SWARTLAND MUNICIPALITY

Annual Water Services Development Plan Performance- and Water Services Audit Report

as directed by the Water Services Act (Act 108 of 1997) and the Regulations relating to Compulsory National Standards and Measures to Conserve Water

FY 2020/2021

22 October 2021

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PROJECT P07017 - SWARTLAND MUNICIPALITY: ANNUAL WSDP PERFORMANCE AND WATER SERVICES AUDIT REPORT FOR 2020/2021

REV	DESCRIPTION	ORIG	REVIEW	IX ENGINEERS APPROVAL	DATE	CLIENT APPROVAL	DATE
Draft	Draft issued for external review	R Kuffner	JT Human		21/10/2021		21.10.2021
		Author	A Reviewer	Approval		Approval	
Final	Final Report for Council approval	R Kuffner	JT Human		26/10/2021		26.10.2021
		Author	A Reviewer	Approval		Approval	

FOREWORD:

Swartland Municipality is required in terms of Section 18 of the Water Services Act, 1997 (Act No.108 of 1997), as well as the "Regulations relating to compulsory national standards and measures to conserve water", as issued in terms of sections 9(1) and 73(1)(j) of the Water Services Act, to report on the implementation of its WSDP during each financial year and to include a water services audit in such an annual report.

The WSDP Performance- and Water Services Audit is designed to monitor the compliance of Swartland Municipality with these regulations. It also assists the communities within Swartland Municipality's Management Area and the DWS to assess how well the Municipality is performing relative to their stated intentions and their capacity. The WSDP Performance- and Water Services Audit Report can be seen as an annexure to the Municipality's Annual Report. The Annual Report is compiled as required by the Local Government Municipal Systems Act, Act no 32 of 2000 (Section 46) and the Local Government: Municipal Finance Management Act, Act no 56 of 2003 (Section 121).

The COVID-19 Pandemic also had a negative impact on the provision of water and sanitation services in Swartland Municipality during the last financial year, which included the following.

- The duration of construction work for capital projects took longer, because companies had to adapt their construction plans to ensure the work continues safely and sometimes with fewer workers.
- Operational personnel had to be issued with PPE and received training on good hygiene practices to prevent the spread of COVID-19.
- Addressing complaints and response to queries sometimes took longer, because fewer personnel were available. Personnel that tested positive or that were in contact with a person with COVID-19 had to go in quarantine, which impacted negatively on service delivery.
- Shifts of Process Controllers at the Water and Wastewater Treatment Plans had to be adjusted if the Operational Personnel or the Process Controllers at the plants tested positive for COVID-19.

Swartland Municipality's Vulnerability Index for 2021 was indicated as 0.15 "Low Vulnerability". The only one area of concern evident from the 2021 assessment is Financial Asset Management, which obtained a score of 50% (High Vulnerability). The vulnerability of all the other key service areas are low, except basic sanitation that is moderate.

The water and sanitation services of Swartland Municipality is managed in a financial sustainable manner, with a surplus generated on the operation and maintenance budgets of both services for the last seven financial years. The Operation and Maintenance budget allocated towards the rehabilitation and maintenance of the existing water and sewerage infrastructure however can be increased. A budget of approximately 2% of the total asset value per annum should be allocated towards the replacement of existing infrastructure. In the case of the operations and maintenance of the systems, a budget of approximately 1% to 2% of the value of the system is typically required to ensure that the systems remain in good condition.

Swartland Municipality successfully completed various capital projects over the last financial year. The capital budget expenditure, for the 2020/2021 financial year, was R2.353 million (92.7% of the budget) for the water infrastructure projects and R64.161 million (100.0% of the budget) for the sewerage infrastructure projects.

The implementation of Swartland Municipality's Water Demand Management Strategy has been extremely successful, and the Municipality was able to reduce the water requirements of the towns significantly. The average annual water requirement growth over the period 2001/2002 to 2020/2021 was 1.31 %/a (System Input Volume). The overall NRW for all the systems for the 2020/2021 financial year was 1 038.727 Ml, which is a respectable 20.86%. The overall water losses was 981.030 Ml (19.70%).

The Western Cape experienced a severe drought over the period 2015 to 2017, with some relief during the 2018 to 2021 winter months. This drought impacted severely on the availability of bulk water supply by the West Coast District Municipality to Swartland Municipality from the WCWSS and the yield of the Municipality's own existing surface and groundwater sources. WC/WDM measures to lower the current water requirements and the augmentation of the West Coast District Municipality's existing water sources, as well as the augmentation of Swartland Municipality's own water resources with groundwater were therefore critical over this period.

Operational Sampling programmes are implemented by the West Coast District Municipality at their two bulk WTWs. Compliance Water Quality Monitoring Programmes are also implemented by the West Coast District Municipality and the Swartland Municipality throughout the water distribution systems. Operational and Compliance Effluent Monitoring Programmes are also implemented by Swartland Municipality at their WWTWs.

The water quality of most of the water distribution systems in Swartland Municipality is "Excellent". The overall percentage compliance of the water quality samples taken over the period July to June for the last three financial years are indicated in the table below.

Overall Percentage Compliance of the Water Quality Samples Taken Over the Period July to June for the Last Three Financial Years

Distribution System	Acute Health (%)						Chronic Health (%)			Aesthetic (%)			Operational Efficiency (%)		
	Microbiological			Chemical											
	20/21	19/20	18/19	20/21	19/20	18/19	20/21	19/20	18/19	20/21	19/20	18/19	20/21	19/20	18/19
All Systems	99.6	97.3	96.2	100.0	-	100.0	100.0	100.0	100.0	99.6	98.0	99.1	97.0	92.8	91.7

The overall percentage compliances of the final effluent samples taken over the last three financial years are summarised in the table below.

Overall Percentage Compliance of the Final Effluent Samples Taken Over the Last Three Financial Years

WWTW	Microbiological (%)			Chemical (%)			Physical (%)		
	20/21	19/20	18/19	20/21	19/20	18/19	20/21	19/20	18/19
All WWTWs	64.9	59.5	67.1	60.7	58.3	61.4	75.8	75.8	73.5

A comprehensive Performance Management System and Customer Services and Complaints system are also in place. The SDBIP is the process plan and performance indicator / evaluation process 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 Municipality has maintained a high and 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. Requests are furthermore captured on an electronic mail or works-order system to ensure the execution thereof.

SWARTLAND MUNICIPALITY

WATER SERVICES AUDIT FOR 2020/2021

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ABBREVIATIONS AND DEFINITIONS

AADD	Average Annual Daily Demand
ADWF	Average Dry Weather Flow
BH	Borehole
BPT	Break Pressure Tank
BRVAS	Berg River Voëlvlei Augmentation Scheme
BSP	Bulk Sewer Pipeline
BWP	Bulk Water Pipeline
CCT	City of Cape Town
CF	Consequence of Failure
COD	Chemical Oxygen Demand
CRC	Current Replacement Cost
CRR	Cumulative Risk Ratio
DCoG	Department of Cooperative Government
DM	District Municipality
DRC	Depreciated Replacement Cost
DWAF	Department of Water Affairs and Forestry
DWQ	Drinking Water Quality
DWS	Department of Water and Sanitation
EC	Electrical Conductivity
ELEC	Electrical
ESETA	Energy and Water Services Sector Education and Training Authority
ESKOM	Electricity Supply Commission
GAMAP	General Accepted Municipal Accounting Practice
GDIP	Green Drop Improvement Plan
GIS	Geographic Information Systems
GWSA	Green Water Services Audit
HIV	Human Immunodeficiency Virus
IAM	Infrastructure Asset Management
ICT	Information and Communications Technology
IDP	Integrated Development Plan
ILI	Infrastructure Leakage Index
IMQS	Information Management Quality Systems
IRIS	Integrated Regulatory Information System
IT	Information Technology
IWA	International Water Association
Kl	Kilolitre
KPI	Key Performance Indicator
l/c/d	Litre per Capita per Day
LF	Likelihood of Failure
LGTAS	Local Government Turn Around Strategy
LM	Local Municipality
l/p/d	Litre per Person per Day
l/s	Litre per Second

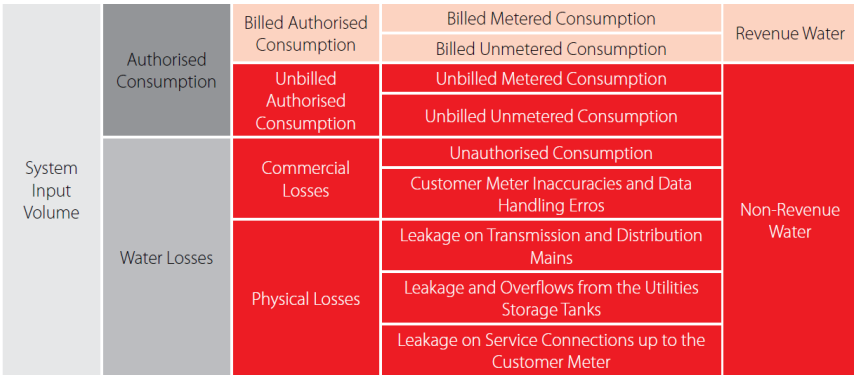
ABBREVIATIONS AND DEFINITIONS / Continue

m	Metre
MAP	Mean Annual Precipitation
MFMA	Municipal Finance Management Act
MIG	Municipal Infrastructure Grant
MISA	Municipal Infrastructure Support Agent
Ml	Mega Litre
Ml/a	Mega Litre per Annum
Ml/d	Mega Litre per Day
MuSSA	Municipal Strategic Self-Assessment
NGA	National Groundwater Archive
NI	No-Information
NRW	Non-Revenue Water
O&M	Operation and Maintenance
OTH	Other
PAT	Progress Assessment Tool
PRP	Pipe Replacement Potential
PRV	Pressure Reducing Valve
PS	Pump Station
RDP	Reconstruction and Development Programme
RES	Reservoir
RR	Risk Rating
RUL	Remaining Useful Life
SA	South Africa
SALGA	South African Local Government Association
SANS	South African National Standard
SCC	Sewer Consumer Connections
SDBIP	Service Delivery and Budget Implementation Plan
SL	Swartland
SPS	Sewer Pump Station
SRP	Sewer Reticulation Pipeline
STW	Sanitation Treatment Works
SWRO	Sea Water Reverse Osmosis
TCTA	Trans Caledon Tunnel Authority
TMG	Table Mountain Group
URV	Unit Reference Value
VAT	Value Added Tax
VIP	Ventilated Improved Pit
WARMS	Water Authorisation Registration and Management System
WCC	Water Consumer Connections
WC DM	West Coast District Municipality
WC/WDM	Water Conservation / Water Demand Management
WCWSS	Western Cape Water Supply System
WDM	Water Demand Management
WH	Withoogte

ABBREVIATIONS AND DEFINITIONS / Continue

WIMP	Wastewater Incident Management Protocol
WMA	Water Management Area
WPS	Water Pump Station
WRP	Water Reticulation Pipeline
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSDP-IDP	Water Services Development Plan – Integrated Development Plan
WSI	Water Services Institution
WSP	Water Services Provider
WTW	Water Treatment Works
W_2RAP	Wastewater Risk Abatement Plan
WWTW	Waste Water Treatment Works

KEY TERMS AND INTERPRETATIONS

KEY TERMS	INTERPRETATIONS
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.

KEY TERMS	INTERPRETATIONS
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.
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.
Municipal Finance Management Act (MFMA)	Municipal Finance Management Act, 2003 (Act No. 56 of 2003)
MIG	A conditional grant from national government to support investment in basic municipal infrastructure.
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	The Strategic Framework provides a comprehensive summary of policy with respect to the water services sector in South Africa and sets out a

KEY TERMS	INTERPRETATIONS
	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.

SWARTLAND MUNICIPALITY

ANNUAL WSDP PERFORMANCE AND WATER SERVICES AUDIT REPORT FOR 2020/2021

EXECUTIVE SUMMARY

Swartland Municipality is required in terms of Section 18 of the Water Services Act, 1997 (Act No.108 of 1997), as well as the "Regulations relating to compulsory national standards and measures to conserve water", as issued in terms of sections 9(1) and 73(1)(j) of the Water Services Act, to report on the implementation of its WSDP during each financial year and to include a water services audit in such an annual report.

Section 62 of the Water Services Act requires the Minister to monitor every WSI in order to ensure compliance with the prescribed national standards. This regulation requires a WSA to complete and submit a WSDP Performance- and Water Services Audit Report every financial year.

The WSDP Performance- and Water Services Audit is designed to monitor the compliance of the WSA and other WSIs with these regulations. The Water Services Act allows the audit to be used as a tool to compare actual performance of the WSA against the targets and indicators set in their WSDP. The WSDP Performance- and Water Services Audit also assists local communities and DWS to assess how well WSAs are performing relative to their stated intentions and their capacity.

The WSDP Performance- and Water Services Audit Report will give an overview of the implementation of the Municipality's previous year's WSDP, for the 2020/2021 financial year, and can be seen as an annexure to Swartland Municipality's Annual Report. The Annual Report is compiled as required by the Local Government: Municipal Systems Act, Act no 32 of 2000 (Section 46) and the Local Government: Municipal Finance Management Act, Act no 56 of 2003 (Section 121).

Availability of the Water Services Audit Report: The WSDP Performance- and Water Services Audit Report is a public document and must be made available within four months after the end of each financial year and must be available for inspection at the offices of the WSA. It is also recommended that the document be placed on the Municipality's website and that copies of the document be placed at the public libraries. The Water Services Audit Report also needs to be made available to the Minister of the DWS, the Minister of the Department of Cooperative Governance, the Province and to SALGA, as required by the Water Services Act, 1997.

The WSDP Performance- and Water Services Audit Report include the following detail information:

- The Municipality's performance with regard to their KPIs for water and sewerage services for the 2020/2021 financial year, as included in the Municipality's SDBIP.
- The Municipality's Performance with regard to DWS's Blue and Green Drop Assessments. Blue drop status is awarded to those towns that comply with 95% criteria on drinking water quality management. Green drop status is awarded to those WWTWs that comply with 90% criteria on key selected indicators on waste water quality management.
- DWS's Scorecard for assessing the potential for WC/WDM efforts in the Municipality.
- Information to be included in a WSDP Performance- and Water Services Audit as stipulated under section 9 of the Water Services Act, "Guidelines for Compulsory National Standards" and also required by DWS's 2014 WSDP Performance- and Water Services Audit Report guidelines.
- Information on the implementation of the various WSDP activities, as included under the WSDP Business Elements in DWS's WSDP guidelines.

The Municipality has a comprehensive Performance Management System in place. 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 following water and sanitation related investigations were successfully completed during the last financial year.

- The WSDP Performance- and Water Services Audit Report for the 2019/2020 financial year was finalised and approved by Council as part of the Annual Report. The non-revenue water balance models were updated for each of the distribution systems (Up to the end of June 2020) as part of the WSDP Performance- and Water Services Audit Process.

- The 2021/202 WSDP – IDP Water Sector Input Report was compiled and approved by Council with the IDP.

- The infrastructure constructed during the 2020/2021 financial year were added to the Asset Register and the Asset Register was updated.

- Separate WWTW Process Audits were completed for each of the WWTWs.

- Resource Augmentation Desktop Study was completed of a number of resource augmentation studies previously completed by the DWS for the WCWSS, by the West Coast District Municipality for the West Coast Region and by Swartland Municipality for towns in their Management Area.

- Swartland Municipality continues with the implementation of their Drinking Water Quality and Effluent Quality Sampling Programmes (Both Operational and Compliance Monitoring). The effluent discharged by industrial consumers is also monitored by Swartland Municipality on a monthly basis.

Most of the capital expenditure for the last financial year was for the upgrading of the Moorreesburg WWTW (R41.802 million expenditure) and the Darling WWTW (R22.274 million expenditure).

Quantity of Water Services Provided (Water Balance)

Detail IWA water balance models are in place for each of the distribution systems in Swartland Municipality's Management Area. These models include the volume of potable water supplied to the Swartland Municipality by the West Coast District Municipality (System Input Volume), the volume of water abstracted from the Municipality's own water resources and the NRW and Water Losses for each of the distribution systems. The flows at the WWTWs are also metered and recorded by the Municipality.

Water Services Delivery Profile

The number of consumer units per category or user type is available for each of the water distribution systems. The 2020/2021 number of formal water consumers in Swartland Municipality was 22 370. The average annual growth in the number of consumers for all the towns over the period 2011/2012 to 2020/2021, last ten financial years, was 2.23%. 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 provided 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. The only other areas where communal water services are in use is on some of the farms in the rural areas. Swartland Municipality is committed to work with the private landowners to ensure that at least basic water and sanitation services are provided to those households in the rural areas with existing services still below RDP standard.

All schools and medical facilities in the urban areas of Swartland Municipality's Management Area are supplied with adequate water and sanitation services.

Cost Recovery and Free Basic Services

A detail seven block step tariff system is implemented by Swartland Municipality. This tariff system discourages the wasteful or inefficient use of water. Various levels of water restriction tariffs are also in place for drought periods. It is expected that the current block step tariff structure will continue to be implemented in the future.

The first six (6) kl of water is provided free to all indigent registered residential consumers. 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 Policy and all indigent households therefore receive free basic water and sanitation services. This implies that either the equitable share is used to cover this cost, or higher consumption blocks are charged at a rate greater than the cost in order to generate a surplus to cross-subsidise indigent consumers who use up to six (6) kilolitres per month.

The actual operational and maintenance expenditure and income for the last seven financial years for water and sanitation services is summarised in the table below.

Operational and Maintenance expenditure and income budgets for water and sanitation services							
Expenditure / Income	**Actual 20/21**	**Actual 19/20**	**Actual 18/19**	**Actual 17/18**	**Actual 16/17**	**Actual 15/16**	**Actual 14/15**
Expenditure	R44 955 432	R61 301 899	R23 087 917	R47 486 198	R43 419 412	R42 952 023	R40 004 208
Income	-R90 231 763	-R106 205 533	-R79 626 773	-R74 863 765	-R55 578 158	-R57 043 282	-R45 463 662
Surplus / Deficit	**-R45 276 331**	**-R44 903 634**	**-R56 538 856**	**-R27 377 567**	**-R12 158 746**	**-R14 091 259**	**-R5 459 454**
Expenditure	R50 616 866	R49 817 322	R31 688 531	R48 691 211	R32 138 118	R30 931 945	R28 769 500
Income	-R87 825 165	-R71 074 049	-R62 948 777	-R72 188 869	-R56 843 924	-R53 402 171	-R41 824 387
Surplus / Deficit	**-R37 208 299**	**-R21 256 727**	**-R31 260 246**	**-R23 497 658**	**-R24 705 806**	**-R22 470 226**	**-R13 054 887**

Water Quality

Operational Sampling programmes are implemented by the West Coast District Municipality at their two bulk WTWs. Compliance Water Quality Monitoring Programmes are also implemented by the West Coast District Municipality and the Swartland Municipality throughout the water distribution systems. Operational and Compliance Effluent Monitoring Programmes are also implemented by Swartland Municipality at their WWTWs.

The water quality of all the water distribution systems in Swartland Municipality is "Excellent", according to the SANS0241 classification. The overall percentage of compliance of the water quality samples taken over the period July to June for the last three financial years is summarised in the table below per distribution system (SANS 241: 2015 Limits).

Percentage compliance of the final water quality samples for the last three financial years															
Distribution System	**Acute Health (%)**						**Chronic Health**			**Aesthetic**			**Operational Efficiency**		
	Chemical			**Microbiological**											
	20/21	**19/20**	**18/19**	**20/21**	**19/20**	**18/19**	**20/21**	**19/20**	**18/19**	**20/21**	**19/20**	**18/19**	**20/21**	**19/20**	**18/19**
Moorreesburg	100.0	-	100.0	100.0	97.1	94.3	100.0	100.0	100.0	100.0	100.0	95.9	97.4	97.8	88.6
Koringberg	100.0	-	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.0	98.8	98.5	97.5
Malmesbury	100.0	-	100.0	100.0	98.1	97.8	100.0	100.0	100.0	98.9	98.4	100.0	97.8	94.1	93.5
Darling	100.0	-	100.0	100.0	98.2	100.0	100.0	100.0	100.0	99.2	100.0	100.0	97.7	96.6	88.1
Riebeek Kasteel	100.0	-	100.0	96.3	100.0	86.4	100.0	100.0	100.0	100.0	100.0	100.0	92.3	79.2	91.7
Riebeek Wes	100.0	-	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.8
Yzerfontein	100.0	-	100.0	100.0	97.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.5	95.6	83.7
Riverlands	100.0	-	100.0	100.0	96.0	90.9	100.0	100.0	100.0	100.0	100.0	98.1	93.0	88.0	90.5

Percentage compliance of the final water quality samples for the last three financial years															
Distribution System	Acute Health (%)						Chronic Health			Aesthetic			Operational Efficiency		
	Chemical			Microbiological											
	20/21	19/20	18/19	20/21	19/20	18/19	20/21	19/20	18/19	20/21	19/20	18/19	20/21	19/20	18/19
Abbotsdale	100.0	-	100.0	100.0	92.9	95.2	100.0	100.0	100.0	100.0	60.7	100.0	96.0	53.6	90.0
Chatsworth	100.0	-	100.0	100.0	95.0	90.9	100.0	100.0	100.0	100.0	100.0	100.0	94.0	91.3	91.7
Kalbaskraal	100.0	-	100.0	100.0	89.5	95.5	100.0	100.0	100.0	100.0	100.0	98.1	100.0	92.1	92.9
All Systems	**100.0**	**-**	**100.0**	**99.6**	**97.3**	**96.2**	**100.0**	**100.0**	**100.0**	**99.6**	**98.0**	**99.1**	**97.0**	**92.8**	**91.7**

Note: *Unacceptable* (According to SANS241-2:2015, Table 4)

The table below indicates the compliance of the E.Coli monitoring frequency in the water distributions systems of Swartland Municipality, in terms of the minimum requirements of SANS:241-2: 2015 (Table 2). The period assessed was for samples taken from July 2020 to June 2021.

Swartland Municipality's Compliance of the Monthly E.Coli Monitoring Frequency for the Water Distribution Systems and at the WTWs in terms of the Minimum Requirements of SANS 241-2:2015 (Table 2).					
Distribution System	Population served	Required number of monthly samples (SANS 241-2:2015: Table 2)	Number of monthly E.Coli samples taken on the network by Swartland Mun. and the West Coast DM	Number of monthly E.Coli samples taken at the Withoogte and Swartland WTW by the West Coast DM	Total monthly E.Coli samples taken for the potable water
Koringberg	1 728	2	3.9	4.8	8.7
Riebeek Wes and Ongegund	1 931	2	2.0	3.7	5.7
Riebeek Kasteel	2 473	2	4.3	3.7	8.0
Yzerfontein	1 623	2	4.1	3.7	7.8
Darling	12 453	2.5	4.9	3.7	8.6
Moorreesburg	18 328	3.7	3.0	4.8	7.8
Malmesbury	53 346	10.7	11.0	3.7	14.7
Abbotsdale	4 909	2	2.0	3.7	5.7
Kalbaskraal	3 740	2	2.0	3.7	5.7
Riverlands and Chatsworth	6 846	2	4	3.7	7.7

The above sampling done by the Swartland Municipality plus the daily sampling done at the Withoogte WTW and the Swartland WTW by the West Coast District Municipality, as well as their monthly E.Coli sampling throughout the various towns on the systems ensure that the number of monthly E.Coli samples taken, as required by SANS 241, is adequate.

The overall Microbiological, Chemical and Physical compliance percentages of the final effluent samples taken over the last three financial years at the Malmesbury-, Darling-, Moorreesburg-, Koringberg-, Chatsworth-, Kalbaskraal- and Riebeek Valley WWTW are summarised in the tables below.

Percentage microbiological, chemical and physical compliance of the compliance samples taken at the various WWTWs for the last three financial years									
WWTW	Microbiological			Chemical			Physical		
	20/21	19/20	18/19	20/21	19/20	18/19	20/21	19/20	18/19
Malmesbury	100.0%	100.0%	100.0%	72.9%	83.3%	95.5%	83.3%	83.3%	97.0%
Darling	91.7%	75.0%	81.8%	100.0%	95.8%	85.4%	97.2%	94.4%	80.0%
Moorreesburg	40.0%	33.3%	41.7%	35.0%	31.3%	31.9%	40.0%	69.4%	71.4%
Koringberg	0.0%	0.0%	0.0%	27.1%	27.1%	25.0%	36.1%	36.1%	33.3%
Chatsworth	16.7%	33.3%	60.0%	31.3%	31.3%	32.5%	63.9%	66.7%	50.0%
Kalbaskraal	100.0%	100.0%	100.0%	16.7%	0.0%	30.0%	100.0%	83.3%	80.0%
Riebeek Valley	91.7%	75.0%	83.3%	93.8%	95.8%	95.8%	97.2%	100.0%	97.2%
Overall Compliance %	**64.9%**	**59.5%**	**67.1%**	**60.7%**	**58.3%**	**61.4%**	**75.8%**	**75.8%**	**73.5%**

All industrial effluent discharge into the sewer system of Swartland Municipality is monitored. 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 compliance percentages for the quality of industrial effluent discharged into the municipality's sewer system are summarised in the table below for the last two financial years.

Compliance percentages of industrial effluent discharged by industrial consumers per parameter					
Town	Industrial Consumer	pH Compliance		COD Compliance	
		20/21	19/20	20/21	19/20
Darling	Darling Breweries	67.3%	72.3%	77.6%	78.7%
	Darling Vleismark	30.6%	81.6%	71.4%	85.7%
	Romery	57.1%	71.4%	83.7%	89.8%
Moorreesburg	Wespin Abattoir	88.0%	93.8%	100.0%	93.8%
Malmesbury	Swartland Abattoir	100.0%	97.9%	88.2%	87.5%
	Roelcor Abattoir	100.0%	100.0%	98.0%	97.9%
	Sugar Bird	0.0%	2.1%	6.0%	2.1%
	O'Kin	42.0%	54.2%	98.0%	97.9%
	Fair Cape	7.3%	15.4%	76.4%	81.0%

WC/WDM

The implementation of Swartland Municipality's Water Demand Management Strategy has been extremely successful, and the Municipality was able to reduce the water requirements of the towns significantly. The average annual water requirement growth over the period 2001/2002 to 2020/2021 was 1.31 %/a (System Input Volume). 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.

NRW, Water Losses and ILIs for the various water distribution systems								
Description	Component	Unit	20/21	Record: Prior (Ml/a)				
				19/20	18/19	17/18	16/17	15/16
Koringberg	NRW	Volume	13.395	16.976	14.694	14.213	8.863	9.147
		Percentage	23.7%	32.7%	31.5%	32.2%	14.7%	14.2%
	Water Losses	Volume	12.634	16.224	13.953	14.125	8.743	9.018
		Percentage	22.4%	31.3%	29.9%	32.0%	14.5%	14.0%
	ILI		**1.80**	**1.59**	**1.41**	**1.37**	**0.85**	**0.95**
	The NRW and Water Losses were drastically reduced during the last financial year. The NRW and Water Losses stayed roughly the same for the period 2017/2018 to 2019/2020.							
Ongegund	NRW	Volume	3.075	4.236	6.546	16.655	17.748	14.966
		Percentage	17.4%	24.9%	36.4%	60.3%	45.2%	34.4%
	Water Losses	Volume	2.968	4.130	6.438	16.600	17.669	14.879
		Percentage	16.8%	24.2%	35.8%	60.1%	45.0%	34.2%
	The NRW and Water Losses were even further reduced during the last financial year. The Municipality needs to keep the NRW percentage for Ongegund less than 20%.							
Riebeek Wes	NRW	Volume	26.490	22.040	23.263	21.515	11.134	31.570
		Percentage	15.5%	14.0%	16.6%	16.9%	6.7%	16.7%
	Water Losses	Volume	21.468	17.044	18.302	21.261	10.804	31.191
		Percentage	12.6%	10.8%	13.0%	16.7%	6.5%	16.5%
	ILI		**0.80**	**0.82**	**1.09**	**1.27**	**0.64**	**1.88**
	The NRW and Water Losses increased a little during the last financial year. The current percentage of NRW of just above 15% is however still excellent.							
Riebeek Kasteel	NRW	Volume	52.790	47.762	25.377	52.180	43.154	47.555
		Percentage	20.6%	21.4%	13.8%	30.9%	17.2%	16.6%
	Water Losses	Volume	50.693	45.732	23.426	51.842	42.653	46.981
		Percentage	19.8%	20.5%	12.8%	30.7%	17.0%	16.4%
	ILI		**1.45**	**1.52**	**0.77**	**1.77**	**1.46**	**1.59**

NRW, Water Losses and ILIs for the various water distribution systems								
Description	**Component**	**Unit**	**20/21**	**Record: Prior (Ml/a)**				
				19/20	**18/19**	**17/18**	**16/17**	**15/16**
	The NRW and Water Losses stayed roughly the same for the last two financial years. Municipality needs to work towards a percentage of less than 20% for the NRW.							
Yzerfontein	NRW	Volume	60.201	47.109	15.977	51.930	33.577	43.238
		Percentage	20.1%	19.8%	9.1%	33.6%	13.5%	13.6%
	Water Losses	Volume	54.562	41.593	10.585	51.621	33.079	42.604
		Percentage	18.2%	17.5%	6.0%	33.4%	13.3%	13.4%
	ILI		**1.03**	**0.97**	**0.25**	**1.37**	**0.91**	**1.19**
	The NRW and Water Losses stayed roughly the same for the last two financial years. Municipality needs to work towards a percentage of less than 20% for the NRW.							
Darling	NRW	Volume	150.505	138.078	127.003	91.397	84.219	112.516
		Percentage	26.4%	26.7%	25.8%	19.6%	14.0%	17.0%
	Water Losses	Volume	146.555	134.234	123.212	90.466	83.012	111.193
		Percentage	25.7%	25.9%	25.1%	19.4%	13.8%	16.8%
	ILI		**3.20**	**2.08**	**1.90**	**1.42**	**1.31**	**1.74**
	The NRW and Water Losses stayed roughly the same for the last three financial years. Municipality needs to work towards a percentage of less than 20% for the NRW.							
Moorreesburg	NRW	Volume	136.476	119.301	110.213	110.910	89.636	120.689
		Percentage	20.3%	20.2%	20.7%	23.1%	13.6%	15.5%
	Water Losses	Volume	129.156	112.145	103.172	109.948	88.318	119.130
		Percentage	19.2%	19.0%	19.4%	22.9%	13.4%	15.3%
	ILI		**1.74**	**1.36**	**1.25**	**1.37**	**1.11**	**1.49**
	The NRW and Water Losses stayed roughly the same for the last three financial years. Municipality needs to work towards a percentage of less than 20% for the NRW.							
Malmesbury	NRW	Volume	595.795	379.300	308.070	290.408	364.912	678.348
		Percentage	20.3%	15.0%	14.1%	14.7%	13.5%	21.6%
	Water Losses	Volume	562.994	347.331	276.769	286.461	359.494	672.065
		Percentage	19.2%	13.8%	12.7%	14.5%	13.3%	21.4%
	ILI		**2.20**	**1.44**	**1.17**	**1.30**	**1.69**	**3.22**
	The NRW and Water Losses increased during the last financial year. The Municipality needs to work towards a NRW percentage of less than 15%, as was done during the previous four financial years.							
TOTAL	**NRW**	**Volume**	**1 038.727**	**774.802**	**631.143**	**649.208**	**653.243**	**1 058.029**
		Percentage	**20.86%**	**17.95%**	**16.72%**	**18.86%**	**13.79%**	**19.29%**
	Water Losses	**Volume**	**981.030**	**718.433**	**575.857**	**642.325**	**643.772**	**1 047.061**
		Percentage	**19.70%**	**16.64%**	**15.25%**	**18.66%**	**13.59%**	**19.09%**
	ILI		**2.11**	**1.60**	**1.41**	**1.51**	**1.49**	**2.57**
	The overall NRW and Water Losses increase a little during the last financial year, mainly because of the increase in the NRW and Water Losses of Malmesbury. The Municipality needs to work towards an overall NRW percentage of less than 20%.							

Note: Infrastructure Leakage Index (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

DWS's WC/WDM scorecard was also populated as part of the Water Services Audit Process. The aim of the scorecard is to establish areas where the municipality has made good progress in relation to WC/WDM and where there is still room for improvement. **The status quo score for Swartland Municipality is 81 out of 100 suggesting that the Municipality is making good progress with regard to the implementation of specific WC/WDM activities.**

Water Services Asset Management

An Asset Register is in place, which include all the water and sewerage infrastructure. The CRC, DRC, RUL and Age distribution of the water and sewerage infrastructure in Swartland Municipality's Management Area is summarised in the table below (June 2021):

CRC, DRC, RUL and Age distribution of the water and sewerage infrastructure					
Asset Type			**CRC**	**DRC**	**%CRC / DRC**
Water Infrastructure			R874 935 749	R393 719 575	45%
Sewerage Infrastructure			R804 791 253	R446 249 281	55%
Remaining Useful Life					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Water Infrastructure	R13 365 313	R3 545 361	R97 616 379	R22 801 923	R737 606 773
Sewerage Infrastructure	R90 036 353	R15 965 473	R102 774 854	R26 065 118	R569 949 455
Age Distribution					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Water Infrastructure	R92 871 638	R50 789 668	R171 271 362	R41 374 561	R518 628 520
Sewerage Infrastructure	R214 681 116	R130 441 663	R82 257 022	R31 807 819	R345 603 633

The above implies that about 55% of the value of the water infrastructure and 45% of the value of the sewerage infrastructure has been consumed. The CRC of the water and sewerage infrastructure that will need to be replaced over the next five years (RUL < 5 yrs) is R103.402 million. The asset renewal needs for the **water infrastructure assets** over the next 10 years is R1.691million per year. The reinvestment required is R13.365 million in the first 5 years and R3.545 million in the second 5-year period. The age of 59.3% of the water infrastructure assets is greater than 20 years. The asset renewal needs for the **sewerage infrastructure assets** over the next 10 years is R10.600 million per year. The reinvestment required is R90.036 million in the first 5 years and R15.965 million in the second 5-year period. The age of 42.9% of the sewerage infrastructure assets is greater than 20 years.

Most of the maintenance work currently carried out on the water and sewerage infrastructure are re-active and it is important for the Municipality to increase their maintenance budget for water and sewerage infrastructure in order to ensure that the required preventative maintenance work is also carried out. The Asset Management Plan needs to indicate the risks associated with the inadequate refurbishment and maintenance of the various water and sewerage infrastructure.

It is important for Swartland Municipality to allocate adequate funds for the rehabilitation and maintenance of their existing infrastructure, which is critical to ensure the sustainability of the services that are provided by the Municipality. All possible external sources of funding to assist with the development of the bulk infrastructure and additional sources need to be identified.

Water Services Operation and Maintenance

Design-out Maintenance, Preventative Maintenance and Corrective or Breakdown Maintenance are practised by Swartland Municipality (Planned and unplanned preventative and corrective maintenance). Adequate resources, information and activity control and management are in place to ensure proper operation and maintenance of the water and sewerage infrastructure.

Water Resources

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 Western Cape experienced a severe drought over the period 2015 to 2017, with some relief during the 2018 to 2021 winter months. This drought over the period 2015 to 2017 impacted severely on the availability of bulk water supply by the West Coast District Municipality to Swartland Municipality from the WCWSS and the yield of the Municipality's own existing surface and groundwater sources. WC/WDM measures to lower the current water requirements and the augmentation of the West Coast District Municipality's existing water sources, as well as the augmentation of Swartland Municipality's own water resources with groundwater were therefore critical over this period.

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.

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			**31 640.000**

DWS's Reconciliation Strategies, as completed during 2016, indicated that the current water sources do not have adequate supply to cater for the current and long-term future water requirements of the various towns.

The table below gives an overview of the years in which the annual water requirements are likely to exceed the licence volumes from the WCWSS:

Years in which the annual water requirements are likely to exceed the total licence volumes for Swartland Municipality from the WCWSS				
Distribution System	**Total Licence Volume for Swartland Municipality (Ml/a)**	**Annual Growth on 2020/2021 Demand (Low Growth)**	**Annual Growth on 2020/2021 Demand (High Growth)**	**WSDP Projection Model**
Withoogte System	1 573.600	> 2044	2036	2043
Swartland System	7 900.000	2035	2027	2031

Note: The severe drought in the Western Cape, over the period 2015 to 2017, impacted on the water availability and the security of supply from the WCWSS, which resulted in severe water restrictions implemented by the Swartland Municipality in order to lower the current water requirements and to ensure that the systems don't "run dry" during the drought period.

A number of resource augmentation studies were previously completed by the DWS for the WCWSS, by the West Coast District Municipality for the West Coast Region and by Swartland Municipality for the towns in their Management Area. A desktop study of these previous augmentation studies was completed during the last financial year. The following recommendations with regard to water resource augmentation options available to Swartland Municipality were made based on the findings and conclusions contained in the desktop study.

- Swartland Municipality should continue to implement their WC/WDM Strategy for both the bulk water distribution systems and the internal water reticulation systems of the towns. Treatment Losses, NRW and Water Losses need to be monitored on a monthly basis.

- Investigate the cost of small groundwater schemes for Koringberg and Riebeek Wes. These are the only two towns where the yields of the newly drilled boreholes are adequate to provide a high percentage of the town's existing demand. The groundwater will require additional treatment and blending options will need to be considered.

- Compile a Feasibility Study for a bulk groundwater augmentation scheme for the Swartland Voëlvlei bulk water distribution system from the target areas included in the "Pre-Feasibility Study of Potential Water Sources for the Area Served by the West Coast District Municipality Phase 1: Assessment of Development Potential of Groundwater Resources" Report.

- The URV of R25-39/kl for a groundwater supply scheme for Yzerfontein from the Grootwater Aquifer is high and should be seen as a possible medium- to long-term possible intervention.

- An investigation has to be carried out into the Colenso Fault Zone close to Darling if the Municipality considers supplying Darling with groundwater. A possible groundwater scheme for Darling should be seen as a possible medium- to long-term possible intervention.

- Continue to reuse treated effluent from the four main WWTWs for irrigation purposes in order to reduce the demand for potable water used for irrigation purposes (Parks, Sport Fields, etc.). The options of "indirect potable reuse" and "direct potable reuse" of treated effluent should be seen as long-term possible interventions.

- Swartland Municipality should engage with the CCT with regard to the following:
  - The CCT's programme for implementing the additional infrastructure to provide the proposed 1 in 200 year level of assurance of supply (Atlantis Managed Aquifer Recharge Scheme Refurbishment Project).
  - The possibility of supplying the towns of Chatsworth and Riverlands with potable water from Atlantis.
  - The other options available to Swartland Municipality to purchase bulk potable water from the CCT, which include the following.
    (1) Purchase potable water from the CCT through their Voëlvlei bulk water pipeline, which supply the Plattekloof reservoir.
    (2) The possibility for the CCT to take over the Swartland WTW and to provide potable water to Gouda and the Swartland Municipality from the WTW.
    (3) Any possible other arrangements with the CCT.

- Swartland Municipality should engage with DWS and the TCTA to discuss the options available for an increased future allocation from the WCWSS for Swartland Municipality, through the implementation of the Berg River Voëlvlei Augmentation Scheme (BRVAS) project or the other future augmentation projects.

- Engage with Saldanha Bay Municipality and the West Coast District Municipality if the proposed Saldanha Bay desalination plant project is started. A possible desalination plant for Yzerfontein should only be seen as a long-term possible intervention.

<u>Water Services Institutional Arrangements and Customer Services</u>

Swartland Municipality is the WSA for the entire Municipal Management Area. A Service Level Agreement is in place with the West Coast District Municipality for the provision of bulk water to most of the towns in Swartland Municipality's Management Area. The 2017-2022 WSDP was approved by the Swartland Municipality's Council on the 30th of March 2016. A 2021/2022 WDP-IDP Water Sector Input Report was also compiled during the last financial year, which was approved by Council with the IDP. The WSDP Performance- and Water Services Audit Report is compiled annually and taken to Council with the Annual Report. The Water Services By-laws was promulgated.

Swartland Municipality's Vulnerability Index for 2021 was indicated as 0.15 "Low Vulnerability". The only one area of concern evident from the 2021 assessment is Financial Asset Management, which obtained a score of 50% (High Vulnerability). The vulnerability of all the other key service areas are low, except basic sanitation that is moderate.

The Municipal staff is continuously exposed to training opportunities, skills development and capacity building at a technical, operations and management level in an effort to create a more efficient overall service to the users. A Workplace Skills Plan is compiled annually and the specific training needs of the personnel, with regard to water and wastewater management are determined annually. An amount of R2 021 645 was spent on training of employed personnel during the 2020/2021 financial year.

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.

Barriers implemented by Swartland Municipality against contamination and deteriorating water quality include the following:

- Service Delivery Agreement between the West Coast District Municipality and Swartland Municipality. A Monitoring Committee is also in place.

- Protection at points of abstraction such as Paardenberg Dam and the boreholes (Abstraction Management).

- Protection and maintenance of the distribution systems. This includes ensuring an adequate disinfectant residual at all times, rapid response to pipe bursts and other leaks, regular cleaning of reservoirs, keeping all delivery points tidy and clean, etc.

Three other important barriers implemented by Swartland Municipality against poor quality drinking water that are a prerequisite to those listed above are as follows:

- A well-informed Council and municipal managers that understand the extreme importance of and are committed to providing adequate resources for continuous professional operation and maintenance of the water supply system.

- Competent managers and supervisors in the technical department who are responsible for water supply services lead by example and are passionate about monitoring and safeguarding drinking water quality.

- Well informed community members and other consumers of water supply services that know how to protect the water from becoming contaminated once it has been delivered, that have respect for water as a precious resource and that adhere to safe hygiene and sanitation practices.

SWARTLAND MUNICIPALITY

ANNUAL WSDP PERFORMANCE AND WATER SERVICES AUDIT REPORT FOR 2020/2021

BACKGROUND

Appointment

iX engineers was appointed by Swartland Municipality to assist them with the compilation of their WSDP Performance- and Water Services Audit Report, which forms part of their annual report for the 2020/2021 financial year. The purpose of the WSDP Performance- and Water Services Audit Report is to report on the implementation of Swartland Municipality's previous year's WSDP, for the 2020/2021 financial year.

The DWS developed the "Annual Water Services Development Plan Performance- and Water Services Audit Report" template during 2014, to assist Municipalities with the drafting of their reports. iX engineers agreed with Swartland Municipality to follow this template as far as possible.

Purpose

Swartland Municipality is required in terms of Section 18 of the Water Services Act, 1997 (Act No.108 of 1997), as well as the "Regulations relating to compulsory national standards and measures to conserve water", as issued in terms of sections 9(1) and 73(1)(j) of the Water Services Act, to report on the implementation of its WSDP during each financial year and to include a water services audit in such an annual report.

Section 62 of the Water Services Act requires the Minister to monitor every WSI in order to ensure compliance with the prescribed national standards. This regulation requires a WSA to complete and submit a WSDP Performance- and Water Services Audit every financial year. The WSDP Performance- and Water Services Audit is designed to monitor the compliance of the WSA and other WSIs with these regulations. The Water Services Act allows the audit to be used as a tool to compare actual performance of the WSA against the targets and indicators set in their WSDP. The purpose of the WSDP Performance- and Water Services Audit is as follows:

- To monitor compliance with the Act and these regulations;
- To compare actual performance against targets contained in the WSDPs.
- To identify possibilities for improving water conservation and water demand management.

The WSDP Performance- and Water Services Audit Report will give an overview of the implementation of the Municipality's previous year's WSDP, for the 2020/2021 financial year, and can be seen as an annexure to Swartland Municipality's Annual Report. The Annual Report is compiled as required by the Local Government: Municipal Systems Act, Act no 32 of 2000 (Section 46) and the Local Government: Municipal Finance Management Act, Act no 56 of 2003 (Section 121). The WSDP Performance- and Water Services Audit Report contain the following detail information:

- The Municipality's performance with regard to their KPIs for water and sewerage services for the 2020/2021 financial year, as included in the Municipality's SDBIP.
- The Municipality's Performance with regard to DWS's Blue and Green Drop Assessments. Blue drop status is awarded to those towns that comply with 95% criteria on drinking water quality management. Green drop status is awarded to those WWTWs that comply with 90% criteria on key selected indicators on waste water quality management.
- DWS's Scorecard for assessing the potential for WC/WDM efforts in the Municipality.

- Information to be included in a WSDP Performance- and Water Services Audit as stipulated under section 9 of the Water Services Act, “Guidelines for Compulsory National Standards” and also required by DWS’s 2014 WSDP Performance- and Water Services Audit Report guidelines.

- Information on the implementation of the various WSDP activities, as included under the WSDP Business Elements in DWS’s WSDP guidelines.

A. WATER SERVICES AUTHORITY PROFILE

A.1. Map of Water Services Authority Area of Jurisdiction

Swartland Municipality is located in the West Coast Region of the Western Cape, as indicated on the figure below.

Figure A.1.1: Location of Swartland Municipality in the Western Cape

The figure below gives an overview of Swartland Municipality’s Management Area and the settlements located in the Area.

Figure A.1.2: Swartland Municipality’s Management Area

The various schemes supplied with bulk water by Swartland Municipality are discussed in more detail under Section A.3. The existing water and sewerage infrastructure of the various distribution systems are indicated on the Aerial Photos included in the Municipality's detail WSDP documents.

A.2. Water Services Administration and Organization

Swartland Municipality is the WSA for the entire Municipal Management Area. The West Coast District Municipality acts as Bulk Water Services Provider for Swartland Municipality and provides bulk potable water to all the towns in Swartland Municipality's Management Area. Swartland Municipality's approved Organogram is included in Annexure G (Council Resolution 28 May 2020). The table below gives the contact details of the persons responsible for water services management and planning within Swartland Municipality.

Table A.2.1: Water Services Administrative Structure	
Accounting Officer	
Designation	Municipal Manager
Name	Joggie Scholtz
Telephone Nr.	022-4879 400
Fax Nr.	022-4879 440
Cell Nr.	082 823 7542
Email	joggiescholtz@swartland.org.za
WSA Manager	
Designation	Director: Civil Engineering Services
Name	Louis Zikmann
Telephone Nr.	022-487 9400
Fax Nr.	022-487 9440
Cell Nr.	082 823 7543
Email	louis@swartland.org.za
WSP Manager	
Designation	Director: Civil Engineering Services
Name	Louis Zikmann
Telephone Nr.	022-487 9400
Fax Nr.	022-487 9440
Cell Nr.	082 823 7543
Email	louis@swartland.org.za
WSDP Manager	
Designation	Senior Manager: Solid Waste and Trade Services
Name	Johan Venter
Telephone Nr.	022-487 9400
Fax Nr.	022-487 9440
Cell Nr.	081 595 6000
Email	venterj@swartland.org.za
IDP Manager	
Designation	IDP Manager
Name	Olivia Fransman
Telephone Nr.	022-487 9400
Fax Nr.	022-487 9440
Cell Nr.	-
Email	fransmano@swartland.org.za

A.3. Water Services Overview

Swartland Municipality is situated within the Berg-Olifants Water Management Area (WMA). The Municipality further 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; and
- Saldanha Bay Municipality
- West Coast District Municipality

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. 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 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 Kalbaskraal. The groundwater is disinfected, before it is blended with the other potable water and distributed to the consumers in Riverlands and Kalbaskraal respectively.



Three Riverlands Boreholes

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 two Ongegund reservoirs with a total capacity of 2.39 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 reservoir (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 to the Yzerfontein reservoirs (2 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 Koringberg reservoir of 0.27 Ml capacity, from where it is distributed to the consumers. The capacity of the West Coast DM's reservoir, adjacent to the Municipality's reservoir, is 0.23 Ml.

The table below gives an overview of the major bulk infrastructure components of the Swartland bulk water distribution system.

Table A.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	258.815	207.105	**465.920**
Reservoirs			
Name	**Type**	**Capacity (Ml)**	**TWL**
Swartland WTW Clear well	WTW	Unknown	Unknown
Kamp reservoir	Reservoir	Unknown	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		**59.400**	

Water Pump Stations						
Name	**Location / Description**	**No. of Pumps**	**Operate / Standby**	**Q (m^3/s)**	**H (m)**	**Capacity (Ml/d)**
Darling PS	At Darling: Boost to Darling reservoir	2	1/1	Unknown	Unknown	Unknown
Yzerfontein PS	At Darling: Boost to Wildshutsvlei Balancing Tank	2	1/1	0.069	88	5.962
Rustfontein PS	Booster: Kasteelberg to Glen Lily reservoirs	2	0/2	0.302	40	26.093
Swavelberg PS	Booster: Kasteelberg to Glen Lily reservoirs	2	0/2	0.302	40	26.093
Swartland RW PS	Swartland WTW (Canal through WTW)	3	2/3	0.369	17	31.882
Swartland PS	Swartland WTW (WTW to Kasteelberg reservoirs)	4	2/2	0.480	220	41.472
Gouda PS	Swartland WTW (WTW to Gouda reservoir)	2	1/1	Unknown	Unknown	Unknown
Kamp PS	Swartland WTW (WTW to Kamp reservoir)	2	1/1	Unknown	Unknown	Unknown

Control Valves		
Name	**Type**	**Description**
Darling BPT	Break pressure tank	WBK line (from Darling)
Malmesbury BPT1	Break pressure tank	Feed to Darling; I line
Malmesbury BPT2	Break pressure tank	Feed under N7 (emergency supply only)
Riebeek Kasteel BPT	Break pressure tank	Hermon supply; E line

The design capacities of the various treatment components of the Swartland WTW are summarised in the table below.

Table A.3.2: Design capacities of the various components of the Swartland WTW		
Design Capacities		
Component	**Ml/a**	**Ml/d**
Overall capacity	10 585	29.000
Flocculation	11 001	30.140
Clarifying	11 001	30.140
Filtration	10 585	29.000
Chlorination	10 585	29.000

Table A.3.3: Swartland WTW's historical flows and operational capacity				
Year	**Maximum Month Average Daily Flow (Ml/d)**	**WTW Operational Capacity for Maximum Month Average Daily Flow (%)**	**Average Annual Daily Flow (Ml/d)**	**WTW Operational Capacity for Average Annual Daily Flow (%)**
2013/2014	25.032 (Febr)	86.32%	17.801	61.38%
2014/2015	26.496 (Febr)	91.37%	19.161	66.07%
2015/2016	24.226 (Febr)	83.54%	18.492	63.77%
2016/2017	19.816 (Febr)	68.33%	15.847	54.64%
2017/2018	13.958 (Jul)	48.13%	11.734	40.46%
2018/2019	16.171 (Febr)	55.76%	13.332	45.97%
2019/2020	17.663 (Febr)	60.91%	13.853	47.77%
2020/2021	21.089 (Febr)	72.72%	16.072	55.42%

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

A.3.4: Existing internal water infrastructure						
Water Distribution System	**Bulk Supply**	**WTW**		**Bulk and Network**	**Number of Water PS**	**Total Res Storage**
	(Resources)	**Operated by West Coast DM**	**Add Disinfection**	**(km)**	**(RW/PW)**	**(Ml)**
Malmesbury (Abbotsdale, Kalbaskraal, Riverlands, Chatsworth)	Berg River (Voëlvlei), Paardenberg Dam and three Riverlands bhs	29 Ml/d (Swartland WTW)	Malmesbury, Kalbaskraal, Riverlands	264.495	9 (PW)	37.543
Moorreesburg	Berg River (Misverstand)	72 Ml/d (Withoogte WTW)	-	72.538	1 (PW)	8.172
Riebeek Kasteel	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	23.084	1 (PW)	1.862
Riebeek Wes	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	22.308	1 (PW)	2.692
Ongegund	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	7.367	1 (PW)	2.391
Koringberg	Berg River (Misverstand)	72 Ml/d (Withoogte WTW)	-	10.353	-	0.508
Darling	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	46.285	-	3.432
Yzerfontein	Berg River (Voëlvlei)	29 Ml/d (Swartland WTW)	-	38.698	-	4.375

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

A.3.5: Existing main sewerage infrastructure			
Sewer Drainage Systems	**Sewer Drainage Network (m)**	**Number of Sewer PS**	**WWTW (Capacity in Ml/d)**
Malmesbury and Abbotsdale	147.705	5	10.000
Kalbaskraal	7.197	2	0.157
Riverlands and Chatsworth	5.106	2	0.270
Moorreesburg	59.870	-	1.500
Riebeek Kasteel, Riebeek Wes and Ongegund	51.581	6	1.900
Koringberg	2.612	-	0.030
Darling	40.930	2	1.500

The table below gives a summary of the existing hydraulic design capacities and current flows at each of the WWTWs, as well as the final effluent quality compliance percentages for the 2020/2021 financial year (Ml/d).

Table A.3.6: Existing hydraulic design capacities and flows at each of the WWTWs (Ml/d)

WWTW	Existing Hydraulic Capacity	Peak Month Average Daily Flow	Average Daily Flow (2020/2021)	Average Wet Weather Flow (Jul'20, Aug'20, May'21, Jun'21,)	Average Daily Flow as a % of Design Capacity	Final Effluent Compliance for 2020/2021
Malmesbury	10.000	6.109 (March 2021)	5.295	5.601	52.95%	Microbiological: 100.0% Chemical: 72.9% Physical: 83.3%
Kalbaskraal	0.157	Unknown	0.076	Unknown	48.41%	Microbiological: 100.0% Chemical: 16.7% Physical: 100.0%
Riverlands/Chatsworth	0.270	Unknown	0.245	Unknown	90.74%	Microbiological: 16.7% Chemical: 31.3% Physical: 63.9%
Moorreesburg	1.500	1.520 (June 2021)	1.097	1.250	73.13%	Microbiological: 40.0% Chemical: 35.0% Physical: 40.0%
Riebeek Valley	1.900	1.237 (Aug 2020)	0.843	1.009	44.37%	Microbiological: 91.7% Chemical: 93.8% Physical: 97.2%
Koringberg	0.030	Unknown	0.082	Unknown	273.33%	Microbiological: 0.0% Chemical: 27.1% Physical: 36.1%
Darling	1.500	1.524 (Dec 2020)	1.241	1.219	82.73%	Microbiological: 91.7% Chemical: 100.0% Physical: 97.2%

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 2020 Socio Economic Profile for Swartland Municipality indicates the 2020 population at 136 137 persons. This total population is estimated to increase to 147 823 by 2024, which equates to 2.08% average annual growth over this period. The current population in the WSDP Performance- and Water Services Audit Report is estimated higher, as well as the average annual future population growth percentage.

The 2020/2021 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 A.3.7: Estimated future annual population growth percentages, population and households per distribution system

Distribution System	Estimated future annual Population Growth %	Projected 2020/2021 Persons	Projected 2020/2021 Households
Darling	2.0%	12 453	3 346
Koringberg	4.0%	1 728	451
Malmesbury	4.5%	53 346	14 078
Abbotsdale	3.0%	4 909	1 206
Chatsworth & Riverlands	6.0%	6 846	1 869
Kalbaskraal	5.0%	3 740	1 022
Moorreesburg	4.0%	18 328	5 263
Riebeek Kasteel	7.0%	8 753	2 473
Ongegund (PPC)	3.0%	420	105
Riebeek Wes	6.0%	7 360	1 826
Yzerfontein	4.0%	1 623	697
Farms	3.5%	44 463	10 043
TOTALS	**4.1%**	**163 968**	**42 380**

The tables below give an overview of the projected population and permanent number of households and the water and sanitation service levels in Swartland Municipality's Management Area.

Table A.3.8: Water Services Overview (Water)

Settlement Type	2011/2012		2020/2021		Water category								
	Households	Population	Households	Population	Adequate: Formal	Adequate: Informal	Adequate: Sahred Services	Water resources needs only	O&M needs only	Infrastructure needs only	Infrastructure & O&M needs	Infrastructure, O&M & Resource need	No Services: Informal	No Services: Formal
URBAN														
Metropolitan Area					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**										
Formal Town					Adequate			Below RDP					None	
Malmesbury	9,473	35,897	14,078	53,346	P		P							
Abbotsdale	924	3,762	1,206	4,909	P		P							
Chatsworth/Riverlands	1,017	3,696	1,169	4,046	P		P							
Kalbaskraal	659	2,411	1,022	3,740	P		P							
Riebeek Kasteel	1,345	4,761	2,473	8,753	P		P							
Riebeek Wes	1,049	4,229	1826	7360	P		P							
Darling	2,800	10,420	3,346	12,453	P		P							
Moorreesburg	3,698	12,877	5,263	18,328	P		P							
Koringberg	317	1,214	451	1,728	P		P							
Yzerfontein	490	1,140	697	1,623	P		P							
Sub-Total	**21,772**	**80,407**	**31,531**	**116,285**										
Townships					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**										
Informal Settlements					Adequate			Below RDP					None	
Chatsworth/Riverlands	89	356	700	2,800									P	
Sub-Total	**89**	**356**	**700**	**2,800**										
Working towns & service centres					Adequate			Below RDP					None	
Ongegund (PPC)	94	376	105	420	P		P							
Sub-Total	**94**	**376**	**105**	**420**										
Sub-Total: (Urban)	**21,955**	**81,139**	**32,336**	**119,505**										
RURAL														
Rural / Farming					Adequate			Below RDP					None	
Farms	7,369	32,624	10,043	44,463	P		P							P
Sub-Total	**7,369**	**32,624**	**10,043**	**44,463**										
Informal Settlements					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**										
Sub-Total (Rural)	**7,369**	**32,624**	**10,043**	**44,463**										
TOTAL	**29,324**	**113,763**	**42,380**	**163,968**										

Table A.3.9: Water Services Overview (Sanitation)

Settlement Type	2011/2012 Households	2011/2012 Population	2020/2021 Households	2020/2021 Population	Sanitation category: Adequate: Formal	Adequate: Informal	Adequate: Sahred Services	Water resources needs only	O&M needs only	Infrastructure needs only	Infrastructure & O&M needs	Infrastructure, O&M & Resource need	No Services: Informal	No Services: Formal
URBAN														
Metropolitan Area					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**										
Formal Town					Adequate			Below RDP					None	
Malmesbury	9,473	35,897	14,078	53,346	P		P							
Abbotsdale	924	3,762	1,206	4,909	P		P							
Chatsworth/Riverlands	1,017	3,696	1,169	4,046	P		P							
Kalbaskraal	659	2,411	1,022	3,740	P		P							
Riebeek Kasteel	1,345	4,761	2,473	8,753	P		P							
Riebeek Wes	1,049	4,229	1,826	7,360	P		P							
Darling	2,800	10,420	3,346	12,453	P		P							
Moorreesburg	3,698	12,877	5,263	18,328	P		P							
Koringberg	317	1,214	451	1,728	P		P							
Yzerfontein	490	1,140	697	1,623	P		P							
Sub-Total	**21,772**	**80,407**	**31,531**	**116,285**										
Townships					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**										
Informal Settlements					Adequate			Below RDP					None	
Chatsworth/Riverlands	89	356	700	2,800									P	
Sub-Total	**89**	**356**	**700**	**2,800**										
Working towns & service centres					Adequate			Below RDP					None	
Ongegund (PPC)	94	376	105	420	P		P							
Sub-Total	**94**	**376**	**105**	**420**										
Sub-Total: (Urban)	**21,955**	**81,139**	**32,336**	**119,505**										
RURAL														
Rural / Farming					Adequate			Below RDP					None	
Farms	7,369	32,624	10,043	44,463	P		P							P
Sub-Total	**7,369**	**32,624**	**10,043**	**44,463**										
Informal Settlements					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**										
Sub-Total (Rural)	**7,369**	**32,624**	**10,043**	**44,463**										
TOTAL	**29,324**	**113,763**	**42,380**	**163,968**										

B. WSDP PERFORMANCE REPORT

B.1. WSDP Reference and Status

The 2021/2022 WSDP-IDP Sector Input Report was compiled during the last financial year and was approved by Council with the IDP. DWS's new WSDP website was rolled-out to all the WSAs in the West Coast District on the 31st of October 2017. The Municipality currently plan to upgrade their WSDP according to DWS's new WSDP website requirements for the new five-year cycle. The table below gives an overview of Swartland Municipality's WSDP status.

Table B.1.1: WSDP and Reporting Reference

Nr	WSDP Title and Reference	Status	Date	WSDP Year	Financial Year	Reporting year
2	Water Services Development Plan, eWSDP, Module 2 and 3 Documents and WSDP-IDP Sector Input Report (2017-2022)	Drafted:	Febr 2016	Year 1	2016/17	Year - 4
		Comment submit:	Apr / May 2016	Year 2	2017/18	Year - 3
		Finalised:	Febr. 2016	Year 3	2018/19	Year - 2
		Adopted:	30 March 2016	Year 4	2019/20	Year - 1
		Published:	June 2016	Year 5	**2020/21**	Year 0

Legend:

- Past Financial Years
- Previous Financial Year (financial year of reporting)
- Future Years

B.2. Performance on Water Services Objectives and Strategies

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.

Finally, the Annual Report, of which the WSDP Performance- and Water Services Audit Report forms a part, records the success or otherwise of the previous year's implementation.

The table below gives an overview of the Municipality's performance on the water and sanitation objectives and strategies per WSDP topic.

Table B.2.1: Performance on Water Services Objectives and Strategies per WSDP Topic

Nr	Objective / Strategy	Key Performance Indicator	Inclusion (yes/no)		WSDP Year 1		WSDP Year 2		WSDP Year 3		WSDP Year 4		WSDP Year 5	
					FY 1	2016/17	FY 2	2017/18	FY 3	2018/19	FY 4	2019/20	FY 5	2020/21
			WSDP	IDP	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual
WSDP Topic 1: Administration														
WSDP Topic 2: Demographics														
WSDP Topic 3: Service levels														
0023	Improved access to water, sanitation and refuse removal.	% of urban households with access to bsic water supply (at least piped (tap) water within 200 meters from dwelling).	Yes	Yes	-	-	100%	100%	100%	100%	100%	100%	100%	100%
0023	Improved access to water, sanitation and refuse removal.	% of urban households with access to basic sanitation (at least a flush toilet, chemical toilet or pit toilet with ventilation (VIP)).	Yes	Yes	-	-	100%	100%	100%	100%	100%	100%	100%	100%
	Ensure continuous and available water supply	% of new water connections completed within 10 working days			100%	100%	-	-	-	-	-	-	-	-
WSDP Topic 4: Socio economic														
WSDP Topic 5: Water Services Infrastructure														
0001	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.	Yes	Yes			100%	100%	100%	100%	100%	100%	100%	100%
WSDP Topic 6: Operation Maintenance														
	Ensure safety of water supply	Number of failures i.r.o. SANS 241			100%	100%	-	-	-	-	-	-	-	-
0086	Improved water sustainability	% total water losses	Yes	Yes	-	-	< 17%	16.3%	< 17%	16.7%	< 17%	12.1%	< 17%	19.7%
	Ensure effective operation and maintenance of waste water treatment works	% compliance with DWS general limits for the discharge of treated waste water			75.00%	89.70%	-	-	-	-	-	-	-	-
WSDP Topic 7: Associated services														
WSDP Topic 8: Conservation and Demand management														
	Ensure continuous and available water supply	Number of burst water mains not repaired within 10 hours after the incident has been reported			100%	100%	-	-	-	-	-	-	-	-
WSDP Topic 9: Water Resources														
WSDP Topic 10: Financial profile														
0013	Capital expenditure in line with budget and time frames	% of capital budget spent	Yes	Yes			90%	91%	90%-100%	97.3%	95%-105%	88.1%	95%-105%	98.4%
0014	Capital project implementation	Average % completion of capital projects	Yes	Yes			90%	94%	90%	111.1%	90%	90.0%	90%	99.0%
0015	Operating expenditure in line with budget and time frames	% of operating budget spent	Yes	Yes			90%	97%	90%-100%	93.6%	90%-100%	99.0%	90%-100%	85.9%
0008	Spending of grants	% spending of grants	Yes	Yes			100%	100%	100%	100%	100%	99%	100%	100%
WSDP Topic 11: Institutional Arrangements profile														
0084	Ensure that accurate revenue estimates are prepared in relation to operating requirements	Projected tariff increases determined for the budget of the new financial year	Yes	Yes			100%	100%	100%	100%	100%	100%	100%	100%
0016	Workforce training roll-out	% of planned training sessions according to the Workplace Skills Plan realised.	Yes	Yes					100%	100%	100%	100%	100%	100%
WSDP Topic 12: Social and Customer service requirements														
0022	Correspondence addressed in a timely manner	% of all correspondence recorded by Collaborator less than 60 days old	Yes	Yes					90%	93.7%	90%	95.3%	90%	95.2%
	Ensure continuous and available water supply	Number of interuptions in continuous service to consumers, where interuptions for a single incident was greater than 48 hrs			100%	100%	-	-	-	-	-	-	-	-
	Ensure continuous and available water supply	Number of blockages not repaired within 10 hours after the incident has been reported			-	-	-	-	-	-	-	-	-	-
	Ensure continuous and available sewerage service	Number of blockages not repaired within 10 hours after the incident has been reported			-	-	-	-	-	-	-	-	-	-
WSDP Topic 13: Needs development plan														

Legend:

Past Financial Years	KPIs up to 2016/2017: Senior Manager Technical Services (Civil Engineering Services)
Previous Financial Year (financial year of reporting)	KPIs for 2017/2018 onwards: Director Civil Engineering Services
Future Years	

The following water and sanitation related investigations were successfully completed during the last financial year.

- The WSDP Performance- and Water Services Audit Report for the 2019/2020 financial year was finalised and approved by Council as part of the Annual Report. The non-revenue water balance models were updated for each of the distribution systems (Up to the end of June 2020) as part of the WSDP Performance- and Water Services Audit Process.

- The 2021/202 WSDP – IDP Water Sector Input Report was compiled and approved by Council with the IDP.

- The infrastructure constructed during the 2020/2021 financial year were added to the Asset Register and the Asset Register was updated.

- Separate WWTW Process Audits were completed for each of the WWTWs.

- Resource Augmentation Desktop Study was completed of a number of resource augmentation studies previously completed by the DWS for the WCWSS, by the West Coast District Municipality for the West Coast Region and by Swartland Municipality for towns in their Management Area.

- Swartland Municipality continues with the implementation of their Drinking Water Quality and Effluent Quality Sampling Programmes (Both Operational and Compliance Monitoring). The effluent discharged by industrial consumers is also monitored by Swartland Municipality on a monthly basis.

The following awards / acknowledgements were also received by the Municipality:

- **The Municipality's overall Blue Drop Score came down from 95.24 % for 2012 to 74.26% for 2014.** The Municipality was commended for the system implemented for the management of the NRW. Comprehensive information has been gathered for each water system for development of water balances. Interventions are ongoing to reduce water losses from 18% to below 10%.

  The overall 2014 Risk Rating for Swartland is 46%. This risk value is based Process Control RR, Drinking Water Quality RR and Risk Management RR, with scores above 50% (medium to critical risks) for both systems for Process Control.

- Swartland Municipality is performing above average with regard to wastewater quality management, with an **overall Green Drop Score of 72.38% for DWS's 2013 assessment**. The highest Green Drop Score of 75.49% was for the Malmesbury WWTW and drainage system and the lowest Green Drop Score of 60.27% was for the Chatsworth WWTW and drainage system.

  The CRR increased in seven of the systems during the 2013/2014 Green Drop Progress Reporting, while the score decreased in two of the systems (Malmesbury and Darling). It appears as if the necessary maintenance team competency is available at all systems and the Municipality is urged to maintain this situation. The DWS is understandably concerned about the increase in risk rating in most of the systems and requests the Municipality to intervene urgently to improve the situation. The upgrade at the Malmesbury works is commended, as well as the project to build a new activated sludge plant at Riebeek Kasteel that will serve Riebeek Kasteel, Riebeek Wes and Ongegund.

B.3. Status of Water Services Projects

Most of the capital expenditure for the last financial year was for the upgrading of the Moorreesburg WWTW (R41.802 million) and the Darling WWTW (R22.274 million). The table below gives an overview of the capital expenditure per project for the last financial year.

Table B3.1: Water Services Projects Status and Performance

Nr	Project Title and Description	Inclusion		Total Project Cost R'000	Year 0 Performance - FY2020/21			Funding Source(s)	Project Category / Type	Planned Period		Project Status	Actual Completion Year
		WSDP	IDP		FY Budget R'000	Expended R'000	%			From FY	To FY		
1	Industrial Area Upgrade of Water Supply	Yes	Yes	R998	R944	R998	106%	CRR	Water	2020/2021	2020/2021	Completed	2020/2021
2	Water: Upgrading water reticulation network: PRVs, flow control, zone metering and water augmentation	Yes	Yes	R7,436	R167	R167	100%	CRR	Water	2012/2013	2024/2025	In Progress	-
3	Equipment water	Yes	Yes	R613	R55	R55	100%	CRR	Water	2013/2014	2025/2026	In Progress	-
4	Bulk water emergency spending	Yes	Yes	R2,588	R372	R188	50%	CRR	Water	2020/2021	2024/2025	In Progress	-
5	Riebeek Wes Square: New Borehole, Pumps and Irrigation	Yes	Yes	R240	R100	R90	90%	CRR	Water	2020/2021	2021/2022	In Progress	-
6	Water: CK23982 NP300 Hardbody	Yes	Yes	R290	R289	R290	100%	CRR	Water	2020/2021	2020/2021	Completed	2020/2021
7	New Connections: Water Meters	Yes	Yes	R3,823	R612	R566	92%	CRR	Water	2019/2020	2024/2025	In Progress	-
8	Sewerage: Moorreesburg WWTW	Yes	Yes	R120,807	R32,498	R32,498	100%	CRR	Sewerage	2016/2017	2022/2023	In Progress	-
					R9,304	R9,304	100%	MIG					
9	Equipment: Sewerage telemetry	Yes	Yes	R577	R62	R62	100%	CRR	Sewerage	2013/2014	2025/2026	In Progress	-
10	Equipment: Sewerage	Yes	Yes	R360	R26	R23	90%	CRR	Sewerage	2013/2014	2025/2026	In Progress	-
11	Sewerage: Darling WWTW	Yes	Yes	R32,471	R11,421	R11,421	100%	CRR	Sewerage	2019/2020	2022/2023	In Progress	-
					R10,853	R10,853	100%	MIG					
Total				**R170,202**	**R66,703**	**R66,515**	**100%**						

B.4. Past Financial Year Water Services Projects Impact Declaration

The impacts of the water and sewerage capital projects, which were implemented by Swartland Municipality in the previous financial year, were as follows:

Table B.4.1: Past Financial Year Project Impact Declaration

Nr	Project Title and Description	Project Category	Settlements which benefitted	Nr Beneficiaries		Impact Declaration
				Households	Population	
1	Industrial Area Upgrade of Water Supply	Water Reticulation	Malmesbury	-	-	Provide water reticulation network and connections for industrial erven
2	Water: Upgrading water reticulation network: PRVs, flow control, zone metering and water augmentation	WC/WDM	Management Area	-	-	Reduce NRW and water losses and ensure adequate monitoring of water usage.
3	Equipment water	Other	Management Area	-	-	Ensure adequate O&M of systems.
4	Bulk water emergency spending	Bulk Pipeline	Management Area	-	-	Ensure adequate O&M of systems.
5	Riebeek Wes Square: New Borehole, Pumps and Irrigation	Water Reticulation	Riebeek Wes	-	-	Reduce potable water requirements (Irrigation with groundwater)
6	Water: CK23982 NP300 Hardbody	Other	Management Area	-	-	Ensure adequate operation of systems.
7	New Connections: Water Meters	WC/WDM	Management Area	-	-	Ensure all water usage is metered. Reduce NRW and Water Losses.
8	Sewerage: Moorreesburg WWTW	WWTW	Moorreesburg	5263	18328	Increase capacity of WWTW and ensure final effluent compliance.
9	Equipment: Sewerage telemetry	Other	Management Area	-	-	Ensure proper process control and system management.
10	Equipment: Sewerage	Other	Management Area	-	-	Ensure adequate O&M of systems.
11	Sewerage: Darling WWTW	WWTW	Darling	3346	12453	Increase capacity of WWTW and ensure final effluent compliance.
	TOTAL			**8609**	**30781**	

C. WATER SERVICES AUDIT REPORT

C.1. Quantity of Water Services Provided (Water Balance)

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 C.1.1: 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

Table C.1.2: 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

The treatment losses at both the Withoogte WTW and the Swartland WTW were less than 5% for the last four financial years, which is excellent. The bulk water distribution losses for the last five financial years for the Withoogte system were less than 3% and for the Swartland system it were between 6% and 10.5%. The treatment losses and the bulk distribution losses for the two systems combined were both less than 5% for the last five financial years, which is excellent.

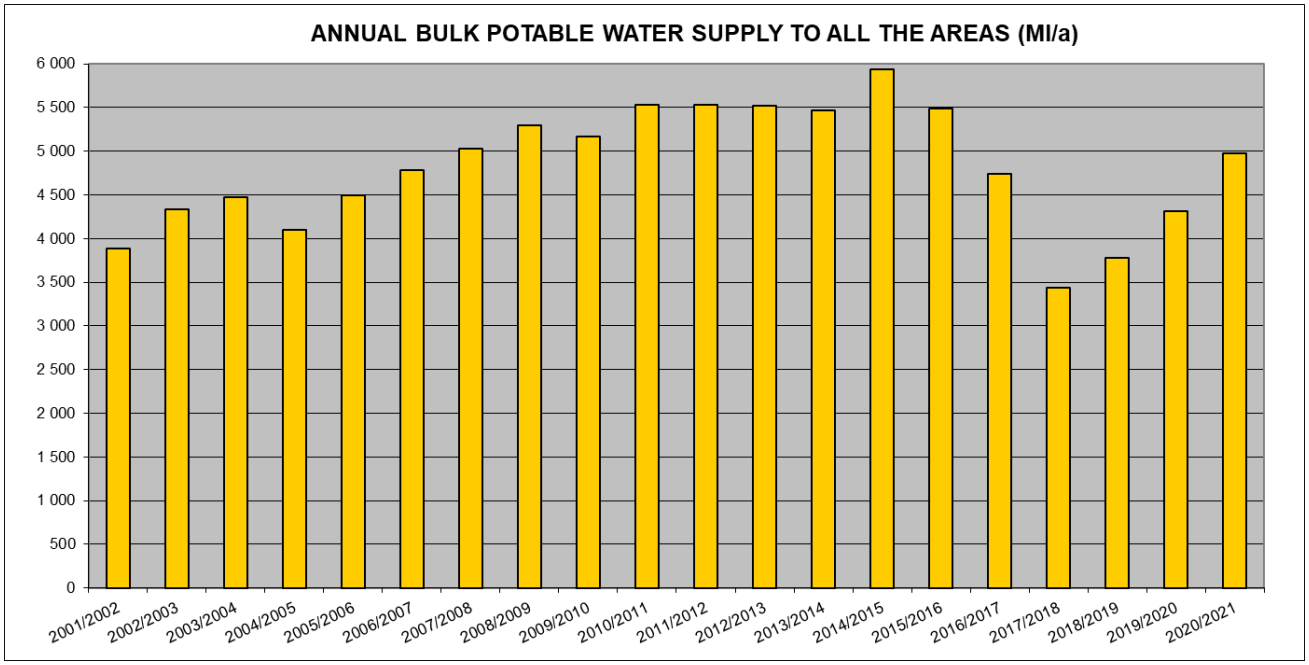


Figure C.1.1: Swartland Municipality's annual bulk potable water supply (System Input Volume) to all the areas

The graph below gives an overview of the total bulk potable water supply (System Input Volume) for the various water distribution systems in Swartland Municipality's Management Area.

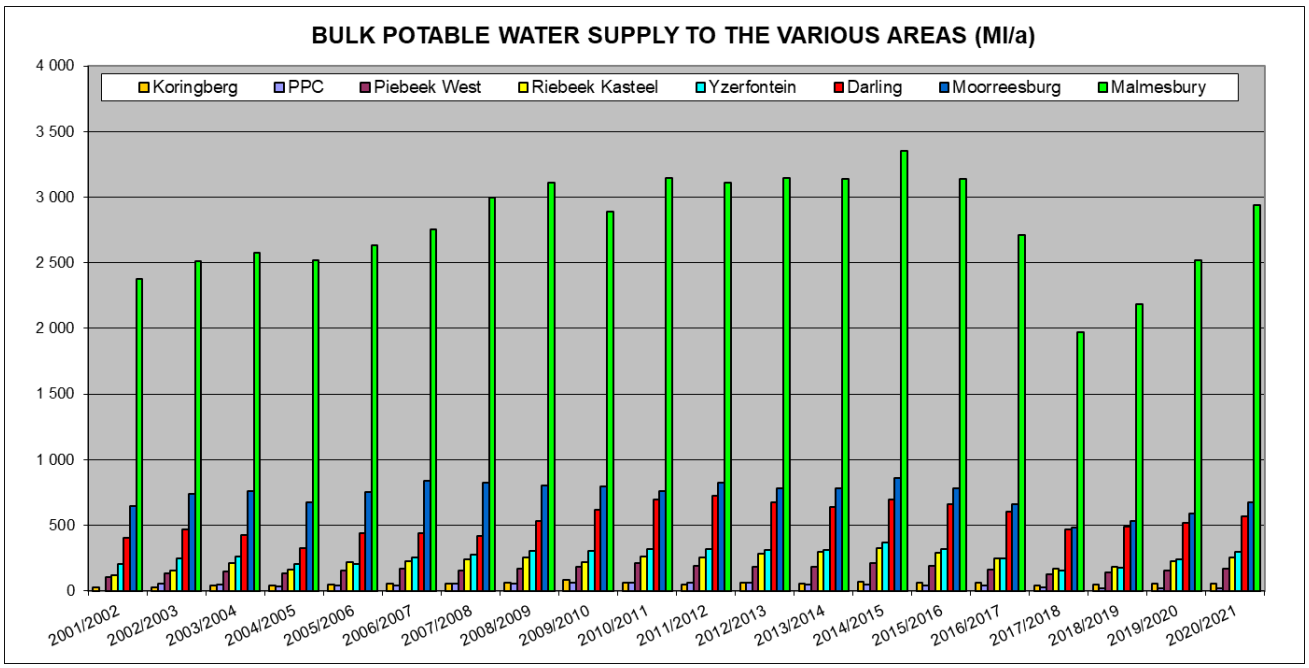


Figure C.1.2: Bulk potable water supply (System Input Volume) for the various distribution systems

The severe impact of the 2015 to 2017 drought on the total water requirements of the various towns can be noted from the previous two graphs and the table below. The total system input volume for all the towns came down from 15.020 Ml/d in 2015/2016 to 9.430 Ml/d in 2017/2018, with a steady recovery over the last three financial years. A significant part of this effort related to the Municipality's WC/WDM initiatives to reduce the overall water requirements and to reduce the NRW and Water Losses for the various systems.

Quantity of water provided by the WSA

The table below gives a summary of the total bulk raw water supply to the various towns within Swartland Municipality's Management Area.

Table C.1.3: Bulk water supply (System Input Volume) for the various towns

Distribution System	Source	20/21	Record : Prior (Ml/a)				
			19/20	18/19	17/18	16/17	15/16
Koringberg	Misverstand Scheme	56.412	51.908	46.609	44.157	60.128	64.578
Ongegund	Voëlvlei Scheme	17.662	17.033	18.004	27.612	39.286	43.529
Riebeek Wes	Voëlvlei Scheme	171.006	157.908	140.524	127.127	165.162	189.440
Riebeek Kasteel	Voëlvlei Scheme	256.218	223.405	183.446	169.061	250.636	287.140
Yzerfontein	Voëlvlei Scheme	299.537	238.116	175.903	154.611	248.845	317.039
Darling	Voëlvlei Scheme	570.859	518.097	491.479	465.322	603.442	661.330
Moorreesburg	Misverstand Scheme	671.591	590.106	532.506	480.789	659.185	779.557
Malmesbury	Voëlvlei Scheme, Paardenberg dam, Boreholes	2 936.354	2 520.750	2 186.436	1 973.521	2 708.884	3 141.356
Total		**4 979.639**	**4 317.323**	**3 774.907**	**3 442.200**	**4 735.568**	**5 932.996**

The graph below gives an overview of billed metered consumption per type of consumer for the last three financial years.

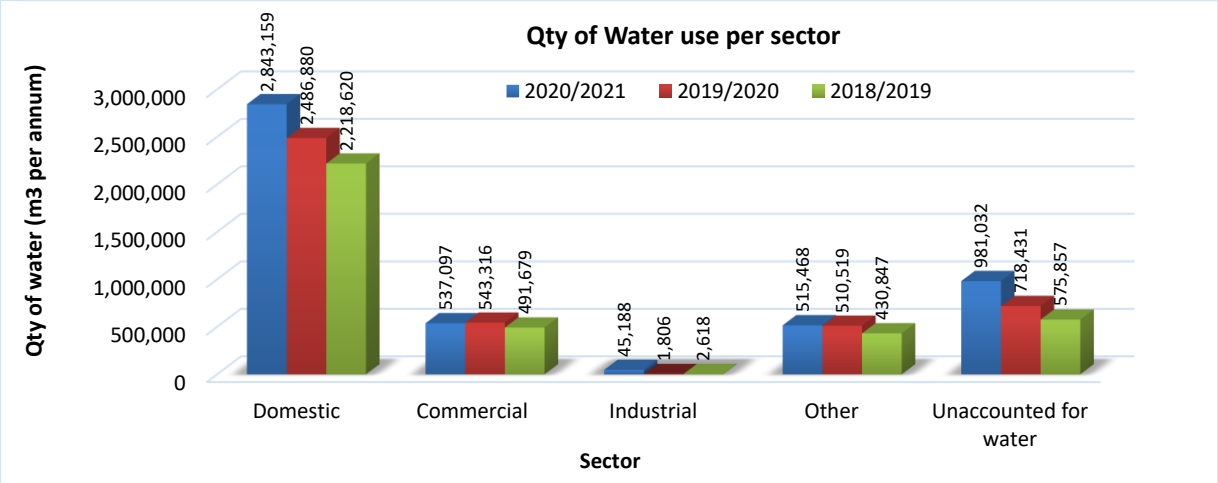


Figure C.1.3: Quantity of water services provided / water balance

Graphs of the water usage per sector for the various water distribution systems within Swartland Municipality's Management Area are included as part of the IWA water balance models included in Annexure A.

The table below gives an overview of the quantity of water services provided / water balance for all the water distribution systems in Swartland Municipality's Management Area.

Table C.1.4: Quantity of Water Services Provided / Water Balance									
WSDP Ref. #	Regulations Ref. #	Description	m^3 per annum			Ml/d		
			Year 0	Year - 1	Year - 2	Year 0	Year - 1	Year - 2
			FY2020/21	FY2019/20	FY2018/19	FY2020/21	FY2019/20	FY2018/19
		RAW WATER						
7.2.1		Surface water purchased	0	0	0	0.00	0.00	0.00
7.1 / 7.2.2		Surface water abstracted	692	73	131	0.00	0.00	0.00
7.1 / 7.2.3		Ground water abstracted	26,763	24,819	45,852	0.07	0.07	0.13
7.2.14		Effluent recycled	0	0	0	0.00	0.00	0.00
7.2.4		*less* Raw water supplied to others	0	0	0	0.00	0.00	0.00
7.2.5		**Sub-Total: Raw Water supplied**	**27,455**	**24,892**	**45,983**	**0.08**	**0.07**	**0.13**
	10.2 (g) (i)	**BULK WATER SUPPLY**						
7.2.6		Volume of water treated	27,455	24,892	45,983	0.08	0.07	0.13
7.2.7	10.2 (a) (ii)	Purchased treated water	4,952,184	4,292,431	3,728,924	13.57	11.76	10.22
7.2.7A		Ground water not treated	0	0	0	0.00	0.00	0.00
7.2.6A		*less* Treated water supplied to others	0	0	0	0.00	0.00	0.00
		Sub-Total: System Input Volume	**4,979,639**	**4,317,323**	**3,774,907**	**13.64**	**11.83**	**10.34**
		WATER CONSUMPTION						
7.2.8.1		Billed Metered:	3,940,912	3,542,521	3,143,764	10.80	9.71	8.61
	10.2 (a) (i)	Domestic	2,843,159	2,486,880	2,218,620	7.79	6.81	6.08
	10.2 (a) (i)	Commercial	537,097	543,316	491,679	1.47	1.49	1.35
	10.2 (a) (i)	Industrial	45,188	1,806	2,618			
	10.2 (a) (i)	etc.	515,468	510,519	430,847	1.41	1.40	1.18
7.2.8.2		Billed Unmetered	0	0	0	0.00	0.00	0.00
	10.2 (a) (i)	Domestic	0	0	0	0.00	0.00	0.00
	10.2 (a) (i)	Commercial	0	0	0	0.00	0.00	0.00
	10.2 (a) (i)	Industrial	0	0	0	0.00	0.00	0.00
	10.2 (a) (i)	etc.	0	0	0	0.00	0.00	0.00
7.2.8.3		Unbilled Metered	0	0	0	0.00	0.00	0.00
7.2.8.4		Unbilled Unmetered	57,695	56,371	55,286	0.16	0.15	0.15
	10.2 (g) (i)	**Sub-Total: Authorized consumption**	**3,998,607**	**3,598,892**	**3,199,050**	**10.96**	**9.86**	**8.76**
		UNACCOUNTED FOR WATER						
7.3.1		Raw water bulk loss	0	0	0	0.00	0.00	0.00
7.2.3/7.2.4		Billing losses	57,695	56,371	55,286	0.16	0.15	0.15
7.2.5		Apparent losses	166,775	122,133	97,896	0.46	0.33	0.27
7.2.5.1		Illegal connections	19,621	14,369	11,517	0.05	0.04	0.03
7.2.5.2		Inaccurate meters	98,103	71,843	57,586	0.27	0.20	0.16
7.2.5.3		Data errors	49,052	35,922	28,793	0.13	0.10	0.08
7.2.6		Real losses	814,257	596,298	477,961	2.23	1.63	1.31
	10.2 (g) (ii)	**Sub-Total: Unaccounted for water**	**981,032**	**718,431**	**575,857**	**2.69**	**1.97**	**1.58**
		WASTEWATER TREATMENT						
7.2.9	10.2 (a) (iii)	Total received at WWTW	3,240,525	2,901,289	2,599,481	8.88	7.95	7.12
7.2.11		Total discharged	2,525,016	2,263,778	2,023,893	6.92	6.20	5.54
7.2.13		Returned to environment	1,032,894	717,865	1,143,044	2.83	1.97	3.13
7.2.14		Recycled	1,492,122	1,545,913	880,849	4.09	4.24	2.41
	10.2 (a) (iv)	**Quantity of water supplied not discharged to WWTW's**	**758,082**	**697,603**	**599,569**	**2.08**	**1.91**	**1.64**

The table below gives a summary of the annual billed metered consumption volume per consumer type for the various distribution systems and financial years.

Table C.1.5: Quantity of water used by each user sector (Ml)						
Town	**Year**	**Residential**	**Business & Industrial**	**Other**	**Farms**	**Total**
Koringberg	08/09	50.193	4.588	0.306	0	55.087
	09/10	41.517	3.795	0.253	0	45.565
	10/11	42.454	3.880	0.259	0	46.594
	11/12	42.647	2.617	2.101	0	47.365
	12/13	41.440	2.698	1.929	0	46.067
	13/14	44.319	2.571	1.846	0	48.736
	14/15	52.873	3.583	2.525	0	58.981
	15/16	47.886	5.215	2.330	0	55.431
	16/17	44.529	5.340	1.396	0	51.265
	17/18	25.758	3.051	1.135	0	29.944
	18/19	27.862	3.061	0.992	0	31.915
	19/20	31.362	2.362	1.208	0	34.932
	20/21	40.579	1.216	1.222	0	43.017
Ongegund	08/09	30.389	2.478	4.679	0	37.546
	09/10	32.532	2.653	5.009	0	40.194
	10/11	33.154	2.703	5.105	0	40.963
	11/12	30.993	2.305	5.066	0	38.364
	12/13	30.921	2.261	9.938	0	43.120
	13/14	28.788	2.846	12.852	0	44.486
	14/15	31.118	1.930	4.748	0	37.796
	15/16	22.268	3.091	3.204	0	28.563
	16/17	18.239	2.166	1.133	0	21.538
	17/18	9.202	0.919	0.836	0	10.957
	18/19	11.453	0	0.005	0	11.458
	19/20	12.793	0	0.004	0	12.797
	20/21	14.472	0.037	0.078	0	14.587
Riebeek Wes	08/09	107.185	39.533	0.971	0	147.690
	09/10	107.127	39.512	0.971	0	147.610
	10/11	117.410	43.305	1.064	0	161.779
	11/12	122.743	20.629	26.231	0	169.603
	12/13	122.448	22.324	19.596	0	164.368
	13/14	136.046	28.436	26.614	0	191.096
	14/15	131.796	30.236	22.229	0	184.261
	15/16	121.093	25.304	11.473	0	157.870
	16/17	121.949	22.368	9.711	0	154.028
	17/18	73.064	15.210	17.338	0	105.612
	18/19	84.487	17.007	15.767	0	117.261
	19/20	96.265	17.084	22.519	0	135.868
	20/21	118.764	14.953	10.799	0	144.516
Riebeek Kasteel	08/09	174.824	51.148	0.672	1.492	228.137
	09/10	165.851	48.523	0.638	1.416	216.428
	10/11	183.815	53.779	0.707	1.569	239.870
	11/12	194.738	28.691	8.078	2.830	234.337
	12/13	193.924	27.439	6.793	3.974	232.130
	13/14	193.757	37.022	7.904	4.727	243.410
	14/15	224.115	24.410	13.490	4.995	267.010
	15/16	194.956	25.221	9.514	9.894	239.585

Table C.1.5: Quantity of water used by each user sector (Ml)						
Town	**Year**	**Residential**	**Business & Industrial**	**Other**	**Farms**	**Total**
	16/17	165.532	22.359	8.153	11.438	207.482
	17/18	93.786	11.801	4.228	7.066	116.881
	18/19	125.625	16.629	8.325	7.490	158.069
	19/20	144.016	18.085	6.845	6.697	175.643
	20/21	171.842	10.802	11.934	8.850	203.428
Yzerfontein	08/09	216.461	15.221	16.891	0	248.573
	09/10	228.769	16.086	17.851	0	262.706
	10/11	235.259	16.542	18.358	0	270.159
	11/12	246.413	11.670	14.858	0	272.941
	12/13	257.029	10.601	23.491	0	291.121
	13/14	278.539	10.805	16.454	0	305.798
	14/15	302.994	11.351	18.852	0	333.197
	15/16	247.560	11.503	14.738	0	273.801
	16/17	195.307	7.914	12.047	0	215.268
	17/18	88.626	5.087	8.968	0	102.681
	18/19	142.166	5.475	12.285	0	159.926
	19/20	165.718	6.243	19.046	0	191.007
	20/21	218.279	10.784	10.273	0	239.336
Darling	08/09	272.375	147.604	4.815	0	424.793
	09/10	362.765	196.587	6.413	0	565.765
	10/11	417.677	226.345	7.383	0	651.406
	11/12	353.766	247.451	75.287	0	676.504
	12/13	357.922	182.954	113.861	0	654.737
	13/14	376.535	146.914	102.642	0	626.091
	14/15	389.988	155.304	81.533	0	626.825
	15/16	353.330	144.849	50.635	0	548.814
	16/17	355.139	134.866	29.218	0	519.223
	17/18	228.404	129.920	15.601	0	373.925
	18/19	254.530	96.992	12.954	0	364.476
	19/20	279.913	87.055	13.051	0	380.019
	20/21	324.719	78.725	16.910	0	420.354
Moorreesburg	08/09	457.302	194.063	32.009	10.734	694.108
	09/10	438.732	186.182	30.709	10.298	665.921
	10/11	440.755	187.041	30.851	10.346	668.992
	11/12	516.230	125.075	44.591	9.747	695.643
	12/13	502.012	131.936	57.359	7.176	698.483
	13/14	521.407	141.826	37.986	8.968	710.187
	14/15	566.974	135.372	37.202	7.394	746.942
	15/16	502.598	123.776	24.287	8.207	658.868
	16/17	454.057	91.142	17.923	6.427	569.549
	17/18	293.675	61.312	11.675	3.217	369.879
	18/19	330.550	63.275	25.092	3.376	422.293
	19/20	369.022	58.184	40.022	3.577	470.805
	20/21	416.587	67.556	45.188	5.784	535.115
Malmesbury	08/09	1 644.012	818.184	126.551	69.044	2 657.791
	09/10	1 566.270	779.494	120.567	65.779	2 532.109
	10/11	1 577.950	785.307	121.466	66.269	2 550.992
	11/12	1 679.448	433.374	404.285	36.950	2 554.057
	12/13	1 678.406	298.303	393.901	37.101	2 407.711
	13/14	1 694.003	382.682	502.578	36.558	2 615.821

Table C.1.5: Quantity of water used by each user sector (Ml)						
Town	**Year**	**Residential**	**Business & Industrial**	**Other**	**Farms**	**Total**
	14/15	1 852.113	407.323	427.192	46.441	2 733.069
	15/16	1 648.433	402.766	368.562	43.247	2 463.008
	16/17	1 567.750	430.508	315.334	30.380	2 343.972
	17/18	1 062.301	334.187	267.066	19.559	1 683.113
	18/19	1 241.947	291.858	253.886	90.675	1 878.366
	19/20	1 387.791	356.109	285.499	112.051	2 141.450
	20/21	1 537.917	398.212	293.799	110.631	2 340.559
TOTAL	**08/09**	**2 952.741**	**1 272.819**	**186.894**	**81.270**	**4 493.725**
	09/10	**2 943.563**	**1 272.832**	**182.411**	**77.493**	**4 476.298**
	10/11	**3 048.474**	**1 318.902**	**185.193**	**78.184**	**4 630.755**
	11/12	**3 186.978**	**871.812**	**580.497**	**49.527**	**4 688.814**
	12/13	**3 184.102**	**678.516**	**626.868**	**48.251**	**4 537.737**
	13/14	**3 273.394**	**753.102**	**708.876**	**50.253**	**4 785.625**
	14/15	**3 551.971**	**769.509**	**607.771**	**58.830**	**4 988.081**
	15/16	**3 138.124**	**741.725**	**484.743**	**61.348**	**4 425.940**
	16/17	**2 922.502**	**716.663**	**394.915**	**48.245**	**4 082.325**
	17/18	**1 874.816**	**561.487**	**326.847**	**29.842**	**2 792.992**
	18/19	**2 218.620**	**494.297**	**329.306**	**101.541**	**3 143.764**
	19/20	**2 486.880**	**545.122**	**388.194**	**122.325**	**3 542.521**
	20/21	**2 843.159**	**582.285**	**390.203**	**125.265**	**3 940.912**

Quantity of effluent received at the WWTWs (Ml/a):

A six-year history of the total influent received at the Malmesbury-, Moorreesburg- and Darling WWTW is available. The influent received at the Riebeek Valley WWTW is also metered and the recorded flows are available from the time when the new plant was put into operation. The influent received at the other WWTWs is not metered and was therefore calculated as a percentage of the billed metered consumption. The monthly flows and rainfall at the various WWTWs are also summarised in Annexure A. The table below gives an overview of the metered and estimated volume of effluent received at the various WWTWs.

Table C.1.6: Quantity of effluent received at the various WWTWs							
WWTWs	**% of Historic Water Demands**	**20/21**	**Record : Prior (Ml/a)**				
			19/20	**18/19**	**17/18**	**16/17**	**15/16**
Malmesbury	N/A (Metered)	1 932.526	1 764.088	1 494.426	1 423.288	1 590.479	1 706.420
Moorreesburg	N/A (Metered)	400.243	351.586	337.553	330.949	378.334	381.562
Darling	N/A (Metered)	452.898	401.561	383.607	357.313	339.337	307.584
Koringberg	70%	30.112	24.452	22.341	20.961	35.886	38.802
Kalbaskraal	40%	27.759	22.176	23.692	19.165	26.301	27.110
Chatsworth / Riverlands	40%	89.351	63.458	60.466	50.449	65.520	66.377
Riebeek Valley	N/A (Metered)	307.636	273.968	277.396	237.217	275.743	253.164
Total		**3 240.525**	**2 901.289**	**2 599.481**	**2 439.342**	**2 711.600**	**2 781.019**

Note: 15/16 Flow for the new Riebeek Valley WWTW was estimated from Jan. 2016 to June 2016 flow data, when new plant was put into operation.

Quantity of treated effluent returned to the water resource system:

The quantity of effluent treated by industrial consumers on their own premises and re-used by them is not known at this stage. 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 C.1.7: 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)			Consumers	
	20/21	19/20	18/19		
Malmesbury	1 365.802	1 346.115	791.259	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.	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.
Moorreesburg	63.444	105.896	64.790	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	46.757	69.706	24.800	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	16.119	24.196	Unknown	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	**1 492.122**	**1 545.913**	**880.849**		

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).

C.2. Water Services Delivery Profile

The National Norms and Standards for Domestic Water and Sanitation Services, as published in the Government Gazette No.41100 of 8 September 2017, makes provision for the following norms and standards for levels of water supply and sanitation services:

Table C.2.1: Norms and standards for levels of water supply services

Full level of service: People access and pay for more than 90 l/c/d at high pressure.	Interim **Full**	**Full provision**: People access a minimum of 50 l/c/d of SANS241 quality water on demand at the boundary of the yard, metered and tariffed.
Middle level of service: People access and pay for 51-90 l/c/d at medium pressure.	Interim **Upper**	**Upper provision**: People access a maximum of 90 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered and tariffed.
	Interim **Intermediate**	Intermediate provision: People access more than 50 l/c/d but less than 90 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered and tariffed.
Minimum level of service: People access 25-50 l/c/d at low to medium pressure, use of more than 25 l/c/d is paid for.	Interim **Basic Plus**	**Basic Plus provision**: People access more than 25 l/c/d but less than 50 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered and tariffed.
	Interim **Basic**	**Basic provision**: People access a minimum of 25 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered and tariffed.
	Interim **Free Basic**	**Free basic provision**: People access a minimum of 25 l/c/d of SANS241 quality water from an improved source at the boundary of the yard, metered.
	Intermittent	**Intermittent provision**: People access a minimum of 1500 l/household/week of acceptable quality water on a weekly basis within 100m, which is metered.
Bulk service: Source of potable water to be provided to people, which is metered in all circumstances.		
No service / provision = backlog: People access water from insecure or unimproved sources, or sources that are too distant, too time consuming or are of poor quality.		

Interim provision: People access a minimum of 25 l/c/d of acceptable quality water within 24 hours of disruption, normal service to be restored within 7 days.

Table C.2.2: Norms and standards for levels of sanitation services

Hygiene promotion; Prevention of pollution; Re-use / recycle; Operation and Maintenance; Metering and tariffing; Solid Waste Management; Asset Management		
Full level: Full concern for human health, environment and sustainability of interconnected systems.	**Full services**	**In-house facility**: Storm water, wastewater/excreta, greywater, solid waste are collected and managed to achieve maximum benefits from treatment and re-use of water and nutrients.
		In-house facility: Access to a pleasant, safe, reliable and properly maintained facility for 24 hours a day, with control of nutrients in human excreta, wastewater and greywater.
Basic level: Remove excreta from the environment through treatment, pathogen reduction, resource recovery and nutrient reuse.	**Free basic services**	**Toilet with functional hand washing facility in the yard**: Access to a pleasant, safe and reliable facility for 24 hours a day, including privacy, personal safety and shelter through a subsidy for free. Maintenance of the facility is for free and is the responsibility of services provider.
	Basic services	**Toilet with functional hand washing facility in the yard**. Access to a pleasant, safe and reliable facility for 24 hours a day, including privacy, personal safety and shelter through a capital subsidy. Maintenance of the facilities is not for free and is the responsibility of the household / owner.
Interim level: Blocking the spread of faecal-oral diseases through proper excreta containment at a fixed point.	**Excreta containment**	**Household, shared or communal toilets with functional hand washing facilities**: Access to safe, reliable and properly maintained toilet and hand washing facility, free of charge, within 200m of the dwelling, which at a minimum safely contains human excreta. Maintenance is the responsibility of the services provider. To be phased out by 2030.
No service / provision = backlog: People practice open defecation or access an unimproved sanitation facility, such as pit toilets and bucket toilets. To be completely eliminated by 2030.		

Proper disposal, clean platform, vector and rodent control, resource use and health protection.

Emergency level: People access pleasant, safe, reliable and properly maintained improved toilets and hand washing facility on the premises in close proximity to the temporary dwelling within 24 hours and for duration of event.

C.2.1. User Connection Profile

The total number of user connections in each user sector, for the consumers provided with water services by Swartland Municipality, is as follows (June 2021).

Table C.2.1.1: User Connection Profile for Water Services

WSDP Ref. #	Category of users	Water Services						
		Year 0 FY2020/21		Year - 1 FY2019/20		Year - 2 FY2018/19		New Connections Year 0 FY2020/21
		Nr	%	Nr	%	Nr	%	Nr
	RESIDENTIAL (DOMESTIC)							
3.3	Metered: Uncontrolled	20,829	93%	19,910	94%	19,497	93%	919
3.3	Metered: Controlled	0	0%	0	0%	0	0%	0
	Unmetered (Flat rate)	0	0%	0	0%	0	0%	0
	Communal water supply	0	0%	0	0%	1	0%	0
	Sub-Total: Residential	**20,829**	**93%**	**19,910**	**94%**	**19,498**	**93%**	**919**
	EDUCATION							
3.3	Schools	30	0%	30	0%	31	0%	0
	Tertiary educaton facilities	1	0%	1	0%	1	0%	0
	Sub-Total: Education	**31**	**0%**	**31**	**0%**	**32**	**0%**	**0**
	HEALTH							
3.3	Clinics	4	0%	4	0%	4	0%	0
3.3	District Hospitals	1	0%	1	0%	1	0%	0
3.3	Health Centres	1	0%	1	0%	1	0%	0
	Sub-Total: Health	**6**	**0%**	**6**	**0%**	**6**	**0%**	**0**
	INSTITUTIONAL							
	Public Institutions (Est)	25	0%	25	0%	25	0%	0
3.3	Magistrate Offices	2	0%	2	0%	2	0%	0
3.3	Police Stations	5	0%	5	0%	5	0%	0
3.3	Prisons	1	0%	1	0%	1	0%	0
	etc	0	0%	0	0%	0	0%	0
	Sub-Total: Institutional	**33**	**0%**	**33**	**0%**	**33**	**0%**	**0**
	INDUSTRIAL							
3.3	Dry industries (Incl. with Businesses)	0	0%	0	0%	0	0%	0
3.3	Wet industries	9	0%	9	0%	8	0%	0
	Sub-Total: Industrial	**9**	**0%**	**9**	**0%**	**8**	**0%**	**0**
	COMMERCIAL							
3.3	Businesses	827	4%	787	4%	799	4%	40
3.3	Office Buildings (Incl. with Businesses)	0	0%	0	0%	0	0%	0
	Sub-Total: Commercial	**827**	**4%**	**787**	**4%**	**799**	**4%**	**40**
	MINING							
	Mining	0	0%	0	0%	0	0%	0
	Sub-Total: Commercial	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**
	OTHER							
	Agriculture: raw water	0	0%	0	0%	0	0%	0
	etc	635	3%	328	2%	621	3%	307
	Sub-Total: Other	**635**	**3%**	**328**	**2%**	**621**	**3%**	**307**
	TOTAL	**22,370**	**100%**	**21,104**	**100%**	**20,997**	**100%**	**1,266**

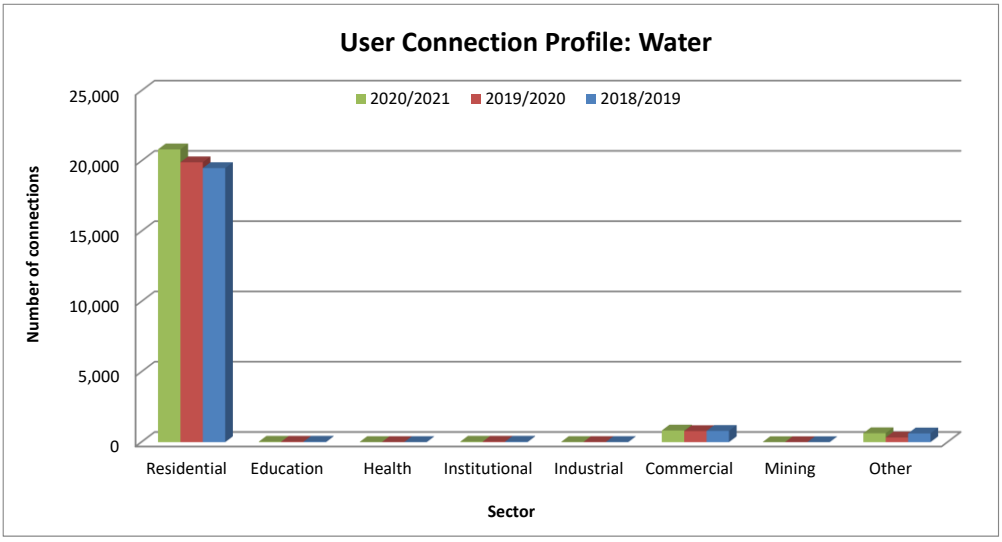


Figure C.2.1.1: User connection profile for water

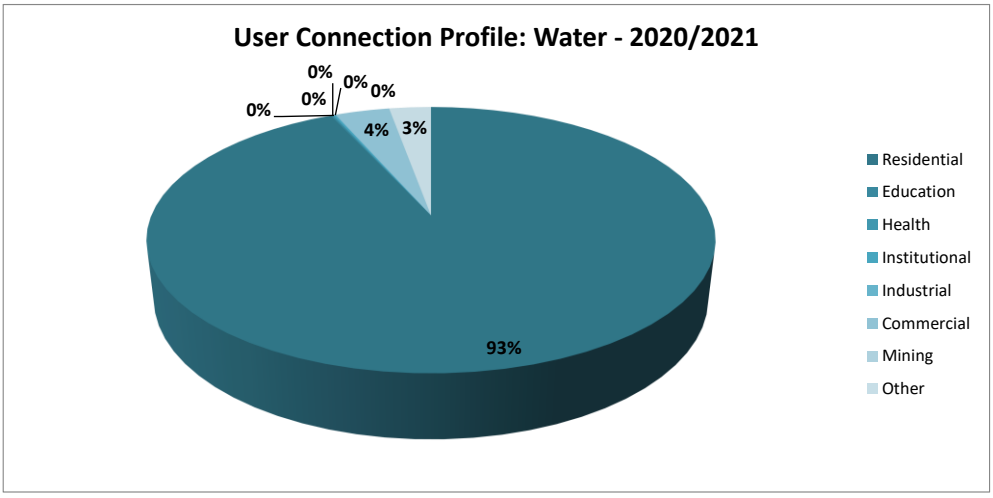


Figure C.2.1.2: User connection distribution for water – Year 2020/2021

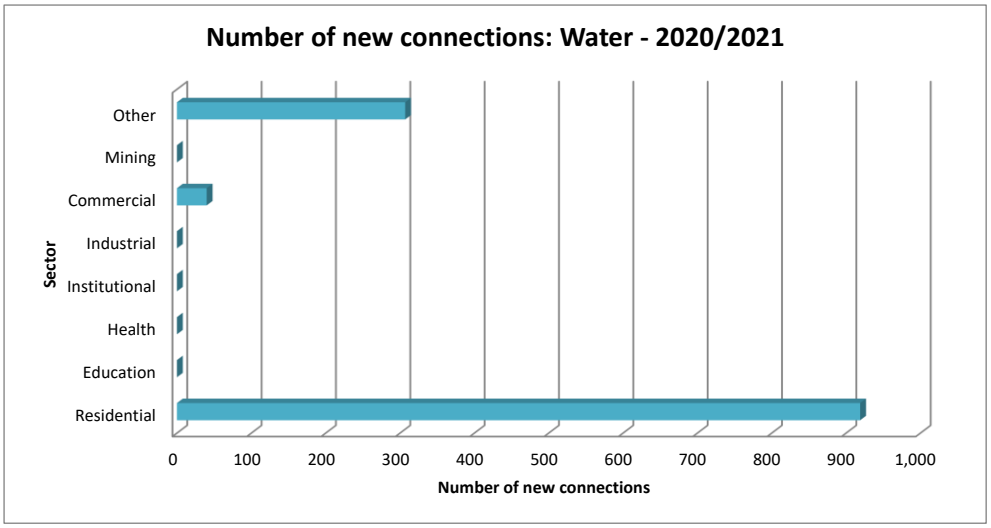


Figure C.2.1.3: Number of new water connections provided during 2020/2021

Table C.2.1.2: User Connection Profile for Wastewater Services								
WSDP Ref. #	Category of users	Wastewater Services						
		Year 0 FY2020/21		Year - 1 FY2019/20		Year - 2 FY2018/19		New Connections Year 0 FY2020/21
		Nr	%	Nr	%	Nr	%	Nr
	RESIDENTIAL (DOMESTIC)							
3.3	Metered: Uncontrolled	20,829	93%	19,910	94%	19,497	93%	919
3.3	Metered: Controlled	0	0%	0	0%	0	0%	0
	Unmetered (Flat rate)	0	0%	0	0%	0	0%	0
	Communal water supply	0	0%	0	0%	1	0%	0
	Sub-Total: Residential	**20,829**	**93%**	**19,910**	**94%**	**19,498**	**93%**	**919**
	EDUCATION							
3.3	Schools	30	0%	30	0%	31	0%	0
	Tertiary educaton facilities	1	0%	1	0%	1	0%	0
	Sub-Total: Education	**31**	**0%**	**31**	**0%**	**32**	**0%**	**0**
	HEALTH							
3.3	Clinics	4	0%	4	0%	4	0%	0
3.3	District Hospitals	1	0%	1	0%	1	0%	0
3.3	Health Centres	1	0%	1	0%	1	0%	0
	Sub-Total: Health	**6**	**0%**	**6**	**0%**	**6**	**0%**	**0**
	INSTITUTIONAL							
	Public Institutions (Est)	25	0%	25	0%	25	0%	0
3.3	Magistrate Offices	2	0%	2	0%	2	0%	0
3.3	Police Stations	5	0%	5	0%	5	0%	0
3.3	Prisons	1	0%	1	0%	1	0%	0
	etc	0	0%	0	0%	0	0%	0
	Sub-Total: Institutional	**33**	**0%**	**33**	**0%**	**33**	**0%**	**0**
	INDUSTRIAL							
3.3	Dry industries (Incl. with Businesses)	0	0%	0	0%	0	0%	0
3.3	Wet industries	9	0%	9	0%	8	0%	0
	Sub-Total: Industrial	**9**	**0%**	**9**	**0%**	**8**	**0%**	**0**
	COMMERCIAL							
3.3	Businesses	827	4%	787	4%	799	4%	40
3.3	Office Buildings (Incl. with Businesses)	0	0%	0	0%	0	0%	0
	Sub-Total: Commercial	**827**	**4%**	**787**	**4%**	**799**	**4%**	**40**
	MINING							
	Mining	0	0%	0	0%	0	0%	0
	Sub-Total: Commercial	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**
	OTHER							
	Agriculture: raw water	0	0%	0	0%	0	0%	0
	etc	635	3%	328	2%	621	3%	307
	Sub-Total: Other	**635**	**3%**	**328**	**2%**	**621**	**3%**	**307**
	TOTAL	**22,370**	**100%**	**21,104**	**100%**	**20,997**	**100%**	**1,266**

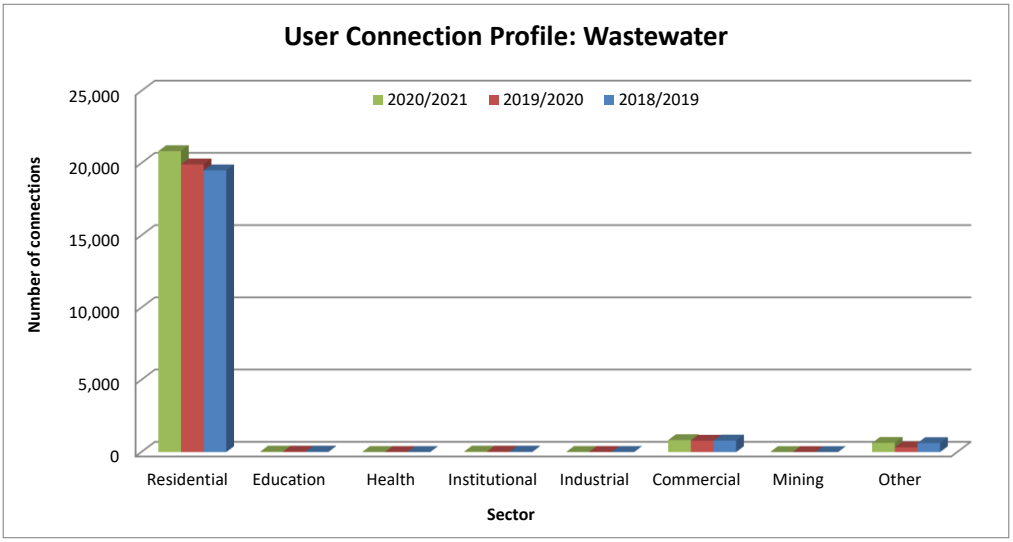


Figure C.2.1.4: User connection profile for wastewater

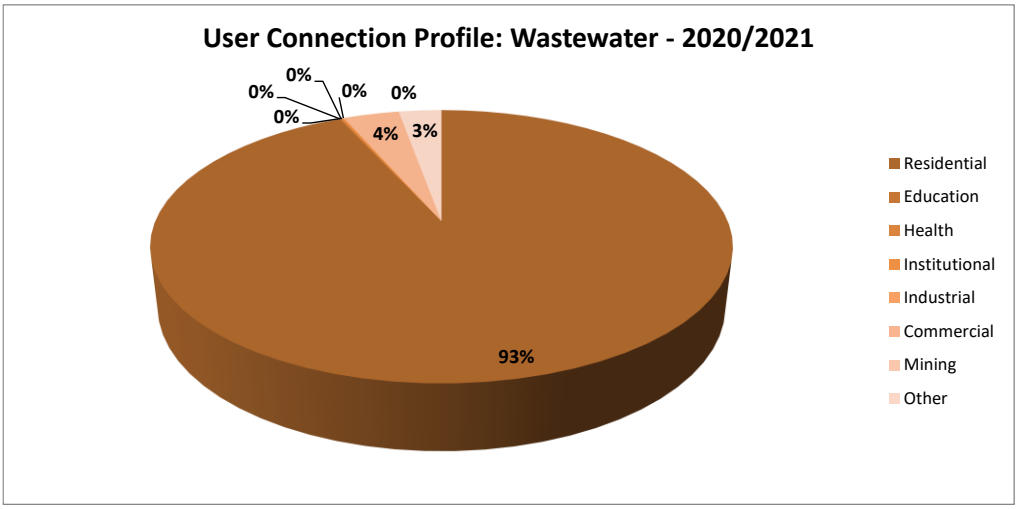


Figure C.2.1.5: User connection distribution for wastewater – Year 2020/2021

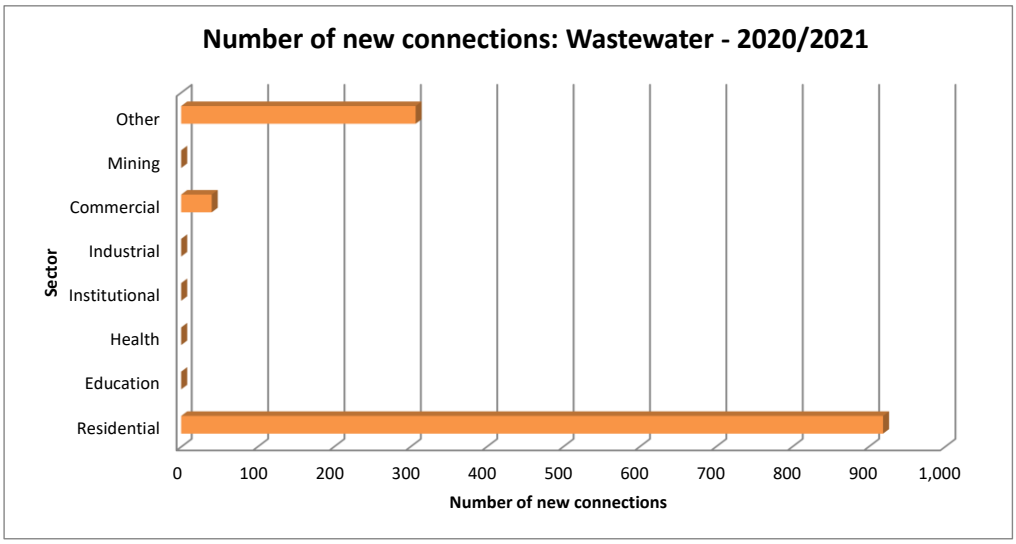


Figure C.2.1.6: Number of new wastewater connections provided during 2020/2021

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

Table C.2.1.3: Number of user connections in each user sector

Distribution System	20/21			19/20			18/19			17/18		
	Res	Bus	Other	Res	Bus	Other	Res	Bus	Other	Res	Bus	Other
Koringberg	332	11	8	329	11	7	328	10	8	315	10	8
Ongegund	88	2	19	86	1	7	84	2	19	82	2	15
Riebeek Wes	966	50	33	896	47	30	713	47	33	702	44	31
Riebeek Kasteel	1 564	38	29	1 126	39	24	1 118	38	28	1 098	33	27
Yzerfontein	1 590	24	36	1 528	23	26	1 474	22	32	1 384	22	29
Darling	2 503	112	46	2 495	107	34	2 477	113	48	2 450	107	45
Moorreesburg	2 876	192	58	2 842	184	47	2 824	190	63	2 797	184	55
Malmesbury	7 908	400	420	7 767	377	181	7 695	379	413	7 473	369	361
Abbotsdale	1 118	0	13	1 111	0	11	1 096	0	13	1 074	0	13
Kalbaskraal	589	5	16	461	5	13	457	4	13	447	4	11
Riverlands	330	1	10	327	1	5	325	1	7	323	1	7
Chatsworth	965	1	17	942	1	13	906	1	15	845	1	18
TOTALS	**20 829**	**836**	**705**	**19 910**	**796**	**398**	**19 497**	**807**	**692**	**18 990**	**777**	**620**

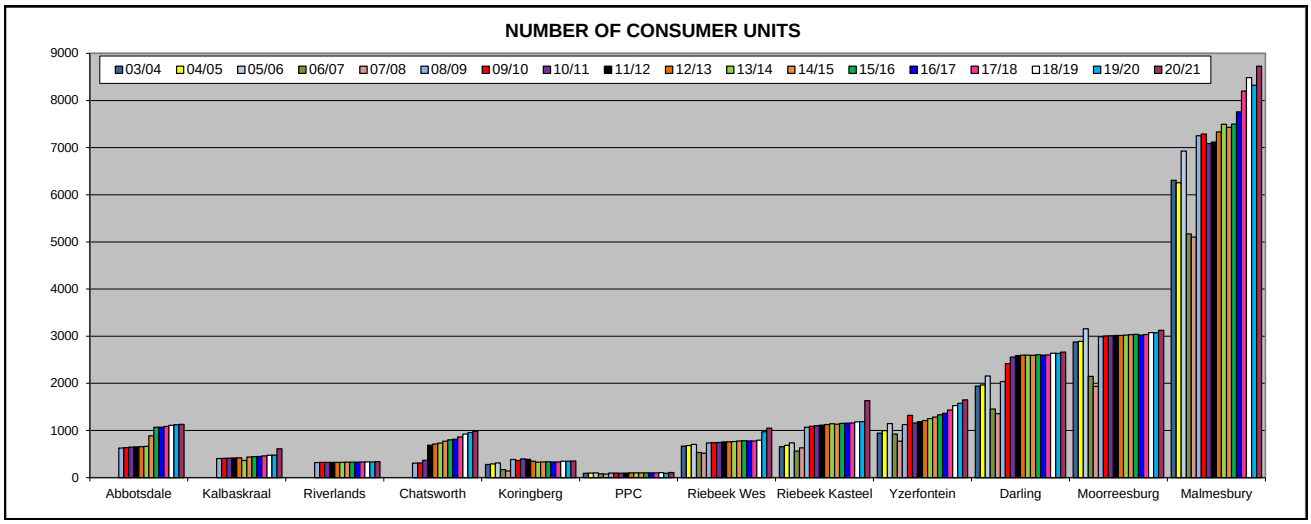


Figure C.2.1.7: Number of consumer units per distribution system

Table C.2.1.4: Total number of consumer units per town and percentage growth from 2011/2012 to 2020/2021

Distribution System	Annual Growth % 11/12 – 20/21	20/21	19/20	18/19	17/18	16/17	15/16	14/15	13/14	12/13	11/12
Koringberg	-1.16%	351	347	346	333	333	335	332	328	346	390
Ongegund	1.42%	109	94	105	99	100	102	101	100	99	96
Riebeek Wes	3.69%	1 049	973	793	777	779	783	777	766	761	757
Riebeek Kasteel	4.34%	1 631	1 189	1 184	1 158	1 154	1 151	1 136	1 141	1 125	1 113
Yzerfontein	3.75%	1 650	1 577	1 528	1 435	1 366	1 330	1 283	1 251	1 211	1 185
Darling	0.31%	2 661	2 636	2 638	2 602	2 598	2 607	2 596	2 598	2 598	2 589
Moorreesburg	0.41%	3 126	3 073	3 077	3 036	3 024	3 040	3 029	3 023	3 017	3 014
Malmesbury	2.29%	8 728	8 325	8 487	8 203	7 760	7 500	7 431	7 495	7 336	7 120
Abbotsdale	6.31%	1 131	1 122	1 109	1 087	1 069	1 071	889	663	656	652
Kalbaskraal	4.37%	610	479	474	462	450	446	436	365	421	415
Riverlands	0.64%	341	333	333	331	328	329	327	322	321	322
Chatsworth	4.03%	983	956	922	864	812	802	775	733	714	689
TOTALS	**2.23%**	**22 370**	**21 104**	**20 996**	**20 387**	**19 773**	**19 496**	**19 112**	**18 785**	**18 605**	**18 342**

The number of new water and sanitation connection made:

The financial system indicated that the residential consumers increased by 919 consumers for the 2020/2021 financial year. The "Business" and "Other" consumers increased by 347 consumers, as also indicated in Tables C.2.1.1, C.2.1.2 and C.2.1.3. The stats from the Engineering Department indicated that 195 new water connections and 26 new sewer connections were installed during the 2020/2021 financial year.

C.2.2. Residential Water Services Delivery Access Profile

The table below gives an overview of the water services delivery access profile of Swartland Municipality.

Table C.2.2.1: Residential Water Services Delivery Access Profile: Water

Census Category	Description	Year 0 FY2020/21		Year - 1 FY2019/20		Year - 2 FY2018/19	
		Nr	%	Nr	%	Nr	%
	WATER (ABOVE MIN LEVEL)						
Piped (tap) water inside dwelling/institution	House connections	28,861	66%	27,603	66%	26,861	67%
Piped (tap) water inside yard	Yard connections	13,415	31%	12,741	31%	12,091	30%
Piped (tap) water on community stand: distance less than 200m from dwelling/institution	Standpipe connection < 200 m	335	1%	595	1%	335	1%
	Sub-Total: Minimum Serivce Level and Above	**42,611**	**98%**	**40,939**	**98%**	**39,287**	**99%**
	WATER (BELOW MIN LEVEL)						
Piped (tap) water on community stand: distance between 200m and 500m from dwelling/institution	Standpipe connection: > 200 m < 500 m	61	0%	61	0%	61	0%
Piped (tap) water on community stand: distance between 500m and 1000m (1km) from dwelling /institution	Standpipe connection: > 500 m < 1 000 m	18	0%	18	0%	18	0%
Piped (tap) water on community stand: distance greater than 1000m (1km) from dwelling/institution	Standpipe connection: > 1 000 m	3	0%	3	0%	3	0%
No access to piped (tap) water	No services	775	2%	701	2%	475	1%
	Sub-Total: Below Minimum Service Level	**857**	**2%**	**783**	**2%**	**557**	**1%**
	Total number of households	**43,468**	**100%**	**41,722**	**100%**	**39,844**	**100%**

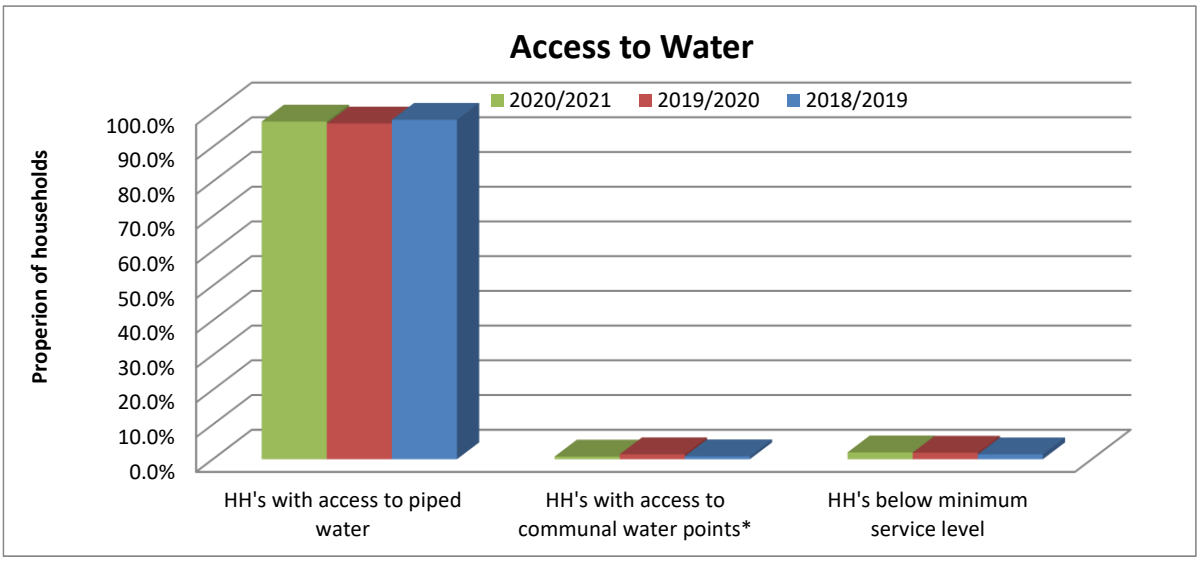


Figure C.2.2.1: Household water access profile

The existing water service levels in Swartland Municipality's Management Area are estimated as follows:

Table C.2.2.2: Residential water service levels (Consumer Units)													
Service Level	**Malmes-bury**	**Abbotsdale**	**Riverlands**	**Chatsworth**	**Kalbas-kraal**	**Riebeek Kasteel**	**Riebeek Wes**	**Darling**	**Moorrees-burg**	**Koringberg**	**Yzerfon-tein**	**Farms**	**Total**
No Water Services	0	0	0	0	0	0	0	0	0	0	0	75 [2)]	**75**
Below RDP: Infrastructure Upgrade	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: Infrastructure Extension	0	0	0	0	0	0	0	0	0	0	0	82 [3)]	**82**
Below RDP: Infrastructure Refurbishment	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: O&M Needs	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: Water Resource Needs	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**
Below RDP: Infrastructure, O&M and Water Resource Needs	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**	**157**	**157**
Below Housing Interim [4)]	0	0	0	700	0	0	0	0	0	0	0	0	**700**
Adequate Housing Permanent [5)]	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total Housing Need	**0**	**0**	**0**	**700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**700**
Standpipes	0	0	0	0	0	0	0	0	0	0	0	335	**335**
Yard Connections [6)]	6 170	88	30	40	433	909	877	843	2 387	119	0	1 519	**13 415**
House Connections [1)]	7 908	1 118	330	965	589	1 564	1 054	2 503	2 876	332	1 590	8 032	**28 861**
Total Adequate	**14 078**	**1 206**	**360**	**1 005**	**1 022**	**2 473**	**1 931**	**3 346**	**5 263**	**451**	**1 590**	**9 886**	**42 611**
Total per Area	**14 078**	**1 206**	**360**	**1 705**	**1 022**	**2 473**	**1 931**	**3 346**	**5 263**	**451**	**1 590**	**10 043**	**43 468**

Notes:
1) Number of residential consumer units for the various towns for 2020/2021, 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 (2020/2021) – Number of residential consumers units (2020/2021) = Estimated number of backyard dwellers.

The table below gives an overview of the sanitation services delivery access profile of Swartland Municipality.

Table C.2.2.3: Residential Water Services Delivery Access Profile: Sanitation

Census Category	Description	Year 0 FY2020/21		Year - 1 FY2019/20		Year - 2 FY2018/19	
		Nr	%	Nr	%	Nr	%
	SANITATION (ABOVE MIN LEVEL)						
Flush toilet (connected to sewerage system)	Waterborne	30,516	70%	29,059	70%	28,086	70%
	Waterborne: Low Flush	0	0%	0	0%	0	0%
Flush toilet (with septic tank)	Septic tanks / Conservancy	10,396	24%	9,921	24%	9,502	24%
Chemical toilet	Non-waterborne (above min. service level)	54	0%	54	0%	54	0%
Pit toilet with ventilation (VIP)		211	0%	211	1%	211	1%
Other / Communal Services		0	0%	260	1%	0	0%
	Sub-Total: Minimum Serivce Level and Above	**41,177**	**95%**	**39,505**	**95%**	**37,853**	**95%**
	SANITATION (BELOW MIN LEVEL)						
Pit toilet without ventilation	Pit toilet	401	1%	401	1%	401	1%
Bucket toilet	Bucket toilet	303	1%	303	1%	303	1%
Other toilet provision (below min. service level	Other	380	1%	380	1%	380	1%
No toilet provisions	No services	1,207	3%	1,133	3%	907	2%
	Sub-Total: Below Minimum Service Level	**2,291**	**5%**	**2,217**	**5%**	**1,991**	**5%**
	Total number of households	**43,468**	**100%**	**41,722**	**100%**	**39,844**	**100%**

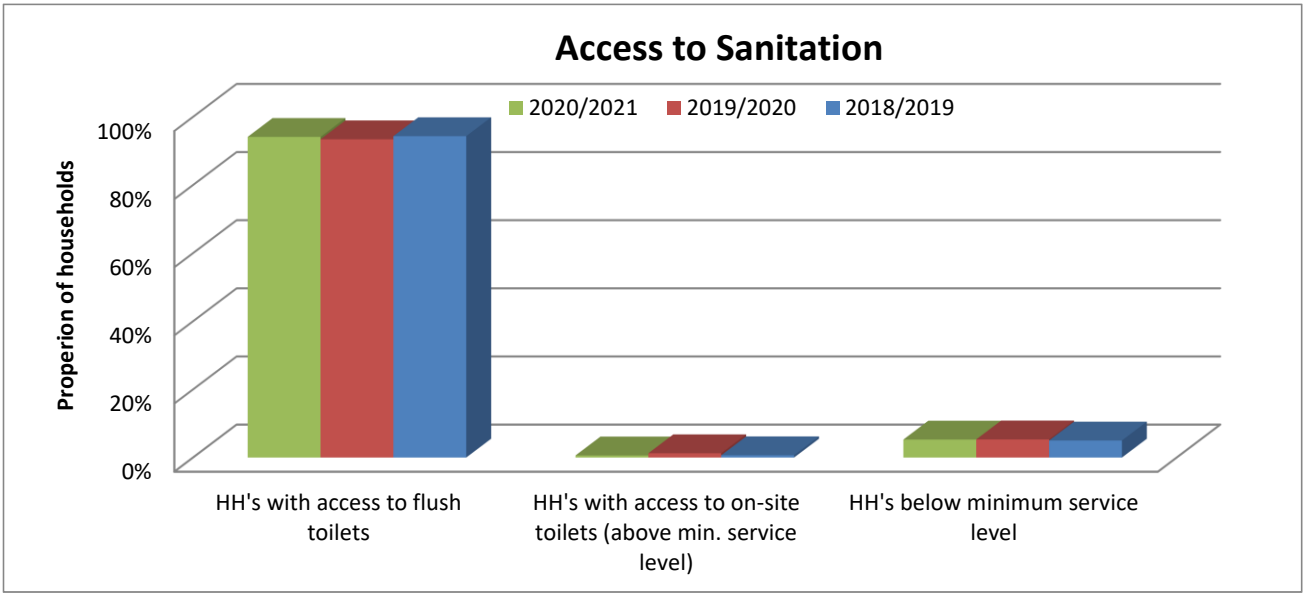


Figure C.2.2.2: Household sanitation access profile

The existing sanitation service levels in Swartland Municipality's Management Area are estimated as follows:

Table C2.2.4: Residential sanitation service levels (Consumer Units)													
Service Levels	**Malmes-bury**	**Abbots-dale**	**River-lands**	**Chats-worth**	**Kalbas-kraal**	**Riebeek Kasteel**	**Riebeek Wes**	**Darling**	**Moorrees-burg**	**Koring-berg**	**Yzerfon-tein**	**Farms**	**Total**
No Sanitation Services	0	0	0	0	0	0	0	0	0	0	0	507 [3]	**507**
Below RDP: Infrastructure Upgrade	0	0	0	0	0	0	0	0	0	0	0	1 138 [4]	**1 138**
Below RDP: Infrastructure Extension	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: Infrastructure Refurbishment	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: O&M Needs	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Below RDP: Water Resource Needs	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**
Below RDP: Infrastructure, O&M and Water Resource Needs	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**	**1 645**	**1 645**
Below Housing Interim [6]	0	0	0	700	0	0	0	0	0	0	0	0	**700**
Adequate Housing Permanent [7]	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total Housing Need	**0**	**0**	**0**	**700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**700**
Non Waterborne	0	0	0	0	0	0	0	0	0	0	0	211 [5]	**211**
Waterborne Low Flush	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Septic Tanks / Conservancy [1]	10	5	3	123	111	46	141	29	76	75	1 590	8 187	**10 396**
Waterborne WWTW [2]	14 068	1 201	357	882	911	2 427	1 790	3 317	5 187	376	0	0	**30 516**
Total Adequate	**14 078**	**1 206**	**360**	**1 005**	**1 022**	**2 473**	**1 931**	**3 346**	**5 263**	**451**	**1 590**	**8 398**	**41 123**
Total per Area	**14 078**	**1 206**	**360**	**1 705**	**1 022**	**2 473**	**1 931**	**3 346**	**5 263**	**451**	**1 590**	**10 043**	**43 468**

Notes:
1) The number of tanks per town was calculated from the total number of tanks pumped during 2020/2021 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 informal households 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.

Number of households provided with water through communal water services:

The National Norms and Standards for Domestic Water and Sanitation Services, as published in the Government Gazette No.41100 of 8 September 2017, include the following interim water and sanitation services:

Table C.2.2.5: Interim water and sanitation services (National Norms and Standards for Domestic Water and Sanitation Services)
Intermittent provision of water at a minimum level of water supply services
• A minimum volume of 1 500 litres of potable water shall be made available to a household per week. • The water provided shall comply with the SANS241 quality standards. • The access/delivery point shall be at a minimum a communal standpipe, or a storage facility in the yard (water container, yard tank, roof tank) of at least a volume of 1 500 litres. • In the case of a communal standpipe, it shall be within a reasonable walking distance of no more than 100m from the farthest household. • In the case of a storage facility in the yard (water container, yard tank, roof tank), it shall be refilled by a water tanker with potable water at least once a week. • The water shall be made available for 52 weeks per year. • All water use and/or supply shall be metered, but not tariffed. • Maintenance of the infrastructure for this level of service is the responsibility of the WSA. • Point-of-use water treatment systems and methods shall be advocated. • Efforts shall be made to ensure user acceptance and understanding for this level of service. • Users shall be educated in effective water use and hygiene. • This level of service shall be phased out by 2030 to comply with the National Development Plan's requirement of providing a basic service of at least a yard connection for water.
Interim sanitation services (Communal and shared facilities)

• Users shall be consulted on the siting and design, and the responsible cleaning and maintenance of shared toilets. Clean toilets are more likely to be frequently used.
• Plumbing in and for communal and shared facilities needs to be more robust than that installed on private premises and shall comply with the general principles of the National Building Regulations. Precautions need to be taken in the design against vandalism, theft and misuse.
• Efforts shall be made to provide people living with chronic illnesses, such as HIV and AIDS, with easy access to a toilet as they frequently suffer from chronic diarrhoea and reduced mobility.
• Where possible, communal and shared toilets must be provided with lighting, or users provided with torches. The input of the users must be sought with regard to ways of enhancing the safety of users.
• Efforts to build a sense of communal ownership and pride of possession shall be made so that cooperation is voluntarily given or assured by peer pressure.
• Sufficient sanitation facilities shall be provided for the number of users
  ➢ Communal toilet: Toilet seats – 1 seat per 50 users; Urinal units – 1 unit per 100 users; Hand washing – 1 basin per 10 toilet seats.
  ➢ Shared toilet mostly used all the time: Toilet seats – 1 seat per 20 users; Urinal units – 1 unit per 50 users; Hand washing – 1 basin per 4 toilet seats.
• Shared and communal facilities shall have separate toilet blocks for men and women with separate entries; waste bins with lids in toilet block for women – emptied once a week and disposed of appropriately; urinal facilities for men; seats for children in the section for women; waiting / circulating area; separate washing cubicles for men and women; facility to store large volumes of water (water-borne sanitation); appropriate wastewater disposal system; and store room for keeping the cleaning material / equipment.

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.

The only other areas where communal water services are in use is on some of the farms in the rural areas. Swartland Municipality is committed to work with the private landowners to ensure that at least basic water and sanitation services are provided to those households in the rural areas with existing services still below RDP standard.

The existing water and sanitation service levels for all the schools in the Swartland Municipality Management Area is summarised in the table below.

Table C.2.2.6: Service Levels at Schools

Associated Services Facility	Number of Facilities	Water			Sanitation		
		Facilities with Adequate Services	Facilities with no Services	Facilities with inadequate Services	Facilities with Adequate Services	Facilities with no Services	Facilities with inadequate Services
Schools	30	30	0	0	30	0	0

Source for number of facilities: Socio Economic Profile Swartland Municipality, Western Cape Government, 2020

The existing water and sanitation service levels for all the Medical Facilities in Swartland Municipality's Management Area are summarised in the table below.

Table C.2.2.7: Service Levels at Medical Facilities

Associated Services Facility	Number of Facilities	Water			Sanitation		
		Facilities with Adequate Services	Facilities with no Services	Facilities with inadequate Services	Facilities with Adequate Services	Facilities with no Services	Facilities with inadequate Services
Hospitals (District)	1	1	0	0	1	0	0
Health Centres	1	1	0	0	1	0	0
Fixed Clinics	4	4	0	0	4	0	0
Mobile/Satellite Clinics	9	9	0	0	9	0	0

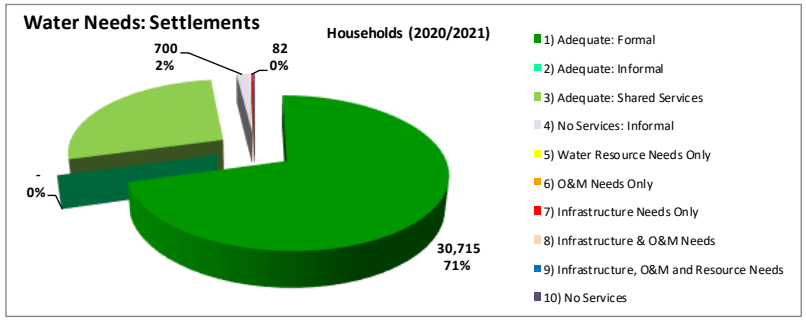
Source for number of facilities: Socio Economic Profile Swartland Municipality, Western Cape Government, 2020

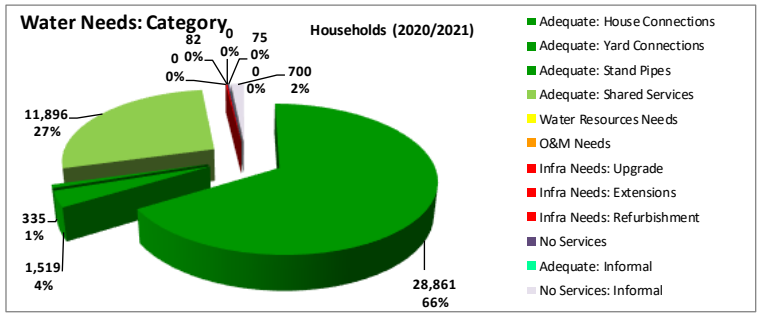
C.2.3. Residential Water Services Delivery Adequacy Profile

The existing residential water service levels in Swartland Municipality's Management Area are estimated as follows:

Table C.2.3.1: Residential Water Services Ddelivery Adequacy Profile (Water)

Water Categorisation	Number of settlements	FORMAL																				INFORMAL			
		Adequate								Water Resource needs		O & M Needs		Infrastructure Needs						No services		Adequate		No services	
		House Connections		Yard Connections		Stand Pipes		Shared Services						Upgrades		Extensions		Refurbishment							
		HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%
1	37	28,861	100%	1,519	100%	335	100%																		
2	1																								
3	10							11,896	100%																
4	1																							700	100%
5	0																								
6	0																								
7	3															82	100%								
8	0																								
9	0																								
10	3																			75	100%				
Total Household Interventions required		28,861		1,519		335		11,896		0		0		0		82		0		75		0		700	



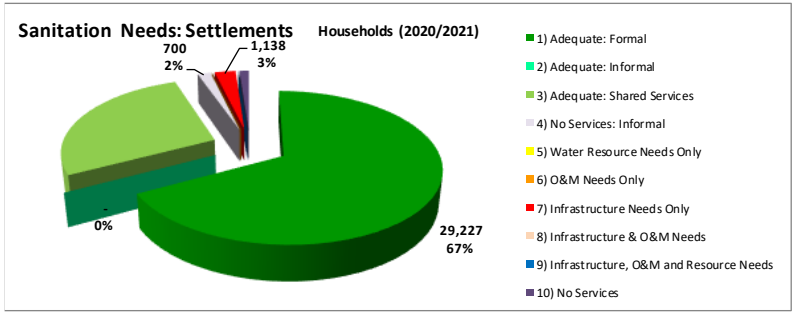


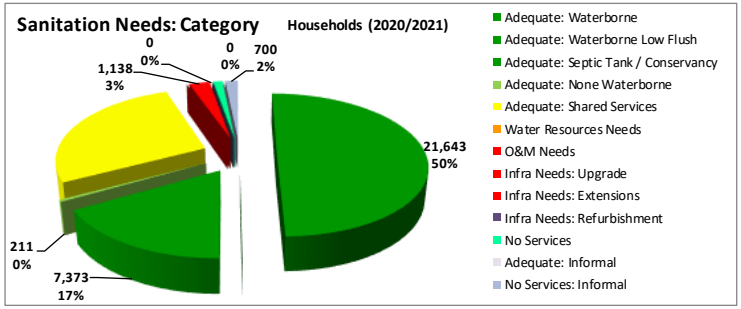
1	Adequate	3	Adequate: Shared services	5	Water Resources Needs **Only**	7	Infrastructure Needs **Only**	9	Infrastructure, O&M & Resource Needs
2	Adequate: Informal	4	No Services: Informal	6	O & M Needs **Only**	8	Infrastructure& O&M needs	10	No Services

The existing residential sanitation service levels in Swartland Municipality's Management Area are estimated as follows:

Table C.2.3.2: Residential Water Services Delivery Adequacy Profile (Sanitation)

Water Categorisation	Number of settlements	FORMAL																				INFORMAL			
		Adequate										Water Resource needs		O & M Needs		Infrastructure Needs						No services		Adequate		No services	
		Waterborne		Waterborne Low flush		Septic Tank/ Conservancy		None Waterborne		Shared Services						Upgrades		Extensions		Refurbishment							
		HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%
1	37	21,643	100%			7,373	100%	211	100%																		
2	1																										
3	10									11,896	100%																
4	1																									700	100%
5	0																										
6	0																										
7	3															1,138	100%										
8	0																										
9	0																										
10	3																					507	100%				
Total Household Interventions required		21,643		0		7,373		211		11,896		0		0		1,138		0		0		507		0		700	





1	Adequate	3	Adequate: Shared services	5	Water Resources Needs **Only**	7	Infrastructure Needs **Only**	9	Infrastructure, O&M & Resource Needs
2	Adequate: Informal	4	No Services: Informal	6	O & M Needs **Only**	8	Infrastructure& O&M needs	10	No Services

C.3. Cost Recovery and Free Basic Services

C.3.1. Tariffs

The water tariff structures for Swartland Municipality for the 2020/2021 financial year and the previous five financial years are summarised in the table below (Subject to 15% VAT).

Table C.3.1: Water tariffs for 2020/2021 and the previous five financial years

Consumer/Description	Category	20/21	19/20	18/19	17/18	16/17	15/16
All	Availability Fees per month	R91-69	R91-69	R86-50	R75-47	R67-38	R61-26
Residential Consumers	Water network charge	R64-87	R64-87	R86-50	No Basic		
	0 – 4 Kl	R5-03	R5-03	R5-04	R4-50	R0-00	R0-00
	5 Kl			R14-09	R12-58	R11-23	
	6 Kl						R10-21
	7 – 10 Kl	R8-64	R8-64				
	11 – 15 Kl	R16-54	R15-77	R14-60			
	16 – 20 Kl	R20-97	R19-99	R15-10			
	21 – 25 Kl	R31-09	R29-64	R27-44			
	26 – 30 Kl	R64-78	R61-75	R57-18	R17-32	R15-46	
	31 – 35 Kl						R14-06
	36 – 50 Kl	R89-40	R85-22				
	51 – 60 Kl			R78-91	R26-81	R23-94	
	61 kl and above						R21-77
Indigent Households	Water network charge	R64-87	R64-87	R86-50	No Basic		
	Free Water 6 Kl (6 Kl EQS)	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00
	7 Kl	R8-64	R8-64	R14-09	R12-58		
	Free Water 8 Kl (2 Kl council + 6 Kl EQS)						
	Free Water 9 Kl (3 Kl council + 6 Kl EQS)					R11-23	
	10 Kl						R10-21
	11 – 15 Kl	R16-72	R15-77	R14-60			
	16 – 20 Kl	R21-19	R19-99	R15-10			
	21 – 25 Kl	R31-41	R29-64	R27-44			
	26 – 30 Kl	R65-46	R61-75	R57-18	R17-32	R15.46	
	31 – 35 Kl						R14-06
	36 – 50 Kl	R90-34	R85-22				
	51 – 60 Kl			R78-91	R26-81	R23-94	
	61 kl and above						R21-77
Any other Institution No fix minimum (Basic)	From 1 kl and above – R/Tariff per Kl	-	-	-	R17-86	R15-95	R14-51
Agricultural (Residential)	Water network charge	R64-87	R64-87	R86-50	No Basic		
	0 – 4 Kl	R5-03	R5-03	R5-04	R4-50	R0-00	R0-00
	5 Kl			R14-09	R12-58	R11-23	
	6 Kl						R10-21
	7 - 10 Kl	R8-64	R8-64				
	11 – 15 Kl	R16-54	R15-77	R14-60			
	16 – 20Kl	R20-97	R19-99	R15-10			
	21 – 25 Kl	R31-09	R29-64	R27-44			
	26 – 30 Kl	R64-78	R61-75	R57-18	R17-32	R15-46	
	31 – 35 Kl						R14-06
	36 – 50 Kl	R89-40	R85-22				

Table C.3.1: Water tariffs for 2020/2021 and the previous five financial years							
Consumer/Description	**Category**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**	**15/16**
	51 – 60 Kl			R78-91	R26-81	R23-94	
	61 kl and above						R21-77
Farms (Businesses)	From first Kl	-	-	-	R17-86	R15-95	R14-51
Business / Commercial / Industrial / etc.	Water network charge	R110-00	R110-00	R86-50	No Basic		
	Per Kl	R21-60	R21-60	R20-00	-	-	-
Water: Agricultural Business	Water network charge	R110-00	R110-00	R86-50	No Basic		
	Per Kl	R21-60	R21-60	R20-00	R17-86	R15-95	R14-51
Schools, Government Institutions	Water network charge	R68-05	R64-87	R86-50	No Basic		
	Per Kl	R24-02	R22-90	R21-20	-	-	-
Sport Clubs	Water network charge	R64-87	R64-87	R86-50	No Basic		
	Per Kl	R22-90	R22-90	R21-20	R15-11	R13-49	R12-27
Municipality (Departmental)	Per Kl	R6-46	R8-64	R14-09	R12-58	R11-23	R10-21
Spice Route and Country Fair	From first Kl	-	-	-	R17-86	R15-95	R14-51
Raw Water (Untreated) to Anne Pienaar Primary School	From first Kl	R4-08	R3-81	R3-56	R3-34	R3-11	R2-73
5% Increase in Tariffs Residential and Agricultural Residential	Water network charge	R64-87	R64-87	R86-50	No Basic		
	0 – 4 Kl	R5-28	R5-28	R5-29	R4-73	R0-00	R0-00
	5 Kl			R14-79	R13-21	R11-79	
	6 Kl						R10-72
	7 - 10 Kl	R9-07	R9-07				
	11 – 15 Kl	R17-37	R16-56	R15-33			
	16 – 20 Kl	R22-02	R20-99	R15-86			
	21 – 25 Kl	R32-64	R31-12	R28-81			
	26 – 30 Kl	R68-02	R64-84	R60-04	R18-19	R16-23	
	31 – 35 Kl						R14-76
	36 – 50 Kl	R93-87	R89-48				
	51 – 60 Kl			R82-86	R28-15	R25-14	
	Above 60 Kl						R22-86
5% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural	Water network charge	R110-00	R110-00	R86-50	No Basic		
	From first Kl	R22-68	R22-68	R21-00	R18-75	R16-75	R15-24
5% Increase in Tariffs Schools and Government Institutions	Water network charge	R68-05	R64-87	R86-50	No Basic		
	From first Kl	R25-22	R24-05	R22-26	-	-	-
5% Increase in Tariffs Sport Clubs	Water network charge	R64-87	R64-87	R86-50	No Basic		
	From first Kl	R24-05	R24-05	R22-26	-	-	-
10% Increase in Tariffs Residential and Agricultural Residential (Level 1)	Water network charge	R64-87	R64-87	R86-50	No Basic		
	0 – 4 Kl	R5-53	R5-53	R5-54	R4-95	R0-00	R0-00
	5 Kl			R15-50	R13-84	R12-35	
	6 Kl						R11-23
	7 - 10 Kl	R9-50	R9-50				
	11 – 15 Kl	R18-19	R17-35	R16-06			
	16 – 20 Kl	R23-07	R21-99	R16-61			
	21 – 25 Kl	R34-20	R32-60	R30-18			
	26 – 30 Kl	R71-26	R67-93	R62-90	R19-05	R17-01	
	31 – 35 Kl						R15-47
	36 – 50 Kl	R98-34	R93-74				
	51 – 60 Kl			R86-80	R29-49	R26-33	
	Above 60 Kl						R23-95
10% Increase in Tariffs	Water network charge	R110-00	R110-00	R86-50	No Basic		

Table C.3.1: Water tariffs for 2020/2021 and the previous five financial years							
Consumer/Description	**Category**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**	**15/16**
Businesses / Commercial / Industrial / Business Agricultural (Level 1)	From first Kl	R23-76	R23-76	R22-00	R19-65	R17-55	R15-96
10% Increase in Tariffs Schools and Government Institutions (Level 1)	Water network charge	R68-05	R64-87	R86-50	No Basic		
	From first Kl	R26-42	R25-19	R23-32	-	-	-
10% Increase in Tariffs Sport Clubs (Level 1)	Water network charge	R64-87	R64-87	R86-50	No Basic		
	From first Kl	R25-19	R25-19	R23-32	-	-	-
15% Increase in Tariffs Residential and Agricultural Residential (Level 1B)	Water network charge	R64-87	R64-87	R86-50	No Basic		
	0 – 4 Kl	R6-07	R5-78	R5-80	R5-18	R0-00	R0-00
	5 Kl			R16-20	R14-47	R12-91	
	6 Kl						R11-74
	7 - 10 Kl	R10-42	R9-94				
	11 – 15 Kl	R19-02	R18-14	R16-79			
	16 – 20 Kl	R24-12	R22-99	R17-37			
	21 – 25 Kl	R35-75	R34-09	R31-56			
	26 – 30 Kl	R74-50	R71-01	R65-76	R19-92	R17-78	
	31 – 35 Kl						R16-17
	36 – 50 Kl	R102-81	R98-00				
	51 – 60 Kl			R90-75	R30-83	R27-53	
	Above 60 Kl						R25-04
15% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 1B)	Water network charge	R110-00	R110-00	R86-50	No Basic		
	From first Kl	R26-06	R24-84	R23-00	R20-54	R18-34	R16-69
15% Increase in Tariffs Schools and Government Institutions (Level 1B)	Water network charge	R68-05	R64-87	R86-50	No Basic		
	From first Kl	R27-62	R26-34	R24-38	-	-	-
15% Increase in Tariffs Sport Clubs (Level 1B)	Water network charge	R64-87	R64-87	R86-50	No Basic		
	From first Kl	R27-63	R26-34	R24-38	-	-	-
20% Increase in Tariffs Residential and Agricultural Residential (Level 2)	Water network charge	R64-87	R64-87	R86-50	No Basic		
	0 – 4 Kl	R6-33	R6-04	R6-05	R5-40	R0-00	R0-00
	5 Kl	R10-88	R10-37	R16-91	R15-10	R13-48	
	6 Kl						R12-25
	7 - 10 Kl						
	11 – 15 Kl	R19-85	R18-92	R17-52			
	16 – 20 Kl	R25-16	R23-99	R18-12			
	21 – 25 Kl	R37-31	R35-57	R32-93			
	26 – 30 Kl	R77-74	R74-10	R68-62	R20-78	R18-55	
	31 – 35 Kl						R16-87
	36 – 50 Kl	R107-28	R102-26				
	51 – 60 Kl			R94-69	R32-17	R28-73	
	Above 60 Kl						R26-12
20% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 2)	Water network charge	R110-00	R110-00	R86-50	No Basic		
	From first Kl	R27-19	R25-92	R24-00	R21-43	R19-14	R17-41
20% Increase in Tariffs Schools and Government Institutions (Level 2)	Water network charge	R68-05	R64-87	R86-50	No Basic		
	From first Kl	R28-82	R27-48	R25-44	-	-	-
20% Increase in Tariffs Sport Clubs (Level 2)	Water network charge	R64-87	R64-87	R86-50	No Basic		
	From first Kl	R28-83	R27-48	R25-44	-	-	-
25% Increase in Tariffs	Water network charge	R64-87	R64-87	R86-50	No Basic		

Table C.3.1: Water tariffs for 2020/2021 and the previous five financial years							
Consumer/Description	**Category**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**	**15/16**
Residential and Agricultural Residential (Level 2B)	0 – 4 Kl	R6-60	R6-29	R6-30	R5-63	R0-00	R0-00
	5 Kl			R17-61	R15-73	R14-04	
	6 Kl						R12-76
	7 - 10 Kl	R11-33	R10-80				
	11 – 15 Kl	R20-68	R19-71	R18-25			
	16 – 20 Kl	R26-21	R24-99	R18-88			
	21 – 25 Kl	R38-86	R37-05	R34-30			
	26 – 30 Kl	R80-98	R77-19	R71-48	R21-65	R19-33	
	31 – 35 Kl						R17-58
	36 – 50 Kl	R111-75	R106-53				
	51 – 60 Kl			R98-64	R33-51	R29-93	
	Above 60 Kl						R27-21
25% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 2B)	Water network charge	R110-00	R110-00	R86-50	No Basic		
	From first Kl	R28-32	R27-00	R25-00	R22-33	R19-94	R18-14
25% Increase in Tariffs Schools and Government Institutions (Level 2B)	Water network charge	R68-05	R64-87	R86-50	No Basic		
	From first Kl	R30-03	R28-63	R26-50	-	-	-
25% Increase in Tariffs Sport Clubs (Level 2B)	Water network charge	R64-87	R64-87	R86-50	No Basic		
	From first Kl	R30-03	R28-63	R26-50	-	-	-
30% Increase in Tariffs Residential and Agricultural Residential (Level 3)	Water network charge	R64-87	R64-87	R86-50	No Basic		
	0 – 4 Kl	R6-86	R6-54	R6-55	R5-85	R0-00	R0-00
	5 Kl			R18-32	R16-35		
	6 Kl					R14-60	R13-27
	7 - 10 Kl	R11-78	R11-23				
	11 – 15 Kl	R21-50	R20-50	R18-98			
	16 – 20 Kl	R27-26	R25-99	R19-63			
	21 – 25 Kl	R40-42	R38-53	R35-67			
	26 – 30 Kl	R84-21	R80-28	R74-33	R22-52	R20-10	
	31 – 35 Kl						R18-28
	36 – 50 Kl	R116-22	R110-79				
	51 – 60 Kl			R102-58	R34-85	R31-12	
	Above 60 Kl						R28-30
30% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 3)	Water network charge	R110-00	R110-00	R86-50	No Basic		
	From first Kl	R29-46	R28-08	R26-00	R23-22	R20-74	R18-86
30% Increase in Tariffs Schools and Government Institutions (Level 3)	Water network charge	R68-05	R64-87	R86-50	No Basic		
	From first Kl	R31-23	R29-77	R27-56	-	-	-
30% Increase in Tariffs Sport Clubs (Level 3)	Water network charge	R64-87	R64-87	R86-50	No Basic		
	From first Kl	R31-23	R29-77	R27-56	-	-	-
35% Increase in Tariffs Residential and Agricultural Residential (Level 3B)	Water network charge	R64-87	R64-87	R86-50	No Basic		
	0 – 4 Kl	R7-12	R6-79	R6-80	R6-08	R0-00	R0-00
	5 Kl			R19-02	R16-98	R15-16	
	6 Kl						R13-78
	7 - 10 Kl	R12-24	R11-66				
	11 – 15 Kl	R22-33	R21-29	R19-71			
	16 – 20 Kl	R28-31	R26-99	R20-39			
	21 – 25 Kl	R41-97	R40-01	R37-04			
	26 – 30 Kl	R87-45	R83-36	R77-19	R23-38	R20-87	
	31 – 35 Kl						R18-98

Table C.3.1: Water tariffs for 2020/2021 and the previous five financial years							
Consumer/Description	**Category**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**	**15/16**
	36 – 50 Kl	R120-69	R115-05				
	51 – 60 Kl			R106-53	R36-19	R32-32	
	Above 60 Kl						R29-39
35% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 3B)	Water network charge	R110-00	R110-00	R86-50	No Basic		
	From first Kl	R30-59	R29-16	R27-00	R24-11	R21-53	R19-59
35% Increase in Tariffs Schools and Government Institutions (Level 3B)	Water network charge	R68-05	R64-87	R86-50	No Basic		
	From first Kl	R32-43	R30-92	R28-62	-	-	-
35% Increase in Tariffs Sport Clubs (Level 3B)	Water network charge	R64-87	R64-87	R86-50	No Basic		
	From first Kl	R32-43	R30-92	R28-62	-	-	-
40% Increase in Tariffs Residential and Agricultural Residential (Level 4)	Water network charge	R64-87	R64-87	R86-50	No Basic		
	0 – 4 Kl	R7-39	R7-04	R7-06	R6-30	-	-
	5 – 6 Kl			R19-73	R17-61		
	7 – 10 Kl	R12-69	R12-10				
	11 – 15 Kl	R23-16	R22-08	R20-44			
	16 – 20 Kl	R29-36	R27-99	R21-14			
	21 – 25 Kl	R43-53	R41-50	R38-42		-	-
	26 – 35 Kl	R90-69	R86-45	R80-05	R24-25	-	-
	36 – 50 Kl	R125-16	R119-31			-	-
	51 Kl and above			R110-47	R37-53	-	-
40% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 4)	Water network charge	R110-00	R110-00	R86-50	No Basic		
	From first Kl	R31-72	R30-24	R28-00	R25-00	-	-
40% Increase in Tariffs Schools and Government Institutions (Level 4)	Water network charge	R68-05	R64-87	R86-50	No Basic		
	From first Kl	R33-63	R32-06	R29-68	-	-	-
40% Increase in Tariffs Sport Clubs (Level 4)	Water network charge	R64-87	R64-87	R86-50	No Basic		
	From first Kl	R33-63	R32-06	R29-68	-	-	-
50% Increase in Tariffs Residential and Agricultural Residential (Level 5)	Water network charge	R64-87	R64-87	R86-50	-	-	-
	0 – 4 Kl	R7-91	R7-55	R6-68	-	-	-
	5 – 6 Kl			R18-67			
	7 – 10 Kl	R13-60	R12-96		-	-	-
	11 – 15 Kl	R24-81	R23-66	R20-53	-	-	-
	16 – 20 Kl	R31-46	R29-99	R58-30	-	-	-
	21 – 25 Kl	R46-64	R44-46	R76-32	-	-	-
	26 – 35 Kl	R97-17	R92-63	R105-99	-	-	-
	36 – 50 Kl	R134-10	R127-83		-	-	-
	51 Kl and above			R281-03	-	-	-
50% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 5)	Water network charge	R110-00	R110-00	R86-50	-	-	-
	From first Kl	R33-99	R32-40	R26-50	-	-	-
50% Increase in Tariffs Schools and Government Institutions (Level 5)	Water network charge	R68-05	R64-87	R86-50	-	-	-
	From first Kl	R36-03	R34-35	R31-80	-	-	-
50% Increase in Tariffs Sport Clubs (Level 5)	Water network charge	R64-87	R64-87	R86-50	-	-	-
	From first Kl	R36-03	R34-35	R31-80	-	-	-
60% Increase in Tariffs Residential and Agricultural	Water network charge	R64-87	R64-87	R86-50	-	-	-
	0 – 4 Kl	R8-44	R8-05	R7-08	-	-	-

Table C.3.1: Water tariffs for 2020/2021 and the previous five financial years							
Consumer/Description	**Category**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**	**15/16**
Residential (Level 6)	5 – 6 Kl			R19-79			
	7 – 10 Kl	R14-50	R13-82		-	-	-
	11 – 15 Kl	R26-46	R25-23	R21-76	-	-	-
	16 – 20 Kl	R33-55	R31-98	R61-80	-	-	-
	21 – 25 Kl	R49-74	R47-42	R80-90	-	-	-
	26 – 35 Kl	R103-65	R98-80	R112-35	-	-	-
	36 – 50 Kl	R143-04	R136-35				
	51 Kl and above			R297-89	-	-	-
60% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 6)	Water network charge	R110-00	R110-00	R86-50	-	-	-
	From first Kl	R36-25	R34-56	R28-09	-	-	-
60% Increase in Tariffs Schools and Government Institutions (Level 6)	Water network charge	R68-05	R64-87	R86-50	-	-	-
	From first Kl	R38-43	R36-64	R33-71	-	-	-
60% Increase in Tariffs Sport Clubs (Level 6)	Water network charge	R64-87	R64-87	R86-50	-	-	-
	From first Kl	R38-44	R36-64	R33-71	-	-	-
70% Increase in Tariffs Residential and Agricultural Residential (Level 7)	Water network charge	R64-87	R64-87	R86-50	-	-	-
	0 – 4 Kl	R8-97	R8-55	R7-50	-	-	-
	5 – 6 Kl			R20-97			
	7 – 10 Kl	R15-41	R14-69		-	-	-
	11 – 15 Kl	R28-12	R26-81	R23-07	-	-	-
	16 – 20 Kl	R35-65	R33-98	R65-51	-	-	-
	21 – 25 Kl	R52-85	R50-39	R85-75	-	-	-
	26 – 35 Kl	R110-13	R104-98	R119-09	-	-	-
	36 – 50 Kl	R151-98	R144-87				
	51 Kl and above			R315-76	-	-	-
70% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 7)	Water network charge	R110-00	R110-00	R86-50	-	-	-
	From first Kl	R38-52	R36-72	R29-78	-	-	-
70% Increase in Tariffs Schools and Government Institutions (Level 7)	Water network charge	R68-05	R64-87	R86-50	-	-	-
	From first Kl	R40-83	R38-93	R35-73	-	-	-
70% Increase in Tariffs Sport Clubs (Level 7)	Water network charge	R64-87	R64-87	R86-50	-	-	-
	From first Kl	R40-84	R38-93	R35-73	-	-	-
80% Increase in Tariffs Residential and Agricultural Residential (Level 8)	Water network charge	R64-87	R64-87	R86-50	-	-	-
	0 – 4 Kl	R9-50	R9-05	R7-95	-	-	-
	5 – 6 Kl			R22-23			
	7 – 10 Kl	R16-31	R15-55		-	-	-
	11 – 15 Kl	R29-77	R28-39	R24-45	-	-	-
	16 – 20 Kl	R37-75	R35-98	R69-44	-	-	-
	21 – 25 Kl	R55-96	R53-35	R90-90	-	-	-
	26 – 35 Kl	R116-60	R111-15	R126-24	-	-	-
	36 – 50 Kl	R160-92	R153-40		-	-	-
	51 Kl and above			R334-71	-	-	-
80% Increase in Tariffs Businesses / Commercial / Industrial / Business Agricultural (Level 8)	Water network charge	R110-00	R110-00	R86-50	-	-	-
	From first Kl	R40-79	R38-88	R31-57	-	-	-
80% Increase in Tariffs Schools and Government	Water network charge	R68-05	R64-87	R86-50	-	-	-
	From first Kl	R43-24	R41-22	R37-87	-	-	-

Table C.3.1: Water tariffs for 2020/2021 and the previous five financial years							
Consumer/Description	**Category**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**	**15/16**
Institutions (Level 8)							
80% Increase in Tariffs Sport Clubs (Level 8)	Water network charge	R64-87	R64-87	R86-50	-	-	-
	From first Kl	R43-24	R41-22	R37-87	-	-	-
Connection Low Cost		Contract	Contract	Contract	Contract	Contract	Contract
Connection (15mm)		R5 459-13	R5 260-87	R5 008-70	R5 000-00	R4 385-96	R4 342-11
Connection (22mm)		R6 469-57	R6 469-57	R6 017-39	R6 008-77	R5 017-54	R5 017-54
Connection 22mm Private Developments		R4 460-87	R4 460-87	R4 113-04	R4 105-26	R3 736-84	R3 736-84
Deposit Payable: Letting of Municipal Standpipe		R6 521-74	R6 086-96	R5 269-57	R5 263-16	R4 824-56	R4 201-75
Test of water meter – Refundable if result is faulty		R782-61	R704-35	R660-87	R438-60	R350-88	R333-33

The sewerage tariff structures for Swartland Municipality for the 2020/2021 financial year and the previous five financial years are summarised in the table below (Subject to 15% VAT).

Table C.3.2: Sewerage tariffs for 2020/2021 and the previous five financial years							
Consumer/Description	**Category**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**	**15/16**
All	Availability Fees per month	R234-35	R234-35	R217-97	R205-63	R193-99	R176-35
For each additional toilet	Businesses, etc. per month	R36-87	R35-15	R32-70	R30-85	R29-10	R26-45
Sewer connections	100mm PVC	R4 789-57	R4 626-09	R4 434-78	R4 429-82	R4 412-28	R3 578-95
Sewer connections	150mm PVC	R6 673-04	R6 252-17	R5 791-30	R5 789-47	R5 315-79	R5 131-58
Sewer blockages	Office hours	R524-35	R487-83	R469-57	R447-37	R447-37	R421-05
Sewer blockages	After hours and public holidays	R743-48	R690-43	R660-87	R640-35	R640-35	R596-49
Emptying of tanks	For two emptying per month	R234-35	R234-35	R217-97	R205-63	R193-99	R176-35
	Every additional emptying	R858-43	R839-13	R791-30	R789-47	R789-47	R745-61
	3rd pumping during Easter Weekend and school holidays in the same month, no tariff will be charged, but the 4th pumping will be charged.	R858-43	R839-13	R791-30	R789-47	R789-47	R745-61
Emptying of tanks (Riebeek Kasteel and Abbotsdale)	From the 1st sewerage pumping	R858-43	R839-13	R791-30	R789-47	R789-47	R745-61
	Plus fixed sewerage pan levy (Owner do not connect to the new waterborne system)	R266-00 (VAT incl.)	R266-00 (VAT incl.)	R250-67 (VAT incl.)	R234-42 (VAT incl.)	R221-15 (VAT incl.)	R201-04 (VAT incl.)
Ad-hoc emptying of tanks	After hours	R1 081-91	R1 021-74	R921-74	R921-05	R921-05	R868-42
Treated Waste Water	Per Kl	R2-96	R2-86	R2-76	R2-61	R2-49	R2-24
Treated Waste Water Rooiheuwel JV	Per Kl	R0-81	R0-76	R0-71	R0-67	R0-63	R0-60
Partially connection (Emptying)		R125-98	R117-18	R108-98	R103-51	R96-99	R88-18
Industrial effluent per Kl (COD)		R11-27	R10-65	R10-03	R9-44	R8-80	R8-39
Grotto Baai and Jakkelsfontein		R234-35	R234-35	R217-97	R205-63	R1 101-75	R1 298-25
Rural and Non-urban areas – emptying of sewerage tanks per pumping		R1 545-22	R1 469-57	R1 382-61	R1 377-19	R1 377-19	R1 298-25

C.3.2. Metering, Billing and Free Basic Services

The table below gives an overview of the metering, billing and free basic services of Swartland Municipality.

Table C.3.2.1: Overview of Metering, Billing and Free Basic Services

Regulations Ref. #	Description	Unit	Year 0	Year - 1	Year - 2
			FY2020/21	FY2019/20	FY2018/19
	UNITS SUPPLIED (as per water services access profile)				
10.2 (b) (i)	Household water connections (house and yard connections)	Nr	**42,276**	**40,344**	**38,952**
10.2 (b) (iv)	Household sewerage connections	Nr	**40,912**	**38,980**	**37,588**
	METERING				
	Metered Water Connections (aligned with Table C2.1)				
	Residential	Nr	20,829	19,910	19,498
	Commercial / Business	Nr	827	787	799
	Industrial	Nr	9	9	8
	Government / Institutional	Nr	70	70	71
	Other	Nr	635	328	621
	Sub-Total: Metered Water Connections	**Nr**	**22,370**	**21,104**	**20,997**
	Proportion of metered connections (residential)*	%	49%	49%	50%
	Total number of meters	Nr	**22,370**	**21,104**	**20,997**
10.2 (b) (vi)	Total number of new connections (aligned with Table C.2.1)	Nr	1,266	107	614
10.2 (e) (i)	Total number of new meters installed	Nr	1,266	107	614
	Proportion of new connections, metered	%	100.0%	100.0%	100.0%
	Number of meters tested	Nr	0	0	0
10.2 (e) (ii)	Proportion of meters tested to total number of meters	%	0.0%	0.0%	0.0%
	Number of meters replaced**	Nr	177	568	651
10.2 (e) (ii)	Proportion of meters replaced to total number of meters	%	0.8%	2.7%	3.1%
	BILLING				
	Customer billing (water and sewerage)		**Nr**	**Nr**	**Nr**
	Residential	Nr	20,829	19,910	19,498
	Commercial / Business	Nr	827	787	799
	Industrial	Nr	9	9	8
	Government / Institutional	Nr	70	70	71
	etc.		635	328	621
	Sub-Total: Customers billed	Nr	**22,370**	**21,104**	**20,997**
	Proportion of bills to metered connections	%	**100%**	**100%**	**100%**
	Residential	%	100%	100%	100%
	Commercial / Business	%	100%	100%	100%
	Industrial	%	100%	100%	100%
	Government / Institutional	%	100%	100%	100%
	etc.	%	100%	100%	100%
	FREE BASIC SERVICES				
	Nr customers receiving:				
	Free Basic Water	Nr	9,698	9,027	8,923
10.2 (b) (v)	Free Basic Sanitation	Nr	8,883	8,525	8,435
	Proportion of Free Basic Services				
	Water	%	47%	45%	46%
	Sewerage	%	22%	22%	22%

Note:

* All residential consumers in the urban areas of Swartland Municipality's Management Area are metered. The "Water Services Access Profile" however includes the consumers on the farms and the backyard dwellers on formal erven in the urban areas. Backyard dwellers use the service of the main house, which is metered. Consumers on the farms utilise their own water sources, which is not metered by the Municipality, therefore the 45% - 55% compliance in the above table.

** Include number of meters inspect / test / repair / install

C.3.3. Revenue Collection and Cost Recovery

The table and figures below gives an overview of Swartland Municipality's water services revenue collection and cost recovery.

Table C.3.3.1: Overview of Water Services Revenue Collection and Cost Recovery				
Regulations Ref. #	Description	Year 0	Year - 1	Year - 2
		FY2020/21	FY2019/20	FY2018/19
	INCOME	**R'000**	**R'000**	**R'000**
	Billed			
	Water reticulation / provision	R 79,338	R 97,519	R 64,978
	Sewerage / wastewater	R 65,389	R 54,572	R 40,997
	Sub-Total: Billed	**R 144,728**	**R 152,092**	**R 105,975**
	Collections			
	Water reticulation / provision	R 79,539	R 95,978	R 73,312
	Sewerage / wastewater	R 82,802	R 69,034	R 57,957
	Sub-Total: Collections	**R 162,341**	**R 165,012**	**R 131,269**
	Equitable share income			
	Water reticulation / provision	R 10,894	R 8,686	R 14,649
	Sewerage / wastewater	R 22,436	R 16,502	R 21,952
	Sub-Total: Equitable share income	**R 33,329**	**R 25,188**	**R 36,600**
	EXPENDITURE (O&M)	**R'000**	**R'000**	**R'000**
	Water services	R 44,955	R 61,302	R 23,088
	Sewerage / wastewater services	R 50,617	R 49,817	R 31,689
	Total: Water Services O&M	**R 95,572**	**R 111,119**	**R 54,776**
	COST RECOVERY ANALYSIS / RATIO'S	**%**	**%**	**%**
10.2 (d) (ii)	**Billed as % of Cost**			
	Water	201%	173%	345%
	Sewerage	174%	143%	199%
	Total	**186%**	**160%**	**260%**
10.2 (d) (iii)	**Unrecovered as % of Cost**			
	Water services	24%	17%	27%
	Sewerage / wastewater services	10%	4%	16%
	Total	**16%**	**11%**	**21%**

The figure below gives an overview of the revenue collection and cost recovery profile for water services for Swartland Municipality.

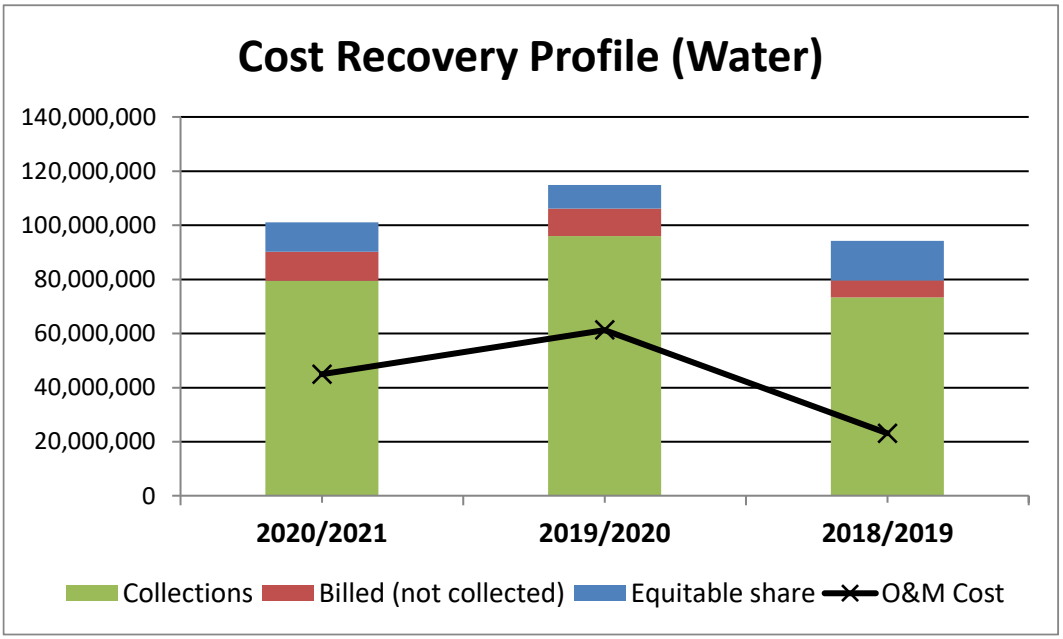


Figure C.3.3.1: Revenue collection and cost recovery profile (Water)

The figure below gives an overview of the revenue collection and cost recovery profile for wastewater services for Swartland Municipality.

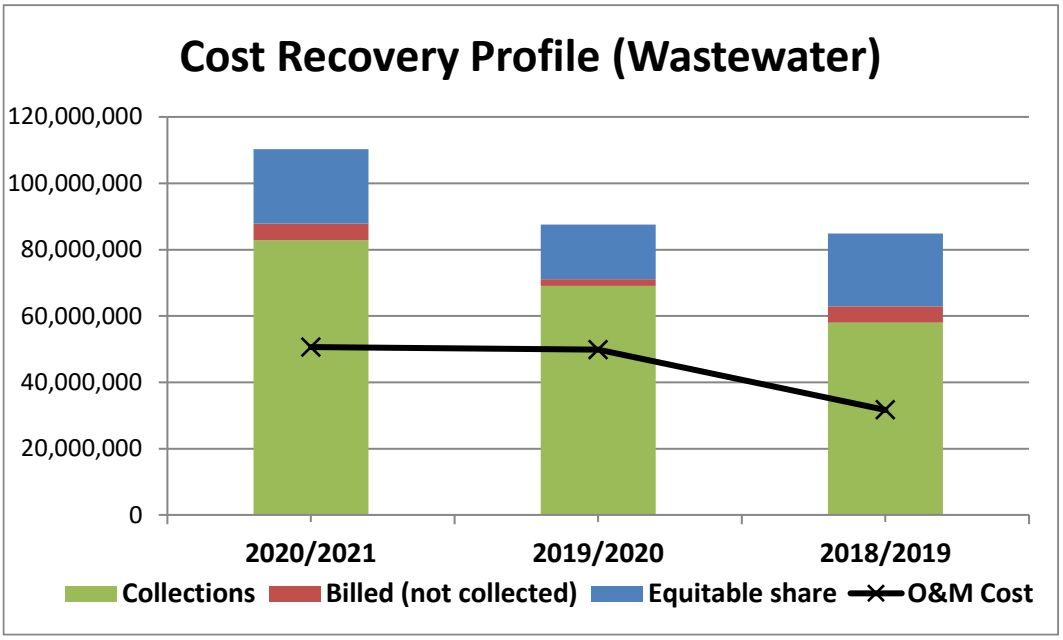


Figure C.3.3.2: Revenue collection and cost recovery profile (Wastewater)

Swartland Municipality's Operational and Maintenance Budget for water services for the last seven financial years are summarised in the table below. A more detailed breakdown of the water operational budgets are also included in Annexure F.

Table C.3.3.2: Operational and Maintenance budget for water services							
Description	**Actual 20/21**	**Record : Prior**					
		Actual 19/20	**Actual 18/19**	**Actual 17/18**	**Actual 16/17**	**Actual 15/16**	**Actual 14/15**
EXPENDITURE							
Wages and Salaries	R14 087 315	R13 729 548	R11 721 909	R10 478 480	R9 495 563	R9 381 352	R7 970 486
Social Contributions	R2 462 631	R2 292 675	R2 035 437	R1 721 005	R1 650 215	R1 550 889	R1 357 840
Bad Debts	R0	R6 462 307	R0	R200 950	R1 637 605	R907 476	R728 932
Depreciation: Property, plant and equipment	R14 639 011	R14 437 698	R0	R13 023 409	R0	R16 892	R43 299
Repairs and Maintenance	R1 021 131	R1 369 954	R1 341 566	R1 461 808	R1 329 269	R1 028 761	R873 016
Interest Expense	R387 675	R959 499	R1 552 598	R2 265 271	R94 487	R98 554	R101 869
General Expenses: Bulk Purchases	R0	R0	R0	R993 632	R24 540 151	R26 235 490	R25 564 759
General Expenses: Departmental	R1 453 743	R1 522 537	R742 701	R1 472 035	R1 480 952	R1 437 818	R1 392 138
Inter Departmental Recoveries	R0	R431 913	R304 742	R331 928	R374 781	R374 956	R350 400
General Expenses: Other	R10 903 926	R20 095 768	R5 388 964	R15 537 680	R2 816 389	R1 919 835	R1 621 469
Expenditure Total	**R44 955 432**	**R61 301 899**	**R23 087 917**	**R47 486 198**	**R43 419 412**	**R42 952 023**	**R40 004 208**
INCOME							
Service Charges	-R72 183 322	-R71 489 657	-R60 146 111	-R52 670 179	-R53 509 950	-R46 895 602	-R41 546 670
Grants and Subsidies received: Operating	-R141 591	-R123 760	R0	R0	R0	-R4 562 000	-R403 572
Unconditional and Other Grants	-R16 770 715	-R14 874 317	-R16 009 462	-R6 338 634	-R4 260 180	-R6 816 086	-R2 912 925
Grants and Subsidies received: Capital	R0	-R16 367 200	R0	-R12 329 552	R0	R0	R0
Other Revenue	-R4 145 841	-R3 350 599	-R3 471 200	-R3 525 400	-R3 942 370	-R3 242 288	-R2 439 339
Less Revenue Foregone	R3 009 706	R0	R0	R0	R6 134 342	R4 472 694	R1 838 844
Income Total	**-R90 231 763**	**-R106 205 533**	**-R79 626 773**	**-R74 863 765**	**-R55 578 158**	**-R57 043 282**	**-R45 463 662**
Nett Surplus / Deficit	**-R45 276 331**	**-R44 903 634**	**-R56 538 856**	**-R27 377 567**	**-R12 158 746**	**-R14 091 259**	**-R5 459 454**

Swartland Municipality's Operational and Maintenance Budget for sanitation services for the last seven financial years are summarised in the table below. A more detail breakdown of the sanitation operational budgets are also included in Annexure F.

Table C.3.3.3: Operational and Maintenance budget for sanitation services							
Description	**Actual 20/21**	**Record : Prior**					
		Actual 19/20	**Actual 18/19**	**Actual 17/18**	**Actual 16/17**	**Actual 15/16**	**Actual 14/15**
EXPENDITURE							
Wages and Salaries	R8 189 332	R7 934 618	R6 882 200	R6 754 761	R6 138 713	R6 157 564	R4 740 456
Social Contributions	R1 483 313	R1 403 886	R1 308 109	R1 200 356	R1 109 066	R965 916	R663 104
Bad Debts	R0	R0	R0	R0	R386 778	R337 872	R1 264 334
Depreciation: Property, plant and equipment	R16 092 587	R16 134 374	R0	R16 006 871	R0	R114 840	R1 136
Repairs and Maintenance	R4 383 979	R3 915 063	R3 097 134	R2 809 945	R2 971 523	R2 790 922	R1 967 088
Interest Expense: External Borrowings	R9 642 519	R10 127 577	R10 518 757	R10 909 157	R11 267 960	R11 597 930	R11 846 704
General Expenses: Bulk Purchases Electricity	R0	R0	R0	R833 276	R832 793	R603 005	R426 074
General Expenses: Departmental	R353 591-00	R689 934	R336 553	R667 050	R681 008	R670 943	R614 567
Interdepartmental Recoveries	R5 259 223	R5 337 182	R4 950 888	R4 831 852	R4 660 252	R4 335 440	R4 382 189
General Expenses: Other	R5 212 322	R4 274 688	R4 594 890	R4 677 943	R4 090 025	R3 357 513	R2 863 848
Nett Expenditure	**R50 616 866**	**R49 817 322**	**R31 688 531**	**R48 691 211**	**R32 138 118**	**R30 931 945**	**R28 769 500**
INCOME							
Service Charges	-R35 856 914	-R45 674 849	-R35 200 087	-R32 999 794	-R49 541 180	-R44 033 953	-R39 651 177
Grants and Subsidies Received Operational	-R38 511	-R53 040	R0	-R319 596	R0	-R9 007	-R36 925
Unconditional and Other grants	-R25 641 135	-R23 454 400	-R22 769 691	-R20 699 719	-R18 451 623	-R19 242 607	-R11 442 486
Grants and Subsidies Received Capital	-R20 156 251	-R4 933 800	R0	-R11 669 293	R0	R0	R0
Transfer Revenue	R0	R0	R0	R0	R0	-R1 500 000	R0
Other Revenue	-R6 132 354	-R5 806 902	-R4 978 781	-R6 449 135	-R7 338 614	-R5 454 231	-R5 645 697
Less Revenue Foregone	R0	-R2 344	-R218	R0	R18 487 493	R16 837 627	R14 951 898
Reversal of Impairment Loss	R0	R8 851 286	R0	-R51 332	R0	R0	R0
Income Total	**-R87 825 165**	**-R71 074 049**	**-R62 948 777**	**-R72 188 869**	**-R56 843 924**	**-R53 402 171**	**-R41 824 387**
Nett Surplus / Deficit	**-R37 208 299**	**-R21 256 727**	**-R31 260 246**	**-R23 497 658**	**-R24 705 806**	**-R22 470 226**	**-R13 054 887**

It can be noted from the table below and Figure C.3.3.3 that there was a drastic increase in the debtors for all the services for the last three financial years. The table below gives an overview of the analysis of the consumer debtors' age in days for the last ten financial years as on the 30th of June.

Table C.3.3.4: Analysis of Consumer Debtors age in days as on the 30th of June						
Service	**Total**	**Current 0-30 Days**	**31 – 60 Days**	**61 – 90 Days**	**91 – 120 Days**	**120+ Days**
2020/2021						
Electricity	R45 169 248	R39 450 816	R3 002 076	R222 638	R251 079	R2 242 639
Water	R20 483 738	R10 720 585	R2 592 453	R710 719	R618 094	R5 841 887
Sewerage	R7 902 773	R3 309 940	R1 050 544	R285 657	R219 870	R3 036 762
Refuse Removal	R6 699 622	R2 495 606	R783 030	R229 113	R182 834	R3 009 039
Housing Rentals	R68 920	R30 438	R13 526	R2 916	R2 902	R19 138
Other Debtors	R13 053 274	R11 661 601	R191 860	R104 255	R59 665	R1 035 893
Total	**R93 377 575**	**R67 668 986**	**R7 633 489**	**R1 555 298**	**R1 334 444**	**R15 185 358**
2019/2020						
Electricity	R43 459 993	R35 519 028	R2 240 095	R548 277	R312 445	R4 840 148
Water	R27 633 016	R11 612 889	R1 196 526	R703 545	R898 116	R13 221 940
Sewerage	R22 306 177	R3 209 681	R1 054 899	R453 445	R362 495	R17 225 657
Refuse Removal	R15 161 724	R2 443 408	R781 252	R373 629	R309 326	R11 254 109
Housing Rentals	R71 421	R31 143	R19 691	R8 811	R6 176	R5 600
Other Debtors	R18 934 333	R17 380 805	R147 618	R91 245	R68 479	R1 246 186
Total	**R127 566 664**	**R70 196 954**	**R5 440 081**	**R2 178 952**	**R1 957 037**	**R47 793 640**
2018/2019						
Electricity	R38 953 867	R33 850 521	R2 605 709	R54 632	R42 123	R2 400 882
Water	R17 489 928	R7 294 075	R1 548 328	R383 583	R339 704	R7 924 238
Sewerage	R13 376 552	R2 975 313	R839 352	R167 326	R129 493	R9 265 068
Refuse Removal	R9 576 058	R2 242 985	R650 391	R139 262	R115 928	R6 427 492
Housing Rentals	R54 764	R30 384	R20 162	R447	R422	R3 349
Other Debtors	R12 232 079	R11 031 954	R235 775	R71 061	R42 285	R851 004
Total	**R91 683 248**	**R57 425 232**	**R5 899 717**	**R816 311**	**R669 955**	**R26 872 033**
2017/2018						
Electricity	R34 610 083	R31 392 802	R1 999 031	R126 953	R78 465	R1 012 832
Water	R12 558 092	R7 986 100	R1 275 909	R335 933	R325 134	R2 635 016
Sewerage	R5 783 698	R2 774 461	R772 673	R190 739	R131 494	R1 914 331
Refuse Removal	R4 851 971	R2 040 785	R589 320	R146 412	R111 169	R1 964 285
Housing Rentals	R51 501	R29 233	R17 660	R1 457	R894	R2 257
Other Debtors	R2 191 934	R1 189 462	R118 064	R93 549	R57 438	R733 421
Total	**R60 047 279**	**R45 412 843**	**R4 772 657**	**R895 043**	**R704 594**	**R8 262 142**
2016/2017						
Electricity	R33 072 674	R29 905 500	R2 110 660	R56 295	R30 851	R969 368
Water	R9 874 516	R6 678 745	R1 128 677	R232 365	R152 008	R1 682 721
Sewerage	R5 589 769	R2 597 035	R770 220	R190 398	R147 174	R1 884 942
Refuse Removal	R4 715 952	R1 909 909	R587 806	R153 659	R121 085	R1 943 493
Housing Rentals	R48 337	R29 247	R18 851	R236	R0	R3
Other Debtors	R2 921 009	R1 008 702	R197 784	R56 083	R75 345	R1 583 095
Total	**R56 222 257**	**R42 129 138**	**R4 813 998**	**R689 036**	**R526 463**	**R8 063 622**

Table C.3.3.4: Analysis of Consumer Debtors age in days as on the 30th of June						
Service	**Total**	**Current 0-30 Days**	**31 – 60 Days**	**61 – 90 Days**	**91 – 120 Days**	**120+ Days**
2015/2016						
Electricity	R29 326 551	R26 248 093	R1 926 526	R181 313	R101 512	R869 107
Water	R8 237 389	R4 909 883	R830 231	R250 838	R187 035	R2 059 402
Sewerage	R4 634 984	R2 255 423	R638 337	R140 428	R98 466	R1 502 330
Refuse Removal	R4 016 596	R1 730 195	R499 449	R128 007	R93 811	R1 565 134
Housing Rentals	R55 075	R28 916	R18 673	R618	R600	R6 268
Other Debtors	R1 974 258	R995 908	R143 109	R60 097	R26 738	R748 406
Total	**R48 244 853**	**R36 168 418**	**R4 056 325**	**R761 301**	**R508 162**	**R6 750 647**
2014/2015						
Electricity	R29 796 750	R26 239 623	R2 639 145	R74 023	R28 995	R814 964
Water	R8 135 637	R4 871 093	R943 943	R273 934	R222 852	R1 823 815
Sewerage	R4 458 378	R2 063 276	R575 637	R155 411	R115 558	R1 548 496
Refuse Removal	R3 800 321	R1 593 719	R460 542	R121 623	R98 797	R1 525 640
Housing Rentals	R48 233	R28 758	R15 896	R836	R371	R2 372
Other Debtors	R2 037 166	R1 048 616	R115 697	R74 961	R74 807	R723 085
Total	**R48 276 485**	**R35 845 085**	**R4 750 860**	**R700 788**	**R541 380**	**R6 438 372**
2013/2014						
Electricity	R22 222 509	R19 698 520	R1 719 742	R55 513	R45 423	R703 311
Water	R6 458 190	R3 598 797	R633 400	R185 280	R199 973	R1 840 740
Sewerage	R5 343 630	R1 796 649	R564 457	R157 305	R196 471	R2 628 748
Refuse Removal	R4 652 584	R1 616 546	R552 773	R174 543	R163 158	R2 055 564
Housing Rentals	R115 609	R30 056	R16 554	R1 564	R1 443	R65 992
Other Debtors	R3 180 263	R1 711 824	R166 814	R66 245	R34 191	R1 201 189
Total	**R41 882 785**	**R28 452 392**	**R3 653 740**	**R640 450**	**R640 659**	**R8 495 544**
2012/2013						
Electricity	R22 201 007	R19 677 018	R1 719 742	R55 513	R45 423	R703 311
Water	R6 577 340	R3 717 947	R633 400	R185 280	R199 973	R1 840 740
Sewerage	R5 345 027	R1 798 046	R564 457	R157 305	R196 471	R2 628 748
Refuse Removal	R4 595 732	R1 649 694	R552 773	R174 543	R163 158	R2 055 564
Total	**R38 719 106**	**R26 842 705**	**R3 470 372**	**R572 641**	**R605 025**	**R7 228 363**
2011/2012						
Electricity	R20 420 130	R18 346 318	R1 314 279	R81 211	R60 792	R617 530
Water	R5 735 495	R3 328 119	R543 262	R217 747	R191 385	R1 454 982
Sewerage	R4 364 421	R1 595 188	R481 875	R181 231	R160 915	R1 945 212
Refuse Removal	R3 383 598	R1 358 102	R431 061	R124 361	R107 068	R1 363 006
Total	**R33 903 644**	**R24 627 727**	**R2 770 477**	**R604 550**	**R520 160**	**R5 380 730**

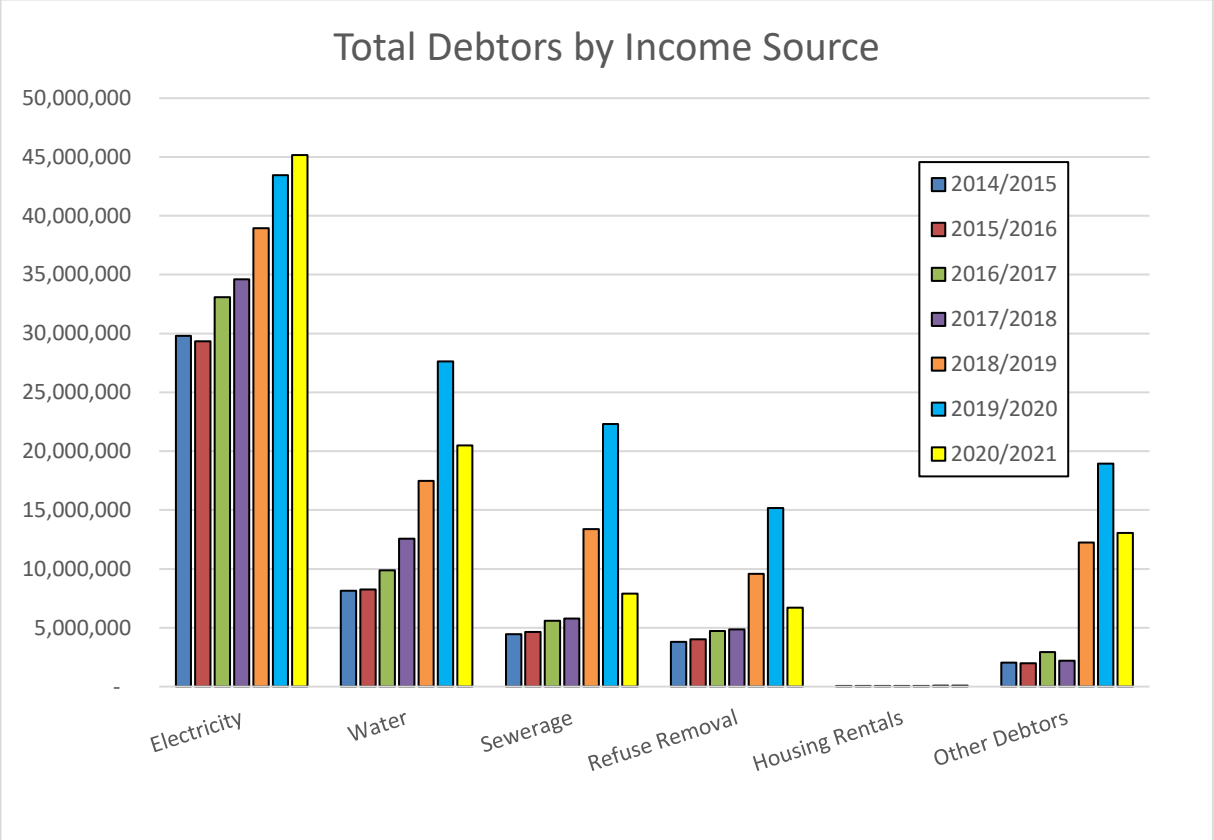


Figure C.3.3.3: Consumer Debtors by Income Source

C.4. Water Quality

C.4.1. Sampling Programme

Operational Sampling programmes are implemented by the West Coast District Municipality at their two bulk WTWs. Compliance Water Quality Monitoring Programmes are also implemented by the West Coast District Municipality and the Swartland Municipality throughout the water distribution systems. Operational and Compliance Effluent Monitoring Programmes are also implemented by Swartland Municipality at their WWTWs.

The two tables below give an overview of the West Coast District Municipality's and Swartland Municipality's compliance sampling programmes for potable water quality, as compiled from the compliance sample results.

Table C.4.1.1: Sampling Programme for Potable Water Quality
Treated Water Schemes: Withoogte and Swartland WTW Final (West Coast DM)

Registered Sites per Scheme		Active (yes/no)			Determinands per Category	Frequency (days)		
		Year 0	Year-1	Year-2		Year 0	Year-1	Year-2
#	Name	FY2020/21	FY2019/20	FY2018/19		FY2020/21	FY2019/20	FY2018/19
33687	Withoogte Final (WCDM)	Yes	Yes	Yes	**Microbiological (Health)**			
32210	Swartland Final (WCDM)	Yes	Yes	Yes	E.Coli (Count per 100 ml)	7	7	7
					Aesthetic			
					Conductivity at 25°C (mS/m)	7	7	7
					Colour (mg/l)	7	7	7
					Total Dissolved Solids (mg/l)	7	7	7
					Chloride as Cl (mg/l)	7	7	7
					Iron as Fe (ug/l)	30	30	15
					Manganese as Mn (ug/l)	30	30	15
					Operational			
					pH at 25°C	7	7	7
					Turbidity NTU	7	7	7
					Total Coliforms count per 100ml	7	7	7
					Heterotrophic Plate Count per 1 ml	-	30	15
					Aluminium as Al (ug/l)	30	30	15
					Disinfectant Residual			
					Free Chlorine	7	7	7
					Not in STD / Limit Set			
					Total Alkalinity (as CaCO3)	15	-	7
					Total Hardness (as CaCO3)	-	-	7

Table C.4.1.1: Sampling Programme for Potable Water Quality
Treated Water Schemes: Distribution Networks

Registered Sites per Scheme		Active (yes/no)			Determinands per Category	Frequency (days)		
		Year 0	Year-1	Year-2		Year 0	Year-1	Year-2
#	Name	FY2020/21	FY2019/20	FY2018/19		FY2020/21	FY2019/20	FY2018/19
33818	Yzerfontein (WCDM)	Yes	Yes	Yes	**Microbiological (Health)**			
25274	Darling (WCDM)	Yes	Yes	Yes	E.Coli (Count per 100 ml)	15	15	15
26627	Koringberg (WCDM)	Yes	Yes	Yes				
27846	Malmesbury (WCDM)	Yes	Yes	Yes	**Aesthetic**			
	Kasteelberg Reservoir (WCDM)	Yes	Yes	Yes	Conductivity at 25°C (mS/m)	15	15	15
	Abbotsdale School	Yes	Yes	Yes				
	Kalbaskraal Municipal Office / Shopping Center	Yes	Yes	Yes	**Operational**			
	Riverlands Primary School	Yes	Yes	Yes	pH at 25°C	15	15	15
	Chatsworth Clinic	Yes	Yes	Yes	Turbidity	15	15	15
	Moorreesburg Sewage	Yes	Yes	Yes	Total Coliforms count per 100ml	15	15	15
	Moorreesburg Municipal Office	Yes	Yes	Yes	Heterotrophic Plate Count per 1 ml	15	15	15
	Koringberg Municipal Office	Yes	Yes	Yes				
	Riebeek Wes Municipal Office	Yes	Yes	Yes	**Disinfectant Residual**			
	Riebeek Kasteel Municipal Office	Yes	Yes	Yes	Free Chlorine	15	15	15
	Yzerfontein Municipal Office	Yes	Yes	Yes				
	Darling Sewage	Yes	Yes	Yes				
	Darling Municipal Office	Yes	Yes	Yes				
	Malmesbury City Hall	Yes	Yes	Yes				
	Malmesbury Mount Royal Office	Yes	Yes	Yes				
	Malmesbury Municipal Office Abbattoir Str.	Yes	Yes	Yes				
	Malmesbury Traffic Office Wesbank	Yes	Yes	Yes				
	Malmesbury Swartland High School	Yes	Yes	Yes				

The current samples taken by the Swartland Municipality, over and above the existing Operational Sampling programme of the West Coast District Municipality, and the proposed additional samples to be taken are summarised in the table below.

Table C.4.1.2: 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 and Free Chlorine (2 Sample points fortnightly	*Adequately covered by the sampling done by the Swartland LM and the West Coast District Municipality at the Withoogte WTW.*
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 monthly)	*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 monthly)	*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 table below indicates the compliance of the E.Coli monitoring frequency in the water distributions systems of Swartland Municipality, in terms of the minimum requirements of SANS:241-2: 2015 (Table 2). The period assessed was for samples taken from July 2020 to June 2021.

Table C.4.1.3: Swartland Municipality's Compliance of the Monthly E.Coli Monitoring Frequency for the Water Distribution Systems and at the WTWs in terms of the Minimum Requirements of SANS 241-2:2015 (Table 2).

Distribution System	Population served	Required number of monthly samples (SANS 241-2:2015: Table 2)	Number of monthly E.Coli samples taken on the network by Swartland Mun. and the West Coast DM	Number of monthly E.Coli samples taken at the Withoogte and Swartland WTW by the West Coast DM	Total monthly E.Coli samples taken for the potable water
Koringberg	1 728	2	3.9	4.8	8.7
Riebeek Wes and Ongegund	1 931	2	2.0	3.7	5.7
Riebeek Kasteel	2 473	2	4.3	3.7	8.0
Yzerfontein	1 623	2	4.1	3.7	7.8
Darling	12 453	2.5	4.9	3.7	8.6
Moorreesburg	18 328	3.7	3.0	4.8	7.8
Malmesbury	53 346	10.7	11.0	3.7	14.7
Abbotsdale	4 909	2	2.0	3.7	5.7
Kalbaskraal	3 740	2	2.0	3.7	5.7

Table C.4.1.3: Swartland Municipality's Compliance of the Monthly E.Coli Monitoring Frequency for the Water Distribution Systems and at the WTWs in terms of the Minimum Requirements of SANS 241-2:2015 (Table 2).					
Distribution System	**Population served**	**Required number of monthly samples (SANS 241-2:2015: Table 2)**	**Number of monthly E.Coli samples taken on the network by Swartland Mun. and the West Coast DM**	**Number of monthly E.Coli samples taken at the Withoogte and Swartland WTW by the West Coast DM**	**Total monthly E.Coli samples taken for the potable water**
Riverlands and Chatsworth	6 846	2	4	3.7	7.7

The above sampling done by the Swartland Municipality plus the daily sampling done at the Withoogte WTW and the Swartland WTW by the West Coast District Municipality, as well as their monthly E.Coli sampling throughout the various towns on the systems ensure that the number of monthly E.Coli samples taken, as required by SANS 241, is adequate.

The table below gives an overview of Swartland Municipality's compliance sampling programme for wastewater (final effluent) quality, as compiled from the final effluent compliance sample results.

Table C.4.1.4: Sampling Programme for Wastewater Effluent Quality								
Registered Sites		**Active**			**Determinands per Category**	**Frequency (days)**		
		Year 0	**Year-1**	**Year-2**		**Year 0**	**Year-1**	**Year-2**
#	**Name**	**FY2020/21**	**FY2019/20**	**FY2018/19**		**FY2020/21**	**FY2019/20**	**FY2018/19**
1	Malmesbury	Yes	Yes	Yes	**Microbiological**			
2	Darling	Yes	Yes	Yes	Faecal Coliforms (Count per 100mℓ)	30	30	30
3	Moorreesburg	Yes	Yes	Yes				
4	Riebeek Valley	Yes	Yes	Yes	**Chemical**			
5	Chatsworth	Yes	Yes	Yes	Ammonia Nitrogen (mg/ℓ as N)	30	30	30
6	Kalbaskraal	Yes	Yes	Yes	Nitrate Nitrogen (mg/ℓ as N)	30	30	30
7	Koringberg	Yes	Yes	Yes	Nitrite Nitrogen (mg/ℓ as N)	30	30	30
					Ortho Phosphate (mg/ℓ as P)	30	30	30
					COD Filtered (mg/ℓ)	30	30	30
					Physical			
					Free Chlorine	30	30	30
					Conductivity (mS/m at 25°C)	30	30	30
					pH	30	30	30
					TSS (mg/ℓ)	30	30	30

The table below gives an overview of the water quality compliance with regard to the Water Quality Sampling Programme and the wastewater quality compliance with regard to the Wastewater Quality Sampling Programme of Swartland Municipality, as taken from the IRIS.

Table C.4.1.5: Compliance to the Sampling Programme (s)

Measurable / Enabling Factor	Unit	Year 0 FY2020/21						Year 1 FY2019/20						Year 1 FY2018/19					
		MAH	CAH	CCH	CNA	O	D	MAH	CAH	CCH	CNA	O	D	MAH	CAH	CCH	CNA	O	D
Potable Water Quality																			
Supply system submissions	Nr registered	Information not available on IRIS						Information not available on IRIS						Information not available on IRIS					
	Nr submitted																		
	Annual %																		
Monitoring compliance	Average %																		
Certified Data	Average %	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%						
In-Time Submission **(Information not correct in IRIS)**	Annual %	93%	100%	96%	94%	92%	92%	0%	0%	0%	0%	0%	0%						
Wastewater Quality																			
		M	C	P	O			M	C	P	O			M	C	P	O		
Monitoring compliance	Average %	56%	50%	52%	-			50%	48%	53%	-			0%					
Certified Data	Average %	100%	100%	100%	-			100%	100%	100%	-								
In-Time Submission	Average %	63%	62%	62%	-			6%	5%	5%	-								

Legend Water **MAH**: Microbiological Acute Health; **CAH**: Chemical Acute Health; **CCH**: Chemical Chronic Health; **CNA**: Chemical Non Health Aesthetic; **O**: Operational; **D**: Disinfectant

Legend Wastewater **M**: Microbiological; **C**: Chemical; **P**: Physical; **O**: Operational

The table below gives an overview of the water quality monitoring from the WSDP Guide Framework perspective.

Table C.4.1.6: Water Quality Monitoring Overview from WSDP Guide Framework Perspective

WSDP Ref #	Measurable / Enabling Factor	Unit	Year 0 FY2020/21	Year - 1 FY2019/20	Year - 2 FY2018/19
6.3	**Water Supply and Quality (West Coast Bulk WTWs)**				
6.3.2	Process Control in place	yes/total WTW in %	100%	100%	100%
6.3.3	Monitoring Programme in place	yes/total schemes in %	100%	100%	100%
6.3.4	Sample Analysis Credibility	Average %	100%	100%	100%
9.2	**Monitoring**				
9.2.1	% of water abstracted monitored: Surface water	Q monitored / Q abstracted in %	100%	100%	100%
9.2.2	% of water abstracted monitored: Ground water	Q monitored / Q abstracted in %	100%	100%	100%
9.2.3	% of water abstracted monitored: External Sources (Bulk purchase)	Q monitored own / Q purchased in %	100%	100%	100%
9.2.6	Water quality for formal schemes? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	frequency	Monthly	Monthly	Monthly
9.2.7	Water quality for rudimentary schemes? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	frequency	N/A	N/A	N/A
9.2.9	Is the number sufficient in accordance to the SANS241 requirements?	yes/no	Yes	Yes	No
9.3	**Water Quality**				
	Is there a water safety plan in place?	yes/no	Yes	Yes	Yes
9.3.1	Reporting on quality of water taken from source: urban & rural	yes/total schemes in %	Yes	Yes	Yes
9.3.5	Quality of water taken from source: urban - % monitored by WSA self?	monitored by WSA / total schemes in %	100%	100%	100%
9.3.6	Quality of water taken from source: rural - % monitored by WSA self?	monitored by WSA / total schemes in %	N/A	N/A	N/A
9.3.9	Are these results available in electronic format?	yes/no	Yes	Yes	Yes

The table below gives an overview of the wastewater quality monitoring from the WSDP Guide Framework perspective.

Table C.4.1.7 : Wastewater Quality Monitoring Overview from WSDP Guide Framework Perspective					
WSDP Ref #	Measurable / Enabling Factor	Unit	Year 0 FY2020/21	Year - 1 FY2019/20	Year - 2 FY2018/19
5.3.1	**Monitoring and Sample Failure**				
5.3.1.1	Compliance Monitoring: % of tests performed as required by general limits /special limits/ license requirements (Average % over previous 12 months)	Annual %	56%	50%	52%
5.3.1.2	Operational: % of tests performed as required by general limits /special limits/ license requirements (Average % over previous 12 months)	Annual %	Not captured on IRIS and recorded by Process Controllers at each of the WWTW		
6.4	**Wastewater Supply and Quality**				
6.4.2	Process Control in place	yes/total WWTW in %	Yes	Yes	Yes
6.4.3	Monitoring Programme in place	yes/total WWTW in %	Yes	Yes	Yes
6.4.4	Sample Analysis Credibility	Average %	100%	100%	100%
9.2	**Monitoring**				
9.2.10	Is the number sufficient in accordance to licences?	yes/no	Yes	Yes	Yes
9.3	**Water Quality**				
	Is there a wastewater risk abatement plan in place?	yes/no	Yes	Yes	Yes
9.3.2	Reporting on quality of water returned to the resource: urban	yes/total WWTW in %	100%	100%	100%
9.3.3	Reporting on quality of water returned to the resource: rural	yes/total WWTW in %	N/A	N/A	N/A
9.3.7	Quality of water returned to resource: urban - % monitored by WSA self?	monitored by WSA / urban WWTW in %	100%	100%	100%
9.3.8	Quality of water returned to resource: rural - % monitored by WSA self?	monitored by WSA / rural WWTW in %	N/A	N/A	N/A
9.3.9	Are these results available in electronic format?	yes/no	Yes	Yes	Yes

DWS's Blue Drop Process

The DWS launched the blue and green drop certification, with regard to drinking water quality and the quality of treated effluent discharged from WWTWs, at the Municipal Indaba during September 2008. Blue drop status is awarded to those towns that comply with 95% criteria on drinking water quality management. The Blue Drop Certification programme is in its eleventh year of existence and promised to be the catalyst for sustainable improvement of South African drinking water quality management in its entirety. The blue drop performance of Swartland Municipality is summarised as follows in the DWS's 2014 Blue Drop Report (last assessment).

Table C.4.1.8: Blue Drop Performance of the Municipality (DWS's 2014 Blue Drop Report)	
Municipal Blue Drop Score	**2011 (92.89%), 2012 (95.24%) 2014 (74.26%)**

Regulatory Impression: A substantial decrease has been observed in the Municipal Blue Drop Score and for each system in this assessment which have since lost their Blue Drop status from 2012. A number of issues were highlighted by the inspector during the assessment that needs to be addressed by the Municipality and their water service provider, the West Coast District Municipality. Although a Water Safety Plan for the distribution network has been compiled during the assessment period, it has not been informed by a water quality Risk Assessment. In addition, evidence could not be presented regarding the alignment of the municipal safety plan with risks identified by the bulk water supplier. A formal process to review and update the risks was not implemented by the West Coast District Municipality.

The WSA and WSP are reminded that they are required to regularly assess and review risks to producing drinking water of an acceptable standard and to implement corrective actions. Evidence should be maintained of interventions implemented to reduce identified risks. The Water Safety Plan should be informed by the recommendations of a process audit and any water quality risks identified through the SANS 241 analysis of the catchment, treatment, and reticulated water or water quality failures. The incident management protocol should also be informed by the risk assessment which defines alert levels and response times to guide all role players with regard to the response and corrective actions when water does not comply with the required quality standards. This must be formally communicated to municipal officials to ensure a common understanding of the protocol and its proper implementation.

Risk based monitoring that is informed by the risk assessment should be implemented. Monitoring should comply with the requirements of SANS 241 with regard to sampling points, frequency of analyses and the determinants that are analysed. Compliance monitoring comprised only microbiological analyses with no chemical and aesthetic determinants analysed and only total coliforms for operational determinants.

The Municipality is commended for the system implemented for management of non-revenue water. Comprehensive information has been gathered for each water system for development of water balances. Interventions are ongoing to reduce water losses from 18% to below 10%.

The commitment of management at the Municipality and more inclusive engagement with the West Coast District is essential to

improve risk based management of both water supply systems.

Performance Area	Malmesbury (Swartland LM, West Coast DM)	Moorreesburg (Swartland LM, West Coast DM)
Water Safety Planning (35%)	22.58	21.53
Treatment Process Management (8%)	8.00	6.00
DWQ Compliance (30%)	22.13	22.13
Management, Accountability (10%)	6.68	6.38
Asset Management (14%)	8.30	8.40
Use Efficiency, Loss Management (3%)	3.00	2.85
Bonus Scores	5.28	4.17
Penalties	1.00	1.00
Blue Drop Score (2014)	**74.95%**	**70.45%**
Blue Drop Score (2012)	95.2%	95.2%
Blue Drop Score (2011)	92.9%	92.9%
Blue Drop Score (2010)	71.94%	71.94%
System Design Capacity (Ml/d)	29.0	73.3
Operational Capacity (% i.t.o. Design)	62%	63%
Average daily consumption (l/p/d)	176.9	256.3
Microbiological Compliance (%)	**99.5%**	**99.9%**
Chemical Compliance (%)	**99.9%**	**99.9%**

Table C.4.1.8: Blue Drop Performance of the Municipality (DWS's 2014 Blue Drop Report)

Municipal Blue Drop Risk Rating	46%

The overall 2014 Risk Rating for Swartland is 46% which translates into the 12th worst performance (or position 14 out of 25 WSAs) in the Western Cape. Note that this value is based on the 3 specific areas indicated below and shows concerns (medium to critical risks) for Process Control (which risks reflect compliance in terms of draft Regulation 813) in 2 of the 2 systems; Drinking Water Quality in none of the 2 systems; and Risk Management in none of 2 systems.

Assessment Area	Malmesbury	Moorreesburg
2014		
Blue Drop Risk Rating (2014)	**46.0%**	**48.4%**
Process Control RR	57.1%	56.1%
Drinking Water Quality RR	40.7%	40.7%
Risk Management RR	43.5%	30.4%
2013		
Blue Drop Risk Rating (2013)	**16.5%**	**14.6%**
Process Control RR	34.1%	31.7%
Drinking Water Quality RR	11.1%	18.5%
Risk Management RR	30.4%	21.7%
2012		
Blue Drop Risk Rating (2012)	**79.5%**	**78.7%**
Process Control RR	80.5%	80.5%
Drinking Water Quality RR	14.8%	11.1%
Risk Management RR	30.4%	26.1%

The average residential daily consumption (l/p/d) for the last four financial years are summarised in the table below:

Table C.4.1.9: Average residential daily consumption (l/p/d) for the last four financial years.

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**
Distribution System	**2018/2019**			**2017/2018**		
	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	1 598	76.334	**47.768**	1 536	70.570	**45.9**
Riebeek Wes and Ongegund	6 924	262.849	**37.962**	6 532	225.385	**34.5**
Riebeek Kasteel	7 645	344.178	**45.020**	7 145	256.948	**36.0**
Yzerfontein *	1 500	361.811	**241.207**	1 442	220.501	**152.9**
Darling	11 969	697.342	**58.262**	11 735	625.764	**53.3**
Moorreesburg	16 945	905.616	**53.444**	16 294	804.589	**49.4**
Malmesbury	62 963	3 402.595	**54.041**	60 218	2 910.413	**48.3**
Total	**109 544**	**6 078.411**	**55.488**	**104 902**	**5 136.482**	**49.0**

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.

DWS's Green Drop Process

The DWS also completed their Third Order Assessment of Municipal Waste Water Treatment Plants, DWS's Green Drop Report for 2013, which provides a scientific and verifiable status of municipal waste water treatment. Green drop status is awarded to those WSAs that comply with 90% criteria on key selected indicators on waste water quality management. The green drop performance of Swartland Municipality is summarised as follows in the DWS's 2013 Green Drop Report.

Table C.4.1.10: Green Drop Performance of the Municipality (DWS's 2013 Green Drop Report)	
Average Green Drop Score	**2009 – 75.00%, 2011 – 72.70%, 2013 –72.38%**

Regulatory Impression: Swartland Local Municipality's commitment to its wastewater business and ambition towards Green Drop Certification cannot be faulted. This inspectorate was welcomed by the Mayor, the Municipal Manager and Senior Technical- and Financial Managers. The Regulator is of firm opinion that with such leadership, management and true understanding of the requirements to wastewater excellence, Swartland will improve in strides going forward. The team wishes to encourage the Municipality to continue being so positive.

Swartland has managed to maintain its municipal Green Drop score at 75.3%, marking an above average performance. This is no small feat, given the stringent standard of the GWSA criteria for 2013. The team is congratulated and encouraged to use the feedback to address the remaining shortcomings.

The most significant factor that retained scores below the 80% (and even 90%) mark, has been the uncertainties of the applicable standards to calculate compliance. The municipality must make a concerted effort to resolve authorisations, especially as pertaining to irrigation- and no-discharge systems. The WSA's resolve to use General Limits as internal standard is commendable and evidence of this accomplished team upholding of good practice. However, by addressing this single aspect, a significant upwards change can be expected during the next cycle GWSA scoring. A special mention of the Process Controllers on Malmesbury WWTW for display of their practical knowledge of the systems – continue to transfer this know-how to fellow practitioners. This is indeed a scarce skill.

Swartland's approach to risk abatement has received a full score for its resolve and Tender Committee approval for the implementation of the W_2RAP. At the moment, all 9 treatment systems remain in moderate risk positions, and the Regulator encourage the municipality to move plants towards low risk space by rigorous implementation of the W_2RAP. Already, the municipality's construction of the new Malmesbury WWTW and planning of the Riebeek Valley WWTW is a proactive step to relieve the pressure on the current systems. Note the recommendation to include the WIMP (O&M) and alert levels specifications in the W_2RAP and GDIP.

Green Drop findings:

1. Regulation 17 compliance is not in place for most plants, and registration of process controllers should be fast-tracked.
2. A number of systems did not have process assessments and network inspection in place, this should be the basis to inform the W_2RAP.
3. Effluent quality fails at 9 of 9 treatment systems.
4. Four (4) of 9 treatment plants are operated above their hydraulic design capacity, and 1 plant do not have base information to complete this calculation (assume highest risk of 151%).

Site Inspection Scores:

Malmesbury 69% and Darling 67%

2013 GREEN DROP REPORT CARD									
Key Performance Area	**Malmesbury-Abbotsdale**	**Darling**	**Chatsworth**	**Kalbaskraal**	**Riebeek Kasteel**	**Riebeek Wes**	**Moorreesburg**	**Koringberg**	**Ongegund (PPC)**
Process Control, Maintenance and Management Skill	80	84	80	80	50	50	80	80	50
Monitoring Programme	100	100	83	83	75	95	100	100	85
Submission of Results	20	50	50	100	50	100	100	50	100
Effluent Quality Compliance	20	20	0	20	20	0	20	0	24
Risk Management	100	96	96	96	100	100	86	96	84
Local Regulation	100	100	100	100	100	100	100	100	100
Treatment Capacity	100	100	63	19	55	35	48	29	44
Asset Management	85	59	60	80	79	73	70	80	60
Bonus Scores	7.74	5.54	7.24	5.76	6.46	6.85	5.60	6.61	6.55
Penalties	0.00	0.00	1.37	1.09	1.22	1.29	1.06	0.00	2.48
Green Drop Score (2013)	**75.49%**	**70.65%**	**60.27%**	**68.40%**	**64.53%**	**62.41%**	**69.27%**	**64.96%**	**62.82%**
Green Drop Score (2011)	**73.90%**	**72.90%**	**61.90%**	**68.80%**	**65.90%**	**64.40%**	**71.40%**	**66.40%**	**78.30%**
Green Drop Score (2009)	**77.00%**	**75.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**73.00%**	**0.00%**	**0.00%**
System Design Capacity (Ml/d)	5.000	1.500	0.118	0.157	0.200	0.300	1.500	0.030	0.150
Capacity Utilisation (% ADWF i.t.o. Design Capacity)	110.00%	73.33%	83.05%	38.22%	157.50%	120.00%	53.33%	NI (151.00%)	100.00%
Resource Discharged into	Diep River	Unknown. Irrigation to land	No discharge	No discharge	Overflow to land	No discharge	No Go river (tributary of Berg River)	No discharge	Unknown
Microbiological Compliance	50.00%	50.00%	58.33%	25.00%	8.33%	41.67%	50.00%	58.33%	75.00%
Chemical Compliance	52.08%	50.00%	22.92%	25.00%	68.75%	68.75%	22.92%	22.92%	58.33%
Physical Compliance	61.11%	69.44%	61.11%	50.00%	75.00%	72.22%	72.22%	33.33%	91.67%
Overall Compliance	55.21%	57.29%	41.67%	34.38%	63.54%	66.67%	44.79%	31.25%	72.92%
Wastewater Risk Rating (2012)	**54.50%**	**58.90%**	**41.20%**	**41.20%**	**41.20%**	**58.80%**	**47.10%**	**41.20%**	**52.90%**
Wastewater Risk Rating (2013)	**70.59%**	**52.94%**	**58.82%**	**35.29%**	**64.71%**	**58.82%**	**52.94%**	**52.94%**	**52.94%**

The 2014 Green Drop Progress Report of the DWS is further the product of a "gap" year, whereby progress is reported in terms of the improvement or decline in the risk position of the particular WWTW, as compared to the previous year's risks profile. This tool to collect, assess and report the risk profile is called the Green Drop Progress Assessment Tool (PAT). The PAT progress assessment period was done on compliance data and actions during 1 July 2012 – 30 June 2013, which represents the year immediately following the Green Drop 2013 assessment period. The results for Swartland Municipality were summarised as follow in DWS's 2014 Green Drop Risk Profile Progress Report.

Table C.4.1.11: DWS's 2014 Green Drop Risk Profile Progress Report results for Swartland Municipality

Technology Description	Malmesbury	Darling	Chatsworth	Kalbaskraal	Riebeek Kasteel	Riebeek Wes	Moorreesburg	Koringberg	Ongegund (PPC)
Technology (Liquid)	Activated sludge & BNR	Activated sludge and maturation ponds	Anaerobic ponds / Facultative ponds	Anaerobic ponds/ Facultative ponds	Anaerobic ponds/ Facultative ponds	Anaerobic ponds/ Facultative ponds	Activated sludge and Biological filters	Anaerobic ponds / Facultative ponds	Activated sludge
Technology (Sludge)	Belt press dewatering	Belt press dewatering and Anaerobic digestion	Sludge lagoon / pond	None specified	None specified	None specified	Solar drying beds	None specified	Solar drying beds
Key Risk Areas									
ADWF Design Capacity (Ml/d)	10.000	1.500	0.118	0.157	0.200	0.300	1.500	0.030	0.150
Operational flow (% of Design Capacity)	55%	113%	151% (NI)	151% (NI)	151% (NI)	151% (NI)	151% (NI)	151% (NI)	151% (NI)
Annual Average Effluent Quality Compliance (2012-2013)	**87.5%**	**97.9%**	**66.7%**	**62.5%**	**70.8%**	**74.0%**	**76.0%**	**46.9%**	**88.5%**
Microbiological Compliance	**58.3%**	**91.7%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**91.7%**	**100.0%**	**83.3%**
Physical Compliance	**100.0%**	**100.0%**	**75.0%**	**72.2%**	**77.8%**	**83.3%**	**83.3%**	**44.4%**	**91.7%**
Chemical Compliance	**85.4%**	**97.9%**	**52.1%**	**45.8%**	**58.3%**	**60.4%**	**66.7%**	**35.4%**	**87.5%**
Technical skills (Reg. 813)	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial
2014 Wastewater Risk Rating (%CRR/CRR$_{max}$)	**50.0%**	**41.2%**	**64.7%**	**70.6%**	**70.6%**	**70.6%**	**70.6%**	**76.5%**	**64.7%**
2013 Wastewater Risk Rating (%CRR/CRR$_{max}$)	**70.6%**	**52.9%**	**58.8%**	**35.3%**	**64.7%**	**58.8%**	**52.9%**	**52.9%**	**52.9%**
Risk Abatement Planning									
Highest Risk Areas based on the CRR	Wastewater quality, technical skills	Technical skills, operational capacity	Wastewater quality, technical skills, operational capacity	Wastewater quality, technical skills, operational capacity	Wastewater quality, technical skills, operational capacity	Wastewater quality, technical skills, operational capacity	Wastewater quality, technical skills, operational capacity	Wastewater quality, technical skills, operational capacity	Wastewater quality, technical skills, operational capacity
WW Risk Abatement Status	Draft document (unapproved by	Draft document (unapproved by	Draft document (unapproved by	Draft document	Draft document	Draft document	Draft document	Draft document	Draft document

Table C.4.1.11: DWS's 2014 Green Drop Risk Profile Progress Report results for Swartland Municipality									
Technology Description	**Malmesbury**	**Darling**	**Chatsworth**	**Kalbaskraal**	**Riebeek Kasteel**	**Riebeek Wes**	**Moorreesburg**	**Koringberg**	**Ongegund (PPC)**
	Council)	Council)	Council)	(unapproved by Council	(unapproved by Council	(unapproved by Council)	(unapproved by Council)	(unapproved by Council)	(unapproved by Council)
Capital & Refurbishment expenditure for Fin Year 2012-2013 (Rand)	R25,7m	NI	NI	NI	R26m	R26m	NI	NI	R26m
Description of Projects' Expenditure 2012-2013	Upgrade from 5 to 10 Ml/d with membrane technology, new structures & equipment over 4 financial years	NI	NI	NI	Construction of an AS plant	Construction of an AS plant	NI	NI	Construction of an AS plant
W_2RAP Abatement Document and Status Commentary	W_2RAP provided dated 11 October 2011. Although actions refer to the following years, the document needs to be reviewed for 2012/13. All elements of the W_2RAP guideline addressed in the W_2RAP: A collaborative, multi-stakeholder team was assembled. All 9 systems were addressed. Medium and high risks for wastewater source (2), wastewater treatment (5) and facility safety and worker protection (1) finalized as indicated. Existing control measures were identified, evaluated and additional control measures proposed where necessary - as part of the Improvement Plan. The Upgrade/ Improvement plan includes short- and long-term programmes. The short-term improvements include additional control measures to improve the effluent quality, while the long-term programmes relate to capital works, which include the upgrading of Malmesbury, with which the Municipality is currently busy, and the future upgrading of the Riebeek Kasteel (Incl. Riebeek Wes and Ongegund), Darling, Koringberg and Chatsworth plants. Implementation of the plan to be monitored to confirm improvements were made. Timeframes and responsibilities were specified. Management procedures such as incident management protocol compiled and being implemented. Supporting programmes to indirectly support the management of risks include actions such as training of personnel, quality management; communication procedures indicated.								

Regulatory Impression

The Swartland Municipality maintained its status on a municipal Green Drop score of 72.38% for the 2013 audit, when compared with the 2011 score of 72.70%. The highest score was achieved for the Malmesbury system at 75.49%. During the 2013-14 Green Drop Progress Reporting the CRR Risk Rating increased in 7 of the systems, while in 2 systems (Malmesbury and Darling) the score decreased.

It appears as if the necessary maintenance team competency is available at all systems and the Municipality is urged to maintain this situation. The DWS is understandably concerned about the increase in risk rating in most of the systems and requests the Municipality to intervene urgently to improve the situation. The DWS has the following concerns about wastewater management at the Municipality: lack of flow metering data at 7 of the plants, resulting in the worse situation (151%) being reported for operational capacity at the works; lack of supervisory and process control competencies at all works; general non-compliant effluent quality except at the Darling works. The Municipality should address the gaps identified in this and the 2013 Green Drop report through an updated GDIP which should be implemented with care to ensure improvement at their wastewater systems. The upgrade at the Malmesbury works is commended, as well as the projects to build activated sludge plants at Riebeek Kasteel, Riebeek Wes and Ongegund.

C.4.2. Water Quality Compliance

The table below gives an overview of the Swartland Municipality's water quality compliance, as taken from the IRIS.

Table C.4.2.1: Overview of Water Quality Compliance

WSDP Ref #	Measurable / Enabling Factor	Unit	Year 0 FY2020/21						Year 1 FY2019/20						Year 2 FY2018/19 *				
			MAH	CAH	CCH	CNA	O	D	MAH	CAH	CCH	CNA	O	D	MAH	CAH	CCH	CNA	O
	Results from Integrated Regulatory Information System																		
n/a	Analysis compliance	Total	412	95	791	941	1541	752	167	0	195	536	999	195	339	75	360	74	1284
n/a		Nr Failures	5	0	1	6	67	613	9	0	0	2	44	181	13	0	0	3	107
n/a		Compliance %	99%	0%	100%	99%	96%	18%	95%	0%	100%	100%	96%	7%	96%	100%	100%	96%	92%
n/a	Samples frequency	Total	341	19	341	341	341	341	167	0	195	268	268	195	339	75	360	74	1284
n/a		Nr Failures	21	1	21	21	21	21	3	0	0	14	14	0	13	0	0	3	107
n/a		Compliance %	94%	0%	94%	94%	94%	94%	98%	0%	100%	95%	95%	100%	96%	100%	100%	96%	92%
n/a	Sites compliance	Total	195	19	195	195	195	195	120	0	108	174	174	108	339	75	360	74	1284
n/a		Nr Failures	11	1	11	11	11	11	3	0	0	9	9	0	13	0	0	3	107
n/a		Compliance %	94%	0%	94%	94%	94%	94%	98%	0%	100%	95%	95%	100%	96%	100%	100%	96%	92%
6.3	**Water Supply and Quality**																		
6.3.6	Blue Drop Status	last year certified by DWS	New Blue Drop PAT still to be done						No Blue Drop assessment was done by DWS						No Blue Drop assessment was done by DWS				
9.3	**Water Quality**																		
9.3.10	% Time (days) within SANS 241 standards per year	Average of analysis compliance %	69%						66%						97%				

Legend **MAH**: Microbiological Acute Health; **CAH**: Chemical Acute Health; **CCH**: Chemical Chronic Health; **CNA**: Chemical Non Health Aesthetic; **O**: Operational; **D**: Disinfectant

Results for 2018/2019 * Calculated from water quality compliance results summarised in Annexure D

The Table below gives an overview of the number of compliance samples taken over the period July 2020 to June 2021 for the various water distribution networks.

Table C.4.2.2: Number of water quality compliance samples taken throughout the various water distribution systems over the period July 2020 to June 2021

Number of Sampling points within the distribution system (Swartland Mun)	2	1	5	2	1	1	1	1	1	1	1
Parameter Sampled	**Moorreesburg**	**Koringberg**	**Malmesbury**	**Darling**	**Riebeek Kasteel**	**Riebeek Wes**	**Yzerfontein**	**Riverlands**	**Abbotsdale**	**Chatsworth**	**Kalbaskraal**
pH (at 25°C)	36	43	129	54	47	24	41	24	24	24	24
Conductivity	36	43	129	54	47	24	41	24	24	24	24
Turbidity	36	43	129	54	47	24	41	24	24	24	24
Free Chlorine	36	38	123	50	43	24	37	24	24	24	24
Total Coliform Bacteria	36	47	132	59	51	24	49	24	24	24	24
E.Coli	36	47	132	59	52	24	49	24	24	24	24
Heterotrophic Plate Count	36	29	112	40	34	24	28	24	24	24	24
Total number of samples	**252**	**290**	**886**	**370**	**321**	**168**	**286**	**168**	**168**	**168**	**168**

The water quality of all the water distribution systems in Swartland Municipality is "Excellent", according to the SANS0241 classification. The water quality compliance sample results are included in Annexure D for each of the distribution systems. A full SANS0241 analyses was done during the 2020/2021 financial year. The overall percentage of compliance of the water quality samples taken over the period July to June for the last three financial years is summarised in the table below per distribution system (SANS 241: 2015 Limits).

Table C.4.2.3: Percentage compliance of the final water quality samples for the last three financial years

Performance Indicator	Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2015)			% Sample Compliance according to SANS241-2015 Limits			Number of Samples taken into account		
	20/21	19/20	18/19	20/21	19/20	18/19	20/21	19/20	18/19
Moorreesburg									
Acute Health Chemical	No (Excellent)	-	No (Excellent)	100.0%	-	100.0%	10	-	5
Acute Health Microbiological	No (Excellent)	No (Excellent)	Yes (Unacceptable)	100.0%	97.1%	94.3%	40	34	35
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	82	26	24
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	95.9%	96	68	74
Operational Efficiency	No (Excellent)	No (Excellent)	Yes (Unacceptable)	97.4%	97.8%	88.6%	152	136	132
Koringberg									
Acute Health Chemical	No (Excellent)	-	No (Excellent)	100.0%	-	100.0%	5	-	5
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	49	37	21
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	61	30	24
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	96.0%	98	66	50
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	98.8%	98.5%	97.5%	166	130	80
Malmesbury									
Acute Health Chemical	No (Excellent)	-	No (Excellent)	100.0%	-	100.0%	40	-	20
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	98.1%	97.8%	148	103	93
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	311	80	96
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	98.9%	98.4%	100.0%	368	192	214
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	97.8%	94.1%	93.5%	536	391	352
Darling									
Acute Health Chemical	No (Excellent)	-	No (Excellent)	100.0%	-	100.0%	10	-	10
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	98.2%	100.0%	63	57	36
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	96	43	48
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	99.2%	100.0%	100.0%	132	100	86
Operational Efficiency	No (Excellent)	No (Excellent)	Yes (Unacceptable)	97.7%	96.6%	88.1%	215	208	134
Riebeek Kasteel									
Acute Health Chemical	No (Excellent)	-	No (Excellent)	100.0%	-	100.0%	5	-	5
Acute Health Microbiological	No (Good)	No (Excellent)	Yes (Unacceptable)	96.3%	100.0%	86.4%	54	12	22
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	66	9	24
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	106	24	52
Operational Efficiency	No (Good)	Yes (Unacceptable)	No (Good)	92.3%	79.2%	91.7%	183	48	84
Riebeek Wes									
Acute Health Chemical	No (Excellent)	-	No (Excellent)	100.0%	-	100.0%	5	-	5
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	26	12	22
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	47	7	24
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	60	24	52
Operational Efficiency	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	98.8%	100	48	84
Yzerfontein									
Acute Health Chemical	No (Excellent)	-	No (Excellent)	100.0%	-	100.0%	5	-	5
Acute Health Microbiological	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	97.4%	100.0%	51	39	23
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	60	30	24
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	94	66	52
Operational Efficiency	No (Excellent)	No (Excellent)	Yes (Unacceptable)	97.5%	95.6%	83.7%	163	136	86
Riverlands									
Acute Health Chemical	No (Excellent)	-	No (Excellent)	100.0%	-	100.0%	5	-	5
Acute Health Microbiological	No (Excellent)	No (Good)	Yes (Unacceptable)	100.0%	96.0%	90.9%	26	25	22
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	47	22	24
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	98.1%	60	50	52

Table C.4.2.3: Percentage compliance of the final water quality samples for the last three financial years									
Performance Indicator	Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2015)			% Sample Compliance according to SANS241-2015 Limits			Number of Samples taken into account		
	20/21	19/20	18/19	20/21	19/20	18/19	20/21	19/20	18/19
Operational Efficiency	No (Excellent)	Yes (Unacceptable)	No (Good)	93.0%	88.0%	90.5%	100	100	84
Abbotsdale									
Acute Health Chemical	No (Excellent)	-	No (Excellent)	100.0%	-	100.0%	5	-	5
Acute Health Microbiological	No (Excellent)	Yes (Unacceptable)	No (Good)	100.0%	92.9%	95.2%	26	14	21
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	47	11	24
Aesthetic	No (Excellent)	Yes (Unacceptable)	No (Excellent)	100.0%	60.7%	100.0%	60	28	50
Operational Efficiency	No (Excellent)	Yes (Unacceptable)	No (Good)	96.0%	53.6%	90.0%	100	56	80
Chatsworth									
Acute Health Chemical	No (Excellent)	-	No (Excellent)	100.0%	-	100.0%	5	-	5
Acute Health Microbiological	No (Excellent)	No (Good)	Yes (Unacceptable)	100.0%	95.0%	90.9%	26	20	22
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	47	15	24
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	60	40	52
Operational Efficiency	No (Excellent)	No (Good)	No (Good)	94.0%	91.3%	91.7%	100	80	84
Kalbaskraal									
Acute Health Chemical	No (Excellent)	-	No (Excellent)	100.0%	-	100.0%	5	-	5
Acute Health Microbiological	No (Excellent)	Yes (Unacceptable)	No (Good)	100.0%	89.5%	95.5%	26	19	22
Chronic Health	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	100.0%	47	16	24
Aesthetic	No (Excellent)	No (Excellent)	No (Excellent)	100.0%	100.0%	98.1%	60	38	52
Operational Efficiency	No (Excellent)	No (Good)	No (Good)	100.0%	92.1%	92.9%	100	76	84

The table below gives an overview of the four categories under which the risks posed by micro-organism, physical or aesthetic property or chemical substance of potable water is normally classified:

Table C.4.2.4: Four Categories under which the risks posed by Micro-organism, Physical or Aesthetic Property or Chemical Substance of potable water is normally classified	
Category	**Risk**
Acute Health	Determinand that poses an immediate unacceptable health risk if present at concentration values exceeding the numerical limits specified in this part of SANS 241.
Aesthetic	Determinand that taints water with respect to taste, odour and colour and that does not pose an unacceptable health risk if present at concentration values exceeding the numerical limits specified in SANS 241.
Chronic Health	Determinand that poses an unacceptable health risk if ingested over an extended period if present at concentration values exceeding the numerical limits specified in SANS 241.
Operational	Determinand that is essential for assessing the efficient operation of treatment systems and risks from infrastructure

The table below gives an overview of Swartland Municipality's wastewater quality compliance, as taken from the IRIS.

Table C.4.2.5: Overview of Wastewater Quality Compliance

WSDP Ref #	Measurable / Enabling Factor	Unit	Year 0 FY2020/21				Year-1 FY2019/20				Year-2 FY2018/19			
			M	C	P	O	M	C	P	O	M	C	P	O
	Results from Integrated Regulatory Information System													
n/a	Regulatory compliance	Total	79	191	259	-	72	151	210	-	-	-	-	-
n/a		Nr Failures	11	72	64	-	3	73	57	-	-	-	-	-
n/a		Compliance %	86%	62%	75%	N/A	96%	52%	73%	N/A	0%	0%	0%	N/A
n/a	Operational compliance	Total	Not captured on IRIS, but recorded by Process Controllers at each of the WWTW											
n/a		Nr Failures												
n/a		Compliance %												
5.3.1	**Monitoring and Sample Failure**													
5.3.1.3 5.3.1.4 5.3.1.5	Average % of sample failure	Failure %	14%	38%	25%	N/A	4%	48%	27%	N/A	100%	100%	100%	N/A
6.3	**Water Supply and Quality**													
6.4.6	Green Drop Status	last year certified by DWS	Green Drop assessment still to be done				No Green Drop assessment was done by DWS				No Green Drop assessment was done by DWS			

Legend **M**: Microbiological; **C**: Chemical; **P**: Physical; **O**: Operational

The final effluent quality compliance sample results are included in Annexure D for each of the WWTWs. The overall percentage compliance of the final effluent samples taken over the last three financial years at the Malmesbury-, Darling-, Moorreesburg-, Koringberg-, Chatsworth-, Kalbaskraal- and Riebeek Valley WWTW are summarised in the tables below.

Table C.4.2.6: Percentage Faecal Coliforms compliance of the compliance samples taken at the various WWTWs for the last three financial years

WWTW	2020/2021	2019/2020	2018/2019
Malmesbury	100.0%	100.0%	100.0%
Darling	91.7%	75.0%	81.8%
Moorreesburg	40.0%	33.3%	41.7%
Koringberg	0.0%	0.0%	0.0%
Chatsworth	16.7%	33.3%	60.0%
Kalbaskraal	100.0%	100.0%	100.0%
Riebeek Valley	91.7%	75.0%	83.3%
Total	**64.9%**	**59.5%**	**67.1%**

Table C.4.2.7: Percentage Chemical compliance of the compliance samples taken at the various WWTWs for the last three financial years

WWTW	2020/2021					2019/2020					2018/2019				
	Ammonia	Nitrates	COD Filtered	Ortho Phosphate	Overall	Ammonia	Nitrates	COD Filtered	Ortho Phosphate	Overall	Ammonia	Nitrates	COD Filtered	Ortho Phosphate	Overall
Malmesbury	75.0%	66.7%	91.7%	58.3%	**72.9%**	91.7%	50.0%	100.0%	91.7%	**83.3%**	100.0%	90.9%	100.0%	90.9%	**95.5%**
Darling	100.0%	100.0%	100.0%	100.0%	**100.0%**	91.7%	100.0%	100.0%	91.7%	**95.8%**	50.0%	100.0%	91.7%	100.0%	**85.4%**
Moorreesburg	0.0%	80.0%	20.0%	40.0%	**35.0%**	0.0%	66.7%	33.3%	25.0%	**31.3%**	0.0%	66.7%	41.7%	18.2%	**31.9%**
Koringberg	0.0%	100.0%	0.0%	8.3%	**27.1%**	8.3%	91.7%	0.0%	8.3%	**27.1%**	0.0%	100.0%	0.0%	0.0%	**25.0%**
Chatsworth	0.0%	100.0%	0.0%	25.0%	**31.3%**	0.0%	100.0%	0.0%	25.0%	**31.3%**	10.0%	100.0%	0.0%	20.0%	**32.5%**
Kalbaskraal	N/A	N/A	16.7%	N/A	**16.7%**	N/A	N/A	0.0%	N/A	**0.0%**	N/A	N/A	30.0%	N/A	**30.0%**
Riebeek Valley	91.7%	100.0%	91.7%	91.7%	**93.8%**	100.0%	100.0%	100.0%	83.3%	**95.8%**	100.0%	100.0%	100.0%	83.3%	**95.8%**
Total	**49.2%**	**92.3%**	**48.1%**	**55.4%**	**60.7%**	**48.6%**	**84.7%**	**47.6%**	**54.2%**	**58.3%**	**44.8%**	**92.5%**	**54.5%**	**54.5%**	**61.4%**

Table C.4.2.8: Percentage Physical compliance of the compliance samples taken at the various WWTWs for the last three financial years.

WWTW	2020/2021				2019/2020				2018/2019			
	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%**	58.3%	91.7%	100.0%	**83.3%**	90.9%	100.0%	100.0%	**97.0%**
Darling	100.0%	100.0%	91.7%	**97.2%**	100.0%	100.0%	83.3%	**94.4%**	91.7%	81.8%	66.7%	**80.0%**
Moorreesburg	100.0%	20.0%	0.0%	**40.0%**	100.0%	66.7%	41.7%	**69.4%**	100.0%	33.3%	81.8%	**71.4%**
Koringberg	100.0%	8.3%	0.0%	**36.1%**	100.0%	0.0%	8.3%	**36.1%**	100.0%	0.0%	0.0%	**33.3%**
Chatsworth	100.0%	83.3%	8.3%	**63.9%**	100.0%	75.0%	25.0%	**66.7%**	100.0%	30.0%	20.0%	**50.0%**
Kalbaskraal	100.0%	100.0%	N/A	**100.0%**	100.0%	66.7%	N/A	**83.3%**	100.0%	60.0%	N/A	**80.0%**
Riebeek Valley	100.0%	100.0%	91.7%	**97.2%**	100.0%	100.0%	100.0%	**100.0%**	100.0%	100.0%	91.7%	**97.2%**
Total	**92.2%**	**77.9%**	**53.8%**	**75.8%**	**94.0%**	**71.4%**	**59.7%**	**75.8%**	**97.4%**	**59.2%**	**62.1%**	**73.5%**

Detail WWTW Process Audits were done for each of the WWTWs during the last financial year. The conclusions and recommendations from these WTW Process Audits are summarised in the table below.

Table C.4.2.9: Recommendations from the detail WWTW Process Audits (July 2018 to June 2020)

WWTW	Component	Recommendation
Malmesbury	Conclusion	Plant is functioning as intended and in excellent condition. The plant is currently operating at 45% of its hydraulic design capacity and 68% of its organic loading capacity. The mechanical and electrical equipment and process units are in good conditions. The processes are operated and maintained at their design specifications and the final effluent complies with the standards as set out in the Water Use Licence. Overall, it can be concluded that the Malmesbury WWTW is in an excellent condition, due to the efforts of the operational staff and management working together and striving to the same goal.
	Recommendation: Design aspects	• Inlet pipeline: Solutions to alter and/or adjust the upward bend at the inlet works, should be investigated, e.g. using grit channels that precede the inlet works.
	Recommendation: Operational aspects	• Plant operation: The proposed Control Sheets, as included in the January 2018 W_2RAP, need to be implemented. • Monitoring: The proposed Operational Monitoring Program needs to be implemented. • Incidents: The Incident Management Protocols, as included in the January 2018 W_2RAP, need to be implemented.
Moorreesburg	Conclusion	The Moorreesburg WTW experienced various challenges which could mainly be attributed to old and dysfunctional infrastructure. The structures and equipment have reached the end of their economic useful life and control systems are ineffective and outdated. This resulted in frequent breakdowns, high maintenance costs and therefore poor effluent quality. The "Technical Report for the MIG: Upgrading of the Moorreesburg WWTW" Report listed the following problems related to the infrastructure at the plant: • Structural integrity of water retaining structures and civil infrastructure pose significant risk (i.e. at the risk of collapse) • Deteriorated mechanical equipment. • Clogged media in trickling biofilter. • Blocked clarigester. • Excessive corrosion to pipework and valves. • Safety of access throughout plant. • De-sludge drying beds. • Final effluent disinfection systems which does not comply with legislated safety requirements. • Flooding of vehicle access bridge during rainfall events. Interventions to ensure reliable treatment capacity of the plant was urgently required and the upgrading of the plant is therefore welcomed.

Table C.4.2.9: Recommendations from the detail WWTW Process Audits (July 2018 to June 2020)		
WWTW	**Component**	**Recommendation**
	Recommendation: Design aspects	• All the design aspects are being addressed in the construction of the new WWTW.
	Recommendation: Operational aspects	• Plant operation: The proposed Control Sheets, as included in the January 2018 W_2RAP, need to be implemented. • Monitoring: The proposed Operational Monitoring Program needs to be implemented. • Incidents: The Incident Management Protocols, as included in the January 2018 W_2RAP, need to be implemented.
Darling	Conclusion	The Darling WWTW is in a reasonable condition. The mechanical and electrical equipment are in good operating condition and the process controllers are performing their duties well as can be expected. The final effluent complies to the General Standard, except for ammonia and free chlorine. The plant is currently operating at 72% and 100% of the plant's hydraulic and organic capacity, respectively. Therefore, the plant is organically overloaded, leading to numerous operational issues.
	Recommendation: Design aspects	• Inlet works screening: As the screen is too small to handle peak flows, resulting in floods, a new mechanical screen and a manual hand-raked by-pass screen is recommended. • Inlet works design: A new inlet works should be constructed, that is above ground level, with a higher Peak Wet Weather Flow design capacity.
	Recommendation: Operational aspects	• Poor nitrification in bioreactor: Modifications to the recycle streams and aeration should be made, to improve the oxidation process efficiency. • Poor TSS removal in SSTs: The secondary sedimentation process should be investigated, to avoid the high amounts of TSS in the final effluent. • Plant operation: The proposed Control Sheets, as included in the January 2018 W_2RAP, need to be implemented. • Monitoring: The proposed Operational Monitoring Program needs to be implemented. • Incidents: The Incident Management Protocols, as included in the January 2018 W_2RAP, need to be implemented.
Koringberg	Conclusion	The Koringberg ponds system is in very poor condition. Based on the estimated flow to the ponds, the system is currently hydraulically overloaded, operating at 114% of the current design capacity of the pond system. It is recommended that the capacity of the system be upgraded to accommodate the flow to the plant, in order to ensure final effluent compliance. Regular maintenance tasks should be carried out to ensure that the pond embankments are kept in an immaculate condition and that no further nuisances can develop.
	Recommendation: Design aspects	• WWTW capacity: The organic loading capacity of the ponds system should be investigated to determine if the WWTW has enough hydraulic capacity. A package plant could be a good solution.
	Recommendation: Operational aspects	• Ponds condition: The ponds should be cleaned, by removing all vegetation, sludge, scum and pollution. • Embankments condition: The embankments should be cleared of vegetation. They should also be reinforced to avoid further damage. • Plant operation: The proposed Control Sheets, as included in the January 2018 W_2RAP, need to be implemented. • Incidents: The Incident Management Protocols, as included in the January 2018 W_2RAP, need to be implemented.
Kalbaskraal	Conclusion	The Kalbaskraal ponds system is in a poor condition. The plant is hydraulically still under capacity, operating at 40% of the plant's design capacity. It is recommended that regular maintenance tasks should be continued to ensure that the pond embankments are kept in an immaculate condition and that no nuisances can develop.
	Recommendation: Design aspects	• WWTW capacity: The organic loading capacity of the ponds system should be investigated to determine if the WWTW has enough capacity to handle the incoming COD loads. • Discharge point: A platform should be built where the trucks position themselves to discharge their waste to the first pond, to avoid damage to the embankments.
	Recommendation: Operational aspects	• Ponds condition: The ponds should be cleaned, by removing all vegetation, sludge, scum and pollution. • Embankments condition: The embankments should be cleared of vegetation. They should also be reinforced to avoid further damage. • Plant operation: The proposed Control Sheets, as included in the January 2018

Table C.4.2.9: Recommendations from the detail WWTW Process Audits (July 2018 to June 2020)		
WWTW	**Component**	**Recommendation**
		W_2RAP, need to be implemented. • Incidents: The Incident Management Protocols, as included in the January 2018 W_2RAP, need to be implemented.
Chatsworth	Conclusion	The Chatsworth ponds system is in very poor condition. Based on the estimated flow to the ponds, the system is currently operating at 63% of its design capacity and is therefore still hydraulically under capacity. It is recommended that the system be investigated to plan for future upgrades to the system, as is currently happening. Regular maintenance tasks should be continued to ensure that the pond embankments are kept in an immaculate condition and that no nuisances can develop.
	Recommendation: Design aspects	• The final effluent quality is complying with the Irrigation Standards. It is still well below the limits and therefore the ponds system is still sufficient. The Municipality is busy with upgrades. The upgrade consists of two phases. The first phase has already taken place in July 2017, which consisted of increasing the capacity to 270 kl/day. Phase 2 will consist of an additional 270m³/day, increasing the total capacity of the ponds system to 540 kl/day. This requires the duplication of the ponds system, after the Phase 1 upgrades, but excludes the fermentation pit and facultative pond.
	Recommendation: Operational aspects	• Ponds condition: The ponds should be cleaned, by removing all vegetation, sludge, scum and pollution. • Embankments condition: The embankments should be cleared of vegetation. • Plant operation: The proposed Control Sheets, as included in the January 2018 W_2RAP, need to be implemented. • Incidents: The Incident Management Protocols, as included in the January 2018 W_2RAP, need to be implemented.
Riebeek Valley	Conclusion	The Riebeek Valley WWTW is performing well, operating at 40% of its hydraulic design capacity and 41% of its organic loading capacity. The mechanical and electrical equipment and process units are in good operating condition. The plant is in an excellent condition, due to the efforts of the operational staff and management working together and striving to the same goal.
	Recommendation: Design aspects	• Inlet pipeline: Solutions to alter and/or adjust the upward bend at the inlet works, should be investigated.
	Recommendation: Operational aspects	• Plant operation: The proposed Control Sheets, as included in the January 2018 W_2RAP, need to be implemented. • Monitoring: The proposed Operational Monitoring Program needs to be implemented. • Incidents: The Incident Management Protocols, as included in the January 2018 W_2RAP, need to be implemented.

C.4.3. Incident Management

Swartland Municipality's 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.

A Water Safety Plan was drafted during 2012/2013 for Swartland Municipality. A detailed risk assessment was executed as part of the process and the existing control measures implemented by Swartland Municipality and the West Coast District Municipality were evaluated as part of the process. An Improvement / Upgrade Plan is also in place with relevant Water and Safety Management Procedures for implementation.

W_2RAPs for the various WWTWs and drainage networks are also in place (2018). 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 identified risks can then be managed according to its potential impacts on the receiving environment / community / resource.

The Water Safety Plan and W_2RAP Teams of Swartland Municipality are committed to meet regularly to review the implementation of all the aspects of the Water Safety Plan and W_2RAPs to ensure that they are still accurate and to determine whether the field assessments need updates or modifications and whether the Incident Response Management Protocol is still adequate. In addition to the regular three-year review, the Water Safety Plan and W_2RAPs 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 incident.

An Incident Response Management Protocol is in place and forms part of Swartland Municipality's Water Safety Plan and W_2RAPs. The Incident Response Management Protocol entails that certain reactive procedures are followed when an incident occurs, such as when a malfunction of the treatment processes occurs due to power failures, faulty equipment, adverse weather conditions or human error.

Operational Alert Levels are also in place for the WWTWs in order to ensure that the various unit processes in the plant performs optimally. If these pre-determined Alert Levels are exceeded at any of the control points where samples are taken for operational purposes, specific actions are taken to bring the operational parameters back to within the target ranges.

Table C.4.3.1: Incident Management and Reporting Overview

WSDP Ref #	Measurable / Enabling Factor	Unit	Year 0	Year - 1	Year - 2
			FY2020/21	FY2019/20	FY2018/19
6.3	**Water Supply and Quality**				
6.3.1	Incident Management Protocol in place	yes/total schemes in %	Yes	Yes	Yes
6.3.5	Failure Response Management in place	yes/total schemes in %	Yes	Yes	Yes
6.4	**Waste Water Supply and Quality**				
6.4.1	Incident Management Protocol in place	yes/total schemes in %	Yes	Yes	Yes
6.4.5	Failure Response Management in place	yes/total schemes in %	Yes	Yes	Yes

The water quality incident reporting compliance, as summarised in the table below, were calculated from the compliance sample results included in Annexure D.

Table C.4.3.2: Water Quality Incident Reporting Compliance (Health Oriented)

Measurable / Enabling Factor	Unit	Year 0 FY2020/21			Year -1 FY2019/20			Year-2 FY2018/19		
		Acute Health Chemical	Acute Health Micriobiological	Chronic Health	Acute Health Chemical	Acute Health Micriobiological	Chronic Health	Acute Health Chemical	Acute Health Micriobiological	Chronic Health
Failures in terms of Analysis	Total nr	100	535	911	-	372	289	75	339	360
	Nr of failures	0	2	0	-	10	0	0	13	0
	Failure %	0%	0%	0%	-	3%	0%	0%	4%	0%
	Nr reported	0	2	0	-	10	0	0	13	0
	Reported % of failure	100%	100%	100%	-	100%	100%	100%	100%	100%
Failures in terms of Samples	Total	100	535	911	-	372	289	75	339	360
	Nr of failures	0	2	0	-	10	0	0	13	0
	Failure %	0%	0%	0%	-	3%	0%	0%	4%	0%
	Nr reported	0	2	0	-	10	0	0	13	0
	Reported % of failure	100%	100%	100%	-	100%	100%	100%	100%	100%
Failures in terms of Sites	Total	100	535	911	-	372	289	75	339	360
	Nr of failures	0	2	0	-	10	0	0	13	0
	Failure %	0%	0%	0%	-	3%	0%	0%	4%	0%
	Nr reported	0	2	0	-	10	0	0	13	0
	Reported % of failure	100%	100%	100%	-	100%	100%	100%	100%	100%

C.5. Water Conservation and Water Demand Management

The table below gives an overview of the WC/WDM activities implemented by Swartland Municipality.

Table C.5.1: Overview of WC/WDM Activities

WSDP Ref. #	Regulations Ref. #	Description	Urban Settlements						Rural Settlements					
			Year 0		Year - 1		Year - 2		Year 0		Year - 1		Year - 2	
			2020/21		2019/20		2018/19		2020/21		2019/20		2018/19	
7.1.1	10.2.g.iii	**REDUCING UNACCOUNTED FOR WATER AND WATER INEFFICIENCIES**												
		Number of customers where the following activities have been pursued:	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total
7.1.1.1		Night flow metering	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
7.1.1.2		Day flow metering	22,370	100%	21,104	100%	20,996	100%	0	0%	0	0%	0	0%
7.1.1.3		Reticulation leaks fixed	263	100%	258	100%	260	100%	0	0%	0	0%	0	0%
7.1.1.4		Illegal connections formalized	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
7.1.1.5		Un-metered connections, metered	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
7.1.2	10.2.g.iii	**REDUCING HIGH PRESSURES FOR RESIDENTIAL CONSUMERS**												
		Number of residential consumers with water supply pressure of:	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total
7.1.2.1		< 300 kPa	4,791	23.0%	4,579	23.0%	4,484	23.0%	0	0%	0	0%	0	0%
7.1.2.2		300 kPa - 600 kPa	6,769	32.5%	6,471	32.5%	6,337	32.5%	0	0%	0	0%	0	0%
7.1.2.3		600 kPa - 900 kPa	8,332	40.0%	7,964	40.0%	7,799	40.0%	0	0%	0	0%	0	0%
7.1.2.4	10.2.b.iii	> 900 kPa	937	4.5%	896	4.5%	877	4.5%	0	0%	0	0%	0	0%
7.1.3	10.2.g.iii	**LEAK AND METER REPAIR PROGRAMMES**												
		Number of consumer units targeted by:	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total
7.1.3.1		Leak repair assistance programme	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
7.1.3.2	10.2.g.iv	Retro-fitting of water inefficient toilets	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
7.1.3.3		Meter repair programme	177	1%	568	3%	651	3%	0	0%	0	0%	0	0%
7.1.4	10.2.g.iii	**CONSUMER / END-USE DEMAND MANAGEMENT: PUBLIC INFO AND EDUCATION PROGRAMMES**												
			Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total	Nr	% of total
7.1.4.1		Number of schools targeted by education programmes	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
7.1.4.2		Number of consumers (people) targeted by public information programmes	22,370	100%	21,104	100%	20,996	100%	0	0%	0	0%	0	0%

Quantity of water unaccounted for (Ml/year):

The implementation of Swartland Municipality's Water Demand Management Strategy has been extremely successful, and the Municipality was able to reduce the water requirements of the towns significantly. The average annual water requirement growth over the period 2001/2002 to 2020/2021 was 1.31 %/a. 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 C.5.2: NRW, Water Losses and ILIs for the various water distribution systems

Description	Component	Unit	20/21	Record: Prior (Ml/a)				
				19/20	18/19	17/18	16/17	15/16
Koringberg	NRW	Volume	13.395	16.976	14.694	14.213	8.863	9.147
		Percentage	23.7%	32.7%	31.5%	32.2%	14.7%	14.2%
	Water Losses	Volume	12.634	16.224	13.953	14.125	8.743	9.018
		Percentage	22.4%	31.3%	29.9%	32.0%	14.5%	14.0%
	ILI		**1.80**	**1.59**	**1.41**	**1.37**	**0.85**	**0.95**
	The NRW and Water Losses were drastically reduced during the last financial year. The NRW and Water Losses stayed roughly the same for the period 2017/2018 to 2019/2020.							
Ongegund	NRW	Volume	3.075	4.236	6.546	16.655	17.748	14.966
		Percentage	17.4%	24.9%	36.4%	60.3%	45.2%	34.4%
	Water Losses	Volume	2.968	4.130	6.438	16.600	17.669	14.879
		Percentage	16.8%	24.2%	35.8%	60.1%	45.0%	34.2%
	The NRW and Water Losses were even further reduced during the last financial year. The Municipality needs to keep the NRW percentage for Ongegund less than 20%.							
Riebeek Wes	NRW	Volume	26.490	22.040	23.263	21.515	11.134	31.570
		Percentage	15.5%	14.0%	16.6%	16.9%	6.7%	16.7%
	Water Losses	Volume	21.468	17.044	18.302	21.261	10.804	31.191
		Percentage	12.6%	10.8%	13.0%	16.7%	6.5%	16.5%
	ILI		**0.80**	**0.82**	**1.09**	**1.27**	**0.64**	**1.88**
	The NRW and Water Losses increased a little during the last financial year. The current percentage of NRW of just above 15% is however still excellent.							
Riebeek Kasteel	NRW	Volume	52.790	47.762	25.377	52.180	43.154	47.555
		Percentage	20.6%	21.4%	13.8%	30.9%	17.2%	16.6%
	Water Losses	Volume	50.693	45.732	23.426	51.842	42.653	46.981
		Percentage	19.8%	20.5%	12.8%	30.7%	17.0%	16.4%
	ILI		**1.45**	**1.52**	**0.77**	**1.77**	**1.46**	**1.59**
	The NRW and Water Losses stayed roughly the same for the last two financial years. Municipality needs to work towards a percentage of less than 20% for the NRW.							
Yzerfontein	NRW	Volume	60.201	47.109	15.977	51.930	33.577	43.238
		Percentage	20.1%	19.8%	9.1%	33.6%	13.5%	13.6%
	Water Losses	Volume	54.562	41.593	10.585	51.621	33.079	42.604
		Percentage	18.2%	17.5%	6.0%	33.4%	13.3%	13.4%
	ILI		**1.03**	**0.97**	**0.25**	**1.37**	**0.91**	**1.19**
	The NRW and Water Losses stayed roughly the same for the last two financial years. Municipality needs to work towards a percentage of less than 20% for the NRW.							
Darling	NRW	Volume	150.505	138.078	127.003	91.397	84.219	112.516
		Percentage	26.4%	26.7%	25.8%	19.6%	14.0%	17.0%
	Water Losses	Volume	146.555	134.234	123.212	90.466	83.012	111.193
		Percentage	25.7%	25.9%	25.1%	19.4%	13.8%	16.8%
	ILI		**3.20**	**2.08**	**1.90**	**1.42**	**1.31**	**1.74**
	The NRW and Water Losses stayed roughly the same for the last three financial years. Municipality needs to work towards a percentage of less than 20% for the NRW.							
Moorreesburg	NRW	Volume	136.476	119.301	110.213	110.910	89.636	120.689
		Percentage	20.3%	20.2%	20.7%	23.1%	13.6%	15.5%
	Water Losses	Volume	129.156	112.145	103.172	109.948	88.318	119.130
		Percentage	19.2%	19.0%	19.4%	22.9%	13.4%	15.3%
	ILI		**1.74**	**1.36**	**1.25**	**1.37**	**1.11**	**1.49**
	The NRW and Water Losses stayed roughly the same for the last three financial years. Municipality needs to work							

Table C.5.2: NRW, Water Losses and ILIs for the various water distribution systems								
Description	**Component**	**Unit**	**20/21**	**Record: Prior (Ml/a)**				
				19/20	**18/19**	**17/18**	**16/17**	**15/16**
	towards a percentage of less than 20% for the NRW.							
Malmesbury	NRW	Volume	595.795	379.300	308.070	290.408	364.912	678.348
		Percentage	20.3%	15.0%	14.1%	14.7%	13.5%	21.6%
	Water Losses	Volume	562.994	347.331	276.769	286.461	359.494	672.065
		Percentage	19.2%	13.8%	12.7%	14.5%	13.3%	21.4%
	ILI		2.20	1.44	1.17	1.30	1.69	3.22
	The NRW and Water Losses increased during the last financial year. The Municipality needs to work towards a NRW percentage of less than 15%, as was done during the previous four financial years.							
TOTAL	**NRW**	**Volume**	**1 038.727**	**774.802**	**631.143**	**649.208**	**653.243**	**1 058.029**
		Percentage	**20.86%**	**17.95%**	**16.72%**	**18.86%**	**13.79%**	**19.29%**
	Water Losses	**Volume**	**981.030**	**718.433**	**575.857**	**642.325**	**643.772**	**1 047.061**
		Percentage	**19.70%**	**16.64%**	**15.25%**	**18.66%**	**13.59%**	**19.09%**
	ILI		2.11	1.60	1.41	1.51	1.49	2.57
	The overall NRW and Water Losses increase a little during the last financial year, mainly because of the increase in the NRW and Water Losses of Malmesbury. The Municipality needs to work towards an overall NRW percentage of less than 20%.							

Note: Infrastructure Leakage Index (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 Infrastructure Leakage Index (ILI) is also included in the above table, which 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 B. Attaining an 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.

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 2020/2021.

Table C.5.3: System input volume, average billed metered consumption and non-revenue water in litre per connection per day for the various water distribution systems for 2020/2021								
Water Balance Component	**Koringberg**	**Ongegund**	**Riebeek Wes**	**Riebeek Kasteel**	**Yzerfontein**	**Darling**	**Moorreesburg**	**Malmesbury**
System Input Volume	440	444	447	430	497	588	589	682
Average Billed Metered Cons.	336	367	377	342	397	433	469	544
Non-Revenue Water	105	77	69	89	100	155	120	138

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. Darling is the town with the highest NRW per connection per day.

Number of consumers connected to a water reticulation system where pressures rise above 900 kPa at the consumer connection are as follows:

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

Tables C.5.4: 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
	Malmesbury - Glen Lily Booster PS	1.304	58.27
	Malmesbury - Kalbaskraal Booster PS	8.659	44.71
	Malmesbury - Kalbaskraal Reservoir	0.131	4.78

Tables C.5.4: Length and average head of water pipelines			
System	**Zone**	**Length (km)**	**Average Head**
	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
	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

The table below indicate the potential savings on bulk water supply for each town within the Swartland Management Area, through the implementation of pressure management. The towns that should consider

pressure management as a measure of water demand management (where the % potential saving > 3% of the total water demand), as identified in the Swartland Municipality WDM Strategy developed by CES, are also indicated in the table below.

Table C.5.5: Potential savings on bulk water supply through the implementation of pressure management

Distribution System	Saving Potential	Pressure Management Priority (WDM Strategy)	Number of consumer connections where pressure rise above 900 kPa	
			Static Pressure	Residual Pressure
Koringberg	13%	**High**	No areas where pressures exceed 90m.	In the 24m to 90m range under peak hour demand conditions
PPC	-	Medium	No areas where pressures exceed 90m.	In the 24m to 90m range under peak hour demand conditions, except for the higher lying areas were the pressures are as low as 20m.
Riebeek Wes	6%	Medium	No areas where pressures exceed 90m.	In the 24m to 90m range under peak hour demand conditions.
Riebeek Kasteel	6%	Medium	No areas where pressures exceed 90m. Three PRVs in the system.	In the 24m to 90m range under peak hour demand conditions.
Yzerfontein	11%	**High**	No areas where pressures exceed 90m.	In the 24m to 90m range under peak hour demand conditions.
Darling	7%	Medium	No areas where pressures exceed 90m.	In the 24m to 90m range under peak hour demand conditions, except for the higher lying areas close to the reservoir and in the low cost housing development
Moorreesburg	7%	Medium	No areas where pressures exceed 90m.	In the 24m to 90m range under peak hour demand conditions, except for the low cost residential area were the pressures are as low as 20m, which is marginally less than the adopted design criteria.
Malmesbury	-	Medium	No areas where pressures exceed 90m. One PRV in the system.	The following areas could experience low residual pressures • Higher lying areas in Wesbank which is currently fed from the Wesbank reservoirs and not the tower. • Small area in the central part of Malmesbury, which is fed from the Kleindam reservoir.
Abbotsdale, Chatsworth, Kalbaskraal and Riverlands	9%	Medium	No areas where pressures exceed 90m. Four PRVs in the system (3 in Chatsworth and 1 in Riverlands)	In the 24m to 90m range under peak hour demand conditions

A **pressure reduction study** was completed for all the towns in Swartland Municipality's Management Area during the 2017/2018 financial year. The table below gives an overview of the existing PRV and the proposed future PRV zones.

Table C.5.6: Existing and proposed PRV zones

Zone	Description	Average Static Head (m)		Current AADD (kl/d)	Estimated Cost	Priority
		Current	Future			
Existing PRV zones						
Chatsworth PRV1	Chatsworth pressure management	54.1	54.1	374.8	-	-
Chatsworth PRV2		40.0	40.0		-	-
Chatsworth PRV3		40.0	40.0		-	-
Riverlands PRV	Riverlands pressure management	38.6	38.6	132.9	-	-
Panorama PRV1	Malmesbury pressure management: Panorama PRV1	45.2	35.2	348.2	-	7
Riebeek Kasteel PRV1	Riebeek Kasteel pressure management	50.9	39.5	195.36	-	-
Riebeek Kasteel PRV2		46.3	31.8	50.02	-	-
Riebeek Kasteel PRV3		29.5	26.5	275.5	-	-
Total Existing PRV zones				**1 376.78**	**-**	

Table C.5.6: Existing and proposed PRV zones						
Zone	Description	Average Static Head (m)		Current AADD (kl/d)	Estimated Cost	Priority
		Current	Future			
Proposed PRV zones						
Darling PRV	Darling pressure management	74.60	33.28	1 118.3	R337 540	1
Koringberg PRV	Koringberg pressure management	65.40	33.80	86.4	R222 600	8
Moorreesburg PRV	Moorreesburg pressure management	68.10	36.90	744.8	R595 000	3
Old Golf Course PRV	Malmesbury pressure management: Old Golf Course PRV	60.60	44.80	385.0	R278 600	6
Panorama PRV2	Malmesbury pressure management: Panorama PRV 2&3	77.40	43.40	836.8	R462 000	2
PPC Riebeek	Ongegund pressure management	63.35	37.30	62.1	R140 000	
Prison PRV	Malmesbury pressure management: Prison PRV	72.20	31.30	60.8	R140 000	9
Riebeek Wes PRV	Riebeek Wes pressure management	74.30	33.30	276.5	R434 000	4
					R930 860	
Yzerfontein PRV	Yzerfontein pressure management	63.00	36.75	427.5	R1 451 380	5
Total Proposed PRV zones				**3 998.2**	**R4 991 980**	

The following PRVs were installed and refurbished during the 2017/2018 financial year:

- New PRV installations: 1 x Darling, 1 x Koringberg, 2 x Moorreesburg, 4 x Malmesbury, 2 x Riebeek Valley and 1 x Yzerfontein,
- Refurbishment of existing PRVs: 4 x Chatsworth, 1 x Malmesbury and 6 x Riebeek Valley.

No further PRVs were installed during the 2020/2021 financial year.

Demand management activities undertaken:

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

Table C.5.7: 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

Table C.5.7: WDM activities implemented by Swartland Municipality
• 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.
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 E. 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 81 out of 100 suggesting that the Municipality is making good progress with regard to the implementation of specific WC/WDM activities.**

Pipeline Replacement Study: 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 C.5.8: 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.

Large Water Users: The Municipality also investigated the large water users during the 2019/2020 financial year. The table below list the 44 largest water users in Swartland Municipality's Management Area.

Table C.5.9: Large water users in Swartland Municipality's Management Area

No.	Address	Consumer	System	AADD May 2020 (kl/d)	Percentage of Town's Daily Billed Metered Consumption (19/20)
1	Dagbreek Street	RSA - Aandag: Zukiswa	Malmesbury	288	4.91%
2	Caledon Street 7	CLB Eiendomme Pty Ltd	Darling	136	13.06%
3	Abattoirweg	Roelcor Vleis EDMS BPK	Malmesbury	96	1.64%
4	Abattoir Street	Swartland Volstruise BPK	Malmesbury	68	1.16%
5	Piketbergweg Informal Settlement	Theron Dibert Familietrust	Moorreesburg	61	4.73%
6	Piketbergweg Correctional Services	Swartland Munisipaliteit Piketbergweg Plakkerskamp	Malmesbury	45	0.77%
7	Schoonspruitweg	Yara Africa Fertilizer Pty Ltd	Malmesbury	40	0.68%
8	Wagener Street 10	Pioneer Foods Groceries Pty LtD	Malmesbury	39	0.66%
9	Bokomoweg	Sasko EDMS Bpk Bokomoweg	Malmesbury	39	0.66%
10	Informal Settlement House 37	Theunis L Informele Nederset Huis	Riverlands	30	0.51%
11	Prospect Street	Du Plessis JT Prospectstraat	Malmesbury	27	0.46%
12	Fresia Street 96 Flats	Swartland Munisipaliteit	Wesbank	26	0.44%
13	Bokomoweg	Quantum Foods(Pty) Ltd Bokomoweg 0	Malmesbury	25	0.43%

Table C.5.9: Large water users in Swartland Municipality's Management Area					
No.	**Address**	**Consumer**	**System**	**AADD May 2020 (kl/d)**	**Percentage of Town's Daily Billed Metered Consumption (19/20)**
14	Abattoir Street	Roelcor Vleis (EDMS) BPK	Malmesbury	24	0.41%
15	Gladiola Street (Saspark)	Transnet Property	Wesbank	23	0.39%
16	Caledonstraat 4404	Brewery Pty Ltd	Darling	23	2.21%
17	Darlingweg Schoonspruit	Dept Van Onderwys & Kultuur	Wesbank	22	0.37%
18	PG Nelson Street – Hospital	Provincial Government W Cape Nelsonstr-Hospitaal PG	Malmesbury	21	0.36%
19	Voortrekkerweg Die Bron	Amrichprop 20 Prop Pty Ltd	Malmesbury	21	0.36%
20	Kotze Street 11	Swartland Eiendomme (Pty) Ltd	Moorreesburg	19	1.47%
21	Ark Str – Smuts Malan H/S	Government Western Arkstr	Riebeek Wes	18	4.84%
22	Uniestraat 0	Moorreesburg Koringboere Uniestraat	Moorreesburg	17	1.32%
23	Rozenburg Hilltop Views	Ikratshi Investment 113 BK	Malmesbury	17	0.29%
24	Kerkstr Pleinstraat Eiland	Swartland Munisipaliteit	Moorreesburg	17	1.32%
25	Nywerheidsingel 15	Intshona Milk Products Pty Ltd	Malmesbury	16	0.27%
26	Hugenote Street 31	Hugenote Park	Malmesbury	16	0.27%
27	Iris Street / Protea D1	Huysamen S	Wesbank	16	0.27%
28	Loopstraat Swembad	Swartland Munisipaliteit	Moorreesburg	16	1.24%
29	Schoonspruitweg 13	Brink & Heath Civils	Malmesbury	16	0.27%
30	Laan Af Kloof Street 215	Morester Trust Laan AF	Riebeek Kasteel	16	3.33%
31	Pieter Bergh Street 4	Property Holdings PT Pieter	Malmesbury	15	0.26%
32	KL Amoskuil	Spice Route Wine Comp	Malmesbury	14	0.24%
33	Alfastraat 9109	Swartland Munisipaliteit	Ilinge Lethu	14	0.24%
34	Langstraat Huis Van Zyl 0	Provinsiale Regering Wes-Kaap	Malmesbury	14	0.24%
35	Voortrekkerweg Maresa 4A 22	Bester Cornelia Elizabeth	Malmesbury	14	0.24%
36	Amoskuil 0	Fair View Trust	Malmesbury	14	0.24%
37	Pieter Cruythofflaan 298	Bader W	Riebeek Kasteel	13	2.70%
38	Swartland Street	Moorreesburg Privaat Abbattoir	Moorreesburg	13	1.01%
39	Darlingweg Liebenberg Pri	Provinsiale Regering Wes-Kaap	Wesbank	13	0.22%
40	Durbanstr Vooruitsig Pri 05	Provincial Government-Western	Darling	12	1.15%
41	Michiel Heyns Kraal	Attaway AH	Riverlands	12	0.20%
42	Langfonteinstraat 2	Anicol Prop Pty Ltd	Darling	11	1.06%
43	Dolfynstr Karavaanpark	Swartland Munisipaliteit	Yzerfontein	11	2.10%
44	H/V Tui St Thomas Street	Fidusie Beleggings (Edms) Bpk	Malmesbury	10	0.17%

Progress made with the installation of water efficient devices:

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 2020/2021 financial year.

C.6. Water Services Asset Management

The tables below give an overview of the water and sewerage assets included in Swartland Municipality's Asset Register. The current and depreciated replacement costs of the water and sewerage infrastructure is summarised in the table below (June 2021).

Table C.6.1: Current and depreciated replacement costs of the water and sewerage infrastructure

Asset Type	GIS ID	CRC	DRC	% DRC / CRC
WATER				
Borehole	BH	R6 090 811	R5 894 941	97%
Pump Station	WPS	R17 285 316	R6 885 938	40%
Reservoir	RES	R135 395 968	R66 277 643	49%
Reticulation Pipeline	WRP	R348 995 175	R181 869 159	52%
Bulk Water Pipeline	BWP	R141 969 609	R65 785 103	46%
Dam	DAM	R36 350 585	R5 177 752	14%
Water Consumer Connections	WCC	R148 476 673	R33 549 510	23%
Electrical	ELEC	R997 031	R659 326	66%
Other Assets	OTH	R39 374 581	R27 620 203	70%
Totals		**R874 935 749**	**R393 719 575**	**45%**
SEWERAGE				
Sewer Pump Station	SPS	R15 338 466	R7 149 778	47%
Sewage Treatment Works	STW	R293 254 742	R218 393 589	74%
Sewer Reticulation Pipeline	SRP	R315 751 202	R152 758 679	49%
Bulk Sewer Pipeline	BSP	R63 809 218	R39 395 799	62%
Sewer Consumer Connections	SCC	R106 390 949	R22 985 816	22%
Other Assets	OTH	R10 246 676	R4 565 620	45%
Totals		**R804 791 253**	**R446 249 281**	**55%**

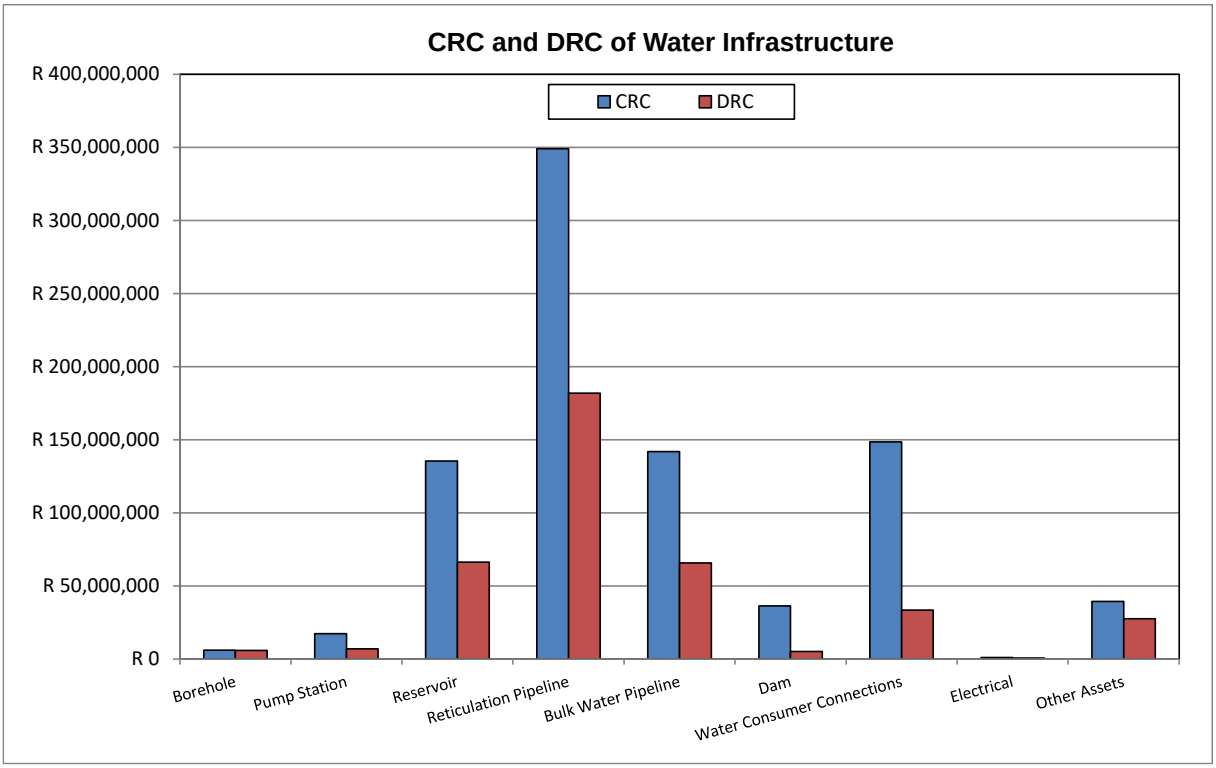


Figure C.6.1: CRC and DRC of the water infrastructure

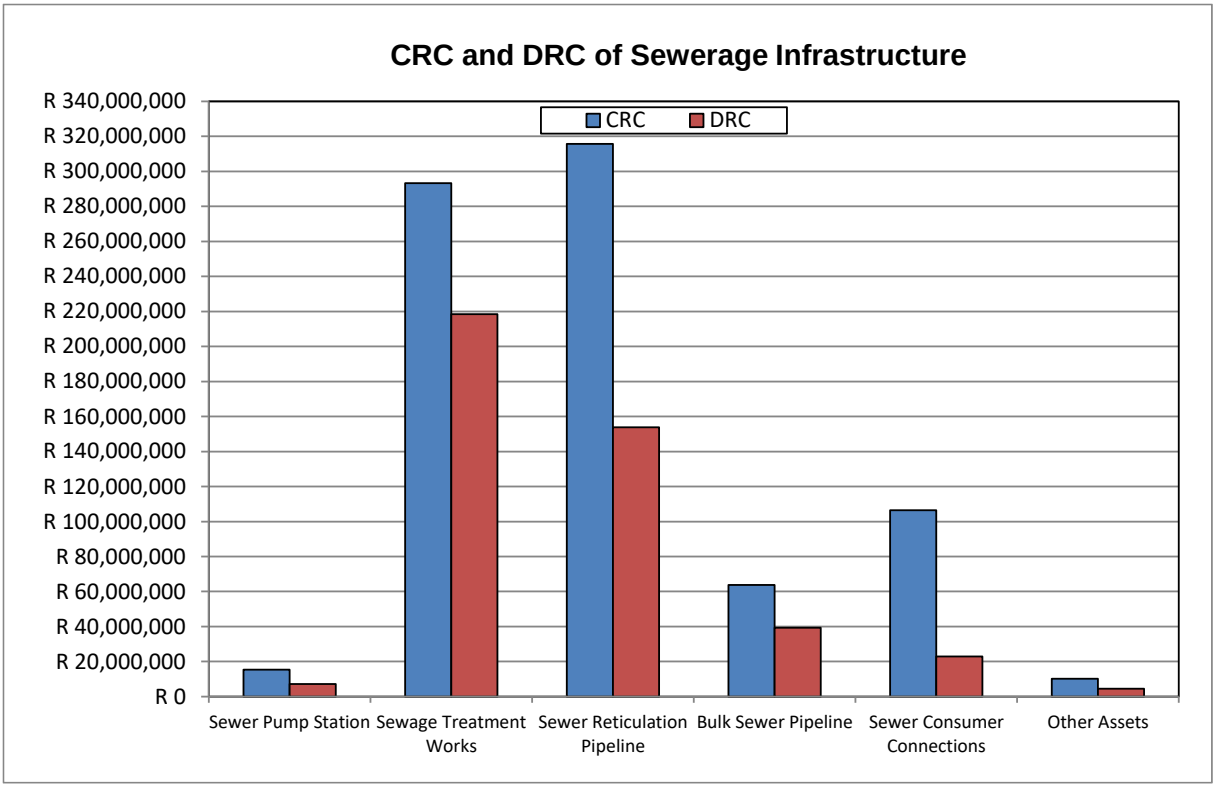


Figure C.6.2: CRC and DRC of the sewerage infrastructure

The above implies that about 55% of the value of the water infrastructure and 45% of the value of the sewerage infrastructure has been consumed.

The table below give's an overview of the RUL per facility type for the water and sewerage infrastructure (June 2021).

Table C.6.2: Overview of the remaining useful life by facility type for water and sewerage infrastructure (CRC)

Asset Type	GIS ID	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
WATER						
Borehole	BH	R10 000	R0	R91 536	R114 107	R5 875 168
Pump Station	WPS	R2 652 512	R767 670	R917 737	R28 967	R12 918 430
Reservoir	RES	R1 247 062	R0	R3 800 395	R1 376 342	R128 972 169
Reticulation Pipeline	WRP	R4 843 172	R0	R73 225 247	R11 733 123	R259 193 633
Bulk Water Pipeline	BWP	R563 639	R0	R14 487 984	R0	R126 917 986
Dam	DAM	R28 959	R0	R529 785	R1 600 831	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	R4 019 969	R2 777 691	R4 557 114	R7 948 553	R20 071 254
TOTALS		**R13 365 313**	**R3 545 361**	**R97 616 379**	**R22 801 923**	**R737 606 773**
SEWERAGE						
Sewer Pump Station	SPS	R1 761 597	R204 935	R2 089 592	R1 967 284	R9 315 058
Sewage Treatment Works	STW	R45 682 563	R2 267 300	R73 004 081	R10 496 545	R161 804 253
Sewer Reticulation Pipeline	SRP	R37 751 926	R0	R25 066 217	R13 019 068	R239 913 991
Bulk Sewer Pipeline	BSP	R3 039 326	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	R1 800 941	R6 648 238	R0	R159 272	R1 638 225
TOTALS		**R90 036 353**	**R15 965 473**	**R102 774 854**	**R26 065 118**	**R569 949 455**

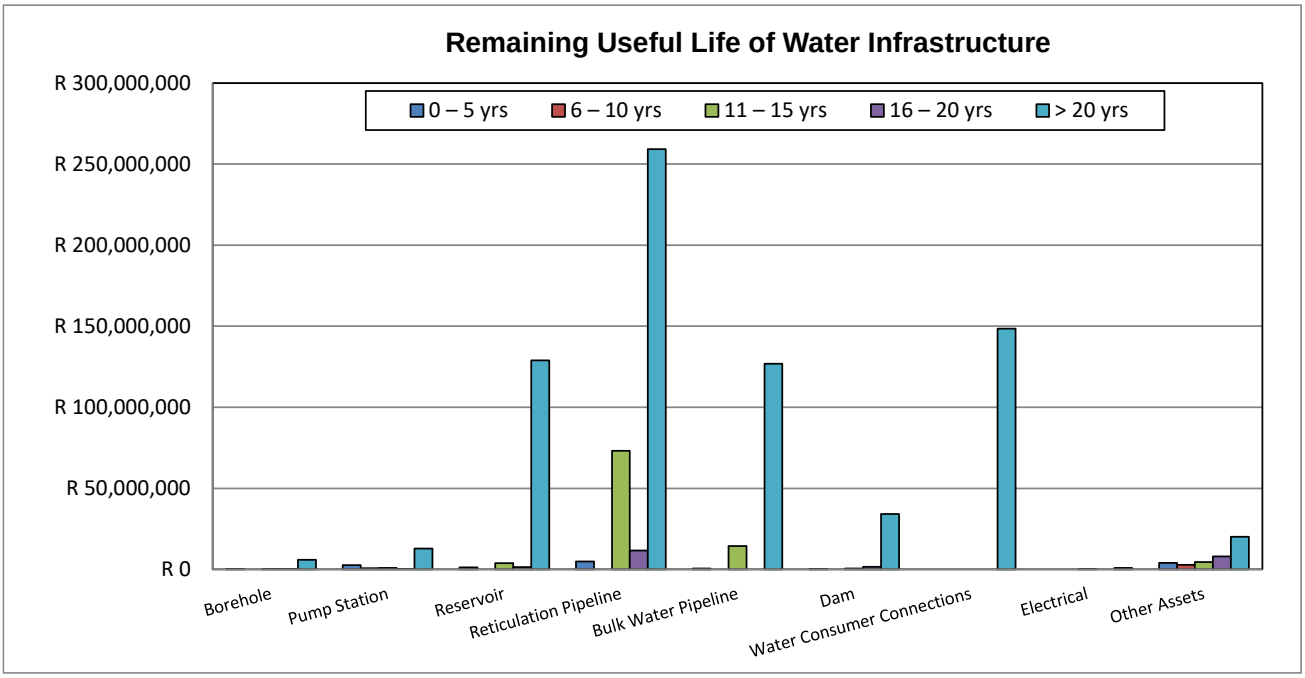


Figure C.6.3: Remaining Useful Life of the water infrastructure

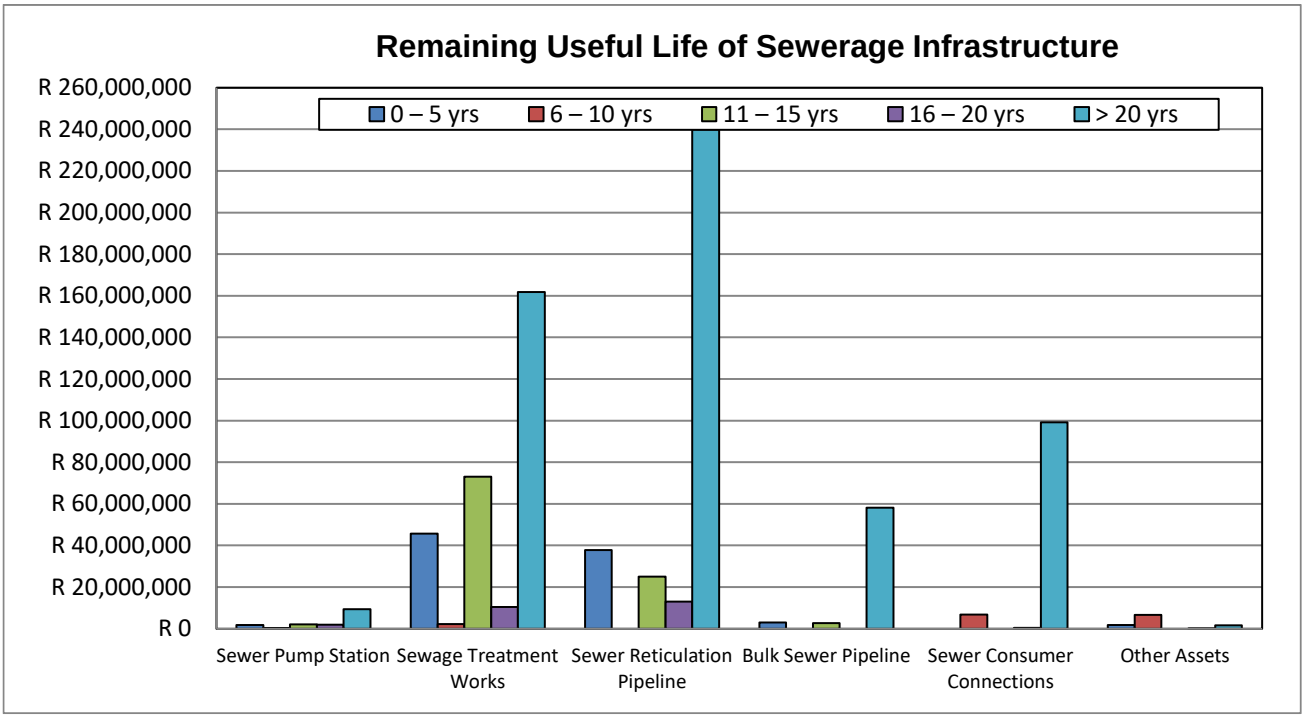


Figure C.6.4: Remaining Useful Life of the sewerage infrastructure

The table below gives an overview of the age distribution per facility for the water and sewerage infrastructure (June 2021).

Table C.6.3: Overview of the age distribution by facility type for water and sewerage infrastructure (CRC)						
Asset Type	**GIS ID**	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
WATER						
Borehole	BH	R5 735 168	R91 536	R114 107	R0	R150 000
Pump Station	WPS	R1 321 801	R1 181 084	R6 698 619	R2 100 338	R5 983 474
Reservoir	RES	R4 953 268	R12 447 053	R47 566 554	R7 278 179	R63 150 914
Reticulation Pipeline	WRP	R37 192 037	R21 885 218	R93 860 430	R14 991 228	R181 066 262
Bulk Water Pipeline	BWP	R15 201 389	R7 693 711	R4 685 147	R15 994 598	R98 394 764
Dam	DAM	R0	R1 483 432	R4 412 622	R410 781	R30 043 750
Water Consumer Connections	WCC	R0	R0	R11 521 842	R0	R136 954 831
Electrical	ELEC	R6 581	R534 666	R455 784	R0	R0
Other Assets	OTH	R28 461 394	R5 472 968	R1 956 257	R599 437	R2 884 525
TOTALS		**R92 871 638**	**R50 789 668**	**R171 271 362**	**R41 374 561**	**R518 628 520**
SEWERAGE						
Sewer Pump Station	SPS	R3 640 340	R2 082 597	R5 619 987	R9 970	R3 985 572
Sewage Treatment Works	STW	R123 498 892	R119 064 682	R34 078 052	R1 748 926	R14 864 190
Sewer Reticulation Pipeline	SRP	R65 763 922	R4 134 926	R33 466 210	R25 130 372	R187 255 772
Bulk Sewer Pipeline	BSP	R19 364 665	R0	R6 978 152	R4 596 496	R32 869 905
Sewer Consumer Connections	SCC	R0	R0	R990 949	R0	R105 400 000
Other Assets	OTH	R2 413 297	R5 159 458	R1 123 672	R322 055	R1 228 194
TOTALS		**R214 681 116**	**R130 441 663**	**R82 257 022**	**R31 807 819**	**R345 603 633**

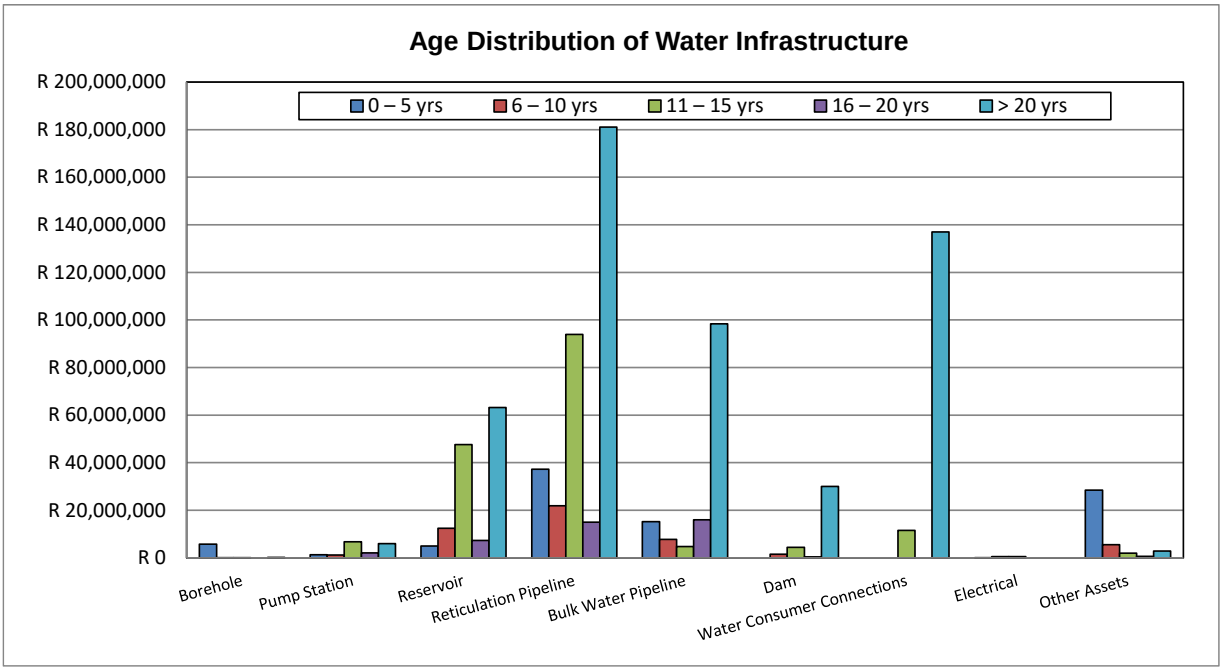


Figure C.6.5: Age distribution of the water infrastructure

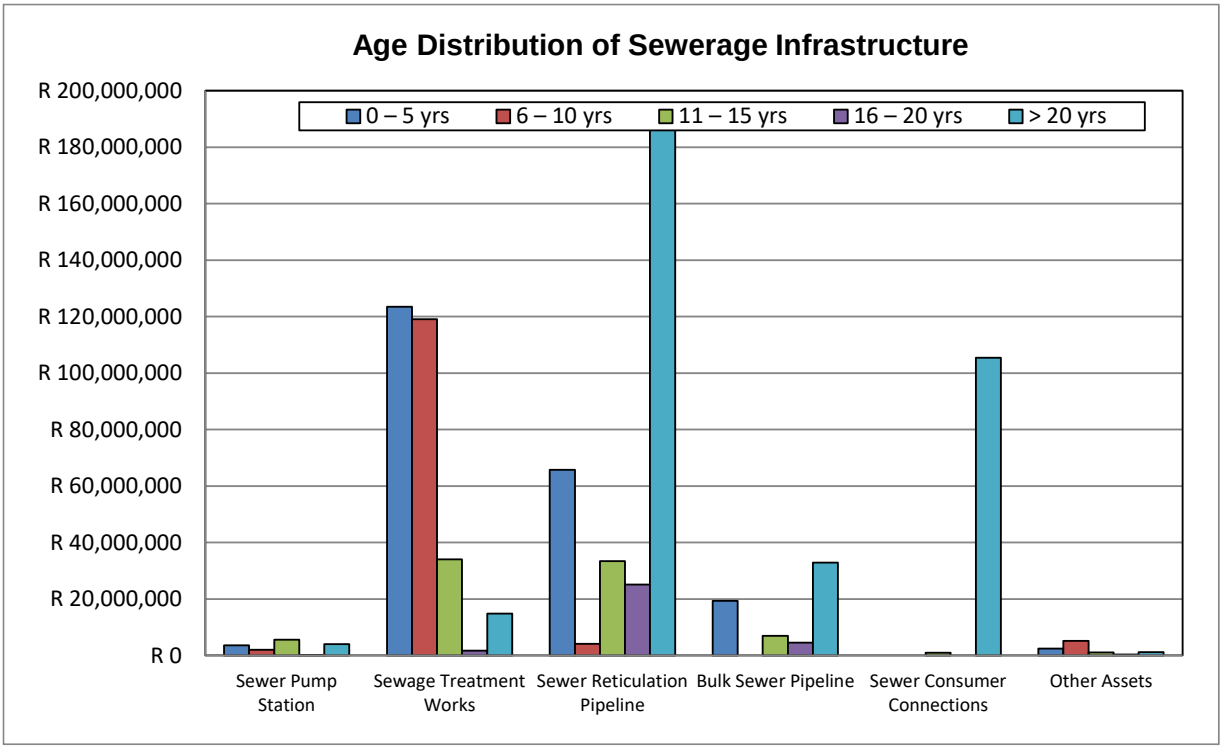


Figure C.6.6: Age distribution of the sewerage infrastructure

The CRC of the water and sewerage infrastructure that will need to be replaced over the next five years (RUL < 5 yrs) is R103.402 million. The asset renewal needs for the **water infrastructure assets** over the next 10 years is R1.691million per year. The reinvestment required is R13.365 million in the first 5 years and R3.545 million in the second 5-year period. The age of 59.3% of the water infrastructure assets is greater than 20 years. The asset renewal needs for the **sewerage infrastructure assets** over the next 10 years is R10.600 million per year. The reinvestment required is R90.036 million in the first 5 years and R15.965 million in the second 5-year period. The age of 42.9% of the sewerage infrastructure assets is greater than 20 years.

Most of the maintenance work currently carried out on the water and sewerage infrastructure are re-active and it is critical for the Municipality to increase their maintenance budget for water and sewerage infrastructure in order to ensure that the required preventative maintenance work is also carried out. The Asset Management Plan needs to indicate the risks associated with the inadequate refurbishment and maintenance of the various water and sewerage infrastructure.

It is important for Swartland Municipality to allocate adequate funds for the rehabilitation and maintenance of their existing infrastructure, which is critical to ensure the sustainability of the services that are provided by the Municipality. All possible external sources of funding to assist with the development of the bulk infrastructure and additional sources need to be identified.

C.7. Water Services Operation and Maintenance

Swartland Municipality implements the following planned and unplanned preventative and corrective maintenance, as summarised in the table below.

Table C.7.1: Types of Planned and Unplanned Preventative and Corrective Maintenance Implemented by Swartland Municipality	
Design-out Maintenance: Design-out Maintenance originates on the drawing board and is aimed at improving the operation, reliability or capacity of equipment. The engineer follows a life cycle approach to infrastructure development.	
Preventative Maintenance: Preventative maintenance is based on planning. For example, breakdowns at a plant can be reduced to a minimum if it is planned that all wearing parts are to be replaced before they fail.	Systematic (Periodic Maintenance): Systematic maintenance is periodic maintenance where the servicing of equipment takes place at regular intervals, either in accordance with a time schedule or on the basis of predetermined units of use, to eliminate possible causes of failure before a breakdown occurs.

Table C.7.1: Types of Planned and Unplanned Preventative and Corrective Maintenance Implemented by Swartland Municipality	
	Systematic maintenance requires a servicing schedule, which is based on the manufacturer's guidelines for equipment. Condition-based (Predictive) Maintenance: Condition-based maintenance is predictive maintenance based on regularly inspecting equipment and infrastructure in order to assess the state of wear and tear. Any failures that are observed, complemented by the findings of the programmed inspections and checks, are then dealt with through corrective action, so as to avoid breakdowns or the deterioration of a condition that could pose a safety hazard.
Corrective or Breakdown Maintenance: It is important to work methodically to keep repair time as short as possible. Good work preparation, use of correct (and well maintained) tools and equipment, and gathering and processing of all data relevant to the repairs helps to avoid downtime, eliminate mistakes and improve operational conditions.	Planned (Scheduled Repairs) Unplanned repairs guided by Troubleshooting: Troubleshooting is used when poor condition causes either total or partial stoppages, or when operations take place under intolerable conditions.

Swartland Municipality's operation and maintenance assessments and plans for their water and sewerage infrastructure are indicated in the table below.

Table C.7.2: Swartland Municipality's Operation and Maintenance Assessments and Plans		
Element	**Assessment Criteria**	**Status Quo**
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 and Commitment). Responsibility allocation (organisational structure) and acceptance thereof.	Below minimum requirement: Additional Process Controllers need to be appointed to comply with the legislative requirements with regard to the number and Class of Process Controller per shift per WWTW. Alternatively the Municipality can apply for exemption from the DWS, w.r.t the number of Process Controllers per shift per plant, if the plants are automated. Work Place Skills Programme is compiled annually to ensure adequate training of staff.
External Resources	Need for external resource providers. Competency level and value for money. Management and control over these providers.	Adequate: The operation and maintenance of the bulk water pipelines and the Swartland WTW are done by the West Coast District Municipality, with adequate personnel. A Service Level Agreement is in place between the West Coast District Municipality and Swartland Municipality.
Spare Parts	Adequate materials provisioning. Store management (Sufficient stock kept, stock control and delivery time).	Adequate: Municipality ensures adequate spare parts are available in their stores for possible failures or breakdowns. Monitored by the Civil Engineering Services Directorate.
Tools and Equipment	Adequate tools and equipment provided. Control and maintenance.	Adequate: Municipality ensures adequate tools and equipment are available. Monitored by the Civil Engineering Services Directorate.
Budget	Adequate budget provided. Budget control. Identification and documentation of needs. Budget preparation and motivation.	Adequate: Required Financial Strategies, Policies and Systems are in place to ensure proper budget control.
Information		
Manuals	Existence of manuals (operation / maintenance or manufacturer). Record keeping / safekeeping and control. Utilisation of manuals by staff.	Adequate: O&M Manuals are in place for the bulk water and sewerage infrastructure and the WWTWs. These Manuals are also used by the Process Controllers at the plants.
Asset Register	Existence of an asset register. Maintenance / updating of asset register. Accessibility of information. Control over assets. Stock taking.	Adequate: An up to date Asset Register is in place, which include all the water and sewerage infrastructure. CRC, DRC, RUL and Age of infrastructure are included in the Asset Register. Asset Register is updated annually.
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.	Adequate: As-built information is available for all water and sewerage infrastructure. The information is also included in the IMQS of the Municipality. The information is regularly updated when the Water and Sewer Master

Table C.7.2: Swartland Municipality's Operation and Maintenance Assessments and Plans		
Element	**Assessment Criteria**	**Status Quo**
	Updating of records.	Plans are updated.
Tools and Equipment	Existence of information on tools and equipment. Record keeping / safekeeping and control. Accessibility of information.	Adequate: Managed by the Operational Personnel at the various Municipal stores, with the required control forms that are in place. Monitored by the Civil Engineering Services Directorate.
Contingency and Safety Plans	Compliance to safety requirements. Safety equipment and maintenance thereof. Existence of safety plan where required. Existence of contingency plan where required.	Adequate: A Water Safety Plan and W_2RAPs are in place for all the areas. WWTW Process Audits are done when required. Incident Management Protocols, as included in the Water Safety Plan and W_2RAPs, are followed by the personnel.
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.	Adequate: Required Procedures and Policies are in place. Procedures and Policies with regard to the water and sewerage infrastructure are managed by the Civil Engineering Services Directorate.
Record Keeping	Existence of record keeping system. Process of data. Actions activated.	Adequate, but can be improved further: Record keeping of information required for the Monthly Reports are kept up to date. The record keeping of certain information is also linked to specific water and sanitation KPIs in the SDBIP. Municipality to implement recommended O&M Control Sheets for groundwater, surface water, bulk water and reticulation networks and fittings, WTWs, WWTWs, water and sewer PSs, reservoirs, remote monitoring and control systems and bulk and sewer drainage networks.
Quality Controls	Quality management plan. Quality assurance. Quality control (Inspections, Control charts, trend analysis). Process adjustment and rework. Quality improvement.	Adequate: Required quality control mechanisms are in place to ensure high quality of materials and to ensure that all work carried out on the water and sewerage infrastructure is of a high quality. The Civil Engineering Services Directorate monitors all work carried out by Consultants and Contractors.
Risk Management	Risk management planning. Risk identification. Risk probability and impact assessment. Risk response planning. Risk monitoring and control.	Adequate: Required Risk Management Protocols are in place, which is followed by the personnel. Potential risks/incidents and control measure to reduce or manage these risks were identified as part of the Water Safety Plan and W_2RAP processes.
Reporting	Production and activity reporting (Completeness, evaluation and action activation). Management reporting (Completeness and evaluation and action activation). Performance monitoring.	Adequate: The Director Civil Engineering Services report on a monthly basis to Council on all the required water and sanitation information. A SDBIP is also in place, linked to specific water and sanitation KPIs, which allows for proper performance monitoring.

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, requirements of the Municipality and DWS as the regulating authority, the availability of staff, plant, equipment, spares, money and other resources.

Swartland Municipality 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 Municipality also ensure that sufficient repair materials, consumables and back-up equipment are also readily available for any potential breakdowns.

A budget of approximately 2% of the total asset value per annum should be allocated towards the replacement of existing infrastructure. In the case of the operations and maintenance of the systems, a budget of approximately 1% to 2% of the value of the system is typically required to ensure that the systems remain in good condition.

The table below gives an overview of the CRC and DRC of the water and sewerage infrastructure included in Swartland Municipality's Asset Register (June 2021). The recommended budgets for the replacement of the existing infrastructure and the operation and maintenance of the existing infrastructure, based on the CRC, are also indicated.

Table C.7.3: Recommended budgets for the replacement and the operation and maintenance of the existing water and sewerage infrastructure.

Asset Type	Asset Register June 2021		Recommended Annual Replacement Budget (Best Practice)	Recommended Annual O&M Budget (Best Practice)	Depreciation, Property, Plant and Equipment: Actual Expenditure
	CRC	DRC	2.0%	1.5%	2020/2021
Borehole	R6 090 811	R5 894 941	R121 816	R91 362	R14 639 011
Pump Station	R17 285 316	R6 885 938	R345 706	R259 280	
Reservoir	R135 395 968	R66 277 643	R2 707 919	R2 030 940	
Reticulation Pipeline	R348 995 175	R181 869 159	R6 979 904	R5 234 928	
Bulk Water Pipeline	R141 969 609	R65 785 103	R2 839 392	R2 129 544	
Dam	R36 350 585	R5 177 752	R727 012	R545 259	
Water Consumer Connections	R148 476 673	R33 549 510	R2 969 533	R2 227 150	
Electrical	R997 031	R659 326	R19 941	R14 955	
Other Assets	R39 374 581	R27 620 203	R787 492	R590 619	
Sub Total Water	**R874 935 749**	**R393 719 575**	**R17 498 715**	**R13 124 037**	**R14 639 011**
Sewer Pump Station	R15 338 466	R7 149 778	R306 769	R230 077	R16 092 587
Sewage Treatment Works	R293 254 742	R218 393 589	R5 865 095	R4 398 821	
Sewer Reticulation Pipeline	R315 751 202	R153 758 679	R6 315 024	R4 736 268	
Bulk Sewer Pipeline	R63 809 218	R39 395 799	R1 276 184	R957 138	
Sewer Consumer Connections	R106 390 949	R22 985 816	R2 127 819	R1 595 864	
Other Assets	R10 246 676	R4 565 620	R204 934	R153 700	
Sub Total Sewerage	**R804 791 253**	**R446 249 281**	**R16 095 825**	**R12 071 868**	**R16 092 587**
Total Water and Sewerage	**R1 679 727 002**	**R839 968 856**	**R33 594 540**	**R25 195 905**	**R30 731 597**

Most of the major replacement of old water and sewerage infrastructure in Swartland Municipality is done through the Municipality's annual capital budget. The capital budget however also include new infrastructure. The table below gives an overview of the total historical water and sewerage capital expenditure for the last five financial years.

Table C.7.4: Historical water and sewerage capital expenditure

Infrastructure	20/21	19/20	18/19	17/18	16/17	15/16
Water	R64 161 385	R9 658 726	R14 797 042	R15 870 453	R7 878 897	R8 028 190
Sewerage	R2 353 219	R14 507 999	R8 976 513	R12 340 699	R5 984 731	R3 602 901
Total	**R66 514 604**	**R24 166 725**	**R23 773 555**	**R28 211 152**	**R13 863 629**	**R11 631 091**

C.8. Water Resources

The Western Cape experienced a severe drought over the period 2015 to 2017, with some relief during the 2018 to 2021 winter months. This drought over the period 2015 to 2017 impacted severely on the availability of bulk water supply by the West Coast District Municipality to Swartland Municipality from the WCWSS and the yield of the Municipality's own existing surface and groundwater sources. WC/WDM measures to lower the current water requirements and the augmentation of the West Coast District Municipality's existing water sources, as well as the augmentation of Swartland Municipality's own water resources with groundwater were therefore critical over this period.

Future water requirement projection models were developed for each of the towns within Swartland Municipality's Management Area, which are included in Annexure C. IWA Water Balance models with graphs of the total water requirements (System Input Volume and billed metered consumption), peak month factors, annual NRW and water losses per town and water usage per sector are included in Annexure A.

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 C.8.1: 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			**31 640.000**

The DWS is currently busy with the updating of the All Towns Reconciliation Strategies for the Western Cape. The table below gives an overview of the recommended potential future water resources, as included in the 2016 All Towns Reconciliation Strategies, for the towns in Swartland Municipality.

Table C.8.2 Potential future water resources for the various towns (DWS's Reconciliation Strategy, March 2016)

Distribution System	Option	Potential
Koringberg	Re-use of water	• The re-use of treated effluent is not a feasible option for Koringberg, as the current treatment process at the Koringberg WWTW is not considered adequate to deliver treated effluent of an acceptable quality.
	Groundwater	• The town of Koringberg is located on the foothills of the relatively small Koringberg Mountains. • The lowermost geological unit in the area of Koringberg is the Malmesbury Group comprising greywacke and phyllite with beds and lenses of quartz schist, limestone and grit predominantly of the Moorreesburg Formation. Towards the area about 4 km south the Klipplaat and Berg River formations are intersected by various faults. Further south the bedrock is covered to a certain degree by quaternary deposits that comprise of loam and sandy loam. • About 12 km north of the town the Table Mountain Group (TMG) is present in the Piketberg Mountains that comprise mostly of sandstone of the Peninsula Formation. • There are only 2 borehole registrations with unknown yields listed in the NGA in the area of Koringberg. • Apparently, the viability of groundwater abstraction in the Malmesbury Group of the direct surrounding area to Koringberg is very low. • The groundwater potential for the quaternary catchment G10K is highest for the TMG that is present in the Piketberg Mountains to the north. The fractured sandstone rocks of the Peninsula Formation in many cases have shown to be a successful option for groundwater abstraction. • Another option is the area of faulting of the Malmesbury Group about 4 km south of the town. Faults intersecting the usually little permeable Malmesbury rocks are likely to cause increased fracturing giving space for enhanced groundwater occurrence. In any case, prior to any groundwater development further hydrogeological investigation is required.

	Surface Water	• The current water supply from the Withoogte Regional Water Supply Scheme will not meet the future water requirements for any of the growth scenarios. Should the growth scenarios discussed in the previous section be realised, the WC DM which act as the bulk Water Services Provider (WSP) for Koringberg, needs to increase their bulk water allocation for the present regional scheme, because there are no surface water resources located in close proximity to Koringberg. The following surface water options may be potential sources for this town:
		  • It is essential that the portion of the safe yield of the Voëlvlei Dam and Berg River system allocated to Koringberg as part of the WCDM license be determined and included in the Service-level Agreement, in order to make more accurate shortfall projections. This action should be the first priority when considering alternative sources.
		  • The Voëlvlei Dam forms part of the supply scheme currently supplying water to

Table C.8.2 Potential future water resources for the various towns (DWS's Reconciliation Strategy, March 2016)		
Distribution System	**Option**	**Potential**
		Koringberg. The inflow is provided by two diversion canals. The first canal is fed by the Klein Berg River and the second by both the 24 Rivers and the Leeu River. The dam has a full supply capacity of 158.6 million m3 and is under stress to meet the projected future requirements. The yield of the Voëlvlei Dam could be augmented by schemes currently under investigation. • The most likely potential sources are thus an augmented supply from the Misverstand Dam and groundwater development.
	Other Sources	• Rainwater harvesting is not a feasible alternative for Koringberg considering the low Mean Annual Precipitation.
	Summary	**The current water sources do not have adequate supply to cater for the projected future water requirements. The following sources are identified as potential sources to augment the water supply:** • Continue with the full implementation of the existing WC/WDM Strategy. • Increase the allocation from the Berg River for the Withoogte Regional Water Supply Scheme • Groundwater development.
Riebeek Wes and Ongegund	Re-use of water	• The re-use of treated effluent is not feasible options for the existing Riebeek Wes and Ongegund WWTW, as the current treatment processes are not considered to be adequate to deliver effluent of an acceptable quality for re-use. • The future sewage from Riebeek Wes and Ongegund will flow under gravitation to the new Riebeek Valley WWTW when it is completed and the possible re-use options for the new WWTW are included under the Riebeek Kasteel Strategy.
	Groundwater	• The town of Riebeek Wes is located at the foothills of an outlier of the Table Mountain Group comprising mostly sandstone of the Peninsula Formation. The south-western boundary of the relatively small Kasteelberg mountain range is formed by a long north-west south-east trending fault line. The underlying basement comprises greywacke and phyllite with beds and lenses of quartz schist, limestone and grit of the Malmesbury Group. About 6 km south-east of the town there is a patch of quaternary deposits comprising light-grey to pale-red sandy soil of unknown thickness of the Springfontein Formation. • The NGA shows numerous entries in the area of Riebeek Wes and Riebeek Kasteel. Borehole yields in the Malmesbury shales are usually in the order of 1 l/s, but can go up to 3 l/s in places. Towards the foothills of the Kasteelberg borehole yields in the Peninsula are likely to be higher. • The groundwater potential is highest for the TMG. Groundwater development along the outcrop of the Peninsula sandstone, favourable along the fault, might be a future option, though the recharge area in the Kasteelberg Mountains is very limited. This unit in general presents a good aquifer system with typical yields of 10 l/s – 20 l/s and a good water quality. • Another viable option is the intergranular deposits. In general there is very little hydrogeological information available for this area and further exploration is recommended.

	Surface Water	• The current water supply will not meet any of the future water requirement scenarios. Should the All Towns Reconciliation Strategy growth scenarios be realised, the following surface water options may be potential sources for this town:
		  • It is essential that the portion of the safe yield of the Voëlvlei Dam allocated to Riebeek Wes and Ongegund as part of the WC DM license be determined and included in the Service-level Agreement in order to make more accurate shortfall projections. This action should be the first priority when considering alternative sources.
		  • Sources indicate that the Voëlvlei Dam is currently stressed and has insufficient capacity to cater for the current and projected requirements. A number of different options have been proposed through the Western Cape System Analysis to augment the yield of the dam.
		  • There are no surface water resources located in close proximity to Riebeek Wes. The most likely potential sources are thus an augmented supply from the Voëlvlei Dam and groundwater development.

	Other Sources	• Rainwater harvesting is a feasible option for Riebeek Wes and should be promoted for private domestic garden use augmentation.
	Summary	**The current water sources do not have adequate supply to cater for the current and longer-term future water requirements. The following sources are identified as potential sources to augment the water supply:** • Continue with the implementation of the existing WC/WDM Strategy in order to reduce water losses and NRW and achieve savings in water consumption. • Increase the allocation from the Voëlvlei Dam for the Swartland Regional Water Supply Scheme. • Groundwater development.
Riebeek	Re-use of water	• The water re-use yields have been calculated by assuming that 70% of the normal water

Table C.8.2 Potential future water resources for the various towns (DWS's Reconciliation Strategy, March 2016)		
Distribution System	**Option**	**Potential**

Kasteel		consumption would be converted to treated effluent.
		• The new Activated Sludge WWTW with biological nutrient removal will be able to provide a 95% assurance of supply in terms of quality requirements and some of the following interventions can therefore be considered for the use of the final treated effluent:
		  • The direct use for non-potable consumption, namely for irrigation end-users specifically.
		  • Dual reticulation systems for new developments, where re-use of water could be considered for irrigation purposes.
		  • The option of indirect use.
		  • The option of direct use (potable consumption) should be seen as a long-term intervention.

	Groundwater	• The town of Riebeek Kasteel is located at the foothills of an outlier of the Table Mountain Group comprising mostly sandstone of the Peninsula Formation. The south-western boundary of this relatively small Kasteelberg mountain range is formed by a long north-west south-east trending fault line. The underlying basement comprises metasediments such as greywacke and phyllite with beds and lenses of quartz schist, limestone and grit of the Malmesbury Group. About 4 km east of the town there is a patch of quaternary deposits comprising light-grey to pale-red sandy soil of unknown thickness of the Springfontein Formation. • The NGA shows numerous entries in the area of Riebeek Kasteel and Riebeek Wes. Borehole yields in the Malmesbury shales are usually in the order of 1 l/s. Towards the foothills of the Kasteelberg borehole yields in the Peninsula Formation of sandstone can be as high as 3.5 l/s. • The groundwater potential is highest for the TMG. Groundwater development along the outcrop of the Peninsula sandstone might be a future option although the recharge area in the Kasteelberg Mountains is very limited. This unit, in general, presents a good aquifer system with typical yields of 10 l/s – 20 l/s and a good water quality. There are some NGA registered boreholes drilled through the Peninsula Formation of sandstone along the eastern foothills. The highest yield is 3.2 l/s. A drilling exploration along the western foot of the Kasteelberg is recommended to find the best access. • Another viable option in the near-surrounding area is the intergranular deposits. In general, there is very little hydrogeological information available and further exploration is recommended.
	Surface Water	• The current water supply will not meet the future water requirements for all the growth scenarios. Should the All Towns Reconciliation Strategy growth scenarios be realised, the following surface water options may be potential sources for this town: • It is essential that the portion of the safe yield of the Voëlvlei Dam allocated to Riebeek Kasteel as part of the WC DM license be determined and included in the Service-level Agreement, in order to make more accurate shortfall projections. This action should be the first priority when considering alternative sources. • Sources indicate that the Voëlvlei Dam is currently stressed and has insufficient capacity to cater for the current and projected requirements. A number of different options have been proposed through the Western Cape System Analysis. These options are currently being investigated to find the best intervention to augment the yield of the Voëlvlei Dam. • There are no surface water resources located in close proximity to Riebeek Kasteel. The most likely potential sources are thus an augmented supply from the Voëlvlei Dam and groundwater development.
	Other Sources	• Rainwater harvesting is a feasible alternative for Riebeek Kasteel, considering the MAP which occurs mainly in winter. This water can be promoted for augmentation of private domestic supplies, mainly for water gardening.
	Summary	**The current water sources do not have adequate yields available to cater for the current and longer-term future water requirements. The following sources are identified as potential sources to augment the water supply:** • Continue with the implementation of the existing WC/WDM Strategy. • Increased allocation for the Swartland Regional Water Supply Scheme from the Voëlvlei Dam (WCWSS). • Groundwater development • Re-use of water • Rainwater harvesting.
Yzerfontein	Re-use of water	• The re-use of treated effluent is not a feasible option for Yzerfontein as there is currently no waterborne sanitation system in place.
	Groundwater	• The village of Yzerfontein is situated on quaternary limestone, calcrete and sand of the Bredasdorp Group, which presents the only target option. These units are part of the Grootwater Aquifer System with available yields of 2 – 5 l/s, but sensitive to abstraction and

Table C.8.2 Potential future water resources for the various towns (DWS's Reconciliation Strategy, March 2016)		
Distribution System	**Option**	**Potential**
		periods of low rainfall and susceptible to contamination. The advantages of use of this system are ease of access and development. Due to the danger of saltwater intrusion a 2.5 km "buffer zone" was declared along the coastline where no abstraction of groundwater is permitted, in order to protect the water quality of the aquifer further inland. • There are some NGA-registered boreholes near Yzerfontein, but only two of them located in the village have a known yield of 0.05 l/s and 7.2 l/s. There are no WARMS registered boreholes. • The Water Services Planning Reference Framework (DWAF, 2004) mapped the expected water quality as class 2 marginal and the average yield as 1.28 l/s, but it is not clear what borehole data these averages and projections are based on. • The intergranular deposits are the only target option, but due to the restrictions described above, the usage of these resources in the area of Yzerfontein is not possible.

	Surface Water	• The current water supply will not meet the future water requirements for all the growth scenarios. Should the All Towns Reconciliation Strategy growth scenarios be realised, the following surface water options may be potential sources for this town:
		  • Sources indicate that the Voëlvlei Dam is currently stressed and has insufficient capacity to cater for the current and projected requirements. A number of different options have been proposed through the Western Cape System Analysis to augment the dam's yield.
		  • There is no surface water resources located in close proximity to Yzerfontein.
		  • It is essential that the portion of the safe yield of the Voëlvlei Dam allocated to Yzerfontein as part of the WC DM license be determined and included in the Service-level Agreement, in order to make more accurate shortfall projections. This action should be the first priority when considering alternative sources.

	Other Sources	• Rainwater harvesting is not a feasible alternative for Yzerfontein considering the low Mean Annual Precipitation. • Yzerfontein is situated on the coast and therefore desalination may be a potential source of water. This option should be investigated further. Due to the integrated nature of the water supply operated by the WC DM, it is possible to build a single desalination plant at Saldanha, which will result in more water becoming available in Voëlvlei Dam for increasing the supply to Yzerfontein.
	Summary	**The current water sources do not have adequate supply to cater for the current and longer-term future water requirements. The following sources are identified as potential sources to augment the water supply:** • Continue with the implementation of the existing WC/WDM Strategy. • Increased allocation for the Swartland Regional Water Supply Scheme from the Voëlvlei Dam (WCWSS). • Desalination of seawater for Saldanha and environs to make more water available for Yzerfontein from the Voëlvlei Dam.
Darling	Re-use of water	The use of treated effluent is a feasible option for Darling, considering that re-use of treated effluent for irrigation is currently taking place. The Swartland Local Municipality must be able to provide a 95% assurance of supply in terms of quality requirements. If such an assurance of supply in terms of quality can be supplied, various re-use options could be considered in addition to those already in use. These include: • Dual reticulation systems for new developments, where re-use of water could be considered for irrigation purposes. • The direct use for non-potable consumption, namely for irrigation and industrial end-users specifically. • The option of indirect use. • The option of direct use (potable consumption) should be seen as a long-term intervention.
	Groundwater	• Darling is located in an area underlain by a large granite body of the Cape Granite Suite referred to as the Darling Pluton. The Cape Granite Suite is understood to have been intruded into the Malmesbury bedrock at various spots in the Western Cape shortly after the onset of the main phase of Pan-African collisional tectonics. • The eastern boundary of the Darling Pluton is formed by the southeast-northwest trending Franschhoek-Saldanha Fault System. Another east-west trending fault cuts through the central part of the pluton about 3 km south of Darling. There are several granodiorite, quartz porphyr and dolerite dykes indicated in the Cape Town 1:250 000 geological map. All these fault and dyke features can be favourable for groundwater occurrence, but there is no detailed information and further investigation is required to assess the potential for groundwater development in the area. • Towards the north-north-east of the town the underlying bedrock is covered by a sediment layer of unknown thickness. These Quaternary deposits comprise loam and sandy loam as well as gravelly clay/loam soil.

Table C.8.2 Potential future water resources for the various towns (DWS's Reconciliation Strategy, March 2016)		
Distribution System	**Option**	**Potential**

		• The NGDB shows numerous boreholes in the area of Darling with borehole yield usually in the order of 1 l/s or less. Higher yielding boreholes are more likely to be in the areas of dykes and faults intersecting the granite pluton or in the area of intergranular sediments.
		• There are two target options:
		  • Zones of fracturing and faulting of the granite. Although these units are usually classified as minor aquifer systems with typical yields of 0.5 – 2 l/s and a moderate water quality, in contacts to other fractured zones they can present better aquifers.
		  • The quaternary units. This primary aquifer has available yields of 2 – 5 l/s, but is sensitive to abstraction and periods of low rainfall and susceptible to contamination. The advantages of use of this system are ease of access and development.
		• The potential for groundwater development is higher in the quaternary deposits. In any case detailed hydrogeological exploration is required to assess the viability of future groundwater development and use. A well-field, starting with one borehole in 2020 (yielding 2 l/s) and progressively develop as needed to six boreholes should meet the requirement of even the high-growth until 2036.

	Surface Water	• The current water supply from the Swartland Regional Water Supply Scheme will not be able to meet the future water requirements for any of the growth scenarios. Should this growth be realised, the WC DM which act as the bulk Water Services Provider (WSP) for Darling, needs to increase their bulk water allocation for the present regional scheme, because there are no surface water resources located in close proximity to Darling. • It is essential that the portion of the allocation from the Voëlvlei Dam allocated to Darling as part of the WC DM license be determined and included in the Service-level Agreement, in order to make more accurate shortfall projections. This action should be the first priority when considering alternative sources.
	Other Sources	• Rainwater harvesting is not a feasible alternative for Darling considering the low rain which mainly falls during winter.
	Summary	**The current water sources do not have adequate supply to cater for the projected future water requirements of Darling. The following sources are identified as potential sources to augment the water supply:** • Continue with the implementation of the existing WC/WDM Strategy. • Increased allocation for the Swartland Regional Water Supply Scheme from the Voëlvlei Dam (WCWSS). • Consider re-use of water. • Groundwater development.
Moorreesburg	Re-use of water	The final treated effluent from the WWTW is currently used for irrigation purposes. It is estimated that approximately 40% of the incoming flow to the WWTW is currently re-used. Further re-use of treated water from the WWTW can only be allowed if the existing works can provide a 95% assurance of supply in terms of quality requirements. Some of the following interventions can be considered: • The direct use for non-potable consumption, namely for irrigation and industrial end-users specifically. • Dual reticulation systems for new developments, where re-use of water could be considered for irrigation purposes. • The option of indirect use. • The option of direct use (potable consumption) should be seen as a long-term intervention.
	Groundwater	• The lowermost geological unit in the area of Moorreesburg is the Malmesbury Group comprising greywacke and phyllite with beds and lenses of quartz schist, limestone and grit of the Moorreesburg, Klipplaat and Berg River formations. Various faults intersect the Klipplaat and Berg River Formations towards the east. In the area of the town and its direct surroundings the bedrock is to a large degree covered with sedimentary deposits of the Quaternary that comprise of loam and sandy loam. • There are a few registrations of boreholes in the NGA where yields less than 1 l/s were recorded. • The potential for the Quaternary aquifers is higher for both G10J and G10L catchments. The Quaternary in this area on average shows yields of 2 – 5 l/s, but is sensitive to abstraction and periods of low rainfall and susceptible to contamination. • The advantages of using this groundwater source are ease of access and development. However, near Moorreesburg the presence of these Berg River Formations is limited and further hydrogeological exploration is recommended to assess the viability of groundwater development for municipal supply from this source. • Another potential option might be the area of faulting in the Malmesbury rocks. Faulting of sedimentary rocks frequently supports groundwater occurrence but there is no detailed information on the fault system in the area so far. Although these units are usually classified as minor aquifer systems with typical yields of 0.5 – 2 l/s and a moderate water quality, in

Table C.8.2 Potential future water resources for the various towns (DWS's Reconciliation Strategy, March 2016)		
Distribution System	**Option**	**Potential**
		contacts or other fractured zones they can present better aquifers.

	Surface Water	• The current water supply from the Withoogte Regional Water Supply Scheme will not meet the future water requirements for all the growth scenarios. Should these growth scenarios discussed in the previous section be realised, the WC DM, which act as the bulk Water Services Provider (WSP) for Moorreesburg, needs to increase their bulk water allocation for the present regional scheme. The following surface water options may be potential sources for this town:
		  • It is essential that the portion of the safe yield of the Voëlvlei Dam and the Berg River system allocated to Moorreesburg as part of the WC DM license be determined and included in the Service-level Agreement in order to make more accurate shortfall projections. This action should be the first priority when considering alternative sources.
		  • The Voëlvlei Dam forms part of the Western Cape Water Supply Scheme currently supplying water to Moorreesburg. The inflow is provided by two diversion canals. The first canal is fed by the Klein Berg River and the second by both the 24 Rivers and the Leeu River. The dam has a full supply capacity of 158.6 million m3 and is under stress to meet the projected future requirements.
		  • Previous studies have investigated the feasibility of raising the Misverstand Dam wall, but water quality problems ruled this option out. Sources indicate that the Voëlvlei Dam is currently stressed and has insufficient capacity to cater for the current and projected demands. A number of different options have been proposed through the Western Cape System Analysis. These options are currently being investigated further to augment the yield of the Voëlvlei Dam.

	Other Sources	• Rainwater harvesting is not a feasible alternative for Moorreesburg for municipal water supply purposes, but should be promoted to augment private domestic supplies, specifically for garden watering.
	Summary	**The current water sources do not have adequate supply to cater for the longer-term future water requirements. The following sources are identified as potential sources to augment the water supply:** • Continue with the implementation of the existing WC/WDM Strategy. • An increased allocation from the Berg River for the Withoogte Regional Water Supply Scheme. • Groundwater development. • Re-use of water. • Rainwater harvesting

Malmesbury and Abbotsdale	Re-use of water	• The water re-use yields have been calculated by assuming that 70% of the normal water consumption would be converted to treated effluent.
		• Most of the final effluent from the WWTW is already used for irrigation purposes. Further re-use of water from the WWTW can be considered as the new Membrane Biological Plant can provide a 95% assurance of supply in terms of quality requirements. The following interventions can further be considered:
		  • The direct use for non-potable consumption, namely for irrigation end-users specifically.
		  • Dual reticulation systems for new developments, where re-use of water could be considered for irrigation purposes.
		  • The option of indirect use.
		  • Recharging of aquifers.
		  • The option of direct use (potable consumption) should be seen as a long-term intervention.

	Groundwater	• The town of Malmesbury is underlain by a large granite body of the Cape Granite Suite referred to as the Paardeberg Pluton. The Cape Granite Suite is understood to have been intruded into the Malmesbury bedrock at various spots in the Western Cape shortly after the onset of the main phase of Pan-African collisional tectonics. • The Malmesbury Group outcrops in the form of the Moorreesburg Formation about 2 to 3 km to the west and east of the town comprising greywacke and phyllite with beds and lenses of quartz schist, limestone and grit. Smaller intrusions of diorite and gabbro of the Cape Granite Suite are present in the north-west and south-west. There is a laterally inextensive outcrop of alluvium along the Diep River to the immediate west and a patch of quaternary deposits of the Springfontein Formation comprising light-grey to pale-red sandy soil towards the south of the town. The same sediments are present in the large deposits that stretch from about 8 km west of Malmesbury to the coast. • The NGA reflects numerous boreholes in the area around Malmesbury. Most boreholes drilled into the Malmesbury sedimentary rock or Cape Suite Granite show low yields of less than 1 l/s. However, some entries reflect yields of up to 5 to 6 l/s.

Table C.8.2 Potential future water resources for the various towns (DWS's Reconciliation Strategy, March 2016)		
Distribution System	**Option**	**Potential**
		• There are two target options: 1. The contact between the Malmesbury Group and the Cape Granite Suite or other fractured zones. Although these units usually are classified as minor aquifer systems with typical yields of 0.5 – 2 l/s and a moderate water quality, in contacts to other fractured zones they can present better aquifers. 2. The Alluvium. Boreholes in this primary aquifer can yield 2 – 5 l/s, but is sensitive to abstraction and periods of low rainfall and susceptible to contamination. The advantages of use of this system are ease of access and development. • The chance of high yielding boreholes in the Malmesbury shale and Cape Suite Granite seems to be low. In general, there is a very high potential for groundwater development but further hydrogeological exploration is required to assess the viability of future groundwater use for municipal supply from these sources. The quaternary deposits exhibit an even higher groundwater potential and high yielding boreholes in the intergranular aquifer are a lot more likely. However, this source is much further away and groundwater is most likely already being used to a high degree by farmers in the area.
	Surface Water	• The current water supply will not meet the future water requirements for all the growth scenarios. Should these growth scenarios discussed in the previous section be realised, the following surface water options may be potential sources for this town: • It is essential that the portion of the safe yield of the Voëlvlei Dam allocated to Malmesbury as part of the WC DM license be determined and included in the Service-level Agreement, in order to make more accurate shortfall projections. This action should be the first priority when considering alternative sources. • Sources indicate that the Voëlvlei Dam is currently stressed and has insufficient capacity to cater for the current and projected requirements. A number of different options have been proposed through the Western Cape System Analysis. These options must be pursued. • The Municipality can investigate the possibility of an increased allocation from the Perdeberg Dam.
	Other Sources	• Rainwater harvesting is not a feasible alternative for Malmesbury considering the low MAP occurring mainly in winter.
	Summary	**The current water sources do not have adequate supply to cater for the current and longer-term future water requirements. The following sources are identified as potential sources to augment the water supply:** • Continue with the full implementation of the existing WC/WDM Strategy in order to keep the water losses and NRW as low as possible and achieve savings in water consumption. • Increased allocation for the Swartland Regional Water Supply Scheme from the Voëlvlei Dam (WCWSS). • Water re-use. • Groundwater development for smaller communities.

Detailed future water requirement projection models were developed for each of the distribution system and the future water requirements are indicated in the table below per system. These models include the future projections up to 2045 and were calibrated by using historic billed metered consumption data and bulk abstraction data. The percentage of NRW was determined for each of the distribution systems and growth in future water requirement was based on agreed population and growth figures.

Table C.8.3: Projected future water requirements of towns						
Distribution System	**Model**	**PROJECTED FUTURE WATER REQUIREMENTS (Ml/a)**				
		2025	**2030**	**2035**	**2040**	**2045**
Moorreesburg	2% Annual Growth	741.491	818.666	903.873	997.949	1 101.816
	4% Annual Growth	817.093	994.119	1 209.497	1 471.539	1 790.352
	WSDP Model	**746.637**	**865.948**	**1 006.954**	**1 173.836**	**1 371.606**
Koringberg	2% Annual Growth	62.283	68.766	75.923	83.825	92.550
	4% Annual Growth	68.634	83.504	101.595	123.606	150.385
	WSDP Model	**63.633**	**74.241**	**86.800**	**101.685**	**119.348**
Total for Withoogte System	**Low Projection**	**803.774**	**887.432**	**979.796**	**1 081.774**	**1 194.366**
	High Projection	**885.727**	**1 077.623**	**1 311.092**	**1 595.145**	**1 940.737**
	WSDP Model	**810.270**	**940.189**	**1 093.754**	**1 275.521**	**1 490.954**
Malmesbury	2% Annual Growth	3 241.972	3 579.399	3 951.946	4 363.268	4 817.400
	4% Annual Growth	3 572.524	4 346.521	5 288.208	6 433.913	7 827.839
	WSDP Model	**3 286.490**	**3 852.347**	**4 534.284**	**5 358.549**	**6 357.692**
Darling	2% Annual Growth	630.274	695.874	768.301	848.266	936.555
	4% Annual Growth	694.537	845.011	1 028.085	1 250.822	1 521.817
	WSDP Model	**586.471**	**646.503**	**714.409**	**791.425**	**879.002**
Riebeek Kasteel	2% Annual Growth	282.885	312.328	344.836	380.726	420.353
	4% Annual Growth	311.728	379.265	461.434	561.405	683.035
	WSDP Model	**307.763**	**394.207**	**510.029**	**665.994**	**876.936**
Riebeek Wes	2% Annual Growth	188.804	208.455	230.152	254.106	280.553
	4% Annual Growth	208.055	253.131	307.972	374.695	455.874
	WSDP Model	**203.208**	**249.544**	**309.127**	**386.076**	**485.831**
Ongegund (PPC)	2% Annual Growth	19.500	21.530	23.771	26.245	28.976
	4% Annual Growth	21.489	26.144	31.808	38.700	47.084
	WSDP Model	**19.180**	**20.978**	**23.001**	**25.281**	**27.854**
Yzerfontein	2% Annual Growth	330.713	365.134	403.137	445.096	491.422
	4% Annual Growth	364.433	443.388	539.449	656.322	798.517
	WSDP Model	**330.819**	**383.537**	**445.874**	**519.694**	**607.232**
Total for Swartland System	**Low Projection**	**4 694.148**	**5 182.720**	**5 722.143**	**6 317.707**	**6 975.259**
	High Projection	**5 172.766**	**6 293.460**	**7 656.956**	**9 315.857**	**11 334.166**
	WSDP Model	**4 733.931**	**5 547.116**	**6 536.724**	**7 747.019**	**9 234.547**
All towns in Swartland Municipality's Management Area	2% Annual Growth	**5 497.922**	**6 070.152**	**6 701.939**	**7 399.481**	**8 169.625**
	4% Annual Growth	**6 058.493**	**7 371.083**	**8 968.048**	**10 911.002**	**13 274.903**
	WSDP Model	**5 544.201**	**6 487.305**	**7 630.478**	**9 022.540**	**10 725.501**

The table below gives an overview of the years in which the annual water requirements are likely to exceed the licence volumes from the WCWSS:

Table C.8.4: Years in which the annual water requirements are likely to exceed the total licence volumes for Swartland Municipality from the WCWSS

Distribution System	Total Licence Volume for Swartland Municipality (Ml/a)	Annual Growth on 2020/2021 Demand (Low Growth)	Annual Growth on 2020/2021 Demand (High Growth)	WSDP Projection Model
Withoogte System	1 573.600	> 2044	2036	2043
Swartland System	7 900.000	2035	2027	2031

Note: The severe drought in the Western Cape, over the period 2015 to 2017, impacted on the water availability and the security of supply from the WCWSS, which resulted in severe water restrictions implemented by the Swartland Municipality in order to lower the current water requirements and to ensure that the systems don't "run dry" during the drought period.

A number of resource augmentation studies were previously completed by the DWS for the WCWSS, by the West Coast District Municipality for the West Coast Region and by Swartland Municipality for the towns in their Management Area. A desktop study of these previous augmentation studies was completed during the last financial year. The Conclusions and the Recommendations from the desktop study are indicated below.

Resource Augmentation Desktop Study Conclusions: The overall water requirements of the towns in Swartland Municipality in 2015/2016 was 5 483 Ml/a (15.025 Ml/d), which came down to a low of 3 442 Ml/a (9.431 Ml/d) in 2017/2018, due to the drought and the water restrictions and WC/WDM measures implemented by the Municipality. This is a reduction of 37.2% over a two year period. There was a steady increase in water requirements again over the period 2018/2019 and 2019/2020. The likely "bounce back" after the drought is uncertain, but it is estimated that it would probably take about four to six years after 2017/2018 to reach the same water requirements as the period before the drought (2015/2016).

The future water requirements for the Swartland Voëlvlei and the Swartland Withoogte (Only Moorreesburg and Koringberg) bulk water distribution systems are expected to increase to 5 945 Ml/a and 1 180 Ml/a (High growth) by 2029. These volumes are still less than the new licence volumes of 7 900 Ml/a and 1 573.6 Ml/a that were issued in 2017.

Comprehensive historical metered data of the water requirements for the two bulk water distribution systems and the towns in Swartland Municipality's Management Area are available, which assist with the future requirement projections for the systems.

Various water resource augmentation studies/investigations were done over the last number of years for the West Coast Region, the WCWSS and the towns in Swartland Municipality's Management Area. These studies recommended various augmentation projects for the various systems. Most of the studies were done in the period before the drought in the Western Cape.

WC/WDM: The Withoogte and Swartland Voëlvlei bulk water distribution systems are already well managed with regard to reducing treatment losses and bulk water distribution losses. The scope to make additional water available through the implementation of specific WC/WDM measures is very limited. Swartland Municipality's NRW and Water Losses for their internal distribution systems (towns) for 2019/2020 was 15.93% and 15.73% respectively, which is also very low. A comprehensive WC/WDM Strategy is in place for the Municipality and the estimated volume of water saved on System Input Volume for the next five and ten years, with the implementation of the additional WC/WDM measures, is 342.098 Ml/a for 2024 and 441.191 Ml/a for 2029 respectively. Swartland Municipality is committed to continue with the implementation of their WC/WDM Strategy.

Reliability of Supply from the WCWSS: The towns in Swartland Municipality nearly ran out of water in 2018, due to the limited supply from the WCWSS and the low levels of the Voëlvlei dam. A combined effort by the Municipality, residents, business and government helped avoid a potential catastrophe through dramatic reduction of water use. Exclusive reliance on rainfall fed dams (WCWSS) is no longer wise over the longer term and Swartland Municipality must adopt a precautionary approach to water resource management in dealing with climate uncertainty and the future supply from the system.

WCWSS Augmentation Options: Various studies for the augmentation of the WCWSS were completed by the DWS over the last number of years. The Berg River to Voëlvlei Augmentation Scheme (BRVAS) was identified as the next surface water scheme in 2015 by the National DWS. It will form an integral part of the WCWSS and is being implemented by the TCTA. The URV of the proposed scheme was estimated at R1-31/kl in 2012. Assuming that the construction costs have escalated at 6% per annum in real terms then the 2021 URV would be R3-71/kl, including R1-50/kl for treatment costs. The growth in the West Coast's requirements could also be supplied from the BRVAS, depending on the actual growth in water requirements. The TCTA is currently in discussion with water users to formulate an institutional approach and to make a decision on a funding model. Indications are that water users from the WCWSS, including the CCT, are supportive of the project, currently scheduled for completion by mid-2023.

Supply from the CCT at their Bulk Tariff: One of the augmentation options available to Swartland Municipality is to purchase treated water from the CCT, for supply from Atlantis to Chatsworth and Riverlands. The estimated cost of a pipeline from Atlantis to Chartsworth and Riverlands is R15.320 million and the annual purchase cost of the potable water will be roughly R1.5 million per year, against the current bulk purchase tariff of R8-13/kl of the CCT.

One of the CCT's current resource augmentation projects is the Atlantis Managed Aquifer Recharge Scheme Refurbishment project, with which the City is currently busy, and this scheme will therefore be independent from the WCWSS. The benefits of supplying Chatsworth and Riverlands with potable water from Atlantis are as follows:

- The Atlantis scheme is a groundwater scheme and the risk associated with surface water sources and the impact of less rainfall on the yield of the system (WCWSS) will therefore not be applicable for the supply to Chatsworth and Riverlands.
- More water will be available for Swartland Municipality's other towns, that are still dependent on supply from the WCWSS, if Chatsworth and Riverlands are supplied from the CCT.
- It will not be necessary to supply potable water from Kalbaskraal to Chatsworth and Riverlands anymore.

Surface Water Source Options: There are no other surface water sources located in close proximity to the various towns in Swartland Municipality's Management Area. The current supply from the WCWSS (from the Misverstand weir and the Voëlvlei dam) is the only real surface water sources available to the Municipality and where the required bulk water infrastructure is already in place.

Groundwater Options: The Pre-Feasibility Study of Potential Water Sources for the Area Served by the West Coast District Municipality Phase 1: Assessment of Development Potential of Groundwater Resources identified various target areas that can be investigated further by Swartland Municipality for possible groundwater augmentation schemes. The URVs of developing groundwater within the various proposed exploration target areas varies from R3-07/m^3 to R12-73/m^3.

Three existing production boreholes are already utilised in Riverlands and there is a possibility that the two newly drilled boreholes can also be commissioned and connected to the system. Koringberg and Riebeek Wes are the only other towns where the yields of the newly drilled boreholes are adequate to provide a high percentage of the town's existing demand. The groundwater will however require additional treatment and blending options will need to be considered.

The Desktop Feasibility Study into water supply to Yzerfontein from the Grootwater Aquifer indicated a URV of R25-39/kl for a groundwater supply scheme for Yzerfontein for water supply. The Study also indicated that a separate investigation has to be carried out into the Colenso Fault Zone close to Darling, based on boreholes with depths of between 100m and 150m, if the Municipality considers supplying Darling with groundwater.

Water reuse Options: Adequate treated effluent needs to be available for any water reuse scheme to be sustainable. The effluent quality from the respective WWTWs and the design of the necessary barriers to ensure the health and safety of the public are some of the most important considerations.

53.3% Of the total treated effluent discharged from the WWTW in 2019/2020 was already reused by end-users for irrigation and agricultural purposes. Therefore there is limited scope for additional reuse options to be implemented at the Darling-, Moorreesburg-, Riebeek Valley- and Malmesbury WWTW. Swartland Municipality will continue to reuse treated effluent from the four main WWTWs for irrigation purposes and options of "indirect use" and "direct use" are only seen as long-term possible interventions.

Desalination Options: The West Coast District Municipality previously proposed to construct and operate a sea water desalination plant in the Saldanha Bay area using sea water reverse osmosis (SWRO) technology. The proposed desalination plant and bulk infrastructure will cost an estimated R500 million, R300 million more than the original cost estimate. This project is however currently on hold, due to inadequate funding.

Yzerfontein is the only town in Swartland Municipality's Management Area where desalination is an option for future water supply. The town's 2019/2020 PDD was 1.552 Ml/d and it is expected to increase to a PDD of 1.887 Ml/d by 2029. The estimated capital cost for a desalination plant at Yzerfontein, with the marine infrastructure included, is roughly R35 million/Ml. It will also be very difficult to obtain environmental authorisation for the construction of a desalination plant at Yzerfontein due to the sensitivity of the coastal area.

Resource Augmentation Desktop Study Recommendations: The following recommendations with regard to water resource augmentation options available to Swartland Municipality were made based on the findings and conclusions contained in this desktop study:

- Swartland Municipality should continue to implement their WC/WDM Strategy for both the bulk water distribution systems and the internal water reticulation systems of the towns. Treatment Losses, NRW and Water Losses need to be monitored on a monthly basis.

- Investigate the cost of small groundwater schemes for Koringberg and Riebeek Wes. These are the only two towns where the yields of the newly drilled boreholes are adequate to provide a high percentage of the town's existing demand. The groundwater will require additional treatment and blending options will need to be considered.

- Compile a Feasibility Study for a bulk groundwater augmentation scheme for the Swartland Voëlvlei bulk water distribution system from the target areas included in the "Pre-Feasibility Study of Potential Water Sources for the Area Served by the West Coast District Municipality Phase 1: Assessment of Development Potential of Groundwater Resources" Report.

- The URV of R25-39/kl for a groundwater supply scheme for Yzerfontein from the Grootwater Aquifer is high and should be seen as a possible medium- to long-term possible intervention.

- An investigation has to be carried out into the Colenso Fault Zone close to Darling if the Municipality considers supplying Darling with groundwater. A possible groundwater scheme for Darling should be seen as a possible medium- to long-term possible intervention.

- Continue to reuse treated effluent from the four main WWTWs for irrigation purposes in order to reduce the demand for potable water used for irrigation purposes (Parks, Sport Fields, etc.). The options of "indirect potable reuse" and "direct potable reuse" of treated effluent should be seen as long-term possible interventions.

- Swartland Municipality should engage with the CCT with regard to the following:
  - The CCT's programme for implementing the additional infrastructure to provide the proposed 1 in 200 year level of assurance of supply (Atlantis Managed Aquifer Recharge Scheme Refurbishment Project).
  - The possibility of supplying the towns of Chatsworth and Riverlands with potable water from Atlantis.
  - The other options available to Swartland Municipality to purchase bulk potable water from the CCT, which include the following.
    (4) Purchase potable water from the CCT through their Voëlvlei bulk water pipeline, which supply the Plattekloof reservoir.
    (5) The possibility for the CCT to take over the Swartland WTW and to provide potable water to Gouda and the Swartland Municipality from the WTW.
    (6) Any possible other arrangements with the CCT.

- Swartland Municipality should engage with DWS and the TCTA to discuss the options available for an increased future allocation from the WCWSS for Swartland Municipality, through the implementation of the Berg River Voëlvlei Augmentation Scheme (BRVAS) project or the other future augmentation projects.

- Engage with Saldanha Bay Municipality and the West Coast District Municipality if the proposed Saldanha Bay desalination plant project is started. A possible desalination plant for Yzerfontein should only be seen as a long-term possible intervention.

Industrial Effluent: 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 D. 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 two financial years.

Table C.8.5: Compliance percentages of industrial effluent discharged by industrial consumers per parameter

Town	Industrial Consumer	pH Compliance		COD Compliance	
		20/21	19/20	20/21	19/20
Darling	Darling Breweries	67.3%	72.3%	77.6%	78.7%
	Darling Vleismark	30.6%	81.6%	71.4%	85.7%
	Romery	57.1%	71.4%	83.7%	89.8%
Moorreesburg	Wespin Abattoir	88.0%	93.8%	100.0%	93.8%
Malmesbury	Swartland Abattoir	100.0%	97.9%	88.2%	87.5%
	Roelcor Abattoir	100.0%	100.0%	98.0%	97.9%
	Sugar Bird	0.0%	2.1%	6.0%	2.1%
	O'Kin	42.0%	54.2%	98.0%	97.9%
	Fair Cape	7.3%	15.4%	76.4%	81.0%

C.9. Water Services Institutional Arrangements and Customer Services

Swartland Municipality is the WSA for the entire Municipal Management Area. A Service Level Agreement is in place with the West Coast District Municipality for the provision of bulk potable water to most of the towns in Swartland Municipality's Management Area. The West Coast District Municipality operate and maintain the Withoogte and Swartland bulk water distribution systems.

A Signed Agreement for the Operation and Maintenance of the Highlands Waste Disposal Facility and the Material Recovery Facility is also in place between Swartland Municipality and Wastegro.

The 2017-2022 WSDP was approved by the Swartland Municipality's Council on the 30th of March 2016. A 2021/2022 WDP-IDP Water Sector Input Report was also compiled during the last financial year, which was approved by Council with the IDP. The WSDP Performance- and Water Services Audit Report is compiled annually and taken to Council with the Annual Report. The Water Services By-laws was promulgated.

The education of users where sanitation facilities are upgraded to waterborne systems is on-going. This is primarily focussed at informing users of the appropriate use of and routine maintenance of such facilities.

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.

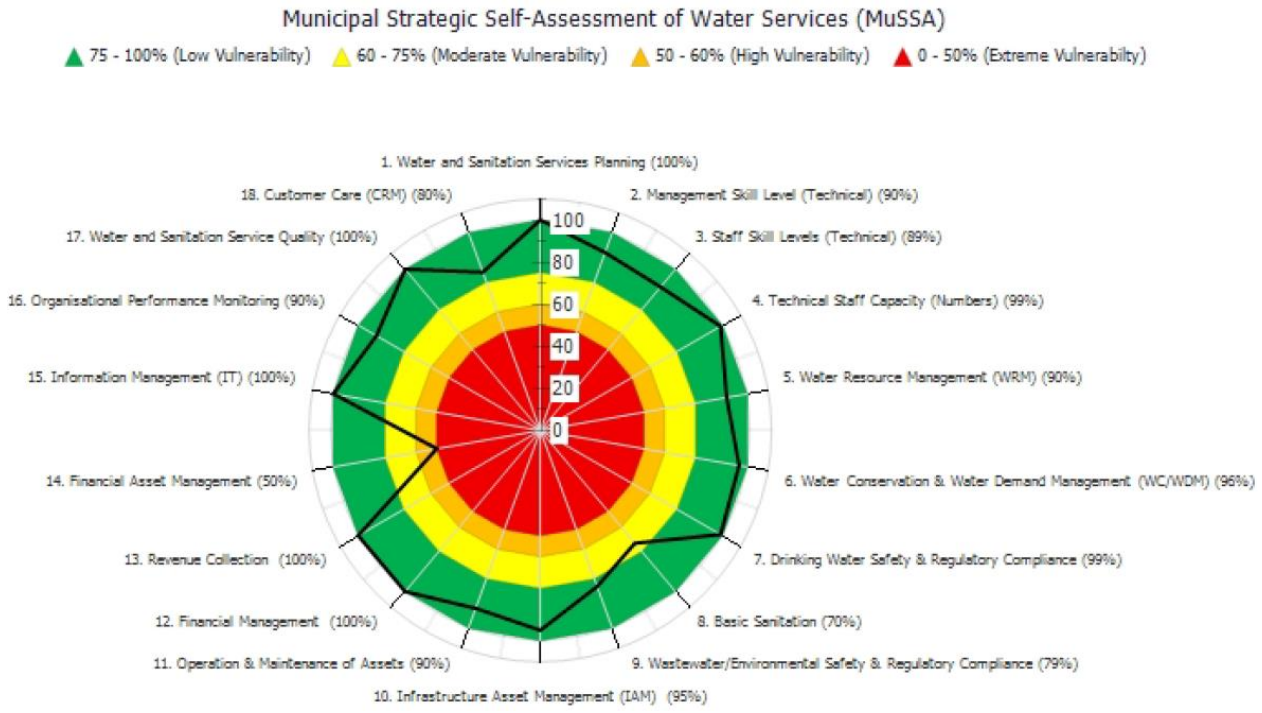


Figure C.9.1: Spider Diagram of the vulnerability levels of Swartland Municipality for 2021

Swartland Municipality's Vulnerability Index for 2021 was indicated as 0.15 "Low Vulnerability". The only one area of concern evident from the 2021 assessment is Financial Asset Management, which obtained a score of 50% (High Vulnerability). The vulnerability of all the other key service areas are low, except basic sanitation that is moderate.

Table C.9.1: Municipal Strategic Self-Assessment (MuSSA) of Water Services for Swartland Municipality

Section	Vulnerability
Water and Sanitation Service Quality • 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). • Customers have a functional, reliable and safe water supply system with sufficient quantity and flow, good quality and minimal interruptions. • 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. • Households in your WSA experience water pressure problems (no flow/partial flow less than 10 litres / minute) (not to be confused with interruption to supply). • 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.	**Low (100%)**
Customer Care • 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. • Regular municipal wide customer satisfaction surveys are conducted to determine customer satisfaction levels and inform the Customer Care Management Plan. • Please indicate what percentage of the reported water related complaints/callouts are acknowledged, including consumer response, within 24 hours. • Please indicate what percentage of the reported wastewater/sanitation related complaints/callouts are acknowledged, including consumer response, within 24 hours. • 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.	**Low (80%)**
Water and Sanitation Services Planning • 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. • You are implementing an up-to-date and adopted municipal water and sanitation services plan (e.g. WSDP). • Your current project list addresses existing needs / shortcomings identified through the WSDP and associated master planning process. • Project progress is monitored, tracked and reported to municipal top management / council and the Regulator (through the annual water and sanitation services report). • Projects identified through your various planning processes have been implemented in the last 3 years.	**Low (100%)**
Water Resource Management (WRM) • The recommendations and actions from the Reconciliation Strategies (Large Systems / All Towns) have been incorporated into your WSDP, master planning and IDP processes. • 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). • The quantity of water available from the resources is sufficient for your future WSA needs (at the stipulated level of assurance of supply) (i.e. no shortage in 10 years). • The source water quality is currently acceptable for its purpose. • The trend indicates a deteriorating source water quality.	**Low (90%)**
WC/WDM • Your WSA has developed a council approved WC/WDM Strategy, which includes a standard water balance (e.g.	**Low (96%)**

Table C.9.1: Municipal Strategic Self-Assessment (MuSSA) of Water Services for Swartland Municipality	
Section	**Vulnerability**
modified IWA). • Please indicate your percentage Non-Revenue Water (NRW) as per the modified IWA water balance. • System input volumes (bulk) to the WSA are accurately monitored using calibrated bulk meters (e.g. check metering). • Please indicate what percentage of all connections are metered and billed (residential and non-residential (commercial, industrial, etc.)) on a monthly basis. • 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).	
Drinking Water Safety and Regulatory Compliance • 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. • 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. • 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 auctioning, and these issues have been actioned (where applicable). • Sufficient funds have been made available to address all these identified water safety related issues. • Required corrective actions/remedial measures to address all these identified water safety related issues have been successfully implemented.	**Low (99%)**
Basic Sanitation • You have formal housing areas that are not fully serviced with sanitation infrastructure. • You have informal housing or rural areas that are not fully serviced with sanitation infrastructure. • 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). • Your sanitation budget is appropriate for required sanitation programmes (implementation and O&M). • 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).	**Moderate (70%)**
Wastewater / Environmental Safety and Regulatory Compliance • Please indicate your treated wastewater effluent compliance for COD for your (or your service provider's) WWTWs for the last 12 months. • ALL your WWTWs, process controllers, monitoring programmes, sample points, laboratories, results, procedures, protocols, etc. are managed with a suitable waste water risk abatement framework. • Council have been made aware of all W_2RAP related issues (e.g. pollution incidents, Green Drop deficiencies) that require budget and auctioning, and these issues have been actioned (where applicable). • Sufficient funds have been made available to address all identified wastewater and environmental safety related issues. • Required corrective actions/remedial measures to address all identified wastewater and environmental safety related issues have been successfully implemented.	**Low (79%)**
Infrastructure Asset Management • 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. • You have developed an appropriate Infrastructure Asset Management (IAM) Plan for your WSA. • You are implementing the IAM outcomes. • Budget allocated to implement IAM outcomes is sufficient and is being effectively spent. • 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.	**Low (95%)**
Operation and Maintenance of Assets • Appropriate maintenance facility(ies) that is (are) secure and stocked with essential equipment (e.g. spare parts), plant and tools is (are) available.	**Low (90%)**

Table C.9.1: Municipal Strategic Self-Assessment (MuSSA) of Water Services for Swartland Municipality	
Section	**Vulnerability**
• Appropriate water and sanitation services infrastructure / equipment planned / preventative maintenance schedules are developed. • Appropriate planned / preventative maintenance is performed at all WTWs and associated reservoirs, pump stations and distribution networks. • Appropriate planned / preventative maintenance is performed at all WWTWs and associated collection systems and pump stations. • Please indicate your infrastructure repairs and maintenance costs as a function of total operating expenditure (%).	
Information Management • You have a developed, approved and implemented IT Master Systems Plan (e.g. covering 3-5 years) that addresses your IT business requirements. • You have a developed, approved and implemented ICT Technology Master Plan that addresses your current and future IT infrastructure requirements. • 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). • 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. • You have sufficient budget and staff to keep key IT systems table and up-to-date as per IT policies and procedures.	**Low (100%)**
Organisational Performance Monitoring • 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. • An organisational performance management system is developed and implemented (i.e. effectively measure, monitor and track water and sanitation services performance indicators). • A municipal risk management framework is developed and implemented and includes monitoring and tracking of water and sanitation related risks. • Effective administration support is available to technical staff to assist with processing work orders, providing order numbers, handling correspondence, etc. • "Access to Basic Water and Sanitation Services" progress reports are frequently produced and presented to council for discussion, action and follow-up.	**Low (90%)**
Financial Management • Financial controls - Please state the audit opinion with regard to your last audit report on the financial statements. • Cash flow status – Please state your Cash / Cost Coverage Ratio (excluding Unspent Conditional Grants) • Your actual operating expenditure closely reflects your budgeted operating expenditure (i.e. Operating Expenditure Budget Implementation Indicator). • Your actual revenue closely reflects your budgeted operating revenue (i.e. Operating Revenue Budget Implementation Indicator). • 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).	**Low (100%)**
Revenue Collection • Please indicate the frequency of actual consumer meter readings. • 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). • Revenue collections - Please state the revenue collection rate in respect to Water and Sanitation Services (%). • Revenue Growth – Please state your Water and Sanitation Services revenue growth for the last 12 months (%). • Grant dependency – Actual-operating revenue less operational grants / subsidies (e.g. equitable share) sufficiently covers actual operating expenditure.	**Low (100%)**
Financial Asset Management	**High**

Table C.9.1: Municipal Strategic Self-Assessment (MuSSA) of Water Services for Swartland Municipality	
Section	**Vulnerability**
• Capital Expenditure (Municipal). Please state your municipal Capital Expenditure as a percentage of Total Expenditure (i.e. Total Operating Expenditure + Capital Expenditure). • Capital Expenditure (Water Services). Please state your Capital Expenditure on Water and Sanitation Services as a percentage of Total Capital Expenditure (Capital Expenditure (Municipal)). • Asset Renewal. Please state your Asset Renewal investment as percentage of Depreciation Costs. • Repairs and Maintenance. Please state your Repairs and Maintenance expenditure as a percentage of Property, Plant and Equipment, Investment Property (Carrying Value). • Grant funding of capital expenditure – Please state your reliance on grant funding.	**(50%)**
Management Skill Level (Technical) • 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). • You have sufficient technical management and technical support staff. • 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). • Managers and technical support staff regularly attend appropriate water and sanitation services skills development / training to support professionalisation. • Key technical managers (e.g. Section 56 and other Senior Management) have signed and monitored Performance Agreements.	**Low (90%)**
Staff Skill Levels (Technical) • WTWs are operated by staff with the correct skills / qualifications and experience (as per Regulation 2834). • WWTWs are operated by staff with the correct skills / qualifications and experience (as per Regulation 2834). • Water system plumbers, mechanics and electricians have the correct skills / qualifications and experience. • Sewage system plumbers, millwrights, mechanics and electricians have the correct skills/qualifications and experience (including contractors / outsourced resources). • Staff regularly attend appropriate water services skills development / training (including safety) (e.g. ESETA courses).	**Low (89%)**
Technical Staff Capacity (Numbers) • Your council approved technical staff organisational organogram meets your business requirements, and posts are filled (i.e. Superintendent of WTWs / WWTWs and below). • WTWs are operated by the appropriate number of staff (as per Regulation 2834). • WWTWs are operated by the appropriate number of staff (as per Regulation 2834). • 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). • An active mentoring/shadowing programme is in place where experienced staff train younger, inexperienced municipal staff.	**Low (99%)**

The Municipal staff is continuously exposed to training opportunities, skills development and capacity building at a technical, operations and management level in an effort to create a more efficient overall service to the users. A Workplace Skills Plan is compiled annually and the specific training needs of the personnel, with regard to water and wastewater management are determined annually. An amount of R2 021 645 was spent on training of employed personnel during the 2020/2021 financial year. The table below gives an overview of the training provided during the 2020/2021 financial year, as taken from the Workplace Skills Plan.

Table C.9.2: Training provided during the 2020/2021 financial year (Workplace Skills Plan)			
Type of Learning Intervention	**Name of Learning Intervention**	**NQF Level**	**Number of personnel trained**
Apprenticeship	Bricklayer - ATBLA (Local Authority)	4	2
Bursary	Bachelor of Library and Information Science	7	1
Bursary	Diploma in Public Accountability	6	1
Bursary	National Senior Certificate for Adults	4	8

Table C.9.2: Training provided during the 2020/2021 financial year (Workplace Skills Plan)			
Type of Learning Intervention	**Name of Learning Intervention**	**NQF Level**	**Number of personnel trained**
Skills Programme towards a Qualification	National Certificate: Professional Driving	3	91
Skills Programme towards a Qualification	Municipal Finance Management Development Programme	6	20
Skills Programme towards a Qualification	Certificate: General Internal Auditing	8	1
Skills Programme towards a Qualification	Occupational Certificate: Loader Operator	2	1
Skills Programme towards a Qualification	General Education and Training Certificate: Adult Basic Education and Training	1	42
Short Course: Non-credit	Diversity Awareness Programme	1	371
Short Course: Non-credit	PAYE Update Legislative Symposium and Workshop	1	2
Total Training for 2020/2021			**540**

The WWTWs in Swartland Municipality's Management Area and the Process Controllers working at these plants are registered with the DWS.

The Occupational Health and Safety Act contain provisions directing employers to maintain a safe workplace and to minimize the exposure of employees and the public to workplace hazards. It is therefore important for Swartland Municipality to compile a Legal Compliance Audit of all their WWTWs, which will provide the management of Swartland Municipality with the necessary information to establish whether the Municipality is in compliance with the legislation or not.

Swartland Municipality's Organogram, as approved on the 28th of May 2020, which include water and sanitation services, is included in Annexure G. Swartland Municipality is currently effectively managing its water and sanitation services. Urgent attention is however required to address the backlog in infrastructure replacement and refurbishment. All forward planning for water and sanitation services is guided by the Water and Sewer Master Plans, which were recently updated.

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 Object ref, Date time reported, Reported by, Contact telephone, Location description, Incident type, Capture by, Allocated to, Date and time attended and Status is recorded.

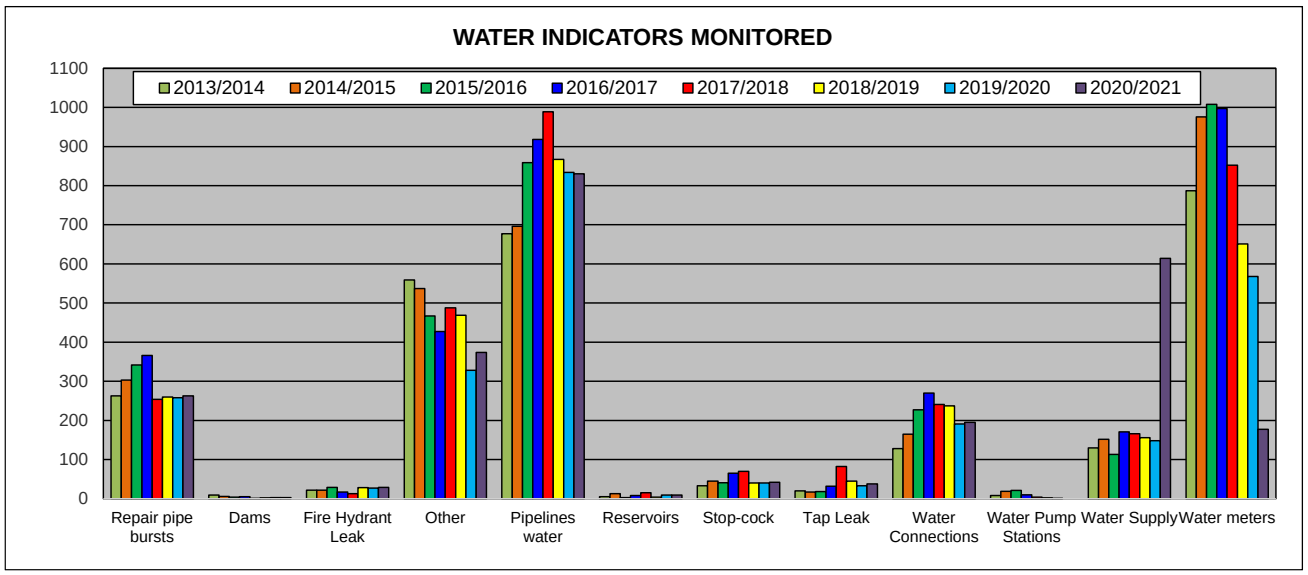


Figure C.9.2: Water indicators recorded for the last eight financial years.

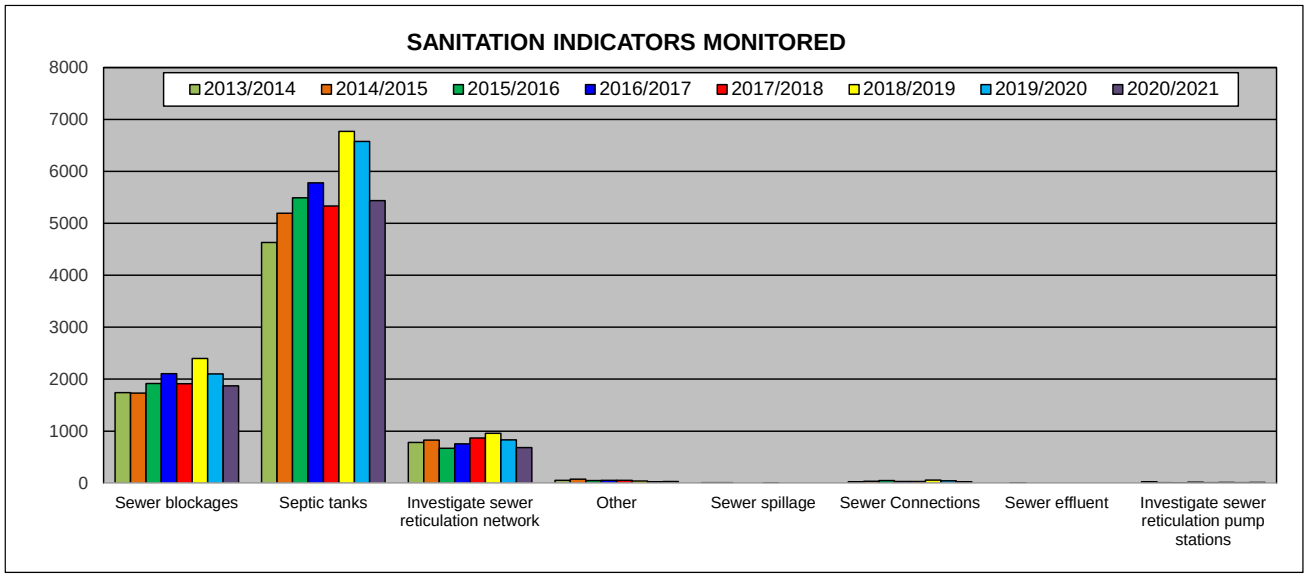


Figure C.9.3: Sanitation indicators recorded for the last eight financial years.

Table C.9.3: Water indicators monitored by Swartland Municipality with regard to customer services and maintenance work															
Service	**Indicator**	**Abbotsdale**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Koringberg**	**Malmesbury**	**Moorrees-burg**	**Farms**	**Ongegund (PPC)**	**Riebeek Kasteel**	**Riebeek Wes**	**Riverlands**	**Yzerfontein**	**Total**
Repair pipe bursts	Repair of burst water pipelines	10	11	18	8	1	114	23	0	3	21	13	32	9	**263**
Dams	Inspect / Repair faults at dams	0	0	0	0	0	2	1	0	0	0	0	0	0	**3**
Fire Hydrant Leak	Inspect / repair leaking hydrants	1	2	4	0	0	14	5	0	2	1	0	0	0	**29**
Other	Other water complaints (Not specified)	16	12	80	3	1	190	47	1	0	8	4	7	5	**374**
Pipelines water	Inspect / repair of faulty water pipelines	25	30	89	23	7	477	109	0	2	16	6	35	11	**830**
Reservoirs	Inspection of reservoirs and work carried out	1	1	0	0	0	6	0	0	0	0	0	0	1	**9**
Stop-cock	Inspect / Repair leaking stop-cocks	0	0	10	0	1	0	30	0	0	0	0	0	1	**42**
Tap Leak	Inspect / Repair leaking taps	0	1	3	0	0	28	5	0	0	1	0	0	0	**38**
Water Connections	New / Inspections and work carried out at water connections	9	35	10	11	0	87	10	0	0	8	3	2	20	**195**
Water Pump Stations	Inspections and work carried out at water PS	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Water Supply	Faulty water supply	21	40	85	20	22	249	115	0	0	17	9	26	10	**614**
Water meters	Inspect / Test / Repair / Install	5	15	16	9	2	100	14	1	0	7	5	1	2	**177**
Total for 2020/2021		**88**	**147**	**315**	**74**	**34**	**1 267**	**359**	**2**	**7**	**79**	**40**	**103**	**59**	**2 574**
Repair pipe bursts	Repair of burst water pipelines	6	14	14	8	-	126	19	-	5	28	14	19	5	**258**
Dams	Inspect / Repair faults at dams	-	-	-	-	-	3	-	-	-	-	-	-	-	**3**
Fire Hydrant Leak	Inspect / repair leaking hydrants	-	-	2	2	-	19	2	-	-	1	-	1	-	**27**
Other	Other water complaints (Not specified)	10	5	52	6	3	185	42	-	-	5	5	8	7	**328**
Pipelines water	Inspect / repair of faulty water pipelines	15	40	71	21	7	497	79	3	6	19	21	45	10	**834**
Reservoirs	Inspection of reservoirs and work carried out	-	-	-	2	-	5	-	-	-	1	-	1	-	**9**
Stop-cock	Inspect / Repair leaking stop-cocks	-	-	9	-	1	4	24	-	-	-	-	-	2	**40**
Tap Leak	Inspect / Repair leaking taps	-	-	4	-	-	25	2	-	-	1	-	-	1	**33**
Water Connections	New / Inspections and work carried out at water connections	10	23	13	5	1	87	8	-	2	6	2	-	34	**191**
Water Pump Stations	Inspections and work carried out at water PS	-	1	-	-	-	-	-	-	-	-	-	-	-	**1**
Water Supply	Faulty water supply	9	7	3	9	3	74	14	-	1	9	3	5	11	**148**
Water meters	Inspect / Test / Repair / Install	29	28	95	10	13	248	85	-	2	16	9	26	7	**568**

Table C.9.3: Water indicators monitored by Swartland Municipality with regard to customer services and maintenance work															
Service	**Indicator**	**Abbotsdale**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Koringberg**	**Malmesbury**	**Moorrees-burg**	**Farms**	**Ongegund (PPC)**	**Riebeek Kasteel**	**Riebeek Wes**	**Riverlands**	**Yzerfontein**	**Total**
Total for 2019/2020		**79**	**118**	**263**	**63**	**28**	**1 273**	**275**	**3**	**16**	**86**	**54**	**105**	**77**	**2 440**
Repair pipe bursts	Repair of burst water pipelines	10	18	15	11	1	77	28	2	4	24	33	19	18	**260**
Dams	Inspect / Repair faults at dams	-	-	-	-	-	-	1	-	-	-	1	-	-	**2**
Fire Hydrant Leak	Inspect / repair leaking hydrants	-	1	-	-	1	16	9	-	1	-	-	-	-	**28**
Other	Other water complaints (Not specified)	17	15	111	13	3	195	73	-	2	14	6	6	14	**469**
Pipelines water	Inspect / repair of faulty water pipelines	41	47	91	31	11	424	86	-	7	21	28	56	24	**867**
Reservoirs	Inspection of reservoirs and work carried out	-	-	-	-	-	2	-	-	-	1	-	1	-	**4**
Stop-cock	Inspect / Repair leaking stop-cocks	-	1	11	-	2	3	21	-	-	-	-	-	2	**40**
Tap Leak	Inspect / Repair leaking taps	-	-	4	-	-	36	4	-	-	-	1	-	-	**45**
Water Connections	New / Inspections and work carried out at water connections	14	29	19	6	1	73	7	1	-	12	9	3	63	**237**
Water Pump Stations	Inspections and work carried out at water PS		-	-	-	-	2	-	-	-	-	-	-	-	**2**
Water Supply	Faulty water supply	22	8	6	9	2	71	7	4	-	12	7	4	4	**156**
Water meters	Inspect / Test / Repair / Install	24	57	99	26	9	237	101	1	4	22	13	40	18	**651**
Total for 2018/2019		**128**	**176**	**356**	**96**	**30**	**1 136**	**337**	**8**	**18**	**106**	**98**	**129**	**143**	**2 761**
Repair pipe bursts	Repair of burst water pipelines	12	10	28	25	1	70	23	2	6	26	23	18	10	**254**
Dams	Inspect / Repair faults at dams	-	-	-	1	-	-	-	-	-	-	-	-	-	**1**
Fire Hydrant Leak	Inspect / repair leaking hydrants	-	-	2	1	-	8	1	-	-	1	-	-	-	**13**
Other	Other water complaints (Not specified)	14	10	70	7	5	205	146	-	1	13	8	4	5	**488**
Pipelines water	Inspect / repair of faulty water pipelines	44	37	146	41	8	483	123	2	8	28	10	33	26	**989**
Reservoirs	Inspection of reservoirs and work carried out	-	-	1	4	2	4	-	-	1	2	1	-	-	**15**
Stop-cock	Inspect / Repair leaking stop-cocks	-	-	10	1	3	12	44	-	-	-	-	-	-	**70**
Tap Leak	Inspect / Repair leaking taps	2	-	2	-	-	69	7	-	-	-	1	-	1	**82**
Water Connections	New / Inspections and work carried out at water connections	22	36	6	12	3	79	8	1	1	10	4	1	58	**241**
Water Pump Stations	Inspections and work carried out at water PS	-	-	-	2	-	1	-	-	-	-	-	1	-	**4**
Water Supply	Faulty water supply	26	7	3	10	1	82	10	2	2	7	9	6	1	**166**
Water meters	Inspect / Test / Repair / Install	36	41	125	22	27	362	156	1	4	19	17	38	4	**852**

Table C.9.3: Water indicators monitored by Swartland Municipality with regard to customer services and maintenance work															
Service	**Indicator**	**Abbotsdale**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Koringberg**	**Malmesbury**	**Moorrees-burg**	**Farms**	**Ongegund (PPC)**	**Riebeek Kasteel**	**Riebeek Wes**	**Riverlands**	**Yzerfontein**	**Total**
Total for 2017/2018		**156**	**141**	**393**	**126**	**50**	**1 375**	**518**	**8**	**23**	**106**	**73**	**101**	**105**	**3 175**
Repair pipe bursts	Repair of burst water pipelines	10	25	37	21	6	141	31		4	33	22	25	11	**366**
Dams	Inspect / Repair faults at dams	-	-	-	-	-	2	-	-	-	-	3	-	-	**5**
Fire Hydrant Leak	Inspect / repair leaking hydrants	-	-	2	1	-	13	1	-	-	-	-	-	-	**17**
Other	Other water complaints (Not specified)	12	17	82	10	4	214	63	4	-	9	3	4	5	**427**
Pipelines water	Inspect / repair of faulty water pipelines	23	62	107	24	14	476	133	2	6	22	9	32	8	**918**
Reservoirs	Inspection of reservoirs and work carried out	3	-	2	-	-	1	-	-	-	-	1	1	-	**8**
Stop-cock	Inspect / Repair leaking stop-cocks	-	-	13	-	4	3	45	-	-	-	-	-	-	**65**
Tap Leak	Inspect / Repair leaking taps	-	-	3	-	-	20	7	-	-	-	1	-	1	**32**
Water Connections	New / Inspections and work carried out at water connections	7	29	12	10	2	110	14	1	1	12	6	3	63	**270**
Water Pump Stations	Inspections and work carried out at water PS	-	-	-	-	-	-	-	-	-	-	-	10	-	**10**
Water Supply	Faulty water supply	28	4	12	6	-	78	10	4	-	13	9	2	5	**171**
Water meters	Inspect / Test / Repair / Install	47	58	151	20	20	423	138	4	6	27	27	46	30	**997**
Total for 2016/2017		**130**	**195**	**421**	**92**	**50**	**1 481**	**442**	**15**	**17**	**116**	**81**	**123**	**123**	**3 286**
Repair pipe bursts	Repair of burst water pipelines	6	17	48	18	2	114	52	2	7	32	22	13	9	**342**
Dams	Inspect / Repair faults at dams	-	-	2	1	-	1	-	-	-	-	-	-	-	**4**
Fire Hydrant Leak	Inspect / repair leaking hydrants	1	-	3	1	1	18	3	-	-	1	-	-	1	**29**
Other	Other water complaints (Not specified)	24	5	80	4	7	244	71	-	2	13	7	6	4	**467**
Pipelines water	Inspect / repair of faulty water pipelines	36	29	100	24	8	507	95	-	1	16	12	20	11	**859**
Reservoirs	Inspection of reservoirs and work carried out	-	-	2	-	-	-	-	-	-	-	1	-	-	**3**
Stop-cock	Inspect / Repair leaking stop-cocks	-	-	6	-	1	4	30	-	-	-	-	-	-	**41**
Tap Leak	Inspect / Repair leaking taps	-	-	3	-	-	7	5	-	-	-	-	2	1	**18**
Water Connections	New / Inspections and work carried out at water connections	11	24	8	10	2	84	10	-	2	13	7	1	55	**227**
Water Pump Stations	Inspections and work carried out at water PS	-	-	-	1	-	-	-	-	-	-	-	20	-	**21**
Water Supply	Faulty water supply	10	5	5	3	2	67	6	4	1	1	1	3	5	**113**
Water meters	Inspect / Test / Repair / Install	38	38	143	13	18	461	152	8	7	31	56	31	12	**1 008**

Table C.9.3: Water indicators monitored by Swartland Municipality with regard to customer services and maintenance work															
Service	**Indicator**	**Abbotsdale**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Koringberg**	**Malmesbury**	**Moorrees-burg**	**Farms**	**Ongegund (PPC)**	**Riebeek Kasteel**	**Riebeek Wes**	**Riverlands**	**Yzerfontein**	**Total**
Total for 2015/2016		**126**	**118**	**400**	**75**	**41**	**1 507**	**424**	**14**	**20**	**107**	**106**	**96**	**98**	**3 132**
Repair pipe bursts	Repair of burst water pipelines	3	17	25	6	8	122	29	3	4	39	13	29	5	**303**
Dams	Inspect / Repair faults at dams	-	-	4	-	-	1	1	-	-	-	-	-	-	**6**
Fire Hydrant Leak	Inspect / repair leaking hydrants	-	-	3	-	1	11	5	-	-	-	2	-	-	**22**
Other	Other water complaints (Not specified)	14	16	74	10	10	257	124	3	1	11	10	5	2	**537**
Pipelines water	Inspect / repair of faulty water pipelines	11	40	62	15	4	403	90	-	2	18	5	37	9	**696**
Reservoirs	Inspection of reservoirs and work carried out	1	-	6	1	-	3	-	-	-	1	-	1	-	**13**
Stop-cock	Inspect / Repair leaking stop-cocks	-	-	8	-	2	-	34	-	-	1	-	-	-	**45**
Tap Leak	Inspect / Repair leaking taps	-	-	1	-	-	4	12	-	-	-	-	-	-	**17**
Water Connections	New / Inspections and work carried out at water connections	8	17	6	14	3	36	8	2	-	14	6	5	46	**165**
Water Pump Stations	Inspections and work carried out at water PS	-	6	-	6	-	3	-	-	-	-	-	4	-	**19**
Water Supply	Faulty water supply	10	16	5	8	2	87	11	2	1	3	2	5	-	**152**
Water meters	Inspect / Test / Repair / Install	49	46	154	12	19	418	140	4	1	38	29	33	33	**976**
Total for 2014/2015		**96**	**158**	**348**	**72**	**49**	**1 345**	**454**	**14**	**9**	**125**	**67**	**119**	**95**	**2 951**
Repair pipe bursts	Repair of burst water pipelines	6	9	13	4	3	107	28	1	7	31	25	22	7	**263**
Dams	Inspect / Repair faults at dams	-	-	1	-	-	3	3	-	-	-	-	2	-	**9**
Fire Hydrant Leak	Inspect / repair leaking hydrants	-	-	1	-	-	9	11	-	-	-	-	1	-	**22**
Other	Other water complaints (Not specified)	13	7	54	9	8	280	163	4		7	8	2	4	**559**
Pipelines water	Inspect / repair of faulty water pipelines	30	25	32	22	8	389	88	2	3	14	13	39	12	**677**
Reservoirs	Inspection of reservoirs and work carried out	-	-	3	-	-	2	-	-	-	-	-	-	-	**5**
Stop-cock	Inspect / Repair leaking stop-cocks	-	-	-	-	-	2	31	-	-	-	-	-	-	**33**
Tap Leak	Inspect / Repair leaking taps	-		1	-	-	10	8	-	-	1	-	-	-	**20**
Water Connections	New / Inspections and work carried out at water connections	9	21	3	8	5	29	7	-	1	4	5	1	35	**128**
Water Pump Stations	Inspections and work carried out at water PS	-	-	-	1	-	5	1	-	-	-	-	1	-	**8**
Water Supply	Faulty water supply	7	2	1	4	3	77	13	4	2	4	6	1	6	**130**
Water meters	Inspect / Test / Repair / Install	30	42	175	5	16	268	146	2	4	25	18	16	40	**787**
Total for 2013/2014		**95**	**106**	**284**	**53**	**43**	**1 181**	**499**	**13**	**17**	**86**	**75**	**85**	**104**	**2 641**

C.9.4: Sanitation indicators monitored by Swartland Municipality with regard to customer services and maintenance work															
Service	**Indicator**	**Abbotsdale**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Koringberg**	**Malmesbury**	**Moorrees-burg**	**Farms**	**Ongegund (PPC)**	**Riebeek Kasteel**	**Riebeek Wes**	**Riverlands**	**Yzerfontein**	**Total**
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	41	14	442	24	12	597	574	2	20	63	55	23	3	1 870
Septic tanks	Empty septic tanks	20	541	129	422	310	47	288	737	0	148	481	10	2 306	5 439
Investigate sewer reticulation network	Investigate and clear blockages in network	25	6	129	15	1	280	110	17	8	51	19	9	14	684
Other	Other sewer complaints (Not specified)	4	1	2	5	0	10	5	0	0	1	1	1	1	31
Sewer spillage	Investigate and clean sewer spillages	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sewer Connections	Installation of sewer connections	3	0	6	2	0	7	4	0	0	4	0	0	0	26
Sewer effluent	Investigate effluent distribution for irrigation purposes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	2	0	0	1	0	7	0	0	0	1	0	3	0	14
Total for 2020/2021		**95**	**562**	**708**	**469**	**323**	**948**	**981**	**756**	**28**	**268**	**556**	**46**	**2 324**	**8 064**
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	57	11	446	39	24	690	589	2	18	121	75	18	12	2102
Septic tanks	Empty septic tanks	13	483	250	411	392	56	308	794	-	238	679	7	2 946	6 577
Investigate sewer reticulation network	Investigate and clear blockages in network	32	15	136	22	1	375	105	12	9	53	23	16	31	830
Other	Other sewer complaints (Not specified)	-	-	5	1	-	13	2	1	1	2	-	-	1	26
Sewer spillage	Investigate and clean sewer spillages	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sewer Connections	Installation of sewer connections	6	-	8	-	-	11	5	-	-	10	2	1	-	43
Sewer effluent	Investigate effluent distribution for irrigation purposes	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	-	-	-	4	-	2	-	-	-	1	-	-	-	7

C.9.4: Sanitation indicators monitored by Swartland Municipality with regard to customer services and maintenance work															
Service	**Indicator**	**Abbotsdale**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Koringberg**	**Malmesbury**	**Moorrees-burg**	**Farms**	**Ongegund (PPC)**	**Riebeek Kasteel**	**Riebeek Wes**	**Riverlands**	**Yzerfontein**	**Total**
Total for 2019/2020		**108**	**509**	**845**	**477**	**417**	**1 147**	**1 009**	**809**	**28**	**425**	**779**	**42**	**2 990**	**9 585**
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	61	21	485	55	28	819	668	5	22	128	81	19	5	2 397
Septic tanks	Empty septic tanks	21	464	262	451	400	46	394	869	-	243	646	6	2 969	6 771
Investigate sewer reticulation network	Investigate and clear blockages in network	38	13	168	19	7	415	124	15	14	56	32	24	32	957
Other	Other sewer complaints (Not specified)	7	1	3	2	-	17	5	-	-	3	1	1	1	41
Sewer spillage	Investigate and clean sewer spillages	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sewer Connections	Installation of sewer connections	10	1	11	1	-	16	3	-	-	8	9	-	-	59
Sewer effluent	Investigate effluent distribution for irrigation purposes	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	-	4	-	2	-	5	-	-	1	2	0	-	-	14
Total 2018/2019		**137**	**504**	**929**	**530**	**435**	**1 318**	**1 194**	**889**	**37**	**440**	**769**	**50**	**3 007**	**10 239**
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	49	9	455	40	13	614	521	3	22	71	90	23	-	**1 910**
Septic tanks	Empty septic tanks	23	358	206	378	331	131	323	519	-	179	542	4	2 341	**5 335**
Investigate sewer reticulation network	Investigate and clear blockages in network	23	12	189	9	2	351	100	14	8	60	30	22	49	**869**
Other	Other sewer complaints (Not specified)	5	2	1	-	-	30	7	-	-	3	4	-	2	**54**
Sewer spillage	Investigate and clean sewer spillages	-	-	-	-	-	4	-	-	-	-	-	-	-	**4**
Sewer Connections	Installation of sewer connections	7	-	4	-	-	11	2	-	-	4	3	-	-	**31**
Sewer effluent	Investigate effluent distribution for irrigation purposes	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	-	-	-	1	1	5	-	-	-	2	-	-	-	**9**

C.9.4: Sanitation indicators monitored by Swartland Municipality with regard to customer services and maintenance work															
Service	**Indicator**	**Abbotsdale**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Koringberg**	**Malmesbury**	**Moorrees-burg**	**Farms**	**Ongegund (PPC)**	**Riebeek Kasteel**	**Riebeek Wes**	**Riverlands**	**Yzerfontein**	**Total**
Total 2017/2018		**107**	**381**	**855**	**428**	**347**	**1 146**	**953**	**536**	**30**	**319**	**669**	**49**	**2 392**	**8 212**
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	66	5	564	16	15	703	536	3	22	85	67	22	2	**2 106**
Septic tanks	Empty septic tanks	25	338	322	394	358	50	295	508	-	135	630	15	2 711	**5 781**
Investigate sewer reticulation network	Investigate and clear blockages in network	16	14	84	17	3	330	142	10	8	47	26	31	26	**754**
Other	Other sewer complaints (Not specified)	6	1	3	1	1	26	7	-	-	3	1	-	3	**52**
Sewer spillage	Investigate and clean sewer spillages	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Sewer Connections	Installation of sewer connections	6	-	2	1	-	8	3	-	1	4	5	1	-	**31**
Sewer effluent	Investigate effluent distribution for irrigation purposes	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	9	-	-	-	-	5	-	-	-	-	-	1	-	**15**
Total 2016/2017		**128**	**358**	**975**	**429**	**377**	**1 122**	**983**	**521**	**31**	**274**	**729**	**70**	**2 742**	**8 739**
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	53	9	540	29	30	568	496	3	16	80	79	8	4	**1 915**
Septic tanks	Empty septic tanks	19	368	266	360	287	75	272	451	1	145	644	4	2 600	**5 492**
Investigate sewer reticulation network	Investigate and clear blockages in network	20	3	100	12	2	295	133	8	9	37	22	17	12	**670**
Other	Other sewer complaints (Not specified)	2	2	5	4	-	28	5	1	-	1	-	1	1	**50**
Sewer spillage	Investigate and clean sewer spillages	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Sewer Connections	Installation of sewer connections	2	2	5	1	-	16	2	-	2	13	6	-	-	**49**
Sewer effluent	Investigate effluent distribution for irrigation purposes	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	1	-	-	-	-	-	-	-	-	-	-	-	-	**1**

C.9.4: Sanitation indicators monitored by Swartland Municipality with regard to customer services and maintenance work															
Service	**Indicator**	**Abbotsdale**	**Chatsworth**	**Darling**	**Kalbaskraal**	**Koringberg**	**Malmesbury**	**Moorrees-burg**	**Farms**	**Ongegund (PPC)**	**Riebeek Kasteel**	**Riebeek Wes**	**Riverlands**	**Yzerfontein**	**Total**
Total 2015/2016		**97**	**384**	**916**	**406**	**319**	**982**	**908**	**463**	**28**	**276**	**751**	**30**	**2 617**	**8 177**
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	53	10	536	18	18	479	434	2	29	76	52	19	5	**1 731**
Septic tanks	Empty septic tanks	25	326	248	316	319	78	257	378	-	134	615	8	2 491	**5 195**
Investigate sewer reticulation network	Investigate and clear blockages in network	18	8	111	17	6	368	173	20	3	48	18	10	26	**826**
Other	Other sewer complaints (Not specified)	7	1	4	1	2	21	30	-	-	5	-	-	2	**73**
Sewer spillage	Investigate and clean sewer spillages	-	-	2	-	-	3	2	-	-	-	-	-	-	**7**
Sewer Connections	Installation of sewer connections	4	-	2	1	-	8	4	-	-	12	3	2	-	**36**
Sewer effluent	Investigate effluent distribution for irrigation purposes	-	-	-	-	-	1	-	-	-	-	-	-	-	**1**
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	2	-	-	-	-	3	-	-	-	-	-	2	-	**7**
Total 2014/2015		**109**	**345**	**903**	**353**	**345**	**961**	**900**	**400**	**32**	**275**	**688**	**41**	**2 524**	**7 876**
Sewer blockages	Repair blockages on main sewer pipelines up to connection points	38	7	456	31	9	536	536	4	17	47	48	7	6	**1 742**
Septic tanks	Empty septic tanks	4	311	180	300	307	82	296	285	-	110	624	-	2 133	**4 632**
Investigate sewer reticulation network	Investigate and clear blockages in network	8	6	114	6	5	372	168	12	11	31	31	6	12	**782**
Other	Other sewer complaints (Not specified)	4	2	5	1	-	26	4	-	-	4	-	-	5	**51**
Sewer spillage	Investigate and clean sewer spillages	-	-	2	-	-	-	2	-	-	2	-	-	-	**6**
Pipeline sewer	Installation of sewer pipelines or repair of pipelines	4	-	1	1	-	7	7	-	-	1	2	1	-	**24**
Sewer effluent	Investigate effluent distribution for irrigation purposes	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Investigate sewer reticulation pump stations	Work carried out at sewer pump stations	8	-	1	1	-	6	1	-	1	5	1	-	-	**24**
Total 2013/2014		**66**	**326**	**759**	**340**	**321**	**1 029**	**1 14**	**301**	**29**	**200**	**706**	**14**	**2 156**	**7 261**

The table below gives an overview of the number of tanks pumped during the last six financial years for the various towns.

Table C.9.5: Number of tanks pumped

Town	2020/2021					2019/2020	2018/2019	2017/2018	2016/2017	2015/2016
	Pump 1	Pump 2	Pump 3	After Hours	Total	Total	Total	Total	Total	Total
Abbotsdale	16	7	1	0	**24**	13	17	25	25	20
Chatsworth	513	75	26	0	**614**	484	401	364	331	375
Darling	103	30	10	1	**144**	214	239	190	270	265
Kalbaskraal	380	163	13	0	**556**	392	368	365	384	359
Koringberg	271	97	6	0	**374**	373	374	306	347	310
Malmesbury	39	9	3	0	**51**	40	32	74	37	57
Moorreesburg	316	59	4	0	**379**	302	345	342	279	290
Farms / Other	678	189	84	1	**952**	834	815	576	568	481
Riebeek Kasteel	135	86	8	0	**229**	226	212	188	130	142
Riebeek Wes	459	185	57	2	**703**	672	541	538	571	647
Riverlands	16	1	0	0	**17**	7	4	5	15	4
Yzerfontein	2 464	519	190	13	**3 186**	2 736	2 676	2 202	2 623	2 615
Department	66	41	65	5	**177**	289	128	173	153	120
Total	**5 456**	**1 461**	**467**	**22**	**7 406**	**6 582**	**6 152**	**5 348**	**5 733**	**5 685**

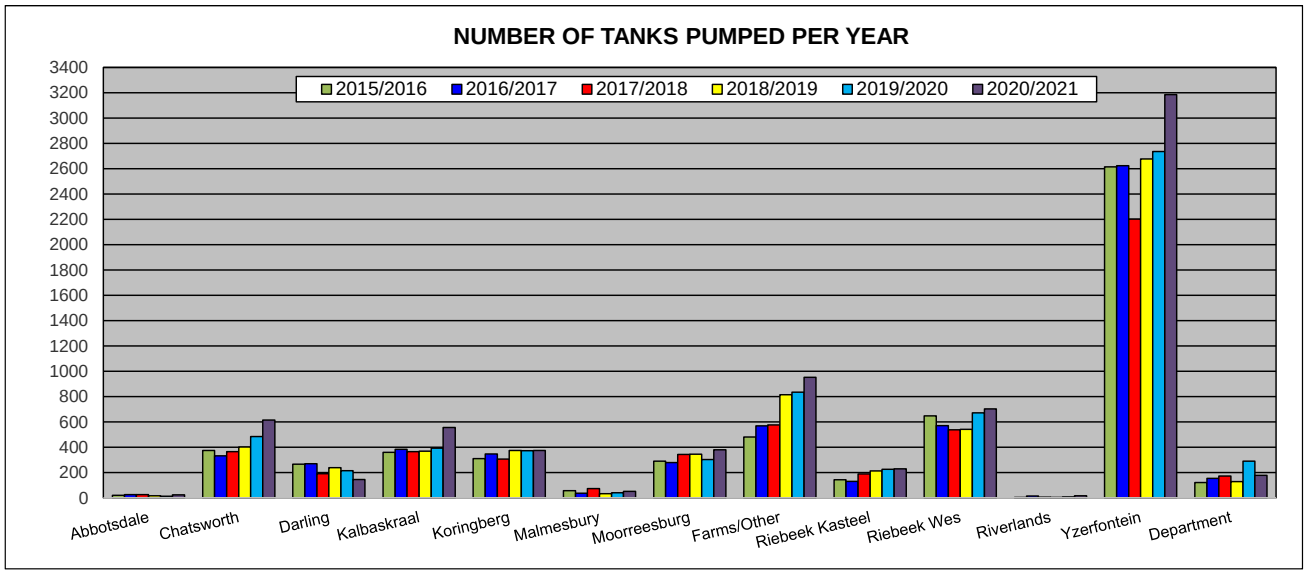


Figure C.9.4: Number of sewage tanks pumped per year for the different areas

Access to safe drinking water is essential to health and is a human right. Safe drinking water that complies with the SANS:241 Drinking Water specification does not pose a significant risk to health over a lifetime of consumption, including different sensitivities that may occur between life stages. Swartland Municipality is therefore committed to ensure that their water quality always complies with national safety standards.

Barriers implemented by Swartland Municipality against contamination and deteriorating water quality include the following:

- Service Delivery Agreement between the West Coast District Municipality and Swartland Municipality. A Monitoring Committee with the following powers and functions are in place:
  - To co-ordinate integrated development planning in respect of the services;
  - To monitor the performance of the District Municipality in respect of service levels;

- To monitor the implementation of this agreement;
- To provide a forum for the local municipalities to interact with the District Municipality;
- To accept delivery, on behalf of the Local Municipalities, of reports which the District Municipality is required to produce in terms of this agreement;
- To consider and make recommendations to the District Municipality on the District Municipality's high-level budget and key performance indicators and targets;
- In consultation with the District Municipality, to handle, manage and make recommendations to the parties in respect of any matter related to the services which is not dealt with by this agreement;
- To ensure that the expenses incurred by the District Municipality in respect of the services do not exceed the amount allocated therefore in the District Municipality's annual budget;
- To formulate a written document that records the rules and procedures, which will be binding on itself, regulating the manner and legislative obligations, powers and functions to the Monitoring Committee.

- Protection at points of abstraction such as Paardenberg Dam and the boreholes (Abstraction Management).
- Protection and maintenance of the distribution systems. This includes ensuring an adequate disinfectant residual at all times, rapid response to pipe bursts and other leaks, regular cleaning of reservoirs, keeping all delivery points tidy and clean, etc.

Three other important barriers implemented by Swartland Municipality against poor quality drinking water that are a prerequisite to those listed above are as follows:

- A well informed Council and municipal managers that understand the extreme importance of and are committed to providing adequate resources for continuous professional operation and maintenance of the water supply system.
- Competent managers and supervisors in the technical department who are responsible for water supply services lead by example and are passionate about monitoring and safeguarding drinking water quality.
- Well informed community members and other consumers of water supply services that know how to protect the water from becoming contaminated once it has been delivered, that have respect for water as a precious resource and that adhere to safe hygiene and sanitation practices.

D. APPROVAL AND PUBLICATION RECORD

This Annual WSDP Performance- and Water Services Audit Report is for the 2020/2021 Financial Year and is hereby approved for submission to the Minister of the Department of Water and Sanitation, the Minister for the Department of Cooperative Governance, the Western Cape Province and to SALGA, as required by the Water Services Act, 1997.

The Municipality will endeavour to publicise a summary of the report.

This report will be available for inspection at the offices of the municipality and is available on the Municipality's website. A Copy of the report is obtainable at a fee as determined by the Municipality

RECOMMENDED:

Signature
Name: J Venter
Title: Senior Manager: Solid Waste and Trade Services

22/10/2021
Date

Signature
Name: L Zikmann
Title: Director Civil Engineering Services

25/10/2021
Date

APPROVED:

Signature
Name: J Scholtz
Title: Municipal Manager

22/10/2021
Date

REFERENCES

- SA Census Data (2011), Community Profiles.
- Water Services Act, Act 108 of 1997. Regulations under Section 9 of the Water Services Act, which include the water services audit as Section 10 of the Guidelines for Compulsory National Standards.
- DWS's Annual Water Services Development Plan Performance- and Water Services Audit Report Template, August 2014.
- DWS's 2014 Blue Drop Report.
- DWS's 2013 Green Drop Report.
- DWS's 2014 Green Drop Progress Report.
- Swartland Municipality's Municipal Services Strategic Assessment (MuSSA) Report, 2021, DWS.
- DWS's All Towns Reconciliation Strategy Documents for each of the towns in Swartland Municipality's Management Area, March 2016.
- Swartland Municipality's Water Services Audit Report for 2019/2020, Final Document, iX engineers.
- Swartland Municipality's Operational Budgets and Tariffs.
- Asset Register for Water and Sanitation Infrastructure Assets, June 2021.
- SDBIP of Swartland Municipality for 2020/2021.
- Socio-Economic Profile for Swartland Municipality, Provincial Treasury, 2020.
- Swartland Municipality: Resource Augmentation Study – Desktop Study, May 2021, iX engineers.
- Process Audit Reports for the WWTWs for the period July 2018 to June 2020, May 2021, Chris Swartz Water Utilization Engineers.

ATTENDANCE REGISTER (DISCUSSION OF DRAFT DOCUMENT)

iX engineers
Infrastructure Excellence

ATTENDANCE REGISTER

Meeting Subject	Draft 2020/2021 Water Services Audit Report		
Location Of Meeting	Swartland Municipality – Engineering Department	**Document No**	
Chaired By	J Human	**Date of Meeting**	21 October 2021
Recorded By	iX engineers	**Time Start**	10:00
		Time Finish	11:30

Attended by:

Representative	Name of Firm	Postal Address	Contact Details				Signature
1. J Human	iX	PO Box 398	**Tel No**	021-9123000	**E-mail**	jaco.h@ixengineers.co.za	
		BELLVILLE					
			Cell No	0846318725	**Fax No**		
2 Clarke Forbes	SWARTLAND LM	1 CHURCH STREET	**Tel No**	022 487 9400	**E-mail**	dirksec@swartland.org.za	
		MALMESBURY		082 053 8192			
			Cell No		**Fax No**		
3. J Venter	Swartland. Mun	11	**Tel No**	022 487 9400	**E-mail**	venterj@swartland.org.za	
			Cell No	084 545 6000	**Fax No**		
4.			**Tel No**		**E-mail**		
			Cell No		**Fax No**		

ANNEXURE A

Monthly number of consumers per category and per town for the last ten financial years

Monthly volume of billed metered consumption per category and per town for the last ten financial years

IWA Water balance models for the various distribution systems

Rainfall and WWTWs flows and capacities

WTWs capacities

ANNEXURE B

No Drop Spreadsheets and ILI

ANNEXURE C

Future Water Requirement Projections for the various distribution systems

ANNEXURE D

Water Quality Compliance Sample Results

Final Effluent Quality Compliance Sample Results

Industrial Effluent Quality Compliance Sample Results

ANNEXURE E

DWS's scorecard for assessing the potential for WC/WDM efforts

ANNEXURE F

Water and Sanitation Operational and Maintenance Budget

ANNEXURE G

Swartland Municipality's Approved Organogram