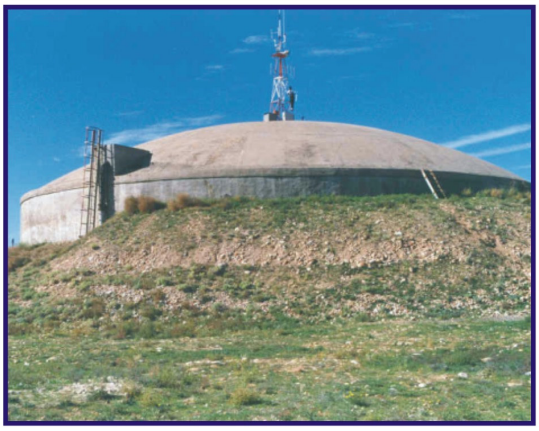
OUDTSHOORN MUNICIPALITY

WATER SERVICES DEVELOPMENT PLAN



NINHAM SHAND
CONSULTING SERVICES

February 2005
Report No.3777/400408

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OUDTSHOORN MUNICIPALITY

WATER SERVICES DEVELOPMENT PLAN (2005)

SUBMITTED BY

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FEBRUARY 2005

TITLE	**:**	**Water Services Development Plan (2005)**
AUTHOR	**:**	**M Makhabane, G English**
PROJECT NAME	**:**	**Oudtshoorn Water Services Development Plan**
NINHAM SHAND REPORT NO.	**:**	**3777/400408**
STATUS OF REPORT	**:**	**Final**

Approved for the Ninham Shand (Pty) Ltd

…….
M J SHAND
Ninham Shand

Approved for Oudtshoorn Municipality

…….
M P MAY
Municipal Manager

OUDTSHOORN MUNICIPALITY

WATER SERVICES DEVELOPMENT PLAN (2005)

EXECUTIVE SUMMARY

1. INTRODUCTION

In terms of the stipulations of the Local Government Municipal Demarcation Act (Act 27 of 1998) and the Local Government Municipal Structures Act (Act 117 of 1998), Oudtshoorn Municipality (WC045) has been formalised as a Category B municipality. From 1 July 2003, the water services authority (WSA) responsibility resides with Category B municipalities.

In 2004, the Oudtshoorn Municipality appointed Ninham Shand to assist in the development of the municipality's Water Services Development Plan (WSDP). The WSDP is a requirement of the Water Services Act (Act 108 of 1997).

2. MUNICIPAL CONTACTS

The main contact persons (in respect of this WSDP) at Oudtshoorn Municipality are :

- The Municipal Manager : Mr M P May
- The Operational Manager : Mr J F S Smit
- The Water and Sanitation Engineer : Mr J D W du Toit

Once approved by Council, the document will be made available publicly.

3. IDP AND WSDP GOALS

The Integrated Development Plan (IDP) and WSDP will reflect common goals and strategies in respect of water services and sanitation, with the WSDP providing the detail in support of these. The delivery of sustainable and affordable water and sanitation services is the ultimate objective, with a strong emphasis on water conservation and demand management, and water resource protection.

4. PHYSICAL AND ECONOMIC PROFILE

The municipality lies within the Klein Karoo, with average precipitation ranging between 280 and 300 mm per annum.

The total population is estimated from various data sources as about 82 000, of which 65% reside in the Greater Oudtshoorn area. About 20% of the total population resides in rural/farmland areas. It is anticipated that the total population will increase to about 87 000 within the next five years. More than 70% of all households survive on a total household income of less than R2 500 per month.

The ostrich industry and tourism are the primary economic activities in the municipality. Unemployment is very high in the smaller settlements and rural communities.

5. WATER SERVICES

The majority of households in Oudtshoorn have access to running water. Augmentation of existing sources of supply will need to be put in place to improve the assurance of supply. De Rust regularly experiences water shortages in summer. Standpipes are used to supply some of the smaller rural communities, where local supply schemes are not in place.

Table E1 provides a summary of the residential consumer units (for various service levels of water supply).

Table E1 Residential Consumer Units - Water

AREA	COMMUNAL SUPPLY		CONTROLLED SUPPLY		UNCONTROLLED SUPPLY (E.G. TAP)	
	2003/2004	2008/2009	2003/2004	2008/2009	2003/2004	2008/2009
Oudtshoorn	60	40	0	0	10 163	11 500
Dysselsdorp	0	0	0	0	1 745	1 800
De Rust/Blomnek	156	40	0	0	500	700
Rural/Farmlands	1 270	1 000	1 875	2 145	0	0

6. SANITATION SERVICES

The phasing out of bucket systems and ventilated improved pit (VIP) latrines, in favour of discharge to wastewater treatment works, is currently in progress. Table E2 provides a summary of the consumer units for various levels of sanitation services.

Table E2 Residential Consumer Units - Sanitation

AREA	INADEQUATE (1)		VIP OR EQUIVALENT		WET (2)		TO WWTW	
	2003/2004	2008/2009	2003/2004	2008/2009	2003/2004	2008/2009	2003/2004	2008/2009
Oudtshoorn	200	0	60	40	0	0	9 620	11 157
Dysselsdorp	0	0	0	0	0	0	1 745	1 800
De Rust/ Blomnek	0	0	156	40	220	230	280	470
Rural/Farmlands	1 358	233	354	1 479	1 874	1 874	0	0

(1) Pit latrine or buckets (below RDP standard)
(2) Septic tanks, digester or tanker

7. WATER RESOURCE PROFILE

Oudtshoorn is supplied out of the Koos Raubenheimer Dam, Melville Dam and from the Rust en Vrede stream. Existing sources cannot supply the current water requirements at a 98% assurance (typical for urban water supply). De Rust experiences shortages and despite its close proximity to the Klein Karoo Rural Water Supply Scheme (KKRWSS), is not connected to it. Dysselsdorp is supplied directly from the KKRWSS.

Potential augmentation of existing sources of supply include :

- Deep groundwater (out of the Table Mountain Group Aquifer)
- Supply of irrigation from separate sources, other than municipal
- Integration of the individual water supply sources with the KKRWSS

It is estimated that the water requirements on municipal supply (and the KKRWSS) will increase from about 8 million m^3/a (2004) to about 14 million m^3/a by 2030.

8. WATER QUALITY

Water quality from the Oudtshoorn Water Treatment Works (WTW) generally meets the SABS standard. However, the treated water occasionally exceeds the acceptable limit for turbidity and colour. Total coliforms in the reticulation network sometimes exceed SABS standards. The municipality called for tenders in October 2004 for the installation of a chlorination facility to address this. Potable water quality at De Rust and Dysselsdorp (KKRWSS) meets SABS standards.

9. WATER RETURNED TO SOURCE

The COD content of treated effluent from the Oudtshoorn WWTW sometimes exceeds the general standard. Upgrades to the WWTW have been undertaken and further improvements within the next five years are planned. Effluent at De Rust is evaporated and not discharged. At the Dysselsdorp WWTW, COD, free and saline ammonia and suspended solids regularly exceed the general standard. The municipality has identified the need to upgrade the works.

10. WATER CONSERVATION AND DEMAND MANAGEMENT

Based on latest available information, current unmetered water at Oudtshoorn is estimated to be about 1 million m^3/a. Losses in the lei-water systems used in the municipality are unknown. About 9% of the annual yield of the KKRWSS is lost from the reticulation network.

Block tariff structures need to be implemented. The current tariffs do not engender efficient water use. The current tariffs are :

- 0 - 6 kℓ/month : Free
- 7 - 100 kℓ/month : R4,30/kℓ
- > 100 kℓ/month : R4,40/kℓ

Consideration could also be given to a sanitation tariff, related to water consumption. In terms of water reuse, Oudtshoorn currently uses approximately 450 Mℓ/year of treated effluent for irrigation of public space, playing fields and golf courses.

11. EXISTING WATER INFRASTRUCTURE

Figure 9.1 of this report shows the existing raw water supply scheme for Oudtshoorn. Pipe bursts in the reticulation network of up to 30 per month in winter (low demand, high pressure) and 20 per month in summer are not uncommon. Studies undertaken to date recommend a stabilisation plant (with respect to calcium carbonate) at the WTW to ensure a less corrosive water.

De Rust is supplied via a run-of-river diversion from a weir on the Huis River. The supply is augmented from a local farmer's source during periods of peak demand. Pipe breakages are also common. Dysselsdorp relies on the KKRWSS.

12. EXISTING SEWAGE WORKS

At Oudtshoorn, the WWTW has been improved to allow for a more effective screening mechanism and de-watering of screenings. Further upgrades will be necessary to reduce the COD content of the treated effluent being discharged.

As discussed under Section 9 of this Executive Summary, upgrades to the WWTW at Dysselsdorp will also be necessary.

13. WATER BALANCE

The current combined yield of all of Oudtshoorn's water sources is about 5 400 Mℓ/year at a 98% assurance of supply (one failure in 50 years). Current water demand is about 6 300 Mℓ/year. The projected 2030 demand is in the order of 8 000 Mℓ/year. Augmentation of existing sources is already necessary. Individual schemes should not be implemented before an integrated water supply scheme investigation for the whole of the Klein Karoo has been undertaken.

De Rust was in balance (demand = supply) in 2004. Meeting peak demands is no longer possible from the Huis River.

14. CUSTOMER SERVICE PROFILE

All complaints are directed to the relevant technical department/person via a Client Care Clerk, to whom feedback is provided once the reported problem is addressed.

15. FINANCIAL PROFILE

The municipality intends to undertake capital projects for sanitation services of about R6,3 m during 2005/2006, R16,1 m in 2006/2007 and R13,6 m in 2007/2008.

Estimates of capital to be spent on water services projects are R3,9 m in 2005/2006, R3,8 m in 2006/2007 and R2,8 m in 2007/2008.

Potential sources of capital funding include :

- CMIP : Consolidated Municipal Infrastructure Programme
- DWAF : Department of Water Affairs and Forestry
- EDEN DM : Eden District Municipality
- CDLF : Consolidated Development Loan Fund
- MIG : Municipal Infrastructure Grant
- DBSA : Development Bank of South Africa
- WRC : Water Research Commission

Refer to Tables 14.1 and 14.2 of this report for details of the proposed projects to be implemented for sanitation and water services.

For 2004/2005, Operating Budgets are estimated to be R18 m for water and R5,7 m for sanitation services.

16. RECOMMENDATIONS

The following recommendations are made :

- Introduce a more rigorous block tariff system for water services.
- Consider a waste tariff, linked to water consumption.
- Focus on integration of the individual water sources, together with the KKRWSS.
- To support further revisions of this WSDP, ensure that more reliable information on service levels in the rural communities is collated.
- Ensure that the necessary service level agreements with Overberg Water Board are in place for ownership of the KKRWSS.
- Prioritise addressing the extent of pipe bursts, water losses and appropriate metering.
- Upgrade WWTW where discharged effluent is not meeting DWAF's general standard.

OUDTSHOORN MUNICIPALITY

WATER SERVICES DEVELOPMENT PLAN (2005)

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1. INTRODUCTION

In terms of the stipulations of the Local Government Municipal Demarcation Act (Act 27 of 1998) and the Local Government Municipal Structures Act (Act 117 of 1998), the following new local authorities have been formalised in the Garden Route region with effect from July 2001 :

DC4 - Eden District Municipality (EDM), a Category C municipality and within its boundaries -

- WC041 - Kannaland Municipality - Category B municipality
- WC042 - Langeberg Municipality - Category B municipality
- WC043 - Mossel Bay Municipality - Category B municipality
- WC044 - George Municipality - Category B municipality
- WC045 - Oudtshoorn Municipality - Category B municipality
- WC046 - Plettenberg Bay Municipality - Category B municipality
- WE047 - Knysna Municipality - Category B municipality

The supply of and functioning of water services as allowed for under Act 108/97 (role of Water Services Authorities and Water Services Providers) only recently became official when the Minister for Local Government in the Western Cape announced that as from 1 July 2003 the water services authority (WSA) responsibilities will resort with Category B municipalities.

The Overberg Water Board (OWB) operates a rural water supply scheme, namely the Klein Karoo Rural Water Supply Scheme (KKRWSS). The scheme supplies water to rural hamlets, individual farms and some municipal areas over a large part of both the Oudtshoorn and Kannaland Municipal areas.

In terms of the Category B municipal WSA status, the Overberg Water Board will act as a Water Services Provider within each of these two municipalities providing water in bulk or to individual users on farms, and to several parts of the municipalities. Subsequent to 1 July 2003, negotiated services agreements will be required.

In 2004, the Oudtshoorn Municipality appointed Ninham Shand Consulting Services to assist with the process and development of a Water Services Development Plan (WSDP) for the municipality.

This WSDP covers the following urban and peri-urban areas located within the extended area of the Oudtshoorn Municipality.

Urban areas :

- Oudtshoorn
- De Rust
- Dysselsdorp

Peri-urban/rural dense areas :

- Volmoed
- Vlakteplaas
- Grootkraal
- Rodewal

This WSDP was prepared in terms of the requirements of the Water Services Act (Act 108 of 1997) and in accordance with the guideline procedures of the DWAF Guide *Framework and Checklist for the Development of Water Services Plans (Edition 2, August 1998)* and the DWAF Guidelines for Water Services Authorities (Preparation Guide - Draft), July 2001.

In terms of the stipulations of Act 108/97 this WSDP should be developed as part of the Oudtshoorn Integrated Development Plan (IDP) as contemplated in the Local Government Transition Act of 1996. The IDP 2004/2005 for the Oudtshoorn Municipality was prepared by Octagonal Development and completed in August 2003.

Formalisation of this Water Services Development Plan has thus been performed in a methodology summarised as follows :

1. Identify the community needs and issues regarding water and sanitation raised in the IDP processes for Oudtshoorn Municipality.

2. In conjunction with municipal officials, review all water and sanitation infrastructure (reservoirs, pipelines, pump stations, treatment works, etc.).

3. Study the most recent technical reports and spatial development reports (refer to References of this WSDP) as input data to various sections of technical reporting required in terms of the DWAF Guidelines for WSDPs.

4. Discussions were held and data obtained from technical and operational staff of water and sanitation services as well as financial managers within the municipal structure.

5. The IDP 2003 revision process was closely followed and input data on water and sanitation issues was received from the IDP Co-ordinator.

On completion of the initial information-gathering phase, the drafting team identified alternative options to meet future water demand (mainly from recently completed study reports) and supply levels of water and sewerage services. These options were considered and included in this Draft WSDP.

2. DEFINITIONS AND TERMS

AC	Asbestos cement
Act 108/97	Water Services Act (108 of 1997)
Act 36/98	National Water Act (36 of 1998)
ave	average
ºC	Degrees Centigrade
CDLF	Consolidated Development Loan Fund
Cl	chlorides
CMIP	Consolidated Municipal Infrastructure Programme
COD	Chemical Oxygen Demand
CU	Consumer Units
DAGEOS	Deep Artesian Groundwater Exploration for Oudtshoorn Study
DBSA	Development Bank of South Africa
DM	District Municipality
dia	diameter
DWAF	Department of Water Affairs and Forestry
EDM	Eden District Municipality
EIA	Environmental Impact Assessment
Fe	Iron
GIS	Geographical Information Systems
HDPE	High Density Polyethylene
IDP	Integrated Development Plan
kg	kilograms
KKRWSS	Klein Karoo Rural Water Supply Scheme
kℓ	kilolitres
km	kilometres
ℓ	litre
MIG	Municipal Infrastructure Grant
Mℓ	million litres
m^3	Cubic metres
mm	millimetres
Mm^3	Million cubic metres
m^3/a	cubic metres per annum
mg/ℓ	milligrams per litre
Mn	Manganese
mS/m	Electrical conductivity (millisiemens per metre)
NTU	Nephylometric Turbidity Units
NWRS	National Water Resources Strategy
OM	Oudtshoorn Municipality
OWB	Overberg Water Board
PAWC	Provincial Administration Western Cape
PVC	Polyvinyl Chloride
RDP	Reconstruction and Development Programme
SABS	South African Bureau of Standards
SMIF	Special Municipal Innovation Fund
SO4	Sulphates
TB	Tuberculosis
TMG	Table Mountain Group
VIP	Ventilated improved pit
WRC	Water Research Commission
WSA	Water Services Authority
WSDP	Water Services Development Plan
WTW	Water Treatment Works
WWTW	Wastewater Treatment Works

3. MUNICIPAL CONTACTS AND WSDP PROCESS

3.1 MUNICIPALITY ADDRESS

Oudtshoorn Municipality (Local Municipality Reference WC045)
P O Box 255
OUDTSHOORN
6620

Tel : 044 - 203 3000
Fax : 044 - 203 3166
e-mail : post@oudtmun.co.za

3.2 CONTACT PERSONS

The Municipal Manager	Mr M P May
The Operational Manager	Mr J F S Smit
The Engineer (Water and Sanitation)	Mr J D W du Toit

3.3 OTHER RESPONSIBLE OUDTSHOORN MUNICIPAL OFFICIALS

Project Manager	Mr J F S Smit
Workshop/Participation Facilitator/Co-ordinator	Mr J F S Smit
Physical Profile/GIS/Maps	Mr H Schnautz
Social Profile/Community Liaison	Mr L A Coetzee
Economic Profile/Business Liaison	Mr G P Baartman
Domestic Consumer Profile	Mr G P Baartman
Industry Consumers and Water Quality	Mr P C E Burger
Health Education and Liaison	Sister N R Hude
Water Resources, Conservation and Demand Management	Mr J W D du Toit
Water Services Infrastructure Operation	Mr J W D du Toit
Water Services System Management	Mr J W D du Toit
Environmental Impact and Legal Compliance	Water related - Mr J W D du Toit Town Planning - Mr J Eastes
Institutional and Management	Mr J F S Smit
Finance	Mr H Bezuidenhout
Strategic Planning and Analysis Co-ordination	Mr M P May
Inter-sectoral Alignment and Integration with IDP	Mr L A Coetzee

3.4 THE DRAFTING TEAM

Engineer	Mr J W D du Toit
Engineering Technician	Mr P C E Burger
The Operational Manager	Mr J F S Smit
Ninham Shand Director	Dr M J Shand
Ninham Shand Technical Staff	Mr G English

3.5 PUBLIC PARTICIPATION PROCESS

Section 14(1)(a) of Act 108/97 requires that the WSA takes reasonable steps to bring its Draft WSDP to the notice of its consumers, potential consumers, industrial users and water services institutions within its area of jurisdiction. From experiences in certain municipalities elsewhere, it has been noted that the conventional route of inviting the public by published notices to attend informative public meetings and awaiting comment on the Draft WSDP, has not always succeeded in proper participation.

This Draft WSDP will be circulated to the Department of Water Affairs and Forestry, the Overberg Water Board, the Eden District Municipality and Kannaland Municipality as interested and affected authorities and a copy will be made available in the town libraries of Oudtshoorn, De Rust, Dysselsdorp for public comment. An advertisement inviting the public to study and comment on the Draft WSDP will be placed in the local newspaper.

4. IDP AND WSDP GOALS

4.1 IDP VISION

In summary, the vision of Oudtshoorn Municipality is "to bring together both rural and urban communities marginalised by previous dispensations and unite them into a strong human resource by providing the environment for empowerment, equal participation, self sufficiency and progress. Integral with these aims are the preservation of the cultural and historical past, sustainable use of natural resources and the provision of at least basic services to all community members".

4.2 IDP PRIORITY OBJECTIVES AND STRATEGIES (WATER AND SANITATION SERVICES)

The Oudtshoorn Municipality's priority issues and objectives relating to water services are summarised as follows :

IDP focus areas

- Addressing De Rust's water shortages during summer
- Optimum operation of the KKRWSS
- Eradication of the bucket system in Dysselsdorp
- Improved quality of bulk water supply through potential integration of existing individual schemes
- High cost of water infrastructure replacements and maintenance
- Investigate and improve rural/agricultural water use
- Maintain an acceptable level of service to urban and rural communities

IDP proposed strategies

The proposed key strategies with reference to the provision of water and sanitation services are as follows :

- Drafting of a sewerage master plan for the Greater Oudtshoorn area
- Evaluate different sanitation options for implementation in rural areas
- Investigate alternative funding sources to deliver services
- Investigate and utilise all possible support from the DWAF, to supply clean drinking water to rural communities, notably Vlakteplaas
- Educate against the culture of non-payment
- Enforce a policy of credit control
- Investigate possibilities of further development of the groundwater resources, notably deep resources
- Repair, maintain and expand existing water reticulation systems
- Implement integrated water resource management

4.3 WSDP GOALS

In order to address sustainable water and sanitation services, the following major goals will apply :

4.3.1 Delivery of Sustainable Water Services

Sub-goals set by Oudtshoorn Municipality :

(a) Water conservation (reduction of wasted and wasteful use of water) shall receive priority before capital expenditure to increase bulk water supply infrastructure/resources.
(b) Water and sanitation service levels shall be improved and operated at a level that will be affordable to the permanent residents of the municipality.

4.3.2 Integrated Water Resource Management

Sub-goals set by Oudtshoorn Municipality :

(a) To protect all surface and groundwater resources from over-exploitation and pollution through an all-inclusive programme of abstraction monitoring and regular water sampling, analysis and database compilation of chemical/bacteriological records.
(b) To protect all surface water resources by the removal and follow-up removal of invasive alien plants, particularly in key surface water runoff areas.
(c) To investigate the integration of surface and groundwater supply schemes so as to improve the assurance of supply to those users currently experiencing shortfalls (De Rust, Volmoed and Vlakteplaas, for example).

4.3.3 Efficient and Effective Water Service Institutional Arrangements

Sub-goals set by Oudtshoorn Municipality :

(a) Updated contractual agreements with other suppliers of raw and potable water to be put in place (Overberg Water Board, for example) to reflect the appropriate institutional arrangements.

5. PHYSICAL AND SOCIO-ECONOMIC PROFILE

5.1 PHYSICAL PROFILE

The total demarcated municipal area to be serviced by Oudtshoorn Municipality covers some 3 535 km^2.

The municipality is one of seven Category-B municipalities falling within the Eden District Municipality (see Figure 5.1).

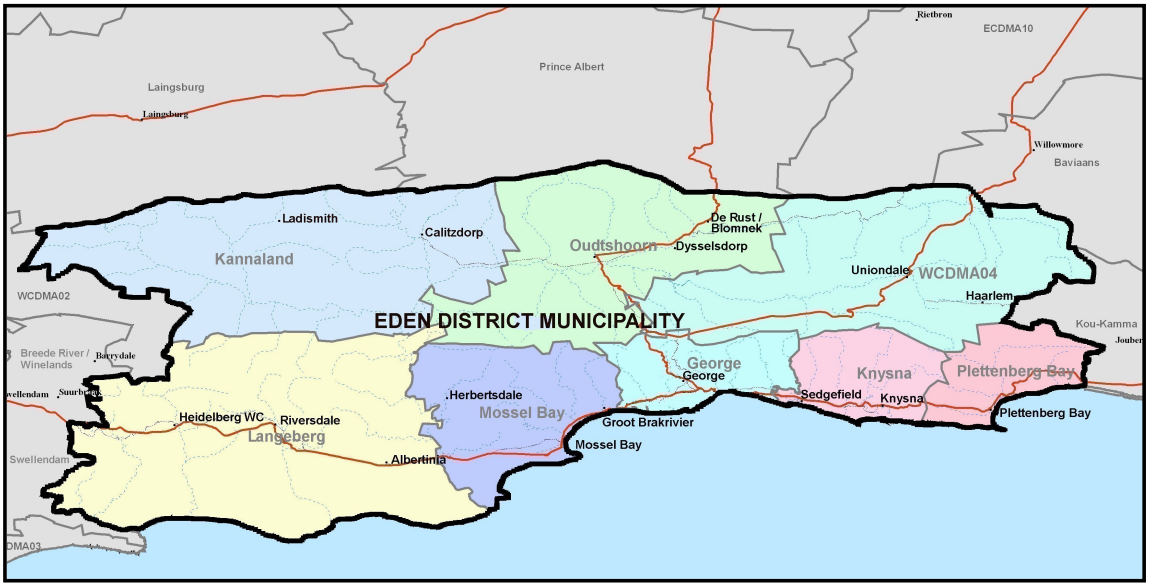


Figure 5.1 The Eden District Municipality

In terms of water supply, the Oudtshoorn Municipality and adjacent Kannaland Municipality both rely on the KKRWSS to meet the needs of many of the rural water users and the town of Dysselsdorp, in their municipal areas. The scheme transcends the boundary between these two municipalities.

The Oudtshoorn Municipality is shown on Figure 5.2.

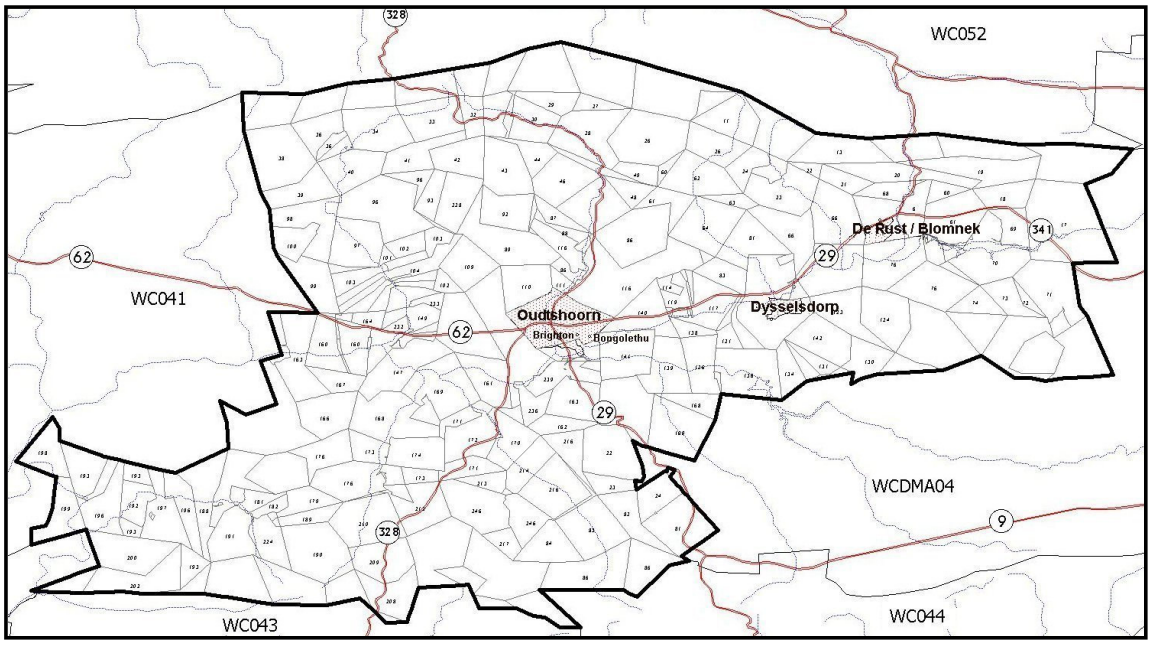


Figure 5.2 The Oudtshoorn Municipality

The main land-use components that characterise the Oudtshoorn Municipality are :

Irrigation	:	220 km^2 (6,2%)
Dry land farming	:	150 km^2 (4,2%)
Forestry	:	< 1 km^2 (0%)
Nature reserves	:	490 km^2 (13,9%)
Urban areas	:	19 km^2 (0,5%)
Other	:	2 656 km^2 (75,2%)

This information is presented graphically on Figure 5.3.

5.2 TOPOGRAPHY AND CLIMATE

The topography of the Oudtshoorn Municipality is typically that of the Little Karoo. The Swartberg Mountains in the north form the divide between the Little and Great Karoo. In the south, the Outeniqua Mountains and Langeberg Mountains form the divide between this municipality and the coastal belt.

The general topographic profile of the municipal area is as follows :

Mountainous	:	25% of total municipal area
Rolling hills	:	65% of total municipal area
Flat	;	10% of total municipal area

The average precipitation within this municipality ranges between 280 and 360 mm per annum. During the summer months, daily temperatures average between 26 and 33ºC, with maximum temperatures reaching as high as 40ºC. Winter days are generally mild and sunny, with maximum temperatures of between 18 and 20ºC.

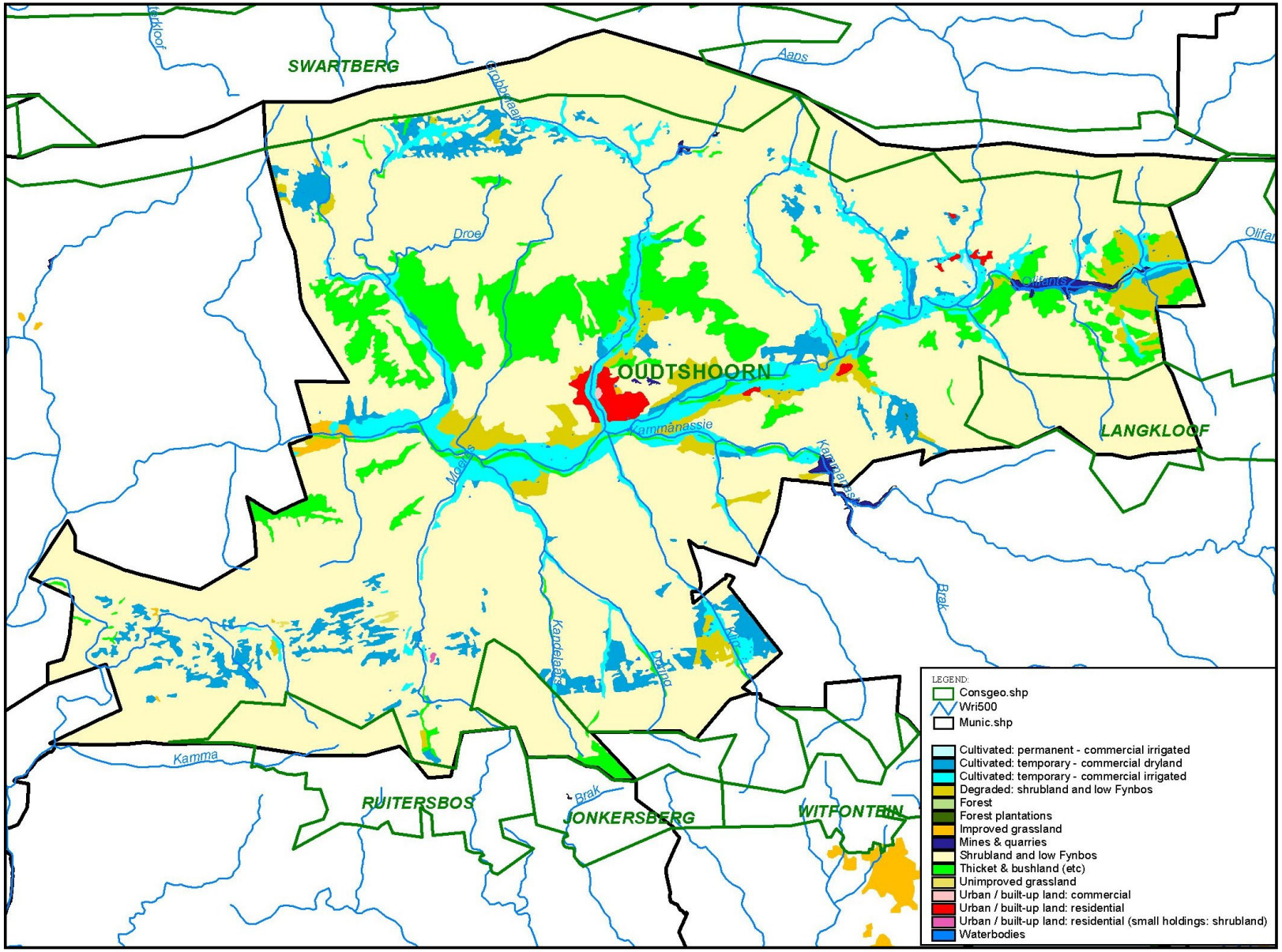


Figure 5.3 Land-use in the Oudtshoorn Municipal area

Rocks belonging to the Cape Supergroup mainly underlie the area with potential for deep groundwater abstraction from the aquifers contained therein. Limestone and kaolin are the only economically exploitable mineral deposits in the area.

5.3 CONSUMER PROFILE

During discussions with the Oudtshoorn Municipality, concern was raised with respect to the population figures available from the 2001 census data, for certain areas within the municipality. Consequently, revised estimates for certain towns were provided from municipal data sources, where these were considered to be more reliable. Table 5.1 provides the municipality's recommended data, which is based on various data sources as indicated. The number of water consumer units (i.e. number of water consumer points, not metered water supply points) are also indicated.

Table 5.1 Population of Oudtshoorn Municipality

AREA	TOTAL POPULATION	RESIDENTIAL CUs	INDUSTRIAL CUs	OTHER CUs	DATA SOURCE
Oudtshoorn	53 500	9 320	115	350	1996 Census
Dysselsdorp	9 592	2 340	1	0	1998 District Council
De Rust/Blomnek	2 500	554	15	6	De Rust Municipality (Oct 2000)
Farmlands/Rural	16 450				1996 Census
TOTAL	**82 042**				

In terms of the racial composition, the distribution in the census data has been used and applied to the total population figure from Table 5.1 to produce the estimates shown in Table 5.2.

Table 5.2 Population by Racial Grouping

RACE GROUP	PERCENTAGES	NUMBER
African	8,1%	6 645
Coloured	76,5%	62 762
Indian	0,1%	82
White	15,3%	12 553
TOTAL	**100%**	**82 042**

Census 2001 showed an average increase in the population of approximately 7% for the Oudtshoorn Municipality between 1996 and 2001. The town of Oudtshoorn itself is home to approximately 65% of the total population in the municipal area. The growth in population will be largely centred around influx to the town of Oudtshoorn as people from rural Karoo areas, both within this municipality and in surrounding municipalities, migrate to Oudtshoorn in search of employment.

Table 5.3 shows the future projected population figures for the municipality.

Table 5.3 Projected Population Growth Rate

AREA	CURRENT POPULATION	GROWTH RATE	POPULATION PROJECTIONS				
			YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Oudtshoorn	53 500	1,8%	54 463	55 443	56 441	57 457	58 491
Dysselsdorp	9 592	2,0%	9 784	9 979	10 179	10 382	10 590
De Rust/Blomnek	2 500	2,5%	2 562	2 626	2 692	2 759	2 828
Farmlands/Rural	16 450	-1,9%	16 137	15 831	15 530	15 235	14 945
TOTAL	**82 042**	**(+1,2% Avg)**	**82 946**	**83 879**	**84 842**	**85 833**	**86 854**

The following trends are observed from the figures in Table 5.3 :

- Oudtshoorn town has the largest population within the municipality and is anticipated to increase.
- Dysselsdorp and De Rust are expected to increase but their relatively small current populations result in correspondingly small increases.
- The rural inhabitants will continue to migrate towards the towns, particularly of Oudtshoorn, in search of employment opportunities and improved living standards.

5.3.1 Migration Patterns

Apart from Oudtshoorn, Dysselsdorp is the only centre that has some potential to develop as an urban centre, capable of attracting people in any significant numbers. At present, Dysselsdorp lacks employment generating opportunities and serves largely as a satellite to Oudtshoorn. It is important to note that the urban water supply schemes of Oudtshoorn and of the KKRWSS are currently at their maximum yield potential, based on the current operation of the existing infrastructure. However, the increasing migration towards urban centres will place an ever increasing demand on the already limited available water resources within the municipality.

5.4 ECONOMIC INDICATORS

5.4.1 Present Income Distribution

Estimated monthly income distribution of households across the municipal area is summarised in Table 5.4.

Table 5.4 Summary of Household Incomes

INCOME RANGE (R/MONTH)	NO. OF HOUSEHOLDS	% OF TOTAL HOUSEHOLDS
0	635	4%
1 - 200	258	2%
201 - 500	1 941	14%
501 - 1 000	2 629	18%
1 001 - 1 500	2 530	18%
1 501 - 2 500	2 143	15%
2 501 - 3 500	1 072	8%
3 501 - 4 500	754	5%
4 501 - 6 000	850	6%
6 001 - 8 000	503	4%
8 000 +	936	6%

Based on the 1996 census data, monthly income distributions per household for the towns in the Oudtshoorn Municipality, are shown in Table 5.5.

Table 5.5 Current Income Distribution per Town

CATEGORY	RANDS PER MONTH	PERCENTAGE %		
		OUDTSHOORN	DYSSELSDORP	DE RUST/BLOMNEK
Very low	0-500	17	50	41
Low	501-1000	16	30	35
Low-middle	1001-1500	15	18	8
Middle-high	1501-3500	16	1	11
High	3501+	36	1	5

The information presented in Table 5.5 shows that in Dysselsdorp and De Rust/Blomnek a significant percentage of households can be classified as very poor, in comparison with that of Oudtshoorn. The overall income distribution reveals a fairly poor population.

5.4.2 Economy of the Municipality

Oudtshoorn

Historically, the economy of this area has been shaped by the ostrich industry, but with the recent slump in the ostrich market, and with repeated drought years and high interest rates, economic growth in and around the town has slowed. The closing of military bases and educational institutions has also reduced the flow of cash in the local economy. However, the area has been blessed with a vast variety of tourist attractions. In particular, ostrich farms, the Cango Caves, majestic mountain ranges, the unspoilt natural environment, culinary adventure and wine tasting. The tourism sector is showing potential in terms of employment opportunity and economic development.

Dysselsdorp

A survey undertaken in 1997 revealed that 78% of household heads were unemployed and only 18% had permanent employment. Furthermore, the survey found that 24% of households relied on old age pensions as their primary source of income. Lack of employment was identified by most residents as the most serious problem facing the settlement. The skills base of the economically active population is limited, and only 55% of the community were found to be literate. As a consequence, the largest proportions of those with formal jobs (38%) were employed as labourers, with artisans and traders comprising 14%. Smallholdings either abstract their water directly out of the Olifants River or from the nearby Stompdrift Irrigation Canal. The smallholdings are not intensively worked, and typically, production is limited to the cultivation of small areas of vegetables and lucerne. There is therefore some potential for more intensive market gardening, provided appropriate levels of investment are made into such a scheme. The Dysselsdorp Small Farmers' Association is in the process of upgrading its irrigation scheme and this could lead to more agricultural activity in the area. (Ref : 5).

De Rust

The economy of the town of De Rust is oriented to the tourist trade, and in recent years there has been a growth in outlets catering for tourism. These include guesthouses, craft shops and restaurants. According to the 1997 survey, more than 50% of those employed were working as

labourers or construction workers. Unemployment rates are high, and overall the level of education is low. The survey found that 38% of households relied on state grants and pensions as their primary source of income. Although data is not available, it is likely that incomes are also supplemented to some extent through a range of informal sector activities.

Vlakteplaas

There is little evidence of growth in the settlement at present. Most of the employed residents work as permanent or casual labourers on the surrounding farms. Furthermore, it is evident that few work opportunities are being generated in the area. As a consequence, people are compelled to leave the area in search of employment opportunity elsewhere.

Lategansvlei

The majority of households derive their livelihoods from either permanent or seasonal labour on surrounding farms. Inhabitants are migrating towards larger centres in search of work.

Volmoed

Most of those employed in the area work as labourers on the surrounding farms. Many of the available jobs are seasonal and unemployment is high, resulting in people leaving the settlement in search of employment elsewhere.

Rooistraat ('Kliplokasie')

There is no formal economic activity in this settlement and only limited informal trading and services (delivery of water). Of those employed, most work as casual labourers on the surrounding farms, many of which on a seasonal basis only.

De Hoop

Virtually all of those members of the community who do work, are employed either permanently or seasonally on neighbouring farms. With the exception of one small trading store, there is no formal economic activity in the settlement.

Based on a comparison of the 1996 and 2001 census data, the unemployment rate amongst the potentially economically active population in the municipality has increased from 25% to 34% in five years.

5.4.3 Future Growth

It is estimated (see Table 5.3) that the population of the Oudtshoorn Municipality will grow by about 1,2% per annum, on average. The economic growth is anticipated to be less than 1% per annum. The impacts of HIV/Aids on population growth will need to be monitored and taken into account in future planning.

6. SERVICE LEVEL PROFILE

The focus of National Government is on the provision of at least basic water and sanitation services (at RDP standards) for domestic use.

RDP standards are defined as follows :

- ***Basic water supply, consisting of*** :
  (a) The provision of appropriate education in respect of effective water use
  (b) A minimum quantity of potable water of 25 litres per person per day, further subject to:
    - a minimum flow rate of not less than 10 litres per minute
    - acceptable water quality
    - within 200 metres of a household, and
    - with a basic service level of not more than 7 days interruption supply to any consumer per year.

- ***Basic sanitation comprises :***
  (a) The provision of appropriate health and hygiene education, and
  (b) A toilet facility which is :
    - safe
    - reliable
    - environmentally sound
    - easy to keep clean
    - provides privacy and protection against the weather
    - is well ventilated
    - keeps smells to a minimum, and
    - prevents the entry and exit of flies and other disease carrying pests.

6.1 WATER SERVICES

The concept of service levels relates to the options consumers are given with regard to the convenience of the service they receive. Typically, four different levels of service can be distinguished ranging from a low level to a relatively high level of service. The higher the level of service, the greater the consumption and wastewater volume generated.

Descriptions of the different levels of service for water are given in Table 6.1.

Table 6.1 Water - Description of Different Levels of Service

LEVEL OF SERVICE	DESCRIPTION
None - inadequate	Consumers who do not have access to basic water supply.
Communal water supply	Basic level of service. Usually refers to communal standpipes within 200m of the dwelling.
Controlled volume supply	This is an intermediate level of service, for example, yard tanks.
Uncontrolled volume supply	Relatively high level of service. Water is piped into the house or there is a tap outside the house.

6.1.1 Service Level Policy

The service level policy of the Oudtshoorn Municipality for urban areas is that all consumer units (Cus) that have full waterborne sanitation and in-house water should be individually metered. In other words, the municipality is applying the highest level of service for all CUs in urban areas. In rural areas (farms) there is uncertainty around the service levels. The likelihood is that farmers may have adequate services but the service levels provided in turn to farm workers may vary from one farm to another.

6.1.2 Water Services in the Municipality

The different levels of water services offered as well as the coverage of these services in the Oudtshoorn Municipality are described hereafter. It is important to note that all people living in the urban areas have access to water according to the RDP standard. Throughout the municipal area, the existing tariff structures do not engender responsible water use. This is further discussed in Section 8.2.

Oudtshoorn
With the exception of a few informal areas (reliant on communal water supply), all households in Oudtshoorn have access to running water on site. Whilst levels of service are high, future water restrictions are likely to become more frequent if existing sources are not augmented. The town's current sources of supply are already limited, and the assurance of supply to users will reduce unless interventions are taken to plan for future water requirements.

Dysselsdorp
With the exception of a small number of informal dwellings, all households have running water on site. Water tariffs are subsidised in the sense that the cost of water, which is currently bought in bulk from the KKRWSS, exceeds the income from consumer sales due to a uniform tariff structure within the Oudtshoorn municipal boundary. Water consumption varies considerably from house to house and 40% of consumers are responsible for 86% of the total water account. There are approximately 800 gardens in Dysselsdorp, many of which are well watered.

De Rust
With the exception of 156 informal dwellings, all households in the town have access to water in their homes. During the summer months, demand exceeds the supply regularly and water restrictions are often introduced.

Vlakteplaas
Although some households have standpipes provided by a recently completed scheme, the water supply is erratic and many families draw their water from surrounding streams. The community does not pay for water. Once the problems experienced with the distribution of water are addressed, the community will be expected to pay for the water that they receive. (Ref : 5).

Lategansvlei
The majority of households draw water from local boreholes and from streams in the area. Consequently, they do not pay for water. (Ref : 5).

Rooistraat ('Kliplokasie')
Two standpipes have recently been erected in this settlement. Consumers pay for their consumption via a third party who is responsible for the settlement of the account, based on the reading of a bulk water meter.

De Hoop

Some households obtain water from the KKRWSS, while others have no running water in their homes.

6.1.3 Current Water Service Level Statistics

Access to clean drinking water (as well as effective sanitation services and refuse removal) is generally accepted as a basic service and of critical importance. The 2001 census showed that 58% of the households have access to water in their dwellings; 28% have access to water inside their yards and 6% to a communal stand. A breakdown of the consumer units per type of water service level (as defined in Table 6.1) is provided in Tables 6.2, 6.3 and 6.4.

Table 6.2 Residential Consumer Units for Water in Oudtshoorn

LEVEL OF SERVICE	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9
None - inadequate	0	0	0	0	0	0
Communal water supply	60	120	180	120	80	40
Controlled volume supply	0	0	0	0	0	0
Uncontrolled volume supply	10 163	10 375	10 600	10 900	11 200	11 500
Total served	10 223	10 495	10 780	11 020	11 280	11 540
Total unserved	0	0	0	0	0	0
TOTAL	**10 223**	**10 495**	**10 780**	**11 020**	**11 280**	**11 540**

Data Source : Oudtshoorn Municipality

Table 6.3 Residential Consumer Units for Water in Dysselsdorp

LEVEL OF SERVICE	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9
None - inadequate	0	0	0	0	0	0
Communal water supply	0	0	0	0	0	0
Controlled volume supply	0	0	0	0	0	0
Uncontrolled volume supply	1 745	1 760	1 770	1 780	1 790	1 800
Total served	1 745	1 760	1 770	1 780	1 790	1 800
Total unserved	0	0	0	0	0	0
TOTAL	**1 745**	**1 760**	**1 770**	**1 780**	**1 790**	**1 800**

Data Source : Oudtshoorn Municipality

Table 6.4 Residential Consumer Units for Water in De Rust/Blomnek

LEVEL OF SERVICE	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9
None - inadequate	0	0	0	0	0	0
Communal water supply	156	160	170	120	80	40
Controlled volume supply	0	0	0	0	0	0
Uncontrolled volume supply	500	510	520	580	660	700
Total served	656	670	690	700	740	740
Total unserved	0	0	0	0	0	0
TOTAL	**656**	**670**	**690**	**700**	**740**	**740**

Data Source : Oudtshoorn Municipality

Table 6.5 Residential Consumer Units for Water in Rural and Farmland Areas

LEVEL OF SERVICE	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9
None - inadequate	0	0	0	0	0	0
Communal water supply	1 270	1 200	1 100	1 000	1 000	1 000
Controlled volume supply	1 875	1 945	2 045	2 145	2 145	2 145
Uncontrolled volume supply	0	0	0	0	0	0
Total served	3 145	3 145	3 145	3 145	3 145	3 145
Total unserved	0	0	0	0	0	0
TOTAL	**3 145**	**3 145**	**3 145**	**3 145**	**3 145**	**3 145**

Data Source : Oudtshoorn Municipality

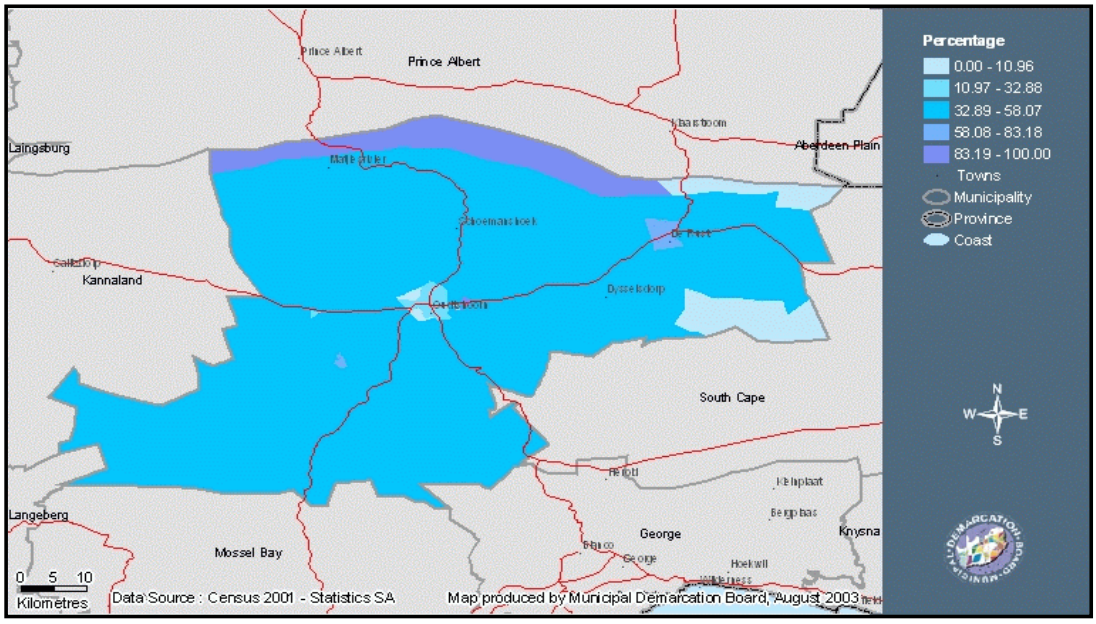


Figure 6.1 Percentage households with access to piped water

6.2 SANITATION SERVICES

Descriptions of the different levels of service for sanitation are given in Table 6.6.

Table 6.6 Description of Different Levels of Sanitation Service

LEVEL OF SERVICE	DESCRIPTION
Inadequate : below basic RDP standards	Consumers who do not have access to any sanitation facilities other than informal pit latrines..
Consumer installations	Basic level of service. Ventilated improved pit (VIP) latrine or equivalent thereof.
Consumer installations : Intermediate technology flush systems	This is an intermediate level of service, for example, LOFLOS or shallow sewers.
Discharge to wastewater treatment works	Relatively high level of service. Full waterborne sanitation, for example.

The process of phasing out the bucket system in Matjoks (Oudtshoorn), and Bhongolethu (Oudtshoorn) residential areas is currently underway. In Blomnek (De Rust), the settlement is serviced with VIP toilets. The rest of Blomnek is serviced with flushed systems and the "old town

area" of De Rust makes use of conservancy tanks which are serviced by the municipality as and when required. Sanitation levels for the whole municipality are shown in Table 6.7 below.

Table 6.7 Oudtshoorn Municipality Sanitation

HOUSEHOLDS	2001	1996
Flush toilet	14 113	11 727
Flush septic tank	677	-
Chemical toilet	100	-
VIP	435	-
Pit latrine	391	1 119
Bucket latrine	732	1 784
None	1 675	1 029

The 2001 census showed a 20% increase in the number of households having access to flush toilets, whilst households making use of pit latrines showed a decrease of 65%. The use of bucket latrines decreased by 59% during those five years. The number of households without any access to sanitation has, however, according to the census data, increased by 63% between 1996 and 2001. This is largely attributed to the influx of rural inhabitants into Oudtshoorn in search of employment.

Table 6.8 Situation with regard to Water and Sanitation at Schools

NO.	NAME OF INSTITUTION	TOILETS	WATER	COMMENTS
1	Bergsig Primary	Flush	Running	
2	Colridge Primary	Flush	Running	
3	De Villiers Primary	Flush	Running	
4	De Jager Primary	Flush	Running	
5	Fezekile Secondary	Flush	Running	
6	Protea Primary	Flush	Running	
7	Saturnus Primary	Flush	Running	
8	Morestêr High	Flush	Running	
9	Oudtshoorn High	Flush	Running	
10	Van Reede Primary	Flush	Running	
11	Junior Primary O/H	Flush	Running	
12	Britsevlakte Primary	Flush	Tank	Water supply unreliable - pressure too low to fill tank
13	Grootkraal Primary	Flush	Tank	Toilets not working. Municipal water supply.
14	Rooirivier Primary	Bucket	Tank	Water supply unreliable and water not safe for drinking.
15	Rooiheuwel Primary	Flush	Running	
16	Hotomskloof Primary	Flush	Running	
17	Scheeperskraal Primary	Chemical	Tank	
18	Matjiesrivier Primary	Bucket	Tank	
19	Rodewal Primary	Flush	Running	
20	Zeekoeigat Primary	Flush	Tank	
21	Vergelegen Primary	Bucket	Running	
22	Volmoed Primary	Flush	Running	
23	Voorbedag Primary	Bucket	Tank	
24	Vlakteplaas Primary	Flush	Running	

Source : Oudtshoorn IDP 2003

Table 6.8 shows that the majority of schools within this municipal area have access to basic services and that the standards are acceptable.

In terms of residential consumer units, a high number are afforded a very high level of sanitation service. See Tables 6.9 and 6.10 hereafter. Percentages for households with access to flush toilets are shown diagrammatically in Figure 6.2.

Table 6.9 Residential Consumer Units for Sanitation (Oudtshoorn)

LEVEL OF SERVICE	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Total or inadequate : below RDP : Pit Buckets	0 200	0 200	0 200	0 100	0 0	0 0
Consumer installations : VIP or equivalent	60	120	180	120	80	40
Consumer installations : Wet (septic tanks, digester or tanker desludge, etc.)	0	0	0	0	0	0
Discharge to water treatment works : intermediate	0	0	0	0	0	0
Discharge to water treatment works : full waterborne	9 620	9 832	10 057	10 457	10 857	11 157
Total served	9 880	10 152	10 437	10 667	10 937	11 197
Total unserved	0	0	0	0	0	0
TOTAL	**9 880**	**10 152**	**10 437**	**10 667**	**10 937**	**11 197**

Data source : Oudtshoorn Municipality

Table 6.10 Residential Consumer Units for Sanitation (Dysselsdorp)

LEVEL OF SERVICE	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Total or inadequate : below RDP : Pit	0	0	0	0	0	0
Consumer installations : VIP or equivalent	0	0	0	0	0	0
Consumer installations : Wet (septic tanks, digester or tanker desludge, etc.)	0	0	0	0	0	0
Discharge to water treatment works : intermediate	0	0	0	0	0	0
Discharge to water treatment works : full waterborne	1 745	1 760	1 770	1 780	1 790	1 800
Total served	1 745	1 760	1 770	1 780	1 790	1 800
Total unserved	0	1 760	0	0	0	0
TOTAL	**1 745**	**1 760**	**1 770**	**1 780**	**1 790**	**1 800**

Data source : Oudtshoorn Municipality

Table 6.11 Residential Consumer Units for Sanitation (De Rust/Blomnek)

LEVEL OF SERVICE	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Total or inadequate : below RDP : Pit	0	0	0	0	0	0
Consumer installations : VIP or equivalent	156	160	170	120	80	40
Consumer installations : Wet (septic tanks, etc.)	220	224	228	230	230	230
Discharge to water treatment works : intermediate	0	0	0	0	0	0
Discharge to water treatment works : full waterborne	280	286	292	350	430	470
Total served	656	670	690	700	740	740
Total unserved	0	0	0	0	0	0
TOTAL	**656**	**670**	**690**	**700**	**740**	**740**

Data source : Oudtshoorn Municipality

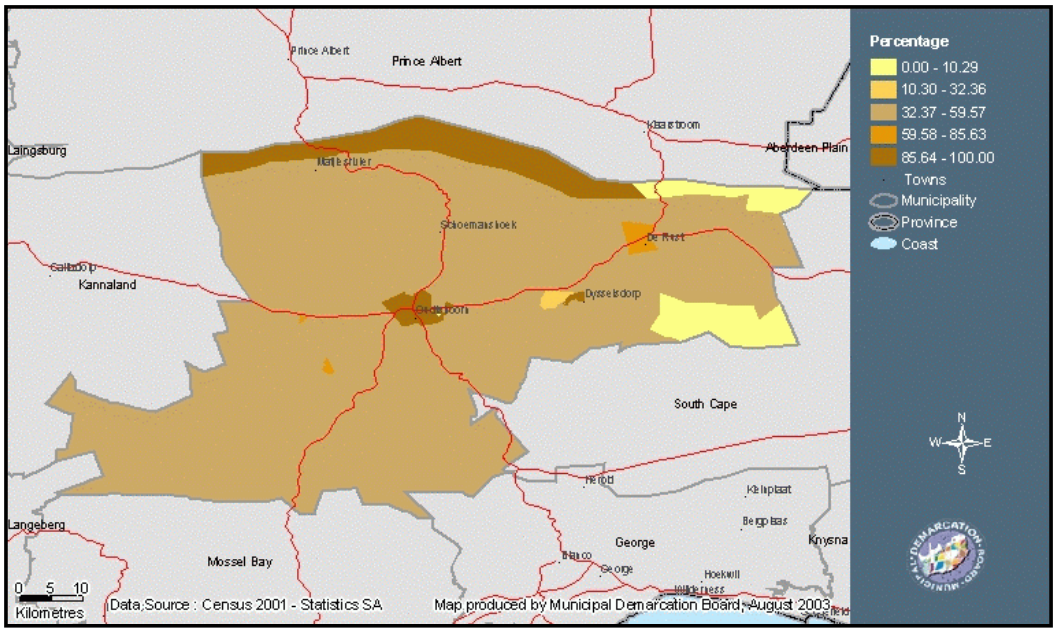


Figure 6.2 Households with improved toilet facilities

Table 6.12 Residential Consumer Units for Sanitation : Rural/Farmland

LEVEL OF SERVICE	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Total or inadequate : below RDP : Pit	1 358	858	263	253	243	233
Consumer installations : VIP or equivalent	354	854	1 449	1 459	1 469	1 479
Consumer installations : Wet (septic tanks, etc.)	1 874	1 874	1 874	1 874	1 874	1 874
Discharge to water treatment works : intermediate	0	0	0	0	0	0
Discharge to water treatment works : full waterborne	0	0	0	0	0	0
Total served	1 928	2728	3323	3333	3343	3353
Total unserved	1 358	858	263	253	243	233
TOTAL	**3 586**	**3 586**	**3 586**	**3 586**	**3 586**	**3 586**

Data source : Oudtshoorn Municipality

6.3 SERVICE LEVEL TARGETS

Priority areas in which development should be focussed for the next two to three years have been identified by the municipality. Through consultation during the IDP process, development objectives and strategies were formulated to further strengthen key performance areas and priorities. Those pertinent to the provision of water and sanitation services are highlighted as follows :

Physical infrastructure

- Access to of basic infrastructure and improve maintenance thereof
- Improved sanitation, water and electricity services to rural areas and agriculture
- Improved credit control
- Improved solid waste management, with particular reference to protection of water resources

Housing

- Development of a housing strategy
- Addressing the extent of informal settlements
- Migration from farms to urban areas
- Financial assistance and information to prospective home owners

6.4 PUBLIC HEALTH PROGRAMME

The quality of life of the inhabitants within any region is influenced by the available health care. Various water-related aspects strongly influence the health conditions of people. These include access to clean water, good sanitation, proper nutrition and adequate housing. All these play an important role in the prevention of diseases such as cholera, TB and diarrhoea, tuberculosis, etc. (Ref : D Barnardo, 1999).

Environmental Health Services rendered within the Oudtshoorn area entail the monitoring of the supply of safe drinking water and foodstuffs, the identification, evaluation and rectification of all conditions detrimental to human health, and the education of the broader public on all environmental health issues.

The latest available estimates of the types of public awareness initiatives through which information is disseminated to consumer units in Oudtshoorn and De Rust is indicated in Table 6.13. Equivalent estimates were not available for Dysselsdorp nor the rural areas.

Table 6.13 Public Health Programme Initiatives

PERCENTAGE OF CONSUMER UNITS REACHED BY	OUDTSHOORN	DE RUST/BLOMNEK
Public meetings	5%	17%
Printed information disseminated (e.g. pamphlets)	14%	52%
Radio/newspaper slots)	24%	0%
Household visits by health officers	57%	31%
Participatory workshops	0%	0%
TOTAL SERVED	**100%**	**100%**

Data source : Oudtshoorn Municipality.

6.5 QUALITY OF WATER SERVICE

The information available to assess the quality of water service provided by the Oudtshoorn Municipality shows that the current and projected future quality of services is adequate. Table 6.15 shows the figures for quality of water service, obtained from the WSDPs of the Oudtshoorn, Dysselsdorp and De Rust/Blomnek draft WSDPs.

Table 6.14 Quality of Water Service

AREA	QUALITY OF SERVICE	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9
Oudtshoorn and Dysselsdorp	% Time within SABS standards per year	100	100	100	100	100	100
	Planned hours downtime per year (average for whole system)	3	3	3	3	3	3
De Rust/Blomnek	% Time within SABS standards per year	100	100	100	100	100	100
	Planned hours downtime per year (average for whole system)	3	3	3	3	3	3

Data Source : Oudtshoorn Municipality

6.6 METERING AND BILLING

According to the Oudtshoorn Municipality, one hundred percent of all metered consumer units have their meters read and receive bills on a monthly basis. Payment of bills takes place at the municipal offices.

Table 6.15 Metering and Billing

UNCONTROLLED VOLUME SUPPLY	OUDTSHOORN	DYSSELSDORP	DE RUST/ BLOMNEK	RURAL AREAS
% yard taps metered	100	100	0	Information not available
% in house metered	100	100	100	
% metered consumer units billed monthly	100	100	100	
% metered consumer units prepaid	0	0	0	
No. billed consumer units/paypoint	2 540 (1)	1 974	500	
No. prepaid consumer units/coupon outlet	0	0	0	

(1) 10 163 consumers per 4 paypoints = 2 540 consumer units per paypoint

6.7 ATTENDING TO COMPLAINTS

The average response time set by the Oudtshoorn Municipality for attending to sanitation related complaints is one hour. However, it must be noted that actual response times are in practice, not recorded.

6.8 FURTHER INVESTIGATION REQUIRED

It is recommended that more information on the status of water services in the rural areas be investigated. This is one of the most notable shortcomings of this WSDP. Recommendations are made in respect of remedying this problem in the future (refer to Chapter 15 : Conclusions and Recommendations).

7. WATER RESOURCE PROFILE

Domestic water users in the Oudtshoorn Municipality are currently supplied from the following sources :

- Oudtshoorn - Melville Dam
  - Koos Raubenheimer Dam
  - The Rust en Vrede Stream
- De Rust - The Huis River (run-of-river yield)
- Dysselsdorp - The Klein Karoo Rural Water Supply Scheme
- Vlakteplaas - Communal taps and local streams
- Lategansvlei - Local boreholes and streams
- Volmoed - Klein Karoo Rural Water Supply Scheme
- Kliplokasie - Klein Karoo Rural Water Supply Scheme

7.1 PRESENT WATER RESOURCES

The larger schemes currently supplying water to users in the Oudtshoorn Municipality are described hereafter:

7.1.1 Oudtshoorn

Oudtshoorn is supplied with water from the Melville Dam (built in 1942) and Koos Raubenheimer Dam (built in 1971) which are both owned and operated by the Oudtshoorn Municipality. These dams, together with the Rust en Vrede stream, supply water to the urban and industrial consumers in Oudtshoorn as well as to rural users along the pipeline route. At the Koos Raubenheimer Dam, a canal conveys low flows around the Dam to supply irrigators along the Grobbelaars River. Water is also released from the Dam to supply irrigators, including some of the erven in Oudtshoorn which have an irrigation allocation from old water rights, recognised as existing lawful use by the 1998 National Water Act.

The extensive development of new houses for the historically disadvantaged communities of Oudtshoorn and the Klein Karoo has resulted in a significant increase in the demand for water in Oudtshoorn. This demand growth is threatening the long-term sustainability of Oudtshoorn's existing sources of supply. The characteristics of the Melville and Koos Raubenheimer Dams are shown in Table 7.1.

Table 7.1 The Melville and Koos Raubenheimer Dams

QUATERNARY CATCHMENT	DAM NAME	RIVER	LIVE STORAGE CAPACITY (Mm^3)	YIELD (1:50 YEAR) (Mm^3)
J35A	Koos Raubenheimer	Klein Le Roux (tributary of Grobbelaars)	9,2	2,2
J35A	Melville		0,4	1,3

A further 0,9 million m^3/a is available from other smaller sources, the most notable being the Rust en Vrede stream. By 2005, Oudtshoorn's water requirement (at a 98% assurance of supply) is estimated to be about 7 million m^3/a, of which only 5,4 million m^3/a could be supplied from the existing sources, at the same level of assurance.

7.1.2 De Rust

The town of De Rust abstracts water on a run-of-river basis from the Huis River. Water shortages do occur during summer. This is overcome through a co-operative agreement with an agricultural user in the area. The farmer is supplied with domestic water from De Rust's source, and the town in turn supplied with bulk water by the farmer. In 1995 it was estimated that through this arrangement, the 0,14 million m^3/a water requirement of De Rust could be met. Subsequently, however, agricultural expansion as well as urban growth in the town has resulted in more frequent shortfalls. Despite its close proximity to the Klein Karoo Rural Water Supply Scheme (KKRWSS), De Rust is not integrated into that scheme. Consequently, it is currently not possible to alleviate summer shortfalls in the town out of the KKRWSS.

7.1.3 Dysselsdorp

Dysselsdorp has been supplied with water out of the KKRWSS since 1993. The scheme is described hereafter :

7.1.4 The Klein Karoo Rural Water Supply Scheme

This scheme is a groundwater scheme, originally owned by DWAF and operated by the Overberg Water Board. In addition to supplying the town of Dysselsdorp, the scheme also supplies potable water to rural inhabitants, and for stock watering purposes. Water is supplied from the scheme at subsidised rates. The extent of the scheme is shown diagrammatically on Figure 7.1

The scheme was designed to supply 4,4 million m^3/a from the 18 production boreholes located in six wellfields. More than 360 km of pipeline distribute the water from two water treatment works, one in Dysselsdorp and one near Calitzdorp (Kannaland Municipality). The current water use from the scheme is only 1,1 million m^3/a by the following constituent water users :

- The town of Dysselsdorp
- Rural communities and farms in the Olifants River valley, downstream of the Stompdrift and Kamanassie Dams
- Rural communities in the Gamka River valley, downstream of Gamkapoort Dam (Kannaland Municipality.

The water from the scheme is used for the following purposes (1997/1998 figures) :

- Dysselsdorp 44%
- Rural domestic 29%
- Stock watering 12%
- Losses 13%
- Waterworks 2%

Both the treatment works operate well below their design capacity. The Dysselsdorp treatment works is designed for 3,5 million m^3/a and operates at only 1 million m^3/a. Similarly, the treatment works near Calitzdorp is designed to treat 0,9 million m^3/a but currently treats only 0,1 million m^3/a. The reduced yield from the KKRWSS is largely attributed to borehole clogging, corrosion of components within the distribution network, and an original over-estimate of potential yield. The communities at Volmoed and Vlakteplaas for example are not receiving adequate water supply from the scheme.

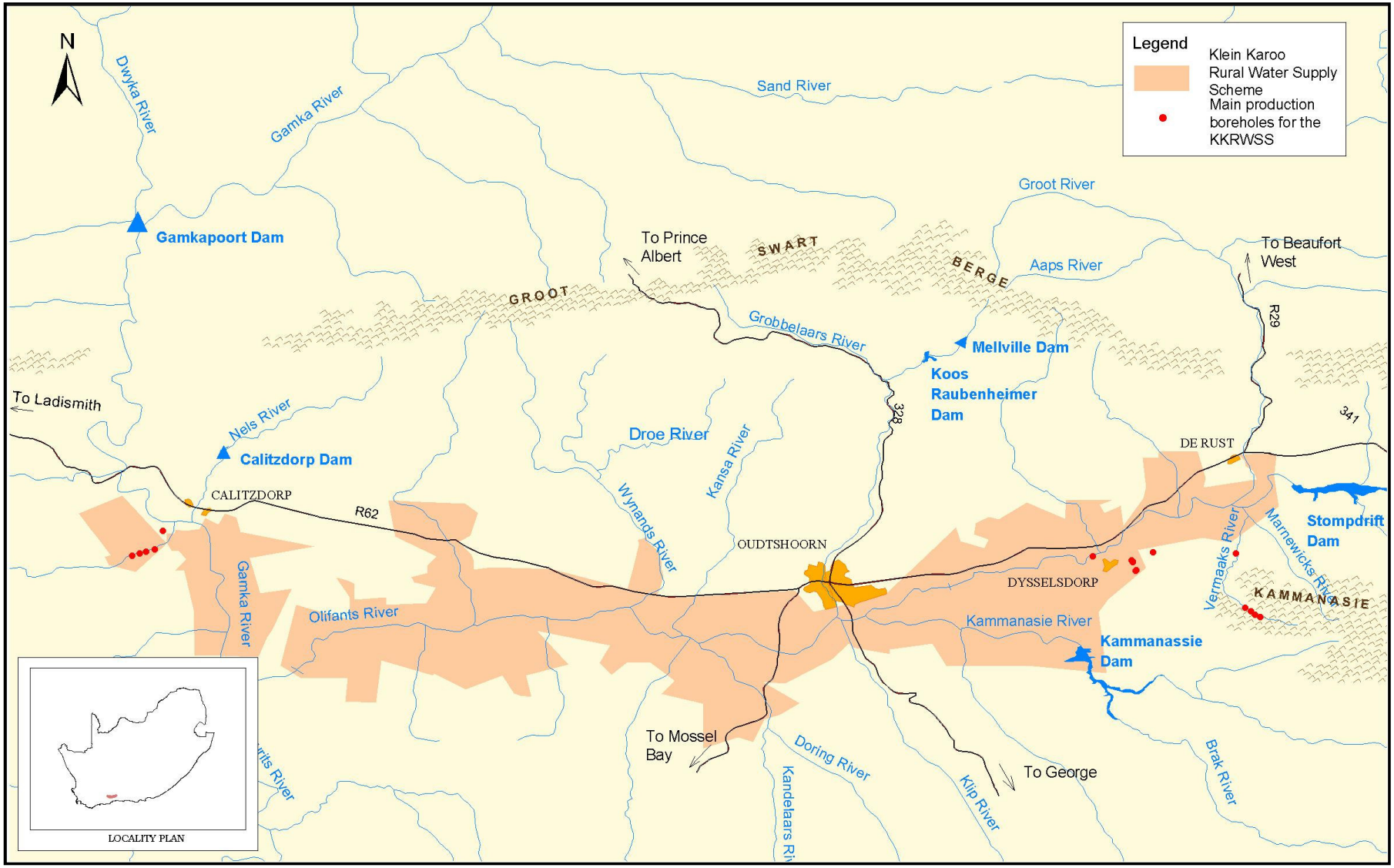


Figure 7.1 The Klein Karoo Rural Water Supply Scheme

The most notable shortcoming in terms of current regional water supply is that the individual water supplies in this municipality are not integrated. The KKRWSS reticulation pipework passes in very close proximity to Oudtshoorn, Calitzdorp and De Rust, yet none of the existing sources of supply at those towns are integrated with the scheme. Consequently, the benefit of meeting shortfalls in one area from possible surpluses in other areas, is lost. In particular, despite the relatively small rural water requirement, water shortages are experienced by that sector. As mentioned previously, De Rust is experiencing water shortages during certain summers, yet there is no means of alleviating such shortfalls via the existing KKRWSS.

7.2 FUTURE WATER RESOURCES

Future water supply planning has become an urgent priority for this region. Water available to Oudtshoorn out of the Koos Raubenheimer and Melville Dams is limited. Furthermore, Koos Raubenheimer Dam is a shared resource with irrigators. Integrated water resource development includes both groundwater and surface water development options.

7.2.1 Deep Groundwater Sources

The potential exploitation of Deep Groundwater Sources, primarily from the Table Mountain Group Aquifer, is currently being investigated by Oudtshoorn Municipality. Through this study, the factors influencing the potential yield from this source will be studied. These include water quality, the ecological water requirements, borehole yields, the impact on surface water flow, aquifer recharge, etc.

7.2.2 Alternative Options for Irrigation Supply out of Municipal Dams

As mentioned previously, Koos Raubenheimer Dam is effectively a shared resource, with an allocation from it to downstream irrigators. The assurance of supply to Oudtshoorn is of considerable concern, with a high likelihood of water restrictions. The development of other sources of supply to meet the needs of irrigators currently reliant on Koos Raubenheimer Dam, would make the full supply from the Dam available for municipal use. This would improve the assurance of supply to Oudtshoorn. Options to achieve this have been previously investigated but more detailed integrated studies are necessary to improve the management of resources and decide on the most appropriate implementation options. In August 2004, the municipality submitted a joint application (with Kannaland) for funding from the Special Municipal Innovation Fund (SMIF) to undertake such a study. To date no announcement has been made in respect of this application.

One of the individual surface water scheme options considered to date is a new dam near Kombuis Farm, on the Grobbelaars River. An important characteristic of this option being that storage provided higher upstream in the Grobbelaars River would allow for more efficient control of releases into the "lei-buurt" system supplying farmers downstream.

Another option, not previously considered, would be to utilise the current water allocation of the municipal farm at De Hoek. This farm is owned by the Eden District Municipality. The scheme could either involve a run-of-river diversion or the construction of a dam.

7.2.3 Integrated Water Resource Management

There is an urgent need to investigate the benefits of integrating the various existing independent water supply schemes in the municipal area, with the KKRWSS. This study would also take into account the integration of potential new schemes, so as to develop a regional water resource management strategy across the extent of the current KKRWSS. Revised cost estimates and

comparative benefits of those schemes already studied, and new scheme options would also be investigated. Use of existing infrastructure, such as reticulation networks, existing dams and water treatment works would be optimised.

Through an integrated water supply system, the existing borehole supply in the vicinity of Dysselsdorp could be used to serve De Rust and Vlakteplaas, while Oudtshoorn would provide water to the central portion of the scheme. Furthermore, the option of integrating the supply of Calitzdorp (Kannaland Municipality) into the western portion of the KKRWSS should also be considered. Groundwater sources such as the TMG aquifer will not be considered in isolation but rather as part of an integrated water supply option in the Klein Karoo.

7.3 FUTURE INFRASTRUCTURE OWNERSHIP

With the exception of the KKRWSS, all water resource infrastructure in the Oudtshoorn municipal area has historically belonged to the municipality. Until recently, the KKRWSS has been owned by DWAF and operated by the Overberg Water Board. The scheme falls within the municipal areas of both Kannaland and Oudtshoorn Municipalities. By virtue of the fact that Category B municipalities are now required to act as the water services authorities, the management and operation of the scheme now lies at municipal level, but across two adjacent B-municipalities. Oudtshoorn Municipality will, through agreements with DWAF and the Kannaland Municipality, act as the responsible authority for this scheme. The transfer of the management and operational responsibility to Oudtshoorn Municipality is due to take place by June 2005.

The Municipal System Act requires that agreements be reached between Kannaland Municipality, Oudtshoorn Municipality, DWAF and the Overberg Water Board, as to the transfer of the authority of this scheme to Oudtshoorn. These arrangements will be structured according to the Section 78 requirement of the Municipal Systems Act. It is envisaged that the Section 78 process could be undertaken at a regional level, encompassing the geographical areas of the Oudtshoorn and Kannaland Municipalities, in which the scheme is situated. The ownership of other existing municipal water resource infrastructure will remain with the municipality. An important aspect of the Section 78 process is that the municipality should establish the degree (and source) of funding that may be available to undertake a regional Section 78 process.

7.4 WATER DEMAND PROJECTIONS

The Oudtshoorn Municipality has indicated that water demand projections (potable water) are likely to increase at about 2% per annum. These projections seem reasonable, and fall within the upper and lower limits for urban and rural water requirements, estimated for the Gouritz Water Management Area in the National Water Resources Strategy (NWRS). Table 7.2 shows the projected increase in water requirements for the Oudtshoorn municipal area. These include urban and domestic rural requirements.

Table 7.2 Water Requirement Projections at 2% p.a. growth for Oudtshoorn Municipality

AREA	EXISTING YIELD	WATER REQUIREMENTS (Mm^3/a)				
		2000	2005	2010	2020	2030
KKRWSS	1,10	1,20	1,32	1,46	1,78	2,17
Oudtshoorn	5,40	6,30	6,99	7,95	9,36	11,41
De Rust	0,14	0,12	0,13	0,15	0,18	0,22
TOTAL	**6,64**	**7,62**	**8,41**	**9,29**	**11,32**	**13,80**

7.5 WATER QUALITY AT SOURCE

7.5.1 Water Quality of Oudtshoorn's Water Supply

Water from the Rust en Vrede stream is piped to a break pressure tank near to Koos Raubenheimer Dam. Water from Melville Dam is piped to the same tank, which overflows into Koos Raubenheimer Dam. The scheme is described in more detail in Section 9.1 and shown graphically on Figure 9.1. From Koos Raubenheimer Dam, water flows to the water treatment works via parallel 500 mm and 300 mm diameter pipes. The water quality from Koos Raubenheimer Dam is generally good, requiring only gaseous chlorination treatment for disinfection. The treatment facility also has provision for dosing lime and carbon dioxide to stabilise the water, so as to prevent further deterioration of the pipeline infrastructure by the naturally pure but aggressive water. However, the stabilisation facility is no longer in operational (see 9.1.3). Typical analysis results (Ref : KKRWSS Augmentation Study) are presented in Table 7.3.

Table 7.3 Koos Raubenheimer Dam - Typical Water Analysis

PARAMETER	UNIT	SABS 241 (1999)			RAW WATER
		CLASS 0 (IDEAL)	CLASS 1 (ACCEPTABLE)	CLASS 2 (MAX ALLOWED)	KOOS RAUBENHEIMER DAM (1)
pH	-	6 to 9	5 to 9,5	4 to 10	6,6 to 8,3
Colour	Hazen	15	20	50	not measured
Turbidity	NTU	0,1	1	10	not measured
Conductivity	ms/cm	70	150	370	2,2 - 36,1
Alkanility	mg/ℓ	-	-	-	8 - 30
Calcium	mg/ℓ	-	-	-	1 - 15
Magnesium	mg/ℓ	30	70	100	1 - 10
Chlorides (Cl)	mg/ℓ	100	200	600	5
Sulphates (SO_4)	mg/ℓ	200	400	600	1 - 26
Total coliforms bacteria	/100 mℓ	0	0	0	not available
E-coli	/100 mℓ	0	0	0	not available

(1) Ref : KKRWSS Augmentation Study (1999)

The above data indicates that the water from Koos Raubenheimer Dam is potable from a chemical standpoint, but colour, turbidity, iron, manganese and *e-coli* are not measured.

Appendix A contains the analysis of the water quality of tap water for samples taken in April and June of 2004. With the exception of turbidity and colour (June sample), all other SABS standards for Class 1 (acceptable) were met.

From independent monitoring data, samples taken between 1983 and 2003 from the reticulation system were analysed for microbial bacteria. It was found that the treated water in the Oudtshoorn reticulation system met the standard (SABS 241) for *e-coli* in every year except for 2002. However, the treated water failed to meet the standards for total plate count and total coliforms. The Water Quality Investigation Report by Ninham Shand (Ref : 2) of July 2003 made the following main recommendations :

- existing chlorination facilities and flow meters be serviced and repaired.

- existing telemetry links be tested.
- a regular maintenance programme of the system be implemented.
- improved management of chlorine dosing facility.
- daily recording of water qualities drawn from each reservoir.
- set up a programme to monitor raw water quality.
- Municipality to ensure that there are no cross connections between the potable reticulation and treated effluent reticulation systems.
- raw water turbidity should be measured during and immediately after significant rainfall events.

The municipality has identified that the problem associated with total coliforms in the reticulation network is primarily related to the network leading from the Old East Bank Reservoir. Tenders were called in October 2004, for the installation of a chlorination facility at that reservoir, to reduce the total coliforms in the network.

7.5.2 Water Quality within the Klein Karoo Rural Water Supply Scheme

A water treatment works near Dysselsdorp in the east treats the groundwater abstracted from the nearby boreholes. In the west, a water treatment works near Calitzdorp treats water abstracted in that region. Typical water analysis results are presented in Table 7.4 (Ref : 5).

Table 7.4 KKRWSS - Typical Water Quality Analysis

PARAMETER	UNIT	SABS 241 (1999)			EASTERN WORKS		WESTERN WORKS	
		CLASS 0 (IDEAL)	CLASS 1 (ACCEPTABLE)	CLASS 2 (MAX ALLOWED)	RAW WATER (AVG)	TREATED WATER (AVG)	RAW WATER (AVG)	TREATED WATER (AVG)
pH	-	6 to 9	5 to 9,5	4 to 10	6,8	8,2	6,7	8,1
Colour	Hazen	15	20	50	11	0	2,5	0
Turbidity	NTU	0,1	1	10	3	0	13	0,6
Conductivity	ms/cm	70	150	370	23	27	48	48
Alkalinity	mg/ℓ	-	-	-	52	68	46	55
Calcium	mg/ℓ	-	-	-	37	54	49	55
Magnesium	mg/ℓ	30	70	100	30	33	43	42
Chlorides (cl)	mg/ℓ	100	200	600	61	61	100	107
Iron (Fe)	mg/ℓ	0,01	0,10	2,00	0,15	0,10	1	0
Manganese (Mn)	mg/ℓ	0,05	0,10	1,00	0,15	0	0,6	0
Total coliforms bacteria	/100 mℓ	0	0	0	0	0	0	0
E-coli	/100 mℓ	0	0	0	0	0	0	0

The main influence on water quality is the Iron (Fe) and Manganese (Mn) which also imparts the colour and turbidity to the water. The existing treatment process is relatively straightforward, except that it includes the removal of Iron and Manganese. Water analysis results from samples taken at Dysselsdorp in April 2004 are provided in Appendix A. The results are all within Class 0 (ideal) or Class 1 (acceptable) of the SABS standards.

7.5.3 Water Quality of De Rust's Water Supply

In terms of water quality, the Huis River source provides raw water of good quality, and chlorination is the only form of treatment before the water is stored in the De Rust Reservoir.

Branches, flotsam, sand and gravel are collected in a grit/sandtrap at the offtake point at the upstream end of the supply line. In terms of microbial contamination, test results from treated water (Ref : 4) indicated zero *e-coli* counts in October 1997 and January 1999 (the available test results). Appendix A provides a water quality analysis of De Rust's potable water supply for April 2004. All parameters lie within Class 0 (ideal) or Class 1 (acceptable) of the SABS standards.

7.6 WATER RETURNED TO SOURCE

7.6.1 Oudtshoorn Wastewater Treatment Works

The Oudtshoorn Municipal WWTW comprises two separate components, namely a biological filtration plant (constructed in the mid-fifties and extended in 1974) and an aeration activated sludge works (constructed in 1987). The combined capacity is 7,5 Mℓ/d and an organic load capacity of 6 375 kg COD/d. Between 1993 and 1995, some modifications were carried out towards upgrading the capacity of the works to 10 Mℓ/d. This upgrade was not completed and in 1995, Ninham Shand Consulting Engineers reported on the remaining steps necessary to complete the upgrade (Ref : 10). These were implemented between 1995 and 2000 and mainly comprised the construction of an additional mechanical screen, a mixer to the tertiary digester, electrical controls, and a 27m diameter (3,3m deep) reinforced concrete clarifier.

At the foot of the inlet works, the flow is split between the biofilter works and the waste activated works. At the biofilter, primary sedimentation tanks are used to settle out the solids. The liquid is then pumped over the two biological filters before being passed through the humus tanks and then discharged to the Olifants River, via maturation ponds. Settled sludge from the sedimentation tanks is anaerobically treated, dried on sludge beds before disposal to land. At the activated sludge plant, the waste is aerobically treated in the aeration basin. Effluent passes through clarifiers before being discharged to the river via the maturation ponds. A small portion of the effluent is pumped into an open dam and is utilised to irrigate the golf course and sportfields (see 8.5). Waste sludge is dried on drying beds before disposal to land.

Daily inflows in 1995 varied between 7,3 and 9,1 Mℓ/d, with an average inflow of 8,3 Mℓ/d, confirming the need to upgrade the works to a 10 Mℓ/d capacity.

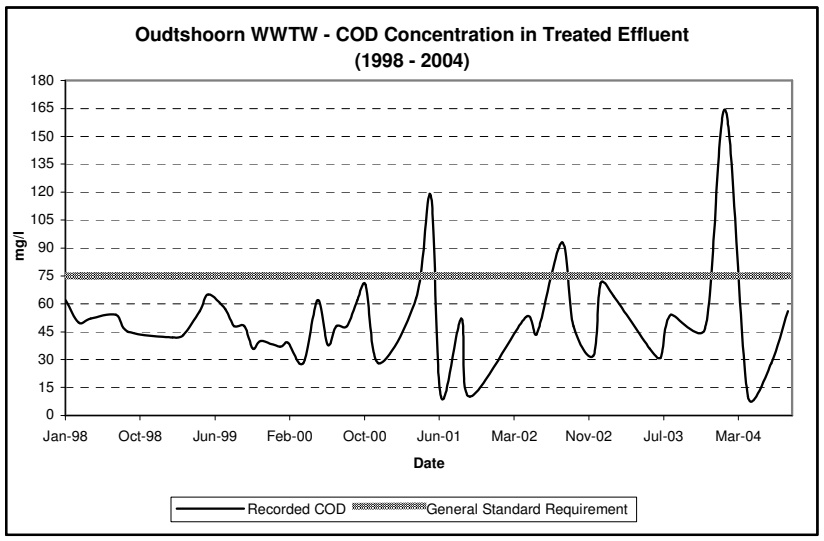
Effluent water quality discharged from the works into the Olifants River is required by DWAF to comply with the general standard.

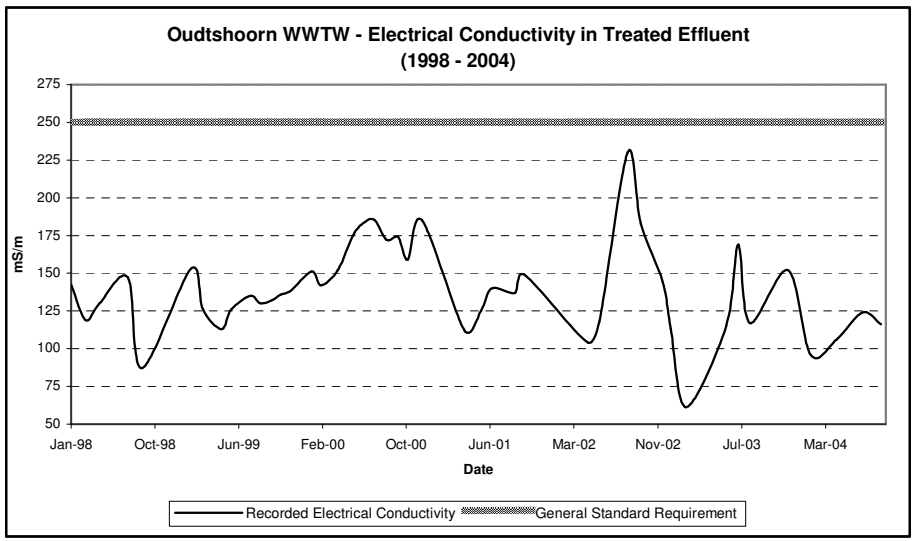
Test results for 1998 to 2004 are provided in Figure 7.2. DWAF require that the general standard be met for each of the following parameters :

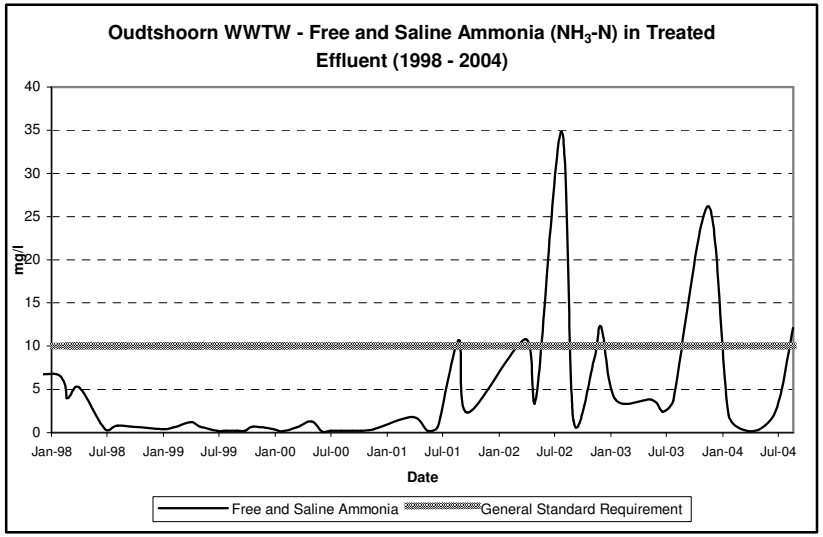
pH	:	5,5 to 9,5
Chemical Oxygen Demand (COD)	:	75 mg/ℓ
Electrical Conductivity	:	250 mS/m
Suspended Solids	:	25 mg/ℓ

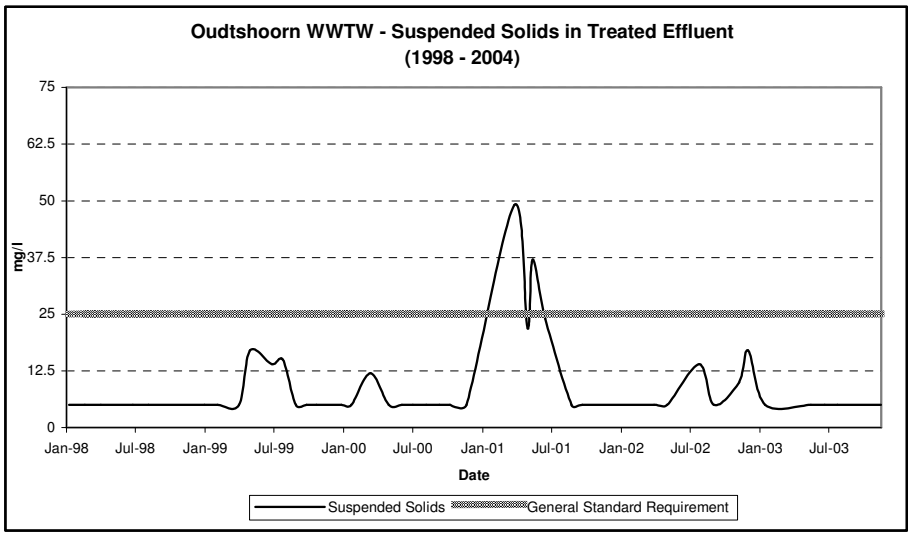
As shown on Figure 7.2, with the exception of very occasional exceedances, the effluent quality from the Oudtshoorn WWTW meets the general standard for each of the above parameters.

A recent monitoring report (2004) is included in Appendix B. Table 10 of that Appendix indicates that in the sample taken from final effluent, the COD and nitrate concentrations were higher than the general standard. Further upgrades to the Oudtshoorn WWTW have been identified as a potential project within the next five years subject to available funding (see Table 14.1).









NOTE: The pH results for the period 1998 - 2004 all fall within the required General Standard Range of 5,5 - 9,5

Figure 7.2 Effluent water quality records at Oudtshoorn WWTW

7.6.2 De Rust Wastewater Treatment Works

The De Rust wastewater treatment system consists of an oxidation pond system with five dams in series. Effluent is not discharged to source but is evaporated. Irrigation of sports grounds is practiced on an ad-hoc basis.

7.6.3 Dysselsdorp Wastewater Treatment Works

The original Dysselsdorp WWTW consisted of a waste activated aerated sludge works.

Operational problems were experienced at the works and it did not operate as an effective waste activated sludge facility.

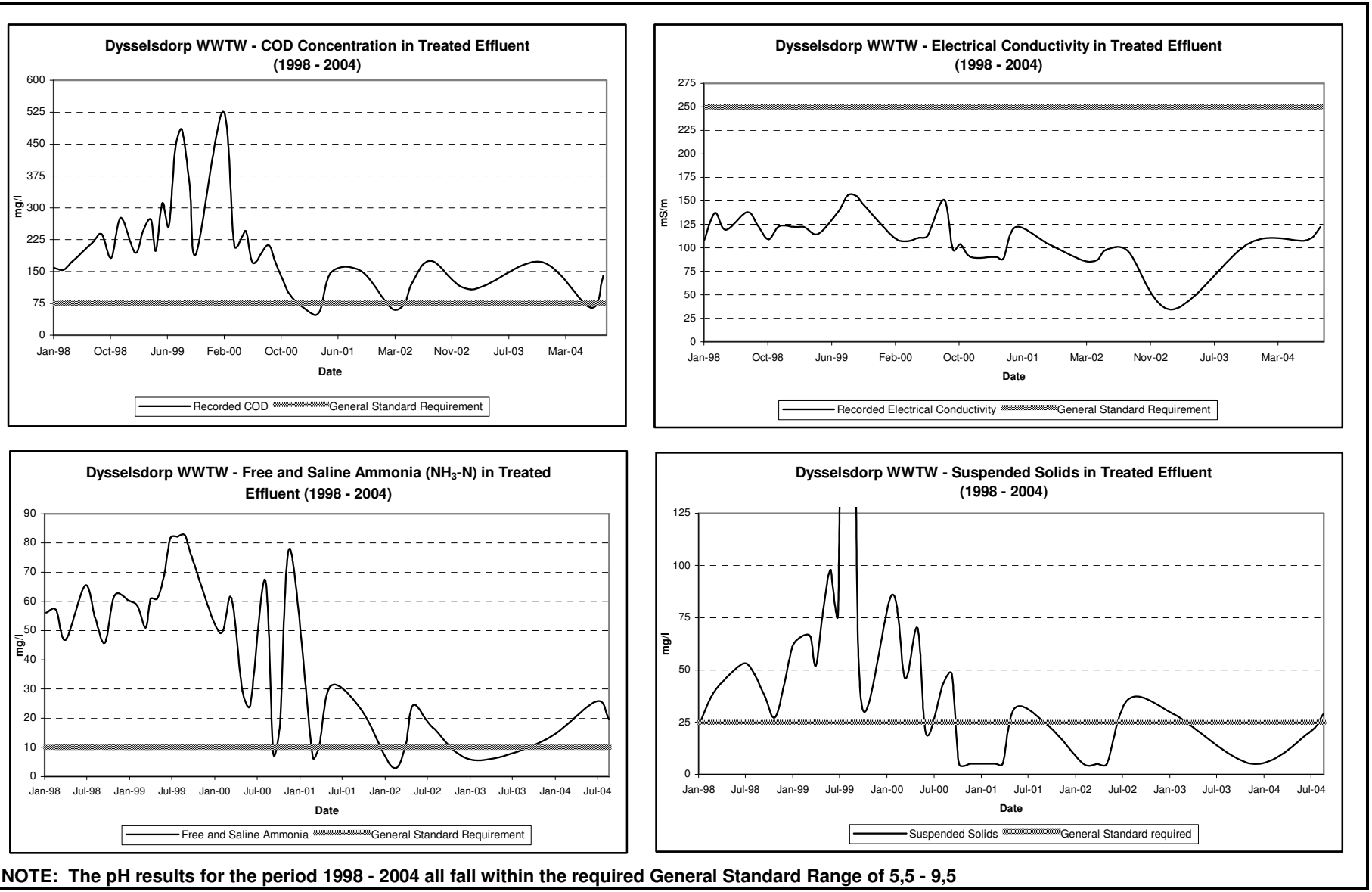
The new Dysselsdorp WWTW consists of the following :

- a hand operated inlet screen and three grit channels.
- an inlet flow gauge.
- a separation facility to apportion the inflow between the aerated oxidation dam and the new activated sludge reactor.
- an aerated oxidation pond with two 15 kW aerators.
- a final settling tank.
- a sludge recirculation pump station.
- an oxidation pond in which chlorine dosing takes place via a chlorinator.
- a gauge plate to measure outflow of treated effluent.
- sludge beds.

A recent monitoring report (June 2004) for the WWTW is included in Appendix C. This reports an organic loading of 178 kg COD/d. The same report contains the physical and chemical analysis of samples taken at various points in the system. As reported no final effluent water quality results were available, as the final oxidation pond had been cleaned just prior to the inspection. As such, the pond was in the process of filling and there was no discharge of final effluent from the works at the time.

Test results for Dysselsdorp WWTW effluent (1998 - 2004) are provided in Figure 7.3. DWAF require that the same general standard (as applicable to Oudtshoorn WWTW) be met. Whilst the quality of effluent discharged has improved since 2001, the only parameters regularly meeting the general standard are pH and Electrical Conductivity. COD, free and saline ammonia, and suspended solids exceed the required standard.

Upgrades to the Dysselsdorp WWTW have been identified as a potential project to be undertaken within the next five years, subject to available funding (see Table 14.1).



NOTE: The pH results for the period 1998 - 2004 all fall within the required General Standard Range of 5,5 - 9,5

Figure 7.3 Effluent water quality records at Oudtshoorn WWTW

8. WATER CONSERVATION / DEMAND MANAGEMENT

Water Conservation is the minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water. Demand management is the implementation of strategies to influence water demand in order to meet economic efficiency, social equity, environmental protection, sustainable resource use and political acceptability. The Oudtshoorn Municipality has implemented a water demand management programme in certain areas and these are discussed hereafter.

8.1 UNACCOUNTED FOR WATER

8.1.1 Oudtshoorn

As mentioned previously, a portion of the town of Oudtshoorn receives "lei-water", being part of one of the irrigation districts along the Grobbelaars River. Losses from this system are high. However, investigations have indicated that it would be difficult to incorporate this supply into the potable water supply system.

The Oudtshoorn Municipality experiences regular pipe bursts due to the soft nature of the water from its raw water sources. Pipe bursts are recorded on a GIS system. In 1996 Ninham Shand (Ref : 7) reported that an estimated 13% of Oudtshoorn's total water consumption was unaccounted for. In addition to losses from leaking pipes, this also included unmetered water, meter inaccuracies, illegal connections and unmetered uses such as fire fighting. That report further concluded that metering in Oudtshoorn is generally adequate, even in those areas served by standpipes. Payment received for water supplied was also found to be generally satisfactory. Based on latest available information from the municipality, current unmetered water is 3 Mℓ/day (1 million m^3/a), increasing to 4 Mℓ/day (1,4 million m^3/a) by 2009.

8.1.2 De Rust

The relatively high water consumption in De Rust is largely attributed to water use by small-scale farmers, and owners of properties with large gardens. Residents are entitled to existing "lei-water" rights. The canals of the "lei-water" distribution system have significant losses associated with them, particularly those which are unlined or in a poor state of repair. The phasing out of this practice ("lei water") is an unlikely option. However, municipal use of this water is a potential option but will have to be negotiated with existing "lei-water" users, and those water rights purchased. The annual consumption by "lei-water" users is not known.

8.1.3 Klein Karoo Rural Water Supply Scheme

The reticulation network of the Scheme consists of 365 km of pipeline with 668 connections. Total losses in this network were estimated at 0,095 million m^3/a in 1999, which is 9% of the average annual yield of 1,1 million m^3/a.

8.2 TARIFF STRUCTURES (WATER)

The present water tariffs (2004/2005) provided by the municipality for Oudtshoorn, Dysselsdorp and De Rust are as follows :

(a) Metered purified water

0 - 6 kℓ /month	free
7 - 100 kℓ/month	R4,30/kℓ
> 100 kℓ/month	R4,40/kℓ

(b) Water availability charges

In addition to the above charges, a water availability charge of R665,76/erf/year is levied on all consumers for erven without buildings.

In terms of water demand management, a more stringently stepped tariff is recommended. The provision of the first 6 kℓ of treated water at no cost, is in accordance with national policy. However, a consumer utilising more than 100 kℓ/month pays only 10 cents more per kℓ than a consumer in the 7 - 100 kℓ/month consumption range. This does not engender a spirit of responsible water use nor does it give effect to water conservation and demand management.

8.3 TARIFF STRUCTURES (SANITATION)

Tariff structures for sanitation services in Oudtshoorn, Dysselsdorp and De Rust currently levied by Oudtshoorn Municipality are as shown in Table 8.1.

Table 8.1 Sanitation Tariffs

CONSUMER INSTALLATION TYPE	2003/2004	2004/2005	ANTICIPATED ANNUAL INCREASE
OUDTSHOORN			
VIP or equivalent (per annum)	R395,00	R432,50	10%
Wet (septic tanks, etc. (per annum, per closet))	R395,00	R432,50	10%
Waterborne (per annum, per closet)	R395,00	R432,50	10%
DYSSELSDORP			
VIP or equivalent (per annum)	R395,00	R432,50	10%
Wet (septic tanks, etc. (per annum, per closet))	R395,00	R432,50	10%
Waterborne (per annum, per closet)	R395,00	R432,50	
DE RUST			
VIP or equivalent (per annum)	R395,00	R432,50	10%
Wet (septic tanks, etc. (per annum, per closet))	R395,00	R432,50	10%
Waterborne (per annum, per closet)	R395,00	R432,50	

As has been implemented by the City of Cape Town for example, a sanitation tariff (for highest service levels in particular) that is linked directly to water consumption should be considered to promote more efficient water use by consumers. Such a tariff could be levied against those consumers currently benefiting from waterborne sewage, so as to generate funding to improve sanitation service levels in rural areas, in particular.

8.4 PUBLIC AWARENESS

Through public awareness programmes, the importance of efficient water use can be conveyed to the wider public. Public information and school education programmes are currently in place in Oudtshoorn and De Rust/Blomnek. Similar initiatives in which the importance of efficient water use can be conveyed should be extended to Dysselsdorp, and within the rural areas. These initiatives should primarily inform the public of :

- The scarcity of surface water in the region.
- The concept of potential blocked tariff structures.
- The costs associated with developing new surface and groundwater supply schemes.
- The protection of existing resources for sustainable ongoing use.

8.5 RE-USE OF TREATED EFFLUENT

In Oudtshoorn, the re-use of treated effluent has to some extent been in place for some time already. Parks, playing fields, golf courses and public gardens utilise about 450 Mℓ per annum of treated effluent. Within the industrial sector, the opportunity for increased re-use of treated effluent is limited. The largest industrial water user (meat processing) requires high quality water. Treatment costs to meet these standards are not economically viable. Furthermore, industrial water use is a fairly low percentage of the total water requirement.

An Oudtshoorn Municipality report on Water Demand Management measures (Ref : 7) dated August 1996, concluded that :

- The relatively high salt content in Oudtshoorn's sewage should be investigated.
- Any further expansion of irrigated sports fields in the vicinity of the existing rising main to the golf course, should make use of treated effluent.
- Opportunity to irrigate with treated effluent or blended water should be investigated, within DWAF's regulatory water quality controls.
- Irrigation exchange with existing irrigators, through water trading, is a viable option.

8.6 STRATEGIC APPROACH

The strategic approach towards water resource management by Oudtshoorn Municipality should be focussed on :

- Investigating the potential to integrate existing urban water supply schemes into one system.
- Reduced consumption by domestic users.
- Engendering awareness within local industry that although water restrictions have never been imposed on this sector, they are not excluded from the possibility.
- Implementing the water demand management recommendations identified in the KKRWSS Study (Ref : 5) of 1999.
- The purchasing of existing irrigation allocations.
- The development of deep groundwater resources as is currently being investigated in the Deep Artesian Groundwater Exploration for Oudtshoorn (DAGEOS) Study.

9. WATER SERVICES INFRASTRUCTURE

Recent review has highlighted the need for conducting an intensive mapping exercise of all water services infrastructure components. Technical information on elements such as pipes, reservoirs and pumps within the municipal system should be verified and updated onto a central GIS system. This information should ultimately culminate into a database containing details of reticulation systems, connection points between pipes, location of valves and water meters.

9.1 EXISTING WATER INFRASTRUCTURE (OUDTSHOORN)

9.1.1 Daily Water Demands for Oudtshoorn

Average annual daily demand (2004)	=	19,1 kℓ/day
Estimated average annual demand (2009)	=	21,2 kℓ/day

A peak factor of 1.8 is assumed for converting the average annual daily water demands into daily water demand peaks.

9.1.2 Raw Water Supply to Oudtshoorn

A diagrammatic representation of the Oudtshoorn Water Supply System is given on Figure 9.1. As mentioned previously, the municipality draws on three sources of supply located to the north of the town, namely the Rust en Vrede springs and the Melville and Koos Raubenheimer Dams.

Water from Melville Dam flows under gravity via 5 km of steel piping to the junction with the supply line between Koos Raubenheimer Dam and the town. Water from the Rust en Vrede springs flows in 6 km of gravity steel piping to a junction with the Melville Dam supply line, some 3 km upstream of the Melville/Koos Raubenheimer pipeline junction. From the Koos Raubenheimer Dam, the water flows under gravity to the town's reservoirs. Piping consists of 32 km of 350 mm dia asbestos cement piping in parallel with a cement mortar lined steel pipe, varying from 500 mm to 350 mm dia. The combined capacity of the pipelines is approximately 40 Mℓ/day. The water is chlorinated at a point 600 m downstream of Koos Raubenheimer Dam.

The steel pipelines from the Rust en Vrede source and from Melville Dam were taken out of service below the Koos Raubenheimer Dam, when the cement mortar and steel pipelines were commissioned. The original pipes above Koos Raubenheimer Dam were coated internally to protect them against corrosion. The current state of the internal lining is unknown, although it is probable that the lining has suffered damage and that the steel is exposed in places.

The 350 mm bitumen dipped asbestos cement pipeline from Koos Raubenheimer Dam was laid in about 1970. The bitumen coating typically has a lifespan of 10 to 15 years, whereafter the asbestos cement pipe wall becomes exposed and may be subject to aggressive attack by the water. The 500 mm to 350 mm cement mortar lined steel pipe was commissioned in 1986. The purpose of the mortar lining is to protect the steel pipe against corrosion.

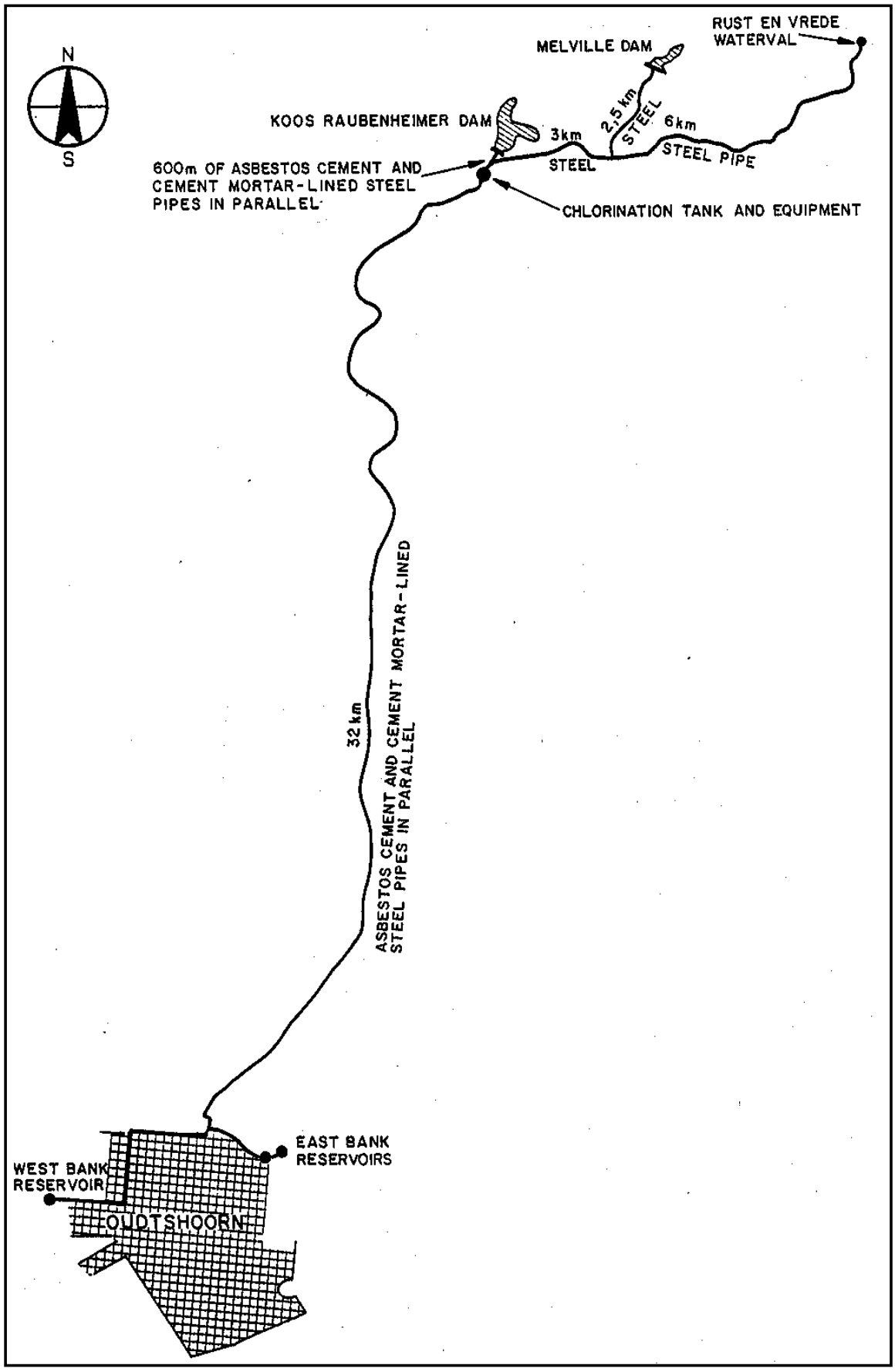


Figure 9.1 Oudtshoorn Water Supply

On the old street mains pipes, both internal and external corrosion has taken place. Within the town, winter pipe bursts in the order of 30 per month, reducing to 20 per month in summer are not uncommon. The seasonal reduction in number is attributed to the reduction in pressure during summer periods, when demand is higher.

It is relevant to note that in the cement mortar lined steel main, no problems have been experienced in terms of pipe breakages. However, increased alkalinity in the water indicates that aggressive attack of the mortar lining is nevertheless occurring.

9.1.3 Treatment System

The water treatment works is located about 1 km downstream of Koos Raubenheimer Dam. In 1995 a report by Ninham Shand (Ref : 6) recommended that a stabilisation plant (with regard to calcium carbonate) be added to the works, to ensure a less corrosive water. The same recommendation was made in a subsequent report by Ninham Shand in 2003 (Ref: 2). This was largely pre-empted by the high rate of pipe bursts in Oudtshoorn (up to 35 per month in winter). The recommendation was implemented for a period of time. However, due to the high costs of carbon dioxide and the rental of equipment, the carbon dioxide dosing plant was dismantled and lime dosing discontinued. Only chlorination now takes place as a disinfectant treatment. During an inspection of the works in May 2003, it was noted that the flow outlet was not being recorded on the chart recorder (installed in 1996).

9.1.4 Trunk Mains

As shown on Figure 9.1, water flows under gravity from the purification works to the town's reservoirs via the two parallel pipes. The trunk mains split at De Brook and deliver water to the original East Bank and West Bank reservoirs. Provision has been made to provide a future booster pump on the steel pipeline and also a booster pump between the old and new East Bank reservoirs. The new West Bank reservoir is situated adjacent to the old West Bank reservoir. Flow meters are installed on the outlets of each reservoir.

9.1.5 Instrumentation and Control

The two main storage dams (Melville and Koos Raubenheimer) are equipped with level meters but the chart recorder components are no longer functioning. The flow rate out of the purification works into the trunk mains is also measured by a chart recorder, but was not functioning when inspected in May 2003. Flow meters are installed at the reservoirs.

A telemetry system capable of relaying data from the various meters in the system to the Town Engineer's office, is functioning.

Water flow through the purification works to the reservoirs is automatically controlled by valves installed at the reservoirs. In other words, the flow through the treatment plant is dictated by the water levels in the reservoirs, with no flow taking place through the works when all the reservoirs are full. The system therefore operates in a stop-start manner during winter, and continuously but at varying flow rates in summer.

Currently the municipality is busy implementing a leakage programme with a water meter replacement programme.

9.1.6 The Reticulation System

The system consists primarily of fibre reinforced cement pipes. Originally some of the pipes were bitumen dipped to protect them against the aggressive water. This type of coating, however, has a limited life and it is probable that the underlying fibre cement matrix is now exposed. In recent years, new extensions to the reticulation system have made use of PVC and HDPE piping. The 2003 Water Quality Investigation Report (Ref: 2) confirmed that aggressive attack and weakening of pipe walls has been the probable cause of the frequent incidents of pipe breakage in the reticulation system.

9.2 EXISTING WATER INFRASTRUCTURE (DE RUST)

The water supply to De Rust is via a run-of-river diversion from a weir on the Huis River to the De Rust Reservoir, via a pipeline and booster pump. Whilst the source is generally able to provide sufficient water, the river flow during particularly dry periods is lower than the town's allocation. This also corresponds to those periods (November to February) of highest consumption. The limiting factor is the lack of sufficient storage to allow for water to be stored in the wetter months so as to provide for the peak demands in summer. It is estimated (Ref : 4) that during periods of peak demand, shortfalls of up to 200 kℓ/day are experienced. Throughout summer, shortfalls of 80 - 100 kℓ/day are experienced. This translates to an average annual shortfall of about 55 kℓ/day. Through co-operation with a local farmer, shortfalls are currently being met by additional water being provided from the individual's allocation out of the Huis River during periods of peak demand, in exchange for a bigger allocation to him during the winter months when the municipality's demand is lower. Boreholes previously sunk by DWAF in an attempt to alleviate the shortfalls have not provided sufficient yield to do so.

As is the case at Oudtshoorn, pipe breakages in the reticulation network at De Rust are common. This is due to the corrosion within the old asbestos cement pipes, which still form part of the reticulation network. Consequently, the system is on some occasions non-operational for as long as 24 hours. When pipe breakages take place in areas where they may not be easily observed, water losses can be significant before the first signs of seepage are noticed. The first sign often being that the reservoir water level has dropped below normal operating levels.

At Blomnek, water from the Bo De Rust reservoir is fed into the Bo De Rust reticulation network via a 75 mm and a 160 mm dia PVC pipe. In the Bo De Rust reticulation network, the pipes are also uPVC, varying between 63 mm and 110 mm dia. The De Rust WSDP (Ref : 4) notes that the main supply line was built in 1962. When pipe breakages occur, the old asbestos cement pipes are replaced with PVC pipes. This random replacement, based on very basic maintenance, is not adequate and there is a need for a properly planned replacement project.

9.3 EXISTING SEWAGE WORKS (OUDTSHOORN)

The treatment process is as described in Section 7.6 of this WSDP. Two reports by Ninham Shand, one in 1992 (Ref : 12) and the other in 1995 (Ref : 10) provide the information presented on the Oudtshoorn WWTW infrastructure, summarised briefly hereafter.

9.3.1 The Biological Filtration Works

This represents the "old" section of the WWTW (built in 1974) and consists of the following :

- 2 primary sedimentation tanks (11 m dia, 3 m deep)
- 2 biological filters, each of 30 m dia

- 2 humus tanks (11m dia, 3 m deep)
- 2 primary and 1 secondary settling tanks
- sludge drying beds
- a pump station to reticulate the sewage between the various components of the plant
- 2 primary and 1 secondary digester

The main operational problems were found to occur at the inlet works. The original inlet works was constructed to accommodate two mechanically raked screens and the mechanisms for two grit traps. Only one of each was installed when the works was constructed, although a second grit trap was installed in 1995.

Problems at the inlet works had included :

- large volumes of organic matter becoming trapped on the inlet screen
- after removal, screenings were not dewatered and therefore could not be affordably incinerated (high fuel costs) and were consequently buried.

In 2004, the mechanical rakes were replaced by the two rotating screens and a dewatering press acquired. This appears to be providing a significant improvement to the workings of the inlet works.

9.3.2 The Activated Sludge Plant

This represents the "new" section of the WWTW (built in 1987). It consists of the following components :

- inlet works of 7,5 Mℓ/day capacity, which can be upgraded to 15 Mℓ/day. This consists of two mechanical rotating screens, one hand-raked screen, a gravel trap and a flow meter to measure the respective flows into the biological filter (old part) and the waste activated plant (new part). Screenings are dewatered in a de-watering press.
- a pump station consisting of three screw pumps, two of installed capacity of 225 ℓ/s and one smaller pump.
- a biological reactor of 8 000 m^3 volume and three aerators, one of which was installed in 1995.
- three 27m diameter (3,3m deep) reinforced concrete clarifiers, one having been constructed in 2000.
- a pump station to pump waste sludge to the drying beds.
- sludge drying beds.
- a re-circulatory system for returning settled activated sludge to the biological reactor.

9.3.3 The Anaerobic Digesters

The two primary and one secondary digesters have a combined volume of 2 190 m^3. During 1995, it was recommended (Ninham Shand) that as a result of corrosion to the underside of the secondary digester's concrete roof slab, the damaged roof be removed and the unit be operated as an open digester. To facilitate breaking of the surface crust that would form, a mixer was installed in 2000.

9.4 SEWER OUTFALL TO THE OUDTSHOORN WWTW

During 1996, the main sewers leading to the inlet works at the WWTW were upgraded. This was undertaken to alleviate the problem of raw sewage spills from surcharges in the Main Outfall Sewer and East Bank Sewer. It involved the construction of a second 450 mm outfall sewer line to

carry the West Bank sewerage flows and a portion of the East Bank flow. It is considered that the capacities of East Bank, West Bank and Abattoir Sewers should be adequate for the next ten years. However, portions of the collector sewers serving Bongolethu and associated new developments may become overloaded in the near future. To counter the risk of raw sewage surcharges, inflow of stormwater into the sewerage system should be avoided. To do so, a systematic programme of flow monitoring should be established to identify sources of stormwater infiltration into the sewerage system.

9.5 EXISTING WATER INFRASTRUCTURE (DE RUST)

9.5.1 Daily Water Demands for De Rust

De Rust has an allocation to abstract 392 kℓ/day from the Huis River and stores water in three reservoirs, namely :

- De Rust Reservoir (350 kℓ)
- Bo De Rust Reservoirs (250 kℓ and 200 kℓ)

By 2000, the consumption of the town was 362 kℓ/day (average daily demand). As previously mentioned, an agreement with a farmer has been negotiated to alleviate shortfalls, particularly during peak demand periods. Based on a projected increase in demand of about 3% per annum, future demands are as estimated in Table 9.1 below.

Table 9.1 De Rust Water Requirements

YEAR	POPULATION	kℓ/DAY
2000	2 500	365
2005	2 734	418
2010	2 992	479
2015	3 277	549
2020	3 590	629
2025	3 935	720

9.5.2 Raw Water Supply to De Rust

Raw water is diverted from a weir on the Huis River into a gravity pipeline from whence it feeds into the De Rust Reservoir. This source is fed by springs and in the months of November to February, the source cannot meet the town's allocation. The three reservoirs are of insufficient capacity to store surplus water in the winter months, so as to meet the requirements during peak water consumption periods in summer. Average annual shortfalls of about 55 Mℓ/day are experienced (see 9.2).

9.5.3 Bulk Water Metering for De Rust

Eighteen bulk water meters are located along the bulk water supply main to monitor the extent of water losses from the supply main. Those meters which are not read on a daily basis, and those which are not in working order, contribute to inaccurate records. From the available readings, it is evident that losses of between 1 and 2 ℓ/s are occurring along the supply main.

9.5.4 Sewerage Treatment at De Rust

The De Rust system consists of an oxidation pond system with five dams in series. Effluent is therefore not discharged to source.

9.6 EXISTING WATER INFRASTRUCTURE AT DYSSELSDORP

Dysselsdorp is supplied with potable water out of the KKWRSS, described in Section 7.1.1. The water quality from the scheme is discussed in Section 7.5.2.

10. WATER BALANCE

10.1 OUDTSHOORN WATER BALANCE

As described in Section 7.1, the existing water resources are currently not sufficient to ensure the supply of water at reliable assurance to Oudtshoorn. From Oudtshoorn's three sources of supply (Koos Raubenheimer Dam, Melville Dam and the Rust en Vrede stream), the annual yield (98% assurance) is 5,4 million m^3/a.

Table 10.1 shows the available records of monthly volumes supplied from the town's reservoirs, as well as the monthly sale volumes. The percentage of unaccounted for water is also indicated. It is important to note that the extent of water losses between Koos Raubenheimer Dam and the water treatment works has not been estimated, as this data is not readily available.

Table 10.1 Oudtshoorn Water Balance

DATE	VOLUME SUPPLIED OUT OF TOWN RESERVOIRS (Kℓ)	WATER SALES TO CONSUMERS (Kℓ)	UNACCOUNTED FOR WATER (%)
Jan 2003	636 574	633 565	0,5%
Feb 2003	702 819	645 076	8,2%
Mar 2003	611 503	629 053	-2,9%
Apr 2003	450 889	471 846	-4,6%
May 2003	343 769	361 817	-5,3%
Jun 2003	323 185	214 337	33,7%
Jul 2003	352 199	252 231	28,4%
Aug 2003	400 638	299 087	25,3%
Sep 2003	491 648	284 112	42,2%
Oct 2003	531 482	353 469	33,5%
Nov 2003	606 311	410 403	32,3%
Dec 2003	615 866	569 926	7,5%
Average	**505 573**	**427 077**	**15%**

Ref : GLS Consulting Engineers

The above period was selected for reporting in this WSDP, as this represents the latest available 12 month record for water sales to consumers. Whilst the above figures can only be interpreted in relation to the accuracy of the metering, certain trends are apparent, namely :

- unaccounted for water is highest during periods of lower consumption as a result of higher pressures within the reticulation system.
- significant savings could be achieved through reduced losses in the reticulation system.
- the negative and very low unaccounted for water percentages suggest a degree of data inaccuracy, which can be attributed to shortcomings in metering.

Furthermore, monitoring, recording and analysis of losses between the raw water sources (Koos Raubenheimer Dam) and the water purification works is an important aspect that should form part of any reliable water balance estimate. The Oudtshoorn Municipality has provided a figure of 6 358 Mℓ/year abstracted in 2003/4 from Koos Raubenheimer Dam. This translates to a monthly volume of 529 833 kℓ. When compared to the average in Table 10.1 (albeit not for the exact same year) it would appear that the water loss between Koos Raubenheimer Dam and the treatment works is of an order of magnitude of 5%.

In terms of future water requirements, the municipality projects that the following bulk water volumes will be required from the Oudtshoorn system in the next five years.

Current : 6 358 Mℓ/year
2004/5 : 6 676 Mℓ/year
2005/6 : 6 994 Mℓ/year
2006/7 : 7 312 Mℓ/year
2007/8 : 7 629 Mℓ/year
2008/9 : 7 948 Mℓ/year

Considering that the current combined yield (98% assurance) from the town's sources is estimated at 5 400 Mℓ/year, the prospect of water restrictions is high and water demand management must be rigorously and urgently implemented. Augmentation options will, however, also need to be developed. This should be investigated as part of an Integrated Water Supply Scheme Study for the Klein Karoo, taking both surface and groundwater development options into account.

10.2 KKRWSS WATER BALANCE

The assessment of water availability and water requirements from the KKRWSS is based on the 1999 KKRWSS Augmentation Study (Ref : 5). Although the data pertaining to the available yield is only up to 1998, the scheme has not been augmented since then. Furthermore, whilst the original design capacity of the scheme was estimated to be 4,4 million m^3/a, the available supply of 1,1 million m^3/a is significantly less. The low yield currently obtained from the existing scheme can be largely attributed to operational and maintenance shortcomings, as well as borehole clogging and lower than estimated borehole yields.

In 1997/1998, the yield of the existing scheme (1,1 million m^3/a) was utilised in the following proportions :

Dysselsdorp	:	44%
Rural users	:	42%
Use in water treatment works	:	2%
Raw water pipe losses	:	4%
Treated water pipe losses	:	8%

Table 10.2 provides the estimated future water demands on the scheme.

Table 10.2 KKRWSS Augmentation Volumes Required

YEAR	AVAILABLE (Mm^3/a)	DEMAND (Mm^3/a)	AUGMENTATION REQUIRED (Mm^3/a)
1997/1998	1,1	1,08	0
2005	1,1	1,26	0,16
2010	1,1	1,40	0,30
2015	1,1	1,54	0,44
2020	1,1	1,70	0,60
2025	1,1	1,88	0,78
2030	1,1	2,10	1,00

Ref : KKRWSS Augmentation Study (Ref: 5)

In conclusion, the scheme as currently operated has already reached its potential yield. To meet future water requirements, augmentation will be necessary. It is, however, not suggested that this be possible via the KKRWSS alone, but rather via a regionalised integration of all individual schemes within the Klein Karoo.

10.3 DE RUST WATER BALANCE

In 2000, the town's water requirements were in balance with their available allocation of 392 kℓ/day (0,143 Mm^3/a). In order to meet summer shortfalls, a farmer assists the town with raw water. It is estimated that the town's water requirements will increase at approximately 3% per annum. Through water demand management and the potential to integrate De Rust into the KKRWSS, the augmentation as set out in Table 10.3 will be required.

Table 10.3 De Rust Augmentation Volumes Required

YEAR	AVAILABLE (Mm^3/a)	DEMAND (Mm^3/a)	AUGMENTATION REQUIRED (Mm^3/a)
2000	0,143	0,14	0
2005	0,143	0,15	0,01
2010	0,143	0,17	0,03
2015	0,143	0,20	0,06
2020	0,143	0,23	0,09
2025	0,143	0,26	0,12

Source of Information : De Rust WSDP (Ref : 4)

Meeting the peak demands during periods of high consumption is the most significant water supply issue in De Rust at present. Summer shortfalls in particular could be met by drawing on other sources of supply within a regional scheme.

11. INSTITUTIONAL ARRANGEMENT PROFILE

11.1 WATER SERVICE AUTHORITY FUNCTIONS

The Oudtshoorn Municipality currently acts as the Water Services Authority in Oudtshoorn, Dysselsdorp and De Rust, and as Water Services provider in Oudtshoorn and De Rust. The Overberg Water Board operates the KKRWSS and, as such, is a Water Services Provider to Dysselsdorp.

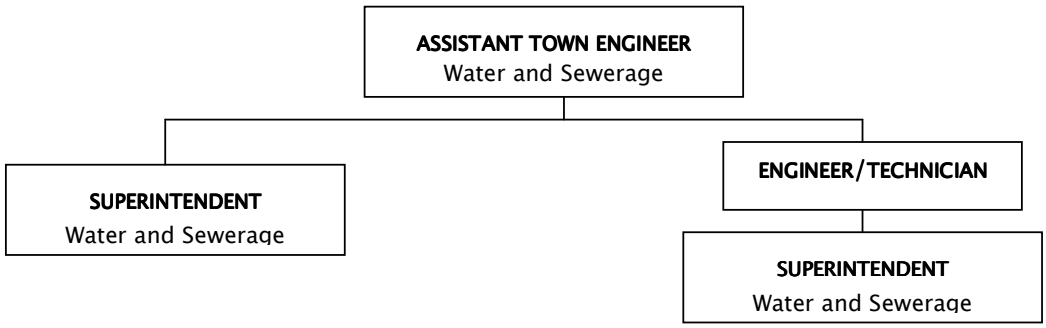
The goals and responsibilities of the various authorities involved in the provision of water services to the public are as follows :

REGULATOR	Minister of Water Affairs and Forestry	• To set minimum levels of service • To set minimum reporting levels • To set tariff policy • To monitor performance • To encourage regionalisation to achieve economies of scale
WATER SERVICES AUTHORITY (WSA)	Municipal Government	• To achieve requirements set by regulators • To balance the needs of stakeholders • To enter into contracts with WSPs best able to achieve these requirements • To monitor performance of the WSPs in terms of the contract with the WSA • To report to regulators
WATER SERVICE PROVIDERS (WSP)	Public, private or mixed entities, or municipal government itself	• To provide the services and perform the duties as required in the contract with WSAs, and as required in the constitution.

The following specific functions are carried out by the WSP :

- take meter readings
- prepare billing
- collect revenue
- daily operation and maintenance
- major maintenance

The Municipal Manager : Civil Engineering Services is seated in Oudtshoorn. He is the Technical Manager of the Water and Sanitation Service and is assisted by the following technical supervisors :



12. CUSTOMER SERVICE PROFILE

The municipality's target is to supply water to SABS standards to all consumers in all areas at all times.

12.1 QUALITY OF WATER SERVICE - URBAN

Currently, the water quality supplied to consumers by the Oudtshoorn Municipality is, in all cases, microbally safe for human consumption. However, at Oudtshoorn and De Rust, the treatment process does not include stabilisation, although this has previously been implemented at Oudtshoorn. The costs associated with lime stabilisation resulted in the process being discontinued. Whilst safe for human consumption, the aggressive nature of the water impacts on the reticulation infrastructure and is associated with pipe damage, which in turn impacts on the level of service to consumers.

12.2 QUALITY OF WATER SERVICE - RURAL

Outside of the supply network of the KKRWSS, no water is provided by the municipality to rural areas. Lack of knowledge of service levels in the rural areas is evident in this report and requires addressing. Within the scope of this WSDP, it has not been possible to investigate the rural areas in any detail. However, in subsequent revisions of the WSDP, this will be necessary. It is, therefore, of great need that the municipality undertake field investigations to acquire the information necessary to support appropriate levels of inclusion of the rural areas in the WSDP and IDP processes.

12.3 ATTENDING TO COMPLAINTS

All complaints are logged by the Client Care Clerk and diverted to the responsible department/person by means of a written note. This note is returned to the Clerk once the compliant has been attended to. A 24-hour stand-by service is, however, in place to attend to emergency matters and repairs. Tanker services are available.

13. FINANCIAL PROFILE

13.1 CAPITAL EXPENDITURE FOR WATER AND SANITATION

Table 13.1 summarises the anticipated capital expenditure for water and sanitation services within the Oudtshoorn Municipality proposed for the projects identified in Chapter 14 of this WSDP (refer to Tables 14.1 and 14.2).

Table 13.1 Summary of Future Capital Budgets from all Funding Sources

SANITATION SERVICES - CAPITAL BUDGETS					
2004/05	2005/06	2006/07	2007/08	2008/09	**TOTAL**
R0,8 m	R6,3 m	R16,1 m	R13,6 m	R1,5 m	**R38,3 m**
WATER SERVICES - CAPITAL BUDGETS					
2004/05	2005/06	2006/07	2007/08	2008/09	
R4,5 m	R3,9 m	R3,8 m	R2,8 m	R0,3 m	**R15,3 m**

The average annual capital expenditure for the **sanitation service** over the next five years amounts to approximately R7,7 million per annum.

Similarly, the average annual capital expenditure for **water services** over the next five years amounts to approximately R3,0 million per annum.

13.2 SOURCES OF CAPITAL INCOME

The municipality funds its capital projects for the water and sanitation services through external and internal loans. Estimated projections for sanitation projects to 2009 are provided in Table 13.2 and potential capital funding sources listed. Refer also to Table 14.1 for detail.

Table 13.2 Oudtshoorn Municipality (Sanitation Projects) Funding Sources for Capital Budget

CAPITAL SOURCE	2004/05	2005/06	2006/07	2007/08	2008/09	TOTAL
Eden DM	R0,6 m	R0,8 m	R1,0 m	R1,0 m		**R3,4 m**
CDLF	R0,2 m	R3,9 m	R4,5 m	R3,1 m		**R11,7 m**
MIG			R1,0 m	R1,5 m	R1,5 m	**R4,0 m**
DBSA		R1,6 m	R9,6 m	R8,0 m		**R19,2 m**
Total	**R0,8 m**	**R6,3 m**	**R16,1 m**	**R13,6 m**	**R1,5 m**	**R38,3 m**

Table 13.3 lists the potential capital funding sources for water projects to 2009. Refer also to Table 14.2 for details.

Table 13.3 Oudtshoorn Municipality (Water Projects) Funding Sources for Capital Budget

CAPITAL SOURCE	2004/05	2005/06	2006/07	2007/08	2008/09	TOTAL
CMIP	R0,9 m					**R0,9 m**
DWAF	R0,6 m					**R0,6 m**
Eden DM	R0,8 m	R0,8 m	R1,0 m	R1,0 m	R0,3 m	**R3,9 m**
CDLF	R0,3 m	R1,3 m	R2,4 m	R1,1 m		**R5,1 m**
MIG			R0,4 m	R0,7 m		**R1,1 m**
DBSA	R1,8 m	R1,5 m				**R3,3 m**
WRC	R0,1 m	R0,3 m				**R0,4 m**
Total	**R4,5 m**	**R3,9 m**	**R3,8 m**	**R2,8 m**	**R0,3 m**	**R15,3 m**

The following abbreviations define the potential source of funding :

CMIP : Consolidated Municipal Infrastructure Programme
DWAF : Department of Water Affairs and Forestry
Eden DM : Eden District Municipality
CDLF : Consolidated Development Loan Fund
MIG : Municipal Infrastructure Grant
DBSA : Development Bank of South Africa
WRC : Water Research Commission

13.3 OPERATING COSTS FOR WATER AND SANITATION

The Municipal operating budget for water and sanitation is presented in Table 13.5. Fuel, chemicals, consultant's fees, delivery and transport costs and water purchases are included as part of "General Expenses and Administration".

Table 13.4 Oudtshoorn Municipality - Summary of Operating Budgets

COST ITEM	WATER 2004/05	SANITATION 2004/05	ANTICIPATED ANNUAL INCREASE
Personnel Expenses	R5 011 283	R2 195 591	7%
General Expenses and Administration	R7 231 406	R1 106 750	4%
Repair and Maintenance	R976 095	R308 119	4%
Capital Loan Redemptions	R2 926 184	R1 505 476	4%
Contribution to Capital Expenditure	R110 000	R45 000	4%
Contribution to Reserves	R1 782 400	R539 100	4%
TOTAL EXPENDITURE	**R18 037 368**	**R5 700 036**	

13.4 TARIFF STRUCTURE AND FREE BASIC WATER POLICY

At present, the first 6 kℓ is supplied free of charge. Thereafter, the tariffs for metered purified water are R4,30/kℓ up to 100 kℓ and R4,40 per kℓ thereafter. The same charges are applied for all the towns. This structure should be revised into a more step-wise (block) tariff structure to encourage more efficient water use.

There are also a number of erven in Oudtshoorn and De Rust that receive an allocation for irrigation at a fixed sum for each kℓ in excess of the first 6 kℓ used. These "old" allocations are recognised in the National Water Act of 1998 as existing lawful entitlements, if use thereof had been implemented at any time during a period of two years before the commencement of the 1998 National Water Act.

The option of water trading remains a viable means of better utilisation of this water, where holders of these entitlements may be willing to sell them.

The implementation of a more rigorously stepped tariff structure throughout the municipality requires consideration as this offers a deterrent to wasteful water use. Currently, the tariff structure does not engender incentive to use water more efficiently.

13.5 METERING AND BILLING

The current coverage of meter installations and billing is shown in Table 13.7.

Table 13.5 Coverage of Metering and Billing

METER CATEGORY	OUDTSHOORN	DE RUST	DYSSELSDORP
% of yard taps metered	100%	100%	100%
% of in-house metered	100%	100%	100%
% of metered consumer units billed monthly	100%	100%	100%
% of metered consumer units pre-paid	100%	100%	100%
% of billed consumer units per paypoint	100%	100%	100%

Consumers can pay for services used and purchase prepaid coupons at paypoints situated in the various centres as follows :

Oudtshoorn	4	paypoints
De Rust	1	paypoint
Dysselsdorp	1	paypoint

Based on current information, it is estimated that 93% of the amount billed to consumers is recovered.

14. LIST OF PROJECTS

Tables 14.1 and 14.2 overleaf present a summary of those water and sanitation services projects proposed for implementation by Oudtshoorn Municipality as part of its five-year capital programme. The possible funding mechanism for each potential project is also indicated. Unless otherwise indicated, the source of information used to compile the two tables is the Oudtshoorn Integrated Development Plan of August 2003 (Ref : 1). The projects listed are presented in no specific order.

It is of relevance to note that during August 2004, the Oudtshoorn and Kannaland Municipalities submitted a joint proposal for SMIF funding to undertake a study of the potential to integrate the various individual surface and groundwater supply schemes in the region. This would to a large extent, make use of the infrastructure already in place and focus on the benefits of managing an integrated urban water supply system. Much of the reticulation network and water treatment facilities are already available (and are under-utilised) within the KKRWSS. Consequently, it is strongly recommended that this study be undertaken as a matter of urgency and as a prerequisite to any decision making with respect to the upgrading of existing schemes on an individual basis. For comparative purposes, these individual schemes are indicated in Table 14.2, but significant cost savings could be effected and would be investigated through such a study. As a result, many of the individual schemes presented in Table 14.2 would overlap with this proposed study.

The proposed Integration Study for the whole of the Klein Karoo (i.e. including Kannaland Municipality) would cost approximately R1,92 million and could be carried out over three financial years with R640 000 per year being allocated. This project is not reflected in Table 14.2 as the request for SMIF funding has yet to be assessed.

Table 14.1 Oudtshoorn Municipality Proposed Five-Year Plan Sanitation Services Capital Programme

NO.	PROJECT DESCRIPTION [2]	BUDGET (X R1000)	POTENTIAL FUNDING	PER FINANCIAL YEAR (X R1000)				
				2004/05	2005/06	2006/07	2007/08	2008/09
1	Oudtshoorn Sewage Network Rehabilitation	1 350	Eden DM CDLF	250 50	200 50	300 50	400 50	
2	Oudtshoorn/Dysselsdorp Rehabilitation of WWTW	2 250	Eden DM	350	600	700	600	
3	Oudtshoorn : Upgrade WWTW	24 000	CDLF DBSA		400 1 600	2 400 9 600	2 000 8 000	
4	Sewer Connections	140	CDLF	35	35	35	35	
5	Diverse Sub-division	40	CDLF	10	10	10	10	
6	CCTV Cameras	65	CDLF	65				
7	Contractor Services (VIP Toilets)	36	CDLF	12	12	12		
8	Upgrade switchgear to Oudtshoorn WWTW	450	CDLF		450			
9	Upgrade main sewer at Nippon and new extension	6 000	CDLF		3 000	2 000	1 000	
10	Improve VIP toilets : De Rust	19	CDLF	19				
11	De Rust Sewerage System	4 000	MIG			1 000	1 500	1 500
	Total	**38 350**		**791**	**6 357**	**16 107**	**13 595**	**1 500**

Ref : Oudtshoorn Municipality

Table 14.2 Oudtshoorn Municipality Proposed Five Year Plan Water Services Capital Programme

NO.	PROJECT DESCRIPTION	BUDGET (R1000 X)	POTENTIAL FUNDING	PER FINANCIAL YEAR (X R1000)				
				2004/2005	2005/06	2006/07	2007/08	2008/09
1	Oudtshoorn Water Reticulation Investigation	4200	Eden DM CDLF	600 200	800 200	1 000 200	1 000 200	
2	KKRWSS Integrated Water Resource Planning Study	442	CMIP DWAF	100 342				
3	Investigation of boosting bulk water supply line capacity	910	Eden DM CDLF	160		250	500	
4	Water connections	320	CDLF	80	80	80	80	
5	Diverse Sub-division	120	CDLF	30	30	30	30	
6	Investigation of Deep Groundwater Sources (TMG)	4 458	CMIP DBSA WRC	700 1 800 155	1 500 303			
7	Oudtshoorn Water Treatment Investigation	291	CMIP DWAF	50 241				
8	Replacement of water meters : Oudtshoorn, De Rust, Dysselsdorp	850	CDLF		150	200	250	250
9	Oudtshoorn Service Reservoirs Rehabilitation	100	MIG				100	
10	Water Meter Test Bank	55	CDLF	55				
11	Cango Caves : Rehabilitation of Water Supply	250	CDLF		100	150		
12	Investigation of additional surface water supply	250	CDLF		250			
13	Nippon water supply to 550 housing units	2 000	CDLF		500	1 500		
14	De Rust connection into KKRWSS	980	MIG			380	600	
	Total	**15 226**		**4 513**	**3 913**	**3 790**	**2 760**	**250**

Ref : Oudtshoorn Municipality

15. CONCLUSIONS AND RECOMMENDATIONS

The introduction of more rigorous block tariffs for water and sanitation services should be prioritised. The current tariff structure does not encourage efficient water use. Sources of funding for potential projects should be actively sought and projects prioritised in order of urgency. Less important projects should be implemented at later stages.

The opportunity to integrate the existing water supply schemes of the Klein Karoo offers significant potential in terms of cost savings on further development of individual schemes. This, however, requires a detailed study, the priority of which is considered urgent. Ad hoc upgrading of individual schemes is not considered to be a viable water resource development option in this municipality, and for that matter, neither in the adjacent Kannaland Municipality.

One of the key aspects lacking attention in this WSDP is the availability of information on the levels of service (water and sanitation) available to the rural communities in the region. It is recommended that a municipal-wide census be undertaken to compile this information within the rural regions. This must include the following :

- a register of all farms within the municipal area
- information on the number of people resident on each farm
- the standard of dwellings
- the level and nature of the water and sanitation services available on each farm

Other issues to be addressed include :

- appropriate service agreements between the municipality and the Overberg Water Board in relation to the continued operation and maintenance of the KKRWSS
- the undertaking of the Section 78 process, possibly at a regional level (Oudtshoorn and Kannaland Municipalities combined, for example)
- the compilation of an existing services infrastructure database, to include reporting information in relation to incidents occurring at :

    - water mains
    - sewers

- attention to potential remedial measures to reduce pressure within water reticulation networks so as to curtail losses
- metering of losses between bulk storage dams (Koos Raubenheimer, for example) and water treatment works
- a review of improved disposal of sludge from wastewater treatment works as an alternative to burial.

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APPENDIX A

Analysis of Oudtshoorn's Potable Water Quality

- April 2004
- June 2004

Analysis of De Rust's Potable Water Quality

- April 2004

APPENDIX B

Monitoring Report (2004) for Oudtshoorn WWTW

APPENDIX C

Monitoring Report (2004) for Dysselsdorp WWTW