

EXECUTIVE SUMMARY

Every WSA has a duty to all customers or potential customers in its area of jurisdiction to progressively ensure efficient, affordable, economical and sustainable access to water services that promote sustainable livelihoods and economic development.

Sections 12 and 13 of the Water Services Act (Act No 108 of 1997) place a duty on WSAs to prepare and maintain a WSDP. The DWAF has developed a new set of WSDP guidelines to assist WSAs with the WSDP process and to provide a framework for the capturing of the data. The business elements included in the guidelines and addressed in detail in SM's WSDP are as follows:

- Socio Economic Profile
- Service Level Profile
- Water Resources Profile
- Water Conservation / Demand Management Profile
- Water Services Infrastructure Profile
- Water Balance Profile
- Water Services Institutional Arrangements Profile
- Customer Services Profile
- Financial Profile

The primary instrument of planning in the water services sector is the Water Services Development Plan (WSDP). The following principles apply to the WSDP as taken from the Strategic Framework for Water Services (September 2003):

- All WSAs must develop a WSDP.
- A new plan must be developed every five years and the plan should be updated as necessary and appropriate in the interim years.
- The WSDP must be integrated with the IDP of the municipality, as required in terms of the Municipal System Act.
- The WSDP must integrate water supply planning with sanitation planning.
- The WSDP must integrate technical planning with social, institutional, financial and environmental planning. The planning of capital expenditures must also be integrated with the associated operation and maintenance requirements and expenditures.
- The WSDP must be informed by the business plans developed by water services providers and with the plans of any regional water services providers, as relevant.
- The plan must take into account the impact of HIV/Aids on future water demand.
- The WSDP must integrate with the catchment management strategy.
- The planning process must take into account the views of all important stakeholders, including communities, through a consultative and participatory process. Every effort must be made to ensure the adequate and meaningful participation of women in consultation forums.

- The draft plan must be made available for public and stakeholder comment and all comments made must be considered when preparing the final plan.
- The contents of the WSDP must be communicated to all important stakeholders, including DWAF.
- A WSA must report annually and in a public way on progress in implementing the plan.

The primary purpose of the WSDP is to assist WSAs to carry out their mandate effectively. It is an important tool to assist the WSA to develop a realistic long-term investment plan which prioritises the provision of basic water services, promotes economic development and is affordable and sustainable over time.

The WSDP is aligned with the IDP of SM for 2007-2011 and the updating was done parallel with the updating of the IDP for the 2008/2009 financial year. Strategic approaches need to be developed to address the information shortfalls and other constraints, which impact on service delivery. The implementation strategies should not constitute a wish-list, but must be reasonable and achievable within the operating and staff constraints of SM. The WSDP should be revised regularly, reporting the information for the previous five years and the projected future requirements. The WSDP is not a stagnant document, but rather a living process reliant on improvement and enhancement through the input provided by councillors, officials and technical assistants. The WSDP is to form an integrated part of the IDP public participation and consultation process. The IDP is predominantly strategic as opposed to the WSDP that are more operationally orientated.

The 2008/2009 WSDP consists of two volumes. The first volume is the report section that was drafted following the DWAF's WSDP preparation guidelines (Revision 10), which was issued to all the WSAs to assist them with their WSDP process. The second volume contains all the Annexures (Maps, models, etc.). The Executive Summary of the WSDP was put together separately so that it can easily be submitted to Council for approval and issued to the public for their comment.

The areas that fall under the SM's Management Area of jurisdiction include Abbotsdale, Chatsworth, Riverlands, Kalbaskraal, Malmesbury, Koringberg, Moorreesburg, Riebeek Kasteel, Riebeek West, Yzerfontein, Darling, PPC and the farms in the area.

ESSENTIAL QUESTIONS:

What are the backlogs? (Basic services):

The only backlogs that still exist in SM's Management Area are the buckets in Riverlands / Chatsworth (Indigent households not yet connected to the existing sewer system, internal connections) and the possible basic services backlogs that still might exist on the farms in the rural areas. Currently SM is busy with a detailed survey to verify the service levels on the farms. The figures for the farms in the table below are based on the Census 2001 data.

Area	Water Needs to RDP Level			Sanitation Needs to RDP Level		
	Number of households below RDP standard	% of total households	Cost to provide Water Services	Number of households below RDP standard	% of total households	Cost to provide Sanitation Services
Towns	0	0%	R0	199	1.3%	R2 600 000
Farms	351	5.6%	R2 106 000	1707	27.1%	R10 242 000
TOTAL	351	1.6%	R2 106 000	1906	8.7%	R12 842 000

The Western Cape Sanitation Backlog Study (Final Report - January 2007) was undertaken by the DWAF and the DLG&H in order to determine the most critical service delivery backlogs to attend to. The backlogs for SM are indicated in the table below.

Name of town	Households					Growth as % of existing backlog
	Informal Housing with no access to basic sanitation (Excl. BD)	Informal housing with access to shared service (Excl. BD)	Backyard dwellers (BD) with access to shared service	Total existing backlog	Estimated future backlog due to growth	
Abbotsdale	88	0	182	270	270	5
Malmesbury	0	220	2370	2590	2080	4
Chatsworth / Riverlands	154	0	251	405	405	5
Kalbaskraal	7	0	343	350	350	5
Darling	0	0	760	760	760	5
Koringberg	0	0	60	60	80	0
Moorreesburg	0	84	216	300	300	5
Riebeek Kasteel	0	0	440	440	440	5
Riebeek Wes	0	0	370	370	140	2
Yzerfontein	0	0	0	0	0	0
TOTALS	249	304	4992	5545	4825	

What is the status of supply to higher levels of service? (Higher levels of services)

Present service levels:

Area	Water		Sanitation	
	Basic RDP	Higher than RDP	Basic RDP	Higher than RDP
Towns	245 (1.6%)	15 290 (98.4%)	0	15 336 (98.7%)
Farms	746 (11.9%)	5 191 (82.6)	453 (7.2%)	4 128 (65.6%)
TOTAL	991 (4.5%)	20 481 (93.9%)	453 (2.1%)	19 464 (89.2%)

Cost of eradicating backlogs:

The Western Cape Sanitation Backlog Study indicated that the following capital funding is needed to address the basic services and housing backlogs in the towns in SM's Management Area.

Name of town	Total cost for water infrastructure	Total cost for sewer infrastructure	Total cost for internal water and sewer infrastructure	Total cost to eradicate sanitation backlog
Abbotsdale	R2 140 000	R315 000	R2 160 000	R4 615 000
Malmesbury	R5 804 000	R23 718 000	R20 720 000	R50 242 000
Chatsworth / Riverlands	R1 191 000	R3 421 000	R3 240 000	R7 852 000
Kalbaskraal	R2 652 000	R2 319 000	R2 800 000	R7 771 000
Darling	R2 100 000	R11 675 000	R6 080 000	R19 855 000
Koringberg	R810 000	R1 531 000	R480 000	R2 821 000
Moorreesburg	R0	R1 771 000	R2 400 000	R4 171 000

Name of town	Total cost for water infrastructure	Total cost for sewer infrastructure	Total cost for internal water and sewer infrastructure	Total cost to eradicate sanitation backlog
Riebeek Wes	R2 520 000	R2 456 000	R2 960 000	R7 936 000
Riebeek Kasteel	R0	R9 242 000	R3 520 000	R12 762 000
TOTALS	R17 217 000	R56 448 000	R44 360 000	R118 025 000

What is the strategy to eradicate backlogs?

The detailed survey of the current service levels on the farms first needs to be completed. SM is committed to determine the current service levels on the farms and to ensure that once the number of households below RDP standard is known at least basic water and sanitation services are provided to these households.

SM is committed to ensure that the current basic water services backlog (Below RDP standard) in SM's Management Area will be eradicated by 2009 and the basic sanitation services backlog by 2010. A sustainable type of sanitation services will also be provided to the households on the farms, with current sanitation services below RDP standard. The financial sustainability of these services will be evaluated by SM once the exact number of households, without basic services, on the farms is known.

IMPACTING FACTORS (Associated services, economic growth and social and environmental (health) issues)

Challenges influencing the municipality's objectives with respect to the delivery of efficient, affordable, economical and sustainable services are as follows:

- Scarcity of technical resources, particularly specialist staff and qualified operators.
- Retention of skilled and experienced staff.
- Limited capital and operational budgets.

Associated services:

The Strategic Framework for Water Services (SFWS) places an appropriate focus on the imperative of ensuring universal access by households to at least a basic water supply and sanitation service. However, the provision of effective and efficient water services to meet the economic demand of all consumers (domestic and non-domestic) is equally important.

One of the visions of the Sector is that all people living in South Africa have access to adequate, safe, appropriate and affordable water and sanitation services, use water wisely and practise safe sanitation (SFWS).

One of the goals of the Sector is that water and sanitation services are provided (SFWS):

- Equitably (adequate services are provided fairly to all people);
- Affordably (no one is excluded from access to basic services because of their cost);
- Effectively (the job is done well);
- Efficiently (resources are not wasted);
- Sustainably (services are financially, environmentally, institutionally and socially sustainable; and

- Gender sensitively (taking into account the different needs and responsibilities of women and men with regard to water services and sanitation).

SM works towards providing all households in the towns with a water connection inside the yard or inside the house and connecting all households to a waterborne sanitation system.

Economic Growth:

Malmesbury is the administrative centre, as well as a commercial centre in the SM. The town has a diversified economic base, which includes agriculture, a well-diversified industrial sector and infrastructure. According to the Growth Potential of Towns in the Western Cape (2004) study, its growth potential is ranked high and its human need low (the towns people are considered well off).

The town's location of being approximately 60km from Cape Metropole increases its market potential. It has sufficient land for future residential development. While tourism does not currently play a major role, this avenue can also be explored. The study found the smaller towns in the Swartland area to have low development potential, while Malmesbury, Moorreesburg and Kalbaskraal scored high on development potential. Kalbaskraal and Koringberg scored high on human need, while all the other towns included in the study, namely Malmesbury, Moorreesburg, Darling, Riebeek Kasteel, Riebeek Wes and Yzerfontein, scored low on human needs (Growth Potential of Towns in the Western Cape, 2004).

The N7 is a major road linking the areas with Cape Town. Rail transport for freight runs from Malmesbury, Kalbaskraal and Riebeek Kasteel.

Social issues (Indicators):

Education:		
Number of Schools (primary and high)		40
Percentage of people over 14 illiterate (less than grade 7)		31
Educator learner ratio		37
Crime measures (reported crime):		
Number of police stations (2004/05)		5
Number of murders (2004/05)		53
Drug related crimes (2002/03)		378
Total number of cases reported (2004/05)		5 881
Number of rapes (2004/05)		148
Drug related crimes (2004/2005)		613
Strengths		
Urban areas receive excellent basic services	National Road N7 linkage to Cape Town	Relatively well educated or high
Capacity to spend	R27 regional corridor pass through region	Skilled workforce
Developed transport network	Progress with indigent households	Favorable staffing capacity
Overall financial standing strong & consistent	EPWP implementation	
Challenges		
Improve basic services for Ward 7	Drug related crime	Drinking water exposed to potential risk
Lack access to health facilities	No youth care facilities	Manufacturing sector not well diversified
Weak numeracy & literacy skills	Low human capital	
Weak ECDs	Access to recreational facilities lacking	
Opportunities		
Use EPWP for Poverty Reduction	Market Malmesbury as a "leader town"	

Socio Economic Profile West Coast District 2006, Provincial Treasury & Socio-Economic Profile West Coast District 2007

Poverty within the area can be identified by comparing the number of indigent residential consumers with the number of residential consumers that are not classified as indigent within the various towns. The following table gives a summary of the number of indigent residential consumers as received from the Financial Department.

Description	Total number of residential consumers (Average Jan to Dec. 2006)	Number of indigent residential consumers (31 December 2007)	Percentage of residential consumers classified as indigent
Abbotsdale	427	116	27.2%
Chatsworth	105	43	41.0%
Riverlands	152	129	84.9%
Kalbaskraal	207	135	65.2%
Malmesbury	5902	1515	25.7%
Koringberg	232	142	61.2%
Moorreesburg	2421	727	30.0%
Riebeek Kasteel	592	440	74.3%
Riebeek Wes	536	126	23.5%
Yzerfontein	1013	6	0.6%
Darling	1685	308	18.3%

From the above table it can be noted that for a high percentage of the residential consumers in the Management Area the free basic services, provided by SM, plays an important role.

Health issues:

HEALTH			
Number of Medical Facilities	17	Nurse patient ratio (National target 34)	36
Percentage births under 2.5 kg (National target < 10%)	8	Proportion under 1 with 1 st measles immunisation (National target 90%)	101
TB prevalence per 100 000 people	1 135	TB Cure rate % (National target 85%)	67
HIV/AIDS prevalence rate (2005)	3.1%	HIV / AIDS prevalence rate (2010)	3.9%
Number of HIV/AIDS deaths (2005)	98	Number of HIV/AIDS deaths (2010)	164

Source: SAPS (2005), Department of Health (2005), WCED (2005)

The management and awareness of HIV/Aids & tuberculosis and specific health care facilities are major concerns in the SM. The only hospital in the region that provides Anti Retroviral (ARV) treatment is Swartland hospital. Distance from the hospital and transport costs are currently major constraints to access. Clinics also have to act as educational centres. Many women receive family planning information as well as HIV/Aids awareness programme information at the clinics.

It is important to ensure that all communities have basic services to ensure improved standards of living. The detailed survey of the service levels in the rural areas (on the farms) will indicate the backlog of SM with regard to basic services. The supply of basic sanitation services on the farms needs to be linked to the provision of health and hygiene education. Improved health requires behaviour change, which also cannot be achieved with a single health education talk given by an outside expert. Behaviour change requires sustained monitoring and promotion within the community. This is the key function of the community health workers employed on sanitation projects.

A solution to the sustainability of the community health worker's position and employment within the community has been to link their position and function to the activities of the Department of Health. In addition support can be provided to the Community Health Workers through local clinics and through the programmes of the Environmental Health Practitioners.

Environmental issues:

SM approaches environmental issues from a service delivery point of view in accordance with legislation. The legislation affects all aspects of service delivery from waste management to roads, and from water to electricity, infrastructure to spatial planning.

SM emphasises that its goal is to secure future environmental sustainability through a planning process in line with a number of objectives for each of the three different types of environments, being:

- Threatened terrestrial ecosystems;
- Special habitats; and
- Aquatic ecosystems

Furthermore, the municipality recognises the fact that environmental integrity constitutes a fundamental ingredient towards it's growth.

The Berg River flows into the Berg River Estuary, which is of high conservation value and is pending recognition as a Ramsar site. The most important assets of the SM's Management Area are as follows:

- The Wilderness areas with surrounding mountains: Kasteelberg, Paardeberg and Dassenberg.
- The crop farms, wine lands and vineyards.
- The slopes with remaining "fynbos"
- The Diep River that runs from its origin in "Kasteelberg" to form a natural link between Malmesbury, Abbotsdale, Kalbaskraal and much further, the Atlantic Ocean.
- The landscape with historical and cultural buildings, places, parks, landmarks, views as well as the network of roads that link the region and social structures, and
- The town boundary that limits expansion.

Global warming: The risk of global warming that is likely to strike the Western Cape poses threats in rainfall amounts and changing seasonality of rain. Future projections of climate show that there is going to be fewer strong or deeper low-pressure systems in winter months (June, July and August) resulting in less rainfall.

Shortage of rain or changing seasonal patterns will not only affect dam levels, but will also severely hamper agricultural production as crops currently produced are based on the current season of rain.

Water Management: Western Cape has already reached full capacity of water use and there is limited scope for further development of this resource. However, demand continues to grow especially in agriculture, Cape Metropole and Coastal towns. Water supply is vulnerable to periodic droughts. Therefore, the climate change has serious implications for the competing interests of environmental integrity and socio-economic development. Coping strategies will have to be developed to increase efficiency in water use especially in agriculture.

In order to ensure efficient and effective water service delivery, it is essential that Operation and Maintenance be conducted at drinking-water treatment plants (and associated infrastructure).

What is the status of all water infrastructure? (Effective water resource management)

The current and depreciated replacement costs of the water and sanitation assets are as follows:

Water / Sanitation	Assets	CRC	DRC	% DRC / CRC
Water	Borehole	2 186 024	1 526 065	70
	Pump Station	4 852 869	3 005 819	62
	Reservoir	106 467 983	66 390 229	62
	Reticulation Pipeline	162 318 215	85 411 412	53
	Totals	275 825 092	156 333 525	57
Sanitation	Pump Station	2 804 050	1 893 133	68
	Sewage Treatment Works	6 978 418	3 763 196	54
	Sewer Reticulation Pipeline	108 116 718	61 981 122	57
	Totals	117 899 186	67 637 451	57

The above implies that about 43% of the value of the water and sanitation networks has been consumed. In order to determine better assessments of the remaining useful life of hidden assets, the municipality will need to improve its monitoring of asset performance in the future.

The RUL and asset age per facility for water and sanitation assets are as follows:

RUL / Asset Age	Asset	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
RUL per facility for Water	Borehole	0	876 224	1 031 240	100 000	178 560
	Pump Station	933 442	1 039 861	2 083 066	96 000	700 500
	Reservoir	8 847 856	3 206 509	19 229 485	6 668 001	68 516 132
	Reticulation Pipeline	2 699 293	26 937 958	5 891 863	17 916 182	108 872 919
	TOTALS	12 480 591	32 060 552	28 235 654	24 780 183	178 268 111
RUL per facility for Sanitation	Pump Station	562 900	733 150	920 000	0	588 000
	Sewage Treatment Works	180 000	2 499 820	217 000	8 361	4 073 237
	Sewer Reticulation Pipeline	0	0	0	38 792 598	69 324 120
	TOTALS	742 900	3 232 970	1 137 000	38 800 959	73 985 357
Asset Age per facility for Water	Borehole	3 000	751 740	472 620	654 044	304 620
	Pump Station	1 533 200	1 390 294	962 822	156 000	810 553
	Reservoir	15 902 997	8 871 165	14 593 865	4 068 228	63 031 728
	Reticulation Pipeline	4 330 951	9 983 318	67 834 501	2 826 156	77 343 288
	TOTALS	21 770 148	20 996 517	83 863 809	7 704 428	141 490 189
Asset Age per facility for Sanitation	Borehole	1 647 900	0	916 900	0	239 250
	Pump Station	10 500	245 000	1 136 820	699 500	4 886 598
	Reservoir	8 309 715	0	3 753 399	3 345 651	92 707 953
	TOTALS	9 968 115	245 000	5 807 119	4 045 151	97 833 801

The average water asset renewal needs over the next 10 years is R4.5M per year and the reinvestment required is R12.5M in the first 5 years and R32M in the second 5 year period. The asset renewal needs for sanitation assets over the next 10 years is R0.4M per year. The reinvestment required is R0.74M in the first 5 years and R3.2M in the second 5 year period. Most of the water and sanitation assets value has age greater than 20 years.

The condition grading per water and sanitation facility is summarized in the table below:

Water / Sanitation	Asset	Very Good	Good	Fair	Poor	Very Poor
Water	Borehole	21 000	1 567 980	597 044	0	0
	Pump Station	1 256 366	2 517 061	774 822	304 620	0
	Reservoir	44 025 878	26 724 684	21 977 731	9 603 962	4 135 728
	Reticulation Pipeline	17 346 075	67 060 134	44 963 169	30 249 544	2 699 293
	TOTALS	62 649 319	97 869 859	68 312 767	40 158 126	6 835 021
Sanitation	Pump Station	1 444 250	796 900	0	562 900	0
	Sewage Treatment Works	1 372 951	5 428 745	176 722	0	0
	Sewer Reticulation Pipeline	13 049 102	54 842 020	40 225 596	0	0
	TOTALS	15 866 303	61 067 665	40 402 318	562 900	0

About 17% (R47M) of the water supply network is in poor and very poor condition. There are no borehole components that are in the poor and very poor state. The bulk of the poor assets are the reticulation pipelines with a value of approximately R30M. About 0.5% of the sanitation supply network is in poor condition. The assets in poor condition are mainly pump station assets with an approximate value of R0.6M.

Effective management

The management of the existing water and sanitation services is being undertaken to the absolute best ability of the WSA, within the considerable financial and technical constraints which prevail. The most pressing need of SM is to improve capacity and access to finances and to obtain and maintain adequate qualified staff.

The WSDP for the SM is a business plan setting out the way in which the SM must effectively manage, plan and deliver services to individuals and businesses in its area of jurisdiction, as summarized in the water services business element summary below:

WATER SERVICES BUSINESS ELEMENT SUMMARY (Status quo, gaps and implementation strategies)

A summary of each of the ten business elements is provided below. Focus is placed on the status quo, current gaps and implementation strategies for each of the ten business elements. The Report and Annexure Sections of the WSDP need to be referred for more detail.

Socio-economic profile

Status quo:

The population for the Management Area was estimated at 85 000 in the IDP of SM and at 76 738 in the Socio-Economic Profile, West Coast District 2007, by the Provincial Government Western Cape. The projected total population included in the WSDP is 80 753, which compare well with the population calculated from the residential consumer units for the various towns.

Robust economic growth was impressive to the extent that SM outperformed the provincial growth levels and even the dominant economic powerhouse of the province, the City of Cape Town. The two sectors that had the most outstanding growth for the 2003-2005 period was construction followed by community, social and other personal services.

The recent interest hikes will most likely have a negative effect on SM's construction sector – a key economic driver -, which recorded impressive growth. This will in all likelihood trigger a cooling down effect on the economic growth of SM.

The finance and business sector made the greatest inroad to the contribution of the GDP since 1995 to 2005. However, the manufacturing sector, which is the biggest contributor to SM's GDP is not well diversified, thus increasing its risk exposure.

Please refer to the Economic Profile (2005) compiled for the SM by the University of Stellenbosch, for a comprehensive socio-economic profile of the region.

Gaps:

The predicted structure of the population for West Coast District shows a rapid child growth profile with strong migration patterns for the youth. Consequently, youth gender imbalances occur with the males out numbering the females. It is also important that the population projections be reviewed, once the information from the last census becomes available.

Numeracy and literacy pass rates reveal a deepening crisis within the schooling system. Long-term educational goals should be aggressively accelerated in order to improve and sustain its relatively high skilled and well educated workforce.

The latest drug related statistics compared with former years points to significant increase. Moreover, there are convincing arguments that attribute this rise to a lack of access to recreational facilities for the youth (Socio- Economic Profile: West Coast District 2007, Provincial Government Western Cape).

The data required for the WSDP needs to be made readily available for input to future WSDPs.

Implementation strategies:

The following Local Economic Development (LED) Goals / Targets were set by SM, in relation with their vision and mission.

- The optimal utilization of Swartland's locality for the development of the community over the long term.
- To support areas with an established tourism potential as priority.
- To promote the development of businesses in towns with economical growth.
- To promote the mobility of young adults in towns with low potential through the transfer of market related skills.
- Emphasize the value of entrepreneurship.
- Develop institutional practices which promotes the establishment of businesses
- Strengthen the link between unemployed individuals and employers.
- Ensure that spatial planning promotes economical growth in a proactive manner in the area.
- Enhance the capacity of the youth in order to better their access to the economy.

- To link the unemployed with the private sector.
- To benefit defenceless groups within the community through internal processes.
- Increased awareness of crime in local communities.
- To make community more aware of development initiatives.
- To render support services to the public regarding PEO.
- Optimal job creation through the designing of labour intensive projects.
- To create jobs through service innovations.
- To manage crime in high priority areas.
- To abate drugs related crime
- To improve functioning of the existing fire fighting service in spite of lack of personnel.
- To discourage squatting within the municipal area.
- To improve overhead attractiveness of the Swartland through crime prevention.
- To inform communities regarding support services / development opportunities.
- To establish centralised community infrastructure in every community for community development.
- To manage caravan facilities optimally.
- To apply the principle of structure follows strategy within the organisation
- Develop more client orientated organisation

Service level profile

Status quo:

The current water service levels within SM's Management Area are as follows:

Towns	1. None or inadequate	2. Communal water supply	3. Controlled volume supply	4. Uncontrolled volume supply: yard tap or house connection	5. Total served (2+3+4)	6. Total (1+5)
Abbotsdale	0	0	0	698	698	698
Chatsworth	0	118	0	105	223	223
Riverlands	0	127	0	152	279	279
Kalbaskraal	0	0	0	324	324	324
Malmesbury	0	0	0	6 738	6 738	6 738
Koringberg	0	0	0	232	232	232
Moorreesburg	0	0	0	2 581	2 581	2 581
Riebeek Kasteel	0	0	0	662	662	662
Riebeek West	0	0	0	611	611	611
Yzerfontein	0	0	0	1 013	1 013	1 013
Darling	0	0	0	2 096	2 096	2 096
PPC	0	0	0	78	78	78
Farmland	351	746	0	5 191	5 937	6288
Total	351	991	0	20 481	21 472	21 823

The current sanitation service levels within SM's Management Area are as follows:

Towns	1. None or inadequate : below RDP : Pit	2. None or inadequate : below RDP : Bucket	3. Consumer installation : On site dry or equivalent	4. Consumer installations: Wet (Septic tanks, digester or tanker desludge, etc.)	5. Discharge to water treatment works (intermediate or full waterborne)	6. Total served (2+3+4+5)	7. Total (1+6)
Abbotsdale	0	88	0	171	439	610	698
Chatsworth	0	104	0	119	0	119	223
Riverlands	0	0	0	0	279	279	279
Kalbaskraal	0	7	0	0	317	317	324
Malmesbury	0	0	0	2	6 736	6 738	6 738
Koringberg	0	0	0	77	155	232	232
Moorreesburg	0	0	0	0	2 581	2 581	2 581
Riebeek Kasteel	0	0	0	222	440	662	662
Riebeek West	0	0	0	122	489	611	611
Yzerfontein	0	0	0	1013	0	1 013	1 013
Darling	0	0	0	10	2 086	2 096	2 096
PPC	0	0	0	0	78	78	78
Farmland	1082	625	453	4 128	0	4 581	6 288
Total	1082	824	453	5 864	13 600	19 917	21 823

Gaps:

The current backlogs (Below RDP standard) with regard to basic water and sanitation services in SM's Management Area are as follows:

Water: Towns – 0 Households Farms – 351 Households

Sanitation: Towns – 199 Households Farms – 1707 Households

Implementation strategies:

SM's commitment with regard to the eradication of the current water and sanitation service level backlogs in the Management Area can be summarised as follows:

- To ensure plans are put in place to adequately record, store and retrieve information required for the WSDP.
- Determine the current service levels on the farms (Water and Sanitation) and putting together an action plan to provide services to the households with service levels below RDP standards.
- Address the current water service level backlogs that still exist in the Management Area by 2009.
- Address the current sanitation service level backlogs that still exist in the Management Area by 2010.

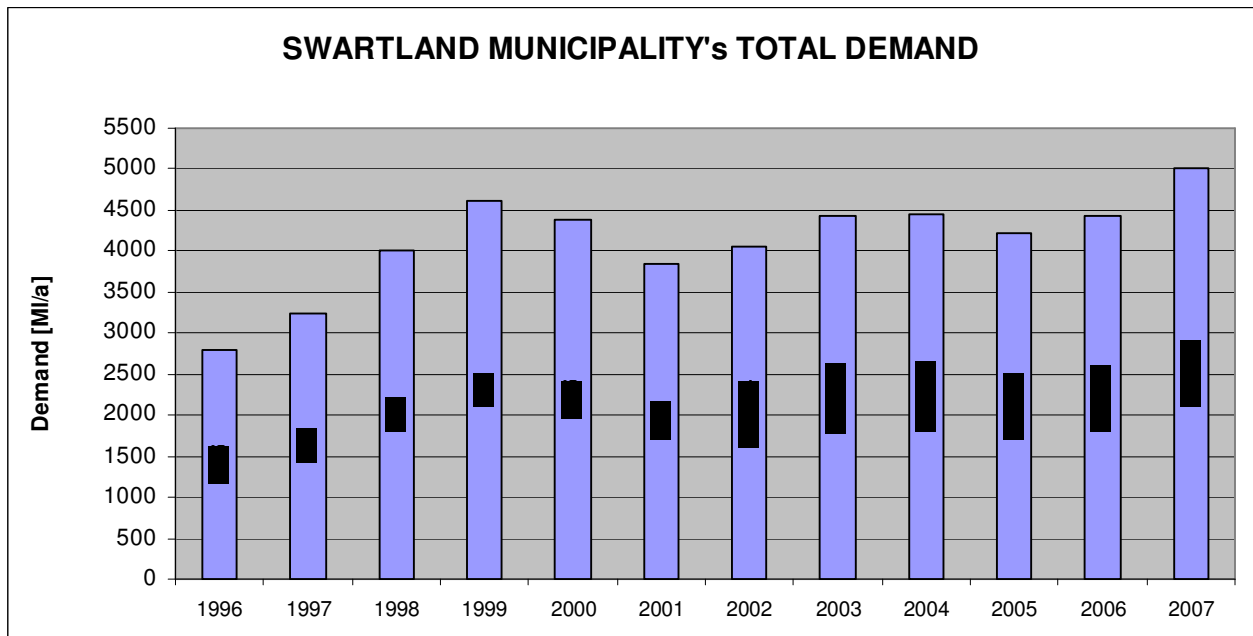
With regard to industrial consumers SM is committed to ensure that all persons apply for the discharge of industrial effluent into the sanitation system, to monitor the quality and quantity of industrial effluent and to get the following by-laws in place with regard to the discharge of industrial effluent into the SM's sanitation system:

- Approval to discharge industrial effluent.
- Quality standards for disposal of industrial effluent.
- Conditions for discharge of industrial effluent.

Water resource profile

Status quo:

The graph below gives an indication of SM's total annual bulk water demands over the last twelve years. The drops in total demands over the period 1999 to 2001 and again in 2005 are due to the water restrictions that were implemented over these periods.



Detail water demand models were developed for every town. The models include the future projections and were calibrated by using historic consumption data and bulk abstraction data. Water losses were determined for each town and growth in demand was based on agreed population and growth figures.

The DWAF completed the "Pre-feasibility study of potential water sources for the area served by the WCDM." study. The purpose of the study was to determine the current situation of water demand versus supply, with regard to the two West Coast bulk schemes, and to determine the more feasible options to be investigated further at a pre-feasibility level.

Zones of groundwater development potential in relation to the existing Miverstand and Voëlvlei Bulk Schemes were also identified as part of the above study by SRK in their "Assessment of development potential of groundwater resources for the West Coast District Municipality" Study and were included in the WSDP as future potential groundwater sources.

The percentage compliance of the water quality samples taken over the last twelve months is as follows.

- Faecal Coliforms (Health), Sample Count 12, Compliance 100%
- E.Coli (Health), Sample Count 50, Compliance 96%
- Total Coliforms (Operational), Sample Count 50, Compliance 84%
- pH (Aesthetic / Operational), Sample Count 12, Compliance 100%
- Turbidity (Aesthetic / Operational / Indirect Health), Sample Count 12, Compliance 91.7%
- Electrical Conductivity (Aesthetic), Sample Count 12, Compliance 100%
- Aluminium (Health), Sample Count 12, Compliance 100%
- Iron (Aesthetic / Operational), Sample Count 12, Compliance 91.7%

Gaps:

SM is currently monitoring the abstraction from all of their boreholes that is used for human consumption, but the static water levels of the boreholes are however not yet monitored. It is important that the water levels be monitored in order to determine whether groundwater mining has taken place.

The quantity of treated effluent returned to the WR System is not metered at any of the WWTWs. The influent at some of the WWTWs is also not metered.

The safe yield of the Paardenberg dam is not known and should be investigated in order to determine whether the SM can apply for an increased allocation from this source in the future.

The DWAF completed a Strategic Gap Analysis for all 30 WSAs in the Western Cape. The objective of the analysis was to determine the current status and gaps related to Drinking Water Quality Management at the WSAs. The focus of the analysis was on Water Legislation, Policies and Regulations, Water Resources and Water System Infrastructure, Drinking Water Quality Monitoring, Laboratories and Logistics, Human Resources, Management and Finances. The key issues identified were as follows:

- Lack of awareness with respect to appropriate Drinking Water Quality Management Programme.
- Lack of staff (numbers and skills)
- Lack of adequate Drinking Water Quality Management Budget.

The status for SM is as follows:

- Water Legislation, policies and regulations – **Marginal**
- Water resources and water supply system – **Marginal**
- Drinking water quality monitoring, laboratories and logistics – **Marginal**
- Human resources – **Marginal**
- Management – **Acceptable**
- Finances - **Acceptable**

Implementation strategies:

The WC DM is the bulk WSP for all the towns in the SM's Management Area and it is important that the recommendations from the second phase of the "Pre-feasibility study of potential water sources for the area served by the WCDM" study be implemented.

It is also important for SM to investigate the possibility of an increased supply from the Paardenberg dam and increased groundwater abstraction. Develop local water sources to their full potential and continue with the infrastructure developments of local sources to reduce dependency on the supply from Misverstand and Voëlvelei.

The following commitments are set by SM with regard to water quality:

- To monitor water quality at all their own sources (abstraction points) and also at the storage points (reservoirs).
- Regular sampling and reporting on water quality and quality of treated effluent.
- Approve the draft Pollution Contingency plan.
- Continue with the upgrading of WWTWs when necessary, in order to reduce the risk of source contamination. WWTWs need to be managed and operated to comply with the permitted standards.

Water conservation and demand managementStatus quo:

There are a host of activities that SM could embark to ensure more efficient use of water, as identified through the recent developed WDM Strategy for SM (Draft Report January 2008). These can be classified according to the following five categories:

- Leakage Management Programme
- CAFES-pricing policy programme
- Socio-political programme.
- Water Conservation products.
- Reuse of wastewater.

The Infrastructure Leakage Index (ILI) is the most recent and preferred performance indicator for comparing leakage from one system to another. It is a non-dimensional index representing the ratio of the current real leakage and the "Unavoidable Annual Real Losses" (UARL). A high ILI value indicates poor performance with large potential for improvement while a small ILI value indicates a well-managed system with less scope for improvement.

The figures below give a summary of the Infrastructure Leakage Index and water losses in the various distribution networks:

Town (Infrastructure Leakage Index for 2007)	Current 2007	Estimate Year 5	Record : Prior				
			2006	2005	2004	2003	2002
Darling (ILI = 1.35)	15,3%	10,0%	20,6%	2.4 %	6,90 %	17,90	
	72,269	47,617	92,077	7,762	27,533	83,052	
Koringberg (ILI = 1.85)	28,8%	15,0%	24,6%	12.1 %	-0,2 %	-40,2 %	
	16,857	7,976	12,749	4.956	-0,100	-12,42	

Town (Infrastructure Leakage Index for 2007)	Current 2007	Estimate Year 5	Record : Prior				
			2006	2005	2004	2003	2002
Malmesbury (ILI = 2.63)	18,0%	10,0%	11,8%	27,6%	11,1%	13,2 %	
	522,723	288,720	296,901	725,671	290,751	346,213	
Moorreesburg (ILI = 2.42)	22,0%	15,0%	13,3%	13,8 %	13,2 %	6,2 %	
	191,325	132,622	105,106	90,832	101,91	44,841	
PPC Village	17,4%	10,0%	24,2%	11,0 %	12,2%	4,5 %	
	6,589	3,666	11,267	3,363	5,758	2,325	
Riebeek Kasteel (ILI = 1.39)	13,1%	10,0%	25,0%	25,1 %	20,3 %	8,40 %	
	29,458	23,205	56,011	45,439	41,674	13,694	
Riebeek West (ILI = 2.60)	22,7%	15,0%	25,0%	7,3 %	9,9 %	-4,3 %	
	40,308	25,652	40,771	9,477	15,153	-5,474	
Yzerfontein (ILI = 1.35)	16,1%	10,0%	-15,1%	16,8%	8,0%	5,4%	
	42,951	25,176	-29,880	37,367	19,043	13,614	
TOTAL	18,4%	11,1%	13,9%	21,9%	11,2%	11,4%	
	922,480	554,634	614,882	924,867	501,822	503,739	

Note: Infrastructure Leakage Index (ILI) = 1 - Excellent, 2 - Good and >3 - Poor

The losses per town can be summarised as follows:

- Darling: The 2006 water losses was relative high, but it came down with approximately 5% over the last year. The ILI of 1.35 indicates a well managed system with little scope for improvement.
- Koringberg: The negative losses of 2003 and 2004 should be ignored and the 2005 to 2007 water losses are probably a true indication of the current water losses. The water losses increased drastically over the last two years. The ILI of 1.85 indicates a good managed system with little scope for improvement.
- Malmesbury: The water losses in 2005 and 2007 were relative high. WDM activities should be targeted at both the residential consumers and the commercial consumers within Malmesbury. The ILI of 2.63 indicates potential for improvement.
- Moorreesburg: The water losses stayed roughly the same over the period 2004 to 2006, but increase drastically over the last year. WDM activities should be targeted at the residential consumers within Moorreesburg. The ILI of 2.42 indicates potential for improvement.
- PPC Village: The water losses increased drastically when the period 2004 to 2005 are compared with the period 2006 to 2007. The ILI was not calculated for PPC Village, because the kilometres of pipeline in the distribution system are not known.
- Riebeek Kasteel: The water losses decreased drastically over the last year, when compared to the period 2004 to 2006. Little scope of improvement through WDM activities exists. The ILI of 1.39 indicates a good managed system with little scope for improvement.
- Riebeek West: The water losses over the last two years were relative high. WDM activities should be targeted at the residential consumers within Riebeek Kasteel. The ILI of 2.60 indicates potential for improvement.
- Yzerfontein: The negative water losses for 2006 should be ignored and the 2005 and 2007 water losses are probably a true indication of the current water losses.

The ILI of 1.35 indicates a good managed system with little scope for improvement.

The priority areas, as included in the draft WDM Strategy (January 2008), can be summarised as follows:

Town	Tariff Adjustment	Water loss management	Pressure Management	Schools WDM	Reuse of wastewater
Darling	Low	Low	Medium	High	Medium
Koringberg		Low	High		Low
Malmesbury		High	Medium		High
Moorreesburg		Low	Medium		Medium
PPC Riebeek Wes		Low	Medium		Low
Riebeek Kasteel		Low	Medium		Low
Riebeek Wes		Low	Medium		Medium
Yzerfontein		Low	High		Medium
Riverlands / Chatsworth		Medium	Medium		Low

Gaps:

Water is scarce and it is important that water be used wisely and that due attention be paid to water conservation and demand management. One of the visions of the Sector is that water is used effectively, efficiently and sustainable in order to reduce poverty, improve human health and promote economic development.

SM must actively implement the recent developed WDM Strategy. The priority areas of the Strategy are summarised under item F.4.1.1.1 in the Report. The Strategy includes the following items:

IN PLACE	FIRST PHASE	SECOND PHASE	LATER
-	LMP1, LMP2	LMP3	LMP4, LMP5
CPP1, CPP2	CPP3	CPP4	CPP5
-	SPP1	SPP2	SPP3-5
-	-	WCP1	WCP2-4
RWW1	RWW2, RWW3	RWW4	RWW5

Implementation strategies:

The following implementation phases of the WDM Strategy are recommended:

COMPONENT	CHRONOLOGICAL STEPWISE APPROACH
CAFES cost and pricing strategy (CPP)	<ol style="list-style-type: none"> 1) Clean billing data, update SWIFT, verify / address metering and non-payment 2) Introduce IBR structure to all residential consumers, but limit price change 3) Set IBR structure = 6 blocks, min / max steps for 6 kl / month / 100 kl / month 4) Set price of water in max block (above 100 kl/month) to at least R15 / kl 5) Introduce informative billing
Leakage management programme (LMP)	<ol style="list-style-type: none"> 1) Measure water volume that is lost <ol style="list-style-type: none"> 1a) Raw water supply and treatment 1b) Distribution system

COMPONENT	CHRONOLOGICAL STEPWISE APPROACH
	1c) End user meter problems 2) Identify and quantify losses 2a) Raw water supply and treatment 2b) Distribution system 2c) End user meter problems 3) Conduct operational and network audit 3a) Raw water supply and treatment 3b) Distribution system 3c) End user meter problems 4) Improve performance: upgrade network, design action plans 5) Sustain performance with good staffing / organisation structures
Socio-political programme (SPP)	1) Schools WDM programme 2) Public awareness programme 3) Non-payment issues 4) Encourage users to implement WCP at their own expense
Water conservation products (WCP)	1) Repair on-site (plumbing) leaks 2) Reduced toilet flush volume 3) Xeriscaping garden areas (water wise gardening) 4) Other methods to reduce consumption by changing human habits
Reuse of waste water (RWW)	1) Identify large water consumers 2) Communicate advantages / incentives of reuse practice to large consumers 3) Information gathering on current status of reuse measures 4) Installation of reuse practice 5) Monitor future water consumption

Some specific items of the WDM Strategy are considered to hold significant promise. These items should receive priority and are the backbone of the SM's WDM Strategy.

- Meter and record bulk water supply (monthly).
- Implement district metered areas (DMAs).
- Improve quality of data regarding consumer use (monthly).
- Initiate a WDM communication campaign to report on what the Municipalities have achieved (Lead by example).
- Implement a 24 hour, toll free leak reporting line.
- Immediately implement the CAFES-pricing policy programme for residential use by conducting a detailed price elasticity study, applicable to SM.
- Extend the implementation of the CAFES-pricing policy by a) evaluating the impact of price changes in different Western Cape municipalities and b) implementing a new pricing / tariff structure where the first block is free and the last block is charged at a rate which severely discourages use above 100 kl/month.
- Implement a schools WDM programme.

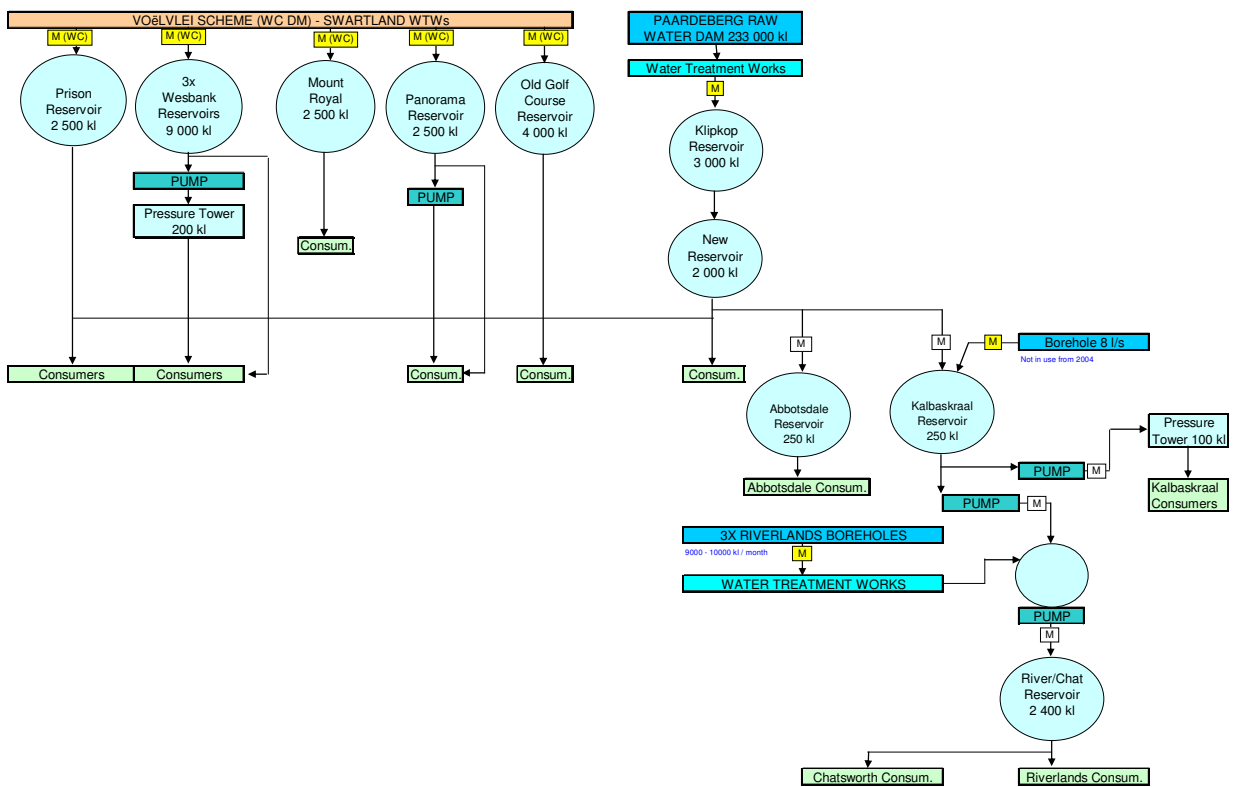
- Implement water saving by individual large water users through reuse of wastewater.
- Monitor progress of the WDM process.

Water services Infrastructures profile

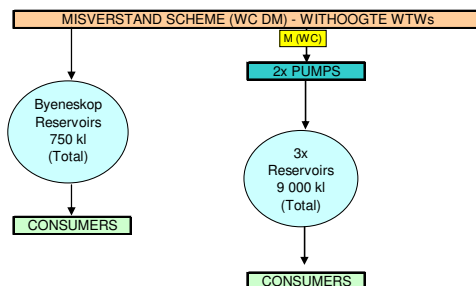
Status quo:

The towns in the SM's Management Area are all supplied with bulk water by the WC DM through either the Misverstand or the Voëlvlei bulk schemes. A small proportion of the requirements are being supply with surface water from the Paardeberg dam and ground water in the form of localised boreholes at Kalbaskraal and Riverlands. The schematic layouts of the distribution networks for the various towns are included below.

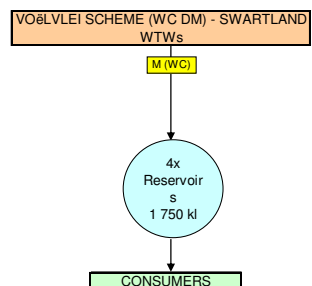
MALMESBURY



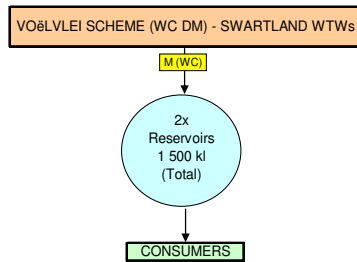
MOORREESBURG



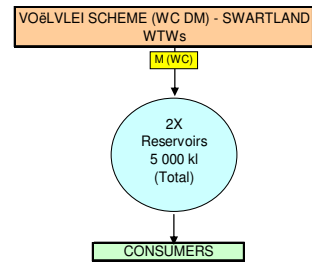
RIEBEEK WES



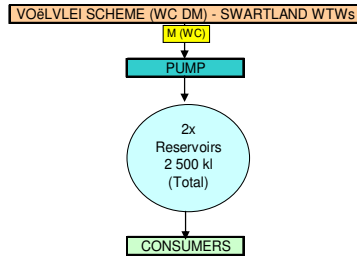
RIEBEEK KASTEEL



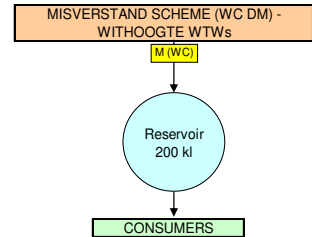
YZERFONTEIN



DARLING



KORINGBERG



Gaps:

Groundwater Infrastructure

The following points are some of the main issues and concerns identified in the Berg WMA Strategy:

- Potential use of groundwater for local supply to towns and the rural users needs to be investigated.
- Groundwater abstraction is increasing in the Diep River management unit of the Berg WMA and exceeds recharge in the poor yielding parts of the aquifer.
- The potential for enhances recharge and Aquifer Storage Recovery needs to be investigated.

SM needs to monitor the monthly (at least) static water level (i.e. the level prior to commencement of pumping for the day) in each of their production and monitoring boreholes. The daily rainfall for the area should also be recorded. This monitoring data should be processed, analysed and reported on by an experienced hydrogeologist in order to ascertain whether the resource is being sustainably utilised or whether groundwater mining is taking place.

Surface Water Infrastructure

The safe yield of the Paardenberg dam is not known and should be investigated in order to determine whether the SM can apply for an increased allocation from this source in the future. SM is currently busy with the upgrading of the Paardenberg WTWs, in order to increase their future usage from this source over the winter months.

Water Treatment Works

Currently SM operates a Water Treatment Works at Malmesbury (Paardenberg dam), Kalbaskraal and Riverlands (Groundwater). These WTWs operate sufficiently and currently no problems are experienced.

Pump stations (Potable)

In the recent completed Master Plans for SM the information (capacity and head) of the pump stations was indicated as unknown. It is important that the necessary information be gathered in order to determine whether the pump stations operates within their design capacities and to determine when upgrading will be necessary.

Reservoirs

The condition of the reservoirs in SM's Management Area is mostly good and the reservoirs are well maintained. The levels of the reservoirs are monitored through a telemetry system. The storage factors of the reservoirs, based on 1 x PDD (24 hours storage capacity), are as follows:

Reservoir	Storage Factor	Reservoir	Storage Factor	Reservoir	Storage Factor
Malmesbury	1.99	Darling	1.04	Riebeek West	1.53
Koringberg	0.45	Yzerfontein	2.61	Riebeek Kasteel	1.07
Moorreesburg	1.91				

From the above table it can be noted that the reservoir capacity of Koringberg needs to be increased. The reservoir requirements for Malmesbury, as included in the Water Master Plans – September 2007, are as follows:

Water District	Present Reservoir Capacity	Future Capacity Required	Future Spare Capacity	Comments
Abbotsdale Res.	250	410	- 160	Monitor Situation
Kleindam Res.	250	1 831	- 1 581	New 2 MI reservoir was built
Old Golf Course Res.	5 200	2 247	2 953	
Panorama Res. Booster	2 500	3 210	- 710	Construct a new 0.7 MI reservoir
Panorama Res.				
Prison Res.	2 400	1 615	785	
Wesbank Res.	9 000	12 177	- 3 177	Construct a new 4 MI reservoir to accommodate future supply to Kalbaskraal, Riverlands and Chatsworth
Wesbank Tower	150	141	9	
Proposed Glen Lily Res.		3 192	- 3 192	Construct a new 3.2 MI reservoir
Proposed Glen Lily Res. Booster				
Proposed Wesbank HL Res.		1 809	- 1 809	Construct a new 1.8 MI reservoir

Reticulation Infrastructure

Water Master Plan August 2004

Abbotsdale, Darling, Koringberg, Moorreesburg, Riebeek Kasteel and Yzerfontein: No problems and the system operate within the operational criteria.

Kalbaskraal, Riverlands and Chatsworth: No problems and the systems operate within the operational criteria. The field staff reported high static pressures, but the static pressures can be controlled to be below the occurrence of acceptable levels by an existing PRV without causing low pressure problems during peak demands.

Riebeek West: Low pressures occur close to the reservoir during peak demand conditions as reported by field staff. High flow velocities occur in the pipeline in Hof Street during peak demand conditions.

Water Master Plan September 2007

Malmesbury:

The operational staff indicated the following operational problems:

- Faulty bulk meter readings.
- Low pressures during peak demand hours in Ilinge Lethu close to the Wesbank Reservoirs, in Suikerbos Street and the area close to the cemetery, in Truter Street and vicinity, in Wagener Street and vicinity and in Percheron Street and vicinity.

The majority of the proposed projects are required to accommodate for the large amount of potential future developments. The following projects are required to augment the existing system or to implement changes to the operation of districts in order to optimize the system:

- Project **MAW1** includes the items to accommodate for potential future developments Exp 1 and V1 (Figure SWW4.1). A new 3.2 MI (Item MAW1.1) reservoir at the existing Glen Lily Reservoir, which belongs to the WC DM, is proposed to supply these developments. A booster pump station with a separate booster sub-district is also proposed to supply the higher lying areas.
- Project **MAW2** includes the items to accommodate for the large amount of potential future developments in the Wesbank Reservoir District. A new 400mm dia supply (Item MAW2.1) and a new 4.4 MI reservoir (Item MAW2.2) are proposed to augment the supply to this district. There are also a few PRV's proposed to control high static pressures in certain developments. A new booster pump station (Item MAW 2.20) is proposed to supply the higher lying areas in potential future development. One of the major changes proposed to the existing operation of the system is to implement items MAW2.12 and MAW2.13 which will result that the Abbotsdale / Kalbaskraal / Riverlands / Chatsworth areas will be fed from the Wesbank reservoir and not from the Kleindam reservoir as is the case presently.
- Project **MAW3** is proposed to rezone the existing Panorama District boundaries and augment the supply to the Panorama Reservoir when capacity problems occur. It is proposed that the southern part of the Panorama Reservoir District, which includes the industrial area, be incorporated into the Kleindam Reservoir District. Although a PRV is currently controlling the high pressures it was decided to incorporate this area into the Kleindam Reservoir District also because of the new 2 MI reservoir currently being constructed at the Kleindam Reservoir. This will result in lower water demands on the Panorama Reservoir District which might currently experience capacity problems.
- Project **MAW4** includes the items to accommodate for potential future developments Exp 7 and V5. A new 200mm dia supply (Item MAW4.1) and a new 1.8 MI reservoir (Item MAW4.2) are proposed to supply this proposed reservoir district directly from the WC DM bulk supply pipes. It is also recommended that a small area of Wesbank, currently experiencing low residual pressures, be incorporated into this district.
- Project **MAW5** is recommended to alleviate existing low residual problems in the Wesbank area. This area is currently being fed from the Wesbank reservoirs and it is proposed to incorporate this area into the Wesbank tower District to alleviate these low pressure problems.

- Project **MAW6** which includes only item MAW6.1 is proposed to accommodate for potential future development V2 (Figure SWW4.1).
- Project **MAW7** is proposed to investigate the zone boundaries of the Booster Sub-District within the Panorama Reservoir District.

The future AADD represents an increase of 224% over the actual present AADD, and an increase of 118% over the potentially fully occupied present AADD. Currently there are a few areas experiencing low residual pressures due to insufficient supply as well as low static conditions, which were addressed in the Master Plans. Generally the existing infrastructure in Malmesbury, which includes the reservoirs and pipes, were not designed to accommodate future developments of the proportions stipulated in the Master Plans. Therefore, many works and projects (Approximately R45M) are proposed to upgrade the existing systems to accommodate the future water demand.

Sewer Master Plan September 2007

Malmesbury:

There are currently no significant problems within the Malmesbury sewer system, therefore all the proposed upgrades were recommended to accommodate for the potential future developments. The cost of all the proposed upgrades that needs to be implemented to accommodate for the future growth amounts to R15.43M.

Waste Water Treatment Works

The physical condition of the WWTWs was described as follows in the "Risk assessment of wastewater treatment infrastructure in the Western Cape" Study that was done by CSIR in 2005.

WWTWs	Condition	WWTWs	Condition	WWTWs	Condition
Kalbaskraal	Poor	Malmesbury	In operation	PPC	Good
Riverlands/Chatsw.	Good	Moorreesburg	Good	Riebeek Kasteel	Good
Darling	Poor	Koringberg	Good	Riebeek West	Poor

The Malmesbury WWTWs will be upgraded over the next five years for an estimated total cost of R 110 M. The Oxidation Dam System in Darling was also upgraded recently to an Activated Sludge System.

Implementation strategies:

It is essential for SM to protect their assets by ensuring that an appropriate maintenance and rehabilitation plan is developed and implemented. The AMP 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. SM must ensure that the AMP is incorporated into the water services development plan and that the 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 Water and Sanitation Master Plans for the other towns need to be completed as soon as possible in order to sufficiently plan for the future new infrastructure and the upgrading of the existing infrastructure. SM needs to identify funds in advance for the proposed projects and should only approve new developments once the necessary bulk infrastructure and the upgrading of the existing infrastructure, as identified in the Master Plans, are in place. SM needs to prioritize from the list of projects those items which can be implemented from available funding for a particular financial year.

It is important for SM to place a high priority on demand management in order to postpone additional capital investment for as long as possible, both from the water availability perspective as well as from the treatment of increased effluent volumes (Implementation of WDM Strategy).

It is also important for SM to balance land-use and development planning SDFs in accordance with the availability of water and the capacity of water care and wastewater treatment facilities that are in place or that will be implemented.

Recommendations as included in the Malmesbury Water Master Plans are as follows:

- The Water Master Plan for the WC DM must be revisited to investigate the effect of the potential future developments on the bulk supply.
- The UAW value is relative high, and it is recommended that an effective water demand management system be implemented to control water losses.
- It is recommended that future developments and densification be closely monitored to ensure that the necessary Master Plan Items be included in the budget and implemented at the appropriate time.

The Goals / Targets and Operational Strategies set by SM, with regard to Infrastructure and Basic Services (Water and Sanitation), are as follows:

- *To maintain surplus capacity regarding all municipal services in all areas of the Municipality*
Adequate funding to create surpluses for all bulk services.
Ensure that developers contribute appropriately in respect of development of bulk services.
Master planning with regard to high / medium / low growth scenarios with costs for bulk upgradings.
Design of infrastructure must take into consideration development for the next 30 years.
- *To maintain existing levels of service delivery*
Ensure adequate funding to deliver existing quality of services
Development of necessary infrastructure from funds.
- *To develop integrated human settlements.*
Application of grown potential logic on all future housing projects.
- *To establish basic services in rural areas.*
Implementation of the WC DM subsidy through liaison with relevant land owners.
Design and establishment of service types which require the minimum support from the municipality.
- *To discourage squatting within the municipal area*
Application and marketing of zero tolerance approach regarding squatting.
Set up a dedicated service within the division to manage the problem.
Increase operating budget to manage squatting.
- *To establish centralised community infrastructure in every community for community development.*

Develop community service points in every community core centre out of which community development can be operated.

- *To bring government services closer to the public.*

The establishment of at least 6 government departments in the functional MPCCs.

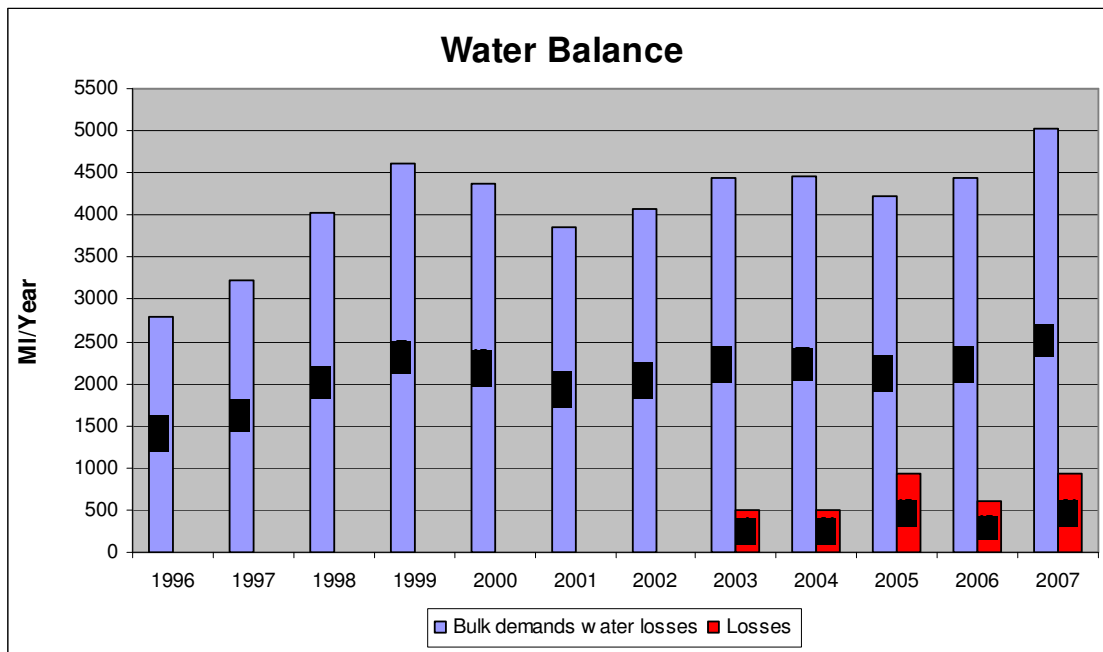
- *Maintenance of existing infrastructure*

Budget adequately for maintenance before budgeting for expansions and upgrading.

Water balance

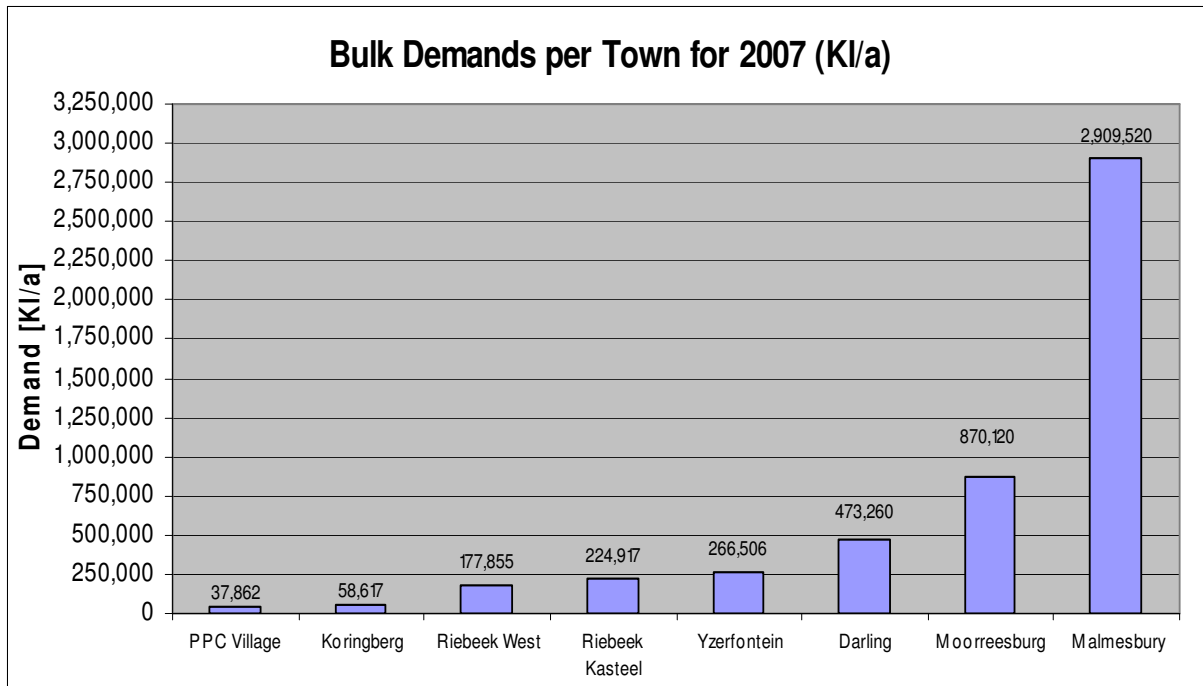
Status quo:

The graph below gives an indication of SM's total annual bulk water demands over the last twelve years and the water losses over the last five years. The drops in total demands over the period 1999 to 2001 and again in 2005 are due to the water restrictions that were implemented over these periods.



The total physical water losses for SM for 2007 were 922,480 Mℓ (18,38 %). SM will be able to reduce their total water losses to 11.1 %, over the next five years, through the effective implementation of the recent developed WDM Strategy. This is considered a realistic target for SM.

The graph below indicates the amount of bulk water supplied to the various towns within the SM's Management Area. The towns of Abbotsdale, Kalbaskraal, Riverlands and Chatsworth are included in the Malmesbury total, because these towns are part of one distribution system.



Gaps:

All water connections provided by SM are metered and the standpipes and sanitation facilities provided in the informal areas are also metered. The influent at the WWTWs, the quantity of treated effluent re-used and the quantity of treated effluent returned to the WR System are however not metered at all the WWTWs.

The Infrastructure Leakage Index (ILI) can be used by SM to determine an appropriate benchmark for managing the water losses according to their own specific circumstances. This ILI can also be compared with the averages for other towns within South Africa. The annual water losses within the various towns' distribution networks are therefore important indicators of the performance of the water supply and distribution systems.

The current information database (Water Balance) is adequate from a water services management perspective. The primary gap is the availability and assurance of water supply to the farms dwellers residing on private land.

Implementation strategies:

SM is committed to update the water balance models on a monthly basis in order to determine locations of wastage and to enable the Municipality to plan measures through their WDM Strategy to reduce losses. The water balance will not directly lead to the reduction of the demand, but is an imperative management tool that will inform the implementation of demand- side management initiatives.

The following goals and strategies are set by SM with regard to the water balances for the various towns.

- The water losses and water demand models developed for the various towns will be managed by SM on a monthly basis and the water losses will be reduced further through the implementation of the WDM Strategy.
- SM will ensure that all water utilized is metered (parks, standpipes, etc).
- SM will ensure that the influent at all the WWTWs is metered and that the quantity of treated effluent re-used and the quantity of water returned to the WR System also be metered.

Water services institutional arrangements

Status quo:

SM acts as both WSA and WSP to the consumers in their Municipal Management Area and therefore does not manage other WSPs. The WC DM is the only WSP to the SM and provides bulk water services to SM, through the Misverstand and Voëlvlei bulk schemes.

Performance contracts are in place at Municipal Manager level. No individual performance reviews are undertaken below that level. The provision of water and sanitation services is monitored against KPIs.

A Workplace Skills Plan for 2007/2008 is in place and SM is in the process of drafting the plan for the 2008/2009 financial year. A draft set of water bylaws for SM is available. The bylaws still need to be published for public comments and are not yet promulgated by SM.

Gaps:

All water and sanitation services are currently effectively managed by SM. SM needs to focus strongly on the rehabilitation and the maintenance of the existing infrastructure and all planning for new services should be guided by the Water and Sanitation Master Plans.

SM's progress with regard to free basic services and institutional development and performance targets are as follows:

- Free basic water services policy is linked to the Indigent Policy and basic water services are provided free to all indigent households.
- Free basic sanitation services policy is linked to the Indigent Policy and basic sanitation services are provided free to all indigent households.
- SM will report within four months after the end of the 2007/2008 financial year on the implementation of their previous year WSDP.
- A service level agreement is in place with the WC DM with regard to bulk water supply.
- SM is rendering services in terms of a business plan.

- SM will ensure that the following KPIs are included in their Performance Management Contracts and is committed to report on these annually.
 - Access to basic water supply.
 - Access to basic sanitation supply.
 - Quality of services: Potable water quality.
 - Quality of services: Continuity of supply.
 - Access to free basic services (Water and Sanitation).
 - Financial performance: Affordability and debtor management.
 - Asset management: Metering coverage and UAW.
 - Protection of the environment: Effluent discharge quality.

Implementation strategies:

It is important for SM to finalize the draft set of water bylaws and to promulgate the bylaws as soon as possible. SM also needs to ensure that the KPIs, as listed under item F.7.1.3, are incorporated in their Performance Management Contracts and to report on these KPIs annually.

The Goals / Targets and Operational Strategies set by SM, with regard to Institutional Development, are as follows:

- *To shift from crisis management to strategic management.*
 - Develop a client service centre, which will efficiently channels enquiries to the appropriate official.
 - Reduce administrative burden on management.
- *To secure expertise through the offering of market related salary packages.*
 - Focus increasingly on contract appointments in order to compete with private sector for specialized skills.
- *To improve the management of libraries.*
 - Optimal utilizations of information technology at all libraries
 - Aggressive canvassing for funds in order to expand IT infrastructure.
 - Upgrading of security systems in libraries.
- *To establish libraries in learning centres in the community.*
 - Development of public internet points in all libraries through sponsors from the telecommunication sector.
 - Increasing of physical structure in order to accommodate the growing number of clients.
 - Establishing of satellite service in smaller centres.
- *To empower users / clients in order to preserve material.*
 - Supplying of information together with material.

- Continued media-leading programmes especially with the focus on ABET.
- *To improve internal capacity.*
Continued induction programme for new appointed and current personnel.
All newly appointed personnel evaluated after induction.
 - *To develop scarce and essential skills for the organisation.*
Establishment of career planning for all personnel.
Addressing of skills shortages identified through career planning programmes through specialized training.
 - *To recruit and retain scarce and essential skills.*
Review the categorization of the municipality in order to offer more competitive packages.
Focus on higher compensated contract appointments for scarce skills.
Employment processes must be more sensitive for the obtaining of scarce skills.
Implement students / internship programmes focussing on the youth.
 - *To render and adequate HR service to personnel.*
Budget for extension of the service in order to obtain additional personnel practioner.
 - *To render a comprehensive HR service for personnel.*
Integrate the HR functions within one directorate.
 - *To improve internal communication in the organisation.*
Establishing of an inter-departmental editorial office / redaction headed by corp. services responsible for the gathering and circulation of information.
 - *To channelise incoming correspondence as quickly as possible to the correct department.*
Continued monitoring of computer capacity and upgrading accordingly.
 - *To regulate record management in accordance with legislation.*
Record management process as part of induction of new personnel.
Monitoring problems identified and training for problem areas / cases.
 - *To optimize communication with public regarding service enquiries.*
Develop and maintain a client service centre for the management and handling of service enquiries and complaints.
 - *To ensure the financial sustainability of the municipality.*
Limit the migration of unemployed individuals to the area through a housing policy that benefits local residents.
Limit subsidized housing in areas with high unemployment and low growth potential.
 - *The strategic compilation of the budget in line with long term objectives of the IDP.*
Organizing annual planning and budgeting workshops with management.

- *To monitor businesses / operations of the municipality.*
Continued application of RBAP
- *To supply a sustainable internal auditing function.*
Recruiting and maintaining appropriate skills.

Customer service profile

Status quo:

A comprehensive customer complaint system is implemented by SM and the KPIs with regard to customer satisfactions are linked to the Performance Management System of the Senior Managers.

Gaps:

SM's progress with regard to the quality of services provided and education and health performance targets are as follows:

Water quality and continuity of supply: All households in the urban areas receive water of an adequate drinking quality. It is estimated that approximately 5.59% of the households on the farms does not receive water of adequate quality and experience inadequate continuity of water supply. The figure is based on the 2001 Census data and will be verified once SM completed their service level survey on the farms.

Hygiene education and the wise use of water are taught in all schools by 2005: Not yet in place.

Households with access to at least a basic sanitation facility know how to practise safe sanitation: The status with regard hereto is still unknown and needs to be verified. The current percentage of households with sanitation service levels below RDP standard is estimated at 27.15% on the farms.

Implementation strategies:

SM's implementation strategies with regard to customer services are to put the necessary systems in place to record the customer services information and to link the customer services KPIs to their Performance Management System, in order to ensure that the following goals are met:

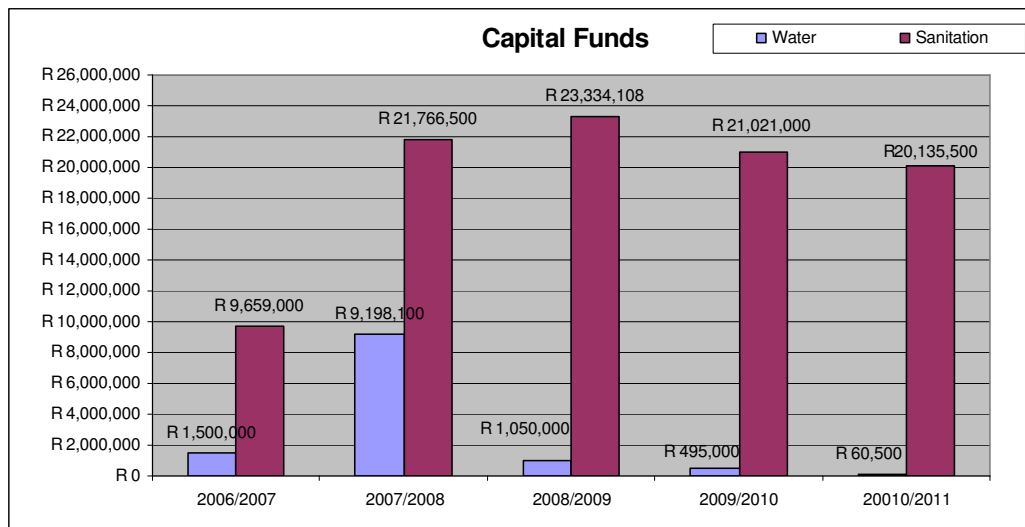
- To monitor the number of consumers experiencing greater than 7 day interruptions in water supply per year and also the number of consumers receiving a flow-rate of less than 10 litres per minute.
- To provide at least basic water services on the farms by 2009, once the current backlog with regard water services (quantity, quality and sustainability) on the farms is known. SM will than be in a better position to monitor the quality of services for water on the farms.
- To keep record of the number of water queries received and to monitor the number of complaints with regard to water quality and the number of major or visible leaks. To respond within 24 hours to all queries and to repair all leaks within 48 hours after being reported.
- To do a survey in order to verify the current service levels on the farms and to provide at least basic sanitation services for those households with current sanitation service levels below RDP standard. To eradicate all backlogs with regard to sanitation services by 2010.

- To keep record of the number of sanitation queries/complaints received per year, the number of blockages, number of calls received for pit/tank emptying and the number of calls received for emergency maintenance to pits/tanks. To respond within 24 hours to all sanitation complaints and to repair all sanitation blockages on the networks within 48 hours. To respond within 48 hours to all requests for pit/tank emptying.
- To evaluate the health and hygiene awareness and water education programmes and to incorporate these programmes in their future planning. To ensure that health and hygiene awareness is part of the process of providing VIPs on the farms, for those households with current sanitation facilities below RDP standard. To implement the public awareness and school education programmes included in the draft WDM Strategy of SM.
- To approve the Pollution Contingency Plan for the Management Area.
- To focus on health and hygiene education on the farms, over the next two years, when basic sanitation facilities will be provided to those households with current sanitation services below RDP standard.

Financial profile

Status quo:

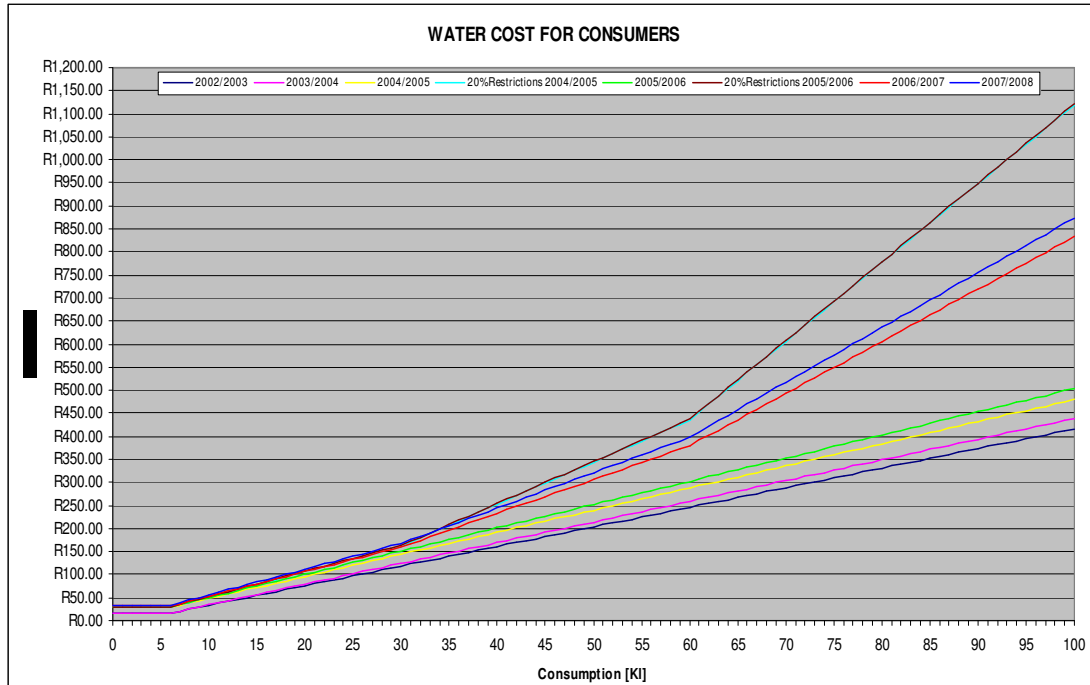
Capital Budget: The following graph indicates the projected capital expenditure for all water and sanitation capital projects for SM.



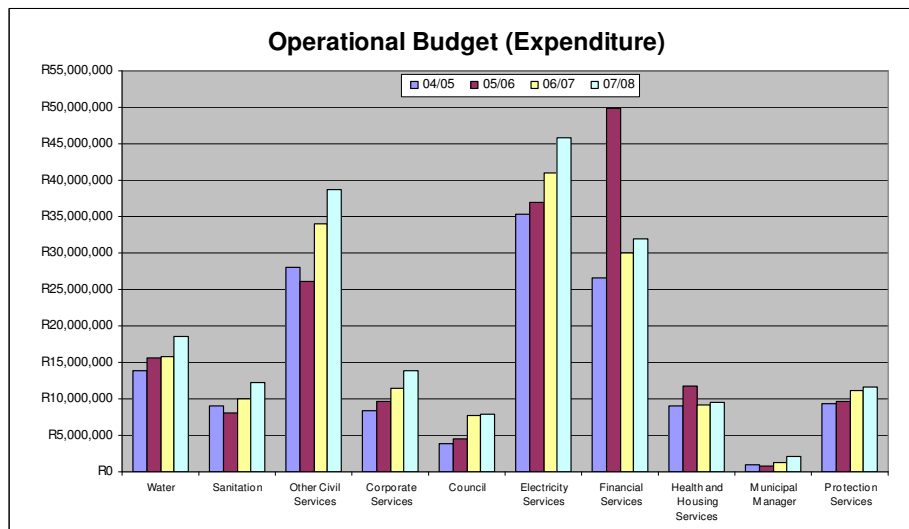
Tariffs: The tariff set by the WSA must:

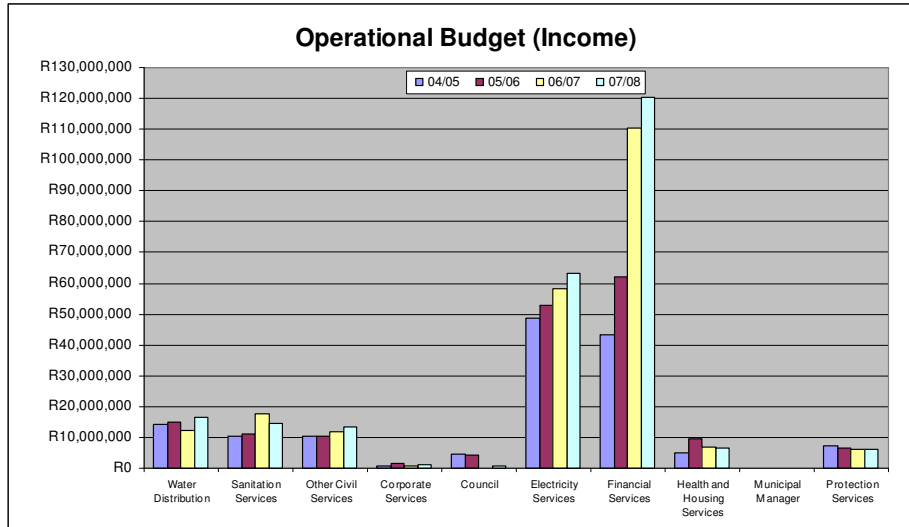
- support the viability and sustainability of water services to the poor;
- discourage wasteful or inefficient water use;
- take into account the incremental cost that would be incurred to increase capacity of the water supply infrastructure to meet an incremental growth in demand.

Tariffs often comprise both a fixed charge and a variable charge based on consumption. The cost of water services for the SM's consumers, for the various years, is presented on the graph below:



Operational Budget: The total operational budgets for SM for 2004/2005, 2005/2006, 2006/2007 and 2007/2008 for expenditure and income are included on the following two graphs:





From the above graphs the following can be noted with regard to water and sanitation services:

- The expenditure of water services increased from R15 676 188 to R18 610 155 (18.7%) and the income generated from water services increased from R14 997 681 to R16 596 859 (10.7%) over the last two years.
- The expenditure for sanitation services increased from R8 036 880 to R12 252 463 (52.5%) and the income generated from sanitation services increased from R11 007 380 to R14 622 508 (32.8%) over the last two years.

Gaps:

Capital Budget: Most of the capital projects for water and sanitation are funded through SM's own funds. Charging for water and sanitation services and the control of payments therefore plays an important role in SM.

The water assets that fall within the poor and very poor condition indicate that the condition backlog is approximately R47M. The bulk of the backlog is made up of reticulation pipeline assets. For sanitation assets the condition backlog is approximately R0.6M. This backlog is made up of pump station assets only.

The Water Master Plan for Malmesbury recommends upgrades to the value of R44.790M in the foreseeable future in order to accommodate development and population growth according to the SDF. The Sanitation Master Plan (Excl. WWTWs) for Malmesbury recommends upgrades to the value of R15.430M in the foreseeable future in order to accommodate development and population growth according to the SDF.

Tariffs: The proposed tariff structure for the SM should remain a rising block rate, but the blocks and rates could be adjusted to reflect the following proposed tariff structure (Draft WDM Strategy):

Block (Kl/month)	SM Tariff	Possible Tariff	Comment
0 - 6	R0,00	R0,00	Free Basic Water
7 - 15	R4,90	R2,00	Low volume use
16 - 30		R4,00	Typical use volume, including garden irrigation
31 - 60	R6,75	R8,00	Above average use, including garden irrigation

Block (Kl/month)	SM Tariff	Possible Tariff	Comment
60 - 100	R10,43	R10,00	Wasteful use and/or severe garden irrigation
>100		R15,00	Significant waste and/or unnecessary garden irrigation

The determination of tariff policies should seek to address both commercial and social welfare concerns. The **CAFES**-principles (Sansom et al. 2002) are outlined below:

- **Conserving.** Tariffs should encourage consumers to purchase enough water to meet their needs without being wasteful.
- **Adequate.** Future investment should also be considered when setting the tariffs.
- **Fair.** The utility should achieve financial sustainability while maintaining access for poor communities.
- **Enforceable.** Tariffs that cannot be enforced are unlikely to be sustained.
- **Simple.** The tariffs should be easy for the Municipality to administer and easy for customers to understand. Consumers generally show greater willingness to pay water bills that they understand.

Operational Budget: Current gaps include unrealistically low depreciation charges, which have to be rectified and ring-fenced into an asset replacement fund, as well as additional budget requirements above inflation for infrastructure development.

Implementation strategies:

SM's implementation strategies with regard to **capital funds** are as follows:

- To focus strongly on revenue collection, because most of the funds for water and sanitation capital projects are from SM's own funds.
- Identify all potential sources of funding for capital projects.
- To actively implement the Credit Control and Debt Collection Policy in order to reduce the current percentage of non-payment of municipal services even further.
- Develop Asset Management Plans from the recent developed Asset Registers, which will indicate the real replacement values and service lives of the assets and the funds required to provide for adequate asset replacement.

Tariffs: It is suggested that the following tariff structure characteristics should remain in SM's Management Area to ensure efficient water use (Draft WDM Strategy):

- Maintain a rising block tariff structure
- Kept number of blocks in the tariff to a minimum. One block to address free basic water (the first step) and another to address the "cut-off" volume where consumers are discouraged to use water above this monthly volume (highest block) are required. In addition another three blocks could be used to distinguish between low users, typical use of high water use. Six blocks in a tariff often make good sense, as listed under Section F.9.3.2.4.
- The volumetric steps should be the same for all the towns within SM.

- The cost of water in the maximum step should severely discourage use in this category. The volumetric use for the highest category could be 100 kl/month, above which residential water use could be considered to be wasteful or unnecessary. Garden use requiring in excess of this volume should be reduced in accordance with xeriscape practices.

SM's implementation strategies with regard to **operational budgets** are as follows:

- Develop Asset Management Plans from the recent developed Asset Registers, which will indicate the real replacement values and service lives of the assets and the funds required to provide for adequate operation and maintenance of the infrastructure.
- The depreciation charges will have to form part of the operating budget and subsequent tariffs, linked to a ring-fenced asset replacement fund.
- Water services operational surpluses have to be allocated to essential water services requirements.

The *Goals / Targets* and Operational Strategies set by SM, with regard to financial viability, are as follows:

- *To ensure financial sustainability of the Municipality.*
Aggressive awareness campaigns to reduce non payment.
Zero tolerance approach regarding non-payment.
Installation of prepaid water and electricity meters in new developments.
Offering of incentives for existing connection to convert to prepaid services.
Preference must be given for income generated capital projects.
Maintenance of assets and infrastructure has priority over the development of new infrastructure / purchase of new assets.
Increased and capacitate credit control division through additional personnel and budget.
- *To apply transparent and statutory correct financial management.*
Investigate all IT solutions to reduce the effect of personnel shortages.
Optimize workflow and technology in order to utilize personnel optimally.
- *To support land reform processes in the municipal area.*
Promotion of land reform through facilitating liaisons between role-players.
Development of existing commonage projects.
- *To develop a developmental orientated organization.*
Constitute a LED committee to provide inputs for the budget.
Ensure that LED directed indicators are integrated in directorates.

List of projects

Status quo:

The proposed list of projects for water and sanitation services for SM, to be included in the IDP, is as follows:

Project name	Settlement type	Water/sanitation	Project type (e.g. bulk reticulation, etc.)	Amount	Funding source	Year
Malmesbury Sewerage works (Extensions)	Malmesbury	Sanitation	WWTW	R12 398 891	EFF	2008/2009
				R3 109 000	MIG	
				R14 409 000	CRRF	2009/2010
				R5 591 000	MIG	
				R16 316 000	CRRF	2010/2011
Fences around sewer dams	Management Area	Sanitation	Safety	R3 684 000	MIG	
				R60 000	EFF	2008/2009
				R66 000	CRRF	2009/2010
				R75 000	CRRF	2010/2011
Riebeek Kasteel: Sewerage (Phase VI) Final Phase	Riebeek Kasteel	Sanitation	Reticulation	R3 750 000	EFF	2008/2009
Waterpipe: Piet Retief Street	Malmesbury	Water	Reticulation	R440 000	CRRF	2009/2010
540 Housing Project Darling: Sewer Pump Station	Darling	Sanitation	Pump Station	R1 216 217	EFF	2008/2009
Abbotsdale Sewer Connections: Indigent households and buckets	Abbotsdale	Sanitation	Reticulation	R2 600 000	EQS	2008/2009
Moorreesburg Water Pump Station	Moorreesburg	Water	Pump Station	R1 000 000	EFF	2008/2009
Supply water to sport grounds and re-use of excessive sewerage water	Moorreesburg	Sanitation	Reticulation	R150 000	EFF	2008/2009
				R900 000	CRRF	2009/2010
Telemetry Sewer	Management Area	Sanitation	Management	R50 000	EFF	2008/2009
				R55 000	CRRF	2009/2010
				R60 500	CRRF	2010/2011
Water saving taps for Moorreesburg and surrounding areas	Moorreesburg	Water	Reticulation	R50 000	EFF	2008/2009
				R55 000	CRRF	2009/2010
				R60 500	CRRF	2010/2011
Provide basic water services on the farms (R6000/Household)	Farms	Water	Basic services	R2 106 000	Identify funds	2009/2010
Provide basic sanitation services on the farms (R6000/Household)	Farms	Sanitation	Basic services	R10 242 000	Identify funds	2010/2011
Metering of influent at WWTWs, treated effluent discharge into WR System and treated effluent re-used	Management Area	Sanitation	Bulk meters	R500 000	Identify funds	2009/2010
Proposed projects as identified through the Water and Sewer Master Plans and the Western Cape Sanitation Backlog Study (Table A.1 in Annexure A, attached to the Executive Summary)						

Gaps:

It is important for SM to focus over the next two years on the consumers with current basic water and sanitation services below RDP standard in the rural areas. The Water and Sewer Master Plans for the other towns need to be completed as soon as possible in order to address the possible bulk infrastructure backlogs that might exist at these towns.

Implementation strategies:

SM's implementation strategies, with regard to new water and sanitation infrastructure, are as follows:

- Take the recommended projects, as identified through the Water and Sewer Master Plans and the WSDP, into account during the planning and prioritization process for new infrastructure. Prioritize from the desired list, those items which can be implemented from available funding in the particular financial year.
- Undertake revised master planning at least every five years and use the Master Plans to list the desired infrastructure development requirements and reflect these in the IDP.
- Prioritize the addressing of the backlogs, with regard to basic water and sanitation services, as soon as the information from the detailed survey of the service levels in the rural areas becomes available.
- Assign a high priority to the implementation of the WDM Strategy (Demand Management) in order to postpone additional capital investment for as long as possible, both from the water availability perspective as well as from the treatment of increased effluent volumes.
- Balance land-use and development planning (SDFs) in accordance with the availability of water and the capacity of water treatment and waste water treatment facilities that are in place or that will be implemented.

ANNEXURE A

TABLE A1: CES MASTER PLAN ITEMS – PROPOSED WORKS AND PHASING

MAP D.1: FUTURE INFRASTRUCTURE PROJECTS

Table.D.1: Proposed Infrastructure Projects

ANNEXURE B

ABBREVIATIONS AND DEFINITIONS

ABBREVIATIONS AND DEFINITIONS

AADD	Average Annual Daily Demand
AMP	Asset Management Plan
BD	Backyard Dwellers
CAFES	Conserving, Adequate, Fair, Enforceable, Simple
CRC	Current Replacement Cost
DLG&H	Department of Local Government and Housing
DM	District Municipality
DRC	Depreciated Replacement Cost
DWAF	Department of Water Affairs and Forestry
EPWP	Expanded Public Works Programme
EQS	Equitable Share
IDP	Integrated Development Plan
ILI	Infrastructure Leakage Index
KPI	Key Performance Indicator
MIG	Municipal Infrastructure Grant
MI	Mega litre
PDD	Peak Daily Demand
PRV	Pressure Reducing Valve
RDP	Reconstruction and Development Programme
RM	Rand Million
RUL	Remaining Useful Life
SDF	Spatial Development Framework
SFWS	Strategic Framework for Water Services
SM	Swartland Municipality
UARL	Unavoidable Annual Real Losses
UAW	Unaccounted Water
WC DM	West Coast District Municipality
WDM	Water Demand Management
WMA	Water Management Area
WR	Water Resource
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSP	Water Services Provider
WTW	Water Treatment Works
WWTW	Waste Water Treatment Works /

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.
CRC	The cost of replacing the service potential of an existing asset, by reference to some measure of capacity, with an appropriate modern equivalent asset. GAMAP defines CRC as the cost the entity would incur to acquire the asset on the reporting date.
DRC	The replacement cost of an existing asset after deducting an allowance for wear or consumption to reflect the remaining economic life of the existing asset.
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.
RUL	The time remaining over which an asset is expected to be used.

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	<p>A Water services provider is</p> <ul style="list-style-type: none"> • 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
Water conservation	<ul style="list-style-type: none"> • The minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water.
Water Demand Management	<ul style="list-style-type: none"> • The adaptation and implementation of a strategy by a water institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services, and political acceptability.