



WATER SERVICES DEVELOPMENT PLAN

FOR

**CITY OF CAPE TOWN
2008/09 – 2012/13**

EXECUTIVE SUMMARY

DRAFT 2

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C. EXECUTIVE SUMMARY

WATER SERVICES DEVELOPMENT PLAN 2008/09 to 2012/13

Introduction

While significant progress has been made since the 2006/07 WSDP Water and Sanitation Services in Cape Town continues to face critical challenges. These include eradicating the backlog of basic sanitation services, achieving the essential targets for reducing water demand, meeting the wastewater effluent standards and thereby reducing the impact on the water quality of urban rivers, asset management and ensuring that infrastructure is extended timeously to meet the development growth demands. Financial sustainability of the service is a particular challenge: ensuring full cost recovery and debt management at a fair tariff, and financing of capital investment.

In order to optimally achieve this and thus meet key policy and legislative requirements, new and effective institutional arrangements and other strategies continue to be put in place.

The national Strategic Framework for Water Services, Sept 2003, is a critical policy document setting out the future approach to the provision of water services. Of the national targets set, the most critical for Cape Town are:

- All people are to have access to functioning basic water supply by 2008 (achieved in CCT in 2005/06)
- All people are to have access to functioning basic sanitation by 2010 (CCT are aiming for 2012 due to the extent of the requirement and its unique constraints)
- Investment in water services infrastructure should total > 0,75% of GDP
- Institutional reform of regional water services providers to be completed by 2013, with Water Services managed and accounted for separately
- Annual reporting on key performance indicators to be started.

The guiding document to date has been the WSDP of June 2006. The 2008/09 update, of which this is the Executive Summary, is a product of the current 2008/09 IDP process and will be a Sector Plan in that.

Vision

To become a leader in the provision of equitable, sustainable, people-centred, affordable and credible water services to all.

Critical challenges

Cape Town Water Services faces a number of critical challenges:

- a) Eradication of basic sanitation services backlog in a fast-track manner
- b) Meeting basic services expansion to meet the influx
- c) Intensifying the Water Demand Management Strategy and achieving the targeted or better reduction

- d) Meeting the Wastewater effluent standards and reducing the impact on the water quality of rivers and water bodies
- e) Greywater runoff quality in informal settlements
- f) Timely provision of infrastructure to meet development growth needs
- g) Maintenance of infrastructure to ensure continued operation
- h) High financial requirements
- i) High debt due to non-payment
- j) Financial sustainability of the service and cost recovery and debt management
- k) Affordability of the Service
- l) Increased performance and efficiency
- m) Establishing a new, more effective institutional arrangement

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

C.1 ESSENTIAL QUESTIONS

C1.1 What is the backlog of water services?

With the exception of the backlog in informal areas and the relatively small but un-serviced rural farm population service levels generally meet the National minimum standards as required by the Water Services Act 108 (of 1997).

The backlog in basic water was effectively eradicated in 2005/06 when 35 000 informal households received basic water. While 13 905 informal households received access to basic sanitation and 4 290 and 2 892 received a full level of service through the provision of government subsidized housing and serviced sites respectively, the backlog remains at approximately 44 000 (at end of 2006/07). This remains a huge challenge given the high unit cost, lack of available land for Human Settlement to accelerate its formal housing provision and ground level / slope /access space constraints.

The challenge then is to provide basic water and sanitation services to new citizens moving into informal areas beyond the emergency level of service and to eradicate the backlog of basic sanitation, targeted over the next 3 to 4 years.

Many of these households in informal settlements share the available on-site facilities or rely on the availability of services from nearby established areas. The basic level of service is defined as suitable clean toilet types shared at less than 5 households/toilet and water taps closer than 200m and shared by less than 25 households/tap.

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

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

C1.3 Cost of eradicating backlogs

In order to eradicate the backlog and to allow for the annual influx the Informal Settlements programme was estimated (in R mil) in the 2007/08 WSDP as below :

	2008/09	2009/10	2010/11	2011/12
Actual Budget	18.1	40.5	17.0	
Requirements	34.5	38.9	45.7	36.4

Water and Sanitation is in the process of securing more funding for this.

In the 2006/07 financial year an amount of R8 million was spent on installing toilets in informal areas. The replacement of buckets has not commenced but will be completed by the deadline year undertaken.

The total housing backlog is now estimated to be 267 000 (117 000 informal settlements and 150 000 backyard shacks). A possible programme to eradicate the backlog of the full level of service for water and sanitation over a 20 year period would require the following annual funding:

PROVIDING FORMAL SERVICES FOR THE HOUSING DEVELOPMENT PROGRAMME

Housing backlog eradication (20 years)	R143M
Sustaining the influx	R88M
TOTAL	R231M

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

The eradication of backlogs is but one of the essential infrastructural requirements of the service. Refer to the 3 year capital budget under the financial section.

C1.4 What is the strategy to eradicate backlogs?

The strategy has been to provide a very basic (emergency) level of service as quickly as possible to about 95% of the approximately 195 informal settlements. The households that do not have access to basic sanitation have access to an emergency level. The emergency service is below the basic level of service in terms of household ratios/service point and includes certain unacceptable toilet types such as black buckets, of which 2,880 (revised upwards from the 2007/08 WSDP of 2 857) still need to be replaced.

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

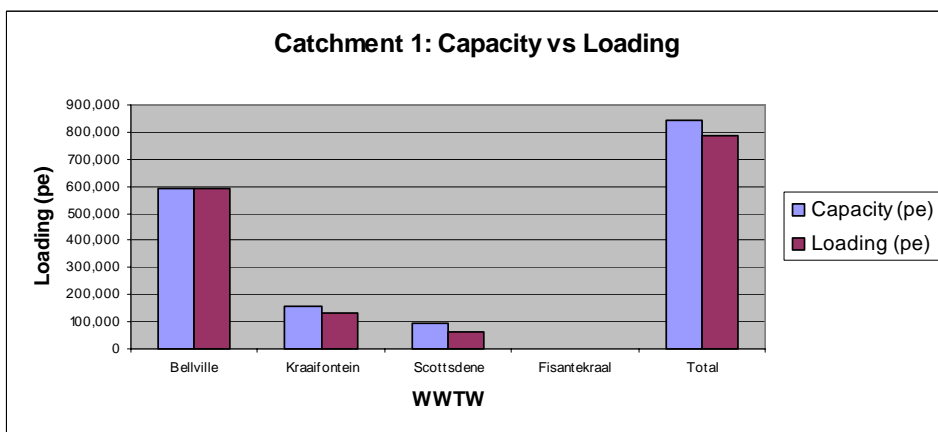
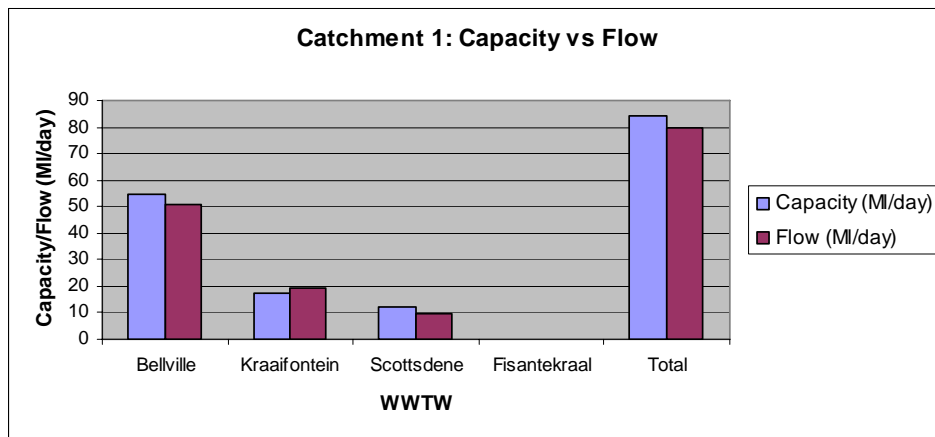
Upgrading on an annual basis for informal areas on developable land is proceeding as funds are obtained. A basic service level is being aimed for (the standard being defined by the ratios mentioned above, ideally opting for pour-flush, anearobic or flush toilets as appropriate). “Greenfields” housing projects are undertaken to receive residents moved from undevelopable land.

Cape Town’s current plans are to eliminate the sanitation backlog by 2012 (behind the National target), but additional manpower resources are being sourced to accelerate implementation.

C1.5 What is the status of all water infrastructure?

Existing infrastructure is often stressed significantly during peak periods. The need for new infrastructure due to growth is also pressing. The limited financial situation in the City versus the high demand for new housing has created a scenario where it is a challenge for the City to maintain existing infrastructure and to provide the required bulk infrastructure for connection of new developments.

For example, the overloading of the wastewater treatment works in Catchment 1 is illustrated below (flows and loadings as at 2007):



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

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

C.1.6 Effective management

ISO Certification

The Bulk Water branch has previously set the standard by achieving full ISO certification on ISO 9001:2000 and thereafter maintaining it as certified by independent audits. Due to a minor issue which has been addressed this certification has now been lost but is hoped to be regained.

An implementation plan to revitalise a drive for achieving certification in other branches is being considered.

Scientific Services have embarked on a plan to achieve ISO 17025 certification by 2009, as legally required for ensuring potable water quality. Standard Operating Procedures (SOP's) have been defined and a process of auditing and refinement has commenced. In the meantime, national Interlaboratory comparisons where the lab is consistently scoring in the top 5, are ensuring that standards are raised or maintained.

This together with the ISO 14001 of Wastewater Treatment and the Risk Management programmes to be implemented will ensure that quality is assured and risks are minimised.

The following areas are being receiving focused attention;

- Information Management Systems
- Integration of existing IT system through Business Warehouse
- Automation of plants via Scada- telemetry
- GIS development for effective management of our infrastructure
- Water quality management through LIMS and SAP
- Maintenance and life cycle of IT equipment.
- Capacity building and training.

C.2 WATER SERVICES BUSINESS ELEMENT SUMMARY

C2.1 Socio-economic profile

The 2001 Census recorded the size of the metropolitan population at 2,9M people living in 759 765 households. The City's 2008/09 Integrated Development Plan put the number of households at 884 000 (up from 847 000 in June 2006), with a population estimate of 3,3M. This, together with a future estimated HIV-incidence rate of 5 % (i.e. one in every 20 people are estimated to be HIV-infected), could constrain future population growth even further, together with an expected reduction of rural immigration.

Cape Town faces rising development challenges. During the past decade poverty and unemployment have almost doubled, the housing backlog has more than doubled, drug-related crime has tripled, HIV prevalence has increased tenfold and public transport has deteriorated. This is despite significant economic growth (4% annual increase in GGP), improvements in the provision of basic services (water, waste, electricity) and rising tourist numbers.

Decades of distorted development in the city has manifested in highly skewed distribution of income and wealth. In Cape Town there is a trend towards rising poverty (from 25% in 1996 to 38% of households living below or marginally above the household poverty line in 2005). This raises the issue of affordability of the service.

Affordability of the Service

A free basic service is provided, in the form of the first 6 kl/month water supply and 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/month to qualifying ratepayers. Approximately 248 000 formal households currently qualify based on a property value less than R199 000 (2006 General Valuation).

The lower steps of the water and sewer tariffs, and the no fixed water and sewer charge and R30 grant for property values less than R199 000 are mechanisms to ensure that water and sanitation is affordable to the poor and indigent. Under conditions of no plumbing leaks, they would consume a relatively low quantity of water. With the free basic and the R30 Indigent Grant indigent households can consume 10.29Kl per month of water and dispose of 7.20 Kl of sewer without charge. The Integrated Leaks Repair Project and the Fixit Project, initiated at the end of 2005, are major initiatives to ensure that these household plumbing leaks are minimized and therefore that the cost of these services is affordable for them. With the implementation of a new policy to install Water Management Devices on a prioritised basis households defined as indigent now have a mechanism to prevent water consumption being above what is affordable.

Affordability of the service as a whole will be viewed over the long term.

Costs can be reduced in the short term but to the detriment of the maintenance of assets and replacement of aging infrastructure and to an effective WDM Strategy resulting in higher tariffs in the longer term. Higher than inflation increases in tariffs will be required to ensure the sustainability of the service. However, through the mechanisms of free basic tariffs, R30 Indigent Grant and the step tariff (increased tariff for higher usage), the installation of Water Management Devices where appropriate, the sourcing of Grant funding and mechanisms to lower the cost of capital, tariffs will be affordable to the various socio-economic groupings, the poor in particular.

The water conservation and demand management strategy, besides being necessary due to the Western Cape being a water scarce region, will also

reduce the cost of the service in the long term by postponing new resource and bulk infrastructure schemes. Reductions in water consumption in the higher steps will result in the need for upward adjustments in the tariff steps but, on their own, will not result in an increase in the average water and sewer bill to the consumer.

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

The Financial and Institutional Strategy will result in improved performance of the Water Services Provider and therefore should result in a reduction in unit costs.

The City's Credit Control and Debt Management policy ([GOTO 9.8](#)) has been revised, is being augmented by concerted efforts of Water Services to manage debt and ensure income due is received.

C2.2 Service level profile

There are currently a total of 642,456 formally registered customers in the City with full level of service.

This customer base is broken down as follows:

Customer Type	Total
Commercial	12,379
Government	221
Industrial	4,099
Miscellaneous	5,554
Schools-Sportsfields	1,440
Domestic Cluster	6,755
Domestic single residential	602,681
Departmental Cluster	2,903
Municipal Water	6,424
Total	642,456

The figure reported in the 2006/07 WSDP has been revised down from 656,800 as there were errors in the previous data.

Customers living in backyard shacks number about 150 000 (2005 figure).

There are an estimated 117 000 households in informal settlements, 767 000 households in formal areas with a full level of service. The total number of households is therefore 884 000. 117 000 customers in informal settlements receive a basic level of service for water and while 73 000 receive a basic level of sanitation. All receive an emergency level.

Grey Water in Informal Settlements

Conveyance of grey water, which has been a problem in informal settlements, is receiving attention for health and amenity reasons. A Pilot project run in Khayelitsha has not yielded the expected results and further attention will be paid to this issue.

C2.3 Water resource profile

Surface water represents 521,5 Mm³/year, or 97,5% of the total yield. The City currently obtains 75 to 80% of its raw water requirements from DWAF and the remainder from its own sources. Approximately 15% of the raw water requirements are obtained from sources within the CMA.

Groundwater resources make up 6,64 Mm³/year yield, representing only 1,24% of the total yield.

The construction of the R1.5 billion Berg Water Project, which includes the Berg River Dam, the first in SA to comply with the guidelines of the United Nations World Commission on Dams, is nearing completion. The BWP has increased the yield of the Western Cape Water Supply System by 81 Mm³/year.

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

The Reconciliation Strategy Study, conducted by the Department of Water Affairs and Forestry and the City of Cape Town, was completed and approved in June 2007. The objective of the study was to put a strategy in place which would ensure the reconciliation of the future requirement for and supply of water from the Western Cape Water Supply System.

A Strategy Steering Committee has been formed to make recommendations, on an annual basis, on long term planning activities required to ensure reconciliation of requirement and available supply in the WCWSS area. In other words, it will be this committee's responsibility to monitor and understand demand growth so that planning for the next scheme takes place timeously **to ensure that the level of assurance of supply remain adequate at all times**. This is required because the actual growth in demand will determine when the next scheme needs to be built. The scenarios indicate that this could be anywhere between 2011 (no WC/WDM) and 2019 (Comprehensive WC/WDM).

The growth in demand depends on the following:

- The actual unconstrained water demand which depends on the growth in the city, and
- The effectiveness of the WC&DM Strategy.

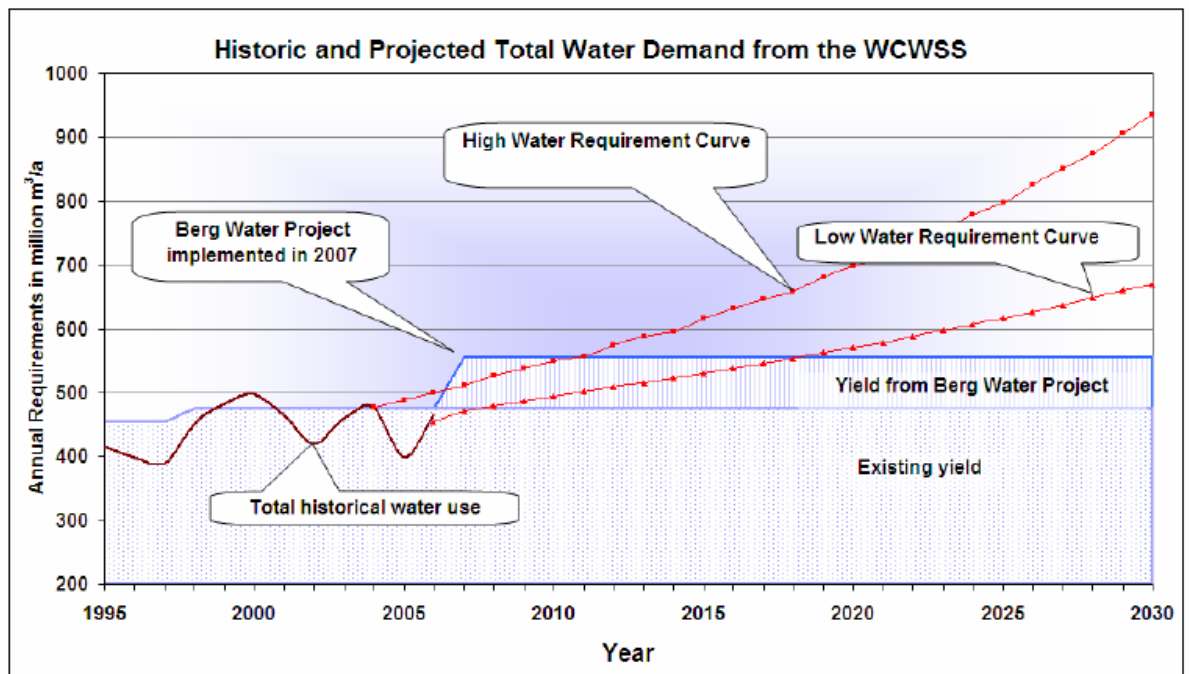
The available supply depends on:

- The effects of climate change, and
- The implementation of ecological reserves for existing schemes.

The need to monitor the growth in demand arises from the uncertainty around these parameters and the 7 year horizon from planning to implementation of a scheme.

In order to ensure that both DWAF and the City of Cape Town are in a “state of readiness” the City is implementing its WC&DM Strategy and various studies are being carried out at the appropriate level.

The historical and Projected Total Water Demand from the WCWSS is shown in the graph below:

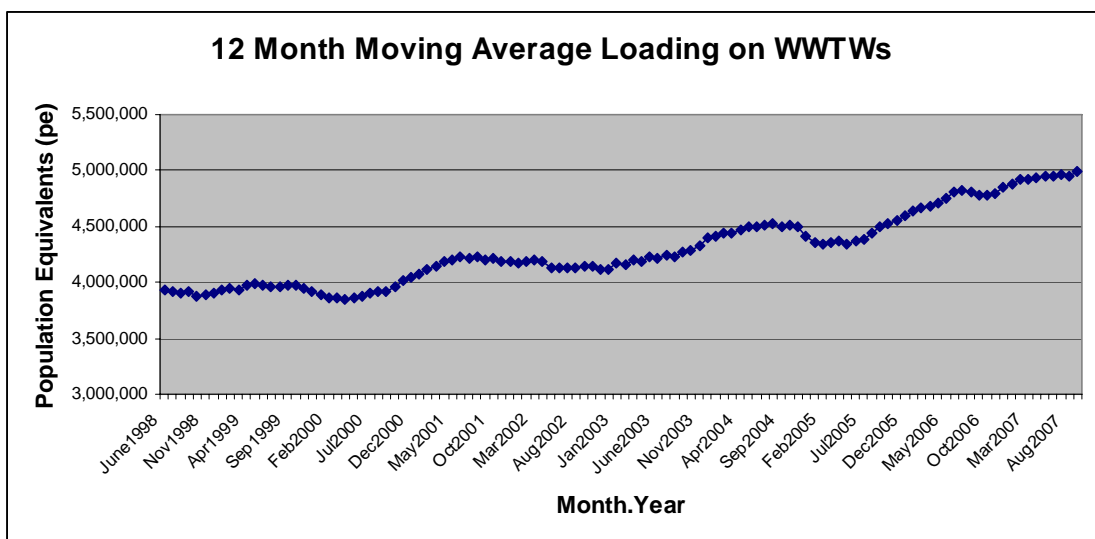
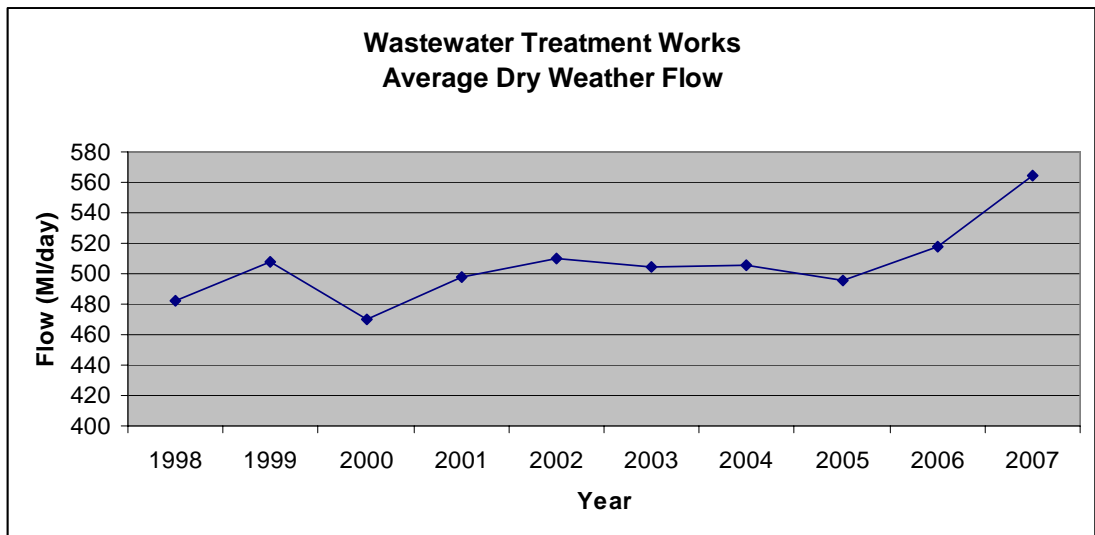


This includes the demand from agriculture and other smaller municipalities.

Wastewater effluent and the impact on the water quality of rivers and water bodies

Certain Wastewater Treatment Plants do not comply with DWAF effluent standards due to an historical lack of funding which resulted in a lack of maintenance of infrastructure, and lack of sufficient investment in the replacement of aging infrastructure and in new infrastructure. (New infrastructure is required over time to increase the treatment capacity as the City grows.) Where investment in new and replacement has taken place, benefits are notable from the improved works. This in turn improves the re-use potential of wastewater effluent.

The increase in flows and loadings to the wastewater treatment works since 2008 is given in the graphs below:



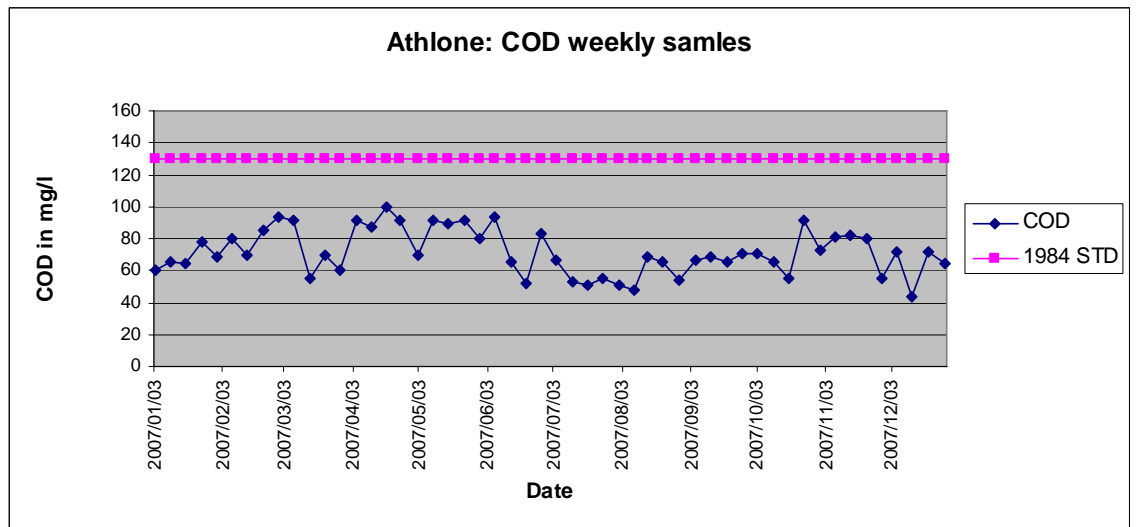
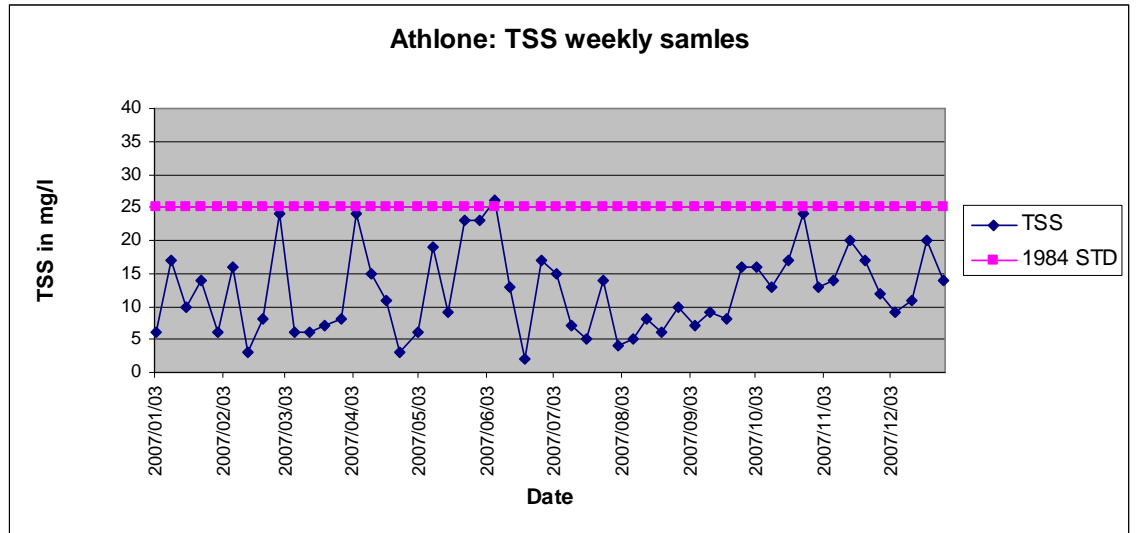
The wastewater treatment works capital upgrading programme (refer to “C2.5 Water Services Infrastructure”) is providing capacity for development and improved performance for a higher quality effluent. Providing that adequate funds continue to be made available, wastewater effluent quality will be totally compliant with current DWAF standards (1984 standards) by 2012. The mean compliance was approximately 81.3% as at June 2007 up from 76% as at December 2006, and 71 % as at December 2000, with 83% being the target for 2008/09 and 95% for June 2012.

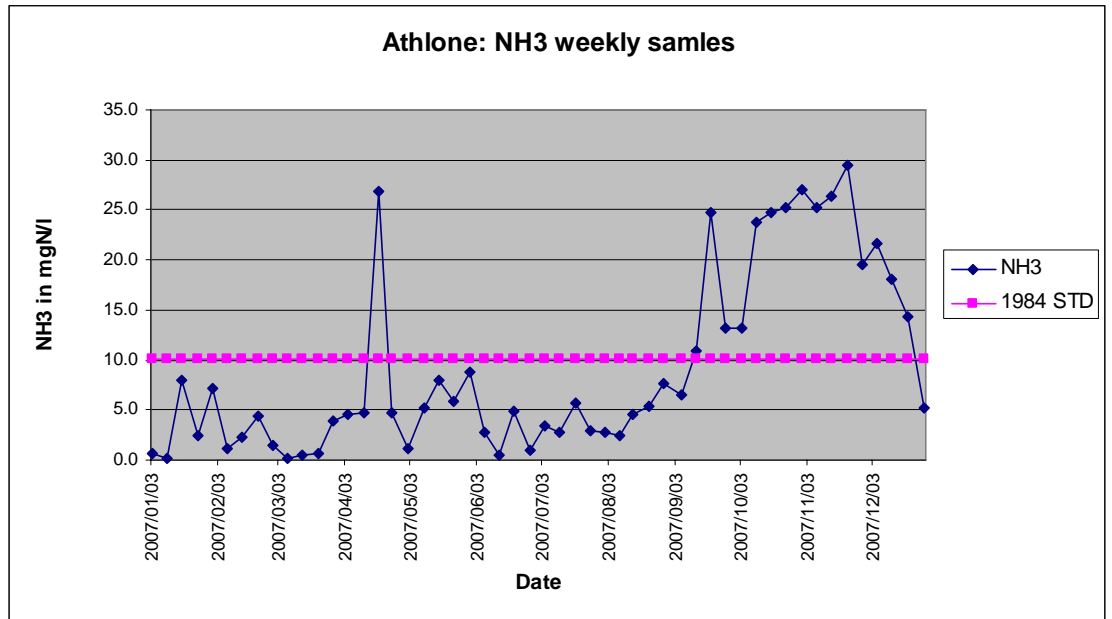
The mean % compliance is arithmetic mean of (Suspended Solids + Chem Ox Demand + Ammonia + E Coli). The Nitrate is excluded as a poorly performing works has a low nitrate which would improve % compliance whereas the "real" compliance is actually worse and ortho-Phosphate is not included as very few works have to comply with the future P standard.

Operational and maintenance problems also result in non-compliance of treated effluent. For example, the tripping of the activated sludge pump at Kraaifontein led to the loss of a significant amount of sludge from the reactor. As a result nitrification ceased and took time to re-establish. At Bellville the mixed liquor rose

resulting in higher oxygen demand. This affected nitrification. Recent power outages due to Eskom supply constraints have also compounded the problem.

The compliance with the standard are measured weekly as indicated in the graphs for Athlone below:





In order to achieve the targets all roleplayers will be mobilised with the Wastewater Treatment driving the process. The branches that the branch depends on (internal and external to Water and Sanitation) to achieve the targets for compliance are given in the table below:

Branch	Issues
Engineering and Asset Management Services	Repairs and Maintenance of assets. (Breakdowns in one part of the process will affect the quality of the effluent) Process Control equipment.
Water Demand Management and Strategy	Estimated future loadings on works (currently being done by the WWT branch) By-laws may need to be tightened up to improve enforcement of industrial effluent and pollution and to create incentives for industries to improve the quality of their discharges.
Water Pollution Control	Illegal discharges at night and seasonally Monitoring and enforcement of industrial effluent discharges. Database of all industrial effluent dischargers (currently only 289). There is a need to determine a more effective process to get them onto the database.
Reticulation	Stormwater ingress into the sewer system causing peak high peak flows especially in winter. Night soil disposal.
Finance	Sufficient capital and operating funds.
Procurement	Ensuring that the necessary materials and parts are supplied on time. Ensuring maintenance contracts are

Branch	Issues
Human Resources	functioning well. Maintaining a competent and skilled workforce with the optimum capacity including skills retention, skills development, etc.
Electricity (Eskom)	Power outages at WWTWs potentially causing poor quality effluent.

The indicators will be used to identify problem areas and identify where strategies need to be put in place to overcome obstacles. For example, since procurement delays cause equipment to be out of order for longer than acceptable periods, Procurement will be engaged to assist with streamlining the process.

Some of the areas that Wastewater Treatment Branch are focusing but will be tightened up are:

- Plant Management and Operator skills and competencies,
- Process optimisation, and
- Improved monitoring and operational control.

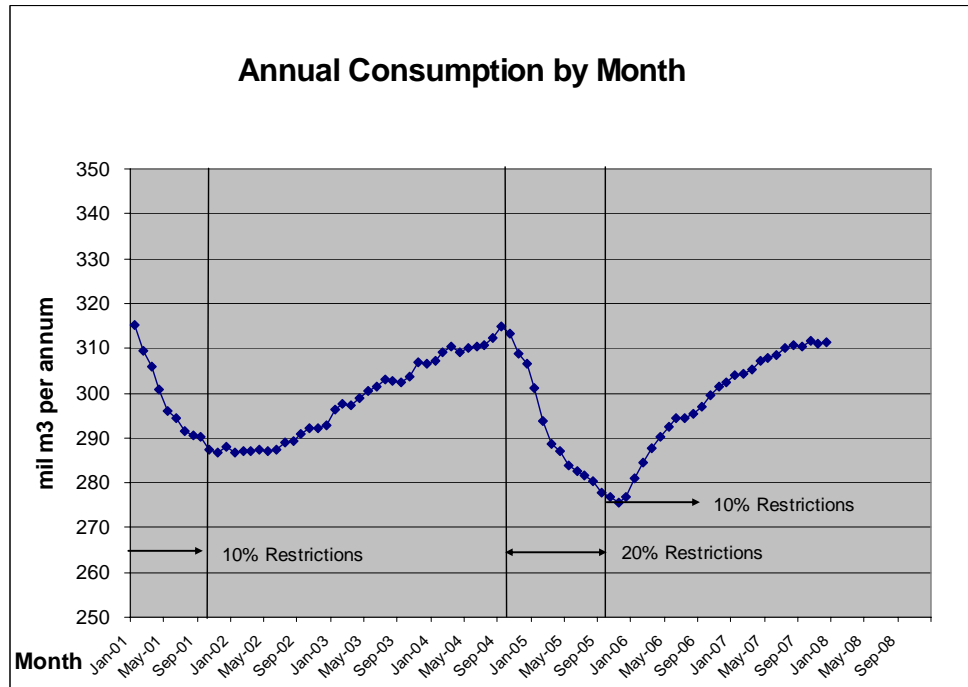
In general, the next four or five years will see a peaking of the upgrading requirements for essential wastewater treatment and it is anticipated that adequate funding will be made available to undertake the necessary improvements, maintain effective service delivery and minimise the impact on the environment.

A Water Quality Plan, which will be linked to the WWTW Master Plan, the Asset Management Plan and an Operational Improvement Plan, will be drawn up to ensure that there are sustained improvements in treated effluent quality.

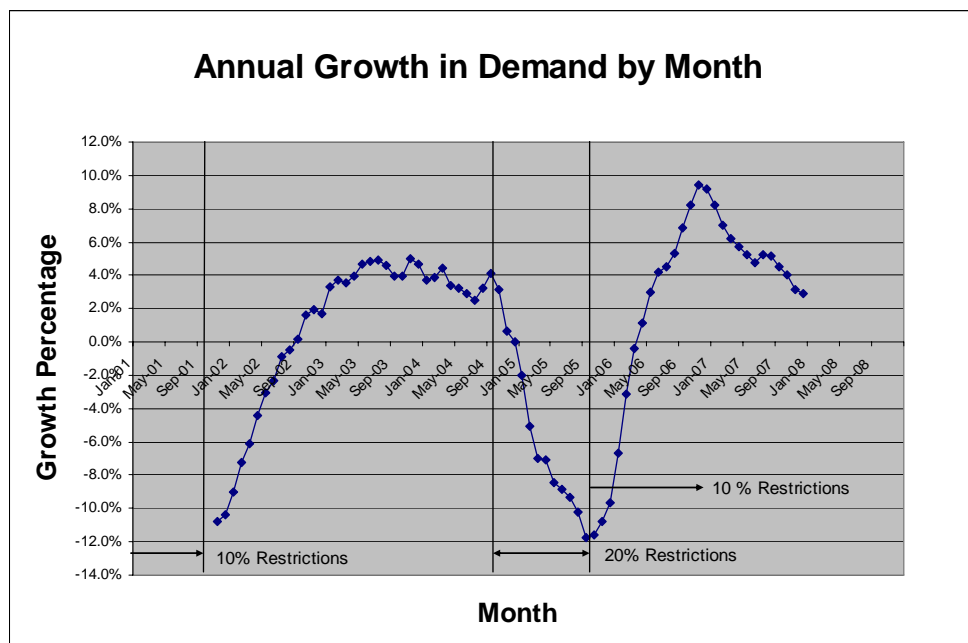
Stormwater runoff from polluted sources (industrial dumping and settlements in catchments) often cause more severe pollution of water bodies than the treated effluent does. A working arrangement has been set up with Catchment Management to ensure the impact of sewerage overflows or effluent problems is minimised and does not worsen the environmental health further.

C2.4 Water conservation and demand management

The annual water consumption (total bulk water treated) by month is given in the graph below:



From this the effect of water restrictions can be seen. From the graph below it can be seen that the growth rate peaked at 9.5% in November 2006 (due to the low base) but has now reduced to 2.9% per annum as at December 2007. Further reductions in the annual growth rate are required as part of the WC&DM Strategy.



The City's approach to water demand management is based on three broad principles: water is a strategic, precious and scarce resource; there should be no wastage of water; and all water used should be measured and accounted for.

A comprehensive ten-year WC/WDM strategy was approved by Mayco in May 2007. The framework of action of the strategy is divided into an enabling section and an implementation section. The implementation goals are as follows:

Goal A: CCT must by 2010 reduce and maintain the non-revenue water to below 15% of the total average demand and within accepted international benchmarks.

Goal B: Water wastage by consumers should be reduced and maintained to below 2% of the total demand by 2012 and most consumers should achieve acceptable water efficiency benchmarks by 2016.

Policy E: Reduce the projected potable water demand by 20% by the year 2012 and conserve Cape Town's Water Supply. (Planning for future water and sewer infrastructure is currently based on the City achieving this goal).

The enabling goals defined in the strategy are as follows:

Goal C: CCT must by 2009 ensure and maintain ongoing effective management systems and implement Integrated Water Resource Planning in all decisions regarding water resources augmentation, bulk infrastructure development and water efficiency projects.

Goal D: CCT must adopt WC/WDM as one of the key water service delivery strategies, and must give priority to its implementation and ensure an ongoing adequate enabling environment.

The two most critical components of the implementation of the WC/WDM strategy are the reduction of the water losses and the re-use of treated effluent water as an additional resource.

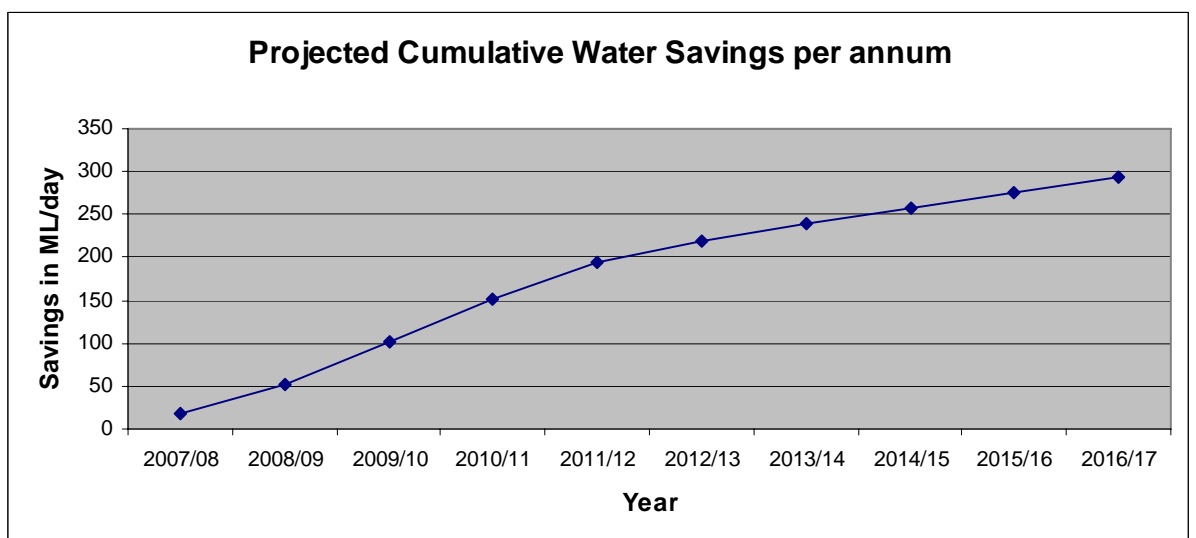
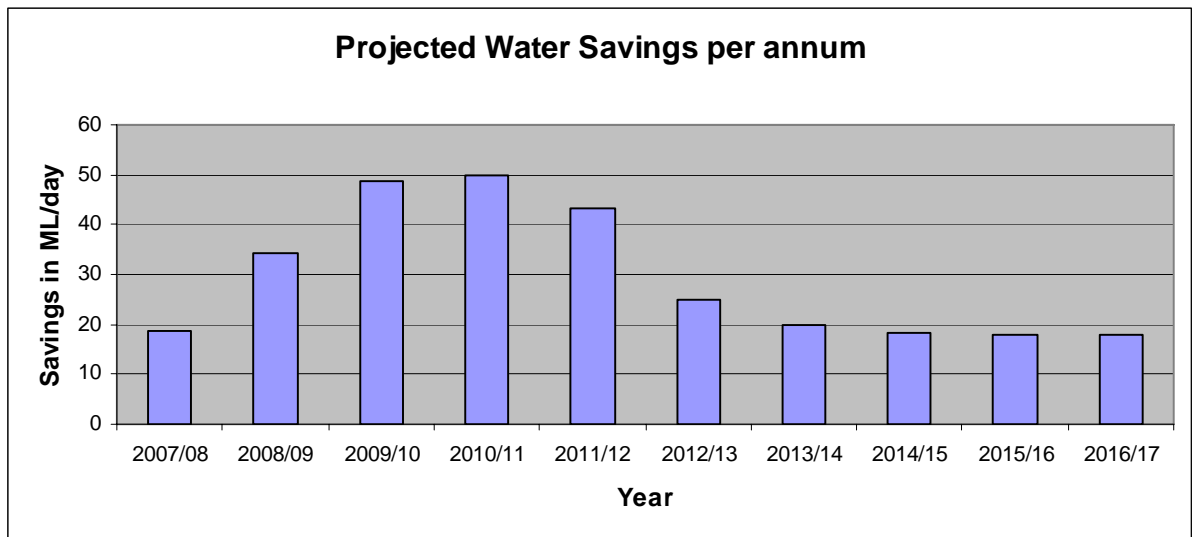
During the last three years a number of successful WC/WDM projects have been implemented, most notable projects were the Mfuleni and Protea Park Integrated Leak Repair Projects, the Fixit Project, the education campaigns, treated effluent recycling and various pressure management projects.

The focus on these projects has reduced non-revenue demand. In addition the tariffs for treated effluent re-use are being rationalised and should result in additional income. The additional income is intended to be ring-fenced for use on WC/DM projects.

The capital budget as outlined in the WC&DM Strategy and compared with actual budget is outlined in the table below:

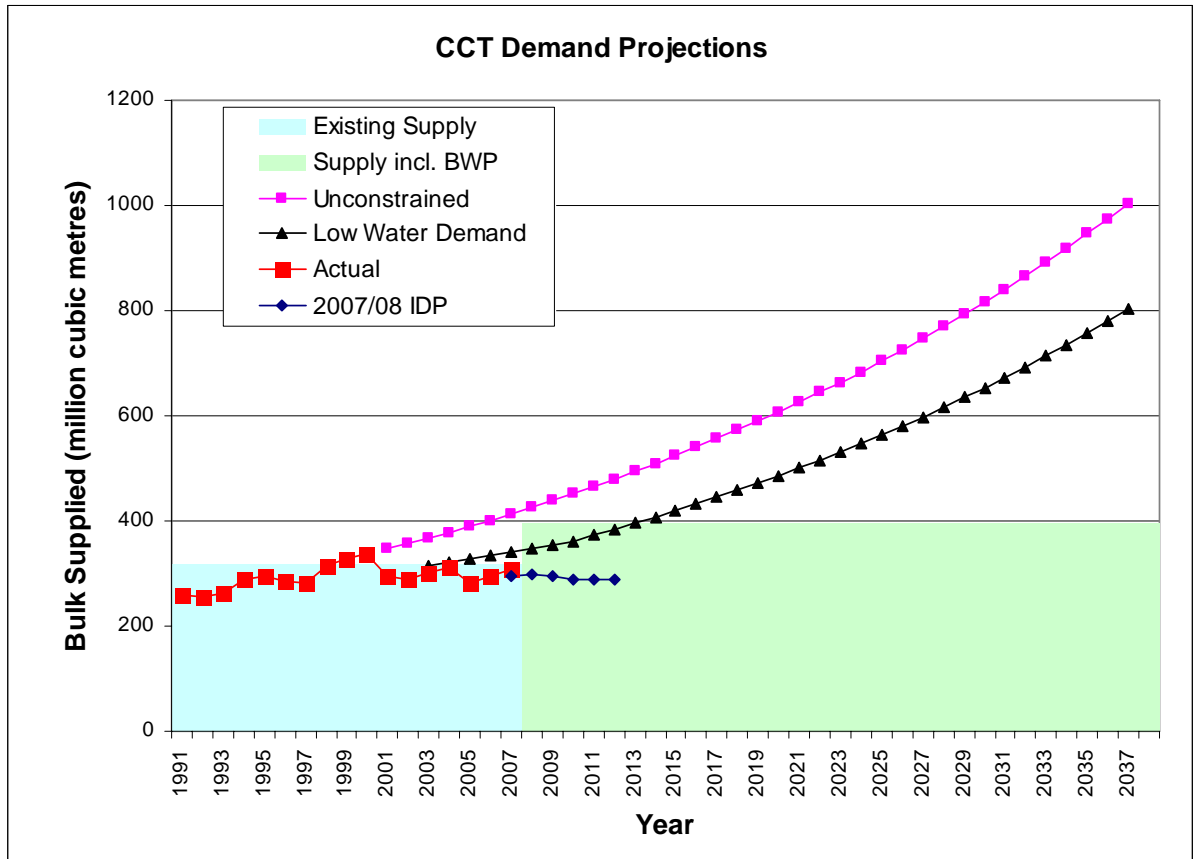
Year	Operating		Capital	
	Strategy	Actual	Strategy	Actual
2007/08	R 19.58	R20.00	R 27.17	R30.00
2008/09	R 40.42		R 56.08	
2009/10	R 57.13		R 79.26	
2010/11	R 54.69		R 75.88	
2011/12	R 52.62		R 73.00	
2012/13	R 26.87		R 37.28	
2013/14	R 18.77		R 26.04	
2014/15	R 16.14		R 22.39	
2015/16	R 15.94		R 22.11	
2016/17	R 15.84		R 21.98	
TOTAL	R 317.99		R 441.20	

The savings and cumulative savings that are projected to result from the WC&DM Strategy are shown below:



The targeted savings for this year are 18.7 ML/day or 6.84 million m³ per annum, which is approximately 2% of the demand.

Demand is currently 25.5% below the unconstrained water demand. This is better than the DWAF requirement of 20%. However, there is concern that despite the increase in water demand management projects as a result of additional funding, the underlying growth remained high at 2.9% as at December 2007. The trends will continue to be monitored and remedial action taken as appropriate in accordance with the Reconciliation Strategy.



C2.5 Water services Infrastructure profile

The replacement value of the water and sewer infrastructure, determined in May 2003 (escalated by 6% pa to 2007) as part of the Section 78(1) evaluation, was about R22.1 Billion, with 70% being the water and sewer pipe networks, made up as follows:

Water Supply Infrastructure	Replacement Value (R mil)
Dams and catchments	1,177
Treatment Works	1,289
Water Reticulation	10,192
Water Pump Stations	396
Reservoirs	1,601
Depots (shared)	38
Sub Total	14,693
Wastewater Infrastructure	
WW treatment works	1,793

Water Supply Infrastructure	Replacement Value (R mil)
Sewer Reticulation	5,251
Sewer Pump Stations	359
Depots (shared)	38
Sub Total	7,440
Total	22,132

Existing Infrastructure

Previously maintenance of infrastructure was mostly reactive. This resulted in inadequate maintenance and replacement. With an investment of R22.1 billion in infrastructure assets it is apparent that proper maintenance of these assets over their life cycles can reduce the cost of ownership and will also ensure that treated effluent targets are met.

Water and Sanitation Services is implementing an AmiP (Asset Management Improvement Programme) and the SAP Plant Maintenance Module, and this situation is gradually being turned around. The stages of AmiP are:

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

The improvement process will ensure

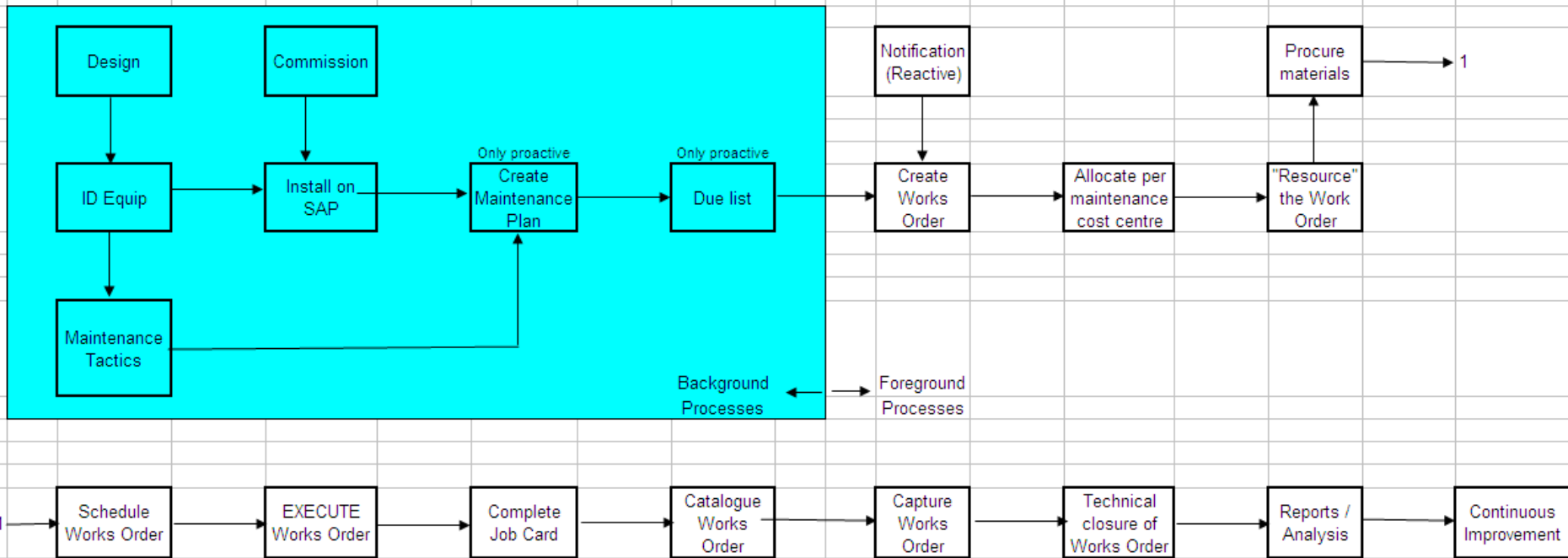
- Assets are maintained proactively rather than reactively,
- The total asset lifecycle is managed and as a result the life of the asset is maximised, and
- Maintenance work is effectively coordinated.

This approach will ensure that **costs and therefore tariffs are minimised in the long term** and unwanted operational failure is significantly reduced. This improvement process is being driven through the Reliability Engineering which was established in March 2004.

Reliability Engineering is essentially a central hub where all maintenance- and asset-related information is recorded, analysed and stored while maintenance schedules, budgets and contractors are managed and proper work execution ensured. Work requests are called in and logged onto an asset management software system. These requests, along with preventative maintenance work, are then assigned to staff. (The process for the maintenance of assets is outlined below).

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

Process for the Maintenance of Assets



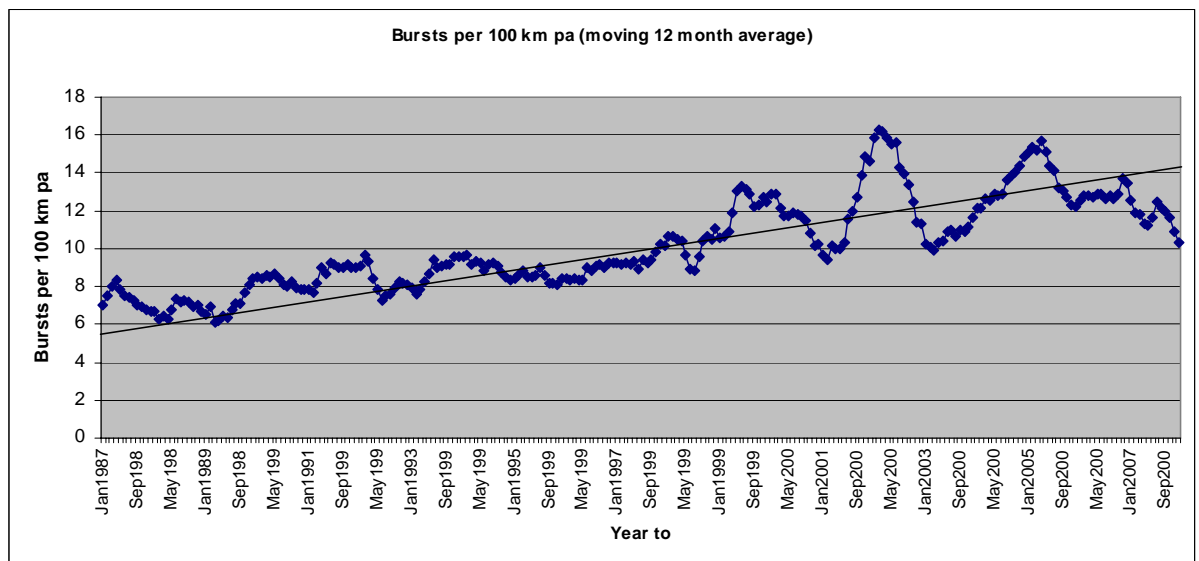
The Reliability Engineering site, captures and records all required work as well as preventative maintenance schedules, generating reports including details of failure analysis.

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

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

The water and sewer reticulation network makes up R15.4 (approximately 70%) of the total R22.1 billion replacement value. In terms of minimizing the long term costs of owning the assets, therefore, the replacement programme for these networks is very significant. Therefore condition records of the networks need to be dramatically improved. Meticulous records of burst mains and blockages, on a Metro basis, has been introduced and maintained since June 2006. The Technical Operations Centre (TOC) is keeping statistics which are presented monthly. The TOC systems are work in progress, but progress is being made with IT and ERP on the portal systems.

The indicator used to track the integrity of a water network is the number of bursts per 100 km per annum. An example of records from the Water Branch of the former CT Administration shows that the number of bursts per 100 km on a 12 month moving has deteriorated from approximately 6 to 14 in the last 20 years due to a reduction in the number of kilometers of pipeline replaced per annum. This needs to be addressed.



From such records, investigations and tools such a CCTV cameras for sewer pipes, a comprehensive pipe replacement programme will be developed which will need adequate funding and staffing to ensure success.

It is likely that the Asset Management Improvement Programme (AmiP) will identify that **in the short term** more funds will need to be allocated to maintenance of infrastructure and replacement of aging infrastructure. However, it will ensure that **in the long term costs and therefore tariffs are minimized.** (Previously costs and tariffs were reduced but this results in higher costs and tariffs in the long term)

While the department has generally achieved Stage 3 (Basic Asset Management), there are bottleneck in the asset management process. **This has resulted because Reliability Engineering is critically short of skilled staff. Critical posts will be filled to get the programme back on track. In addition, the temporary outsourcing of particular functions is being investigated.**

Besides the filling of critical posts, the urgent tasks that required additional capacity are :

- All gaps in Equipment data to be identified and put on SAP Master Data,
- All gaps in Equipment without Maintenance Plans to be identified and put onto SAP Master Data,
- Ensure all critical proactive works order are generated on SAP,
- Rationalise the number of Maintenance Plans where possible,
- Ensure all proactive orders are generated,
- Improve the procurement process to ensure that all the tools and materials required for pro-active work is received timeously,
- Complete all works orders either using internal staff or outsourced maintenance teams.
- All completed Works Orders to be captured timeously without build up in a backlog,
- Re-instate monitoring systems and indicators such as the ratio of pro-active to reactive maintenance.

The following activities are planned once the basics are being done:

- Improved work planning where the Planner, Supervisor and Procurement plan maintenance work together,
- Work scheduling and then improved work scheduling where there is a closer co-ordination with the operational staff. Currently, pro-active jobs are generated for the month and work is done in accordance with the daily needs rather than a planned schedule. A planned schedule enables more effective utilization of resources.
- Another current gap is the determining of the catalogue of the notification. This enables one to determine which parts in a piece of equipment are continuously failing and thereby take effective remedial action.

There is also a skills shortage on the operational side. Tenders are being prepared for the maintenance of critical equipment (belt presses, centrifuges, pumps and gearboxes). Currently the maintenance of lifting equipment and pressure vessels is outsourced.

As in the case of treated wastewater effluent quality indicators will be used to identify where there are gaps and strategies will be devised to close the gaps.

Planning for new and upgrading/replacement of aging infrastructure

Growth areas

To alleviate the problem of overloading of infrastructure in the growth areas of the City a process under the leadership of the Corporate Development Directorate was started to address the situation in a multi-disciplinary way. A partnership approach with developers was started to ensure that development could continue. Development contributions are determined and agreed for each node or Corridor to fund some of the required infrastructure. There are still a number of challenges, and implementation and capacity constraints in the City. The areas where water and sewer infrastructure are severely stressed and are in need of significant upgrades include:

- 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 / AECl development node

Wastewater Treatment Works

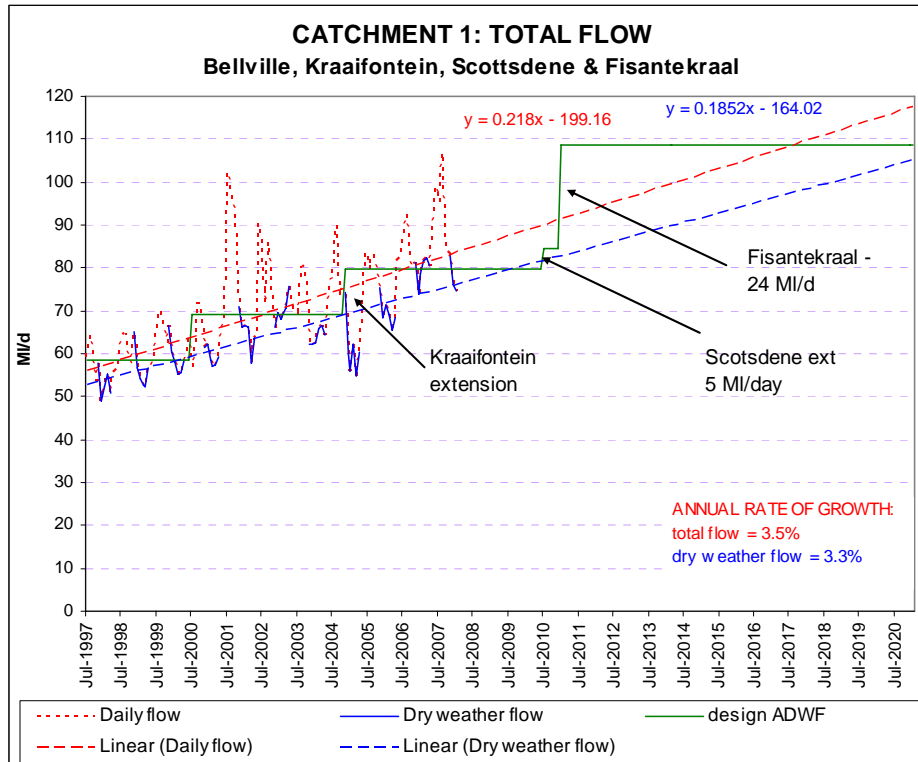
The strategies for ensuring that wastewater treatment capacity is sufficient are:

- 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,
- Provide sufficient funding (EFF and MIG funds) to address the backlog in WWTW capacity and provide for growth.

In the north eastern areas of the City (Catchment 1) and the Blaauberg areas (Catchment 4) the lack of capacity resulted in development being slowed. The plans for each catchment are detailed below:

Catchment 1

The total of all the wastewater treatment works in Catchment 1 are currently near their design capacities as shown in the graph below:



To overcome the capacity constraints the construction of the Scottsdene extension of 5 MI/day and phase 1 of the Fisantekraal works of 24 MI/day are planned. The capacity extension at the Scottsdene WWTW is expected to commence in May 2008 and be complete by early 2010.

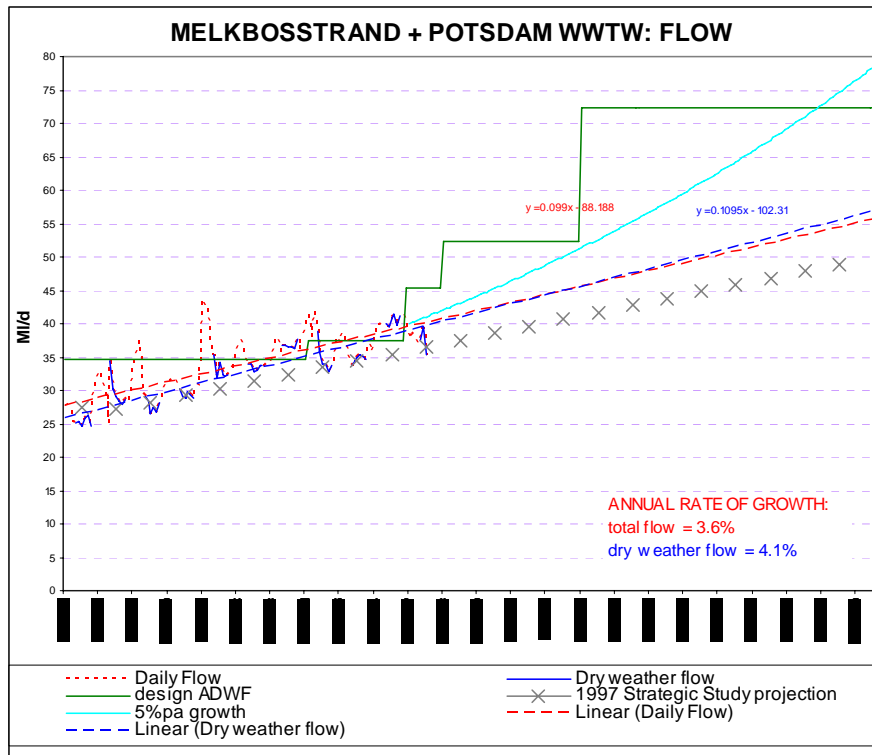
Agreement on the purchase of land for the new wastewater treatment works at Fisantekraal has been concluded and consultants have been appointed and are busy with the design. Construction will commence around mid 2008 with the expected commissioning by mid 2010.

The preliminary upgrading of Bellville WWTW to improve the quality of effluent should be substantially complete by the end of 2008 and will be followed by a capacity extension to deal with on-going development in the catchment.

Catchment 4

The Potsdam WWTW in Catchment 4 has recently been extended by 8 MI/day with the new works scheduled to be fully operational by April 2008. This has provided sufficient capacity to allow the limitations on development in the Blaauwberg area to be relaxed.

It will be extended by another 7 MI/day by the end of June 2008. Due to the rapid growth in the area it is anticipated, an additional 20 ML/day will be required by June 2012.



DEADP accepted the scoping report for increasing the treatment capacity at either Melkbos or Potsdam WWTW to cater for growth in the area. Specialist environmental studies have been undertaken and the draft Environmental Impact Report will be presented to the public early in 2008. This will be followed by the submission of the report and recommendation to DEADP.

The Zandvliet WWTW is currently being extended in capacity to accommodate the N2 Gateway project and other developments in the area. The new treatment process which utilises membrane technology, a first for Cape Town, is due to be completed by May 2008.

The capital upgrading programme is not only providing capacity for development but also for improved performance for a higher quality effluent.

Bulk Water

To cater for the growth in demand in the northern areas there are plans and budgets for the implementation of the Northern Areas Bulk Water Augmentation Scheme. The phase of this scheme involving the implementation of a new water treatment plant and bulk reservoir is currently in its EIA phase. Revisions to the EIA and additional infrastructure to be covered in the EIA process has resulted in planned completion of the EIA and submission to the environmental authorities in May 2008.

The table of proposed wastewater treatment capacity extensions for the period of this plan is shown on the following page.

Long Term Integrated Planning

To ensure more effective long term integrated planning within Water and Sanitation Services, Consultants were appointed to identify what information exists and what the gaps in the current master plans are. The report for this was completed at the end of March 2008. A tender has soon be awarded to procure professional services to develop master plans where there are gaps and to update existing master plans. Loading on the infrastructure will be based on land use and will apply to all services.

The objectives of the master planning process are:

- All services within Water and Sanitation use the same customer data with respect to existing flows/loadings and their expected growth rates in particular areas,
- Infrastructure plans within Water and Sanitation Services are fully aligned,
- Capital budgets for future years are mainly based on the master plans which are kept up to date, and
- Monitor where new infrastructure and identified replacement infrastructure is lagging due to inadequate funding.

Proposed Wastewater Treatment Capacity Extensions

	Existing Capacity as at 01-Jul-07		Capacity Extensions by 2007/08		Capacity Extensions by 2008/09		Capacity Extensions by 2009/10		Capacity Extensions by 2010/11		Capacity Extensions by 2011/12		Capacity Extensions by 2012/13		Total proposed additional capacity by 2012/13		Total Capacity by 2012/13			
	Hydraulic (Ml/day)	Organic (pe's)	Hydraulic (Ml/day)	Organic (pe's)	Hydraulic (Ml/day)	Organic (pe's)	Hydraulic (Ml/day)	Organic (pe's)	Hydraulic (Ml/day)	Organic (pe's)	Hydraulic (Ml/day)	Organic (pe's)	Hydraulic (Ml/day)	Organic (pe's)	Hydraulic (Ml/day)	Organic (pe's)	Hydraulic (Ml/day)	Organic (pe's)		
Athlone	105	900,000															105.00	900,000		
Bellville	54.6	581,182											15.00	159,660	15.00	159,660	69.60	740,842		
Borcherds Quarry	33	360,000															33.00	360,000		
Camps Bay	5.5	40,000															5.50	40,000		
Cape Flats	200	1,810,000															200.00	1,810,000		
Dover	0.01	0															0.01	0		
Fisantekraal	0	0							24.00	218,160					24.00	218,160	24.00	218,160		
Gordons Bay	3.1	13,909															3.10	13,909		
Green Point	30	232,727															30.00	232,727		
Hout Bay	9.8	80,182															9.80	80,182		
Klipheuwel	0.07	455							0.07	455						0.07	455	0.14	910	
Kraaifontein	17.5	159,091															17.50	159,091		
Llandudno	0.28	1,591															0.28	1,591		
Macassar	57	370,500															57.00	370,500		
Melbosstrand	5.4	24,545										20.00	192,500			20.00	192,500	25.40	217,045	
Millers Point	0.06	600															0.06	600		
Mitchells Plain	45	480,000															45.00	480,000		
Oudekraal	0.03	300															0.03	300		
Parow	1.2	6,800															1.20	6,800		
Philadelphia	0.086	0															0.09	0		
Potsdam	40	385,000	7.00	67,375												7.00	67,375	47.00	452,375	
Scottsdale	7.5	92,727					5.00	61,815								5.00	61,815	12.50	154,542	
Simons Town	5	27,636															5.00	27,636		
Wesfleur	14	152,727							4.00	43,636						4.00	43,636	18.00	196,363	
Wildevoevlei	14	86,000															14.00	86,000		
Zandvliet	59	375,455	18.00	114,534													18.00	114,534	77.00	489,989
TOTALS	707	6,181,427	25.00	181,909	0.00	0	5.00	61,815	28.07	262,251	20.00	192,500	15.00	159,660	93.07	858,135	800.21	7,039,562		
Cumulative Capacity	707	6,181,427	732.14	6,363,336	732.14	6,363,336	737.14	6,425,151	765.21	6,687,402	785.21	6,879,902	800.21	7,039,562						
			total growth in capacity over 5 years		13.2%	13.9%														
			average growth in capacity pa over 5 years		1.8%	1.9%														

C2.6 Water balance

The 12 month-moving average of unaccounted for water (UAW) for bulk and reticulation was 19.3% as at the end of June 2007.

However, the City has adopted international best practice with respect to reporting on water balance and will stop reporting on UAW. Due to uncertainties in certain components of the water balance there are a wide range of possible values for the indicators for the reticulation system as shown in the table below:

Range of Indicators				
Indicator	Min	Rating	Max	Rating
Non-revenue Demand as a percentage of system input	17.3%	Good	23.2%	Poor
Real losses - litres per connection per day	162	Good	228	Poor
Infrastructure Leakage index	2.7	Good	3.8	Poor

These indicators are for the period 1 May 2006 to 30 April 2007

A process is currently underway to narrow down the range of indicators.

As at April 2007 the input into the reticulation system was estimated to be 268 mil m³ pa, the non-revenue demand 62 mil m³ pa and real losses 47 million m³ pa.

The distribution of water demand is as follows:

Type of usage	2005/6	2006/7
Domestic	56.9%	58.5%
Domestic Cluster	7.0%	7.7%
Municipal	4.9%	4.6%
Commercial and Industrial	18.3%	17.8%
Other	12.9%	11.4%

C2.7 Water services institutional arrangements

The City's organisational structure, under revision since 2001, has predominantly reached finalisation, with new staff rapidly being appointed and current staff mostly having being placed. Internal optimisation of structure and process, inter-departmental coordination, integrated planning, as well as Employment Equity are being given high priority in conjunction with the placement process. Water and Sanitation has continued on a path to further optimise its organisational structure which is being implemented

where and when possible, within given constraints. It is based on the optimal allocation of available staff, augmented by advanced information and operational technology.

An additional staff budget of R116 million per annum from 2007/08 onwards to alleviate the critical staff shortages have been approved and budgeted for. Of particular significance are the funds to appoint several Financial staff. Engineering staff is also being recruited.

The key to addressing the challenges that Cape Town Water and Sanitation face and achieving Water Services' vision and goals is to ensure that Water and Sanitation is structured financially and institutionally to achieve enhanced operational and financial performance.

The decision to establish an appropriate service authority mechanism and the establishment of a Water Service Authority (WSA) and a Water services Provider (WSP) arrangement has experienced numerous obstacles. The decision to form an internal ring-fenced business unit dates back to November 2001 with the confirmation that WSA and WSP be established dating back to June 2004.

The purpose of investigating Section 78 options and deciding on an appropriate model for the separation was to:

- ◆ Comply with national legislation.
- ◆ Bring effect to national and City's strategic intent
- ◆ Comply with the Council resolution on the matter in June 2004
- ◆ Ensure that water and sanitation services in the City are sustainable

The current arrangement is that accountability for the financially ring-fenced internal branch acting as WSP rests with the Director: Water Services who is expected to deliver on the city's strategic goals through the organizational structure to the Executive Director: Utility Services and the 3-year rolling business plan made up the WSDP and related documents such as the SDBIP and the Utility Services: BSC. The branch has set up a properly-staffed Financial section to focus on financial sustainability. Management is finding that this arrangement is working well and that introducing further measures such as a formal service-level agreement between the WSA and WSP is not a priority, with no apparent advantages.

The City is also committed to developing alternative service delivery and infrastructure funding or investment mechanisms. Objective 7.2 under the Strategic Focus Area 7 "Good Governance and Regulatory Reform" from the

2007/08 IDP (Draft 15.03.07vx2.2) states “Enhance service delivery through exploring alternative service delivery mechanisms”.

C2.8 Customer service profile

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

An annual customer survey is undertaken. The ratings from previous customer surveys are given in the table below:

	2002/03	2003/04	2004/05	2005/06	2006/07
Percentage of customers satisfied with the service	85%	82%	83%	87%	89%

However, in informal areas there is a completely different picture as shown in the table below:

	2002/03	2003/04	2004/05	2005/06	2006/07
Percentage of customers satisfied with the service		72%	45%	37%	47%

The general conclusions from the 2007 Customer Survey are:

- Respondents living in formal residential areas are increasingly more satisfied than in the past.
- Respondents living in informal residential areas are dissatisfied and this perception is increasing with time. However the numbers of somewhat satisfied respondents are also increasing in time.
- Overall respondents are satisfied with the taste, colour, smell, texture, pressure and quality of water at their disposal. However a number of formal residential respondents complained about the low water pressure and a number of informal residential respondents complained about very high water pressure.
- In the business sector, there is an upward trend in the change in behaviour to conserve water. There is no change from 2006 in the formal residential areas.
- Across all the types of surveys, there is a lack of knowledge about water efficient fittings. A small number of respondents from all the different areas have boreholes which are mainly used as supplementary source to water the garden.
- In direct contact with the Department of Water and Sanitation Services employees, most respondents found them courteous but a significant number of respondents did not receive any follow-up from contact with the Department of Water and Sanitation Services.

- In the informal residential areas there is a need for basic sanitation hygiene services which are safe and hygienic. Most households share toilet facilities with 7 other households.
- A significant number of respondents from informal residential areas complain about unpleasant smells and health problems related to unhygienic sanitation services.
- A rising tariff scale could encourage businesses to conserve water.

The actions that flow from the customer survey which will be taken are:

- Address pockets of low pressures in formal areas and high pressures in informal areas,
- The Education and Awareness Campaign will be improved to ensure there is an upward trend in the behaviour change in residential customers with respect to water consumptions reductions, and that all customers have a better knowledge of water efficient fittings,
- A system will be established to ensure that customer complaints are followed up, and
- The Hlonipa Amanzi Campaign in informal areas will be improved to ensure that the concerns of customers in informal areas are addressed.

C2.9 Financial profile

The collection ratios have improved. Sanitation collection ratio has improved from 87% (05/06) to 92% (06/07) while Water has improved from 70% (05/06) to 85% (06/07).

The outstanding Debt as at the end of October 2007 was R1.77b for Water and Sanitation. High debt reduces Water and Sanitation's ability to afford the necessary capital programmes to maintain existing infrastructure and develop new infrastructure for the growth in the City.

Water and Sanitation are currently busy with a number of interventions. Apart from the leaks project which focuses on reducing the consumption (and therefore monthly bill) and debt of low income households, the number of teams that performs the actual disconnections and reconnections are being increased, large meters with zero consumption are being replaced, properties with no sewerage charge are being identified, and new developments are being updated.

The key financial strategies for CCT in the IDP, with Water and Sanitation's approach in italics, are:

- ◆ Limiting salary costs to acceptable levels, taking into account the City's new operating model and transferring savings to improve the maintenance of assets. *Water and Sanitation have had to increase their*

staff due to critical shortages. However, strategies outlined above ensure that the service remains affordable;

- ◆ Reducing the dependency on cross-subsidisation from tariff-based services to within acceptable norms. *As from 2007/08 the water tariff no longer cross subsidizes rates;*
- ◆ Maintaining rate and tariff adjustments within national norms and guidelines, ensuring the national and local economy are not undermined. This has been achieved when compared to the other 5 metros, *despite higher than inflation increases in tariffs necessitated by infrastructure needs;*
- ◆ Making adequate provision for free basic services for the poor through an improvement of the indigent policy, to ensure that there is no further marginalisation of poorer communities or individuals through the entrenchment of the indigent policy. *The step tariffs and relief to indigent households outlined above ensures that water and sanitation remains affordable;*
- ◆ Preparing realistic income budgets with adequate provision for non-recovery to ensure the expenditure reflected for each year can be fully covered by cash receipts; *(Being Done)*
- ◆ Ensuring that adequate cash reserves are maintained to cover legislated funds and provisions. *(Being Done)*

Implementing these financial strategies will go a long way to putting Water and sanitation Services on a sustainable path.

A summary of the overall 3-year capital requirement in Rand million for the service is detailed in the table below:

Functional Area	2008/09	2009/10	2010/11
Bulk Water	38.4	149.5	414.9
Reticulation	351.5	293.6	269.8
Wastewater Treatment	226.5	228.0	222.0
Water Demand Management	27.0	38.3	26.5
EAMS	0.6	19.1	18.0
Informal Settlements	18.1	40.5	17.0
Meter Replacement	14.0	15.0	15.0
Information Technology	3.5	3.5	2.5
Technical Operation Centre	1.0	0.5	0.5
Masterplanning	2.0	2.0	2.0
TOTAL	682.5	790.0	988.2

The funding arrangements for the three financial years (in R millions) is given in the table below:

Funding	2008/09	2009/10	2010/11
MIG	171.6	137.5	93.5
BICL	79.2	0.0	4.0
EFF	431.7	652.5	890.7
Total	682.5	790.0	988.2

The allocation for MIG funding is based on approved amounts. It is anticipated that further funding will be approved as applications are made.

This requires a significant increase in funding through EFF which historically has stood at approximately R160 mil. This has a significant impact of the operating budget through interest and depreciation charges. The high capital budget is required to ensure the sustainability of the service and tariffs have been adjusted to cater for these increases.

The City recognises the urgent need to upgrade and extend infrastructure. This is highlighted under the IDP Strategic Focus Area "Sustainable Urban Infrastructure". In order to ensure that this becomes a reality it is committed to "improve leveraging of available funds without compromising the Council's ability to sustain service delivery" (part of the Public Infrastructure Investment Programme under the Objective 2.7 -Strategic Focus Area No. 2)

Depending on the effect of an aggressive Water Demand management Strategy and a re-evaluation of the approach to treated effluent standards, the high capital requirement may be able to be reduced.

The 3 year operating budget (in Rand Million) is as detailed below:

ITEM	2006/07	2007/08	2008/09	2009/10	2010/11
	R mil	R mil	R mil	R mil	R mil
Salaries, Wages and Allowance	264	431	543	592	646
Employee Related Costs - Social Contribution	58	61	81	88	96
General Expenses	248	274	309	341	365
Contracted Services	69	107	91	97	103
Repairs and Maintenance (Primary)	86	104	126	138	152
Bad Debts Provision / Working Capital Reserve	437	263	256	284	234
Collection Costs	0	0	0	0	0
Bulk Purchases - Electricity	0	0	0	0	0
Bulk Purchases - Water	163	259	264	295	329
Bulk Purchases - Water Research Levy	8	12	13	14	16
Indigent Relief	0	0	0	0	0
Grants & Subsidies Paid	0	0	0	0	0

ITEM	2006/07	2007/08	2008/09	2009/10	2010/11
Interest on External Loans	0	0	0	0	0
Depreciation	127	158	190	199	215
Transfer to / from Future Depreciation Fund	-36	-42	-63	-66	-71
Transfer to / from CRR	15	200	91	206	100
Housing Funds	1	1	1	1	1
FDR :Transfer Capital Receipts	148	125	172	138	94
Operating G & D - Projects	0	13	15	23	23
Internal Utilities Expenditure	21	55	61	65	69
Bulk Charges	782	865	942	1,003	1,068
Insurance Departmental Premiums: Assets Based	11	11	11	12	13
Insurance Departmental Premiums: Remuneration Based	2	4	5	5	5
Interest Paid Internal loans	117	123	142	60	296
Trading Contribution to Rates	90	0	0	0	0
Activity Based Costing - Operating Account	-57	-139	-130	-138	-147
Activity Based Costing - Recharges	17	10	13	14	15
Repairs & Maintenance (Sec)	71	159	146	155	165
Operating Grants and Donations - Projects (Sec)	0	0	0	0	0
Activity Based Costing - Capital Account	-10	-14	-17	-18	-19
Support Services	106	147	218	232	248
Total Operating Expenditure	2,739	3,189	3,480	3,741	4,015
% Increase in operating budget		16.4%	9.1%	7.5%	7.3%

This is based on the following assumptions:

City growth	2.00%
Inflation	6.50%
Water Demand growth	2.00%

With the high financial requirements and the need to ensure the sustainability of the service, tariffs may need to increase above inflation over the next 3 - 5 years.

As mentioned under “Institutional Arrangements”, the Water Services Provider will be structured in a way that enhances operational and financial performance.