WATER AND SANITATION SERVICES DEVELOPMENT PLAN

PICTURE

6.0 WATER AND SANITATION SERVICES DEVELOPMENT PLAN

6.1 INTRODUCTION

The section below is a summary of the Breede Valley Municipality (BVM) Water Services Development Plan (WSDP) published in August 2004 covering the urban and rural areas of the BVM, namely Worcester, De Doorns, Touws River, Rawsonville and farmland areas, which comply with the requirements of the Water Services Act (Act 108 of 1997). For a fuller treatment and detail pertaining to the WSDP please refer to the original document which is included in the CD accompanying the IDP.

The three critical issues identified within the document are highlighted below:

- Water and sanitation backlogs need to be eliminated by providing needed service infrastructure. Grants provided by National Government in the form of the Municipal Infrastructure Grant (MIG) should be utilised for the provision of sanitation facilities and basic water supply.
- The local economy needs to be stimulated in order to ease unemployment and eradicate poverty and this can be achieved through boosting tourism and increasing local economic development. Referring to the local economy, industrial activity needs to be diversified within the municipality and small and micro enterprises need additional support.
- Water Conservation and Water Demand Management (WC/WDM) has been recognised as one of the most important principles that will ensure sustainable, efficient and affordable service delivery. A WC/WDM programme needs to be implemented by the BVM in this regard and should include the following:
  - Establishment and looking at the integrity of water supply zones and districts for all water supply systems.
  - Monitoring of the level of unaccounted for water (UAW) continuously for each water supply zone and district.
  - Maintenance of the level of UAW at benchmarked standards.
  - Implementation of a consumer meter management programme.
  - Implementation of a pressure management programme.
  - Implementation of a pipeline maintenance and replacement programme.
  - Implementation of efficient water effluent management measures.
  - Installation of meters to all existing consumer connections.
  - Provision of adequate information to support strategic decision

making.

- Promotion and education of efficient water usage to consumers.
- Adoption of the ethos of partnership and transparency.
- Adoption of an Integrated Resource Plan (IRP).
- Implementation of a complaints management system.
- Implementation an integrated GIS-system to assist with record-keeping, monitoring, operation and management.

The Breede River Municipality also has as one of its aims the provision to all consumers of good quality water and adequate sanitation by 2008 using one of the following three services levels:

- Communal water supply point (stand pipes) with dry sanitation system (VIP).
- Yard tap with intermediate waterborne sanitation system.
- House connection with full waterborne sanitation system.

Furthermore, the following objectives were outlined:

- A target for reducing UAW in the Breede Valley to at least 10% within the next five (5) years should be set by Council. Although there are some bulk water meters, adequate bulk water meters should be installed before and after the Water Treatment Works (WTW) for both the urban and rural areas. The BVM should identify illegal connections, unmetered connections, internal plumbing leaks and reticulation leaks regarding lowering UAW that shall form part of the WC/WDM programme.
- Adequate water treatment of the Stettynskloof Dam source should be investigated for Worcester.
- Provision of basic water services in Worcester need to be completed as certain informal areas lack stand pipes and farm workers in the farmland areas need water points.
- Provision of basic sanitation services in Worcester and De Doorns need to be completed as informal settlements are not fully serviced and farm workers in the farmland areas need basic VIP sanitation.
- Monitoring and testing of the following boreholes regarding quality and long term sustainability:
  - Witklip borehole (Touws River)
  - Four (4) boreholes (Rawsonville)
- Investigation of the feasibility of upgrading of the Touws River Wastewater Treatment Works (WWTW) before future development is allowed.
- Extension of the existing GIS-system to form part of the complete WC/WDM programme.
- Extension of the existing telemetry monitors and control system to include key installations of the rural areas.
- Appropriate water services regulations and by-laws need to be

drawn-up which are aligned with the applicable legislation.
• A comprehensive user education/public awareness campaign needs to be implemented.
• A sanitation promotion, health and hygienic awareness programme needs to be implemented.
• Investigate and implement permitted effluent volume and concentration limits for industries.
• A pollution awareness programme needs to be implemented within the next three years.
• Act as Implementing Agent (IA) for the Working for Water (WfW) programme either under trading account funding or the poverty relief funding.
• The BVM carries out ongoing leak repairs as they occur (e.g. burst pipes) for both the urban and rural areas. This should be extended to a formal leak and meter repair programme that form part of the WC/WDM programme and include the following:
  ▪ Leak repair assistance programmes.
  ▪ Retro-fitting of water efficient toilets.
  ▪ Meter repair programme.
• Although the BVM have leak detection equipment for steel pipes, Council should investigate and acquire suitable additional leak detection equipment that include the following:
  ▪ Flow loggers.
  ▪ Portable flow measuring equipment (Strap-on flow meters, insertion flow meters).
  ▪ Pressure loggers.	

6.2 PROJECTS

During the drafting of the WSDP document the following projects were identified that link into the overall strategy.

6.2.1 SUSTAINABLE WATER SERVICES SUB-GOALS

Sub-goals	Strategies	Projects
Provision of basic water services (includes free basic water)	Provide water to all	De Doorns Rugbyveld project
		Zweletemba informal services project
Provision of basic sanitation services	Provide sewerage service to all	Zweletemba informal services project
		De Doorns Orchid housing scheme
Higher levels of water services	Improve and maintain quality of water system	De Doorns upgrading of pumps
		Zweletemba Mandela Square services
		Avlanpark Rohlihlahla services
		Zweletemba housing scheme
		De Doorns N1 South housing project
Higher levels of sanitation services	Improve and maintain quality of sewer system and treatment works	Upgrading Rawsonville sewerage purification works
		Zweletemba Mandela Square services
		De Doorns N1 South housing project

6.2.2 INTEGRATED WATER RESOURCE MANAGEMENT SUB-GOALS

Sub-goals	Strategies	Projects
Water resource protection	Develop policies to protect water resource	Stettynskloof dam rehabilitation
		Bok River pipeline rehabilitation
Water resource conservation	Develop policies to conserve water resource	N/A
Demand management	Lower UAW less than 10%	Water Master Plan Worcester
		Installation of zone meters for UAW management

6.2.3 EFFICIENT AND EFFECTIVE WATER SERVICES INSTITUTIONAL ARRANGEMENTS SUB-GOALS

Sub-goals	Strategies	Projects
Water services authority (WSA) overall capacity	Develop and maintain effective management and maintenance water service systems	N/A
Water services provider (WSP) institutional arrangements	Integrate and implement WSDP for towns in the BVM area	N/A

6.3 SERVICE LEVEL PROFILE

The provision of effective, efficient and sustainable water services to consumers is necessary to support economic development. As a priority it is the responsibility of the BVM to ensure that all consumers in its area of jurisdiction receive at least a basic level of water and sanitation services.

Basic water supply comprises the following:

- Provision of appropriate education in respect of effective water use.
- Supplying a minimum quantity of potable water of 25 litres per person per day.
- Supplying at a minimum flow rate of not less than 10 litres per minutes.
- Supplying and communal water tap within 200 metres of a household.
- Effective service of not more than 7 days interruption of water supply to any consumer per year.

Basic sanitation comprises the following:

- Provision of appropriate health and hygiene education.
- Provision of a toilet which is safe, reliable, environmentally sound, easy to keep clean, provides privacy and protection against the weather, well ventilated, keeps smells to a minimum and prevents the entry and exist of flies and other disease-carrying pests (VIP).

Whilst the provision of basic water and sanitation services is the most important and immediate priority, the BVM should provide intermediate and higher levels of services wherever it is practical, financially viable and sustainable to do so.

Water service levels include the following:

- **Communal water supply**: Supplying a communal water tap within 200 metres of a household.
- **Controlled volume supply**: Providing each house with a tank which holds about 200 litres (yard tanks). The tank gets filled up once a day. This type of service is often referred to as an intermediate level of supply.
- **Uncontrolled volume supply**: There are generally two types: either the tap stands outside the house on its own or on the wall of an outside toilet (yard tap) or water is piped into the house to take water to taps in the kitchen, bathroom, toilet, etc.

Sanitation service levels include the following:

- **Consumer installations: Dry -** The latrine has a lined pit with a concrete slab over it. An air vent allows smells out into the air above the privy (VIP).
- **Consumer installations: Wet -** Water is flushed into a digester where certain bacteria live (Septic tank). Digester effluent flows into the soak-away, then the ground. The digester has to be pumped

out occasionally.

- **Discharge to wastewater treatment works -** Here there are generally two types: intermediate (e.g. aqua-privy with solids free sewer which is similar to a septic tank, but instead of a soak-away the digester effluent flows into a pipe which connects to a small sewer in the road reserve).

6.3.1 RESIDENTIAL CONSUMER UNITS FOR WATER

The goal for the BVM as part of the IDP process is that all residential consumers in Worcester, De Doorns, Touws River and Rawsonville be serviced with at least good quality drinking water and adequate sanitation by the year 2008.

Thus all residential CU's in the above areas are to have one of the following three services levels:

- Communal water supply with dry sanitation system (VIP).
- Uncontrolled yard tap with intermediate waterborne sanitation system.
- Uncontrolled house connection with full waterborne sanitation system.

The following tables show an analysis of Projected CU of water for BVM:

TABLE 7: RESIDENTIAL CONSUMER UNITS: BVM URBAN

No of consumer units with:	2002	2003	2004	2005	2006	2007	2008
1. None or inadequate	1 392	1 417	572	448	298	149	0
2. Communal water supply	783	797	1 681	1 846	2 037	2 228	2 420
3. Controlled volume supply	0	0	0	0	0	0	0
4. Uncontrolled volume supply: yard tap or house connection	17 764	18 084	18 409	18 741	19 078	19 421	19 771
5. Total served (2+3+4)	**18 547**	**18 881**	**20 091**	**20 587**	**21 115**	**21 650**	**22 191**

TABLE 8: RESIDENTIAL CONSUMER UNITS FOR WATER: BVM RURAL

No of consumer units with:	2002	2003	2004	2005	2006	2007	2008
1. None or inadequate	1022	1037	769	576	384	192	0
Communal water supply – back log	0	0	115	230	345	460	575
2. Communal water supply	1155	1171	1478	1701	1 923	2 146	2 371
3. Controlled volume supply	0	0	0	0	0	0	0
4. Uncontrolled volume supply: yard tap or house connection	13 375	13 458	14 012	14 111	14 212	14 316	14 423
5. Total served (2+3+4)	**14 531**	**14 630**	**15 491**	**15 812**	**16 136**	**16 463**	**16 793**

Should certain urban communities be unable to afford more than the 6Kl of free water then controlled volume water supply may become an option.

6.3.2 RESIDENTIAL CONSUMER UNITS FOR SANITATION: URBAN: WORCESTER

No. consumer units with access to sanitation facilities:	2002	2003	2004	2005	2006	2007	2008
1. None or inadequate: below RDP: Pit	1 876	1 910	1 074	959	587	216	0
2. None or inadequate: below RDP: Bucket	139	142	145	147	150	152	0
3. Consumer installation: On site dry or equivalent	82	84	955	1 107	1 516	1 926	2 335
4. Consumer installations: Wet (Septic tanks, digester or tanker desludge, etc.)	165	168	171	174	177	180	184
5. Discharge to water treatment works (intermediate or full waterborne).	17 678	17 996	18 320	18 649	18 985	19 327	19 675
6. Total served (2+3+4+5)	**18 064**	**18 248**	**19 591**	**20 078**	**20 828**	**21 585**	**22 193**

6.3.3 RESIDENTIAL CONSUMER UNITS FOR SANITATION: BVM RURAL

No. consumer units with access to sanitation facilities:	2002	2003	2004	2005	2006	2007	2008
1. None or inadequate: below RDP: Pit	1 910	1 913	1 415	1 061	708	354	0
2. None or inadequate: below RDP: Bucket	203	203	179	179	179	179	0
3. Consumer installation: On site dry or equivalent	678	678	1 225	1 579	1 932	2 286	2 821
4. Consumer installations: Wet (Septic tanks, digester or tanker desludge, etc.)	4 036	4 037	4 038	4 039	4 041	4 042	4 043
5. Discharge to water treatment works (intermediate or full waterborne).	8 724	8 832	8 929	9 029	9 131	9 236	9 343
6. Total served (2+3+4+5)	**13 641**	**13 750**	**14 371**	**14 826**	**15 283**	**15 743**	**16 207**

6.4 WATER RESOURCE PROFILES

6.4.1 PRESENT WATER RESOURCES

6.4.1.1 WORCESTER

Worcester is supplied from three (3) sources namely Stettynskloof Dam, Fairy Glen Dam as well as by the Hex River. The latter is used as irrigation water for schools, sports grounds and through a canal system to many erven mainly in the older parts of town. The catchment areas of the Stettynskloof Dam and Fairy Glen Dam are located in the surrounding mountains with adequate water quality.

The main supply to Worcester is by gravity flow with a delivery rate of 39 Mℓ per day from Stettynskloof and 9 Mℓ per day from Fairy Glen. The capacity from Stettynskloof Dam can be increased to 52 Mℓ per day if water is pumped.

Based on a 1,8% growth rate per annum in water demand, currently more water is withdrawn than permitted, but with envisaged water savings taken into account the sources could yield sufficient water until 2019 regarding the total permitted abstraction.

Worcester also possesses three (3) boreholes of low yield that have lain unused for more than thirty (30) years. This source could be utilised for irrigation purposes.

The extent of groundwater sources is unknown and could be investigated should the need arise for additional sources.

6.4.1.2 DE DOORNS

Bulk water is supplied to De Doorns from the Grootkloof mountain stream and the Hex Valley Irrigation Board. The catchment area of the Grootkloof stream is located in the Grootkloof Mountain. This water source yield water of adequate quality. The maximum capacity of the sources is approximately 1 766 m^3/day.

Based on a 2,5% growth rate per annum in water demand, the sources could yield sufficient water until 2025 regarding the total permitted abstraction.

No groundwater sources are currently in use but these would be investigated when the need arise for additional sources

6.4.1.3 TOUWS RIVER

Bulk water in Touws River is supplied from the following sources: Mountain streams and springs, one borehole and one storage dam with catchment areas in the surrounding mountains. The source water quality is adequate. Water availability is estimated at 1 728 m^3 per day.

Water is supplied to Touws River in two (2) asbestos cement water mains of 250 mm and 200 mm respectively.

Based on a 2,5% growth rate per annum in water demand, the sources cannot yield sufficient water until 2006, but with envisaged water savings

taken into account the sources could yield sufficient water until 2022 regarding the total permitted abstraction.

Groundwater from the Witklip borehole is utilised for both household and business consumption that should be monitored regarding quality although treated at the WTW. The long term sustainability of the Witklip borehole is unknown and should be tested.

6.4.1.4 RAWSONVILLE

Bulk water is supplied to Rawsonville from the Smalblaar River (Smalblaar Irrigation Board) whose catchment area is in the surrounding mountains and four (4) boreholes. The sources water quality is adequate. Due to limited information available, no accurate figures can be provided on existing capacities. Water stabilisation and chlorination which takes place at the WTW where the reservoirs are situated and is sufficient. .

Based on a 2,5% growth rate per annum in water demand, the sources could yield sufficient water until 2019 regarding the total permitted abstraction .

Groundwater from the 4 boreholes managed by the Smalblaar Irrigation Board is utilised for both household and business consumption and the quality should be monitored, although treated at the WTW. The long term sustainability of the 4 boreholes is unknown and should be tested.

6.4.2 QUALITY OF DRINKING WATER AND FINAL EFFLUENT (SEWERAGE)

Drinking water, as well as the final effluent from the WWTW, is analysed on a regular basis to ensure that it complies with the minimum standards as set out by legislation.

Drinking water samples from Rawsonville, De Doorns and Touws River are collected on a monthly basis, while samples within the Worcester area are collected once a week. Final effluent samples from Rawsonville, De Doorns and Touws River WWTW are collected on a monthly basis, while samples from Worcester WWTW are collected once a week from the outlet of the maturation ponds.

Chemical and bacteriological analyses are performed on potable water samples and include the following: pH, Electrical Conductivity (EC), Total Dissolved Salts (TDS), Phenolphthalein Alkalinity, Total Alkalinity, Calcium Hardness as $CaCO_3$, Calcium as Ca as well as Total Coliforms and *E coli* (Type 1).

Analyses on final effluent include the following: Chemical Oxygen Demand (COD), Ammonia-Nitrogen, Total Kjeldahl Nitrogen (TKN), pH, Electrical Conductivity (EC), Nitrate as N, Phosphate (orto) as P, Sulphate as S, Chloride as Cl and Suspended Solids (SS).

6.5 WATER SERVICES INFRASTRUCTURE PROFILE

6.5.1 EXISTING INFRASTRUCTURE

Please refer to chapter 7 of the WSDP document for a full analysis of current infrastructure.

6.5.2 SCHEMES TO BE REHABILITATED

High priority maintenance and rehabilitation projects include the following:

- Bok River bulk water supply line to De Doorns (replacement of existing 200 mm with 300 mm diameter).
- Hex River canal rehabilitation for Worcester.
- Water and sewerage master plan for De Doorns, Touws River and Rawsonville.

6.5.3 NEW INFRASTRUCTURE TO BE BUILT

Important projects of high priority include the following:

- Bulk water zone meters regarding UAW control for Worcester.
- Stettynskloof Dam rehabilitation of carbon dioxide plant.
- Water source development for De Doorns.

6.5.4 FUTURE BULK WATER SUPPLY INFRASTRUCTURE

Future bulk water supply infrastructure needs are shown in the project list in Section 12.

Additional projects may be needed for Worcester, pending the outcome of the Water Master Plan.

A Water Master Plan for the rural areas must still be executed.

Important projects of high priority include the following:

- De Doorns water source development.
- Bok River bulk supply next phase.
- Stettynskloof Dam water supply extension.
- Hex River canal rehabilitation next phase.

6.5.5 FUTURE BULK SANITATION INFRASTRUCTURE

Future bulk sanitation infrastructure needs are shown in the project list in Section 12.

Additional projects may be needed for Worcester, pending the outcome of the Sewer Master Plan.

A Sewer Master Plan for both the urban and rural areas must still be executed.

Important projects of high priority include the following:

- De Doorns upgrade of WWTW.