 over an 8 year period.

45. Figure F.6.1.2.4: Water Savings



Source: Water Demand Management

F.6.1.2.5 Total effluent received at treatment works

It is difficult to predict with any certainty what the trends will be with respect to the total influent received at treatment works. The impact of ground water infiltration is also not quantified.

F.6.1.3 Strategic gap analysis (water balance)

- The SABS 0306:1999 standard discourages the use of percentage losses to quantify water losses in the distribution network.
- Some meters from the bulk system are faulty, the integrity of some reticulation feed zones may not be reliable.
- Water losses calculations need to be refined based on more accurate zone information.

F.6.1.4 Implementation strategies (water balance)

- Repair or replace faulty meters.
- Check zones are discrete.
- Zone metering needs to be intensified. Refer to WC/WDM strategies.
- Improve water balance and water loss estimates by comprehensive zone metering and meter testing programs.

F.7 Water Services Institutional Arrangement Profile

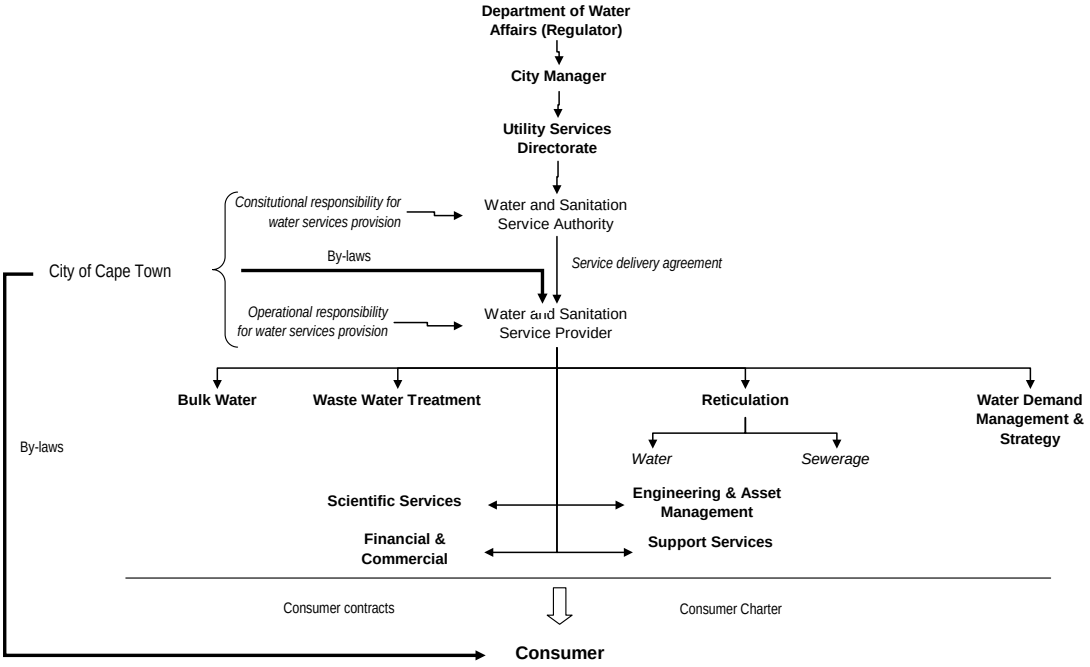
For explanation from the Preparation Guideline GOTO Ex18

F.7.1 Water services institutional arrangements

F.7.1.1 Situation assessment (water services institutional arrangements profile)

The new City of Cape Town and the Water and Sanitation Services entity was formed with the amalgamation of the Cape Metropolitan Council and the 6 metropolitan local councils in December 2000.

47. Table F.7.1.1: Water Service institutional arrangements



Source: Water Demand Management Strategy; Based on June 2003 Rand Values

On 28 November 2001 Council authorized Water and Sanitation Services to operate as fully-fledged and functional internal business unit in order to, ensure maximum independence and minimum constraints. The City of Cape Town is currently undertaking the constitutional responsibility for water service provision (as the Water Services Authority (WSA)) as well as the operational responsibility (as the Water Service Provider (WSP)). The City is looking at separating the service authority and service provision function to establish a municipal entity. At the moment, there is no service delivery agreement in place.

Processes and Systems

It is intended that all branches achieve ISO 9001:2000 accreditation, in order to enhance processes and systems and promote a world class status for the Water and Sanitation Services Department. The Progress of each branch is given below:

Bulk Water Branch

In December 2006 Bulk Water Branch successfully maintained its three-year ISO: 9001:2000 Quality Management Systems (QMS) certification (2006 -2009) during the triennial review audits by SABS. Bulk Water is no longer certified, because it failed to maintain the certification. A certification study is being undertaken to remedy this situation.

The Branch was assessed and found to satisfy the requirements of ISO 9001:2000 QMS in respect of: The Management of Water Resources, and the Planning, Design, Development and Maintenance of the Infrastructure for the Catchment, Treatment, Storage and Conveyance for Bulk Water Supply excluding clause 7.5.4 Customer Property.

The Branch has embarked on integrating ISO 9001:2000 QMS with other management systems, such as OHSAS 18001:1999 Occupational Health and Safety Management Systems (OHSMS), including Risk Management Systems, and ISO 14001:2004 Environmental Management Systems

This alignment of the management system will help the Branch in the facilitation of Integrated Management Systems also known as SHREQ (Safety Health Risk Environment and Quality).

The Branch implemented the OHSAS 18001:1999 (OHSMS) in 2004. The Environmental Management System (ISO 14001:2004) it is still in its development phase.

Controlled Document Management System, ZIZO (Zoom In Zoom Out) software: In 2003 the Branch simultaneously took a decision to also introduce a multidisciplinary document control system that was paperless, user-friendly, flexible, self expandable to complement ISO 9001:2000 (QMS) and later ISO 18001:1999, and ISO 14001:2004 (EMS) (SHREQ).

Wastewater Treatment Branch

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.

Reticulation Branch

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. It is envisaged that certification will be achieved over the next few years.

Asset Management Services

During the first quarter of 2004, the Electrical Engineering Maintenance workshop embarked upon obtaining the SABS standardization in order to benchmark them 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.

Risk Management

Work has started on an Integrated Risk Management Programme with the appointment of a Risk Manager and the development of a strategy.

Safety

An increase in Safety standards have been achieved mainly due to a focus on training and implementation of safety practice. No fatalities occurred for the 2005/06 financial year. About 10 % of all procedures were reviewed during the 2005/06 financial year but a lot of work remains on addressing the identified risks.

As a number of engineering contractors working for Water and Sanitation Services have been contravening basic provisions of the OHSA, its management proved to be a challenge. Steps taken included ensuring the requirements are in the contract and are enforced by undertaking unexpected site checks. A structured programme of assistance to contractors to improve on safety is also being developed.

During the 2005/06 financial year, 54 plants and 70 pump stations were inspected in order to ensure compliance with the OHSA act GOTO 9.7a. It was found that the majority of all the plants have improved steadily over the years and that all statutory requirements were met or exceeded. In general the older installations needed upgrading and this is being done on a phased priority basis.

F.7.1.1.1 WSA functions and outputs

In order to fulfil the WSA roles and responsibilities the following major functions that need to be in place are addressed in the table below:

(Y= Yes, N= No, I= insufficient / inadequate, NA= Not applicable)

Generally only problem areas are highlighted.

		Resources available to perform the function				
		Budget	Bylaws	Infrastructure	Personnel	If no by when?
Policy Development						
Indigent Policy	Y					Updated annually
Free basic water policy (including equitable share)	Y					
Free basic sanitation policy	Y					
Procurement Policy	Y					
Credit Control and debt Collection Policy (GOTO 9.8)	Y					Updated annually
Regulation and Tariffs						
Water Services bylaws with conditions as required by the Water Services Act	Y		Y			
Mechanisms to ensure compliance with bylaws	N		NA			
Tariff structure	Y		NA			
Tariffs promulgated	Y		NA			
Infrastructure development						
Mechanisms to undertake project feasibility studies	Y		NA			
Criteria for prioritising projects	Y		NA			
Mechanisms to assess and approve project business plans	Y		NA			
Mechanisms for selecting, contracting, managing and monitoring implementing	Y		NA			

		Resources available to perform the function				
		Budget	Bylaws	Infrastructure	Personnel	If no by when?
agents						
Mechanisms to monitor project implementation	Y		NA			
Water conservation and demand management						
Water conservation and demand management strategy	Y					
Performance management and monitoring						
Performance management systems	Y		NA			
Water Service monitoring and evaluation system	Y		NA			
WSDP						
WSDP information system	I		NA	I	I	2009/10
Mechanisms for stakeholder participation	Y		NA			
Mechanisms to monitor and report on WSDP implementation	Y		NA			
WSP institutional arrangements						
Criteria to select appropriate WSPs	Y		NA			
Mechanisms to contract, manage and monitor WSPs	Y		NA			
Mechanisms to approve WSP business plans	Y		NA			
WSA overall capacity	Y		NA			
Sufficient staff and systems to fulfil all WSA functions			NA		I	2008/09
Other (state)						

In summary the major issue is staff capacity constraints.

F.7.1.1.2 WSA capacity development

WSA Priorities for capacity development	Capacity needs assessments conducted(Yes/No)	Formal Skills training required (Yes/ No)	Proposed timeframe for capacity development	Estimated Cost
Strategic and Master Planning	Yes	Yes	2009/10	R500 000
Integrated Asset Management Plan	Yes	Yes	2009/10	-

Integration or centralisation of several functions has delivered benefits of improved planning, efficiency and cost saving:

- Strategic and Master Planning;
- Benchmarking;
- Regulation of the new by-laws;
- Fleet maintenance;
- Electrical-/ Mechanical Maintenance.

Communication both internally and externally has improved with the development of a communication strategy, implemented via, inter alia:

- launching of various roadshows, events and ceremonies,
- communication with international cooperation partners and
- media releases.

Water and Sanitation Services' internal IT capability has streamlined through the acquisition and installation of various new systems such as infrastructure for the new LIMS software at Scientific Services, upgrades to SCADA and Telemetry at reservoirs and works or optimising connectivity such as by sharing the connection to Bellville Compost Plant of Solid Waste.

The Department has developed version 7 of the Workplace Skills Plan.

F.7.1.1.3 Bylaws affecting water services

The bylaws affecting water services are listed in the table below:

By-law	Date promulgated	Short Description	Effect on Water Services
Water (GOTO 7.1)	1 September 2006	To control and regulate water services in the City	More effective management of the use of water and sanitation services by users
Wastewater and Industrial Effluent (GOTO 2.3)	1 September 2006	To control and regulate sewerage and industrial effluent and discharges	More effective management of the discharge of industrial effluent by users
Credit Control and Debt Collection (GOTO 9.8)	Update still in draft form. (Existing policy dated June 2004)	To give effect to the Council's credit control and debt collection policy, its implementation and enforcement, as required by Section 98 of the Municipal Systems Act, 32 of 2000, and to give effect to the duty imposed by Section 96 of the Municipal Systems Act to collect all money that is due and payable to the Council.	Water Services is more financially sustainable.
By-law relating to Stormwater Management (GOTO 3.10b)	23 September 2005	To provide for the regulation of stormwater management and to regulate activities which may have a detrimental effect on the development, operation or maintenance of the stormwater system	More effective management of the discharge of stormwater by users
Treated Effluent	In preparation	To control and regulate the use of treated effluent in the City	More effective management of the use of treated effluent by users

F.7.1.1.4 Water services providers (retail water)

The internal Water and Sanitation Department within the City of Cape Town is the retail water provider.

F.7.1.1.5 Water services providers (sanitation)

The internal Water and Sanitation Department within the City of Cape Town is the retail sanitation provider.

F.7.1.1.6 Water services providers (bulk water)

The internal Water and Sanitation Department within the City of Cape Town is the bulk water provider. The Department also provides bulk water to Drakenstein and Stellenboch

F.7.1.1.7 Water services providers (bulk sanitation)

The internal Water and Sanitation Department within the City of Cape Town is the bulk sanitation provider.

F.7.1.1.8 Support services agents (water)

The internal Water and Sanitation Department within the City of Cape Town provides some support functions while some are provided corporately by the City.

F.7.1.1.9 Sanitation promotion agent

This function is provided in-house by the Water and Sanitation Department. The Health Department of the City also undertakes health and hygiene awareness programmes

F.7.1.1.10 Support service contract

For explanation from the Preparation Guideline GOTO Ex19. The following functions have service contracts:

- Wastewater Treatment works at Zandvliet
- Meter reading in specific areas

F.7.1.1.11 Water Services Institutions

There are no public Water Services institutions that assist the City in its WSA functions.

F7.1.1.12 WSP staffing levels: water

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.

F.7.1.1.13 WSP staffing levels: sanitation

By way of example of the critical issue of staff capacity the Wastewater Treatment Branch is highlighted.

The Wastewater Treatment Branch staff levels have reduced from 449 in December 1997 to 279 in March 2007 – almost a 38% reduction.

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

48. Table F. 7.1.1.13: - Staff Losses in Wastewater Treatment Branch

Group	December 1997	June 2005	March 2007	Percentage Decrease
Professional	20	11	13	35%
Managers / Process Controllers	76	57	63	17%
Process Assistants	136	95	72	47%

In the last 2 years there has been an increase in the number of Process Controllers due to having taken over some Operators from the Athlone Power Station. They are experienced in operating mechanical and electrical equipment, but have no knowledge of wastewater treatment.

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

F.7.1.1.14 WSP training programmes

In 2005/06 Version 7 of the Workplace Skills Plan was completed and general operating funds were re-prioritised to enable more appropriate training of staff than originally budgeted. The Pinelands Training Centre was also fully accredited by the ESETA (Energy Sector Education Authority).

F.7.1.2 Future trends and goals (water services institutional arrangements)

Institutional Reform

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 7.3. For an extract from the SFWS on the institutional reform of water services provision GOTO 7.4.

The objectives of the reform process are given in Table below:

Reform Objectives (Strategic Framework for Water Services)
The key objectives of reform are: ❑ Ensure the provision of an appropriate level of water 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.

The key determinant of Water and Sanitation's institutional arrangements is the institutional arrangements of the City as a whole. An extract from the 2007/08 IDP (Draft 15.03.07vx2.2) is given below: of the IDP states:

The institutional objectives given in the IDP are:

7.1 Optimising the development of our Organisation staff structure, strategies, policies and promote skills development.
7.2 Enhance service delivery through exploring alternative service delivery mechanisms.
7.3 Strategically utilise information technology, validated data bases and systems to support the transformation of public services to provide better and more efficient government and reporting structures.
7.4 Improve the service culture and workplace ethics by accomplishing sound financial governance; improved accountability and transparency.
7.5 Management of key financial areas such as income control, cash flow, indigent support, alternative income opportunities, asset management and risk management.
7.6 Improve the regulatory environment *through conducting policy and by-law review* (B*ureaucratic red tape)*.
7.7 Establishment of representative Ward Participatory Mechanisms
7.8 Improvement of community satisfaction

Human Resources

Primary Objective

The strategic provision is the development and retention of a skilled and motivated workforce for Water Services.

Secondary objective(s)

- Introduce a performance-driven culture through an appropriate reward system.
- Ensure the achieve employment equity
- Ensure effective personnel administration
- Facilitating business process engineering while eliminating duplication of functions.

- Establish Wellness coordination for Occupational Risk Management initiatives, e.g. HIV/AIDS and TB programmes.
- Develop and maintain a skilled and motivated workforce by retraining managers, attending to remuneration levels, and inspiring staff.

F.7.1.2.1 Water services providers (retail water)

The trends and goals that apply to the how service, as outlined in F.7.1.2 applies to this.

F.7.1.2.2 Water services providers (sanitation water)

The trends and goals that apply to the how service, as outlined in F.7.1.2 applies to this.

F.7.1.2.3 Water services providers (bulk water)

The trends and goals that apply to the how service, as outlined in F.7.1.2 applies to this.

F.7.1.2.4 Water services providers (bulk sanitation)

The trends and goals that apply to the how service, as outlined in F.7.1.2 applies to this.

F.7.1.2.5 Support services agent (water)

The trends and goals that apply to the how service, as outlined in F.7.1.2 applies to this.

F.7.1.2.6 Sanitation promotion agent

The trends and goals that apply to the how service, as outlined in F.7.1.2 applies to this.

F.7.1.3 Strategic gap analysis

Institutional Reform

The City is looking at separating the service authority and service provision function to establish a municipal entity. At the moment, there is no service delivery agreement in place.

Human Resources

The lack of staff capacity in key areas such as Finance, technical and project management is hampering delivery.

Processes and Systems

Processes and systems to support service delivery need improvement.

F.7.1.4 Implementations strategies (water services institutional arrangements)

Institutional Reform Strategy

- The need for a Water Service Authority as required by the Water Service Act.
- There is a certification study to access the readiness of the Water and Sanitation for ISO 9001 certification.

HR Strategy

- Budgeting for key financial and technical posts,
- Training and multi-skilling existing staff,
- Actively head hunt – Humanity, Science and Technology students via Tertiary Educational Institutions,
- Establishing Science and Technology mentorships for in-house designated groups.

Processes and Systems

To enhance processes and systems and promote a world class status for the Water and Sanitation Services Department, it is intended that all branches achieve ISO 9001:2000 accreditation.

F.8 Customer Service Profile

Consumer's experience of the delivery of water services is not restricted to what level of service they receive, but includes the quality of service rendered. If consumers are satisfied with the quality of service, they are more likely to prepare to pay for the services they receive.

On the water supply side, quality of service includes: water quality, service continuity, complaint response time, meter coverage, billing, and access to pay points. On the sanitation side, quality of service is determined by the response time to complaints.

F.8.1 Customer service

F.8.1.1 Situation assessment (customer services)

	Item	Resources available to perform the function			
		Budget	Bylaws	Infrastructure	Personnel
1	Quality of service for water: urban	Yes	Yes	Yes	Yes
2	Quality of service for water: rural	Yes	Yes	Yes	Yes
3	Attending to complaints for water: urban	Yes	Yes	Yes	Yes
4	Attending to complaints for water: rural	Yes	Yes	Yes	Yes
5	Attending to complaints for water: urban	Yes	Yes	Yes	Yes
6	Attending to complaints for water: rural	Yes	Yes	Yes	Yes
7	Education for basic water services	Yes	Yes	Yes	Yes
8	Pollution Awareness	Yes	Yes	Yes	Yes

Infrastructure and personnel is in place for this function and there are also projects to improve the performance.

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 Consumer (previously Customer) Charter was introduced as part of this process during 2001. For the latest copy GOTO 8.1.

Consumer Surveys

Since 2002, Water and Sanitation 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, among other things, used as (a) input to the ISO 9001:2000 certification auditing, (b) to uncover unmet needs, (c) customer segmentation, and (d) input for updating the Water Services Customer Charter.

Presentations on all the findings are given on the Cape Town website GOTO or the PDF document GOTO 8.2. For a report on the 2006 findings GOTO 8.3.

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 and Sanitation Services is committed to addressing these aspects within an integrated comprehensive Customer and Meter Management Strategy for Water and Sanitation 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 CCT is basing its customer and meter management strategy:

- An Effective Debt Management Process (refer to 9.6 Income and Sales)
- Meter Verification and Meter Accuracy (refer to 9.7 metering and billing)
- Meter Management and Billing (refer to 9.7 metering and billing)
- Meter Reading (refer to 9.7 metering and billing)
- 24/7 Technical Operation Centre (refer to F.8.1.1.3)
- Corporate Call Centre (refer to F.8.1.1.3)
- Customer Interaction (refer to F.8.1.1.7)

F.8.1.1.1 Quality of service for water: urban

The overview of the quality of service provided is given in the table below:

	Item	2007/08
1.	Total no. of consumers	604 294
2.	No. of consumers experiencing greater than 7 days interruption in supply per year	Zero
3.	No. of consumers receiving flow rate of less than 10 litres per minute	Zero
4.	Water quality: no chlorination	Zero
5.	Water quality: chlorinated	Zero
6.	Water quality: full treatment	604 294

*Information is not available for the previous years.

The fourth annual detail independent survey of consumer perceptions of Water and Sanitation Services has been completed. 87% of consumers are satisfied with the service, a result up from 83% in 2004, with a significant upward swing from “Somewhat satisfied” to “Very satisfied”. Specific findings from this survey have been used to identify areas where service can be improved.

The ratings from previous surveys are given in the table below:

	2003/04	2004/05	2005/06	2006/07	2007/08
Percentage of customers satisfied with the service	> 80%	83%	87%	n/a	n/a

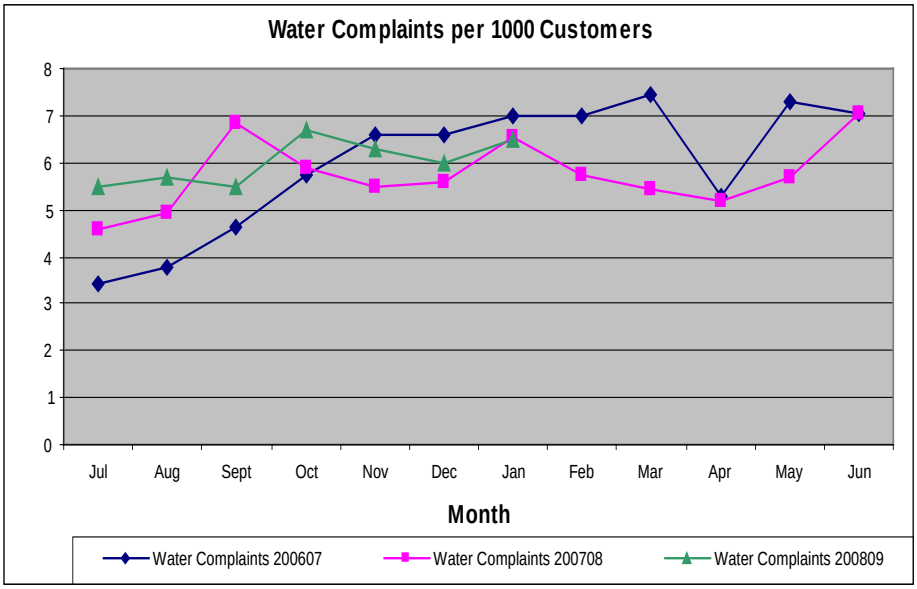
F.8.1.1.2 Quality of Services for water: rural

Refer to F.8.1.1.1

F.8.1.1.3 Attending to complaints for water: urban and rural

The water and sewerage complaints’ trend for the last two financial years compared to new financial year, 2008/09. On average, monthly water complaints per 1000 customers in 2007/08 declined compared to the previous financial period.

46. Figure F.8.1.1.3a: Water Related Customer Complaints



Source: Report to Portfolio Committee

Technical Operation Centre (24hr Emergency Service)

The Technical Operation Centre responds 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

During the 2005/06 financial year, the TOC's operation was bedded down and much improved. An average of 45 000 calls per month are taken with and an average call response time of 8 seconds and only 1% dropped.

All calls are logged and responded to appropriately, becoming part of the Workflow process. All calls reaching the Corporate Call Centre but dealing with Water and Sanitation Services-related matters are re-routed to it.

A number of pilot applications for new technology utilisation towards improved operational processes such as GIS, GPS and Vehicle tracking have been implemented.

Corporate Call Centre

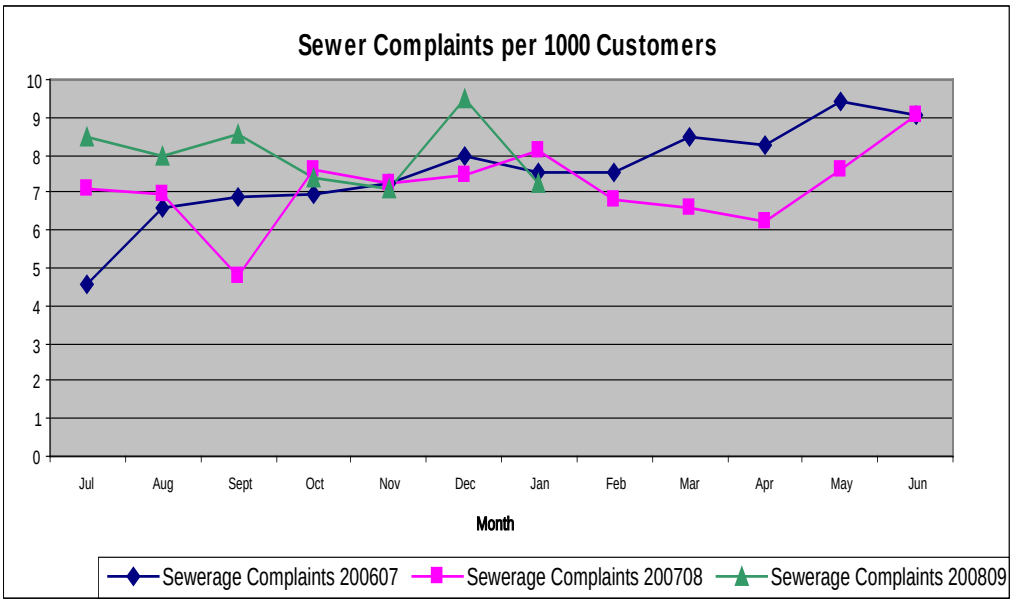
A Corporate Call Centre (Tel 086 010 3089, Fax 086 010 3090, e-mail accounts@capetown.gov.za) has been established by the City, which receives most

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.

F.8.1.1.3 Attending to complaints for sanitation: urban and rural

The statistics with respect to attending to complaints is given below:

47. Figure F.8.1.1.3b: Water Related Customer Complaints



Source: Report to Portfolio Committee

F.8.1.1.4 Education for basic water services

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 are accepted as key strategic issues and are being afforded a high priority in the new structure of Water and Sanitation Services. Water conservation, water pollution, water ingress and payment habits, among others, are all being addressed in a comprehensive and sustainable fashion.

F.8.1.1.5 Pollution awareness

There is pollution awareness programmes in informal settlements.

F.8.1.2 Future trends and goals (customer services)

F.8.1.2.1 Quality of service for water: urban and rural

For explanation from the Preparation Guideline GOTO Ex21

The goal is to ensure that the percentage of customers satisfied with the service continues to increase and reaches 95% within the next 5 years.

F.8.1.2.2 Attending to complaints for water: urban and rural

The goal is to ensure that all complaints / queries are routed through the TOC within the next two years and that consolidated statistics on response times and other indicators are available.

F.8.1.2.3 Attending to complaints for sanitation: urban and rural

Refer to F.8.1.2.3.

F.8.1.2.4 Education for basic water services

The goal is to extend the successful “Hlonipha Amanzi” programme to all currently existing informal areas by mid 2009.

F.8.1.2.5 Pollution awareness

The Hlonipha Amanzi Programme will continue to be used to raise awareness on pollution issues.

F.8.1.2.6 Quality of health and hygiene education and awareness

Refer to F.8.1.2.5

F.8.1.3 Strategic gap analysis (customer services)

For explanation from the Preparation Guideline on targets GOTO Ex22

There is no consolidated information on response times to complaints and queries and to repairing water and sewer mains. The reasons are:

- TOC does not do notifications on SAP and the information systems are not integrated.
- There is a huge backlog in closing of notifications.

The lack of integration of the TOC and District processes also means that other statistics such as number of burst water mains and sewer blockages repaired have to be obtained from the Districts. It is not possible to get a consolidated report.

The link between SAP and GIS is not in place.

All informal areas have not been covered with education for basic water and sanitation services.

F.8.1.4 Implementations strategies (customers services)

In order to ensure that consolidated information is readily available from SAP the project for integrating the TOC and SAP processes have been raised to the level of a corporate project. It is envisaged that it will still take 12-14 months before the system is fully integrated.

The link between SAP and GIS is planned to be in place by the end of 2010.

More funding is required to improve the facilities at the TOC Centre.

F.9.1 Financial Profile

For explanation from the Preparation Guideline GOTO Ex23

F.9.1 Capital funds

F.9.1.1 Situation assessment (Capital Funds): Capital expenditure

Table F.9.1.1 shows the actual capital expenditure for 2006/07, 2007/08 and 2008/09.

49. Table F.9.1.1: Historic Capital Budget of Water and Sanitation Services

Area (R'million)	2005/6	2006/7	2007/8
Bulk Water	27.3	16.3	36.1
Reticulation	239.4	76.6	294.6
Wastewater Treatment	78.7	206.5	129.4
Water Demand management	12.3	9.5	20
EAMS	10.1	14.1	46.3
Informal Settlements	25.1	16.7	30.1
Meter Replacement	0.5	13.8	15
Information Technology	4.0	2.5	5.5
Technical Operation Centre	0.0	0	0
Masterplanning	1.0	0	3.5
Other	3.0	4.6	8.2
TOTAL	401.4	360.6	588.7

Source: Water and Sanitation – Capital Projects

Capital expenditure of R? million was incurred during the 2008/09 financial period. (Edwin to supply detail for 08/09)

F.9.1.1.1 Capital expenditure: water (R Million)

Refer to TABLE F.9.1.1.

F.9.1.1.2 Capital expenditure (budget): sanitation (R Million)

Refer to TABLE F.9.1.1

F.9.1.1.3 Sources of capital income: water (R Million)

The capital expenditure in table F9.1.1 was financed from the following sources:

50. Table F.9.1.1.3: Sources of The Capital Budget For Water and Sanitation Services

Funder	2005/6	2006/7	2007/8
MIG	137.5	115.6	101.3
CMIP	4.5	-	-
DWAF	1.7	0.3	-
AFF (now CRR)	55.4	10.0	51.9
BICL (now DC)	22.6	12.9	13.3
EFF	161.6	207.7	407.2
Other	18.1	14.1	15.0
TOTAL	401.4	360.6	588.7

Source: Water and Sanitation – Capital Projects

(Edwin to supply detail for 08/09)

F.9.1.1.4 Sources of capital income: sanitation (R Million)

Refer to F.9.1.1.3

F.9.1.2 Future trends and goals (capital budget)

The annual capital budget is expected to grow to R? billion by 2011/12.

51. Table F.9.1.2 (a): Projected Capital Budget of Water and Sanitation Services

Area (R'million)	2008/9	2009/10	2010/11
Bulk Water	34	57	385
Reticulation	379	325	274
Wastewater Treatment	288	293	246
Water Demand Management	48	39	46
EAMS	19	21	11
Informal Settlements	18	21	17
Meter Replacement	10	15	15
Information Technology	8	5	3
Technical Operation Centre	1	-	-
Masterplanning	3	6	8
Other	6	-	3
TOTAL	813	782	1,008

Source: Water and Sanitation – Capital Projects

Investment in reticulation, wastewater treatment and bulk water infrastructure is still expected to dominate Water and Sanitation's budget going forward – at levels of ?% and ?% in 2010/11 and 2011/12 respectively.

F.9.1.2.1 Capital expenditure (budget) : water

See F.9.1.2

F.9.1.2.2 Capital expenditure (budget): sanitation (R Million)

See F.9.1.2

F.9.1.2.3 Sources of capital income: water (R Million)

The projected capital expenditure will be financed from the sources given below:

52. Table F.9.1.2.3: Sources For Projected Capital Budget of Water and Sanitation Services

Funder	2008/09	2009/10	2010/11
MIG	231.2	194.3	94.5
BICL (now DC)	65.1	2	7
EFF	477.7	530.6	678.5
CRR (Excluding DC)	23.1	40.3	213
Other	15.5	14.9	15
TOTAL	812.6	782.1	1008

MIG = Municipal Infrastructure Grant

BICL= Bulk Infrastructure Contribution Levy

EFF = External Financing Fund

Source: Capital Budget

(Edwin to supply detail for 08/09)

F.9.1.2.4 Sources of capital income: sanitation (R Million)

See F.9.1.2.3

F.9.1.3 Strategic gap analysis (capital funds)

Obtain the optimum level of funding to ensure that current and future infrastructure is in place versus the financial affordability/sustainability of the service.

F.9.1.4 Implementation strategies (capital funds)

- Optimisation of Grant funding
- Increasing the CRR via income and expenditure interventions to make provision for future infrastructure.

F.9.2 Operating cost and income

F.9.2.1 Situation assessment (operating costs and income)

The operating costs of Water and Sanitation stood at R3.13 billion at the end of the 2007/08 financial period – this equated to operating costs per consumer of R4,614 per annum.

53. Table F.9.2.1: The Historic Operating Costs of Water and Sanitation Services

	(R'000)	2006/07	2007/08	2008/09
1	Puchase of bulk water	229,695	227,535	256,409
2+3	Production costs (raw water + treatment system)	-	-	-
4	Operating costs	-	-	-
	Salaries and wages	273,702	359,686	539,842
	Maintenance and repairs	206,793	229,423	207,916
	Depreciation	142,208	161,439	176,380
5	Finance charges	117,444	117,231	152,113
6	Other	551,030	741,849	
7	Total costs	1,520,872	1,837,163	
	Add: Inter-Departmental Charges	1,020,672	951,903	
	TOTAL COSTS	2,541,544	2,789,066	
8	Operating costs per consumer unit (Rands)	2,516	3,039	
	Opex per consumer unit including Inter-dept charges (Rands)	4,204	4,614	

Source: Water and Sanitation

9.2.1.1 Operating costs: water

Refer to F.9.2.1

F.9.2.1.2 Operating costs: sanitation

Refer to F.9.2.1

F.9.2.1.3 Operating income: subsidies

In 2007/08 the income of water and sanitation stood at R3.25 billion, this is expected to increase by 1.2% to R3.57 billion in 2008/09.

54. Table F.9.2.1.3: The Historic Income of Water and Sanitation Services

(R'000)	2006/07	2007/08	2008/09
Service charges	1,684,529	2,020,441	2,167,940
Finance income	144,327	127,409	172,464
Government grants	1,594	10,823	15,000
Other	56,239	65,013	80,899
	1,886,689	2,223,686	2,436,303
Add: Inter-Departmental Charges	996,142	1,031,756	-
	2,882,831	3,255,442	2,436,303

Source: Water and Sanitation

In the current year, income from water supply services is expected to decline by 4.6% to R2.29 billion, though income from service charges is expected to increase by 4.5%. The positive growth of income from service charges will be offset by a decline in finance charges on arrear balance, government grants as well as income from other sources such as rental income.

F.9.2.1.4 Operating income: tariffs

For explanation from the Preparation Guidline GOTO Ex25.

Revised Water and Sanitation Tariff Policies are approved every year. For the 2008/09 policies GOTO 9.6.

F.9.2.2 Future trends and goals (operating cost and income)

F.9.2.2.1 Operating costs: water

The operating budget for water supply services is expected to escalate by 9.5% in 2009/10. The escalation rate per annum is not expected to be more than 12%, thereafter.

55. Table F.9.2.2.1: Projected Operating Costs of Water and Sanitation Services

	(R'000)	2008/09	2009/10	2010/11	2011/12	2012/13
1	Puchase of bulk water	264,441	283,025	324,346	367,971	422,063
2+3	Production costs (raw water + treatment system)	-	-	-	-	-
4	Operating costs	-	-	-	-	-
	Salaries and wages	624,001	733,242	845,365	947,365	1,050,207
	Maintenance and repairs	126,455	147,732	168,585	191,621	215,973
	Depreciation	189,509	209,808	247,852	299,949	351,114
5	Finance charges	150,996	140,496	152,833	175,458	205,548
6	Other	2,236,946	2,398,629	2,547,009	2,736,080	2,972,313
7	Total costs	3,592,347	3,912,932	4,285,990	4,718,444	5,217,217
	Add: Inter-Departmental Charges	-	-	-	-	-
	TOTAL COSTS	3,592,347	3,912,932	4,285,990	4,718,444	5,217,217
8	Operating costs per consumer unit (Rands)	5,943	6,473	7,090	7,813	8,648
	Opex per consumer unit including Inter-dept charges (Rands)	5,943	6,473	7,090	7,813	8,648

Notes: The projected operating costs per consumer unit do not reflect growth in the number of consumer units – the denominator remains constant through to 2012/13.
Source: Water and Sanitation; MTREF

F.9.2.2.2 Operating costs: sanitation

Refer to F.9.2.2.1

F.9.2.2.3 Operating income: subsidies

Refer to F.9.2.2.4

F.9.2.2.4 Operating income : tariff

The income from service charge of water supply and sanitation services is expected to modestly decline to annual growth rates closer to the projected inflation rates.

56. Table F.9.2.2.4: The Projected Income of Water and Sanitation Services

(R'000)	2008/09	2009/10	2010/11	2011/12	2012/13
Service charges	2,063,282	2,268,152	2,500,449	2,860,361	3,312,672
Finance income	110,000	117,150	124,765	110,000	110,000
Government grants	15,000	17,267	18,558	80,000	40,000
Other	1,301,089	1,381,506	1,486,775	1,569,103	1,755,715
	3,489,371	3,784,075	4,130,547	4,619,464	5,218,387
Add: Inter-Departmental Charges	-	-	-	-	-
	3,489,371	3,784,075	4,130,547	4,619,464	5,218,387
Income per consumer unit (Rands)	5,772	6,260	6,833	7,650	8,650
Income per consumer unit including Inter-dept (Rands)	5,772	6,260	6,833	7,650	8,650
Operating costs per consumer unit (Rands)	5,943	6,473	7,090	7,813	8,648
Income per consumer unit - cost per consumer unit	-170	-213	-257	-164	2
Operating costs-to-income	103%	103%	104%	102%	100%
Operating costs-to-income after inter-dept charge	103%	103%	104%	102%	100%

Source: Water and Sanitation; MTREF

F.9.2.3 Strategic gap analysis (operating cost and income)

- The capacity of the operating budget to cater for the backlogs in infrastructure maintenance and the operating impact of replacement and infrastructure development as a result of the growth in the city.
- The capacity of the operating budget to achieve optimum levels of staff establishment.
- Achieving acceptable levels of bad debts.

F.9.2.4 Implementation strategies (operating cost and income)

In order to close the gaps the following strategies will be implemented:

- Increase operating expenditure in key areas over 5 years in the following areas:

Item	Average pa
Salaries, Wages and Allowance	10.0%
Repairs and Maintenance (Primary)	11.3%
Depreciation	13.1%
Finance charges	12.0%

- Increased Expenditure need to be addressed via Increased Revenue. Affordable / Sustainable tariff levels to be obtained via MTREF.

- Ensure payment of current accounts. Utilisation of R30 indigent relief allocation to assist indigent households with specific reference to water and sanitation.

- Implementation of water demand management devices to assist indigent households with water usage.

- Focused approach on current payments and top debtors

F.9.3 Tariff and charges

F.9.3.1 Situation assessment (tariff and charges): residential

57. Table F.9.3.1(a): Historic Water Tariffs – Residential

WATER TARIFFS (Rands)		2005/06	2006/07	2007/08	2008/09	201
0-6 kℓ		-	-	-	-	-
+6-12 kℓ		2.39	2.56	3.05	3.33	3.66
+12-20 kℓ		5.10	5.46	6.50	7.10	7.81
+20-40 kℓ		7.55	8.08	9.63	10.52	11.57
+40-50 kℓ		9.33	9.98	11.90	12.99	14.29
+50 kℓ		12.31	13.17	15.70	17.14	18.85
Domestic cluster	per kℓ	n/a	5.47	6.52	7.12	7.83

Source: Water and Sanitation Billing.

58. Table F.9.3.1(b): Historic Sanitation Tariffs - Residential

SANITATION TARIFFS (Rands)		2005/06	2006/07	2007/08	2008/09	2009/10
0-4.2 kℓ		-	-	-	-	-
+4.2-8.4 kℓ		1.60	1.68	3.78	4.01	4.29
+8.4-14 kℓ		3.90	4.10	8.04	8.52	9.12
+28-35 kℓ		n/a	n/a	9.23	9.78	9.97
Domestic Cluster (>4.2 kℓ)	per kℓ	3.85	4.04	9.10	9.65	10.46
Departmental/Municipal	per kℓ	2.09	2.31	5.20	5.51	9.65

Source: Water and Sanitation Billing.

Tariff increases has been set higher than inflation during the last number of years due to increasing pressure from repairs and maintenance, increasing staff capacity as well as the capital program resulting from the upkeep of current infrastructure and the growth in the capacity requirement.

F.9.3.1.1 Fixed charges: residential (per month) for water

There are no fixed charges for the residential customers of water.

F.9.3.1.2 Fixed charges: residential (per month) for sanitation

There are no fixed charges for sanitation.

F.9.3.1.3 Volume charges or other charge mechanisms: residential sanitation

Refer to Table F.9.1.3a: The Historic Tariffs of Sanitation Services

**Note that the fixed charge was dropped from 2007/08. The sewerage tariff became fully volumetric.

F.9.3.1.4 Block tariffs: residential (R/kℓ) for water

Refer Table 9.3.1(b) above

F.9.3.2 Future trends and goals (tariff and charges)

59. Table F.9.3.2(a): Proposed Tariffs for Water Services

CURRENT TARIFFS 2008/ 2009		PROPOSED TARIFFS 2009 / 2010	
Domestic Full	R 0.00	0-6 kl	R 0.00
Water that is used predominantly for domestic purposes and supplied to single residential properties.	R 3.33	6-12 kl	R 3.66
	R 7.10	+12 – 20kl	R 7.81
	R 10.52	+20 – 40kl	R 11.57
	R 12.99	+40 – 50kl	R 14.29
	R 17.14	+50kl	R 18.85
Domestic Cluster – Bulk metered flats, cluster developments including single title and sectional title units. An allowance of 6 Kl per unit per month at zero cost upon submission of affidavits stating the number of units.	R 7.12	Dom. Cluster	R 7.83

Source: Water and Sanitation Billing.

60. Table F.9.3.2(b): Proposed Tariffs for Sanitation Services

	TARIFFS	PROPOSED TARIFFS	
	2008 / 2009	2009 / 2010	
VOLUMETRIC TARIFFS			
Domestic Full - Single residential properties.	R 0.00	0 – 4.2kl	R 0.00
	R 4.01	+4.2 – 8.4kl	R 4.29
70% of water consumption to a maximum of 35 kl of sewage per month (70% of 50 kl water equals 35 kl of sewage)	R 8.52	+8.4 – 14kl	R 9.12
	R 9.32	+14 - 28kl	R 9.97
	R 9.78	+28 - 35kl	R 10.46
Domestic Cluster - Bulk metered flats, cluster developments. Including sectional and single title units.			
90% of Water Consumption to a maximum of 35kl of sewerage per unit per month (* see note)			
An allowance of 4.2 kl per unit per month will be made available at zero cost upon submission of a signed affidavit stating the number of units supplied from that metered connection.	R 9.65		R 9.65

Source: Water and Sanitation Billing.

F.9.3.2.1 Fixed charges: residential (per month) for water

There are no plans to introduce fixed charges for water.

F.9.3.2.2 Fixed charges: residential (per month) for sanitation

The fixed charge for sanitation will be discontinued from 2007/08 onwards.

F.9.3.2.3 Volume charges or other charge mechanisms: residential sanitation

Investigation to change the width of the steps within the block tariff has commenced in response to volumetric trends / risk of revenue generation within the current block structure.

F.9.3.2.4 Block tariffs: residential (R/kℓ) for water

Investigation to change the width of the steps within the block tariff has commenced in response to volumetric trends / risk of revenue generation within the current block structure.

F.9.3.3 Strategic analysis (tariff and charges)

For explanation from the Preparation Guideline GOTO Ex26.

The tariffs are modelled every year and changes in consumption patterns are factored into the annual adjustments. Increasing expenditure will require increasing tariffs.

Overall expenditure is expected to increase in excess of 9% during the financial years to follow.

Increasing expenditure will require increasing tariffs	Request to increase the tariffs in line with MTREF modelling to meet increasing requirements.
Reduction in water demand due to water demand management strategy may affect income received.	Monitor reduction in consumption and income and adjust tariffs accordingly
No gap. Strategy is in place	Free basic water is provided to all. In addition Indigent households receive a credit of R30 pm on their water and sanitation account. This enables them to use 10.5 Kl of water and dispose of 7.15 Kl of sewer for free. In addition, in order to reduce indigent households' water consumption, there is a program to repair plumbing leaks and install water management devices.

F.9.3.4 Implementation strategies (tariff and charges)

Implementation Strategies are outlined below:

- Request to increase the tariffs in line with MTREF modelling to meet increasing requirements.
- Monitor reduction in consumption and income and adjust tariffs accordingly.

The tariffs are modelled every year and changes in consumption patterns are factored into the annual adjustments. Increasing expenditure will require increasing tariffs.

Overall expenditure is expected to increase in excess of 9% during the financial years to follow.

For the tariffs for 20% and 30% restrictions GOTO 9.7

The proposed domestic tariffs for sanitation for 2009/10 are:

For the tariffs for 20% and 30% restrictions GOTO 9.7.

There will be ongoing analysis of the changing water consumption and wastewater discharge patterns to ensure that income will be sufficient.

In order to ensure that Water and Sanitation Services is able to meet the infrastructure and other challenges above inflation increases in the average tariff will be required.

Over the period income from user charges are projected to increase.

This assumes a city growth of 1.0% per annum, annual increase in water demand (low water demand curve), an inflation rate of 5.8% and that the 10% restriction will continue for the next 5 years.

The reduction in revenue demand as a result of the WC&DM Strategy will result in higher increases in the average tariff although not a high average cost to the consumer. In other words the projected income from the user charges will remain the same but because of the lower water consumption the average tariff will increase.

F.9.4 Free basic water

F.9.4.1 Situation assessment (free basic)

F.9.4.1.1 Subsidy targeting approach for free basic water

The first 6 kilolitres of water supplied to all residential dwellings in the municipal area is free. There is no fixed charge. A R30 Indigent Grant is applicable to the water tariff for qualifying households. The net result is that an Indigent household can consume an additional 4.5kl per month without attracting any charges

This subsidy would be ineffective without the ongoing Integrated Leaks Repair and Fixit Projects aimed at repairing leaks, reducing consumption, reducing monthly bills and eliminating arrears of properties occupied by Indigent households. Refer to the Water Conservation and Demand Management Strategy.

F.9.4.1.2 Subsidy targeting approach for free basic sanitation

The first 4.2 kilolitres of sewerage removed from all residential dwellings in the municipal area is free. The fixed charge does not apply to dwellings occupied by Indigent households. A R30 Indigent Grant is applicable to the water tariff for qualifying households.

The net result is that an Indigent household can discharge an additional 3.15 kilolitres per month (with sewerage disposal 70% of water consumption) without attracting any charges.

F.9.4.2 Future trends and goals (free basic)

F.9.4.2.1 Subsidy targeting approach for free basic water

No changes to the existing structure are planned. The approach of free basic water to all may need to be investigated in the near future.

F.9.4.2.2 Subsidy targeting approach for free basic sanitation

No changes to the existing structure are planned. The approach of free basic sanitation to all may need to be investigated in the near future.

F.9.4.3 Strategic gap analysis (free basic)

For explanation from the Preparation Guideline GOTO Ex27.

While the tariff structure is aligned to the needs of the indigent and a significant number of leak repairs have been done, leaking plumbing continues to result in higher water consumption and sewerage disposal and therefore higher and unaffordable charges.

F.9.4.4 Implementation strategies

The Integrated Water Leaks Repair and the Fixit Projects are addressing the high water consumption and sewerage disposal (refer to Water conservation and Demand Management).

The Indigent Grant on top of free basic services will be monitored over time and changes made should it be necessary.

F.9.5 Charges and block tariffs: Industrial and Commercial

F.9.5.1 Situation assessment (charges and block tariffs)

Refer to F.9.5.1.1

F.9.5.1.1 Fixed charges and block tariffs: industrial for water (per month)

There are no blocks in the tariff or fixed charges for water supplied to industrial properties.

F.9.5.1.2 Fixed charges and block tariffs: industrial for wastewater (per month)

There are no blocks in the tariff but there is a fixed charge for wastewater removed from industrial properties.

F.9.5.1.3 Fixed charges and block tariffs: commercial for water (per kℓ)

As for Industrial.

F.9.5.1.4 Fixed charges and block tariffs : commercial for wastewater (per month)

As for Industrial.

F.9.5.1.5 Fixed charges and block tariffs: Other (water)

The other tariffs for water are:

School / Sports
Government
Municipal
Miscellaneous
Miscellaneous external
Bulk Tariff

Water is charged at a one rate per kl. There are no fixed charges.

F.9.5.1.6 Fixed charges and block tariffs: Other (sanitation)

Sanitation is charged at one rate per kl discharged. The volume discharged is assumed to be 95% of the water consumed. The Director: Water and Sanitation can adjust the percentage based on measurements taken.

There is a fixed charge for wastewater removed from “government and other” properties.

F.9.5.2 Future trends and goals (charges and block tariffs)

F.9.5.2.1 Fixed charges and block tariffs : industrial for water

No changes to the structure are planned for the future.

61. Table F.9.5.2.1(a): Proposed Tariff Commercial and Industrial

CURRENT TARIFFS 2008/ 2009		PROPOSED TARIFFS 2009 / 2010	
Commercial – Water supplied to premises predominantly of a commercial nature	R 7.59	Comm / Ind	R 8.35
Industrial - Water which is used in manufacturing, generating electricity, land-based transport, construction or any related purpose.			

Source: Water and Sanitation Billing.

Above inflation increases can be expected in line with the average tariff.

F.9.5.2.2 Fixed charges and block tariffs: industrial for sanitation

The fixed charge based on the cents in the rand will be dropped from 1 July 2007. Above inflation increases for tariffs can be expected in line with the average tariff increases.

F.9.5.2.3 Fixed charges and block tariffs: commercial for water

No changes to the structure are planned for the future.

62. Table F.9.5.2.3(a): Proposed Tariff Commercial and Industrial

	TARIFFS	PROPOSED TARIFFS
	2008 / 2009	2009 / 2010
VOLUMETRIC TARIFFS		
Industrial and Commercial - Schools, hospitals, Government: National / Provincial and any other – 95% of water consumption (* see note)	R 5.99	R 6.41

Source : Water and Sanitation Billing.

Above inflation increases can be expected in line with the average tariff.

F.9.5.2.4 Fixed charges and block tariffs: commercial for sanitation

The fixed charge based on the cents in the rand was dropped from 1 July 2007.

No changes to the structure are planned for the future.

F.9.5.2.5 Fixed charges and block tariffs: Other (water)

No changes to the structure are planned for the future. Above inflation increases can be expected in line with the average tariff.

F.9.5.2.6 Fixed charges and block tariffs: Other (sanitation)

The fixed charge based on the cents in the rand was dropped from 1 July 2007. Above inflation increases for tariffs can be expected in line with the average tariff.

F.9.5.3 Strategic gap analysis (charges and blocks tariffs)

The current tariff modelling uses the historical water demand in the various categories in order to ensure that there is sufficient income. The successful implementation of WC & WDM Strategy will necessitate a revision of the tariffs.

The tariffs are modelled every year and changes in consumption patterns are factored into the annual adjustments.

F.9.5.4 Implementation strategies (charges and block tariffs)

The average tariff for water and sanitation are projected to increase by above inflation annually.

F.9.6 Income and sales

F.9.6.1 Situation assessment (income and sales)

F.9.6.1.1 Total income (and non-payment) and expenditure: water (R)

Water and Sanitation income is combined under Table F.9.6.1.1

63. Table F.9.6.1.1: Total Income and Expenditure of Water and Sanitation Services

	(R'000)	2007/08
1	Total income (billed income and subsidies)	3,255,442
2	Actual income received	3,255,442
3	% non-payment	n/a
4	Non-payment by residential consumers	n/a
5	Non-payment by commercial consumers	n/a
6	Non-payment by industrial consumers	n/a
7	Non-payment by other consumers	n/a
8	Total non-payment (4+5+6+7)	n/a
9	Operating expenditure	2,789,066
10	Capital expenditure	588,700
11	Total expenditure (9+10)	3,377,766
12	Equitable share allocated to water supply	
13	Surplus/(deficit) (2 minus 11)	-122,324

Source: Water and Sanitation Billing.

F.9.6.1.2 Total income (and non-payment) and expenditure: sanitation (R)

Water and Sanitation income is combined under F.9.6.1

F.9.6.1.3 Sales arrangements

The billing system is integrated with the SAP computer software. The Water and Sanitation bill is sent monthly with the rates and other services accounts. The City is divided into 20 billing areas / meter reading areas. Bills are sent out daily in order to cover the whole city in one month.

Payment for municipal accounts can be easily made at any municipal office, through third party payments (supermarkets etc) and electronic funds transfers (EFTs) or stop orders through banks

The current credit control policy (GOTO 9.8) was developed during 2007/08.

F.9.6.2 Future trends and goals (income and sales)

F.9.6.2.1 Total income (and non-payment) and expenditure: water

TABLE F.9.6.2.1 shows the projected income and expenditure of Water and Sanitation services. Water and Sanitation operations are expected to generate a surplus before appropriation of surplus income for CRR. When capital expenditure is included, water and sanitation is expected to be in a deficit position.

64. Table F.9.6.2.1: The Projected Income and Expenditure of Water and Sanitation Services

	Rands	2009/10	2010/11	2011/12	2012/13
1	Total income (billed income and subsidies)	2,385,520,290	2,665,211,694	2,960,361,070	3,312,671,677
2	Actual income received	3,912,901,504	4,287,182,405	4,619,464,441	5,218,386,609
3	% non-payment	n/a	n/a	n/a	n/a
4	Non-payment residential consumers	n/a	n/a	n/a	n/a
5	Non-payment commercial consumers	n/a	n/a	n/a	n/a
6	Non-payment industrial consumers	n/a	n/a	n/a	n/a
7	Non-payment by other consumers	n/a	n/a	n/a	n/a
8	Total non-payment (4+5+6+7)	n/a	n/a	n/a	n/a
9	Operating expenditure	3,912,931,727	4,285,989,939	4,718,444,368	5,217,217,039
10	Capital expenditure	782,100,000	1,008,000,000	-	-
11	Total expenditure (9+10)	4,695,031,727	5,293,989,939	4,718,444,368	5,217,217,039
12	Equitable share allocated to water supply				
13	Surplus/(deficit) (2 minus 11)	-782,130,223	-1,006,807,534	-98,979,927	1,169,570

Source: Water and Sanitation Billing.

This assumes a city growth of 1.0% per annum, a ?% annual increase in water demand (low water demand curve), an inflation rate of 5.8% and that the 10% restriction will continue for the foreseeable future.

F.9.6.2.2 Total income (and non-payment) and expenditure: sanitation

Refer to F.9.6.2.1.

F.9.6.2.3 Sales arrangements

The Credit Control and Debt Management Policy (GOTO 9.8) was updated during the 2008/09 Financial Year.

The City has plans to set up a customer internet portal on SAP.

F.9.6.3 Strategic gap analysis (income and sales)

For explanation from the Preparation Guideline GOTO Ex28.

The gaps are:

- Many indigent households have huge municipal debt due to previous or ongoing water leaks on their property that discourages them from paying the current account.
- Capacity for disconnections /restrictions and reconnections
- There is a gap between the number of properties being disconnected/restricted and those being reconnected.

F.9.6.4 Implementation strategies (income and sales)

- The focus of the leaks project is to assist such indigent households. These households are also encouraged to make arrangements (reasonable terms) with Council on arrears with the focus on getting the current accounts paid.

- Internal teams appointed to increase debt management actions. Tender being approved for further capacity via external contractors.

- Programme in place to regularly update these properties and to ensure inclusion in future debt processes. Programme to standardise the meters in the long term. Reports are being put in place to identify tampered meters and take corrective action.

F.9.7 Metering and Billing Urban

F.9.7.1 Situation and assessment (metering and billing)

F.9.7.1.1 Metering and billing: urban

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 and Sanitation Services deal with the management of the water meter, its accuracy and the preparation of the customers account before invoicing by the Corporate Finance Department.

Meter Reading

The CCT currently reads on average approximately 82% of the 604 490 water meters, while the balance is estimated in the months that actual readings can not be obtained.

Consolidated monthly statistics on the following have been collected through the District Managers' Operational report since June 2006:

- Meters installed
- Meters replaced
- Meters relocated / refixed
- Meters stolen
- Meter connections removed
- Leaking meters repaired

Historical data will therefore be available from 2006/07. For an example of the District Managers' Operational Report GOTO 9.9.

F.9.7.1.2 Metering and billing: rural

Refer to F.9.7.1.1

F.9.7.2 Future trends and goals (metering and billing)

F.9.7.2.1 Metering and billing: urban

Water and Sanitation Services has set a target to reduce the number of estimated readings to 10% by 2012 and to progressively eliminating repeated estimations.

F.9.7.2.2 Metering and billing: rural

Refer to F.9.7.2.2

F.9.7.3 Strategic gap analysis (metering and billing)

There are a number of issues that need to be addressed:

- Estimated readings of meters above acceptable norm.
- Inaccurate readings of a number of meters.
- Ensuring accuracy on SAP
- The existence of Unbilled Areas

F.9.7.4 Implementation and strategies (metering and billing)

- Increase of capacity via updated tenders for meter reading contract. Specific focus of problematic meters, e.g. covered by building rubble. Program to systematically move meters to the outside of the properties
- Programme in place to identify zero consumption meters as well as "inaccurate (low) reads" as part of meter replacement programme.
- Set up a program to clean up customer data
- Incorporate the loading of meters into the process and ensure that Developer is billed in the interim period.

F.10 LIST OF PROJECTS

F.10.1 Annual, WSA Sustainability and IDP Project Lists

For explanation from the Preparation Guideline GOTO Ex29

The project list as provided from the SAP system is given in the table below: (Source: Water 2008/09 to 2009/10 Revised Capital Budget).

This is a comprehensive list of Projects which includes the sustainability list. The table lists the total cost of each project as well as the funding source. All the projects are for inclusion in the IDP.

The infrastructure projects are listed in group in accordance with their investment reason i.e. new asset, enhancement asset and replacement of asset. Support Services projects are grouped together. For an Excel Spreadsheet of 10 year Capital Budget Plan: GOTO

65. Table F.10.1: List of Projects

Department	WBS Element Description	Adj Budget 2008_2009 Mar	Revised Budget 2008_2009	Revised Draft Budget 2009/10
Water Services	Water Demand Management	736,831	173,430	-
Water Services	N2 Gateway Projects	4,279,487	3,944,565	334,922
Water Services	Development of Additional Infrastructure	1,500,000	2,000,000	-
Water Services	Development of Additional Infrastructure	-	-	38,937,000
Water Services	Aandrag Supply System	-	-	-
Water Services	Aandrag Supply System	-	-	-
Water Services	Monwabisi Pumpstation	584,167	584,167	-
Water Services	Monwabisi Pumpstation	7,869,885	6,943,457	926,428
Water Services	Durbanville Collectors Sewers	1,000,000	1,000,000	7,300,000
Water Services	Repl&Upgr Sew Pumpstns	5,700,000	4,200,000	-
Water Services	Repl&Upgr Sew Pumps Citywide	23,600,000	20,600,000	3,000,000
Water Services	Incremental Upgrade Areas - Standpipes	1,228,680	1,228,680	-
Water Services	Replace & Upgrade Water Network	1,526,856	1,526,856	-
Water Services	Replace & Upgrade Water Network	33,330,613	33,753,113	-
Water Services	Sewer Network Emergencies	5,000,000	5,000,000	-

Water Services	Replacement of Vehicles	14,332,242	14,332,242	-
Water Services	Replacement of Plant & Equipment	500,000	1,945,413	-
Water Services	Strand High Risers Water Main	6,575,000	6,575,000	-
Water Services	Bellvile North Water Supply system	5,407,758	4,809,143	1,198,615
Water Services	Remove midblock water network-Bishop Lav	1,174,472	1,174,472	-
Water Services	Upgrade & Replacemnt Watermeters	3,686	3,686	-
Water Services	SWest Bus Park Main Sewer (upper leg)	112,687	112,687	-
Water Services	SWest Bus Park Main Sewer (upper leg)	6,300,000	-	13,437,000
Water Services	Pich Fibre Replacement - M/Plain	2,000,000	2,000,000	-
Water Services	Pich Fibre Replacement - M/Plain	1,000,000	1,000,000	-
Water Services	Remove midblock sewer network-Bishop Lav	-	-	-
Water Services	Fisantekraal Main Sewer	26,000,000	-	26,000,000
Water Services	Fisantekraal Main Sewer	8,000,000	8,000,000	20,000,000
Water Services	Bridgetown Sewer Pump station	419,550	419,550	-
Water Services	Helderberg / AECI Macassar system	31,001,170	31,001,170	-
Water Services	Helderberg / AECI Macassar system	8,400,000	8,400,000	-
Water Services	Helderberg / AECI Macassar system	4,835,000	4,835,000	-
Water Services	Mobile Generators Emergencies	-	-	-
Water Services	Fisantekraal Main Sewer	30,660,547	30,660,547	-
Water Services	Infrastructure Replace/Refurbish - WWT	847,505	847,505	-
Water Services	Infrastructure Replace/Refurbish - WWT	20,164,307	16,164,307	4,000,000
Water Services	Infrastructure Replace/Refurbish	1,008,275	1,008,275	-
Water Services	Replacement of Plant & Equipment-BW	200,000	200,000	-
Water Services	Depot Rationalisation for Transformation	50,000	50,000	-
Water Services	Expansion of WWTW - EFF	-	-	-
Water Services	Rehab of Water Network (Citywide)	2,500,000	2,500,000	-
Water Services	Rehab of Sewer Network (Citywide)	7,500,000	6,151,939	1,348,061
Water Services	Rehab of Sewer Network (Citywide)	1,000,000	301,925	-
Water Services	Pump Stn Rehab (Citywide)	-	-	-

Water Services	Pump Stn Rehab (Citywide)	1,000,000	145,701	-
Water Services	Retreat Rising Main - Rehab	-	-	3,000,000
Water Services	Retreat Rising Main - Rehab	459,000	168,200	290,800
Water Services	Informal Settlements Water	1,096,105	1,096,105	-
Water Services	Informal Settlements Water Increase Upgrade	-	-	-
Water Services	Melkbos Wastewater Treatm	1,111,450	1,111,450	5,000,000
Water Services	Scottsdene WWTW-EFF	26,500,000	26,000,000	500,000
Water Services	Scottsdene WWTW-MIG	7,531,460	7,531,460	27,000,000
Water Services	Kraaifontein/Fisantekraal	-	-	8,000,000
Water Services	Mitchells Plain WWTW	-	-	-
Water Services	Bellville WaterWasteTreatment Works	4,200,000	200,000	39,000,000
Water Services	Bellville WWTW-MIG	30,800,000	30,800,000	35,000,000
Water Services	Servitudes -CLF - 15 Y	50,000	15,000	-
Water Services	Cape Flats Wastewater Tre	14,351,020	10,351,020	23,000,000
Water Services	Athlone Wastewater Treatm	17,000,000	15,000,000	4,400,000
Water Services	Athlone Wastewater Treatm	26,000,000	26,000,000	3,600,000
Water Services	Infrastructure Replace/Re	19,008,561	18,582,561	10,240,500
Water Services	Extension of Bulk Pipelin	263,000	133,000	-
Water Services	Master Planning -CLF - 15	1,000,000	1,000,000	-
Water Services	Installation of New Infra	1,747,135	1,747,135	-
Water Services	Voëlvlei : replace LLPS P	1,400,000	1,064,000	15,000
Water Services	Potsdam Wastewater Treatm	28,500,000	25,000,000	3,500,000
Water Services	Potsdam WWTW-MIG	47,000,000	47,000,000	-
Water Services	TMS Aquifer Deep Borehole	8,800,000	12,300,000	-
Water Services	Replace & Upgr Sew Netw	12,255,877	13,808,251	-
Water Services	Replace & Upgr Sew Netw	859,500	859,500	-
Water Services	Flood Disaster Wallacedene	457,017	457,017	-
Water Services	Flood Disaster Wallacedene	291,932	291,932	1,213,622
Water Services	Fisantekraal WWTW-EFF	31,000,000	21,000,000	64,500,000

Water Services	Fisantekraal WWTW-MIG	27,000,000	27,000,000	50,500,000
Water Services	Water Infrastructure Master Planning	1,000,000	1,000,000	-
Water Services	Protea Heights Water Sup	1,452,145	94,878	5,357,267
Water Services	Protea Heights Water Sup	17,546,000	13,118,021	12,000,000
Water Services	Install New Infrastructure D6	1,000,000	1,000,000	2,000,000
Water Services	Plant & Equipment Additional	1,267,825	1,057,825	-
Water Services	Informal Settlements : Sanitation	3,077,380	3,077,380	-
Water Services	Informal Settlements : Sanitation	454,720	454,720	-
Water Services	Informal Settlement Proj - Standpipes	-	-	-
Water Services	Upgrade Water Network District 6	3,500,000	3,500,000	-
Water Services	Informal Settlements : Grey Water	700,000	-	700,000
Water Services	Informal Settlements : Sand & Rag Trap	2,800,000	208,149	2,591,851
Water Services	Informal Settlements : Sand & Rag Trap	250,000	250,000	-
Water Services	Replacement of Langa Sewer	4,268,216	4,268,216	-
Water Services	Replacement of Langa Sewer	991,971	-	991,971
Water Services	Pitch Fibre Sewer Replacement	1,500,000	1,486,535	-
Water Services	Fish Hoek Outfall Sewer	100,000	100,000	-
Water Services	Fish Hoek Outfall Sewer	100,000	100,000	1,200,000
Water Services	Blue Route Interceptor Sewer	941,000	941,000	-
Water Services	Blue Route Interceptor Sewer	1,500,000	1,500,000	1,500,000
Water Services	Wallacedene New Sewer Upgrade	1,650,000	110,311	2,000,000
Water Services	Wallacedene New Sewer Upgrade	1,131,932	1,131,932	1,623,114
Water Services	Laboratory Equipment	1,500,000	1,500,000	-
Water Services	Refurbishment of Labs	1,200,000	-	3,200,000
Water Services	Furniture & Equipment	2,000,000	2,000,000	-
Water Services	Basic Sanitation: Informal Settlements	10,275,260	10,275,260	-
Water Services	Informal Incremental Areas Upgrade	792,860	792,860	-
Water Services	Northern Area Sewer Thornton	300,000	210,669	20,000,000
Water Services	Construction of new water main Macassar	2,000,000	1,000,000	1,000,000

Water Services	Macassar Wastewater Treatment Works	-	-	-
Water Services	Sundry equipment at various WWTW	60,000	60,000	-
Water Services	IT Equipment Replacement	5,808,529	5,808,529	-
Water Services	Borcherds Quarry WTW	2,000,000	2,000,000	8,000,000
Water Services	Tools & Sundry Equipment	20,000	20,000	-
Water Services	De Grendel Reservior	150,000	150,000	2,000,000
Water Services	Trappies Sewerage System	5,836,978	5,836,978	-
Water Services	Bulk Sewer connection MIG	2,790,000	2,790,000	-
Water Services	New Water Main MIG	1,000,000	1,000,000	10,000,000
Water Services	Installation of flow-contol devices	5,000,000	5,000,000	-
Water Services	Fisantekraal Pressure Manager	142,743	15,887	-
Water Services	Mitchells Plain Pressure Management	4,043,841	4,043,841	-
Water Services	Atlantis Pressure Manager	93,696	93,696	-
Water Services	Macassar Treated Effluent	-	-	4,500,000
Water Services	Athlone treated effluent	15,000,000	15,000,000	8,000,000
Water Services	Athlone Treated Effluent	10,000,000	10,000,000	-
Water Services	Consolidated Plans Filing System	-	-	30,000
Water Services	TOC Infrastructure Development	1,000,000	1,000,000	-
Water Services	Upgrade Wood Rd / Belgravia Sewer	5,730,101	5,730,101	2,000,000
Water Services	Small Plant & Equipment	1,000,000	1,000,000	-
Water Services	De Gendel Reservior link	7,000,000	7,000,000	-
Water Services	Contermans Kloof Water mains	18,500,000	18,500,000	20,000,000
Water Services	Master Plan Sewer K/sha	-	-	-
Water Services	SWest Bus Park Main Sewer (lower leg)	50,000	27,000	3,023,000
Water Services	Renovations Melton Rose Depot	96,660	96,660	-
Water Services	Renovations Strand Depot	600,000	600,000	-
Water Services	Provision of Sewerage to Croydon	90,000	50,000	-
Water Services	Provision of Sewer to Gordon/Strand	-	-	-
Water Services	Replace & upgrade Mains Reservior fencin	913,851	913,851	-

Water Services	Main Rd Upgrade M/Berg to Clovelly Rehab	14,126,674	14,126,674	21,417,000
Water Services	Main Rd Upg M/Berg to Clovelly Replace	1,000,000	1,000,000	-
Water Services	Replacement of Plumstead Sewer	941,000	941,000	-
Water Services	Informal settlements Anaerobic Toilets	558,746	558,746	-
Water Services	Informal settlements sewer Installations	338,193	338,193	-
Water Services	Informal settlements water Installations	3,000,000	3,000,000	-
Water Services	Rehab of Liesbeeck Interceptor Sewer	414,287	414,287	-
Water Services	Rehab Liesbeeck Interceptor Sewer	-	-	3,000,000
Water Services	Maitland Sewer at Valkenberg Rehab	7,000,000	3,500,000	3,500,000
Water Services	Rehab Main Rd Green Point Sewer	750,000	750,000	-
Water Services	Relining 250m sewer on Rondebosch golf	179,170	179,170	-
Water Services	C/Flats II Cleaning Of Pipeline	414,280	414,280	-
Water Services	Upgrading of Scottsdene Office Ward 7	158,616	158,616	-
Water Services	Cape Flats Collector Sewer	110,000	110,000	-
Water Services	Replace Water Infrastructure	1,900,000	1,900,000	-
Water Services	Water Upgrades for Master Plan	-	-	-
Water Services	Master Plan Sewer Upgrade	500,000	500,000	-
Water Services	Replace Sewer Infrastructure D6	3,000,000	3,000,000	-
Water Services	Ruyterwacht Midblock Water Pipes	500,000	182,456	317,544
Water Services	Replace Valves District 2	-	-	-
Water Services	Replace Pitch Fibre Sewers District 2	-	-	-
Water Services	Water Reticulation Replacement	-	-	-
Water Services	Gugulethu/Nyanga Sewer Investigation	-	-	-
Water Services	Gugulethu/Nyanga Sewer Investigation	-	-	1,000,000
Water Services	Lansdowne Riversdale Rd - Sewer Rehab	1,000,000	1,000,000	-
Water Services	Pump Station & Rising Main Du Noon	170,000	170,000	-
Water Services	Rehab Outfall Sewers Pentz Sandrift m/qu	8,000,000	7,501,772	8,000,000
Water Services	Railway Pumpstation Upgrade	-	-	-
Water Services	Treated Effluent Inf Upgrade	2,500,000	2,500,000	-

Water Services	Bellville Treated Effluent	-	-	6,000,000
Water Services	Capeflats Treated Effluent (eastern & we	-	-	10,000,000
Water Services	Belhar Pressure Management	2,500,000	2,500,000	-
Water Services	N2 Gateway Delft Pressure Management	2,500,000	2,500,000	2,500,000
Water Services	Strandfontein Pressure Management System	2,000,000	2,000,000	-
Water Services	PVR Controllers & Upgrades	1,000,000	1,690,257	-
Water Services	Langa Advanced Pressure Management	-	-	2,500,000
Water Services	Wesfleur WWTW-EFF	-	-	-
Water Services	Wesfleur WWTW-MIG	-	-	10,000,000
Water Services	Wildevoelvlei WWTW	-	-	-
Water Services	Water Meters	10,000,000	10,000,000	-
Water Services	Furniture, Fittings, Tools & Equip BW	165,557	165,557	-
Water Services	Furniture, Fittings, Tools & Equip WWTW	75,550	75,550	-
Water Services	Furniture, Fittings, Tools & Equip WDM	86,797	86,797	-
Water Services	Furniture, Fittings, Tools & Equip Retic	596,858	596,858	-
Water Services	Furniture, Fittings, Tools & Equip IT	92,536	92,536	-
Water Services	Furniture, Fittings, Tools & Equipt EAMS	204,424	204,424	-
Water Services	Furniture, Fittings, Tools & Equipt Fin	250,000	250,000	-
Water Services	Furniture, Fittings, Tools & Equipt Fin	300,000	300,000	100,000
Water Services	Plant & Equipment Additional	2,500,000	2,500,000	-
Water Services	Reservoir Pallisade fence SWest	75,000	75,000	-
Water Services	Toilets for informal settlement Rastakam	100,000	100,000	-
Water Services	N2 Gateway Water Infrastructure (EFF)	700,000	700,000	-
Water Services	N2 Gateway Water Infrastructure (MIG)	5,396,320	5,247,566	-
Water Services	N2 Gateway Sewer Infrastructure (EFF)	900,000	477,500	-
Water Services	N2 Gateway Sewer Infrastructure (MIG)	6,020,665	5,546,126	-
Water Services	N2 Gateway Sewer Infrastructure (CRR)	400,000	-	-
Water Services	Replacement of Vehicles	3,000,000	3,000,000	-
Water Services	Replacement of Stolen vehicles	967,423	967,423	-

Water Services	Cape Flats #1 Rehabilitation	-	-	-
Water Services	Cape Flats #2 Rehabilitation	-	-	-
Water Services	Constantia Sewer Reticulation	-	-	-
Water Services	Borcherds Quarry WWTW-SCADA	-	-	-
Water Services	Infrastructure Extention South Pensula	-	-	-
Water Services	Cape Flats WWTW-Refurbish Structures	-	-	-
Water Services	Gordons Bay WWTW-Improvements	-	-	-
Water Services	South Peninsula Pressure Management	-	-	2,000,000
Water Services	Kleinvle, Sarepta Midblock Sewer	-	-	-
Water Services	Ravensmead & Surrounds Pressure Manage	-	-	-
Water Services	Llandudno WWTW-Improvements	-	-	-
Water Services	Scottsdene WWTW-Phosphate removal	-	-	-
Water Services	Wildevoelvlei WWTW-Dewatering equipment	-	-	-
Water Services	Zandvliet WWTW-Extension	-	-	-
Water Services	Relocate Midblock Sewer Belhar	-	-	-
Water Services	Relocate Midblock Sewer Bonteheuwel	-	-	-
Water Services	Relocate Midblock Sewer Ravensmead	-	-	-
Water Services	Repl & Upgrade Sewer Network Dist2	-	-	-
Water Services	Khayelitsha Driftsands Bypass Site C	-	-	852,611
Water Services	Additional Plant & Equipment	-	-	1,000,000
Water Services	Replace Water Network Dist 2	-	-	-
Water Services	Additional Vehicles	-	-	1,500,000
Water Services	Replace Lourens River/Macassar Outfall	-	-	-
Water Services	Rusthof Strand Water Main	-	-	-
Water Services	Upgrade Regional Depots D6	-	-	-
Water Services	Upgrade Watermains Rustdal Penhill	-	-	-
Water Services	Zeekoevlei Sewer Reticulation	-	-	-
Water Services	Khayelitsha Driftsands Site C	-	-	6,913,382
Water Services	Greenpoint 2010 Irrigation	-	-	11,700,000

Water Services	Repl&Upgr Sew Pumps Citywide	-	-	19,400,000
Water Services	Incremental Upgrade Areas - Standpipes	-	-	-
Water Services	Replace & Upgrade Water Network	-	-	39,634,410
Water Services	Sewer Network Emergencies	-	-	-
Water Services	Replacement of Plant & Equipment	-	-	8,000,000
Water Services	Replacement of Vehicles	-	-	7,500,000
Water Services	Mobile Generators Emergencies	-	-	1,000,000
Water Services	Infrastructure Replace/Refurbish - WWT	-	-	29,100,000
Water Services	Replacement of Plant & Equipment-BW	-	-	220,000
Water Services	Depot Rationalisation for transformation	-	-	1,000,000
Water Services	Expansion of WWTW - EFF	-	-	6,000,000
Water Services	Rehab of Water Network (Citywide)	-	-	4,000,000
Water Services	Rehab of Sewer Network (Citywide)	-	-	15,000,000
Water Services	Pump Stn Rehab (Citywide)	-	-	5,000,000
Water Services	Pump Stn Rehab (Citywide)	-	-	-
Water Services	Informal Settlements Water	-	-	3,000,000
Water Services	Informal Settlements Water Incre Upgrade	-	-	-
Water Services	Servitudes -EFF	-	-	50,000
Water Services	Extension of Bulk Pipelin	-	-	279,500
Water Services	Master Planning -EFF	-	-	5,500,000
Water Services	Installation of New Infra	-	-	1,000,000
Water Services	TMS Aquifer Deep Borehole	-	-	4,000,000
Water Services	Replace & Upgr Sew Netw	-	-	41,277,833
Water Services	Water Infrastructure Master Planning	-	-	-
Water Services	Install New Infrastructure	-	-	-
Water Services	Plant & Equipment Additional	-	-	1,210,000
Water Services	Informal Settlements : Sanitation	-	-	10,000,000
Water Services	Informal Settlement Proj - Standpipes	-	-	-
Water Services	Upgrade Water Network District 6	-	-	-

Water Services	Informal Settlements : Sand & Rag Trap	-	-	6,785,056
Water Services	Informal Settlements : Sand & Rag Trap	-	-	2,000,000
Water Services	Pitch Fibre Sewer Replacement	-	-	-
Water Services	Furniture & Equipment	-	-	2,000,000
Water Services	Basic Sanitation: Informal Settlements	-	-	9,000,000
Water Services	Informal Incremental Areas Upgrade	-	-	-
Water Services	IT Equipment Replacement	-	-	5,000,000
Water Services	Tools & Sundry Equipment	-	-	200,000
Water Services	Bulk Sewer Connection MIG	-	-	-
Water Services	Tools & Equipment (Mech)	-	-	60,000
Water Services	Tools & Equipment (design & contracts)	-	-	50,000
Water Services	Tools & Equipment (PCS)	-	-	50,000
Water Services	TOC Infrastructure Development	-	-	1,000,000
Water Services	Small Plant & Equipment	-	-	1,000,000
Water Services	Informal settlements water Installations	-	-	7,700,000
Water Services	Master Plan Bulk Water line	-	-	-
Water Services	Water Upgrades for Master Plan	-	-	-
Water Services	Master Plan Sewer Upgrade	-	-	-
Water Services	Replace Pitch Fibre Sewers District 2	-	-	-
Water Services	Treated Effluent Inf Upgrade	-	-	2,500,000
Water Services	PVR Controllers & Upgrades	-	-	500,000
Water Services	Water Meters	-	-	11,000,000
Water Services	Furniture, Fittings, Tools & Equip WDM	-	-	200,000
Water Services	Furniture	-	-	1,000,000
Water Services	Furniture, Fittings, Tools & Equip IT	-	-	150,000
Water Services	Furniture, Fittings, Tools & Equipt EAMS	-	-	330,000
Water Services	Furniture, Fittings, Tools & Equipt Fin	-	-	150,000
Water Services	Additional Plant & Equipment	-	-	-
Water Services	Additional Plant & Equipment	-	-	-

Water Services	Regional resources development	-	-	4,000,000
		812,648,579	729,344,548	856,106,487

Source: Capital Budgets

F.10.2. Future Trends and Goals

The City has accepted that the upgrade and extension of infrastructure is key to ensuring an efficient, effective and sustainable Water and Sanitation Service.

F.10.3. Strategic Gap Analysis

Obtain the optimum level of funding to ensure that current and future infrastructure is in place versus the financial affordability/sustainability of the service.

F.10.4. Implementation Strategy

- Optimisation of Grant funding
- Increasing the CRR via income and expenditure interventions