SWARTLAND MUNICIPALITY

WATER SERVICES DEVELOPMENT PLAN FOR 2022-2027

ADMINISTRATION, INFORMATION AND COMPREHENSIVE OVERVIEW

FINAL DOCUMENT

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WATER SERVICES DEVELOPMENT PLAN: ADMINISTRATION, INFORMATION AND COMPREHENSIVE OVERVIEW

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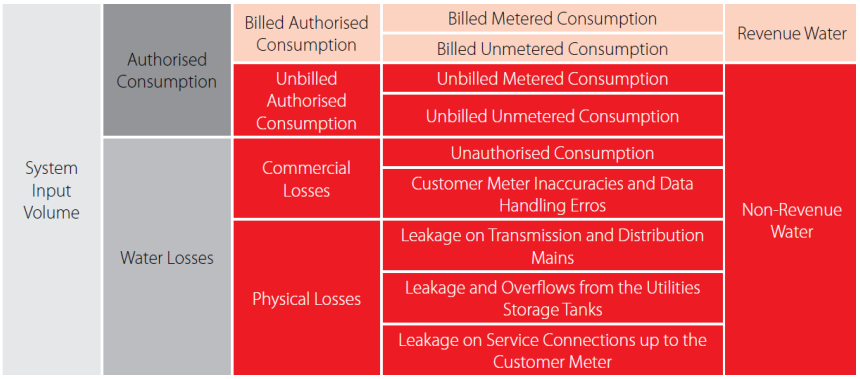
AADD	Average Annual Daily Demand
ADWF	Annual Dry Weather Flow
AIDS	Acquired Immune Deficiency Syndrome
ALC	Adult Learning Centre
AMP	Asset Management Plan
BBBEE	Broad Based Black Economic Empowerment
BD	Blue Drop
BDRR	Blue Drop Risk Rating
BGWMA	Breede-Gouritz Water Management Area
BH	Borehole
BOWMA	Breede-Olifants Water Management Area
BPT	Bulk Pressure Tank
BSP	Bulk Sewer Pipeline
BV	Book Value
BW	Bulk Water
BWP	Bulk Water Pipeline
CAP	Corrective Action Plan
CCT	City of Cape Town
CF	Consequence of Failure
CFO	Chief Financial Officer
CHC	Community Health Centre
CLC	Community Learning Centre
CMA	Catchment Management Agency
CMS	Catchment Management Strategy
COD	Chemical Oxygen Demand
CRC	Current Replacement Cost
CRR	Cumulative Risk Ratio
CWCBR	Cape West Coast Biosphere Reserve
DCoG	Department of Cooperative Government
DEA	Department of Environmental Affairs
DLG	Department of Local Government
DM	District Municipality
DMC	Disaster Management Centre
DMP	Disaster Management Plan
DO	Dissolved Oxygen
DoA	Department of Agriculture
DoRA	Division of Revenue Act
DPW	Department of Public Works
DRA	Disaster Risk Assessment
DRC	Depreciated Replacement Cost
DRM	Disaster Risk Management
DWQ	Drinking Water Quality
DWS	Department of Water and Sanitation
EC	Electrical Conductivity
EHP	Environmental Health Practitioner
ELEC	Electrical
EMF	Environmental Management Framework
EPWP	Expanded Public Works Programme

ESETA	Energy Sector Education and Training Authority
ESKOM	Electricity Supply Commission
GA	General Authorisation
GAMAP	General Accepted Municipal Accounting Practice
GD	Green Drop
GDP	Gross Domestic Product
GDPR	Gross Domestic Product of Region
GIS	Geographic Information Systems
GRAP	Generally Recognised Accounting Practice
H / HH	Household
HIV	Human Immunodeficiency Virus
HL	High Level
HMI	Human Machine Interface
IAM	Infrastructure Asset Management
ICT	Information and Communication Technology
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
ILI	Infrastructure Leakage Index
IMP	Incident Management Protocol
IMQS	Infrastructure Management Query System
IRIS	Integrated Regulatory Information System
ISP	Internal Strategic Perspective
IT	Information Technology
IWA	International Water Association
Kl	Kilolitre
KPI	Key Performance Indicator
l/c/d	Litre per Capita per Day
l/p/d	Litre per Person per Day
l/s	Litre per Second
LED	Local Economic Development
LF	Likelihood of Failure
LGSETA	Local Government Sector Education and Training Authority
LGTAS	Local Government Turn Around Strategy
LM	Local Municipality
m^3/a	Cubic Metre per Annum
MBR	Membrane Bioreactor
MEC	Members of the Executive Council
MIG	Municipal Infrastructure Grant
MISA	Municipal Infrastructure Support Agent
Ml	Mega Litre
Ml/a	Mega Litre per Annum
Ml/d	Mega Litre per Day
MLSS	Mixed Liquor Suspendid Solids
Mm^3/a	Million Cubic Metre per Annum
MNF	Minimum Night Flow
MPRA	Municipal Property Rates Act

mSCOA	Municipal Standard Chart of Accounts
MTREF	Medium-Term Revenue Expenditure Framework
MuSSA	Municipal Strategic Self-Assessment
N/A	Not Applicable
NGK	Dutch Reformed Church
NRW	Non-Revenue Water
NWRS	National Water Resource Strategy
O&M	Operation and Maintenance
OC	Opening Cost
OHS	Occupational Health and Safety
OTH	Other
P	Person
P/H	Person per Household
PAT	Progress Assessment Tool
PC	Process Controller
PMS	Performance Management System
PMU	Project Management Unit
PPE	Property, Plant and Equipment
PRP	Pipe Replacement Potential
PRV	Pressure Reducing Valve
PS	Pump Station
RAS	Return Activated Sludge
RDP	Reconstruction and Development Programme
RES	Reservoir
RM	Rand Million
RUL	Remaining Useful Life
SALGA	South African Local Government Association
SANS	South African National Standard
SCADA	Supervisory Control and Data Acquisition
SCC	Sewer Consumer Connections
SDBIP	Service Delivery and Budget Implementation Plan
SDF	Spatial Development Framework
SETA	Sector Education and Training Authority
SL	Swartland
SLM	Swartland Local Municipality
SMME	Small, Medium and Micro Enterprises
SPLUMA	Spatial Planning and Land Use Management Act
SPS	Sewer Pump Station
SRP	Sewer Reticulation Pipelines
STW	Sewage Treatment Works
SWOT	Strengths, Weaknesses, Opportunities and Threats
TWL	Top Water Level
UCT	University of Cape Town
VIP	Ventilated Improved Pit
WARMS	Water use Authorisation and Registration Management System
WAS	Waste Activated Sludge

WCC	Water Consumer Connections
WC/WDM	Water Conservation / Water Demand Management
WCD	West Coast District
WCDM	West Coast District Municipality
WDM	Water Demand Management
WH	Withoogte
WHO	World Health Organisation
WPS	Water Pump Station
WRP	Water Reticulation Pipeline
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSI	Water Services Institution
WSIG	Water Services Infrastructure Grant
WSP	Water Services Provider
WSS	Water Supply System
WTP	Water Treatment Plant
WTW	Water Treatment Works
WUA	Water User Association
WULA	Water Use License Application
WWQ	Waste Water Quality
W_2RAP	Wastewater Risk Abatement Plan
WWTW	Waste Water Treatment Works

KEY TERMS	INTERPRETATION
Current replacement cost (CRC)	The cost of replacing the service potential of an existing asset, by reference to some measure of capacity, with an appropriate modern equivalent asset. GAMAP defines CRC as the cost the entity would incur to acquire the asset on the reporting date.
Depreciated Replacement Cost (DRC)	The replacement cost of an existing asset after deducting an allowance for wear or consumption to reflect the remaining economic life of the existing asset.
Financial Year	Financial year means in relation to- • a national or provincial department, the year ending 31 March; or • a municipality, the year ending 30 June.
Integrated Development Plan (IDP)	An IDP is a legislative requirement for municipalities, which identifies the municipality's key development priorities; formulates a clear vision, mission and values; formulates appropriate strategies; shows the appropriate organisational structure and systems to realise the vision and the mission and aligns resources with the development priorities.
International Water Association (IWA) Water Balance	
System Input Volume	The volume of treated water input to that part of the water supply system to which the water balance calculation relates.
Authorised Consumption	The volume of metered and/or un-metered water taken by registered customers, the water supplier and others who are implicitly or explicitly authorised to do so by the water supplier, for residential, commercial and industrial purposes. It also includes water exported across operational boundaries. Authorised consumption may include items such as fire-fighting and training, flushing of mains and sewers, street cleaning, watering of municipal gardens, public fountains, frost protection, building water, etc. These may be billed or unbilled, metered or unmetered.
Water Losses	The difference between System Input and Authorised Consumption. Water losses can be considered as a total volume for the whole system, or for partial systems such as transmission or distribution schemes, or individual zones. Water Losses consist of Physical Losses and Commercial Losses (also known as Real Losses and Apparent Losses).
Billed Authorised Consumption	Those components of Authorised Consumption which are billed and produce revenue (also known as Revenue Water). Equal to Billed Metered Consumption plus Billed Unmetered Consumption.
Unbilled Authorised Consumption	Those components of Authorised Consumption which are legitimate but not billed and therefore do not produce revenue. Equal to Unbilled Metered Consumption plus Unbilled Unmetered Consumption.
Commercial Losses	Includes all types of inaccuracies associated with customer metering as well as data handling errors (meter reading and billing), plus unauthorised consumption (theft or illegal use). Commercial losses are called "Apparent Losses" by the International Water Association and in some countries the misleading term "Non-Technical Losses" is used.
Physical Losses	Physical water losses from the pressurized system and the utility's storage tanks, up to the point of customer use. In metered systems this is the customer meter, in unmetered situations this is the first point of use (stop tap/tap) within the property. Physical losses are called "Real Losses" by the International Water Association and in some countries the misleading term "Technical Losses" is used.
Billed Metered Consumption	All metered consumption which is also billed. This includes all groups of customers such as domestic, commercial, industrial or institutional and also includes water transferred across operational boundaries (water exported) which is metered and billed.
Billed Unmetered Consumption	All billed consumption which is calculated based on estimates or norms but is not metered. This might be a very small component in fully metered systems (for example billing based on estimates for the period a customer meter is out of order) but can be the key consumption component in systems without universal metering. This component might also include water transferred across operational boundaries (water exported) which is unmetered but billed.

KEY TERMS	INTERPRETATION
Unbilled Metered Consumption	Metered Consumption which is for any reason unbilled. This might for example include metered consumption by the utility itself or water provided to institutions free of charge, including water transferred across operational boundaries (water exported) which is metered but unbilled.
Unbilled Unmetered Consumption	Any kind of Authorised Consumption which is neither billed nor metered. This component typically includes items such as fire-fighting, flushing of mains and sewers, street cleaning, frost protection, etc. In a well-run utility it is a small component which is very often substantially overestimated. Theoretically this might also include water transferred across operational boundaries (water exported) which is unmetered and unbilled – although this is an unlikely case.
Unauthorised Consumption	Any unauthorised use of water. This may include illegal water withdrawal from hydrants (for example for construction purposes), illegal connections, bypasses to consumption meters or meter tampering.
Customer Metering Inaccuracies and Data Handling Errors	Commercial water losses caused by customer meter inaccuracies and data handling errors in the meter reading and billing system.
Leakage on Transmission and /or Distribution Mains	Water lost from leaks and breaks on transmission and distribution pipelines. These might either be small leaks which are still unreported (e.g. leaking joints) or large bursts which were reported and repaired but did obviously leak for a certain period before that.
Leakage and Overflows at Utility's Storage Tanks	Water lost from leaking storage tank structures or overflows of such tanks caused by e.g. operational or technical problems.
Leakage on Service Connections up to point of Customer Metering	Water lost from leaks and breaks of service connections from (and including) the tapping point until the point of customer use. In metered systems this is the customer meter, in unmetered situations this is the first point of use (stop tap/tap) within the property. Leakage on service connections might be reported breaks but will predominately be small leaks which do not surface and which run for long periods (often years).
Revenue Water	Those components of Authorised Consumption which are billed and produce revenue (also known as Billed Authorised Consumption). Equal to Billed Metered Consumption plus Billed Unmetered Consumption.
Non-Revenue Water	Those components of System Input which are not billed and do not produce revenue. Equal to Unbilled Authorised Consumption plus Physical and Commercial Water Losses.
MIG	A conditional grant from national government to support investment in basic municipal infrastructure.
Municipal Finance Management Act (MFMA)	Municipal Finance Management Act, 2003 (Act No. 56 of 2003)
Remaining useful life (RUL)	The time remaining over which an asset is expected to be used.
Service Delivery Budget Implementation Plan (SDBIP)	The SDBIP is a management, implementation and monitoring tool that enable the Municipal Manager to monitor the performance of senior managers, the Mayor to monitor the performance of the Municipal Manager, and for the community to monitor the performance of the municipality.
Strategic Framework for Water Services (SFWS)	The Strategic Framework provides a comprehensive summary of policy with respect to the water services sector in South Africa and sets out a strategic framework for its implementation over the next ten years.
Water Conservation	The minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water.
Water Demand Management	The adaptation and implementation of a strategy by a water institution or consumer to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services, and political acceptability.
Water Services Authority (WSA)	A water services authority means a municipality with the executive authority and the right to administer water services as authorised in terms of the Municipal Structures Act, 1998 (Act No.117 of 1998). There can only be one water services authority in any specific area. Water services authority area boundaries cannot overlap. Water services authorities are metropolitan municipalities, district municipalities and authorised local municipalities.
Water Services Development Plan (WSDP)	A plan to be developed and adopted by the WSA in terms of the Water Services Act, 1997 (Act No.108 of 1997)
WSDP Guide Framework	Modular tool which has been developed by the DWS to support WSAs in complying with the Water Services Act with respect to Water Services Development Planning and which is also used by the DWS to regulate such compliance.
Water Services Provider (WSP)	A WSP means any person or institution who provides water services to consumers or to another water services institution but does not include a water services intermediary.

A. WATER SERVICES AUTHORITY ADMINISTRATION

Introduction: Strategic Perspective and Methodology

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

Sections 12 and 13 of the Water Services Act (Act No 108 of 1997) place a duty on WSAs to prepare and maintain a WSDP. The DWS has developed a new WSDP website (Rolled-out to all WSAs during 2017) to assist WSAs with their WSDP process and to provide a framework for the capturing of the data. The business elements included in the new WSDP website are as follows:

- Administration
  - Role Player Details
  - Sector Integrations
  - Service Provider
- Information and Comprehensive Overview
  - Settlement Demographics and Public Amenities
  - Service Levels Profile
  - Water Services Asset Management (Information)
  - Water Services O&M
  - Conservation and Demand Management
  - Water Resources
  - Finance
  - Water Services Institutional Arrangements and Customer Services
- Master Plan
  - Settlement Demographics and Public Amenities
  - Service Levels Profile
  - Water Services Asset Management
  - Water Services O&M
  - Conservation and Demand Management
  - Water Resources
  - Existing Needs Perspective
  - Water Master Plan Perspective
  - Overall Topic Strategies
- Project Management

WSDP Process

This 2022-2027 WSDP of Swartland Municipality is an update of the previous WSDP. The WSDP was drafted according to the DWS's new WSDP website, as rolled out to the Municipalities in the West Coast Region on the 31st of October 2017. The WSDP is aligned and integrated with the 2023/2024 IDP of Swartland Municipality and needs to form an integrated part of the IDP public participation and consultation process. The IDP is predominantly strategic as opposed to the WSDP that are more operationally orientated with regard to water and sanitation services.

Part of the WSDP is to identify strategies (Master Plan) that need to be developed to address the information shortfalls and other constraints, which impact on service delivery. The implementation strategies should not constitute a wish-list, but must be reasonable and achievable within the capital and operational budget and staff constraints of Swartland Municipality. The WSDP should be revised regularly, reporting the information for the previous five years and the projected future requirements. It is not a stagnant document, but rather a living process reliant on improvement and enhancement through the input provided by councillors, officials and technical assistants.

The 2022-2027 WSDP for Swartland Municipality consists of the following documents and processes.

- WSDP-IDP Sector Input Report (Executive Summary Report that can be used for Council approval and for the Public Participation Process);
- Administration, Information and Comprehensive Overview Report; and
- Master Plan: Future Demand and Functionality Requirements Report.
- Updated WSDP website.

The WSDP-IDP Sector Input Report must be submitted to the Council for their approval and issued to the public for their comment.

WSDP'S as set out in the Strategic Framework for Water Services (September 2003)

The primary instrument of planning in the water services sector is the WSDP. The following principles apply to the WSDP:

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

- The contents of the WSDP must be communicated to all important stakeholders, including DWS.
- A WSA must report annually and in a public way on progress in implementing the plan.

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

The progressive development of the WSDP is two-phased. On the one hand it involves updating of the information content on which to base latest planning initiatives. On the other hand the structure and functionality of the framework itself will progressively be enhanced and improved.

The current guideline introduces a strategic theme to each of the business elements. Strategic approaches need to be defined and implemented in order to bridge the gap between the status quo, its existing information levels and the proposed visions and objectives for the Municipality, in relation to the delivery of water services. In particular:

- What needs to be done to bridge the gap?
- What are the different options towards achieving the objectives / priorities?
- What are the constraints in terms of the options?
- What is feasible within the existing constraints?
- What assumptions are being made?
- What aspects need to be flagged as being or relatively higher importance than others?

Name of WSA

Swartland Municipality is responsible for ensuring provision of water services within their area of jurisdiction and has the constitutional responsibility for planning, ensuring access to, and regulating provision of water services within their area of jurisdiction.

One of the visions of the Sector is that water supply and sanitation services are provided by effective, efficient and sustainable institutions that are accountable and responsive to those whom they serve (SFWS).

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

Swartland Municipality forms part of the West Coast Region, which also include the Category B Municipalities of Bergrivier, Saldanha Bay, Matzikama and Cederberg. The Swartland Municipality covers an area of approximately 3 707 km². The Swartland Municipality is in the southern segment of the district and is bordered by the City of Cape Town, Drakenstein, Berg River and Saldanha Bay Municipalities. Swartland Municipality's Management Area includes the following areas:

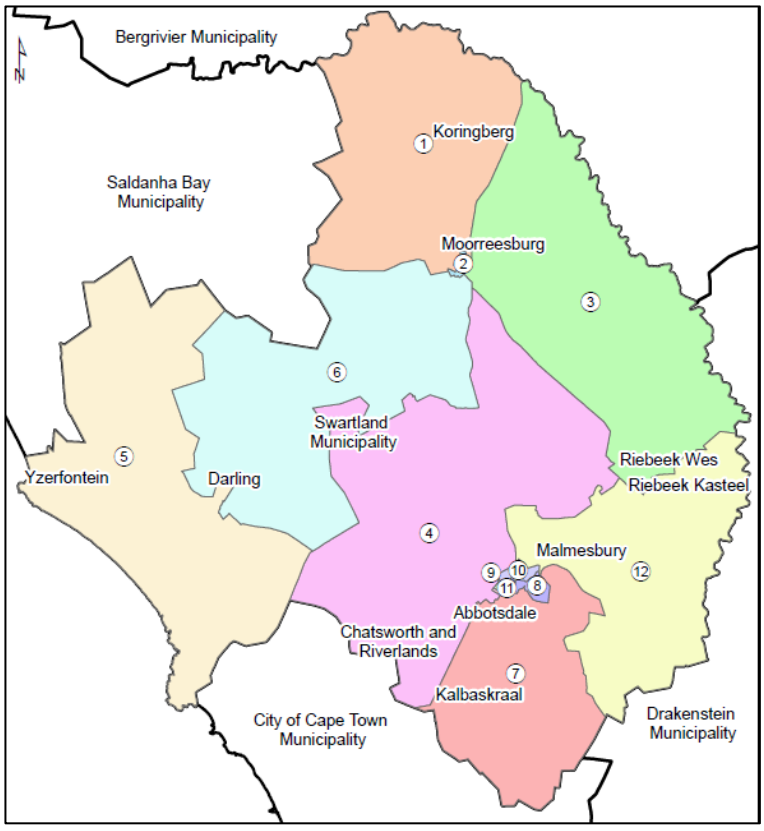
- The large towns of Malmesbury (Wards 8, 9, 10 and 11) and Moorreesburg (Ward 2);
- The small towns of Yzerfontein (Ward 5), Darling (Ward 6), Koringberg (Ward 1), Riebeek Kasteel (Ward 12), Riebeek Wes (Ward 3);
- The rural hamlets of Abbotsdale and Kalbaskraal (Ward 7), Riverlands and Chatsworth (Ward 4); and
- The rural farm areas (Ward 1).

Swartland Municipality consists of 12 individual wards and is the only WSA within the Swartland Municipality's Management Area. It is also the Water Services Provider (WSP). Potable bulk water is however provided to Swartland Municipality by the West Coast District Municipality through their Swartland and Withoogte bulk water distribution systems. Swartland Municipality's responsibility as WSA also extends to the rural areas within its Municipal boundary, which prior to July 2003 had fallen under the jurisdiction of the West Coast District Municipality.

Table A.1: Name of WSA	
Name	Swartland Municipality
Street Address	Church Street, Malmesbury
Postal Address	Private Bag X52, Malmesbury 7299
Reference No.	WC015

The table and figure below give an overview of the twelve wards and the sub-places or townships in each of the wards and the linkage with the water distribution schemes.

Table A.2: Wards in Swartland Municipality		
Ward	**Sub-places or Townships**	**Bulk Water Distribution Scheme**
1	Koringberg, part of Moorreesburg and rural areas	Withoogte Bulk Distribution System
2	Moorreesburg	Withoogte Bulk Distribution System
3	Riebeek West, Ongegund and rural areas	Swartland Bulk Distribution System
4	Riverlands, Chatsworth, Mount Royal (Malmesbury), Rust stasie and rural areas	Swartland Bulk Distribution System
5	Yzerfontein, Jakkalsfontein, Grotto Bay, Ganzekraal, Darling (Western part), Dassen Island and rural areas	Swartland Bulk Distribution System
6	Darling (Eastern part) and rural areas	Swartland Bulk Distribution System
7	Abbotsdale, Kalbaskraal and rural areas	Swartland Bulk Distribution System
8	Malmesbury South and part of Wesbank	Swartland Bulk Distribution System
9	Ilinge Lethu	Swartland Bulk Distribution System
10	Malmesbury North (Panorama, Tafelzicht) and West (Schoonspruit)	Swartland Bulk Distribution System
11	Part of Wesbank and Saamstaan	Swartland Bulk Distribution System
12	Riebeek Kasteel and rural areas	Swartland Bulk Distribution System



Status of WSDP

The WSDP will be taken to the Council for approval. Swartland Municipality will forward the Council Resolution for the approval to the DWS once approved. Councilors must be aware of the targets and funding commitments made within the WSDP since they will be responsible for ensuring that these commitments are fulfilled. The WSDP will also serve as a project management tool to monitor the achievement of these commitments.

A.1 ROLE PLAYER DETAILS

The table below gives a summary of the contact details of the various role players and the interaction acknowledgement of the WSDP process of Swartland Municipality.

Table A.1.1: Contact details of Role Players

Position	Designation	Person	Tel	Cell	Email	Interaction Acknowledgement (Yes / No)	Interaction Acknowledge Signature (Yes / No)
Municipal Manager	Municipal Manager	Mr. Joggie Scholtz	022 487 9400	082 823 7542	joggiescholtz@swartland.org.za	Yes	
Executive Mayor	Executive Mayor	Mr. H Cleophas	022 487 9400	083 340 6407	mayor@swartland.org.za	Yes	
Water Services Councilor	Water Services Councilor	Mr. Tijmen van Essen	022 487 9400	082 777 1794	vanessent@swartland.org.za	Yes	
WSDP Contact	Snr Manager Solid Waste & Trade Services	Mr. Esias de Jager	022 487 9400	084 620 6025	dejagere@swartland.org.za	Yes	
IDP Manager	IDP Manager	Ms. Olivia Fransman	022 487 9400	073 517 9134	fransmano@swartland.org.za	Yes	
PIMSS Senior Planner	Head: Asset and Fleet Management	Ms Arina Beneke	022 487 9400	084 582 8369	benekea@swartland.org.za	Yes	
Technical Services	Director: Civil Engineering Services	Mr. Louis Zikmann	022 487 9400	082 823 7543	louis@swartland.org.za	Yes	
Chief Financial Officer	Director: Financial Services	Mr. Mark Bolton	022 487 9400	083 635 3152	boltonm@swartland.org.za	Yes	
Data Official	Senior Technician Trade Services	Ms. Clarise Fortuin	022 487 9400	082 053 8192	dirksec@swartland.org.za	Yes	
Acting Mayor	Acting Mayor	-	-	-	-	-	
PMU Manager	Manager PMU & Public Services	Mr Jonhill Spies	022 487 9400	073 144 3865	spiesj@swartland.org.za	Yes	
Acting Chief Financial Officer	Acting Chief Financial Officer	-	-	-	-	-	
Housing	Manager Human Settlements	Mr Sylvester Arendse	022 487 9400	072 179 9121	arendses@swartland.org.za	Yes	
Environmental	Manager: Environmental and Occupational Health	Mr Kobus Marais	022 487 9400	082 533 1724	maraisk@swartland.org.za	Yes	
Infrastructure	Director: Civil Engineering Services	Mr. Louis Zikmann	022 487 9400	082 823 7543	louis@swartland.org.za	Yes	

A.2 SECTOR INTREGRATION

Integration between the WSDP and the IDP is important in order to coordinate that the timing for the update of the WSDP is aligned with that of the IDP process implementation plan. The IDP process itself will form the primary route for political stakeholder involvement in the WSDP. In so doing, recommended actions to support the strategic planning of water services will be reflected in the IDP.

Process Followed

The following process was followed for the updating of Swartland Municipality's WSDP.

- All the water and sewerage infrastructure were visited in Malmesbury, Abbotsdale, Kalbaskraal, Riverlands, Chatsworth, Koringberg, Moorreesburg, Riebeek Kasteel, Riebeek Wes, Ongegund, Darling and Yzerfontein during May 2023.
- The final 2022/2023 MTREF Budget and 2023/2024 IDP were incorporated into the WSDP where applicable.
- The draft WSDP documents were submitted to Swartland Municipality's Executive Mayoral Committee on the 21st of May 2024 for approval for public participation.
- The draft WSDP documents were distributed to the DWS, the DLG and the neighbouring WSAs for their comments during May 2024.
- Notices were placed in the Local Newspapers that the draft WSDP documents were available at the office of the Director Civil Engineering Services and placed on the Municipality's website for public comments. The due date for the submission of comments was the 30th of June 2024.
- No comments were received on the draft WSDP documents and the WSDP documents were finalised for final approval by Swartland Municipality's Council on the 25th of July 2024.

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

Swartland Municipality's WSDP is an integrated and aligned Sectoral Plan of the IDP of Swartland Municipality. The IDP/Budget Time Schedule for Swartland Municipality for September 2023 – August 2024 is summarised in the table below (Approved by Council 24 August 2023).

Table A.2.1: IDP / Budget Time Schedule (September 2023 – August 2024)

Task	Date
September 2023	
Commence with the spreadsheets for multi-year capital and operating budgets (Budget Office)	1 Sept
Determine revenue projections and proposed rate and service charges and drafts initial allocations for the next financial year after taking into account strategic objectives.	1 Sept
Engage with Provincial and National sector departments and sector specific programmes for alignment with municipalities plans (schools, libraries, clinics, water, electricity, roads, etc.)	1 Sept
Annual panel evaluation of the 2023/2024 performance.	Sept
Submit the performance assessment results of the municipal manager to the MEC for local government.	Sept
Distribute operating and capital budget spreadsheets to departments for purposes of multi-year request verification.	29 Sept
October 2023	
Commence with salary, vehicle and operating budget compilation.	2 Oct
Determine potential price increases of bulk resources.	2 Oct
Submit Section 52 Report to Council.	26 Oct
Ward 1 & 2 (IDP feedback)	30 Oct
Ward 5 & 6 (IDP feedback)	31 Oct
Deadline for operating budget inputs, including salary budget and vehicle budget.	31 Oct

Table A.2.1: IDP / Budget Time Schedule (September 2023 – August 2024)	
Task	**Date**
November 2023	
Determine possible tariff increases for water and electricity	Nov
Audit Outcomes released internally	Nov
Submit Section 52 Report to the National Treasury and the relevant provincial treasury.	1 Nov
Ward 9 (IDP feedback)	1 Nov
Ward 3 & 4 (IDP feedback)	2 Nov
Ward 8 & 10 (IDP feedback)	6 Nov
Ward 11 & 12 (IDP feedback)	7 Nov
Ward 7 (IDP feedback)	9 Nov
Deadline for capital budget inputs from departments	3 Nov
Due date for final adjustment budget submissions	10 Nov
Review the key performance indicators and targets for current financial year during the performance assessment meetings.	20 – 24 Nov
December 2023	
Commence with compilation of Adjustments Budget (B Schedule and Report)	1 Dec
Commence with compilation of midyear budget and performance assessments report	1 Dec
Strategic Session (Unpacking the IDP)	Dec
January 2024	
Budget: Finalise budget in the prescribed formats incorporating National & Provincial budget allocations. Integrate and align to IDP documentation. Finalise budget policies.	Jan & Feb
Annual Report: Submit to Mayoral Committee. Table in Council.	24 & 30 Jan
Section 72 mid-year assessment report: Submit to Mayoral Committee. Submit to Provincial Treasury and National Treasury. Submit to Council.	24, 21 & 30 Jan
Submit review of KPIs and performance targets for current financial year to Mayoral Committee.	19 Jan
Adjustments Budget: Submit to Budget Steering Committee. Submit to Mayoral Committee. Submit to Council.	18, 24 & 30 Jan
Submit Section 52 Report to Council.	30 Jan
Make the midyear budget and performance assessment public by placing it on the municipal website.	31 Jan
Make public any other information that the municipal council considers appropriate to facilitate public awareness of the midyear budget and performance assessment.	6 & 7 Feb
February 2024	
Finalise detailed operating and capital budgets in the prescribed formats incorporating National and Provincial budget allocations, integrate and align to IDP documentation and draft SDBIP, finalise budget policies including tariff policy.	Feb
Note any provincial and national allocations to municipalities (DoRA and Prov Gasette) for incorporation into budget.	Feb
Compile draft SDBIP for next financial year.	Feb & Mar
Review the KPIs and performance targets for next financial year.	Feb & Mar
Submit Section 52 Report to the National Treasury and the relevant provincial treasury.	2 Feb
Annual Report: Submit to Auditor General, Provincial Treasury and provincial department responsible for local government.	1 Feb
Make public and invite comments from the local community.	6, 7 Feb
Post Adjustments Budget and Annual Report on the website.	1 Feb
Make public the Adjustments Budget.	6, 7 Feb
Submit the approved adjustments budget to Provincial Treasury and National Treasury.	Before 10 Feb
Submit revised SDBIP for the current financial year to the Mayoral Committee (following approval of an adjustments budget)	21 Feb
Make public any revisions of the SDBIP.	27, 28 Feb
Post revised SDBIP on the municipal website.	23 Feb
Submit revised SDBIP to Provincial Treasury and National Treasury.	28 Feb
Receive notification of any transfers that will be made to the municipality from other municipalities in each of the next three financial years.	Before 26 Feb
Preliminary approval of electricity tariff increase for submission to NERSA.	26 Feb
March 2024	

Table A.2.1: IDP / Budget Time Schedule (September 2023 – August 2024)	
Task	**Date**
Technical Integrated Municipal Engagement (Time) and IDP Indaba engagements.	Mar
Annual Report: MPAC Meeting – Oversight Report	5 Mar
Draft IDP, budget and review of KPIs and targets for next financial year: Submit budget to Budget Steering Committee. Submit to Mayoral Committee. Table in Council.	14, 20, 28 Mar
Draft SDBIP for the next financial year: Submit to Mayoral Committee. Table in Council.	20, 28 Mar
Annual Report approval: Consider and approve, reject or refer back the annual report at the council meeting. Adopt an oversight report providing comments on the annual report.	28 Mar
April 2024	
Invite Mayoral Consultative forum members and other invited stakeholders and ward committee members to comment on the draft IDP.	Apr
Post on the website: Budget documents. Draft SDBIP for next financial year. Draft DIP of predecessor. Draft KPIs and targets for the next financial year. Annual Report and Oversight Report.	2 Apr
Annual Report submission: Submit copies of the minutes of those meetings to the Auditor General, the relevant provincial treasury and the provincial department for local government.	2 Apr
Submit copies of the annual report and oversight report to the provincial legislator.	2 Apr
Make public the draft IDP, the review of KPIs and performance targets, as well as the annual budget and invite the community to submit representations.	2, 3 Apr
Make public the oversight report.	2, 3 Apr
Process of consultation and meetings with Provincial and National Treasury and other organs of state.	2-23 Apr
Submit the draft IDP, draft SDBIP and budget to the Local Government, Provincial Treasury, National Treasury and other affected organs of state.	5 Apr
Submit the draft IDP to the District Municipality.	5 Apr
Submit Section 52 Report to Council.	25 Apr
Submit Section 52 Report to the National Treasury and the relevant provincial treasury.	30 Apr
May 2024	
Strategic Integrated Municipal Engagement (SIME).	May
Compile a summary of the predecessor's IDP.	May
Council must give the mayor an opportunity to respond to the submissions and, if necessary, to revise the budget and table amendments for consideration by the council.	2-17 May
Finalisation of IDP, review of KPIs and performance targets, as well as the annual budget amendments / refinements.	Before 17 May
Submit annual budget to Budget Steering Committee.	16 May
Submit IDP of predecessor, review of KPIs and performance targets, as well as the annual budget to Mayoral Committee.	22 May
Submit IDP of predecessor and annual budget to Council.	30 May
Place the IDP, annual budget and all budget related policies on the website.	31 May
Make known reviewed KPIs and performance targets by placing it on the municipal website.	31 May
June 2024	
Review the provisions of the performance agreements during June each year.	June
Submit a copy of the IDP to the MEC for local government (if amended) and the DLG.	7 Jun
In case of an amendment of the IDP, Council must consider the MEC's proposals and respond within 30 days	Within 30 days of receiving the MEC's request
Make public the approved IDP, approved annual budget and supporting documentation (including tariffs)	11, 12 Jun
Submit to the Mayor the draft SDBIP and draft annual performance agreements for the next year	7 Jun
Submit approved IDP and budget to the Provincial Treasury and National Treasury	Before 12 Jun
Submit the draft SDBIP and draft annual performance agreements for the next year to the Mayoral Committee.	19 Jun
Place the performance agreements and all service delivery agreements on the website.	21 Jun
Make public the projections, targets and indicators as set out in the SDBIP as well as the performance agreements of the Municipal Manager and senior managers.	26, 26 Jun
Submit the SDBIP to National and Provincial Treasury.	28 Jun
Conclude new performance agreements that replaces the previous agreement at least once a year.	28 Jun
Publish property rates tariffs in Provincial Gazette	Before 24 Jun
Distribution of Budget and Tariff books	24 Jun

Table A.2.1: IDP / Budget Time Schedule (September 2023 – August 2024)	
Task	**Date**
Submit copies of the performance agreements to Council and the MEC for local government as well as the national minister responsible for local government.	28 Jun
Implement pre-paid electricity tariffs by 24:00	30 Jun
July 2024	
Submit Section 52 Report to Council.	25 Jul
Submit Section 52 Report to the National Treasury and the relevant provincial treasury.	29 Jul
August 2024	
Performance and Risk Audit Committee: Evaluation of the Annual Performance Report.	20 Aug
Performance and Risk Audit Committee: Annual financial statements	27 Aug
Process Plan and time schedule of key deadlines: Submit to Mayoral Committee, Submit to Council, Submit to the Provincial Treasury, DLG and the West Coast DM.	14 – 26 Aug
Submit annual financial statements and annual performance report to the Auditor-General for auditing.	Before 31 Aug

Community Participation

Public participation in Swartland Municipality is done in a structured way. Most of the liaison with communities is done through ward committee meetings. Although ward committees provide for representation of communities on a geographical basis, there are also a number of sector interests not covered by ward committees that play a major role within the municipal area, such as education, business and agriculture. Liaison with and involvement of such sector groups is therefore also crucial in order to get a full picture of the current reality in the area. Liaison with sector groups is done mainly through the Swartland Municipal Advisory Forum (SMAF).

The municipality also communicates through a well-structured website www.swartland.gov.za as well as its Facebook Page www.facebook.com/SwartlandMunicipality.

Table A.2.2: Consultation Process			
Consultation	**Process and Communication**	**Date**	**Comments**
Users	IDP Process	Advertised in Local Newspapers during May 2024 for comments to be received by the 30th of June 2024	No comments were received on the draft WSDP documents
Public	IDP Process		
Water Services Institutions	IDP Process		
Neighbouring WSAs	IDP Process	20th of May 2024	No comments were received
Provinces (DLG)	Copy of draft WSDP	15th of May 2024	No comments were received
DWS	Copy of draft WSDP	20th of May 2024	No comments were received

Table A.2.3: Sector Integration		
Sector / Plans	**Interaction (Yes / No / Partial)**	**Area**
Agriculture	Partial	Settlement Demographics and Public Amenities
Mining	N/A	N/A
Tourism	Partial	Settlement Demographics and Public Amenities
Finance	Yes	Finance
IDP	Yes	Administration
PMU	Yes	Water Services Asset Management
LMs	Yes	Administration
Water Master Plan	Yes	Water Services Asset Management
Sewer Master Plan	Yes	Water Services Asset Management
WDM Strategy	Yes	Conservation and Demand Management
Maintenance Backlog Study	Yes	Water Services O&M
SDF	Yes	Settlement Demographics and Public Amenities
ISP	Yes	Administration

Table A.2.3: Sector Integration		
Sector / Plans	**Interaction (Yes / No / Partial)**	**Area**
Health	Partial	Service Levels
LED	Partial	Settlement Demographics and Public Amenities
DMP	Partial	Water Services Asset Management
Institutional	Yes	Water Services Institutional Arrangements and Customer Services

Comments

The draft 2022-2027 WSDP was approved for public distribution by Swartland Municipality's Executive Mayoral Committee on the 21st of May 2024. The draft WSDP was also distributed to all the neighbouring WSAs, the DLG and the DWS's Regional Office on the dates indicated in Table A.2.2 for their comments, as required by legislation. The due date for the submission of comments on the draft WSDP documents was the 30th of June 2024. No comments were received from any of the interest groups.

Table A.2.4: Comments received on the draft WSDP				
Date	**Components**	**Interest Group**	**Consideration**	**Comments**
20 May 2024	All	DWS	All draft WSDP documents	No comments were received
15 May 2024	All	DLG	All draft WSDP documents	No comments were received
20 May 2024	WSDP-IDP Sector Input Report	City of Cape Town	WSDP-IDP Sector Input Report	No comments were received
20 May 2024		Bergrivier LM	WSDP-IDP Sector Input Report	No comments were received
20 May 2024		Drakenstein LM	WSDP-IDP Sector Input Report	No comments were received
20 May 2024		Saldanha Bay LM	WSDP-IDP Sector Input Report	No comments were received
20 May 2024		West Coast DM	WSDP-IDP Sector Input Report	No comments were received
May 2024	All	Public	All draft WSDP documents	No comments were received

The WSDP was finalised, after the public participation process, and will be taken to Council for approval on the 25th of July 2024.

IDP Goals and Integration

To comply with the Water Services Act, the WSDP should be prepared as part of the IDP process unless there is no IDP process in which case it can be prepared separately. The WSDP is a sectoral plan that falls within the inter-sectoral umbrella plan of the IDP. The WSDP sectoral planning and integrated development planning, must inform each other. It is therefore important to start the WSDP planning process by orientating the water services development goals against the overall development goals of the IDP. This in essence becomes the overall framework within which detailed water services needs and development projects can be benchmarked and tested.

The Vision statement of Swartland Municipality is "**Swartland forward-thinking 2040 - where people can live their dreams.**"

Swartland Municipality's Strategic Objectives, Initiatives and Targets, as included in the 2023/2024 IDP, are as follows:

- **Community safety and wellbeing**
  - SMME development;
  - Social regeneration;
  - Take action against Gender-Based Violence and Femicide;
  - Youth Development;
  - Improve prosecution of law enforcement offenders;
  - Animal pound for the Swartland area;

- Integrated operational emergency room;
- Increase law enforcement present in all towns;
- Document management;
- Strategic establishment and placement;
- Extension of Traffic and Law Enforcement Services; and
- Sufficient office space for Protection Services.

- **Economic transformation**
  - Skills development;
  - Global networks and an active participant in global knowledge exchange;
  - Investment Promotion / Marketing;
  - Assist and support SMME; and
  - Improving the ease of doing business.

- **Quality and reliable services**
  - Water resource augmentation;
  - Bulk water supply system that is fit for future;
  - Extension of the Highlands landfill site;
  - Ensure sufficient infrastructure that is fit for future;
  - Maintenance and upgrading that sustain and improve the current condition of surfaced roads;
  - Wheeling framework development;
  - Ensure bulk infrastructure capacity that is adequate for future developments;
  - Optimally maintain electrical network infrastructure;
  - Ensure sustainable electricity tariffs; and
  - Facilitate grid access for renewable energy generation.

- **A healthy and sustainable environment**
  - Maintain a balance between non-paying and paying households through the increased provision of affordable housing. Finance Linked Individual Subsidy Programme housing. Gap housing and social housing in the Swartland Area;
  - Alignment of capital expenditure framework between spatial planning engineering and financial services; and
  - Climate change study.

- **A connected and innovative local government**
  - Innovative local government;
  - Inter-connected towns and Municipal buildings;
  - “Smart City” concept;
  - Increased use of digital technology; and
  - Improved corporate image and communication.

The Water Sector's Vision, Goal and Objectives for the NWRS 2, as aligned with the vision of South Africa 2030, are as follows:

- Vision: Sustainable, equitable and secure water for a better life and environment for all.
- Goal: Water is efficiently and effectively managed for equitable and sustainable growth and development.
- Objectives:
  - Water supports development and the elimination of poverty and inequality;
  - Water contributes to the economy and job creation; and
  - Water is protected, used, developed, conserved, managed and controlled in an equitable and sustainable manner.

Catchment Management Agency Catchment Management Strategy Integration

Swartland Municipality's Management Area falls within the Breede-Olifants Catchment Management Area. The Breede-Olifants Catchment Management Agency was established by extending the boundary and area of operation of the Breede-Gouritz CMA Water Management Area (Government Gazette No.47559, 25 November 2022).

The area of operation of the Breede-Olifants Catchment Management Agency includes the previous Breede-Gouritz and Berg-Olifants water management areas as pronounced in the National Water Resource Strategy second edition, 2013.

A Catchment Management Strategy is not yet available for the Breede-Olifants Water Management Area (BOWMA), but the Catchment Management Strategy of the former Breede-Gouritz Water Management Area (BGWMA), July 2017, included the following Vision and three Strategic Focus Areas.

"Healthy water resources, for all, forever,"

- **Strategic Area 1: Protecting for People and Nature:** Focusing primarily on management of streamflow, water quality, habitat and riparian zones related to riverine, wetland, estuarine and groundwater resources, to maintain important ecosystem goods and services and biodiversity.
- **Strategic Area 2: Sharing for Equity and Development:** Focusing primarily on management of water use from surface and groundwater resources through the operation of infrastructure, in order to provide water for productive and social purposes within and outside of the WMA.
- **Strategic Area 3: Co-operating for Compliance and Resilience:** Focusing primarily on co-operation and management of institutional aspects to enable and facilitate the protection and sharing of water, including the more co-operative stakeholders, partnerships, information sharing, disaster risk and adaptation elements of the strategy.

The NWA envisages that all water resources management functions, excluding those that have national strategic implications, should be delegated to the CMAs. The functions to be delegated to the CMAs will include the following:

- Water use authorisation
- Water resources protection
- Compliance monitoring and enforcement
- Coordination of WC/WDM programmes.
- Water quality management
- Establishment and oversight of WUAs
- Water resource planning

- Water resources information management
- Billing and collection of water use charges
- Coordination of disaster management

A.3 SERVICE PROVIDER

Table A.3.1: Service Provider					
Company			iX Engineers (Pty) Ltd		
Name of PSP WSDP Project Manager			Jaco Human		
Tel: 021 – 912 3000	Cell: 084 431 8728	Fax: 021 – 912 3222	Email: jaco.h@ixengineers.co.za		
INPUTS					
Components	**Chapter**	**Name**	**Designation**	**Role**	**Contact address and Number**
Comprehensive Overview					
Settlement Demographics & Public Amenities	1	Jaco Human	Engineer	WSDP PSP	See Above
Service Levels Profile	2	Jaco Human	Engineer	WSDP PSP	See Above
Water Services Asset Management	3	Jaco Human	Engineer	WSDP PSP	See Above
Water Services O&M	4	Jaco Human	Engineer	WSDP PSP	See Above
Conservation and Demand Management	5	Jaco Human	Engineer	WSDP PSP	See Above
Water Resources	6	Jaco Human	Engineer	WSDP PSP	See Above
Financial Profile	7	Jaco Human	Engineer	WSDP PSP	See Above
Water Services Institutional Arrangements and Customer Services	8	Jaco Human	Engineer	WSDP PSP	See Above
Master Plan					
Settlement Demographics & Public Amenities	1	Jaco Human	Engineer	WSDP PSP	See Above
Service Levels Profile	2	Jaco Human	Engineer	WSDP PSP	See Above
Water Services Asset Management	3	Jaco Human	Engineer	WSDP PSP	See Above
Water Services O&M	4	Jaco Human	Engineer	WSDP PSP	See Above
Conservation and Demand Management	5	Jaco Human	Engineer	WSDP PSP	See Above
Water Resources	6	Jaco Human	Engineer	WSDP PSP	See Above
Existing Needs Perspective		Jaco Human	Engineer	WSDP PSP	See Above
Water Master Plan Perspective		Jaco Human	Engineer	WSDP PSP	See Above
Overall Topic Strategies		Jaco Human	Engineer	WSDP PSP	See Above
Name of PSP WSDP Information Systems Operator			Rian Kuffner		
Tel: 021 – 912 3000	Cell: 083 298 9624	Fax: 021 – 912 3222	Email: rian.k@ixengineers.co.za		

References

- 2001, 2011 and 2022 SA Census Data. 2016 Community Survey data of STATSSA.
- DWS's All Towns Reconciliation Strategy Documents for each of the towns in Swartland Municipality's Management Area, 2016.
- Final Draft 2022/2023 Annual Report, Swartland Municipality, January 2024.
- Integrated Development Plan, 2023/2024, Swartland Municipality, May 2023.
- 2022/2023 Medium Term Revenue Expenditure Framework (MTREF) Budget Report, Swartland Municipality.
- Operational and Capital Budgets and Tariffs of Swartland Municipality.
- 2022-23 Municipal Economic Review and Outlook, West Coast District, Western Cape Government.
- Socio-Economic Profile for Swartland Municipality, 2022, Western Cape Government.
- DWS's 2023 Blue Drop Report
- DWS's 2022 Green Drop Report.
- DWS's 2023 Green Drop PAT
- Swartland Municipality Spatial Development Framework, Draft 2023-2028, CK Rumboll & Partners.
- Growth Potential Study, 2014, Western Cape Government, Environmental Affairs and Development Planning.
- Municipal Services Strategic Assessment (MuSSA) for Swartland Municipality, 2023.
- Swartland Water Master Plan, 2020, GLS Consulting.
- Swartland Sewer Master Plan, 2020, GLS Consulting.
- Swartland Bulk Water Master Plan, 2021, GLS Consulting.
- WSDP Performance- and Water Services Audit Report for 2022/2023, iX engineers.
- West Coast District Municipality's Climate Change Plan, May 2019.
- Water Safety Plan for the Internal Water Supply Systems, Working Document, August 2022, iX engineers.
- Water Safety Plan for the Swartland Bulk Water Distribution System, Working Document, June 2022.
- Process Audit Reports for the Wastewater Treatment Plants for the period July 2018 to June 2020, May 2021, Chris Swartz Water Utilization Engineers.
- Wastewater Risk Abatement Plans (W_2RAPs) for the various WWTWs, Working Documents, January 2018, iX engineers.
- Swartland Municipality: Resource Augmentation Study – Desktop Study, May 2021, iX engineers.
- Assessment of Bulk Water Meters, Malmesbury and Riebeek Kasteel, June 2023, Draft, Bigen.

1. SETTLEMENT DEMOGRAPHICS AND PUBLIC AMENITIES

An important component of planning is to characterise the WSA in terms of physical, topographical and socio-economic attributes that might influence the provision of services.

Description of settlement types

- Urban – Formal towns within vicinity of urban cores.
- Dense – Dense rural settlements with population > 5000.
- Village – Rural village with population between 500 and 5000.
- Scattered – Scattered rural village with population less than 500.
- Farmlands – Farming.

Location

The WSA is the Swartland Municipality and the boundaries of the area are indicated on Map 1A in Annexure A. The Municipality is situated within the Breede-Olifants Catchment Management Area. Swartland Municipality falls within the West Coast Region of the Western Cape Province, in which the following Municipalities are also located:

- Matzikama Municipality;
- Cederberg Municipality;
- Bergrivier Municipality;
- Saldanha Bay Municipality; and
- West Coast District Municipality.

The existing water distribution systems for which Swartland Municipality is responsible are as follows:

Swartland Bulk Distribution System: Raw water from the Voëlvlei dam gravitates to the Swartland WTW. The raw water is pumped through the Swartland WTW and the final treated water from the WTW is then further pumped into the bulk distribution network by the Gouda and Kasteelberg pump stations, which are located at the WTW). The following towns receive potable water from the Swartland Bulk System.

Riebeek Wes and Ongegund: Potable water is distributed from the Kasteelberg Reservoirs on the Swartland Scheme (West Coast DM) to the Ongegund Reservoirs and the Riebeek Wes Reservoirs (Three Riebeek Wes reservoirs with a total capacity of 2.69 Ml and one Ongegund reservoir with a total capacity of 2.30 Ml). Potable water is distributed from these reservoirs to the Ongegund and Riebeek Wes consumers.

Riebeek Kasteel: Potable water is distributed from the Kasteelberg Reservoirs on the Swartland Scheme (West Coast DM) via Riebeek Wes to two storage reservoirs in Riebeek Kasteel, with a combined capacity of 1.86 Ml. Potable water is distributed from the two reservoirs to the Riebeek Kasteel consumers.

Malmesbury (Abbotsdale, Kalbaskraal, Riverlands and Chatsworth): Potable water is supplied via the Swavelberg and Rustfontein Pump Stations to the Glen Lilly reservoirs on the Swartland Scheme. The potable water is supplemented downstream with water from the Paardenberg Dam, which is treated by an automatic backwash rapid gravity sand filter and disinfected, before it is distributed to Abbotsdale, Kalbaskraal, Riverlands and Chatsworth. Additional groundwater is also supplied from three boreholes in Riverlands, which is pumped into the Chatsworth reservoirs (after disinfection) and blended with the other potable water, before it is distributed to the Riverlands and Chatsworth consumers.

Darling: Potable water is distributed from the Glen Lilly reservoirs on the Swartland Scheme (West Coast DM) via the Darling PS to the Darling Reservoirs (three reservoirs with a combined capacity of 3.43 Ml). Potable water is distributed from the three reservoirs to the Darling consumers.

Yzerfontein: Potable water is supplied from the Swartland Scheme (West Coast DM) via the Yzerfontein Pump Station in Darling to the Yzerfontein reservoirs (Two reservoirs with combined capacity of 4.37 Ml). Potable water is distributed from the two reservoirs to the Yzerfontein consumers.

Withoogte Bulk Distribution System: Raw water from the Misverstand dam on the Berg River is pumped via the Misverstand pump station to the Withoogte WTWs from where treated water is distributed to the following two towns in Swartland Municipality's Management Area.

Moorreesburg: Potable water is pumped from the Withoogte WTWs (West Coast DM) to the three reservoirs in Moorreesburg with a total capacity of 8.17 Ml. Potable water is distributed from the three reservoirs to the Moorreesburg consumers.

Koringberg: Potable water is pumped from the Withoogte WTWs (West Coast DM) to the two Koringberg reservoirs with a total capacity of 0.51 Ml capacity, from where it is distributed to the Koringberg consumers.

WSA Perspective

Swartland Municipality has been classified as a high capacity Category 'B' municipality. A category 'B' municipality shares municipal executive and legislative authority with a category 'C' or district municipality within whose area it falls, in this case the West Coast District Municipality (DC1). Swartland Municipality share their borders with the City of Cape Town, Bergrivier-, Drakenstein- and Saldanha Bay Municipality.

Swartland Municipality's 2023/2024 IDP list the following challenges facing Municipalities.

- Local and international economy – recessions;
- Electricity supply constraints;
- Electricity demand (diminishing);
- A failing state;
- Potential of drought;
- Ability to collect revenue in challenging environments;
- Growing population of non-paying consumers (expanding subsidy package);
- Expenditure growth higher than revenue growth;
- Capital implementation;
- Impact of aging infrastructure;
- Changes in regulatory environment e.g. MPRA, mSCOA Regulations, GRAP, etc.

The 2023/2024 IDP list the following biophysical, social and economic and built environments Strengths and Weaknesses for Swartland Municipality (SWOT Analysis).

Table 1.1: Institutional, Natural Capital, Economic and Social/Culture Strengths and Weaknesses.

Strengths	Weaknesses
• Settlements Malmesbury – regional development anchor, Moorreesburg and Darling – rural development centres – agricultural and agri-tourism). • Tourism nodes (Riebeek Valley and Yzerfontein) • Water sources / courses Berg-, Diep- and Groen River. • Land cover Mountains and hills (Paardeberg, Porseleinberg and Kasteelberg). • Diversity in agriculture Natural coastal belt (West Coast). • Infrastructure Roads (N7, R27, R45, R46, R315). • Economy	• Maintenance of infrastructure. Maintenance and upgrading of infrastructure to provide for future development. • Land demand and shelter. Housing backlog. • Low levels of income. Unemployment. Dependency on municipal support. • School drop-outs. Dependency on subsidies.

Table 1.1: Institutional, Natural Capital, Economic and Social/Culture Strengths and Weaknesses.	
Strengths	**Weaknesses**
Highest contributors To Employment - commercial services and agriculture. To Gross Domestic Product - Commercial services and manufacturing.	

The 2023/2024 IDP also list the following biophysical, social and economic and built environments Opportunities and Threats for Swartland Municipality (SWOT Analysis).

Table 1.2: Institutional, Natural Capital, Economic and Social/Culture Opportunities and Threats.	
Opportunities	**Threats**
• Access value chains Industrial Development Zone (IDZ) in Saldanha. Proximity to Cape Town. • Access to information • Governance and regulation (Spatial Planning and Land Use Management Act (SPLUMA)). • Access to tertiary education. • World economy. • World nature conservation initiatives. • Catalytic projects enabling the provision of infrastructure.	• Economic globalization and exporting scarce resources. • Climate change. • Urbanization. Population growth. • Availability of and expensive potable water. • Poverty. • Loadshedding. • Limited water resources (and drought).

Swartland Municipality has embarked on a strategic risk assessment process, where the following top strategic risks were identified as strategic risks in the Municipality (2023/2024 IDP):

- In-migration, population growth and land invasion;
- Ageing infrastructure;
- Lack of capacity in respect of infrastructure;
- Expansion in waste, pollution, road congestion and increasing pressure on existing infrastructure;
- Failed state (external risk);
- Global warming (external risk);
- Community safety and compliance with laws and regulations;
- Potential developers not investing in Swartland;
- Inadequate IT management and IT systems, business continuity and disaster recovery processes;
- Insufficient access to water resources;
- Unsafe and unhealthy working conditions and environment;
- Capacity limitations to increase electricity supply (Yzerfontein); and
- Imbalance between the three pillars of sustainable development i.e. environment, economy and people.

Aerial photos of the various urban areas (towns) and the existing water and sewerage infrastructure are included as Maps 2A to 2J in Annexure A. The two bulk water distribution systems are indicated on Maps 2K and 2L in Annexure A.

Physical Perspective

Topography

The landscape is characterized by undulating hills that flattens towards the coastline, with four prominent smaller detached mountains within the area known as Kasteelberg, Porseleinberg, Paardeberg and Darling Hills.

The topography of the Swartland is characterized by an elevated eastern edge formed by the existing mountains, which slope down across the inland plains and valley systems towards the coastal plain and Atlantic Coastline. The general drainage direction in Swartland is therefore in an east-to-west direction.

The primary hydrological systems in Swartland are the Berg River and Diep River System. Smaller rivers and streams feed into these rivers and drain towards the ocean within these primary hydrological systems.

There are a number of man-made dams located within the river networks through the Swartland municipal area, which are used for bulk water reticulation purposes for domestic use and agricultural irrigation. The most prominent of these dams in the Swartland is the Misverstand Dam, in the Berg River.

The Swartland is located within one of the richest biodiversity areas of South Africa and forms part of the Cape Floral Region and one of 34 globally identified biodiversity hotspots. The land is covered with Coastal Renosterveld (or West Coast Renosterveld), Coastal Fynbos (or Salt Plain fynbos), Mountain Fynbos, Strandveld vegetation (or Strandveld succulent Karoo Fynbos) and Dune Thicket (Draft 2023-2028 SDF).

The topographical profile of Swartland Municipality's Management Area is indicated on Map1C in Annexure A.

Climate

Swartland is known for its mild Mediterranean climate with warm very dry summers and mild wet winters. The locality of the region between the Atlantic Ocean in the west and the Berg River and Witzenberg and Great Winterhoek Mountains to the east forms a topographical area with various micro climates that vary between the coastal areas and the inland areas. Coastal temperatures are very mild with average summer temperatures during the day of around 28°C and mild average winter day temperatures in the low 20's. Inland areas have higher average day temperatures in the summer months in the middle to high 30's.

Swartland is located within the winter rainfall region with 80% of the rainfall that occur from April to September. The average annual rain for the following areas in Swartland are: Koringberg Rooikaroo area average 250mm, the lowest with a very short rainfall season. Middle Swartland Piketberg and Porterville average 300mm increasing from the lower lying areas in the west towards the higher lying areas in the east. Koeberg, Kortreiberg, Malmesbury and Voorberg average between 400 and 500 mm. Durbanville, Mamreweg, Paardeberg and Riebeek average between 500 and 600 mm with deposits of more than 700 mm occurring in the higher lying areas of the Riebeek mountains.

There are generally high levels of evaporation (from 18mm to 20mm) during the summer months due to higher temperatures and lower evaporation levels during the winter months being the rain and growth season in the Swartland (Draft 2023-2028 SDF).

<u>Climate Change</u>

It is necessary for WSAs to develop climate response strategies and include these in their WSDPs, implement WC/WDM and reduce levels of non NRW. Water-related climate change adaptation and mitigation planning should be incorporated into all WSDPs and IDPs. The implementation of WC/WDM is a critical element of adapting to climate change. This must be implemented by all water sector institutions and water users, and should include the optimisation of dam and groundwater operation, as well as the reduction of physical water losses and the introduction of water-efficient appliances, processes and crops.

The Climate Change Adaption Summary Report was developed through the Local Government Climate Change Support program in partnership with the Western Cape Climate Change Municipal Support Programme. A summary of the key vulnerability indicators is provided in the table below.

Table 1.3: Key high priority indicators for Climate Change

Sector	Indicator Title	Exposure	Sensitivity	Adaptive Capacity
Agriculture	Change in viticulture (grapes) production	Yes	High	Low
Agriculture	Change in fruit production	Yes	High	Low
Agriculture	Increased risks to livestock	Yes	High	Low
Biodiversity and Environment	Loss of High Priority Biomes	Yes	High	Low
Biodiversity and Environment	Increased impacts on environment due to land-use change	Yes	High	Low
Human Settlements, Infrastructure and Disaster Management	Loss of industrial and labour productivity	Yes	High	Low
Human Settlements, Infrastructure and Disaster Management	Increased impacts on strategic infrastructure	Yes	High	Low
Human Settlements, Infrastructure and Disaster Management	Increased impacts on traditional and informal dwellings	Yes	High	Low
Human Settlements, Infrastructure and Disaster Management	Increased isolation of rural communities	Yes	High	Low
Water	Decreased water quality in ecosystem due to floods and droughts	Yes	High	Low
Water	Less water available for irrigation and drinking	Yes	High	Low

In terms of adapting for climate change, water systems will need to be more robust and new / alternative sources of supply may need to be found. Increased skills will be required from water managers and long-term water projections are required. Although an overall decrease in rainfall is generally not forecasted, increased variability in the climate and frequency of extreme events, as well as increased temperature and wind could have an impact on water sources, particularly surface waters.

Due to the uncertainty associated with the impact of climate change on water demand and on water resources, it would be prudent to adopt the precautionary principle. The following scenario is likely:

- As a result of uncertainty about future rainfall, all resources, especially surface water resources, may be under pressure and may have lower safe yields.
- Due to increased heat units water demand from agriculture, as well as from towns (approximately 62% of all water) will rise sharply.
- Even in the event that average annual rainfalls would not reduce much, it is anticipated that much greater variability of rainfall will occur within a year and also between years due to more extreme climatic conditions.

It is therefore advisable for Swartland Municipality and the West Coast District Municipality that a conservative approach be followed regarding the management of water sources. It is proposed that the following approach be adopted to mitigate and adapt to the impacts of climate change:

- All resources, especially surface water resources, need to be re-evaluated, especially where demand is close to the safe one in twenty year yields. It is therefore important to establish assurance of supply levels of all water sources;
- increase assurance of supply of the water resources by ensuring that there is at least 10% additional capacity (headroom), when considering the maximum 24 hour demand on the peak month of the year;
- do not undertake new developments unless a proper investigation of the implication on water sources and sustainability in the long term has been undertaken;

- vigorously implement WDM measures, especially in terms of the following:
  - increased water efficiency
  - frequent monitoring of the water supply system, from the sources to the consumers; and
  - regular and adequate system maintenance and repairs.
- Diversify water resources, e.g. surface water, groundwater, wastewater re-use and sea water desalination.

The recommended projects and sub-projects for the different Sectors were indicated as follow in the West Coast District Municipality's Climate Change Plan, May 2019.

Table 1.4: Sector Projects for the Adaptation to Climate Change

Objective	Project
Agriculture	
Manage the change in grain production areas.	• Identify climate resilient land-uses that will support the agricultural industry's efforts to exploit new agricultural opportunities, new areas and new crops thus reducing climate change impacts on current agricultural potential. • Implement evidence based monitoring initiatives that feed into management systems. • Promote knowledge generation, knowledge sharing, stakeholder participation and awareness-raising in grain production. • Research and improve understanding of climate change impacts on grain production. • Work with research institutions to research and identify drought resistant crops that can be implemented.
Mange the change in viticulture (grapes) production.	• Commission research and improve understanding of climate change impacts on viticulture production. • Optimise climate resilient land-uses of existing agricultural areas. • Promote knowledge generation, knowledge sharing, stakeholder participation and awareness-raising regarding the alternative agricultural production in the western and southern Cape. • Promote knowledge generation, knowledge sharing, stakeholder participation and awareness-raising regarding viticulture in new growth areas.
Manage the change in fruit production.	• Generate and share scientific, social and indigenous knowledge that will minimise the loss of areas suitable for the growth of fruit. • Identify climate resilient land-uses that will support new agricultural opportunities that will minimise the new areas and new crops thus reducing climate change impacts on current agricultural potential. • Implement evidence based monitoring initiatives that feed into the management systems for fruit production. • Promote knowledge generation, knowledge sharing, stakeholder participation and awareness-raising regarding the decline in suitable areas for the growth of fruit. • Research and improve understanding of climate change impacts on fruit. • Strengthen management plans, to enable continuous monitoring and the ability to effectively respond to the change.
Manage increasing risks to livestock.	• Commission research and improve understanding of climate change impacts livestock and land availability. • Develop a framework that will assist and educate farmers with adjusting to reduce rainfall. • Generate and share scientific, social and indigenous knowledge that will assist with adapting to the reduction in herbage yields. • Improve collaboration and partnership on existing programs (e.g. LandCare Programme, EPWP and River Health Programmes). • Strengthen management plans, to enable continuous monitoring of water and herbage availability for livestock.
Biodiversity and Environment	
Manage Loss of Priority Wetlands and River ecosystems.	• Rehabilitation of degraded wetlands and removal of alien species in the Olifants Estuary between 2018-2022 by the Environmental Services and Technical Services Departments of Matzikama Local Municipality and Technical Services. This will include the development of an Alien Vegetation Management Plan.
Coastal and Marine	
Manage loss of land due to sea level rise.	• The West Coast District Municipality and Saldanha Local Municipality's Environment and Technical Services Departments to facilitate a research project on identifying possible interventions to respond to the loss of land/beach due to sea level rise at Langebaan Beach. This should be done in partnership with the CSIR, DEA, WCDM and Saldanha Local Municipality by July 2019.

Table 1.4: Sector Projects for the Adaptation to Climate Change	
Objective	**Project**
Manage increased damage to property from sea level rise.	• Installation of gabions at Strandfontein Beach in Vredendal within the 2018- 2022 period by the Matzikama Local Municipality Environmental Services and Technical Services Departments to manage the damage to property at Strandfontein Beach.
Human Settlements, Infrastructure and Disaster Management	
Manage potential increased risk of wildfires.	• Installation of four early warning weather stations in identified areas by Fire Services in order to establish early warning systems in Winterhoek and Swartland Mountains by June 2019. • Establish firewise communities in Elandskloof, Goedverwacht, Algeria and Esselbank by the end of June 2020 by Fire Services in collaboration with Fire Protection Association.
Water	
Manage decreased water quality in ecosystem.	• Conduct a review of wastewater treatment works by all local municipalities (Engineering Departments) to determine more appropriate technology for improved quality and recycling of treated effluent for industrial and potable use by April 2018. • Implementation of new technology (based on outcomes of review project) at all local municipalities to improve the quality of treated effluent for industrial and potable use by April 2025. • Department of Water and Sanitation to conduct a study on recharging aquifers with recycled, treated effluent by June 2018.
Manage the quantity of water available for irrigation and drinking.	• Review the entire surface water system for catchment areas in the Western Cape by the Western Cape government in collaboration with DWS, DoA and DEA by November 2018. • Review the entire groundwater system for catchment areas in the Western Cape by the Western Cape government in collaboration with DWS, DoA and DEA by November 2018. • Review the entire desalination water system for catchment areas in the Western Cape by the Western Cape government in collaboration with DWS, DoA and DEA by November 2018. • Review the treated effluent system for catchment areas in the Western Cape by the Western Cape government in collaboration with DWS, DoA and DEA by November 2018.

Floods

One of the climate change threats in some parts of the Western Cape is the likelihood of floods with greater intensity and longer-term impacts. There is likely to be increases in the severity and unpredictability of weather patterns. Flooding and storms are predicted which could have devastating effects on agricultural production.

Natural Environment

Swartland region is home to a diverse fauna and marine life. The coastline along Yzerfontein and Dassen Island provide a unique environment for various marine based animals. Protected areas and threatened ecosystems include: Paardeberg, Riebeek and Porseleinberge, Areas around and between Darling and Riverlands, West of the R27 and Malmesbury (Draft 2023-2028 SDF).

The Swartland region is characterised by a variety of unique natural and cultural elements that must be protected in order to ensure continued conservation of these areas. The existing conservation areas are located throughout the region from the coastline in the west to the Berg River in the east. The formal conservation areas include National Parks, Provincial Nature Reserves and Municipal Nature Reserves. The formal nature reserves in Swartland include:

- Riverlands Provincial Nature Reserve;
- Pella Provincial Nature Reserve;
- Kasteelberg Provincial Nature Reserve;
- Paardeberg Municipal Nature Reserve (are management in cooperation with Drakenstein Municipality)
- Yzerfontein Municipal Nature Reserve;
- Groenekloof Municipal Nature Reserve;
- Darling Renosterveld Municipal Nature Reserve;
- Kalbaskraal Municipal Nature Reserve;
- Tienie Versveld Nature Reserve (wild flower reserve managed by SANBI).

The western side of the Swartland Municipal area form part of the Cape West Coast Biosphere Reserve. The Cape West Coast Biosphere Reserve (CWCBR) is an initiative by Cape Nature to facilitate sustainable development along the West Coast through stewardship agreements with private land owners. The CWCBR stretches from Diep River in the Cape Metropolitan Area in the south northwards along the coastline and coastal plains towards the Bergrivier north of Saldanha and Vredenburg.

Swartland is one of the municipal areas that have the most critically endangered ecosystems, with four of the twenty-one national endangered ecosystems that occur within the area (Draft 2023-2028 SDF).

The conservation areas and vegetation profiles are indicated on Map 1B in Annexure A.

Demographic Perspective

Economics: The Swartland Municipal area's economy was valued at R8.983 billion in 2020 and employed 43 200 people. Historical trends between 2016 and 2020 indicates that the municipal economy grew marginally at an average annual growth rate of 0.1 per cent. Although the secondary sector contracted, the primary and tertiary sectors continued to grow at 2.1 and 0.3 per cent respectively. The growth can be attributed to the good growth in the agriculture, forestry & fishing sector (2.1 per cent) as well as relatively strong growth in the finance, insurance, real estate & business services (2.0 per cent) and general government (2.3 per cent) sectors.

The 2020 recession made a substantial dent in the average growth rate over the period, but load shedding and the drought within the Province also played a major role in prior years.

Table 1.5: Swartland GDPR performance per sector

Sector	R million value 2020	Trend 2016-2020	Real GDPR growth 2021e
PRIMARY SECTOR	**1 394.7**	**2.1**	**8.4**
Agriculture, forestry and fishing	1 378.1	2.1	8.5
Mining and quarrying	16.7	1.9	-13.5
SECONDARY SECTOR	**2 542.6**	**-1.2**	**7.1**
Manufacturing	2 010.3	0.2	9.5
Electricity, gas and water	178.4	-3.3	2.4
Construction	353.8	-6.1	-3.4
TERTIARY SECTOR	**5 045.4**	**0.3**	**5.8**
Wholesale and retail trade, catering and accommodation	1 450.9	-1.4	8.1
Transport, storage and communication	436.3	-3.5	5.2
Finance, insurance, real estate and business services	1 115.6	2.0	4.2
General government	1 075.6	2.3	3.0
Community, social and personal services	967.0	1.0	8.2
Total Swartland	**8 982.7**	**0.1**	**6.6**

Source: 2022 Socio-Economic Profile Swartland Municipality

Social: The table below gives an overview of the 2022 Socio-Economic Profile of Swartland Municipality.

Table 1.6: 2022 Socio Economic Profile of Swartland Municipality

Education (2021)		Poverty (2021)	
Matric Pass Rate	85.8%	Gini Coefficient	0.61
Learner-Teacher Ratio	76.1%	Upper Bound Poverty Line	57.73%
Retention Rate	32.9		
Health (2021/22)		**Safety and Security (Actual number of reported cases in 2021/2022)**	
Primary Health Care Facilities	5	Residential Burglaries	525
Immunisation Rate	63.5%	DUI	76
Maternal Mortality Ratio (per 100 000 live births)	0.0	Drug-related Crimes	1 226
Teenage Pregnancies – Delivery rate to women U18	14.8%	Murder	30
		Sexual Offences	125
Access to Basic Service Delivery		**Road Safety (2021/22)**	

Table 1.6: 2022 Socio Economic Profile of Swartland Municipality			
Education (2021)		**Poverty (2021)**	
(Percentage of households with access to basic services, 2021)			
Water	99.5%	Road User Fatalities	17
Refuse Removal	78.3%	Fatal Crashes	16
Electricity	98.4%	**Labour (2021)**	
Sanitation	97.2%	Unemployment Rate	14.6%
Housing	91.2%		
Socio-economic Risks		**Largest Three Sectors (Contribution to GDPR, 2020)**	
Increasing unemployment and job losses, especially in the informal sector	Risk 1	Manufacturing	22.4%
Steady increase in learner teacher ratio	Risk 2	Wholesale & retail trade, catering & accommodation	16.2%
Continued strong population growth	Risk 3	Agriculture, forestry and fishing	15.3%

Source: 2022 Socio-Economic Profile Swartland Municipality

Regional Perspective

The economy of the West Coast District was valued at R33.9 billion in 2020, contributing 4.9 percent to the Western Cape's total GDPR. Between 2016 and 2020, the District's economy recorded a near stagnant average annual growth rate of 0.1 per cent. This rate was higher than the average annual contraction of 0.4 per cent experienced in the Province over the same period.

In 2020, the Saldanha Bay municipal area was the leading contributor to GDPR at 32.2 per cent. This was followed by the Swartland municipal area at 26.5 per cent during the year. The Matzikama and Bergrivier municipal areas had similar contributions in 2020 at 14.8 per cent and 14.2 per cent respectively. However, the Bergrivier municipal area's average annual growth outweighed that of the Matzikama municipal area between 2016 and 2020, which suggests that it may soon surpass the Matzikama municipal area's GDPR contribution. The Cederberg municipal area registered the smallest contribution to the WCD economy in 2020 at 12.3 per cent.

Valued at R18.1 billion in 2020, which signified a GDPR contribution of 53.4%, the tertiary sector was the leading contributor to the WCD economy during the year. Between 2016 and 2020, the tertiary sector recorded an average annual growth rate of 0.2 per cent, which was marginally higher than the average growth rate of 0.1 per cent recorded in the WCD over the same period. As such, it is concluded that growth in the District is largely dependent on the performance of the tertiary sector.

Within the tertiary sector, the finance sector accounted for the largest share of GDPR at 14.6% in 2020. This was followed by the trade and general government sectors, which contributed 13.7% and 10.3% respectively during the year. Between 2016 and 2020, the finance sector recorded an average annual growth rate of 2.6%, which was significantly above the 0.1% average growth rate recorded by the District (2022-23 Municipal Economic Review and Outlook, West Coast District, Western Cape Government).

1.1 SETTLEMENT DEMOGRAPHICS

Following the 2011 Census survey it became evident that there was an extensive migration into the Municipal Area. The population figure for Swartland Municipality in 2001 was 72 108 (18 675 households). This figure increased substantially to 113 763 in 2011 (29 324 households) at an average annual population growth rate of 4.67%/a.

The Community Survey of 2016 from Statistics South Africa estimate the 2016 population for Swartland Municipality at 133 762 persons and the permanent households at 39 139, at an average household size of 3.4 persons per household.

The Socio-economic Profile of 2022 for Swartland Municipality estimated the 2022 population at 140 697 persons and the 2021 households at 32 515. This total population is estimated to increase to 152 921 by 2026. The current population in the is estimated higher, as well as the average annual future population growth percentage.

The published 2022 Census population for Swartland Municipality was 148 331 persons (Annual growth rate of 2.6% over the period 2011 to 2022) and the number of permanent households was 44 856, which is higher than the figures included in the IDP and the 2022 Socio Economic Profile. The projected population and households included in the Municipality's approved 2022/2023 WSDP Performance- and Water Services Audit Report is higher than the 2022 Census published data. The 2022 Census data is not yet available per town and it was therefore not possible to update Swartland Municipality's projected population and households per town (system) at this stage. It was therefore decided to keep the projected population and households for Swartland Municipality for the WSDP the same as the figures included in the approved 2022/2023 WSDP Performance- and Water Services Audit Report.

The 2022/2023 population for the various water distribution systems were estimated by applying the annual growth rates as indicated in the table below to the 2011 Census data. The current population figures and the annual population growth percentages used in the WSDP Performance- and Water Services Audit Report are aligned with the figures used in DWS's GeoDatabase.

The future estimated annual population growth percentages, as listed in the table below, were agreed with the Municipality's Engineering Department during January 2014.

Table 1.1.1: Estimated future annual population growth percentages, population and households per distribution system

Distribution System	Estimated future annual population growth %	Projected 2022/2023 population	Projected 2022/2023 households
Darling	2.0%	12 956	3 481
Koringberg	4.0%	1 869	488
Malmesbury	4.5%	58 256	15 373
Abbotsdale	3.0%	5 207	1 279
Chatsworth & Riverlands	6.0%	7 692	2 100
Kalbaskraal	5.0%	4 124	1 127
Moorreesburg	4.0%	19 824	5 693
Riebeek Kasteel	7.0%	10 021	2 831
Ongegund (PPC)	3.0%	420	105
Riebeek Wes	6.0%	8 322	2 066
Yzerfontein	4.0%	1 755	754
Farms	3.5%	47 630	10 759
TOTALS	**4.1%**	**178 075**	**46 056**

The current 2022/2023 population for Swartland Municipality is therefore estimated at 178 075 persons and the permanent households at 46 056, as indicated in the table above.

WSDP: ADMINISTRATION, INFORMATION AND COMPREHENSIVE OVERVIEW
TOPIC 1: SETTLEMENT DEMOGRAPHICS AND PUBLIC AMENITIES

The table below gives a summary of the population and households for the various water distribution and sanitation drainage systems.

Table 1.1.2: Settlement Demographics

Settlement Name	Scheme ID	Main Type (Urban / Rural)	Type	2011 Census Data			2022/2023 Projected Data			WSDP General Fields									
				Population	Households	Person / hh	Population	Households	Person / hh	% HH Communal Supply	% HH Controlled Supply	% HH Uncontrolled Supply	% of Settlement Metered	% of Settlement Billed	Water Use	Artificial Recharge	Rain Water Harvesting	No of HH requiring free basic water	No of HH requiring free basic sanitation
Darling		Urban	Formal Town	10 420	2 800	3.7	12 956	3 481	3.7	0%	0%	100%	98.9%	98.9%	Domestic	No	No	884	884
Koringberg		Urban	Formal Town	1 214	317	3.8	1 869	488	3.8	0%	0%	100%	98.2%	98.2%	Domestic	No	No	124	124
Malmesbury		Urban	Formal Town	35 897	9 473	3.8	58 255	15 373	3.8	0%	0%	100%	99.4%	99.4%	Domestic	No	No	3 902	3 902
Abbotsdale		Urban	Formal Town	3 762	924	4.1	5 207	1 279	4.1	0%	0%	100%	96.8%	96.8%	Domestic	No	No	325	325
Chatsworth / Riverlands		Rural	Rural - Small Village <= 5000	4 052	1 106	3.7	7 692	2 100	3.7	33.3%	0%	66.7%	95.1%	95.1%	Domestic	No	No	533	533
Kalbaskraal		Urban	Formal Town	2 411	659	3.7	4 124	1 127	3.7	0%	0%	100%	95.1%	95.1%	Domestic	No	No	286	286
Moorreesburg		Urban	Formal Town	12 877	3 698	3.5	19 824	5 693	3.5	0%	0%	100%	97.0%	97.0%	Domestic	No	No	1 445	1 445
Riebeek Kasteel		Urban	Formal Town	4 761	1 345	3.5	10 021	2 831	3.5	0%	0%	100%	99.2%	99.2%	Domestic	No	No	719	719
Ongegund (PPC)		Rural	Rural - Small Village <= 5000				420	105	0.0	0%	0%	100%	99.0%	99.0%	Domestic	No	No	27	27
Riebeek Wes		Urban	Formal Town	4 605	1 143	4.0	8 322	2 066	4.0	0%	0%	100%	96.9%	96.9%	Domestic	No	No	524	524
Yzerfontein		Urban	Formal Town	1 140	490	2.3	1 755	754	2.3	0%	0%	100%	95.9%	95.9%	Domestic	No	No	436	436
Farms		Rural	Farming	32 624	7 369	4.4	47 630	10 759	4.4	3.1%	0%	96.9%	100.0%	100.0%	Domestic & Agricultural	Unknown	Unknown	Unknown	Unknown
Total				**113 763**	**29 324**	**3.9**	**178 075**	**46 056**	**3.9**										

Notes: 1) % of Settlement Metered and Billed: 100% - (2018 Swift calculated developed erven without a meter / Number of projected 2022/2023 households x 100). Used the number of residential consumer units for Yzerfontein.
2) No of HH requiring free basic water: 22/23 Number of projected households for town / Total number of projected households in the Urban areas, excluding farms x 9 205 (22/23 registered indigent households that received free basic water)
3) No of HH requiring free basic sanitation: 22/23 Number of projected households for town / Total number of projected households in the Urban areas, excluding farms x 9 205 (22/23 registered indigent households that received free basic sanitation)
4) The 2011 Census Data in the above table is revised data for the urban areas of each town according to new boundaries.

The residential Water and Sanitation Service Levels Profiles for the above settlements are included under Topic 2.

The towns in Swartland Municipality's Management Area were described as follows in the draft 2023-2028 SDF.

Table 1.1.3: Towns in Swartland Municipality's Management Area
Malmesbury
Malmesbury is located approximately 60 kilometres north of the Cape Town Metropolitan area. The town is surrounded by hills of vineyards and wheat fields. The vibrant combination of colours and textures of the landscape contributes to the unique character of the Swartland. Malmesbury also serves as the connection point for four major transport routes; the N7 that connects Cape Town with the Northern Cape and Namibia, Main Road 25/1 that connects Ceres and Paarl with the N7, the R302 Main Road 174 that connects Stellenbosch and Durbanville with Malmesbury and lastly Main Road 21/1 that connects Stellenbosch and Durbanville with the West Coast. The location of Malmesbury in terms of access and transportation routes as well as the town's proximity to other towns such as the Riebeek Valley, Darling, Yzerfontein, Moorreesburg, Vredenburg, Langebaan and Piketberg are contributing factors to the identification of Malmesbury as the regional service centre of the Swartland.
Abbotsdale
Abbotsdale is situated 5 kilometres from Malmesbury in a south-western direction and is classified as a small rural town. The town has access directly from the N7.
Kalbaskraal
Kalbaskraal is the southernmost settlement within the Swartland Municipal jurisdiction area. Although this town is isolated from Malmesbury (main town of the Swartland) access is obtained directly from the N7 that connects Malmesbury with the Cape Town Metropolitan area.
Moorreesburg
Moorreesburg is located approximately 100 kilometres north of the Cape Metropole along the N7 route and 70 kilometres to the east of the West Coast towns of Langebaan and Saldanha. The town is centrally located in the northern part of the Swartland and form an important agricultural service centre to the surrounding extensive agricultural production area.
Riebeek West
Riebeek West is located in the east of Swartland, approximately 6 kilometers north of Riebeek Kasteel, in the Riebeek Valley. The town is situated close to the slopes of the Kasteelberg, surrounded by intensively cultivated agricultural activities including some of oldest wineries in South Africa, namely Groenrivier, Allesverloren and Brandwag. Access to Riebeek West is obtained from the R311, the main traffic route in the Riebeek Valley that connects with the N7 at Moorreesburg, and the R45 between Malmesbury and Hermon.
Riebeek Kasteel
Riebeek Kasteel is situated approximately 20 kilometres northeast from Malmesbury and receives access via the Paarl road (Divisional Road 24/1) to the R45 that connects Malmesbury with Hermon. The R45 is connected to the N7 via the R311 (main route in the Riebeek Valley). The town is located along the slopes of Kasteelberg and is surrounded by some of the oldest vineyards in the history of South Africa. The town's characteristic grid layout is encouraged by the surrounding vineyards along with intensive agricultural uses adjacent to the urban edge.
Riverlands and Chatsworth
Riverlands is located 14 kilometres south of Malmesbury along the western side of the N7 in the area known as Greater Chatsworth. Access from the N7 to Riverlands is obtained via connection road no 241. Chatsworth is located on the southern boundary of the Swartland Municipal area in the area known as Greater Chatsworth. The town is situated 14 kilometres south of Malmesbury. Access from the N7 national road to Chatsworth is obtained via connection road no 241. The N7 is approximately 4.5 kilometres east of the town.
Darling
Darling is situated in the rural area of Ward 6 in the Swartland Municipal area. This town is approximately 80 kilometres from Cape Town and located near the West Coast Industrial Corridor. Access to Darling is obtained from the R315 via Malmesbury (N7) and the West Coast road (R27)
Yzerfontein
Yzerfontein is situated approximately 80 kilometres from Cape Town along the west coast in the Swartland region. This location advantage and accessibility contributes to the town's attractiveness and growth over the past years. Permanent residence commutes to work from Yzerfontein.

The Growth Potential Study 2014 of the Western Cape Government determined the growth potential and socio-economic needs of settlements in the Western Cape using quantitative data (e.g. factors relating to socio-economic, economic, physical-environmental, infrastructure and institutional aspects). The growth potential of the towns in Swartland Municipality's Management Area was indicated as follows.

Table 1.1.4: Growth potential of the towns in Swartland Municipality's Management Area

Town	Growth Potential Score (Out of 100)	Growth Category
Darling	55	Medium
Koringberg	58	Medium
Malmesbury	73	Very High
Kalbaskraal	69	High
Moorreesburg	62	High
Riebeek Kasteel / Riebeek Wes	69	High
Yzerfontein	56	Medium

The table below gives an overview of the growth potential indicators for the towns in Swartland Municipality's Management Area, as included in the Growth Potential Study.

Table 1.1.5: Growth potential indicators for the towns in Swartland Municipality's Management Area (Settlement Level Classification)

Indicator	Darling	Koringberg	Malmesbury	Kalbaskraal	Moorreesburg	Riebeek Kasteel / Wes	Yzerfontein
Absolute socio-economic needs	Low	Very Low	High	Low	Medium	Medium	Very Low
Proportional socio-economic needs	Low	Medium	Medium	High	Low	Medium	Very Low
Human capital index	Medium	High	Medium	High	High	High	Very High
Economic index	Low	Low	Medium	Medium	Low	Medium	Medium
Physical index	Low	High	Very High	Very High	Medium	Very High	Very Low
Infrastructure	Very High	High	Very High	High	Very High	High	Very High
Institutional	High	High	High	High	High	Very High	High

1.2 PUBLIC AMENITIES

The Public facilities in Swartland Municipality's Management Area are shown in the table below.

Table 1.2.1: Public Amenities in Swartland Municipality's Management Area

Facility Name	Town	Main Type	Sub Type
West Coast College	Malmesbury	Educational Facility	Tertiary Facility
Moorreesburg Clc (Movos)	Moorreesburg	Educational Facility	ABET
Laurie Hugo Primary School	Moorreesburg	Educational Facility	Combined School
Dolfyntjies Bewaarskool	Moorreesburg	Educational Facility	Pre-Primary School
Dirkie Uys Primary School	Moorreesburg	Educational Facility	Primary School
Dirkie Uys High School	Moorreesburg	Educational Facility	Secondary School
Riebeeck Kasteel	Riebeek Kasteel	Educational Facility	ABET
Carnegie House Preparatory	Riebeek Kasteel	Educational Facility	Combined School
Riebeeck-Kasteel Primary School	Riebeek Kasteel	Educational Facility	Primary School
Meiring Primary School	Riebeek Kasteel	Educational Facility	Primary School
Riebeeck-Wes	Riebeek West	Educational Facility	ABET
Riebeeck-Wes Primary School	Riebeek West	Educational Facility	Combined School
Riebeeck Valley Special School	Riebeek West	Educational Facility	LSEN
Darling CLC	Darling	Educational Facility	ABET
Vooruitsig Primary School	Darling	Educational Facility	Combined School
Evita's Darlings Pre-Primary	Darling	Educational Facility	Pre-Primary School
Klouter Kabouter Pre-Primary	Darling	Educational Facility	Pre-Primary School
Darling Pre-Primary	Darling	Educational Facility	Pre-Primary School
Darling Kollege	Darling	Educational Facility	Primary School
Darling Primary School	Darling	Educational Facility	Primary School
Koringberg (Site)	Koringberg	Educational Facility	ABET
Koringberg Primary School	Koringberg	Educational Facility	Primary School
Schoonspruit Secondary (ALC)	Malmesbury	Educational Facility	ABET
Malmesbury Volwasse Onderwyssentrum	Malmesbury	Educational Facility	ABET
Malmesbury New Prison	Malmesbury	Educational Facility	ABET
Illingelethu	Malmesbury	Educational Facility	ABET
Piketberg Christian School	Malmesbury	Educational Facility	Combined School
Goue Vlokkies Bewaarskool	Malmesbury	Educational Facility	Pre-Primary School
Vrolike Vinkies Pre-Primary (Malmesbury)	Malmesbury	Educational Facility	Pre-Primary School
Swartland Pre-Primary	Malmesbury	Educational Facility	Pre-Primary School

Table 1.2.1: Public Amenities in Swartland Municipality's Management Area

Facility Name	Town	Main Type	Sub Type
Christelike Privaatskool Malmesbury	Malmesbury	Educational Facility	Primary School
Swartland Primary School	Malmesbury	Educational Facility	Primary School
Liebenberg Primary School	Malmesbury	Educational Facility	Primary School
St. Thomas Primary School	Malmesbury	Educational Facility	Primary School
Naphakade Primary School	Malmesbury	Educational Facility	Primary School
Better Beginnings College	Malmesbury	Educational Facility	Primary School
Swartland High School	Malmesbury	Educational Facility	Secondary School
Wesbank Secondary School	Malmesbury	Educational Facility	Secondary School
Schoonspruit Secondary School	Malmesbury	Educational Facility	Secondary School
Llingelethu Secondary School	Malmesbury	Educational Facility	Secondary School
Abbotsdale	Abbotsdale	Educational Facility	ABET
Bambino's Creche	Abbotsdale	Educational Facility	Pre-Primary School
St. Michael's Primary School	Abbotsdale	Educational Facility	Primary School
Kalbaskraal	Kalbaskraal	Educational Facility	ABET
O.J. Erasmus NGK Primary School	Kalbaskraal	Educational Facility	Primary School
Riverlands CLC	Chatsworth/Riverlands	Educational Facility	ABET
Chatsworth CLC	Chatsworth/Riverlands	Educational Facility	ABET
Riverlands Primary School	Chatsworth/Riverlands	Educational Facility	Primary School
Chatsworth Ame Primary School	Chatsworth/Riverlands	Educational Facility	Primary School
Rust Stasie	Swartland Rural	Educational Facility	ABET
Anne Pienaar Primer	Swartland Rural	Educational Facility	ABET
Riebeecksrivier Vallei Kleuterskool	Swartland Rural	Educational Facility	Pre-Primary School
Welgemeend NGK Primary School	Swartland Rural	Educational Facility	Primary School
Anne Pienaar Gedenk NGK Primary School	Swartland Rural	Educational Facility	Primary School
Bloemendal NGK Primary School	Swartland Rural	Educational Facility	Primary School
Goedehoop Primary School	Swartland Rural	Educational Facility	Primary School
Koranrug Primary School	Swartland Rural	Educational Facility	Primary School
Morning Star NGK Primary School.	Swartland Rural	Educational Facility	Primary School
Ruststasie Primary School	Swartland Rural	Educational Facility	Primary School
Weltevreden NGK Primary School	Swartland Rural	Educational Facility	Primary School
Kleinkarnmelkvlei NGK Primary School	Swartland Rural	Educational Facility	Primary School
Skilpadvlei NGK Primary School	Swartland Rural	Educational Facility	Primary School
Moorreesburg CHC	Moorreesburg	Health Facility	Health Centers
Malmesbury CHC	Malmesbury	Health Facility	Health Centers
Riebeeck Kasteel Clinic	Riebeek Kasteel	Health Facility	Clinics
Riebeeck West Clinic	Riebeek West	Health Facility	Clinics
Yzerfontein Satellite Clinic	Yzerfontein	Health Facility	Clinics
Darling Clinic	Darling	Health Facility	Clinics
Koringberg Satellite Clinic	Koringberg	Health Facility	Clinics
Malmesbury Satellite Clinic	Malmesbury	Health Facility	Clinics
Malmesbury Town Satellite Clinic	Malmesbury	Health Facility	Clinics
Malmesbury ID Hospital	Malmesbury	Health Facility	Hospitals
Swartland Hospital	Malmesbury	Health Facility	Hospitals
Abbotsdale Satellite Clinic	Abbotsdale	Health Facility	Clinics
Kalbaskraal Satellite Clinic	Kalbaskraal	Health Facility	Clinics
Chatsworth Clinic	Chatsworth/Riverlands	Health Facility	Clinics
Riverlands Satellite Clinic	Chatsworth/Riverlands	Health Facility	Clinics

1.3 SOCIO ECONOMIC BACKGROUND (Information)

1.3.1 Population and Households

The 2001 Census recorded the population in the Swartland Municipality's Management Area at 72 108 persons (18 675 Households) and the 2011 Census data recorded the population at 113 763 persons (29 324 Households), which is indicative of extensive migration into the Municipal Area. The 2022/2023 population of Swartland Municipality is estimated at approximately 178 075 persons (46 056 Households). The table below gives an overview of the historical population figures for Swartland Municipality for the various years.

Table 1.3.1.1: Historical population and household data of Swartland Municipality

Year	Source	Population	Households	Person / Household
2001	Census 2001 Community Profiles	72 108	18 675	3.86
2011	Census 2011 Community Profiles	113 763	29 324	3.88
2016	2016 Community Survey	133 762	39 139	3.42
2022	Socio-Economic Profile	140 697	32 515	4.33
2022	Census 2022 Community Profiles	148 331	44 856	3.31

The published 2022 Census population for Swartland Municipality was 148 331 persons (Annual growth rate of 2.6% over the period 2011 to 2022) and the number of permanent households was 44 856, which is higher than the figures included in the 2022 Socio Economic Profile. The projected population and households included in the Municipality's approved 2022/2023 WSDP Performance- and Water Services Audit Report is higher than the 2022 Census published data. The 2022 Census data is not yet available per town and it was therefore not possible to update Swartland Municipality's projected population and households per town (system) at this stage. It was therefore decided to keep the projected population and households for Swartland Municipality, as included in the 2022/2023 WSDP Performance- and Water Services Audit Report.

The historical population and household figures and population growth rates and projected present population and number of households for Swartland Municipality, for the various schemes, are summarised in the table below.

Table 1.3.1.2: Historical population and household figures and population growth rates and projected present population and households

Town	Census 2011 (Stats SA Source)			Future Population Growth per year (2011 Onwards)	Projected for 2022/2023 (Calculated from revised boundaries of Census 2011 data)		
	P	H	P/H		P	H	P/H
Darling	10 420	2 800	3.7	2.0%	12 956	3 481	3.7
Koringberg	1 214	317	3.8	4.0%	1 869	488	3.8
Malmesbury	35 897	9 473	3.8	4.5%	58 255	15 374	3.8
Abbotsdale	3 762	924	4.1	3.0%	5 207	1 279	4.1
Chatsworth / Riverlands	4 052	1 106	3.7	6.0%	7 692	2 100	3.7
Kalbaskraal	2 411	659	3.7	5.0%	4 124	1 127	3.7
Moorreesburg	12 877	3 698	3.5	4.0%	19 824	5 693	3.5
Riebeek Kasteel	4 761	1 345	3.5	7.0%	10 021	2 831	3.5
Ongegund (PPC)	255	86	3.0	4.6%	420	105	3.0
Riebeek Wes	4 350	1 057	4.1	6.0%	8 322	2 065	4.1
Yzerfontein	1 140	490	2.3	4.0%	1 755	754	2.3
Farms	32 624	7 369	4.4	3.5%	47 630	10 759	4.4
Total	**113 763**	**29 324**	**3.9**	**4.2%**	**178 075**	**46 056**	**3.9**

Notes: Abbreviations P – Persons, H – Households and P/H - Person / Household.

The size of the population provides an indication of the volume of demand for government services in a particular area. It also serves as a planning measure to assist budget planners to match available resources to the relative demand for infrastructural and social services including water, sanitation, electricity, housing and health care.

1.3.2 Population Growth Rates

The effective population growth rate will most likely change over the next 5 years considering the effect of economic development, social development (e.g. education) and the HIV / Aids pandemic. The projected population growth rates included in the WSDP are as follows.

Table 1.3.2.1: Projected population growth rate for the next five years

Town	Estimated annual population growth for next 5 Years (%/a)
Darling	2.0%
Koringberg	4.0%
Malmesbury	4.5%
Abbotsdale	3.0%
Chatsworth & Riverlands	6.0%
Kalbaskraal	5.0%
Moorreesburg	4.0%
Riebeek Kasteel	7.0%
Ongegund (PPC)	3.0%
Riebeek Wes	6.0%
Yzerfontein	4.0%
Farms	3.5%
Total	**4.1%**

1.3.3 Age and Gender Profile

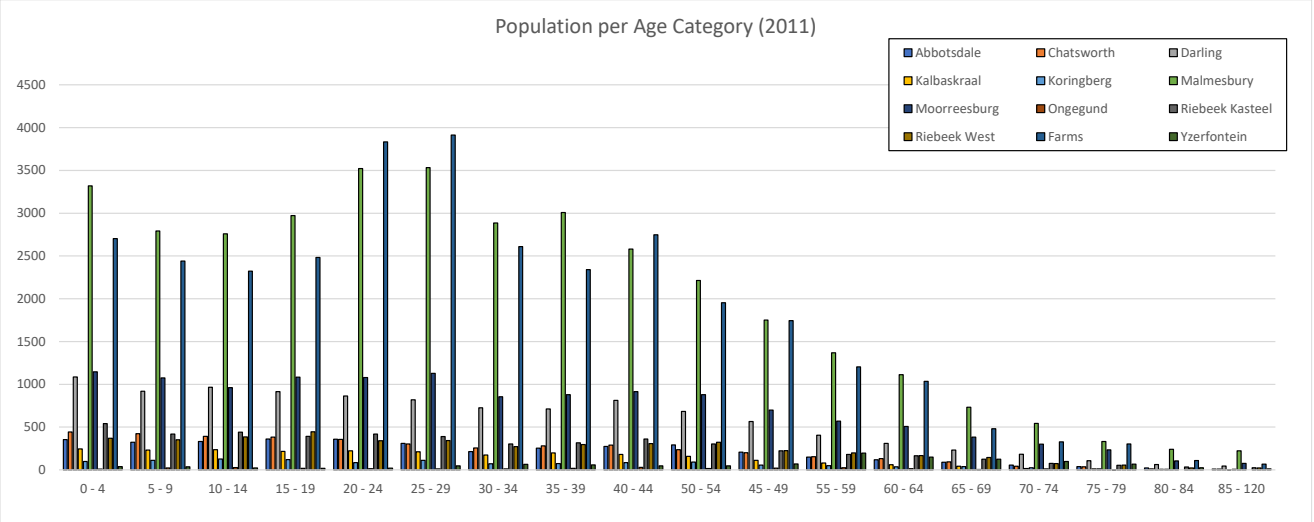
The age and gender profile of the various communities may be indicative of development needs and socio-economic status and the statistics provides important insights into the age groups, where the bulk of the population is located and to target government, civil society and non-governmental programmes more effectively. The 2022 age and gender Census data is not yet available per Community Profile. The information below for Swartland Municipality is as taken from the 2011 Census data.

Table 1.3.3.1: Age and gender profile per scheme for 2011

Scheme	Permanent resident population 2011	Residents (15 to 64 years)		Youth and aged residents (< 15 years &>64 years)		Male residents		Female residents	
		Number	%	Number	%	Number	%	Number	%
Darling	10 420	6 815	65.4%	3 605	34.6%	4 983	47.8%	5 437	52.2%
Koringberg	1 214	782	64.4%	432	35.6%	618	50.9%	596	49.1%
Malmesbury	35 897	24 951	69.5%	10 946	30.5%	18 017	50.2%	17 880	49.8%
Abbotsdale	3 762	2 539	67.5%	1 223	32.5%	1 816	48.3%	1 946	51.7%
Chatsworth & Riverlands	4 052	2 597	64.1%	1 455	35.9%	1 936	47.8%	2 116	52.2%
Kalbaskraal	2 411	1 616	67.0%	795	33.0%	1 230	51.0%	1 181	49.0%
Moorreesburg	12 877	8 596	66.8%	4 281	33.2%	6 154	47.8%	6 723	52.2%
Riebeek Kasteel	4 761	3 048	64.0%	1 713	36.0%	2 322	48.8%	2 438	51.2%
Ongegund (PPC)	255	177	69.4%	78	30.6%	121	47.5%	134	52.5%
Riebeek Wes	4 350	2 922	67.2%	1 428	32.8%	2 101	48.3%	2 249	51.7%
Yzerfontein	1 140	717	62.9%	423	37.1%	558	48.9%	583	51.1%
Farms	32 624	23 866	73.2%	8 758	26.8%	16 620	50.9%	16 004	49.1%
Total	**113 763**	**78 626**	**69.1%**	**35 137**	**30.9%**	**56 476**	**49.6%**	**57 287**	**50.4%**

From the above table it can be noted that there is not a big difference between the male and female population within the various towns.

The graph below gives an overview of the 2011 Census population distribution per age category for Swartland Municipality.



The increase in the working population aged 20-29 compared to those aged 0-14 is an indication of in migration of workers looking for jobs in the area. The growth in the labour force will have a direct impact on a greater need for employment opportunities.

The table below gives an overview of the population categories by age.

Table 1.3.3.2: Age distribution

Year	Children (0-14)	Economically Active (15 – 64)	Elderly (> 64)	Youth (15-34)	Youth and Children (0 – 34)
2011	28 496 (25.1%)	78 626 (69.1%)	6 641 (5.8%)	40 089 (35.2%)	68 570 (60.3%)

The child and age dependency ratio of Swartland Municipality for 2011 was 25.1% and 5.8% respectively. The total dependency ratio for Swartland Municipality was therefore 30.9%. In relation to the Age Distribution within the Swartland Municipality, the Working Age segment of the population accounts for 69.1%. From an economic standpoint, the labour force appeared to be well endowed with a fair sparkling of youth.

1.3.4 Employment Profile

The status and type of employment indicates the nature of household income and income security. The 2022 employment Census data is not yet available per Community Profile. The employment profile for Swartland Municipality for 2011, as taken from the 2011 Census data, is as follows.

Table 1.3.4.1: Employment profile per scheme for 2011

Scheme	Employed		Unemployed		Discouraged Work Seeker		Other not Economically Active		Not Applicable	
	Number	%	Number	%	Number	%	Number	%	Number	%
Darling	3 672	35.2%	750	7.2%	60	0.6%	2 329	22.4%	3 609	34.6%
Koringberg	408	33.6%	15	1.2%	12	1.0%	346	28.5%	433	35.7%
Malmesbury	12 403	34.6%	2 710	7.5%	402	1.1%	9 439	26.3%	10 943	30.5%
Abbotsdale	1 292	34.4%	239	6.4%	13	0.3%	994	26.4%	1 124	32.5%
Chatsworth & Riverlands	1 165	28.8%	478	11.8%	138	3.4%	815	20.1%	1 456	35.9%
Kalbaskraal	809	33.6%	265	11.0%	51	2.1%	492	20.4%	794	32.9%
Moorreesburg	4 096	31.8%	661	5.1%	222	1.7%	3 623	28.1%	4 275	33.3%
Riebeek Kasteel	1 756	36.9%	133	2.8%	22	0.5%	1 137	23.9%	1 713	35.9%
Ongegund (PPC)	117	45.8%	6	2.4%	0	0.0%	53	20.8%	79	31.0%
Riebeek Wes	1 495	34.3%	159	3.7%	40	0.9%	1 226	28.2%	1 430	32.9%
Yzerfontein	365	32.0%	27	2.4%	6	0.5%	320	28.1%	422	37.0%
Farms	13 071	40.1%	485	1.5%	229	0.7%	10 083	30.9%	8 756	26.8%

Table 1.3.4.1: Employment profile per scheme for 2011										
Scheme	Employed		Unemployed		Discouraged Work Seeker		Other not Economically Active		Not Applicable	
	Number	%	Number	%	Number	%	Number	%	Number	%
Total	**40 649**	**35.7%**	**5 928**	**5.2%**	**1 195**	**1.1%**	**30 857**	**27.1%**	**35 134**	**30.9%**

The table below gives an overview of Swartland employment per sector.

Table 1.3.4.2: Swartland employment per sector			
Sector	Number of jobs 2020	Average annual change 2016-2020	Net change 2021e
PRIMARY SECTOR			
Agriculture, forestry and fishing	12 193	-460	-313
Mining and quarrying	19	-1	-1
SECONDARY SECTOR			
Manufacturing	4 812	8	-66
Electricity, gas and water	129	0	-3
Construction	1 836	-33	-108
TERTIARY SECTOR			
Wholesale and retail trade, catering and accommodation	8 656	75	-306
Transport, storage and communication	1 000	-6	-81
Finance, insurance, real estate and business services	4 102	82	-41
General government	2 932	54	58
Community, social and personal services	7 521	-15	122
Total Swartland	**43 200**	**-296**	**-739**

Source: 2022 Socio-Economic Profile Swartland Municipality

It is estimated that the Swartland region's total employed in 2021 amounts to 42 461 workers of which 35 779 (84.3 per cent) are in the formal sector while 6 682 (15.7 per cent) are informally employed, showing a drop in proportion of informally employed workers.

Informal employment has been on a declining trend since 2015 while overall formal employment has only been able to reach 0.4 per cent average growth between 2016 and 2020. The informal economy absorbed the majority of the job losses in 2021. This is concerning as the informal economy is expected to act as a buffer during times of economic recession. Most of the formally employed consisted of low skilled (49.3 per cent) and semi-skilled (33.5 per cent) workers. Although the skilled category only contributed 17.2 per cent to total formal employment (2020), it outpaced the other two categories in terms of average annual growth between 2016 and 2020, the skilled cohort grew on average by 1.3 per cent, while the semi-skilled category grew at 0.4 per cent; low skilled employment stagnated with zero growth over the same period. The growth in the skilled category reflects the market demand for more skilled labour and the ability to sustain and even expand skilled employment even during difficult economic times. Evidently, the demand for skilled labour is on the rise which implies the need to capacitate and empower low skilled and semi-skilled workers (2022 Socio-Economic Profile Swartland Municipality).

The formally employed workers in the Swartland labour force in 2021 was dominated by low-skilled workers (49.5%), as indicated in the table below.

Table 1.3.4.3: Trends in labour force skills for Swartland Municipality				
Formal employment by skill	Skill level contribution (%)	Average growth (%)	Number of jobs	
	2021	2016 – 2020	2020	2021
Skilled	17.4	1.3%	6 088	6 239
Semi-skilled	33.1	0.4%	11 837	11 853
Low-skilled	49.5	0.0%	17 406	17 687
Total	**100.0**	**0.4%**	**35 331**	**35 779**

Source: 2022 Socio-Economic Profile Swartland Municipality

The number of skilled workers experienced the highest growth (1.3%) across the period 2016-2020, while the low-skilled workers experienced no growth during the same reporting period. Evidently, the demand for skilled labour is on the rise, which implies the need to capacitate and empower low-skilled and semi-skilled workers.

The table below gives an overview of the percentage unemployment rates for Swartland Municipality and the West Coast Region.

Table 1.3.4.4: Unemployment rates

Area	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Swartland Municipality	9.4%	9.2%	8.9%	9.5%	8.5%	9.3%	10.1%	10.2%	11.1%	11.8%	14.6%
West Coast	10.6%	10.2%	9.7%	10.3%	9.1%	10.0%	10.9%	11.1%	12.1%	12.9%	16.0%

Source: 2022 Socio-Economic Profile Swartland Municipality

While unemployment rates in the District ranges from a high of 23.1 per cent in Saldanha Bay to a low of 7.7 per cent in Bergrivier area, the Swartland area's unemployment rate 14.6 per cent in 2021 is roughly in line with that of the District (16.0 per cent). Swartland area's unemployment rate has been on an upward trend since 2015 (8.5 per cent). The proportion of the not economically active population has also increased from 2020 to 2021 as job losses and an insufficient supply of jobs have led to an increasing number of discouraged work seekers. Unfortunately, most job losses affected informal workers who are more vulnerable to living in poverty during times of tough economic times.

The unemployment rates are concerning given that this estimate is based on the narrow definition of unemployment i.e. the percentage of people that are actively looking for work, but unable to find employment. In turn, the broad definition refers to people that want to work but are not actively seeking employment (excludes those who have given up looking for work).

1.3.5 Household Income

The economic profile is directly related to the development prospects, affordability of services and projected water use. Poverty can be defined as a lack of resources to meet basic needs, such as adequate food, shelter and basic amenities. It also represents the inability to meet higher order needs, such as the need for personal fulfilment, recreation and freedom. Income related factors are direct determinants of poverty levels. The 2022 household income Census data is not yet available per Community Profile. The household income for Swartland Municipality for 2011, as taken from the 2011 Census data, is as follows.

Table 1.3.5.1: Household income per scheme for 2011

Household Income Categories	Darling	Koringberg	Malmesbury	Abbotsdale	Chatsworth & Riverlands	Kalbaskraal
No Income	225	10	1 748	54	140	50
R1 – R4 800	28	2	246	10	44	27
R4 801 – R9 600	54	12	264	23	45	38
R9 601 – R19 600	344	61	1 024	126	227	108
R19 601 – R38 200	583	91	1 576	186	283	150
R38 201 – R76 400	706	82	1 370	228	202	145
R76401 – R153 800	465	34	1 243	186	108	81
R153 801 – R307 600	243	13	1 062	79	38	38
R307 601 – R614 400	125	10	708	29	15	17
R614 401 – R1 228 800	20	2	174	3	2	5
R1 228 801 – R2 457 600	3	0	39	0	1	0
R2 457 601 +	4	0	18	0	0	0
Unspecified	0	0	1	0	0	0
Total	**2 800**	**317**	**9 473**	**924**	**1 105**	**659**
Household Income Categories	**Moorreesburg**	**Riebeek Kasteel**	**Ongegund (PPC)**	**Riebeek Wes**	**Yzerfontein**	**Farms**
No Income	247	125	13	66	114	276
R1 – R4 800	57	26	0	17	4	36

Table 1.3.5.1: Household income per scheme for 2011						
R4 801 – R9 600	126	51	0	34	8	102
R9 601 – R19 600	427	219	3	135	14	1 246
R19 601 – R38 200	731	343	2	169	23	2 216
R38 201 – R76 400	830	255	8	256	49	1 763
R76401 – R153 800	607	139	19	179	96	657
R153 801 – R307 600	411	87	23	125	92	568
R307 601 – R614 400	196	69	14	60	67	312
R614 401 – R1 228 800	47	17	4	8	17	130
R1 228 801 – R2 457 600	10	9	0	4	6	38
R2 457 601 +	9	5	0	4	0	25
Unspecified	0	0	0	0	0	0
Total	**3 698**	**1 345**	**86**	**1 057**	**490**	**7 369**

The percentage of households within the various income brackets are as follows.

- Low Income (Up to R38 200 per annum) – 49.8%
- Middle Income (R38 201 up to R307 600 per annum) – 42.6%
- High Income (R307 601 and higher per annum) – 7.6%

Approximately 12.2% of the 29 324 households in Swartland Municipality earned R400 or less per month in 2011. Lower levels of household income increase indigent dependency on municipal support. Municipal resources are therefore strained in an effort to provide free basic services.

A key constraint in planning for infrastructure delivery is household affordability. Knowing the existing situation regarding household incomes is a key part to understanding consumers' affordability levels. These levels should be considered when setting service level targets.

Income inequality has been increasing not only in Swartland, but also in the West Coast and the broader Western Cape Province. This indicates that the relative satisfactory growth experienced across these regions has not equally been distributed amongst households or individuals.

The National Development Plan has set a target of reducing income inequality in South Africa from a Gini coefficient of 0.7 in 2010 to 0.6 by 2030. The table below gives an overview of the Gini coefficient for 2015, 2018 and 2021.

Table 1.3.5.2: Gini coefficient for 2015, 2018 and 2021			
Year	**Western Cape**	**West Coast**	**Swartland Municipality**
2015	0.610	0.581	0.582
2018	0.616	0.597	0.598
2021	0.627	0.614	0.614

Income inequality was lower in the West Coast District than in the Province. All of the municipal areas within the WCD reflected a similar growth trend where there was a moderate increase in the Gini coefficient from 2015 to 2021. The Swartland municipal area reflected a 0.614 result in 2021, which is the same as the West Coast District (2022-23 Municipal Economic Review and Outlook, Western Cape Government).

2. SERVICE LEVELS PROFILE

Having an understanding of the current situation allows the most important aspect of the plan to be addressed, which is the service level targets. This section sets out what services will be provided to consumers, both in terms of *level of service* and *quality of service (reliability)*.

The concept of service levels relates to the options which consumers can be given with regard to the convenience of the service and hence the amount of water which they will consume and the associated wastewater they will generate.

There are a range of different service types which can be provided. These are clarified below according to the types reported in the tables.

Service Types:

None or inadequate

This refers to the number of consumer units (or households) that do not have access to basic water supply or sanitation.

Basic water supply comprises:

- the provision of appropriate education in respect of effective water use;
- a minimum quantity of potable water of 25 litres per person per day;
- at a minimum flow rate of not less than 10 litres per minutes;
- within 200 metres of a household, and
- with an effectiveness of not more than 7 days interrupted supply to any consumer per year.

Basic sanitation comprises:

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

Water Service Levels:

Communal water supply

See ‘basic water supply’ explained above.

Controlled volume supply

E.g. Yard Tanks

Each house is provided with a tank which holds about 200 litres. The tank gets filled up once a day. This type of service is often referred to as an intermediate level of supply.

Uncontrolled volume supply

There are generally two types: either the tap stands outside the house on its own or on the wall of an outside toilet (yard tap) or water is piped into the house to take water to taps in the kitchen, bathroom, toilet etc.

Sanitation Service Levels:

Consumer installations : dry

See basic sanitation supply explained above.

Ventilated pit: A basic pit latrine structurally reinforced without preventing water seepage into surrounding soil, a slab that seals the edges of the pit and a screened air pipe that vents smells from the pit into the air above the privy. The concrete slab over the pit is not standard requirement for all VIP toilets, but necessary under certain geotechnical conditions and it must comply with ground water protocol.

Eco San option: one of a range of sanitation options that covert the waste products into re-usable agricultural soil conditioners of fertilizers on-site (usually without water use).

Consumer installations: wet (Septic tanks)

Water is flushed into a digester where certain bacteria and other organisms breakdown the solids. Digester effluent flows into the soak away, then the ground and it must be ensured that the soak away does not cause pollution of the ground water. There can be a build-up of sludge in the digester that has to be pumped out occasionally. In some cases the effluent from the septic tank is discharged into the bulk sewer network, which leads to a WWTWs.

Discharge to WWTWs

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

Full waterborne refers to the situation where a flushing toilet is used; the wastewater flows to a sewer on the site, then to sewers on the street. Effluent discharged from WWTWs must meet national effluent discharge quality standards in order to avoid polluting the water resources.

Service Level Policy:

The key issue in preparing a service level policy is that higher than basic services should be provided only where households can afford these levels of service, due to the necessity of recovering the increased capital and operating and maintenance costs. While politically difficult, this is likely to be the only way in which sustainable services can be provided in the long term. There are numerous examples of unaffordable service levels being provided with catastrophic results for both households and municipalities.

Key issues to take into account when formulating a service level policy

The following should be taken into account when formulating a service level policy:

- The types of service levels decided upon have a major impact on capital and operating costs and hence on the long-term viability of service provision. If service levels are set too high the consumers who receive them will not be able to afford to pay for them and are likely to default on their payment which will in turn, impact on the viability of the service provider.

- Service levels are related to the quantity of water used and thus there is an impact on the environment from which this water has to be abstracted and returned to. Similarly, the availability of adequate water for waterborne sanitation should be considered.

- Risks of pollution associated with the various levels of services must be considered; higher levels of service have higher risk of pollution.

- The size and density of the settlement should be taken into account when deciding levels of service. In general large settlements produce more waste and hence higher risks of pollution while pollution from smaller settlements is easier to manage.

- Desludging of septic tanks, pit emptying service and capacity of bulk sewer network and WWTWs.

Service level targets:

a) **New consumer units** – this refers to new units that will need to be provided as a result of natural population increase or migration to the area.

b) **Current backlogs** – this refers to those households that are currently not adequately served, for example those having a supply less than RDP standards.

c) **Upgrading** – this refers to those households which currently have adequate services but are to be upgraded to a higher level.

The 2022 Census Community Profiles are not yet available. The 2011 Census data (Households) and the number of residential consumer units, as calculated from the financial system, were used to populate the residential water and sanitation service levels in the urban areas in the Municipality's Management Area. The 2011 Census data was also used for the farms in the rural areas. The 2011 Census Sub-Places were grouped together as follows for the various water distribution systems.

Table 2.1: Grouping of the 2011 Census data Sub-Places for the various distribution systems

Distribution System	2011 Census Sub-Places
Darling	Nuwedorp SP, Darling SP
Koringberg	Koringberg SP
Malmesbury	Mount Royal Golf & Country Estate, Wesbank SP, Myrtledene, Doornkuil, Malmesbury SP, Illinge Lethu SP
Abbotsdale	Abbotsdale SP
Chatsworth	Chatsworth SP
Riverlands	Greater Chatsworth SP
Kalbaskraal	Kalbaskraal SP
Moorreesburg	Moorreesburg SP, Bothasig, Bergsig, Doornkloof, Steynsburg, Rosenhof SP
Riebeek Kasteel	Riebeek Kasteel SP, Esterhof SP
Riebeek Wes	Riebeek West Mine SP, Riebeek West SP
Yzerfontein	Yzerfontein SP
Farms	Swartland NU, Klipfontyn SP, Dassen Island SP, The Grotto Bay SP

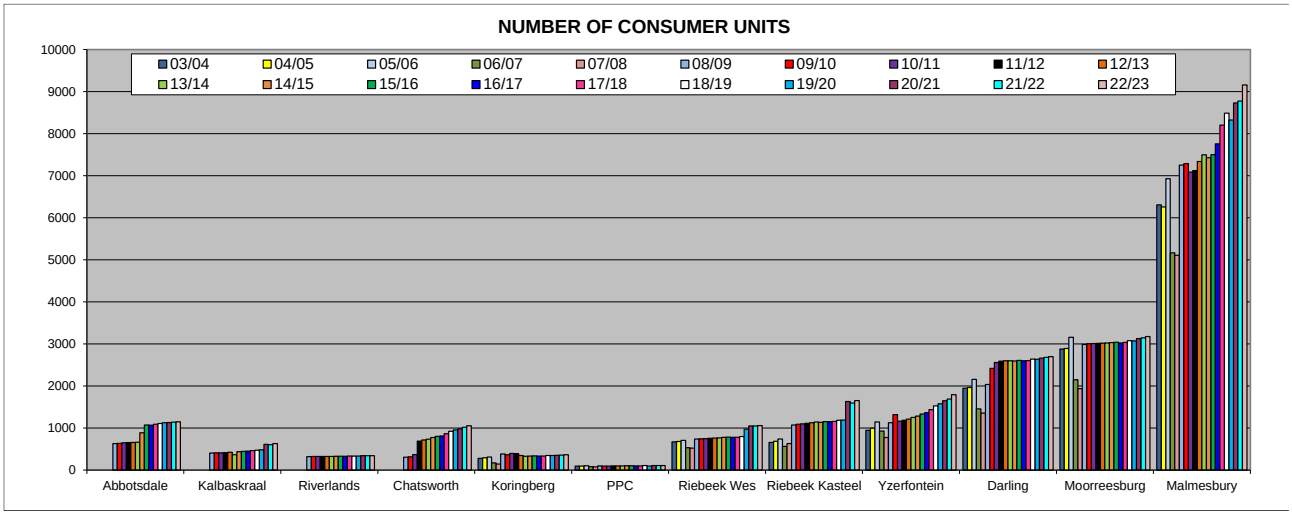
The number of user connections in each user sector, for the various distribution systems in Swartland Municipality's Management Area, is as follows.

Table 2.2: Number of user connections in each user sector

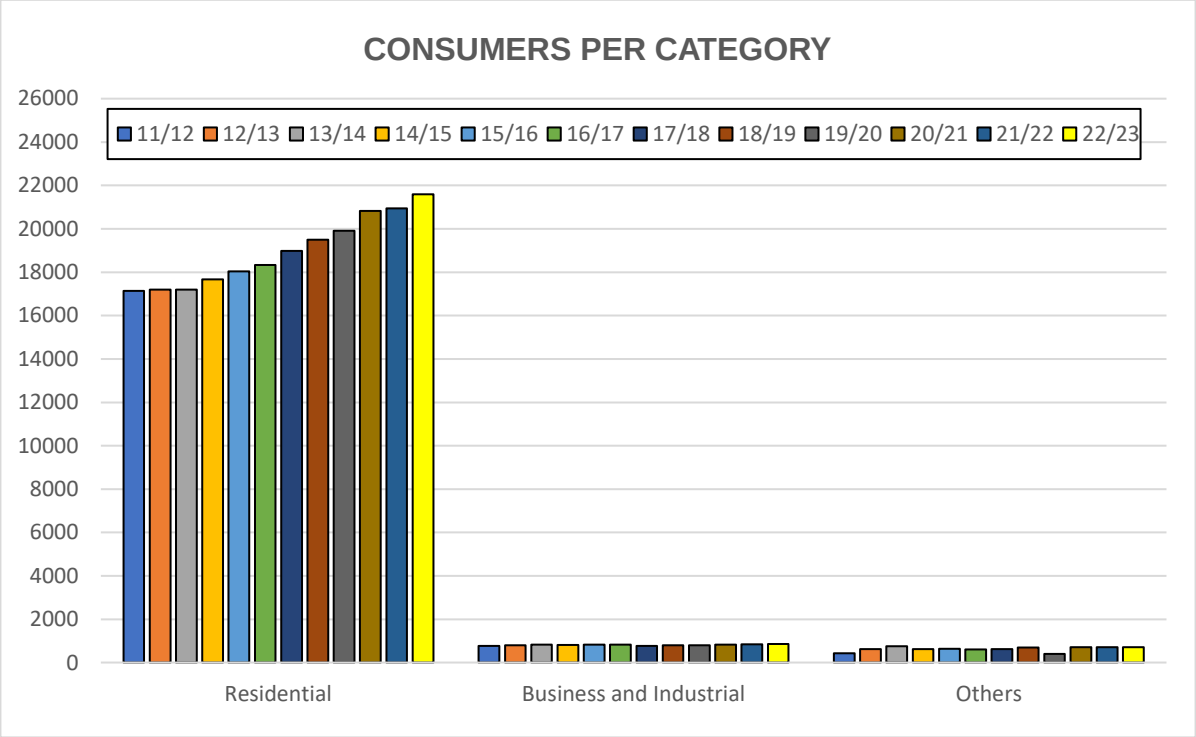
Distribution System	19/20			20/21			21/22			22/23		
	Res	Bus	Other	Res	Bus	Other	Res	Bus	Other	Res	Bus	Other
Koringberg	329	11	7	332	11	8	335	11	8	344	11	8
Ongegund	86	1	7	88	2	19	88	2	19	88	2	19
Riebeek Wes	896	47	30	966	50	33	963	51	34	975	50	33
Riebeek Kasteel	1 126	39	24	1 564	38	29	1 527	38	30	1 586	38	29
Yzerfontein	1 528	23	26	1 590	24	36	1 626	24	39	1 717	29	45
Darling	2 495	107	34	2 503	112	46	2 519	112	46	2 538	114	45
Moorreesburg	2 842	184	47	2 876	192	58	2 892	194	59	2 920	196	59
Malmesbury	7 767	377	181	7 908	400	420	7 955	400	420	8 327	406	423
Abbotsdale	1 111	0	11	1 118	0	13	1 127	0	13	1 135	0	12
Kalbaskraal	461	5	13	589	5	16	581	4	16	606	4	17
Riverlands	327	1	5	330	1	10	330	1	9	330	1	10
Chatsworth	942	1	13	965	1	17	995	2	18	1 030	3	18
TOTALS	**19 910**	**796**	**398**	**20 829**	**836**	**705**	**20 938**	**839**	**711**	**21 596**	**854**	**718**

Table 2.3: Total number of consumer units per town and percentage growth from 2013/2014 to 2022/2023											
Distribution System	**Annual Growth % 13/14 – 22/23**	**13/14**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	**19/20**	**20/21**	**21/22**	**22/23**
Koringberg	1.13%	328	332	335	333	333	346	347	351	354	363
Ongegund	0.96%	100	101	102	100	99	105	94	109	109	109
Riebeek Wes	3.65%	766	777	783	779	777	793	973	1 049	1 048	1 058
Riebeek Kasteel	4.20%	1 141	1 136	1 151	1 154	1 158	1 184	1 189	1 631	1 595	1 653
Yzerfontein	4.07%	1 251	1 283	1 330	1 366	1 435	1 528	1 577	1 650	1 689	1 791
Darling	0.42%	2 598	2 596	2 607	2 598	2 602	2 638	2 636	2 661	2 678	2 697
Moorreesburg	0.55%	3 023	3 029	3 040	3 024	3 036	3 077	3 073	3 126	3 144	3 175
Malmesbury	2.25%	7 495	7 431	7 500	7 760	8 203	8 487	8 325	8 728	8 775	9 156
Abbotsdale	6.28%	663	889	1 071	1 069	1 087	1 109	1 122	1 131	1 140	1 147
Kalbaskraal	6.21%	365	436	446	450	462	474	479	610	601	627
Riverlands	0.64%	322	327	329	328	331	333	333	341	340	341
Chatsworth	4.09%	733	775	802	812	864	922	956	983	1 015	1 051
Total	**2.36%**	**18 785**	**19 112**	**19 496**	**19 773**	**20 387**	**20 996**	**21 104**	**22 370**	**22 488**	**23 168**

The graph below indicates the number of billed metered consumers per system for the various financial years.



The graph below indicates Swartland Municipality's Consumers per Category Type.



All the formal households in the urban areas of Swartland Municipality's Management Area are provided with water and sewer connections inside the erven. Informal areas are supplied with shared services as an intermediary measure. There are an estimated 700 informal households in Chatsworth with no access to shared water and sanitation services. Swartland Municipality works towards a ratio of at least 1 tap per twenty-five households and 1 communal toilet per five households for their shared services. Swartland Municipality is committed to ensure that private landowners provide at least basic water and sanitation services to those households in the rural areas with existing services below RDP standard.

Swartland Municipality's challenges with regard to the provision of basic water and sanitation services are as follows:

- To provide basic water and sanitation services in the informal areas to new citizens moving into the informal areas and to ensure that health and hygiene awareness and education is part of the process of providing basic services.

- To identify suitable land for the relocation of the people from informal areas, with existing communal services, to formal houses with a higher level of water and sanitation service (Services inside the erven).

- To identify adequate funding for the rehabilitation, maintenance, replacement and upgrading of the existing bulk and reticulation infrastructure in order to support the sustainability of the water and sanitation services.

- To monitor the provision of basic water and sanitation on privately owned land.

2.1 RESIDENTIAL WATER PROFILE

The Municipality provides water services to all towns in its area of jurisdiction. All the urban households within the Municipality's area of jurisdiction have access to a higher level of water service, except the informal areas that are supplied with communal services as an intermediary measure. The 2022 Census Community Profiles are not yet available. The 2011 residential household water service levels for the towns in Swartland Municipality's Management Area, as taken from the 2011 Census Data, were as follows.

Table 2.1.1: 2011 Census household water service levels

Town	Inside Dwelling	Inside Yard	Communal Water Services				No Access	Total
			< 200m	200m – 500m	500m – 1000m	> 1000m		
Darling	2 672	119	1	**3**	**0**	**0**	**6**	**2 801**
Koringberg	291	23	0	**0**	**0**	**0**	**3**	**317**
Malmesbury	7 356	2 089	7	**4**	**2**	**2**	**12**	**9 472**
Abbotsdale	643	266	4	**2**	**0**	**0**	**9**	**924**
Chatsworth	586	24	57	**9**	**3**	**0**	**0**	**679**
Riverlands	259	142	14	**2**	**3**	**0**	**7**	**427**
Kalbaskraal	487	124	26	**5**	**1**	**0**	**15**	**658**
Moorreesburg	3 464	206	19	**1**	**0**	**1**	**7**	**3 698**
Riebeek Kasteel	1 041	298	2	**0**	**2**	**0**	**2**	**1 345**
Ongegund (PPC)	86	0	0	**0**	**0**	**0**	**0**	**86**
Riebeek Wes	903	141	0	**2**	**0**	**0**	**10**	**1 056**
Yzerfontein	480	5	2	**0**	**0**	**0**	**3**	**490**
Farms	5 357	1 519	335	**61**	**18**	**3**	**75**	**7 368**
Total	**23 625**	**4 956**	**467**	**89**	**29**	**6**	**149**	**29 321**

Note: **Basic Services Backlog**

The current residential water service levels in Swartland Municipality's Management Area are estimated as follows (June 2023).

Table 2.1.2: Residential water service levels

Classification	Definitions	Malmesbury		Abbotsdale		Riverlands		Chatsworth		Kalbaskraal		Riebeek Kasteel		Riebeek Wes		Darling		Moorreesburg		Koringberg		Yzerfontein		Farms		Total	
		Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH
No Water Services	Whole community never had any formal (Municipal) water supply system	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	332	75 [2]	332	75
Below RDP: Infrastructure Upgrade	Existing infrastructure not on RDP std:																										
	Network: Too small pipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Storage: Add to exist / elevation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Source: Infra. To increase exist yield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure Extension	Communities have grown structurally and there are hh that do not have water:																										
	Network: New Infrastructure	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	363	82 [3]	363	82
	Storage: New & Adjacent	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure Refurbishment	Water can be restored to RDP by:																										
	Repair / Replace with same existing infrastructure	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: O&M Needs	Water can be restored to RDP (Where infra. Ok) by enough & efficient staff and sufficient funds for O&M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Water Resource Needs	Includes Source development, Local available source, new bh, pipeline, WC/WDM, Water Source quality and drinking water quality	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure and O&M Needs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure and O&M Needs and Water Resource Needs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Basic Need (RDP)		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**695**	**157**	**695**	**157**
Below Housing Interim [4]	**No Services**: Squatter (un-orderly layout) to be addressed with temp infra	0	0	0	0	0	0	2 564	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 564	700
Adequate Housing Permanent [5]	**Temporary Services Provided:** Orderly layout where housing scheme is needed. E.g. overcrowded yard, informal areas with existing communal services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Housing Need		**0**	**0**	**0**	**0**	**0**	**0**	**2 564**	**700**	**0**	**0**			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2 564**	**700**
Adequate	Standpipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 483	335	1 483	335
	Yard Connection [6]	26 700	7 046	586	144	110	30	37	10	1 906	521	4 407	1 245	4 460	1 107	3 509	943	9 656	2 773	551	144	0	0	6 725	1 519	58 647	15 482
	House Connection [1]	31 555	8 327	4 621	1 135	1 209	330	3 772	1 030	2 218	606	5 614	1 586	4 282	1 063	9 447	2 538	10 168	2 920	1 318	344	1 755	1 717	38 727	8 748	114 686	30 344
Total Adequate		**58 255**	**15 373**	**5 207**	**1 279**	**1 319**	**360**	**3 809**	**1 040**	**4 124**	**1 127**	**10 021**	**2 831**	**8 742**	**2 170**	**12 956**	**3 481**	**19 824**	**5 693**	**1 869**	**488**	**1 755**	**1 717**	**46 935**	**10 602**	**174 816**	**46 161**
Totals		**58 255**	**15 373**	**5 207**	**1 279**	**1 319**	**360**	**6 373**	**1 740**	**4 124**	**1 127**	**10 021**	**2 831**	**8 742**	**2 170**	**12 956**	**3 481**	**19 824**	**5 693**	**1 869**	**488**	**1 755**	**1 717**	**47 630**	**10 759**	**178 075**	**47 018**

Notes:
1) Number of residential consumer units for the various towns for 2022/2023, as calculated from the financial data.
2) Census 2011: Number of households with no access to piped (tap) water 75
3) Census 2011: Number of households with communal services (200m – 500m) 61, (500m – 1000m) 18 and (>1000m) 3
4) Below Housing Interim in the above table is the number of households in informal areas without basic water services. There is an estimated 700 informal households in Chatsworth without basic water services.
5) Adequate Housing Permanent in the above table is the number of informal households in informal areas with communal water services.
6) Projected number of residential households (2022/2023) – Number of residential consumers units (2022/2023) = Estimated number of backyard dwellers.

The table below summarise the Water Service Infrastructure Supply Level Profile for the various settlements in Swartland Municipality's Management Area.

Table 2.1.3: Residential water services infrastructure supply level profile

Classification	Malmesbury		Abbotsdale		Riverlands		Chatsworth		Kalbaskraal		Riebeek Kasteel		Riebeek Wes		Darling		Moorreesburg		Koringberg		Yzerfontein		Farms		Total	
	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH
Total with a water Need (Irrelevant the type of need)	**0**	**0**	**0**	**0**	**0**	**0**	**2 564**	**700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**695**	**157**	**3 260**	**857**
Total below RDP	**0**	**0**	**0**	**0**	**0**	**0**	**2 564**	**700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**695**	**157**	**3 260**	**857**
Piped water inside the yard	26 700	7 046	586	144	110	30	37	10	1 906	521	4 407	1 245	4 460	1 107	3 509	943	9 656	2 773	551	144	0	0	6 725	1 519	58 647	15 482
Piped water inside the dwelling / house	31 555	8 327	4 621	1 135	1 209	330	3 772	1 030	2218	606	5 614	1 586	4 282	1 063	9 447	2 538	10 168	2 920	1 318	344	1 755	1 717	38 727	8 748	114 686	30 344
Piped water distance < 200 m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 483	335	**1 483**	**335**
Piped water distance > 200 m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	363	82	**363**	**82**
Borehole in the yard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Rain water tank in the yard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Water vendor – carrier / tanker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Stagnant water – dam / pool	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Flowing water – spring / stream / river	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Water other (Include no water)	0	0	0	0	0	0	2 564	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	332	75	**2 896**	**775**
Total	**58 255**	**15 373**	**5 207**	**1 279**	**1 319**	**360**	**6 373**	**1 740**	**4 124**	**1 127**	**10 021**	**2831**	**8 742**	**2 170**	**12 956**	**3 481**	**19 824**	**5 693**	**1 869**	**488**	**1 755**	**1 717**	**47 630**	**10 759**	**178 075**	**47 018**

The table below summarise the Water Reliability Profile for the various settlements in Swartland Municipality's Management Area.

Table 2.1.4: Residential water reliability profile (Households)

Classification	Malmesbury	Abbotsdale	Riverlands	Chatsworth	Kalbaskraal	Riebeek Kasteel	Riebeek Wes	Darling	Moorreesburg	Koringberg	Yzerfontein	Farms	Total
Total number of households having reliable service	**15 373**	**1 279**	**360**	**1 040**	**1 127**	**2 831**	**2 170**	**3 481**	**5 693**	**488**	**1 717**	**10 602**	**46 161**
Total number of households NOT having reliable service	**0**	**0**	**0**	**700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**157**	**857**
Number of households NOT having reliable service due to: Functionality (O&M and Management)	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of households NOT having reliable service due to: Resource	0	0	0	0	0	0	0	0	0	0	0	**75**	**75**
Number of households NOT having reliable service due to: Infrastructure	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of households NOT having reliable service due to: Resource – Conservation and Demand Management	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of households NOT having reliable service due to: New Source	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of households NOT having reliable service due to: Infrastructure – Upgrade / Refurbishment	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of households NOT having reliable service due to: Infrastructure – Extension	0	0	0	0	0	0	0	0	0	0	0	**82**	**82**
Number of households NOT having reliable service due to: Infrastructure – New Scheme	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of households NOT having reliable service due to: Replace Old	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2 RESIDENTIAL SANITATION PROFILE

The 2022 Census Community Profiles are not yet available. The 2011 residential household sanitation service levels for the towns in Swartland Municipality's Management Area, as taken from the 2011 Census Data, were as follows.

Table 2.2.1: 2011 Census household sanitation service levels

Area	Flush to sewerage system	Flush with Septic Tank	Chemical Toilet	Pit with Ventilation	Pit without Ventilation	Bucket	Other	None	Total
Darling	2 724	1	0	2	0	5	30	39	**2 801**
Koringberg	230	70	2	0	0	12	0	3	**317**
Malmesbury	9 245	87	5	6	1	46	59	23	**9 472**
Abbotsdale	590	152	0	5	16	61	38	62	**924**
Chatsworth	495	95	1	4	24	17	19	24	**679**
Riverlands	315	29	0	0	4	66	10	3	**427**
Kalbaskraal	517	37	3	1	5	26	54	15	**658**
Moorreesburg	3 519	90	0	1	0	39	16	33	**3 698**
Riebeek Kasteel	1 280	43	0	2	2	5	5	8	**1 345**
Ongegund (PPC)	79	7	0	0	0	0	0	0	**86**
Riebeek Wes	942	73	0	0	0	26	7	8	**1 056**
Yzerfontein	102	377	0	0	1	0	6	4	**490**
Farms	2 635	2 877	54	211	401	303	380	507	**7 368**
Total	**22 673**	**3 938**	65	**232**	454	606	624	729	**29 321**

Note: **Basic Sanitation Services Backlog**

The current sanitation service levels in Swartland Municipality's Management Area are estimated as follows (June 2023).

Table 2.2.2: Residential sanitation service levels

Classification	Definitions	Malmesbury		Abbotsdale		Riverlands		Chatsworth		Kalbaskraal		Riebeek Kasteel		Riebeek Wes		Darling		Moorreesburg		Koringberg		Yzerfontein		Farms		Total	
		Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH
No Sanitation Services	Whole community has never had any formal (Municipal) sanitation supply system	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 245	507[3]	2 245	507
Below RDP: Infrastructure Upgrade	Existing infrastructure not on RDP standard. Typically, unimproved pit or chemical toilet.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5 038	1 138 [4]	5 038	1 138
	Communities have sanitation but below the minimum standard. This will normally be a bucket or an ecological toilet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Communities at RDP standard but not appropriate due to local circumstances e.g. shallow ground water levels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure Ext.	Community partially served to RDP level	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure Refurbishment	Sanitation can be restored to RDP by repair / replace with the same infrastructure.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: O&M Needs	Water can be restored to RDP (Where infra. ok) by enough & efficient staff and sufficient funds for O&M (Incl. pit-emptying and appropriate actions for waterborne)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Water Resource Needs	Adequate infrastructure but not working due to inadequate water in the system	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure and O&M Needs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure and O&M Needs and Water Resource Needs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Basic Need (RDP)		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7 283**	**1 645**	**7 283**	**1 645**
Below Housing Interim [6]	**No Services**: Squatter (un-orderly layout) to be addressed with temp infra	0	0	0	0	0	0	2 564	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 564	700
Adequate Housing Permanent [7]	**Temporary Services Provided:** Orderly layout where housing scheme is needed. E.g. overcrowded yard, informal areas with existing communal services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Housing Need		**0**	**0**	**0**	**0**	**0**	**0**	**2 564**	**700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2 564**	**700**
Adequate	Non Waterborne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	934	211	934	211
	Waterborne Low Flush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Septic Tanks / Conservancy [1]	49	13	20	5	26	7	491	134	450	123	269	76	737	183	153	41	369	106	421	110	1 755	1 717	39 413	8 903	44 153	11 418
	Waterborne WWTWs [2]	58 206	15 360	5 187	1 274	1 293	353	3 318	906	3 674	1 004	9 752	2 755	8 005	1 987	12 803	3 440	19 455	5 587	1 448	378	0	0	0	0	123 141	33 044
Total Adequate		**58 255**	**15 373**	**5 207**	**1 279**	**1 319**	**360**	**3 809**	**1 040**	**4 124**	**1 127**	**10 021**	**2 831**	**8 742**	**2 170**	**12 956**	**3 481**	**19 824**	**5 693**	**1 869**	**488**	**1 755**	**1 717**	**40 347**	**9 114**	**168 228**	**44 673**
Totals		**58 255**	**15 373**	**5 207**	**1 279**	**1 319**	**360**	**6 373**	**1 740**	**4 124**	**1 127**	**10 021**	**2 831**	**8 742**	**2 170**	**12 956**	**3 481**	**19 824**	**5 693**	**1 869**	**488**	**1 755**	**1 717**	**47 630**	**10 759**	**178 075**	**47 018**

Notes: 1) The number of tanks per town was calculated from the total number of tanks pumped during 2022/2023 divided by 5.
2) Include Backyard dwellers
3) Census 2011: Number of households with no toilet facility 507.
4) Census 2011: Number of households with existing buckets 303, chemical toilets 54, pit toilets without ventilation 401 and "other" 380
5) Census 2011: Number of households with pit toilets with ventilation 211.
6) Inadequate Housing Interim in the above table is the number of shacks in informal areas without basic sanitation services. There is an estimated 700 informal households in Chatsworth without basic sanitation services.
7) Inadequate Housing Permanent in the above table is the number of informal households in informal areas with communal ablution facilities.

The table below summarise the Sanitation Service Infrastructure Supply Level Profile for the various settlements in Swartland Municipality's Management Area.

Table 2.2.3: Residential sanitation services infrastructure supply level profile

Classification	Malmesbury		Abbotsdale		Riverlands		Chatsworth		Kalbaskraal		Riebeek Kasteel		Riebeek Wes		Darling		Moorreesburg		Koringberg		Yzerfontein		Farms		Total	
	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH	Pop	HH
Total with a sanitation Need (Irrelevant the type of need)	**0**	**0**	**0**	**0**	**0**	**0**	**2 565**	**700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7 283**	**1 645**	**9 847**	**2 345**
Total below RDP	**0**	**0**	**0**	**0**	**0**	**0**	**2 565**	**700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7 283**	**1 645**	**9 847**	**2 345**
Flush toilet (connected to sewerage system)	58 206	15 360	5 187	1 274	1 293	353	3 318	906	3 674	1 004	9 752	2 755	8 005	1 987	12 803	3 440	19 455	5 587	1 448	378	0	0	0	0	123 140	33 044
Flush toilet (with septic tank)	49	13	20	5	26	7	491	134	450	123	269	76	737	183	153	41	369	106	421	110	1755	1 717	39 413	8 903	44 153	11 418
Chemical toilet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	239	54	239	54
Pit toilet with ventilation (VIP)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	934	211	934	211
Pit without ventilation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 775	401	1 775	401
Bucket Toilet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 341	303	1 341	303
None (Include other)	0	0	0	0	0	0	2 564	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3 928	887	**6 491**	**1 587**
Total	**58 255**	**15 373**	**5 207**	**1 279**	**1 319**	**360**	**6 373**	**1 740**	**4 124**	**1 127**	**10 021**	**2 831**	**8 742**	**2 170**	**12 956**	**3 481**	**19 824**	**5 693**	**1 869**	**488**	**1 755**	**1 717**	**47 630**	**10 759**	**178 074**	**47 018**

The table below summarise the Sanitation Reliability Profile for the various settlements in Swartland Municipality's Management Area.

Table 2.2.4: Residential water reliability profile (Households)

Classification	Malmesbury	Abbotsdale	Riverlands	Chatsworth	Kalbaskraal	Riebeek Kasteel	Riebeek Wes	Darling	Moorreesburg	Koringberg	Yzerfontein	Farms	Total
Total number of households having reliable service	**15 373**	**1 279**	**360**	**1 040**	**1 127**	**2 831**	**2 170**	**3 481**	**5 693**	**488**	**1 717**	**9 114**	**44 673**
Total number of households NOT having reliable service	**0**	**0**	**0**	**700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1 645**	**2 345**
Infrastructure to be upgraded: None to VIP	0	0	0	0	0	0	0	0	0	0	0	887	**887**
Infrastructure to be upgraded: Buckets to VIP	0	0	0	0	0	0	0	0	0	0	0	303	**303**
Infrastructure requirement: None to waterborne	0	0	0	700	0	0	0	0	0	0	0	0	**700**
Infrastructure to be upgraded: Buckets to waterborne	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Infrastructure to be upgraded: Pit to VIP	0	0	0	0	0	0	0	0	0	0	0	401	**401**
Infrastructure to be upgraded: Pit to waterborne	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Infrastructure to be upgraded: VIPs to waterborne	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Number of households NOT having reliable service due to: Resource – Water Security	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Number of households NOT having reliable service due to: Functionality	0	0	0	0	0	0	0	0	0	0	0	54	**54**
Households requiring existing scheme refurbishment	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Households requiring VIP refurbishment	0	0	0	0	0	0	0	0	0	0	0	0	**0**

2.3 PUBLIC AMENITIES

2.3.1 Water Services

The previous section dealt with the water and sanitation service levels and reliability for residential stands within the municipality. The water service levels of the health and education facilities in Swartland Municipality's Management Area are shown in the table below.

Table 2.3.1.1: Education and health facilities water services

Associated services facility	Number of facilities	Facilities with adequate services	Facilities with no services	Facilities with inadequate services	Total potential cost (basic level) (Rmil)
Education Plan					
Primary school	26	16	10 (To be verified)		Unknown
Secondary school	5	5	0	0	-
Tertiary	1	1	0	0	-
Combined	5	5	0	0	-
Special needs	1	1	0	0	-
Other	24	22	2 (To be verified)		Unknown
Total	**62**	**49**	**12 (To be verified)**		**Unknown**
Health Plan					
Hospitals	2	2	0	0	-
Health Centres	2	2	0	0	-
Clinics	4	4	0	0	-
Mobile & Satellite Clinics	7	7	0	0	-
Total	**15**	**15**	**0**	**0**	**-**

All the schools and Community Learning Centres in the urban areas are supplied with higher levels of water services. The water service levels of the primary schools in the rural areas however need to be verified. All the hospitals and clinics in the urban areas receive potable water through the reticulation networks of the various towns. The water quality results of the 2022/2023 financial year, as loaded onto DWS's IRIS System, are included in Annexure E.

2.3.2 Sanitation Services

The sanitation service levels of the health and education facilities in Swartland Municipality's Management Area are shown in the table below.

Table 2.3.2.1: Education and health facilities sanitation services

Associated services facility	Number of facilities	Facilities with adequate services	Facilities with no services	Facilities with inadequate services	Total potential cost (basic level) (Rmil)
Education Plan					
Primary school	26	16	10 (To be verified)		
Secondary school	5	5	0	0	-
Tertiary	1	1	0	0	-
Combined	5	5	0	0	-
Special needs	1	1	0	0	-
Other	24	22	2 (To be verified)		Unknown
Total	**62**	**49**	**12 (To be verified)**		**Unknown**
Health Plan					
Hospitals	2	0	0	0	-
Health Centres	2	0	0	0	-
Clinics	4	0	0	0	-
Mobile & Satellite Clinics	7	0	0	0	-
Total	**15**	**0**	**0**	**0**	**-**

All the schools and Community Learning Centres in the urban areas are supplied with higher levels of sanitation services. The sanitation service levels of the primary schools in the rural areas however need to be verified. All the hospitals and clinics in the urban areas are supplied with waterborne sewer systems.

2.3.3 Public Amenities Services

The table below gives an overview of the service levels at public amenities in Swartland Municipality's Management Area.

Table 2.3.3.1: Service levels at public amenities in Swartland Municipality's Management Area

Facility Name	Adequate for Basic Services (Yes/No)	Adequate for Higher Level Services (Yes/No)	Facility Water Metered (Yes/No)	Facility Water Billed (Yes/No)	% Income Received	Total Potential Cost to bring to basic water level (Rmil)	Total Potential Cost to bring to basic sanitation level (Rmil)	Settlement Main Type (Urban / Rural / Farming)	Water Status (Adequate / Inadequate / None)	Sanitation Status (Adequate / Inadequate / None)	Water Supply Type (Communal / Controlled / Uncontrolled)	Sanitation Supply Type (Waterborne / On site Wet / On site Dry / Bucket / None)
West Coast College	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Moorreesburg Clc (Movos)	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Laurie Hugo Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Dolfyntjies Bewaarskool	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Dirkie Uys Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Dirkie Uys High School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Riebeeck Kasteel	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Carnegie House Preparatory	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Riebeeck-Kasteel Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Meiring Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Riebeeck-Wes	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Riebeeck-Wes Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Riebeeck Valley Special School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Darling CLC	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Vooruitsig Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Evita's Darlings Pre-Primary	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Klouter Kabouter Pre-Primary	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Darling Pre-Primary	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Darling Kollege	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Darling Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Darling Kollege	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Darling Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Koringberg (Site)	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Koringberg Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Schoonspruit Secondary (ALC)	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Malmesbury Volwasse Onderwyssentrum	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Malmesbury New Prison	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Illingelethu	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Piketberg Christian School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Goue Vlokkies Bewaarskool	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Vrolike Vinkies Pre-Primary (Malmesbury)	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Swartland Pre-Primary	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Christelike Privaatskool Malmesbury	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Swartland Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Liebenberg Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
St. Thomas Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Naphakade Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Better Beginnings College	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Swartland High School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Wesbank Secondary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Schoonspruit Secondary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Llingelethu Secondary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Abbotsdale	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Conservancy Tank
Bambino's Creche	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
St. Michael's Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Conservancy Tank
Kalbaskraal	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
O.J. Erasmus NGK Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Riverlands CLC	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Chatsworth CLC	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Conservancy Tank
Riverlands Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne

Table 2.3.3.1: Service levels at public amenities in Swartland Municipality's Management Area

Facility Name	Adequate for Basic Services (Yes/No)	Adequate for Higher Level Services (Yes/No)	Facility Water Metered (Yes/No)	Facility Water Billed (Yes/No)	% Income Received	Total Potential Cost to bring to basic water level (Rmil)	Total Potential Cost to bring to basic sanitation level (Rmil)	Settlement Main Type (Urban / Rural / Farming)	Water Status (Adequate / Inadequate / None)	Sanitation Status (Adequate / Inadequate / None)	Water Supply Type (Communal / Controlled / Uncontrolled)	Sanitation Supply Type (Waterborne / On site Wet / On site Dry / Bucket / None)
Chatsworth Ame Primary School	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Conservancy Tank
Rust Stasie	Unknown	Unknown	No	No	Not Applicable	Unknown	Unknown	Rural	Unknown	Unknown	Unknown	Unknown
Anne Pienaar Primer	Unknown	Unknown	No	No	Not Applicable	Unknown	Unknown	Rural	Unknown	Unknown	Unknown	Unknown
Riebeecksrivier Vallei Kleuterskool	Unknown	Unknown	No	No	Not Applicable	Unknown	Unknown	Rural	Unknown	Unknown	Unknown	Unknown
Welgemeend NGK Primary School	Unknown	Unknown	No	No	Not Applicable	Unknown	Unknown	Rural	Unknown	Unknown	Unknown	Unknown
Anne Pienaar Gedenk NGK Primary School	Unknown	Unknown	No	No	Not Applicable	Unknown	Unknown	Rural	Unknown	Unknown	Unknown	Unknown
Bloemendal NGK Primary School	Unknown	Unknown	No	No	Not Applicable	Unknown	Unknown	Rural	Unknown	Unknown	Unknown	Unknown
Goedehoop Primary School	Unknown	Unknown	No	No	Not Applicable	Unknown	Unknown	Rural	Unknown	Unknown	Unknown	Unknown
Koranrug Primary School	Unknown	Unknown	No	No	Not Applicable	Unknown	Unknown	Rural	Unknown	Unknown	Unknown	Unknown
Morning Star NGK Primary School.	Unknown	Unknown	No	No	Not Applicable	Unknown	Unknown	Rural	Unknown	Unknown	Unknown	Unknown
Ruststasie Primary School	Unknown	Unknown	No	No	Not Applicable	Unknown	Unknown	Rural	Unknown	Unknown	Unknown	Unknown
Weltevreden NGK Primary School	Unknown	Unknown	No	No	Not Applicable	Unknown	Unknown	Rural	Unknown	Unknown	Unknown	Unknown
Kleinkarnmelkvlei NGK Primary School	Unknown	Unknown	No	No	Not Applicable	Unknown	Unknown	Rural	Unknown	Unknown	Unknown	Unknown
Skilpadvlei NGK Primary School	Unknown	Unknown	No	No	Not Applicable	Unknown	Unknown	Rural	Unknown	Unknown	Unknown	Unknown
Moorreesburg CHC	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Malmesbury CHC	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Riebeeck Kasteel Clinic	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Riebeeck West Clinic	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Yzerfontein Satellite Clinic	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Conservancy Tank
Darling Clinic	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Koringberg Satellite Clinic	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Malmesbury Satellite Clinic	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Malmesbury Town Satellite Clinic	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Malmesbury ID Hospital	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Swartland Hospital	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Abbotsdale Satellite Clinic	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Kalbaskraal Satellite Clinic	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne
Chatsworth Clinic	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Conservancy Tank
Riverlands Satellite Clinic	Yes	Yes	Yes	Yes	Unknown	R0.000	R0.000	Urban	Adequate	Adequate	Uncontrolled	Waterborne

3. WATER SERVICES ASSET MANAGEMENT

3.1 GENERAL INFORMATION

3.1.1 Asset Management Plan

An updated Asset Management Policy is in place (Reviewed and amended May 2023). Swartland Municipality has a large investment in property, plant and equipment (PPE). The carrying value of PPE is projected to be very constant as capital additions is projected to be approximately in line with the annual depreciation charge. The large investment in PPE is basically the result of a continued large capital program employed at the Municipality to ensure that basic services are delivered at all times and service delivery backlogs are addressed.

The complete nature of repairs and maintenance has changed from the norm as it was calculated, with the implementation of mSCOA on 1 July 2017.

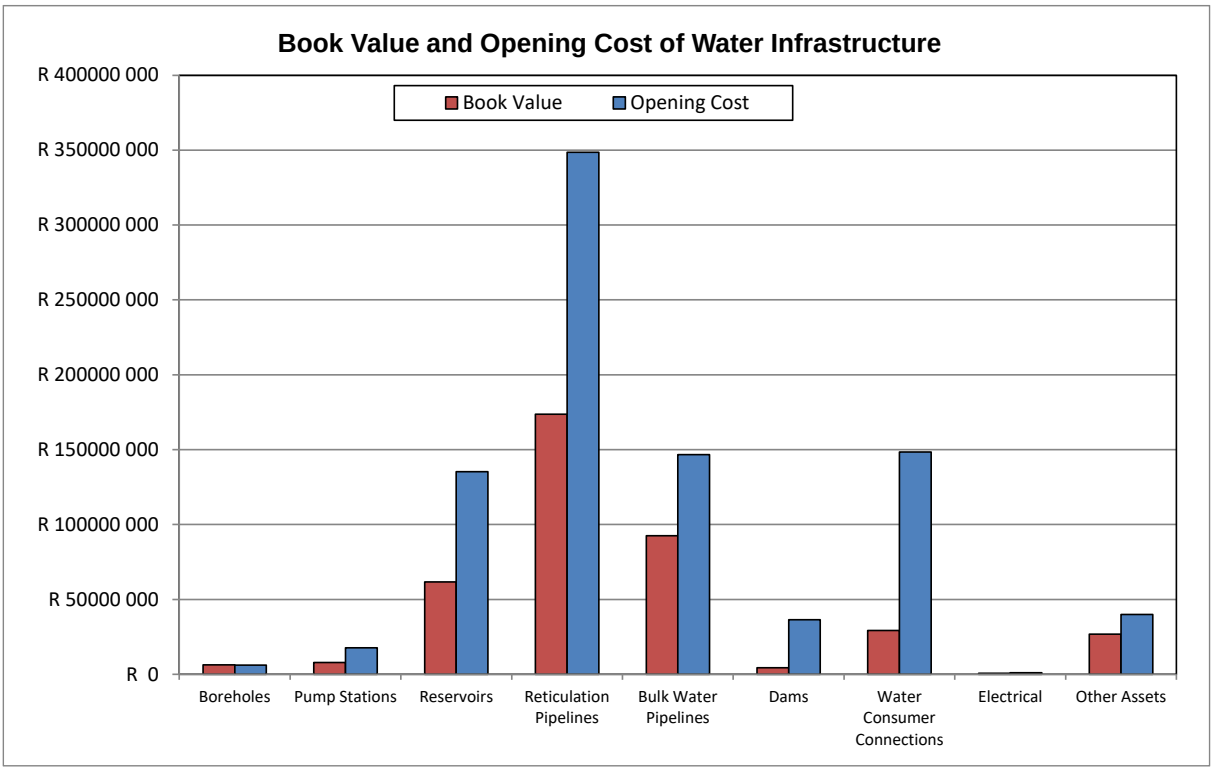
Asset Register: Swartland Municipality updated their current Asset Register after June 2023, in order to include the new assets constructed during the 2022/2023 financial year. The tables that follow give an overview of the current water and sewerage infrastructure included in Swartland Municipality's Asset Register.

Water Infrastructure: The Opening Cost and Book Value of the water infrastructure included in Swartland Municipality's current Asset Register (June 2023) is summarised in the table below.

Table 3.1.1.1: Opening Cost (OC) and Book Value (BV) of the water infrastructure

Asset Type	GIS ID	Opening Cost (OC)	Book Value (BV)	% BV / OC
WATER				
Boreholes	BH	R6 169 524	R6 364 420	103%
Pump Stations	WPS	R17 770 078	R7 870 026	44%
Reservoirs	RES	R135 231 874	R61 711 730	46%
Reticulation Pipelines	WRP	R348 482 573	R173 704 719	50%
Bulk Water Pipelines	BWP	R146 680 189	R92 491 996	63%
Dams	DAM	R36 350 585	R4 379 828	12%
Water Consumer Connections	WCC	R148 476 673	R29 307 359	20%
Electrical	ELEC	R997 031	R614 612	62%
Other Assets	OTH	R39 904 296	R26 712 074	67%
Totals		**R880 062 823**	**R403 156 764**	**46%**

Note: Exclude R70 195 709 under "Future Use" for Asset Type Description.

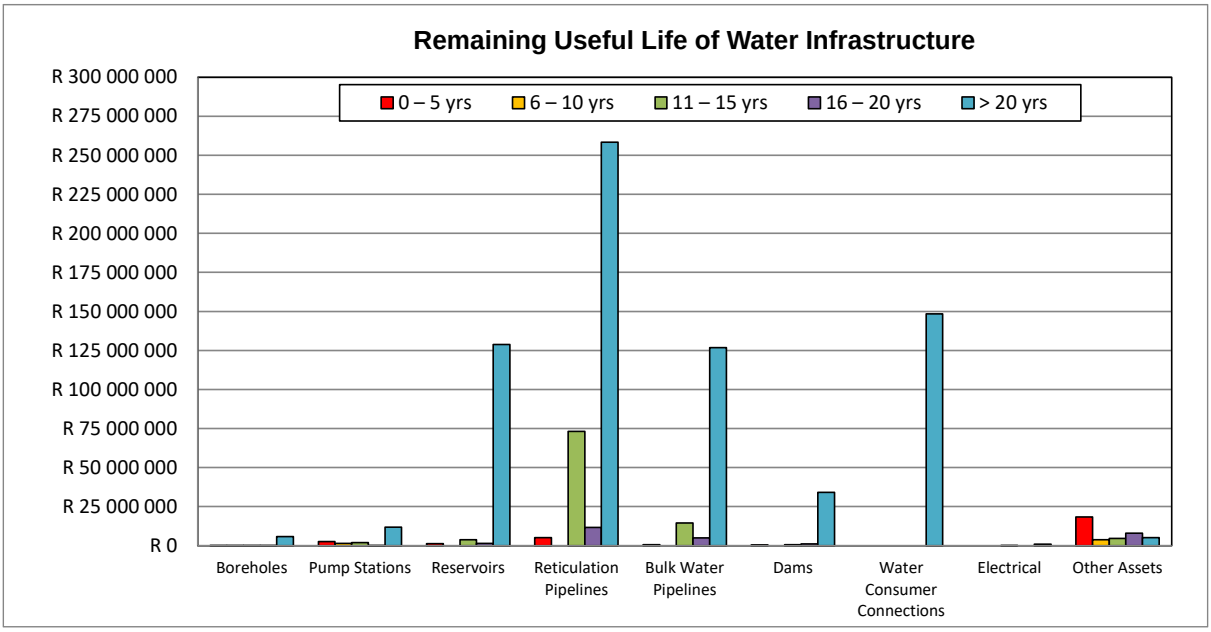


The previous table indicates that about 54.0% of the value of the water infrastructure has been consumed.

The table and graph below give an overview of the RUL by facility type for the water infrastructure.

Table 3.1.1.2: Overview of the RUL by facility type for the water infrastructure (OC)

Asset Type	GIS ID	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
WATER						
Boreholes	BH	R10 000	R90 320	R170 044	R114 107	R5 785 053
Pump Stations	WPS	R2 596 367	R1 463 903	R1 929 436	R7 446	R11 772 926
Reservoirs	RES	R1 247 062	R0	R3 800 395	R1 376 342	R128 808 075
Reticulation Pipelines	WRP	R5 147 878	R0	R73 225 247	R11 733 123	R258 376 325
Bulk Water Pipelines	BWP	R563 639	R0	R14 487 984	R4 898 353	R126 730 213
Dams	DAM	R464 427	R0	R529 785	R1 165 363	R34 191 010
Water Consumer Connections	WCC	R0	R0	R0	R0	R148 476 673
Electrical	ELEC	R0	R0	R6 581	R0	R990 450
Other Assets	OTH	R18 364 805	R3 836 510	R4 641 801	R7 948 553	R5 112 627
TOTALS		**R28 394 178**	**R5 390 733**	**R98 791 273**	**R27 243 287**	**R720 243 352**

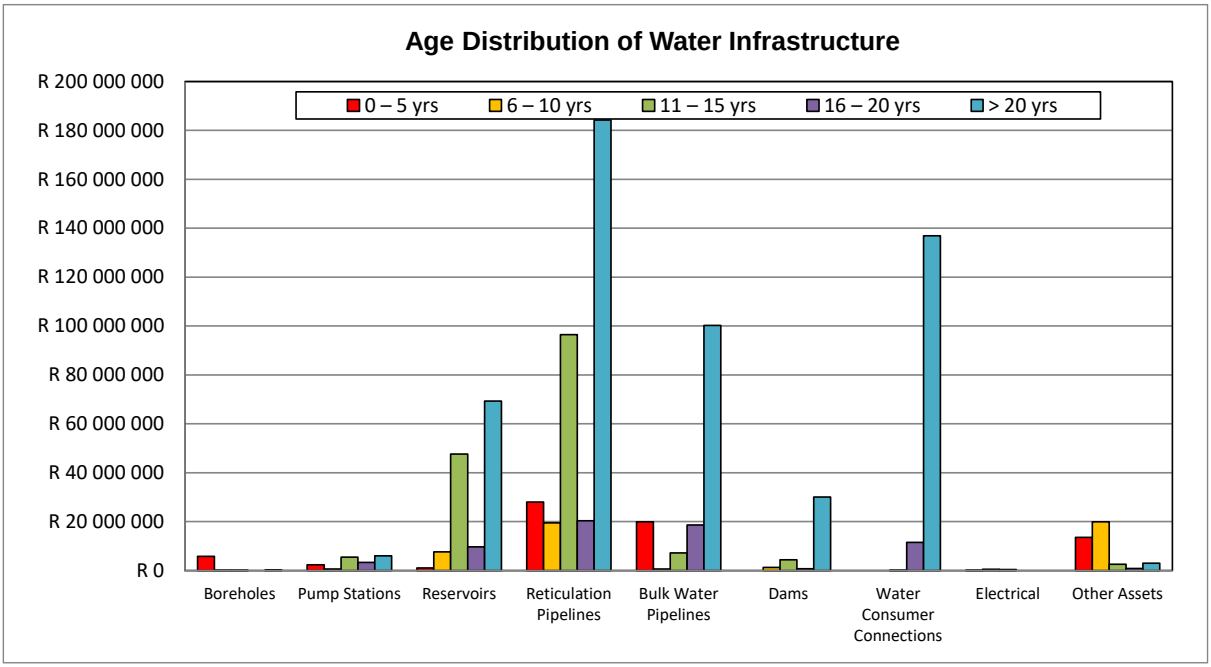


The asset renewal needs for the water infrastructure assets over the next ten years is R3.378 million per year. The reinvestment required is R28.394 million in the first five years and R5.391 million in the second five-year period.

The table and graph below give an overview of the age distribution by facility type for the water infrastructure.

Table 3.1.1.3: Overview of the age distribution by facility type for the water infrastructure (OC)

Asset Type	GIS ID	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
WATER						
Boreholes	BH	R5 813 881	R91 536	R114 107	R0	R150 000
Pump Stations	WPS	R2 353 937	R656 128	R5 473 821	R3 311 152	R5 975 040
Reservoirs	RES	R1 021 422	R7 688 965	R47 589 095	R9 648 062	R69 284 330
Reticulation Pipelines	WRP	R27 966 457	R19 542 644	R96 447 147	R20 328 740	R184 197 585
Bulk Water Pipelines	BWP	R19 911 969	R663 869	R7 181 241	R18 632 684	R100 290 426
Dams	DAM	R0	R1 228 062	R4 374 981	R703 791	R30 043 751
Water Consumer Connections	WCC	R0	R0	R27 842	R11 494 000	R136 954 831
Electrical	ELEC	R6 581	R524 930	R465 520	R0	R0
Other Assets	OTH	R13 533 723	R19 946 320	R2 559 280	R813 568	R3 051 405
TOTALS		**R70 607 970**	**R50 342 454**	**R164 233 034**	**R64 931 997**	**R529 947 368**

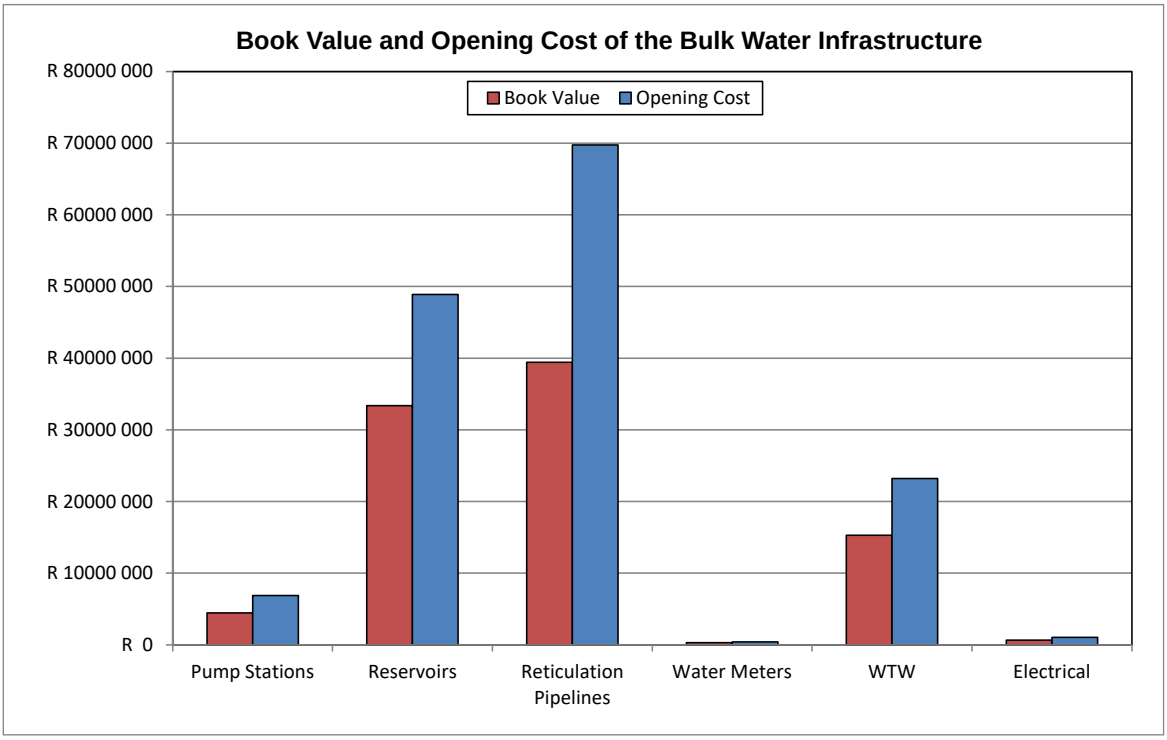


The age of 60.22% of the water infrastructure assets is greater than twenty years.

The tables below give an overview of the water infrastructure assets for the Swartland bulk water distribution system, which is owned by the Swartland Municipality, but operated and maintained by the West Coast District Municipality. The Opening Cost and Book Value of the bulk water infrastructure is summarised in the table below (June 2023).

Table 3.1.1.4: Opening Cost and Book Value of the bulk water infrastructure (Swartland bulk water distribution system)

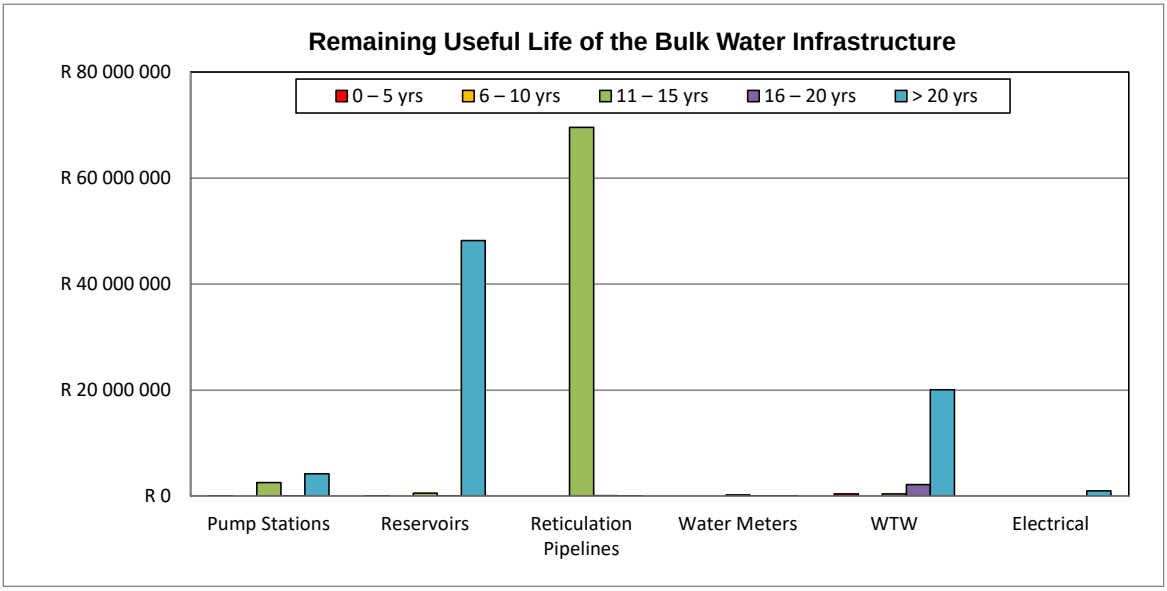
Asset Type	Opening Cost (OC)	Book Value (BV)	% OC / BV
Pump Stations	R6 886 347	R4 453 668	65%
Reservoirs	R48 884 416	R33 359 602	68%
Reticulation Pipelines	R69 750 948	R39 433 654	57%
Water Meters	R389 711	R289 950	74%
WTW	R23 191 967	R15 271 540	66%
Electrical	R1 028 455	R636 220	62%
Totals	**R150 131 844**	**R93 444 634**	**62%**



The table and graph below give an overview of the RUL by facility type for the bulk water infrastructure.

Table 3.1.1.5: Overview of the RUL by facility type for the bulk water infrastructure (OC, Swartland bulk water distribution system)

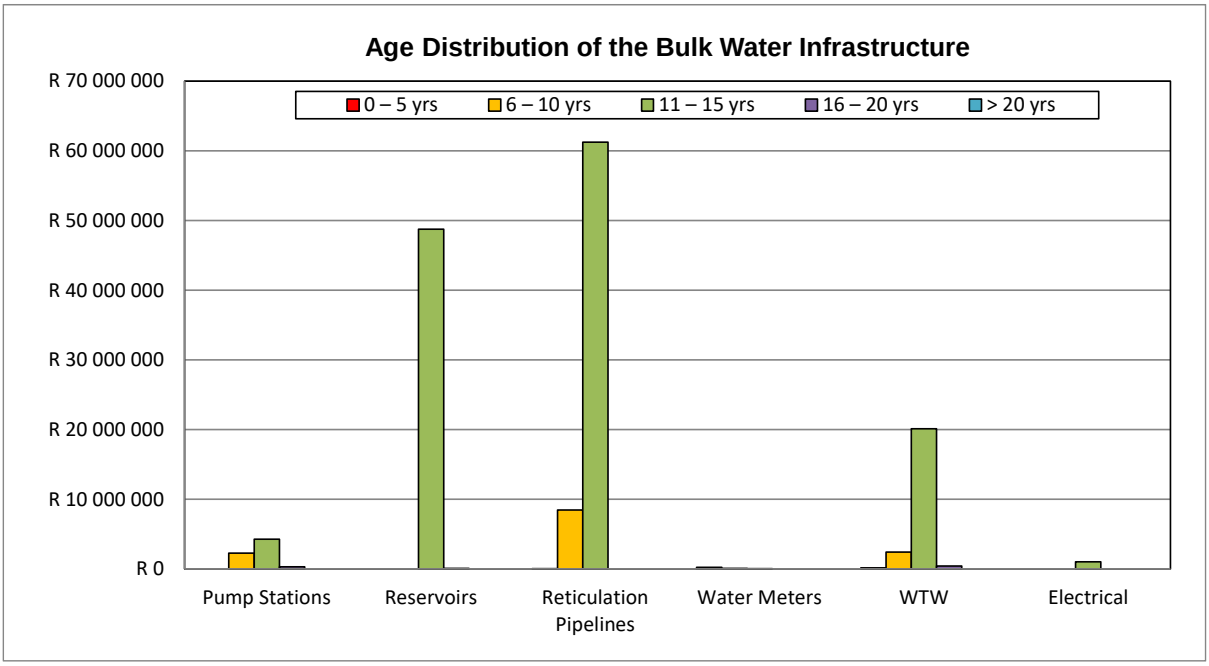
Asset Type	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Pump Stations	R24 890	R0	R2 589 481	R50 490	R4 221 486
Reservoirs	R29 813	R0	R613 317	R27 662	R48 213 624
Reticulation Pipelines	R0	R0	R69 577 563	R106 315	R67 070
Water Meters	R0	R0	R266 416	R89 316	R33 979
WTW	R440 328	R0	R463 045	R2 209 689	R20 078 905
Electrical	R0	R0	R0	R0	R1 028 455
Totals	**R495 031**	**R0**	**R73 509 822**	**R2 483 472**	**R73 643 519**



The table and graph below give an overview of the age distribution by facility type for the bulk water infrastructure.

Table 3.1.1.6: Overview of the age distribution by facility type for the bulk water infrastructure (OC, Swartland bulk water distribution system)

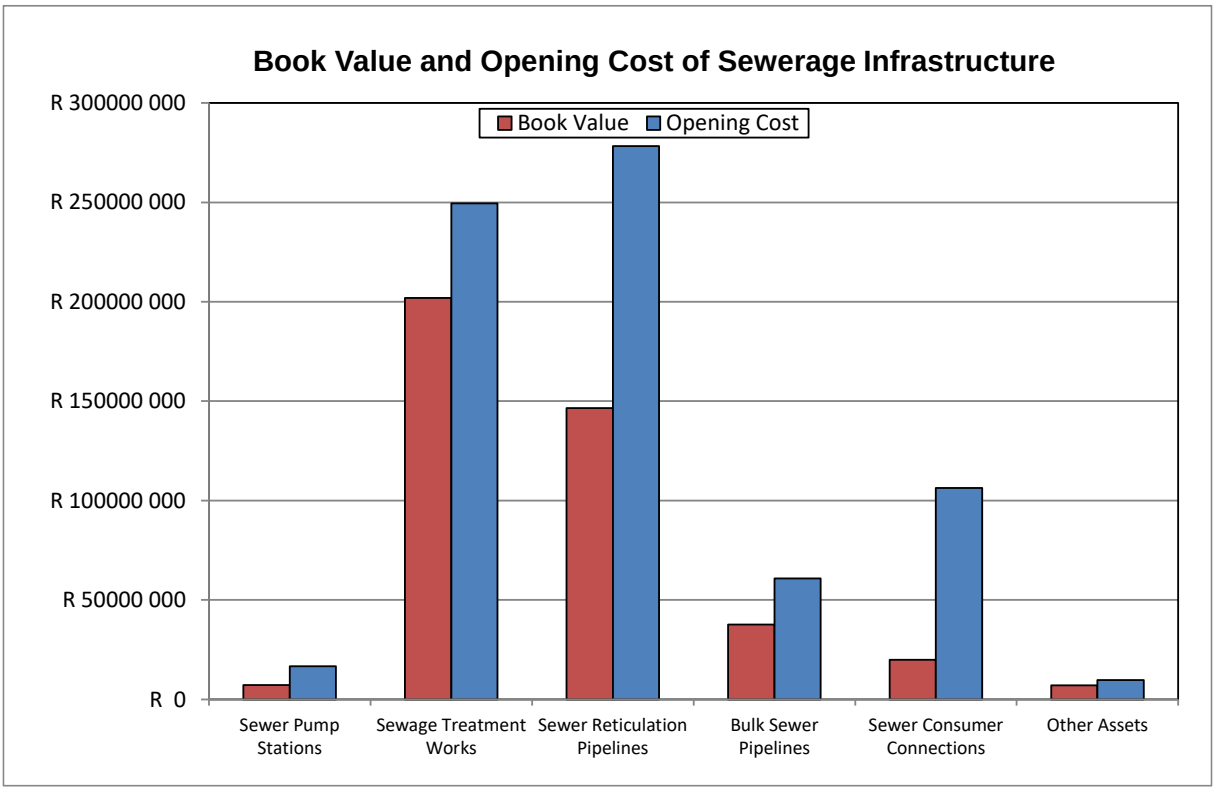
Asset Type	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
Pump Stations	R0	R2 263 619	R4 290 439	R332 289	R0
Reservoirs	R0	R0	R48 784 536	R99 880	R0
Reticulation Pipelines	R20 215	R8 462 824	R61 267 909	R0	R0
Water Meters	R223 575	R104 350	R61 786	R0	R0
WTW	R173 009	R2 436 711	R20 136 377	R445 870	R0
Electrical	R0	R0	R1 028 455	R0	R0
Totals	**R416 799**	**R13 267 504**	**R135 569 502**	**R878 039**	**R0**



Sewerage Infrastructure: The Opening Cost and Book Value of the sewerage infrastructure included in Swartland Municipality's current Asset Register (June 2023) is summarised in the table below.

Table 3.1.1.7: Opening Cost (OC) and Book Value (BV) of the sewerage infrastructure

Asset Type	GIS ID	Opening Cost (OC)	Book Value (BV)	% BV / OC
SEWERAGE				
Sewer Pump Stations	SPS	R16 655 331	R 7 149 256	43%
Sewage Treatment Works	STW	R249 463 337	R 201 844 640	81%
Sewer Reticulation Pipelines	SRP	R278 306 190	R 146 508 794	53%
Bulk Sewer Pipelines	BSP	R60 769 892	R 37 671 726	62%
Sewer Consumer Connections	SCC	R106 390 949	R 19 925 241	19%
Other Assets	OTH	R9 737 532	R 7 070 269*	73%
Totals		**R721 323 231**	**R 420 169 926**	**58%**

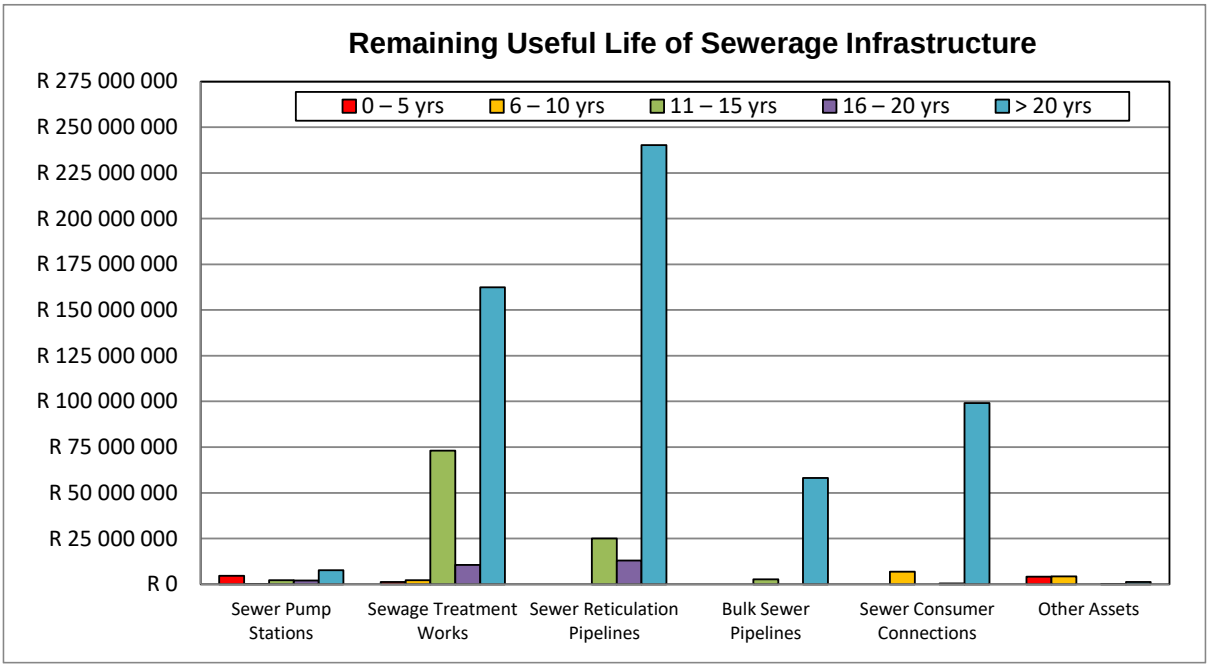


The previous table indicates that about 42.0% of the value of the sewerage infrastructure has been consumed.

The following table and graph give an overview of the RUL by facility type for the sewerage infrastructure.

Table 3.1.1.8: Overview of the RUL by facility type for the sewerage infrastructure (OC)

Asset Type	GIS ID	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
SEWERAGE						
Sewer Pump Stations	SPS	R4 655 802	R183 717	R2 137 131	R1 967 284	R7 711 397
Sewage Treatment Works	STW	R1 222 373	R2 266 340	R73 004 081	R10 496 545	R162 473 998
Sewer Reticulation Pipelines	SRP	R0	R0	R25 066 217	R13 019 068	R240 220 905
Bulk Sewer Pipelines	BSP	R0	R0	R2 614 964	R0	R58 154 928
Sewer Consumer Connections	SCC	R0	R6 845 000	R0	R422 949	R99 123 000
Other Assets	OTH	R4 091 918	R4 249 386	R0	R159 272	R1 236 956
TOTALS		**R9 970 093**	**R13 544 443**	**R102 822 393**	**R26 065 118**	**R568 921 184**

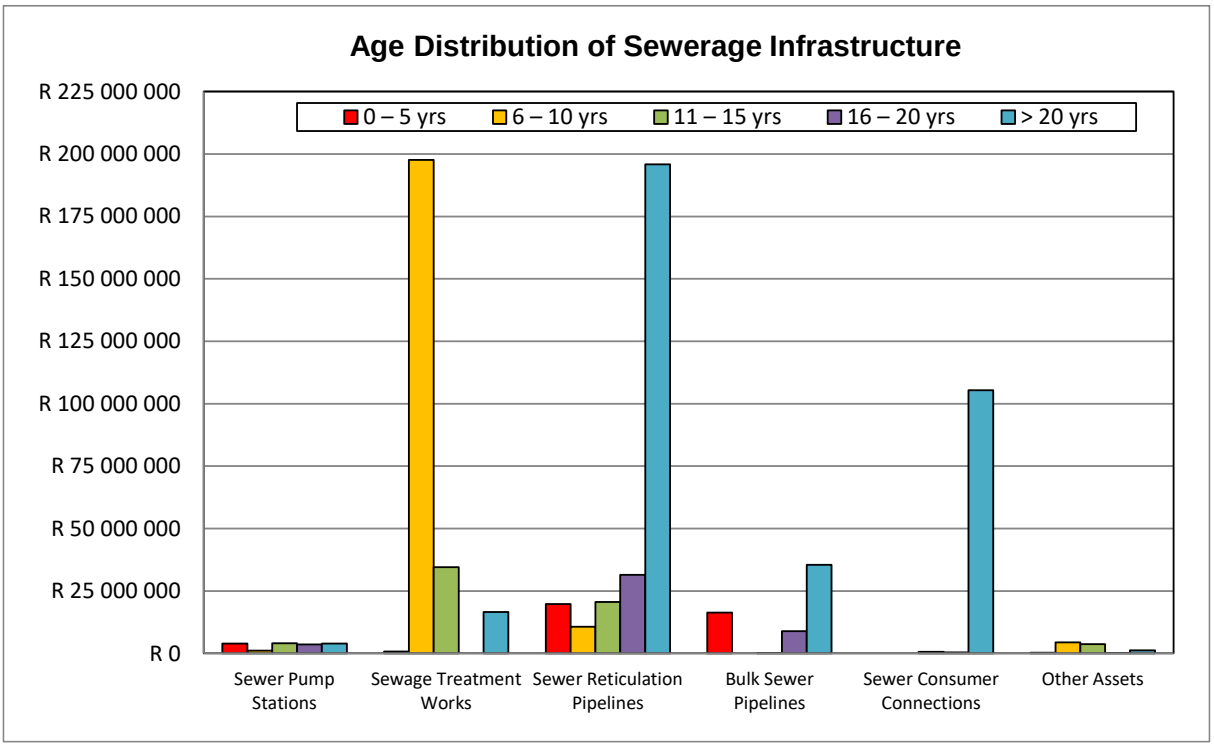


The asset renewal needs for the sewerage infrastructure assets over the next ten years is R2.351 million per year. The reinvestment required is R9.970 million in the first five years and R13.544 million in the second five-year period.

The table below give's an overview of the age distribution per facility for the sewerage infrastructure.

Table 3.1.1.9: Overview of the age distribution by facility type for the sewerage infrastructure (OC)

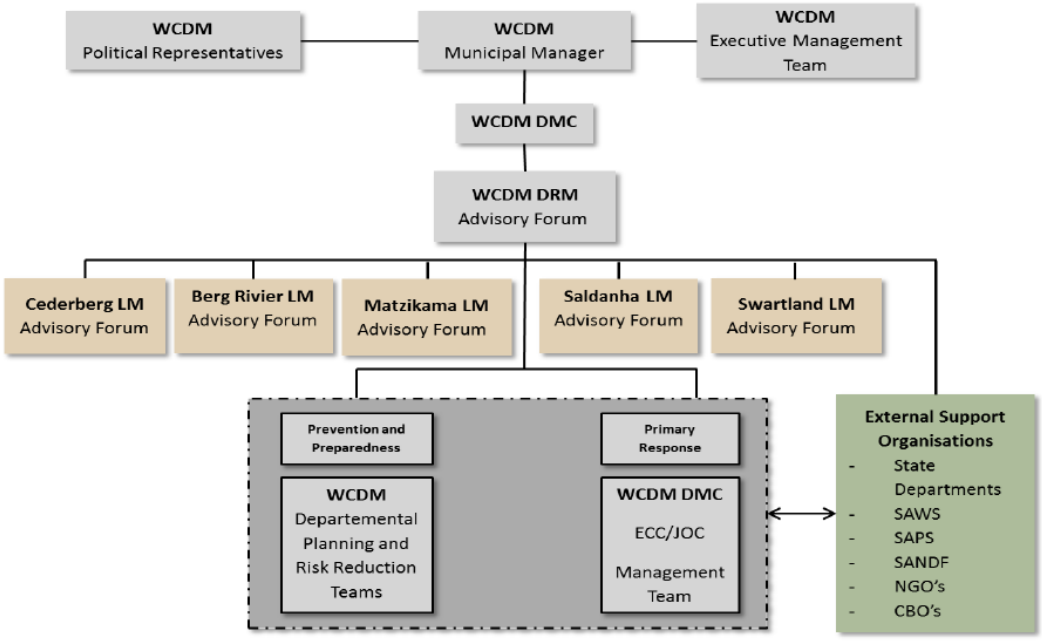
Asset Type	GIS ID	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
SEWERAGE						
Sewer Pump Stations	SPS	R3 922 674	R1 161 879	R4 029 220	R3 546 017	R3 995 541
Sewage Treatment Works	STW	R755 131	R197 586 213	R34 509 836	R0	R16 612 157
Sewer Reticulation Pipelines	SRP	R19 758 239	R10 645 321	R20 555 847	R31 461 899	R195 884 884
Bulk Sewer Pipelines	BSP	R16 325 339	R0	R60 022	R8 890 427	R35 494 104
Sewer Consumer Connections	SCC	R0	R0	R580 949	R410 000	R105 400 000
Other Assets	OTH	R272 523	R4 443 560	R3 741 176	R93 772	R1 186 501
TOTALS		**R41 033 906**	**R213 836 973**	**R63 477 050**	**R44 402 115**	**R358 573 187**



The age of 49.71% of the sewerage infrastructure assets is greater than 20 years.

3.1.2 Disaster Management Plan

The West Coast District Municipality has a functional Disaster Management Centre (DMC) located in Moorreesburg, which attends to all Disaster Risk Management (DRM) related issues. The West Coast District Municipality DMC has developed a Disaster Management Policy Framework and established a Municipal Disaster Management Advisory Forum to encourage participation of stakeholders in disaster management related matters. Institutional arrangements established for the West Coast District Municipality to perform the function of DRM and support the Local Municipalities in the District is illustrated below.



The following disaster risks were identified during a risk assessment process conducted throughout the West Coast District in 2006 and updated in October 2013.

- Accidents (aircraft)
- Accidents (road)
- African Horse sickness
- Anthrax
- Coastal erosion
- Deforestation
- Desertification
- Diseases such as: HIV / Aids; TB; Cholera; Diphtheria; Hemorrhagic Fever; Typhus fever; Typhoid; Dysentery; Polio; Plague; Meningitis; Measles; Rabies; Anthrax; Food poisoning
- Diseases (Human)
- Disease (Human - Ebola)
- Diseases (Animals)
- Drought
- Electricity disruption
- Events
- Fires (structural)
- Fires (veld)
- Hail
- Hazardous installations
- Hazmat (rail, road & sea)
- Heat waves
- Land degradation
- Lightning
- Municipal elections
- Nuclear event
- Pollution (air & water)
- Red tide
- Rift valley fever
- Sand dune migration
- Seismic hazards
- Severe weather
- Social conflict
- Storms surges
- Tornado
- Wind

<u>Priority risks</u>

- Veld Fire
- Structural fires
- Storm surges
- Social Conflict
- Seismic hazards
- Road incidents
- Drought
- Hazmat oceans (oil spill)
- Floods
- Red tide
- Hazmat (roads)
- Human diseases
- Coastal erosion
- Sand dune migration
- Animal diseases
- Nuclear event
- Severe Weather (Storms, Wind, Rain)
- Heat waves
- Dam failure
- Aircraft incident

<u>New risks:</u>

- Electrical failure (black out)

Communities in informal settlements are the most vulnerable to many of these physical risks, but proximity to certain installations or hazards also exposes other communities to risks. In terms of capacity to address and therefore reduce risks, there currently is a strong emphasis on preparedness and response planning. This means that capacity in terms of mitigation and prevention should be strengthened. (Water Safety Plan of Swartland LM).

3.1.3 Untreated Effluent Management Plan

All effluent discharged in the urban areas in Swartland Municipality are treated at the existing WWTWs and there is no known untreated effluent discharged to the environment. W_2RAPs were prepared for all the wastewater treatment systems.

EXISTING MAIN INFRASTRUCTURE

Swartland Municipality receives bulk potable water from the West Coast District Municipality. The District Municipality operates the Withoogte and Swartland bulk schemes, which is served by the Berg River as main raw water supply. The bulk supply of Withoogte is augmented by abstraction of groundwater from the Langebaan Road Groundwater Aquifer System. Both these bulk distribution schemes are cross-border schemes and supply water to Swartland Municipality, Bergrivier Municipality and Saldanha Bay Municipality. The towns in Swartland Municipality's Management Area which are supplied with bulk potable water by the West Coast District Municipality from their Swartland bulk scheme are Malmesbury (Abbotsdale, Riverlands, Chatsworth and Kalbaskraal), Yzerfontein, Darling, Riebeek Kasteel, Riebeek Wes, and Ongegund (PPC). Moorreesburg and Koringberg are supplied from the Withoogte bulk scheme. The two bulk systems are briefly described below:

- **Swartland Bulk Distribution System**: Raw water from the Voëlvlei dam gravitates to the Swartland WTW. The raw water is pumped through the Swartland WTW and the final treated water from the WTW is then further pumped into the bulk distribution network by the Gouda and Kasteelberg pump stations, which are located at the WTW. These two pump stations pump the final treated water to Gouda and the Kasteelberg reservoirs respectively. The water from the Kasteelberg reservoirs is further distributed to the towns in Swartland Municipality's Management Area.

- **Withoogte Bulk Distribution System**: Raw water from the Misverstand dam on the Berg River is pumped via the Misverstand pump station to the Withoogte WTWs from where treated water is distributed to be various towns in Swartland-, Saldanha Bay- and Bergrivier Municipality's Management Areas.

Swartland Municipality supplements the water received from West Coast District Municipality in the Malmesbury distribution system with water from the Paardenberg Dam, which is treated by an automatic backwash rapid gravity sand filter, before it is distributed to Abbotsdale, Kalbaskraal, Riverlands and Chatsworth. A further three boreholes in Riverlands are also used as additional supply for Riverlands and Chatsworth. The groundwater is disinfected, before it is blended with the other potable water and distributed to the consumers in Riverlands and Chatsworth respectively.

Water: The tables below give an overview of the major bulk infrastructure components of the Swartland and Withoogte bulk water distribution systems.

Table 3.1: Existing water infrastructure of the Swartland Bulk Water Distribution System

Bulk and Network Pipelines			
Component	**Bulk (km)**	**Network (km)**	**Total (km)**
Water Pipelines	251.903	207.244	459.146
Reservoirs			
Name	**Type**	**Capacity (Ml)**	**TWL**
Swartland WTW Clear well	WTW	Unknown	Unknown
Kamp reservoir No.1	Reservoir	0.072	Unknown
Kamp reservoir No.2	Reservoir	0.072	Unknown
Kasteelberg No.1	Reservoir	4.525	286.0
Kasteelberg No.2	Reservoir	4.525	286.0
Kasteelberg No.3	Reservoir	4.525	286.0
Kasteelberg No.4	Reservoir	4.525	286.0
Glen Lilly No.1	Reservoir	8.000	263.5
Glen Lilly No.2	Reservoir	8.000	263.5
Glen Lilly No.3	Reservoir	25.000	263.5
Wildschutsvlei	Balancing Tank	0.300	189.7
Total		**59.544**	

Table 3.1: Existing water infrastructure of the Swartland Bulk Water Distribution System						
Water Pump Stations						
Name	**Location / Description**	**No. of Pumps**	**Operate / Standby**	**Q (l/s)**	**H (m)**	**Capacity (Ml/d)**
Darling PS	At Darling: Boost to Darling reservoir	2	1/1	47 (1)	75	4.061
Yzerfontein PS	At Darling: Boost to Wildschutsvlei Balancing Tank	2	1/1	69 (1)	88	5.962
Rustfontein PS	Booster: Kasteelberg to Glen Lily reservoirs	2	0/2	235 (1)	40	20.304
Swavelberg PS	Booster: Kasteelberg to Glen Lily reservoirs	2	0/2	302 (1)	40	26.093
Swartland RW PS	Swartland WTW (Canal through WTW)	3	2/3	369 (2)	17	31.882
Swartland PS	Swartland WTW (WTW to Kasteelberg reservoirs)	4	2/2	354 (3)	46	30.586
Gouda PS	Swartland WTW (WTW to Gouda reservoir)	2	1/2	21.2 (2)	125	1.832
Kamp PS	Swartland WTW (WTW to Kamp reservoir)	2	1/1	Unknown	Unknown	Unknown

Note: ( ) Number of pumps used for calculation of Q in l/s

Table 3.2: Existing water infrastructure of the Withoogte bulk water distribution system			
Bulk and Network Pipelines			
Component	**Bulk (km)**	**Network (km)**	**Total (km)**
Water Pipelines	314.205	376.610	**690.815**
Reservoirs			
Name	**Type**	**Capacity (Ml)**	**TWL**
Withoogte Raw Water Dam	Dam	260.000	180
Withoogte WTW Clearwell	WTW	22.500	175
Byeneskop No. 1	Reservoir	0.628	243.8
Byeneskop No. 2	Reservoir	0.873	243.8
Vergeleë No. 1	Reservoir	4.500	90
Vergeleë No. 2	Reservoir	4.500	90
Vergeleë No. 3	Reservoir	15.000	91
Besaansklip	Reservoir	45.000	99
Besaansklip Modular addition No.1	Reservoir	6.000	99
Besaansklip Modular addition No.1	Reservoir	6.000	99
Besaansklip Modular addition No.1	Reservoir	6.000	99
Besaansklip Modular addition No.1	Reservoir	6.000	99
New Besaansklip	Reservoir	15.000	100.14
Total		**392.001**	

Table 3.2: Existing water infrastructure of the Withoogte bulk water distribution system						
Water Pump Stations						
Name	**Location / Description**	**No. of Pumps**	**Operate / Standby**	**Q (l/s)**	**H (m)**	**Capacity (Ml/d)**
Misverstand Raw Water PS	Misverstand Dam	5	5/0	1 236	200	106.800
Byeneskop PS	WTW to Byeneskop Reservoirs	3	2/1	35.5	91	3.072
Moorreesburg PS	WTW to Moorreesburg PS (LM)	2	1/1	67.5	102	5.830

The table below gives an overview of the major water infrastructure components, for the various internal distribution systems, in Swartland Municipality's Management Area.

Table 3.3: Existing main water infrastructure for the various internal distribution systems

Water Distribution System	Bulk Supply	WTW		Bulk and Reticulation	Number of Water PS	Reservoir and Water Tower Storage	
	(Resources)	Managed by West Coast DM	Add Disinfection	(km)	(RW/PW)	(Ml)	No.
Malmesbury (Abbotsdale, Kalbaskraal, Riverlands, Chatsworth)	Berg River (Voëlvlei), Paardenberg Dam and three Riverlands bhs	29 Ml/d (Swartland WTW)	Malmesbury, Kalbaskraal, Riverlands	264.495	11 (PW)	39.393	18
Moorreesburg	Berg River (Misverstand)	72 Ml/d (Withoogte WTW)	-	72.538	1 (PW)	8.172	3
Riebeek Kasteel	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	23.084	1 (PW)	1.862	2
Riebeek Wes	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	22.308	1 (PW)	2.692	3
Ongegund	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	7.367	1 (PW)	2.298	1
Koringberg	Berg River (Misverstand)	72 Ml/d (Withoogte WTW)	-	10.353	-	0.508	2
Darling	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	46.285	-	3.432	3
Yzerfontein	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	38.698	-	4.375	2

Sewerage: The table below gives an overview of the major sewerage infrastructure components, for the various drainage systems, in Swartland Municipality's Management Area.

Table 3.4: Existing main sewerage infrastructure

Sewer Drainage Systems	Sewer Drainage Network (m)	Number of Sewer PS	WWTW	
			Hydraulic Design Capacity (Ml/d)	Organic Design Capacity (kg COD/d)
Malmesbury and Abbotsdale	147.706	6	10.000	10 000
Kalbaskraal	7.197	2	0.157	To be confirmed
Riverlands and Chatsworth	5.107	2	0.270	To be confirmed
Moorreesburg	42.489	-	2.000	2 000
Riebeek Kasteel, Riebeek Wes and Ongegund	51.582	10	1.900	1 500
Koringberg	2.612	-	0.030	To be confirmed
Darling	41.934	2	1.500	1 500

Malmesbury (Abbotsdale, Kalbaskraal, Riverlands and Chatsworth): Potable water is supplied via the Swavelberg and Rustfontein Pump Stations to the Glen Lilly reservoirs on the Swartland Scheme. The potable water is supplemented downstream with water from the Paardenberg Dam, which is treated by an automatic backwash rapid gravity sand filter and disinfected, before it is distributed to Abbotsdale, Kalbaskraal, Riverlands and Chatsworth. Additional groundwater is also supplied from three boreholes in Riverlands, which is pumped into the reservoir (after disinfection) and blended with the other potable water, before it is distributed to the Riverlands and Chatsworth consumers.

Malmesbury and Abbotsdale is serviced with a formal sewer reticulation system. The sewer drainage system consists of 147.705 km of pipelines and six municipal sewer pump stations. The hydraulic capacity of the Malmesbury WWTW is 10.000 Ml/d.

Kalbaskraal is serviced with a formal sewer reticulation system. The sewer drainage system consists of 7.197 km of pipelines and two municipal sewer pump stations. The hydraulic capacity of the Kalbaskraal WWTW is 0.157 Ml/d.

Riverlands and Chatsworth is serviced with a formal sewer reticulation system. The sewer drainage system consists of 5.106 km of pipelines and 2 municipal sewer pump stations. The hydraulic capacity of the Chatsworth WWTW is 0.270 Ml/d.

The existing bulk water networks and the proposed master plan items for the Swartland and Withoogte bulk water supply systems are included on the following Maps and Figures.

Table 3.5: List of maps, figures and tables for the existing bulk water networks and the proposed master plan items for the Swartland and Withoogte bulk supply systems

Service	Map / Figure / Table	Description	Report	Annexure
Water	Aerial Photo Maps 2K	Bulk Water Scheme Layout Withoogte	Overview	A
	Aerial Photo Maps 2I	Bulk Water Scheme Layout Swartland	Overview	A
Water	Fig SLW 2.1a	Existing water distribution system: Swartland System	Overview	B
	Fig SLW 2.1b	Existing water distribution system: Withoogte System	Overview	B
Water	Fig SLW 2.2a	Existing water distribution zones: Swartland System	Overview	B
	Fig SLW 2.2b	Existing water distribution zones: Withoogte System	Overview	B
Water	Fig SLW 4.1a	Potential future developments: Swartland System	Future	A
	Fig SLW 4.1b	Potential future developments: Withoogte System	Future	A
Water	Fig SLW 6.4a	Future distribution zones: Swartland System	Future	A
	Fig SLW 6.4b	Future distribution zones: Withoogte System	Future	A
Water	Fig SLW 6.5	Required water works: Swartland System	Future	A
Water	Table SLW 6.4a	Water: Proposed works, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4b	Water: Proposed projects, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4c	Priority Water Projects	Future	A

The existing water and sewer networks and the proposed master plan items for the Malmesbury (Abbotsdale, Kalbaskraal, Riverlands and Chatsworth) system are included on the following Maps and Figures.

Table 3.6: List of maps, figures and tables for the existing water and sewer networks and the proposed master plan items for the Malmesbury (Abbotsdale, Kalbaskraal, Riverlands and Chatsworth) system

Service	Map / Figure / Table	Description	Report	Annexure
Water and Sewer	Aerial Photo Map 2A	Existing water and sewer networks: Chatsworth-Riverlands	Overview	A
	Aerial Photo Map 2B	Existing water and sewer networks: Kalbaskraal	Overview	A
	Aerial Photo Map 2C	Existing water and sewer networks: Abbotsdale	Overview	A
	Aerial Photo Map 2D	Existing water and sewer networks: Malmesbury	Overview	A
Water	Fig SLW 2.1a	Existing water distribution system: Malmesbury & Abbotsdale	Overview	B
	Fig SLW 2.1b	Existing water distribution system: Chatsworth, Kalbaskraal & Riverlands	Overview	B
Water	Fig SLW 2.2a	Existing water distribution zones: Malmesbury & Abbotsdale	Overview	B
	Fig SLW 2.2b	Existing water distribution zones: Chatsworth, Kalbaskraal & Riverlands	Overview	B
Sewer	Fig SLS 2.1a	Existing sewer distribution system: Malmesbury & Abbotsdale	Overview	B
	Fig SLS 2.1b	Existing sewer distribution system: Chatsworth, Kalbaskraal & Riverlands	Overview	B
Sewer	Fig SLS 2.2a	Existing sewer drainage areas: Malmesbury & Abbotsdale	Overview	B
	Fig SLS 2.2b	Existing sewer drainage areas: Chatsworth, Kalbaskraal & Riverlands	Overview	B
Water	Fig SLW 4.1a	Potential future developments: Malmesbury & Abbotsdale	Future	A

Table 3.6: List of maps, figures and tables for the existing water and sewer networks and the proposed master plan items for the Malmesbury (Abbotsdale, Kalbaskraal, Riverlands and Chatsworth) system				
Service	**Map / Figure / Table**	**Description**	**Report**	**Annexure**
	Fig SLW 4.1b	Potential future developments: Chatsworth, Kalbaskraal & Riverlands	Future	A
Water	Fig SLW 6.4a	Future distribution zones: Malmesbury & Abbotsdale	Future	A
	Fig SLW 6.4b	Future distribution zones: Chatsworth, Kalbaskraal & Riverlands	Future	A
Water	Fig SLW 6.5a	Required water works: Malmesbury & Abbotsdale	Future	A
	Fig SLW 6.5b	Required water works: Chatsworth, Kalbaskraal & Riverlands	Future	A
Water	Table SLW 6.4a	Water: Proposed works, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4b	Water: Proposed projects, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4c	Priority Water Projects Swartland	Future	A
Sewer	Fig SLS 6.3a	Future drainage areas: Malmesbury & Abbotsdale	Future	A
	Fig SLS 6.3b	Future drainage areas: Chatsworth, Kalbaskraal & Riverlands	Future	A
Sewer	Fig SLS 6.4a	Required sewer works: Malmesbury & Abbotsdale	Future	A
	Fig SLS 6.4b	Required sewer works: Chatsworth, Kalbaskraal & Riverlands	Future	A
Sewer	Table SLS 6.5a	Sewer: Proposed works, cost estimates and phasing: Future systems	Future	A
Sewer	Table SLS 6.5b	Sewer: Proposed projects, cost estimates and phasing: Future systems	Future	A
Sewer	Table SLS 6.5c	Priority Sewer Projects Swartland	Future	A

Moorreesburg: Potable water is pumped from the Withoogte WTWs (West Coast DM) to the three reservoirs in Moorreesburg with a total capacity of 8.172 Ml. Potable water is distributed from the three reservoirs to the Moorreesburg consumers.

The town is serviced with a formal sewer reticulation system. The sewer drainage system consists of 59.870 km of sewer pipelines. The hydraulic design capacity of the new Moorreesburg WWTW is 2.000 Ml/d.

The existing water and sewer networks and the proposed master plan items for the Moorreesburg system are included on the following Maps and Figures.

Table 3.7: List of maps, figures and tables for the existing water and sewer networks and the proposed master plan items for the Moorreesburg system				
Service	**Map / Figure / Table**	**Description**	**Report**	**Annexure**
Water and Sewer	Aerial Photo Map 2G	Existing water and sewer networks: Moorreesburg	Overview	A
Water	Fig SLW 2.1e	Existing water distribution system: Moorreesburg	Overview	B
Water	Fig SLW 2.2e	Existing water distribution zones: Moorreesburg	Overview	B
Sewer	Fig SLS 2.1e	Existing sewer distribution system: Moorreesburg	Overview	B
Sewer	Fig SLS 2.2e	Existing sewer drainage areas: Moorreesburg	Overview	B
Water and Sewer	Fig SLW 4.1e	Potential future developments: Moorreesburg	Future	A
Water	Fig SLW 6.4e	Future distribution zones: Moorreesburg	Future	A
Water	Fig SLW 6.5e	Required water works: Moorreesburg	Future	A
Water	Table SLW 6.4a	Water: Proposed works, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4b	Water: Proposed projects, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4c	Priority Water Projects Swartland	Future	A
Sewer	Fig SLS 6.3e	Future drainage areas: Moorreesburg	Future	A
Sewer	Fig SLS 6.4e	Required sewer works: Moorreesburg	Future	A
Sewer	Table SLS 6.5a	Sewer: Proposed works, cost estimates and phasing: Future systems	Future	A
Sewer	Table SLS 6.5b	Sewer: Proposed projects, cost estimates and phasing: Future systems	Future	A
Sewer	Table SLS 6.5c	Priority Sewer Projects Swartland	Future	A

Riebeek Kasteel: Potable water is distributed from the Kasteelberg Reservoirs on the Swartland Scheme (West Coast DM) via Riebeek Wes to two storage reservoirs in Riebeek Kasteel, with a combined capacity of 1.862 Ml. Potable water is distributed from the two reservoirs to the Riebeek Kasteel consumers.

Riebeek Kasteel is serviced with a formal sewer reticulation system. The sewer drainage system consists of 38.147 km of pipelines and nine municipal sewer pump stations. Effluent is treated at the Riebeek Valley WWTW, with a hydraulic capacity of 1.900 Ml/d.

The existing water and sewer networks and the proposed master plan items for the Riebeek Kasteel system are included on the following Maps and Figures.

Table 3.8: List of maps, figures and tables for the existing water and sewer networks and the proposed master plan items for the Riebeek Kasteel system

Service	Map / Figure / Table	Description	Report	Annexure
Water and Sewer	Aerial Photo Map 2F	Existing water and sewer networks: Riebeek Kasteel	Overview	A
Water	Fig SLW 2.1f	Existing water distribution system: Riebeek Kasteel, Riebeek West & Ongegund	Overview	B
Water	Fig SLW 2.2f	Existing water distribution zones: Riebeek Kasteel, Riebeek West & Ongegund	Overview	B
Sewer	Fig SLS 2.1f	Existing sewer distribution system: Riebeek Kasteel, Riebeek West & Ongegund	Overview	B
Sewer	Fig SLS 2.2f	Existing sewer drainage areas: Riebeek Kasteel, Riebeek West & Ongegund	Overview	B
Water and Sewer	Fig SLW 4.1f	Potential future developments: Riebeek Kasteel, Riebeek West & Ongegund	Future	A
Water	Fig SLW 6.4f	Future distribution zones: Riebeek Kasteel, Riebeek West & Ongegund	Future	A
Water	Fig SLW 6.5f	Required water works: Riebeek Kasteel, Riebeek West & Ongegund	Future	A
Water	Table SLW 6.4a	Water: Proposed works, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4b	Water: Proposed projects, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4c	Priority Water Projects Swartland	Future	A
Sewer	Fig SLS 6.3f	Future drainage areas: Riebeek Kasteel, Riebeek West & Ongegund	Future	A
Sewer	Fig SLS 6.4f	Required sewer works: Riebeek Kasteel, Riebeek West & Ongegund	Future	A
Sewer	Table SLS 6.5a	Sewer: Proposed works, cost estimates and phasing: Future systems	Future	A
Sewer	Table SLS 6.5b	Sewer: Proposed projects, cost estimates and phasing: Future systems	Future	A
Sewer	Table SLS 6.5c	Priority Sewer Projects Swartland	Future	A

Riebeek Wes and Ongegund: Potable water is distributed from the Kasteelberg Reservoirs on the Swartland Scheme (West Coast DM) to the Ongegund Reservoirs and the Riebeek Wes Reservoirs (Three Riebeek Wes reservoirs with a total capacity of 2.692 Ml and one Ongegund reservoirs with a total capacity of 2.298 Ml). Potable water is distributed from these reservoirs to the Ongegund and Riebeek Wes consumers.

Riebeek Wes and Ongegund area serviced with a formal sewer reticulation system. The sewer drainage system of Riebeek Wes consists of 7.974 km of pipelines and Ongegund of 5.460 km of pipelines and one municipal sewer pump station. Effluent is treated at the Riebeek Valley WWTW.

The existing water and sewer networks and the proposed master plan items for the Riebeek Wes and Ongegund system are included on the following Maps and Figures.

Table 3.9: List of maps, figures and tables for the existing water and sewer networks and the proposed master plan items for the Riebeek Wes and Ongegund system

Service	Map / Figure / Table	Description	Report	Annexure
Water and Sewer	Aerial Photo Map 2E	Existing water and sewer networks: Riebeek West & Ongegund	Overview	A
Water	Fig SLW 2.1f	Existing water distribution system: Riebeek Kasteel, Riebeek West & Ongegund	Overview	B

Table 3.9: List of maps, figures and tables for the existing water and sewer networks and the proposed master plan items for the Riebeek Wes and Ongegund system				
Service	**Map / Figure / Table**	**Description**	**Report**	**Annexure**
Water	Fig SLW 2.2f	Existing water distribution zones: Riebeek Kasteel, Riebeek West & Ongegund	Overview	B
Sewer	Fig SLS 2.1f	Existing sewer distribution system: Riebeek Kasteel, Riebeek West & Ongegund	Overview	B
Sewer	Fig SLS 2.2f	Existing sewer drainage areas: Riebeek Kasteel, Riebeek West & Ongegund	Overview	B
Water and Sewer	Fig SLW 4.1f	Potential future developments: Riebeek Kasteel, Riebeek West & Ongegund	Future	A
Water	Fig SLW 6.4f	Future distribution zones: Riebeek Kasteel, Riebeek West & Ongegund	Future	A
Water	Fig SLW 6.5f	Required water works: Riebeek Kasteel, Riebeek West & Ongegund	Future	A
Water	Table SLW 6.4a	Water: Proposed works, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4b	Water: Proposed projects, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4c	Priority Water Projects Swartland	Future	A
Sewer	Fig SLS 6.3f	Future drainage areas: Riebeek Kasteel, Riebeek West & Ongegund	Future	A
Sewer	Fig SLS 6.4f	Required sewer works: Riebeek Kasteel, Riebeek West & Ongegund	Future	A
Sewer	Table SLS 6.5a	Sewer: Proposed works, cost estimates and phasing: Future systems	Future	A
Sewer	Table SLS 6.5b	Sewer: Proposed projects, cost estimates and phasing: Future systems	Future	A
Sewer	Table SLS 6.5c	Priority Sewer Projects Swartland	Future	A

Koringberg: Potable water is pumped from the Withoogte WTWs (West Coast DM) to the two Byeneskop Reservoirs from where the water gravitate to the two Koringberg reservoirs of 0.508 Ml capacity, from where it is distributed to the Koringberg consumers.

The town is serviced with a formal sewer reticulation system. The sewer drainage system consists of 2.612 km of pipelines. The hydraulic design capacity of the Koringberg WWTW is 0.030 Ml/d.

The existing water and sewer networks and the proposed master plan items for the Koringberg system are included on the following Maps and Figures.

Table 3.10: List of maps, figures and tables for the existing water and sewer networks and the proposed master plan items for the Koringberg system				
Service	**Map / Figure / Table**	**Description**	**Report**	**Annexure**
Water and Sewer	Aerial Photo Map 2H	Existing water and sewer networks: Koringberg	Overview	A
Water	Fig SLW 2.1d	Existing water distribution system: Koringberg	Overview	B
Water	Fig SLW 2.2d	Existing water distribution zones: Koringberg	Overview	B
Sewer	Fig SLS 2.1d	Existing sewer distribution system: Koringberg	Overview	B
Sewer	Fig SLS 2.2d	Existing sewer drainage areas: Koringberg	Overview	B
Water and Sewer	Fig SLW 4.1d	Potential future developments: Koringberg	Future	A
Water	Fig SLW 6.4d	Future distribution zones: Koringberg	Future	A
Water	Fig SLW 6.5d	Required water works: Koringberg	Future	A
Water	Table SLW 6.4a	Water: Proposed works, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4b	Water: Proposed projects, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4c	Priority Water Projects Swartland	Future	A
Sewer	Fig SLS 6.3d	Future drainage areas: Koringberg	Future	A
Sewer	Fig SLS 6.4d	Required sewer works: Koringberg	Future	A
Sewer	Table SLS 6.5a	Sewer: Proposed works, cost estimates and phasing: Future systems	Future	A
Sewer	Table SLS 6.5b	Sewer: Proposed projects, cost estimates and phasing: Future systems	Future	A
Sewer	Table SLS 6.5c	Priority Sewer Projects Swartland	Future	A

Darling: Potable water is distributed from the Glen Lilly reservoirs on the Swartland Scheme (West Coast DM) via the Darling PS to the Darling Reservoirs (three reservoirs with a combined capacity of 3.432 Ml). Potable water is distributed from the three reservoirs to the Darling consumers.

The town is serviced with a formal sewer reticulation system. The sewer drainage system consists of 40.930 km of pipelines and nine municipal sewer pump stations. The hydraulic design capacity of the Darling WWTW is 1.500 Ml/d.

The existing water and sewer networks and the proposed master plan items for the Darling system are included on the following Maps and Figures.

Table 3.11: List of maps, figures and tables for the existing water and sewer networks and the proposed master plan items for the Darling system

Service	Map / Figure / Table	Description	Report	Annexure
Water and Sewer	Aerial Photo Map 2I	Existing water and sewer networks: Darling	Overview	A
Water	Fig SLW 2.1c	Existing water distribution system: Darling	Overview	B
Water	Fig SLW 2.2c	Existing water distribution zones: Darling	Overview	B
Sewer	Fig SLS 2.1c	Existing sewer distribution system: Darling	Overview	B
Sewer	Fig SLS 2.2c	Existing sewer drainage areas: Darling	Overview	B
Water and Sewer	Fig SLW 4.1c	Potential future developments: Darling	Future	A
Water	Fig SLW 6.4c	Future distribution zones: Darling	Future	A
Water	Fig SLW 6.5c	Required water works: Darling	Future	A
Water	Table SLW 6.4a	Water: Proposed works, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4b	Water: Proposed projects, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4c	Priority Water Projects Swartland	Future	A
Sewer	Fig SLS 6.3c	Future drainage areas: Darling	Future	A
Sewer	Fig SLS 6.4c	Required sewer works: Darling	Future	A
Sewer	Table SLS 6.5a	Sewer: Proposed works, cost estimates and phasing: Future systems	Future	A
Sewer	Table SLS 6.5b	Sewer: Proposed projects, cost estimates and phasing: Future systems	Future	A
Sewer	Table SLS 6.5c	Priority Sewer Projects Swartland	Future	A

Yzerfontein: Potable water is supplied from the Swartland Scheme (West Coast DM) via the Yzerfontein Pump Station in Darling to the Yzerfontein reservoirs (Two reservoirs with combined capacity of 4.375 Ml). Potable water is distributed from the two reservoirs to the Yzerfontein consumers.

There is no formal sewer reticulation system and the houses are serviced by conservancy- and septic tanks.

The existing water and sewer networks and the proposed master plan items for the Yzerfontein system are included on the following Maps and Figures.

Table 3.12: List of maps, figures and tables for the existing water and sewer networks and the proposed master plan items for the Yzerfontein system

Service	Map / Figure / Table	Description	Report	Annexure
Water and Sewer	Aerial Photo Map 2J	Existing water networks: Yzerfontein	Overview	A
Water	Fig SLW 2.1g	Existing water distribution system: Yzerfontein	Overview	B
Water	Fig SLW 2.2g	Existing water distribution zones: Yzerfontein	Overview	B
Sewer	Fig SLS 2.1g	Existing sewer distribution system: Yzerfontein	Overview	B
Sewer	Fig SLS 2.2g	Existing sewer drainage areas: Yzerfontein	Overview	B
Water and Sewer	Fig SLW 4.1g	Potential future developments: Yzerfontein	Future	A
Water	Fig SLW 6.4g	Future distribution zones: Yzerfontein	Future	A
Water	Fig SLW 6.5g	Required water works: Yzerfontein	Future	A
Water	Table SLW 6.4a	Water: Proposed items, cost estimates and phasing: Future systems	Future	A

Table 3.12: List of maps, figures and tables for the existing water and sewer networks and the proposed master plan items for the Yzerfontein system

Service	Map / Figure / Table	Description	Report	Annexure
Water	Table SLW 6.4b	Water: Proposed projects, cost estimates and phasing: Future systems	Future	A
Water	Table SLW 6.4c	Priority Water Projects Swartland	Future	A
Sewer	Fig SLS 6.3g	Future drainage areas: Yzerfontein	Future	A
Sewer	Fig SLS 6.4g	Required sewer works: Yzerfontein	Future	A
Sewer	Table SLS 6.5a	Sewer: Proposed works, cost estimates and phasing: Future systems	Future	A
Sewer	Table SLS 6.5b	Sewer: Proposed projects, cost estimates and phasing: Future systems	Future	A
Sewer	Table SLS 6.5c	Priority Sewer Projects Swartland	Future	A

EXISTING GROUNDWATER INFRASTRUCTURE (BOREHOLES)

Riverlands Borehole No. 1

Riverlands Borehole No. 2

Riverlands Borehole No. 3

Table 3.13: Existing groundwater infrastructure (Boreholes)			
3.1 General information	**BH 1**	**BH 2**	**BH 3**
Scheme Name	Chatsworth / Riverlands	Chatsworth / Riverlands	Chatsworth / Riverlands
Scheme Number	WC0111	WC0111	WC0111
Borehole Name	Riv BH No.1	Riv BH No.2	Riv BH No.3
Provincial Borehole ID	WC0111002	WC0111001	WC0111003
Alternative Borehole ID			
Community ID served by borehole	WC0111	WC0111	WC0111
Community name served by borehole	Chatsworth / Riverlands	Chatsworth / Riverlands	Chatsworth / Riverlands
Asset Register Group Name (Included in Asset Register)	Could not identify	Could not identify	Could not identify
3.2 Operation			
O&M Occurrence (Regular, Periodic, Sporadic, None, Occasional, When needed)	Regular	Regular	Regular
Incidents, including Security Problems (Regular, Periodic, Sporadic, None)	Sporadic	Sporadic	Sporadic
Safety Inspection performed (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular
Is the abstraction registered with DWS? (Yes / No)	Yes	Yes	Yes
Is abstraction recorded? (Yes / No)	Yes	Yes	Yes
License abstraction (Ml/a)	54.333 (Registration No. 22063516)	54.333 (Registration No. 22063516)	54.333 (Registration No. 22063516)
3.3 Functionality Observation			
Refurbishment needs (High, Medium, Low, None)	None	None	None
Observation (Dysfunctional, Operational, Prime Condition, Vandalised, Destitute)	Operational	Operational	Operational
Total refurbishment needs %	20%	20%	20%
Total refurbishment needs cost for next 15 years (RM)	R0.200	R0.200	R0.200
Refurbishment cost for the next 5 years (RM)	R0.000	R0.000	R0.000
Refurbishment cost for the next 6 - 10 years (RM)	R0.100	R0.100	R0.100
Refurbishment cost for the next 11 - 15 years (RM)	R0.100	R0.100	R0.100
Total replacement needs %	20%	20%	20%
Total replacement needs cost for next 15 years (RM)	R0.200	R0.200	R0.200
Replacement cost for the next 5 years (RM)	R0.000	R0.000	R0.000
Replacement cost for the next 6 - 10 years (RM)	R0.100	R0.100	R0.100
Replacement cost for the next 11 - 15 years (RM)	R0.100	R0.100	R0.100
Total new development cost for next 15 years (RM)	R0.000	R0.000	R0.000
New development cost for the next 5 years (RM)	R0.000	R0.000	R0.000
New development cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000
New development cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000
% Where of the WSA Self is the Current Owner	100.0%	100.0%	100.0%
% Where of the WSA Self is the Current Operator	100.0%	100.0%	100.0%
3.4 Asset Assessment Spectrum			
Total expected lifespan (Short, Medium, Long)	Long	Long	Long
Estimated replacement value (RM): CRC	R1.000	R1.000	R1.000
Already reached Useful Life (Yes/No)	No	No	No
Annual Operating Cost (RM) (1.0% of CRC)	R0.010	R0.010	R0.010
Annual Maintenance Cost (RM) (0.5% of CRC)	R0.005	R0.005	R0.005
Borehole Depth (m)	Unknown	Unknown	Unknown
Altitude above mean sea level (mamsl)	Unknown	Unknown	Unknown
Pump installed in borehole	Unknown	Unknown	Unknown
Motor driving pump	Unknown	Unknown	Unknown
Water level (m)	Unknown	Unknown	Unknown
Water Class	Unknown	Unknown	Unknown
Blow yield (l/s)	Unknown	Unknown	Unknown
Recommended borehole yield (l/s) / Capacity – Over 24 hrs	Unknown	Unknown	Unknown
Current abstraction (Ml/a) – (July 2022 to June 2023)	0.000	0.000	0.000

EXISTING SURFACE WATER INFRASTRUCTURE (ABSTRACTION POINTS)

Table 3.14: Existing surface water infrastructure (Abstraction points)				
3.1 General information	**SW 1**	**SW 2**	**SW 3**	**SW 4**
Scheme Name	Malmesbury	Swartland Bulk Scheme		
Scheme Number	WC0108	WC0100		
Description	Paardenberg Dam	Voëlvlei Dam		
Abstraction Number	WC0108	WC0100		
Abstraction Status (Existing / Future)	Existing	Existing		
Abstraction Class (Regional / Internal)	Internal	Regional		
Asset Register Group Name (Included in Asset Register)	Not Applicable	Not Applicable		
3.2 Operation				
O&M Occurrence (Regular, Periodic, Sporadic, None, Occasional, When needed)	Regular	Regular		
Incidents, including Security Problems (Regular, Periodic, Sporadic, None)	Sporadic	Sporadic		
Is the abstraction registered with DWS? (Yes / No)	Yes	Yes		
Is abstraction recorded? (Yes / No)	Yes	Yes		
Safety Inspection performed (Regular, Periodic, Sporadic, None)	Regular	Regular		
License abstraction (Ml/a)	Unknown	7 900.000 (Swartland)		
3.3 Functionality Observation				
Refurbishment needs (High, Medium, Low, None)	Low	Low		
Observation (Dysfunctional, Operational, Prime Condition, Vandalised, Destitute)	Operational	Operational		
Total refurbishment needs %	0%	0%		
Total refurbishment needs cost for next 15 years (RM)	R0.000	R0.000		
Refurbishment cost for the next 5 years (RM)	R0.000	R0.000		
Refurbishment cost for the next 6 - 10 years (RM)	R0.000	R0.000		
Refurbishment cost for the next 11 - 15 years (RM)	R0.000	R0.000		
Total replacement needs %	0%	0%		
Total replacement needs cost for next 15 years (RM)	R0.000	R0.000		
Replacement cost for the next 5 years (RM)	R0.000	R0.000		
Replacement cost for the next 6 - 10 years (RM)	R0.000	R0.000		
Replacement cost for the next 11 - 15 years (RM)	R0.000	R0.000		
Total new development cost for next 15 years (RM)	R0.000	R0.000		
New development cost for the next 5 years (RM)	R0.000	R0.000		
New development cost for the next 6 - 10 years (RM)	R0.000	R0.000		
New development cost for the next 11 - 15 years (RM)	R0.000	R0.000		
% Where of the WSA Self is the Current Owner	0%	0%		
% Where of the WSA Self is the Current Operator	0%	0%		
3.4 Asset Assessment Spectrum				
Total expected lifespan (Short, Medium, Long)	Long	Long		
Estimated replacement value (RM): CRC	-	-		
Already reached Useful Life (Yes/No)	No	No		
Annual Operating Cost (RM) (1.0% of CRC)	-	-		
Annual Maintenance Cost (RM) (0.5% of CRC)	-	-		
Current abstraction (Ml/a) – (Average July 2022 to June 2023)	0.242	6 887.064		
Full supply storage capacity (Ml)	Unknown	158 600		
Capacity - Total daily assured yield (Ml/day)	Unknown	21.644 (Licence)		
Type of structure (Dam, Weir, Canal, Run of River)	Dam	Dam		

EXISTING BULK WATER PIPELINE INFRASTRUCTURE

Table 3.15: Existing bulk water pipeline infrastructure

3.1 General information	BW 1	BW 2	BW 3	BW 4	BW 5	BW 6	BW 7	BW 8	BW 9	BW 10	BW 11
Scheme Name	Swartland Bulk Scheme	Moorreesburg	Riebeek Kasteel	Riebeek Wes	Yzerfontein	Darling	Koringberg	Malmesbury	Abbotsdale	Kalbaskraal	Chatsworth-Riverlands
Scheme Number	WC0100	WC0102	WC0103	WC0104	WC0105	WC0106	WC0107	WC0108	WC0109	WC0110	WC0111
Description	Water Pipeline in Scheme	Water Pipeline in Scheme	Water Pipeline in Scheme	Water Pipeline in Scheme	Water Pipeline in Scheme	Water Pipeline in Scheme	Water Pipeline in Scheme	Water Pipeline in Scheme	Water Pipeline in Scheme	Water Pipeline in Scheme	Water Pipeline in Scheme
Bulk Status (Existing / Future)	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing
Bulk Class (Regional / Internal)	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal
Bulk Type (Water / Sewer)	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Asset Register ID (Included in Asset Register)	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs
Length of pipeline (km)	459.146	72.538	23.084	29.675	38.698	46.285	10.353	181.481	18.512	17.716	46.786
3.2 Operation											
O&M Occurrence (Regular, Periodic, Sporadic, None, Occasional, When needed)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Incidents, including Security Problems (Regular, Periodic, Sporadic, None)	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic
Safety Inspection performed (R: Regular, P: Periodic, S: Sporadic, N: None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
3.3 Functionality Observation											
Refurbishment needs (High, Medium, Low, None)	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
General physical condition (Dysfunctional, Operational, Prime Condition, Vandalised, Destitute)	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational
Total refurbishment needs %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total refurbishment needs cost for next 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Total replacement needs %	22.5%	22.5%	22.5%	22.5%	22.5%	22.5%	22.5%	22.5%	22.5%	22.5%	22.5%
Total replacement needs cost for next 15 years (RM)	R219.989	R17.942	R5.847	R6.211	R10.537	R9.774	R1.856	R47.898	R4.317	R6.418	R12.767
Replacement cost for the next 5 years (RM)	R73.330	R5.981	R1.949	R2.070	R3.512	R1.856	R0.619	R15.966	R1.439	R2.139	R4.256
Replacement cost for the next 6 - 10 years (RM)	R73.330	R5.981	R1.949	R2.070	R3.512	R1.856	R0.619	R15.966	R1.439	R2.139	R4.256
Replacement cost for the next 11 - 15 years (RM)	R73.330	R5.981	R1.949	R2.070	R3.512	R1.856	R0.619	R15.966	R1.439	R2.139	R4.256
Total new development cost for next 15 years (RM)	R417.744	R11.558	R8.142	R5.928	R5.327	R6.867	R1.436	R39.689	R19.236	R7.185	R29.024
New development cost for the next 5 years (RM)	R66.529	R0.000	R4.061	R3.074	R0.000	R4.743	R0.848	R24.542	R3.055	R5.392	R29.024

Table 3.15: Existing bulk water pipeline infrastructure											
3.1 General information	**BW 1**	**BW 2**	**BW 3**	**BW 4**	**BW 5**	**BW 6**	**BW 7**	**BW 8**	**BW 9**	**BW 10**	**BW 11**
New development cost for the next 6 - 10 years (RM)	R192.062	R1.834	R0.241	R0.471	R3.551	R1.720	R0.588	R4.140	R1.457	R1.793	R0.000
New development cost for the next 11 - 15 years (RM)	R159.153	R9.724	R3.840	R2.383	R1.776	R0.404	R0.000	R11.007	R1.793	R0.000	R0.000
% Where of the WSA Self is the Current Owner	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
% Where of the WSA Self is the Current Operator	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
3.4 Asset Assessment Spectrum											
Total expected lifespan (Short, Medium, Long)	Long	Long	Long	Long	Long	Long	Long	Long	Long	Long	Long
Estimated replacement value (RM): CRC	R977.729	R79.743	R25.988	R27.606	R46.830	R43.441	R8.249	R212.881	R19.186	R28.524	R56.744
Already reached Useful Life (Yes/No)	No	No	No	No	No	No	No	No	No	No	No
Annual Operating Cost (RM) (1.0% of CRC)	R9.777	R0.797	R0.260	R0.276	R0.468	R0.434	R0.082	R2.129	R0.192	R0.285	R0.567
Annual Maintenance Cost (RM) (0.5% of CRC)	R4.889	R0.399	R0.130	R0.138	R0.234	R0.217	R0.041	R1.064	R0.096	R0.143	R0.284
Pipe material (Most common)	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC
Average discharge rate (l/sec), Based on 2022/2023 AADD	211.899	22.786	12.604	6.271	9.504	14.486	1.718	80.336	4.390	2.420	9.860

Note: 1) Riebeek Wes in the above table include Ongegund.

2) New development cost in the above table include bulk and internal reticulation (Table 3.2.3.1, Table 3.2.3.2 and Table 3.2.7.1 in the Future Demand and Functionality Requirements Report)

EXISTING WATER TREATMENT WORKS INFRASTRUCTURE

SWARTLAND WTW: Raw water gravitates from the Voëlvlei dam through a canal to the Swartland WTW, from where the raw water is pumped into the WTW. Sudfloc 3870 is dosed as coagulant, which is an aluminium based salt polymer with cationic polyelectrolyte polymer blend (Fast floc forming, good activity, good filtering and adapted for a wide pH value). The corrosion effect of the water is stabilised by the addition of lime, which also causes the pH to rise. The functioning of the Flocculants is better at a higher pH. The precipitate formed due to the turbidity being removed by flash mixing with the flocculants, settles out in the two settling tanks. From the settling tanks the water gravitates through the twelve sand filters where excess turbidity is removed. The last phase of the purification process is to disinfect the final water with chlorine. The final water gravitates to the storage reservoir before being pumped into the three distribution networks (Kasteelberg, Gouda and Kamp). The sludge, which is drawn off from the settling tanks, gravitates to the sludge dams. A pipeline was also constructed to recover the overflow water from the sludge dams and to re-circulate the water back to the inlet works.

The current capacity of the Swartland WTW is 29 Ml/d, which include the following treatment processes:

- Flow measurement (Inflow, Process flow and Outflow)
- Chemical dosing (Coagulant Sudfloc 3870 and Stabilization with Lime)
- Hydraulic Flocculation
- Gravity Sedimentation (Two horizontal and two vertical flow tanks)
- Filtration (Eight new gravity sand filters and four old filters)
- Disinfection (Chlorine Gas)
- Sludge Handling

Inlet to raw water PS from Voëlvlei Canal

Stabilisation Lime

Sudfloc 3870 dosing pumps (Duty/Standby)

Vertical flow sedimentation tanks

Horisontal flow sedimentation tanks

Rapid Gravity Sand Filters

PAARDENBERG WTW: A Rapid Gravity Sand Filter is used to treat the surface water supplied from the Paardenberg Dam. The water is also disinfected with chlorine gas before it is distributed to Abbotsdale, Kalbaskraal, Riverlands and Chatsworth.

Paardenberg WTW

WTW Filter

Disinfection Facility

Disinfection facility (Chlorine gas)

Filter pumps

EXISTING WATER TREATMENT WORKS INFRASTRUCTURE

Table 3.16: Existing water treatment works infrastructure				
3.1 General information	**WTW 1**	**WTW 2**	**WTW 3**	**WTW 4**
Scheme Name	Greater Malmesbury	Swartland Bulk		
Scheme Number	WC0101	WC0100		
WTW Name	Paardenberg WTW	Swartland WTW		
WTW Number	WC0101001	WC0100001		
WTW Classification (A, B, C, D, E, Unknown)	Not classified	A		
WTW Class (Regional / Internal)	Internal	Regional		
WTW Status (Existing / Future)	Existing	Existing		
Asset Register ID (Included in Asset Register)	Various IDs	Various IDs		
Water Quality Monitoring Programme in place - Compliance and Operational (Yes / No)	Yes	Yes		
3.2 Operation				
O&M Occurrence (Regular, Periodic, Sporadic, None, Occasional, When needed)	Regular	Regular		
Incidents, including security problems (Regular, Periodic, Sporadic, None)	Sporadic	Sporadic		
Safety Inspection performed (Regular, Periodic, Sporadic, None)	Regular	Regular		
Average operating hours per day	8	24		
Blue Drop Status (Yes / No)	No	No		
Blue Drop Score 2023 (%)	93.33%	93.33%		
Incident Management Protocol in place (Yes / No)	Yes	Yes		
Proper Process Control in place (Yes / No, % Technical Skills 2021)	Yes	Yes		
Failure Response Management in place (Yes / No, Risk Management RR)	Yes	Yes		
Sample Analysis Credibility (Percentage)	100%	100%		
Authorisation Compliance (Yes / No)	Yes	Yes		
3.3 Functionality Observation				
Refurbishment needs (High, Medium, Low, None)	Low	Low		
General physical condition (Dysfunctional, Operational, Prime Condition, Vandalised, Destitute)	Operational	Operational		
Total refurbishment needs %	30%	15%		
Total refurbishment needs cost for next 15 years (RM)	R0.600	R46.080		
Refurbishment cost for the next 5 years (RM)	R0.200	R15.360		
Refurbishment cost for the next 6 - 10 years (RM)	R0.200	R15.360		
Refurbishment cost for the next 11 - 15 years (RM)	R0.200	R15.360		
Total replacement needs %	30%	15%		
Total replacement needs cost for next 15 years (RM)	R0.600	R46.080		
Replacement cost for the next 5 years (RM)	R0.200	R15.360		
Replacement cost for the next 6 - 10 years (RM)	R0.200	R15.360		
Replacement cost for the next 11 - 15 years (RM)	R0.200	R15.360		
Total new development cost for next 15 years (RM)	R0.000	R728.000		
New development cost for the next 5 years (RM)	R0.000	R364.000		
New development cost for the next 6 - 10 years (RM)	R0.000	R364.000		
New development cost for the next 11 - 15 years (RM)	R0.000	R0.000		
Number of Permanent Staff on site	0	7		
% Where of the WSA Self is the Current Owner	100%	100%		
% Where of the WSA Self is the Current Operator	100%	0%		
3.4 Asset Assessment Spectrum				
Total Expected Lifespan, RUL (Short, Medium, Long)	Long	Long		
Estimated replacement value (RM): CRC	R2.000	R307.192		
Already reached use full life span (Yes / No)	No	No		
Annual Operating Cost (RM) (1.0% of CRC)	R0.020	R3.072		
Annual Maintenance Cost (RM) (0.5% of CRC)	R0.010	R1.536		
Capacity (Ml/day)	Unknown	29.000		
Total volume of water received and treated per day for 2022/2023 (Ml/day)	0.001	18.869		
Discharge volume per day for 2022/2023 (Ml/day)	0.001	18.308		
Capacity sufficient (Yes / No)	Yes	No		

EXISTING WATER PUMP STATIONS

Raw Water PS at Swartland WTW

Kasteelberg PS at Swartland WTW

Kamp PS at Swartland WTW

Rustfontein Booster PS

Swavelberg Booster PS

Darling PS for supply to Darling

Darling PS for supply to Yzerfontein

Moorreesburg PS at Withoogte WTW

Chatsworth/Riverlands Supply PS

Moorreesburg PS

Riebeek Kasteel Booster PS

Riebeek Wes HL Reservoir Supply PS

Ongegund PS for HL Reservoir

Mount Royal Booster PS

Panorama Booster PS

Tafelsig Booster PS

Wesbank Tower PS

Wesbank Booster PS

Abbotsdale Bulk PS

Abbotsdale Booster PS

Highlands Supply PS

Kalbaskraal Booster PS

Riverlands to Chatsworth reservoirs PS

EXISTING WATER PUMP STATIONS

Table 3.17: Existing water pump station infrastructure									
3.1 General information	**WPS 1**	**WPS 2**	**WPS 3**	**WPS 4**	**WPS 5**	**WPS 6**	**WPS 7**	**WPS 8**	**WPS 9**
Scheme Name	Swartland Bulk	Swartland Bulk	Swartland Bulk	Swartland Bulk	Swartland Bulk	Swartland Bulk	Swartland Bulk	Misverstand Bulk	Greater Malmesbury
Scheme Number	WC0100	WC0100	WC0100	WC0100	WC0100	WC0100	WC0100	WC0200	WC0101
Pump Number	WC0100001	WC0100003	WC0100004	WC0100005	WC0100006	WC0100007	WC0100008	WC0200004	WC0101001
Description (RW – Raw Water, PW – Potable Water)	Raw Water PS at Swartland WTW (RW)	Kasteelberg PS at Swartland WTW (PW)	Kamp PS at Swartland WTW (PW)	Rustfontein Booster PS (PW)	Swavelberg Booster PS (PW)	Darling PS for supply to Darling (PW)	Darling PS for supply to Yzerfontein (PW)	Moorreesburg PS at Withoogte WTW (PW)	Chatsworth/Riverlands Supply PS
Pump Station Status (Existing / Future)	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing
Pump Station Class (Regional / Internal)	Regional	Regional	Regional	Regional	Regional	Regional	Regional	Regional	Internal
Asset Register ID (Included in Asset Register)	37674 - 37692			Could not identify	37644 - 37647	37671 – 37673, 37693	Could not identify	Could not identify	31031, 31032
Pump Type (Water / Sewer)	Water	Water	Water	Water	Water	Water	Water	Water	Water
3.2 Operation									
O&M Occurrence (Regular, Periodic, Sporadic, None, Occasional, When needed)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Incidents, including Security Problems (Regular, Periodic, Sporadic, None)	None	None	None	Sporadic	Sporadic	Sporadic	Sporadic	None	Sporadic
Safety Inspection performed (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Are there any standby pumps available? (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of pumps	3	4	2	2	2	2	2	2	2
3.3 Functionality Observation									
Refurbishment needs (High, Medium, Low, None)	None	None	None	None	None	None	None	None	None
General physical condition (Dysfunctional, Operational, Prime Condition, Vandalised, Destitute)	Operational	Prime Condition	Operational	Prime Condition	Prime Condition	Prime Condition	Prime Condition	Operational	Prime Condition
Total refurbishment needs %	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total refurbishment needs cost for next 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Total replacement needs %	0%	0%	0%	0%	0%	4.6%	8.9%	0%	0%
Total replacement needs cost for next 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.150	R0.150	R0.000	R0.000
Replacement cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.150	R0.150	R0.000	R0.000
Replacement cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Replacement cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Total new development cost for next 15 years (RM)	R20.360	R0.000	R0.000	R3.450	R3.450	R0.512	R0.000	R0.000	R0.315
New development cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
New development cost for the next 6 - 10 years (RM)	R20.360	R0.000	R0.000	R3.450	R3.450	R0.000	R0.000	R0.000	R0.315
New development cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.512	R0.000	R0.000	R0.000
% Where of the WSA Self is the Current Owner	100%	100%	100%	100%	100%	100%	100%	100%	100%
% Where of the WSA Self is the Current Operator	0%	0%	0%	0%	0%	0%	0%	0%	100%
3.4 Asset Assessment Spectrum									
Total expected lifespan (Short, Medium, Long)	Long	Long	Long	Long	Long	Long	Long	Long	Long
Estimated replacement value (RM): CRC	R4.000	R20.906	R2.290	R7.840	R8.500	R3.257	R1.680	R1.994	R1.873
Already reached Useful Life (Yes/No)	No	No	No	No	No	No	No	No	No
Annual Operating Cost (RM) (1.0% of CRC)	R0.040	R0.209	R0.023	R0.078	R0.085	R0.033	R0.017	R0.020	R0.019
Annual Maintenance Cost (RM) (0.5% of CRC)	R0.020	R0.105	R0.011	R0.039	R0.043	R0.016	R0.008	R0.010	R0.009
Delivery capacity (l/s)	369	354	Unknown	235	302	Unknown	69	Unknown	15 (Master Plan)
Type of Motor (Number)	WEG (x3)	WEG (x4)	BMM (x1) & Siemens (x1)	WEG (x2)	WEG (x2)	WEG (x2)	WEG (x2)	BMG (x2)	TEE Type Mot3 Q2E FA 180M2A-40H (x2)
Type of Pump (Number)	KSB Type ETA 250-29 (x3)	Sulzer Type HPL-42-22.5 5ST (x4)	KSB Type ETA 50-200 (x2)	KSB Type ETA 250-40 (x2)	KSB Type OMEGA 250-480 GC (x2)	KSB Type ETANORM 100-080-250 (x1) & KSB Type ETA 80-250 (x1)	Grundfos, Type NK80-250/270 Y1-F-B-BAQE (x1) & Grundfos, Type NK 80-250/264 Y1-F-B-BAQE (x1)	Saer Type MCB80-200/AB (x2)	WILO Type MVI7004-3/16/E/50-2 (x2)
Motor (kW)	45kW (x3)	500kW (x4)	15kW (x1) & 11kW (x1)	160kW (x2)	185kW (x2)	75kW (x2)	90kW (x1) & 60kW (x1)	45kW (x2)	22kW (x2)

EXISTING WATER PUMP STATIONS – Continued

Table 3.17: Existing water pump station infrastructure

5.1 General information	WPS 10	WPS 11	WPS 12	WPS 13	WPS 14	WPS 15	WPS 16	WPS 17	WPS 18
Scheme Name	Moorreesburg	Riebeek Kasteel	Riebeek Wes	Riebeek Wes	Malmesbury	Malmesbury	Malmesbury	Malmesbury	Malmesbury
Scheme Number	WC0102	WC0103	WC0104	WC0104	WC0108	WC0108	WC0108	WC0108	WC0108
Pump Number	WC0102001	WC0103001	WC0104001	WC0104002	WC0108001	WC0108002	WC0108003	WC0108004	WC0108005
Description (RW – Raw Water, PW – Potable Water)	Moorreesburg PS (PW)	Riebeek Kasteel Booster PS (PW)	Riebeek Wes HL Reservoir Supply PS (PW)	Ongegund PS for HL Reservoir (PW)	Mount Royal Booster PS (PW)	Panorama Booster PS (PW)	Tafelsig Booster PS (PW)	Wesbank Tower PS (PW)	Wesbank Booster PS (PW)
Pump Station Status (Existing / Future)	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing
Pump Station Class (Regional / Internal)	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal
Asset Register ID (Included in Asset Register)	10728, 10729, 10730, 10731, 10732, 10733	Could not identify	Could not identify	Could not identify	9953, 9954, 9956, 9957, 9959	9938, 9939, 9940, 9941, 9942, 9943	8902, 8903, 8905, 8906, 8907	Could not identify	Could not identify
Pump Type (Water / Sewer)	Water	Water	Water	Water	Water	Water	Water	Water	Water
5.2 Operation									
O&M Occurrence (Regular, Periodic, Sporadic, None, Occasional, When needed)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Incidents, including Security Problems (Regular, Periodic, Sporadic, None)	Sporadic	Sporadic	Sporadic	Sporadic	None	Sporadic	Sporadic	Sporadic	Sporadic
Safety Inspection performed (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Are there any standby pumps available? (Yes / No)	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Number of pumps	3	3	2	1	2	2	3	2	2
5.3 Functionality									
Refurbishment needs (High, Medium, Low, None)	None	None	None	High	None	None	Low	None	None
General physical condition (Dysfunctional, Operational, Prime Condition, Vandalised, Destitute)	Prime Condition	Prime Condition	Prime Condition	Operational	Operational	Prime Condition	Operational	Operational	Operational
Total refurbishment needs %	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total refurbishment needs cost for next 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Total replacement needs %	8.8%	6.0%	0%	15.2%	0%	0%	0%	0%	0%
Total replacement needs cost for next 15 years (RM)	R0.240	R0.090	R0.000	R0.270	R0.000	R0.000	R0.000	R0.000	R0.000
Replacement cost for the next 5 years (RM)	R0.240	R0.090	R0.000	R0.270	R0.000	R0.000	R0.000	R0.000	R0.000
Replacement cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Replacement cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Total new development cost for next 15 years (RM)	R0.470	R0.000	R0.269	R1.976	R0.306	R0.000	R0.000	R0.290	R0.319
New development cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.271	R0.000	R0.000	R0.000	R0.290	R0.319
New development cost for the next 6 - 10 years (RM)	R0.470	R0.000	R0.269	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
New development cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R1.705	R0.306	R0.000	R0.000	R0.000	R0.000
% Where of the WSA Self is the Current Owner	100%	100%	100%	100%	100%	100%	100%	100%	100%
% Where of the WSA Self is the Current Operator	100%	100%	100%	100%	100%	100%	100%	100%	100%
5.4 Asset Assessment Spectrum									
Total expected lifespan (Short, Medium, Long)	Long	Long	Long	Short	Long	Long	Long	Long	Long
Estimated replacement value (RM): CRC	R2.732	R1.500	R1.786	R1.779	R1.680	R1.775	R1.829	R2.391	R2.145
Already reached Useful Life (Yes/No)	No	No	No	No	No	No	No	No	No
Annual Operating Cost (RM) (1.0% of CRC)	R0.027	R0.015	R0.018	R0.018	R0.017	R0.018	R0.018	R0.024	R0.021
Annual Maintenance Cost (RM) (0.5% of CRC)	R0.014	R0.008	R0.009	R0.009	R0.008	R0.009	R0.009	R0.012	R0.011
Delivery capacity (l/s)	50 (Master Plan)	Unknown	9 (Master Plan)	Unknown	8.3	10 (Master Plan)	25	25 (Master Plan)	12.5
Type of Motor (Number)	BMG (x1) & Motorelli (x2)	Grundfos Type MOT MG 100LC2-28FT130-D1 (x2) & Grundfos (x1)	TEE IE2 (x2)	Siemens (x1)	Grundfos Type 3 MOT MG 132SC2-38FF265-D1 (x2)	Siemens Type ILA3166-4YA40 (x1) & BMM (x1)	Grundfos Type 3 MOT MG 132SB2-38FF265-C2 (x3)	EML (x2)	Grundfos Type 3 MOT MG 160MC2-42FF300-D1 (x2)
Type of Pump (Number)	KSB Type WKLn 100/5 (x3)	Grundfos, Type CR15-03 A-F-A-E-HQQE (x2) & Grundfos, Type CR3-7 A-FGJ-A-E-HQQE (x1)	WILO Type MVI3205-3/16/E/3-400-50-2 (x2)	Sulzer, Type AZG 50-250 (x1)	Grundfos Type CR32-3 A-F-A-E-HQQE (x2)	Rapid Allweiler Type NS 65-316 (x1) & Rapid Allweiler Type N12/40-250 (x1)	Grundfos Type CR45-2-2 A-F-A-E-HQQE (x3)	KSB Type ETANORM 080-065-315 (x2)	Grundfos CR45-3 A-F-A-E-HQQE (x2)
Motor (kW)	75kW (x3)	3kW (x2) & 0.55kW (x1)	9kW (x2)	22kW (x1)	5.5kW (x2)	15kW (x1) & 5.5kW (x1)	5.5kW (x3)	7.5kW (x2)	11kW (x2)

EXISTING WATER PUMP STATIONS – Continued

Table 3.17: Existing water pump station infrastructure									
5.1 General information	**WPS 19**	**WPS 20**	**WPS 21**	**WPS 22**	**WPS 23**	**WPS 24**	**WPS 25**	**WPS 26**	**WPS 27**
Scheme Name	Abbotsdale	Abbotsdale	Abbotsdale	Kalbaskraal	Chatsworth/Riverlands				
Scheme Number	WC0109	WC0109	WC0109	WC0110	WC0111				
Pump Number	WC0109001	WC0109002	WC0109003	WC0110001	WC0111001				
Description (RW – Raw Water, PW – Potable Water)	Abbotsdale Bulk PS (PW)	Abbotsdale Booster PS (PW)	Highlands Supply PS (PW)	Kalbaskraal Booster PS (PW)	Chatsworth Reservoir PS (PW)				
Pump Station Status (Existing / Future)	Existing	Existing	Existing	Existing	Existing				
Pump Station Class (Regional / Internal)	Internal	Internal	Internal	Internal	Internal				
Asset Register ID (Included in Asset Register)	Could not identify	Could not identify	Could not identify	Could not identify	9392, 9406				
Pump Type (Water / Sewer)	Water	Water	Water	Water	Water				
5.2 Operation									
O&M Occurrence (Regular, Periodic, Sporadic, None, Occasional, When needed)	Regular	Regular	Regular	Regular	Regular				
Incidents, including Security Problems (Regular, Periodic, Sporadic, None)	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic				
Safety Inspection performed (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular				
Are there any standby pumps available? (Yes / No)	Yes	Yes	No	Yes	Yes				
Number of pumps	2	2	1	2	2				
5.3 Functionality									
Refurbishment needs (High, Medium, Low, None)	None	None	Medium	None	None				
General physical condition (Dysfunctional, Operational, Prime Condition, Vandalised, Destitute)	Operational	Prime Condition	Operational	Operational	Prime Condition				
Total refurbishment needs %	0%	0%	100%	0%	0%				
Total refurbishment needs cost for next 15 years (RM)	R0.000	R0.000	R0.025	R0.000	R0.000				
Refurbishment cost for the next 5 years (RM)	R0.000	R0.000	R0.025	R0.000	R0.000				
Refurbishment cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000				
Refurbishment cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000				
Total replacement needs %	4.5%	0%	0%	0%	0%				
Total replacement needs cost for next 15 years (RM)	R0.090	R0.000	R0.000	R0.000	R0.000				
Replacement cost for the next 5 years (RM)	R0.090	R0.000	R0.000	R0.000	R0.000				
Replacement cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000				
Replacement cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000				
Total new development cost for next 15 years (RM)	R2.789	R0.404	R0.000	R2.482	R0.693				
New development cost for the next 5 years (RM)	R0.000	R0.404	R0.000	R2.482	R0.000				
New development cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000				
New development cost for the next 11 - 15 years (RM)	R2.789	R0.000	R0.000	R0.000	R0.693				
% Where of the WSA Self is the Current Owner	100%	100%	100%	100%	100%				
% Where of the WSA Self is the Current Operator	100%	100%	100%	100%	100%				
5.4 Asset Assessment Spectrum									
Total expected lifespan (Short, Medium, Long)	Long	Long	Medium	Long	Long				
Estimated replacement value (RM): CRC	R2.000	R1.706	R0.025	R1.810	R2.032				
Already reached Useful Life (Yes/No)	No	No	No	No	No				
Annual Operating Cost (RM) (1.0% of CRC)	R0.020	R0.017	R0.000	R0.018	R0.020				
Annual Maintenance Cost (RM) (0.5% of CRC)	R0.010	R0.009	R0.000	R0.009	R0.010				
Delivery capacity (l/s)	Unknown	5 (Master Plan)	Unknown	11.5 (Master Plan)	25				
Type of Motor (Number)	WEG (x2)	TEE Type Mot 3 Q2E FA 132M2A-43 (x2)	Foros (x1)	Unknown	3 Phase Induction: Type YX3-225M-2 (x2)				
Type of Pump (Number)	KSB Type ETA 80-40/2 (x2)	WILO Type MVI7002/1-3/16/E/50-2 (x2)	Type KB210 (x1)	Unknown	Vertical Multistage Centrifugal Pump Type SVM 90-60 (x2)				
Motor (kW)	11kW (x2)	9kW (x2)	15kW (x1)	Unknown	45kW (x2)				

EXISTING RESERVOIR INFRASTRUCTURE

8.000 Ml Glen Lilly Reservoir No. 1

8.000 Ml Glen Lilly Reservoir No. 2

25.000 Ml Glen Lilly Reservoir No. 3

4.525 Ml Kasteelberg Reservoir No. 1

4.525 Ml Kasteelberg Reservoir No. 2

4.525 Ml Kasteelberg Reservoir No. 3

4.525 Ml Kasteelberg Reservoir No. 4

1.036 Ml Moorreesburg Reservoir No. 1

4.582 Ml Moorreesburg Reservoir No. 2

2.554 Ml Moorreesburg Reservoir No. 3

0.662 Ml Riebeek Kasteel Reservoir No. 1

1.200 Ml Riebeek Kasteel Reservoir No. 2

1.500 Ml Riebeek Wes LL Reservoir

0.289 Ml Riebeek Wes HL Reservoir No. 1

0.903 Riebeek Wes HL Reservoir No. 2

2.298 Ml Ongegund HL Reservoir

1.822 Ml Yzerfontein Old Reservoir

2.553 Ml Yzerfontein New Reservoir

0.577 Ml Darling Reservoir No. 2

2.101 Ml Darling Reservoir No. 1

0.754 Ml Darling Reservoir No. 3

0.233 Ml Koringberg Reservoir No. 1

0.275 Ml Koringberg Reservoir No. 2

5.378 Ml Old Golf Course Reservoir

0.988 Ml Wesbank Reservoir No. 1

3.322 Ml Wesbank Reservoir No. 2

5.138 Ml Wesbank Reservoir No. 3

4.000 Ml Wesbank Reservoir No. 4

0.226 Ml Wesbank Tower

5.299 Ml Panorama Reservoir

2.125 Ml Prison Reservoir

2.810 Ml Klipkop Reservoir

1.418 Ml Kleindam Reservoir No. 2

1.447 Ml Kleindam Reservoir No. 1

2.500 Ml Mount Royal Reservoir

0.267 Ml Abbotsdale Reservoir No. 1

1.500 Ml Abbotsdale Reservoir No. 2

0.292 Ml Kalbaskraal Reservoir

0.292 Ml Kalbaskraal Reservoir

0.541 Ml Chatsworth Reservoir

1.850 Ml Chatsworth Reservoir

EXISTING RESERVOIR INFRASTRUCTURE

Table 3.18: Existing reservoir infrastructure

3.1 General information	RES 1	RES 2	RES 3	RES 4	RES 5	RES 6	RES 7	RES 8	RES 9	RES 10		
Scheme Name	Swartland Bulk Scheme	Swartland Bulk Scheme	Swartland Bulk Scheme	Swartland Bulk Scheme	Swartland Bulk Scheme	Swartland Bulk Scheme	Swartland Bulk Scheme	Moorreesburg	Moorreesburg	Moorreesburg		
Scheme Number	WC0100	WC0100	WC0100	WC0100	WC0100	WC0100	WC0100	WC0102	WC0102	WC0102		
Reservoir Number	WC0100001	WC0100002	WC0100003	WC0100004	WC0100005	WC0100006	WC0100007	WC0102001	WC0102002	WC0102003		
Description	Glen Lilly No. 1	Glen Lilly No. 2	Glen Lilly No. 3	Kasteelberg No. 1	Kasteelberg No. 2	Kasteelberg No. 3	Kasteelberg No. 4	Moorreesburg Reservoir No.1	Moorreesburg Reservoir No.2	Moorreesburg Reservoir No.3		
Reservoir Status (Existing / Future)	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing		
Reservoir Class (Regional / Internal)	Regional	Regional	Regional	Regional	Regional	Regional	Regional	Internal	Internal	Internal		
Asset Register ID (Included in Asset Register)	37733	37734	37735	Not Included	Not Included	Not Included	Not Included	10628	10627	10626		
3.2 Operation												
O&M Occurrence (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular		
Incidents, including Security Problems (Regular, Periodic, Sporadic, None)	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic		
Safety Inspection performed (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular		
What is the storage factor (x daily use)	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.38	2.38	2.38		
3.3 Functionality Observation												
Refurbishment needs (High, Medium, Low, None)	None	None	None	None	None	None	None	None	None	None		
General physical condition (Dysfunctional, Operational, Prime Condition, Vandalised)	Operational	Operational	Prime Condition	Operational	Operational	Operational	Operational	Operational	Operational	Operational		
Total refurbishment needs %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
Total refurbishment needs cost for next 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
Refurbishment cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
Refurbishment cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
Refurbishment cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
Total replacement needs %	0%	0%	0%	0%	0%	0%	0%	8.8%	3.2%	5.3%		
Total replacement needs cost for next 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.470	R0.470	R0.470		
Replacement cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.470	R0.470	R0.470		
Replacement cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
Replacement cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
Total new development cost for next 15 years (RM)	R54.013	R0.000	R0.000	R30.450	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
New development cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
New development cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
New development cost for the next 11 - 15 years (RM)	R54.013	R0.000	R0.000	R30.450	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
% Where of the WSA Self is the Current Owner	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
% Where of the WSA Self is the Current Operator	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%		
3.4 Asset Assessment Spectrum												
Total Expected Lifespan, RUL (Short, Medium, Long)	Long	Long	Long	Long	Long	Long	Long	Long	Long	Long		
Estimated replacement value (RM): CRC	R22.311	R22.311	R54.013	R14.784	R14.784	R14.784	R14.784	R5.338	R14.900	R8.907		
Already reached Useful Life (Yes/No)	No	No	No	No	No	No	No	No	No	No		
Annual Operating Cost (RM) (1.0% of CRC)	R0.223	R0.223	R0.540	R0.148	R0.148	R0.148	R0.148	R0.053	R0.149	R0.089		
Annual Maintenance Cost (RM) (0.5% of CRC)	R0.112	R0.112	R0.270	R0.074	R0.074	R0.074	R0.074	R0.027	R0.075	R0.045		
Capacity (Ml)	8.000	8.000	25.000	4.525	4.525	4.525	4.525	1.036	4.582	2.554		
TWL (m.asl)	263.5	263.5	263.5	286.0	286.0	286.0	286.0	226.2	227.2	226.2		

Table 3.18: Existing reservoir infrastructure

3.1 General information	RES 11	RES 12	RES 13	RES 14	RES 15	RES 16	RES 17	RES 18	RES 19	RES 20	RES 21	RES 22
Scheme Name	Riebeek Kasteel	Riebeek Kasteel	Riebeek Wes	Riebeek Wes	Riebeek Wes	Riebeek Wes	Yzerfontein	Yzerfontein	Darling	Darling	Darling	Koringberg
Scheme Number	WC0103	WC0103	WC0104	WC0104	WC0104	WC0104	WC0105	WC0105	WC0106	WC0106	WC0106	WC0107
Reservoir Number	WC0103001	WC0103002	WC0104001	WC0104002	WC0104003	WC0104004	WC0105001	WC0105002	WC0106001	WC0106002	WC0106003	WC0107001
Description	Riebeek Kasteel Reservoir No.1	Riebeek Kasteel Reservoir No.2	Riebeek Wes LL Reservoir	Riebeek Wes HL Reservoir No.1	Riebeek Wes HL Reservoir No.2	Ongegund HL Reservoir	Yzerfontein Old Reservoir	Yzerfontein New Reservoir	Darling Reservoir No.2	Darling Reservoir No.1	Darling Reservoir No.3	Koringberg Reservoir No.1
Reservoir Status (Existing / Future)	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing
Reservoir Class (Regional / Internal)	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal
Asset Register ID (Included in Asset Register)	9934	9933	9931	Not Included	Not Included	Not Included	8862	8861	13927	13928	13926	37746
3.2 Operation												
O&M Occurrence (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Incidents, including Security Problems (Regular, Periodic, Sporadic, None)	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic
Safety Inspection performed (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
What is the storage factor (x daily use)	0.94	0.94	3.45	3.45	3.45	17.68	2.59	2.59	1.34	1.34	1.34	1.49
3.3 Functionality Observation												
Refurbishment needs (High, Medium, Low, None)	High	None	None	None	None	None	None	None	Medium	None	None	High
General physical condition (Dysfunctional, Operational, Prime Condition, Vandalised)	Operational	Operational	Prime Condition	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational
Total refurbishment needs %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total refurbishment needs cost for next 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Total replacement needs %	15.6%	6.5%	0%	0%	0%	3.3%	0%	0%	8.2%	3.8%	7.2%	10.6%
Total replacement needs cost for next 15 years (RM)	R0.590	R0.390	R0.000	R0.000	R0.000	R0.300	R0.000	R0.000	R0.315	R0.315	R0.315	R0.200
Replacement cost for the next 5 years (RM)	R0.590	R0.390	R0.000	R0.000	R0.000	R0.300	R0.000	R0.000	R0.315	R0.315	R0.315	R0.200
Replacement cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Replacement cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Total new development cost for next 15 years (RM)	R0.000	R14.223	R0.000	R5.040	R0.000	R0.000	R0.000	R0.000	R11.920	R0.000	R0.000	R5.040
New development cost for the next 5 years (RM)	R0.000	R14.223	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
New development cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R5.040	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
New development cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R11.920	R0.000	R0.000	R5.040
% Where of the WSA Self is the Current Owner	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
% Where of the WSA Self is the Current Operator	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
3.4 Asset Assessment Spectrum												
Total Expected Lifespan, RUL (Short, Medium, Long)	Short	Long	Long	Long	Long	Long	Long	Long	Medium	Long	Long	Short
Estimated replacement value (RM): CRC	R3.785	R5.963	R6.888	R2.400	R4.698	R9.198	R7.726	R9.752	R3.832	R8.294	R4.356	R1.881
Already reached Useful Life (Yes/No)	No	No	No	No	No	No	No	No	No	No	No	No
Annual Operating Cost (RM) (1.0% of CRC)	R0.038	R0.060	R0.069	R0.024	R0.047	R0.092	R0.077	R0.098	R0.038	R0.083	R0.044	R0.019
Annual Maintenance Cost (RM) (0.5% of CRC)	R0.019	R0.030	R0.034	R0.012	R0.023	R0.046	R0.039	R0.049	R0.019	R0.041	R0.022	R0.009
Capacity (Ml)	0.662	1.200	1.500	0.289	0.903	2.298	1.822	2.553	0.577	2.101	0.754	0.233
TWL (m.asl)	201.7	201.7	250.8	293.9	293.9	312.0	81.7	81.7	176.9	177.0	176.9	172.5

Table 3.18: Existing reservoir infrastructure

3.1 General information	RES 23	RES 24	RES 25	RES 26	RES 27	RES 28	RES 29	RES 30	RES 31	RES 32	RES 33	RES 34
Scheme Name	Koringberg	Malmesbury	Malmesbury	Malmesbury	Malmesbury	Malmesbury	Malmesbury	Malmesbury	Malmesbury	Malmesbury	Malmesbury	Malmesbury
Scheme Number	WC0107	WC0108	WC0108	WC0108	WC0108	WC0108	WC0108	WC0108	WC0108	WC0108	WC0108	WC0108
Reservoir Number	WC0107002	WC0108001	WC0108002	WC0108003	WC0108004	WC0108005	WC0108006	WC0108007	WC0108008	WC0108009	WC0108010	WC0108011
Description	Koringberg Reservoir No.2	Old Golf Course Reservoir	Wesbank Reservoir No.1	Wesbank Reservoir No.2	Wesbank Reservoir No.3	Wesbank Reservoir No.4	Wesbank Tower	Panorama Reservoir	Prison Reservoir	Klipkop Reservoir	Kleindam Reservoir No.1	Kleindam Reservoir No.2
Reservoir Status (Existing / Future)	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing
Reservoir Class (Regional / Internal)	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal
Asset Register ID (Included in Asset Register)	Not Included	9951	8882	8881	8880	38962	8864	9936	8897	13107	13110	Not Included
3.2 Operation												
O&M Occurrence (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Incidents, including Security Problems (Regular, Periodic, Sporadic, None)	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic
Safety Inspection performed (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
What is the storage factor (x daily use)	1.49	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67
3.3 Functionality Observation												
Refurbishment needs (High, Medium, Low, None)	None	None	None	None	None	None	None	None	None	None	None	None
General physical condition (Dysfunctional, Operational, Prime Condition, Vandalised)	Operational	Operational	Operational	Operational	Operational	Prime Condition	Operational	Operational	Operational	Operational	Operational	Operational
Total refurbishment needs %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total refurbishment needs cost for next 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Refurbishment cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Total replacement needs %	0%	0%	0%	0%	0%	0%	0%	5.8%	0%	0%	0%	0%
Total replacement needs cost for next 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.960	R0.000	R0.000	R0.000	R0.000
Replacement cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.960	R0.000	R0.000	R0.000	R0.000
Replacement cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Replacement cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Total new development cost for next 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
New development cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
New development cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
New development cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
% Where of the WSA Self is the Current Owner	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
% Where of the WSA Self is the Current Operator	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
3.4 Asset Assessment Spectrum												
Total Expected Lifespan, RUL (Short, Medium, Long)	Long	Long	Long	Long	Long	Long	Long	Long	Long	Long	Long	Long
Estimated replacement value (RM): CRC	R2.202	R16.211	R5.220	R12.139	R16.167	R13.601	R6.488	R16.446	R8.606	R10.961	R6.605	R6.605
Already reached Useful Life (Yes/No)	No	No	No	No	No	No	No	No	No	No	No	No
Annual Operating Cost (RM) (1.0% of CRC)	R0.022	R0.162	R0.052	R0.121	R0.162	R0.136	R0.065	R0.164	R0.086	R0.110	R0.066	R0.066
Annual Maintenance Cost (RM) (0.5% of CRC)	R0.011	R0.081	R0.026	R0.061	R0.081	R0.068	R0.032	R0.082	R0.043	R0.055	R0.033	R0.033
Capacity (Ml)	0.275	5.378	0.988	3.322	5.138	4.000	0.226	5.299	2.125	2.810	1.447	1.418
TWL (m.asl)	172.9	212.0	208.6	208.6	208.6	208.6	222.3	230.0	215.0	Unknown	170.0	170.0

Table 3.18: Existing reservoir infrastructure

3.1 General information	RES 35	RES 36	RES 37	RES 38	RES 39	RES 40	RES 41					
Scheme Name	Malmesbury	Abbotsdale	Abbotsdale	Kalbaskraal	Kalbaskraal	Chatsworth/Riverlands	Chatsworth/Riverlands					
Scheme Number	WC0108	WC0109	WC0109	WC0110	WC0110	WC0111	WC0111					
Reservoir Number	WC0108012	WC0109001	WC0109002	WC0110001	WC0110002	WC0111001	WC0111002					
Description	Mount Royal Reservoir	Abbotsdale Reservoir No.1	Abbotsdale Reservoir No.2	Kalbaskraal Reservoir	Kalbaskraal Reservoir	Chatsworth Reservoir	Chatsworth Reservoir New					
Reservoir Status (Existing / Future)	Existing	Existing	Existing	Existing	Existing	Existing	Existing					
Reservoir Class (Regional / Internal)	Internal	Internal	Internal	Internal	Internal	Internal	Internal					
Asset Register ID (Included in Asset Register)	9960	14431	27228	13208	13207	13954	30455					
3.2 Operation												
O&M Occurrence (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular					
Incidents, including Security Problems (Regular, Periodic, Sporadic, None)	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic					
Safety Inspection performed (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular					
What is the storage factor (x daily use)	2.67	2.48	2.48	1.49	1.49	1.50	1.50					
3.3 Functionality Observation												
Refurbishment needs (High, Medium, Low, None)	None	None	None	None	None	None	None					
General physical condition (Dysfunctional, Operational, Prime Condition, Vandalised)	Prime Condition	Operational	Prime Condition	Operational	Operational	Operational	Prime Condition					
Total refurbishment needs %	0%	0%	0%	0%	0%	0%	0%					
Total refurbishment needs cost for next 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000					
Refurbishment cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000					
Refurbishment cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000					
Refurbishment cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000					
Total replacement needs %	0%	13.3%	4.1%	0%	0%	8.1%	3.2%					
Total replacement needs cost for next 15 years (RM)	R0.000	R0.285	R0.285	R0.000	R0.000	R0.255	R0.255					
Replacement cost for the next 5 years (RM)	R0.000	R0.285	R0.285	R0.000	R0.000	R0.255	R0.255					
Replacement cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000					
Replacement cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000					
Total new development cost for next 15 years (RM)	R0.000	R16.324	R0.000	R12.172	R0.000	R0.000	R15.190					
New development cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R12.172	R0.000	R0.000	R0.000					
New development cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R15.190					
New development cost for the next 11 - 15 years (RM)	R0.000	R16.324	R0.000	R0.000	R0.000	R0.000	R0.000					
% Where of the WSA Self is the Current Owner	100%	100%	100%	100%	100%	100%	100%					
% Where of the WSA Self is the Current Operator	100%	100%	100%	100%	100%	100%	100%					
3.4 Asset Assessment Spectrum												
Total Expected Lifespan, RUL (Short, Medium, Long)	Long	Long	Long	Long	Long	Long	Long					
Estimated replacement value (RM): CRC	R9.752	R2.137	R6.888	R2.337	R2.337	R3.142	R7.874					
Already reached Useful Life (Yes/No)	No	No	No	No	No	No	No					
Annual Operating Cost (RM) (1.0% of CRC)	R0.098	R0.021	R0.069	R0.023	R0.023	R0.031	R0.079					
Annual Maintenance Cost (RM) (0.5% of CRC)	R0.049	R0.011	R0.034	R0.012	R0.012	R0.016	R0.039					
Capacity (Ml)	2.500	0.267	1.500	0.292	0.292	0.541	1.850					
TWL (m.asl)	248.0	152.8	152.8	81.2	81.2	188.0	188.0					

EXISTING BULK SEWER INFRASTRUCTURE

Table 3.19: Existing bulk sewer pipeline infrastructure

3.1 General information	BS 1	BS 2	BS 3	BS 4	BS 5	BS 6	BS 7	BS 8	BS 9	
Scheme Name	Moorreesburg	Riebeek Valley	Darling	Koringberg	Malmesbury	Kalbaskraal	Chatsworth/Riverlands			
Scheme Number	WC0101	WC0102	WC0103	WC0104	WC0105	WC0106	WC0107			
Description	Sewer Pipeline in Scheme	Sewer Pipeline in Scheme	Sewer Pipeline in Scheme	Sewer Pipeline in Scheme	Sewer Pipeline in Scheme	Sewer Pipeline in Scheme	Sewer Pipeline in Scheme			
Bulk Status (Existing / Future)	Existing	Existing	Existing	Existing	Existing	Existing	Existing			
Bulk Class (Regional / Internal)	Internal	Internal	Internal	Internal	Internal	Internal	Internal			
Bulk Type (Water / Sewer)	Sewer	Sewer	Sewer	Sewer	Sewer	Sewer	Sewer			
Asset Register ID (Included in Asset Register)	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs			
Length of pipeline (km)	42.489	51.582	41.934	2.612	147.706	7.197	5.107			
3.2 Operation										
O&M Occurrence (Regular, Periodic, Sporadic, None, Occasional, When needed)	Regular	Regular	Regular	Regular	Regular	Regular	Regular			
Incidents, including security problems (Regular, Periodic, Sporadic, None)	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic			
Safety Inspection performed (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular			
3.3 Functionality Observation										
Refurbishment needs (High, Medium, Low, None)	Low	Low	Low	Low	Low	Low	Low			
General physical condition (Dysfunctional, Operational, Prime Condition, Vandalised, Destitute)	Operational	Operational	Operational	Operational	Operational	Operational	Operational			
Total refurbishment needs %	0%	0%	0%	0%	0%	0%	0%			
Total refurbishment needs cost for next 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000			
Refurbishment cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000			
Refurbishment cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000			
Refurbishment cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000			
Total replacement needs %	22.5%	22.5%	22.5%	22.5%	22.5%	22.5%	22.%			
Total replacement needs cost for next 15 years (RM)	R39.357	R33.783	R26.220	R1.566	R96.057	R4.698	R3.339			
Replacement cost for the next 5 years (RM)	R13.119	R11.261	R8.740	R0.522	R32.019	R1.566	R1.113			
Replacement cost for the next 6 - 10 years (RM)	R13.119	R11.261	R8.740	R0.522	R32.019	R1.566	R1.113			
Replacement cost for the next 11 - 15 years (RM)	R13.119	R11.261	R8.740	R0.522	R32.019	R1.566	R1.113			
Total new development cost for next 15 years (RM)	R0.000	R22.693	R6.168	R15.697	R29.148	R2.161	R45.361			
New development cost for the next 5 years (RM)	R0.000	R22.693	R4.277	R0.000	R14.750	R2.161	R5.971			
New development cost for the next 6 - 10 years (RM)	R0.000	R0.000	R1.891	R6.796	R5.004	R0.000	R20.172			
New development cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R8.901	R9.394	R0.000	R19.218			
% Where of the WSA Self is the Current Owner	100%	100%	100%	100%	100%	100%	100%			
% Where of the WSA Self is the Current Operator	100%	100%	100%	100%	100%	100%	100%			
3.4 Asset Assessment Spectrum										
Total Expected Lifespan, RUL (Short, Medium, Long)	Long	Long	Long	Long	Long	Long	Long			
Estimated replacement value (RM): CRC	R174.925	R150.143	R116.532	R6.956	R426.919	R20.882	R14.835			
Already reached Useful Life (Yes/No)	No	No	No	No	No	No	No			
Annual Operating Cost (RM) (1.0% of CRC)	R1.749	R1.501	R1.165	R0.070	R4.269	R0.209	R0.148			
Annual Maintenance Cost (RM) (0.5% of CRC)	R0.875	R0.751	R0.583	R0.035	R2.135	R0.104	R0.074			
Pipe material (Most common)	AC	AC	AC	AC	AC	AC	AC			
Average discharge rate for period July 2022 to June 2023 (l/sec)	14.28	9.26	15.13	1.04	67.21	0.97	3.95			

Note 1) The new development cost in the above table includes bulk and internal sewer reticulation pipelines (Table 3.2.8.1 of the Future Demand and Functionality Requirements Report)

EXISTING SEWER PUMP STATIONS

Sarel Celliers PS

De Hoop PS

Shiraz PS

Madeliefie PS

Hermon / Pekon PS

Sportfield PS

Blikkiesdorp PS

Esterhof Main PS

PPC PS

ASLA (RDP) PS

Industrial (Bonwit) PS

Rosenburg PS

Abbotsdale PS No. 1

Abbotsdale PS No. 2

Abbotsdale PS No. 3

Abbotsdale PS No. 4

Abbotsdale PS No. 5

Kalbaskraal PS No. 1

Kalbaskraal PS No. 2

Riverlands PS No. 1

Chatsworth PS No. 1

EXISTING SEWER PUMP STATIONS

Table 3.20: Existing sewer pump stations

3.1 General information	SPS 1	SPS 2	SPS 3	SPS 4	SPS 5	SPS 6	SPS 7	SPS 8	SPS 9	SPS 10	SPS 11	SPS 12
Scheme Name	Riebeek Valley	Riebeek Valley	Riebeek Valley	Riebeek Valley	Riebeek Valley	Riebeek Valley	Riebeek Valley	Riebeek Valley	Riebeek Valley	Riebeek Valley	Darling	Darling
Scheme Number	WC0102	WC0102	WC0102	WC0102	WC0102	WC0102	WC0102	WC0102	WC0102	WC0102	WC0103	WC0103
Pump Number	WC0102001	WC0102002	WC0102003	WC0102004	WC0102005	WC010200	WC01020017	WC0102008	WC0102009	WC0102010	WC0103001	WC0103002
Description	Sarel Celliers PS	De Hoop PS	Shiraz PS	Madeliefie PS	Hermon / Pekon PS	Sportfield PS	Blikkiesdorp PS	Esterhof Main PS	Riebeek Kasteel PS No. 6	PPC PS	ASLA (RDP) PS	Industrial (Bonwit) PS
Pump Station Status (Existing / Future)	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing
Pump Station Class (Regional / Internal)	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal
Asset Register Group Name (Included in Asset Register)	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs
Pump Type (Water / Sewer)	Sewer	Sewer	Sewer	Sewer	Sewer	Sewer	Sewer	Sewer	Sewer	Sewer	Sewer	Sewer
3.2 Operation												
O&M Occurrence (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Incidents, including security problems (Regular, Periodic, Sporadic, None)	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic
Safety Inspection performed (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Are there any standby pumps available? (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unknown	Unknown	Yes	Yes
Number of pumps	2	2	2	2	2	2	2	3 (1 in for repairs)	Unknown	Unknown	2 (1 in for repairs)	2 (1 in for repairs)
3.3 Functionality Observation												
Refurbishment needs (High, Medium, Low, None)	Low	Low	None	Low	None	Low	None	Low	None	Low	Low	None
General physical condition (Dysfunctional, Operational, Prime Condition, Vandalised)	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational
Total refurbishment needs %	6.5%	6.5%	0%	3.3%	0%	6.0%	0%	7.1%	0%	10.5%	6.5%	0%
Total refurbishment needs cost for next 15 years (RM)	R0.100	R0.100	R0.000	R0.050	R0.000	R0.100	R0.000	R0.200	R0.000	R0.200	R0.100	R0.000
Refurbishment cost for the next 5 years (RM)	R0.100	R0.100	R0.000	R0.050	R0.000	R0.100	R0.000	R0.000	R0.000	R0.000	R0.100	R0.000
Refurbishment cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.200	R0.000	R0.200	R0.000	R0.000
Refurbishment cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Total replacement needs %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total replacement needs cost for next 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Replacement cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Replacement cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Replacement cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Total new development cost for next 15 years (RM)	R0.024	R0.024	R0.024	R0.024	R0.024	R0.024	R0.000	R0.024	R0.024	R0.024	R2.201	R0.000
New development cost for the next 5 years (RM)	R0.024	R0.024	R0.024	R0.024	R0.024	R0.024	R0.000	R0.024	R0.024	R0.024	R2.201	R0.000
New development cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
New development cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
% Where of the WSA Self is the Current Owner	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
% Where of the WSA Self is the Current Operator	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
3.4 Asset Assessment Spectrum												
Total expected lifespan (Short, Medium, Long)	Long	Long	Long	Long	Long	Long	Long	Long	Long	Long	Long	Long
Estimated replacement value (RM): CRC	R1.538	R1.538	R1.538	R1.538	R0.935	R1.658	R0.935	R2.832	R0.935	R1.896	R1.538	R1.538
Already reached Useful Life (Yes/No)	No	No	No	No	No	No	No	No	No	No	No	No
Annual Operating Cost (RM) (1.0% of CRC)	R0.015	R0.015	R0.015	R0.015	R0.009	R0.017	R0.009	R0.028	R0.009	R0.019	R0.015	R0.015
Annual Maintenance Cost (RM) (0.5% of CRC)	R0.008	R0.008	R0.008	R0.008	R0.005	R0.008	R0.005	R0.014	R0.005	R0.009	R0.008	R0.008
Pump Capacity (l/s) – Master Plan	6	6	6	6	3	10	6	50	3	18	6	6
Motors kW	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

Table 3.20: Existing sewer pump stations

3.1 General information	SPS 13	SPS 14	SPS 15	SPS 16	SPS 17	SPS 18	SPS 19	SPS 20	SPS 21	SPS 22		
Scheme Name	Malmesbury	Malmesbury	Malmesbury	Malmesbury	Malmesbury	Malmesbury	Kalbaskraal	Kalbaskraal	Chatsworth/ Riverlands	Chatsworth/ Riverlands		
Scheme Number	WC0105	WC0105	WC0105	WC0105	WC0105	WC0105	WC0106	WC0106	WC0107	WC0107		
Pump Number	WC0105001	WC0105002	WC0105003	WC0105004	WC01050015	WC010500	WC0106001	WC0106002	WC0107001	WC0107002		
Description	Rosenburg PS	Abbotsdale PS No. 1	Abbotsdale PS No. 2	Abbotsdale PS No. 3	Abbotsdale PS No. 4	Abbotsdale PS No. 5	Kalbaskraal PS No. 1	Kalbaskraal PS No. 2	Riverlands PS No. 1	Chatsworth PS No. 1		
Pump Station Status (Existing / Future)	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing		
Pump Station Class (Regional / Internal)	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal	Internal		
Asset Register Group Name (Included in Asset Register)	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs		
Pump Type (Water / Sewer)	Sewer	Sewer	Sewer	Sewer	Sewer	Sewer	Sewer	Sewer	Sewer	Sewer		
3.2 Operation												
O&M Occurrence (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular		
Incidents, including security problems (Regular, Periodic, Sporadic, None)	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic		
Safety Inspection performed (Regular, Periodic, Sporadic, None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular		
Are there any standby pumps available? (Yes / No)	Unknown	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Number of pumps	Unknown	2	2	2	2	2	2	2	2	2		
3.3 Functionality Observation												
Refurbishment needs (High, Medium, Low, None)	None	Low	Low	Low	Low	Low	Low	Low	None	None		
General physical condition (Dysfunctional, Operational, Prime Condition, Vandalised)	Prime Condition	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational	Operational		
Total refurbishment needs %	0%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	0%	0%		
Total refurbishment needs cost for next 15 years (RM)	R0.000	R0.100	R0.100	R0.100	R0.100	R0.100	R0.100	R0.100	R0.000	R0.000		
Refurbishment cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.100	R0.100	R0.000	R0.000		
Refurbishment cost for the next 6 - 10 years (RM)	R0.000	R0.100	R0.100	R0.100	R0.100	R0.100	R0.000	R0.000	R0.000	R0.000		
Refurbishment cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
Total replacement needs %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
Total replacement needs cost for next 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
Replacement cost for the next 5 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
Replacement cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
Replacement cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
Total new development cost for next 15 years (RM)	R9.057	R0.573	R0.024	R0.694	R1.658	R0.000	R0.024	R0.580	R1.230	R1.955		
New development cost for the next 5 years (RM)	R5.682	R0.000	R0.000	R0.000	R0.000	R0.000	R0.024	R0.580	R0.024	R1.955		
New development cost for the next 6 - 10 years (RM)	R0.000	R0.573	R0.024	R0.694	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000		
New development cost for the next 11 - 15 years (RM)	R3.375	R0.000	R0.000	R0.000	R1.658	R0.000	R0.000	R0.000	R1.206	R0.000		
% Where of the WSA Self is the Current Owner	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
% Where of the WSA Self is the Current Operator	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
3.4 Asset Assessment Spectrum												
Total expected lifespan (Short, Medium, Long)	Long	Long	Long	Long	Long	Long	Long	Long	Long	Long		
Estimated replacement value (RM): CRC	R5.776	R1.538	R1.538	R1.538	R1.538	R1.538	R1.538	R1.538	R1.538	R1.538		
Already reached Useful Life (Yes/No)	No	No	No	No	No	No	No	No	No	No		
Annual Operating Cost (RM) (1.0% of CRC)	R0.006	R0.002	R0.002	R0.002	R0.002	R0.002	R0.002	R0.002	R0.002	R0.002		
Annual Maintenance Cost (RM) (0.5% of CRC)	R0.003	R0.001	R0.001	R0.001	R0.001	R0.001	R0.001	R0.001	R0.001	R0.001		
Pump Capacity (l/s) – Master Plan	110	6	6	6	6	6	6	6	6	6		
Motors kW	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown		

EXISTING WASTE WATER TREATMENT INFRASTRUCTURE

MOORREESBURG WWTW: The Moorreesburg WWTW was upgraded and the new plant was put into operation on the 13th of March 2023. The hydraulic design capacity of the new plant is 2.000 Ml/day and the organic design capacity is 2 000 kg COD/day. The 2021 Green Drop Score for the Moorreesburg WWTW was 87% and the CRR of the plant stayed the same for 2022 and 2023 at 76.5% (Before upgrade). The WWTW include the following treatment processes.

- Inlet works: Screening (Two rotary mechanical drum screens and hand raked bypass screen) and grit removal (Two vortex degritters and grit disposal system).
- Activated sludge Bio Reactor with two anaerobic zones, an anoxic zone and an aerobic zone (Bubble aeration).
- RAS and WAS pump stations
- Two Secondary settling tanks.
- Disinfection with chlorine gas and chlorine contact tank.
- Waste sludge digestion and dewatering (Aerobic digester with floating aerator and sludge feed pumps, poly coagulant dosing and belt press)
- Maturation ponds.
- PS for re-use of final effluent for irrigation purposes.

Inlet Works (Hand-rake bypass screen and two rotary mechanical drum screens)

Bio Reactor: Two anaerobic zones with mixers

Bio Reactor: Aerobic zone (Bubble Aeration)

Secondary Settling Tanks

Aerobic Digestor with floating aerator

Disinfection with chlorine gas.

Belt Press

Maturation ponds

Final effluent PS

RIEBEEK VALLEY WWTW: The Riebeek Valley WWTW is an activated sludge system with biological nutrient removal, with a hydraulic design capacity of 1.900 Ml/day and an organic design capacity of 1 500 kg COD/day. The 2021 Green Drop Score for the Riebeek Valley WWTW was 92%->89% and the CRR of the plant increased from 23.5% in 2022 to 70.6% in 2023. The WWTW include the following treatment processes.

- Inlet Works with raw wastewater pumps, screening (two rotary mechanical screens) and grit removal (two vortex degritters).
- Activated Sludge Bioreactor with two anaerobic zones, primary and secondary anoxic zones, aerobic zone and re-aeration zone.
- RAS and WAS pump stations
- Two Secondary settling tanks
- Disinfection with chlorine gas and chlorine contact tank
- Waste Sludge digestion and dewatering (Aerobic Digester with sludge macerator and sludge feed pumps, poly coagulant dosing and belt press)
- Anaerobic pond, facultative pond and two maturation ponds.
- PS for re-use of final effluent for irrigation purposes.

Inlet works

Activated sludge bioreactor

Secondary Settling Tanks

Chlorine contact channel

Aerobic Digestor with floating aerator

Conveyor and Skip for Belt Press

DARLING WWTW: The Darling WWTW is an Activated Sludge WWTW, with a hydraulic design capacity of 0.1.500 Ml/day and an organic design capacity of 1 500 kg COD/day. The 2021 Green Drop Score for the Darling WWTW was 95%->89% and the CRR of the plant increased from 29.4% in 2022 to 64.7% in 2023. The WWTW include the following treatment processes.

- Inlet works with raw wastewater pumps, hand raked screen and grit channels.
- Two anaerobic ponds
- Activated Sludge Bioreactor with anoxic and aerobic zones
- RAS and WAS pump stations
- One Secondary settling tank
- Disinfection with chlorine floaters

- Waste Sludge digestion and dewatering (Aerobic Digester with floating aerator and sludge feed pumps, poly coagulant dosing and belt press)
- Six Maturation ponds
- PS for re-use of final effluent for irrigation purposes.

Inlet works

Anaerobic Pond No. 1

Bio Reactor: Anoxic zone

Chlorine Contact Channel

Maturation Pond No. 1

Chlorine Building (Currently not in use)

KORINGBERG WWTW: The Koringberg WWTW is an Oxidation Pond WWTW, with a hydraulic design capacity of 0.030 Ml/day. The 2021 Green Drop Score for the Koringberg WWTW was 70% and the DWS's Wastewater Risk Rating decreased from 88.2% in 2022 to 83.3% in 2023. The WWTW include the following treatment processes.

- Two Primary ponds
- Three Secondary ponds

Inlet at Primary Pond

Primary Pond No.1

Primary Pond No.2

MALMESBURY WWTW: The Malmesbury WWTW is an Activated Sludge WWTW, with a hydraulic design capacity of 10.000 Ml/day and an organic design capacity of 10 000 kg COD/day. The 2021 Green Drop Score for the Malmesbury WWTW is 92%->89% and the CRR of the plant increased from 36.4% in 2022 to 40.9% in 2023. The WWTW include the following treatment processes.

- Inlet Works with macerator, raw wastewater pumps with front raked mechanical screen, screening (Two manual hand-raked bar screens and two 5mm perforated drum screens), grit removal (vortex degritters), flow division chamber and rotating brush fine screening for MBR.
- Pasveer Ditch with floating aerators
- Two Secondary settling tanks
- RAS pump station and MLSS recycle pump station
- Disinfection with chlorine gas and chlorine contact channel
- Membrane Bioreactor (UCT type configuration bioreactor with four dedicated membrane tank / trains).
  - Two anaerobic zones
  - Anoxic zone
  - Two aerobic zones (each basin has 3 DO meters)
  - MBR filtration zone (4 membrane tanks in total and each membrane tank presently has four outside-in hollow fibre membrane modules installed)
  - De-aeration zone
  - Antifouling chemical dosing
  - Membrane permeate / backpulse pumps
- Waste Sludge Digestion and Dewatering (Two aerobic digesters with sludge feed pumps, poly coagulant dosing and two belt presses).
- Maturation Ponds.
- Re-use of final effluent for irrigation purposes.

Inlet works with hand raked screens

MBR plant

Pasveer Bio-Reactor

Secondary Settling Tank No. 1

RAS and WAS PS

Maturation Ponds

KALBASKRAAL WWTW: The Kalbaskraal WWTW is an Oxidation Pond system, with a hydraulic design capacity of 0.157 Ml/d. The 2021 Green Drop Score for the Kalbaskraal WWTW was 83% and the CRR of the plant increased from 23.5% in 2022 to 66.7% in 2023. The WWTW include the following treatment processes.

- One Primary Pond
- Four Secondary Ponds
- One Tertiary Pond

Primary pond

Secondary pond No. 2

Tertiary pond

CHATSWORTH WWTW: The Chatsworth WWTW is an Oxidation Pond system, with a hydraulic design capacity of 0.270 Ml/d. The 2021 Green Drop Score for the Chatsworth WWTW was 85% and the CRR of the plant decreased from 70.6% in 2022 to 66.7% in 2023. The WWTW include primary and secondary ponds.

Primary pond No. 1

Secondary Pond No. 1

Secondary Pond No. 4

EXISTING WASTE WATER TREATMENT INFRASTRUCTURE

Table 3.21: Existing waste water treatment works infrastructure							
3.1 General information	**WWTW 1**	**WWTW 2**	**WWTW 3**	**WWTW 4**	**WWTW 5**	**WWTW 6**	**WWTW 7**
Scheme Name	Moorreesburg	Riebeek Valley	Darling	Koringberg	Malmesbury	Kalbaskraal	Chatsworth/Riverlands
Scheme Number	WC0101	WC0102	WC0103	WC0104	WC0105	WC0106	WC0107
WWTW Name	Moorreesburg WWTW	Riebeek Valley WWTW	Darling WWTW	Koringberg WWTW	Malmesbury WWTW	Kalbaskraal WWTW	Chatsworth WWTW
WWTW Number	WC0101001	WC0102001	WC0103001	WC0104001	WC0105001	WC0106001	WC0107001
Description	Moorreesburg WWTW	Riebeek Valley WWTW	Darling WWTW	Koringberg WWTW	Malmesbury WWTW	Kalbaskraal WWTW	Chatsworth/Riverlands WWTW
Category (Scheme Based, NSB Social Services, NSB Mines and Industries, NSB Small Works, Septic Tanks)	Scheme Based	Scheme Based	Scheme Based	Scheme Based	Scheme Based	Scheme Based	Scheme Based
WWTW Classification (A, B, C, D, E, Unknown)	D	B	B	E	A	E	E
WWTW Status (Existing / Future)	Existing	Existing	Existing	Existing	Existing	Existing	Existing
WWTW Class (Regional / Internal)	Internal	Internal	Internal	Internal	Internal	Internal	Internal
Main Type of Process (Advanced, Activated Sludge, Bio-filter, None, Oxidation ponds lined, Oxidation ponds unlined, Package Plant, Maturation Ponds)	Activated Sludge and Biological Nutrient Removal	Activated Sludge and Biological Nutrient Removal	Activated Sludge with denitrification (MLE process)	Oxidation ponds	Activated Sludge and Biological Nutrient Removal	Oxidation ponds	Oxidation ponds
Asset Register ID (Included in Asset Register)	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs	Various IDs
Proper Asset Management Processes and Plans in place (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Is there a plan in place to manage untreated effluent? (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Down Stream User – Agricultural	Yes	Yes	Yes	No	Yes	No	No
Down Stream User – Recreational	No	No	No	No	No	No	No
Down Stream User – Industrial	No	No	No	No	No	No	No
Down Stream User – Domestic	No	No	No	No	No	No	No
Down Stream User – Mining	No	No	No	No	No	No	No
Down Stream User - None	No	No	No	Yes	No	Yes	Yes
Is there any Down Stream Objectives	No	No	No	No	No	No	No
Down Stream Objectives achieved (%)	100%	100%	100%	100%	100%	100%	100%
Ecological Status of Down Stream Receiving Body (Good, Fair, Bad)	Fair	Fair	Fair	Not Applicable	Fair	Not Applicable	Not Applicable
3.2 Operation							
O&M Occurrence (Regular, Periodic, Sporadic, None, Occasional, When needed)	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Incidents, including security problems (Regular, Periodic, Sporadic, None)	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic	Sporadic
Safety Inspection performed (R: Regular, P: Periodic, S: Sporadic, N: None)	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Average operating hours per day	24	24	24	24	24	24	24
Green Drop Status (Yes / No)	No	No	No	No	No	No	No
Green Drop Score 2021 (%)	87%	92%->89%	95%->89%	70%	92%->89%	83%	85%
Incident Management Protocol in place (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Proper Process Control in place (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Failure Response Management in place (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Waste Water Monitoring Programme in place - Compliance and Operational (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
How often is effluent quality monitored (Daily, Weekly, Monthly, Annually, Never)	Daily	Daily	Daily	Monthly	Daily	Monthly	Monthly
How often is influent quality monitored (Daily, Weekly, Monthly, Annually, Never)	Daily	Daily	Daily	Never	Daily	Never	Never
Sample Analysis Credibility (%)	100%	100%	100%	100%	100%	100%	100%
Compliance Monitoring: % of tests performed as required by General Limits / Special Limits / License Requirements (Average % over previous 12 months)	100%	100%	100%	100%	100%	100%	100%
Operational Monitoring: % of tests performed as required by General Limits / Special Limits / License Requirements (Average % over previous 12 months)	100%	100%	100%	100%	100%	100%	100%
Chemical (Results of tests performed. Average % sample failure over previous 12 months)	54.2%	10.4%	16.7%	72.9%	20.8%	41.7%	68.7%
Microbiological (Results of tests performed. Average % sample failure over previous 12 months)	91.7%	16.7%	0%	100%	0%	0%	91.7%
Physical Compliance (Results of tests performed. Average % sample failure over previous 12 months)	40.0%	0%	16.7%	63.9%	13.9%	0%	36.1%
Authorised Effluent Release (Ml/day)	Busy with application	1.500	1.851	0.180	7.620	0.000	0.270
Type of Authorisation (General, Exemption Permit, Permit, Licence, No Licence, Undetermined)	Busy with application for new works	GA (8 February 2017)	GA (29 January 2020)	GA (2 September 2014)	Licence 01/G21C/EFG/8785 (21 November 2018)	GA (20 December 1999)	GA (5 December 2013)
Authorisation Compliance (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Effluent controlled (%)	100%	100%	100%	100%	100%	100%	100%
Solid waste disposal (m³/day)	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Where is solid waste disposed of (Registered waste site, Irrigation, Sludge trench on site, Water Course, Other)	Registered waste site	Registered waste site	Registered waste site	Registered waste site	Registered waste site	Registered waste site	Registered waste site
Sludge produced (dry tonnes per day)	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
% Of time that effluent is chlorinated	100%	100%	100%	0%	100%	0%	0%
3.3 Functionality Observation							
Refurbishment needs (High, Medium, Low, None)	None	None	Medium	Medium	None	High	High
General physical condition (Dysfunctional, Operational, Prime Condition, Vandalised, Destitute)	Prime Condition	Prime Condition	Operational	Operational	Prime Condition	Operational	Operational

Table 3.21: Existing waste water treatment works infrastructure							
3.1 General information	**WWTW 1**	**WWTW 2**	**WWTW 3**	**WWTW 4**	**WWTW 5**	**WWTW 6**	**WWTW 7**
Total refurbishment needs %	10.0%	15.0%	15.0%	10.0%	15.0%	30.0%	15.0%
Total refurbishment needs cost for next 15 years (RM)	R11.000	R10.200	R6.750	R0.500	R52.500	R0.750	R0.975
Refurbishment cost for the next 5 years (RM)	R0.000	R3.400	R2.250	R0.000	R17.500	R0.250	R0.325
Refurbishment cost for the next 6 - 10 years (RM)	R5.500	R3.400	R2.250	R0.250	R17.500	R0.250	R0.325
Refurbishment cost for the next 11 - 15 years (RM)	R5.500	R3.400	R2.250	R0.250	R17.500	R0.250	R0.325
Total replacement needs %	10.0%	15.0%	15.0%	10.0%	15.0%	0%	15.0%
Total replacement needs cost for next 15 years (RM)	R11.000	R10.200	R6.750	R0.500	R52.500	R0.000	R0.975
Replacement cost for the next 5 years (RM)	R0.000	R3.400	R2.250	R0.000	R17.500	R0.000	R0.325
Replacement cost for the next 6 - 10 years (RM)	R5.500	R3.400	R2.250	R0.250	R17.500	R0.000	R0.325
Replacement cost for the next 11 - 15 years (RM)	R5.500	R3.400	R2.250	R0.250	R17.500	R0.000	R0.325
Total new development cost for next 15 years (RM)	R0.000	R0.000	R37.500	R5.000	R0.000	R0.000	R7.000
New development cost for the next 5 years (RM)	R0.000	R0.000	R37.500	R5.000	R0.000	R0.000	R7.000
New development cost for the next 6 - 10 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
New development cost for the next 11 - 15 years (RM)	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000	R0.000
Number of Permanent Staff on site	2	2	2	No permanent staff	4	No permanent staff	No permanent staff
Compliance to Supervisory staff requirements - Green Drop (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Compliance to Process Control staff requirements - Green Drop (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Compliance to O&M staff requirements - Green Drop (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sufficient Management Capacity and Efficiency (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
% Where of the WSA Self is the Current Owner	100.0%	100.0%	100.0%	100.0%	100.0%	100%	100.0%
% Where of the WSA Self is the Current Operator	100.0%	100.0%	100.0%	100.0%	100.0%	100%	100.0%
3.4 Asset Assessment Spectrum							
Date of Commission (Start to Operate)	1965	1943	1964	1996	Unknown	Unknown	Unknown
Year of last upgrade	2020 - 2023	2013-2015	2019-2021	1996	2010-2013	Unknown	2016-2017
Total Expected Lifespan, RUL (Short, Medium, Long)	Long	Long	Medium	Short	Long	Short	Short
Estimated replacement value (RM): CRC	R110.000	R68.000	R45.000	R1.000	R350.000	R2.500	R6.500
Already reached Useful Life (Yes/No)	No	No	No	No	No	No	No
Critical elements of refurbishment (Next five years)	-	-	Portions of plant to be refurbished.	Plant to be upgraded.	Some small parts that require refurbishment	Ponds in poor condition, to be refurbished.	Ponds in poor condition, to be refurbished. Fence required.
Date of assessment	May 2023	May 2023	May 2023	May 2023	May 2023	May 2023	May 2023
Assessment done by	iX engineers (WSDP)	iX engineers (WSDP)	iX engineers (WSDP)	iX engineers (WSDP)	iX engineers (WSDP)	iX engineers (WSDP)	iX engineers (WSDP)
Comments	New plant, no further upgrades are required in next five year.	Two non-operational mixers to be repaired. DO meters to be refurbished. Some security measures to be improved (Burglar bars)	Inlet works flooded during load shedding periods. Mechanical drum screens and flow meter were removed at inlet works. Anaerobic pond to be cleaned. DO meters to be repaired.	No screening. Ponds overgrown with reeds. Vegetation on ponds to be removed. No flow meter	One belt press not working (Faulty gearbox). Old aerator for digester not working. SST No.2 not operational. Central screw of one vortex degritter broken.	Embankments of ponds in poor condition and covered with vegetation, which should be cleared. Reeds in primary pond to be removed. No flow meter.	Reeds to be removed. Embankments covered with vegetation, which should be removed. Trees growing on the embankments, which should be removed. No flow meter. Not fenced.
Annual Operating Cost (RM) (1.0% of CRC)	R1.100	R0.680	R0.450	R0.010	R3.500	R0.025	R0.065
Annual Maintenance Cost (RM) (0.5% of CRC)	R0.550	R0.340	R0.225	R0.005	R1.750	R0.013	R0.033
Total volume of water received and treated per day for period July 2022 to June 2023 (Ml/day)	1.234	0.800	1.307	0.090	5.807	0.084	0.341
Discharge volume for period July 2022 to June 2023 (Ml/day)	0.815	0.625	0.998	0.063	1.462	0.000	0.000
Volume of effluent recycled for period July 2022 to June 2023 (Ml/day)	0.172	0.055	0.048	0.000	3.183	0.000	0.000
Capacity Sufficient (Yes / No)	Yes	Yes	Yes	No	Yes	Yes	No
Hydraulic Design Capacity (Ml/day)	1.500	1.900	1.500	0.030	10.000	0.157	0.270
Hydraulic capacity in use (%)	61.70%	42.11%	87.13%	300.0%	58.07%	53.50%	126.30%
Organic Design Capacity (kg COD/day)	2 000	1 500	1 500	Unknown	10 000	Unknown	Unknown
Organic capacity in use (%)	53.4%	49.9%	121.9%	Unknown	76.9%	Unknown	Unknown

3.5 WATER AND SANITATION SCHEMES

3.5.1 Water Schemes

Table 3.5.1.1: Existing water schemes in Swartland Municipality's Management Area

Water Schemes	Scheme 1	Scheme 2	Scheme 3	Scheme 4	Scheme 5	Scheme 6	Scheme 7	Scheme 8	Scheme 9	Scheme 10	Scheme 11	Scheme 12	Scheme 13
Scheme Name	Swartland Bulk Supply Scheme	Greater Malmesbury	Moorreesburg	Riebeek Kasteel	Riebeek West	Yzerfontein	Darling	Koringberg	Malmesbury	Abbotsdale	Kalbaskraal	Chatsworth/ Riverlands	Swartland Rural
Scheme Number	WC0100	WC0101	WC0102	WC0103	WC0104	WC0105	WC0106	WC0107	WC0108	WC0109	WC0110	WC0111	WC010R
Scheme ID	WC0100	WC0101	WC0102	WC0103	WC0104	WC0105	WC0106	WC0107	WC0108	WC0109	WC0110	WC0111	WC010R
Water Services Authority Name	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality
Blue Drop Compliance Score (2023)	93.33%	93.33%	96.48%	93.33%	93.33%	93.33%	93.33%	96.48%	93.33%	93.33%	93.33%	93.33%	93.33%
Classification (Regional / Internal Bulk)	Internal Bulk	Internal Bulk	Internal Bulk	Internal Bulk	Internal Bulk	Internal Bulk	Internal Bulk	Internal Bulk	Internal Bulk	Internal Bulk	Internal Bulk	Internal Bulk	Internal Bulk
Status (Existing Future)	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing	Existing
Owner Type (DM, LM, Water Board, Agencies, Private)	LM	LM	LM	LM	LM	LM	LM	LM	Private	Private	LM	LM	Private
Owner Name	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality
Refurbishment Needs Priority (High, Medium, Low, None)	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
O&M Needs Priority (High, Medium, Low, None)	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Requirement Type (Upgrade, Refurbishment, O&M, Replace, Resource, Combination, None)	Combination	Combination	Combination	Combination	Combination	Combination	Combination	Combination	Combination	Combination	Combination	Combination	Combination
How many illegal connections to date?	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Already reached Useful Life (Yes/No)	No	No	No	No	No	No	No	No	No	No	No	No	No
Blue Drop Status 2023 (Yes/No)	No	No	Yes	No	No	No	No	Yes	No	No	No	No	No
Number of Sources: Groundwater	-	-	-	-	-	-	-	-	-	-	-	3	Unknown
Number of Sources: Surface Water	1	1	-	-	-	-	-	-	-	-	-	-	Unknown
IWA WATER BALANCE													
See Tables included under Section 5.2													
FUTURE SOURCES (Next 18 years)													
Additional source available no. of: Groundwater	-	-	-	-	1	16	-	1	-	-	-	2	Unknown
Additional source available no. of: Surface water	-	-	-	-	-	-	-	-	-	-	-	-	Unknown
Additional source available no. of: External sources Bulk Purchase	1	-	-	-	-	-	-	-	-	-	-	1	-
Additional source available potential volume: Groundwater Ml/a	-	-	-	-	78	2 000	-	45	-	-	-	61	Unknown
Additional source available potential volume: Surface water Ml/a	-	-	-	-	-	-	-	-	-	-	-	-	Unknown
Additional source available potential volume: External Sources Bulk Purchase Ml/a	5 000	-	-	-	-	-	-	-	-	-	-	160	-

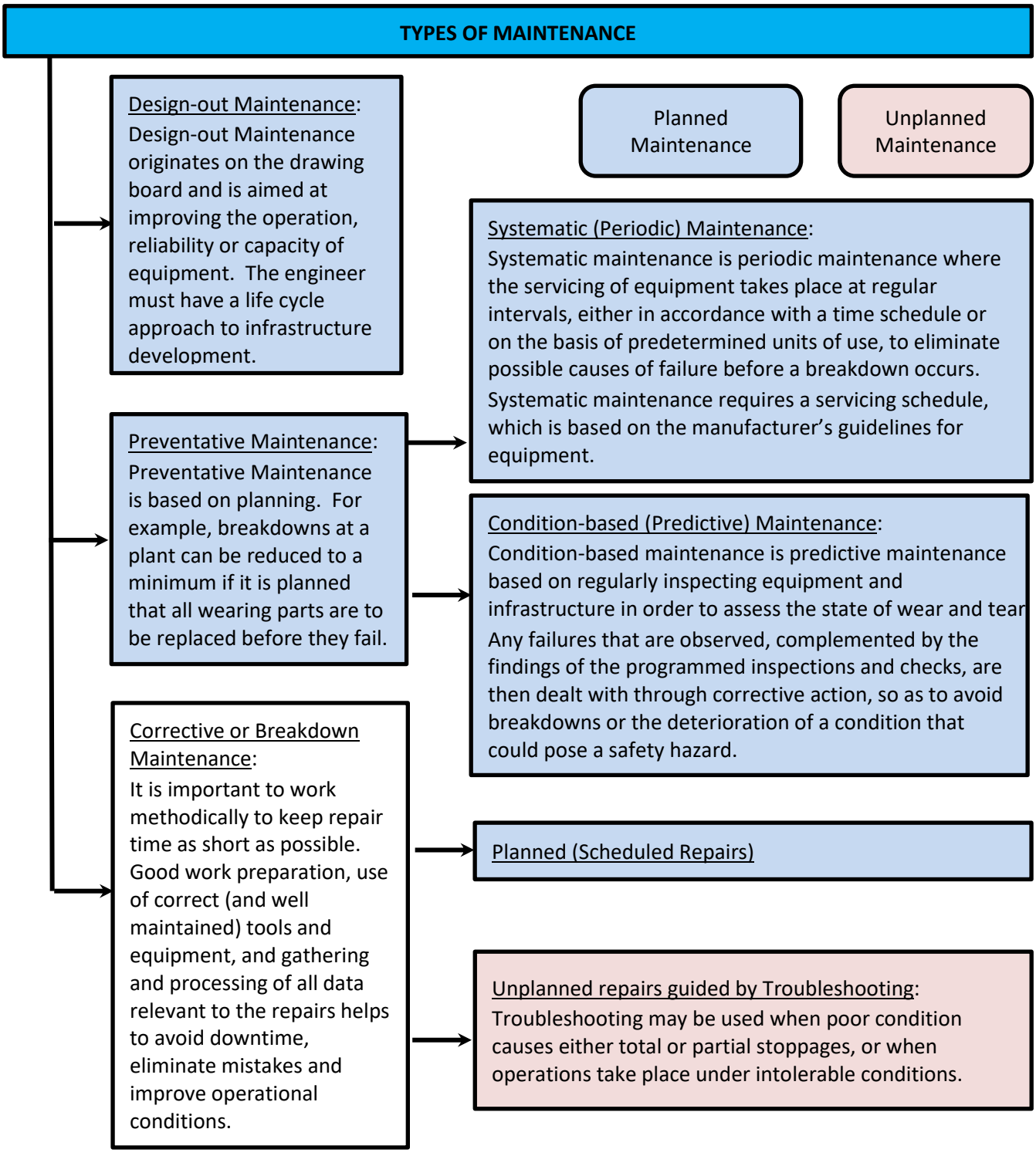
3.5.2 Sanitation Schemes

Table 3.5.2.1: Existing sanitation schemes in Swartland Municipality's Management Area

Sanitation Schemes	Scheme 1	Scheme 2	Scheme 3	Scheme 4	Scheme 5	Scheme 6	Scheme 7
Scheme Name	Moorreesburg	Riebeek Valley	Darling	Koringberg	Malmesbury	Kalbaskraal	Chatsworth/Riverlands
Scheme Number	WC0101	WC0102	WC0103	WC0104	WC0105	WC0106	WC0107
Scheme ID	WC0101	WC0102	WC0103	WC0104	WC0105	WC0106	WC0107
Water Services Authority Name	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality
Classification (Regional / Internal Bulk)	Internal Bulk	Internal Bulk	Internal Bulk	Internal Bulk	Internal Bulk	Internal Bulk	Internal Bulk
Status (Existing Future)	Existing	Existing	Existing	Existing	Existing	Existing	Existing
Owner Type (DM, LM, Water Board, Agencies, Private)	LM	LM	LM	LM	LM	Private	LM
Owner Name	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Swartland Municipality	Moravian Church	Swartland Municipality
Refurbishment Needs Priority (High, Medium, Low, None)	Low	Low	Low	Low	Low	Low	Low
O&M Needs Priority (High, Medium, Low, None)	Low	Low	Low	Low	Low	Low	Low
Requirement Type (Upgrade, Refurbishment, O&M, Replace, Resource, Combination, None)	Combination	Combination	Combination	Combination	Combination	Combination	Combination
How many illegal connections to date?	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Already reached Useful Life (Yes/No)	No	No	No	No	No	No	No
Green Drop Status 2021 (Yes/No)	No	No	No	No	No	No	No
Green Drop Compliance Score 2021	87%	92%->89%	95%->89%	70%	92%->89%	83%	85%

4. WATER SERVICES OPERATION AND MAINTENANCE

Maintenance is usually practiced in two forms, preventative maintenance and corrective maintenance. A third form is called design-out maintenance, which is rather an aspect of the design considerations when the infrastructure is planned. Maintenance may be divided into planned and unplanned maintenance. The section below gives an overview of the different types of maintenance.



4.1 OPERATION AND MAINTENANCE PLAN

The focus on improvement of levels of service through creating new infrastructure at great cost results often in overlooking the importance of the development and implementation of sound asset management practices. Through the assessment of this important function WSAs are enabled to identify areas of concern and it should form the base for the development of an Asset Management Plan as discussed in Topic 3. Neglecting the implementation of best practice operational and maintenance procedures would result in ineffective service delivery and shortened life span expectancy of assets. Additional capital expenditure for refurbishment or replacement will eventually be unavoidable.

The two important aspects of asset management under consideration are:

- Operations
- Maintenance

Table 4.1.1: Definitions for Operational and Maintenance Assessments and Plans

	Element Description	Assessment Criteria

4.2 Resources	**Staff**	• Sufficient staff numbers
		• Competency level of staff at all levels
		• Level of service provided by staff
		• Empowerment and training:
		  ○ Adequately trained for position
		  ○ Safety regulation
		  ○ Commitment
		• Responsibility allocation (organisational structure) and acceptance thereof

	External resources	• Need for external resource providers • Competency level and value for money • Management and control over these providers

	Spare Parts	• Adequate materials provisioning
		• Store management
		  ○ Sufficient stock kept
		  ○ Stock control
		  ○ Delivery time

	Tools & equipment	• Adequate tools and equipment provided • Control and maintenance
	Budget	• Adequate budget provided • Budget control • Identification and documentation of needs • Budget preparation and motivation

Table 4.1.1: Definitions for Operational and Maintenance Assessments and Plans

Element Description		Assessment Criteria
4.3 Information	**Manuals**	• Existence of manuals (operation / maintenance or manufacturer) • Record keeping / safekeeping and control • Utilisation of manuals by staff
	Asset register	• Existence of an asset register • Maintenance / updating of asset register • Accessibility of information • Control over assets • Stock taking
	As-built information	• Existence of as-built drawings • Existence of important reports e.g. design reports etc. • Record keeping / safekeeping and control • Accessibility of information • Updating of records
	Tools and Equipment	• Existence of information on tools and equipment • Record keeping / safekeeping and control • Accessibility of information
	Contingency and safety plan	• Compliance to safety requirements • Safety equipment and maintenance thereof • Existence of safety plan where required • Existence of contingency plan where required
4.4 Activity Control and Management	**Procedures**	• Existence of procedures for all activities • Existence of policies – standardisation, quality, operational and maintenance, etc • Correctness of procedures – if in place
	Record keeping	• Existence of record keeping system • Process of data • Actions activated

	Quality control	• Quality management plan
		• Quality assurance
		• Quality control
		  ○ Inspections
		  ○ Control charts
		  ○ Trend analysis
		• Process adjustment and rework
		• Quality improvement

	Risk management	• Risk management planning • Risk identification • Risk probability and impact assessment • Risk response planning • Risk monitoring and control

	Reporting	• Production and activity reporting
		  ○ Completeness
		  ○ Evaluation and action activation
		• Management reporting

Table 4.1.1: Definitions for Operational and Maintenance Assessments and Plans		
Element Description		Assessment Criteria
		○ Completeness ○ Evaluation and action activation ● Performance monitoring

Status Quo – The current situation on each component of the water distribution system was evaluated / assessed in terms of the previous list. The following criteria are applicable:

N/R - Not required

Z - Zero compliance (if there is no capacity / resources or information)

1 - Below minimum requirement

2 - Minimum requirement

3 - Above minimum requirement

"Minimum requirement" is considered to be a good judgement of what is required to ensure proper operation and maintenance that could be maintained given the specific conditions and infrastructure.

Impact – Secondly the impact on having access to the resources / information or capability listed should be assessed in terms of the importance for providing operational and maintenance services on each component.

Criteria applicable is as follows: C – Critical, M – Medium, L – Low and No - No impact

Operation and Maintenance Plan	Yes / No
Is there an Operation and Maintenance Plan?	Yes

Swartland Municipality's key focus is on the optimal operation and maintenance of their water and sewer networks, which will have minimum breakdowns when it is:

- Correctly designed and constructed.
- Properly operated and maintained
- Correctly used by the customers
- Kept clean and protected from pollution

Pipe bursts and other serious damage to pipes immediately interrupts services to the affected area and is rapidly addressed by Swartland Municipality. O&M is a continuous process for Swartland Municipality involving various activities, with the ultimate purpose of delivering good quality services to all customers at all times and keeping the percentage of water lost through pipe bursts and other serious damage to pipes as low as possible. Swartland Municipality's O&M Plan depends on a range of factors such as the age and condition of the water supply system (Pipe Replacement Study, See Section 5.1.1.3), requirements of the Municipality and DWS as the regulating authority, the availability of staff, plant, equipment, spares, money and other resources.

Swartland Municipality also have standby teams available after hours and over weekends, besides the planned and scheduled O&M activities, in order to allow for unscheduled responses to service breakdowns due to mal-functioning equipment, vandalism, emergency situations, etc. This allows Swartland Municipality to be able to quickly assess service breakdowns and re-allocate staff and resources to do unscheduled repairs, and then quickly return to the regular and scheduled O&M activities. The technical personnel ensure that sufficient repair materials, consumables and back-up equipment are also available in the stores.

Legend:

STATUS QUO:
- N/R - Not required
- Z - Zero compliance
- 1 - Below minimum requirement
- 2 - Minimum basic requirement
- 3 - Above minimum requirement

IMPACT:
- C - Critical
- M - Meduim / High
- L - Low
- No - No impact

4.1 WATER SERVICES OPERATION AND MAINTENANCE: OPERATIONAL ASSESSMENT

COMPONENT		4.2 RESOURCES										4.3 INFORMATION								4.4 ACTIVITY CONTROL AND MANAGEMENT									
		Staff		External resources		Spare Parts		Tools & Equipment		Budget		Manuals Available		Asset Register		As-Built information		Contingency & Safety Plan		Policies & Procedures		Record keeping in place		Quality control procedures established		Risk Management		Reporting (data analysis & report generation procedures established)	
		Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact
1	EXISTING GROUND WATER INFRASTUCTURE	2	L	N/R	No	2	L	2	L	2	L	2	L	3	L	3	L	3	M/H	2	M/H	2	M/H	2	M/H	3	C	2	M/H
2	EXISTING SURFACE WATER INFRASTUCTURE	2	L	3	C	2	L	2	L	2	L	2	L	3	L	3	L	3	M/H	2	L	2	L	2	M/H	3	C	2	M/H
3	EXISTING WASTE WATER TREATMENT WORKS INFRASTRUCTURE	2	M/H	N/R	No	2	M/H	3	L	3	M/H	3	M/H	3	M/H	3	M/H	3	M/H	3	C	3	C	3	C	3	C	3	C
4	EXISTING WATER TREATMENT WORKS INFRASTRUCTURE	3	M/H	3	C	2	M/H	3	L	3	M/H	3	M/H	3	M/H	3	M/H	3	M/H	3	C	3	C	3	C	3	C	3	C
5	EXISTING PUMP STATION INFRASTUCTURE	3	C	3	C	2	C	3	L	3	C	2	C	3	C	3	M/H	3	M/H	2	C	2	C	3	C	3	C	2	C
6	EXISTING BULK PIPELINE INFRASTUCTURE	3	M/H	3	C	2	M/H	3	L	3	M/H	2	L	3	L	3	M/H	3	M/H	2	L	2	L	3	L	3	C	2	M/H
7	EXISTING RESERVOIR & WATER TOWER INFRASTUCTURE	3	M/H	3	C	2	M/H	3	L	3	C	2	M/H	3	M/H	3	M/H	3	M/H	2	L	2	L	3	L	3	C	2	M/H
8	EXISTING RETICULATION INFRASTUCTURE	3	C	N/R	No	3	C	3	L	3	C	2	L	3	L	3	M/H	3	M/H	2	L	2	M/H	3	M/H	3	C	3	C

Legend:

STATUS QUO:
- N/R - Not required
- Z - Zero compliance
- 1 - Below minimum requirement
- 2 - Minimum basic requirement
- 3 - Above munimum requirement

IMPACT:
- C - Critical
- M - Meduim / High
- L - Low
- No - No impact

4.1 WATER SERVICES OPERATION AND MAINTENANCE: MAINTENANCE ASSESSMENT

COMPONENT		4.2 RESOURCES										4.3 INFORMATION								4.4 ACTIVITY CONTROL AND MANAGEMENT									
		Staff		External resources		Spare Parts		Tools & Equipment		Budget		Manuals Available		Asset Register		As-Built information		Contingency & Safety Plan		Policies & Procedures		Record keeping in place		Quality control procedures established		Risk Management		Reporting (data analysis & report generation procedures established)	
		Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact	Status	Impact
1	***EXISTING GROUND WATER INFRASTUCTURE***																												
	Condition monitoring	2	L	N/R	No	2	L	2	L	2	L	2	L	3	L	3	L	2	M/H	2	M/H	2	M/H	2	M/H	3	C	2	M/H
	Planned Maintenance	2	L	N/R	No	2	L	2	L	2	L	2	L	3	L	3	L	3	M/H	2	M/H	2	M/H	3	M/H	3	C	3	M/H
	Unplanned Maintenance	2	L	N/R	No	2	L	2	L	2	L	2	L	3	L	3	L	2	M/H	2	M/H	2	M/H	2	M/H	2	C	2	M/H
2	***EXISTING SURFACE WATER INFRASTUCTURE***																												
	Condition monitoring	2	L	3	C	2	L	2	L	2	L	2	L	3	L	3	L	2	M/H	2	L	2	L	2	M/H	3	C	2	M/H
	Planned Maintenance	2	L	3	C	2	L	2	L	2	L	2	L	3	L	3	L	3	M/H	2	L	2	L	3	M/H	3	C	3	M/H
	Unplanned Maintenance	2	L	3	C	2	L	2	L	2	L	2	L	3	L	3	L	2	M/H	2	L	2	L	2	M/H	2	C	2	M/H
3	***EXISTING WASTE WATER TREATMENT WORKS INFRASTRUCTURE***																												
	Condition monitoring	2	M/H	N/R	No	2	M/H	3	L	3	M/H	2	M/H	3	M/H	3	M/H	2	M/H	2	C	2	C	2	C	3	C	3	C
	Planned Maintenance	2	M/H	N/R	No	2	M/H	3	L	3	M/H	3	M/H	3	M/H	3	M/H	3	M/H	3	C	3	C	3	C	3	C	3	C
	Unplanned Maintenance	2	M/H	N/R	No	2	M/H	2	L	2	M/H	2	M/H	3	M/H	3	M/H	2	M/H	2	C	2	C	2	C	2	C	2	C
4	***EXISTING WATER TREATMENT WORKS INFRASTRUCTURE***																												
	Condition monitoring	3	M/H	3	C	2	M/H	3	L	3	M/H	3	M/H	3	M/H	3	M/H	2	M/H	2	C	3	C	2	C	3	C	3	C
	Planned Maintenance	3	M/H	3	C	2	M/H	3	L	3	M/H	3	M/H	3	M/H	3	M/H	3	M/H	3	C	3	C	3	C	3	C	3	C
	Unplanned Maintenance	3	M/H	3	C	2	M/H	2	L	2	M/H	2	M/H	3	M/H	3	M/H	2	M/H	2	C	2	C	2	C	2	C	2	C
5	***EXISTING PUMP STATION INFRASTUCTURE***																												
	Condition monitoring	3	C	3	C	2	C	3	L	3	C	2	C	3	C	3	M/H	2	M/H	2	C	2	C	2	C	3	C	2	C
	Planned Maintenance	3	C	3	C	2	C	3	L	3	C	2	C	3	C	3	M/H	3	M/H	2	C	2	C	3	C	3	C	3	C
	Unplanned Maintenance	3	C	3	C	2	C	2	L	2	C	2	C	3	C	3	M/H	2	M/H	2	C	2	C	2	C	2	C	2	C
6	***EXISTING BULK PIPELINE INFRASTUCTURE***																												
	Condition monitoring	3	M/H	3	C	2	M/H	3	L	3	M/H	2	L	3	L	3	M/H	2	M/H	2	L	2	L	2	L	3	C	2	N/H
	Planned Maintenance	3	M/H	3	C	2	M/H	3	L	3	M/H	2	L	3	L	3	M/H	3	M/H	2	L	2	L	3	L	3	C	3	M/H
	Unplanned Maintenance	3	M/H	3	C	2	M/H	2	L	2	M/H	2	L	3	L	3	M/H	2	M/H	2	L	2	L	2	L	2	C	2	M/H
7	***EXISTING RESERVOIR & WATER TOWER INFRASTUCTURE***																												
	Condition monitoring	3	M/H	3	C	2	M/H	3	L	3	C	2	M/H	3	M/H	3	M/H	2	M/H	2	L	2	L	2	L	3	C	2	M/H
	Planned Maintenance	3	M/H	3	C	2	M/H	3	L	3	C	2	M/H	3	M/H	3	M/H	3	M/H	2	L	2	L	3	L	3	C	3	M/H
	Unplanned Maintenance	3	M/H	3	C	2	M/H	2	L	2	C	2	M/H	3	M/H	3	M/H	2	M/H	2	L	2	L	2	L	2	C	2	M/H
8	***EXISTING RETICULATION INFRASTUCTURE***																												
	Condition monitoring	3	C	N/R	No	3	C	3	L	3	C	2	L	3	L	3	M/H	2	M/H	2	L	2	M/H	2	M/H	3	C	3	C
	Planned Maintenance	3	C	N/R	No	3	C	3	L	3	C	2	L	3	L	3	M/H	3	M/H	2	L	2	M/H	3	M/H	3	C	3	C
	Unplanned Maintenance	3	C	N/R	No	3	C	3	L	3	C	2	L	3	L	3	M/H	2	M/H	2	L	2	M/H	2	M/H	2	C	3	C

5. CONSERVATION AND DEMAND MANAGEMENT

Promoting the efficient use of water should be a driver of the WSDP process, particularly since South Africa is a water scarce country. Water required as a result of the service level targets may exceed water availability. There are two options in this case, either build new infrastructure (which is very costly), or institute a WC/WDM strategy, or a combination of the two. The need to implement WC/WDM is not limited to water resource requirements. The implementation of WC/WDM can have a significant impact in ensuring effective, affordable and sustainable water services with social, economic and environmental benefits.

Key WC/WDM issues, as included in the new NWRS 2, are as follows:

- The National Water Act recognises the pivotal role of WC/WDM in water resource management, with the objective of enabling all user sectors to gain equitable access to the desired quantity, quality and reliability of water.
- WC/WDM is the foremost Reconciliation Strategy to balance water supply and demand.
- WC/WDM can be implemented in a shorter time than new infrastructure development and can significantly postpone the need for new water resources infrastructure and new WTWs and WWTWs.
- WC/WDM is more cost effective than new water infrastructure development.
- WC/WDM is important in the light of climate change when more frequent droughts and floods will impact adversely on the availability of water.

A WC/WDM Strategy is a fundamental step in promoting water use efficiency and is consistent with the National Water Act, which emphasises effective management of water resources.

WC/WDM Strategy

The Directorate Water Conservation has prepared comprehensive guidelines in this regard, including a model strategy for WSAs. The WC/WDM strategy for WSAs also needs to form part of the regional WC/WDM strategy. It is important to recognise that although WSAs are ultimately at the interface of WC/WDM initiatives the needs and objectives of the strategy need to be looked at from various perspectives including consumers, municipalities, bulk suppliers, catchment management agencies and the national perspective.

The purpose of the WC/WDM model strategies is to enhance the management of water services in order to achieve sustainable, efficient and 100 per cent affordable services to all consumers. The aim of the model strategies is to influence all functions and business plans related to water services. The emphasis of the model strategies is to influence water services to incorporate social, environmental, economic and technical considerations.

Many of the elements of such a strategy are part of the WSDP requirements. However, particularly the larger, more capacitated WSAs are encouraged to produce specific strategies based on the above-mentioned model strategy. Should this be the case, the WSA should include their strategy in the Master Plan Module of the WSDP.

The implementation of a WC/WDM strategy does not only refer to measures that reduce water wastage and inefficient use, but also include measures to effectively manage and sustain efficiency targets. Some of the priority requirements are to install systems that measure and identify certain key parameters such as minimum night flows and systems to enable detailed and regular water audits and water balances.

Depending on the circumstances, the initial focus of reducing demand could be the reduction in water losses and a reduction on the wastage and inefficient use of NRW consumption (i.e. the reduction of involuntary water usage by non-paying consumers). However, this does not mean that Swartland Municipality should not target paying consumers and should also consider implementing other activities to reduce water consumption.

Swartland Municipality will continue with the implementation of their various WC/WDM measures. The purpose of the WC/WDM Strategy and activities are to further conserve and protect available resources and to ensure the effective utilisation of the available water resources. The average annual growth percentage in total raw water requirements for Swartland Municipality over the period 2001/2002 to 2022/2023 was 1.38%/a.

The overall percentage of NRW for the 2022/2023 financial year was 16.51% (System Input – Revenue Water) and the percentage of Water losses was 14.0% (System Input – Authorised Consumption). Both the NRW and water losses were reduced during the last financial year.

The main water demand management interventions undertaken by Swartland Municipality over the last few years, as included in their WDM Strategy of September 2019, are summarised in the table below.

Table 5.1: WDM activities implemented by Swartland Municipality
Reduce water losses and non-revenue water
• Metering of all water usage – households, standpipes, municipal parks, industrial, commercial and institutional. • Monthly reading and billing of all meters. • Inspection for illegal connections on an ongoing basis; • Formalising all illegal and/or unmetered connections immediately upon coming to attention; • Metering and billing of temporary consumption, typically by construction companies; • Annual audit of all meters 50mm and larger and replacement of the meters where necessary; • Monthly monitoring of all wet industries and large volume water users for deviations together with appropriate actions in the event of a deviation. • Monthly monitoring and inspection of zero usage consumers; • Repair of burst pipes within 3 hours; • Accurate calculation of water losses and record keeping; • Zone metering; • Day flow metering; • Re-use of treated effluent for the irrigation of sport fields in Moorreesburg, Malmesbury, Darling and Riebeek Kasteel; • Watering of municipal parks during cooler early morning hours; and • Re-Use of treated effluent during construction projects instead of potable water, where possible.
Pressure Management
• Pressure control at high pressure zones in each of the towns in the Municipal Area.
Leak and Meter Repairs
• Leak repairs assistance programme for indigent households; • Meter replacement programme for all connections; • Annual fire hydrant inspection for leaks and functioning; • Retrofitting of municipal buildings with water efficient equipment; • Immediate leak repair in municipal buildings; and • Meter audits to determine the accuracy of meter readings.
Consumer / End User Demand Management
• Block tariffs to discourage inefficient and wasteful use of water; • Drought tariffs applicable during times of severe drought; • Central customer care service where leaks are reported by the public; • Incremental levels of stringency for water restrictions, to manage demand during periods of drought and water shortages; • Notices and communication media on billboards and municipal website raising awareness pertaining water conservation; and • Communicating information on municipal bills pertaining water use and target volume savings.
Infrastructure Management
• Operations and maintenance schedule; • Regular inspections of water distribution networks, pump stations and reservoirs; and • Current Water- and Sewer Masterplan based on current available growth projections.

Table 5.1: WDM activities implemented by Swartland Municipality
Reduction in Municipal Water Demand
• Municipal parks have been re-landscaped to be less water intensive. Watering has been limited to before 08:00 am, in order to limit water losses through evaporation.
Alternative Resources
• Funding was secured for the development of groundwater as an alternative resource. Boreholes were drilled as an alternative water source and have yielded reasonable volumes.

The WDM Strategy also include the following future WDM measures that will be implemented by Swartland Municipality.

- Pressure Management
- Leak Repair and Assistance Programme
- Residential Measures
- Re-use of treated effluent
- Meter replacement
- Night Flow Analyses
- Leakage Detection
- Zone Metering
- Alternative water resources

DWS's scorecard for assessing the potential for WC/WDM efforts, as completed for Swartland Municipality, is included in Annexure D. The aim of the scorecard was to establish areas where the municipality has made good progress in relation to WC/WDM and where there is still room for improvement. It can be seen from the Scorecard that there are 25 questions each of which carries a maximum of 4 points providing a possible maximum score of 100. If the Municipality has the specific item completely under control, it receives the maximum points and if it is neglecting the item completely it receives no points. There are various levels between the maximum and the minimum number of points assigned to the municipality for each item depending on the level of completeness or lack thereof. **The status quo score for Swartland Municipality is 85 out of 100 suggesting that the Municipality is making good progress with regard to the implementation of specific WC/WDM activities.**

5.1 WATER RESOURCE MANAGEMENT

Water resource management interventions should deal with interventions such as the removal of invading plants, artificial recharge of aquifers, and rehabilitation of wetlands and clean up campaigns of rivers. Total figures for NRW are reported as part of the water balance, however activities to reduce the percentage of NRW and water inefficiencies are unpacked in this section.

Losses (Apparent and Real) is defined as the difference between the measured volumes of water put into the supply system and the total authorised consumption. Internal plumbing leaks are leaks past the consumer meter. Such leaks can be assessed through sample surveys of consumer households and by analysing the minimum night flow of bulk meters.

5.1.1 Reducing Unaccounted for Water and Water Inefficiencies

It is not possible at this stage to differentiate between the water loss through reticulation leaks, illegal connections, un-metered connections and internal plumbing leaks. Swartland Municipality's commitment is to ensure that all the connections, providing an uncontrolled volume of water, are metered. Detail IWA water balance models for each of the water distribution systems are included in Annexure C. Leakage Benchmarking Sheets for each of the systems are also included in Annexure D.

Table 5.1.1.1: Resources available to reduce unaccounted for water and water inefficiencies

Activities	Resources Available
Night flow metering	Partially
Day flow metering	Yes
Reticulation leaks	Yes
Illegal connections	Yes
Un-metered connections	Yes

5.1.1.1 Night flow metering

The reservoir levels of the Swartland and Withoogte bulk water distribution systems and the outflows from these reservoirs are monitored and logged through the West Coast District Municipality's Scada system and the night flows are therefore also monitored at each of these reservoirs through the system.

The outflows for some of Swartland Municipality's internal reservoirs are logged through the Municipality's Scada System and the night flows are therefore also monitored to some extent at these reservoirs. The Municipality will start in the future with the logging of Minimum Night Flows (MNFs) for specific zones for the monitoring of the flows and pressures and the implementation of additional pressure management projects. Leak detection will be implemented in areas with high MNFs.

The difference between the theoretical and actual MNF is called "Excess night flow" and gives a good estimate of the physical water leakage in an area. The higher the excess flow the higher the expected water leakage.

5.1.1.2 Day flow metering

All bulk potable water supplied by the West Coast District Municipality to Swartland Municipality is metered and the raw water abstracted from Swartland Municipality's own water resources is also metered. The comprehensive set of bulk water meters enables Swartland Municipality to monitor their NRW and water losses accurately and to identify specific areas for the implementation of WDM activities in order to address the specific problems causing high NRW and water losses.

All new water connections are provided with water meters, once a customer apply for a new water connection. All water connections used for irrigation purposes at parks and public ablution facilities are also provided with water meters, in order to ensure that all connections are metered. Comprehensive pressure management zones are in place, which enable the Municipality to better monitor and manage their NRW and water losses.

5.1.1.3 Reticulation leaks

All leaks on the reticulation systems are repaired as soon as it is noticed or reported. Standby teams are also available over weekends and after hours to repair any possible leaks on the reticulation networks. The table below gives an overview of the number of pipe bursts repaired by Swartland Municipality over the last ten financial years.

Table 5.1.1.3.1: Number of pipe bursts repaired for the various water distribution systems

Reticulation leaks	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
Abbotsdale	6	3	6	10	12	10	6	10	3	5
Chatsworth	9	17	17	25	10	18	14	11	19	13
Darling	13	25	48	37	28	15	14	18	20	18
Kalbaskraal	4	6	18	21	25	11	8	8	7	6
Koringberg	3	8	2	6	1	1	-	1	1	1
Malmesbury	107	122	114	141	70	77	126	114	157	133
Moorreesburg	28	29	52	31	23	28	19	23	19	28
Farms	1	3	2	-	2	2	-	-	1	1
Ongegund (PPC)	7	4	7	4	6	4	5	3	6	4
Riebeek Kasteel	31	39	32	33	26	24	28	21	33	21
Riebeek Wes	25	13	22	22	23	33	14	13	20	17
Riverlands	22	29	13	25	18	19	19	32	24	42
Yzerfontein	7	5	9	11	10	18	5	9	7	1
Total	**263**	**303**	**342**	**366**	**254**	**260**	**258**	**263**	**317**	**290**

A pipeline replacement study was performed for Swartland Municipality's entire water distribution system. The project entailed the verification of system data, establishment of a computer model for the pipe replacement network, performing an analysis and reporting. The pipe replacement potential was determined for each of the pipelines in the water distribution systems by assessing the likelihood of failure (LF) and the consequence of failure (CF). The independent factors and their weight factors used are summarised in the tables below:

Table 5.1.1.3.2: The independent factors and the weight factors used to determine the pipe replacement potential

Likelihood of Failure Property	Weight	Weight (%)	Consequence of Failure Property	Weight	Weight (%)
Nominal diameter (mm)	20	19.0	High cost to consumer due to high water pressure (m)	2	3.0
Reserve water pressure ratio	10	9.5	High cost to consumer due to flow (l/s)	15	19.0
Catalogue remaining useful life (yr)	15	14.3	High repair cost due to pipe location	10	13.0
Master Plan Item	5	4.8	Flooding due to geography	5	6.0
Leakage volume (l/min/km)	10	9.5	Strategic location	20	26.0
Undesired material	20	19.0	Network redundancy (l/s)	10	13.0
Failure frequency (breaks/km/yr)	25	23.8	Pavement management system	15	19.0
		100.0			100.0

The total pipe replacement potential was calculated for each pipeline as an index.

PRP = LF x CF (In the range of 1 to 25)

The total length of the water supply network is approximately 418 km with an estimated replacement value of R543 400 000. The average condition of the water network can be rated as fair to poor. The pipe replacement requirement amounts to R59 434 766 over the next three (3) years and 30.84 km. This new calibrated and tested pipe failure model identifies with a single geographical view where pipe failures are most likely to occur. It is foreseen that this model will greatly assist the pipe replacement prioritization

process as it is completely based on a new scientific approach. By allocating funds to replacing those pipes most likely to fail in future, a limited budget can be spent effectively. The Municipality continued with their pipeline replacement programme during the last financial year.

The table below gives an overview of the length of water pipelines and the average head for the different water distribution zones.

Tables 5.1.1.3.3: Length and average head of water pipelines

System	Zone	Length (km)	Average Head
Bulk Water Pipelines			
Malmesbury	Malmesbury - Chatsworth Supply	4.750	50.05
	Malmesbury - Kalbaskraal Reservoir	0.029	4.29
	Malmesbury - Kleindam Reservoir	0.029	5.00
	Malmesbury - Kleindam to Kalbaskraal	18.232	43.72
	Malmesbury - Riverlands Supply	9.153	30.55
	Malmesbury - Wesbank Reservoir	0.348	7.25
	Malmesbury - Wesbank Spoelpype	0.016	21.47
	Malmesbury - Wesbank Tower	0.024	14.51
Moorreesburg	Moorreesburg - WCDM bulk PS	4.028	128.15
Riebeek Wes	Riebeek Wes - HL Reservoir	0.356	17.53
Swartland	Swartland - Glen Lilly reservoir	8.352	37.18
	Swartland - Kasteelberg reservoir	0.645	16.35
Withoogte	Withoogte - Moorreesburg PS	0.012	139.55
External Bulk Water Pipelines			
Swartland	Swartland - Darling town PS	0.933	57.99
	Swartland - Darling Yzerfontein PS	21.548	79.94
	Swartland - Glen Lilly reservoir	12.165	31.21
	Swartland - Gouda PS	6.842	70.72
	Swartland - Kamp reservoir	1.319	26.95
	Swartland - Kasteelberg reservoir	50.792	71.62
	Swartland - Malmesbury BPT	61.160	57.31
	Swartland - Rustfontein booster PS	8.719	27.59
	Swartland - Swavelberg booster PS	37.016	45.66
	Swartland - Voëlvlei PS	29.111	152.03
	Swartland - Voëlvlei WTP	0.060	2.03
	Swartland - Wildschutsvlei balancing reservoir	29.124	123.83
Withoogte	Withoogte - Byeneskop reservoir	25.235	97.14
	Withoogte - Misverstand dam	13.215	90.97
	Withoogte - Moorreesburg PS	7.767	153.04
	Withoogte - Withoogte reservoir	67.001	79.23
Reticulation Pipelines			
Darling	Darling Reservoir	20.715	41.26
	Darling Reservoir - Darling PRV	25.570	30.34
Koringberg	Koringberg - Koringberg PRV	4.936	29.27
	Koringberg - Koringberg Reservoir	5.417	38.60
Malmesbury	Malmesbury - Abbotsdale booster	0.497	35.54
	Malmesbury - Abbotsdale Reservoir	16.280	31.00
	Malmesbury - Chatsworth PRV1	25.333	53.79
	Malmesbury - Chatsworth PRV2	1.330	64.83
	Malmesbury - Chatsworth Reservoir	5.325	39.31

Tables 5.1.1.3.3: Length and average head of water pipelines

System	Zone	Length (km)	Average Head
	Malmesbury - Glen Lily Booster PS	1.304	58.27
	Malmesbury - Kalbaskraal Booster PS	8.659	44.71
	Malmesbury - Kalbaskraal Reservoir	0.131	4.78
	Malmesbury - Kleindam Reservoir	19.337	30.86
	Malmesbury - Kleindam to Kalbaskraal	0.017	4.97
	Malmesbury - Mount Royal Booster PS	1.692	38.17
	Malmesbury - Mount Royal Reservoir	3.545	55.64
	Malmesbury - Old Golf Course PRV	15.330	43.77
	Malmesbury - Old Golf Course Reservoir	1.135	21.79
	Malmesbury - Panorama Booster	0.051	41.82
	Malmesbury - Panorama Booster 1	1.587	46.85
	Malmesbury - Panorama Booster 2	9.383	65.18
	Malmesbury - Panorama Res PRV1	14.297	45.51
	Malmesbury - Panorama Res PRV2	4.143	43.31
	Malmesbury - Panorama Reservoir	5.894	30.95
	Malmesbury - Prison Reservoir	5.014	48.56
	Malmesbury - Riverlands PRV	5.782	38.09
	Malmesbury - Wesbank Reservoir	38.443	35.88
	Malmesbury - Wesbank Reservoir booster	9.863	31.50
	Malmesbury - Wesbank Tower	11.200	31.60
Moorreesburg	Moorreesburg - Moorreesburg Reservoir	42.384	50.19
	Moorreesburg - Moorreesburg PRV	26.114	35.11
Ongegund	Ongegund - PPC Factory Direct	1.202	39.32
	Ongegund - PPC Riebeek Wes Reservoir	6.160	45.10
Riebeek Kasteel	Riebeek Kasteel - Riebeek Kasteel PRV1	7.253	53.47
	Riebeek Kasteel - Riebeek Kasteel PRV2	2.821	45.17
	Riebeek Kasteel - Riebeek Kasteel PRV3	6.341	39.82
	Riebeek Kasteel - Riebeek Kasteel PRV4	0.177	24.55
	Riebeek Kasteel - Riebeek Kasteel Reservoir	6.494	45.35
Riebeek Wes	Riebeek Wes - HL Reservoir	5.993	53.18
	Riebeek Wes - LL Reservoir	15.314	47.25
Swartland	Swartland - Kasteelberg reservoir	0.006	14.71
Yzerfontein	Yzerfontein - Yzerfontein Booster	1.905	51.73
	Yzerfontein - Yzerfontein Reservoir	36.749	60.29
	Yzerfontein Reservoir	0.045	4.10
External Reticulation Pipelines			
Swartland	Swartland - Darling BPT	41.525	55.67
	Swartland - Darling Yzerfontein PS	0.022	31.74
	Swartland - Gouda PS	0.011	19.26
	Swartland - Kasteelberg reservoir	115.599	127.01
	Swartland - Riebeek Kasteel BPT	8.056	40.67
	Swartland - Voëlvlei PRVS	42.030	63.27
	Swartland - Wildschutsvlei balancing reservoir	0.011	64.85
Withoogte	Withoogte - Byeneskop BPT	26.584	60.34
	Withoogte - Byeneskop reservoir	105.068	87.70
	Withoogte - Koringberg BPT	14.221	34.38
	Withoogte - Koringberg reservoir	15.576	112.34
	Withoogte - WBK line PRV 1	9.738	80.47

Tables 5.1.1.3.3: Length and average head of water pipelines			
System	**Zone**	**Length (km)**	**Average Head**
	Withoogte - WBK line PRV 2	42.732	77.89
	Withoogte - Withoogte reservoir	95.088	75.88

Average Head: 0m - 30m; 31m – 60m; 61m – 90m; > 90m

5.1.1.4 Illegal connections

The Swift Analyses of 2018 assisted Swartland Municipality with the identification of potential illegal connections. The table below gives an overview of the occupied stands in the treasury data with a water meter, but with zero demand (2018 Swift Analysis).

Table 5.1.1.4.1: Number of occupied stands in the treasury data with a water meter, but with zero demand	
System	**Number of occupied erven in treasury data with a water meter, but with zero demand**
Koringberg	8
Ongegund	-
Riebeek Wes	9
Riebeek Kasteel	6
Yzerfontein	13
Darling	20
Moorreesburg	16
Malmesbury	67
Kalbaskraal	5
Abbotsdale	7
Chatsworth	41
Riverlands	1
Farms	0
Total	**193**

The above occupied erven with a water meter, but with zero demand, need to be investigated. All illegal connections need to be formalised immediately by Swartland Municipality once noticed. A set of Water Services Bylaws is also in place, which support the Municipality in their effort to prevent any unauthorised connections to their water supply systems.

The Municipality also make use of their monthly billed metered consumption data from their Finance Department to identify all erven with no water usage, in order to identify potential illegal connections.

5.1.1.5 Un-metered connections

All un-metered consumer connections are immediately supplied with water meters and formalised once noticed by Swartland Municipality. The table below gives an overview of the occupied stands in the treasury data without a water meter (2018 Swift Analysis).

Table 5.1.1.5.1: Number of occupied stands in treasury data without a water meter.

System	Number of Occupied Erven in Treasury Data without a Water Meter
Koringberg	9
Ongegund	1
Riebeek Wes	65
Riebeek Kasteel	22
Yzerfontein	70
Darling	39
Moorreesburg	170
Malmesbury	88
Kalbaskraal	55
Abbotsdale	41
Chatsworth	88
Riverlands	15
Farms	255
Total	**918**

The occupied erven in the above table need to be investigated and water meters need to be installed for all the unmetered erven.

5.1.2 Leak and Meter Repair Programmes

Swartland Municipality monitors the water usage of their consumers on a monthly basis through their billed metered consumption data.

In potable water distribution systems, the main component of water losses which is of concern is Unaccounted-for-Water, which can be categorised into real and apparent losses. Real losses include leakage, pipe bursts, flushing, overflows, etc., while apparent losses are inaccurate measurements and the inaccurate reading of meters. It is not possible to effectively manage real losses until steps have been taken to manage the non-physical losses, as inaccurate measurements create a “garbage in – garbage out” scenario, and can result incorrect actions being taken to curb the real losses.

Meter error is often thought to be the main cause of apparent losses (Often referred to as non-physical or paper losses) in a water system and can be due to wear and tear, incorrect meter installation, lack of maintenance, incorrect meter type or incorrect sizing. Another contribution to apparent losses in South Africa and other developing countries is theft or illegal connections. In addition to blatant theft, many accounts go unnoticed in the system. The table below gives a summary of the suggested apparent loss percentages for a typical system.

Table 5.1.2.1: Suggested apparent loss percentages for a typical distribution system

Meter age and accuracy	Good Water Quality	Poor Water Quality
Poor > 10 years	8%	10%
Average 5 – 10 years	4%	8%
Good < 5 years	2%	4%

Table 5.1.2.1: Suggested apparent loss percentages for a typical distribution system		
Meter age and accuracy	**Good Water Quality**	**Poor Water Quality**
Illegal connections		
Very high		10%
High		8%
Average		6%
Low		4%
Very low		2%
Data Transfer		
Very poor		9%
Poor		7%
Average		5%
Good		3%
Very good		1%

Table 5.1.2.2: Resources available to perform leak and meter repair programmes	
Activities	**Resources Available**
Leak repair assistance programme	Partially
Retro-fitting of water inefficient toilets	Partially
Meter repair programme	Yes

5.1.2.1 Leak Repair Assistance Programme

WSAs should prioritise assistance programmes in the low income and informal areas. Such assistance programmes should include a number of measures that will ensure efficient water usage and build trust between the consumers and the WSA. Houses in the low income and informal areas are not always adequately maintained, which often result in significant plumbing leaks and the consumers do not always have the funds or knowledge to fix the leaks themselves or to purchase water efficient devices.

Swartland Municipality is not yet focusing on Assistance Programmes in the low income areas and properties occupied or owned by indigent households, due to a lack of human and financial resources to implement these Assistance Programmes.

5.1.2.2 Retro-fitting of Water Inefficient Toilets

It is a common problem in South Africa that many buildings have high internal plumbing leakage and that water in-efficient devices are still being used in the ablution facilities. One of the key contributors to water wastage in public buildings is tip-tray urinals. These urinals flush continuously and can be retrofitted with a push button flush mechanisms, which will only flush when activated by a user.

The automatically flushing urinals in most of the Municipal buildings were already replaced with manually operated push button systems. Swartland Municipality has investigated the possibility to replace all existing star pillar taps in all public ablution facilities throughout its whole jurisdiction and is considering committing to this proposal by including the replacement costs in its budget for the coming financial years. It should be noted that the replacement of taps will be done over a five-year period to allow Municipal staff capacity to execute the task themselves. No flow restrictors were installed during the last three financial years.

5.1.2.3 Meter Repair Programme

The installation of meters enables Swartland Municipality to monitor and control the provision of services and to ensure that the services delivered are sustainable. The following is ensured by the installation of meters.

- For consumers to be accountable and take responsibility for the water they use.
- Calculation of real water losses and that WC/WDM measures can be implemented.
- That a free basic water policy can be implemented.

Monthly statistics are available with regard to the number of meters installed, replaced, repaired and tested. It is important for the Municipality to continue to keep monthly records of the work done on the water meters per system.

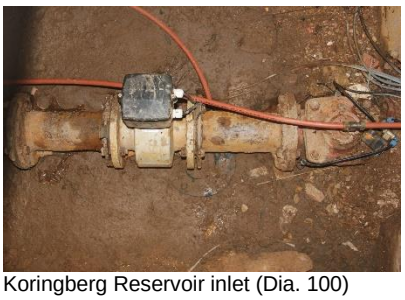
Bulk water meters are in place to effectively monitor the NRW and water losses for all the water distribution systems. The table below gives an overview of the bulk water meters on the bulk water pipelines and at the various reservoirs, water pump stations and WTWs as visited during the WSDP site visits.

Table 5.1.2.3.1: Bulk water meters on the bulk water pipelines and at the various reservoirs, water pump stations and WTWs

System Component	Bulk Water Meter (Position)	Make of Meter	Model	Factor	Condition of Meter
Koringberg					
Koringberg Reservoir	100mm dia. bulk meter on inlet to reservoirs	Siemens	Magflo MAG5100W	m³	Operational
Ongegund					
Ongegund Reservoir	150mm dia. bulk meter on outlet of reservoir	Sensus	MeiStream150	X10 m³	Operational
Riebeek Wes					
Riebeek Wes PS	80mm dia. bulk meter inside PS for supply to HL reservoirs	Siemens	Magflo MAG5100W	m³	Operational
Riebeek Wes HL reservoir	100mm dia. bulk meter	Siemens	Magflo MAG5100W	m³	Operational
Riebeek Wes LL reservoir	150mm dia. bulk meter on outlet for supply from LL reservoir	Siemens	Magflo MAG5100W	m³	Operational
In Road	100mm dia. bulk meter on inlet for supply to LL reservoir	Sensus	WPD 100	m³	Operational
Riebeek Kasteel					
Riebeek Kasteel Reservoirs	150mm dia. meter on outlet (from old reservoir)	Siemens	Magflo MAG5100W	m³	Operational
	150mm dia. meter on inlet of reservoirs	Endress and Hauser	Promag 53W	m³	Operational
	250mm dia. meter on outlet of reservoirs	Siemens	Magflo MAG5100W	m³	Operational
Yzerfontein					
Yzerfontein Reservoirs	200mm dia. meter on outlet of reservoirs	Siemens	Magflo MAG5100W	m³	Operational
Moorreesburg					
Booster PS	200mm dia. bulk meter at booster PS	Endress and Hauser	Promag 10W	m³	Operational
On network near reservoirs	150mm dia. bulk meter for supply from Swartland bulk scheme to Moorreesburg reservoirs	Sensus	WP-Dynamic 150	x10 m³	Operational
Moorreesburg reservoirs	150mm dia. bulk meter on outlet of reservoirs	Siemens	Magflo MAG5100W	m³	Operational
	200mm dia. bulk meter on outlet of reservoirs	Siemens	Magflo MAG5100W	m³	Operational
Abbotsdale					
Abbotsdale Booster PS	100mm dia. bulk meter at Booster PS	Siemens	Magflo MAG5100W	m³	Operational
Abbotsdale Reservoir	200mm dia. bulk meter on outlet of reservoirs	Siemens	Magflo MAG6000	m³	Operational
Abbotsdale bulk PS	100mm dia. bulk meter at Bulk PS	Sensus	WP-Dynamic 100	m³	Operational
Highlands Supply PS	Bulk meter at Highlands Supply PS	Unknown	Unknown	m³	Faulty
Kalbaskraal					
Kalbaskraal PS	100mm dia. bulk meter at PS for supply to Riverlands/Chatsworth	Sensus	WP-Dynamic 100	m³	Operational
Kalbaskraal Booster PS	Bulk meter at Booster PS for supply to Kalbaskraal	Siemens	Magflo MAG6000	m³	Operational
Riverlands and Chatsworth					

Table 5.1.2.3.1: Bulk water meters on the bulk water pipelines and at the various reservoirs, water pump stations and WTWs

System Component	Bulk Water Meter (Position)	Make of Meter	Model	Factor	Condition of Meter
Riverlands PS	150mm dia. bulk meter for supply to Chatsworth reservoirs PS	Safmag	150DB4	m³	Operational
Boreholes	Three 80mm dia. bulk meters for BHs No.1, 2 and 3	Sensus	MeiStream 80	m³	Operational
At Riverlands PS Sump	150mm dia. bulk meter for supply from Kalbaskraal	Sensus	WP Dynamic 150	x10 m³	Operational
Chatsworth Reservoirs	350mm dia. bulk meter on outlet of reservoir	Siemens	Magflo MAG6000	m³	Operational
	200mm dia. bulk meter on outlet of reservoir	Siemens	Magflo MAG6000	m³	Operational
Malmesbury					
Mount Royal Reservoir	Inlet of Mount Royal Reservoir	Sensus	WPD 150	Unknown	Operational
Mount Royal Booster PS	Mount Royal Booster PS	Endress and Hauser	Unknown	m³	Operational
Panorama Reservoir	150mm dia. bulk meter on Panorama reservoir inlet	Siemens	Magflo MAG5100W	m³	Operational
	200mm dia. bulk meter on Panorama reservoir outlet	Siemens	Magflo MAG5100W	m³	Operational
	200mm dia. bulk meter on Panorama reservoir outlet	Siemens	Magflo MAG5100W	m³	Operational
Tafelsig PS	150mm dia. Tafelsig Booster PS bulk meter	Endress and Hauser	Promag W	m³	Operational
Panorama Booster PS	150mm dia. Panorama Booster PS bulk meter	Siemens	Magflo MAG5000	m³	Operational
Old Golf Course Reservoir	150mm dia. bulk meter on Old Golf Course reservoir inlet	Meinecke	WPD 150	Unknown	Operational
	300mm dia. bulk meter on Old Golf Course reservoir outlet	Siemens	Magflo MAG5100W	m³	Display not functioning
Paardenberg WTW	Bulk meter at Paardenberg WTW	Mobrey	MCU900	m³	Operational
Tronk Reservoir	150mm dia. bulk meter on inlet (supply from Glen Lilly)	Siemens	MAG8000	m³	Display not functioning
	50mm dia. bulk meter on outlet (small holdings)	Sensus	MeiStream50	m³	Operational
	150mm dia. and 40mm dia. bulk meters on outlet (main)	Huile Africa	LXF-150E	m³	Operational
Wesbank Reservoir	350mm dia. bulk meter on outlet (to Saamstaan)	Siemens	Magflo MAG5100W	m³	Operational
	300mm dia. bulk meter on outlet (to De Hoop & Phola Park)	Siemens	Magflo MAG5100W	m³	Operational
	150mm dia. bulk meter on outlet (from Tower)	Siemens	Magflo MAG5100W	m³	Operational
	300mm dia. bulk meter on outlet (supply to high lying Wesbank area)	Siemens	Magflo MAG5100W	m³	Operational
Kleindam Reservoirs	150mm dia. bulk meter Inlet No.1 (from Klipkop)	Siemens	Magflo MAG5100W	m³	Operational
	200mm dia. bulk meter Inlet No.2 (from Klipkop)	Siemens	Magflo MAG5100W	m³	Operational
	200mm dia. bulk meter inlet (from Old Golf Course reservoir)	Siemens	Magflo MAG5100W	m³	Operational
	250mm dia bulk meter on outlet (supply to Kalbaskraal)	Siemens	Magflo MAG5100W	m³	Operational
	150mm dia. bulk meter on outlet (supply to Malmesbury)	Siemens	Magflo MAG5100W	m³	Operational
	200mm dia. bulk meter on outlet (supply to Malmesbury)	Siemens	Magflo MAG5100W	m³	Operational
Swartland Bulk Supply					
Swartland WTW	Raw water flow meter	Siemens	Unknown	m³	Operational
	Final water flow meter for supply to Kasteelberg Reservoirs	Endress and Hauser	Unknown	m³	Operational
Swavelberg Booster PS	Flow meter at Swavelberg Booster PS	Endress and Hauser	Unknown	m³	Operational
Rustfontein Booster PS	Flow meter at Rustfontein Booster PS	Safmag	Unknown	m³	Operational
Glen Lilly Reservoirs	Flow meter at Glen Lilly Reservoirs	Siemens	Unknown	m³	Operational
Darling PS	Flow meter at Darling PS	Endress and Hauser	Unknown	m³	Operational
Yzerfontein PS	Flow meter at Yzerfontein PS	Endress and Hauser	Unknown	m³	Operational
Withoogte Bulk Supply					
Moorreesburg PS	Flow meter at Moorreesburg PS	Endress and Hauser	Unknown	m³	Operational


Koringberg Reservoir inlet (Dia. 100)


Ongegund Reservoir outlet (Dia. 150)


Riebeek Wes PS (80 dia.)


Riebeek Wes LL Reservoir (Dia. 150)


Riebeek Wes supply (Dia. 100)


Riebeek Kasteel Reservoirs meter


Riebeek Kasteel Reservoirs Inlet (Dia. 150)


Riebeek Kasteel Reservoirs Outlfow (Dia. 250)


Yzerfontein Reservoirs (Dia. 200)


Moorreesburg Booster PS (Dia. 200)


Moorreesburg supply (Dia. 150)


Abbotsdale Booster PS (Dia. 100)


Abbotsdale Reservoirs outlet (Dia. 200)


Abbotsdale Bulk PS (Dia. 100)


Kalbaskraal: Riverlands/Chatsworth Supply PS (Dia. 100)


Kalbaskraal Booster PS


Riverlands BH meters (Dia. 80)


Riverlands to Chatsworth Reservoirs PS (Dia. 150)


Supply from Kalbaskraal (Dia. 150)


Chatsworth Reservoir outlet (Dia 350)


Chatsworth Reservoir outlet (Dia 200)

Malmesbury Mount Royal Booster PS


Malmesbury Panorama Reservoir (Dia 200)


Malmesbury Panorama Reservoir (Dia 200)


Tafelsig Booster PS (Dia. 150)


Panorama Booster PS (Dia. 150)

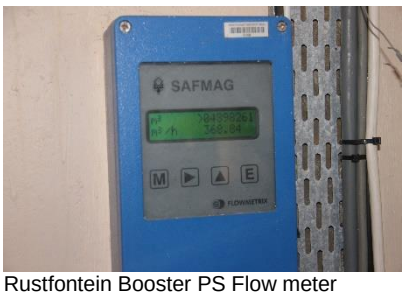

Old Golf Course reservoir (300 dia.)


Paardenberg WTW


Kleindam Reservoirs meters (Six)

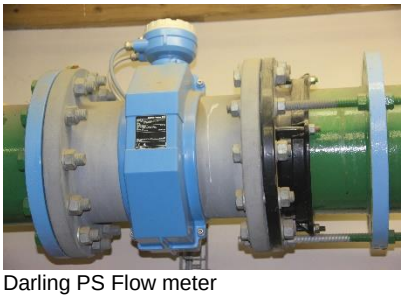

Kasteelberg Reservoirs at Swartland WTW

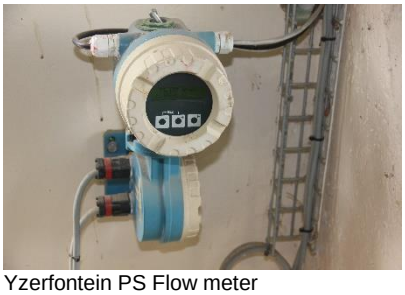

Swavelberg Booster PS Flow meter

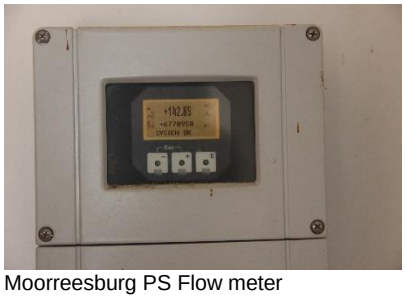


Rustfontein Booster PS Flow meter


Glen Lily Reservoirs Flow meter


Darling PS Flow meter


Yzerfontein PS Flow meter


Moorreesburg PS Flow meter

The main reasons for inaccuracy are incorrect selection, incorrect sizing, incorrect installation, incorrect reading and lack of maintenance. It is important for Swartland Municipality to continue with the implementation of their Meter Replacement Programme, whereby all faulty and leaking meters are replace / repaired immediately and all consumer water meters older than eight (8) years are replaced systematically, as funding becomes available.

5.1.3 Consumer / End-use Demand Management: Public Information and Education Programmes

There are a number of ways of ensuring the reduction of water demand by consumers. These can generally be divided into two categories. The first is to influence the behaviour of consumers and the second is through the implementation of assistance projects.

Assistance projects are interventions of best management practices, which are funded or partially funded by WSAs. Examples include projects to repair plumbing leaks, to retrofit dual-flush toilets, installation of dual water distribution systems and to replace exotic gardens with alternative water wise gardens.

More efficient use can also be made through recycling of water. This can be to different standards depending on what it will be used for. For example, consumers can be encouraged to use grey water, i.e. bath, shower, etc. for watering of their gardens.

Basic service must include an education component. Many water and sanitation projects carried out by Municipalities have lacked this important aspect in the past and this need to be addressed.

Education programmes could include information on:

- Sanitation promotion.
- Sources of water pollution (e.g. sewage with specific reference to downstream users of rivers and groundwater sources).
- Dangers of people using water from polluted rivers, boreholes or wells.
- Waterborne diseases.

- Health and hygiene awareness including initiatives to reduce waterborne diseases, such as hand washing.
- The need to conserve water and use it efficiently.

There are a number of different methods in which these messages can be distributed and thought should be given to which groups will be targeted, possible health messages, communication methods, roles of different institutions, timeframes, who will carry it out and how skills will be transferred.

These methods include:

- Public meetings, workshops and seminars;
- Notices on billboards, shopping centres and washrooms;
- Competitions;
- Development and distribution of leaflets, fliers and posters;
- Distribution of small gadgets and stickers;
- Radio/newspaper slots and press releases; or
- Household visits by health officials

Specific numbers of consumers targeted by Swartland Municipality for awareness and education are not defined. All low income housing developments are however targeted for education, once water services were installed.

One of the key elements of a sustainable WC/WDM strategy is to develop and promote activities that are also beneficial to consumers. WSAs are encouraged to adopt a “win-win” approach and not introduce punitive measures unless they have to. One of the most effective ways to encourage consumers to use water more efficiently is through tariff mechanisms.

Table 5.1.3.1: Resources available to perform Consumer / End-use Demand Management

Activities	Resources Available
Schools targeted by education programmes	Yes
Consumers targeted by public information programmes	Yes

5.1.3.1 Schools Targeted by Education Programmes

The schools in Swartland Municipality’s Management Area are not yet targeted with awareness around water education programmes and water conservation. The following can be included in Swartland Municipality’s WDM Strategy with regard to a WDM programme for the schools.

- Meter water use at all the schools and ensure that schools are recorded in the treasury system under a unique customer code to enable future analysis of this consumer category.

- Urinals: Tip tray flush mechanisms on urinals are widely recognised as a major source of water wastage in schools. Therefore, automatically flushing urinals should be replaced with manually operated push button systems.

- Toilet pans: Particularly as the number of toilets available in many schools is limited, pans should be inspected and broken pans and cracked pans should be replaced.

- Toilet cisterns: All the existing toilet cisterns flush volume should be recorded in a detailed study and those with a capacity of more than 13 litres per flush should be removed and replaced with modern cisterns having a 6 litre flush volume, or with 6 / 4.5 dual flush mechanisms.

- Taps: All existing conventional taps and non-SABS push taps should be replaced by SABS-approved push button taps that close automatically as soon as the pupil releases the button.
- Inspection of taps for leaks: Where leaking is noted at the head the taps should be serviced through replacement of the tap head assembly or replacement or tightening of the graphite seal.
- Pipework: Underground piping on the property should be repaired where leaks are detected.
- Municipal water meters: All the municipal meters should be inspected and those found to be faulty or inoperative should be repaired or replaced.
- Schools could be encouraged to reuse wastewater for irrigation of sports fields and / or to use borehole water for this purpose instead of potable water from the Municipal supply system.

Water saving by schools often forms the basis of WDM programmes elsewhere, because it also involves learners who experience implementation of WDM measures first hand. Schools should be encouraged to make WDM programmes part of a long term project, where learners should be actively involved. The schools WDM programme should receive high priority.

5.1.3.2 Consumers Targeted by Public Information Programmes

Swartland Municipality realises the importance of good communication with the public and involving community members on a regular basis. Community members are made aware of safe handling of water, hygienic sanitation practices and how to conserve and not misuse water. Good communication ensures consumer trust and confidence.

Total transparency is therefore one of the main objectives when public notifications are distributed by Swartland Municipality. High on the list of priorities in these communications, mostly through newsletters, is how to conserve water and reduce any wastage.

5.1.4 Conjunctive Use of Surface- and Groundwater

Water can be conserved by integrating the management of surface – and groundwater. This can be contained, by minimising groundwater abstraction during periods of excess surface water (i.e. resting the aquifers), or by artificially recharging aquifers whenever possible. Storing water in aquifers could, for example, minimise evaporation from dams, or provide a means to re-use treated wastewater.

Table 5.1.4.1: Conjunctive use of surface and groundwater

Source	Number of Settlements
Ground Water	-
Surface Water	Koringberg, Moorreesburg, Malmesbury, Darling, Yzerfontein, Riebeek Kasteel, Riebeek Wes, Ongegund, Abbotsdale and Kalbaskraal
Conjunctive Use	Riverlands and Chatsworth
Artificial Recharge	-
Rain Water Harvesting	-

5.1.5 Working for Water

One of the key environmental impacts on surface water resources is the invasion of the natural vegetation on river banks by alien vegetation which transpires excessive water volumes. The DWS has initiated the Working for Water Programme to eradicate alien vegetation from rivers and streams and thereby conserve water resources for the in-stream environmental reserve and other priority use. The programme also aims to free clogged river channels to reduce the effect of floods. **There are currently no Working for Water projects implemented by Swartland Municipality.**

5.1.6 Water Resource Management Projects

Most of the current WC/WDM initiatives are implemented by Swartland Municipality through their operational budget, for example the repair of pipe bursts, etc. The only funding support available to Municipalities for WC/WDM initiatives from National and Provincial Government is through the WSIG. The funding is however very limited for the Western Cape and therefore Swartland Municipality funds most of their WDM initiatives through their own operational and capital budgets.

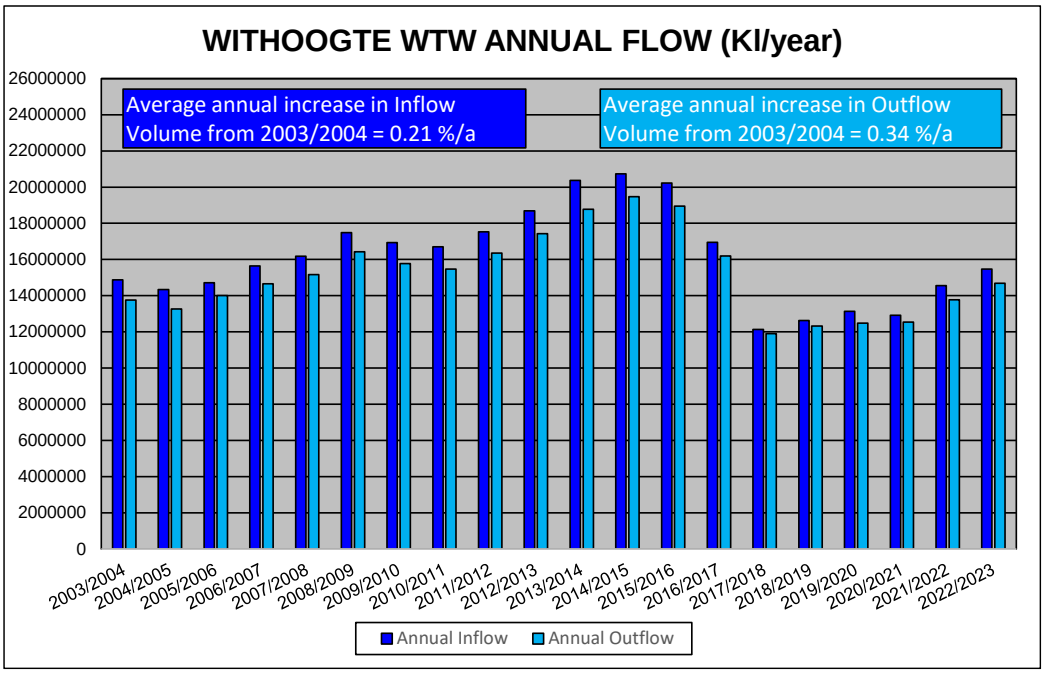
The table below gives an overview of the WC/WDM projects included in the 2022/2023 approved Capital Budget.

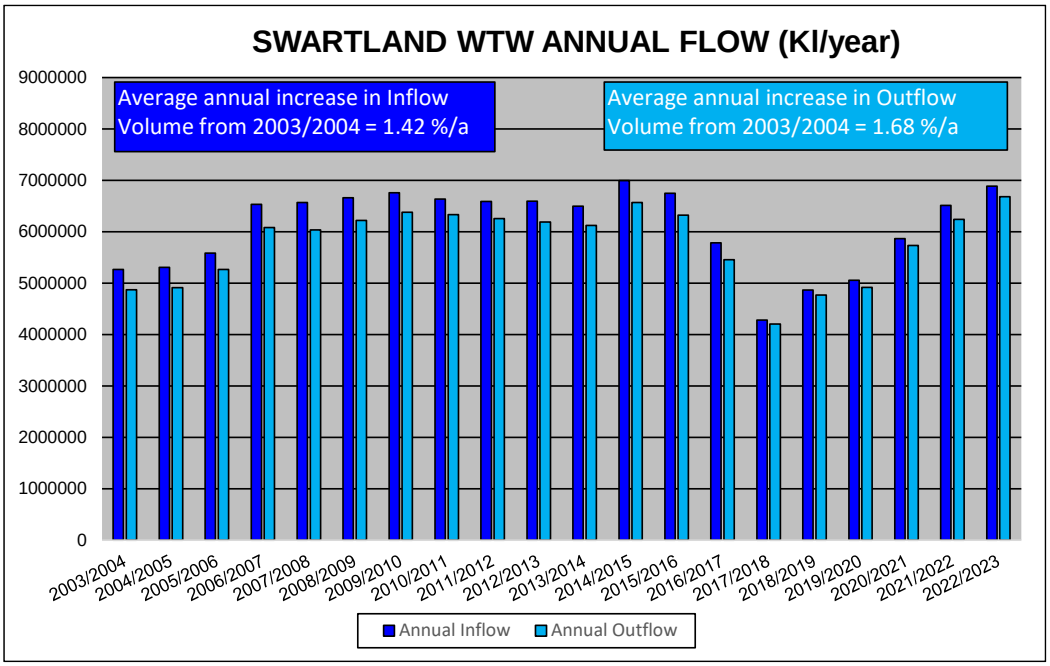
Table 5.1.6.1: Water resource management projects (WC/WDM)

Project name	2023/2024	2024/2025	2025/2026
Water networks: Upgrades and Replacement (CRR)	R2 000 000	R2 000 000	R4 000 000
Upgrading of water reticulation network, PRVs, etc.	R100 000	R200 000	R800 000
Bulk water infrastructure (Emergency spending)	R2 000 000	R500 000	R700 000
Connections: Water meters (new / replacements)	R797 216	R940 993	R1 035 092

5.2 WATER BALANCE

By undertaking a water balance, WSAs can calculate the amount of water that is being lost to their systems. The NRW provides an indicator of how efficient the water supply system is being run and provides information to the WSA on how to improve the system. NRW is a direct loss to the WSA. The two graphs below provide an overview of the historical raw water volumes and system input volumes for the two bulk water distribution systems managed by the West Coast District Municipality. The Withoogte WTW also supply potable water to Saldanha Bay Municipality and Bergrivier Municipality.





The tables below give an overview of the volume of water supplied by the West Coast District Municipality through the Withoogte and Swartland bulk water schemes, the treatment losses at the Withoogte WTW and the Swartland WTW and the bulk water distribution losses for the two bulk schemes.

Table 5.2.1: Volume of water supplied by the West Coast District Municipality (Ml/a)

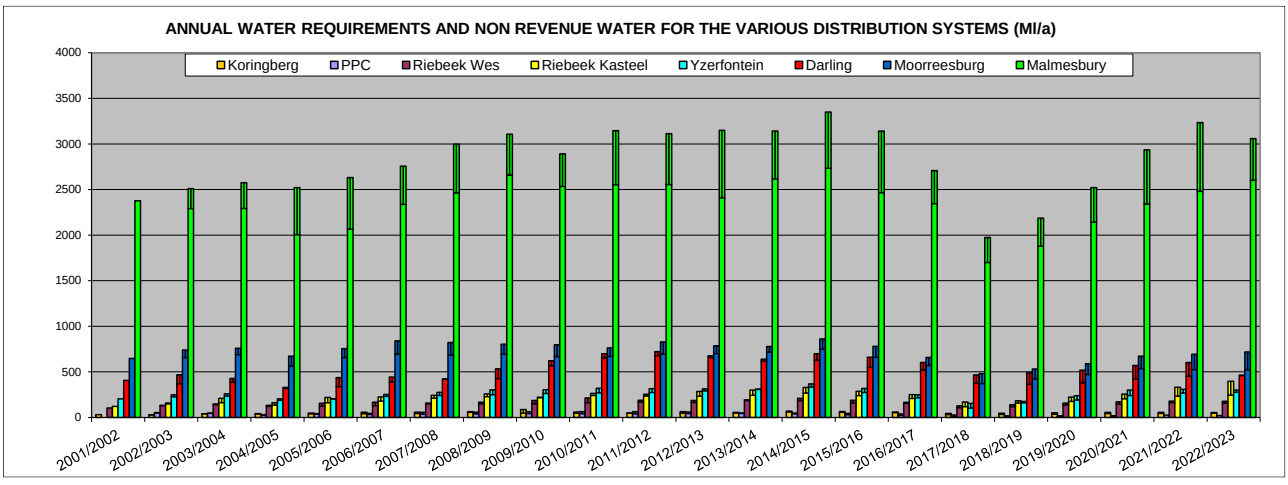
Year	Raw Water			Treated Water (System Input Volume)		Billed Metered Consumption		Totals		
	WH	LOG	SL	WH	SL	WH	SL	Raw	Treated	Billed
2003/2004	14 874.980	867.392	5 267.300	13 759.357	4 872.253	14 349.383	4 613.652	21 009.672	19 499.001	18 963.035
2004/2005	14 340.236	1 279.771	5 310.791	13 264.718	4 912.482	13 373.190	4 416.873	20 930.798	19 456.971	17 790.063
2005/2006	14 709.035	1 241.188	5 587.953	13 997.380	5 270.022	14 630.476	4 728.972	21 538.176	20 508.590	19 359.448
2006/2007	15 645.447	1 162.414	6 536.925	14 652.629	6 084.440	15 633.075	5 163.068	23 344.786	21 899.483	20 796.143
2007/2008	16 179.454	1 014.826	6 572.601	15 163.558	6 035.104	15 826.004	5 336.768	23 766.881	22 213.488	21 162.772
2008/2009	17 487.890	436.312	6 661.635	16 425.249	6 221.938	16 067.399	5 722.786	24 585.837	23 083.499	21 790.185
2009/2010	16 932.258	621.476	6 761.867	15 768.546	6 379.743	16 471.427	5 605.095	24 315.601	22 769.765	22 076.522
2010/2011	16 705.674	972.433	6 636.187	15 469.275	6 336.233	15 657.437	5 838.737	24 314.294	22 777.941	21 496.174
2011/2012	17 525.046	1 088.030	6 592.732	16 347.850	6 256.296	16 622.986	5 867.488	25 205.808	23 692.176	22 490.474
2012/2013	18 692.770	931.778	6 595.709	17 429.487	6 189.326	17 569.427	5 759.405	26 220.257	24 550.591	23 328.832
2013/2014	20 363.425	0.000	6 497.447	18 772.020	6 124.786	18 116.985	5 545.097	26 860.872	24 896.806	23 662.082
2014/2015	20 738.318	0.000	6 993.623	19 473.750	6 572.495	18 082.462	6 128.899	27 731.941	26 046.245	24 211.361
2015/2016	20 230.454	583.318	6 749.603	18 955.808	6 326.667	17 738.149	5 992.835	27 563.375	25 865.793	23 730.984
2016/2017	16 952.798	928.765	5 784.056	16 196.973	5 455.098	16 854.138	5 122.162	23 665.619	22 580.836	21 976.300
2017/2018	12 129.606	1 055.105	4 282.906	11 898.399	4 208.092	12 614.429	3 783.008	17 467.617	17 161.596	16 397.437
2018/2019	12 626.990	412.341	4 866.029	12 320.023	4 770.391	12 410.194	4 384.439	17 905.360	17 502.755	16 794.633
2019/2020	13 127.882	118.869	5 056.347	12 480.771	4 920.110	12 526.147	4 623.505	18 303.098	17 519.750	17 149.652
2020/2021	12 918.000	170.146	5 866.143	12 534.000	5 732.805	12 792.298	5 190.546	18 954.289	18 436.951	17 982.844
2021/2022	14 560.000	224.112	6 515.111	13 774.000	6 241.020	12 712.535	5 812.752	21 299.223	20 239.132	18 525.287
2022/2023	15 468.000	408.965	6 887.064	14 688.000	6 682.462	13 902.486	5 687.547	22 764.029	21 779.427	19 590.033

Table 5.2.2: Treatment and distribution losses for the Withoogte and Swartland bulk water schemes

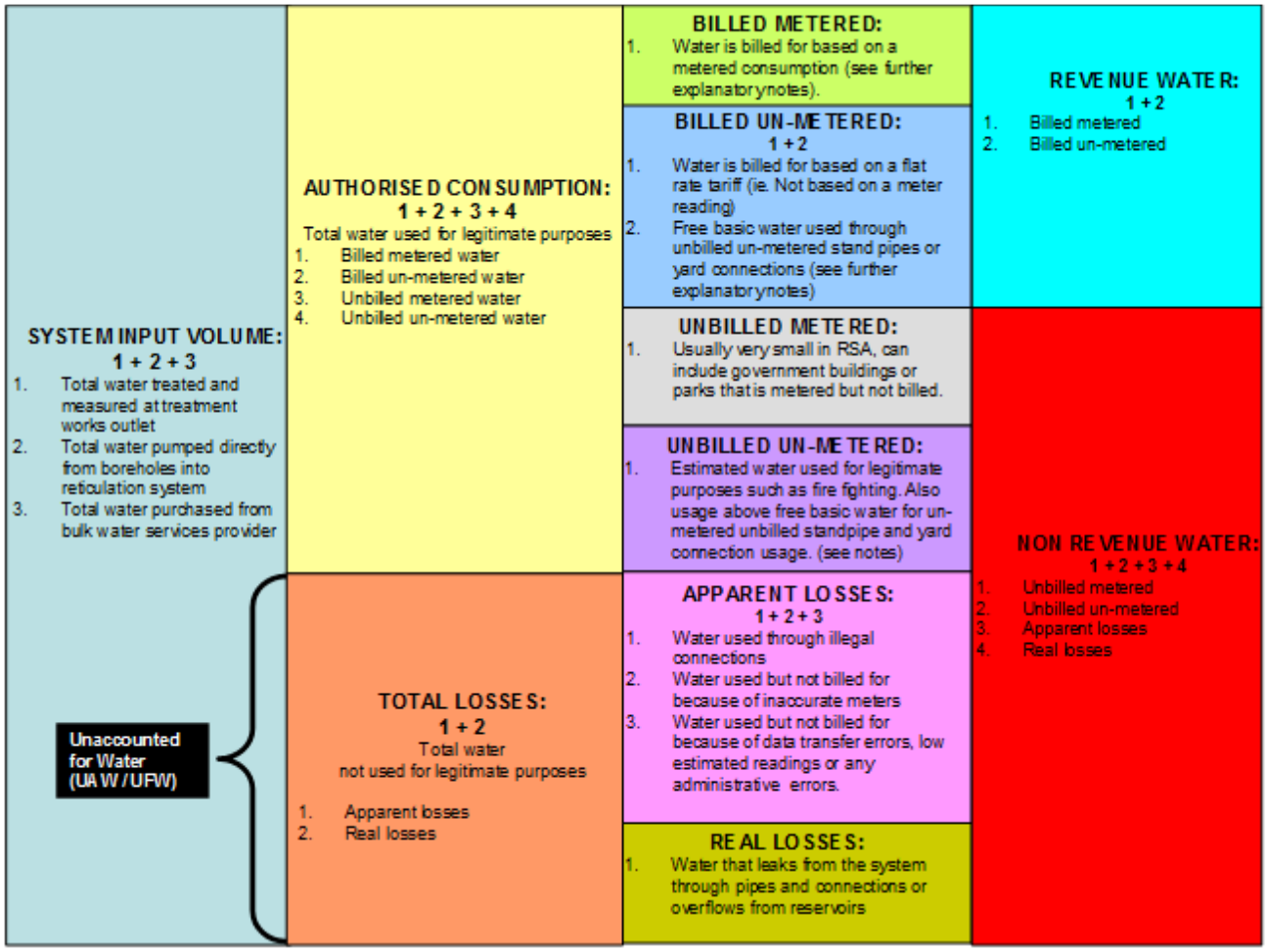
Year	Purification				Distribution				Totals			
	WH		SL		WH		SL		Purification		Distribution	
	Ml	%	Ml	%	Ml	%	Ml	%	Ml	%	Ml	%
2003/2004	1 115.623	7.50	395.047	7.50	277.366	1.90	258.601	5.31	1 510.670	7.19	535.967	2.75
2004/2005	1 075.518	7.50	398.309	7.50	1 171.299	8.05	495.609	10.09	1 473.827	7.04	1 666.908	8.57
2005/2006	711.655	4.84	317.931	5.69	608.092	3.99	541.050	10.27	1 029.586	4.78	1 149.142	5.60
2006/2007	992.818	6.35	452.485	6.92	181.968	1.15	921.372	15.14	1 445.303	6.19	1 103.340	5.04
2007/2008	1 015.896	6.28	537.497	8.18	352.380	2.18	698.336	11.57	1 553.393	6.54	1 050.716	4.73
2008/2009	1 062.641	6.08	439.697	6.60	794.162	4.71	499.152	8.02	1 502.338	6.11	1 293.314	5.60
2009/2010	1 163.712	6.87	382.124	5.65	-81.405	-0.50	774.648	12.14	1 545.836	6.36	693.243	3.04
2010/2011	1 236.399	7.40	299.954	4.52	784.271	4.77	497.496	7.85	1 536.353	6.32	1 281.767	5.63
2011/2012	1 177.196	6.72	336.436	5.10	812.894	4.66	388.808	6.21	1 513.632	6.01	1 201.702	5.07
2012/2013	1 263.283	6.76	406.383	6.16	791.838	4.31	429.921	6.95	1 669.666	6.37	1 221.759	4.98
2013/2014	1 591.405	7.82	372.661	5.74	655.035	3.49	579.689	9.46	1 964.066	7.31	1 234.724	4.96
2014/2015	1 264.568	6.10	421.128	6.02	1 391.288	7.14	443.596	6.75	1 685.696	6.08	1 834.884	7.04
2015/2016	1 274.646	6.30	422.936	6.27	1 800.977	9.22	333.832	5.28	1 697.582	6.16	2 134.809	8.25
2016/2017	755.825	4.46	328.958	5.69	271.600	1.59	332.936	6.10	1 084.783	4.58	604.536	2.68
2017/2018	231.207	1.91	74.814	1.75	339.075	2.62	425.084	10.10	306.021	1.75	764.159	4.45
2018/2019	306.967	2.43	95.638	1.97	322.170	2.53	385.952	8.09	402.605	2.25	708.122	4.05
2019/2020	647.111	4.93	136.237	2.69	73.493	0.58	296.605	6.03	783.348	4.28	370.098	2.11
2020/2021	384.000	2.97	133.338	2.27	-88.152	-0.70	542.259	9.46	517.338	2.73	454.107	2.46
2021/2022	786.000	5.40	274.091	4.21	1 285.577	9.18	428.268	6.86	1 060.091	4.98	1 713.845	8.47
2022/2023	780.000	5.04	204.602	2.97	1 194.479	7.91	994.915	14.89	984.602	4.33	2 189.394	10.1

The treatment losses at both the Withoogte WTW and the Swartland WTW were less than 5.5% for the last five financial years, which is excellent. The bulk water distribution losses for the last five financial years for the Withoogte system were less than 9.2% and for the Swartland system it were between 6% and 14.89%. The treatment losses for the two systems combined were less than 5% for the last five financial years, which is excellent. The bulk distribution losses for the two systems combined increased from below 4.2% over the financial years 2017/2018 to 2020/2021 to 8.47% and 10.1% for the last two financial years respectively.

The graph below gives a summary of the System Input Volume and the NRW for the various internal water distribution systems in Swartland Municipality's Management Area.



The various sections that make up the water balance are presented on the diagram below and are also described in the text below.



TOTAL INFLUENT OF WATER TO WATER TREATMENT PLANTS

The total influent to water treatment plants (5) are the sum of the following:

- The volume of surface water purchased from others (1),
- Plus the volume of surface water abstracted (2),
- Plus the volume of groundwater abstracted (3),
- Plus the volume of water recycled from waste water treatment plants (14),
- Minus the volume of raw water supplied/sold (4).

The total volume of water received at the water treatment plants are generally referred to as the raw water input into the system.

SYSTEM INPUT VOLUME

The system input volume (SIV) is the total volume of potable water entering the distribution system for consumption by consumers. It is the sum of the following:

- Total volume of treated water from the water treatment plants (6). The difference between the input and output of the water treatments plants are referred to as treatment losses,
- Minus the volume of treated water supplied/sold to others (6A),
- Plus the volume of treated water purchased (7),
- Plus the volume of untreated water that enters the system (7A), usually from boreholes with water of sufficient quality to allow potable use.

REVENUE WATER

The SIV can be grouped into revenue and non-revenue water, indicating as the name suggests the volume of water generating income for Swartland Municipality vs the volume of water bought, but not generating income from its usage or loss. All revenue water is considered to be authorised consumption and consists of the following:

- Billed metered consumption (8.1),
- Billed unmetered consumption (8.2). The billed unmetered portion can be further grouped into
    - the volume of water supplied at a flat rate (8.2.1), where no meter is used but the consumer is billed and
    - free basic water supplied (8.2.2). Free basic water can be claimed form equitable share and is therefore considered authorised and revenue generating.

NON-REVENUE WATER

Non-revenue water consists of an authorised consumption portion that the municipality is aware of supplying, but it is not currently metered and therefore no account can be sent and a portion of losses, either apparent or real. The components are as follows:

- Unbilled metered consumption (8.3),
- Unbilled unmetered consumption (8.4), this, together with 8.3 forms part of the authorised portion,
- Apparent losses (8.5) that can be further grouped into
    - Illegal connections (8.5.1),
    - Inaccurate meters (8.5.2),
    - Data handling errors (8.5.3),
- Real losses; these are all loss of water from the distribution system upstream of consumer connections.

TOTAL INFLUENT RECEIVED AT WASTE WATER TREATMENT WORKS

Water discharged from the distribution system and received at the waste water treatment works also form part of the water cycle and can be included in the water balance. Once the water is treated it can be grouped as follows:

- Total volume of treated water discharged from the waste water treatment works (11), this can be further grouped into:
    - Volume returned to the environment (13),
    - Recycled water supplied to the water treatment works (14),
- Other uses (12). This portion represents the volume that is either re-used for irrigation purposes or re-used on the waste water treatment plant.

The peak month factors are used in order to size bulk water infrastructure such as purification works, pumps and main supply pipes to reservoirs. An estimated peak day factor of 1.25 was also included in the models to estimate the peak day flow. The historical peak month factors were calculated for the various schemes, and are included in the table below. The factors are the maximum peak month factors for the period on record. The particular months varies notably from one system to the next, but are mainly in the summer as could be expected. The month when this particular peak month factor value was recorded is also included in brackets in the table below.

Table 5.2.3: Peak month factors for the various water distribution schemes

Scheme	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	Average (18/19 – 22/23)
Withoogte and Swartland Bulk Water Distribution Systems (System Input Volume at WTW)						
Withoogte	1.18 (Apr)	1.13 (Febr)	1.17 (Febr)	1.22 (Febr)	1.17 (Febr)	1.15 (Febr)
Swartland	1.15 (Dec)	1.16 (Febr)	1.18 (Febr)	1.21 (Febr)	1.24 (Febr)	1.19 (Febr)
Swartland Municipality's Internal Water Distribution Systems (System Input Volume)						
Koringberg	1.61 (Febr)	1.38 (Dec/Mar)	1.47 (Febr)	1.81 (Febr)	1.32 (Jan)	1.46 (Feb)
Ongegund	1.77 (Aug)	1.41 (Feb)	1.44 (Jan)	1.50 (May)	1.59 (Jan)	1.23 (Apr)
Riebeek Wes	1.24 (Apr)	1.19 (Mar)	1.27 (Jan)	1.63 (Jan)	1.25 (Feb)	1.28 (Jan)
Riebeek Kasteel	1.23 (Febr)	1.37 (Mar)	1.41 (Jan)	1.46 (Feb)	1.21 (Feb)	1.29 (Feb)
Yzerfontein	1.64 (Jan)	1.36 (Jan)	1.55 (Jan)	1.52 (Jan)	1.52 (Jan)	1.51 (Jan)
Darling	1.16 (Jan)	1.08 (Mar)	1.13 (Feb)	1.24 (Feb)	1.17 (Nov)	1.14 (Feb)
Moorreesburg	1.39 (May)	1.21 (Mar)	1.24 (Feb)	1.34 (Feb)	1.20 (Feb)	1.22 (Feb)
Malmesbury	1.34 (Jan)	1.14 (Mar)	1.23 (Jan)	1.25 (Feb)	1.34 (Jan)	1.20 (Jan)

5.2.1 Water Balance for Koringberg

The table below provides a six year historical record of the IWA water balance data for the Koringberg water distribution system.

Table 5.2.1.1: Water Balance for Koringberg (Ml/a)

Water Balance Component	Record : Prior (Ml/a)					2022/2023
	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	
Surface Water Purchased (1)	0.000	0.000	0.000	0.000	0.000	0.000
Surface Water Abstracted (2)	0.000	0.000	0.000	0.000	0.000	0.000
Groundwater Abstracted (3)	0.000	0.000	0.000	0.000	0.000	0.000
Effluent Recycled (14)	0.000	0.000	0.000	0.000	0.000	0.000
Less Raw Water Supplied (4)	0.000	0.000	0.000	0.000	0.000	0.000
Total bulk water supply Ml/d	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Influent at WTW (5)	0.000	0.000	0.000	0.000	0.000	0.000
Total Treated Water at WTW (6)	0.000	0.000	0.000	0.000	0.000	0.000
Purchased Treated Water (7)	44.157	46.609	51.908	56.412	55.417	54.168
Groundwater not Treated (7a)	0.000	0.000	0.000	0.000	0.000	0.000
Less Potable water to other neighbours (6A)	0.000	0.000	0.000	0.000	0.000	0.000
System Input Volume	**44.157**	**46.609**	**51.908**	**56.412**	**55.417**	**54.168**
Authorised Consumption: Billed Metered (8.1)	29.944	31.915	34.932	43.017	43.318	46.831
Residential communal water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential controlled water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential uncontrolled water supply	25.758	27.862	31.362	40.579	37.424	39.137
Industrial Supply Wet	3.051	3.061	2.362	1.216	4.743	5.448
Industrial Supply Dry						
Commercial supply						
Other supply	1.135	0.992	1.208	1.222	1.151	2.246
Authorised Consumption: Billed Unmetered (8.2)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered: Flat Rate (8.2.1)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered Free Basic Water (8.2.2)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Metered (8.3)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Unmetered (8.4)	0.088	0.741	0.752	0.761	1.733	1.728
Total Urban Supply	**30.032**	**32.656**	**35.684**	**43.778**	**45.049**	**48.560**
Total Rural supply	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Authorised Consumption (Urban + Rural)	**30.032**	**32.656**	**35.684**	**43.778**	**45.049**	**48.560**
Apparent Losses (8.5)	2.401	2.372	2.758	2.148	1.763	0.953
Apparent Losses: Illegal Connections (8.5.1)	0.282	0.279	0.324	0.253	0.207	0.112
Apparent Losses: Inaccurate Meters (8.5.2)	1.412	1.395	1.622	1.263	1.037	0.561
Apparent Losses: Data Errors (8.5.3)	0.706	0.698	0.811	0.632	0.518	0.280
Real Losses (8.6)	11.723	11.581	13.466	10.487	8.606	4.655
Total Losses	**14.125**	**13.953**	**16.224**	**12.634**	**10.368**	**5.608**
Total received at WWTW (9)	20.961	22.341	24.452	30.112	30.323	32.782
Total discharged (11)	14.673	15.638	17.117	21.078	21.226	22.947
Other (12)	0.000	0.000	0.000	0.000	0.000	0.000
Returned to source (13)	14.673	15.638	17.117	21.078	21.226	22.947

Note: Apparent Losses: Used 2% for illegal connections (Very Low), 10% for inaccurate meters (Meter age > 10 yrs) and 5% for data errors (Average).

5.2.2 Water Balance for Ongegund

The table below provides a six year historical record of the IWA water balance data for the Ongegund water distribution system.

Table 5.2.2.1: Water Balance for Ongegund (Ml/a)

Water Balance Component	Record : Prior (Ml/a)					2022/2023
	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	
Surface Water Purchased (1)	0.000	0.000	0.000	0.000	0.000	0.000
Surface Water Abstracted (2)	0.000	0.000	0.000	0.000	0.000	0.000
Groundwater Abstracted (3)	0.000	0.000	0.000	0.000	0.000	0.000
Effluent Recycled (14)	0.000	0.000	0.000	0.000	0.000	0.000
Less Raw Water Supplied (4)	0.000	0.000	0.000	0.000	0.000	0.000
Total bulk water supply Ml/d	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Influent at WTW (5)	0.000	0.000	0.000	0.000	0.000	0.000
Total Treated Water at WTW (6)	0.000	0.000	0.000	0.000	0.000	0.000
Purchased Treated Water (7)	27.612	18.004	17.033	17.662	24.013	21.200
Groundwater not Treated (7a)	0.000	0.000	0.000	0.000	0.000	0.000
Less Potable water to other neighbours (6A)	0.000	0.000	0.000	0.000	0.000	0.000
System Input Volume	**27.612**	**18.004**	**17.033**	**17.662**	**24.013**	**21.200**
Authorised Consumption: Billed Metered (8.1)	10.957	11.458	12.797	14.587	14.799	19.940
Residential communal water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential controlled water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential uncontrolled water supply	9.202	11.453	12.793	14.472	14.553	18.545
Industrial Supply Wet	0.919	0.000	0.000	0.037	0.181	1.386
Industrial Supply Dry						
Commercial supply						
Other supply	0.836	0.005	0.004	0.078	0.065	0.009
Authorised Consumption: Billed Unmetered (8.2)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered: Flat Rate (8.2.1)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered Free Basic Water (8.2.2)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Metered (8.3)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Unmetered (8.4)	0.055	0.108	0.106	0.107	0.228	0.222
Total Urban Supply	**11.012**	**11.566**	**12.903**	**14.694**	**15.027**	**20.163**
Total Rural supply	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Authorised Consumption (Urban + Rural)	**11.012**	**11.566**	**12.903**	**14.694**	**15.027**	**20.163**
Apparent Losses (8.5)	2.822	1.094	0.702	0.504	1.528	0.176
Apparent Losses: Illegal Connections (8.5.1)	0.332	0.129	0.083	0.059	0.180	0.021
Apparent Losses: Inaccurate Meters (8.5.2)	1.660	0.644	0.413	0.297	0.899	0.104
Apparent Losses: Data Errors (8.5.3)	0.830	0.322	0.206	0.148	0.449	0.052
Real Losses (8.6)	13.778	5.344	3.428	2.463	7.459	0.861
Total Losses	**16.600**	**6.438**	**4.130**	**2.968**	**8.986**	**1.037**
Total received at WWTW (9)	0.000	0.000	0.000	0.000	0.000	0.000
Total discharged (11)	0.000	0.000	0.000	0.000	0.000	0.000
Other (12)	0.000	0.000	0.000	0.000	0.000	0.000
Returned to source (13)	0.000	0.000	0.000	0.000	0.000	0.000

Note: Apparent Losses: Used 2% for illegal connections (Very Low), 10% for inaccurate meters (Meter age > 10 yrs) and 5% for data errors (Average).

5.2.3 Water Balance for Riebeek Wes

The table below provides a six year historical record of the IWA water balance data for the Riebeek Wes water distribution system.

Table 5.2.3.1: Water Balance for Riebeek Wes (Ml/a)

Water Balance Component	Record : Prior (Ml/a)					2022/2023
	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	
Surface Water Purchased (1)	0.000	0.000	0.000	0.000	0.000	0.000
Surface Water Abstracted (2)	0.000	0.000	0.000	0.000	0.000	0.000
Groundwater Abstracted (3)	0.000	0.000	0.000	0.000	0.000	0.000
Effluent Recycled (14)	0.000	0.000	0.000	0.000	0.000	0.000
Less Raw Water Supplied (4)	0.000	0.000	0.000	0.000	0.000	0.000
Total bulk water supply Ml/d	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Influent at WTW (5)	0.000	0.000	0.000	0.000	0.000	0.000
Total Treated Water at WTW (6)	0.000	0.000	0.000	0.000	0.000	0.000
Purchased Treated Water (7)	127.127	140.524	157.908	171.006	179.456	176.547
Groundwater not Treated (7a)	0.000	0.000	0.000	0.000	0.000	0.000
Less Potable water to other neighbours (6A)	0.000	0.000	0.000	0.000	0.000	0.000
System Input Volume	**127.127**	**140.524**	**157.908**	**171.006**	**179.456**	**176.547**
Authorised Consumption: Billed Metered (8.1)	105.612	117.261	135.868	144.516	161.142	156.745
Residential communal water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential controlled water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential uncontrolled water supply	73.064	84.487	96.265	118.764	121.425	119.248
Industrial Supply Wet	15.210	17.007	17.084	14.953	25.891	17.959
Industrial Supply Dry						
Commercial supply						
Other supply	17.338	15.767	22.519	10.799	13.827	19.539
Authorised Consumption: Billed Unmetered (8.2)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered: Flat Rate (8.2.1)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered Free Basic Water (8.2.2)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Metered (8.3)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Unmetered (8.4)	0.254	4.961	4.996	5.022	12.059	12.053
Total Urban Supply	**105.866**	**122.222**	**140.864**	**149.538**	**173.201**	**168.798**
Total Rural supply	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Authorised Consumption (Urban + Rural)	**105.866**	**122.222**	**140.864**	**149.538**	**173.201**	**168.798**
Apparent Losses (8.5)	3.614	3.111	2.898	3.650	1.063	1.317
Apparent Losses: Illegal Connections (8.5.1)	0.425	0.366	0.341	0.429	0.125	0.155
Apparent Losses: Inaccurate Meters (8.5.2)	2.126	1.830	1.704	2.147	0.625	0.775
Apparent Losses: Data Errors (8.5.3)	1.063	0.915	0.852	1.073	0.313	0.387
Real Losses (8.6)	17.646	15.191	14.147	17.818	5.191	6.431
Total Losses	**21.261**	**18.302**	**17.044**	**21.468**	**6.255**	**7.749**
Total received at WWTW (9)	0.000	0.000	0.000	0.000	0.000	0.000
Total discharged (11)	0.000	0.000	0.000	0.000	0.000	0.000
Other (12)	0.000	0.000	0.000	0.000	0.000	0.000
Returned to source (13)	0.000	0.000	0.000	0.000	0.000	0.000

Note: Apparent Losses: Used 2% for illegal connections (Very Low), 10% for inaccurate meters (Meter age > 10 yrs) and 5% for data errors (Average).

5.2.4 Water Balance for Riebeek Kasteel

The table below provides a six year historical record of the IWA water balance data for the Riebeek Kasteel water distribution system.

Table 5.2.4.1: Water Balance for Riebeek Kasteel (Ml/a)

Water Balance Component	Record : Prior (Ml/a)					2022/2023
	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	
Surface Water Purchased (1)	0.000	0.000	0.000	0.000	0.000	0.000
Surface Water Abstracted (2)	0.000	0.000	0.000	0.000	0.000	0.000
Groundwater Abstracted (3)	0.000	0.000	0.000	0.000	0.000	0.000
Effluent Recycled (14)	0.000	0.000	0.000	0.000	0.000	0.000
Less Raw Water Supplied (4)	0.000	0.000	0.000	0.000	0.000	0.000
Total bulk water supply Ml/d	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Influent at WTW (5)	0.000	0.000	0.000	0.000	0.000	0.000
Total Treated Water at WTW (6)	0.000	0.000	0.000	0.000	0.000	0.000
Purchased Treated Water (7)	169.061	183.446	223.405	253.218	330.992	397.478
Groundwater not Treated (7a)	0.000	0.000	0.000	0.000	0.000	0.000
Less Potable water to other neighbours (6A)	0.000	0.000	0.000	0.000	0.000	0.000
System Input Volume	**169.061**	**183.446**	**223.405**	**253.218**	**330.992**	**397.478**
Authorised Consumption: Billed Metered (8.1)	116.881	158.069	175.643	203.428	232.904	243.974
Residential communal water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential controlled water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential uncontrolled water supply	93.786	125.625	144.016	171.842	187.583	209.616
Industrial Supply Wet	11.801	16.629	18.085	10.802	25.133	16.065
Industrial Supply Dry						
Commercial supply						
Other supply and Farms	11.294	15.815	13.542	20.784	20.189	18.292
Authorised Consumption: Billed Unmetered (8.2)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered: Flat Rate (8.2.1)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered Free Basic Water (8.2.2)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Metered (8.3)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Unmetered (8.4)	0.338	1.951	2.031	2.096	4.622	4.755
Total Urban Supply	**117.219**	**160.020**	**177.674**	**205.524**	**237.526**	**248.729**
Total Rural supply	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Authorised Consumption (Urban + Rural)	**117.219**	**160.020**	**177.674**	**205.524**	**237.526**	**248.729**
Apparent Losses (8.5)	8.813	3.982	7.774	8.618	15.889	25.287
Apparent Losses: Illegal Connections (8.5.1)	1.037	0.469	0.915	1.014	1.869	2.975
Apparent Losses: Inaccurate Meters (8.5.2)	5.184	2.343	4.573	5.069	9.347	14.875
Apparent Losses: Data Errors (8.5.3)	2.592	1.171	2.287	2.535	4.673	7.437
Real Losses (8.6)	43.029	19.444	37.957	42.075	77.577	123.462
Total Losses	**51.842**	**23.426**	**45.732**	**50.693**	**93.466**	**148.749**
Total received at WWTW (9)	237.217	277.396	273.968	307.636	301.847	292.143
Total discharged (11)	201.634	235.787	232.873	261.491	256.570	248.322
Other (12)	0.000	0.000	24.196	10.731	14.747	20.135
Returned to source (13)	201.634	235.787	208.677	250.760	242.096	228.187

Note: Apparent Losses: Used 2% for illegal connections (Very Low), 10% for inaccurate meters (Meter age > 10 yrs) and 5% for data errors (Average).

5.2.5 Water Balance for Yzerfontein

The table below provides a six year historical record of the IWA water balance data for the Yzerfontein water distribution system.

Table 5.2.5.1: Water Balance for Yzerfontein (Ml/a)

Water Balance Component	Record : Prior (Ml/a)					2022/2023
	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	
Surface Water Purchased (1)	0.000	0.000	0.000	0.000	0.000	0.000
Surface Water Abstracted (2)	0.000	0.000	0.000	0.000	0.000	0.000
Groundwater Abstracted (3)	0.000	0.000	0.000	0.000	0.000	0.000
Effluent Recycled (14)	0.000	0.000	0.000	0.000	0.000	0.000
Less Raw Water Supplied (4)	0.000	0.000	0.000	0.000	0.000	0.000
Total bulk water supply Ml/d	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Influent at WTW (5)	0.000	0.000	0.000	0.000	0.000	0.000
Total Treated Water at WTW (6)	0.000	0.000	0.000	0.000	0.000	0.000
Purchased Treated Water (7)	154.611	175.903	238.116	299.537	308.290	299.729
Groundwater not Treated (7a)	0.000	0.000	0.000	0.000	0.000	0.000
Less Potable water to other neighbours (6A)	0.000	0.000	0.000	0.000	0.000	0.000
System Input Volume	**154.611**	**175.903**	**238.116**	**299.537**	**308.290**	**299.729**
Authorised Consumption: Billed Metered (8.1)	102.681	159.926	191.007	239.336	267.956	275.004
Residential communal water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential controlled water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential uncontrolled water supply	88.626	142.166	165.718	218.279	231.664	236.049
Industrial Supply Wet	5.087	5.475	6.243	10.784	12.000	14.859
Industrial Supply Dry						
Commercial supply						
Other supply	8.968	12.285	19.046	10.273	24.292	24.096
Authorised Consumption: Billed Unmetered (8.2)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered: Flat Rate (8.2.1)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered Free Basic Water (8.2.2)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Metered (8.3)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Unmetered (8.4)	0.309	5.392	5.516	5.639	13.217	13.199
Total Urban Supply	**102.990**	**165.318**	**196.523**	**244.975**	**281.173**	**288.203**
Total Rural supply	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Authorised Consumption (Urban + Rural)	**102.990**	**165.318**	**196.523**	**244.975**	**281.173**	**288.203**
Apparent Losses (8.5)	8.776	1.799	7.071	9.276	4.610	1.959
Apparent Losses: Illegal Connections (8.5.1)	1.032	0.212	0.832	1.091	0.542	0.231
Apparent Losses: Inaccurate Meters (8.5.2)	5.162	1.059	4.159	5.456	2.712	1.153
Apparent Losses: Data Errors (8.5.3)	2.581	0.529	2.080	2.728	1.356	0.576
Real Losses (8.6)	42.845	8.786	34.522	45.286	22.507	9.567
Total Losses	**51.621**	**10.585**	**41.593**	**54.562**	**27.117**	**11.526**
Total received at WWTW (9)	0.000	0.000	0.000	0.000	0.000	0.000
Total discharged (11)	0.000	0.000	0.000	0.000	0.000	0.000
Other (12)	0.000	0.000	0.000	0.000	0.000	0.000
Returned to source (13)	0.000	0.000	0.000	0.000	0.000	0.000

Note: Apparent Losses: Used 2% for illegal connections (Very Low), 10% for inaccurate meters (Meter age > 10 yrs) and 5% for data errors (Average).

5.2.6 Water Balance for Darling

The table below provides a six year historical record of the IWA water balance data for the Darling water distribution system.

Table 5.2.6.1: Water Balance for Darling (Ml/a)

Water Balance Component	Record : Prior (Ml/a)					2022/2023
	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	
Surface Water Purchased (1)	0.000	0.000	0.000	0.000	0.000	0.000
Surface Water Abstracted (2)	0.000	0.000	0.000	0.000	0.000	0.000
Groundwater Abstracted (3)	0.000	0.000	0.000	0.000	0.000	0.000
Effluent Recycled (14)	0.000	0.000	0.000	0.000	0.000	0.000
Less Raw Water Supplied (4)	0.000	0.000	0.000	0.000	0.000	0.000
Total bulk water supply Ml/d	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Influent at WTW (5)	0.000	0.000	0.000	0.000	0.000	0.000
Total Treated Water at WTW (6)	0.000	0.000	0.000	0.000	0.000	0.000
Purchased Treated Water (7)	465.322	491.479	518.097	570.859	602.718	456.832
Groundwater not Treated (7a)	0.000	0.000	0.000	0.000	0.000	0.000
Less Potable water to other neighbours (6A)	0.000	0.000	0.000	0.000	0.000	0.000
System Input Volume	**465.322**	**491.479**	**518.097**	**570.859**	**602.718**	**456.832**
Authorised Consumption: Billed Metered (8.1)	373.925	364.476	380.019	420.354	452.288	463.816
Residential communal water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential controlled water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential uncontrolled water supply	228.404	254.530	279.913	324.719	327.638	322.101
Industrial Supply Wet	129.920	96.992	87.055	78.725	103.959	119.771
Industrial Supply Dry						
Commercial supply						
Other supply	15.601	12.954	13.051	16.910	20.691	21.943
Authorised Consumption: Billed Unmetered (8.2)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered: Flat Rate (8.2.1)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered Free Basic Water (8.2.2)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Metered (8.3)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Unmetered (8.4)	0.931	3.791	3.844	3.950	8.225	7.934
Total Urban Supply	**374.856**	**368.267**	**383.863**	**424.304**	**460.513**	**471.750**
Total Rural supply	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Authorised Consumption (Urban + Rural)	**374.856**	**368.267**	**383.863**	**424.304**	**460.513**	**471.750**
Apparent Losses (8.5)	15.379	20.946	22.820	24.914	24.175	-2.536
Apparent Losses: Illegal Connections (8.5.1)	1.809	2.464	2.685	2.931	2.844	-0.298
Apparent Losses: Inaccurate Meters (8.5.2)	9.047	12.321	13.423	14.656	14.220	-1.492
Apparent Losses: Data Errors (8.5.3)	4.523	6.161	6.712	7.328	7.110	-0.746
Real Losses (8.6)	75.087	102.266	111.414	121.641	118.030	-12.382
Total Losses	**90.466**	**123.212**	**134.234**	**146.555**	**142.205**	**-14.918**
Total received at WWTW (9)	357.313	383.607	401.561	452.898	460.101	477.148
Total discharged (11)	285.850	306.885	321.249	362.318	368.081	381.718
Other (12)	35.731	24.800	69.706	46.757	16.232	17.343
Returned to source (13)	250.119	282.085	251.543	315.561	351.849	364.375

Note: Apparent Losses: Used 2% for illegal connections (Very Low), 10% for inaccurate meters (Meter age > 10 yrs) and 5% for data errors (Average).

5.2.7 Water Balance for Moorreesburg

The table below provides a six year historical record of the IWA water balance data for the Moorreesburg water distribution system.

Table 5.2.7.1: Water Balance for Moorreesburg (Ml/a)

Water Balance Component	Record : Prior (Ml/a)					2022/2023
	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	
Surface Water Purchased (1)	0.000	0.000	0.000	0.000	0.000	0.000
Surface Water Abstracted (2)	0.000	0.000	0.000	0.000	0.000	0.000
Groundwater Abstracted (3)	0.000	0.000	0.000	0.000	0.000	0.000
Effluent Recycled (14)	0.000	0.000	0.000	0.000	0.000	0.000
Less Raw Water Supplied (4)	0.000	0.000	0.000	0.000	0.000	0.000
Total bulk water supply Ml/d	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Influent at WTW (5)	0.000	0.000	0.000	0.000	0.000	0.000
Total Treated Water at WTW (6)	0.000	0.000	0.000	0.000	0.000	0.000
Purchased Treated Water (7)	480.789	532.506	590.106	671.591	692.967	718.573
Groundwater not Treated (7a)	0.000	0.000	0.000	0.000	0.000	0.000
Less Potable water to other neighbours (6A)	0.000	0.000	0.000	0.000	0.000	0.000
System Input Volume	**480.789**	**532.506**	**590.106**	**671.591**	**692.967**	**718.573**
Authorised Consumption: Billed Metered (8.1)	369.879	422.293	470.805	535.115	523.249	521.888
Residential communal water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential controlled water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential uncontrolled water supply	293.675	330.550	369.022	416.587	415.964	406.312
Industrial Supply Wet	61.312	63.275	58.184	67.556	74.323	75.005
Industrial Supply Dry						
Commercial supply						
Other supply and Farms	14.892	28.468	43.599	50.972	32.962	40.571
Authorised Consumption: Billed Unmetered (8.2)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered: Flat Rate (8.2.1)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered Free Basic Water (8.2.2)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Metered (8.3)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Unmetered (8.4)	0.962	7.041	7.156	7.319	16.326	16.377
Total Urban Supply	**370.841**	**429.334**	**477.961**	**542.434**	**539.575**	**538.265**
Total Rural supply	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Authorised Consumption (Urban + Rural)	**370.841**	**429.334**	**477.961**	**542.434**	**539.575**	**538.265**
Apparent Losses (8.5)	18.691	17.539	19.065	21.957	26.077	30.652
Apparent Losses: Illegal Connections (8.5.1)	2.199	2.063	2.243	2.583	3.068	3.606
Apparent Losses: Inaccurate Meters (8.5.2)	10.995	10.317	11.214	12.916	15.339	18.031
Apparent Losses: Data Errors (8.5.3)	5.497	5.159	5.607	6.458	7.670	9.015
Real Losses (8.6)	91.257	85.633	93.080	107.200	127.315	149.656
Total Losses	**109.948**	**103.172**	**112.145**	**129.156**	**153.392**	**180.308**
Total received at WWTW (9)	330.949	337.553	351.586	400.243	399.445	450.414
Total discharged (11)	264.759	270.042	281.269	320.194	319.556	360.331
Other (12)	66.190	64.790	105.896	63.444	43.667	62.897
Returned to source (13)	198.569	205.252	175.373	256.750	275.889	297.434

Note: Apparent Losses: Used 2% for illegal connections (Very Low), 10% for inaccurate meters (Meter age > 10 yrs) and 5% for data errors (Average).

5.2.8 Water Balance for Malmesbury

The table below provides a six year historical record of the IWA water balance data for the Malmesbury water distribution system.

Table 5.2.8.1: Water Balance for Malmesbury (Ml/a)

Water Balance Component	Record : Prior (Ml/a)					2022/2023
	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	
Surface Water Purchased (1)	0.000	0.000	0.000	0.000	0.000	0.000
Surface Water Abstracted (2)	0.032	0.131	0.073	0.692	0.338	0.242
Groundwater Abstracted (3)	32.400	45.852	24.819	26.763	30.426	0.000
Effluent Recycled (14)	0.000	0.000	0.000	0.000	0.000	0.000
Less Raw Water Supplied (4)	0.000	0.000	0.000	0.000	0.000	0.000
Total bulk water supply Ml/d	**32.432**	**45.983**	**24.892**	**27.455**	**30.764**	**0.242**
Total Influent at WTW (5)	32.432	45.983	24.892	27.455	30.764	0.242
Total Treated Water at WTW (6)	32.432	45.983	24.892	27.455	30.764	0.242
Purchased Treated Water (7)	1 941.089	2 140.453	2 495.858	2 908.899	3 202.898	3 058.934
Groundwater not Treated (7a)	0.000	0.000	0.000	0.000	0.000	0.000
Less Potable water to other neighbours (6A)	0.000	0.000	0.000	0.000	0.000	0.000
System Input Volume	**1 973.521**	**2 186.436**	**2 520.750**	**2 936.354**	**3 233.662**	**3 059.176**
Authorised Consumption: Billed Metered (8.1)	1 698.692	1 878.366	2 141.450	2 340.559	2 478.166	2 599.820
Residential communal water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential controlled water supply	0.000	0.000	0.000	0.000	0.000	0.000
Residential uncontrolled water supply	1 062.301	1 241.947	1 387.791	1 537.917	1 651.568	1 721.925
Industrial Supply Wet	334.187	291.858	356.109	398.212	432.876	473.829
Industrial Supply Dry						
Commercial supply						
Other supply and Farms	302.204	344.561	397.550	404.430	393.722	404.066
Authorised Consumption: Billed Unmetered (8.2)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered: Flat Rate (8.2.1)	0.000	0.000	0.000	0.000	0.000	0.000
Billed Unmetered Free Basic Water (8.2.2)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Metered (8.3)	0.000	0.000	0.000	0.000	0.000	0.000
Authorised Consumption: Unbilled Unmetered (8.4)	3.947	31.301	31.970	32.801	73.787	73.438
Total Urban Supply	**1 702.639**	**1 909.667**	**2 173.420**	**2 373.360**	**2 551.953**	**2 673.258**
Total Rural supply	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Total Authorised Consumption (Urban + Rural)	**1 702.639**	**1 909.667**	**2 173.420**	**2 373.360**	**2 551.953**	**2 673.258**
Apparent Losses (8.5)	46.050	47.051	59.046	95.709	115.891	65.606
Apparent Losses: Illegal Connections (8.5.1)	5.418	5.535	6.947	11.260	13.634	7.718
Apparent Losses: Inaccurate Meters (8.5.2)	27.088	27.677	34.733	56.299	68.171	38.592
Apparent Losses: Data Errors (8.5.3)	13.544	13.838	17.367	28.150	34.085	19.296
Real Losses (8.6)	224.834	229.718	288.284	467.285	565.818	320.311
Total Losses	**270.884**	**276.769**	**347.330**	**562.994**	**681.709**	**385.917**
Total received at WWTW (9)	1 423.288	1 494.426	1 764.088	1 932.526	2 028.272	2 119.441
Total discharged (11)	1 138.630	1 195.541	1 411.270	1 546.021	1 622.618	1 695.553
Other (12)	782.808	791.259	1 346.115	1 365.802	1 123.616	1 161.959
Returned to source (13)	355.822	404.282	65.155	180.219	499.002	533.594

Note: Apparent Losses: Used 2% for illegal connections (Very Low), 10% for inaccurate meters (Meter age > 10 yrs) and 5% for data errors (Average).

5.2.9 Total influent received at treatment works

For planning purposes, it is a reasonable assumption that the seasonal distribution of the influent can be based on the corresponding distribution of the water demand. Similarly, where treated effluent is not used for irrigation, it is reasonable to assume that the majority of the influent is returned to the Water Resource System, with the exception of local losses for which a percentage allowance can be made. Account must also be taken of those WWTWs where the process relies on evaporation ponds, in which case the return to the Water Resource System is effectively zero.

The status of the flow meters at the various WWTWs is indicated in Table 5.2.9.2. The table below gives an overview of the annual volume of effluent received at the various WWTWs. The hydraulic and organic design capacities of the various WWTWs and the monthly flows at the various plants are included in Annexure C.

Table 5.2.9.1: Quantity of effluent received at the various WWTWs

WWTW	% of Historic Water Demands	Record : Prior (Ml/a)					22/23
		17/18	18/19	19/20	20/21	21/22	
Malmesbury	N/A (Metered)	1 423.288	1 494.426	1 764.088	1 932.526	2 028.272	2 119.441
Moorreesburg	N/A (Metered)	330.949	337.553	351.586	400.243	399.445	450.414
Darling	N/A (Metered)	357.313	383.607	401.561	452.898	460.101	477.148
Koringberg	70%	20.961	22.341	24.452	30.112	30.323	32.782
Kalbaskraal	40%	19.165	23.692	22.176	27.759	27.971	30.489
Chatsworth / Riverlands	40%	50.449	60.466	63.458	92.656	89.498	124.358
Riebeek Valley	N/A (Metered)	237.217	277.396	273.968	307.636	301.847	292.143
Total		**2 439.342**	**2 599.481**	**2 901.289**	**3 243.830**	**3 337.457**	**3 526.775**

The current status of flow metering at the various WWTWs and the availability of the flow data are indicated in the table below.

Table 5.2.9.2: Flow metering at WWTWs

WWTW	Influent			Final Effluent			Treated Effluent Re-used		
	Metered	Meter Operational	Data provided	Metered	Meter Operational	Data provided	Metered	Meter Operational	Data provided
Malmesbury	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Moorreesburg	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Darling	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Koringberg	-	-	-	-	-	-	-	-	-
Kalbaskraal	-	-	-	-	-	-	-	-	-
Chatsworth / Riverlands	-	-	-	-	-	-	-	-	-
Riebeek Valley	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes

Moorreesburg WWTW: Incoming Flow Meter

Moorreesburg WWTW: RAS Flow Meter

Moorreesburg WWTW: Flow meter & Turbidity Meter

Moorreesburg WWTW: Poly Flow Meter

Moorreesburg WWTW: Final Effluent Flow Meter

Moorreesburg WWTW: Re-use (irrigation) Bulk Water Meter

Riebeek Valley WWTW: Inflow Meter

Riebeek Valley WWTW: Flow meter for WAS PS

Riebeek Valley WWTW: Flow meter for RAS PS

Riebeek Valley WWTW: Final Flow Meter

Riebeek Valley WWTW: Irrigation Meter

Riebeek Valley WWTW: Flow meter for Aerobic Digester

Riebeek Valley WWTW: Poly and sludge Flow meters

Darling WWTW: Final Effluent Flow Meter

Darling WWTW: Sludge Flow Meter & inline Turbidity Meter

Darling WWTW: Service Water Flow Meter

Malmesbury WWTW: Final Effluent Flow Meter

Malmesbury WWTW: Sludge take-off Flow Meter

Malmesbury WWTW: Incoming Flow Meter

5.2.10 Total returns to the water resource system

All effluent discharged into the Municipal sewer system is however treated at the existing WWTWs. The current volume of treated effluent re-use from the various WWTWs and the current effluent re-use practices are as indicated in the table below.

Table 5.2.10.1: Volume of effluent re-use and current re-use practices at the various WWTWs

WWTW	Re-use of treated effluent					Current effluent re-use practices
	Billed Volume (Ml/a)				Consumers	
	22/23	21/22	20/21	19/20		
Malmesbury	1 161.959	1 123.616	1 365.802	1 346.115	Rooiheuwel JV, Primary School Swartland, High School Swartland, Wesbank Sportsfields, Golf Course, Landbougenootskap, Ilinge Lethu Sportgrounds, St Thomas Primary, Alkana Childcare, Bowling Club, Alfa Street Sport Centre, Building Contractors.	Building Contractors, Rooiheuwels Irrigation Scheme, Irrigation of rugby and cricket fields at schools and golf course. Treated effluent not re-used is returned to the Diep River. In excess of 80% of the treated effluent is re-used.

Table 5.2.10.1: Volume of effluent re-use and current re-use practices at the various WWTWs

WWTW	Re-use of treated effluent					Current effluent re-use practices
	Billed Volume (Ml/a)				Consumers	
	22/23	21/22	20/21	19/20		
Moorreesburg	62.897	43.667	63.444	105.896	WWTW, Gene Louw, Golf Course	Irrigation of rugby and cricket fields and golf course. During the summer months all treated effluent is re-used. Treated effluent not re-used is returned to the Nogo River.
Darling	17.343	16.232	46.757	69.706	Golf Course, Gabriel Faroa Sport	Irrigation of rugby fields and golf course. During the summer months all treated effluent is re-used. Treated effluent not re-used is returned to the Groen River.
Riebeek Valley	20.135	14.474	10.731	24.196	Farmers	Re-use for agricultural purposes (Tender was awarded for 20-year period).
Koringberg	-	-	-	-	-	No re-use practices. Treated effluent returned into a local stream (Brak River)
Kalbaskraal	-	-	-	-	-	No re-use practices. Evaporate
Chatsworth / Riverlands	-	-	-	-	-	No re-use practices. Evaporate
Total	**1 262.334**	**1 197.989**	**1 486.734**	**1 545.913**		

The tender for the agricultural re-use of the final effluent discharged from the Riebeek Valley WWTW was awarded in 2018/2019 (20-year contract period).

There is a need to report on the volume or proportion of treated effluent that is returned from each WWTW to the Water Resource System. These return flows can be significant and can add to the water resources of a catchment and need to be accounted for. In other instances, the effluent is not returned and is diverted to oxidation ponds or is re-used on parks, sports fields, etc. The total returns to the water resource system and the treated effluent re-used for irrigation purposes are summarised in the table below.

Table 5.2.10.2: Total returns to the water resource system and treated effluent re-used for irrigation purposes

WWTW	Type of WWTW	Resource Name (River, Dam, Other)	Current returns (22/23)		Current re-use (22/23)	
			Total Returns (Ml/a)	Portion (%) of total influent returned	Total Re-use (Ml/a)	Portion (%) of total influent reused
Malmesbury	MBR, Pasveer Bio-Reactor and Aerobic Digestion	Diep River	533.594	25.2%	1 161.959	54.8%
Moorreesburg	Activated Sludge and Aerobic Digestion	Nogo River	297.434	66.0%	62.897	14.0%
Darling	Activated Sludge	Groen River	364.375	76.4%	17.343	3.6%
Riebeek Valley	Activated Sludge	-	228.187	78.1%	20.135	6.9%
Koringberg	Oxidation ponds system	Brak River	22.947	70.0%	-	-
Kalbaskraal	Oxidation ponds system	-	-	-	-	-
Chatsworth / Riverlands	Oxidation ponds system	-	-	-	-	-

Note: The total return volumes in the above table were estimated.

Re-use of water is becoming more acceptable and feasible because of increasing water shortages, improved purification technology and decreasing treatment costs. Improvements in membrane technologies and their affordability have made a significant contribution in recent years. At present, up to 14% of water use is reused, mostly through wastewater return flows to rivers from which it is abstracted downstream for indirect re-use. Re-use of return flows could be significantly increased, particularly in coastal cities where wastewater ordinarily drains into the sea.

The direct re-use of treated wastewater can pose a risk to public health and safety; must be managed carefully and be subject to water quality management and control. Advanced treatment and proper monitoring of all processes and quality of potable water produced is essential. Public perceptions and opinions vary on the topic of water re-use, specifically as it relates to direct potable water re-use. Public perceptions are strongly informed by the general awareness of the poor operation, maintenance and performance of municipal wastewater treatment plants at present. This poses a significant challenge to building public acceptance of direct water re-use in the current situation. The performance of municipal wastewater and effluent treatment plants nationwide will have to be improved to meet high standards, resulting in consistently good quality discharges to the environment before direct water re-use can be placed on the national water supply agenda.

5.3 WATER LOSSES

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

The parameters used to calculate the ILIs for the various distribution systems are included in the Models in Annexure D. Attaining and ILI = 1 is a theoretical limit which is the minimum water loss in an operational water reticulation system. A value of less than 1 should not occur since this implies that the actual leakage is less than the theoretical minimum level of leakage.

Table 5.3.1: Information included in the Leakage Benchmarking Sheets

Water Losses Models	Leakage Benchmarking Sheets		
Bulk and water sales data	Summary Sheet	System name and contact details	
Water balance for town		Performance indicators of water loss	
Non-Revenue water (%/month)		Key operating parameters which influence UARL	
		Key components of annual system input volume	
Monthly Peak Factors (Pmf)	Data Entry Sheet	General	
Annual NRW (% / year)		System data	
		Unavoidable annual real losses (UARL)	
Water usage per sector (Kl / month)		Annual water balance data	Data period
			System input volume
			Components of authorised consumption
			Components of water losses
		Selected operational performance indicators	Current annual real losses per connection at current pressures
			Infrastructure Leakage Index
			Non-Revenue water as a % by volume of system input
		Selected financial performance indicators	Local valuation of real and apparent losses
			Annual cost of running system
			Non-Revenue water as % by value of cost of running system
		Relationship between real losses expressed as % of system input	Real losses curve definition
			Components of water balance in litres / service connection / day (Actual Results)
			Current real losses as % of system input volume
			Potential real losses as % of system input volume
			Real losses as a % of system input volume versus consumption in litres / service connection for different values of Real Losses in Litres / service connection / day

The table below gives a summary of the NRW, Water Losses and ILI for the various water distribution systems in Swartland Municipality's Management Area.

Table 5.3.2: NRW, Water Losses and ILIs for the various water distribution systems

Description	Component	Unit	Record: Prior (Ml/a)					22/23
			17/18	18/19	19/20	20/21	21/22	
Koringberg	NRW	Volume	14.213	14.694	16.976	13.395	12.099	7.337
		Percentage	32.20%	31.50%	32.70%	23.70%	21.80%	13.5%
	Water Losses	Volume	14.125	13.953	16.224	12.634	10.368	5.608
		Percentage	32.00%	29.90%	31.30%	22.40%	18.70%	10.4%
	ILI		**1.37**	**1.41**	**1.59**	**1.8**	**1.51**	**0.83**
Ongegund	NRW	Volume	16.655	6.546	4.236	3.075	9.214	1.260
		Percentage	60.30%	36.40%	24.90%	17.40%	38.40%	5.9%
	Water Losses	Volume	16.6	6.438	4.13	2.968	8.986	1.037
		Percentage	60.10%	35.80%	24.20%	16.80%	37.40%	4.9%
Riebeek Wes	NRW	Volume	21.515	23.263	22.04	26.49	18.314	19.802
		Percentage	16.90%	16.60%	14.00%	15.50%	10.20%	11.2%
	Water Losses	Volume	21.261	18.302	17.044	21.468	6.255	7.749
		Percentage	16.70%	13.00%	10.80%	12.60%	3.50%	4.4%
	ILI		**1.27**	**1.09**	**0.82**	**0.8**	**0.23**	**0.29**
Riebeek Kasteel	NRW	Volume	52.18	25.377	47.762	52.79	98.088	153.504
		Percentage	30.90%	13.80%	21.40%	20.60%	29.60%	38.6%
	Water Losses	Volume	51.842	23.426	45.732	50.693	93.466	148.749
		Percentage	30.70%	12.80%	20.50%	19.80%	28.20%	37.4%
	ILI		**1.77**	**0.77**	**1.52**	**1.45**	**2.72**	**4.21**
Yzerfontein	NRW	Volume	51.93	15.977	47.109	60.201	40.333	24.725
		Percentage	33.60%	9.10%	19.80%	20.10%	13.10%	8.2%
	Water Losses	Volume	51.621	10.585	41.593	54.562	27.117	11.526
		Percentage	33.40%	6.00%	17.50%	18.20%	8.80%	3.8%
	ILI		**1.37**	**0.25**	**0.97**	**1.03**	**0.5**	**0.21**
Darling	NRW	Volume	91.397	127.003	138.078	150.505	150.43	-6.984
		Percentage	19.60%	25.80%	26.70%	26.40%	25.00%	-1.5%
	Water Losses	Volume	90.466	123.212	134.234	146.555	142.205	-14.918
		Percentage	19.40%	25.10%	25.90%	25.70%	23.60%	-3.3%
	ILI		**1.42**	**1.9**	**2.08**	**3.2**	**3.09**	**2.28**
Moorreesburg	NRW	Volume	110.91	110.213	119.301	136.476	169.718	196.685
		Percentage	23.10%	20.70%	20.20%	20.30%	24.50%	27.4%
	Water Losses	Volume	109.948	103.172	112.145	129.156	153.392	180.308
		Percentage	22.90%	19.40%	19.00%	19.20%	22.10%	25.1%
	ILI		**1.37**	**1.25**	**1.36**	**1.74**	**2.06**	**2.40**
Malmesbury	NRW	Volume	290.408	308.07	379.3	595.795	755.496	459.356
		Percentage	14.70%	14.10%	15.00%	20.30%	23.40%	15.0%
	Water Losses	Volume	286.461	276.769	347.331	562.994	681.709	385.917
		Percentage	14.50%	12.70%	13.80%	19.20%	21.10%	12.6%
	ILI		**1.3**	**1.17**	**1.44**	**2.2**	**2.67**	**1.46**
TOTAL	**NRW**	**Volume**	**649.208**	**631.143**	**774.802**	**1 038.73**	**1 253.692**	**855.685**
		Percentage	**18.86%**	**16.72%**	**17.95%**	**20.86%**	**23.10%**	**16.51%**
	Water Losses	**Volume**	**642.325**	**575.857**	**718.433**	**981.03**	**1 123.498**	**725.976**
		Percentage	**18.66%**	**15.25%**	**16.64%**	**19.70%**	**20.70%**	**14.00%**
	ILI		**1.51**	**1.41**	**1.6**	**2.11**	**2.4**	**1.83**

Notes: ILI for Developed Countries = **1 – 2 Excellent (Category A)**, **2 – 4 Good (Category B)**, **4 – 8 Poor (Category C)** and **> 8 – Very Bad (Category D)**

Category A = No specific intervention required.

Category B = No urgent action required although should be monitored carefully.

Category C = Requires attention

Category D = Requires immediate water loss reduction interventions

The table below gives an overview of the System Input Volume, Average Billed Metered Consumption and Non-Revenue Water in litre per connection per day for the various water distribution systems for the 2022/2023 financial year.

Table 5.3.3: System input volume, average billed metered consumption and NRW in litre per connection per day for the various water distribution systems for 2022/2023

Water Balance Component	Koringberg	Ongegund	Riebeek Wes	Riebeek Kasteel	Yzerfontein	Darling	Moorreesburg	Malmesbury
System Input Volume	409	533	457	659	459	464	620	680
Average Billed Metered Cons.	353	501	406	404	421	471	450	578
Non-Revenue Water	55	32	51	254	38	-7	170	102

Malmesbury is the town with the highest system input volume and average billed metered consumption per connection per day, because it is main town of Swartland Municipality and the town with the biggest commercial centre. Riebeek Kasteel is the town with the highest NRW per connection per day.

6 WATER RESOURCES

6.1 SOURCES AND VOLUMES

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

This part of the WSDP is driven by the National Water Act (Act 36 of 1998) and therefore will require dialogue with the Catchments Management Agency (CMA) (or DWS's Regional Office until the CMA is established) and reference to the Catchments Management Strategy/ies (CMS) when these are in place. It is very important that water demand and wastewater flows within the Catchments be viewed against what the resources can sustainably supply and what the likely environmental impacts will be.

Permits govern abstraction and return rights within a Catchment. The additional flows that might arise from the service level targets may well result in requirements over and above what is stated in the permit. The WSA needs to understand what these are and the implications for permits.

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

The reporting format in this section does not require a separation into urban and rural areas. With the annual water demand and wastewater flows known, the capacity of sources to meet this demand needs to be assessed. In the case where boreholes are operated independently and water used for human consumption, the WSA should report on these as well.

Reporting requirements in this section refer to water supplied through the municipal system. This includes borehole water supplied for human consumption. Water abstracted from sources needs to be reported in terms of all providers extracting water. There are three main sources of water:

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

Treated water is supplied to Malmesbury, Moorreesburg, Yzerfontein, Darling, Riebeek Kasteel, Riebeek Wes, Koringberg and Ongegund by the West Coast District Municipality, from their Withoogte and Swartland WTWs, through the West Coast District Municipality's two bulk water distribution systems. A Service Level Agreement between the West Coast District Municipality and Swartland Municipality is in place for the provision of bulk potable water to the various towns.

The supply from Paardenberg Dam is to supplement the supply to Malmesbury, Abbotsdale, Kalbaskraal, Riverlands and Chatsworth from the Municipality's own local source. Three boreholes at Riverlands are also used as supplementary sources.

The West Coast District Municipality applied to the DWS in December 2013 to increase the allocation from the System to initially 18.087 million m^3/a for the Withoogte supply area, which is to be increased to 30.3 million m^3/a by 2033, and to 6.39 million m^3/a for the Swartland supply area (to be increased to 11.1 million m^3/a by 2033). The current raw water abstraction Licence No. 01/G10F/A/5903 of October 2017 list the following volumes allocated to the respective WSAs, which include operational, treatment and bulk conveyance losses.

Table 6.1.1: Volumes allocated to the respective WSAs in Licence No. 01/G10F/A/5903

Name	Resource Name	WSA	Maximum Volume (Ml/a)
Withoogte from Misverstand Weir	Berg River	Saldanha LM	20 427.000
		Swartland LM	**1 573.600**
		Berg River LM	1 439.400
Swartland from Voëlvlei Dam	Berg River	**Swartland LM**	**7 900.000**
		Drakenstein LM	300.000
Langebaan Aquifer Boreholes 1 & 2	Langebaan Aquifer	Saldanha Bay LM	675.000
Langebaan Aquifer Boreholes 3 & 4		Saldanha Bay LM	675.000
Total Allocation for the West Coast District Municipality			**32 990.000**
Total Allocation for the West Coast District Municipality from the WCWSS			**31 640.00**

The table below gives an overview of the current water resources, the current volumes abstracted and the authorised volumes.

Table 6.1.2: Current water resources and volumes

Source Type	Scheme	Number of Sources	Current 22/23 System Input Volumes or Returns (Mm^3/a)	Licensed Abstraction / Returns (Mm^3/a)	Community water supply		Assessment Score
					Rural	Urban	
Groundwater	-	-	-	-	-	-	80%
Surface Water	-	-	-	-	-	-	80%
External Sources (Bulk Purchase)	Koringberg	1	0.054	1.574	0%	100%	80%
	Moorreesburg	1	0.719		0%	100%	80%
	Riebeek Wes	1	0.177	7.900	0%	100%	80%
	Riebeek Kasteel	1	0.397		0%	100%	80%
	Yzerfontein	1	0.300		0%	100%	80%
	Darling	1	0.457		0%	100%	80%
	Ongegund	1	0.021		0%	100%	80%
Conjunctive Use	Malmesbury	5	3.059		0%	100%	80%
Water returned to source	Malmesbury	1 WWTW	0.534	2.781	N/A	N/A	80%
	Moorreesburg	1 WWTW	0.297	0.495	N/A	N/A	80%
	Darling	1 WWTW	0.364	0.338	N/A	N/A	80%
	Riebeek Valley	1 WWTW	0.228	0.548	N/A	N/A	80%

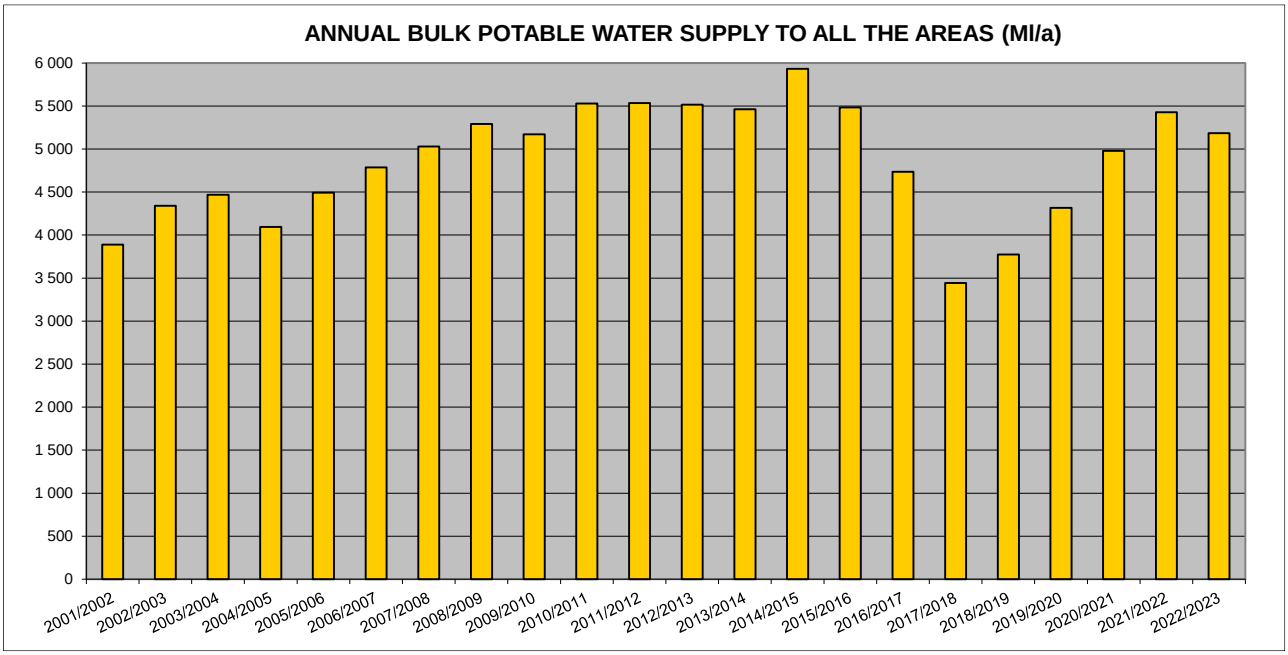
The table below indicates the potential additional future water resources for Swartland Municipality.

Table 6.1.3: Additional water resources and volumes

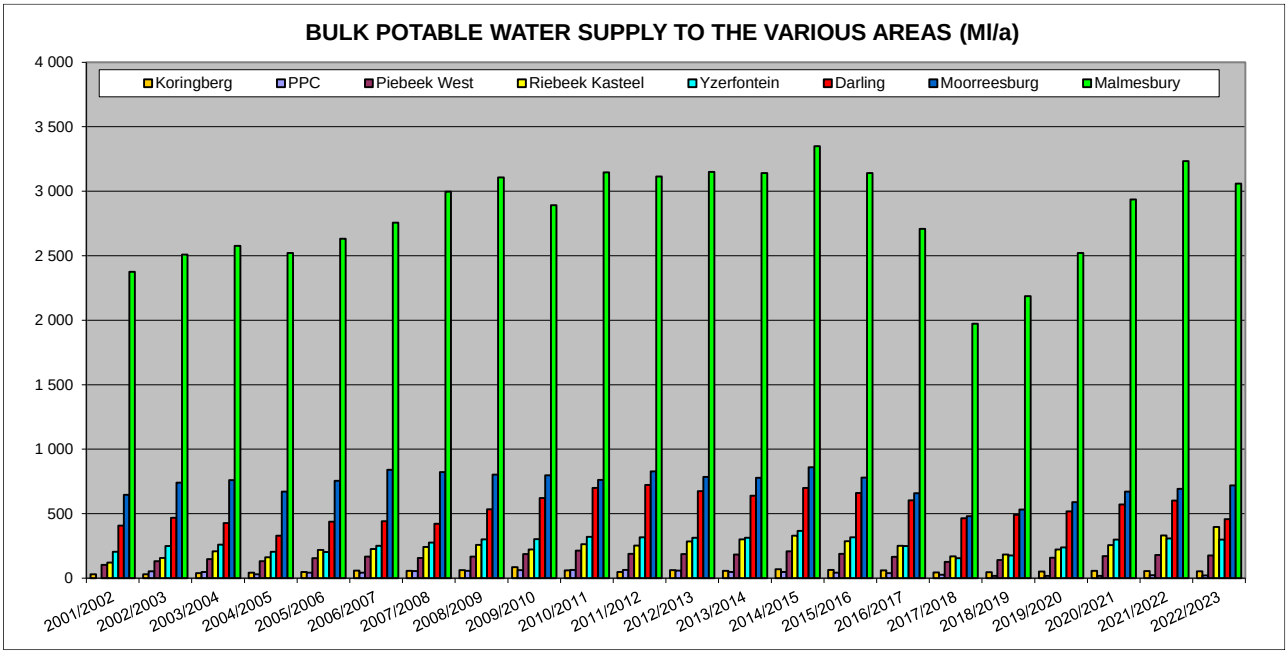
Source Type	Schemes	Number of Sources	Potential Volume (Mm^3/a)	Licensed Abstraction (Mm^3/a)
Groundwater	Yzerfontein	16	0.532	Not yet started
Surface Water	-	-	-	-
External Sources (Bulk Purchase)	Saldanha Bulk System	1	To be determined	1.574
	Swartland Bulk System	1	To be determined	7.900
	Supply from CCT *	1	To be determined	Not yet started

Note: * Supply from Atlantis to Chatsworth and Riverlands

The average annual growth percentage in total system input volume for all the towns in Swartland Municipality's Management Area over the period 2001/2002 to 2022/2023 was 1.38%/a. Detail IWA Water Balances are available for the water distribution systems (towns) in Swartland Municipality's Management Area. The graph below gives an overview of the annual bulk potable water supply volumes (System Input Volumes) for all the systems. The impact of the droughts experienced over the last number of years can be noted on the graphs.



The graph below gives an overview of the historical bulk water supply (System Input Volumes) to the towns in Swartland Municipality's Management Area (Ml/a).



6.2 MONITORING

Swartland Municipality has an established monitoring plan to monitor the volume of water supplied to the various towns by the West Coast District Municipality and the volume of water abstracted from their own surface and ground water resources and quality of the water abstracted.

6.2.1 Percentage of Water Abstracted Monitored: Surface Water

Table 6.2.1.1: Quantity of water abstracted: Surface Water

Scheme	Source type	Licensed abstraction (Ml/a)	Record : Prior (Ml/a)					2022/2023
			2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	
Malmesbury	Paardenberg dam	Unknown	0.032	0.131	0.073	0.692	0.338	0.242
Total		**Unknown**	**0.032**	**0.131**	**0.073**	**0.692**	**0.338**	**0.242**

The abstraction from the Paardenberg dam for Malmesbury are monitored monthly by Swartland Municipality and is a valuable source of information in terms of the IWA water balance for this scheme.

6.2.2 Percentage of Water Abstracted Monitored: Groundwater

Table 6.2.2.1: Quantity of water abstracted: Groundwater

Scheme	Borehole / Well Number	Licensed abstraction (Ml/a)	Record : Prior (Ml/a)					2022/2023
			2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	
Malmesbury	Riverlands BHs	Unknown	32.400	45.852	24.819	26.763	30.426	0.000
Total		**Unknown**	**32.400**	**45.852**	**24.819**	**26.763**	**30.426**	**0.000**

The abstraction from the three Riverlands production boreholes are monitored monthly by Swartland Municipality. It also enables Swartland Municipality to operate their groundwater management system efficiently and to prevent any over abstraction of these boreholes.

6.2.3 Percentage of Water Abstracted Monitored: External Sources (Bulk Purchase)

Table 6.2.3.1: Quantity of water abstracted: External Sources (Bulk Purchase)

Scheme	Licence Volume (Ml/a)	Record : Prior (Ml/a)					2022/2023
		2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	
Koringberg	1 573.600	44.157	46.609	51.908	56.412	55.417	54.168
Moorreesburg		480.789	532.506	590.106	671.591	692.967	718.573
Ongegund	7 900.000	27.612	18.004	17.033	17.662	24.013	21.200
Riebeek Wes		127.127	140.524	157.908	171.006	179.456	176.547
Riebeek Kasteel		169.061	183.446	223.405	256.218	330.992	397.478
Yzerfontein		154.611	175.903	238.116	299.537	308.290	299.729
Darling		465.322	491.479	518.097	570.859	602.718	456.832
Malmesbury		1 941.089	2 140.453	2 495.858	2 908.899	3 202.898	3 058.934
Total	**9 473.600**	**3 409.768**	**3 728.924**	**4 292.431**	**4 952.184**	**5 396.751**	**5 183.461**

6.2.4 Surface Water Levels

Table 6.2.4.1: Surface water levels monitored	
Scheme	**Monitoring Intervals**
Malmesbury	Flow is daily monitored at the Paardenberg Filtration and Disinfection Plant

Note: Monitoring Intervals: 1 – Daily, 2 – Weekly, 3 – Monthly, 4 – Annually, 5 - Never

6.2.5 Groundwater Levels

In order to establish the optimum abstraction rates from the production boreholes and to ensure the aquifer is not over-pumped, it is essential that groundwater levels and abstraction be monitored on a regular basis. In addition to the production boreholes, nearby un-used boreholes should also be monitored, as these provide a better indication than the production boreholes on the status of the aquifer.

Table 6.2.5.1: Groundwater levels monitored	
Distribution System	**Monitoring Intervals**
Malmesbury (Riverlands BHs)	Monthly

Note: Monitoring Intervals: 1 – Daily, 2 – Weekly, 3 – Monthly, 4 – Annually, 5 - Never

6.2.6 Water Quality for Formal Schemes

The Compulsory National Standards (Regulations under Section 9 of the Water Services Act) on quality of potable water state that a WSA must include a suitable programme for sampling the quality of potable water provided to consumers within its WSDP. The intention of this regulation is to ensure that WSAs provide potable water that is safe for human consumption, suitable for drinking, for preparation of food, for personal hygiene and not harmful to water supply installations and domestic appliances. Swartland Municipality's Operational and Compliance Water Quality Sampling Programmes and the parameters monitored are included in Table 8.1.7.2 of Topic 8. The Operational and Compliance Wastewater Quality Sampling Programmes and the parameters monitored are included in Tables 8.1.9.2 and 8.1.9.3 of Topic 8.

Water Safety Plans for the water resources and the distribution systems and W_2RAPs for the WWTWs and the sewer drainage areas are in place.

Water Safety Plans are a form of water quality assurance through a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer. The multiple barrier principle implies that actions are required at all stages in the process of producing and distributing water in order to protect water quality. This includes source protection, treatment through several different stages and prevention of contamination during distribution to each individual household.

The W_2RAP is an all-inclusive risk analysis tool by which risks associated with the management of collection, treatment and disposal of wastewater are identified and rated (quantified). The W_2RAPs need to be used by Swartland Municipality to manage the identified risks according to its potential impacts on the receiving environment / community / resources.

Swartland Municipality actively implements their Operational and Compliance Water and Effluent Quality Sampling Programmes in order to promptly identify water and effluent quality failures and to react accordingly.

Table 6.2.6.1: Water quality monitored for formal schemes

Scheme	Monitoring Intervals
Swartland Bulk Distribution System	Daily
Withoogte Bulk Distribution System	Daily
Koringberg	Monthly
Riebeek Wes and Ongegund	Monthly
Riebeek Kasteel	Monthly
Yzerfontein	Monthly
Darling	Monthly
Moorreesburg	Monthly
Malmesbury	Monthly
Abbotsdale	Monthly
Kalbaskraal	Monthly
Riverlands and Chatsworth	Monthly

Note: Monitoring Intervals: 1 – Daily, 2 – Weekly, 3 – Monthly, 4 – Annually, 5 – Never

6.2.7 Water Quality for Rudimentary Schemes

Table 6.2.7.1: Water quality monitored for rudimentary schemes

Scheme	Monitoring Intervals
Rural: Farms supplied with water from own sources	Monthly by the Health Officials of the West Coast District Municipality

Note: Monitoring Intervals: 1 – Daily, 2 – Weekly, 3 – Monthly, 4 – Annually, 5 - Never

6.2.8 Borehole Abstraction

The three Riverlands boreholes are metered and the abstraction volumes are adequately monitored and recorded on a monthly basis.

Table 6.2.8.1: Borehole abstraction monitored

Scheme	Current Production Boreholes / Well Numbers	Monitoring Intervals
Riverlands	Riv BH1, Riv BH2, Riv BH3	Automatic flow meter (Linked to Telemetry), No chemistry parameters

Note: Monitoring Intervals: 1 – Daily, 2 – Weekly, 3 – Monthly, 4 – Annually, 5 - Never

6.3 WATER QUALITY

Quality of water returned to the resource is increasingly becoming an issue in South Africa. Water quality is regulated according to permits, licenses and standards and it is very important that these be put in place if not already effective.

The water returned to the resource may be from either point source e.g. WWTWs, the quality of which will be measurable, or diffuse sources e.g. grey water from informal settlements the quality of which will be less easy to measure.

Different types of pollution need to be dealt with in this section, both from “point” (e.g. an industry) and “diffuse” (e.g. an informal settlement or agricultural holding) sources.

Point sources: refer to discharges from identifiable users at a point (generally a pipe discharging to a stream). Often this is associated with industries but also includes WWTWs that may discharge water- containing waste back to a resource. For industries not discharging directly to a resource but to the sewer, the WSA needs to monitor the types of chemicals being disposed of and that these are disposed of to the WWTWs within the parameters laid down in bylaws. In this way, the effluent can be treated effectively with no adverse effects on the WWTWs' operation. If these sources are polluting directly to a resource because of, for example, poor storm water management, steps need to be taken to ensure that these flows are directed through treatment works.

It is therefore important for the WSA to monitor the types of effluent being disposed of into the sewers as well as the discharges from the WWTWs itself.

Diffuse sources of pollution refer to a number of cases where polluted water is returned to the resource (both surface and groundwater) without being treated. This mainly occurs when:

- There are no, or poorly managed storm water systems which results in run-off and pollution of water sources.
- There are poorly operated and maintained sanitation facilities e.g. blocked sewers, pump failures etc. leading to sewage leaks and pollution of water resources.
- There is runoff from informal settlements (e.g. where standpipes are poorly designed with no drainage system).
- There are inadequate sewage works.
- Sludge from pit latrines is not disposed of adequately. To avoid this, the use of double pits could be explored.
- There is run-off from solid waste sites (e.g. where no leachate collection system exists).
- There is run-off from agricultural areas e.g. feedlots, cultivated lands. The most urgent task to be undertaken is for the WSA to find out where there are problems and prioritise those areas that represent the greatest threat to water quality. The WSA needs to address the above (i.e. both point and diffuse sources of pollution).

Table 6.3.1. Water Quality

Water Quality Component	In Place? Yes/No	Status Quo (%)
Is there a Water Safety Plan in Place?	Yes	80%
Reporting on quality of water taken from source: Urban and Rural	Yes	80%
Quality of water returned to the resource: Urban	Yes	80%
Quality of water returned to the resource: Rural	No	Not Applicable
Is there a pollution contingency measures plan in place?	Yes	60%
Quality of water taken from source: Urban - % monitored by WSA self?	Yes	80%
Quality of water taken from source: Rural - % monitored by WSA self?	No	Not Applicable
Quality of water returned to the source: Urban - % monitored by WSA self?	Yes	80%
Quality of water returned to the source: Rural - % monitored by WSA self?	No	Not Applicable
Are these results available in electronic format?	Yes	80%
% Time within SANS241 standards per year	Yes	80%

Note: Percentage in the above table: None – 0%, Limited – 20%, Partial – 40%, Good – 60% and Excellent – 80%.

WATER SAFETY PLAN AND INCIDENT RESPONSE MANAGEMENT

DWS's 2022 Blue Drop requirements for drinking water quality management were as follows (Indicators for evaluation of blue drop status):

Table 6.3.2: 2022 Blue Drop Certification Standards and Requirements

KPA Number	Key Performance Area (Weighting)	Requirements	Sub Requirements
1a	Capacity Management (15%)	Registration of Water Treatment Plant	The water treatment facility is registered as per the requirements of Regulation 2834 or as per Blue Drop Standard (Draft Regulation 813). Evidence: 1) Classification Certificate for WTW
1b		Registration of Process Controllers & Supervisor	Process Controllers and Supervisors are classified as per Reg. 2834 or draft Reg. 813 (Blue Drop Standard). This requirements will apply for all shifts or a specific water supply system. Evidence: 1) Copies of Registration Certificates of Process Controllers and Supervisors. 2) Copies of the classification certificates of all Process Controllers / Operators and Supervisors / Superintendents must be uploaded on the IRIS. 3) Compliance with Reg. 2834 coupled with shift details; WSI must indicate shift patterns or measures in place when a shift does not comply with Regulatory Process Control requirements. 4) WSI must indicate Process Controllers and / or Supervisors that are "shared" across different plants / sites.
1c		Maintenance Capacity	The water system must be served by a competent maintenance team (internal or outsourced), executing the maintenance work according to an acceptable maintenance plan / schedule. Evidence: 1) The plant and pump stations (both mechanical and electrical). Internal or evidence of outsourced. 2) Term Contract (Outsourced) or Organisational Structure (Internal). 3) Proof of team competency (Qualification & Experience & Trade Test). 4) Provide a site specific operation and maintenance schedule. 5) Logbook with maintenance entries as per maintenance plan.
1d		Engineering Management Capacity	The WSI must ensure that a competent engineering specialist oversee water treatment and supply operations, maintenance and general asset management. Evidence: 1) Number of Engineering staff available in the WSI taking responsibility for Maintenance Planning and General Asset Management.
1e		Scientific Capacity	The WSI must ensure that a suitably qualified professional scientist oversee the implementation of the Operational and Compliance monitoring programme (sampling and analyses). Evidence: 1) Number of Scientific Staff appointed for the management of drinking water quality management, incl. implementation of the water safety planning process and monitoring programme, sampling and analyses.
2a	Drinking Water Quality Risk Management (20%)	Water Safety Planning	The WSI must has a Water Safety Plan in place which complies to the World Health Organisation's guide for water safety planning, in terms of competencies, comprehensive DWQ risk assessment, control measures, monitoring programmes, etc., providing for a risk management approach to drinking water quality monitoring for the water supply system. A WSI could have an overarching water safety plan, but it shall have reference to all requirements for each water supply system. Evidence: The WSI must provide a water safety plan, adhering to WHO standards: 1)Team Assembled. 2) System detailed in the Plan. 3) Plan reviewed in past 3 years. 4) Detailing system-specific Hazard / Risk Assessment 5) Adequate Control measures identified (Planned for- or implemented). Proof that the Water Safety Plan has been approved by Council).
2b		Operational Monitoring	Each WTW will have an operational monitoring programme in place which informs the operational treatment efficacy (as per the required frequency) of the treatment facility as per SANS 241. Evidence: Details of Operational Monitoring 1) Proof of Operational Monitoring sites, determinands and frequency. 2) Samples must include i) inflow (raw), ii) pre-filtration, iii) post-filtration, iv) final, v) network. 3) Determinands monitored must at least incl. pH, Turbidity, Free Chlorine (Final). 4) As per Authorization measure abstraction rates (Ml/d).

Table 6.3.2: 2022 Blue Drop Certification Standards and Requirements			
KPA Number	**Key Performance Area (Weighting)**	**Requirements**	**Sub Requirements**
2c		Compliance Monitoring	Each WTW will have a compliance monitoring programme in place (implemented), informed by the Water Safety Planning process, and SANS 241 requirements, as per the required frequency, determinands and sampling points. Evidence: Details of Compliance Monitoring Programme: 1) Compliance monitoring sampling sites informed by Water Safety Planning Process. 2) Determinands monitored for informed risk assessment process.
2d		Laboratory Credibility	All compliance monitoring samples must be analysed at a credible laboratory (either accredited according to SANAS requirements or participating in a Proficiency Testing scheme with acceptable Z-scores) for the required determinands, with an acceptable turnaround time. Evidence: WSI must prove that all compliance samples are analysed at a credible laboratory 1) Certificate of Accreditation for applicable methods or Z-scores results in a recognised Proficiency Testing Scheme. 2) Or proof of intra- and inter-laboratory proficiency (quality assurance as prescribed in Standard Methods).
2e		Incident Management Protocol	As part of the DWQ Risk Management preparedness the WSI should have an Incident Management Protocol in place and an Incident Register detailing incident, causes, rectification and timeframes. The Treatment works will have a WTW Logbook to record all treatment process related incidents. Evidence: WSI must have an Incident Management Protocol to guide reaction should there be a failure in DWQ; Detailing Communication Processes and Treatment Process protocols 1) A DWQ Incident Register detailing i) Incidents. ii) Causative factors. iii) Rectification. iv) Timeframes. 2) A WTW Logbook detailing all treatment process related incidents.
3a	Financial Management (10%)	Water Supply Operations	The WSI must determine the actual operations and maintenance cost of water treatment and supply (reticulation) per water supply scheme and express this in R/m3. (This determination should include energy use for treatment and pumping) Evidence: 1) Municipality / WSI must provide evidence of a proper O&M cost determination for the entire water supply system (treatment works, network, pumpstations) This must at least include the Energy Consumption, Compensation of Employees, Chemical Cost and Maintenance Cost drivers. 2) Provide an operational cost determination per m^3 treated.
3b		Water Treatment and Supply O&M Budget	The WSI must have an annual O&M budget per water supply system, for water treatment and supply / reticulation. Evidence: The WSI must provide proof of the water treatment system Operations & Maintenance Budget per annum (for the audit period) -Including the water treatment works, bulk distribution and reticulation.
3c		Water Treatment and Supply O&M Expenditure	WSI must provide evidence of the water treatment and supply O&M expenditure per annum (to be measured in relation to the original budget). Evidence: WSI to provide proof of the water treatment system O&M expenditure per annum.
3d		Supply Chain Management of services and Treatment Products	There must be appropriate supply chain management process in place to ensure continuous availability of treatment chemicals (and related consumables), maintenance and spares. Evidence: WSI must provide proof of approved contracts for outsourced Technical Services (i.e. maintenance, spares, calibration) and supply of chemical and treatment consumables (where applicable).
3e		Capital Budget and Expenditure	The WSI must provide current (and planned) capital budget and expenditure for refurbishment and/or upgrades of the specific water treatment and supply system. Evidence: In terms of refurbishment or upgrades, the WSI must provide the capital budget for treatment and supply system and expenditure to date.
4a	Technical Management (20%)	Water Treatment Works Design and Supply Capacity Management	The WSI must be authorised for a Section 21(a) water use, measure operations (volumes treated per day) accordingly and record for planning and audit purposes. It is also required to have a record of the available supply/pumping capacity to convey water to reservoir(s). Evidence: 1) Documented design capacity of the water treatment facility. 2) Documented daily water treatment volumes (over 12 months of

Table 6.3.2: 2022 Blue Drop Certification Standards and Requirements			
KPA Number	**Key Performance Area (Weighting)**	**Requirements**	**Sub Requirements**
			assessed period) in Ml/d. 3) WSI is required to provide a motivation / proof of accuracy of meter readings (calibration or verification).
4b		Process Audit	A water treatment facility must be subjected to an annual condition assessment and/or a Process Audit (conducted by a duly qualified professional person) to inform functionality of the infrastructure. Risk findings must be incorporated in the Water Safety Planning process. Evidence: 1) Condition Assessment report (conducted by a qualified engineering/technical/scientific internal resource). Evidence required of audit findings and recommendations on treatment facility status (Jul '21 to Sept '23). 2) Process Audit report (conducted by a duly qualified independent professional person) to include the (design) capability of the plant to meet compliance standards, as well as actual performance of unit processes (Period: Jul '15 to Sept '23). 3) Evidence/plan of implementation of 1) or 2) audit recommendations during year(s) following Audit Report.
4c		Water Reticulation Inspection	The WSI shall ensure that the water supply system is subjected to at least an annual inspection to determine asset condition of pump-stations, reservoirs, and the network in general. The results of this inspection must inform the water safety planning process, especially the reservoirs. Evidence: 1) Site inspection and report on water reticulation network (incl. pump station/s and reservoirs). 2) Provide evidence in form of capacity and condition assessment/audit description, findings, and recommendations of system. 3) Report to include a water flow balance that provides an indication of Unaccounted for Water.
4d		Water Treatment and Supply Asset Management	Water Infrastructure must be included in the WSI Asset Register (as per AGSA requirements). Evidence: 1) Updated Water Treatment and Supply Infrastructure / Asset Register 2) Asset Register must detail relevant equipment and infrastructure, asset description, location, condition, RUL and replacement value. 3) Proof that Asset Register is used to inform Maintenance Plan.
5a	Drinking Water Quality Compliance (35%)	Monitoring Data Submission to DWS	A WSI must ensure that all Compliance Monitoring data is submitted on a monthly basis to the Department of Water and Sanitation on the required Regulatory System (IRIS) (12 months). Compliance monitoring must be adhering to the water safety planning informed monitoring programme. Evidence: 1) The WSI should ensure that all DWQ data (compliance incl. risk-based) is submitted to the DWS 2) Data submitted for 12 months of the audit period. 3) All sampling results submitted as per the WSP monitoring programme. 4) Submitted on the IRIS.
5b		Microbiological Compliance	The Microbiological Quality of water supply must comply with the South African National Standard (SANS241: 2015). Evidence: The Microbiological Quality of water supply must comply with the South African National Standard (SANS241) as per the Excellent Requirements set by the Blue Drop Programme.
5c		Chemical Compliance	The Chemical Quality of water supply must comply with the South African National Standard (SANS241: 2015), for both Acute and Chronic health determinands. Evidence: 1) The Chemical Quality of water supply must comply with the South African National Standard (SANS241) as per the Excellent Requirements set by the Blue Drop Programme. a) Chemical Acute Health Excellent Compliance (97% for < 100 000 and 99% for > 100 000) and Good Compliance (95% for < 100 000 and 97% for > 100 000). b) Chemical Chronic Health Excellent Compliance (95% for < 100 000 and 97% for > 100 000) and Good Compliance (93% for < 100 000 and 95% for > 100 000).
5d		Risk-defined Compliance	All Determinands identified in the Risk Assessment Process must be included in the risk defined monitoring programme and must be measured for compliance with SANS 241 limits. Evidence: The Compliance of all Determinands identified during the Risk Assessment Process to be included in the risk-defined monitoring programme, must comply with the requirements set in the SANS 241 (Excellent Compliance 95% for < 100 000 and 97% for > 100 000 and Good Compliance 93% for < 100 000 and 95% for > 100 000)

Table 6.3.2: 2022 Blue Drop Certification Standards and Requirements			
KPA Number	**Key Performance Area (Weighting)**	**Requirements**	**Sub Requirements**
5e		Water Treatment Efficiency Index	The compliance of operational determinands as monitored at the final water sampling point must comply with SANS 241 Requirements. Evidence: The compliance of operational determinands as monitored at the Final Water sampling point must comply with the SANS 241 Requirements. (Excellent Compliance 93% for < 100 000 and 95% for > 100 000 and Good Compliance 90% for < 100 000 and 93% for > 100 000)
6a	Bonus (Max 10%)	Process Controller Training	Process controllers and supervisory staff must be subjected to relevant training over the past 24 months as from the date of audit. Cross-pollination and in-house training will be acknowledged as non-accredited capacity building. Evidence: 1) Proof of Process Controller and Supervisor staff being subjected to relevant training past 24 months. 2) Evidence must include training dates, subject, attendees, trainer – certificates of training will be an advantage. 2) Technical or Process Control related, incl. OHS training. 3) Training can be accredited or 'credible' training. 4) Cross-pollination and in-house training will be acknowledged as non-accredited capacity building.
6b		Performance Agreement	Institutional arrangement between the WSA and the Water Services Provider, then it is essential that the legislatively required contract (Section 19 of the Water Services Act) stipulate the Service Level Agreements between the two entities. Evidence: 1) A copy of the workplan and Performance Agreements of DWQ Management between the WSA and WSP as per Section 78 arrangements, aligned to Water Treatment Operations Requirements and SANS 241 compliance targets. 2) A copy of the Performance Agreement between the responsible manager (official) which stipulates Drinking Water Quality Management responsibilities and performance expectations related to supply and quality (SANS 241).
6c		Publication of Drinking Water Results	The WSI takes responsibility to inform the public of quality of drinking water supplied. Evidence 1) Evidence on the various means of drinking water quality information made public to constituencies supplied with drinking water from this specific water supply system. 2) Newspaper publication, Municipal billing, Community Radio, Annual Report, Posters & Pamphlets, Population and promotion of “My Water” or Electronic Webpage. 3) Water Services Institutions must provide evidence of adequate marketing of Blue Drop registered water supply systems.
6d		Water Demand Management	WSI has a water balance of its water supply system in terms of Section 11 Regulation 509 developed under Section 9 of the Water Services Act. Evidence: Water Conservation and Water Demand Management Plan which provides a strategy and work plan that identify, quantify, monitor and manage leakages and water losses of any kind. The bonus will be maximised should a Water Balance be provided (IWA standard or better).
7a	Penalties (Max 10%)	Data Variances and Discrepancies	A penalty will be applied if hardcopy records present differences to what was uploaded onto IRIS or reported to the public. Evidence: A Disqualifying Penalty will apply should the Department find proof during / post assessment that the WSI is guilty of an offence as per Section 82 of the Water Services Act, by only submitting partial or false information in order to present a false impression of DWQ performance and/or compliance.
7b		Less than 11 Months of Compliance Data	If less than 11 months’ data is available to assess compliance. Evidence: A WSI will be penalised if less than 11 months compliance data is uploaded on IRIS.
7c		Non-Notification of Drinking Water Failure	Should the WSI fail to present evidence of an Adverse Water Quality Alert Notice (incl. Boil Water Notice) issued for significant (sustained) failures exceeding 48hours. Evidence: If any Directive/ non compliance letter was issued a year prior or during the BD Assessment Period by the Department or Delegated Authority to the WSI for the specific WTW or water supply system, then the WSI should present proof of attempts made to adhere to Directive/ non compliance letter Requirements.
8	Disqualifier (s)	That a WSI will be disqualified from being eligible for Blue Drop status or positive scoring if: 1) There is evidence of falsifying any information related to the Drinking Water Quality Management. 2) A system fails to meet compliance levels in Microbiological and Chemical quality compliance. 3) Less than 9 months of water quality data is available.	

A Water Safety Plan was drafted during the 2021/2022 financial year by the West Coast District Municipality for the Swartland bulk water distribution system. Swartland Municipality drafted a Water Safety Plan for their internal network distribution systems during 2022/2023. A qualified, dedicated team was established by both the West Coast DM as well as the Swartland Municipality to compile the Water Safety Plans. The operational personnel were also included in the Water Safety Plan Team from the start of the process, because of their detailed knowledge about the existing water quality problems in the supply systems and the WTWs. They are also the best familiarised with their systems and know exactly what the existing operational monitoring controls are and the potential water quality hazards and hazardous events and the risks associated with these hazards. They will also contribute to the success of the plan through facilitating its ownership and implementation.

A detailed risk assessment was executed. This step of the Water Safety Plan establishes the risk that the water quality standard will not be met as well as the consequences if the standard is not complied with. A list of potential hazards and hazardous events were compiled and worked through with the Water Safety Plan Team. Additional hazards were also added to the list by the Water Safety Plan Team and the potential hazards were evaluated for each of the distribution systems.

The impact of each of the hazards or hazardous events were characterised by assessing the severity of the likely health outcome and the probability of occurrence. This step of the Water Safety Plan establishes the risk that the water quality standard will not be met as well as the consequences if the standard is not complied with.

An Improvement / Upgrade Plan was also developed for all the existing significant risks, where the existing controls were not effective or absent. Each identified improvement was linked to one of the Water Safety Plan Team members to take responsibility for implementation together with an appropriate time frame for implementation of these controls.

Many actions are important in ensuring drinking water safety but do not directly affect drinking water quality and are therefore not control measures. These are referred to as supporting programmes and are activities that ensure the operating environment, equipment used and the people themselves do not become an additional source of potential hazards to the drinking water supply. The existing Supporting programmes of Swartland Municipality are included in their Water Safety Plan.

An Incident Management Protocol (IMP) exists to guide Swartland Municipality’s response to resolution and communication of drinking water quality failures (as defined according to the latest version of SANS 241). The objective of Swartland Municipality’s IMP is to ensure that the failures are dealt with and are managed in an efficient and effective manner, using a consultative and transparent approach. The Water Services Act (No.108 of 1997) states that Water Services Institutions must take reasonable steps in an emergency situation to address incidents and to minimise the health risks.

The goal of Water and Safety Management Procedures is to highlight the procedures / protocols implemented and adhered to by Swartland Municipality and forms part of Swartland Municipality’s Incident Management Protocol.

The Water Safety Plan Team of Swartland Municipality is committed to meet regularly to review all aspects of the Water Safety Plan to ensure that they are still accurate. In addition to the regular three year review, the Water Safety Plan will also be reviewed when, for example, a new water source is developed, major treatment improvements are planned and brought into use, or after a major water quality incident.

W_2RAP AND FAILURE RESPONSE MANAGEMENT

DWS's 2021 Green Drop requirements for waste water collection and treatment include the following (Indicators for evaluation of Green drop status).

Table 6.3.3: DWS's 2021 Green Drop requirements for waste water treatment and collection

No	Key Performance Area	Requirements	Sub-Requirements
A	Capacity Management	A.1: Registration of Wastewater Treatment Plant	a) The wastewater treatment facility is registered as per the Requirements of Regulation 2834/813 (Draft Regulation 813 consider for bonus).
		A.2: Registration of Process Controllers and Supervisor	a) Copies of Registration Certificates of Process Controllers and Supervisor(s). b) Copies of the classification certificates of all process controllers/operators and supervisors/superintendents must be uploaded on the IRIS. c) Compliance with Regulation 2834 (must comply at least 50% in each of the shifts); WSI must indicate shift patterns or measures in place when a shift does not comply with Regulatory Process Control Requirements. d) WSI must indicate process controllers and/or supervisors that are 'shared' across different plants/sites.
		A.3: Maintenance Capacity	a) Evidence of Maintenance Team used for general maintenance work at the plant and pumpstations (both mechanical and electrical) - (Internal or evidence of Outsourced Term Contract). b) Information on in-house staff (or organogram) or external contractor/s. c) Provide additional proof of competency of team (e.g. Qualification and Experience and Tradetest). d) Provide a site specific operation and maintenance schedule (routine / scheduled). e) Contract or Logbook with maintenance entries to serve as evidence of the above aspects.
		A.4: Engineering Management Capacity	Number of Engineering Staff available in the Municipality taking responsibility for Maintenance Planning and General Asset Management): a) 1 x Engineering Technician; b) 1 x Engineering Technologist; c) 1 x Engineer, or d) More than one of the above.
		A.5: Scientific Capacity: Sampling and Laboratory Information Management (Advanced Systems only)	Number of Scientific Staff appointed for the management of wastewater treatment management, incl. sampling and analyses: a) 1 x Candidate Scientist; b) 1 x Professional Scientist, or c) More than one of the above.
B	Environmental Management	B.1: Wastewater Risk Management	a) A Risk Register available on all risks posed by the wastewater collection and treatment processes to the immediate environment (not older than 3 years). b) A Wastewater Risk Abatement Plan; is the more advanced standard, but will only be accepted if not older than 3 years, and approved by Management. - A practical and site specific Wastewater Risk Abatement Plan (W_2RAP) is in place which identify and prioritise risks, with measures to mitigate inefficiencies/inadequacies that result in non-compliance - Implementation evidence and proof of management commitment. c) Implementation evidence and proof of management commitment. Providing evidence of risk mitigation (identified during the audit period).
		B.2: Operational Monitoring	Details of Operational Monitoring: a) Proof of Operational Monitoring sites, determinands and frequency; b) Samples must include: i) inflow, ii) outflow, iii) process flows, d) sludge; c) Determinands monitored; d) as per Authorisation / as per best practice per technology type; e) Frequency: as per Authorisation /as per best practice.

Table 6.3.3: DWS's 2021 Green Drop requirements for waste water treatment and collection

		B.3: Compliance Monitoring (Effluent)	Details of Compliance Monitoring (For ALL Effluent Discharges). a) Sampling Sites as per Authorisation; b) Determinands as per Authorisation (This would include determinands not categorised as Microbiological, Chemical or Physical, e.g. SAR, biomonitoring) ; c) Sampling frequency occurs as per Authorisation Requirements Note1: For zero-effluent treatment systems - still need to monitor for impact on catchment / environment (for both lined and unlined systems). Where oxidation ponds are producing effluent for irrigational purposes then General Limits apply. Note 2: A monitoring programme alone will not be sufficient to obtain full score; Analyses results should proof implementation of the monitoring programme.
		B.4: Sludge Classification and Monitoring (Advanced Systems Only)	a) Proof of Sludge Classification b) Provide Sludge Treatment Monitoring Programme c) Provide Sludge Monitoring Results d) Sludge Handling and Management Plan
		B.5: Laboratory Credibility	a) Name lab(s) for operational analysis (in-house or on-site) and lab for compliance analysis/checks (in-house or external) b) Certificate of Accreditation for applicable methods c) Or Z-scores results following participation a recognised Proficiency Testing Scheme (–2 ≥ z-score ≥ 2 are unacceptable) d) Or Proof of Intra- and Inter-laboratory proficiency (quality assurance as prescribed in Standard Methods) e) Proof Turn Around time allows for proper process control (less than 5days)
C	Financial Management	C.1: Wastewater Operations Cost Determination	a) Municipality / WSI must provide evidence of a proper operations cost determination for the entire wastewater system (incl. Pump stations). This must at least incl.: i) Energy Consumption; ii) Compensation of Employees; iii) Chemical cost; iv) Maintenance cost, etc. b) Provide an operational cost determination per m^3 treated. Note: budget / cost excluding interest and redemption on capital
		C.2: Energy Demand	WSI is able to provide DWS with proof of Energy Efficiency Management: a) Energy Demand figures: Current and 3-year Projections (Energy Efficiency Management), based upon Specific Power Consumption (SPC, kWh/m^3), and b) Energy unit cost (R/kWh) and energy consumption figures for the specific WWTW (R/m^3)
		C.3: Operations and Maintenance Budget	WSI to provide proof of the wastewater system O&M Budget per annum
		C.4: Operations and Maintenance Expenditure	WSI to provide proof of the wastewater system O&M Expenditure per annum Note: budget / cost excluding interest and redemption on capital (Comparing Expenditure / m^3 vs Cost Determination / m^3
		C.5: Supply Chain Management of Services and Treatment Products (Advanced Systems only)	WSI must provide proof of approved contracts for Outsourced services (i.e. Maintenance) and Treatment Chemical Supplies
D	Technical Management	D.1: Wastewater Treatment Works Design Capacity Management	a) Documented design capacity (hydraulic and organic) of the wastewater treatment facility i) Design capacity as Average Dry Weather Flow (ADWF)and COD load to the plant and b) Documented daily receiving flows over the 12months of assessed period (ideally ≤ than design capacity) i) Evidence of daily flows and subsequent calculated averages. Measurement method to be explained ii) Evidence of peak wet weather flow to plant during rain events (record rain event and flow to plant) iii) Evidence of minimum night flow (minimum monitoring: monthly)

Table 6.3.3: DWS's 2021 Green Drop requirements for waste water treatment and collection

			iv) Water services institution is required to provide motivation/proof of accuracy of meter readings c) Monitoring of outflow volumes (available records).
		D.2: Process Audit	a) Condition Assessment report (conducted by a technically/scientifically qualified municipal official); evidence required of audit findings and recommendations on treatment facility status (Previous Audit year up until Oct '21) OR The Process Audit (conducted by a duly qualified independent professional person)to include the (design) capability of the plant to meet compliance standards, as well as actual performance of plant (Period: July 2015 to October 2021). b) Evidence/plan of implementation of findings during year(s) following Audit Report required.
		D.3: Sewer Main Inspection	Site inspection of sewer reticulation network and pump-station/s. Provide evidence in form of capacity and conditional assessment/audit and recommendations of system. Report to include flow balance that provides evidence which % of total sewage is received at treatment plant. Note: both the process audit/Conditional Assessment and sewer network report could serve as baseline to the W_2RAP (may run concurrently with "system description and risk identification/rating") NB! Must report on Functionality of Pump stations in the Sewer Collector System.
		D.4: Wastewater Asset Register	Updated sanitation / wastewater Infrastructure Asset Register a) Proof of Asset Register, evidence to be submitted. Asset register to include movable equipment and immovable infrastructure / assets with matching detail. The asset register must detail: i) relevant equipment and infrastructure ii) indicate asset description iii) location iv) condition (remaining useful life) v) replacement value b) Proof Asset Register is used to inform Maintenance Plan.
		D.5: Bylaws and Enforcement (Local Regulation) (Advanced Systems only)	Proof of the a) Bylaws and b) Enforcement providing for the regulation of the municipal sewer system, incl. the following elements: i) industrial (trade) influent (volumes & quality) discharged into municipal system, ii) package plants, iii) decentralized systems, iv) vacuum tank discharges, v) Spillages into the environment, and vi) Storm-water connections to sewer system. For DPW and Private Plants: Copy of municipal bylaws and evidence of compliance to relevant sections.
E	Effluent and Sludge Quality Compliance	E.1: Monitoring data submission to DWS	a) 12 months of Compliance Monitoring data submitted to DWS on the IRIS b) Frequency: Monthly Submission (or as per Authorisation) c) WSA must ensure that 12 months' sets of results are submitted and recorded on the IRIS prior to the assessment. Note: All compliance results' data required If proven that the system is not generating effluent, and oxidation pond content is strictly used as per Authorisation Conditions, then 12 months' data records not necessary but according to Authorisation requirements.
		E.2: Water Use Authorisation	Copy of authorisation, detailing Effluent Quality Standards. NOTE: List Standards to comply with. (GA or License Conditions)
		E.3: Effluent Quality Compliance	a) 90% Microbiological Compliance (e.g. E Coli; Faecal Coliforms) b) 90% Chemical Compliance (e.g. COD, Ammonia, Nitrogen, Nitrate, Nitrite, Chlorine, Ortho-Phosphates, Fluoride, Arsenic, Cadmium, Copper, Manganese, Iron, Selenium, Zinc, Boron, etc.) c) 90% Physical Compliance (e.g. pH, Suspended Solids, Electrical Conductivity, Soap, Oil or Grease, etc)

Table 6.3.3: DWS's 2021 Green Drop requirements for waste water treatment and collection			
		E.4: Sludge Quality Compliance (Advanced Systems Only)	a) Sludge treatment not managed / monitored (Monitoring records must be produced); b) In case of ponds systems, provide schedule for desludging of system.
F	Green Drop Bonuses	F.1: Process Control Training	Proof of Process Controller staff being subjected to relevant training the past 24 months (Technical or Process Control related incl. OHS)
		F.2: Storm Water Management	Proof of a Storm-water management plan detailing how storm-water (or other extraneous flow e.g. groundwater) entry is quantified, managed and monitored to prevent entry to sewer systems. Plan should also include measures to prevent sewage from entering storm water systems. Evidence of implementation required.
		F.3 Water Demand Management	Water Demand Management Plan which provides a strategy and/or work plan that identify, quantify, monitor and manage leakages and water losses of any kind that (may) create an artificial water demand due to higher hydraulic loading of wastewater collection and treatment infrastructure. The bonus will be maximised should a wastewater flow balance be provided. No Drop Assessment.
		F.4 Capital Projects planned for upgrades or refurbishment of wastewater treatment and collector system	Proof of approved business plans for utilizing MIG, WSIG or Municipal Capital Budget for upgrades of refurbishment. Detail for investment required.
		F.5 Sludge Reuse	Provide proof of plant-specific initiatives that contribute to wastewater resource and climate resilience objectives: energy efficiency, energy generation, beneficial use of sludge nutrients, etc. A full score will be awarded if the reduced footprint can be demonstrated (projected CO2 equivalents improved by the initiates).
		F.6 Additional Impact Monitoring	Incl. Groundwater and Up-stream / Down Stream monitoring
G	Green Drop Penalties	G.1: Wastewater Treatment Works operating beyond hydraulic design capacity.	a) Design capacity as Average Dry Weather Flow (ADWF)and COD load to the plant and b) Documented daily receiving flows over the 12months of assessed period (ideally ≤ than design capacity). Based on information provided in D.1.
		G.2: Any sewer collector pump station dysfunctional causing long term spillage.	Based on information provided in D.3.
H	Disqualifier	H.1: Withholding information	Disqualifying Penalty will apply should the Department find proof during / post assessment that the WSI is guilty of an offence as per Section 82 of the Water Services Act, by only submitting partial information in order to present a false impression of WWQ Performance and/or compliance.
		H.2: Directive Status	If any Directive was issued over the GD Assessment Period by the Department or Delegated Authority to the WSI for this specific WWTW and/or system, then the WSI should present proof of attempts made to adhere to Directive Requirements.

W_2RAPs were drafted during 2018 for all the WWTWs and sewer drainage networks in Swartland Municipality. The W_2RAPs include the following sections:

- Wastewater Quality Compliance
  - Wastewater Risk Abatement Plan
- Wastewater Quality Failures Response Management
  - Wastewater Incident Management Protocol
  - Evidence of Implementation of Protocol
- Wastewater Quality Monitoring

  - Operational Monitoring
  - Compliance Monitoring
  - Historical Energy Demands and Future Projected Demands
- Recommendations and Way Forward

A detailed risk assessment was executed. A list of potential hazards and hazardous events were compiled and worked through with the W_2RAP Team. The impact of each of the hazards or hazardous events were characterised by assessing the severity of the likely health outcome and the probability of occurrence.

An Improvement / Upgrade Plan was compiled for all the existing significant risks, where the existing controls were not effective or absent. Each identified improvement was linked to one of the W_2RAP Team members to take responsibility for implementation together with an appropriate time frame for implementation of these controls.

Swartland Municipality implements the proposed Management Procedures and Incident Response and Emergency Protocols, in which certain reactive procedures are followed when an incident occurs (normally when a malfunction of the treatment processes occur due to power failures, faulty equipment, adverse weather conditions or human error). The Management Procedures and Incident Response and Emergency Protocols forms part of Swartland Municipality's W_2RAPs.

The Incident Management Protocol for plant infrastructure, networks and pump stations include the following categories:

- Incidents (Network blockages, network breakages, electricity failure, mechanical equipment failure, civil infrastructure failure, human injury / fatality)
- Incident is reported
- Assess incident
- Determine alert level
- Determine decision maker
- Respond to incident
- Remedial actions
- Record / Investigate / Review Incident

Incident Management Protocols for the final effluent compliance at the WWTW are also in place, which include the following alert levels:

- Alert Level 1: Incident occurs only once
- Alert Level 2: Incident occurs recurringly
- Alert Level 3: Incident occurs continuously

A set of Compliance Alert Levels, corresponding to the requirements of the various Licences and General Authorisations, is also in place. Authorisations are in place for all the WWTWs.

There are two levels of incident management, firstly when final effluent is discharged that does not meet the requirements of the Water Act, and secondly when an event takes place causing a major pollution event for which emergency response is required. For serious incidents or emergency situations, additional actions and notifications are required, including notification of DWS and the media / public.

The W_2RAP team of Swartland Municipality is committed to meet regularly to review the implementation and all the aspects of the W_2RAP and to determine whether the field assessments need updates or modifications and whether the Incident Response Management Protocol is still adequate.

6.3.1 Reporting on Quality of Water Taken From Source: Urban and Rural

There has to date been no repeated occurrence of water quality issues requiring public notification. The public notifications over the previous number of years were with regard to the drought situation and the water restrictions that were implemented. Should such a problem arise in the future, then Swartland Municipality will inform the users at risk via pamphlets, radio announcements, local newspapers and through direct communication with schools.

A Disaster Management Plan for the West Coast Region is also in place, which confirms the arrangements for managing disaster risk and for preparing for- and responding to disasters within the West Coast District as required by the Disaster Management Act.

Percentage compliance to Drinking Water Acceptable Limits:

Swartland Municipality monitors the water quality in the distribution networks of all the towns within their Municipal Management Area. The Drinking Water Quality Sampling Programme is actively implemented in order to promptly identify water quality failures and to react accordingly. The water quality results are loaded onto DWS's IRIS via the internet. Once entered the data is automatically compared to SANS241. This real-time system allows for immediate intervention to rectify any problems.

Up to present it was not necessary to take any steps to inform the consumers of any health risk regarding the potable water supplied by Swartland Municipality. Safety Management Procedures are however in place, to inform the Municipality's consumers about any potential health risks regarding the water quality, should it become necessary.

The percentage Microbiological and Chemical Compliance for the various distribution systems, as included in the various Blue Drop and Blue Drop Progress Reports, were as follows.

Table 6.3.1.1: Percentage Microbiological and Chemical Water quality compliance per system as included in the various Blue Drop and Blue Drop Progress Reports

Scheme	2013 Blue Drop Progress Report		2014 Blue Drop Report		2022 Blue Drop Progress Report		2023 Blue Drop Report	
	Micro-biological	Chemical	Micro-biological	Chemical	Micro-biological	Chemical	Micro-biological	Chemical
Swartland (Malmesbury)	99.06%	95.50%	99.5%	99.9%	98.7%	98.6%	99.41%	99.90%
Withoogte (Moorreesburg)	96.62%	97.20%	99.9%	99.9%	97.5%	98.3%	99.35%	99.34%

Swartland Municipality's compliance sample results for the period July 2022 to June 2023 are included in Annexure E. The percentage water quality compliance for determinands identified during the Blue Drop risk assessment exceeding the SANS241:2015 limits, for the various schemes, are included in Table 8.1.7.5 of the Future Demand and Functionality Requirements Report.

Number of Monitoring Points for Drinking Water Sufficient:

The current Operational and Compliance Water Quality Sampling Programmes of Swartland Municipality are adequate, with just some additional sampling proposed for the supply from the Paardenberg Dam (See Table 8.1.7.2). No additional microbiological samples need to be taken by Swartland Municipality as indicated in Table 8.1.7.3 under Topic 8 of the Future Demand and Functionality Requirements Report. The additional monitoring required by Swartland Municipality for determinands identified during the Blue Drop risk assessment exceeding the SANS241:2015 limits for the 2022/2023 financial year, as can be noted from Table 8.1.7.5 under Topic 8 of the Future Demand and Functionality Requirements Report, were as follows.

- Yzerfontein: Operational Efficiency: Additional monthly sampling.
- Riverlands and Chatsworth: Acute Health Microbiological: Additional monthly sampling.

6.3.2 Quality of Water Returned to the Resource: Urban

Swartland Municipality monitors the quality of the final treated effluent returned to the Water Resource System at all their WWTWs and the sample results for the 2022/2023 financial year are included in Annexure E.

Industrial Consumers: Special application must be made to discharge industrial effluent into the sewage disposal system including detailed information to ensure the composition of the effluent meets the standards and criteria of the Municipality. The Municipality's Water Services By-laws, with regard to the discharge of industrial effluent into the sewer system, were promulgated and all industrial consumers formally apply for the discharge of industrial effluent into the sewer system. An external accredited laboratory monitors the industrial effluent of the industrial consumers in Darling, Moorreesburg and Malmesbury on a weekly basis. The industrial effluent sample results and graphs indicating the pH and COD compliances are included in Annexure E for the 2022/2023 financial year. The compliance percentages for the quality of industrial effluent discharged into the municipality's sewer system are summarised in the table below for the last three financial years.

Table 6.3.2.1: Compliance percentages of industrial effluent discharged by industrial consumers per parameter

Town	Industrial Consumer	pH Compliance			COD Compliance		
		2020/2021	2021/2022	2022/2023	2020/2021	2021/2022	2022/2023
Darling	Consumer No. 1	67.3%	84.9%	84.0%	77.6%	84.9%	92.0%
	Consumer No. 2	30.6%	40.4%	51.0%	71.4%	63.5%	80.4%
	Consumer No. 3	57.1%	90.6%	84.3%	83.7%	92.5%	100.0%
Moorreesburg	Consumer No. 4	88.0%	98.0%	84.4%	100.0%	100.0%	100.0%
Malmesbury	Consumer No. 5	100.0%	100.0%	100.0%	88.2%	90.6%	95.7%
	Consumer No. 6	100.0%	98.1%	100.0%	98.0%	96.2%	100.0%
	Consumer No. 7	0.0%	0.0%	1.9%	6.0%	16.0%	3.8%
	Consumer No. 8	42.0%	34.6%	17.6%	98.0%	98.1%	100.0%
	Consumer No. 9	7.3%	17.0%	7.1%	76.4%	77.4%	73.2%

Percentage compliance to Effluent Release Acceptable Limits:

The effluent quality compliance sample results are loaded onto DWS's IRIS via the internet. The effluent quality compliance sampling results per parameter per WWTW for the period July 2022 to June 2023 are included in Annexure E.

The overall Microbiological, Chemical and Physical compliance percentages of the final effluent samples taken over the last three financial years at the various WWTWs in Swartland Municipality's Management Area are summarised in the tables below.

Table 6.3.2.2: Percentage Microbiological (Faecal Coliforms) compliance of the compliance samples taken at the various WWTWs for the last three financial years

WWTW	2020/2021	2021/2022	2022/2023
Malmesbury	100.0%	100.0%	100.0%
Darling	91.7%	75.0%	100.0%
Moorreesburg	40.0%	0.0%	8.3%
Koringberg	0.0%	0.0%	0.0%
Chatsworth	16.7%	25.0%	8.3%
Kalbaskraal	100.0%	100.0%	100.0%
Riebeek Valley	91.7%	75.0%	83.3%
Overall Compliance %	**64.9%**	**54.9%**	**57.1%**

Table 6.3.2.3: Percentage Chemical compliance of the compliance samples taken at the various WWTWs for the last three financial years

WWTW	2020/2021					2021/2022					2022/2023				
	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall	Ammonia	Nitrites & Nitrates	COD	Ortho Phosphate	Overall
Malmesbury	75.0%	66.7%	91.7%	58.3%	**72.9%**	91.7%	75.0%	100.0%	91.7%	**89.6%**	50.0%	66.7%	100.0%	100.0%	**79.2%**
Darling	100.0%	100.0%	100.0%	100.0%	**100.0%**	16.7%	100.0%	75.0%	91.7%	**70.8%**	50.0%	100.0%	83.3%	100.0%	**83.3%**
Moorreesburg	0.0%	80.0%	20.0%	40.0%	**35.0%**	0.0%	100.0%	0.0%	40.0%	**35.0%**	16.7%	100.0%	25.0%	41.7%	**45.8%**
Koringberg	0.0%	100.0%	0.0%	8.3%	**27.1%**	16.7%	91.7%	0.0%	16.7%	**31.3%**	0.0%	100.0%	0.0%	8.3%	**27.1%**
Chatsworth	0.0%	100.0%	0.0%	25.0%	**31.3%**	0.0%	100.0%	8.3%	25.0%	**33.3%**	0.0%	100.0%	8.3%	16.7%	**31.3%**
Kalbaskraal	N/A	N/A	16.7%	N/A	**16.7%**	N/A	N/A	33.3%	N/A	**33.3%**	N/A	N/A	58.3%	N/A	**58.3%**
Riebeek Valley	91.7%	100.0%	91.7%	91.7%	**93.8%**	100.0%	100.0%	100.0%	100.0%	**100.0%**	75.0%	100.0%	100.0%	83.3%	**89.6%**
Overall Compliance %	**49.2%**	**92.3%**	**48.1%**	**55.4%**	**60.7%**	**38.6%**	**94.3%**	**46.3%**	**61.4%**	**59.6%**	**31.9%**	**94.4%**	**53.6%**	**58.3%**	**59.3%**

Table 6.3.2.4: Percentage Physical compliance of the compliance samples taken at the various WWTWs for the last three financial years

WWTW	2020/2021				2021/2022				2022/2023			
	pH	Electrical Conductivity	Total Suspended Solids	Overall	pH	Electrical Conductivity	Total Suspended Solids	Overall	pH	Electrical Conductivity	Total Suspended Solids	Overall
Malmesbury	50.0%	100.0%	100.0%	**83.3%**	83.3%	100.0%	100.0%	94.4%	66.7%	100.0%	91.7%	**86.1%**
Darling	100.0%	100.0%	91.7%	**97.2%**	100.0%	66.7%	66.7%	77.8%	100.0%	83.3%	66.7%	**83.3%**
Moorreesburg	100.0%	20.0%	0.0%	**40.0%**	100.0%	10.0%	10.0%	40.0%	100.0%	50.0%	33.3%	**60.0%**
Koringberg	100.0%	8.3%	0.0%	**36.1%**	100.0%	0.0%	0.0%	33.3%	100.0%	8.3%	0.0%	**36.1%**
Chatsworth	100.0%	83.3%	8.3%	**63.9%**	100.0%	83.3%	33.3%	72.2%	100.0%	66.7%	25.0%	**63.9%**
Kalbaskraal	100.0%	100.0%	N/A	**100.0%**	100.0%	100.0%	N/A	100.0%	100.0%	100.0%	N/A	**100.0%**
Riebeek Valley	100.0%	100.0%	91.7%	**97.2%**	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	**100.0%**
Overall Compliance %	**92.2%**	**77.9%**	**53.8%**	**75.8%**	**97.6%**	**67.1%**	**52.9%**	**73.5%**	**95.2%**	**72.6%**	**52.8%**	**74.5%**

The percentage wastewater quality compliance for the various WWTWs, as included in DWS's 2022 Green Drop Report and 2023 Green Drop Progress Report, were as follows.

Table 6.3.2.5: Microbiological, Chemical, Physical and Overall compliance percentages, as included in DWS's 2022 Green Drop Report and 2023 Green Drop Progress Report.

WWTW	2022 Green Drop Report			2023 Green Drop Progress Report (July 2021 – June 2022 data)		
	Microbiological	Chemical	Physical	Microbiological	Chemical	Physical
Malmesbury	100%	87%	100%	100.0%	93.3%	100.0%
Darling	71%	96%	98%	90.0%	60.0%	80.0%
Moorreesburg	Insufficient data set			11.1%	22.2%	48.1%
Koringberg	Insufficient data set			0.0%	NMR	50.0%
Chatsworth	17%	0%	61%	30.0%	10.0%	73.3%
Kalbaskraal	NMR	NMR	NMR	10.0%	0.0%	40.0%
Riebeek Valley	81%	95%	98%	9.1%	48.5%	78.8%

The trend of the wastewater quality compliance for the various WWTWs are summarised in the table below.

Table 6.3.2.6: Trend of microbiological, chemical and physical compliance percentages for the various WWTWs.

WWTW	2016/2017 to 2018/2019			2018/2019 to 2020/2021			2020/2021 to 2022/2023		
	Micro.	Chemical	Physical	Micro.	Chemical	Physical	Micro.	Chemical	Physical
Malmesbury	Same	Increase	Decrease	Same	Decrease	Decrease	Same	Increase	Increase
Darling	Increase	Decrease	Decrease	Increase	Increase	Increase	Increase	Decrease	Decrease
Moorreesburg	Increase	Decrease	Decrease	Decrease	Increase	Decrease	Decrease	Increase	Increase
Koringberg	Decrease	Decrease	Same	Same	Increase	Increase	Same	Same	Same
Chatsworth	Increase	Decrease	Decrease	Decrease	Decrease	Increase	Decrease	Same	Same
Kalbaskraal	Increase	Decrease	Decrease	Same	Decrease	Increase	Same	Increase	Same
Riebeek Valley	Decrease	Same	Decrease	Increase	Decrease	Same	Decrease	Decrease	Increase

Number of Monitoring Points for Effluent Release Sufficient:

Swartland Municipality's existing Operational and Compliance Sampling Programmes are included in Tables 8.1.9.2 and 8.1.9.3. The Compliance Monitoring Programme includes the monthly sampling of the final effluent at all the WWTWs and analyses of all the main quality criteria as required by the authorisations. Results of the samples taken, as part of the implementation of the Compliance Monitoring Programme, are loaded onto DWS's IRIS.

6.3.3 Quality of Water Returned to the Resource: Rural

Swartland Municipality monitors no water returned to the Water Resource system in the rural areas. The Municipal Health Services of the West Coast District Municipality report monthly to the Department of Health on water quality. The EHPs of the West Coast District Municipality take water quality samples in the rural areas of the West Coast Region on request.

6.3.4 Pollution Contingency Measures Plan

It is important to indicate those resources which could potentially become polluted. The specific resource should be indicated, based on detail available to the municipality, for example the number of the borehole/s or the name of the river.

WWTWs and pump stations are the most notable causes for concern. These elements have to be managed properly to prevent untreated wastewater from becoming a health risk or a pollution risk to the environment. Swartland Municipality could conduct a future study, or appoint a specialist environmental consultant to do so, to determine the status quo of existing wastewater infrastructure and the related risk that it presents to the environment and human health.

Some of the sewer pump stations are provided with emergency storage capacity to prevent spillages during power and pump failures. Some of the pump stations are also provided with backup generators for power failure periods. Mobile generators are also available.

Wastewater treatment has to be managed properly to prevent untreated wastewater from becoming a health risk or a pollution risk to the environment.

A Disaster Management Plan for the West Coast District Municipality is also in place to manage potential pollution risks in the West Coast Region.

6.3.5 Quality of Water Taken from Source: Urban – Percentage Monitored by WSA

The raw water quality of the supply to the Withoogte and Swartland WTWs are adequately monitored by the West Coast District Municipality on a daily basis. The potable water quality compliance sample results, as taken over the last twelve months, are included in Annexure E. Swartland Municipality's Water Quality Sampling Programme is included in Table 8.1.7.2.

6.3.6 Quality of Water Taken from Source: Rural – Percentage Monitored by WSA

The water quality in the rural areas is monitored by the EHPs of the West Coast District Municipality. Samples are taken on the farms when complaints or requests for water quality sampling are received by the EHPs. To date there is no monitoring undertaken by Swartland Municipality in the rural areas, other than the areas supplied with water from the current supply networks of Swartland Municipality.

The water quality of the drinking water at the schools in the rural areas is also regularly monitored by the EHPs of the West Coast District Municipality.

6.3.7 Quality of Water Returned to the Source: Urban – Percentage Monitored by WSA

Swartland Municipality's Wastewater Quality Sampling Programme is included under Tables 8.1.9.2. and 8.1.9.3. The final effluent quality sample results for the 2022/2023 financial year are included in Annexure E.

6.3.8 Quality of Water Returned to the Source: Rural – Percentage Monitored by WSA

The water returned to the source in the rural areas is monitored by the EHPs of the West Coast District Municipality.

6.3.9 Water Quality Results in Electronic Format?

All the water quality sample results are available in electronic format and the results are loaded on a monthly basis onto DWS's IRIS.

6.3.10 Percentage Time (Days) within SANS241 Standards per Year

The percentage compliance with the SANS241:2015 limits for the various schemes are included in Table 8.1.7.5 of the Future Demand and Functionality Requirements Report. The water and final effluent quality results and the compliance percentages for the 2022/2023 financial year are also included in Annexure E.

6.4 OPERATION

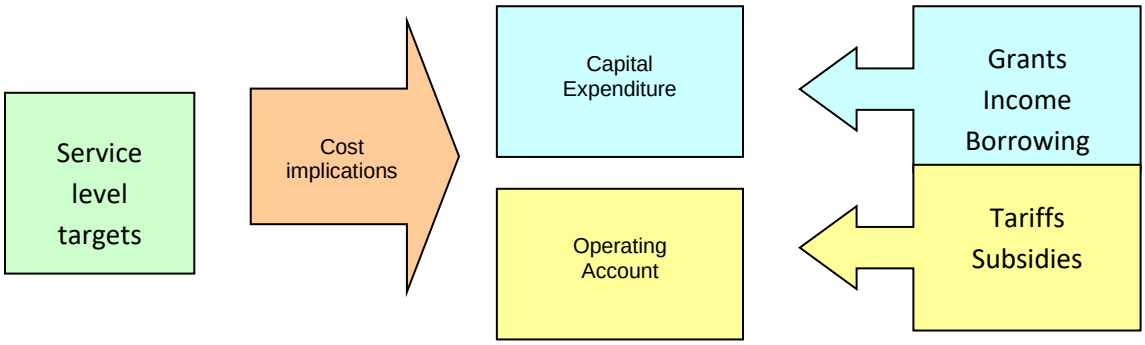
Table 6.4.1: Registration and recording of raw water abstraction

Scheme	Source	Is the abstraction registered with DWS? (Yes/No)	Is the abstraction recorded? (Yes/No)
Withoogte Bulk System	Berg River	Yes	Yes
Swartland Bulk System	Voëlvlei Dam	Yes	Yes
Malmesbury	Paardenberg Dam	Unknown	Yes
Chatsworth/Riverlands	Riverlands Boreholes	Unknown	Yes

7. FINANCIAL PROFILE

This part of the planning process is critical to the final WSDP. By identifying the costs associated with service level targets and the sources to meet the costs, the WSA will be able to see how financially viable their plan is.

Finance overview



As mentioned earlier, service level targets are what drive costs. On the one hand there are capital costs which refer to how much it is going to cost to install the infrastructure. The section on capital expenditure requires the costs of infrastructure to be recorded according to a number of different categories. The section on capital income requires that the sources of finance to meet capital expenditure be recorded in terms of subsidies, consumer payments, money from the WSA's current income and amounts to be borrowed.

Once the infrastructure has been built, there are on-going operating costs. If the projected operating costs associated with capital expenditure are not factored in right from the start (i.e. when service levels are being considered), there is a danger that the WSA will not be able to afford the running cost of the services. Detailed operating costs are not required as part of the tables, however information on the operational budget is requested. This information gives an indication of how "healthy" the WSA's finances are.

Income for operating costs comes from user payments (through tariffs) and subsidies (equitable share). The section on operating incomes requires information on current and future tariffs. Future tariffs are important since they provide an indication of the costs to users for the services set out in the targets.

Whilst income and expenditure will be calculated for the different settlement types, the tables require that the amounts be consolidated for the WSA area as a whole.

It also needs to be noted that costs can only be calculated once the necessary water services policies are in place, for example Free Basic Water Policy, Indigent Policy, and policies regarding the use of equitable share and other subsidies.

Currently the Water Sector suffers an unacceptable high level of financial losses, mainly for reasons that could be addressed through proper governance and management. The financial losses are evidenced by:

- Unacceptably high water leakages.
- Failure to meter water supplied and other forms of unaccounted for water.
- Poor infrastructure planning and poor investments.
- Poor operation and maintenance.
- Pollution of the resource leading to unnecessarily high water treatment costs.
- Corruption, tender fraud, maladministration and lack of governance.

- Failure of local government ring-fence the water sector finances and the diversion of funds allocated to water to non-essential purposes.
- Inefficient institutional performance.
- Poor revenue and debt management.
- Inefficient water pricing that results in the under-recovery of costs.
- A misunderstanding of the free basic water policy and the neglect to manage the quantity of water supplied in terms of the policy and the poor maintenance of indigent registers.

Swartland Municipality is however getting the following right:

- Swartland Municipality is rated amongst the best four municipalities in the country;
- Budget informed by multi-year real financial modelling;
- Sound financial policies, practices and management oversight arrangements, resulting in financial discipline;
- Excellent financial position;
- Cash flow grip: past – present – future;
- Allocations informed/influenced by financial position; and
- Infrastructure investment prioritized per council's financial strategy.

7.1 EXPENDITURE

7.1.1 Ratios and Efficacy Indicators

The table below gives an overview of the ratios and efficacy indicators for Swartland Municipality.

Table 7.1.1.1: Water and sanitation ratios and efficacy indicators

Ratios and Efficacy Indicators	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023
Water service O&M cost as a % of Total O&M Budget	These indicators are not yet part of the Municipality's MFMA Schedule A tables. The key financial indicators and ratios included in the 2023/2024 Final Budget are summarised in Table 7.1.1.2 below.				
Water service O&M cost as a % of Total Asset Value (CRC)					
Sanitation service O&M cost as a % of Total O&M Budget					
Sanitation service O&M cost as a % of Total Asset Value (CRC)					
Untreated waste water units released					
Cost to purify water					
Cost to deliver water to consumers					
Cost to treat waste water					
Cost to deliver waste water to treatment facility					
Blue Drop cost					
Blue Drop number of WTWs					
Green Drop cost					
Green Drop number of WWTWs					

The table below indicates the key financial indicators and ratios as included in the 2023/2024 MTREF Budget.

Table 7.1.1.2: Financial performance indicators and benchmarks

Financial Indicator	Basis of Calculation	Record Prior				2022/2023 Adjusted Budget
		2018/2019 Audited outcome	2019/2020 Audited outcome	2020/2021 Audited outcome	2021/2022 Audited outcome	
Borrowing Management						
Capital Charges to Operating Expenditure (6)	Interest & Principal Paid / Operating Expenditure	3.8%	3.5%	3.1%	2.7%	2.4%
Capital Charges to Own Revenue	Finance charges and repayment of borrowing / Own Revenue	4.0%	3.8%	3.4%	2.6%	-
Borrowed funding of "own" capital expenditure	Borrowing / Capital expenditure excl. transfers and grants and contributions	0.0%	0.0%	0.0%	0.0%	0.0%
Safety of Capital						
Gearing	Long Term Borrowing / Funds and Reserves	61.5%	54.1%	47.3%	0.0%	32.8%
Liquidity						
Current Ratio	Current assets / Current liabilities	5.0	5.2	5.6	6.0	6:1
Current Ratio adjusted for aged debtors	Current assets less debtors > 90 days/current liabilities	5.0	5.2	5.6	6.0	-
Liquidity Ratio (1)	Monetary Assets / Current Liabilities	4.1	4:4	4:5	5:9	6:1
Revenue Management						
Annual Debtors Collection Rate (Payment level %)	Last 12 months receipts / Last 12 months billing	-	96.6%	92.7%	128.4%	97.0%
Creditors Management						
Creditors System Efficiency (5)	% of Creditors paid within terms	100.0%	100.0%	100.0%	100.0%	100.0%
Creditors to Cash and Investments		12.0%	10.6%	10.5%	-	-
Other Indicators						
Electricity Distribution Losses	Total volume losses (kW)	11085288	12096519	11090346	13268804	12096519
	Total cost of losses (Rand)	10135686	13769266	17411843	-	17308534
	% Volume (units purchased and generated less units sold/units purchased and generated)	5.6%	6.0%	5.37%	6.49%	6.0%
Water Distribution Losses	Total volume losses (Kl)	631143	779450	1050678	1253797	857395
	Total cost of losses (Rand)	5049144	5035247	4550757	8099529	5538772
	% Volume (units purchased and generated less units sold/units purchased and generated)	16.72%	18.05%	21.11%	23.10%	21.0%
Employee Costs (7)	Employee costs / (Total Revenue – Capital Revenue)	25.5%	27.2%	29.3%	28.2%	29.3%
Remuneration	Total remuneration / (Total Revenue – Capital Revenue)	25.6%	28.5%	30.6%	29.3%	30.4%
Repairs and Maintenance (8)	R&M / (Total Revenue excluding Capital Revenue)	7.0%	6.7%	6.3%	6.1%	6.5%
Finance Charges and Depreciation	FC&D / (Total Revenue – Capital Revenue)	13.4%	12.5%	11.9%	12.0%	12.0%
IDP Regulation Financial Viability Indicators						
Debt Coverage (4)	Total Operating Revenue – Operating Grants) / Debt service payments due within financial year)	11.0	14.1	14.4	20.0	18.1
O/S Service Debtors to Revenue (3)	Total outstanding service debtors / annual revenue received for services	20.4%	19.3%	21.3%	4.1%	11.1%
Cost Coverage (2)	(Available cash + Investments) / monthly fixed operational expenditure	11.6	13.0	12.3	10.7	9.7

Source: Medium Term Revenue and Expenditure Framework for Swartland Municipality 2023/2024: Table SA8 – Performance indicators and benchmarks

Notes:

(1) **Liquidity Ratio**: Measures the municipality's ability to pay its bills and is calculated by dividing the monetary assets (due within one year) by the municipality's current liabilities. A higher ratio is better.

(2) **Cost Coverage**: It explains how many months expenditure can be covered by the cash and other liquid assets available to the Municipality excluding utilisation of grants.
(3) **Outstanding Service Debtors**: Measures how much money is still owed by the community for water, electricity, waste removal and sanitation compared to how much money has been paid for these services. It is calculated by dividing the total outstanding debtors by the total annual revenue. A lower score is better.
(4) **Debt Coverage**: The number of times debt payments can be accommodated within Operating revenue (excluding grants). This in turn represents the ease with which debt payments can be accommodated by the municipality.
(5) **Creditors System Efficiency**: The proportion of creditors paid within terms (i.e. 30 days). This ratio is calculated by outstanding trade creditors divided by credit purchases.
(6) **Capital Charges to Operating Expenditure**: Is calculated by dividing the sum of capital interest and principle paid by the total operating expenditure.
(7) **Employee Costs**: Measures what portion of the revenue was spent on paying employee costs. It is calculated by dividing the total employee cost by the difference between total revenue and capital revenue.
(8) **Repairs and Maintenance**: This represents the proportion of the operating expenditure spent on repairs and maintenance.

7.1.2 Water Balance Cost / Revenue

The table below gives an overview of the water balance cost for Swartland Municipality.

Table 7.1.2.1: Operation, function, process water balance cost / revenue

Water Balance Cost / Revenue	2019/2020		2020/2021		2021/2022		2022/2023	
	R	Kl Units	R	Kl Units	R	Kl Units	R	Kl Units
System Input Volume	**R106 205 533 R61 301 899**	**4 317 323**	**R90 231 763 R44 955 432**	**4 979 639**	**R99 081 926 R79 784 691**	**5 427 515**	**R123 943 612 R86 615 726**	**5 183 703**
Billed metered consumption	**R106 205 533**	3 542 521	**R90 231 763**	3 940 913	**R99 081 926**	4 173 822	**R123 943 612**	4 328 018
Billed un-metered consumption	0	0	0	0	0	0	0	0
Un-billed metered consumption	0	0	0	0	0	0	0	0
Un-billed un-metered consumption	R800 415	56 371	R520 862	57 695	R1 913 872	130 195	R2 167 305	129 707
Apparent losses (17%)	R1 734 173	122 133	R1 505 620	166 775	R2 807 634	190 995	R2 062 187	123 416
Real losses (83%)	R8 466 867	596 298	R7 350 981	814 256	R13 707 832	932 503	R10 068 335	602 561
Total water losses during the process of O&M	R10 201 040	718 431	R8 856 601	981 031	R16 515 466	1 123 498	R12 130 522	725 977

7.1.3 Operating Cost

The table below gives a summary of the total operating costs and income for water and sanitation services for the last five financial years, with the detail information in the tables that follow.

Table 7.1.3.1: Summary of Operational and Maintenance expenditure and income budgets for water and sanitation services

Description	Record Prior (R)				2022/2023
	2018/2019	2019/2020	2020/2021	2021/2022	
Water Services					
Expenditure	R23 087 917	R61 301 899	R44 955 432	R79 784 692	R86 615 726
Income	-R79 626 773	-R106 205 533	-R90 231 763	-R99 081 926	-R123 943 612
-Surplus / Deficit	**-R56 538 856**	**-R44 903 634**	**-R45 276 331**	**-R19 297 234**	**-R37 327 886**
Sanitation Services					
Expenditure	R31 688 531	R49 817 322	R50 616 866	R56 552 156	R56 389 563
Income	-R62 948 777	-R71 074 049	-R87 825 165	-R94 802 406	-R83 697 003
-Surplus / Deficit	**-R31 260 246**	**-R21 256 727**	**-R37 208 299**	**-R38 250 250**	**-R27 307 440**

Source: WSDP Performance and Water Services Audit Report 2022/2023

Water Services and Sanitation Services generated operating surpluses for the last five financial years. The surpluses are used to subsidise other services that do not generate enough own revenue to sustain themselves.

7.1.3.1 Operating Costs: Water

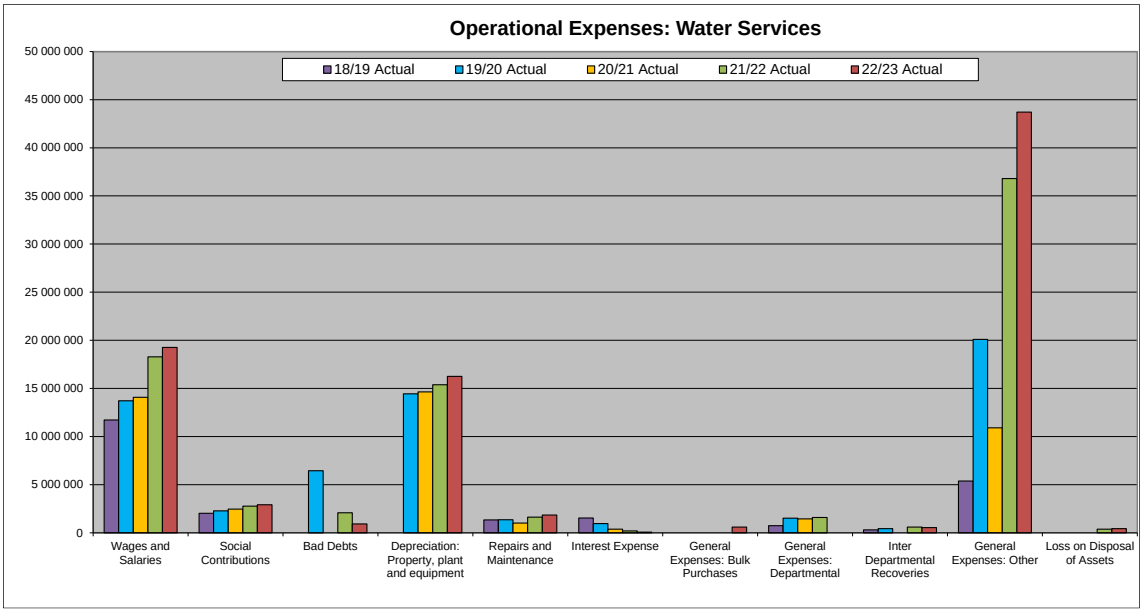
The table below gives a summary of the operational expenditure for water services for the last five financial years.

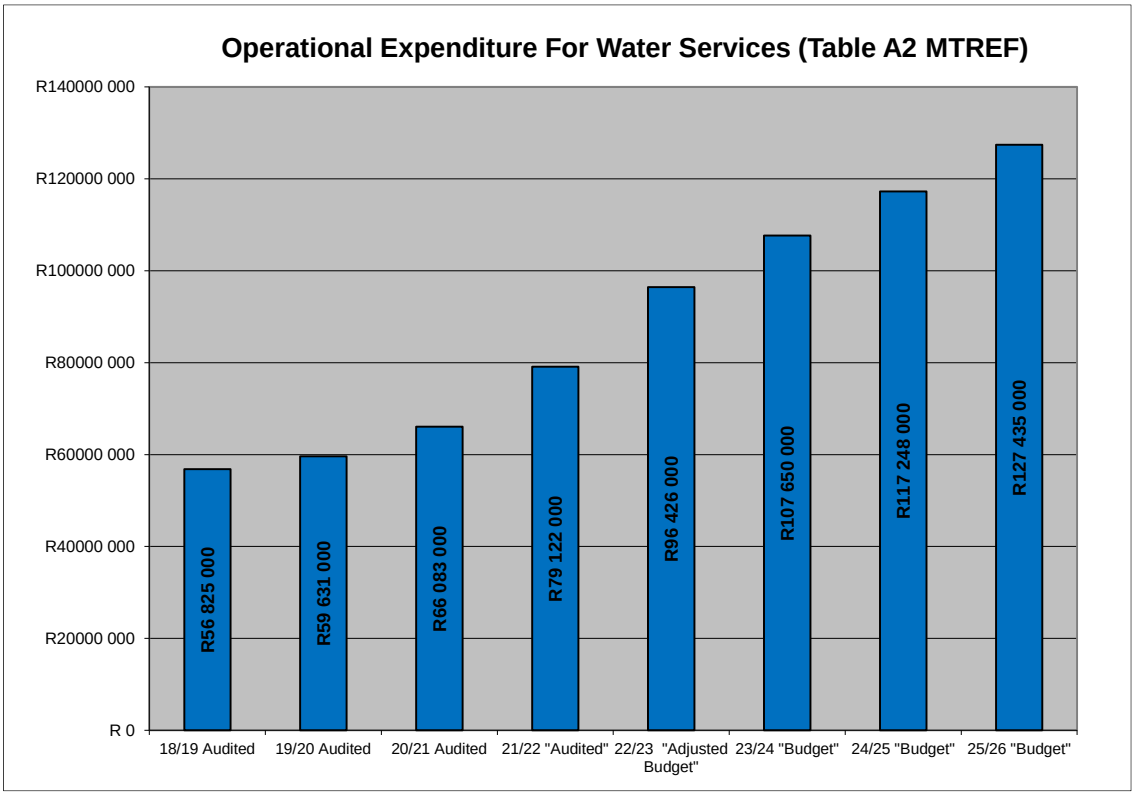
Table 7.1.3.1.1: Detail operational expenditure budgets for water services

Description	Record Prior (R)				2022/2023
	2018/2019	2019/2020	2020/2021	2021/2022	
Wages and Salaries	R11 721 909	R13 729 548	R14 087 315	R18 280 444	R19 267 099
Social Contributions	R2 035 437	R2 292 675	R2 462 631	R2 784 942	R2 924 612
Bad Debts	R0	R6 462 307	R0	R2 096 897	R924 286
Depreciation: Property, plant and equipment	R0	R14 437 698	R14 639 011	R15 396 207	R16 260 078
Repairs and Maintenance	R1 341 566	R1 369 954	R1 021 131	R1 630 875	R1 860 174
Interest Expense	R1 552 598	R959 499	R387 675	R197 429	R87 121
General Expenses: Bulk Purchases	R0	R0	R0	R0	R598 233
General Expenses: Departmental	R742 701	R1 522 537	R1 453 743	R1 599 615	R0
Inter Departmental Recoveries	R304 742	R431 913	R0	R608 080	R540 553
General Expenses: Other	R5 388 964	R20 095 768	R10 903 926	R36 800 382	R43 705 732
Loss on Disposal of Assets	R0	R0	R0	R389 820	R447 838
Total Expenditure	**R23 087 917**	**R61 301 899**	**R44 955 432**	**R79 784 691**	**R86 615 726**

Source: WSDP Performance and Water Services Audit Reports 2022/2023

The graphs below give an overview of the historical operational expenditure for water services for the last five financial years.





7.1.3.2 Operating Costs: Sanitation

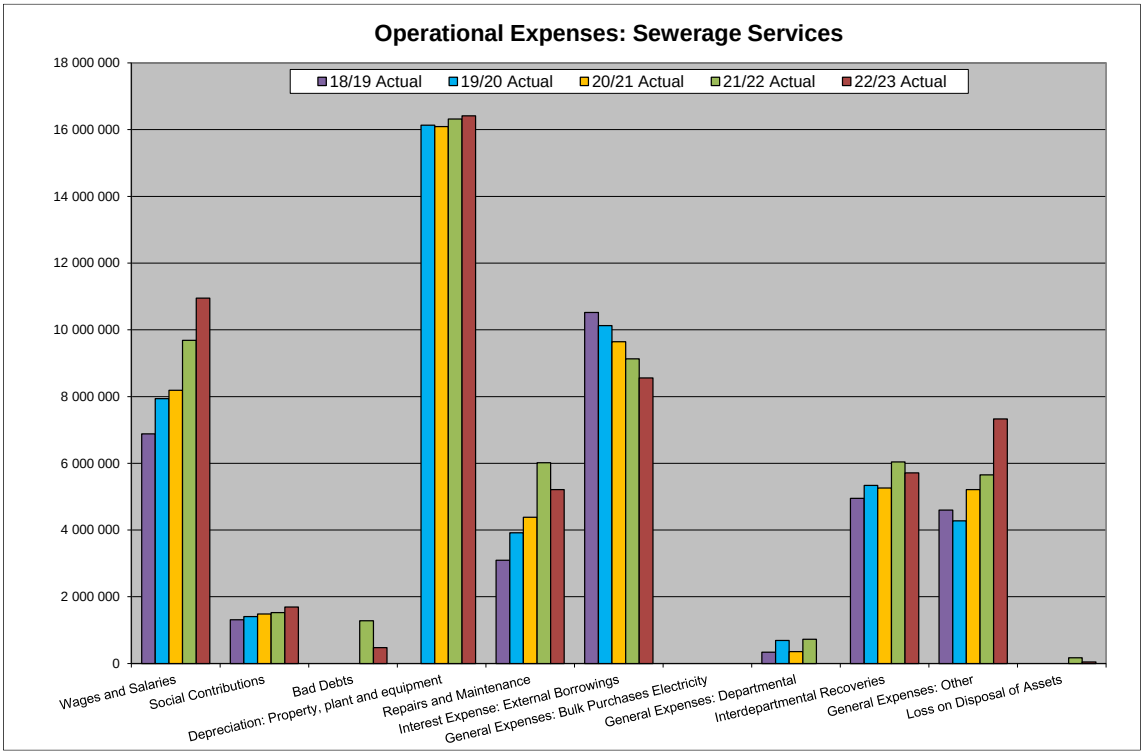
The table below gives a summary of the operational expenditure for sanitation services for the last five financial years.

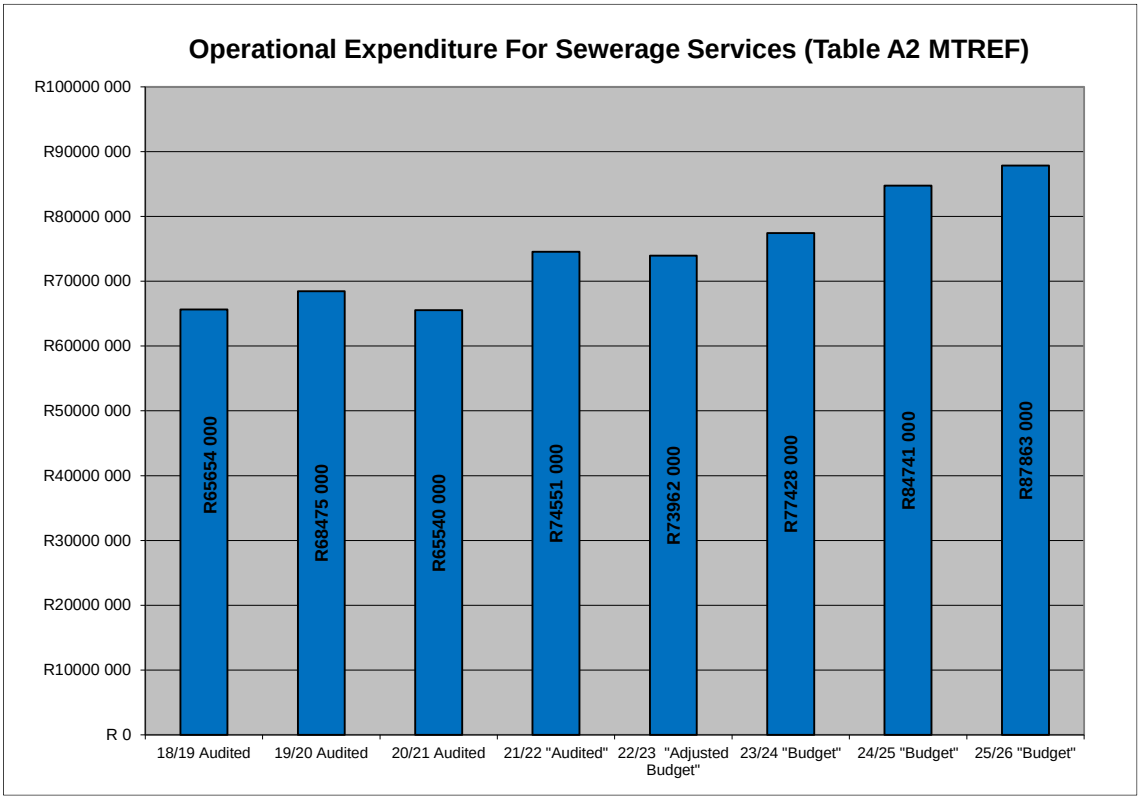
Table 7.1.3.2.1: Detail operational expenditure budgets for sanitation services

Description	Record Prior (R)				2022/2023
	2018/2019	2019/2020	2020/2021	2021/2022	
Wages and Salaries	R6 882 200	R7 934 618	R8 189 333	R9 684 345	R10 946 800
Social Contributions	R1 308 109	R1 403 886	R1 483 313	R1 527 960	R1 692 442
Bad Debts	R0	R0	R0	R1 280 373	R475 436
Depreciation: Property, plant and equipment	R0	R16 134 374	R16 092 587	R16 317 745	R16 414 351
Repairs and Maintenance	R3 097 134	R3 915 063	R4 383 979	R6 019 299	R5 209 746
Interest Expense	R10 518 757	R10 127 577	R9 642 519	R9 128 835	R8 557 112
General Expenses: Bulk Purchases	R0	R0	R0	R0	R0
General Expenses: Departmental	R336 553	R689 934	R353 591-00	R724 862	R0
Interdepartmental Recoveries	R4 950 888	R5 337 182	R5 259 223	R6 040 607	R5 715 033
General Expenses: Other	R4 594 890	R4 274 688	R5 212 322	R5 654 712	R7 331 479
Loss on Disposal of Assets	R0	R0	R0	R173 418	R47 164
Total Expenditure	**R31 688 531**	**R49 817 322**	**R50 616 866**	**R56 552 156**	**R56 389 563**

Source: WSDP Performance and Water Services Audit Reports 2022/2023

The graphs below give an overview of the operational expenses for sewerage services for the last five financial years.





7.1.4 Capital Expenditure

The capital expenditure per standard classification of Swartland Municipality's previous financial year's capital budgets are summarised in the table below.

Table 7.1.4.1: Capital expenditure of Swartland Municipality's previous financial year's capital budgets

Capital Expenditure Standard	Record Prior				2022/2023 Adjusted Budget
	2018/2019 Audited Outcome	2019/2020 Audited Outcome	2020/2021 Audited Outcome	2021/2022 Audited Outcome	
Executive and Council	R12 000	R2 000	R3 000	R17 000	R651 000
Finance Administration	R9 373 000	R15 640 000	R39 440 000	R16 491 000	R4 441 000
Community and social Services	R1 079 000	R107 000	R264 000	R124 000	R408 000
Sports and Recreation	R14 555 000	R3 452 000	R7 032 000	R4 421 000	R2 817 000
Public Safety	R5 589 000	R2 640 000	R1 934 000	R2 896 000	R4 047 000
Planning and Development	R3 403 000	R3 439 000	R10 064 000	R9 100 000	R4 114 000
Road Transport	R16 509 000	R30 141 000	R56 654 000	R44 318 000	R56 533 000
Energy Sources	R15 203 000	R20 082 000	R18 135 000	R23 596 000	R44 253 000
Water Management	R14 797 000	R13 508 000	R7 375 000	R9 324 000	R38 109 000
Waste Water Management	R9 031 000	R26 976 000	R73 508 000	R63 368 000	R19 204 000
Waste Management	R2 482 000	R4 954 000	R3 139 000	R1 247 000	R4 262 000
Total Capital Expenditure	**R92 033 000**	**R120 941 000**	**R217 548 000**	**R174 902 000**	**R178 839 000**

Source: Medium Term Revenue and Expenditure Framework for Swartland Municipality 2023/2024: Table A5 - Capital Expenditure by Vote, Standard Classification and Funding

7.1.4.1 Capital Expenditure: Water

Swartland Municipality successfully completed various water infrastructure capital projects over the last number of financial years. The table below gives an overview of Swartland Municipality's historical water capital expenditure over the last five financial years.

Table 7.1.4.1.1: Historical capital expenditure for water services

Project	Record Prior (R)				2022/2023
	2018/2019	2019/2020	2020/2021	2021/2022	
Water: Upgrading water reticulation network: PRVs, flow control, zone metering and water augmentation	R599 010	R294 089	R166 750	R100 000	-R4 280
Equipment water	R38 967	R57 496	R54 516	R67 674	R48 999
Bulk water infrastructure (Emergency Spending)	-	-	R187 773	R1 102 963	R519 976
Water Meters Gains	-	-	-	-	R14 951
Connections: Water Meters (New/Replacements)		R313 717	R566 254	R584 008	R538 229
Swartland Bulk Water System S3.3 S3.4 Panorama to Wesbank I1/4	-	-	-	R1 499 998	R19 516 072
Riebeek Kasteel supply S2.4	-	-	-	R200 000	R938 000
Water networks: Upgrades and Replacement	-	-	-	R2 000 000	R2 217 712
Housing: Malmesbury De Hoop - External Services (Water)	-	-	-	R2 738 090	R2 758 148
Wesbank I1/4 to Wesbank Reservoir supply SMW.B6	-	-	-	-	R1 947 687
Generator Installation: Rustfontein Water Pumpstation	-	-	-	-	R531 508
Electrofusion Welding machine (replacement)	-	-	-	-	R88 952
Emergency Power Supply: Water / Sanitation	-	-	-	-	R285 225
Upgrade Riverlands and Kalbaskraal water pump stations	-	-	-	R991 248	-
Malmesbury De Hoop (395 Water Meters)	-	-	-	R40 000	-

Table 7.1.4.1.1: Historical capital expenditure for water services					
Project	**Record Prior (R)**				**2022/2023**
	2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	
Water Vehicles	-	R270 635	R289 583	-	-
Industrial Area upgrade of water supply	-	-	R998 228	-	-
Riebeek Wes Square: New borehole, pumps and irrigation	-	-	R90 115	-	-
New reservoir: MBY/Wesbank De Hoop Development	R11 021 638	R348 985	-	-	-
Water: Replacement water reticulation network	R2 587 033	R8 183 800	-	-	-
Bulk water infrastructure	-	R190 005	-	-	-
Water network expansion and new boreholes	R500 000	-	-	-	-
WCDM: Water Meters	R50 394	-	-	-	-
Total	**R14 797 042**	**R9 658 727**	**R2 353 219**	**R9 323 981**	**R29 401 179**

Source: WSDP Performance and Water Services Audit Reports

7.1.4.2 Capital Expenditure: Sanitation

Swartland Municipality successfully completed various sewerage infrastructure capital projects over the last number of financial years. The table below gives an overview of Swartland Municipality's historical sewerage capital expenditure over the last five financial years.

Table 7.1.4.2.1: Historical capital expenditure for sanitation services					
Project	**Record Prior (R)**				**2022/2023**
	2018/2019	**2019/2020**	**2020/2021**	**2021/2022**	
Sewerage: Moorreesburg WWTW	R2 203 218	R9 784 243	R41 802 000	R54 716 114	R7 733 233
Equipment: Sewerage telemetry	R24 179	-	R62 100	R54 732	R55 358
Equipment: Sewerage	R23 947	R41 582	R23 285	R25 037	R25 556
Sewerage: Darling WWTW	-	R4 669 778	R22 274 000	R7 332 537	R423 500
Security Fencing: MBY WWTW Irrigation Pump Station	-	-	-	-	R536 025
Sewerage: Vehicles	-	-	-	R641 994	R1 640 906
Sewerage: New Vacuum Tanker extend capacity	-	-	-	-	R1 640 906
Schoonspruit: Pipe Replacement	-	-	-	-	R1 362 000
Generator Installation: Moorreesburg WWTW	-	-	-	-	R1 534 990
Malmesbury: New Macerator	-	-	-	R526 248	-
Bulk Sewer: De Hoop housing project	R6 553 691	-	-	-	-
Industrial effluent: Sampling Equipment	R171 479	-	-	-	-
Total	**R8 976 514**	**R14 495 603**	**R64 161 385**	**R63 296 662**	**R14 952 473**

Source: WSDP Performance and Water Services Audit Reports

7.2 INCOME

7.2.1 Operating Income

7.2.1.1 Operating Income: Subsidies

The main subsidy available for funding the operating costs of services is the equitable share. This is an unconditional grant from national to local government and the amount allocated is based on the levels of poverty within the particular municipal area. The WSA will have to decide how it will spend this subsidy and how much of it is to be spent on water. It is strongly recommended that part of this subsidy be used to cover the running costs of supplying a basic level of supply to poor households. This should be based on the Indigent Policy, which requires that poor households be identified and the conditions of subsidization be clearly spelt out.

Table 7.2.1.1.1: Operating Income: Transfers and Grants

Transfers and Grants	Record Prior (R)				2022/2023 Adjusted Budget
	2018/2019 Audited Outcome	2019/2020 Audited Outcome	2020/2021 Audited Outcome	2021/2022 Audited Outcome	
National Government					
Local Government Equitable Share	R82 048 000	R91 534 000	R116 404 000	R108 796 000	R126 228 000
Finance Management	R1 520 000	R1 550 000	R1 550 000	R1 550 000	R1 550 000
EPWP Incentive	R1 572 000	R1 768 000	R1 867 000	R1 832 000	R1 873 000
Sub Total	**R85 140 000**	**R94 852 000**	**R119 821 000**	**R112 178 000**	**R129 651 000**
Provincial Government					
Community Development Workers	-	R74 000	R38 000	R38 000	R38 000
Human Settlements	R28 649 000	R1 243 000	R2 270 000	R34 725 000	R33 500 000
Municipal Accreditation and Capacity Building Grant	-	R224 000	R238 000	R508 000	R256 000
Libraries	R8 379 000	R 9 557 00	R10 718 000	R11 351 000	R11 573 000
Proclaimed Roads Subsidy	R9 534 000	R5 084 000	R175 000	R175 000	R4 470 000
Financial Management Support Grant: Student Bursaries	R360 000	R379 000	R300 000	R250 000	R300 000
Thusong Grant	R106 000	-	-	-	-
Establishment of K9 Unit	R3 925 000	R954 000	R1 588 000	R4 511 000	R2 390 000
Establishment of Law Enforcement Reaction Unit	-	-	-	R2 214 000	-
Financial Management Support Grant mSCOA	R330 000	R330 000	-	-	R418 000
Local Government Support Grant	-	R330 000	-	-	-
Disaster Relief Grant	-	R850 000	-	-	-
RSEP/VPUU Municipal Projects	-	R119 000	-	-	-
WC Mun Energy Resilience Grant	-	-	-	R400 000	-
LG Public Employment Support Grant	-	-	-	R1 700 000	-
Establishment of a Rural Safety Unit	-	-	-	-	R4 000 000
Municipal Water Resilience Grant	-	-	-	-	R600 000
Sub Total	**R51 283 000**	**R19 144 000**	**R15 327 000**	**R55 872 000**	**R57 545 000**
District Municipality					
WCDM	-	R50 000	-	-	**-**
Sub Total	**-**	**R50 000**	-	-	**-**
Other Grant Providers					
LG Seta	-	R250 000	-	-	**-**
Sub Total	**-**	**R250 000**	-	-	**-**
Total	**R136 423 000**	**R114 296 000**	**R135 148 000**	**R168 050 000**	**R187 196 000**

Source: Medium Term Revenue and Expenditure Framework for Swartland Municipality 2023/2024: Table SA18 Transfers and Grants Receipt

7.2.1.2 Operating Income: Water

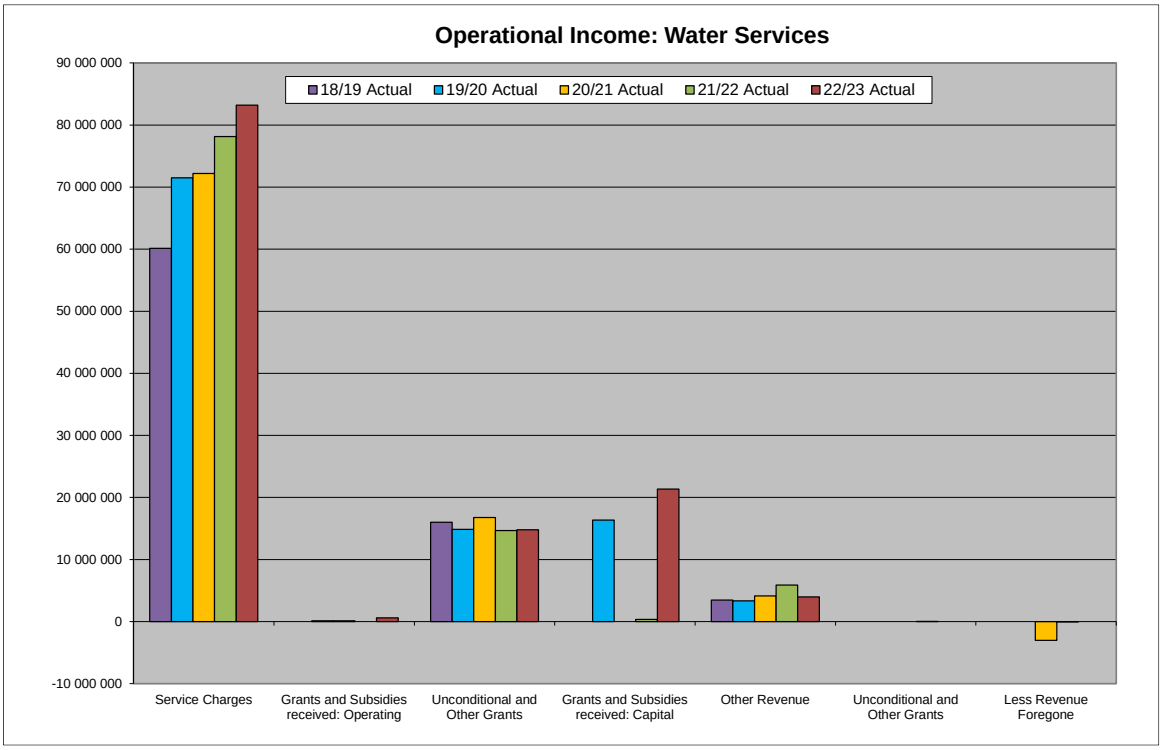
The table below gives a summary of the operational income for water services for the last five financial years.

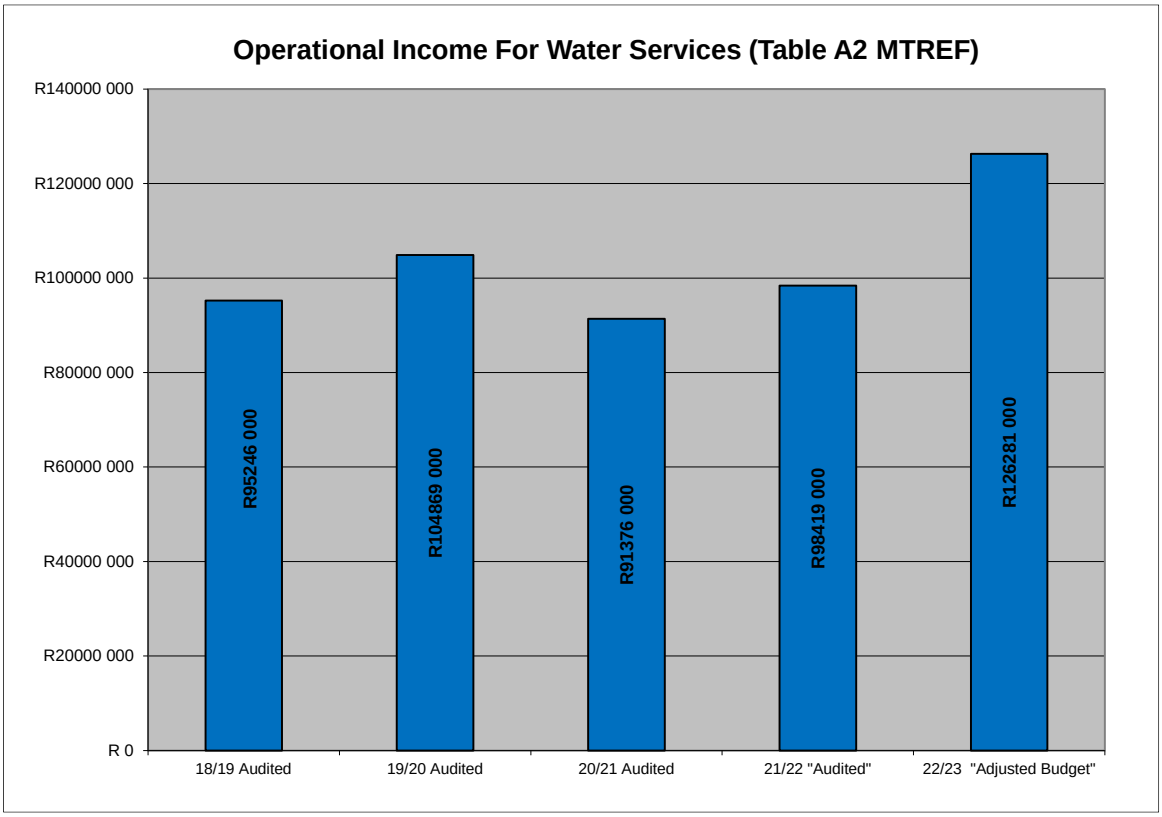
Table 7.2.1.2.1: Operating income for water services

Description	Record Prior (R)				2022/2023
	2018/2019	2019/2020	2020/2021	2021/2022	
Service Charges	R60 146 111	R71 489 657	R72 183 322	R78 150 261	R83 195 597
Grants and Subsidies received: Operating	R0	R123 760	R141 591	R0	R600 000
Unconditional and Other Grants	R16 009 462	R14 874 317	R16 770 715	R14 659 002	R14 804 997
Grants and Subsidies received: Capital	R0	R16 367 200	R0	R350 000	R21 359 212
Other Revenue	R3 471 200	R3 350 599	R4 145 841	R5 900 953	R3 983 806
Unconditional and Other Grants	R0	R0		R22 000	R0
Less Revenue Foregone	R0	R0	-R3 009 706	-R290	R0
Total Income	**R79 626 773**	**R106 205 533**	**R90 231 763**	**R99 081 926**	**R123 943 612**

Source: WSDP Performance and Water Services Audit Reports 2022/2023

The graphs below give an overview of the operational income for water services for the last five financial years.





7.2.1.3 Operating Income: Sanitation

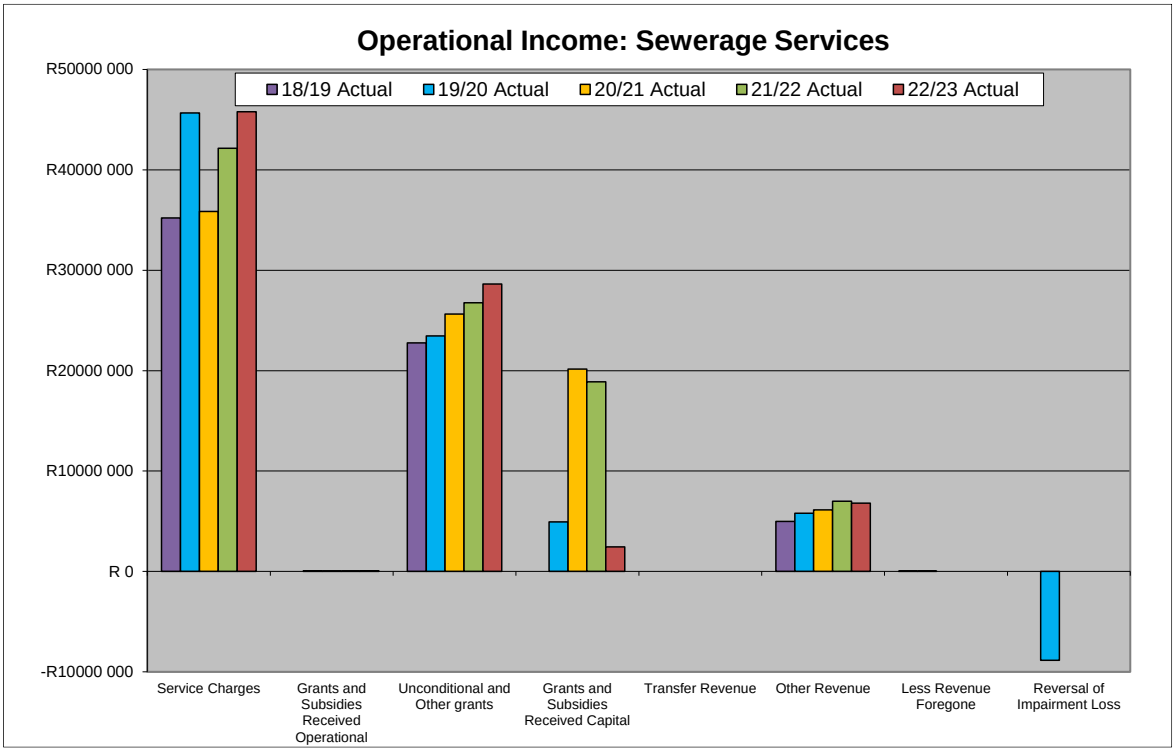
The table below gives a summary of the operational income for sanitation services for the last five financial years.

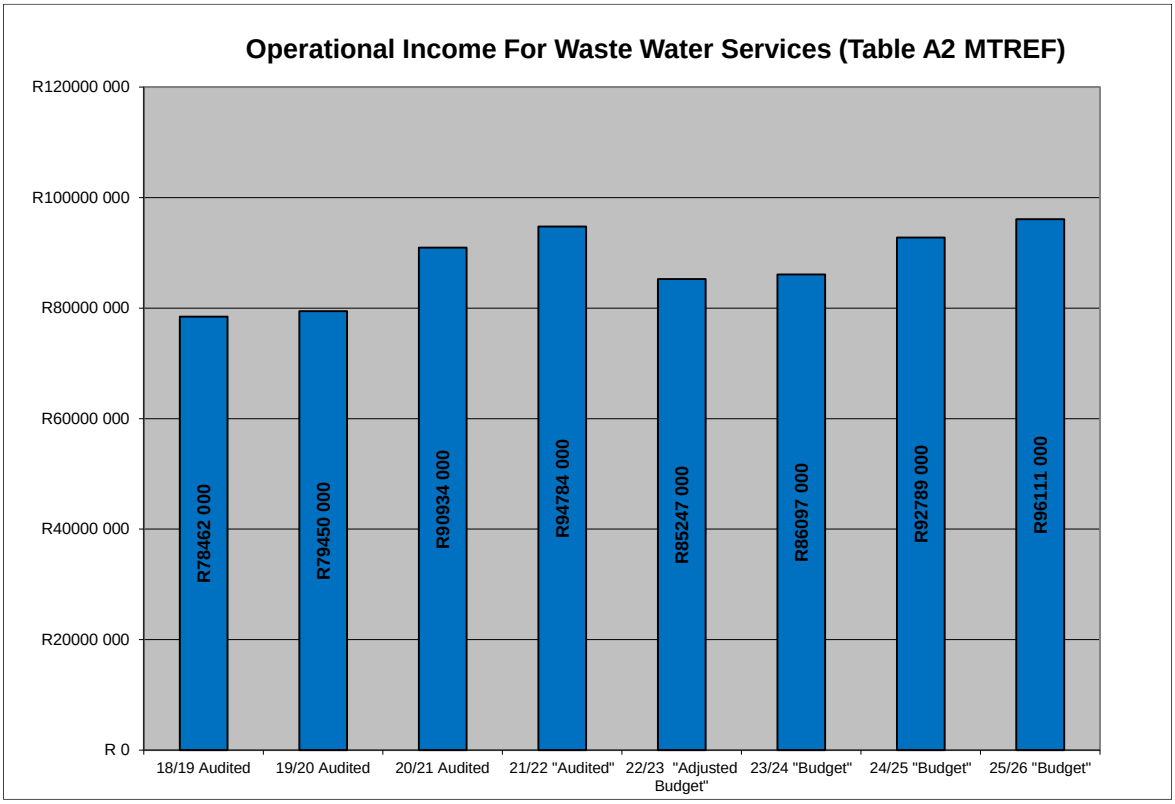
Table 7.2.1.3.1: Operating income for sanitation services

Description	Record Prior (R)				2022/2023
	2018/2019	2019/2020	2020/2021	2021/2022	
Service Charges	R35 200 087	R45 674 849	R35 856 914	R42 148 282	R45 782 452
Grants and Subsidies Received Operating	R0	R53 040	R38 511	R41 400	R55 200
Unconditional and Other grants	R22 769 691	R23 454 400	R25 641 135	R26 750 000	R28 622 500
Grants and Subsidies Received Capital	R0	R4 933 800	R20 156 251	R18 877 474	R2 438 483
Transfer Revenue	R0	R0	R0	R0	R0
Other Revenue	R4 978 781	R5 806 902	R6 132 354	R6 985 250	R6 798 368
Less Revenue Foregone	R218	R2 344	R0	R0	R0
Reversal of Impairment Loss	R0	-R8 851 286	R0	R0	R0
Total Income	**R62 948 777**	**R71 074 049**	**R87 825 165**	**R94 802 406**	**R83 697 003**

Source: WSDP Performance and Water Services Audit Reports 2022/2023

The graphs below give an overview of the operational income for sanitation services for the last five financial years.





7.2.2 Capital Income

Capital expenditure is funded through National Grants, External Borrowing and Internally Generated Revenue. Internally Generated Revenue can only be generated through operating budget surpluses, but this means that Swartland Municipality's customer base must pay for it through property rates and service charges levied.

Grants and donations through government programmes are another important funding source. Government programmes will usually give grants for bulk infrastructure service and internal infrastructure services where the investment in infrastructure is needed to provide basic services to the poor.

External borrowing is the least desirable source of finance to invest in infrastructure services, simply because borrowings need to be repaired at a cost for Swartland Municipality's customer base. A Municipality can become over borrowed and needs to guard against this not to burden their customer base in an unsustainable and non-viable manner.

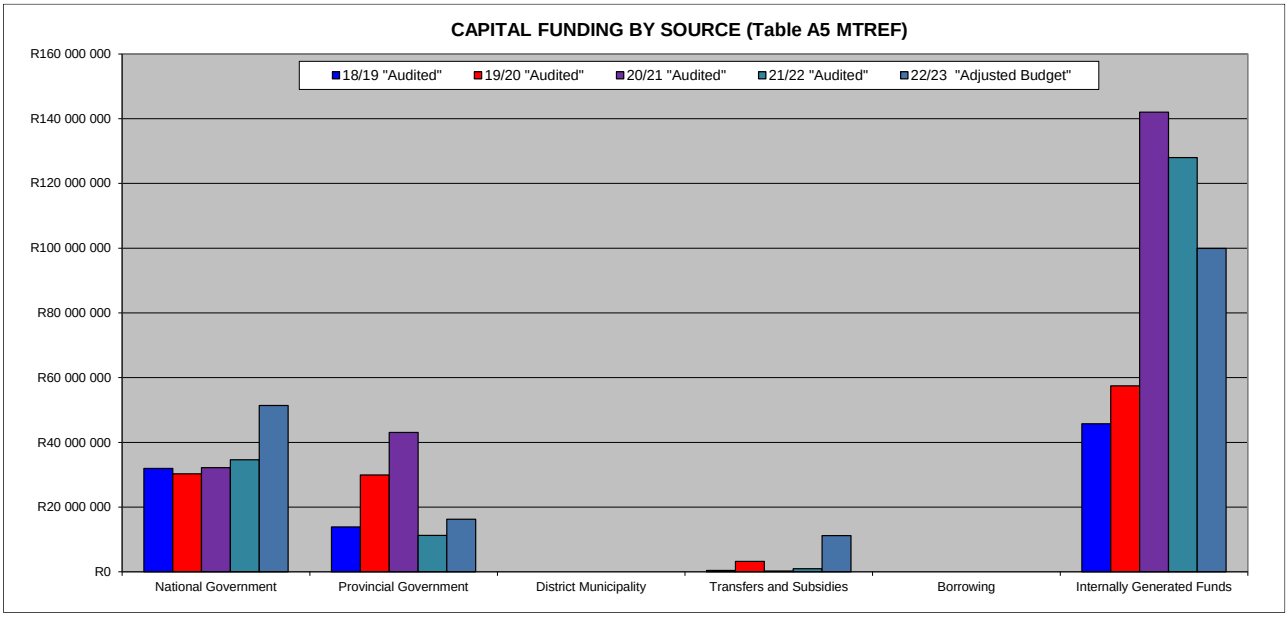
The total capital requirement for the 2022/2023 financial year was R178.839 million. The funding sources of Swartland Municipality's previous year's capital budgets are summarised in the table below.

Table 7.2.2.1: Sources of funding of Swartland Municipality's previous years' capital budgets

Capital Funding	Record Prior				2022/2023 Adjusted Budget
	2018/2019 Audited Outcome	2019/2020 Audited Outcome	2020/2021 Audited Outcome	2021/2022 Adjusted Budget	
National Government	R31 975 000	R30 301 000	R32 175 000	R34 655 000	R51 410 000
Provincial Government	R13 863 000	R29 939 000	R43 066 000	R14 471 000	R16 277 000
District Municipality	R0	R0	R0	R0	R0
Transfers and Subsidies	R458 000	R3 225 000	R290 000	R1 000 000	R11 203 000
Borrowing	R0	R0	R0	R0	R0
Internally generated funds	R45 735 000	R57 477 000	R142 018 000	R119 913 000	R99 949 000
Total Capital Funding	**R92 031 000**	**R120 942 000**	**R217 549 000**	**R170 039 000**	**R178 839 000**

Source: Medium Term Revenue and Expenditure Framework for Swartland Municipality 2023/2024: Table A5 - Capital Expenditure by Vote, Standard Classification and Funding

The graph below gives an overview of the historical capital budget funding per sources for Swartland Municipality for the last five financial years.



7.2.2.1 Capital Income: Water

The historical funding sources for the water capital budget of Swartland Municipality were as follows.

Table 7.2.2.1.1: Source of funding for the water capital budgets of Swartland Municipality

Source of Finance	Record Prior (R)				2022/2023
	2018/2019	2019/2020	2020/2021	2021/2022	
CRR	R1 189 671	R1 474 927	R2 353 219	R3 435 893	R5 010 503
MIG	R13 607 371	R8 183 800	R0	R5 888 088	R23 859 168
DLG		R0	R0	R0	R531 508
Total	**R14 797 042**	**R9 658 727**	**R2 353 219**	**R9 323 981**	**R29 401 179**

Source: WSDP Performance and Water Services Audit Reports

7.2.2.2 Capital Income: Sanitation

The historical funding sources for the sanitation capital budget of Swartland Municipality were as follows.

Table 7.2.2.2.1: Source of funding for the sanitation capital budgets of Swartland Municipality

Source of Finance	Record Prior (R)				2022/2023
	2018/2019	2019/2020	2020/2021	2021/2022	
CRR	R499 323	R5 311 099	R44 005 134	R20 125 485	R13 417 483
MIG	R8 477 190	R9 184 504	R20 156 251	R43 171 177	R0
DLG	R0	R0	R0	R0	R1 534 990
Total	**R8 976 513**	**R14 495 603**	**R64 161 385**	**R63 296 662**	**R14 952 473**

Source: WSDP Performance and Water Services Audit Reports

7.3 TARIFF AND CHARGES

The WSA needs to have an income or tariff policy stating from where it will raise recurrent income, how tariffs are to be set for different consumer groups and levels of service, and actual tariff levels. This should include a policy to provide free water for those who cannot afford a basic level of supply.

The tariff set by the WSA must:

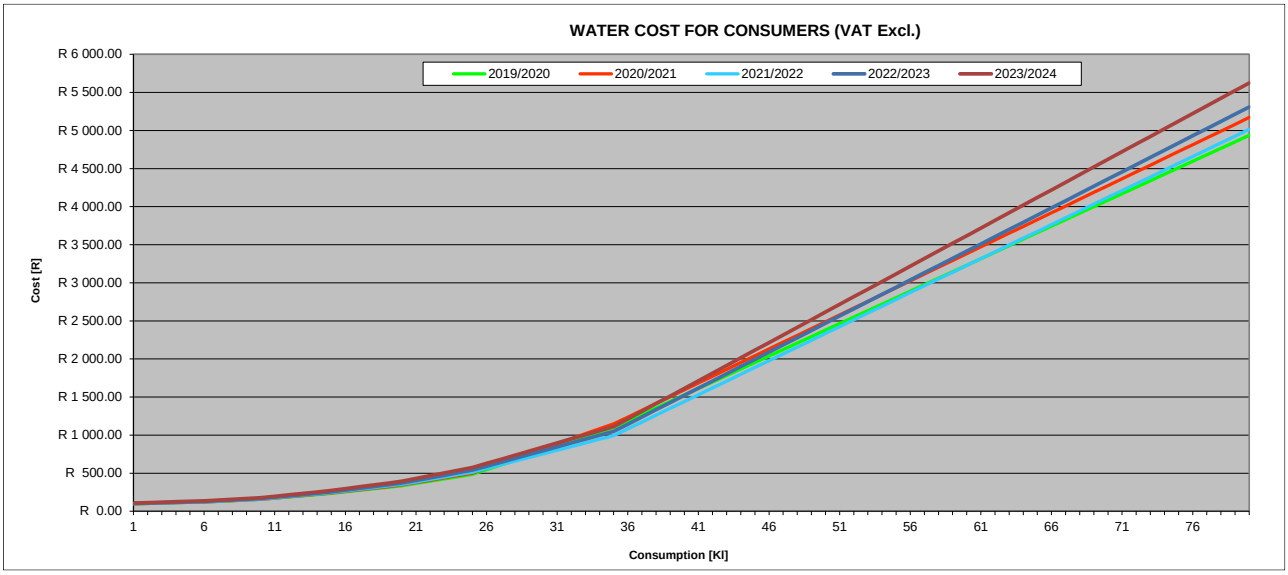
- support the viability and sustainability of water services to the poor;
- discourage wasteful or inefficient water use;
- take into account the incremental cost that would be incurred to increase capacity of the water supply infrastructure to meet an incremental growth in demand.

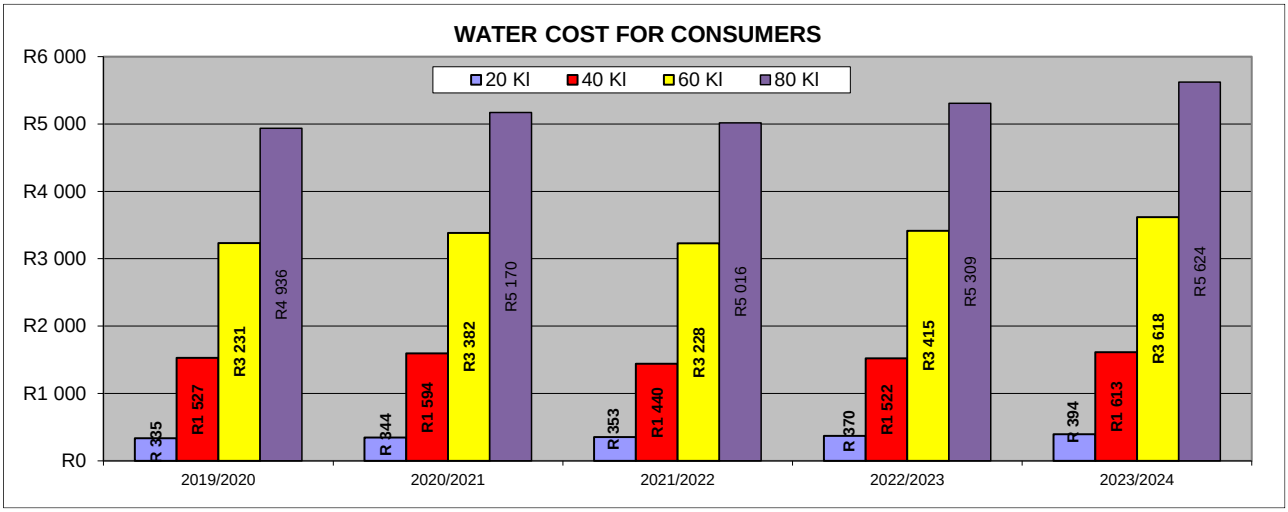
Swartland Municipality's current (2023/2024) water and sewerage tariffs are based on the following:

- A seven block step rising residential water tariff structure with the first 6 kl/month being free for all indigent registered households (Subsidised). Residential consumers also pay a fix water network charge per month.
- Business, Commercial, Industrial, Schools, Government Institutions, Sport Clubs and the Municipality pay a fix water network charge and a fix tariff per kl water usage.
- Eight Level Drought and Emergency water restriction tariffs are also in place.
- Sewerage charge, based on the size of the connection, and availability fee for residential consumers are fix charges irrespective of the number of toilets.
- The sewerage tariffs for Businesses, Industrial, Schools, Churches, Sport Facilities, etc. consumers are fix, with an additional charge per toilet for businesses. Availability fee is also payable per month.
- Fix sewage tariffs are also in place for the emptying of septic or conservancy tanks (Two emptying per month), with an additional tariff for each pumping thereafter.

Historically, water use in the highest tariff block provided a mechanism to subsidize lower-usage and indigent customers. However, after the drought, consumption in the highest block is greatly reduced. Thus, cross subsidization now hardly benefits low usage and indigent customers. The current tariff structure is largely based on volume of water consumed, meaning exogenous factors can control water revenues. Examples are climate change, industrial efficiency gains, domestic plumbing improvements, etc. that all reduce water consumed and revenues. Fixed charges, independent of water consumption, provide 24% of water's total revenues.

The cost consumers had to pay for their water in Swartland Municipality's Management Area, for the various financial years, is presented on the graphs below.





The water tariff structures for Swartland Municipality for the 2023/2024 financial year and the previous four financial years are summarised in the table below (Subject to VAT).

Table 7.3.1: Water tariffs for 2023/2024 and the previous four financial years

Consumer/Description	Category	19/20	20/21	21/22	22/23	23/24
All	Availability Fees per month	R91-69	R91-69	R91-69	R96-09	R101-18
Residential Consumers	Water network charge	R64-87	R64-87	R67-14	R70-16	R75-07
	0 – 6 Kl	R5-03	R5-03	R5-21	R5-44	R6-02
	7 – 10 Kl	R8-64	R8-64	R8-94	R9-34	R9-99
	11 – 15 Kl	R15-77	R16-54	R17-12	R17-89	R18-95
	16 – 20 Kl	R19-99	R20-97	R21-70	R22-98	R24-34
	21 – 25 Kl	R29-64	R31-09	R32-18	R34-08	R36-09

Table 7.3.1: Water tariffs for 2023/2024 and the previous four financial years

Consumer/Description	Category	19/20	20/21	21/22	22/23	23/24
	26 – 35 Kl	R61-75	R64-78	R47-94	R50-77	R53-77
	36Kl and above	R85-22	R89-40	R89-40	R94-67	R100-26
Indigent Households	Water network charge	R64-87	R64-87	R67-14	R70-16	R75-07
	Free Water 6 Kl (6 Kl EQS)	R0-00	R0-00	R0-00	R0-00	R0-00
	7 – 10 Kl	R8-64	R8-64	R8-94	R9-34	R9-99
	11 – 15 Kl	R15-77	R16-54	R17-12	R17-89	R18-95
	16 – 20 Kl	R19-99	R20-97	R21-70	R22-98	R24-34
	21 – 25 Kl	R29-64	R31-09	R32-18	R34-08	R36-09
	26 – 35 Kl	R61-75	R64-78	R47-94	R50-77	R53-77
	36Kl and above	R85-22	R89-40	R89-40	R94-67	R100-26
Agricultural (Residential)	Water network charge	R64-87	R64-87	R67-14	R70-16	R75-07
	0 – 6 Kl	R5-03	R5-03	R5-21	R5-44	R6-02
	7 – 10 Kl	R8-64	R8-64	R8-94	R9-34	R9-99
	11 – 15 Kl	R15-77	R16-54	R17-12	R17-89	R18-95
	16 – 20 Kl	R19-99	R20-97	R21-70	R22-98	R24-34
	21 – 25 Kl	R29-64	R31-09	R32-18	R34-08	R36-09
	26 – 35 Kl	R61-75	R64-78	R47-94	R50-77	R53-77
	36Kl and above	R85-22	R89-40	R89-40	R94-67	R100-26
Business / Commercial / Industrial / etc.	Water network charge	R110-00	R110-00	R113-85	R119-31	R125-16
	Per Kl	R21-60	R21-60	R22-36	R23-43	R24-58
Water: Agricultural Business	Water network charge	R110-00	R110-00	R113-85	R119-31	R125-16
	Per Kl	R21-60	R21-60	R22-36	R23-43	R24-58
Schools	Water network charge	R64-87	R68-05	R70-43	R73-81	R77-43
	Per Kl	R22-90	R24-02	R24-86	R26-33	R16-42
Government Institutions	Water network charge	R64-87	R68-05	R70-43	R119-31	R125-16
	Per Kl	R22-90	R24-02	R24-86	R26-33	R27-88
Sport Clubs	Water network charge	R64-87	R64-87	R67-14	R70-36	R73-81
	Per Kl	R22-90	R22-90	R23-70	R24-84	R26-06
Municipality (Departmental)	Per Kl	R8-64	R6-46	R6-46	R6-46	R6-12
Raw Water (Untreated) to Anne Pienaar Primary School	From first Kl	R3-81	R4-08	R4-32	R4-32	R5-79
5% Increase in Tariffs Residential and Agricultural Residential	Water network charge	R64-87	R64-87	R67-14	R70-16	R75-07
	0 – 6 Kl	R5-28	R5-28	R5-47	R5-72	R6-32
	7 – 10 Kl	R9-07	R9-07	R9-39	R9-81	R10-49
	11 – 15 Kl	R16-56	R17-37	R17-97	R18-78	R19-90
	16 – 20 Kl	R20-99	R22-02	R22-79	R24-13	R25-56
	21 – 25 Kl	R31-12	R32-64	R33-79	R35-78	R37-90
	26 – 35 Kl	R64-84	R68-02	R50-34	R53-31	R56-46
	36Kl and above	R89-48	R93-87	R93-87	R99-40	R105-27
5% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural	Water network charge	R110-00	R110-00	R113-85	R119-31	R125-16
	From first Kl	R22-68	R22-68	R23-47	R24-60	R25-81
5% Increase in Tariffs Schools	Water network charge	R64-87	R68-05	R70-43	R73-81	R77-43
	From first Kl	R24-05	R25-22	R26-10	R27-65	R14-50
	Water network charge	R64-87	R68-05	R70-43	R119-31	R125-16

Table 7.3.1: Water tariffs for 2023/2024 and the previous four financial years

Consumer/Description	Category	19/20	20/21	21/22	22/23	23/24
5% Increase in Tariffs Government Institutions	From first Kl	R24-05	R25-22	R26-10	R27-65	R29-28
5% Increase in Tariffs Sport Clubs	Water network charge	R64-87	R64-87	R67-14	R70-36	R73-81
	From first Kl	R24-05	R24-05	R24-89	R26-08	R27-37
10% Increase in Tariffs Residential and Agricultural Residential (Level 1)	Water network charge	R64-87	R64-87	R67-14	R70-16	R75-07
	0 – 6 Kl	R5-53	R5-53	R5-73	R5-99	R6-63
	7 – 10 Kl	R9-50	R9-50	R9-84	R10-27	R10-99
	11 – 15 Kl	R17-35	R18-19	R18-83	R19-68	R20-84
	16 – 20 Kl	R21-99	R23-07	R23-87	R25-28	R26-77
	21 – 25 Kl	R32-60	R34-20	R35-40	R37-49	R39-70
	26 – 35 Kl	R67-93	R71-26	R52-73	R55-85	R59-15
	36Kl and above	R93-74	R98-34	R98-34	R104-14	R110-29
10% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 1)	Water network charge	R110-00	R110-00	R113-85	R119-31	R125-16
	From first Kl	R23-76	R23-76	R24-59	R25-77	R27-03
10% Increase in Tariffs Schools (Level 1)	Water network charge	R64-87	R68-05	R70-43	R73-81	R77-43
	From first Kl	R25-19	R26-42	R27-35	R28-96	R15-88
10% Increase in Tariffs Government Institutions (Level 1)	Water network charge	R64-87	R68-05	R70-43	R119-31	R125-16
	From first Kl	R25-19	R26-42	R27-35	R28-96	R32-06
10% Increase in Tariffs Sport Clubs (Level 1)	Water network charge	R64-87	R64-87	R67-14	R70-37	R73-81
	From first Kl	R25-19	R25-19	R26-07	R27-32	R29-97
15% Increase in Tariffs Residential and Agricultural Residential (Level 1B)	Water network charge	R64-87	R64-87	R67-14	R70-16	R75-07
	0 – 6 Kl	R5-78	R6-07	R6-28	R6-26	R6-92
	7 – 10 Kl	R9-94	R10-42	R10-79	R10-74	R11-49
	11 – 15 Kl	R18-14	R19-02	R19-69	R20-57	R21-79
	16 – 20 Kl	R22-99	R24-12	R24-96	R26-43	R27-99
	21 – 25 Kl	R34-09	R35-75	R37-00	R39-19	R41-50
	26 – 35 Kl	R71-01	R74-50	R55-13	R58-38	R61-83
	36Kl and above	R98-00	R102-81	R106-41	R108-87	R115-30
15% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 1B)	Water network charge	R110-00	R110-00	R113-85	R119-31	R125-16
	From first Kl	R24-84	R26-06	R26-97	R26-94	R28-27
15% Increase in Tariffs Schools (Level 1B)	Water network charge	R64-87	R68-05	R70-43	R73-81	R77-43
	From first Kl	R26-34	R27-62	R28-59	R30-28	R15-88
15% Increase in Tariffs Government Institutions (Level 1B)	Water network charge	R64-87	R68-05	R70-43	R119-31	R125-16
	From first Kl	R26-34	R27-62	R28-59	R30-28	R32-06
15% Increase in Tariffs Sport Clubs (Level 1B)	Water network charge	R64-87	R64-87	R67-14	R70-37	R73-81
	From first Kl	R26-34	R27-63	R28-60	R28-57	R29-97
20% Increase in Tariffs Residential and Agricultural Residential (Level 2)	Water network charge	R64-87	R64-87	R67-14	R70-16	R75-07
	0 – 6 Kl	R6-04	R6-33	R6-55	R6-53	R7-23
	7 – 10 Kl	R10-37	R10-88	R11-26	R11-21	R11-99
	11 – 15 Kl	R18-92	R19-85	R20-54	R21-47	R22-74

Table 7.3.1: Water tariffs for 2023/2024 and the previous four financial years						
Consumer/Description	**Category**	**19/20**	**20/21**	**21/22**	**22/23**	**23/24**
	16 – 20 Kl	R23-99	R25-16	R26-04	R27-57	R29-21
	21 – 25 Kl	R35-57	R37-31	R38-61	R40-90	R43-30
	26 – 35 Kl	R74-10	R77-74	R57-53	R60-92	R64-52
	36Kl and above	R102-26	R107-28	R111-03	R113-60	R120-31
20% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 2)	Water network charge	R110-00	R110-00	R113-85	R119-31	R125-16
	From first Kl	R25-92	R27-19	R28-14	R28-12	R29-50
20% Increase in Tariffs Schools (Level 2)	Water network charge	R64-87	R68-05	R70-43	R73-81	R77-43
	From first Kl	R27-48	R28-82	R29-83	R31-60	R16-57
20% Increase in Tariffs Government Institutions (Level 2)	Water network charge	R64-87	R68-05	R70-43	R119-31	R125-16
	From first Kl	R27-48	R28-82	R29-83	R31-60	R33-45
20% Increase in Tariffs Sport Clubs (Level 2)	Water network charge	R64-87	R64-87	R67-14	R70-36	R73-81
	From first Kl	R27-48	R28-83	R29-84	R29-81	R31-27
Connection Low Cost		Contract	Contract	Contract	Contract	Contract
Connection (15mm)		R5 260-87	R5 459-13	R5 986-09	R5 913-04	R6 200-00
Connection (22mm)		R6 469-57	R6 469-57	R6 676-52	R8 260-87	R8 260-87
Connection 22mm Private Developments		R4 460-87	R4 460-87	R4 636-52	R4 469-57	R4 843-48
Deposit Payable: Letting of Municipal Standpipe		R6 086-96	R6 521-74	R7 500-00	R7 500-00	R7 500-00
Test of water meter – Refundable if result is faulty		R704-35	R782-61	R782-61	R826-09	R869-57

Note: 25% Increase in Tariffs (Level 2B), 30% Increase in Tariffs (Level 3), 35% Increase in Tariffs (Level 3B), 40% Increase in Tariffs (Level 4), 50% Increase in Tariffs (Level 5), 60% Increase in Tariffs (Level 6), 70% Increase in Tariffs (Level 7) and 80% Increase in Tariffs (Level 8) are also in place.

The sewerage tariff structures for Swartland Municipality for the 2023/2024 financial year and the previous four financial years are summarised in the table below (Subject to VAT).

Table 7.3.2: Sewerage tariffs for 2023/2024 and the previous four financial years						
Consumer/Description	**Category**	**19/20**	**20/21**	**21/22**	**22/23**	**23/24**
Basic Network Charge	Sewerage connection / pumping service	-	-	R105-10	-	-
Households, Flats, Semi-detached households	Availability Fees per month	R234-35	R234-35	R143-08	R262-82	R278-33
Businesses, Industrial, Schools, Churches, Sport Facilities, etc.	Availability Fees per month	R234-35	R234-35	R143-08	R262-82	R278-33
For each additional toilet	Businesses per month	R35-15	R36-87	R39-08	R41-04	R43-47
Sewer connections	100mm PVC	R4 626-09	R4 789-57	R5 024-35	R5 732-82	R6 852-17
Sewer connections	150mm PVC	R6 252-17	R6 673-04	R6 525-22	R6 663-18	R7 800-00
Sewer blockages	Office hours	R487-83	R524-35	R556-52	R560-06	R643-48
Sewer blockages	After hours and public holidays	R690-43	R743-48	R789-57	R795-05	R913-04
Emptying of tanks	For two emptying per month	R234-35	R234-35	R143-08	R303-91	R347-83
	Every additional emptying	R839-13	R858-43	R909-94	R1 149-10	R1 304-35
	3rd pumping during Easter Weekend and school holidays in the same month will be charged.	R839-13	R858-43	R909-94	R1 149-10	R1 304-35
	From the 1st sewerage pumping	R839-13	R858-43	R909-94	R1 149-10	R1 304-35

Table 7.3.2: Sewerage tariffs for 2023/2024 and the previous four financial years						
Consumer/Description	**Category**	**19/20**	**20/21**	**21/22**	**22/23**	**23/24**
Emptying of tanks (Riebeek Kasteel and Abbotsdale)	Plus fixed sewerage pan levy (Owner do not connect to the new waterborne system)	R266-00 (VAT incl.)	R266-00 (VAT incl.)	R285-41 (VAT incl.)	R302-24 (VAT incl.)	R400-00 (VAT incl.)
Ad-hoc emptying of tanks	After hours	R1 021-74	R1 081-91	R1 137-39	R1 252-17	R1 391-30
Treated Waste Water	Per Kl	R2-86	R2-96	R3-13	R3-30	R3-57
Treated Waste Water Rooiheuwel JV	Per Kl	R0-76	R0-81	R0-86	R0-90	R0-96
Partially connection (Emptying)		R117-18	R125-98	R52-61	R131-41	R139-13
Industrial effluent per Kl (COD)		R10-65	R11-27	R11-95	R12-52	R13-30
Grotto Baai and Jakkelsfontein – Network Charge		-	-	R105-10	-	-
Grotto Baai and Jakkelsfontein for two emptying per month		R234-35	R234-35	R143-08	R303-91	R347-83
Partial connection (pumping) sewerage tanks for two emptying per month, take consideration of the sewerage network monthly charge.		-	-	R71-60	R303-91	R330-43
Rural and Non-urban areas – emptying of sewerage tanks per pumping		R1 469-57	R1 545-22	R1 619-13	R1 630-82	R1 956-52

7.4 FREE BASIC SERVICES

The first six (6) kl of water is provided free to all indigent registered households. Swartland Municipality's tariffs support the viability and sustainability of water supply services to the poor through cross-subsidies (where feasible). Free basic water and sanitation services are linked to the Municipality's Indigent Support Policy and all indigent households therefore receive free basic water and sanitation services.

The free basic services are funded through the Equitable Share allocation to the Municipality in the Division of Revenue Act. Financial assistance may be granted by the municipality to a household that meets the following criteria, as included in the Indigent Policy (May 2023):

- where the property occupied by such owner is valued at R105 000.00 or less, or as determined by council annually, provided that the R15 000.00 exemption as contemplated in section 17(1)(h) of the Act shall be excluded from the R105 000.00 and the combined income of the occupants of the property does not exceed R4 515.00;
- where the property that is occupied by the owner is valued at more than R105 000.00, but the combined income of the occupants does not exceed R4 515.00; or
- where the occupier is not the owner of the property and the combined income of the occupants does not exceed R4 515.00; and where it is found that a state official whether from a national, provincial or local department is resident on a property, the indigent subsidy will not be granted or cancelled as the case may be.

None of the persons residing on a property, mentioned above, may own any other immovable property.

The table below provides an overview of the number of indigent households that received free basic water and sanitation services for the last five financial years.

Table 7.4.1: Number of indigent registered households that received free basic water and sanitation services for the last five financial years

Year	Water	Sanitation
2018/2019	8 923	8 435
2019/2020	9 027	8 525
2020/2021	9 698	8 883
2021/2022	9 223	8 918
2022/2023	9 205	9 205

7.5 METERING, BILLING AND INCOME

Installing meters and implementing an adequate billing system is central to managing services effectively and building a relationship of understanding and trust between the provider and consumer. The information below provides an indication of the extent of metering and billing throughout the Municipality, as calculated from the 2018 Swift Analysis.

Table 7.5.1: Number of unlinked treasury data, unmetered erven, erven with no consumption and erven with very low monthly consumption (July 2018 Swift data)

Town	Treasury Records without GIS link	Occupied stands without a water meter	Occupied stands with a water meter, but zero demand	Stands with water demand <0.1 Kl/d
Koringberg	28	9	8	51
Ongegund	0	1	0	2
Riebeek Wes	0	65	9	57
Riebeek Kasteel	0	22	6	131
Yzerfontein	268	70	13	345
Darling	133	39	20	213
Moorreesburg	238	170	16	396
Malmesbury	1 356	88	67	611
Kalbaskraal	21	55	5	54
Abbotsdale	22	41	7	147
Chatsworth	163	88	41	89
Riverlands	24	15	1	38
Farms	222	255	0	1
Total	**2 475**	**918**	**193**	**2 135**

The above occupied stands need to be investigated by the Municipality's meter readers in order to ensure that all stands are metered and that consumers are billed according to the volume of water used by them.

8. WATER SERVICES INSTITUTIONAL ARRANGEMENTS AND CUSTOMER SERVICES

Institutional Arrangements: In order to address the WSDP goals and service level targets the Municipality needs to ensure that:

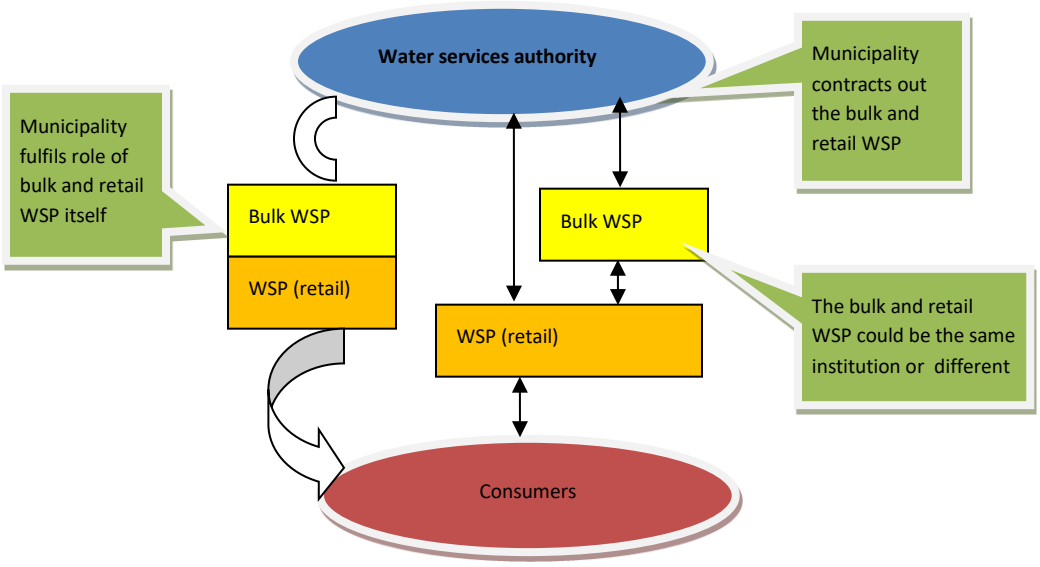
- it is able to effectively fulfil the WSA responsibilities as outlined in the Water Services Act (internal management and regulatory arrangements) and
- that efficient and effective water services provider institutional arrangements are in place (bulk WSPs, retail WSPs and support services agents).

The WSA is the Municipality that has been assigned WSA functions. The WSA is accountable and responsible for ensuring that water services are provided to consumers. However, this does not mean that it has to provide the services itself. The Municipality or other WSPs can provide the services. If the WSA decides to appoint a WSP to fulfil the water services provision function, it will enter into a municipal services partnership through signing a contract with a bulk and / or retail WSP.

Whilst the Water Service Act does not require the WSDP to contain details about the Municipality's capacity to fulfil WSA functions, various components within the WSDP are dependent upon these functions being effectively fulfilled.

Water services provider (WSP) institutional arrangements

WSP institutional arrangements refer to the bulk and retail WSP functions. The figure below illustrates the municipality fulfilling both the bulk and retail WSP functions (on the left hand side) and municipal service partnerships (MSPs) with bulk and retail WSPs (on the right hand side).



Note: There are many different options in establishing WSP institutional arrangements. For example the Municipality could contract out the bulk WSP function and fulfil the retail WSP function itself. In addition the Municipality could act as WSP for some areas and contract other WSPs for other areas. These arrangements will depend on specific context of the WSA area of jurisdiction.

If the WSA decides to fulfil the water services provision function itself, it may fulfil the function through an integral unit or it may corporatise the function through creating a municipal company. It may also decide to outsource parts of the water services provider function, for example meter reading, billing, etc. through service contracts. In this case the WSA remains the WSP with the assistance of service contracts.

Retail water services providers

The retail WSP function includes the following:

- Daily operations and repairs
- Preventative and major maintenance
- Customer relations, health and hygiene awareness and communication
- Revenue collection and related financial management
- Reporting and providing information on the provision of services
- General administration of the water services

A WSP may be contracted to fulfil some or all of these functions. There are a number of different types of WSPs which could fulfil the WSP retail functions, including district and local municipalities, a water board (they are typically associated with bulk water supply, but in some areas also provide retail services), private companies, and community based organisations (CBOs), such as a village water committee.

Some WSPs may require access to support, for example a community based water services provider or other small water services providers. The WSA may provide the support itself, or it may contract a support services agent (SSA) to provide support such as institutional and social development (ISD) mentoring, maintenance support or sanitation promotion.

The WSP institutional arrangements will depend on a range of issues such as:

- The particular settlement type (as different institutions are suited to different contexts);
- Location and accessibility of the community to be served;
- Capacity of the municipality to provide services itself;
- Capacity of the municipality to monitor and regulate WSPs should it decide to contract WSPs;
- Suitability of other WSPs to provide the services (cost, acceptability to the community/ies concerned, etc).

Customer Services: Consumer's experience of the delivery of water services is not restricted to what level of service they receive but includes the quality of service rendered. If consumers are satisfied with the quality of service, they are more likely to prepare to pay for the services they receive.

On the water supply side, quality of service includes water quality, service continuity, complaint response time, meter coverage, billing, and access to pay points. On the sanitation side, quality of service is about the quality of infrastructure provided (basic sanitation) and support for operation and maintenance and also about response times to complaints.

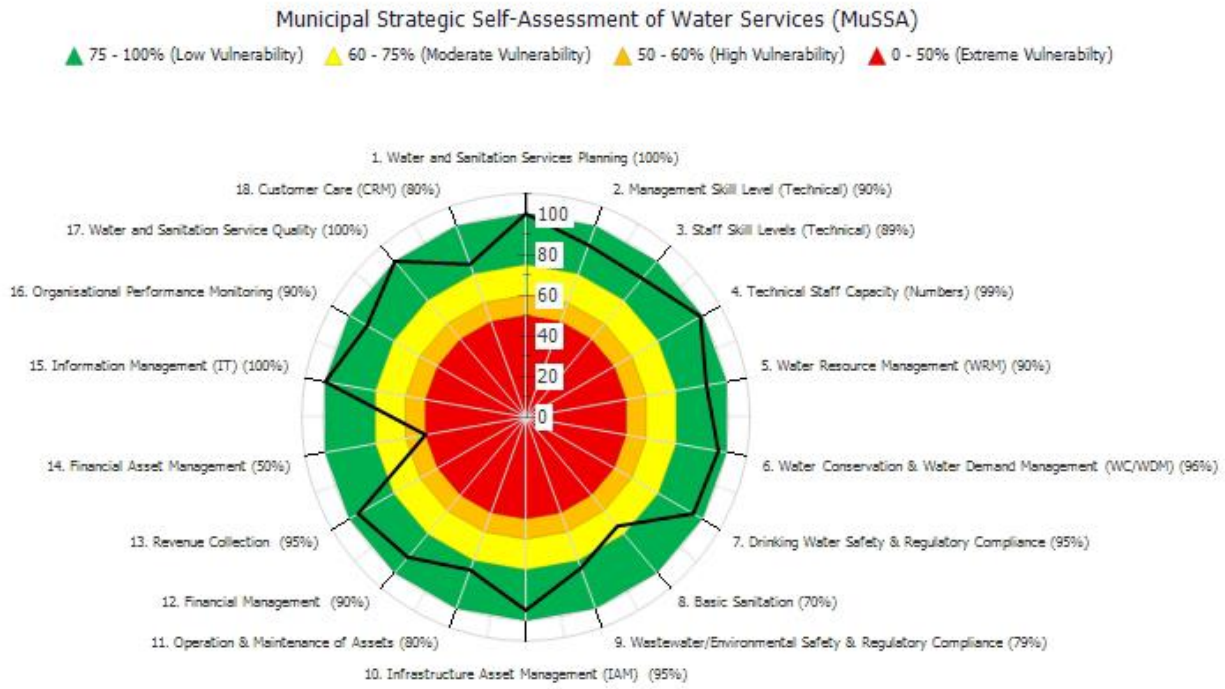
Monitoring is necessary to collect sufficient and accurate data to inform decision making, and reduce and manage risks. Therefore, the ultimate goal is to provide information needed for planning, decision making and operational water management.

Swartland Municipality is the WSA and Water Services Provider for the various towns in Swartland Municipality's Management Area.

8.1 MUNICIPAL STRATEGIC SELF-ASSESSMENT (MuSSA)

Overseen by the DWS the MuSSA conveys an overall business health of municipal water business and serves as a key source of information around municipal performance. The MuSSA also identifies key municipal vulnerabilities that are strategically important to DWS, the Department of Cooperative Government (DCoG), National Treasury, the planning Commission/Office of the Presidency, the South African Local Government Association (SALGA) and the municipalities themselves. The MuSSA team continues to engage (1) DWS directorates and their associated programmes (e.g. Water Services Development Plan, Water Services Regulation), and (2) other sector departments and their associated programmes (e.g. LGTAS, MISA) to minimize duplication and ensure alignment. Through the tracking of current and likely future performance, the key areas of vulnerability identified, allow municipalities to effectively plan and direct appropriate resources that will also enable DWS and the sector to provide more effective support.

The Spider Diagram below effectively indicates the vulnerability levels of Swartland Municipality across the eighteen key service areas, as identified through the Municipal Strategic Self-Assessment of Water Services process.



Swartland Municipality's Vulnerability Index for 2023 was indicated as 0.19 "Low Vulnerability". The only one area of concern evident from the 2023 assessment is Financial Asset Management, which obtained a score of 50% (High Vulnerability).

CONTEXT INFORMATION

The table below gives an overview of the context information as completed during the MuSSA of Swartland Municipality.

Table 8.1.1: MuSSA context information

Questions	MuSSA
Municipality name	Swartland
Date of completion	25 October 2023
Municipality type	B2 – LM
Water service provider type	Internal (i.e. municipality)
Wastewater service provider type	Internal (i.e. municipality)
Water system maintenance	Internal (i.e. municipality)
Wastewater system maintenance	Internal (i.e. municipality)
Bulk water provision	Combination of internal and external
The key staff (i.e. managerial) turnover in your WSA.	Low: <10% (i.e. not an issue, good staff retention)
Your WSA has developed and implemented a scarce skills policy.	Yes, developed and implemented
Your WSA actively provides required drinking water related data to the Regulator (e.g. Blue Drop participation)	Yes, strongly agree
Regular drinking-water quality monitoring and management (including boreholes) is performed for all communities / towns in the WSA.	Yes, all (i.e. close to 100% of WSA population)
WTWs operational capacity as a function of total design capacity (Combine for all WTWs within your WSA).	<90%
Your WSA actively provides required wastewater related data to the Regulator (e.g. Green Drop participation)	Yes, strongly agree
Regular wastewater quality monitoring and management is performed for all wastewater systems in the WSA.	Yes, all (i.e. close to 100%)
WWTWs operational flow capacity as a function of total design capacity (Combine for all WWTWs within your WSA).	<90%
WWTWs operational COD load as a function of total design load (Combine for all WWTWs within your WSA).	<90%
Your WSA actively provides required WC and WDM related data to the Regulator (e.g. No Drop participation)	Yes, strongly agree
Your municipality has a water resilience policy in place, which includes optimisation of existing water resources, diversifying supply to increase water security, and optimisation of the “water mix"	In process
Your municipality has a policy and procedures in place to encourage rainwater harvesting	No, disagree
Your municipality has desalination facilities for augmenting drinking-water supply	Not applicable
Your municipality recovers and reuses treated wastewater either directly (e.g. for potable purposes) or indirectly (e.g. for irrigation, feed to industry, aquifer recharge)	>25% of total wastewater generated
Your municipality recovers and reuses stormwater either directly (e.g. for potable purposes) or indirectly (e.g. recharging river for ecological functioning, nature based systems) (NOTE: This does not aim to measure inflow to dams at catchment level, but rather aims to define the extent of stormwater capture/reuse in the urban context).	No, none (i.e. 0%)
Advanced water treatment technologies (e.g. membrane based) and wastewater treatment/recovery technologies (e.g. reuse) implemented at your municipality are staffed by appropriately qualified personnel	Yes, all (i.e. close to 100%)
Your WSA actively promotes improved hygiene practices through campaigns in communities (e.g. had washing education, safe and improved sanitation).	In place, with occasional non-optimal response
Indicate the proportion of the population serviced via on-site sanitation (e.g. using appropriate technologies as defined by the National Norms and Standards for Sanitation Services (Sep 2017))	>50%
Indicate the proportion of the population not serviced (i.e. backlog, and potentially implying open defecation)	> 0% - 10%

WSDP: ADMINISTRATION, INFORMATION AND COMPREHENSIVE OVERVIEW
TOPIC 8: WATER SERVICES INSTITUTIONAL ARRANGEMENTS AND CUSTOMER SERVICES

Table 8.1.1: MuSSA context information	
Questions	**MuSSA**
Indicate the proportion of drinking-water sources at risk from on-site sanitation (e.g. VIPs could pollute groundwater source)	No, no sources (0%) are at risk
Indicate the proportion of on-site sanitation systems (e.g. VIPs, septic tanks) that are appropriately sealed/enclosed and/or fully/partially lined with minimal environmental impact (e.g. no overflow/seepage)	All (i.e. close to 100%)
Indicate the estimated proportion of wastewater not delivered for treatment (to all WWTWs) (e.g. lost through old, leaking sewer pipes)	<1%
Indicate the estimated proportion of faecal sludge/supernatant emptied from all on-site sanitation systems (e.g. septic tanks, VIPs) that is not delivered for treatment (e.g. honeysucker does not deliver to the WWTW, but rather dumps into environment)	<1%
You have classified all of your treated sludge (from WWTWs and on-site sanitation systems (e.g. VIPs, septic tanks)	Yes, all sludges classified (i.e. close to 100%)
You are disposing/reusing all of your all your sludge (from both WWTWs and on-site sanitation systems (e.g. VIPs, septic tanks)) in accordance with licence conditions/WRC guidelines	Yes, all sludges reused/disposed appropriately (i.e. close to 100%)
Your municipality is adhering to its mandated responsibility as WSA and proactively managing water and sanitation services on farms/rural areas within its area of jurisdiction (as per National Norms and Standards for Domestic Water and Sanitation Services (Sep 2017))	No, disagree
Council has functional Oversight Committees and Ward Committees, as appropriate (DM would be served via LM Ward Committees)	Yes, strongly agree (i.e. Oversight and Ward Committees established and functioning)
Council has effective systems of internal control and functional governance structures (internal audit unit, audit committee, risk committee, IT governance)	Yes, strongly agree (i.e. internal audit unit established and posts filled, governance structures in place, frequent meetings held and risk assessments conducted, audit plan developed and quarterly reports submitted to council)
Forensic investigations are undertaken as and when necessary to ensure adherence to governance requirements (i.e. either internally initiated by the municipality or externally initiated by, for example, Public Protector, Auditor General)	Yes, strongly agree
Your municipality has policies, procedures and systems in place that negate the impact of vandalism / sabotage of municipal water and sanitation infrastructure on services delivery	No, disagree
Your municipality has ongoing and appropriate public participation, is transparent in its decision making, and is accountable to its constituency (fiscal and social).	Yes, strongly agree
Your municipality have a co-operation agreement in place (technical, financial, twinning, peer learning, etc) with an international municipality or other international institution?	No, disagree
Your municipality receives international financial aid (grants/loans)?	No, disagree
Those of your 18 MuSSA Business Aspects which reflect Extreme and / or Highly Vulnerable, are included within your WSAs Corporate Risk Register.	In place, with occasional non-optimal response
Your MuSSA was completed with appropriate inputs from senior officials within Technical Services, Finance and Human Resources (as a minimum these three departments should participate).	Yes, strongly agree (i.e. Technical Services HOD, Finance AND HR all participated)
Names, designation and contact details (phone, email) of all MuSSA participants.	Esias de Jager 022 487 9400 / 084 620 6025 dejagere@swartland.org.za, Finance Dept. - Hilmary Papier, papierh@swartland.org.za, HR - Sunet de Jongh

8.1.1 Water and Sanitation Services Planning

Table 8.1.1.1: Water and Sanitation Services Planning						
Water and Sanitation Services Planning – Low Vulnerability 100%						
Your appropriate water and sanitation services planning (e.g. WSDP) and associated master planning processes include and are aligned with appropriate Water and Sewage Master Plans, Spatial Development Framework, Water Safety Plans and Wastewater Risk Abatement Plans (W_2RAPs) and are aligned to your IDP and associated SDBIP targets.						
Yes, appropriate water services	Yes, appropriate water services	Yes, appropriate water services	Yes, appropriate water services	Plans still in development	Plan development	Don't know

Table 8.1.1.1: Water and Sanitation Services Planning						
Water and Sanitation Services Planning – Low Vulnerability 100%						
plans are developed and include all required plans and alignment (i.e. 100%)	plans are developed and include all required plans and alignment (i.e. > 95%)	plans are developed and include all required plans and alignment (i.e. > 75%)	plans are developed and include all required plans and alignment (i.e. > 50%)		not yet initiated	
You are implementing an up-to-date and adopted municipal water and sanitation services plan (e.g. WSDP).						
Yes, municipal water and sanitation services plans up-to-date, adopted and implemented	Municipal water and sanitation services plans adopted and implemented, but out-of-date (i.e. requires revision)	Municipal water and sanitation services plans adopted but not yet implemented	Municipal water and sanitation services plans not adopted but implemented	Municipal water and sanitation services plans neither adopted nor implemented	Don't know	
Your current project list addresses existing needs / shortcomings identified through the WSDP and associated master planning process.						
Yes, all projects are identified via the planning process (i.e. 100%)	Almost all (i.e. >95% of projects)	Most projects (i.e. >75%)	Some projects (i.e. >50%)	<50% of projects	None (i.e. 0%)	Don't know
Project progress is monitored, tracked and reported to municipal top management / council and the Regulator (through the annual water and sanitation services report).						
Yes, strongly agree (both to municipal top management/council and Regulator)	Only to municipal top management/council	Only to Regulator	No, disagree	Don't know		
Projects identified through your various planning processes have been implemented in the last 3 years.						
Yes, all projects identified via planning have been implemented (i.e. 100%)	Almost all implemented (i.e. >95%)	Most implemented (i.e. >75%)	Some implemented (i.e. >50%)	<50% implemented	None implemented (i.e. 0%)	Don't know

Swartland Municipality's Water and Sewer Master Plan process entails the establishment of computer models for the water systems and the sewer systems in Swartland Municipality, the linking of these models to the stand and water meter databases of the treasury financial system, evaluation and master planning of the networks and the posting of all the information to IMQS. The Water and Sewer Master Plans lists the analyses and findings of the study on Swartland Municipality's water distribution and sewer drainage systems. The following Water and Sewer Master Plans were incorporated into the WSDP.

- Bulk Water Master Plan for Swartland Municipality (December 2021);
- Water Master Plan for Swartland Municipality (June 2020); and
- Sewer Master Plan for Swartland Municipality (June 2020).

All forward planning for water and sanitation services and water and sewerage infrastructure is guided by the Water and Sewer Master Plans.

Water Safety Plans for the two bulk WTWs and the bulk distribution systems were drafted in 2022 by the West Coast District Municipality and a Water Safety Plan for the internal water distribution systems was drafted by Swartland Municipality in 2022. W_2RAPs were also drafted in 2018 for the various WWTWs and sewer drainage networks. Detail WTWW Process Audits were compiled for the WWTWs during 2021. The Municipality annually compile the WSDP Performance- and Water Services Audit Report, as required by the Water Services Act and the DWS.

8.1.2 Management Skill Level (Technical)

Table 8.1.2.1: Management Skill Level						
Management Skill Level (Technical) – Low Vulnerability 90%						
Your council approved technical management organisational organogram meets your business requirements, and key posts are filled (e.g. Technical Director, Water Services Manager, and Sanitation Services Manager).						
Yes, and all posts filled (i.e. close to 100%)	Yes, and almost all posts filled (i.e. >95%)	Yes, and most posts filled (i.e. >75%)	Yes, but only some posts filled (i.e. >50%)	Yes, but <50% of posts filled	No, does not meet business requirements	Don't know
You have sufficient technical management and technical support staff.						
Yes, 100% as per approved organogram	Yes, strongly agree (i.e. >95% as per approved organogram)	Mostly agree (i.e. >75% as per approved organogram)	Agree somewhat (i.e. >50% as per approved organogram)	<50% as per approved organogram	None (i.e. 0% as per approved organogram)	Don't know
Technical management and technical support staff have the correct skills / qualifications and experience as per Job Description requirements (e.g. if Job Description requires Pr Eng, Pr Tech or CPM, the staff have these qualifications).						
Yes, all (i.e. 100%)	Almost all (i.e. >95%)	Most (i.e. >75%)	Some (i.e. >50%)	<50%	None (i.e. 0%)	Don't know
Managers and technical support staff regularly attend appropriate water and sanitation services skills development / training to support professionalisation.						
Quarterly (or more frequent) skills development/ training	Bi-annual skills development/ training	Annual skills development/ training	Less frequent skills development/ training (i.e. >1 year)	No skills development/ training	Don't know	
Key technical managers (e.g. Section 56 and other Senior Management) have signed and monitored Performance Agreements.						
Yes, all (i.e. close to 100%)	Almost all (i.e. >95%)	Most (i.e. >75%)	Some (i.e. >50%)	<50%	None (i.e. 0%)	Don't know

The Management personnel for water and sanitation services of Swartland Municipality are as follows:

- Director: Civil Engineering Services: Mr Louis Zikmann.
- Senior Manager: Solid Waste and Trade Services (Master Planning, Refuse, Sewerage and Water): Mr Esias De Jager.
- Manager: Civil Operations and Maintenance (Sewerage, Water, Street, Stormwater, Parks, Sport Facilities): Mr John Barlow.

8.1.3 Staff Skill Level (Technical)

Table 8.1.3.1: Staff Skill Level							
Staff Skill Levels (Technical) – Low Vulnerability 89%							
WTWs are operated by staff with the correct skills / qualifications and experience (as per Regulation 2834).							
Yes, all (i.e. close to 100%)	Almost all (i.e. >95%)	Most (i.e. >75%)	Some (i.e. >50%)	<50%	None (i.e. 0%)	Don't know	Not applicable
WWTWs are operated by staff with the correct skills / qualifications and experience (as per Regulation 2834).							
Yes, all (i.e. 100%)	Almost all (i.e. >95%)	Most (i.e. >75%)	Some (i.e. >50%)	<50%	None (i.e. 0%)	Don't know	Not applicable
Water system plumbers, millwrights, mechanics and electricians have the required skills / qualifications and experience (including contractors / outsourced resources).							
Yes, all (i.e. close to 100%)	Almost all (i.e. >95%)	Most (i.e. >75%)	Some (i.e. >50%)	<50%	None (i.e. 0%)	Don't know	
Sewage system plumbers, millwrights, mechanics and electricians have the required skills/qualifications and experience (including contractors / outsourced resources).							

Table 8.1.3.1: Staff Skill Level						
Staff Skill Levels (Technical) – Low Vulnerability 89%						
Yes, all (i.e. close to 100%)	Almost all (i.e. >95%)	Most (i.e. >75%)	Some (i.e. >50%)	<50%	None (i.e. 0%)	Don't know
Staff regularly attend appropriate water services skills development / training (including safety) (e.g. ESETA courses).						
Quarterly (or more frequent) skills development/ training	Bi-annual skills development/ training	Annual skills development/ training	Less frequent skills development/ training (i.e. >1 year)	No skills development/ training	Don't know	

At a technical, operations and management level, municipal staff is continuously exposed to training opportunities, skills development and capacity building in an effort to create a more efficient overall service to the users, within budget constraints. Submissions were also made to the DWS for the classification and registration of the Process Controllers and Supervisors at the various plants.

A skills audit is conducted during each year which leads to various training programmes in order to wipe out skills shortages and to provide employees with the necessary capacity.

WTWs: Swartland Municipality receives bulk potable water from the West Coast District Municipality. The District Municipality operates the Withoogte and Swartland bulk schemes, which is served by the Berg River as main raw water supply. The bulk supply of Withoogte is augmented by abstraction of groundwater from the Langebaan Road Groundwater Aquifer System. Both these bulk distribution schemes are cross-border schemes and supply water to Swartland Municipality, Bergrivier Municipality and Saldanha Bay Municipality. The towns in Swartland Municipality's Management Area supplied with bulk potable water by the West Coast District Municipality are Malmesbury (Abbotsdale, Riverlands, Chatsworth and Kalbaskraal), Moorreesburg, Yzerfontein, Darling, Riebeek Kasteel, Riebeek Wes, Koringberg and Ongegund (PPC).

Swartland Municipality supplements the water received from West Coast District Municipality in the Malmesbury distribution system with water from the Paardenberg Dam, which is treated by an automatic backwash rapid gravity sand filter, before it is distributed to Abbotsdale, Kalbaskraal, Riverlands and Chatsworth. A further three boreholes in Riverlands are also used as additional supply for Riverlands and Chatsworth. The groundwater is disinfected, before it is blended with the other potable water and distributed to the consumers in Riverlands and Chatsworth respectively.

The current classification of the two bulk WTWs, according to Section 26 of the National Water Act (Act No.36 of 1998), is summarised in the table below. The required number of qualified personnel at the WTWs according to Regulation 3630 (June 2023) for water treatment personnel is shown in the table below, together with number of operational and supervisory personnel currently employed and their classifications.

Table 8.1.3.2: Required Class of Process Controllers for the Swartland and Withoogte WTWs and existing classification of the Process Controllers at the WTWs

WTW (Classification)	Requirements according to Regulation 3630	Process Controllers	Description	ID Number	Class of Process Controller
Swartland Class A	Class IV Process Controller per shift Class V Process Controller for Supervision	**Grace Adams**	**Process Controller**	**7307120137080**	**IV**
		Marlene Bottom	**Principal Process Controller**	**7305270117084**	**V**
		Richard Coetzee	Process Controller	7601145169080	II
		Jacques Frantz	**Process Controller**	**6807045130087**	**IV**
		Devon Fredericks	Process Controller	9408225422084	III
		Carlo Herbert	Assistant Process Controller	8304235096086	III
		Bevan Isaac	Process Controller	8204085076081	III
		Denvan Julies	**Plant Superintendent**	**7708145136082**	**V**
		Hilton Kamfer	Process Controller	7707245104081	II
		Barnard Louw	Process Controller	6204295198081	II

Table 8.1.3.2: Required Class of Process Controllers for the Swartland and Withoogte WTWs and existing classification of the Process Controllers at the WTWs

WTW (Classification)	Requirements according to Regulation 3630	Process Controllers	Description	ID Number	Class of Process Controller
		Willem Macelli	**Principal Process Controller**	**7510305477086**	**V**
		Ashley Otto	Assistant Process Controller	8007165075083	III
		Ashleen Stevens	Process Controller	9202140136089	III
		Lewis Laverlot	Process Controller	7110095087086	II
Withoogte Class A	Class IV Process Controller per shift Class V Process Controller for Supervision	**Denise Adams**	**Assistant Process Controller**	**8602280223087**	**IV**
		Geduld Baadjies	**Principal Process Controller**	**6407115144082**	**V**
		Mark Baatjes	**Process Controller**	**7509085153081**	**IV**
		Petrus De Klerk	**Principal Process Controller**	**7204305148083**	**IV**
		Sharalene Dunn	**Principal Process Controller**	**8409300051088**	**IV**
		Jacobus Engelbrecht	**Process Controller**	**8505265102087**	**IV**
		Shaun Fortuin	Assistant Process Controller	902075349088	Learner
		Ge-Nade Hanson	Process Controller	0109020213087	Learner
		Steven Isaacs	Process Controller	8204175342088	II
		Josephine Josephs	**Process Controller**	**7601230073080**	**IV**
		Johannes Julies	**Plant Superintendent**	**6506085732089**	**V**
		Johnyboy Julies	Process Controller	8910145128080	II
		Halgernon Maschilla	Assistant Process Controller	8608075102089	Learner
		Lluvainne Schippers	**Process Controller**	**8708090136086**	**IV**
		Denver Smith	Process Controller	7807115190085	III
		Gerreth Smith	Assistant Process Controller	8907035236080	III
		Llewellyn Solomons	**Process Controller**	**8701015096089**	**IV**
		Daniel Sym	**Principal Process Controller**	**8012315089083**	**V**
		Garnet Titus	**Chemical Technician**	**7302155202081**	**VI**
		Jeremy Valentyn	Assistant Process Controller	8306295170081	Learner
		Ben Van Der Merwe	**Manager: Purification**	**6808175748086**	**V**

The current Supervisors and Process Controllers at the two bulk WTWs comply with the required number and Class of Supervisors and Process Controllers according to the classification of the plants.

Operational and Maintenance support personnel must be available at all times, but may be in-house or outsourced (Electrician, fitter and instrumentation technician). The Supervisor for Class C – E works does not have to be at the works at all the times, but must be available at all times.

The West Coast District Municipality's Water Services Section is headed by the Senior Manager (Mr M Visser). Mr B van der Merwe is the Operational Manger and he is supported by Mr G Titus (Chemical Technician). Swartland Municipality's Water Services Section is headed by the Director Civil Engineering Services (Mr L Zikmann). Mr E De Jager is Senior Manager: Solid Waste and Trade Services and he is supported by Ms C Fortuin (Senior Technician Trade Services) and Mr J Barlouw (Manager Civil Operations and Maintenance).

The West Coast District Municipality and the Swartland Municipality regularly review their Organograms in order to ensure that the number of Process Controllers per WTW is in-line with DWS's requirements for Process Controllers per Class of plant. Submissions for the re-classification of Process Controllers, after specific training courses were completed, will also be loaded onto the IRIS in the future.

WWTWs: Swartland Municipality owns and manages the following WWTWs and sewer drainage systems:

- Malmesbury WWTW and Malmesbury and Abbotsdale Drainage Systems
- Kalbaskraal WWTW and Drainage System
- Riverlands/Chatsworth WWTW and Riverlands and Chatsworth Drainage Systems
- Moorreesburg WWTW and Drainage System
- Riebeek Valley WWTW and Ongegund, Riebeek Wes and Riebeek Kasteel Drainage Systems
- Koringberg WWTW and Drainage System
- Darling WWTW and Drainage System

Current authorisations for the Swartland Municipality's WWTWs are as follows:

Table 8.1.3.3: Authorisations for the WWTWs

WWTW	Authorisations
Malmesbury	Licence 01/G21C/EFG/8765, 21 November 2018.
Kalbaskraal	New application was submitted. Previous General Authorisation (Ref 16/2/7/G202/D132/X3), dated 20/12/1999.
Riverlands/Chatsworth	General Authorisation 05/12/2013
Moorreesburg	Application was submitted. Previous Permit 206B (23/01/1984)
Riebeek Valley	General Authorisation
Koringberg	General Authorisation 28/08/2014
Darling	General Authorisation 29/01/2020

The current classification of the WWTWs, according to Section 26 of the National Water Act (Act No.36 of 1998), for which Swartland Municipality is responsible is summarised in the table below. The required number of qualified personnel at the WWTWs according to Regulation 3630 (June 2023) for wastewater treatment personnel is shown in the table below, together with number of operational and supervisory personnel currently employed and their classifications.

Table 8.1.3.4: Required Class of Process Controllers for the WWTWs and existing classification of the Process Controllers at the WWTWs

WWTW, Class and Shifts	Requirements according to Regulation 3630	Process Controllers and Supervisors	
		Name	Class
Malmesbury WWTW Class A Shift 08:00 – 17:00	Class IV Process Controller per shift	H. Strydom W Barendse R Jenneke F. Mbongo	V V V III
	Class V Process Controller for Supervision	DF Malan	VI
	Number and Class of Supervisor and Process Controllers for the Malmesbury WWTW are adequate.		
Kalbaskraal WWTW Class E Shift 08:00 – 17:00	Class I Process Controller per shift	No full-time operator on site, but there is an official in attendance at the adjacent solid waste transfer station.	-
	Class V Process Controller for Supervision	DF Malan	VI
	Municipality to ensure that a Class I Process Controller is available for the WWTW		
Riverlands/Chatsworth WWTW Class E Shift 08:00 – 17:00	Class I Process Controller per shift	No full-time operator on site, but there is an official in attendance at the adjacent solid waste transfer station.	-
	Class V Process Controller for Supervision	DF Malan	VI
	Municipality to ensure that a Class I Process Controller is available for the WWTW		
Moorreesburg WWTW Class D	Class II Process Controller per shift	E. P. Alexander DB Jannike	V

Table 8.1.3.4: Required Class of Process Controllers for the WWTWs and existing classification of the Process Controllers at the WWTWs

WWTW, Class and Shifts	Requirements according to Regulation 3630	Process Controllers and Supervisors	
		Name	Class
Shift 08:00 – 17:00			Not yet classified
	Class V Process Controller for Supervision	DF Malan	VI
	Second Process Controller to be classified as soon as possible.		
Riebeek Valley WWTW Class B Shift 08:00 – 17:00	Class IV Process Controller per shift	W. M. Maarman S. Faro	III III
	Class V Process Controller for Supervision	DF Malan	VI
	Two Class IV Process Controllers are required for the plant.		
Koringberg WWTW Class E Shift 08:00 – 17:00	Class I Process Controller per shift	No full-time operator on site, but there is an official in attendance at the adjacent solid waste transfer station.	-
	Class V Process Controller for Supervision	DF Malan	VI
	Municipality to ensure that a Class I Process Controller is available for the WWTW		
Darling WWTW Class B Shift 08:00 – 17:00	Class IV Process Controller per shift	E Basson	IV
	Class V Process Controller for Supervision	DF Malan	VI
	Second Class IV Process Controller is required for the plant.		

Operational and Maintenance support personnel must be available at all times, but may be in-house or outsourced (Electrician, fitter and instrumentation technician). The Supervisor for Class C – E works does not have to be at the works at all the times, but must be available at all times.

Swartland Municipality is responsible to ensure that the number of Process Controllers per WWTW is in-line with DWS's requirements for Process Controllers per Class op plant. Submissions for the re-classification of Process Controllers, after specific training courses were completed, will also be loaded onto the IRIS in the future.

The Maintenance Team mainly performs their own repair and preventative maintenance work to the equipment and infrastructure of the Municipality, except when specialised repair work is required, in which case the work is sub-contracted to approved sub-contractors on the municipal database.

8.1.4 Technical Staff Capacity (Numbers)

Table 8.1.4.1: Technical Staff Capacity

Technical Staff Capacity (Numbers) – Low Vulnerability 99%							
Your council approved technical staff organisational organogram meets your business requirements, and posts are filled (i.e. Superintendent of WTWs / WWTWs and below).							
Yes, and all posts filled (i.e. close to 100%) as per the approved organogram	Strongly agree, and most posts filled (i.e. >95%) as per the approved organogram	Yes, and most posts filled (i.e. >75%) as per the approved organogram	Yes, but only some posts filled (i.e. >50%) as per the approved organogram	Yes, but <50% of posts filled as per the approved organogram	No, does not meet requirements	Don't know	
WTWs are operated by the appropriate number of staff (as per Regulation 2834).							
Yes, close to 100% as per requirements	Strongly agree (i.e. >95% as per requirements)	Mostly agree (i.e. >75% as per requirements)	Agree somewhat (i.e. >50% as per requirements)	<50% as per requirements	None (i.e. 0% as per requirements)	Don't know	Not applicable
WWTWs are operated by the appropriate number of staff (as per Regulation 2834).							
Yes, 100% as per requirements	Strongly agree (i.e.	Mostly agree (i.e. >75% as	Agree somewhat (i.e.	<50% as per requirements	None (i.e. 0% as per requirements)	Don't know	Not applicable

Table 8.1.4.1: Technical Staff Capacity							
Technical Staff Capacity (Numbers) – Low Vulnerability 99%							
	>95% as per requirements)	per requirements)	>50% as per requirements)				
You have sufficient water and sewerage/sanitation network operations and repair staff/plumbers including contractors / outsourced resources (i.e. you have the appropriate number of staff).							
Yes, close to 100% as per functional requirements	Strongly agree (i.e. >95% as per functional requirements)	Mostly agree (i.e. >75% as per functional requirements)	Agree somewhat (i.e. >50% as per functional requirements)	<50% as per functional requirements	None (i.e. 0% as per functional requirements)	Don't know	
An active mentoring/shadowing programme is in place where experienced staff train younger, inexperienced municipal staff.							
Yes, strongly agree	In place, but not ideal	No, disagree	Don't know				

The draft 2022/2023 Annual Report (January 2024) indicated that the municipality had 646 of the 663 posts filled for the 2022/2023 financial year (Vacancy rate of 2.56%). The vacancy rate for 2022/2023 for water services was 2.78% (1 of the 36 approved posts were vacant) and for sanitation services there were no vacancies. The table below gives an overview of the number of employees for water and sanitation services for the last three financial years and the vacancies for the 2022/2023 financial year (Draft 2022/2023 Annual Report).

Table 8.1.4.2: Employees for Water and Sanitation Services for the last three financial years

Job Level	2020/2021	2021/2022	2022/2023			
	Employees	Employees	Employees	Posts	Vacancies	Vacancies (% of total posts)
	No.	No.	No.	No.	No.	%
Water Services						
0 – 3	15	12	12	12	0	0.00%
4 – 6	11	10	11	12	1	8.33%
7 – 9	5	6	5	5	0	0.00%
10 – 12	6	6	6	6	0	0.00%
13 – 15	2	2	1	1	0	0.00%
16 – 18	0	0	0	0	0	0.00%
19 – 20	0	0	0	0	0	0.00%
Total	**39**	**36**	**35**	**36**	**1**	**2.78%**
Sanitation Services						
0 – 3	8	7	5	5	0	0.00%
4 – 6	11	9	12	12	0	0.00%
7 – 9	9	10	11	11	0	0.00%
10 – 12	1	3	3	3	0	0.00%
13 – 15	1	1	1	1	0	0.00%
16 – 18	0	0	0	0	0	0.00%
19 – 20	0	0	0	0	0	0.00%
Total	**30**	**30**	**32**	**32**	**0**	**0.00%**

Swartland Municipality is currently effectively managing their water and sanitation services. Special focus is however required to ensure adequate rehabilitation and maintenance of the existing water and sewerage infrastructure, with adequate operational personnel.

Tables 8.1.3.2 and 8.1.3.4 indicate the required number of process controllers per Class of WTWs and WWTWs, as well as the personnel currently employed at the WTWs and WWTWs and their classifications.

8.1.5 Water Resource Management (WRM)

Table 8.1.5.1: Water Resource Management

Water Resource Management (WRM) – Low Vulnerability 90.0%								
The recommendations and actions from the Reconciliation Strategies (Large Systems / All Towns) have been incorporated into your WSDP, master planning and IDP processes.								
Yes, strongly agree	In process	No, disagree	Don't know	Not applicable				
The metered quantity of water available from the resources is sufficient for your future WSA needs (at the stipulated level of abstraction and assurance of supply).								
No shortage (i.e. sufficient water)	1 - 10% shortage	11-20% shortage	21-30% shortage	31-40% shortage	41-50% shortage	>50% shortage	Don't know	Not applicable
The metered quantity of water available from the resources is sufficient for your future WSA needs (at the stipulated level of abstraction and assurance of supply and considering possible climate change impacts) (i.e. no shortage in 10 years).								
No shortage (i.e. sufficient water)	1 - 10% shortage	11-20% shortage	21-30% shortage	31-40% shortage	41-50% shortage	>50% shortage	Don't know	Not applicable
The source water quality is regularly tested and is currently acceptable for its purpose.								
Yes, strongly agree (i.e. all sources (close to 100%) by water volume are acceptable)	Agree (i.e. >95% of sources by water volume are acceptable)	Agree somewhat (i.e. >50% of sources by water volume are acceptable)	<50% of sources by water volume acceptable	None (i.e. 0% of sources by water volume are acceptable)	Don't know	Not applicable		
The source water quality is regularly tested and the trend indicates a deteriorating quality.								
Yes, all sources (100%) by water volume are deteriorating	>75% of sources by water volume are deteriorating	>50% of sources by water volume are deteriorating	>25% of sources by water volume are deteriorating	< 25% of sources by water volume are deteriorating	No, no sources (0%) are deteriorating	Don't know	Not applicable	

See Topic 6 for more information on the water resource management of the municipality.

8.1.6 Water Conservation and Water Demand Management (WC/WDM)

Table 8.1.6.1: Water Conservation and Water Demand Management

Water Conservation and Water Demand Management (WC/WDM) – Low Vulnerability 96%						
Your WSA has developed a council approved WC/WDM Strategy, which includes a standard water balance (e.g. modified IWA).						
WC/WDM Strategy and water balance developed	Only WC/WDM Strategy developed	Only water balance developed	None developed	Don't know		
Please indicate your percentage Non-Revenue Water (NRW) as per the modified IWA water balance.						
Less than 15%	Less than 25%	Less than 30%	Less than 40%	Less than 50%	50% or more	Don't know
System input volumes (bulk) to the WSA are accurately monitored using calibrated bulk meters (e.g. check metering).						
Yes, all (i.e. close to 100%)	Almost all (i.e. >95%)	Most (i.e. >75%)	Some (i.e. >50%)	<50%	None (i.e. 0%)	Don't know
Please indicate what percentage of all connections are metered and billed (residential and non-residential (commercial, industrial, etc.)) on a monthly basis.						
>98%	75% - 98%	50% - 75%	<50%	< 25%	No metering	Don't know
Your WSA is implementing appropriate intervention programmes to reduce NRW (e.g. minimisation of night flows through pressure management, removal of unlawful connections, leak detection and repairs, consumer education / awareness).						
Yes, strongly agree (i.e. 100% implementation)	Agree (i.e. >95% implementation)	Mostly agree (i.e. >75% implementation)	Agree somewhat (i.e. >50% implementation)	<50% implementation	No implementation (i.e. 0%)	Don't know

Swartland Municipality also received their 2023 No Drop Score, as calculated through the 2023 Assessment done by the DWS. The 2023 No Drop assessments were performed using a reduced set of No Drop Criteria. These criteria were selected to assess a WSA's understanding of their WC/WDM status, the plans, strategies, budgets, and implementation of remedial projects. Below is a brief description of the Criteria used for the 2023 assessment.

Table 8.1.6.2: Description of No Drop Criteria	
Criteria 1	WC/WDM status quo, plans and strategies, budgets, and implementation of projects (Water Resource Diagram, Water Balance, Council approved WC/WDM strategies and budgets)
Criteria 2	Asset management as it relates to meter replacement. Monitoring, analysis, and action of high loss District Metered Areas (DMAs) in metropolitan municipalities
Criteria 3	Technical skills of WC/WDM team
Criteria 5	Compliance and Performance based on the water loss and efficiency Key Performance Indicators (KPI) and year on year improvement there-of

The purpose of the 2023 No Drop Assessments was twofold:

- To complete the consultative assessment of the 144 WSAs as per the No Drop Requirements based on the 2021/22 financial year.
- To update the water balance and water loss benchmarking for the 2022/23 financial year. This is reported on in the Status of Water Loss, Water Use Efficiency and Non-Revenue Water in South African Municipalities (2012/13 to 2022/23).

The No Drop results for Swartland Municipality are presented in the table below.

Table 8.1.6.3: No Drop Performance of the Municipality (DWS's 2023 No Drop Report)		
No Drop Score (2021/2022)		**91%**
Criteria	**Weight**	**Score**
1: WC/WDM Strategy, Planning and Implementation	45%	100% (Excellent)
2: Asset Management	10%	40% (Poor)
3: Technical Skills	10%	80% (Good)
5: Compliance and Performance	35%	69% (Average)
Weighted Sub-Total		81%
Bonus		10%
Score		91% (Excellent)
Penalty 1: No evidence of approved budget		0.0%
Penalty 2: Section 82 of the Water Servies Act		0.0%
Criteria 1 Sub-Items: WC/WDM Strategy, Planning and Implementation		
Item		**Score (Max = 1)**
1.1: Water Resources		1.0 (Excellent)
1.2: Water Balance		1.0 (Excellent)
1.2: WC/WDM Strategy and Business Plan		1.0 (Excellent)
Penalty 1: No evidence of approved budget		0.0
Criteria 5 Sub-Items: Compliance and Performance		
Item		**Score (Max = 1)**
5.1: Reticulation Leak Repair		1.0 (Excellent)
5.2: Physical Water Losses		0.6 (Average)
5.3: Commercial Water Losses		0.5 (Average)
5.4: Non-Revenue Water		0.7 (Average)
5.5: Water Use Efficiency		0.7 (Average)
Water Balance Integrity		**High (Excellent)**

See Topic 5 for more information on the WC/WDM of the municipality.

8.1.7 Drinking Water Safety and Regulatory Compliance

Table 8.1.7.1: Drinking Water Safety and Regulatory Compliance

Drinking Water Safety and Regulatory Compliance – Low Vulnerability 95.0%							
Please indicate your microbiological drinking- water quality compliance for E.Coli (or faecal coliforms) for the communities you are monitoring for the last 12 months.							
99% - 100%	97% - <99%	95% - <97%	< 95%	Don't know			
ALL your supply schemes, WTWs, process controllers, monitoring programmes, sample points, laboratories, results, procedures, protocols, etc. are managed with a suitable Water Safety Planning framework.							
Yes, strongly agree (i.e. close to 100% covered)	Strongly agree (i.e. >95% covered)	Mostly agree (i.e. >75% covered)	Agree somewhat (i.e. >50% covered)	<50% covered	None covered (i.e. 0%)	Don't know	
Council have been made aware of high risk / critical water safety plan related issues (including those identified via the Blue Drop Certification programme) that require budget and actioning, and these issues have been actioned (where applicable).							
Yes, strongly agree (i.e. all (close to 100%) tabled)	Strongly agree (i.e. >95% tabled)	Mostly agree (i.e. >75% tabled)	Agree somewhat (i.e. >50% tabled)	<50% tabled	Issues noted but none tabled (i.e. 0%)	Not applicable (no issues requiring council resolution exist)	Don't know
Sufficient funds have been made available to address all these identified water safety related issues.							
Yes, strongly agree (i.e. 100% of required funds)	Strongly agree (i.e. >95% of required funds)	Mostly agree (i.e. >75% of required funds)	Agree somewhat (i.e. >50% of required funds)	<50% of required funds	Issues noted but no funds (i.e. 0%)	Not applicable (no issues requiring funding exist)	Don't know
Required corrective actions/remedial measures to address all these identified water safety related issues have been successfully implemented.							
Yes, strongly agree (i.e. 100% implementation)	Strongly agree (i.e. >95% implementation)	Mostly agree (i.e. >75% implementation)	Agree somewhat (i.e. >50% implementation)	<50% implementation	Issues noted but no implementation (i.e. 0%)	Not applicable (no issues requiring corrective actions exist)	Don't know

Drinking Water Quality Monitoring Programme: Operational and Compliance Water Quality Monitoring Programmes are implemented by the West Coast District Municipality and Swartland Municipality. The current and proposed operational and compliance water quality sampling programmes of Swartland Municipality for the various water distribution systems are summarised in the table below.

Table 8.1.7.2: Current parameters sampled by the Swartland Municipality: Routine monitoring of Process Indicators

System	Sampling Point	Current Parameters Sampled by Swartland Municipality (Number of samples and frequency)	Additional Proposed Parameters to be sampled by Swartland Municipality (Number of samples and frequency)
Abbotsdale, Kalbaskraal, Riverlands, Chatsworth	Intake Paardenberg	-	pH, Conductivity and Turbidity Daily
	Final Water Paardenberg	-	pH Daily
		-	Conductivity Morning and Afternoon
		-	Turbidity Morning and Afternoon
		-	E.Coli and Heterotrophic Plate Count Weekly
	Distribution Systems	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (4 Sample points fortnightly).	*Adequately covered by the sampling done by the Swartland LM.*
Moorreesburg	Distribution System	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality at the Withoogte WTW.*

Table 8.1.7.2: Current parameters sampled by the Swartland Municipality: Routine monitoring of Process Indicators			
System	**Sampling Point**	**Current Parameters Sampled by Swartland Municipality (Number of samples and frequency)**	**Additional Proposed Parameters to be sampled by Swartland Municipality (Number of samples and frequency)**
		and Free Chlorine (2 Sample points fortnightly	
Koringberg	Distribution System	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (1 Sample point fortnightly)	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality*
Malmesbury	Distribution System	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (5 Sample points fortnightly)	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality and the sampling done at the Swartland WTW (West Coast District Municipality)*
Riebeek Wes	Distribution System	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (1 Sample point fortnightly)	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality at the Swartland WTW.*
Riebeek Kasteel	Distribution System	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (1 Sample point fortnightly)	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality at the Swartland WTW.*
Yzerfontein	Distribution System	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (1 Sample point fortnightly)	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality*
Darling	Distribution System	pH, Conductivity, Turbidity, Heterotrophic Plate Count, E.Coli, Total Coliform Count and Free Chlorine (2 Sample points fortnightly	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality*

The current and proposed operational and compliance water quality sampling programmes of the West Coast District Municipality for the Swartland bulk water distribution system are summarised in the table below.

Table 8.1.7.3: Current and proposed water quality parameters to be sampled by the West Coast District Municipality for the Swartland bulk water distribution system: Routine monitoring of Process Indicators			
Sampling Point	**Frequency of sampling**	**Samples taken by**	**Current Parameters sampled**
Current Swartland WTW Sampling			
After pump station (Raw Water)	Weekly	PC	Conductivity, Dissolved Solids, pH, Turbidity, Temperature, Chloride, Total Alkalinity, Total Hardness, Calcium Hardness, Magnesium Hardness
	Inline Sampling	PC	pH, Turbidity
	2 Hourly	PC	pH, Turbidity, Electrical Conductivity
After sedimentation	Inline Sampling	PC	pH, Turbidity
	2 Hourly	PC	pH, Turbidity
Final Water after storage reservoir	Inline Sampling	PC	pH, Turbidity, Free Chlorine
	2 Hourly	PC	pH, Turbidity, Electrical Conductivity, Free Chlorine
	Daily	PC	Langelier Saturation Index
	Weekly	PC	Conductivity, Turbidity, pH, E.Coli, Total Coliform Count, Colour, Free Chlorine, Sodium, Chloride, Total Dissolved Solids, Total Alkalinity, Temperature
	Fortnightly	PC	Heterotrophic Plate Count, Iron, Manganese, Aluminium

Table 8.1.7.3: Current and proposed water quality parameters to be sampled by the West Coast District Municipality for the Swartland bulk water distribution system: Routine monitoring of Process Indicators

Sampling Point	Frequency of sampling	Samples taken by	Current Parameters sampled
	Bi - annually	External Lab	Full SANS
Current Distribution Sampling			
Malmesbury Reservoir Darling Distribution Kasteelberg Reservoir Yzerfontein Reservoir Gouda Hoenderplaas Distribution	Fortnightly	PC	Conductivity, Turbidity, pH, Heterotrophic Plate Count, E.Coli, Total Coliform Count, Free Chlorine
Malmesbury Reservoir	Bi - annually	External Lab	Full SANS
Proposed Swartland WTW Sampling			
Current Sampling Programme complies with SANS 241:2015 sampling requirements and is adequate, except Heterotrophic Plate Count of the final water which also needs to be sampled weekly and not only fortnightly.			
Proposed Distribution Sampling			
Current Sampling Programme complies with SANS 241:2015 sampling requirements and is adequate.			

Monitoring is the act of conducting a planned series of observations or measurements of operational and / or critical limits to assess whether the components of the water supply are operating properly. The first process is checking the water quality during the operational processes including abstraction, treatment and distribution. The second process is checking that the water delivered complies with the quality standards as set by government regulations.

A significant limitation of an approach that focuses on compliance monitoring only is that it promotes reactive management, rather than proactive preventative management, as corrective actions are initiated only after drinking water quality monitoring indicates that guideline values have been exceeded.

Other limitations of a compliance monitoring approach to protecting public health include that:

- It is neither technically nor economically feasible to monitor every possible chemical, physical and microbiological parameter. Furthermore, indicator organisms such as E.Coli do not always correlate well with risks for viruses and protozoa, and
- Contamination can occur between sampling events and be missed by the monitoring programme.

The objectives of operational monitoring are for the West Coast District Municipality and Swartland Municipality to monitor each control measure in a timely manner to enable effective system management and to ensure that health-based targets are achieved. It also ensures that all the risks identified during the risk assessment process are adequately monitored and that the drinking water quality requirements as set out in SANS:241 are fully complied with. Appropriate data capturing and record keeping systems are in place for the West Coast District Municipality and Swartland Municipality to satisfy the requirements of the Water Services Act.

The parameters to be selected by the West Coast District Municipality and Swartland Municipality for operational monitoring should

- reflect the effectiveness of each control measure;
- provide a timely indication of performance;
- are readily measured; and
- provide opportunity for an appropriate response.

The water quality results from operational monitoring should be used as a trigger for immediate short – term corrective action to operational procedures, to improve drinking water quality. Swartland Municipality's Compliance Sampling Programme for the internal water distribution networks is summarised in the table below.

Table 8.1.7.4: Existing Compliance Sampling Programme implemented by Swartland Municipality for their internal water distribution networks

Distribution System	Sampling Points	Frequency of sampling	Analyses performed on the samples
Koringberg	Municipal Office	15 days	See Table 8.1.7.2 for the analysis performed for the Distribution Systems
Riebeek Wes and Ongegund	Municipal Office		
Riebeek Kasteel	Municipal Office		
Yzerfontein	Municipal Office		
Darling	Sewage Works, Municipal Office		
Moorreesburg	Moorreesburg Sewage Works, Municipal Office,		
Malmesbury	City Hall, Mount Royal Office, Municipal Office Abbattoir Str., Traffic Office Wesbank and Swartland High School		
Abbotsdale	Abbotsdale School		
Kalbaskraal	Municipal Office / Shopping Center		
Riverlands and Chatsworth	Riverlands Primary School, Chatsworth Clinic		

The Table below gives an overview of the number of compliance samples taken over the period July to June for the last three financial years for the various water distribution networks.

Table 8.1.7.5: Number of water quality samples taken throughout the various water distribution systems for the last three financial years

Number of Sampling points within distribution system	2			1			5			2		
Parameter Sampled	**Moorreesburg**			**Koringberg**			**Malmesbury**			**Darling**		
	22/23	**21/22**	**20/21**	**22/23**	**21/22**	**20/21**	**22/23**	**21/22**	**20/21**	**22/23**	**21/22**	**20/21**
pH (at 25ºC)	49	33	36	49	49	43	152	128	129	76	57	54
Conductivity	49	33	36	49	49	43	151	128	129	76	57	54
Turbidity	49	33	36	49	49	43	152	128	129	76	57	54
Free Chlorine	49	33	36	46	50	38	150	126	123	76	57	50
Total Coliform Bacteria	50	33	36	58	53	47	151	130	132	78	61	59
E.Coli	49	33	36	57	53	47	151	130	132	78	61	59
Heterotrophic Plate Count	49	33	36	54	49	29	148	128	112	73	59	40
Total number of samples	**344**	**231**	**252**	**362**	**352**	**290**	**1055**	**898**	**886**	**533**	**409**	**370**
Number of Sampling points within distribution system	1			1			1			1		
Parameter Sampled	**Riebeek Kasteel**			**Riebeek Wes**			**Yzerfontein**			**Riverlands**		
	22/23	**21/22**	**20/21**	**22/23**	**21/22**	**20/21**	**22/23**	**21/22**	**20/21**	**22/23**	**21/22**	**20/21**
pH (at 25ºC)	49	48	47	25	27	24	48	47	41	25	24	24
Conductivity	49	48	47	25	27	24	48	47	41	25	24	24
Turbidity	47	48	47	25	27	24	48	47	41	25	24	24
Free Chlorine	49	48	43	25	27	24	48	48	37	25	24	24
Total Coliform Bacteria	51	50	51	25	27	24	50	49	49	31	25	24
E.Coli	49	49	52	25	27	24	50	49	49	28	24	24
Heterotrophic Plate Count	46	49	34	25	27	24	47	49	28	25	24	24
Total number of samples	**340**	**340**	**321**	**175**	**189**	**168**	**339**	**336**	**286**	**184**	**169**	**168**
Number of Sampling points within distribution system	1			1			1					

Table 8.1.7.5: Number of water quality samples taken throughout the various water distribution systems for the last three financial years

Parameter Sampled	Abbotsdale			Chatsworth			Kalbaskraal			Total		
	22/23	21/22	20/21	22/23	21/22	20/21	22/23	21/22	20/21	22/23	21/22	20/21
pH (at 25°C)	25	24	24	24	25	24	25	24	24	547	486	470
Conductivity	25	24	24	24	25	24	25	24	24	546	486	470
Turbidity	25	24	24	24	25	24	25	24	24	545	486	470
Free Chlorine	25	24	24	24	25	24	25	24	24	542	486	447
Total Coliform Bacteria	26	24	24	28	26	24	27	25	24	575	503	494
E.Coli	25	24	24	27	25	24	25	24	24	564	499	495
Heterotrophic Plate Count	25	24	24	24	25	24	25	24	24	541	491	399
Total number of samples	**176**	**168**	**168**	**175**	**176**	**168**	**177**	**169**	**168**	**3860**	**3437**	**3245**

Note: Full SANS241:2015 analysis was also done for each of the above systems during the last three financial years by Swartland Municipality, which include all the other parameters.

Drinking Water Sample Analysis (Credibility): Operational samples are taken by the West Coast District Municipality's Process Controllers at the two bulk WTWs. The accreditation certificate of the external laboratory, who is responsible for compliance sampling for Swartland Municipality's internal water reticulation networks, are indicated below.

- AL Abbott and Associates, Accreditation Number T0276 for Chemical and Microbiological Analysis.

The water quality compliance sample results are loaded onto the IRIS, which indicate the compliance performance for the month for each of the distribution systems, with specific indication of samples that does not comply. The water quality compliance sample results are also summarised in Annexure E for each of the schemes.

DWS's Blue Drop Process: The DWS completed the Blue Drop process for the WSAs in 2023. Blue drop status is awarded to those towns that comply with 95% criteria on drinking water quality management. The blue drop performance of Swartland Municipality was summarised as follows in the DWS's 2023 Blue Drop Report.

Table 8.1.7.6: Blue Drop Performance of the Municipality (DWS's 2023 Blue Drop Report)

Municipal Blue Drop Score	2011 - 92.89%, 2012 - 95.24%, 2014 - 74.26% and 2023 - 93.76%

Introductions: The Swartland Local Municipality (SLM) supplies approximately 72 375 people with potable water from its Swartland system and 8 974 people from its Withoogte system, using a water service provider namely West Coast District Municipality (WCDM):

- The Swartland system receives treated water from the Swartland WTP, delivered at a SIV of 12.81 Ml/d of which 100% is distributed by the SLM.
- The Withoogte system receives treated water from the Withoogte WTP, delivered at a SIV of 2.05 Ml/d kl/d of which 100% is distributed by the SLM.

Regulatory Impression: The Swartland Local Municipality (SLM) was well prepared for the Blue Drop assessment and was represented by the Director of the Water and Sanitation Services and accompanied by a team of three technical managers as well as a representative from a private engineering company assisting the SLM with its Blue Drop related requirements. The SLM had a constant Blue drop score history in 2011 and 2012 of between 93% and 95% before ranging down to 74% in 2014. The WSI has an agreement in place with the WCDM which operates the two water treatment plants and delivery system on behalf of the SLM. Both the WSP and the WSI has water safety plans in place which are reviewed on an ongoing basis. Proof of the implementation of these plans were presented of which the installation of chlorine dioxide as additional treatment to counter deteriorating raw water qualities is a major step in ensuring safe water. Both the WSI with its WSP have sufficient technical capabilities in place as well as an operational supply chain system to ensure maintenance is done in time. Scientific services from the WSI are outsourced to a service provider. Incidents are adequately reported and actioned on to ensure good service delivery. The total capital budget for the municipality is R5.3 million, of which R8.2 million has been used mainly on the piping network.

Technical Findings:

Swartland WSS:

- The WTP site is adequately staffed with trained process controllers and with competent supervision.
- The design capacity was confirmed as 29.1 Ml/d and operating at 52% of its capacity.

Table 8.1.7.6: Blue Drop Performance of the Municipality (DWS's 2023 Blue Drop Report)

- Implementation of the water safety plan and the process audit findings are taking place, with specifically the use of chlorine dioxide at the plant mentioned as an initiative to counter deteriorating raw water qualities.
- Vandalism, aging pipework, and load shedding remains the key high-risk areas in the distribution system and capital work done at this WSS was focused on upgrading and repairing key pump stations and network piping.
- The microbiological compliance was excellent while the chemical acute compliance was also excellent, resulting in a low-risk rating of 26.6% for this system.

Withoogte WSS:

- The WTP site has sufficient process controller attendance, as well as a competent supervisory section.
- Apart from the same capital work done as the Swartland system to counter vandalism and aging pipework, the WCDM's capital expenses was focused on laboratory equipment to improve monitoring, as well as movable items such as machinery and valves to attend to bulk pipeline repairs.
- The design capacity of the WTP was confirmed as 72 Ml/d and operating at 50% of its capacity.
- Both the microbiological compliance and chemical acute compliance of its final water were excellent, resulting in a low-risk rating of 23% for this system.

Technical Site Assessment:

Both plants from the WCDM were inspected to verify the Blue Drop audit findings and the Swartland WTP received a technical site score of 92%, while the Withoogte WTP received a technical site score of 95%. Both plants were found to be neat, well operated, and regularly monitored for performance.

Both plants have been testing the addition of chlorine dioxide to its treatment train, with the view of taste and odour removal, as well as ensuring a residual in the pipeline. This was also installed to counter the risk of low supplies of chlorine gas.

At Swartland WTP, the installation of lights at the sludge dams, and additional handrails at the filters to ensure safe working conditions, as well as the installation of one more air blower can be considered. The Withoogte plant should install emergency washes at the flocculant dosing station, while the filter backwash pumps should be regularly maintained to ensure sufficient standby.

Performance Area		Swartland	Withoogte
Bulk/WSP		West Coast DM Bulk	West Coast DM Bulk
Capacity Management	15%	82.00%	82.00%
DWQ Risk Management	20%	96.00%	96.00%
Financial Management	10%	87.95%	87.95%
Technical Management	20%	95.50%	95.50%
DWQ Compliance	35%	89.80%	98.80%
Bonus	10%	100.00%	100.00%
Penalties	10%	0.00%	0.00%
Disqualifiers		None	None
Blue Drop Score (2023)	**%**	**93.33%**	**96.48%**
Blue Drop Score (2014)	%	75.00%	70.50%
Blue Drop Score (2012)	%	95.20%	95.20%
Blue Drop Score (2011)	%	92.90%	92.90%
System Design Capacity	kl/d	29 100	72 000
System Available Capacity	kl/d	29 100	72 000
System Input Value	kl/d	12 810	2 050
Capacity utilization	%	51.55%	50.00%
Average Daily Consumption	l/p/d	177	228
Resource Abstracted From		Channel conveying water from the Voëlvlei Dam	Misverstand Weir on the Berg River
Microbiological Compliance	%	99.41%	99.35%
Chemical Health Compliance	%	99.90%	99.34%
Risk Defined Compliance	%	93.88%	96.86%
VROOM	Rand	R3 201 000	R2 160 000
BDRR 2023	%	26.55%	18.89%
BDRR 2022	%	30.00%	23.00%

The average residential daily consumption (l/p/d) for the last four financial years are summarised in the table below.

Table 8.1.7.7: Average residential daily consumption (l/p/d) for the last four financial years.

Distribution System	2022/2023			2021/2022		
	Estimated Permanent Population	Aver. Daily Billed Metered Residential Consumption (kl)	Aver. Daily residential consumption (l/p/d)	Estimated Permanent Population	Aver. Daily Billed Metered Residential Consumption (kl)	Aver. Daily residential consumption (l/p/d)
Koringberg	1 869	107.225	**57.370**	1 797	102.531	**57.057**
Riebeek Wes and Ongegund	8 742	377.515	**43.184**	8 247	372.542	**45.173**
Riebeek Kasteel	10 021	574.290	**57.309**	9 366	513.926	**54.871**
Yzerfontein *	1 755	587.408	**334.705**	1 687	583.136	**345.664**
Darling	12 956	882.468	**68.113**	12 702	897.638	**70.669**
Moorreesburg	19 824	1 113.184	**56.153**	19 061	1 139.627	**59.788**
Malmesbury	75 279	4 717.603	**62.668**	71 987	4 524.843	**62.856**
Total	**130 446**	**8 359.693**	**64.085**	**124 847**	**7 790.455**	**62.400**
Distribution System	**2020/2021**			**2019/2020**		
	Estimated Permanent Population	**Aver. Daily Billed Metered Residential Consumption (kl)**	**Aver. Daily residential consumption (l/p/d)**	**Estimated Permanent Population**	**Aver. Daily Billed Metered Residential Consumption (kl)**	**Aver. Daily residential consumption (l/p/d)**
Koringberg	1 728	111.175	**64.337**	1 661	85.923	**51.730**
Riebeek Wes and Ongegund	7 780	365.030	**46.919**	7 340	298.789	**40.707**
Riebeek Kasteel	8 753	470.800	**53.787**	8 180	394.564	**48.235**
Yzerfontein *	1 623	536.535	**330.582**	1 560	393.680	**252.359**
Darling	12 453	889.641	**71.440**	12 209	766.885	**62.813**
Moorreesburg	18 328	1 141.334	**62.273**	17 623	1 011.019	**57.369**
Malmesbury	68 841	4 213.471	**61.206**	65 835	3 802.167	**57.753**
Total	**119 506**	**7 789.477**	**65.181**	**114 408**	**6 753.027**	**59.026**

Note: * The average daily billed metered residential consumption for Yzerfontein were calculated from March-November (Excluding January, February and December). The high l/c/d is due to the small number of permanent residents in Yzerfontein and the large number of holiday homes.

The residential consumption for the last four financial years for all the systems were very low, which indicate very efficient water usage by the residential consumers. The drought situation in the Western Cape and the water restrictions and other WC/WDM measures implemented by the Swartland Municipality contributed to the very low water usage per person.

8.1.8 Basic Sanitation

Table 8.1.8.1: Basic Sanitation

Basic Sanitation – Moderate Vulnerability 70.0%						
You have formal housing areas that are not fully serviced with sanitation infrastructure.						
No, all formal areas are fully serviced (i.e. no bucket sanitation service)	Yes, but these are new households that will be serviced within 2 years	Yes, still trying to meet formal backlog but >90% are serviced	Yes, still trying to meet formal backlog with 80 - 90% serviced	Yes, still trying to meet formal backlog with 60 - 80% serviced	Yes, still trying to meet formal backlog with <60% serviced (e.g. occurrence of bucket systems, existence of open defecation)	Don't know
You have informal housing or rural areas that are not fully serviced with sanitation infrastructure.						

Table 8.1.8.1: Basic Sanitation

Basic Sanitation – Moderate Vulnerability 70.0%							
No, all informal and rural areas are fully serviced	We have no informal areas and rural areas are serviced	Yes, but these are new households that will be serviced within 2 years	Yes, still trying to meet informal or rural backlog with >90% serviced	Yes, still trying to meet informal or rural backlog but 80- 90% are serviced	Yes, still trying to meet informal or rural backlog with 60 - 80% serviced	Yes, still trying to meet informal or rural backlog with <60% serviced (e.g. occurrence of bucket systems, existence of open defecation)	Don't know
You have a detailed plan and programme to provide safe sanitation to all households (including health and hygiene education and user awareness including Water, Sanitation and Health (WASH) aspects).							
Yes, strongly agree (i.e. close to 100% implementation)	Strongly agree (i.e. >95% implementation)	Mostly agree (i.e. >75% implementation)	Agree somewhat (i.e. >50% implementation)	<50% implementation	No implementation (i.e. 0%)	Don't know	Not applicable
Your sanitation budget is appropriate for required sanitation programmes (implementation and O&M).							
Yes, strongly agree (i.e. close to 100% of required funds)	Mostly agree (i.e. >95% of required funds)	Some shortfall (i.e. >75% of required funds)	Disagree, significant shortfall (50-75% of required funds)	Serious underfunding (<50% of required funds)	No funds (i.e. 0%)	Don't know	Not applicable
You are servicing your basic sanitation facilities (e.g. pit latrines) as per safe sanitation requirements (healthy, environmentally safe, structurally sound, regularly maintained, following faecal sludge management best practices).							
Yes, close to 100% as per requirements	Strongly agree (i.e. >95% as per requirements)	Mostly agree (i.e. >75% as per requirements)	Agree somewhat (i.e. >50% as per requirements)	No, we only manage to service <50% of the sanitation infrastructure	No, we have serious shortfalls in the servicing of sanitation infrastructure (i.e.<20 %)	Don't know	Not applicable

See Topic 2 for more information on the Service Levels of the municipality.

8.1.9 Waste Water / Environmental Safety and Regulatory Compliance

Table 8.1.9.1: Waste Water / Environmental Safety and Regulatory Compliance

Wastewater / Environmental Safety and Regulatory Compliance – Low Vulnerability 79.0%							
Please indicate your treated wastewater effluent compliance for COD for your (or your service provider's) WWTWs for the last 12 months.							
>95%	90% - 95%	80% - <90%	<80%	Don't know			
ALL your WWTWs, process controllers, monitoring programmes, sample points, laboratories, results, procedures, protocols, etc. are managed with a suitable waste water risk abatement framework.							
Yes, strongly agree (i.e. close to 100% covered)	Agree (i.e. >95% covered)	Mostly agree (i.e. >75% covered)	Agree somewhat (i.e. >50% covered)	< 50% covered	None covered (i.e. 0%)	Don't know	
Council have been made aware of all W_2RAP related issues (e.g. pollution incidents, Green Drop deficiencies) that require budget and actioning, and these issues have been actioned (where applicable).							
Yes, strongly agree (i.e. all (close to 100%) tabled)	Agree (i.e. >95% covered)	Mostly agree (i.e. >75% tabled)	Agree somewhat (i.e. >50% tabled)	< 50% tabled	Issues noted but none tabled (i.e. 0%)	Not applicable (no issues requiring council resolution exist)	Don't know
Sufficient funds have been made available to address all identified wastewater and environmental safety related issues.							
Yes, strongly agree (i.e. 100% of required funds)	Agree (i.e. >95% covered)	Mostly agree (i.e. >75% of required funds)	Agree somewhat (i.e. >50% of required funds)	< 50% of required funds	Issues noted but no funds (i.e. 0%)	Not applicable (no issues requiring funding exist)	Don't know

Table 8.1.9.1: Waste Water / Environmental Safety and Regulatory Compliance							
Required corrective actions/remedial measures to address all identified wastewater and environmental safety related issues have been successfully implemented.							
Yes, strongly agree (i.e. 100% implementation)	Agree (i.e. >95% covered)	Mostly agree (i.e. >75% implementation)	Agree somewhat (i.e. >50% implementation)	<50% implementation	Issues noted but no implementation (i.e. 0%)	Not applicable (no issues requiring corrective actions exist)	Don't know

Waste Water Monitoring Programme: Sampling is done on a frequent basis by the treatment plant personnel at the activated sludge WWTWs, according to a comprehensive operational monitoring programme. The current operational monitoring programme of Swartland Municipality for their WWTWs is summarised in the table below.

Table 8.1.9.2: Swartland Municipality's Operational Waste Water Quality Sampling Programme		
Position	**Frequency**	**Determinant**
Malmesbury WWTW		
Inlet Works	Daily	pH
Anaerobic zone	Daily	pH
Anoxic zones	Daily	pH
Aerobic zones	Daily	pH, Suspended Solids
De-aeration zone	Daily	pH, Suspended Solids
Bioreactor	Continuously (Inline)	pH, Dissolved Oxygen, Electrical Conductivity
Final effluent	Daily	pH
Darling WWTW		
Inlet Works	Twice per day	pH and Electrical Conductivity
Aeration Tank / ATML	Twice per Day	pH, Suspended Solids, Diluted Sludge Volume Index (DSVI) Volumetric Sludge Concentration, Dissolved Oxygen
AXML	Twice per Day	Dissolved Oxygen
Secondary Settling Tank	Twice per Day	pH and Dissolved Oxygen
Final Effluent	Twice per Day	pH and Free Chlorine
Moorreesburg WWTW		
Inlet Works	Once per day	pH
Reactor Aeration Tank	Once per day	pH, Volumetric Sludge Concentration
Trickling Filter Inlet and Outlet	Once per day	pH
Settling Tank 1 & 2	Once per day	pH
RAS	Once per day	pH
Final Effluent	Once per day	pH
	Once per day	Free Chlorine
Koringberg WWTW		
-	-	-
Chatsworth WWTW		
-	-	-
Kalbaskraal WWTW		
-	-	-
Riebeek Valley WWTW		
Inlet Works	Weekly	pH
Bioreactor	Daily	pH and SS by Process Controllers.
	Continuously (Inline)	pH and DO
Final Effluent	Daily	pH
	Twice per Week	Free Chlorine

The table below gives an overview of the monthly parameters tested by the external laboratory at the various WWTWs and the place where the samples are taken.

Table 8.1.9.3: Monthly effluent quality parameters monitored by External Laboratory for compliance monitoring	
Position	**Determinand**
Riebeek Valley	
Raw Sewage	pH, Settleable Solids, Chemical Oxygen Demand, Kjeldahl Nitrogen, Ammonia Nitrogen, Total Phosphate
Anaerobic Tank	pH, Settleable Solids, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Dissolved Oxygen
Anoxic Tank	pH, Settleable Solids, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Dissolved Oxygen
Aeration Tank	pH, Settleable Solids, Chemical Oxygen Demand (Filtered), Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Dissolved Oxygen
Settling Tank	pH, Settleable Solids, Chemical Oxygen Demand, Ammonia Nitrogen, Dissolved Oxygen
Settling Tank 2	pH, Settleable Solids, Chemical Oxygen Demand, Ammonia Nitrogen, Dissolved Oxygen
Final Effluent	pH, Settleable Solids, Conductivity, Faecal Coliforms, Chemical Oxygen Demand, Chemical Oxygen Demand (Filtered) Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total Suspended Solids, Ortho Phosphate, Free Chlorine, Total Chlorine
ANML, AXML, ATML	Total Suspended Solids, Volatile Suspended Solids
RAS, RAS2, DSVI	Total Suspended Solids
Darling WWTW	
Raw Sewage	pH, Settleable Solids, Chemical Oxygen Demand, Kjeldahl Nitrogen, Ammonia Nitrogen, Total Phosphate, Oil & Grease
Splitter Box	pH, Settleable Solids, Chemical Oxygen Demand, Ammonia Nitrogen
Anoxic Zone	pH, Settleable Solids, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Dissolved Oxygen
Aeration Tank	pH, Settleable Solids, Chemical Oxygen Demand (Filtered), Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Dissolved Oxygen
Settling Tank	pH, Settleable Solids, Chemical Oxygen Demand, Ammonia Nitrogen, Dissolved Oxygen
Final Effluent	pH, Settleable Solids, Conductivity, Faecal Coliforms, Chemical Oxygen Demand, Chemical Oxygen Demand (Filtered) Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total Suspended Solids, Ortho Phosphate, Oil and Grease, Free Chlorine, Total Chlorine
DIG	pH, Total Suspended Solids, Volatile Suspended Solids, Volatile Fatty Acids, % Solids, Volatile Fraction
ATML, AXML	Total Suspended Solids, Volatile Suspended Solids
RAS, DSVI	Total Suspended Solids
Moorreesburg WWTW	
Raw Sewage	pH, Settleable Solids, Chemical Oxygen Demand, Kjeldahl Nitrogen, Ammonia Nitrogen, Total Phosphate
Clarigester	pH, Settleable Solids, Chemical Oxygen Demand, Ammonia Nitrogen
Biofilter	pH, Settleable Solids, Chemical Oxygen Demand, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Dissolved Oxygen
Aeration Tank	pH, Settleable Solids, Chemical Oxygen Demand (Filtered), Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Dissolved Oxygen
Settling Tank	pH, Settleable Solids, Chemical Oxygen Demand, Ammonia Nitrogen, Dissolved Oxygen
Settling Tank 2	pH, Settleable Solids, Chemical Oxygen Demand, Ammonia Nitrogen, Dissolved Oxygen
Final Effluent	pH, Settleable Solids, Conductivity, Faecal Coliforms, Chemical Oxygen Demand, Chemical Oxygen Demand (Filtered), Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total Suspended Solids, Ortho Phosphate, Free Chlorine, Total Chlorine
ATML	Total Suspended Solids, Volatile Suspended Solids
RAS, RAS2, DSVI	Total Suspended Solids
Malmesbury WWTW	

Table 8.1.9.3: Monthly effluent quality parameters monitored by External Laboratory for compliance monitoring	
Position	**Determinand**
Raw Sewage	pH, Settleable Solids, Chemical Oxygen Demand, Kjeldahl Nitrogen, Ammonia Nitrogen, Total Phosphate
Anaerobic Tank	pH, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen
Anoxic Tank 1	pH, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen
Anoxic Tank 2	pH, Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen
Aeration Tank 1	pH, Settleable Solids, Chemical Oxygen Demand (Filtered), Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Dissolved Oxygen
Aeration Tank 2	pH, Settleable Solids, Chemical Oxygen Demand (Filtered), Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Dissolved Oxygen
Final Effluent	pH, Settleable Solids, Conductivity, Faecal Coliforms, Chemical Oxygen Demand, Chemical Oxygen Demand (Filtered), Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total Suspended Solids, Ortho Phosphate, Free Chlorine, Total Chlorine
Feeder Channel to MBR	pH, Conductivity, Chemical Oxygen Demand, Chemical Oxygen Demand (Filtered), Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total Suspended Solids, Ortho Phosphate
AXML, AXML2, ANML, ATML, ATML2	Total Suspended Solids, Volatile Suspended Solids
RAS, DSVI, DSVI2	Total Suspended Solids
Koringberg WWTW	
Final Effluent	pH, Conductivity, Chemical Oxygen Demand, Chemical Oxygen Demand (Filtered), Ammonia Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total Suspended Solids, Ortho Phosphate, Faecal Coliforms
Chatsworth WWTW	
Final Effluent	pH, Conductivity, Chemical Oxygen Demand, Ammonia Nitrogen, Chemical Oxygen Demand (Filtered), Nitrate Nitrogen, Nitrite Nitrogen, Total Suspended Solids, Ortho Phosphate, Faecal Coliforms

The Compliance Monitoring Programme consists of monthly sampling of final effluents at the various WWTWs and analyses of all the main quality criteria. Results of the samples taken are loaded onto DWS's IRIS. The Municipality takes immediate action to rectify problems and / or improve operational aspects as and when may be required. For serious failures an Incident Response Management Protocol, as included in the W_2RAPs, is followed to ensure rapid remedying of the problems, which includes notification to the DWS as may be necessary.

Waste Water Sample Analysis (Credibility): Compliance Waste Water Samples of Swartland Municipality are analysed by an accredited external laboratory. Once the analyses of the wastewater samples received at the laboratory are completed the results are given through to Swartland Municipality. Any final effluent samples that do not comply with the target values (corresponding either to the Licence Limits or General Authorisation Limits) are reported.

The final effluent quality compliance sample results are loaded onto the IRIS, which indicate the compliance performance for the month for each of the WWTWs, which specific indication of samples that does not comply. The final effluent quality compliance sample results for the 2022/2023 financial year are also summarised in Annexure E for each of the WWTWs.

DWS's Green Drop Process

The DWS completed the new Green Drop assessment for the WSAs in 2021 and the results were received early in 2022. Green drop status is awarded to those WSAs that comply with 90% criteria on key selected indicators on wastewater quality management. The green drop performance of Swartland Municipality is summarised as follows in the DWS's 2022 Green Drop Report.

Table 8.1.9.4: Green Drop Performance of the Swartland Municipality (DWS's 2022 Green Drop Report)

Average Green Drop Score	2009 – 75.0%, 2011 – 73.0%, 2013 – 72.0%, 2021 – 89.0%

Regulator's Comment: Swartland LM delivered a sterling performance and improved from its 2013 baseline of 72% to a 2021 GD score of 89%. The team was well prepared for the assessment and displayed enthusiasm in their approach towards the audit. The WSA was represented by a technical team and supported by their consulting engineers. Notably the aspect of financial management and an ability to reflect on cost of treatment is commendable, this aspect account to a lion share of the GD Criteria for the year under review. The WSA was able to get a full score on this aspect even though it is a new requirement. The WSA is also praised for presenting Water Services Audit, which raises the level of accountability and best practice in South Africa.

There are areas that need attention such as the effluent compliance, which also account for the highest percentage of the overall audit score. Improved performance in this aspect will be able to sustain the WSAs performance and take it into an upward trajectory. Environmental Management is one particular area where Swartland can improve substantially, in particular dedicated monitoring of sludge streams, as well as desludging schedules at the oxidation pond facilities. Sampling of control boreholes needs to be implemented in order to have a fit for purpose impact monitoring programme. With respect to Capacity Management, the adoption of automation and control is commended for advanced systems, however, need to be discussed with DWS to ensure that all the risk associated with such interventions are aligned with regulatory processes.

Swartland has three (3) potential Green Drop Certified systems, which regrettably cannot be confirmed as the microbiological and/or chemical compliance was below the 90% excellent mark – thereby reducing the audit score to 89% default. The Regulator trust that the municipality will achieve >90% for all the effluent quality criteria in future and earn its Green Drop status in 2023. Well done to the Swartland LM water and wastewater team on the excellent performance and management of wastewater services.

Green Drop findings:

1. Process control staff partially compliant, noting the aid of automation and telemetry.
2. External Service providers competency could not be verified.
3. W_2RAP is in place and implemented and further backed by compliance monitoring presented.
4. Financial information was largely available, including budgets and expenditure, evidence of contracts for external services.
5. Lack of calibrated flow meters for the inlet and outlet meters.
6. Good sewage inspection and process audit reports.
7. Updated bylaws and enforcement thereof with regular inspections of restaurants and commercial properties. WSA encouraged to keep records of enforcement records for future references.
8. 12 months of data uploaded on IRIS and supported by availability of general authorisation and Water Use Licenses.
9. Generic stormwater management plan and water demand management plan – but lacking wastewater balances.
10. No penalties and no directives were issued for any system.
11. Three of the seven plants are in high-risk positions.
12. Budget had been secured for capital projects for replacement, upgrades, and addition of new unit process at some of the WWTWs and associated infrastructure:
    - R5 000 000: Multiyear project at Chatsworth WWTWs
    - R22 740 000: Darling WWTW for a construction of a sludge handling facility.
    - R41 802 000: Construction of a new works at Moorreesburg WWTW.

The Riebeek Valley WWTW was inspected to verify the Green Drop audit findings (**Technical Site Assessment: Riebeek Valley WWTW 97%)**:

- The network and pump station was in good condition, routine maintenance was in place and response to sewage blockages and records were kept.
- Plant was in very good condition: equipped with an office on site, there was display of certificates, plans, and other certificates.
- Operational monitoring, daily logbook or maintenance records were kept on site.

Table 8.1.9.4: Green Drop Performance of the Swartland Municipality (DWS's 2022 Green Drop Report)

- The site was tidy and well kept.
- Flow meters were in place and correctly converted, but not calibrated.
- All process units were in working order with the exception of the scum withdrawal at the SST.
- The screens and the grit removal were automated and maintenance records were kept for verification.
- The WWTW employs high end technology, operated using SCADA controllers and HMI system – this functionality is maintained as result of highly competent Process Controllers.
- The belt presses were well maintained, flocculants were stored in a suitable area with all safety signs and MSDS.
- There was a proper facility for chemical disinfection - with safety signs, ventilation, and the required monitoring and management systems.

GREEN DROP REPORT CARD								
Key Performance Area	**Weight**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Moorreesburg**	**Riebeek Valley**	**Malmesbury**	**Koringberg**
A: Capacity Management	15%	77.5%	94.0%	77.5%	94.0%	98.0%	94.0%	80.0%
B: Environmental Management	15%	88.8%	89.0%	87.5%	81.0%	85.0%	85.0%	87.5%
C: Financial Management	20%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	87.5%
D: Technical Management	20%	82.4%	90.0%	88.2%	90.0%	90.0%	90.0%	88.2%
E: Effluent & Sludge Compliance	30%	37.5%	81.0%	37.5%	41.0%	81.0%	81.0%	26.3%
F: Bonus		58.0%	65.5%	28.0%	65.5%	35.5%	35.5%	28.0%
G. Penalties		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-50.0%
H: Disqualifiers		None	None	None	None	None	None	None
2021 Green Drop Score		**85%**	**95% - > 89%**	**83%**	**87%**	**92% - >89% %**	**92% - >89%**	**70%**
2013 Green Drop Score		**60%**	**71%**	**68%**	**69%**	**62%**	**76%**	**69%**
2011 Green Drop Score		**62%**	**73%**	**69%**	**71%**	**64%**	**74%**	**64%**
2009 Green Drop Score		**0%**	**75%**	**0%**	**73%**	**0%**	**77%**	**0%**
System Design Capacity (Ml/d)		0.270	1.500	0.157	1.500	1.900	10.000	0.030
Design Capacity Utilisation (%)		91%	83%	48%	73%	44%	53%	273%
Resource Discharged into		Swart River	Groen River	Non-discharge	Sand River	Krom River and irrigation	Diep River	Brak River
Microbiological Compliance (%)		17%	71%	NMR	Insufficient Data	81%	100%	Insufficient Data
Chemical Compliance (%)		0%	96%	NMR	Insufficient Data	95%	87%	Insufficient Data
Physical Compliance (%)		61%	98%	NMR	Insufficient Data	98%	100%	Insufficient Data
Wastewater Risk Rating (CRR% of CRRmax)								
CRR (2011)		**72.0%**	**72.0%**	**72.0%**	**61.0%**	**67.0%**	**83.0%**	**56.0%**
CRR (2013)		**59.0%**	**53.0%**	**35.0%**	**53.0%**	**59.0%**	**71.0%**	**53.0%**
CRR (2021)		**70.6%**	**29.4%**	**23.5%**	**76.5%**	**23.5%**	**36.4%**	**88.2%**

Swartland Municipality also received their 2023 Green Drop Risk Ratings, as calculated from the 2023 assessment done by the DWS.

Table 8.1.9.5: Green Drop Risk Rating of the Swartland Municipality (DWS's 2023 Green Drop Progress Report)

Municipal CRR% 2023 (%CRR/CRRmax)	51.2%

Introduction:

Swartland Local Municipality (SLM) owns and operates seven (7) WWTWs which range in design capacity from 30 kl/day to 10 000 kl/day.

Regulator's Comment: The Swartland Local Municipality (SLM) has provided good information for the GD PAT in terms of the design capacities of the WWTWs and all the WWTWs are registered and approved. However, the operational flow at each works was not able to be verified as no flow data was provided to support the reported operational flows at the works, which represents a critical risk as these impacts on the CRR scores significantly. The WSA is encouraged to confirm the operational capacity of all works with accurate flow records as the lack of flow data increases the CRR risk rating. In addition, the WSA must ensure that inflow and outflow meters are installed if necessary or repaired if required and that daily flow readings are recorded. Annual flow meter calibration should also be performed to ensure that the operational capacity of the works does not exceed its design capacity.

The compliance of the final effluent is good at some sites (Darling, Malmesbury) and poor at the other sites including Chatsworth Kalbaskraal, Koringberg, Moorreesburg and Riebeek Valley.

Sufficient evidence exists for external maintenance teams to provide civil, electrical and mechanical assistance and organograms included relevant staff members at SLM. The competencies of the internal staff should be verified with their qualification as the availability of a preventative maintenance team is essential to ensure that routine preventative maintenance is performed regularly. In addition, the availability of supervisors and process controllers has a significant impact on the quality of final effluent discharged and the regulator notes that many sites have insufficient qualified and competent staff at the sites to operate and manage the WWTWs effectively. These impacts significantly on the CRR scores obtained for the different WWTWs.

The SLM has a good W_2RAP document for each site although outdated and therefore the WSA is encouraged to update the W_2RAP's as new risks may be present. The WSA is encouraged to review the W_2RAPs and implement the risk-based methodology of the W_2RAP as this ensures that the overall risk rating decreases with an improvement in effluent quality compliance. The WSA must also develop and implement a GDIP plan which identifies the shortcomings for all Green Drop criteria and allocates responsibility, budget and timeframes to address the gaps. A CAP was not required for SLM due to the previous scores awarded during the 2022 GD. There are some capital projects planned including a de-watering plant for Darling, a new macerator for Malmesbury and an upgrade for Moorreesburg WWTW which will assist in improving the effluent quality. The SLM is encouraged to prioritize the appointment of qualified competent process control staff and supervisors to ensure that the effluent quality is maintained within the regulatory limits.

Risk Assessment Areas	Weight	Chatsworth	Darling	Kalbaskraal	Moorreesburg	Riebeek Valley	Malmesbury	Koringberg
Class of Works		E: Approved	B: Approved	E: Approved	D: Approved	B: Approved	A: Approved	E: Approved
Treatment Technology		Oxidation Ponds	Activated Sludge	Oxidation Ponds	Activated Sludge	Activated Sludge	Activated Sludge	Oxidation Ponds
A: Total Design Capacity	Kl/d	270	1 500	157	1 500	1 900	10 000	30
B: Operational Capacity (% inflow/design)	%	90.7%	84.2%	49.0%	68.5%	45.3%	55.6%	276.7%
C: Effluent Quality Non-compliance	#	4	5	5	7	7	1	2
% Microbiological Compliance	%	30.0%	90.0%	10.0%	11.1%	9.1%	100.0%	0.0%
% Physical Compliance	%	73.3%	80.0%	10.0%	48.1%	78.8%	100.0%	50.0%
% Chemical Compliance	%	10.0%	60.0%	0.0%	22.2%	48.5%	93.3%	NMR
D: Technical Skills Compliance	%	33.3%	50.0%	33.3%	50.0%	33.3%	66.7%	33.3%
Process Controller Compliance	%	0%	50%	0%	50%	0%	100%	0%
Supervisor Compliance	%	0%	0%	0%	0%	0%	0%	0%
Maintenance Team Compliance	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
CRR (2023)	%	**66.7%**	**64.7%**	**66.7%**	**76.5%**	**70.6%**	**40.9%**	**83.3%**

Table 8.1.9.5: Green Drop Risk Rating of the Swartland Municipality (DWS's 2023 Green Drop Progress Report)								
CRR (2021)	%	**70.6%**	**29.4%**	**23.5%**	**76.5%**	**23.5%**	**36.4%**	**88.2%**
CRR (2013)	%	**59.0%**	**53.0%**	**35.0%**	**53.0%**	**59.0%**	**71.0%**	**53.0%**
CRR (2011)	%	**72.0%**	**72.0%**	**72.0%**	**61.0%**	**67.0%**	**83.0%**	**56.0%**
W_2RAP Status: 2022 Green Drop Report		Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)
W_2RAP Status: 2023 Green Drop PAT		Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)	Draft document (unapproved by Council)
Capital and Refurbishment Projects (Rand)		0	R7 332 537	0	R54 716 114	0	R526 248	0
Description of Capital and Refurbishment Projects		Non-Available	De-watering plant for Darling WWTW.	Non-Available	Moorreesburg WWTW upgrading.	Non-Available	New Macerator	Non-Available
2022 GD Score	%	85.0%	89.0%	83.0%	87.0%	89.0%	89.0%	70.0%
GD Improvement Plan (GDIP)	Y/N	No	No	No	No	No	No	No
Corrective Action Plan (CAP)	Y/N	No	No	No	No	No	No	No

8.1.10 Infrastructure Asset Management (IAM)

Table 8.1.10.1: Infrastructure Asset Management							
Infrastructure Asset Management (IAM) – Low Vulnerability 95.0%							
You have an appropriate and up-to-date water and sanitation services technical Asset Register (includes asset name, location, condition, extent, remaining useful life, performance and risk). NOTE: This does only not refer to GRAP17 asset register requirements.							
Yes, strongly agree (e.g. advanced asset register)	Yes, agree (e.g. basic asset register - i.e. not all aspects included)	Not ideal (e.g. outdated asset register)	No, disagree (i.e. no asset register)	Don't know			
You have developed an appropriate Infrastructure Asset Management (IAM) Plan for your WSA.							
Yes, strongly agree	In place, with occasional non-optimal performance	Partially in place, but not ideal	No, disagree	Don't know			
You are implementing the IAM outcomes.							
Yes, strongly agree (i.e. 100% implementation)	Agree (i.e. >95% implementation)	Mostly agree (i.e. >75% implementation)	Agree somewhat (i.e. >50% implementation)	< 50% implementation	No implementation (i.e. 0%)	Don't know	
Budget allocated to implement IAM outcomes is sufficient and is being effectively spent.							
Yes, strongly agree (i.e. 100%)	Agree (i.e. >95%)	Mostly agree (i.e. >75%)	Agree somewhat (i.e. >50%)	< 50%	No (i.e. 0%)	Don't know	
You conduct annual technical assessments of your water and wastewater related systems (including sources, WTWs, WWTWs, pump stations, network, etc.) and implement required follow-up actions.							
Yes, all systems (i.e. 100%)	Almost all systems (i.e. >95%)	Most systems (i.e. >75%)	Some systems (i.e. > 50%)	< 50% systems	No systems (i.e. 0%)	Don't know	Not applicable

An Asset Management Policy (Reviewed and amended May 2023) is in place for Swartland Municipality. The current water and sewerage infrastructure assets, as included in the latest Asset Register of Swartland Municipality (June 2023), are summarised under Section 3.1.1 of Topic 3.

8.1.11 Operation and Maintenance of Assets

Table 8.1.11.1: Operation and Maintenance of Assets					
Operation and Maintenance of Assets –Low Vulnerability 80.0%					
Appropriate maintenance facility(ies) that is (are) secure and stocked with essential equipment (e.g. spare parts), plant and tools is (are) available.					
Yes, strongly agree	In place, with occasional non-optimal performance	Partially in place, but not ideal	No, disagree	Don't know	
Appropriate water and sanitation services infrastructure / equipment planned / preventative maintenance schedules are developed.					
Yes, strongly agree	In place, with occasional non-optimal performance	No, disagree	Don't know		
Appropriate planned / preventative maintenance is performed at all WTWs and associated reservoirs, pump stations and distribution networks.					
Yes, all (i.e. 100%)	Almost all (i.e. >95%)	Some (i.e. > 50%)	< 50%	None (i.e. 0%)	Don't know
Appropriate planned / preventative maintenance is performed at all WWTWs and associated collection systems and pump stations.					
Yes, all (i.e. 100%)	Almost all (i.e. >95%)	Some (i.e. > 50%)	< 50%	None (i.e. 0%)	Don't know
Please indicate your infrastructure repairs and maintenance costs as a function of total operating expenditure (%).					

Table 8.1.11.1: Operation and Maintenance of Assets					
Operation and Maintenance of Assets –Low Vulnerability 80.0%					
<5%	5% - <10%	10% - <15%	15% - <12%	20% or more	Don't know

See Topic 4 for more information on the Operation and Maintenance of the water and sewerage infrastructure of the municipality.

8.1.12 Financial Management

Table 8.1.12.1: Financial Management					
Financial Management – Low Vulnerability 90.0%					
Financial controls - Please state the audit opinion with regard to your last audit report on the financial statements.					
Clean audit outcome (i.e. unqualified with no findings)	Financially unqualified audit opinion (with findings)	Qualified audit opinion	Disclaimer of audit opinion	Adverse audit opinion	Don't know
Cash flow status – Please state your Cash / Cost Coverage Ratio (excluding Unspent Conditional Grants)					
> 90 days	60 - 90 days	30 - 60 days	< 30 days	Don't know	
Your actual operating expenditure closely reflects your budgeted operating expenditure (i.e. Operating Expenditure Budget Implementation Indicator).					
95% - 100%	90% - <95%	85% - <90%	80% - <85%	<80%	Don't know
Your actual revenue closely reflects your budgeted operating revenue (i.e. Operating Revenue Budget Implementation Indicator).					
95% - 100%	90% - <95%	85% - <90%	80% - <85%	<80%	Don't know
Liabilities (Creditors) - Money is owed by your municipality to major / critical service providers (e.g. ESKOM, Water Board, largest contractors, etc.) for more than 30 days from receipt of invoice (NOTE: Ignore disputed invoices).					
Never	Once per year	Twice per year	Once per quarter	More frequently than quarterly	Don't know

See Topic 7 for more information on the financial management of the municipality.

8.1.13 Revenue Collection

Table 8.1.13.1: Revenue Collection				
Revenue Collection - Low Vulnerability 95.0%				
Please indicate the frequency of actual consumer meter readings.				
Actual meter reading on a monthly basis	Actual meter reading at least every 2nd month	Meter reading at least on a quarterly basis	Meter reading less frequently than quarterly	Don't know
Net Surplus / Deficit – Please state your net surplus / deficit from water services activities for the last 12 months (NOTE: This question tests whether your WSA currently has fully cost reflective Water and Sanitation Tariffs, which take into account cost of maintenance and renewal of purification plants and networks and the cost of new infrastructure).				
Surplus (i.e. >0%)	Breakeven (i.e. = 0%)	Net deficit (i.e. <0%)	Don't know	
Revenue collections - Please state the revenue collection rate in respect to Water and Sanitation Services (%).				
<50%	50% - <70%	70% - <80%	80% - <95%	95% or more	Don't know
Revenue Growth – Please state your Water and Sanitation Services revenue growth for the last financial year (%).				
>CPI	Equals CPI	<CPI, but >0%	Negative growth (-ve)	Don't know	
Grant dependency – Actual-operating revenue less operational grants / subsidies (e.g. equitable share) sufficiently covers actual operating expenditure.				
Yes, all (i.e. 100%)	Most (i.e. >75%)	Some (i.e. > 50%)	< 50%	None (i.e. 0%)	Don't know

See Topic 7 for more information on the revenue collection of the municipality

8.1.14 Financial Asset Management

Table 8.1.14.1: Financial Asset Management					
Financial Asset Management – High Vulnerability 50.0%					
Capital Expenditure (Municipal). Please state your municipal Capital Expenditure as a percentage of Total Expenditure (i.e. Total Operating Expenditure + Capital Expenditure).					
<5%	5% - <10%	10% - <15%	15% - <20%	20% or more	Don't know
Capital Expenditure (Water Services). Please state your Capital Expenditure on Water and Sanitation Services as a percentage of Total Capital Expenditure (Capital Expenditure (Municipal)).					
<25%	25% - <50%	50% - <75%	75% or more	Don't know	
Asset Renewal. Please state your Asset Renewal investment as percentage of Depreciation Costs.					
100%	>90%	>75%	>50%	<50%	None (i.e. 0%)	Don't know
Repairs and Maintenance. Please state your Repairs and Maintenance expenditure as a percentage of Property, Plant and Equipment, Investment Property (Carrying Value).					
<5%	5% - <8%	8% - <10%	10% or more	Don't know	
Grant funding of capital expenditure – Please state your reliance on grant funding.					
>90%	> 75%	>50%	<50%	Don't know	

See Topic 3, Section 3.1.1. for more information on the financial asset management of the municipality.

8.1.15 Information Management (IT)

Table 8.1.15.1: Information Management					
Information Management (IT) – Low Vulnerability 100.0%					
You have a developed, approved and implemented IT Master Systems Plan (e.g. covering 3-5 years) that addresses your IT business requirements.					
Yes, developed, approved and being implemented	Developed and approved, but not yet implemented	Developed but not yet approved or implemented	In development	No, disagree	Don't know
You have a developed, approved and implemented ICT Technology Master Plan that addresses your current and future IT infrastructure requirements.					
Yes, developed, approved and being implemented	Developed and approved, but not yet implemented	Developed but not yet approved or implemented	In development	No, disagree	Don't know
You have IT systems that support your full range of water and sanitation services business requirements (e.g. billing, GIS, customer care, O&M, asset management).					
Yes, strongly agree (i.e. 100% of required systems)	Mostly agree (i.e. >75% of required systems)	Agree somewhat (i.e. >50% of required systems)	< 50% of required systems	None (i.e. 0% of required systems)	Don't know
ICT service continuity – Adequate IT security exists with off-site back-ups / archiving of operation critical applications, databases, data, etc. routinely performed in terms of an IT disaster Recovery Plan.					
Yes, strongly agree (i.e. All (close to 100%) in place)	Mostly agree (i.e. >75% in place)	Agree somewhat (i.e. >50% in place)	< 50% in place	Nothing in place (i.e. 0%)	Don't know
You have sufficient budget and staff to keep key IT systems stable and up-to-date as per IT policies and procedures.					
Yes, strongly agree (i.e. 100%)	Mostly agree (i.e. >75%)	Agree somewhat (i.e. >50%)	< 50%	No (i.e. 0%)	Don't know

The Performance Objectives of the Information and Communication Technology (ICT) Department of Swartland Municipality are indicated in the table below (Draft 2022/2023 Annual Report).

Table 8.1.15.2: Performance Objectives of the ICT Department

Performance Objective	KPI	2021/2022		2022/2023		2023/2024
		Target	Actual	Target	Actual	Target
Ensure that all personnel have full time access to the computer network	% availability of critical IT resources / services	99%	100%	99%	100%	99%
Address requests effectively	% of requests lodged with Helpdesk resolved within 48 hours	90%	97%	90%	94%	90%
Ensure proper management of IT systems	Number of quarterly IT Committee meetings held	1 per quarter	4 for the year	4 for the year	4 for the year	4 for the year
Ensure relevant and efficient IT service and infrastructure.	Survey of new strategic IT needs and changes in the organization done and submitted to Management Team for budget purposes.	Yes	Yes	Yes	Yes	Yes
Ensure relevant and efficient IT service and infrastructure.	ICT Strategic Plan reviewed.	Yes	Yes	Yes	Yes	Yes
Update risk assessment	Risk register updated	Yes	Yes	Yes	Yes	Yes
Operational management	Ensure that all baseline security settings of IT systems are reviewed as per policy.	Yes	Yes	Yes	Yes	Yes
Operational management	Number of testings of Disaster Recovery site	1 per quarter	4 for the year	4 for the year	4 for the year	4 for the year
Operational management	Number of consultations to coordinate with ICT Managers Forum.	2 for the year	2 for the year	2 for the year	2 for the year	2 for the year
Productive workforce	% of person days lost per month due to sick leave.	4% pm maximum	1.9% average pm	4% pm maximum	2.3% average pm	4% pm maximum
Inform staff	Number of invocoms held.	4 for the year	4 for the year	4 for the year	4 for the year	4 for the year

8.1.16 Organisational Performance Monitoring

Table 8.1.16.1: Organisational Performance Monitoring

Organisational Performance Monitoring – Low Vulnerability 90.0%				
Appropriate plans, policies and procedures to address Disaster Management / emergencies and other issues (safety, public participation, communication, etc.) are developed and implemented. NOTE: Although Disaster Management is a district function, LMs need to ensure they are aware of their associated roles and responsibilities and have developed a Disaster Management Framework.				
Yes, developed and implemented	Developed but not yet implemented	In development	No, disagree	Don't know
An organisational performance management system is developed and implemented (i.e. effectively measure, monitor and track water and sanitation services performance indicators).				
Yes, developed and implemented	Developed but not yet implemented	In development	No, disagree	Don't know
A municipal risk management framework is developed and implemented and includes monitoring and tracking of water and sanitation related risks.				
Yes, developed and implemented and includes water and sanitation related risks	Yes, developed and implemented but does not include water and sanitation related risks	Developed but not yet implemented	In development	No, disagree	Don't know
Effective administration support is available to technical staff to assist with processing work orders, providing order numbers, handling correspondence, etc.				

Table 8.1.16.1: Organisational Performance Monitoring					
Yes, strongly agree (i.e. 100% effective)	Mostly agree (i.e. >75% effective)	Agree somewhat (i.e. >50% effective)	< 50% effective	No, completely ineffective (i.e. 0%)	Don't know
"Access to Basic Water and Sanitation Services" progress reports are frequently produced and presented to council for discussion, action and follow-up.					
At least quarterly	At least bi-annually	At least annually	Less frequently (i.e. > 1 year)	No, never	Don't know

The IDP is the Municipality's single most strategic document that drives and directs all implementation and related processes. The Municipality's budget is developed based on the priorities, programmes and projects of the IDP, after which a Service Delivery Budget Implementation Plan (SDBIP) is developed, to ensure that the organisation actually delivers on the IDP targets.

The SDBIP is the process plan and performance indicator / evaluation for the execution of the budget. The SDBIP is being used as a management, implementation and monitoring tool that assists and guide the Executive Mayor, Councillors, Municipal Manager, Senior Managers and the community. The plan serves as an input to the performance agreements of the Municipal Manager and Directors. It also forms the basis for the monthly, quarterly, mid-year and the annual assessment report and performance assessments of the Municipal Manager and Directors.

The performance evaluation of the water and sanitation indicators / targets, as included in the Municipality's SDBIP, for the 2022/2023 financial year was also summarised in the Municipality's WSDP Performance and Water Services Audit Report for 2022/2023.

The 2022/2023 water and sanitation KPIs, as included in the 2022/2023 WSDP Performance- and Water Services Audit Report, and the performance with regard to these KPIs are summarised in the table below (Annual Performance Report 2022/2023).

Table 8.1.16.2: 2022/2023 Water and Sanitation KPIs and the performance

KPI	Unit of Measurement	Annual Target	Actual
Access to water, sanitation and refuse removal	Number of formal residential properties with piped water connections.	22 602	24 774
Access to water, sanitation and refuse removal	Number of formal residential properties with access to sewerage services.	20 409	31 160
Asset safeguarding	A condition assessment and a review of the remaining useful life of all assets in the department done and a certification in this regard provided to the Head Asset Management.	100%	100%
Improved water sustainability	% total water losses	< 17%	13.2%
Capital expenditure in line with budget and time frames	% of capital budget spent	95%-105%	92.2%
Capital project implementation	Average % completion of capital projects	95%	92.2%
Operating expenditure in line with budget and time frames	% of operating budget spent	90%-100%	91.2%
Spending of grants	% spending of grants	100%	83.7%
Workforce training roll-out	% of planned training sessions according to the Workplace Skills Plan realised.	100%	100%

8.1.17 Water and Sanitation Service Quality

Table 8.1.17.1: Water and Sanitation Service Quality

Water and Sanitation Service Quality – Low Vulnerability 100.0%						
Critical business databases and documents (e.g. as-built drawings, records, manuals, agreements, billing/revenue collection, project and scheme management data, etc.) are current, maintained and stored in secure locations (on-site and off-site, both paper and electronic).						
Yes, strongly agree (i.e. 100% in place)	Agree (i.e. >95% in place)	Mostly agree (i.e. >75% in place)	Agree somewhat (i.e. >50% in place)	< 50% in place	Nothing in place (i.e. 0%)	Don't know
Customers have a functional, reliable and safe water supply system with sufficient quantity and flow, good quality and minimal interruptions.						
Yes, all have a functional, reliable and safe service (i.e. close to 100%)	At least 90% have a functional, reliable and safe service	Most have a functional, reliable and safe service (i.e. >75%)	Some have a functional, reliable and safe service (i.e. > 50%)	< 50% of customers have a functional, reliable and safe service	None have a functional, reliable and safe service (i.e. 0%)	Don't know
All consumers served experience interruptions of less than 48 hours (at any given time) and a cumulative interruption time during the year of less than 15 days.						
Yes, all (i.e. close to 100%)	>90% of households	>75% of households	>50% of households	<50% of households	None (i.e. 0%)	Don't know
Households in your WSA experience water pressure problems (i.e. meet requirements as per National Norms and Standards for Domestic Water (Sep 2017) (not to be confused with interruption to supply).						
Yes, no households experience pressure problems (i.e. close to 100% do not experience pressure problems)	>90% of households do not experience pressure problems	>75% of households do not experience pressure problems	>50% of households do not experience pressure problems	<50% of households do not experience pressure problems	All households (i.e. 100%) experience pressure problems	Don't know
Customers have a functional, reliable, dignified and safe sanitation system with no blockages resulting in overflows that impact on the environment, including effective collection and treatment of faecal sludge.						
Yes, all customers have a functional, reliable, dignified and safe service with no impact on the environment (i.e. close to 100%)	> 98% of all customers have a functional, reliable, dignified and safe service with minimal impact on environmental health	Almost all have a functional, reliable, dignified and safe service (i.e. >90%)	Most have a functional, reliable, dignified and safe service (i.e. >75%)	Some have a functional, reliable, dignified and safe service (i.e. > 50%)	< 50% of customers have a functional, reliable, dignified and safe service	None have a functional, reliable, dignified and safe service (i.e. 0%)	Don't know

Swartland Municipality is currently effectively managing its water and sanitation services. Disruptions to water supply and sanitation services at the consumer's end are minimal. Standby pumps and motors and backup generators are available at most of the pump stations and additional standby pumps and motors are also kept in storage by Swartland Municipality in order to minimise the risk of interruption in water supply from pump stations and possible sewage spillages at the sewer pump stations.

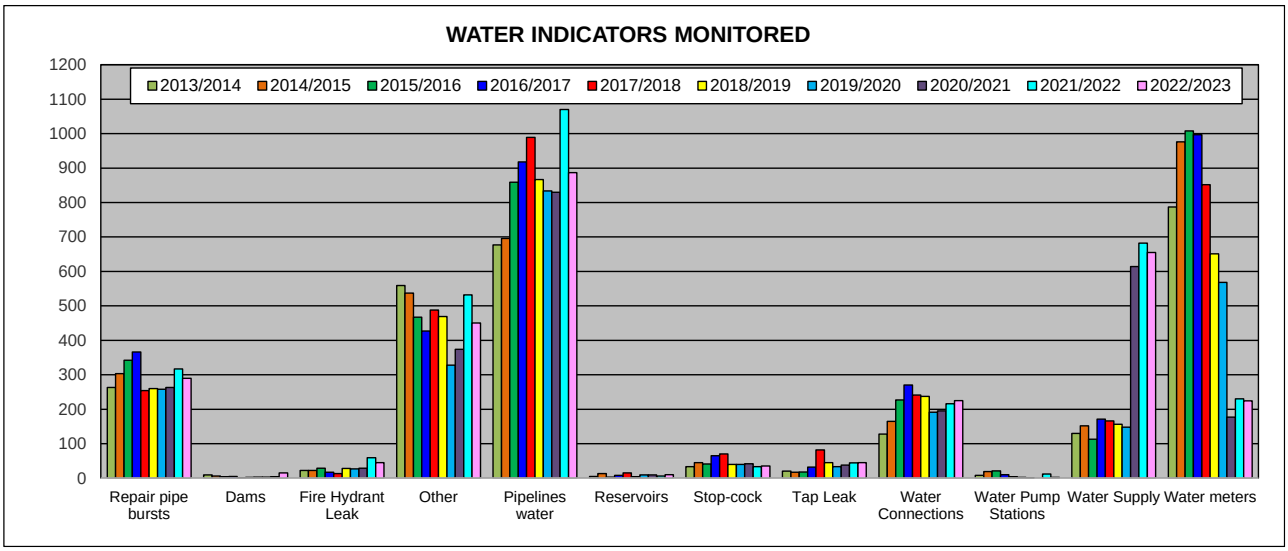
8.1.18 Customer Care (CRM)

Table 8.1.18.1: Customer Care

Customer Care (CRM) – Low Vulnerability 80.0%						
A functional customer service system manned by appropriate customer services representatives and using a complaints register, is in place to address complaints and appropriately inform customers of service interruptions, contamination of water, boil water alert, etc.						
Yes, strongly agree	In place, with occasional non-optimal performance	Partially in place, but not ideal	No, disagree	Don't know		
Regular municipal wide customer satisfaction surveys are conducted to determine customer satisfaction levels and inform the Customer Care Management Plan.						
Annual customer satisfaction surveys	Biennial (i.e. every 2nd year) customer satisfaction surveys	Less frequent customer satisfaction surveys (i.e. > 2 years)	No customer satisfaction surveys	Don't know		
Please indicate what percentage of the reported water related complaints/callouts are acknowledged, including consumer response, within 24 hours.						
All (i.e. close to 100%)	Almost all (i.e. >95%)	Most (i.e. >75%)	Some (i.e. > 50%)	< 50%	None (i.e. 0%)	Don't know
Please indicate what percentage of the reported wastewater/sanitation related complaints/callouts are acknowledged, including consumer response, within 24 hours.						
All (i.e. close to 100%)	Almost all (i.e. >95%)	Most (i.e. >75%)	Some (i.e. > 50%)	< 50%	None (i.e. 0%)	Don't know
A comprehensive customer awareness programme (informing customers of water and wastewater system O&M activities, water quality, resource protection / pollution, reporting incidents / security concerns, etc.) is in place and implemented.						
Yes, strongly agree	Partially in place, but not ideal	No, disagree (i.e. no awareness programme)	Don't know			

A comprehensive Customer Services and Complaints system is in place at Swartland Municipality and the Municipality has maintained a high and a very consistent level of service to its urban water consumers. After hour emergency requests are being dealt with by the control room on a twenty-four-hour basis. All water and sanitation related complaints are logged through the system in order to ensure quick response to complaints.

The graphs and table below give an overview of the of the water and sanitation customer services and maintenance work that was done by Swartland Municipality on the water and sanitation networks.



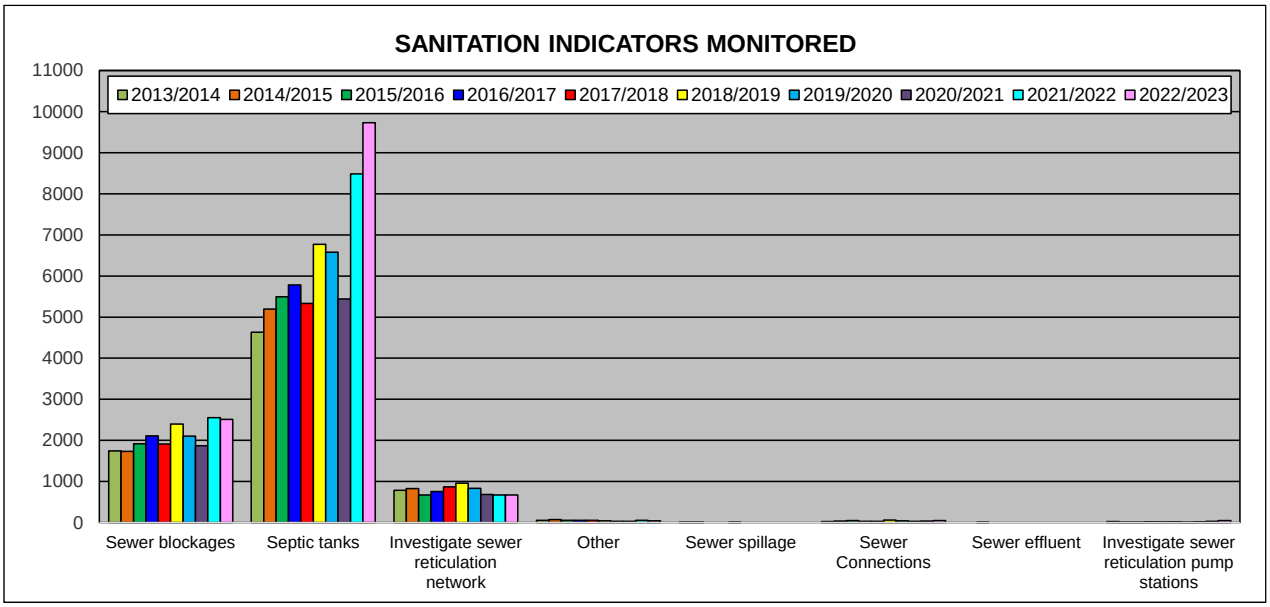


Table 8.1.18.2: Water and Sanitation indicators monitored by Swartland Municipality with regard to customer services and maintenance work for the last seven financial years

Service	Indicator	16/17	17/18	18/19	19/20	20/21	21/22	22/23
Water Indicators								
Repair pipe bursts	Repair of burst water pipelines	366	254	260	258	263	317	290
Dams	Inspect / Repair faults at dams	5	1	2	3	3	4	15
Fire Hydrant Leak	Inspect / repair leaking hydrants	17	13	28	27	29	59	45
Other	Other water complaints (Not specified)	427	488	469	328	374	532	450
Pipelines water	Inspect / repair of faulty water pipelines	918	989	867	834	830	1 070	887
Reservoirs	Inspection of reservoirs and work carried out	8	15	4	9	9	6	10
Stop-cock	Inspect / Repair leaking stop-cocks	65	70	40	40	42	33	35
Tap Leak	Inspect / Repair leaking taps	32	82	45	33	38	44	45
Water Connections	New / Inspections and work carried out at water connections	270	241	237	191	195	216	225
Water Pump Stations	Inspections and work carried out at water PS	10	4	2	1	0	12	2
Water Supply	Faulty water supply	171	166	156	148	614	682	655
Water meters	Inspect / Test / Repair / Install	997	852	651	568	177	230	224
Total		**3 286**	**3 175**	**2 761**	**2 440**	**2 574**	**3 205**	**2 883**
Sanitation Indicators								
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	2 106	1 910	2 397	2 102	1 870	2 551	2 511
Septic tanks	Empty septic tanks	5 781	5 335	6 771	6 577	5 439	8 483	9 730
Investigate sewer reticulation network	Investigate and clear blockages in network	754	869	957	830	684	669	672
Other	Other sewer complaints (Not specified)	52	54	41	26	31	52	42
Sewer spillage	Investigate and clean sewer spillages	-	4	-	-	0	0	0
Sewer Connections	Installation of sewer connections	31	31	59	43	26	35	47
Sewer effluent	Investigate effluent distribution for irrigation purposes	-	-	-	-	0	0	0
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	15	9	14	7	14	27	49
Total		**8 739**	**8 212**	**10 239**	**9 585**	**8 064**	**11 817**	**13 051**

The table and graph below give an overview of the number of tanks pumped during the last six financial years for the various towns.

Table 8.1.18.3: Number of tanks pumped

Town	2022/2023					2021/2022	2020/2021	2019/2020	2018/2019	2017/2018
	Pump 1	Pump 2	Pump 3	After Hours	Total	Total	Total	Total	Total	Total
Abbotsdale	15	7	2	0	**24**	**22**	24	13	17	25
Chatsworth	556	94	19	0	**669**	**829**	614	484	401	364
Darling	161	35	9	0	**205**	**169**	144	214	239	190
Kalbaskraal	495	106	14	0	**615**	**538**	556	392	368	365
Koringberg	391	146	11	0	**548**	**461**	374	373	374	306
Malmesbury	37	21	8	0	**66**	**43**	51	40	32	74
Moorreesburg	431	88	13	0	**532**	**426**	379	302	345	342
Farms / Other	1 000	155	24	0	**1 179**	**1 133**	952	834	815	576
Riebeek Kasteel	180	166	32	0	**378**	**237**	229	226	212	188
Riebeek Wes	557	257	101	0	**915**	**790**	703	672	541	538
Riverlands	27	8	2	0	**37**	**29**	17	7	4	5
Yzerfontein	3 364	897	397	3	**4 661**	**3 786**	3 186	2 736	2 676	2 202
Department	83	51	115	3	**252**	**259**	177	289	128	173
Total	**7 297**	**2 031**	**747**	**6**	**10 081**	**8 722**	**7 406**	**6 582**	**6 152**	**5 348**