BITOU MUNICIPALITY

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Version Control:

Status	Description	Date	Reference
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Approval	Final 2020/2021 Annual WSDP Performance- and Water Services Audit Report	Will be submitted with Annual Report	The Municipality will forward the Council Resolution for the approval to the DWS.

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PROJECT P07802 - BITOU 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				
		Author	A Reviewer	Approval		Approval	
Final	Final for Council approval	R Kuffner	JT Human				
		Author	A Reviewer	Approval		Approval	

FOREWORD:

Bitou 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 Bitou Municipality with these regulations. The Water Services Act allows the audit to be used as a tool to compare actual performance of Bitou Municipality against the targets and indicators set in their WSDP. The WSDP Performance- and Water Services Audit also assists local communities 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 Bitou 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.
- Emergency water and sanitation services had to be provided in some of the informal areas in order to ensure adequate water and sanitation services for healthy living conditions.

Bitou Municipality's Vulnerability Index for 2020 was indicated as 0.26 "Moderate Vulnerability". The only area of concern evident from the 2020 assessment is Financial Asset Management (Extreme Vulnerability, 35.0%). All other key service areas were indicated as low vulnerability, except Operation and Maintenance of Assets, Information Management and Technical Staff Capacity (Numbers) that were indicated as Moderate Vulnerability.

The water and sanitation services of Bitou Municipality is managed in a financial sustainable manner. The Operation and Maintenance budget allocated towards the rehabilitation and maintenance of the existing water and sewerage infrastructure however needs to 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.

Bitou Municipality also successfully completed various capital projects over the last financial year. The capital budget expenditure, for the 2020/2021 financial year, was R17.275 million (93.5% of the budget) for the water infrastructure projects and R17.307 million (93.1% of the budget) for the sewerage infrastructure projects.

Bitou Municipality is committed to continue with the implementation of the proposed WC/WDM Strategy, as included in the WSDP, and the current WC/WDM measures to further lower the NRW and Water Losses for the various distribution systems. The overall NRW for all the systems for the 2020/2021 financial year was 1 428 Ml (36.02%) and the Water Losses was 965 Ml (24.35%). The NRW increased during the last financial year and the water losses decreased. The decrease of the water losses was due to a more accurate calculation of the estimated unbilled unmetered consumption.

The drought measures, water restrictions and other WC/WDM measures implemented by Bitou Municipality over the drought periods 2009/2010 to 2010/2011 and again over the period 2015/2016 to 2016/2017 resulted in a reduction of the overall water requirements for the towns. There was however a steady increase in total water requirement experienced over the last four financial years. Bitou Municipality continue to actively plan for the augmentation of their existing water resources for the systems where the future water requirements will exceed the safe yields of the existing resources. The augmentation of the Plettenberg Bay existing water resources is currently the most critical.

Comprehensive Operational and Compliance Water Quality and Final Effluent Monitoring Programmes are implemented by Bitou Municipality. The Municipality continued to perform "Excellent" with regard to their Water Quality Compliance for the last financial year, according to the SANS 241:2015 classification.

The percentage compliance of the water quality samples taken over the period July to June for the last two financial years are indicated in the table below.

Percentage compliance of the water quality samples taken over the period July to June for the last two financial years										
Distribution System	Acute Health				Chronic Health		Aesthetic		Operational Efficiency	
	Microbiological		Chemical							
	20/21	19/20	20/21	19/20	20/21	19/20	20/21	19/20	20/21	19/20
Plettenberg Bay	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	100.0%	100.0%	100.0%
Kurland	100.0%	100.0%	100.0%	100.0%	99.5%	98.5%	100.0%	100.0%	100.0%	100.0%
Natures Valley	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	100.0%	99.8%	100.0%
Overall Compliance	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**99.9%**	**99.8%**	**99.9%**	**100.0%**	**99.9%**	**100.0%**

The overall percentage compliance of the final effluent samples taken over the period July to June for the last two financial years, at the Plettenberg Bay and Kurland WWTWs, are indicated in the table below.

Percentage microbiological, chemical and physical compliances of the final effluent samples taken over the period July to June for the last two financial years						
WWTW	Microbiological		Chemical		Physical	
	20/21	19/20	20/21	19/20	20/21	19/20
Plettenberg Bay	100.0%	100.0%	99.8%	100.0%	100%	100.0%
Kurland	100.0%	100.0%	100.0%	100.0%	99.2%	100.0%
Overall Percentage Compliance	**100.0%**	**100.0%**	**99.9%**	**100.0%**	**99.8%**	**100.0%**

Bitou Municipality is currently effectively managing their water and sanitation services. A comprehensive Performance Management System is in place. The Municipality updated their WSDP during the 2019/2020 financial year and the Water and Sewer Master Plans for the various systems were also updated. The Water and Sewer Master Plans are used to guide all future water and sewerage infrastructure planning.

A comprehensive Customer Services and Complaints system is in place 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. Requests are furthermore captured on an electronic mail or works-order system to ensure execution thereof.

BITOU MUNICIPALITY

WATER SERVICES AUDIT FOR 2020/2021

ANNEXURES:

Annexure A:	IWA Water balances for the various distribution systems Rainfall and WWTW's flows and capacities WTW's flows and capacities Billed metered consumption and number of consumer units
Annexure B:	DWS's No Drop Spreadsheet ILI for the various distribution systems DWS's scorecard for assessing the potential for WC/WDM efforts
Annexure C:	Future Water Requirement Projections for the various distribution systems
Annexure D:	Water Quality Compliance Sample Results Final Effluent Quality Compliance Sample Results
Annexure E:	Summary of Water and Sanitation O&M Budgets
Annexure F:	Bitou Municipality's Approved Micro Structure 29 June 2018

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FIGURES

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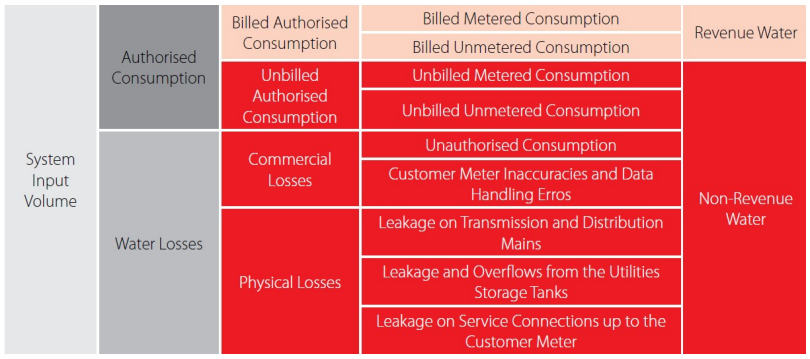
ABBREVIATIONS AND DEFINITIONS

AADD	Average Annual Daily Demand
ADWF	Average Dry Weather Flow
AIDS	Acquired Immune Deficiency Syndrome
AMP	Asset Management Plan
BDS	Blue Drop System
CAH	Chemical Acute Health
CCH	Chemical Chronic Health
CNA	Chemical Non Health Aesthetic
COD	Chemical Oxygen Demand
CPM	Contract Programme Manager
CRC	Current Replacement Cost
CRR	Cumulative Risk Ratio
CV	Carrying Value
D	Disinfectant
DAF	Dissolved Air Flotation
DMA	District Management Area
DWQ	Drinking Water Quality
DWS	Department of Water and Sanitation
EC	Electrical Conductivity
EHP	Environmental Health Practitioner
ESKOM	Electricity Supply Commission
GAMAP	General Accepted Municipal Accounting Practice
GRAP	Generally Recognised Accounting Practice
HIV	Human Immunodeficiency Virus
HOA	Home Owners Association
IAM	Infrastructure Asset Management
ICT	Information and Communications Technology
IDP	Integrated Development Plan
ILI	Infrastructure Leakage Index
IMQS	Information Management Quality System
IRIS	Integrated Regulatory Information System
IT	Information Technology
IWA	International Water Association
Kl	Kilolitre
KPI	Key Performance indicator
LGTAS	Local Government Turn Around Strategy
l/c/d	Litre per Capita per Day
LDV	Light Duty Vehicle
l/p/d	Litre per Person per Day
l/s	Litre per Second
m	Metre
MAH	Microbiological Acute Health
MFMA	Municipal Finance Management Act
MISA	Municipal Infrastructure Support Agent

ABBREVIATIONS AND DEFINITIONS / Continue

Ml	Mega Litre
Ml/a	Mega Litre per Annum
Ml/d	Mega Litre per Day
MNF	Minimum Night Flow
MuSSA	Municipal Strategic Self-Assessment
NQF	National Qualifications Framework
NRV	Non-return Valve
NRW	Non-Revenue Water
O	Operational
OC	Opening Cost
O&M	Operation and Maintenance
PAT	Progress Assessment Tool
PRP	Pipe Replacement Prioritisation
PRV	Pressure Reducing Valve
PS	Pump Station
RDP	Reconstruction and Development Programme
RO	Reverse Osmosis
RR	Risk Rating
RSC	Regional Services Council
RUL	Remaining Useful Life
SA	South Africa
SANS	South African National Standard
SDBIP	Service Delivery and Budget Implementation Plan
TMG	Table Mountain Group
URV	Unit Reference Value
VAT	Value Added Tax
VIP	Ventilated Improved Pit
WARMS	Water Registration Management System
WC/WDM	Water Conservation and Water Demand Management
WDM	Water Demand Management
WMA	Water Management Area
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSDP-IDP	Water Services Development Plan – Integrated Development Plan
WSI	Water Services Institution
WSIG	Water Services Infrastructure Grant
WSMP	Water Services Master Plan
WSP	Water Services Provider
WTW	Water Treatment Works
W_2RAP	Waste Water 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.
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

KEY TERMS	INTERPRETATIONS
	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)
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 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

KEY TERMS	INTERPRETATIONS
	(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.

BITOU MUNICIPALITY

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

EXECUTIVE SUMMARY

Bitou 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 further 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 Bitou 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 WSDP Performance- and 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 last 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 in regulations 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.

Bitou 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.

- Bitou Municipality continues with the implementation of their Drinking Water Quality and Effluent Quality Sampling Programmes (Both Operational and Compliance Monitoring). Sample results are loaded on a monthly basis onto DWS's IRIS. All the WTWs and WWTWs are also registered on the IRIS website.

- 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 IWA 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 following WSDP documents were finalised and approved by Council on the 8th of June 2021.
  - 2020/2021 WSDP-IDP Water Sector Input Report, September 2020;
  - WSDP: Administration, Information and Comprehensive Overview Report, September 2020; and
  - WSDP: Future Demand and Functionality Requirements Report, September 2020.

- The Asset Register was updated to include all the water and sewerage capital projects completed during the 2020/2021 financial year.

- Study to Analyse Treasury Data and Identify Projects that Promote WC/WDM in Bitou Local Municipality, June 2021, was finalised.

Bitou Municipality completed the following water and sewerage capital projects during the last financial year.

- The following bulk water pipelines were upgraded:
  - The Kranshoek supply pump station (located at Brakkloof Reservoir), the Kranshoek bulk water pipeline and the new Kranshoek water pump station were completed. The Kranshoek Steel Tower was also repaired and put back in operation.
  - Kwanokuthula bulk water pipeline was completed. This pipeline enable water to be pumped from the Plettenberg Bay WTW to the Kwanokuthula East and West reservoirs.

- New bulk water and sewer pipelines were installed for Ebenezer and internal water reticulation and sewer drainage networks were installed.

- The Kwanokuthula Steel Tower was repaired and put back in operation.

- The Municipality continued with the feasibility studies and designs for the upgrading of the Kurland WTW and WWTW.

- Sections of the Kranshoek sewer drainage networks were upgraded. The Kranshoek sewer pump station No.3 was upgraded.

- A new inlet screen was installed at the Gansevlei WWTW, which was commissioned in September 2020.

- The following upgrades were done at the Piesang Valley sewer pump stations.
  - New electrical panels and new NRV were installed at the Piesang Valley PS No 18.
  - New NRV was installed at the Piesang Valley PS No 19.
  - New electrical panels and new NRV were installed at the Piesang Valley PS No 20.
- New LDV, jetting truck and digger loader were purchased.

Quantity of Water Services Provided (Water Balance)

Detail IWA water balance models are in place for each of the distribution systems in Bitou Municipality's Management Area. These models include the volume of raw water abstracted from the various water resources, the treated volume supplied from the WTW (System Input Volume) and the NRW and Water Losses for each of the distribution systems. The flows at the two WWTWs are also recorded by the Municipality.

Water Services Delivery Profile

The number of consumer units per category or user type is available for each of the distribution systems. The 2020/2021 total number of formal water consumers in Bitou Municipality was 11 805. The average annual growth in the number of consumers for all the towns over the period 2009/2010 to 2020/2021 was 2.82%. All the formal households in the urban areas of Bitou 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. The number of households in informal areas for June 2020 was 3 513. The average ratio of the number of households per communal tap for June 2020 was 10.71 and the ratio of the number of households per communal toilet facility was 6.70. There are no households in informal areas without basic communal water and sanitation facilities.

Bitou Municipality is committed 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 Bitou Municipality's Management Area are supplied with adequate water and sanitation services.

Cost Recovery and Free Basic Services

A detail seven (7) block step tariff system is implemented by Bitou Municipality. This tariff system discourages the wasteful or inefficient use of water. It is expected that this tariff structure will continue to be implemented in the future. The sustainable supply of potable water is however becoming an ever-increasing challenge.

The first twenty five (25) kl of water is provided free to all residential consumers. Bitou 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-subsidies consumers who use up to twenty five (25) kilolitres per month.

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

Summary of operational and maintenance expenditure and income for water and sewerage services for the last seven financial years							
Expenditure / Income	**Actual 20/21**	**Actual 19/20**	**Actual 18/19**	**Actual 17/18**	**Actual 16/17**	**Actual 15/16**	**Actual 14/15**
Water Services							
Expenditure Water Purification	R13 781 318	R11 827 730	R10 562 567	R10 674 951	R11 067 621	R9 406 435	R6 815 975
Expenditure Water Distribution	R108 466 174	R50 855 593	R54 440 704	R40 006 957	R32 426 830	R31 338 207	R33 775 406
Expenditure Water Storage	R40 214	R352	R0	R0	R0	R0	R0
Total Expenditure	**R122 287 706**	**R62 683 675**	**R65 003 271**	**R50 681 908**	**R43 494 451**	**R40 744 642**	**R40 591 381**
Income Water Purification	R0	R0	-R1 126 057	R0	-R35 689	-R29 818	-R354 410
Income Water Distribution	-R120 216 247	-R101 647 561	-R118 872 076	-R119 588 936	-R91 997 607	-R85 114 553	-R73 539 583
Income	**-R120 216 247**	**-R101 647 561**	**-R119 998 133**	**-R119 588 936**	**-R92 033 295**	**-R85 144 371**	**-R73 893 993**
Surplus / Deficit	**R2 071 459**	**-R38 963 886**	**-R54 994 861**	**-R68 907 028**	**-R48 538 845**	**-R44 399 728**	**-R33 302 612**
Sewerage Services							
Expenditure Wastewater Purification	R10 391 221	R57 345 515	R47 295 857	R29 243 094	R46 015 797	R44 915 789	R42 968 306
Expenditure Wastewater Reticulation	R6 228 981	R3 284 597	R1 857 417	R2 737 272	R3 226 553	R3 044 595	R2 559 946
Expenditure	**R16 620 202**	**R60 630 111**	**R49 153 274**	**R31 980 366**	**R49 242 350**	**R47 960 384**	**R45 528 252**
Income Wastewater Purification	-R91 809 016	-R79 090 503	-R85 164 978	R56 093 832	-R75 260 892	-R74 386 729	-R64 423 147
Income Wastewater Reticulation	-R24 872	-R55 532	-R339 869	-	-	-	-
Income	**-R91 833 888**	**-R79 146 035**	**-R85 504 847**	**-R56 093 832**	**-R75 260 892**	**-R74 386 729**	**-R64 423 147**
Surplus / Deficit	**-R75 213 686**	**-R18 515 924**	**-R36 351 574**	**-R24 113 466**	**-R26 018 542**	**-R26 426 345**	**-R18 894 895**

Water Quality

Comprehensive Operational and Compliance Water Quality and Final Effluent Monitoring Programmes are implemented by Bitou Municipality. Water Quality sampling is done by Bitou Municipality's own laboratory at the Plettenberg Bay WTW. **The current Operational and Compliance water quality sampling programmes of Bitou Municipality comply with SANS 241-2:2015 requirements with regard to the minimum monitoring frequency for process risk indicators and no additional sampling is proposed for any of the water distribution systems.**

Bitou Municipality actively implement their Operational and Compliance Water and Effluent Quality Sampling Programmes in order to promptly identify water and effluent quality failures and to react accordingly. The water quality compliance sample results and the effluent quality compliance sample results are loaded onto DWS's IRIS via the internet. Once entered the water quality data is automatically compared to SANS:241:2015 limits and the final effluent data to the authorisations for the WWTWs. These real-time systems allow for immediate intervention to rectify any problems.

The table below indicates the compliance of the E.Coli monitoring frequency in the water distributions systems of Bitou 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.

Bitou Municipality's compliance of the monthly E.Coli monitoring frequency in the water distributions systems 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 by Municipality during 2020/2021**
Plettenberg Bay	63 761	12.8	59.3
Kurland	5 739	2	9.6
Natures Valley	655	2	10.7

It can be noted from the above table that the number of monthly E.Coli samples taken by the Municipality during the 2020/2021 financial year was more than the required number of samples for all the systems.

The water quality of all the water distribution systems in Bitou Municipality is "Excellent", according to the SANS 241:2015 classification. The percentage compliance of the water quality samples taken over the period July to June for the last two financial years are indicated in the table below.

Percentage compliance of the water quality samples for the last two financial years										
Distribution System	Acute Health				Chronic Health		Aesthetic		Operational Efficiency	
	Microbiological		Chemical							
	20/21	19/20	20/21	19/20	20/21	19/20	20/21	19/20	20/21	19/20
Plettenberg Bay	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	100.0%	100.0%	100.0%
Kurland	100.0%	100.0%	100.0%	100.0%	99.5%	98.5%	100.0%	100.0%	100.0%	100.0%
Natures Valley	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.9%	100.0%	99.8%	100.0%
Overall Percentage Compliance	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**99.9%**	**99.8%**	**99.9%**	**100.0%**	**99.9%**	**100.0%**

The overall Microbiological, Chemical and Physical compliance percentages of the final effluent samples taken over the period July to June for the last two financial years, at the Plettenberg Bay and Kurland WWTWs, are summarised in the table below.

Percentage microbiological, chemical and physical compliances of the final effluent samples taken over the period July to June for the last two financial years						
WWTW	Microbiological		Chemical		Physical	
	20/21	19/20	20/21	19/20	20/21	19/20
Plettenberg Bay (Gansevlei)	100.0%	100.0%	99.8%	100.0%	100.0%	100.0%
Kurland	100.0%	100.0%	100.0%	100.0%	99.2%	100.0%
Overall Percentage Compliance	**100.0%**	**100.0%**	**99.9%**	**100.0%**	**99.8%**	**100.0%**

WC/WDM

WC/WDM measures were recommended for Bitou Municipality as part of the updated WSDP. The WC/WDM measures will enable the Municipality to meet the challenge of the growing water requirements on the raw water resources and to reduce the current NRW and Water Losses for the various distribution systems. A Drought Management Policy is also in place, which include various levels of restrictions for drought periods.

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

Treatment Losses, 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
Plettenberg Bay	Treatment Losses	Volume	167.337	198.056	252.564	278.997	168.139	168.763
		Percentage	4.3%	5.8%	7.2%	8.3%	6.0%	5.5%
	NRW	Volume	1 330.010	1 084.239	973.853	984.733	387.339	836.629
		Percentage	36.0%	30.5%	27.8%	29.9%	13.3%	27.0%
	Water Losses	Volume	891.142	1 062.643	930.383	944.893	321.049	766.964
		Percentage	24.1%	29.9%	26.5%	28.7%	11.0%	24.8%
	ILI		2.83	3.75	3.36			
	The treatment losses are at an acceptable level. There was an increase in the NRW for the last financial year. The Water Losses came down, due to a more accurate calculation of the estimated unbilled unmetered consumption for 2020/2021. The proposed WC/WDM Strategy, as included in the WSDP, needs to be implemented. Sufficient funding needs to be allocated towards the implementation of the WC/WDM measures. Municipality needs to work towards a NRW of 25% and Water Losses of 20% for Plettenberg Bay. The ILI of 2.83 is good, but should be monitored carefully.							

Treatment Losses, NRW, Water Losses and ILIs for the various water distribution systems								
Kurland	Treatment Losses	Volume	23.320	4.158	2.917	12.436	16.107	11.144
		Percentage	9.9%	1.9%	1.5%	6.6%	9.4%	6.3%
	NRW	Volume	81.446	69.368	79.841	40.584	29.327	43.027
		Percentage	38.5%	31.7%	41.4%	23.0%	18.8%	25.9%
	Water Losses	Volume	63.011	52.167	54.159	27.134	26.054	39.185
		Percentage	29.8%	23.9%	28.1%	15.4%	16.7%	23.6%
	ILI		3.47	2.91	3.32			
	The NRW and Water Losses increased during the last financial year. Municipality needs to work towards a NRW of 25% and Water Losses of 20% for Kurland. The ILI of 3.47 is good, but should be monitored carefully.							
Natures Valley	Treatment Losses	Volume	26.011	26.653	18.775	9.880	1.622	2.588
		Percentage	30.9%	33.9%	24.6%	17.4%	3.4%	4.9%
	NRW	Volume	16.361	10.602	15.854	6.884	0.087	9.056
		Percentage	28.2%	20.4%	27.5%	14.7%	0.2%	18.0%
	Water Losses	Volume	11.222	10.498	15.739	6.790	0	8.445
		Percentage	19.3%	20.2%	27.3%	14.5%	0.0%	16.8%
	ILI		2.40	1.59	2.39			
	The treatment losses is very high and needs to be reduced. The NRW increased during the last financial year. The Water Losses came down, due to a more accurate calculation of the estimated unbilled unmetered consumption for 2020/2021. Municipality needs to work towards a NRW of 25% and Water Losses of 20% for Natures Valley. The ILI of 2.40 is good, but should be monitored carefully.							
TOTAL	**Treatment Losses**	Volume	**216.668**	**228.867**	**274.256**	**301.313**	**185.868**	**182.495**
		Percentage	**5.18%**	**6.11%**	**7.25%**	**8.33%**	**6.13%**	**5.51%**
	NRW	**Volume**	**1 427.817**	**1 164.209**	**1 069.548**	**1 032.201**	**416.753**	**888.712**
		Percentage	**36.02%**	**30.47%**	**28.46%**	**29.37%**	**13.37%**	**26.84%**
	Water Losses	**Volume**	**965.375**	**1 125.308**	**1 000.281**	**978.817**	**347.103**	**814.594**
		Percentage	**24.35%**	**29.46%**	**26.62%**	**27.86%**	**11.13%**	**24.60%**
	ILI		2.77	3.66	3.34			
	The overall treatment losses are at an acceptable level. The overall NRW for all the systems is high and needs to be reduced. The overall Water Losses came down during the last financial year, due to a more accurate calculation of the estimated unbilled unmetered consumption for 2020/2021. Municipality needs to work towards an overall NRW of 25% and Water Losses of 20%. The ILI of 2.77 is good, but should be monitored carefully.							

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 DWS developed the WC/WDM scorecard 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 Bitou Municipality is 74 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

The most significant challenges, from a Water Services perspective, are the augmentation of the existing water resources for Plettenberg Bay, the refurbishment and upgrading of the existing water and sewer networks and pump stations and the provision of sustainable communal services in the informal areas.

Bitou Municipality updated their current Asset Register during the 2020/2021 financial year. The tables below give an overview of Bitou Municipality's Water and Sewerage assets as included in the Municipality's Asset Register on the 30th of June 2021.

Summary of water and sewerage infrastructure assets included in Bitou Municipality's Asset Register (June 2021)					
Asset Type			**Opening Cost (OC)**	**Carrying Value (CV)**	**% CV / OC**
Water Infrastructure			R273 649 540	R195 672 362	71.5%
Sewerage Infrastructure			R161 736 597	R117 081 471	72.4%
Remaining Useful Life					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Water Infrastructure	R48 783 360	R22 339 135	R19 054 107	R16 541 924	R166 931 014
Sewerage Infrastructure	R18 086 762	R11 319 388	R21 746 559	R12 237 009	R98 346 879
Age Distribution					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Water Infrastructure	R96 338 005	R97 313 988	R10 080 311	R12 645 824	R57 271 412
Sewerage Infrastructure	R63 850 730	R44 600 668	R13 211 501	R8 449 305	R31 624 393

The Opening Cost and Carrying Value in the previous table indicate that 28.5% of the value of the water infrastructure and 27.6% of the value of the sewerage infrastructure has been consumed.

The asset renewal needs for the water infrastructure assets over the next 10 years is R7.112 million per year. The reinvestment required is R48.783 million in the first 5 years and R22.339 million in the second 5-year period. The age of 22.93% 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 R2.941 million per year. The reinvestment required is R18.087 million in the first 5 years and R11.319 million in the second 5-year period. The age of 19.55% of the sewerage infrastructure assets is greater than 20 years.

One of the key challenges of Bitou Municipality is to identify adequate funds for the rehabilitation and maintenance of the existing infrastructure, which is critical to ensure the sustainability of the services that are provided by the Municipality. 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. An Asset Management Plan needs to indicate the risks associated with the inadequate refurbishment and maintenance of the various water and sewerage infrastructure.

Water Services Operation and Maintenance

Design-out Maintenance, Preventative Maintenance and Corrective or Breakdown Maintenance are practised by Bitou 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. The only assessment criteria currently inadequate is Asset Register. The CRC of the water and sewerage infrastructure also needs to be indicated in the Asset Register. An Asset Management Plan needs to be compiled to ensure efficient, effective and optimal management , operation and maintenance of all assets. The Financial Asset Management KPI was indicated as extreme vulnerability in the 2020 MuSSA assessment. The Record Keeping assessment criteria is adequate, but can be improved further.

Water Resources

A number of boreholes were developed during the 2017/2018 and 2018/2019 financial years to augment the water supply to Plettenberg Bay, Forest View, Harkerville and Kurland. The Municipality is currently busy with WULAs for these boreholes. Detail future water requirement projections models were developed for each of the towns within Bitou Municipality's Management Area.

The table below gives an overview of the years in which the annual water requirement is likely to exceed the sustainable yields / registration volumes of the various water resources.

Years in which the annual water requirement will exceed the sustainable yield / registration volumes from the various resources				
Distribution System	**Total sustainable Yield or Registration (x 10^6 m^3/a)**	**Annual Growth on 2020/2021 requirement (1.5% or 3.5%)**	**Annual Growth on 2020/2021 requirement (3.5% or 5.5%)**	**WSDP Projection Model**
Plettenberg Bay	4.125 (Registration)	2021 (3.5%)	2021 (5.5%)	2022
	8 778.805 (Yield)	2043 (3.5%)	2035 (5.5%)	2043
Kurland	0.256 (Yield)	2026 (1.5%)	2022 (3.5%)	2026
Natures Valley	0.120 (Registration)	2043 (1.5%)	2030 (3.5%)	2037

Plettenberg Bay: The historical firm yield of all Bitou Municipality's supply systems was previously determined to be 4.33 million m^3/a (Feasibility Study Phase of the Regional Integration of the Bulk Water Supply Systems of the Knysna and Bitou Municipalities, Phase 2A: Feasibility Option Analysis Report). With the 2020/2021 total water demand of 3.862 million m^3/a for Plettenberg Bay alone, there is currently surplus water supply available. Based on the current rapid increase in water demand as a result of the drought recovery period, the time period of surplus supply could be limited.

The successful implementation of WC/WDM measures could however delay the need for the implementation of a bulk water augmentation scheme. The Feasibility Option Analysis Report short-listed the following stand-alone options for Plettenberg Bay.

Short-listed Bitou stand-alone options (Feasibility Option Analysis Report, 2014)						
Scheme Elements	**Option 1**	**Option 2**	**Option 3**	**Option 4**	**Option 5**	**Option 6**
Groundwater Wellfield	N/A	N/A	George Fault East	George Fault East	Plettenberg Bay Central	N/A
Storage Reservoir	Wadrif (3 Mm^3)	Wadrif (4.5 Mm^3)	Wadrif (3 Mm^3)	Wadrif (4.5 Mm^3)	Wadrif (3 Mm^3)	2.0 Ml/d Desalination Plant
Total Cost (R million)	65.7	80.25	73.8	86.52	102.0	24.0
Incremental Yield (Mm^3/a)	5.09	6.55	6.22	6.51	6.51	0.73
URV (R/m^3)	3.30	3.63	2.89	3.27	4.71	9.76*

Note: * URV not directly comparable since this scheme does not supply the necessary demand over the entire record period

Possible resource augmentation options for the Plettenberg Bay system include the following:

- Continue with the active implementation of the proposed WC/WDM Strategy.
- Expansion of the existing wellfield in the Kwanokathula Aquifer.
- Development of the George Fault East wellfield.
- Keurbooms River off-channel Wadrif dam to store surplus winter water and use in conjunction with groundwater.
- Additional desalination or indirect water re-use through pumping treated effluent into the Roodefontein Dam.

Kurland: Two new boreholes were drilled in 2018/2019 at the Kurland WTW, but the one borehole is blocked and current supply is only from the second borehole. The current supply from the Wit River and the second borehole is only adequate to meet the projected future water requirements for Kurland for the short term. Two new boreholes were recently drilled for Kurland (October 2021), which will be pump tested and the safe yields of the existing and new boreholes will be recalculated.

Natures Valley: The current supply from the Groot River is adequate to meet the projected future water requirements for Natures Valley for the long term. The Municipality plan to drill a borehole for Natures Valley, which will be used as back-up water supply for Natures Valley during the peak holiday periods.

Water Services Institutional Arrangements and Customer Services

Bitou Municipality is the official WSA for the entire Municipal Management Area and act as the WSP for the whole area. An updated WSDP was compiled for Bitou Municipality during 2020, which was approved by Council on the 8th of June 2021. The required Policies and Bylaws for water and sanitation provision are in place. The Municipal personnel 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 every year and the specific training needs of the personnel, with regard to water and wastewater management are determined annually.

Bitou Municipality's Vulnerability Index for 2020 was indicated as 0.26 "Moderate Vulnerability". The only area of concern evident from the 2020 assessment is Financial Asset Management (Extreme Vulnerability, 35.0%). All other key service areas were indicated as low vulnerability, except Operation and Maintenance of Assets, Information Management and Technical Staff Capacity (Numbers) that were indicated as Moderate Vulnerability.

Bitou Municipality is currently effectively managing their water and sanitation services. It is however important for the Municipality to also focus on the rehabilitation and maintenance of the existing water and sewerage infrastructure. The Operation and Maintenance budget allocated towards the rehabilitation and maintenance of the existing water and sewerage infrastructure needs to 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. The Municipality needs to continue to use the updated Water and Sewer Master Plans to guide all future water and sewerage infrastructure planning.

A comprehensive Customer Services and Complaints system is in place at Bitou 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. Requests are furthermore captured on an electronic mail or works-order system to ensure execution thereof.

Water Safety Plans are in place for Plettenberg Bay, Kurland and Natures Valley, which include Improvement / Upgrade Plans. The purpose of the Improvement / Upgrade Plans is to address the existing significant risks where the existing controls were not effective or absent. Barriers implemented by Bitou Municipality against contamination and deteriorating water quality include the following:

- Participate in Catchment management and water resource protection initiatives.
- Protection at points of abstraction such as river intakes and dams (Abstraction Management).
- Correct operation and maintenance of WTWs (Coagulation, flocculation, sedimentation and filtration).
- 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 Bitou 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 have respect for water as a precious resource.

BITOU MUNICIPALITY

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

BACKGROUND

Appointment

iX Engineers was appointed by Neil Lyners and Associates to assist Bitou Municipality 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 Bitou 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 Bitou Municipality to follow this template as far as possible.

Purpose

Bitou 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 Bitou 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 last 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 in regulations 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

Bitou Municipality is located in the Garden Route Region of the Western Cape, as indicated on the figure below.

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

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

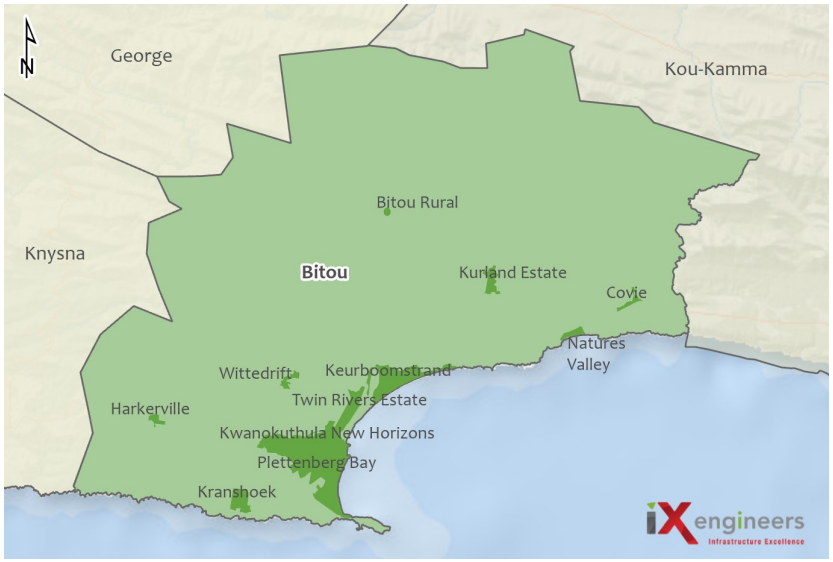


Figure A.1.2: Bitou Municipality's Management Area

The various schemes supplied with bulk water by Bitou 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 Maps included in the Municipality's detail WSDP documents.

A.2. Water Services Administration and Organization

Bitou Municipality is the WSA for the entire Municipal Management Area. Bitou Municipality's Organogram for Water and Sanitation Services is included in Annexure F. The table below gives the contact details of the persons responsible for water services management and planning within Bitou Municipality.

Table A.2.1: Water Services Administrative Structure	
Accounting Officer	
Designation	Municipal Manager
Name	Mr Lonwabo Ngoqo
Telephone Nr.	044 533 6161
Cell Nr.	N/A
Email	lngoqo@plett.gov.za
WSA Manager	
Designation	Manager: Water Services
Name	Ms Franclyn Samuel
Telephone Nr.	044 533 5716
Cell Nr.	N/A
Email	fsamuel@plett.gov.za
WSP Manager	
Designation	Manager: Water Services
Name	Ms Franclyn Samuel
Telephone Nr.	044 533 5716
Cell Nr.	N/A
Email	fsamuel@plett.gov.za
WSDP Manager	
Designation	Manager: Water Services
Name	Ms Franclyn Samuel
Telephone Nr.	044 533 5716
Cell Nr.	N/A
Email	fsamuel@plett.gov.za
IDP Manager	
Designation	Manager IDP
Name	T Henge
Telephone Nr.	044 501 3319
Cell Nr.	072 820 4107
Email	thenge@plett.gov.za

A.3. Water Services Overview

The Municipality is situated in the South Eastern corner of the Province and the Bloukrans River is the boundary between the Western and Eastern Cape Provinces and its southern border adjoins the Indian Ocean. Bitou Municipality falls within the Breede-Gouritz Water Management Area (WMA) and is located within the Garden Route District of the Western Cape Province, in which the following local municipalities are also located:

- Hessequa Municipality;
- Mossel Bay Municipality;
- Oudtshoorn Municipality;
- Kannaland Municipality;
- George Municipality; and
- Knysna Municipality

Bitou Municipality consists of seven (7) individual wards and is the only WSA within Bitou Municipality's Management Area. The Municipality is also the Water Services Provider (WSP). Bitou Municipality's Management Area includes the following towns and ***Water Distribution Systems***:

- Plettenberg Bay, Kranshoek, Gansevallei, Wittedrift, Green Valley, Keurboomstrand, Kwanokuthula, New Horizons, Ladywood and Qolweni / Bossiesgif / Pine Trees – ***Plettenberg Bay System***

  Bulk raw water supply to the Plettenberg Bay system is from the following water resources:

  <u>Keurbooms River</u>

  The main supply to Plettenberg Bay is abstracted on a run-of-river basis from the Keurbooms River. The water is pumped from the river to two raw water storage reservoirs, with a total storage capacity of 4.128 Ml, from where it flows under gravity to the Plettenberg Bay WTW. A licence for 3.154 million m³/a is in place for abstraction from the Keurbooms River.


Keurbooms River


Keurbooms raw water PS and inlet works


Keurbooms raw water PS inlet pipework

  <u>Piesang River (Roodefontein Dam)</u>

  The main supply from the Keurbooms River is supplemented by raw water supply from the Roodefontein Dam located on the Piesang River. The dam is owned by the DWS and operated and maintained by Bitou Municipality. This dam is currently the only raw water storage in the supply system and has a capacity of 2.060 million m³ (raised in 2004 from 1.440 million m³). The Bitou Municipality is allocated 55% of the raw water available and the remainder is allocated to the Jackalsfontein farm.

The dam receives inflow from its own catchment area as well as from an emergency transfer pipeline which can divert water from the Keurbooms pipeline and discharge this into the Piesang River upstream of the dam. This transfer pipeline to the Roodefontein Dam can divert up to 32 l/s from the Keurbooms diversion pipeline (with 22 hours operation per day). Operational rules have recently been amended, and the pipeline can transfer water whenever there is spare capacity in the Keurbooms diversion pipeline and provided that the Roodefontein Dam has not reached its full supply level.


Piesang River: Roodefontein dam


Intake at Roodefontein dam


Level indicators at Roodefontein dam

Boreholes

There are nineteen (19) boreholes in the vicinity of Plettenberg Bay, fourteen (14) of which are production boreholes. The boreholes that are equipped are summarized in the table below:

Table A.3.1: Production boreholes of Plettenberg Bay Municipality

Town	Borehole	Recommended Yield			
		Discharge (L/s)	Pumping Time (Hrs/day)	Yield m³/day	Yield m³/annum
Plettenberg Bay	Bh 3 [2]	10	24	864	315 360
	Bh 6 [2]	6	24	518	189 216
	BH NH [2]	4	24	346	126 144
	GWA 1C [3]	5	24	432	157 680
	GWA 5C [1]	4	24	346	126 144
	GWA 6B [3]	5	24	432	157 680
	GWA 8C [1]	6	24	518	189 216
	GWA 9 [1]	8	24	691	252 288
	GWA 10 [1]	7	24	605	220 752
	WTW 3 [3]	10	24	864	315 360
	BH Airport [3]	1.8	24	156	56 765
Subtotal		-	-	**5 772**	**2 106 605**
Harkerville North	Forest View BH1 [3]	2.2	24	190	69 379
	Forest View BH2 [1]	2	24	170	63 072
Harkerville South	BH2 (at School)	1.5	24	130	47 304
Subtotal		-	-	**490**	**179 755**
TOTAL		-	-	**6 262**	**2 286 360**

Notes:
1) Recommended yields were taken from Bitou Municipality Plettenberg Bay 2018 Drilling Report, Groundwater Africa
2) Recommended yields were taken from Bitou Municipality Emergency Groundwater Supplies: Borehole Rehabilitation and Drilling Report, March 2011.
3) Yields revised according to yields included in WULAs.

These production boreholes are located in Kwanokuthula, Harkerville, Forest View, the Golf Course at the Plettenberg Bay Country Club and the Plettenberg Bay WTW. The raw water from the two golf course boreholes and the WTW borehole is pumped to the WTW where it is treated first before it is distributed into the water reticulation network.


WTW Borehole No.3 at WTW


Borehole GWA5C in Kwanokuthula


Golf Course Borehole No.2 (GWA8C)

Plettenberg Bay Desalination Plant

A desalination plant was constructed by Bitou Municipality, with a capacity of 2 Ml/d, and the first supply from the plant was in December 2010. Treated water is supplied from the plant over the period December to April each year.


Seven inlets for Desalination Plant


Three banks of RO Membranes


Final water PS at Desalination Plant

- Kurland – ***Kurland System***

Kurland is supplied with run-off water abstracted from a weir constructed on the Wit River and from one of the two drilled boreholes. Borehole No.1 is blocked and current groundwater supply is only from Borehole No.2. The surface water and groundwater are pumped to the WTW. Only 27.9% of the total raw water supplied to the Kurland WTW for the 2020/2021 financial year was from the one borehole. Two new boreholes were recently drilled for Kurland (October 2021), which will be pump tested and the safe yields of the existing and new boreholes will be recalculated. The WARMS registered volume for abstraction from the Wit River is 0.130 million m³/a.


Kurland Borehole No1 (Yield 3 l/s)


Kurland Borehole No2 (Yield 4 l/s)


Kurland raw water PS (Wit River)

- Natures Valley – ***Natures Valley System***

Raw water for Natures Valley is abstracted from the Groot River, which flows into the sea at Natures Valley. Water is abstracted at 12 l/s and pumped at a head of 2.5m. The WARMS registered volume for abstraction from the Groot River is 0.120 million m³/a. The Municipality plan to drill a borehole for Natures Valley, which will be used as back-up water supply for Natures Valley during the peak holiday periods.


Groot River (Natures Valley)


Groot River abstraction at Natures Valley WTW

- Harkerville (Supplied from groundwater), Covie (Supplied from run of river) and the farms in the rural areas.

The two tables below give an overview of the major water infrastructure components, for the various distribution systems, in Bitou Municipality's Management Area.

Table A.3.2: Summary of existing main water sources and WTWs

Water Distribution System	Resources	WTW		
		WTW	Capacity (Ml/d)	Treatment Processes
Plettenberg Bay	Keurbooms River (Weir), Piesang River (Roodefontein Dam) and Boreholes	Plettenberg Bay WTW	27.000	Coagulation (Sudfloc 475, Aluminium Sulphate and Lime), Flocculation, Sedimentation / Flotation (2 Sedimentation Dams and 1 DAF unit), Filtration (5 Large Filters and 9 Small Filters), Stabilisation (Lime) and Disinfection (Chlorine gas)
	Desalination	Plettenberg Bay Desalination Plant	2.000	7 Seawater abstraction wells,3 Reverse Osmosis units, Soda-Ash dosing and Biocide dosing, Stabilisation (Limestone filters), Disinfection (Sodium Hypochlorite) and Seafloor diffuser for brine.
Kurland	Wit River and one borehole	Kurland WTW	0.600	Surface Water: Coagulation (Soda-Ash, Aluminium Sulphate, Magnafloc – Polymer), Flocculation, Plate settler, Filtration, Disinfection (Chlorine gas) and Dewatering. Groundwater: Soda-Ash dosing, Filtration and Disinfection (Chlorine gas).
Natures Valley	Groot River	Natures Valley WTW	1.000	Coagulation (Sudfloc 475), Flocculation, Filtration (3 Automated backwash filters and 3 manual backwash filters), Stabilisation (Soda-Ash) and Disinfection (Chlorine gas).
Harkerville	Boreholes	-	-	Disinfection (Sodium Hypochlorite)
Covie	Run of River	-	-	Disinfection (Calcium Hypochlorite)

The table below gives a summary of the existing capacities and current flows at each of the WTWs.

Table A.3.3: Existing capacities and flows at each of the WTWs (Ml/d)

WTW	Existing Hydraulic Capacity	Peak Month Average Daily Flow	Average Daily Flow (Jul 2020 – Jun 2021)	Required Treatment Capacity (1.5 x AADD10yr)	2020/2021 Water Quality Failures (SANS0214:2015)
Plettenberg Bay WTW	27.000	13.176 (Jan 21)	10.578	22.381	-
Plettenberg Bay Desalination	2.000	0.051 (Febr 21)	0.004	2.000	-
Kurland WTW	0.600	0.721 (Apr 21)	0.643	1.119	-
Natures Valley WTW	1.000	0.365 (Dec 20)	0.230	0.401	-

Table A.3.4: Summary of existing water reticulation networks, water pump stations and reservoirs								
Water Distribution System	Bulk Water Pipelines	Internal Water Reticulation	Number of Water PS		Reservoirs and Towers			
	km	km	Raw Water PS	Potable Water PS	Raw Water		Potable Water	
					Number	Volume Ml	Number	Volume Ml
Plettenberg Bay	99.326	259.226	2	21 2 (Private)	3	4.608	28 1 Tank	52.580 0.011
Kurland	3.994	8.462	1	-	-	-	2	2.000
Natures Valley	0.878	10.990	1	1	-	-	1	0.600
Harkerville	-	Unknown	-	1	-	-	1 2 Tanks	0.500 0.010
Covie	-	Unknown	-	-	-	-	1	0.040

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

Table A.3.5: Summary of existing main sewerage infrastructure						
Sewer Drainage Systems	Sewer Drainage Network		Number of Sewer PS	WWTW		
	Rising	Gravity		Name	Hydraulic Capacity	Organic Capacity
	km	km			Ml/d	Kg COD/d
Plettenberg Bay	54.540	247.227	41 31 (Private)	Plettenberg Bay (Gansevlei)	6.250 *	4 000
Kurland	1.299	8.651	3	Kurland	0.500	1 000

Note: * The design peak wet weather flow capacity of the Plettenberg Bay (Gansevlei) WWTW is 9.000 Ml/d for short periods of time.

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.

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 (Aug'20)	Average Daily Flow as a % of Design Capacity	Final Effluent Compliance for 2020/2021
Plettenberg Bay	6.250	6.535 (Oct 20)	4.790	5.775	76.64%	Microbiological: 100.0% Chemical: 99.8% Physical: 100.0%
Kurland	0.500	0.415 (Aug 20)	0.381	0.415	76.20%	Microbiological: 100.0% Chemical: 100.0% Physical: 99.2%

Population: The table below gives an overview of the historical population and household figures for Bitou Municipality for the various years.

Table A.3.7: Historical population and household data of Bitou Municipality				
Year	Source	Population	Households	Person / Household
2001	Census 2001 Community Profiles	29 182	8 942	3.26
2007	2007 Community Survey	39 002	12 645	3.08
2011	Census 2011 Community Profiles	49 159	16 649	2.95
2016	2016 Community Survey	59 157	21 914	2.70

The population figure for Bitou Municipality was 29 182 in 2001. This figure increased substantially to 49 159 in 2011. The Community Survey of 2016 from Statistics South Africa estimate the 2016 population for Bitou

Municipality at 59 157 persons and the permanent households at 21 914, at an average household size of 2.7 persons per household.

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 during January 2014.

Table A.3.8: Estimated future annual population growth percentages, population and households per distribution system

Town	Estimated future annual Population Growth %	Projected 2020/2021 Persons	Projected 2020/2021 Households
Plettenberg Bay	5.4%	63 761	21 802
Kurland	4.0%	5 739	1 796
Natures Valley	4.0%	655	108
Farms	2.0%	5 920	2 068
Total	**5.0%**	**76 075**	**25 774**

Bitou Municipality's 2018/2019 population was estimated at 65 879 persons, according to the 2020/2021 IDP. The 2020 Socio Economic Profile for Bitou Municipality estimated the 2020 population at 67 139 persons. This population is expected to grow to 75 727 by 2024, which equates to a 3.1% average annual growth rate. The current population in the WSDP and Water Services Audit Report is estimated a bit higher, as well as the estimated average annual future population growth percentage.

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

Table A.3.9: Water Services Overview (Water)

Settlement Type	2011/2012 Households	2011/2012 Population	2020/2021 Households	2020/2021 Population	Water category: Adequate: Formal	Adequate: Informal	Adequate: Shared 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	
Plettenberg Bay	12,357	34,822	18,974	52,449	P		P							
Kurland	847	2,372	1,220	3,435	P		P							
Natures Valley	76	460	108	655	P		P							
Sub-Total	**13,280**	**37,654**	**20,302**	**56,538**	**3**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Townships					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**										
Informal Settlements					Adequate			Below RDP					None	
Pinetrees	25	100	109	436		P								
Zawa-Zawa			504	2,016		P								
Bossiesgif / Qolweni	1,185	4,740	2212	8,848		P								
Kranshoek	14	56	3	12		P								
Kurland	415	1,660	576	2,304		P								
Sub-Total	**1,639**	**6,556**	**3,404**	**13,616**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Working towns & service centres					Adequate			Below RDP					None	
Sub-Total	**0**	**0**	**0**	**0**										
Sub-Total: (Urban)	**14,919**	**44,210**	**23,706**	**70,154**	**3**	**5**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
RURAL														
Rural / Farming					Adequate			Below RDP					None	
Farms	1,694	4,810	1,959	5,484	P		P							P
Sub-Total	**1,694**	**4,810**	**1,959**	**5,484**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
Informal Settlements					Adequate			Below RDP					None	
Harkerville	36	144	80	320		P								
Covie	0	0	29	116		P								
Sub-Total	**36**	**144**	**109**	**436**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Sub-Total (Rural)	**1,730**	**4,954**	**2,068**	**5,920**	**1**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
TOTAL	**16,649**	**49,164**	**25,774**	**76,075**	**4**	**7**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**1**

Table A3.10: 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**	
Plettenberg Bay	12,357	34,822	18,974	52,449	P		P							
Kurland	847	2,372	1,220	3,435	P		P							
Natures Valley	76	460	108	655	P		P							
Sub-Total	**13,280**	**37,654**	**20,302**	**56,538**	**3**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Townships					**Adequate**			**Below RDP**					**None**	
Sub-Total	**0**	**0**	**0**	**0**										
Informal Settlements					**Adequate**			**Below RDP**					**None**	
Pinetrees	25	100	109	436		P								
Zawa-Zawa	0	0	504	2,016		P								
Bossiesgif / Qolweni	1,185	4,740	2,212	8,848		P								
Kranshoek	14	56	3	12		P								
Kurland	415	1,660	576	2,304		P								
Sub-Total	**1,639**	**6,556**	**3,404**	**13,616**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Working towns & service centres					**Adequate**			**Below RDP**					**None**	
Sub-Total	**0**	**0**	**0**	**0**										
Sub-Total: (Urban)	**14,919**	**44,210**	**23,706**	**70,154**	**3**	**5**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
RURAL														
Rural / Farming					**Adequate**			**Below RDP**					**None**	
Farms	1,694	4,810	1,959	5,484	P		P							P
Sub-Total	**1,694**	**4,810**	**1,959**	**5,484**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
Informal Settlements					**Adequate**			**Below RDP**					**None**	
Harkerville	36	144	80	320		P								
Covie	0	0	29	116		P								
Sub-Total	**36**	**144**	**109**	**436**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Sub-Total (Rural)	**1,730**	**4,954**	**2,068**	**5,920**	**1**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
TOTAL	**16,649**	**49,164**	**25,774**	**76,075**	**4**	**7**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**1**

B. WSDP PERFORMANCE REPORT

B.1. WSDP Reference and Status

Bitou Municipality updated their 2014/2015 WSDP during 2019/2020, according to DWS's new WSDP guidelines, which were rolled out to the Municipality's in the Garden Route Region on the 23 of October 2017. The WSDP documents were approved by Council on the 8th of June 2021. The table below gives an overview of the 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
1	Water Services Development Plan, Module 1, 2 and 3	Drafted:	November 2019 to July 2020	Year 1	2016/2017	Year -4
		Comment submit:	August 2020	Year 2	2017/2018	Year -3
		Finalised:	September 2020	Year 3	2018/2019	Year -2
		Adopted:	8 June 2021	Year 4	2019/2020	Year -1
		Published:	8 June 2021	Year 5	**2020/2021**	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 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														
	Report on the implementation of the Water Services Implementation Plan by 31 October	Report submitted	No	No	1	1	0	0	-	-	-	-	-	-
WSDP Topic 2: Demographics														
WSDP Topic 3: Service levels														
	Supply and install metered water connections within 14 days after receipt of request and payment	% of connections supplied within required timeframe	No	No	95%	98.00%	-	-	-	-	-	-	-	-
	Provide piped water to properties which are connected to the municipal water infrastructure network and billed for the service as at 30 June	Number of properties that receive piped water	Yes	Yes	-	-	-	-	11495	11670	11495	11863	-	-
	Provide sanitation services to properties which are connected to the municipal waste water (sanitation/sewerage) network and are billed for sewerage service irrespective of the number of water closets (toilets) as at 30 June	Number of residential properties which are billed for sewerage	Yes	Yes	-	-	-	-	12111	12170	12111	12409	-	-
WSDP Topic 4: Socio economic														
WSDP Topic 5: Water Services Infrastructure														
WSDP Topic 6: Operation Maintenance														
D308	95% of water samples comply with SANS241 Micro Biological indicators	% of water samples comliant	Yes	Yes	-	-	-	-	95%	99.9%	95%	99.0%	95%	99.99%
D309	90% of test results of outflow water comply with permit values	% of test results within permit values	Yes	Yes	-	-	-	-	90%	99.1%	90%	99.0%	90%	99.99%
WSDP Topic 7: Associated services														
WSDP Topic 8: Conservation and Demand management														
	Limit non revenue water losses to less than 19% as at 30 June 2020	% non-revenue water losses	Yes	Yes	15%	7%	-	-	19%	5.47%	19%	28.00%	-	-
D311	Complete the Water Balance audit by 30 June	Water balance audit completed	Yes	Yes	1	1	0	1	0	1	1	0	0	0
D310	Repair breaks amd leaks within 6 hours after break has been reported	% repaired within 6 hours	Yes	Yes	95%	98%	95%	95%	95%	100%	95%	95%	95%	95%
WSDP Topic 9: Water Resources														
WSDP Topic 10: Financial profile														
	Spend 90% of approved capital budget for Waste Water Services by 30 June	% budget spent	Yes	Yes	90%	84%	-	-			90%	82%	-	-
D322	Spend 90% of approved capital budget for Water Services by 30 June	% budget spent	Yes	Yes	90%	89%	-	-	90%	100%	90%	80%	90%	96%
D314	Spend 80% of the sewerage maintenance budget by the end of June 2020	% of maintenance budget spent	Yes	Yes	90%	92%	-	-	-	-	80%	85%	80%	154%
D315	Spend 80% of the water maintenance budget by the end of June 2020	% of maintenance budget spent	Yes	Yes	90%	80%	-	-	-	-	80%	83%	80%	231%
D313	Submit one application for external funding by the end of September	Application submitted	Yes	Yes	-	-	-	-	-	-	1	0	0	0
D326	Spend 90% of the approved budget for the upgrade of the Kranshoek sewer reticulation by 30 June 2021	% budget spent	Yes	Yes	-	-	-	-	-	-	-	-	90%	59%
WSDP Topic 11: Institutional Arrangements profile														
	Attend all site meetings for projects to ensure that projects are completed according to specifications	% of meetings attended	No	No	100%	100%	-	-	-	-	-	-	-	-
D312	Hold quarterly Health and Safety meetings to ensure a safe working environment	Number of meetings held	Yes	Yes	-	-	1	1	1	1	1	1	1	1
WSDP Topic 12: Social and Customer service requirements														
	Sewerage blockage removals within 48 hours from receipt of complaint	% successful blockage removals within 48 hours	No	No	100%	100%	-	-	-	-	-	-	-	-
WSDP Topic 13: Needs development plan														

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

- Bitou Municipality continues with the implementation of their Drinking Water Quality and Effluent Quality Sampling Programmes (Both Operational and Compliance Monitoring). Sample results are loaded on a monthly basis onto DWS's IRIS. All the WTWs and WWTWs are also registered on the IRIS website.

- 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 IWA 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 following WSDP documents were finalised and approved by Council on the 8th of June 2021.
  - 2020/2021 WSDP-IDP Water Sector Input Report, September 2020;
  - WSDP: Administration, Information and Comprehensive Overview Report, September 2020; and
  - WSDP: Future Demand and Functionality Requirements Report, September 2020.

- The Asset Register was updated to include all the water and sewerage capital projects completed during the 2020/2021 financial year.

- Study to Analyse Treasury Data and Identify Projects that Promote WC/WDM in Bitou Local Municipality, June 2021, was finalised.

The Municipality previously received the following Blue and Green Drop awards / acknowledgements, which were the last assessments done by the DWS.

- The Municipality's overall Blue Drop score came down from 97.74% for 2012 to 90.44% for 2014. The Bitou Local Municipality team was however well prepared and demonstrated their commitment to the Blue Drop assessment and water quality excellence.

  The overall 2014 Risk Rating for Bitou Municipality is 16%, which translates into the best performance in the Western Cape. The risk value is based on Process Control RR, Drinking Water Quality RR and Risk Management RR, and shows no concerns (medium to critical risks) for Process Control, Drinking water Quality and Risk Management in any of the three systems.

- Bitou Municipality is also performing well with regard to wastewater quality management, to the extent that the Municipality was awarded Green Drop Status (>90%) for both of their drainage systems and WWTWs in 2013 and received an overall Green Drop Score of 98.82% (the last full assessment completed by DWS).

  It is often difficult to show further progress once a state of excellence has already been achieved. However, Bitou showed in the 2014 Green Drop Performance Progress Assessment an even further reduction in the Wastewater Risk Rating for Kurland, whist Plettenberg Bay (Gansevallei) remained constant. Wastewater quality discharged at both works remains excellent, while sufficient wastewater treatment capacity is available.

B.3. Status of Water Services Projects

Bitou Municipality completed the following water and sewerage capital projects during the last financial year.

- The following bulk water pipelines were upgraded:
  - The Kranshoek supply pump station (located at Brakkloof Reservoir), the Kranshoek bulk water pipeline and the new Kranshoek water pump station were completed. The Kranshoek Steel Tower was also repaired and put back in operation.
  - Kwanokuthula bulk water pipeline was completed. This pipeline enable water to be pumped from the Plettenberg Bay WTW to the Kwanokuthula East and West reservoirs.
- New bulk water and sewer pipelines were installed for Ebenezer and internal water reticulation and sewer drainage networks were installed.
- The Kwanokuthula Steel Tower was repaired and put back in operation.
- The Municipality continued with the feasibility studies and designs for the upgrading of the Kurland WTW and WWTW.
- Sections of the Kranshoek sewer drainage networks were upgraded. The Kranshoek sewer pump station No.3 was upgraded.
- A new inlet screen was installed at the Gansevlei WWTW, which was commissioned in September 2020.
- The following upgrades were done at the Piesang Valley sewer pump stations.
  - New electrical panels and new NRV were installed at the Piesang Valley PS No 18.
  - New NRV was installed at the Piesang Valley PS No 19.
  - New electrical panels and new NRV were installed at the Piesang Valley PS No 20.
- New LDV, jetting truck and digger loader were purchased.

Table B.3.1: 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	Kranshoek Upgrade Bulk Water	Yes	Yes	R20,980	R4,505	R4,501	100%	MIG	Water	2018/2019	2020/2021	Completed	2021
				R5,793	R1,500	R1,838	123%	AFR	Water	2018/2019	2020/2021	Completed	2021
2	Kwano New Water Pipeline	Yes	Yes	R8,675	R4,442	R4,864	110%	MIG	Water	2019/2020	2020/2021	Completed	2021
3	Kurland: New Water	Yes	Yes	R200	R200	R200	100%	HOUSING	Water	2020/2021	2020/2021	Completed	2021
4	Kurland: Upgrade WTW	Yes	Yes	R8,717	R800	R717	90%	AFR	Water	2020/2021	2023/2024	In Progress	-
5	Pump Station Equipment	Yes	Yes	R2,421	R1,000	R741	74%	AFR	Water	2018/2019	2023/2024	In Progress	-
6	Plett Water Works: New Highlift Pump	Yes	Yes	R606	R1,000	R0	0%	AFR	Water	2019/2020	-	Not Implemented	-
7	Ebenezer: New Water	Yes	Yes	R2,567	R2,400	R2,400	100%	AFR	Water	2019/2020	2020/2021	Completed	2021
8	Uplands: New Highlift Pump	Yes	Yes	R420	R520	R0	0%	AFR	Water	2019/2020	-	Not Implemented	-
9	Kwano: Upgrade Tank	Yes	Yes	R2,013	R2,100	R2,013	96%	AFR	Water	2020/2021	2020/2021	Completed	2021
10	Kurland: New Sewer	Yes	Yes	R3,600	R500	R500	100%	HOUSING	Sewer	2019/2020	2021/2022	In Progress	-
11	Kranshoek: Upgrade Sewer Retic	Yes	Yes	R4,932	R2,600	R1,532	59%	AFR	Sewer	2020/2021	2022/2023	In Progress	-
12	Tools And Equipment	Yes	Yes	R406	R205	R111	54%	AFR	Sewer	2016/2017	2021/2022	In Progress	-
13	Pump Station Equipment	Yes	Yes	R3,284	R1,165	R827	71%	AFR	Sewer	2019/2020	2023/2024	In Progress	-
14	Gansevlei WWTW: New Screen	Yes	Yes	R607	R140	R101	72%	AFR	Sewer	2019/2020	2020/2021	Completed	2021
15	Replace LDV: Water	Yes	Yes	R667	R375	R344	92%	AFR	Sewer	2019/2020	2020/2021	Completed	2021
16	New Digger Loader: Water	Yes	Yes	R1,098	R1,070	R1,070	100%	BORROWINGS	Sewer	2020/2021	2020/2021	Completed	2021
17	New Jetting Truck	Yes	Yes	R1,070	R1,098	R1,098	100%	BORROWINGS	Sewer	2020/2021	2020/2021	Completed	2021
18	Kurland: Upgrade WWTW	Yes	Yes	R26,777	R2,000	R1,777	89%	AFR	Sewer	2020/2021	2023/2024	In Progress	-
19	Kranshoek: Upgrade Ps3	Yes	Yes	R961	R800	R961	120%	AFR	Sewer	2020/2021	2020/2021	Completed	2021
20	Kranshoek: Reconstruct Ps2	Yes	Yes	R0	R300	R0	0%	AFR	Sewer	2020/2021	-	Not Implemented	-
21	Ebenezer: New Sewer	Yes	Yes	R1,606	R2,000	R1,606	80%	HOUSING	Sewer	2020/2021	2020/2021	Completed	2021
22	Ebenhaezer New Bulk Sewer	Yes	Yes	R3,344	R3,344	R3,344	100%	MIG	Sewer	2020/2021	2020/2021	Completed	2021
23	Plesangs Valley Pump Stations	Yes	Yes	R6,736	R3,000	R4,036	135%	AFR	Sewer	2020/2021	2021/2022	In Progress	-
Total				**R107,479**	**R37,063**	**R34,582**	**93%**						

Note: Total Project Cost is actual expenditure from 2014/2015 to 2020/2021 plus planned budget for period 2021/2022 to 2023/2024.

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

The impact of the water and sewerage capital projects, which were implemented by Bitou 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	Kranshoek Upgrade Bulk Water	Bulk Water Pipeline	Kranshoek	1440	4176	Provide higher level of water services to residents. Ensure adequate bulk water pipeline capacity.
2	Kwano New Water Pipeline	Bulk Water Pipeline	Plettenberg Bay	3000	8700	Provide higher level of water services to residents. Ensure adequate bulk water pipeline capacity.
3	Kurland: New Water	Water Reticulation	Kurland	1796	5739	Provide higher level of water services to residents. Ensure adequate bulk water pipeline capacity.
4	Kurland: Upgrade WTW	WTW	Kurland	1796	5739	Upgrade capacity of WTW to ensure continued compliance with SANS241:2015 water quality limits.
5	Pump Station Equipment	Pump Station	Management Area	-	-	Ensure adequate pump capacity.
6	Plett Water Works: New Highlift Pump	Pump Station	Plettenberg Bay	-	-	Project was not implemented.
7	Ebenezer: New Water	Bulk Water Pipeline	Plettenberg Bay	517	1500	Provide higher level of water services to residents. Ensure adequate bulk water pipeline capacity.
8	Uplands: New Highlift Pump	Pump Station	Plettenberg Bay	-	-	Project was not implemented.
9	Kwano: Upgrade Tank	Reservoir	Plettenberg Bay	3000	8700	Provide higher level of water services to residents. Ensure adequate water storage capacity.
10	Kurland: New Sewer	Sewer Drainage	Kurland	1727	5518	Provide higher level of sanitation services to Kurland residents
11	Kranshoek: Upgrade Sewer Retic	Sewer Drainage	Kranshoek	77	306	Provide higher level of sanitation services to residents.
12	Tools And Equipment	Other	Management Area	-	-	Efficient operation and maintenance of sewerage infrastructure.
13	Pump Station Equipment	Pump Station	Management Area	-	-	Ensure adequate pump capacity.
14	Gansevlei WWTW: New Screen	WWTW	Plettenberg Bay	-	-	Installation of new screen at inlet works to ensure adequate screening of raw sewage.
15	Replace LDV: Water	Other	Management Area	-	-	Efficient operation and maintenance of water and sewerage infrastructure.
16	New Digger Loader: Water	Other	Management Area	-	-	Efficient operation and maintenance of water and sewerage infrastructure.
17	New Jetting Truck	Other	Management Area	-	-	Efficient operation and maintenance of water and sewerage infrastructure.
18	Kurland: Upgrade WWTW	WWTW	Kurland	1796	5739	Upgrade capacity of WWTW to ensure continued compliance with final effluent quality (Standards).
19	Kranshoek: Upgrade Ps3	Sewer Drainage	Kranshoek	1440	4176	Ensure adequate pump capacity in order to prevent any possible sewage spillages.
20	Kranshoek: Reconstruct Ps2	Sewer Drainage	Kranshoek	1440	4176	Ensure adequate pump capacity in order to prevent any possible sewage spillages.
21	Ebenezer: New Sewer	Sewer Drainage	Plettenberg Bay	517	1500	Provide higher level of sanitation services to residents.
22	Ebenhaezer New Bulk Sewer	Bulk Sewer Pipeline	Plettenberg Bay	517	1500	Ensure adequate bulk sewer pipeline capacity.
23	Piesangs Valley Pump Stations	Sewer Drainage	Plettenberg Bay	-	-	Ensure adequate pump capacity in order to prevent any possible sewage spillages.
Total				**19,063**	**57,469**	

C. WATER SERVICES AUDIT REPORT

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

All bulk water supplied from the various sources to the Plettenberg Bay, Kurland and Natures Valley distribution systems are metered through bulk water meters, which enable Bitou Municipality to do a proper IWA water balance for each of their distribution systems. The graph below provides a summary of the total bulk raw water supplied from the various water resources for Plettenberg Bay, Kurland and Natures Valley.

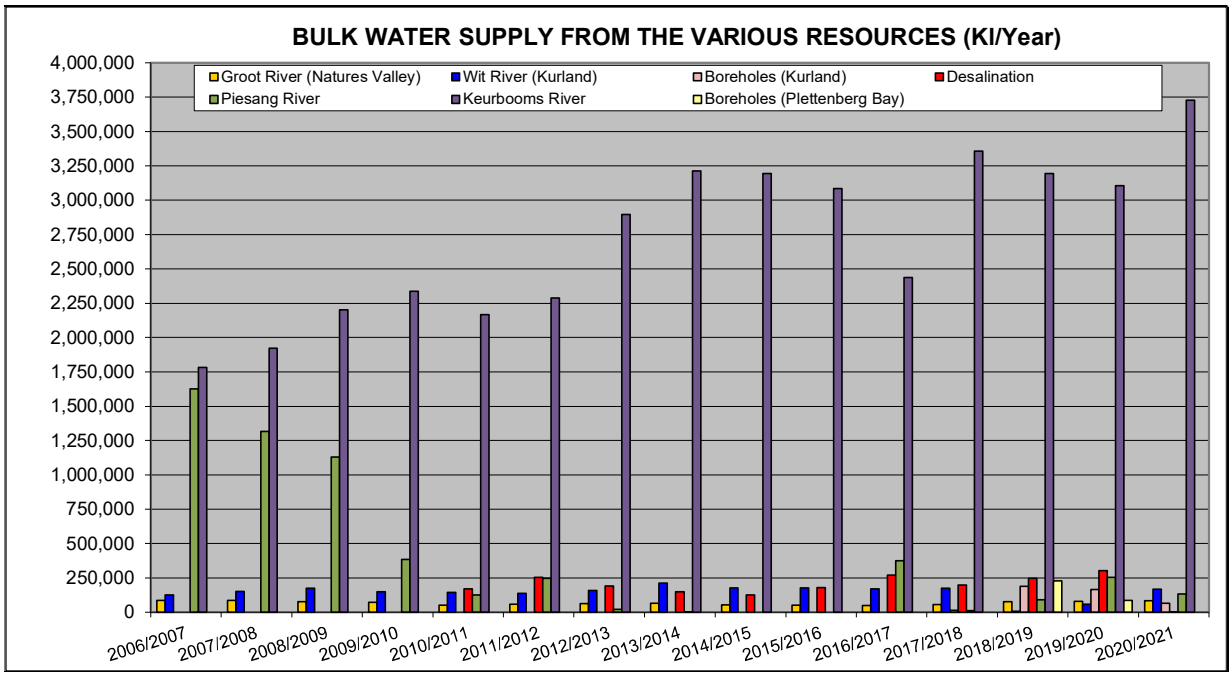


Figure C.1.1: Bulk raw water supply to the Plettenberg Bay, Natures Valley and Kurland systems.

The table below gives a summary of the total bulk raw water supplied to the various water distribution systems in Bitou Municipality's Management Area.

Table C.1.1: Bulk raw water supplied to the various water distribution systems

Distribution System	Source	20/21	Record : Prior (Ml/a)				
			19/20	18/19	17/18	16/17	15/16
Plettenberg Bay	Piesang River	132.650	253.364	89.435	12.292	374.851	0.000
	Keurbooms River	3 728.217	3 105.273	3 194.827	3 357.932	2 437.637	3 084.230
	Desalination	1.419	303.103	246.744	199.818	270.905	179.150
	Boreholes	-	86.194	228.474	-	-	-
Plettenberg Bay Sub Total		3 862.286	3 747.934	3 759.480	3 570.042	3 083.393	3 263.380
Natures Valley	Groot River	84.126	78.695	76.366	56.633	48.067	52.854
Kurland	Wit River	169.249	57.682	7.885	174.869	171.814	177.189
	Boreholes	65.422	164.973	188.110	13.741	-	-
Kurland Sub Total		234.671	222.655	195.995	188.610	171.814	177.189
Total		**4 181.083**	**4 049.284**	**4 031.841**	**3 815.285**	**3 303.274**	**3 493.423**

The graph below gives an overview of the annual system input volume and water losses for the various water distribution systems in Bitou Municipality's Management Area.

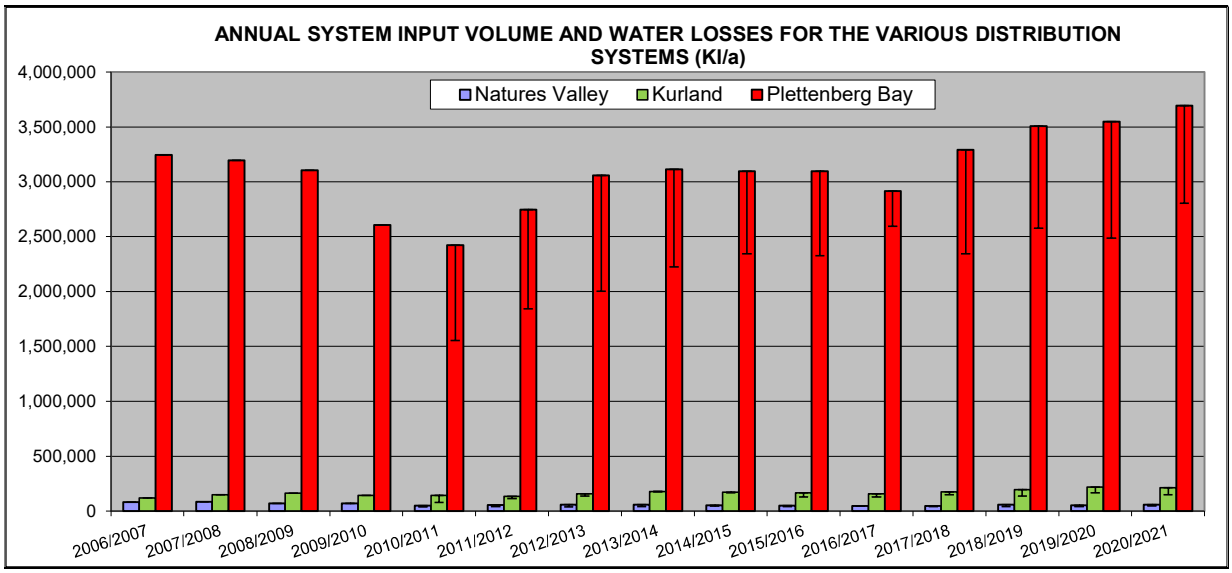


Figure C.1.2: System Input Volume and water losses for the Plettenberg Bay, Natures Valley and Kurland systems.

Volume of water used by each user sector:

The figure below gives an overview of Bitou Municipality's overall water usage per Sector for the various financial years.

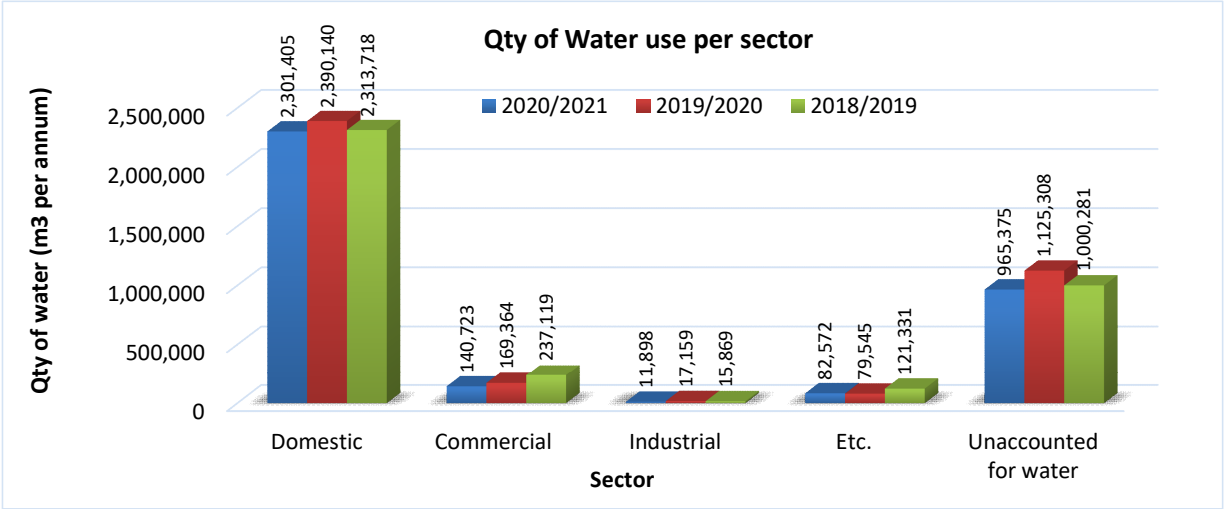


Figure C.1.3: Quantity of water services provided / water balance

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

Table C.1.2: 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	4,114,242	3,495,014	3,368,513	11.27	9.58	9.23
7.1 / 7.2.3		Ground water abstracted	65,422	251,167	416,584	0.18	0.69	1.14
7.2.14		Desalination	1,419	303,103	246,744	0.00	0.83	0.68
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**	**4,181,083**	**4,049,284**	**4,031,841**	**11.46**	**11.09**	**11.05**
	10.2 (g) (i)	**BULK WATER SUPPLY**						
7.2.6		Volume of water treated	3,964,415	3,820,417	3,757,585	10.86	10.47	10.29
7.2.7	10.2 (a) (ii)	Purchased treated water	0	0	0	0.00	0.00	0.00
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	**3,964,415**	**3,820,417**	**3,757,585**	**10.86**	**10.47**	**10.29**
		WATER CONSUMPTION						
7.2.8.1		Billed Metered:	2,536,598	2,656,208	2,688,037	6.95	7.28	7.36
	10.2 (a) (i)	Domestic	2,301,405	2,390,140	2,313,718	6.31	6.55	6.34
	10.2 (a) (i)	Commercial	140,723	169,364	237,119	0.39	0.46	0.65
	10.2 (a) (i)	Industrial	11,898	17,159	15,869	0.03	0.05	0.04
	10.2 (a) (i)	etc.	82,572	79,545	121,331	0.23	0.22	0.33
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	31,260	61,752	0.00	0.09	0.17
7.2.8.4		Unbilled Unmetered	462,442	7,641	7,515	1.27	0.02	0.02
	10.2 (g) (i)	**Sub-Total: Authorized consumption**	**2,999,040**	**2,695,109**	**2,757,304**	**8.22**	**7.38**	**7.55**
		UNACCOUNTED FOR WATER						
7.3.1		Raw water bulk loss	216,668	228,867	274,256	0.59	0.63	0.75
7.2.3/7.2.4		Billing losses	462,442	38,901	69,267	1.27	0.11	0.19
7.2.5		Apparent losses	164,114	191,302	170,048	0.45	0.52	0.47
7.2.5.1		Illegal connections	38,615	45,012	40,011	0.11	0.12	0.11
7.2.5.2		Inaccurate meters	77,230	90,025	80,022	0.21	0.25	0.22
7.2.5.3		Data errors	48,269	56,265	50,014	0.13	0.15	0.14
7.2.6		Real losses	801,261	934,006	830,233	2.20	2.56	2.27
	10.2 (g) (ii)	**Sub-Total: Unaccounted for water**	**965,375**	**1,125,308**	**1,000,281**	**2.64**	**3.08**	**2.74**
		WASTEWATER TREATMENT						
7.2.9	10.2 (a) (iii)	Total received at WWTW	1,887,656	1,666,119	1,460,133	5.17	4.56	4.00
7.2.11		Total discharged	1,702,724	1,506,498	1,308,473	4.66	4.13	3.58
7.2.13		Returned to environment	1,615,300	1,430,616	1,241,113	4.43	3.92	3.40
7.2.14		Recycled (Estimated)	87,424	75,882	67,359	0.24	0.21	0.18
	10.2 (a) (iv)	**Quantity of water supplied not discharged to WWTWs**	**1,111,384**	**1,028,990**	**1,297,171**	**3.04**	**2.82**	**3.55**

Graphs of the water usage per sector for the various water distribution systems in Bitou Municipality's Management Area are included as part of the IWA water balance models in Annexure A. The table below gives a summary of the annual billed metered consumption data for the different consumers.

Table C.1.3: Annual volume of billed metered consumption by each user sector for the three systems (Ml)

Town	Year	Residential	Business	Industrial	Other	Total
Plettenberg Bay	10/11	1 345.359	171.689	10.212	23.102	**1 550.362**
	11/12	1 627.658	173.900	11.585	23.904	**1 837.047**
	12/13	1 681.541	196.095	10.058	33.898	**1 921.592**
	13/14	1 862.284	184.711	10.654	66.799	**2 124.448**
	14/15	1 905.582	193.871	13.102	136.909	**2 249.464**
	15/16	1 934.117	202.287	14.223	107.361	**2 257.988**
	16/17	2 187.624	196.642	14.696	128.953	**2 527.915**
	17/18	2 007.722	172.996	12.791	112.803	**2 306.312**
	18/19	2 164.184	234.184	15.869	118.826	**2 533.063**
	19/20	2 206.340	166.006	17.159	76.134	**2 465.639**
	20/21	2 136.723	137.554	11.898	78.764	**2 364.939**
Kurland	10/11	76.555	0	0	0	**76.555**
	11/12	113.760	0	0	0	**113.760**
	12/13	137.869	0	0	0	**137.869**
	13/14	178.053	0	0	0	**178.053**
	14/15	162.795	0	0	0	**162.795**
	15/16	123.018	0	0	0	**123.018**
	16/17	122.149	2.159	0	2.072	**126.380**
	17/18	130.547	2.731	0	2.312	**135.590**
	18/19	109.478	1.785	0	1.974	**113.237**
	19/20	143.878	2.277	0	2.974	**149.129**
	20/21	124.185	2.335	0	3.385	**129.905**
Natures Valley	10/11	36.259	0	0	0	**36.259**
	11/12	37.996	0	0	0	**37.996**
	12/13	37.763	0	0	0	**37.763**
	13/14	41.673	0	0	0	**41.673**
	14/15	44.966	0	0	0	**44.966**
	15/16	41.210	0	0	0	**41.210**
	16/17	43.799	1.651	0	0.908	**46.358**
	17/18	37.413	1.081	0	1.375	**39.869**
	18/19	40.056	1.150	0	0.531	**41.737**
	19/20	39.922	1.081	0	0.437	**41.440**
	20/21	40.497	0.834	0	0.423	**41.754**
Total	**10/11**	**1 458.173**	**171.689**	**10.212**	**23.102**	**1 663.176**
	11/12	**1 779.414**	**173.900**	**11.585**	**23.904**	**1 988.803**
	12/13	**1 857.173**	**196.095**	**10.058**	**33.898**	**2 097.224**
	13/14	**2 082.010**	**184.711**	**10.654**	**66.799**	**2 344.174**
	14/15	**2 113.343**	**193.871**	**13.102**	**136.909**	**2 457.225**
	15/16	**2 098.345**	**202.287**	**14.223**	**107.361**	**2 422.216**
	16/17	**2 353.572**	**200.452**	**14.696**	**131.933**	**2 700.653**
	17/18	**2 175.682**	**176.808**	**12.791**	**116.490**	**2 481.771**
	18/19	**2 313.718**	**237.119**	**15.869**	**121.331**	**2 688.037**
	19/20	**2 390.140**	**169.364**	**17.159**	**79.545**	**2 656.208**
	20/21	**2 301.405**	**140.723**	**11.898**	**82.572**	**2 536.598**

The billed metered consumption volumes for the different suburbs in the Plettenberg Bay system are summarised in the table below.

Table C.1.4: Billed metered volumes for the different suburbs in Plettenberg Bay						
Suburb	20/21		19/20		18/19	
	Annual Volume (Ml)	Daily Volume (Ml/d)	Annual Volume (Ml)	Daily Volume (Ml/d)	Annual Volume (Ml)	Daily Volume (Ml/d)
Plettenberg Bay	1 171.170	3.209	1 196.307	3.278	1 314.168	3.600
New Horizons	193.009	0.529	204.313	0.560	224.620	0.615
Kwanokuthula	414.645	1.136	462.781	1.268	382.228	1.047
Wittedrift	27.468	0.075	34.897	0.096	20.877	0.057
Kranshoek	201.133	0.551	215.704	0.591	195.799	0.536
Keurbooms	142.005	0.389	144.822	0.397	177.031	0.485
Green Valley	33.462	0.092	35.418	0.097	31.639	0.087
Farms	182.047	0.499	171.398	0.470	186.701	0.512
Suburb	17/18		16/17		Annual % Growth over period 16/17 to 20/21	
	Annual Volume (Ml)	Daily Volume (Ml/d)	Annual Volume (Ml)	Daily Volume (Ml/d)		
Plettenberg Bay	1 200.916	3.290	1 430.463	3.919	-4.88%	
New Horizons	188.547	0.517	180.711	0.495	1.66%	
Kwanokuthula	368.928	1.011	360.093	0.987	3.59%	
Wittedrift	21.943	0.060	23.444	0.064	4.04%	
Kranshoek	173.348	0.475	176.943	0.485	3.26%	
Keurbooms	129.137	0.354	156.802	0.430	-2.45%	
Green Valley	28.884	0.079	29.130	0.080	3.53%	
Farms	194.609	0.533	170.329	0.467	1.68%	

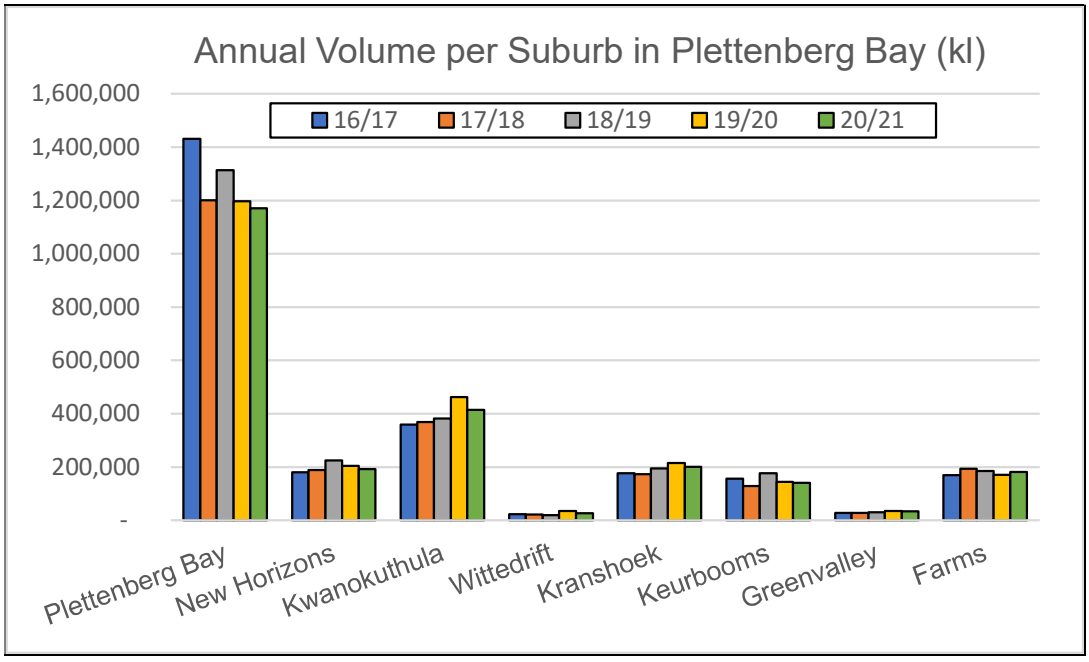


Figure C.1.4: Annual billed metered consumption volume per suburb in Plettenberg Bay

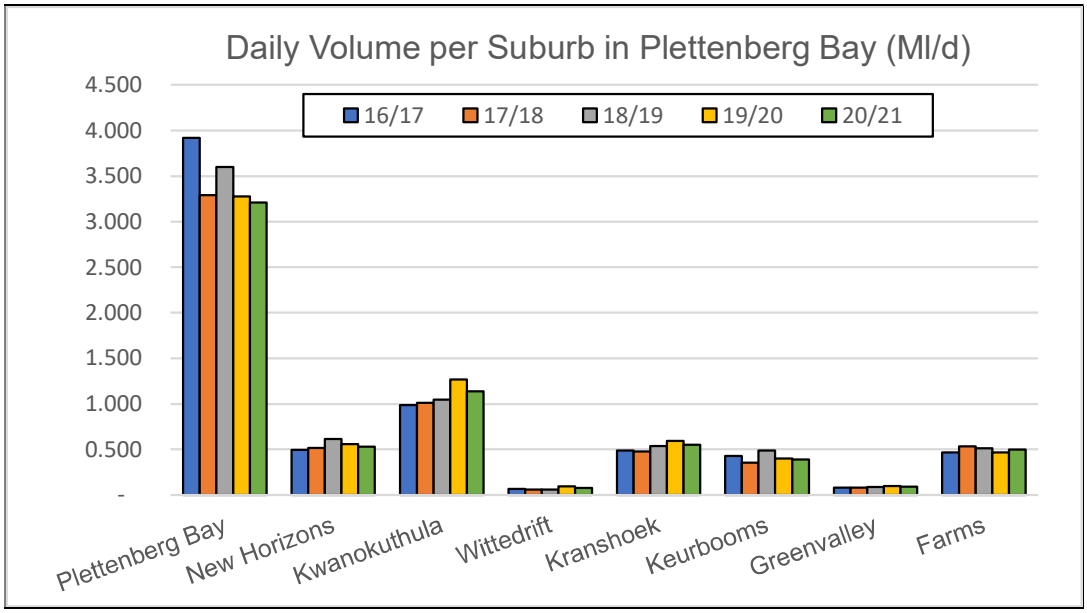


Figure C.1.5: Daily billed metered consumption volume per suburb in Plettenberg Bay

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

Both WWTWs in Bitou Municipality's Management Area are supplied with flow meters and the table below gives an overview of the annual volume of effluent received and the volume of final effluent discharged from the WWTWs. The final flows discharged from both WWTWs were estimated for the current financial year. The monthly flows and rainfall measured at the Plettenberg Bay and Kurland WWTW are also included in Annexure A.

Table C.1.5: Annual volume of effluent metered at the Plettenberg Bay and Kurland WWTWs

WWTW		20/21	Record : Prior (Ml/a)				
			19/20	18/19	17/18	16/17	15/16
Plettenberg Bay (Gansevlei)	Incoming Flow	1 748.488	1 517.634	1 347.189	1 371.460	1 317.270	1 715.632
	Final Effluent	*1 486.215*	*1 289.989*	*1 145.111*	*1 165.741*	*1 119.680*	*1 458.287*
	% Discharged	*85.00%*	*85.00%*	*85.00%*	*85.00%*	*85.00%*	*85.00%*
Kurland	Incoming Flow	139.168	148.485	112.944	86.129	78.152	80.540
	Final Effluent	*129.085*	140.627	*96.002*	*73.210*	*66.429*	*68.459*
	% Discharged	*92.75%*	94.71%	*85.00%*	*85.00%*	*85.00%*	*85.00%*
Total	Incoming Flow	**1 887.656**	**1 666.119**	**1 460.133**	**1 457.589**	**1 395.422**	**1 796.172**
	Final Effluent	**1 615.300**	**1 430.616**	**1 241.113**	**1 238.951**	**1 186.109**	**1 526.746**
	% Discharged	**85.57%**	**85.87%**	**85.00%**	**85.00%**	**85.00%**	**85.00%**

Note: *Estimated*

Quantity of treated effluent returned to the water resource system:

All effluent discharged into the Municipal sewer system is treated at the existing WWTWs and the current effluent re-use practices are as follows:

Table C.1.6: Current effluent re-used practices at the various WWTWs

WWTW	Current effluent re-used practices
Plettenberg Bay (Gansevlei)	Re-use for irrigation at Plettenberg Primary School and Goose Valley Golf Course
Kurland	None, final effluent is discharged to natural stream to Sout River

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, make 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		

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.

Table C.2.2: Norms and standards for levels of sanitation services
facility, such as pit toilets and bucket toilets. To be completely eliminated by 2030.

C.2.1. User Connection Profile

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

Table C.2.1.1: User Connection Profile (Water)

WSDP Ref. #		Water Services						
		Year 0 FY2020/21		Year - 1 FY2019/20		Year - 2 FY2018/19		New Connections Year 0
		Nr	%	Nr	%	Nr	%	Nr
	RESIDENTIAL (DOMESTIC)							
3.3	Metered: Uncontrolled	11,372	74%	11,314	74%	11,166	80%	58
3.3	Metered: Controlled	0	0%	0	0%	0	0%	0
	Unmetered (flat rate)	0	0%	0	0%	0	0%	0
	Communal water supply	3,513	23%	3,513	23%	2,356	17%	0
	Sub-Total: Residential	**14,885**	**97%**	**14,827**	**97%**	**13,522**	**97%**	**58**
	EDUCATION							
3.3	Schools	11	0%	11	0%	11	0%	0
	Tertiary educaton facilities	0	0%	0	0%	0	0%	0
	Sub-Total: Education	**11**	**0%**	**11**	**0%**	**11**	**0%**	**0**
	HEALTH							
3.3	Clinics	4	0%	4	0%	4	0%	0
3.3	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 (Governm./Sc)	0	0%	0	0%	0	0%	0
3.3	Magistrate Offices	1	0%	1	0%	1	0%	0
3.3	Police Stations	2	0%	2	0%	2	0%	0
3.3	Prisons	0	0%	0	0%	0	0%	0
	etc	0	0%	0	0%	0	0%	0
	Sub-Total: Institutional	**3**	**0%**	**3**	**0%**	**3**	**0%**	**0**
	INDUSTRIAL							
3.3	Dry industries	36	0%	36	0%	36	0%	0
3.3	Wet industries	0	0%	0	0%	0	0%	0
	Sub-Total: Commercial	**36**	**0%**	**36**	**0%**	**36**	**0%**	**0**
	COMMERCIAL							
3.3	Businesses	275	2%	279	2%	281	2%	-4
3.3	Office Buildings (Incl with Other.)	0	0%	0	0%	0	0%	0
	Sub-Total: Commercial	**275**	**2%**	**279**	**2%**	**281**	**2%**	**-4**
	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
	Other	103	1%	95	1%	94	1%	8
	Sub-Total: Other	**103**	**1%**	**95**	**1%**	**94**	**1%**	**8**
	TOTAL	**15,319**	**100%**	**15,257**	**100%**	**13,953**	**100%**	**62**

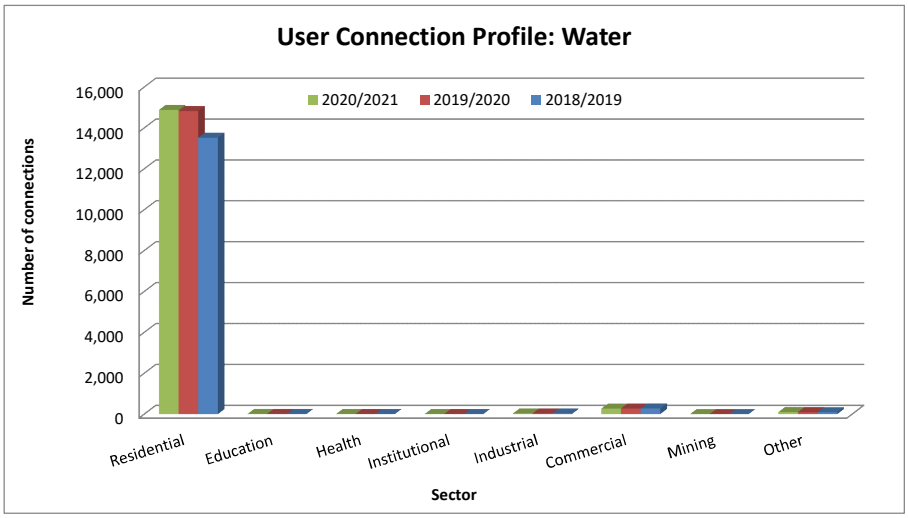


Figure C.2.1.1: User connection profile for water

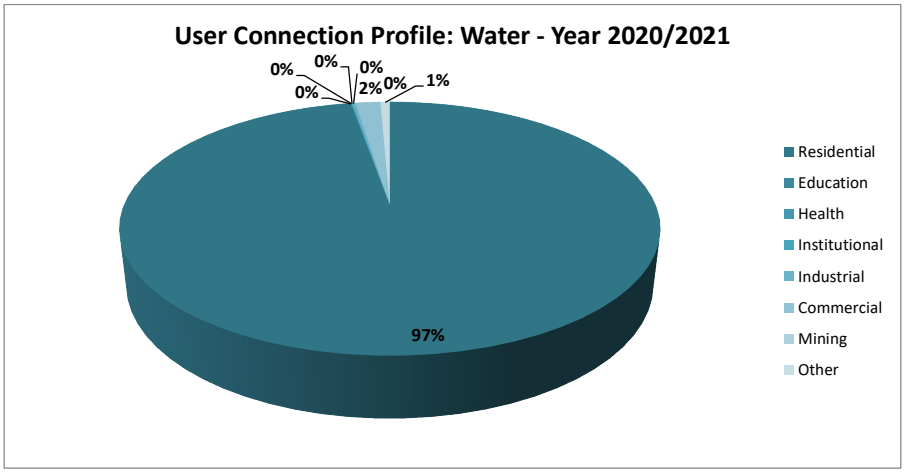


Figure C.2.1.2: User connection distribution for water – Year 2020/2021

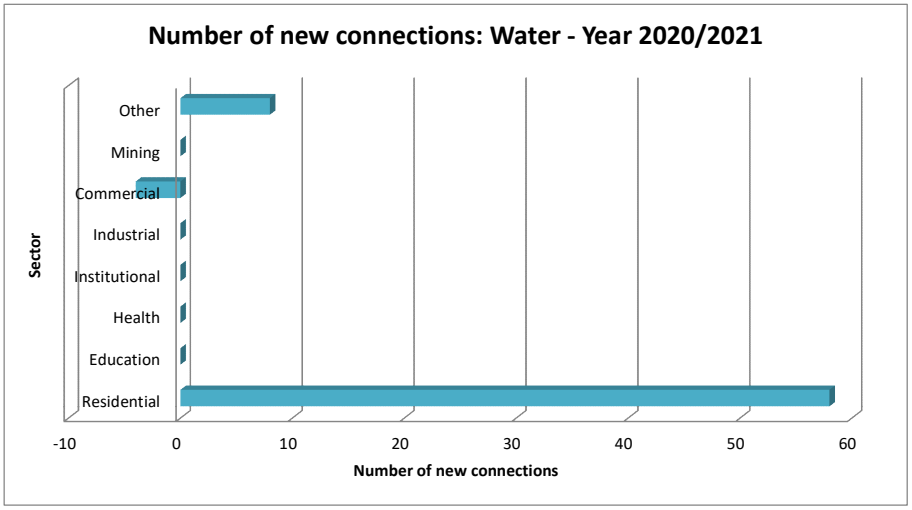


Figure C.2.1.3: Number of new water connections provided during 2020/2021

Table C.2.1.2: User Connection Profile (Wastewater)								
WSDP Ref. #		Wastewater Services						
		Year 0 FY2020/21		Year - 1 FY2019/20		Year - 2 FY2018/19		New Connections Year 0
		Nr	%	Nr	%	Nr	%	Nr
	RESIDENTIAL (DOMESTIC)							
3.3	Metered: Uncontrolled	11,372	74%	11,314	74%	11,166	80%	58
3.3	Metered: Controlled	0	0%	0	0%	0	0%	0
	Unmetered (flat rate)	0	0%	0	0%	0	0%	0
	Communal water supply	3,513	23%	3,513	23%	2,356	17%	0
	Sub-Total: Residential	**14,885**	**97%**	**14,827**	**97%**	**13,522**	**97%**	**58**
	EDUCATION							
3.3	Schools	11	0%	11	0%	11	0%	0
	Tertiary educaton facilities	0	0%	0	0%	0	0%	0
	Sub-Total: Education	**11**	**0%**	**11**	**0%**	**11**	**0%**	**0**
	HEALTH							
3.3	Clinics	4	0%	4	0%	4	0%	0
3.3	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 (Governm./Sc)	0	0%	0	0%	0	0%	0
3.3	Magistrate Offices	1	0%	1	0%	1	0%	0
3.3	Police Stations	2	0%	2	0%	2	0%	0
3.3	Prisons	0	0%	0	0%	0	0%	0
	etc	0	0%	0	0%	0	0%	0
	Sub-Total: Institutional	**3**	**0%**	**3**	**0%**	**3**	**0%**	**0**
	INDUSTRIAL							
3.3	Dry industries	36	0%	36	0%	36	0%	0
3.3	Wet industries	0	0%	0	0%	0	0%	0
	Sub-Total: Commercial	**36**	**0%**	**36**	**0%**	**36**	**0%**	**0**
	COMMERCIAL							
3.3	Businesses	275	2%	279	2%	281	2%	-4
3.3	Office Buildings (Incl with Other.)	0	0%	0	0%	0	0%	0
	Sub-Total: Commercial	**275**	**2%**	**279**	**2%**	**281**	**2%**	**-4**
	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
	Other	103	1%	95	1%	94	1%	8
	Sub-Total: Other	**103**	**1%**	**95**	**1%**	**94**	**1%**	**8**
	TOTAL	**15,319**	**100%**	**15,257**	**100%**	**13,953**	**100%**	**62**

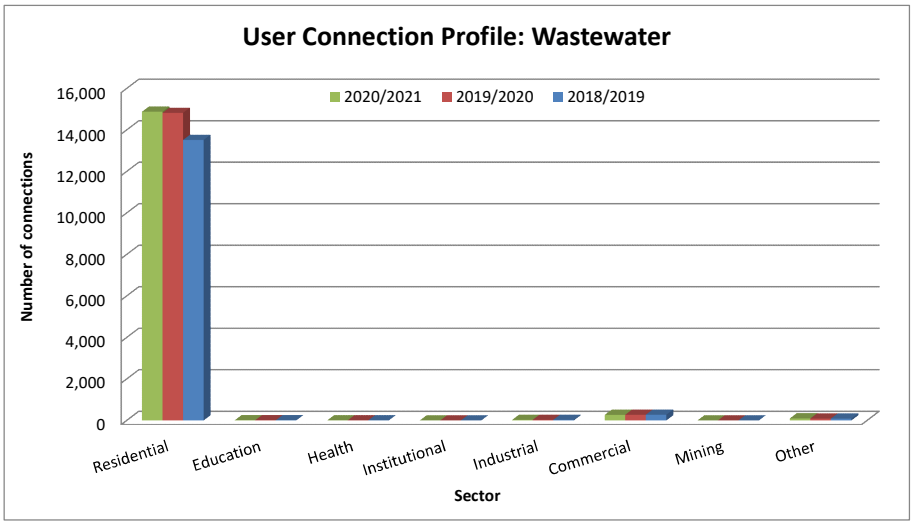


Figure C.2.1.4: User connection profile for wastewater

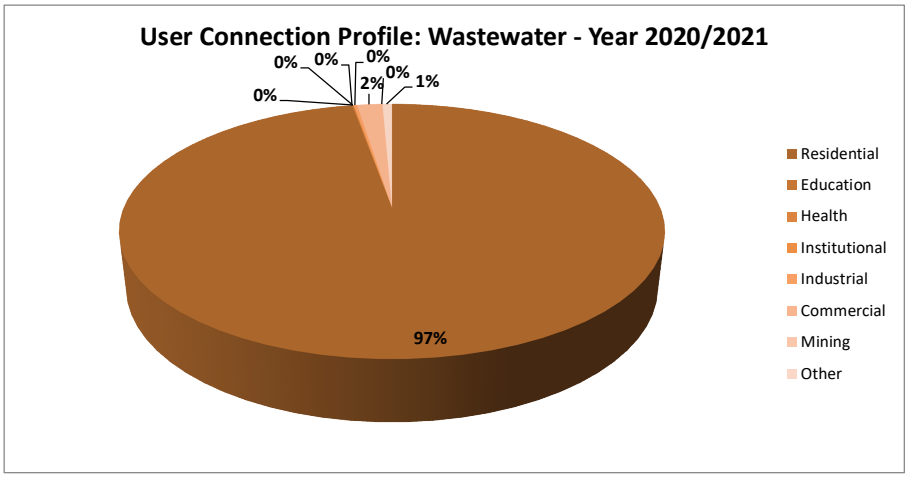


Figure C.2.1.5: User connection distribution for wastewater – Year 2020/2021

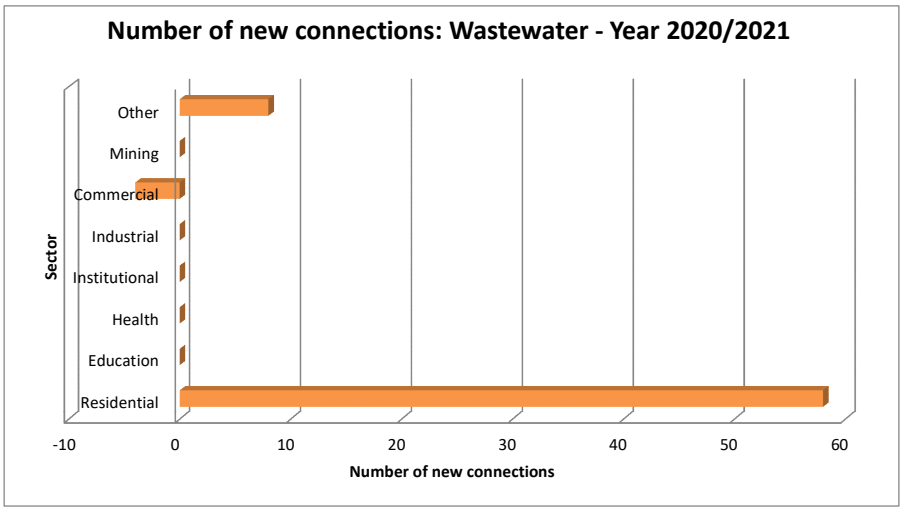


Figure C.2.1.6: Number of new wastewater connections provided during 2020/2021

The tariff codes of Bitou Municipality were grouped together as follows, for the different areas, in order to calculate the number of billed metered consumers and the billed metered consumption per consumer type.

Table C.2.1.3: Grouping of Tariff Codes for the calculation of the number of billed metered consumers and billed metered consumption per consumer type.

Supply Area	Residential	Business	Industrial	Other
Plettenberg Bay	Basic, Commercial flats, Domei Ind Domestic, Domestic, Flats, Indec, Indei, Rural, Water consmsbec Mun. Sub Economic	Business, Laundries, Restaurant, Shops	Industries	Water consmbuss Mun. Business, Water consmdom Mun. Domestic, Water consmflat Mun. Flat, Water consmindu Mun. Industries, Water consmshop Mun. Shops, Prep, School
New Horizons	Basic, Domei Ind Domestic, Domestic, Indei, Water consmsbec Mun. Sub Economic, Water consmsbei Mun. Indigent	Business, Shops	-	Creche, Elim, Water consmbuss Mun. Business, Water consmdom Mun. Domestic, School
Kwanokuthula	Basic, Domestic, Water consmsbec Mun. Sub Economic, Water consmsbei Mun. Econ Indigent	Business, Shops	-	Creche, Water consmbuss Mun. Business, School
Farms	Basic, Indigent Econ, Domestic, Flats, Keubooms Caravan Park, Rural	Business, Restaurant, Shops	-	Creche, Water consmbasc Mun. Basic, Water consmbuss Mun. Business, Water consmflat Mun. Flat
Farms	Basic, Commercial flats, Indigent Econ, Domestic, Flats, Rural	Business, Restaurant, Shops	-	Water consmbuss Mun. Business
Wittedrift	Basic, Dome Ind Domestic, Domestic, Flats, Indec, Indei, Water consmsbec Mun. Sub Economic	Business	-	Water consmbuss Mun. Business, School
Keurbooms	Basic, Commercial flats, Domestic, Flats, Rural	Business, Restaurant, Shops	-	Water consmbuss Mun. Business
Kranshoek	Basic indigent, Dome Ind Domestic, Domestic, Rural, Water consmsbec Mun. Sub Economic, Water consmsbei Econ Indigent	Business	-	Creche, Water consmbuss Mun. Business, School
Green Valley	Sub economic, Water consmsbei Mun. Econ Indigent	Business	-	Creche, Water consmsbec Mun. Sub Economic
Kurland	Basic indigent, Domestic, Sub economic, Water consmsbei Mun. Econ Indigent	Business	-	Creche, Water consmbuss Mun. Business, Water consmsbec Mun. Sub Economic, School
Natures Valley	Domestic, Natures Valley	Business, Restaurant	-	Water consmbuss Mun. Business

The average annual growth in the number of consumers for Plettenberg Bay, Kurland and Natures Valley over the period 2009/2010 to 2020/2021 was 3.04%. The number of billed metered consumers in each user sector, for the various distribution systems in Bitou Municipality's Management Area, is as follows (Financial System).

Table C.2.1.4: Number of billed metered consumers in each user sector for the Plettenberg Bay distribution system and average annual growth of consumers

Year	No of Household Consumer Units	No of Commercial Consumer Units	No of Industrial Consumer Units	No. of Other Consumer Units	Total
2009/2010	7 347	316	33	14	**7 710**
2010/2011	8 155	309	33	15	**8 512**
2011/2012	8 343	323	33	15	**8 714**
2012/2013	8 386	325	33	47	**8 791**
2013/2014	8 607	271	32	92	**9 002**
2014/2015	9 017	268	37	93	**9 415**
2015/2016*	9 315	265	36	96	**9 712**
2016/2017	9 606	265	36	101	**10 008**
2017/2018	9 986	265	36	101	**10 388**
2018/2019	10 102	272	36	101	**10 512**
2019/2020	10 249	270	36	102	**10 657**

Table C.2.1.4: Number of billed metered consumers in each user sector for the Plettenberg Bay distribution system and average annual growth of consumers					
Year	**No of Household Consumer Units**	**No of Commercial Consumer Units**	**No of Industrial Consumer Units**	**No. of Other Consumer Units**	**Total**
2020/2021	10 312	267	36	100	**10 715**
Average Annual Growth	**3.13%**	**-1.52%**	**0.79%**	**19.57%**	**3.04%**

Categories: * 2015/2016 figures were estimated

Table C.2.1.5: Number of billed metered consumers in each user sector for the Kurland distribution system and average annual growth of consumers				
Year	**No of Household Consumer Units**	**No of Commercial Consumer Units**	**No. of Other Consumer Units**	**Total**
2009/2010 *	595	5	9	**609**
2010/2011 *	607	5	9	**621**
2011/2012 *	619	5	9	**633**
2012/2013 *	632	5	9	**646**
2013/2014 *	645	5	9	**659**
2014/2015 *	658	5	9	**672**
2015/2016 *	671	5	9	**685**
2016/2017	685	5	9	**699**
2017/2018	685	5	9	**699**
2018/2019	684	5	9	**698**
2019/2020	684	5	9	**698**
2020/2021	679	4	18	**701**
Average Annual Growth	**1.21%**	**-2.01%**	**6.50%**	**1.29%**

Note: * 2009/2010 to 2015/2016 figures were estimated

Table C.2.1.6: Number of billed metered consumers in each user sector for the Natures Valley distribution system and average annual growth of consumers				
Year	**No of Household Consumer Units**	**No of Commercial Consumer Units**	**No. of Other Consumer Units**	**Total**
2009/2010	375	0	0	**375**
2010/2011	376	0	0	**376**
2011/2012	375	0	0	**375**
2012/2013	374	0	0	**374**
2013/2014	373	0	0	**373**
2014/2015	381	0	0	**381**
2015/2016 *	381	2	2	**385**
2016/2017	381	4	4	**389**
2017/2018	381	4	4	**389**
2018/2019	380	4	4	**388**
2019/2020	381	4	4	**389**
2020/2021	381	4	4	**389**
Average Annual Growth	**0.14%**	**-**	**-**	**0.33%**

Note: * 2015/2016 figures were estimated

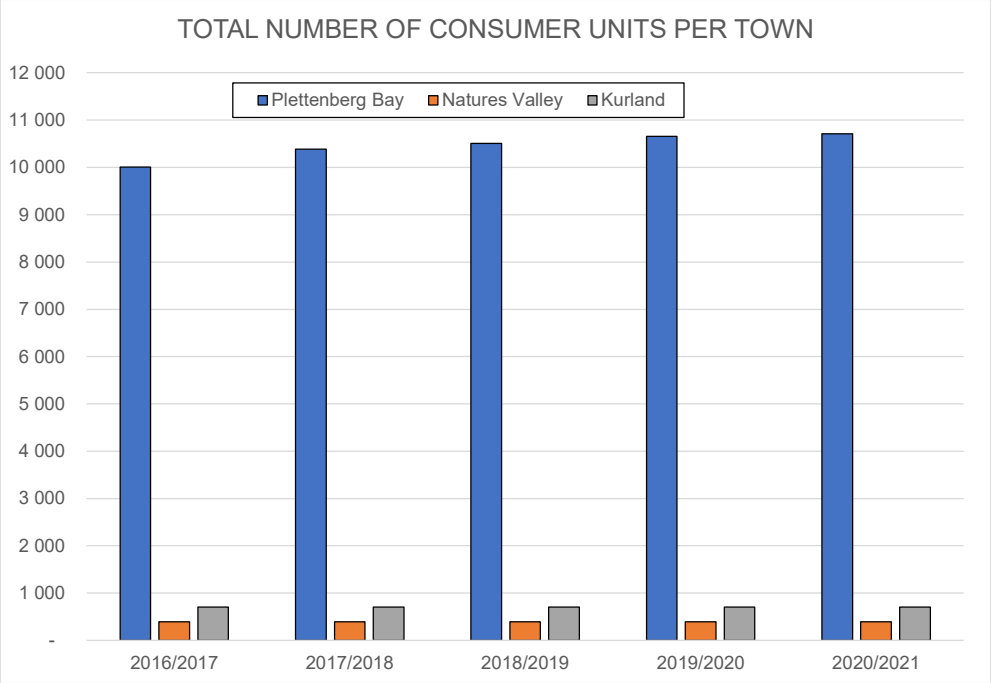


Figure C.2.1.7: Total number of consumer units per town for the last five financial years.

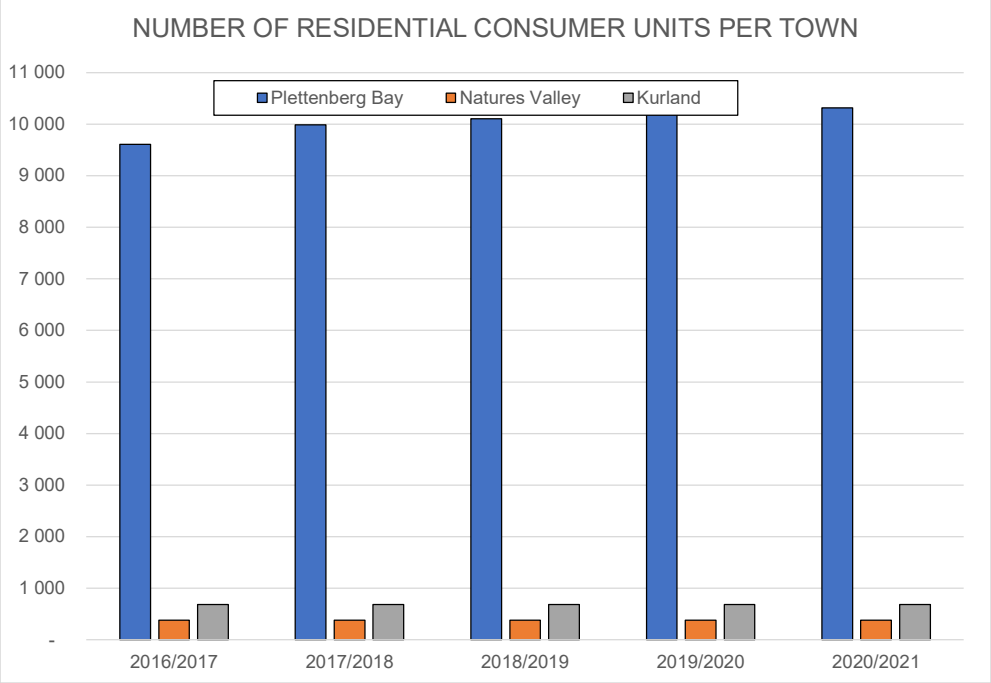


Figure C.2.1.8: Number of Residential consumer units per town for the last five financial years

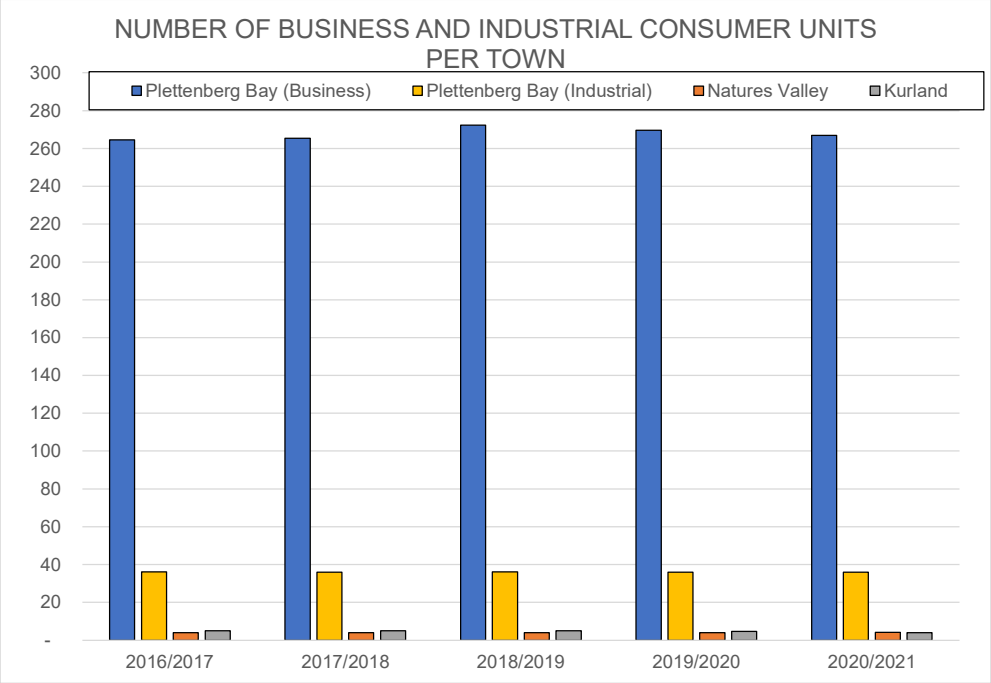


Figure C.2.1.9: Number of Business/Commercial consumer units per town for the last five financial years

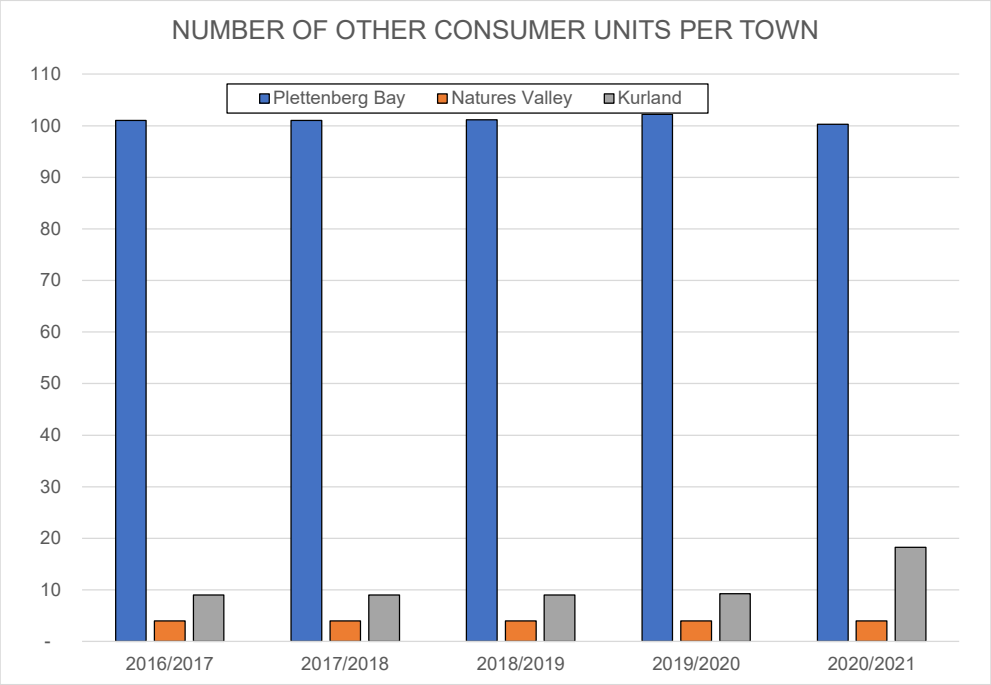


Figure C.2.1.10: Number of Other consumer units per town for the last five financial years

C.2.2. Residential Water Services Delivery Access Profile

As a priority it is the responsibility of Bitou Municipality to make sure that adequate and appropriate investments are made to ensure the progressive realisation of the right of all people in its area of jurisdiction to receive at least a basic level of water and sanitation services. Whilst the provision of basic water services is the most important and immediate priority, WSAs are expected to provide intermediate and higher levels of services (for example, water on-site) wherever it is practical and provided it is financially viable and sustainable to do so.

Water and Sanitation Service Level Policies for Bitou Municipality are not yet in place, but the water service levels to be provided by the Municipality to the consumers in their Management Area are however partly addressed in the Water Services By-laws. All services are linked to the Municipality's Tariff Policy and Rates Policy and poor households are incorporated through Bitou Municipality's Indigent Policy.

The influx of persons from the Eastern Cape into Bitou Municipality's Management Area and the large number of residents in the lowest income groups (living in informal areas) places a major challenge on Bitou Municipality to provide suitable housing to these people. Bitou Municipality works towards providing all formal households in the towns with a water connection inside the erven and connecting all households to a waterborne sanitation system. Informal areas are provided with communal services as temporary emergency services. Bitou Municipality takes note of the fact that communal standpipes represent probably the weakest part of a network's water supply services. Standpipes are often constructed in ways that cannot withstand excessive use (and abuse) and often neglected in terms of operation and maintenance adversely affecting the health of its already vulnerable and poor users. Communal standpipes are also used by poor households who normally don't pay for water.

Bitou Municipality is committed to support the private landowners as far as possible with regard to addressing the basic water services backlog that might still exist on the farms in the rural areas. The Municipality is however faced with various challenges with regard to the provision of services on private owned land in a financial sustainable manner (enabling the ongoing operation of services and adequate maintenance and rehabilitation of the assets), which include the following:

Free basic water policy:

- The provision of the infrastructure (facilities) necessary to provide access to water to all households in a sustainable and economically viable manner.

- The development of subsidy mechanisms which benefit those who most need it.

Free basic sanitation policy:

- Provision of the most viable sanitation facility to the poor household.

- Health and hygiene promotion must be provided in a co-ordinated manner and must be properly managed and adequately funded if free basic sanitation is to become a reality. This requires close collaboration between the EHPs of the Garden Route District Municipality responsible for environmental health and Bitou Municipality.

- Subsidising the operating and maintenance costs. If the basic service is to be provided free to the poor then Bitou Municipality must ensure that the costs of providing the service are covered by the local government equitable share and / or through cross-subsidies within Bitou Municipality's Management Area.

The table below gives an overview of the water services delivery access profile of Bitou 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	12,852	49%	12,753	51%	12,565	53%
Piped (tap) water inside yard	Yard connections (Incl. Backyard Dwellers)	9,453	36%	8,325	34%	8,503	36%
Piped (tap) water on community stand: distance less than 200m from dwelling/institution	Standpipe connection < 200 m	3,513	13%	3,513	14%	2,356	10%
	Sub-Total: Minimum Serivce Level and Above	**25,818**	**99%**	**24,591**	**99%**	**23,424**	**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	31	0%	31	0%	31	0%
Piped (tap) water on community stand: distance between 500m and 1000m (1km) from dwelling /institution	Standpipe connection: > 500 m < 1 000 m	4	0%	4	0%	4	0%
Piped (tap) water on community stand: distance greater than 1000m (1km) from dwelling/institution	Standpipe connection: > 1 000 m	10	0%	10	0%	10	0%
No access to piped (tap) water	No services	184	1%	184	1%	184	1%
	Sub-Total: Below Minimum Service Level	**229**	**1%**	**229**	**1%**	**229**	**1%**
	Total number of households	**26,047**	**100%**	**24,820**	**100%**	**23,653**	**100%**

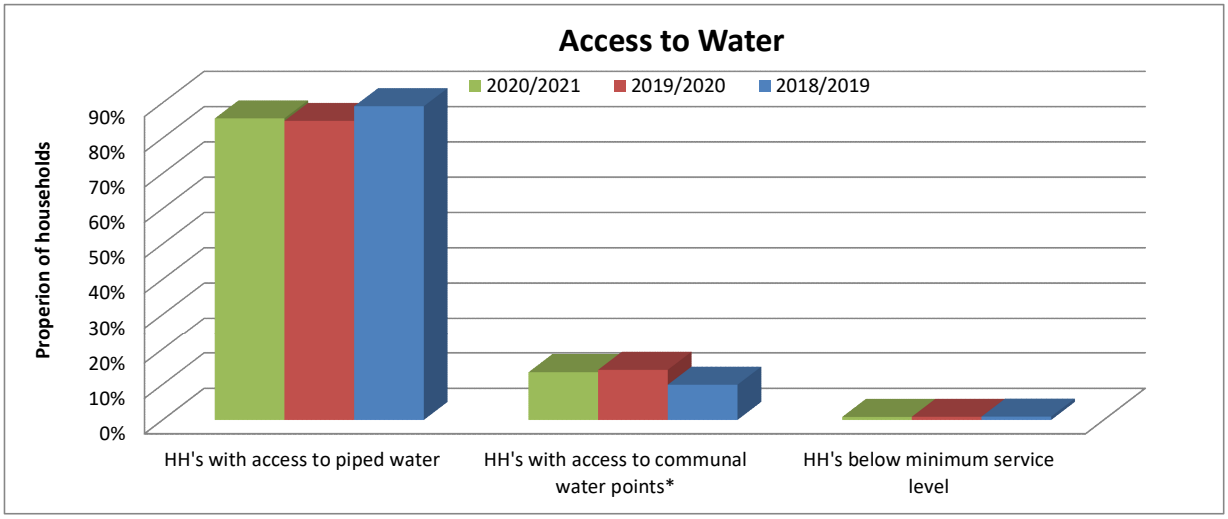


Figure C.2.2.1: Household water access profile

The existing residential water service levels in Bitou Municipality's Management Area are estimated as follows (June 2021).

Table C.2.2.2: Residential water service levels

Service Level	Plettenberg Bay	Kurland	Natures Valley	Farms	Total
No Water Services	0	0	0	184 [1)]	184
Below RDP: Infrastructure Upgrade	0	0	0	0	0
Below RDP: Infrastructure Extension	0	0	0	45 [2)]	45
Below RDP: Infrastructure Refurbishment	0	0	0	0	0
Below RDP: O&M Needs	0	0	0	0	0
Below RDP: Water Resource Needs	0	0	0	0	0
Below RDP: Infrastructure and O&M Needs	0	0	0	0	0
Below RDP: Infrastructure, O&M and Water Resource Needs	0	0	0	0	0
Total Basic Need (RDP)	**0**	**0**	**0**	**229**	**229**
Below Housing Interim [3)]	0	0	0	0	0
Adequate Housing Permanent [4)]	2 828	576	0	109	3 513
Total Housing Need	**2 828**	**576**	**0**	**109**	**3 513**
Standpipes	0	0	0	0	0
Yard Connections [5)]	8 662	541	0	250	9 453
House Connections [6)]	10 312	679	381	1 480	12 852
Total Adequate	**18 974**	**1 220**	**381**	**1 730**	**22 305**
Total	**21 802**	**1 796**	**381**	**2 068**	**26 047**

Notes: 1) Census 2011: Number of households on the farms in the rural areas with no access.

2) Census 2011: Number of households on the farms in the rural areas with communal services (200m – 500m) 31, (500m – 1000m) 4 and (> 1000m) 10

3) Below Housing Interim in the above table is the number of households in informal areas without basic water services. There are no households in the urban areas with existing water service levels below RDP standard.

4) Adequate Housing Permanent in the above table is the number of households in informal areas with communal water services, as confirmed by the Municipality.

5) Estimated number of backyard dwellers: Projected number of households – Number of residential consumers as taken from the financial system – Number of households in informal areas.

6) Residential billed metered consumers as taken from the financial system. The residential consumers include holiday houses.

The table below gives an overview of the sanitation services delivery access profile of Bitou 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	19,740	76%	18,554	75%	18,585	79%
	Waterborne: Low Flush	0	0%	0	0%	0	0%
Flush toilet (with septic tank)	Septic tanks / Conservancy	2,446	9%	2,405	10%	2,364	10%
Chemical toilet	Non-waterborne (above min. service level)	16	0%	16	0%	16	0%
Pit toilet with ventilation (VIP)		35	0%	35	0%	35	0%
Other / Communal Services		3,513	13%	3,513	14%	2,356	10%
	Sub-Total: Minimum Serivce Level and Above	**25,750**	**99%**	**24,523**	**99%**	**23,356**	**99%**
	SANITATION (BELOW MIN LEVEL)						
Pit toilet without ventilation	Pit toilet	168	1%	168	1%	168	1%
Bucket toilet	Bucket toilet	48	0%	48	0%	48	0%
Other toilet provision (below min. service level	Other	29	0%	29	0%	29	0%
No toilet provisions	No services	52	0%	52	0%	52	0%
	Sub-Total: Below Minimum Service Level	**297**	**1%**	**297**	**1%**	**297**	**1%**
	Total number of households	**26,047**	**100%**	**24,820**	**100%**	**23,653**	**100%**

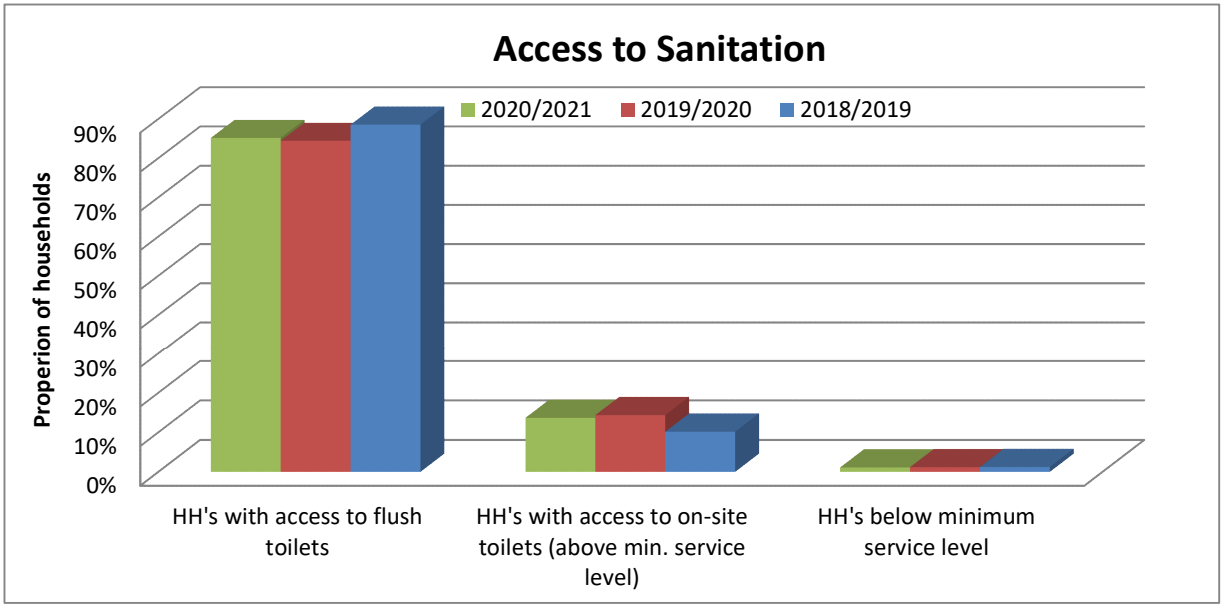


Figure C.2.2.2: Household sanitation access profile

The existing sanitation service levels in Bitou Municipality's Management Area are estimated as follows (June 2021).

Table C.2.2.4: Residential sanitation service levels

Service Levels	Plettenberg Bay	Kurland	Natures Valley	Farms	Total
No Sanitation Services	0	0	0	52 [1)]	52
Below RDP: Infrastructure Upgrade	0	0	0	261 [2)]	261
Below RDP: Infrastructure Extension	0	0	0	0	0
Below RDP: Infrastructure Refurbishment	0	0	0	0	0
Below RDP: O&M Needs	0	0	0	0	0
Below RDP: Water Resource Needs	0	0	0	0	0
Below RDP: Infrastructure and O&M Needs	0	0	0	0	0
Below RDP: Infrastructure, O&M and Water Resource Needs	0	0	0	0	0
Total Basic Need (RDP)	**0**	**0**	**0**	**313**	**313**
Below Housing Interim [4)]	0	0	0	0	0
Adequate Housing Permanent [5)]	2 828	576	0	109	3 513
Total Housing Need	**2 828**	**576**	**0**	**109**	**3 513**
Non Waterborne	0	0	0	35 [3)]	35
Waterborne Low Flush	0	0	0	0	0
Septic Tanks [6)]	0	0	81	1 611	1 692
Conservancy [6)]	454	0	300	0	754
Waterborne WWTW [7)]	18 520	1 220	0	0	19 740
Total Adequate	**18 974**	**1 220**	**381**	**1 646**	**22 221**
Total	**21 802**	**1 796**	**381**	**2 068**	**26 047**

Notes: 1) Census 2011: Number of households on the farms in the rural areas with no toilet facility 52
2) Census 2011: Number of households on the farms in the rural areas with existing buckets 48, chemical toilets 16, pit toilets without ventilation 168 and "other" 29
3) Census 2011: Number of households on the farms in the rural areas with pit toilets with ventilation 35.
4) Below Housing Interim in the above table is the number of households in informal areas without basic sanitation services. There are no households in the urban areas with existing sanitation service levels below RDP standard.
5) Adequate Housing Permanent in the above table is the number of households in informal areas with communal sanitation services, as confirmed by the Municipality.
6) Plettenberg Bay tanks as taken from the 2011 Census data.
7) Include backyard dwellers that use the services of the main house.

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.

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
• 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.

Informal areas are supplied with communal services as an intermediary measure. The June 2020 number of households in the informal areas, with access to communal basic services, was 3 513. These services consist of communal standpipes and communal ablution facilities. Bitou Municipality works towards a ratio of at least one tap per twenty-five (25) households and one communal toilet per five (5) households for their shared services. The number of households with communal water and sanitation services in the informal areas and the number of households per facility type are summarised in the table below (June 2020).

Table C.2.2.6: Communal service levels in informal areas

Informal Area	Sanitation Facility			Water Facility			Number of Structures (Counted)
	Toilets	No. of Structures / Facility	Additional Toilets required	Taps	No. of Structures / Facility	Additional Taps required	
Pinetrees	12	9.08	10	5	21.80	0	109
Zawa-zawa	60	8.40	41	28	18.00	0	504
Bossiegif	37	19.41	107	45	15.96	0	718
Qolweni	307	4.87	0	59	25.32	1	1 494
Kurland	86	6.70	30	150	3.84	0	576
Kranshoek	1	3.00	0	1	3.00	0	3
Harkerville	14	5.71	2	10	8.00	0	80
Covie	7	4.14	0	30	0.97	0	29
Total	**524**	**6.70**	**190**	**328**	**10.71**	**1**	**3 513**

Notes: No Services, Ratios above Targets, Ratios meeting Targets

All schools and tertiary facilities in Bitou Municipality's Management Area are supplied with a higher level of water and sanitation service. The existing water and sanitation service levels for all the schools are summarised in the table below.

Table C.2.2.7: 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	11	11	-	-	11	-	-

Source: Number of public ordinary school facilities from Bitou Municipality's Socio-Economic Profile, Provincial Treasury, 2020

All medical facilities in Bitou Municipality's Management Area are supplied with a higher level of water and sanitation service. The existing water and sanitation service levels for all the Medical Facilities in Bitou Municipality's Management Area are summarised in the table below.

Table C.2.2.8: 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	1	1	-	-	1	-	-
Health Centres	1	1	-	-	1	-	-
Clinics	4	4	-	-	4	-	-
Satellite Clinics	3	3	-	-	3	-	-

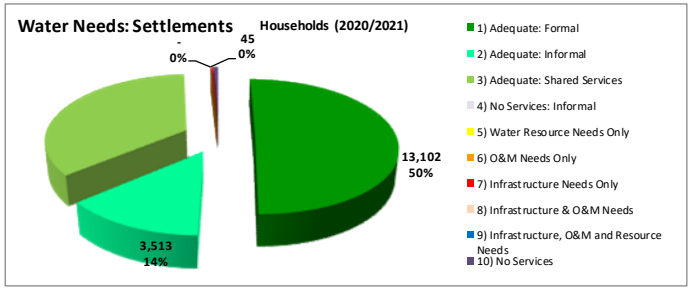
Source: Number of medical facilities from Bitou Municipality's Socio-Economic Profile, Provincial Treasury, 2020

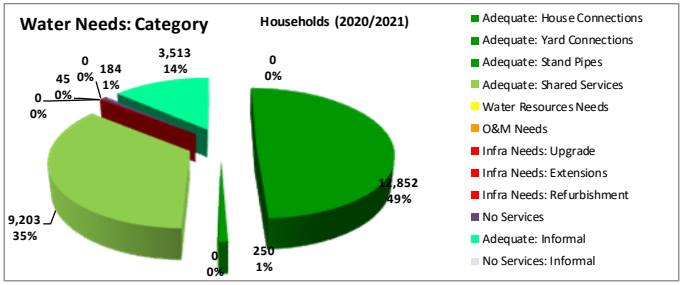
C.2.3. Residential Water Services Delivery Adequacy Profile

The existing residential water service levels in Bitou 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	18	12,852	100%	250	100%																				
2	6																					3,513	100%		
3	16							9,203	100%																
4	0																								
5	0																								
6	0																								
7	2															45	100%								
8	0																								
9	0																								
10	2																			184	100%				
Total Household Interventions required		12,852		250		0		9,203		0		0		0		45		0		184		3,513		0	



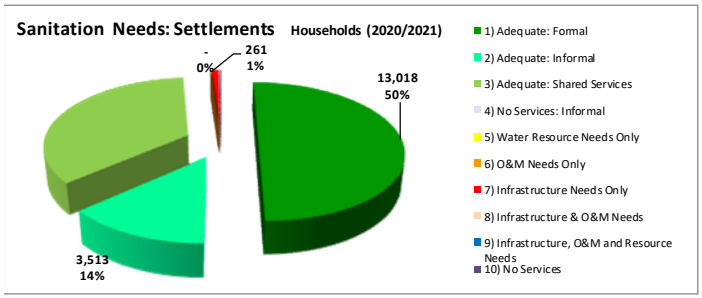


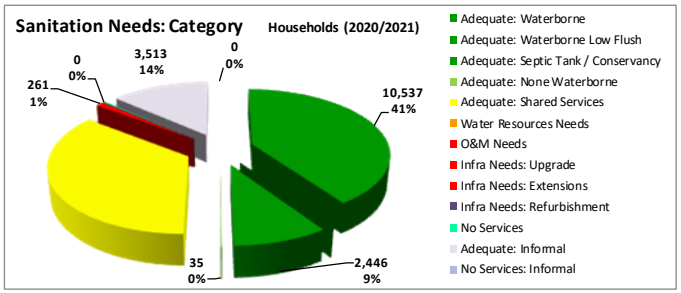
1	Adequate	3	Adequate: Shared services	5	Water Resources Needs **Only**	7	Infrastructure Needs **Only**	9	Infrastructure, O&M & Resource Needs
2	Adequate: Informal	4	No Services: Informal	6	O & M Needs **Only**	8	Infrastructure& O&M needs	10	No Services

The existing residential sanitation service levels in Bitou 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	18	10,537	100%			2,446	100%	35	100%																		
2	6																							3,513	100%		
3	16									9,203	100%																
4	0																										
5	0																										
6	0																										
7	2															261	100%										
8	0																										
9	0																										
10	2																					52	100%				
Total Household Interventions required		10,537		0		2,446		35		9,203		0		0		261		0		0		52		3,513		0	





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

A detail seven (7) block step tariff system is implemented by Bitou Municipality. This tariff system discourages the wasteful or inefficient use of water. It is expected that this tariff structure will continue to be implemented in the future. The water usage block tariff has been structured for a basic affordable tariff for up to 30 kl per household per month. Punitive tariffs are in place for excessive water consumption and to equalise under recovery for the lower blocks. The sustainable supply of potable water is however becoming an ever increasing challenge.

The first twenty five (25) kl of water is provided free to all residential consumers. Bitou 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-subsidies consumers who use up to twenty five (25) kilolitres per month. The water tariffs for Bitou Municipality for the 2020/2021 financial year and the previous eight financial years are summarised in the table below (Subject to VAT).

Table C.3.1.1: Basic minimum charges and availability charges for water services

Description	Conditions	20/21	Record Prior (Vat Excluded)							
			19/20	18/19	17/18	16/17	15/16	14/15	13/14	12/13
Basic Minimum Charges										
Domestic and Churches: Per dwelling / Flat / Accommodation establishment with 3 or less bedrooms	All Areas	-	-	-	R317-33	R298-24	R281-36	R264-44	R251-85	R237-59
Per Dwelling / Flat / Accommodation establishment	All Areas	-	R355-37	R336-37	R317-33	-	-	-	-	-
Domestic property valuation below R350 000 per Dwelling / Flat	Consump. 1 – 6 Kl / month	-	R0-00	R0-00	R0-00	R0-00	0-00	R0-00	R0-00	R0-00
	Consump. 7 Kl or more / month	-	-	-	-	-	R70-34	R66-11	R62-96	R59-40
	Rebate as % of residential on consump. of 7 Kl or more per month	-	0%	0%	30%	50%	0%			
Shops / Offices / Accommodation establishment	Per Unit	R480-47	R461-99	R437-28	R412-53	R387-72	R365-77	R343-77	R327-40	R308-87
Restaurants	Per Unit	R960-93	R923-97	R874-56	R825-06	R775-43	R731-54	R687-54	R654-80	R67-74
Industrial	Per unit	R960-93	R923-97	R874-56	R825-06	R775-43	R731-54	R687-54	R654-80	R617-74
Per Non-Profit Community Creche (On application only)	First 40 Kl water free	R384-38	R369-60	R349-83	R330-03	R310-18	R292-62	R275-02	R261-92	R247-09

Table C.3.1.1: Basic minimum charges and availability charges for water services											
Description	Conditions	20/21	Record Prior (Vat Excluded)							
			19/20	18/19	17/18	16/17	15/16	14/15	13/14	12/13
Hotels / Boarding Houses	Per Unit	R480-47	R461-99	R437-28	R412-53	R387-72	R365-77	R343-77	R327-40	R308-87
Caravan Parks	Per Unit	R480-47	R461-99	R437-28	R412-53	R387-72	R365-77	R343-77	R327-40	R308-87
Schools	Per Unit	R960-93	R923-97	R874-56	R825-06	R775-43	R731-54	R687-54	R654-80	R617-74
PDI Areas	Per Unit	-	-	-	R330-03	R310-18	R292-62	R275-02	R261-92	R247-09
Rural Areas	Per Unit	R480-47	R461-99	R437-28	R412-53	R387-72	R365-77	R343-77	R327-40	R308-87
Registered schools and crèches qualify for a rebate of	Rebate of	10%	10%	10%	10%	10%	10%	10%	10%	10%
Availability Charges Per Annum										
Domestic	On vacant properties	R4 435-00	R4 264-00	R4 036-00	R3 808-00	R3 579-00	R3 376-00	R3 173-00	R3 022-00	R2 851-09
Domestic: PDI Areas	On vacant properties	-	-	-	-	-	-	-	R756-00	R712-77
Other Erven	On vacant properties	R11 533-00	R11 089-00	R10 496-00	R9 902-00	R9 306-00	R8 779-00	R8 251-00	R7 858-00	R7 412-84
Other PDI Areas	On vacant properties	-	-	-	-	-	-	-	R3 143-00	R2 965-13

Table C.3.1.2: Volume charges for water services											
Description	Block Definition		20/21	Record Prior (Vat Excluded)							
				19/20	18/19	17/18	16/17	15/16	14/15	13/14	12/13
Domestic Indigents	0 – 6 Kl	R / Kl	R0-00	-	-	-	-	-	-	-	-
	7 – 10 Kl	R / Kl	R8-00	-	-	-	-	-	-	-	-
	11 – 15 Kl	R / Kl	R8-00	-	-	-	-	-	-	-	-
	16 – 25 Kl	R / Kl	R8-00	-	-	-	-	-	-	-	-
	> 25 Kl	R / Kl	R13-00	-	-	-	-	-	-	-	-
Domestic and Churches	0 – 25 Kl	R / Kl	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00
	26 – 30 Kl	R / Kl	R8-69	R8-36	R7-91	R7-46	R7-01	R6-61	R6-21	R5-91	R5-58
	31 – 40 Kl	R / Kl	R12-17	R11-70	R11-07	R10-44	R9-81	R9-25	R8-69	R8-28	R7-81
	41 – 50 Kl	R / Kl	R14-75	R14-18	R13-42	R12-66	R11-90	R11-23	R10-55	R10-05	R9-48
	51 – 60 Kl	R / Kl	R19-08	R18-35	R17-37	R16-39	R15-40	R14-53	R13-66	R13-01	R12-27
	61 – 70 Kl	R / Kl	R24-30	R23-37	R22-12	R20-87	R19-61	R18-50	R17-39	R16-56	R15-62
	> 70 Kl	R / Kl	R47-74	R45-90	R43-45	R40-99	R38-52	R36-34	R34-15	R32-52	R30-68
	Bulk Consumers	Rebate of	-	0%	0%	10%	10%	10%	10%	10%	10%
Pre-Paid Water Meters	0 – 25 Kl	R / Kl	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00
	26 – 30 Kl	R / Kl	R8-69	R8-36	R7-91	R7-46	R7-01	R6-61	R6-21	R5-91	R5-58

Table C.3.1.2: Volume charges for water services											
Description	Block Definition		20/21	Record Prior (Vat Excluded)							
				19/20	18/19	17/18	16/17	15/16	14/15	13/14	12/13
	31 – 40 Kl	R / Kl	R12-17	R11-70	R11-07	R10-44	R9-81	R9-25	R8-69	R8-28	R7-81
	41 – 50 Kl	R / Kl	R14-75	R14-18	R13-42	R12-66	R11-90	R11-23	R10-55	R10-05	R9-48
	51 – 60 Kl	R / Kl	R19-08	R18-35	R17-37	R16-39	R15-40	R14-53	R13-66	R13-01	R12-27
	61 – 70 Kl	R / Kl	R24-30	R23-37	R22-12	R20-87	R19-61	R18-50	R17-39	R16-56	R15-62
	> 70 Kl	R / Kl	R47-74	R45-90	R43-45	R40-99	R38-52	R36-34	R34-15	R32-52	R30-68
Business / Commercial / Other	0 – 60 Kl	R / Kl	R11-99	R11-53	R10-91	R10-29	R9-67	R9-12	R8-57	R8-16	R7-70
	61 – 100 Kl	R / Kl	R27-12	R26-08	R24-69	R23-29	R21-89	R20-65	R19-41	R18-49	R17-44
	101 – 200 Kl	R / Kl	R31-01	R29-82	R28-23	R26-63	R25-03	R23-61	R22-19	R21-13	R19-93
	Above 200 Kl excl. Laundromats	R / Kl	R34-85	R33-51	R31-72	R29-92	R28-12	R26-53	R24-93	R23-74	R22-40
	Above 200 Kl Laundromats	R / Kl	R31-01	R29-82	R28-23	R26-63	R25-03	R23-61	R22-19	R21-13	R19-93
Rural (Without service agreement for development)	0 – 20 Kl	R / Kl	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00	R0-00
	21 – 30 Kl	R / Kl	R8-69	R8-36	R7-91	R7-46	R7-01	R6-61	R6-21	R5-91	R5-58
	31 – 40 Kl	R / Kl	R14-75	R14-18	R13-42	R12-66	R11-90	R11-23	R10-55	R10-05	R9-48
	Above 40 Kl	R / Kl	R47-77	R45-93	R43-47	R41-01	R38-54	R36-36	R34-17	R32-54	R30-70
Raw Water from Municipal Boreholes	0 – 100 Kl	R / Kl	R1-32	R1-27	R1-20	R1-13	R1-06	R1-00			
	Above 100 Kl	R / Kl	R1-32	R1-27	R1-20	R1-13	R1-06	R1-00			
Beaches (Pre-paid)	Beaches	R / Kl	R11-91	R11-45	R10-84	R10-23	R9-61	R9-07	R8-52	R8-11	R7-65

Other water tariffs applicable for Bitou Municipality are summarised in the table below.

Table C.3.1.3: Other water tariffs for Bitou Municipality										
Description	Conditions	20/21	Record Prior (Vat Excluded)							
			19/20	18/19	17/18	16/17	15/16	14/15	13/14	12/13
Connection Fees										
Municipal Area 15 mm	Per Connection	R2 641-00	R2 539-00	R2 403-00	R2 267-00	R2 131-00	R2 010-00	R1 889-00	R1 799-00	R1 697-49
Municipal Area 20 mm	Per Connection	R3 169-00	R3 047-00	R2 884-00	R2 721-00	R2 557-00	R2 412-00	R2 267-00	R2 159-00	R2 036-99
Municipal Area 25 mm	Per Connection	R4 278-00	R4 113-00	R3 893-00	R3 673-00	R3 452-00	R3 257-00	R3 061-00	R2 915-00	R2 749-93
Municipal Area 40 mm	Per Connection	R12 834-00	R12 340-00	R11 680-00	R11 019-00	R10 356-00	R9 770-00	R9 182-00	R8 745-00	R8 249-80
Municipal Area 50 mm	Per Connection	R14 116-00	R13 573-00	R12 847-00	R12 120-00	R11 391-00	R10 746-00	R10 100-00	R9 619-00	R9 074-78
Municipal Area 80 mm	Per Connection	R15 527-00	R14 930-00	R14 132-00	R13 332-00	R12 530-00	R11 821-00	R11 110-00	R10 581-	R9 982-26

Table C.3.1.3: Other water tariffs for Bitou Municipality										
Description	Conditions	20/21	Record Prior (Vat Excluded)							
			19/20	18/19	17/18	16/17	15/16	14/15	13/14	12/13
									00	
Rural Area 20mm only	Per Connection	R4 119-00	R3 961-00	R3 749-00	R3 537-00	R3 324-00	R3 136-00	R2 947-00	R2 807-00	R2 648-08
Non Standard Connections		Cost plus 10%								
Minimum Charge	Per Connection	R5 989-00	R5 759-00	R5 451-00	R5 142-00	R4 833-00	R4 559-00	R4 285-00	R4 081-00	R3 849-91
Other Fees										
Dis and Reconnections due to non-payment – All Areas	Per Incident	R433-00	R416-00	R392-00	R370-00	R348-00	R328-00	R308-00	R293-00	R279-30
Special Readings – All Areas		R354-00	R340-00	R322-00	R304-00	R286-00	R270-00	R254-00	R242-00	R227-85
Sale of water by tanker – Collected at Depot	Per Kl	R11-15	R10-72	R10-15	R9-58	R9-00	R8-49	R7-98	R7-60	R4-50
Delivery of water by Tanker	Per Kl	R26-45	R25-43	R24-07	R22-71	R21-34	R20-13	R18-92	R18-02	R17-00
	Per Tanker of part thereof	R595-00	R572-00	R541-00	R510-00	R479-00	R452-00	R425-00	R405-00	R382-00
Filling of Swimming Pools from Hydrant	Per kilometre	Invoice / Quote								
	Per tanker or part thereof									
Service Calls – Normal Working Hours	Town	R354-00	R340-00	R322-00	R304-00	R286-00	R270-00	R254-00	R242-00	R227-85
	Rural	R480-00	R462-00	R437-00	R412-00	R387-00	R365-00	R343-00	R327-00	R308-70
Service Calls – Outside Normal Working Hours	Town	R531-00	R510-00	R483-00	R456-00	R429-00	R405-00	R381-00	R362-00	R341-78
	Rural	R720-00	R693-00	R656-00	R618-00	R581-00	R548-00	R515-00	R491-00	R463-05
Service Calls – Sundays and Public Holidays	Town	R708-00	R680-00	R644-00	R608-00	R572-00	R540-00	R508-00	R483-00	R455-70
	Rural	R960-00	R924-00	R874-00	R824-00	R774-00	R730-00	R686-00	R654-00	R617-40
Test of water meter		Cost + 10%	Cost + 10%	Cost + 10%	R247-00	R232-00	R219-00	R206-00	R196-00	R184-98
Temporary dis / reconnection		R354-00	R340-00	R322-00	R304-00	R286-00	R270-00	R254-00	R242-00	R227-85
Tampering with meter	Payable before replacement	R3 481-00	R3 347-00	R3 168-00	R2 989-00	R2 809-00	R2 650-00	R2 491-00	R2 372-00	R2 237-93
Surcharge inaccessible meter	Per incident	R500-00	R500-00	R500-00	R359-00	R337-00	R318-00	R299-00	R285-00	-
Relocation of water meters		Cost + 10%								-
Penalty for illegal water connection	Per Incident	R11 527-00	R11 084-00	R10 491-00	R9 897-00	R9 302-00	R8 775-00	R8 247-00	R7 854-00	-
Water Tests Chemical	Per Sample	R884-00	R850-00	R550-00	R519-00	R488-00	R460-00	R432-00	R411-00	R388-08
Water Tests Bacteriological, E.Coli, Coliforms	Per Sample	R208-00	R200-00	R146-00	R138-00	R130-00	R123-00	R116-00	R110-00	R103-49
Penalty for late payment		Prime + 1%								
Augmentation Fees		See Municipality's Tariffs Schedule								

A five stage drought tariff structure is also in place. The Drought Tariffs for the supply of water for the last seven financial years are summarised in the table below.

Table C.3.1.4: Tariffs for drought situations									
Block		**Conditions**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**	**15/16**	**14/15**
Drought Situation Stage 1: These tariffs would only be applied if either the Roodefontein Dam is at 60% or the flow of the Keurbooms River is at 600 l/s and when water consumption is more than 25 kl/month.									
Basic (Minimum) Charges (Domestic and Churches)	Per Dwelling / Flat	All Areas	-	-	-	R317-33	R298-24	R422-05	R396-66
Consumption Charge (Domestic and Churches)	26 – 30 kl	R / kl	-	-	-	R11-17	R10-50	R9-91	R9-31
	31 – 40 kl	R / kl	-	-	-	R15-63	R14-69	R13-86	R13-03
	41 – 50 kl	R / kl	-	-	-	R18-98	R17-84	R16-83	R15-82
	51 – 60 kl	R / kl	-	-	-	R24-59	R23-11	R21-80	R20-49
	61 – 70 kl	R / kl	-	-	-	R31-30	R29-42	R27-75	R26-08
	Above 70 kl	R / kl	-	-	-	R61-47	R57-77	R54-50	R51-22
Rural (Without service agreement for development)	0 – 20 kl	R / kl	-	-	-	R0-00	R0-00	-	-
	21 – 30 kl	R / kl	-	-	-	R11-17	R10-50	-	-
	31 – 40 kl	R / kl	-	-	-	R18-98	R17-84	-	-
	Above 40 kl	R / kl	-	-	-	R61-47	R57-77	-	-
Drought Situation Stage 2: These tariffs would only be applied if either the Roodefontein Dam is at 40% or the flow of the Keurbooms River is at 400 l/s and when water consumption is more than 20 kl/month.									
Basic (Minimum) Charges (Domestic and Churches)	Per Dwelling / Flat	All Areas	R369-58	R355-37	R336-37	R317-33	R298-24	R562-72	R528-87
	Incentive Rebate	All Areas	R43-43	R41-76	R39-53	R37-29	R35-05	-	-
Consumption Charge (Domestic and Churches)	21 – 30 KL	R / KL	R17-22	R16-56	R15-67	R14-78	R13-89	-	-
	26 – 30 kl	R / kl	-	-	-	-	-	R13-23	R12-43
	31 – 40 kl	R / kl	R24-32	R23-38	R22-13	R20-88	R19-62	R18-51	R17-40
	41 – 50 kl	R / kl	R29-54	R28-40	R26-88	R25-36	R23-83	R22-48	R21-13
	51 – 60 kl	R / kl	R38-22	R36-75	R34-78	R32-81	R30-84	R29-09	R27-34
	61 – 70 kl	R / kl	R48-65	R46-78	R44-28	R41-77	R39-26	R37-04	R34-81
	Above 70 kl	R / kl	R95-57	R91-89	R86-98	R82-06	R77-12	R72-75	R68-37
Rural (Without service agreement for development)	0 – 20 kl	R / kl	R0-00	R0-00	R0-00	R0-00	R0-00	-	-
	21 – 30 kl	R / kl	R17-22	R16-56	R15-67	R14-78	R13-89	-	-
	31 – 40 kl	R / kl	R29-54	R28-40	R26-88	R25-36	R23-83	-	-
	Above 40 kl	R / kl	R95-57	R91-89	R86-98	R82-06	R77-12	-	-
Drought Situation Stage 3: These tariffs would only be applied if either the Roodefontein Dam is at 25% or the flow of the Keurbooms River is at 300 l/s and when water consumption is more than 15 kl/month.									
Basic (Minimum) Charges (Domestic and Churches)	Per Dwelling / Flat	All Areas	R369-58	R355-37	R336-37	R317-33	R298-24	R844-09	R793-32

Table C.3.1.4: Tariffs for drought situations									
Block		**Conditions**	**20/21**	**19/20**	**18/19**	**17/18**	**16/17**	**15/16**	**14/15**
	Incentive Rebate	All Areas	R86-88	R83-54	R79-07	R74-59	-	-	-
Consumption Charge (Domestic and Churches)	16 – 30 KL	R / KL	R25-79	R24-80	R23-47	R22-14	R20-81	-	-
	26 – 30 kl	R / kl	-	-	-	-	-	R19-82	R18-63
	31 – 40 kl	R / kl	R36-47	R35-07	R33-19	R31-31	R29-43	R27-76	R26-09
	41 – 50 kl	R / kl	R44-29	R42-59	R40-31	R38-03	R35-74	R33-72	R31-69
	51 – 60 kl	R / kl	R57-30	R55-10	R52-15	R49-20	R46-24	R43-62	R41-00
	61 – 70 kl	R / kl	R72-92	R70-12	R66-37	R62-61	R58-84	R55-51	R52-17
	Above 70 kl	R / kl	R143-26	R137-75	R130-38	R123-00	R115-60	R109-06	R102-50
Rural (Without service agreement for development)	0 – 15 kl	R / kl	R0-00	R0-00	R0-00	R0-00	R0-00	-	-
	16 – 30 kl	R / kl	R25-79	R24-80	R23-47	R22-14	R20-81	-	-
	31 – 40 kl	R / kl	R44-29	R42-59	R40-31	R38-03	R35-74	-	-
	Above 40 kl	R / kl	R143-26	R137-75	R130-38	R123-00	R115-60	-	-
Drought Situation Stage 4: These tariffs would only be applied if either the Roodefontein Dam is at 35% - 21% or consumption greater than 15 kilolitre per month per household connection.									
Basic (Minimum) Charges (Domestic and Churches)	Per Dwelling / Flat	All Areas	R523-01	R502-89	R476-00	-	-	-	-
	Incentive Rebate	All Areas	R122-94	R118-21	R111-89	-	-	-	-
Consumption Charge (Domestic and Churches)	16 – 30 KL	R / KL	R36-49	R35-09	R33-21	-	-	-	-
	31 – 40 kl	R / kl	R51-60	R49-62	R46-97	-	-	-	-
	41 – 50 kl	R / kl	R62-68	R60-27	R57-05	-	-	-	-
	51 – 60 kl	R / kl	R81-09	R77-97	R73-80	-	-	-	-
	61 – 70 kl	R / kl	R103-20	R99-23	R93-92	-	-	-	-
	Above 70 kl	R / kl	R202-72	R194-92	R184-50	-	-	-	-
Rural (Without service agreement for development)	0 – 15 kl	R / kl	R0-00	R0-00	R0-00	-	-	-	-
	16 – 30 kl	R / kl	R36-49	R35-09	R33-21	-	-	-	-
	31 – 40 kl	R / kl	R62-68	R60-27	R57-05	-	-	-	-
	Above 40 kl	R / kl	R202-72	R194-92	R184-50	-	-	-	-
Drought Situation Stage 5: These tariffs would only be applied if either the Roodefontein Dam is less than 20% or consumption greater than 15 kilolitre per month per household connection.									
Basic (Minimum) Charges (Domestic and Churches)	Per Dwelling / Flat	All Areas	R784-51	R754-34	R714-00	-	-	-	-
	Incentive Rebate	All Areas	R184-41	R177-32	R167-84	-	-	-	-
Consumption Charge (Domestic, Churches and accommodation establishments with three or less bedrooms)	16 – 30 KL	R / KL	R54-74	R52-63	R49-82	-	-	-	-
	31 – 40 kl	R / kl	R77-42	R74-44	R70-46	-	-	-	-
	41 – 50 kl	R / kl	R94-04	R90-42	R85-58	-	-	-	-
	51 – 60 kl	R / kl	R121-31	R116-95	R110-70	-	-	-	-
	61 – 70 kl	R / kl	R154-76	R148-81	R140-85	-	-	-	-

Table C.3.1.4: Tariffs for drought situations									
Block		Conditions	20/21	19/20	18/19	17/18	16/17	15/16	14/15
	Above 70 kl	R / kl	R304-09	R292-39	R276-75	-	-	-	-
Rural (Without service agreement for development)	0 – 15 kl	R / kl	R0-00	R0-00	R0-00	-	-	-	-
	16 – 30 kl	R / kl	R54-74	R52-63	R49-82	-	-	-	-
	31 – 40 kl	R / kl	R94-04	R90-42	R85-58	-	-	-	-
	Above 40 kl	R / kl	R304-10	R292-40	R276-76	-	-	-	-

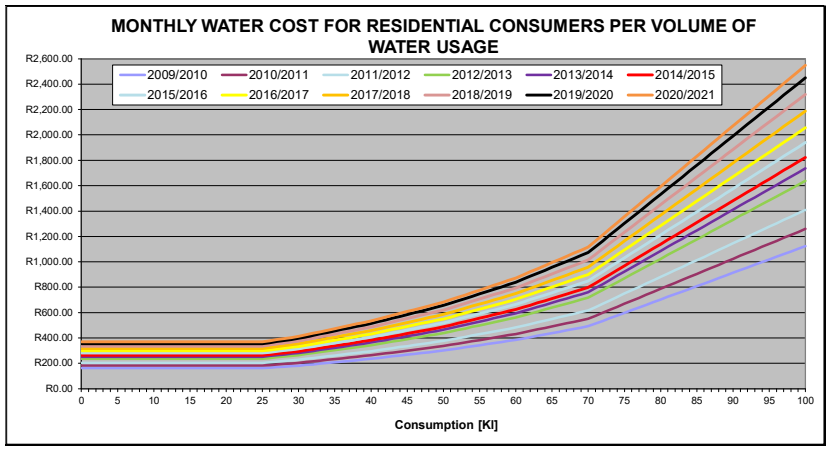


Figure C.3.1.1: Monthly water cost for residential consumers per volume

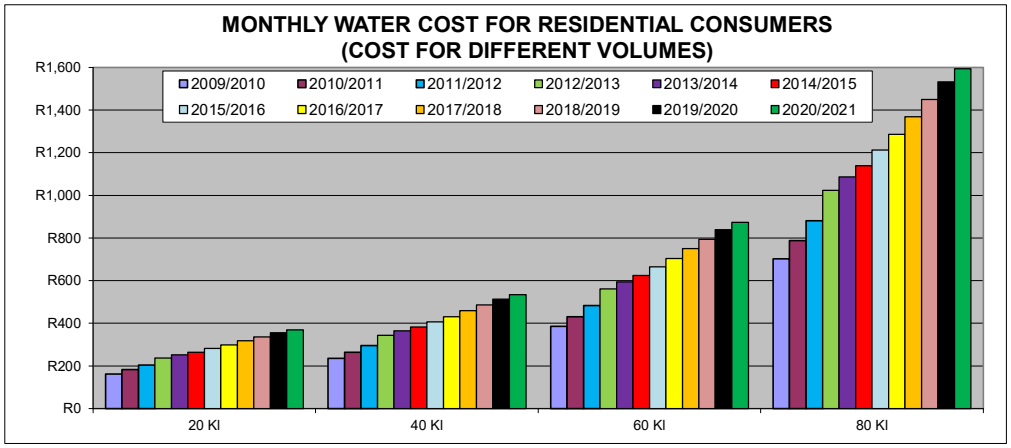


Figure C.3.1.2: Monthly water cost for residential consumers for 20kl, 40kl, 60kl and 80kl

The sewerage tariff structures for Bitou Municipality for the 2020/2021 financial year and the previous eight financial years are summarised in the tables below (Subject to VAT).

Table C.3.1.5: Basic minimum charges and availability charges for sanitation services										
Description	Conditions	20/21	Record Prior (Vat Excluded)							
			19/20	18/19	17/18	16/17	15/16	14/15	13/14	12/13
Basic Minimum Charge										
Single Residential erven and Churches	Per Annum / per Unit	R5 477-00	R5 266-00	R4 984-00	R4 702-00	R4 419-00	R4 169-00	R3 904-00	R3 718-00	R3 494-00
General Residential, Shops, Offices, Hotels, including accommodation establishments	Per Annum	R8 421-00	R8 097-00	R7 664-00	R7 230-00	R6 795-00	R6 410-00	R6 002-00	R5 716-00	R5 372-00
Single residential properties utilised for business purposes, etc.	Per Unit or Equivalent / Per Annum	R10 947-00	R10 526-00	R9 963-00	R9 399-00	R8 834-00	R8 334-00	R7 803-00	R7 431-00	R6 984-00
Residential property valuation below R350 000	Per Annum	Rebate as % of residential (0.0%)	Rebate as % of residential (0.0%)	Rebate as % of residential (15.0%)	Rebate as % of residential (15%)	Rebate as % of residential (30%)	Rebate as % of residential (50%)	Rebate as % of residential (70%)	R1 041-00	R978-36
Restaurants	Per Unit or Equivalent / Per Annum	R10 947-00	R10 526-00	R9 963-00	R9 399-00	R8 834-00	R8 334-00	R7 803-00	R7 431-00	R6 984-00
Bulk Consumers	Rebate of	0%	0%	10%	10%	10%	10%	10%	10%	10%
Schools (31 May each year)	Per learner per annum	R14-56	R14-00	R13-28	R12-53	R11-78	R11-11	R10-40	R9-90	R9-30
Hostels (31 May each year)	Per learner per annum	R14-56	R14-00	R13-28	R12-53	R11-78	R11-11	R10-40	R9-90	R9-30
Group Housing and Resort Zones	Per unit per annum	R5 477-00	R5 266-00	R4 984-00	R4 702-00	R4 419-00	R4 169-00	R3 904-00	R3 718-00	R3 494-00
Registered schools and crèches qualify for a rebate of:	Rebate of	10%	10%	10%	10%	10%	10%	10%	10%	10%
Sanitation Fee per Erf										
Improved properties not served by waterborne sewerage irrespective if service is utilised	Per Annum	R2 148-00	R2 065-00	R1 948-00	R1 838-00	R1 727-00	R1 629-00	R1 525-00	R1 452-00	R1 365-00
Availability Charge Per Annum										
Single residential erven	Vacant Properties	R5 477-00	R5 266-00	R4 984-00	R4 702-00	R4 419-00	R4 169-00	R3 904-00	R3 718-00	R3 494-00
Light industrial erven	Vacant Properties	R5 477-00	R5 266-00	R4 984-00	R4 702-00	R4 419-00	R4 169-00	R3 904-00	R3 718-00	R3 494-00
Other	Vacant Properties	R10 952-00	R10 526-00	R9 963-00	R9 404-00	R8 838-00	R8 338-00	R7 807-00	R7 435-00	R6 988-00

Table C.3.1.6: Volume charges for sanitation services										
Description	Block Definition	19/20	Record Prior (Vat Excluded)							
			18/19	17/18	16/17	15/16	14/15	13/14	12/13	11/12
Septic Tank Removals (Normal Working Hours)										
Tanker Removals	Per load or part thereof	R504-00	R485-00	R459-00	R433-00	R407-00	R384-00	R360-00	R343-00	R322-00
Tanker Removals per load or part thereof	Where no annual fee is paid	R1 266-00	R1 217-00	R1 152-00	R1 087-00	R1 022-00	R964-00	R903-00	R860-00	R808-00
Tanker Removals – Sub-economic	Per load or part thereof	R674-00	R648-00	R613-00	R578-00	R543-00	R512-00	R479-00	R456-00	R429-00
Septic Tank Removals (Outside Normal Working Hours)										
Tanker Removals	Per load or part thereof	R756-00	R728-00	R689-00	R650-00	R611-00	R576-00	R540-00	R514-00	R483-00
Tanker Removals per load or part thereof	Where no annual fee is paid	R1 899-00	R1 826-00	R1 728-00	R1 631-00	R1 533-00	R1 446-00	R1 355-00	R1 290-00	R1 212-00
Tanker Removals – Sub-economic	Per load or part thereof	R1 011-00	R972-00	R920-00	R867-00	R815-00	R768-00	R719-00	R685-00	R643-50
Septic Tank Removals (Sundays and Public Holidays)										
Tanker Removals	Per load or part thereof	R1 008-00	R970-00	R918-00	R866-00	R814-00	R768-00	R720-00	R685-00	R644-00
Tanker Removals per load or part thereof	Where no annual fee is paid	R2 532-00	R2 434-00	R2 304-00	R2 174-00	R2 044-00	R1 928-00	R1 806-00	R1 719-00	R1 616-00
Tanker Removals – Sub-economic	Per load or part thereof	R1 348-00	R1 296-00	R1 226-00	R1 156-00	R1 086-00	R1 024-00	R958-00	R913-00	R858-00
Night Soil (Per Bucket)										
Dwellings/Shops/Churches/Schools	Per month	-	-	-	R57-87	R54-39	R51-31	R48-04	R45-75	R43-00

Other sanitation tariffs applicable for Bitou Municipality are summarised in the table below.

Table C.3.1.7: Other sanitation tariffs for Bitou Municipality										
Description	Conditions	20/21	Record Prior (Vat Excluded)							
			19/20	18/19	17/18	16/17	15/16	14/15	13/14	12/13
Dumping at WWTW										
Per load or part thereof or < 5000 litres	Per Month	R1 425-00	R1 370-00	R1 297-00	R1 224-00	R1 150-00	R1 085-00	R1 016-00	R968-00	R909-56
Per single load > 5000 litres	Per Load	R451-00	R434-00	R411-00	R388-00	R365-00	R344-00	R322-00	R307-00	R288-75
Connection Fees										
Connection at existing Municipal point	Single Residential	R3 073-00	R2 955-00	R2 797-00	R2 639-00	R2 480-00	R2 340-00	R2 191-00	R2 087-00	R1 961-40
	Other	R9 040-00	R8 692-00	R8 227-00	R7 761-00	R7 294-00	R6 881-00	R6 443-00	R6 136-00	R5 766-60
Connection at different or additional point	Single Residential	R3 073-00	R2 955-00	R2 797-00	R2 639-00	R2 480-00	R2 340-00	R2 191-00	R2 087-00	R1 961-40
	Other	R9 040-00	R8 692-00	R8 227-00	R7 761-00	R7 294-00	R6 881-00	R6 443-00	R6 136-00	R5 766-60
Other Sanitation Tariffs										

Table C.3.1.7: Other sanitation tariffs for Bitou Municipality									
Description	Conditions	20/21	Record Prior (Vat Excluded)						
			19/20	18/19	17/18	16/17	15/16	14/15	13/14	12/13
Payable on late payment of an account		Prime + 1%							
Augmentation Fees		See Municipality's Tariffs Schedule							

C.3.2. Metering, Billing and Free Basic Services

The table below gives an overview of the metering, billing and free basic services of Bitou 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	**22,305**	**21,078**	**21,068**
10.2 (b) (iv)	Household sewerage connections	Nr	**22,186**	**20,959**	**20,949**
	METERING				
	Metered Water Connections (aligned with Table C2.1)				
	Residential	Nr	14,885	14,827	13,522
	Commercial / Business	Nr	275	279	281
	Industrial	Nr	36	36	36
	Government / Institutional	Nr	20	20	20
	etc.	Nr	103	95	94
	Sub-Total: Metered Water Connections	**Nr**	**15,319**	**15,257**	**13,953**
	Proportion of metered connections (residential) *	%	67%	70%	64%
	Total number of meters	Nr	**15,319**	**15,257**	**13,953**
10.2 (b) (vi)	Total number of new connections (aligned with Table C.2.1)	Nr	62	1,304	121
10.2 (e) (i)	Total number of new meters installed	Nr	6	27	50
	Proportion of new connections, metered	%	100%	100%	100%
	Number of meters tested	Nr	0	0	0
10.2 (e) (ii)	Proportion of meters tested to total number of meters	%	0%	0%	0%
	Number of meters replaced	Nr	10	22	24
10.2 (e) (ii)	Proportion of meters replaced to total number of meters	%	0%	0%	0%
	BILLING				
	Customer billing (water and sewerage)		**Nr**	**Nr**	**Nr**
	Residential	Nr	13,397	13,344	12,170
	Commercial / Business	Nr	248	251	253
	Industrial	Nr	32	32	32
	Government / Institutional	Nr	18	18	18
	etc.	Nr	93	86	85
	Sub-Total: Customers billed	Nr	**13,787**	**13,731**	**12,558**
	Proportion of bills to metered connections	%	**90%**	**90%**	**90%**
	Residential	%	90%	90%	90%
	Commercial / Business	%	90%	90%	90%
	Industrial	%	90%	90%	90%
	Government / Institutional	%	90%	90%	90%
	etc.	%	90%	90%	90%
	FREE BASIC SERVICES				
	Nr customers receiving:				
	Free Basic Water	Nr	3,930	2,357	1,891
10.2 (b) (v)	Free Basic Sanitation	Nr	3,930	2,357	1,891
	Proportion of Free Basic Services				
	Water	%	26.4%	15.9%	14.0%
	Sewerage	%	26.4%	15.9%	14.0%

Note: * All residential consumers in the urban areas of Bitou 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, therfore the 64% - 70% compliance in the above table.

A Swift Analysis was done for the twelve month period ending January 2021 for Bitou Municipality. The occupied stands with no water meter, with a water meter but zero demand and with low average consumption, as calculated from the Swift data, are summarised in the table below.

Table C.3.2.2: Number of occupied stands with no water meter, with a water meter but zero demand and low average consumption

Description	Number of Stands according to Description	Total Number of Stands	% of Total Stands
Occupied stands with no water meter	1 090	13 093	8.1%
Stands with a meter, but zero demand	1 168	13 093	8.9%
Stands with low average consumption	1 099	13 093	8.4%

The integrity of metering and billing data needs to be improved through an investigation into the list of treasury records without a GIS link, the list of occupied stands with a zero demand, the list of occupied stands without a water meter as well as an investigation into the list of stands with substantial increases and decreases in water demands.

C.3.3. Revenue Collection and Cost Recovery

The table and figures below gives an overview of Bitou 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 110,062	R 101,648	R 115,390
	Sewerage / wastewater	R 83,711	R 79,146	R 81,816
	Sub-Total: Billed	**R 193,773**	**R 180,794**	**R 197,206**
	Collections			
	Water reticulation / provision	R 120,216	R 101,648	R 119,998
	Sewerage / wastewater	R 91,834	R 79,146	R 85,505
	Sub-Total: Collections	**R 212,050**	**R 180,794**	**R 205,503**
	Equitable share income			
	Water reticulation / provision	R 10,154	R 0	R 4,608
	Sewerage / wastewater	R 8,123	R 0	R 3,689
	Sub-Total: Equitable share income	**R 18,278**	**R 0**	**R 8,297**
	EXPENDITURE (O&M)	**R'000**	**R'000**	**R'000**
	Water services	R 122,288	R 62,684	R 65,003
	Sewerage / wastewater services	R 16,620	R 60,630	R 49,153
	Total: Water Services O&M	**R 138,908**	**R 123,314**	**R 114,157**
	COST RECOVERY ANALYSIS / RATIO'S	**%**	**%**	**%**
10.2 (d) (ii)	**Billed as % of Cost**			
	Water	98%	162%	185%
	Sewerage	553%	131%	174%
	Total	**153%**	**147%**	**180%**
10.2 (d) (iii)	**Unrecovered as % of Cost**			
	Water services	0%	0%	0%
	Sewerage / wastewater services	0%	0%	0%
	Total	**0%**	**0%**	**0%**

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

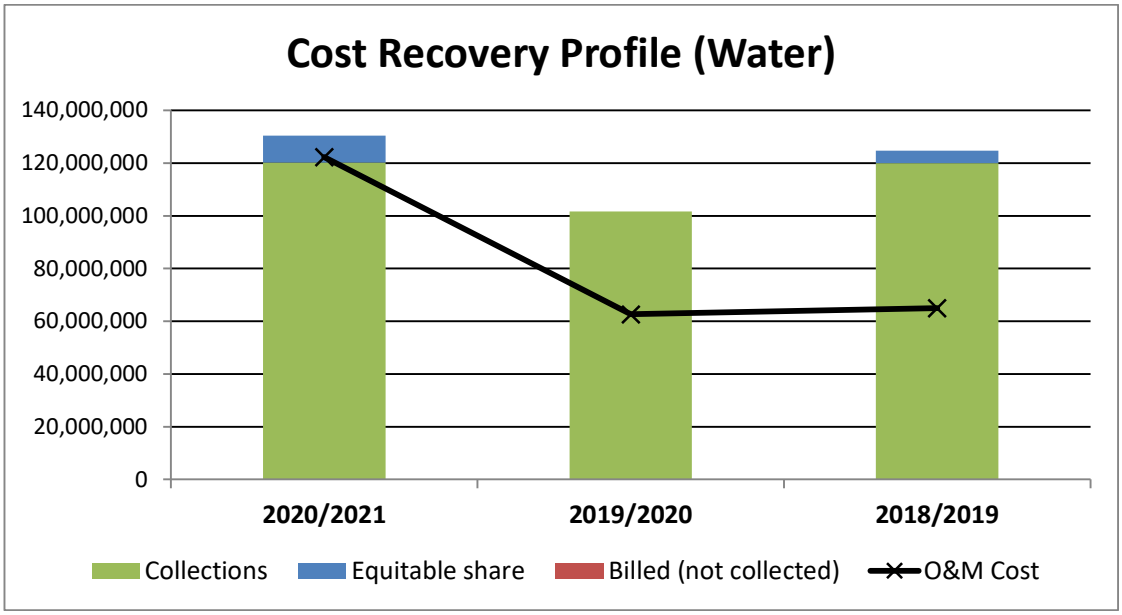


Figure C.3.3.1: Revenue collection and cost recovery profile (Water)

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

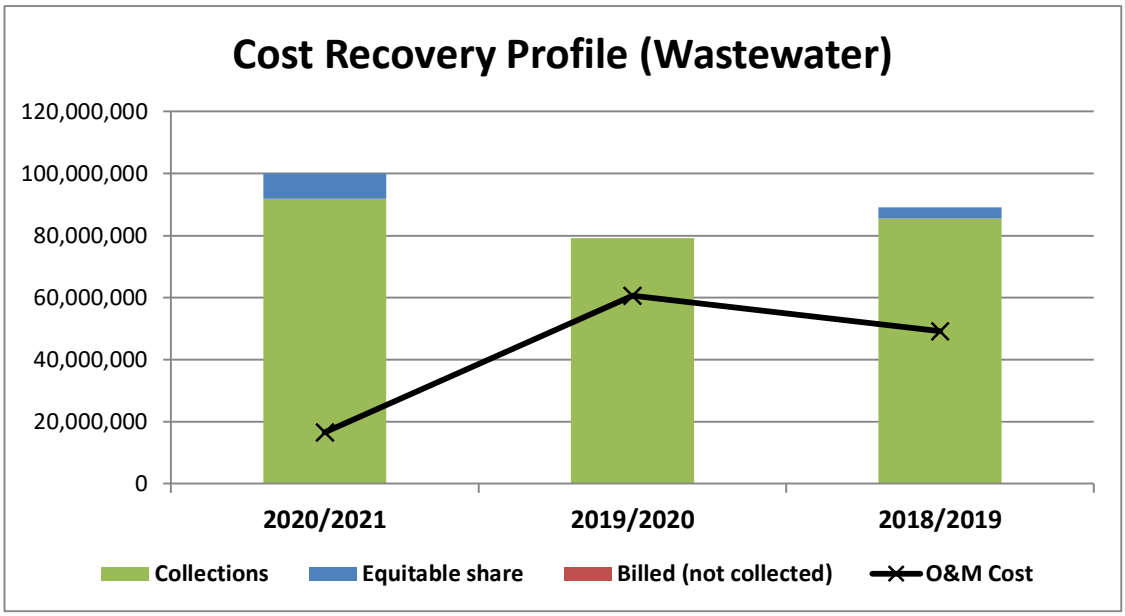


Figure C.3.3.2: Revenue collection and cost recovery profile (Wastewater)

Bitou Municipality's Operational and Maintenance expenditure and income for water and sewerage services for the last seven financial years are summarised in the table below.

Table C3.3.2: Summary of operational and maintenance expenditure and income for water and sewerage services for the last seven financial years							
Expenditure / Income	**Actual 20/21**	**Actual 19/20**	**Actual 18/19**	**Actual 17/18**	**Actual 16/17**	**Actual 15/16**	**Actual 14/15**
Water Services							
Expenditure Water Purification	R13 781 318	R11 827 730	R10 562 567	R10 674 951	R11 067 621	R9 406 435	R6 815 975
Expenditure Water Distribution	R108 466 174	R50 855 593	R54 440 704	R40 006 957	R32 426 830	R31 338 207	R33 775 406
Expenditure Water Storage	R40 214	R352	R0	R0	R0	R0	R0
Total Expenditure	**R122 287 706**	**R62 683 675**	**R65 003 271**	**R50 681 908**	**R43 494 451**	**R40 744 642**	**R40 591 381**
Income Water Purification	R0	R0	-R1 126 057	R0	-R35 689	-R29 818	-R354 410
Income Water Distribution	-R120 216 247	-R101 647 561	-R118 872 076	-R119 588 936	-R91 997 607	-R85 114 553	-R73 539 583
Income	**-R120 216 247**	**-R101 647 561**	**-R119 998 133**	**-R119 588 936**	**-R92 033 295**	**-R85 144 371**	**-R73 893 993**
Surplus / Deficit	**R2 071 459**	**-R38 963 886**	**-R54 994 861**	**-R68 907 028**	**-R48 538 845**	**-R44 399 728**	**-R33 302 612**
Sewerage Services							
Expenditure Wastewater Purification	R10 391 221	R57 345 515	R47 295 857	R29 243 094	R46 015 797	R44 915 789	R42 968 306
Expenditure Wastewater Reticulation	R6 228 981	R3 284 597	R1 857 417	R2 737 272	R3 226 553	R3 044 595	R2 559 946
Expenditure	**R16 620 202**	**R60 630 111**	**R49 153 274**	**R31 980 366**	**R49 242 350**	**R47 960 384**	**R45 528 252**
Income Wastewater Purification	-R91 809 016	-R79 090 503	-R85 164 978	R56 093 832	-R75 260 892	-R74 386 729	-R64 423 147
Income Wastewater Reticulation	-R24 872	-R55 532	-R339 869	-	-	-	-
Income	**-R91 833 888**	**-R79 146 035**	**-R85 504 847**	**-R56 093 832**	**-R75 260 892**	**-R74 386 729**	**-R64 423 147**
Surplus / Deficit	**-R75 213 686**	**-R18 515 924**	**-R36 351 574**	**-R24 113 466**	**-R26 018 542**	**-R26 426 345**	**-R18 894 895**

Bitou Municipality's detail Operational and Maintenance Expenditure Budgets for Water Purification, Water Distribution and Water Storage for the last four financial years are summarised in the table below.

Table C3.3.3: Detail operational and maintenance expenditure budget for Water Purification, Water Distribution and Water Storage for the 2017/2018 to 2020/2021 financial years.				
Description	**Actual 20/21**	**Actual 19/20**	**Actual 18/19**	**Actual 17/18**
WATER PURIFICATION				
Employee Related Costs	R4 802 109	R4 568 718	R3 570 656	R4 691 959
Operational Costs	R911 848	R416 042	R125 564	R330 505
Operating Leases	R0	R0	R0	R606 958
Inventory Consumed	R2 488 027	R2 371 919	R1 677 654	R2 158 314
Contracted Services	R1 629 757	R257 934	R289 109	R513 771
Disposal of Fixed and Intangible Assets	R0	R0	R244 424	R0
Depreciation and Amortisation	R2 310 771	R2 317 128	R2 373 227	R2 373 444
Interest, Dividends and rent	R1 638 805	R1 895 989	R2 281 933	R0
Total Expenditure	**R13 781 317**	**R11 827 730**	**R10 562 567**	**R10 674 951**
WATER DISTRIBUTION				
Employee Related Costs	R11 419 640	R10 596 432	R9 365 781	R7 024 999
Operational Costs	R815 569	R374 727	R678 216	R858 859
Contracted Services	R3 970 564	R5 991 566	R1 937 465	R2 841 053
Bulk Purchases	R394 038	R211 174	R415 205	R0
Bad Debts Written-off	R81 831 587	R0	R6 570 214	R14 028 631
Other Expenses	R5 080 261	R3 250 521	R3 889 556	R4 181 672
Depreciation and Amortisation	R4 824 549	R4 172 368	R3 884 397	R3 318 885
Disposal of Fixed and Intangible Assets	R531 652	R105 438	R108 809	R139 778
Inventory Consumed	R466 964	R616 174	R407 501	R760 516
Impairment Losses	-R868 650	R25 537 193	R27 183 560	R4 585 381
Interest, Dividends and rent	R0	R0	R0	R2 267 183

Table C3.3.3: Detail operational and maintenance expenditure budget for Water Purification, Water Distribution and Water Storage for the 2017/2018 to 2020/2021 financial years.				
Description	**Actual 20/21**	**Actual 19/20**	**Actual 18/19**	**Actual 17/18**
Total Expenditure	**R108 466 174**	**R50 855 593**	**R54 440 704**	**R40 006 957**
WATER STORAGE				
Depreciation and Amortisation	R352	R353	R0	R0
Disposal of Fixed and Intangible Assets	R39 862	R0	R0	R0
Total Expenditure	**R40 214**	**R353**	**R0**	**R0**

Bitou Municipality's Operational and Maintenance Income Budgets for Water Purification and Water Distribution for the last four financial years are summarised in the table below.

Table C.3.3.4: Operational income budget for Water Purification and Water Distribution for the 2017/2018 to 2020/2021 financial years.				
Description	**Actual 20/21**	**Actual 19/20**	**Actual 18/19**	**Actual 17/18**
Exchange Revenue	-R85 220 241	-R86 859 455	-R84 217 722	-R69 009 777
Non-exchange Revenue	-R34 939 656	-R14 788 106	-R31 211 758	-R47 567 725
Other Income	-R56 350	R0	R0	-R736 548
Inventory	R0	R0	-R2 123 312	-R2 274 886
Employee Related Costs	R0	R0	-R2 445 341	R0
Total Income	**-R120 216 247**	**-R101 647 561**	**-R119 998 133**	**-R119 588 936**

Bitou Municipality's detail Operational and Maintenance Expenditure Budgets for Waste Water Purification and Waste Water Reticulation for the last four financial years are summarised in the table below.

Table C.3.3.5: Detail operational and maintenance expenditure budget for Waste Water Purification and Waste Water Reticulation for the 2017/2018 to 2020/2021 financial years.				
Description	**Actual 20/21**	**Actual 19/20**	**Actual 18/19**	**Actual 17/18**
WASTEWATER PURIFICATION				
Employee Related Costs	R5 276 786	R3 783 435	R4 002 404	R3 695 761
Operational Costs	R983 139	R1 811 186	R410 540	R370 872
Inventory Consumed	R360 084	R152 446	R148 566	R287 340
Contracted Services	R2 199 065	R1 396 442	R590 378	R2 950 098
Disposal of Fixed and Intangible Assets	R138 387	R742	R585 315	R1 810 895
Depreciation and Amortisation	R4 639 567	R4 151 937	R3 744 354	R3 535 298
Bad Debts Written-off	R0	R20 887 483	R8 640 060	R781 032
Other Expenses	R3 943 050	R3 139 287	R3 148 367	R3 090 501
Impairment Losses	-R8 222 947	R20 726 320	R24 541 105	R11 242 204
Interest, Dividends and rent	R1 074 090	R1 296 239	R1 484 766	R1 479 094
Total Expenditure	**R10 391 221**	**R57 345 515**	**R47 295 857**	**R29 243 094**
WASTEWATER RETICULATION				
Employee Related Costs	R5 334 415	R3 182 788	R1 778 390	R2 623 062
Operational Costs	R222 545	R13 043	R0	R25 520
Inventory Consumed	R483 944	R0	R0	R0
Contracted Services	R142 744	R0	R0	R0
Depreciation and Amortisation	R45 333	R45 454	R78 924	R88 690
Disposal of Fixed and Intangible Assets	R0	R43 311	R103	R0
Total Expenditure	**R6 228 981**	**R3 284 597**	**R1 857 417**	**R2 737 272**

Bitou Municipality's Operational and Maintenance Income Budgets for Waste Water Purification and Waste Water Reticulation for the last four financial years are summarised in the table below.

Table C.3.3.6: Operational income budget for Waste Water Purification and Waste Water Reticulation for the 2017/2018 to 2020/2021 financial years.

Description	Actual 20/21	Actual 2019/2020	Actual 2018/2019	Actual 2017/2018
Employee Related Costs	R0	R0	-R1 037 002	R0
Exchange Revenue	-R83 424 651	-R78 865 017	-R80 432 614	-R49 988 364
Non-exchange Revenue	-R8 123 359	R0	-R3 771 288	-R5 686 195
Other Income	-R285 878	-R281 018	-R263 944	-R419 273
Total Income	**-R91 833 888**	**-R79 146 035**	**-R85 504 847**	**-R56 093 832**

There was a drastic increase in the debtors for water and sanitation services for the last three financial years, as indicated in the table below and also on Figure C.3.3.5. The table below gives an overview of the debtors' age analysis by income source for the last five financial years.

Table C.3.3.7: Analysis of Debtors age by income source as at 30 June for the last five financial years							
Service	**Future**	**0 – 30 days**	**31 – 60 days**	**61 – 90 days**	**91 - 120 days**	**Over 120 days**	**Total**
2020/2021							
Water	R1 813 780-08	R4 900 120-30	R2 557 493-53	R2 382 011-13	R2 334 406-96	R65 516 164-74	R79 503 976-74
Electricity	R1 784 964-52	R9 332 425-31	R1 271 601-72	R697 561-26	R582 354-92	R12 208 863-49	R25 877 771-22
Property Rates	R1 085 136-87	R8 031 485-62	R2 396 556-40	R2 172 288-10	R1 374 931-03	R33 494 114-99	R48 554 513-01
Refuse	R898 159-57	R2 816 791-64	R1 428 206-96	R1 301 873-56	R1 263 235-86	R40 768 626-79	R48 476 894-38
Sewerage	R1 591 304-86	R4 743 135-16	R2 417 124-85	R2 199 765-04	R2 136 239-81	R68 369 156-72	R81 456 726-44
RSC Levies	R0	R0	R0	R0	R0	R0	R0
Sundries	-R21 941 573-32	R579 447-54	R74 210-67	R317 430-00	R62 569-15	R6 574 659-52	-R14 333 256-44
Total	**-R14 768 227-42**	**R30 403 405-57**	**R10 145 194-13**	**R9 070 929-09**	**R7 753 737-73**	**R226 931 586-25**	**R269 536 625-35**
2019/2020							
Water	R865 894-02	R5 776 394-99	R3 145 455-46	R2 865 203-19	R3 054 689-10	R76 770 620-15	R92 478 256-91
Electricity	R415 989-13	R9 238 249-68	R2 280 513-50	R1 607 209-74	R1 339 334-13	R12 494 095-70	R27 375 391-88
Property Rates	R276 115-97	R7 676 466-38	R2 519 877-62	R1 937 636-69	R1 557 513-98	R34 186 864-32	R48 154 474-96
Refuse	R521 114-57	R3 557 553-78	R1 951 880-67	R1 848 372-16	R1 766 804-35	R47 450 791-98	R57 096 517-51
Sewerage	R923 785-36	R6 114 348-79	R3 318 545-86	R3 157 199-58	R3 019 889-32	R79 982 086-21	R96 515 855-12
RSC Levies	R0	R0	R0	R0	R0	R0	R0
Sundries	-R13 003 695-56	R189 405-19	R50 364-40	R50 030-49	R71 434-93	R6 410 077-99	-R6 232 382-56
Total	**-R10 000 796-51**	**R32 552 418-81**	**R13 266 637-51**	**R11 465 651-85**	**R10 809 665-81**	**R257 294 536-35**	**R315 388 113-82**

Table C.3.3.7: Analysis of Debtors age by income source as at 30 June for the last five financial years							
Service	**Future**	**0 – 30 days**	**31 – 60 days**	**61 – 90 days**	**91 - 120 days**	**Over 120 days**	**Total**
2018/2019							
Water	R437 565-09	R6 620 867-47	R3 775 399-01	R3 266 044-24	R3 146 707-12	R44 222 178-75	R61 468 761-68
Electricity	R357 025-24	R10 330 724-55	R2 252 199-67	R1 165 634-24	R958 335-13	R10 583 710-44	R25 647 629-27
Property Rates	R293 883-25	R7 371 311-67	R2 113 606-87	R1 539 363-27	R1 389 831-12	R29 185 903-72	R41 893 899-90
Refuse	R290 220-20	R3 528 601-28	R1 874 562-77	R1 785 489-46	R1 693 857-61	R31 483 417-68	R40 656 149-00
Sewerage	R471 829-27	R6 030 550-18	R3 198 828-81	R3 053 114-22	R2 897 281-36	R52 485 909-52	R68 137 513-36
RSC Levies	R0	R0	R0	R0	R0	R0	R0
Sundries	-R11 772 527-87	R501 128-96	R60 055-39	R56 960-46	R51 994-60	R6 686 746-08	-R4 415 642-38
Total	**-R9 922 004-82**	**R34 383 184-11**	**R13 274 652-52**	**R10 866 605-89**	**R10 138 006-94**	**R174 647 866-19**	**R233 388 310-83**
2017/2018							
Water	R588 984-50	R5 337 659-65	R1 599 873-16	R1 377 772-26	R1 104 975-66	R21 701 649-28	R31 710 914-51
Electricity	R186 747-26	R9 860 248-31	R1 435 440-28	R775 545-57	R531 416-89	R6 727 654-46	R19 517 052-77
Property Rates	R131 836-78	R7 282 624-25	R1 940 167-48	R1 371 614-46	R1 686 382-73	R23 063 513-85	R35 476 139-55
Refuse	R421 033-70	R2 559 788-89	R943 331-57	R791 439-79	R724 787-25	R18 565 203-03	R24 005 584-23
Sewerage	R620 309-54	R4 185 663-23	R1 595 656-04	R1 351 068-08	R1 243 094-45	R29 740 561-19	R38 736 352-53
RSC Levies	R0	R0	R0	R0	R0	R0	R0
Sundries	-R11 345 808-97	R217 760-40	R70 433-44	R83 522-97	R91 847-02	R5 748 103-33	-R5 134 141-81
Total	**-R9 396 897-19**	**R29 443 744-73**	**R7 584 901-97**	**R5 750 963-13**	**R5 382 504-00**	**R105 546 685-14**	**R144 311 901-78**
2016/2017							
Water	R1 399 763-67	R4 417 803-40	R1 619 515-12	R1 087 753-74	R1 007 900-54	R20 918 515-06	R30 451 251-53
Electricity	R230 127-53	R10 067 619-84	R1 377 072-63	R572 221-55	R463 459-40	R4 991 012-25	R17 701 513-20
Property Rates	R141 718-14	R6 936 730-73	R1 230 985-99	R647 273-84	R505 580-76	R14 447 754-28	R23 910 043-74
Refuse	R527 674-59	R2 110 585-15	R619 301-59	R520 685-36	R488 917-13	R12 187 097-46	R16 454 261-28
Sewerage	R736 266-41	R3 447 731-66	R1 033 701-17	R862 875-46	R829 925-97	R18 695 716-89	R25 606 217-56
RSC Levies	R0	R0	R0	R0	R0	R0	R0
Sundries	-R8 486 172-51	R137 815-86	R135 052-33	R1 150 510-80	R137 832-52	R4 487 461-61	-R2 437 499-39
Total	**-R5 450 622-17**	**R27 118 286-64**	**R6 015 628-83**	**R4 841 320-75**	**R3 433 616-32**	**R75 727 557-55**	**R111 685 787-92**

The table below gives an overview of the debtors' age analysis by customer group for the last five financial years.

Table C.3.3.8: Analysis of Debtors age by customer group as at 30 June for the last five financial years							
Service	**Future**	**0 – 30 days**	**31 – 60 days**	**61 – 90 days**	**91 - 120 days**	**Over 121 days**	**Total**
2020/2021							
Government	-R886 327-14	R329 755-12	R193 963-32	R176 493-67	R175 100-29	R1 551 213-41	R1 540 198-67
Business	-R90 293-23	R3 880 520-04	R540 024-88	R488 698-87	R358 000-30	R4 577 868-32	R9 754 819-18
Households	-R13 791 607-05	R26 193 130-41	R9 411 205-93	R8 405 736-55	R7 220 637-14	R220 802 504-52	R258 241 607-50
Other	R0	R0	R0	R0	R0	R0	R0
Total	-R14 768 227-42	R30 403 405-57	R10 145 194-13	R9 070 929-09	R7 753 737-73	R226 931 586-25	R269 536 625-35
2019/2020							
Government	-R898 382-44	R304 035-75	R227 444-40	R173 926-64	R157 833-03	R995 135-19	R959 992-57
Business	-R150 389-46	R2 740 010-37	R947 372-37	R736 842-65	R440 166-59	R 3 866 143-76	R8 580 146-28
Households	-R8 952 024-61	R29 508 372-69	R12 091 820-74	R10 554 882-56	R10 211 666-19	R252 433 257-40	R305 847 974-97
Other	R0	R0	R0	R0	R0	R0	R0
Total	**-R10 000 796-51**	**R32 552 418-81**	**R13 266 637-51**	**R11 465 651-85**	**R10 809 665-81**	**R257 294 536-35**	**R315 388 113-82**
2018/2019							
Government	-R279 077-39	R225 784-05	R182 249-79	R163 210-80	R150 114-11	R3 492 400-08	R3 934 681-44
Business	-R17 961-33	R66 644-50	R 29 108-02	R12 934-79	R 6 443-14	R265 082-70	R362 251-82
Households	-R9 624 966-10	R34 090 755-56	R13 063 294-71	R10 690 460-30	R9 981 449-69	R170 890 383-41	R229 091 377-57
Other	R0	R0	R0	R0	R0	R0	R0
Total	**-R9 922 004-82**	**R34 383 184-11**	**R13 274 652-52**	**R10 866 605-89**	**R10 138 006-94**	**R174 647 866-19**	**R233 388 310-83**
2017/2018							
Government	-R246 142-46	R292 306-04	R166 283-02	R179 936-95	R172 736-57	R3 365 711-46	R3 930 831-58
Business	-R60 106-23	R814 629-42	R46 813-98	R34 543-78	R33 210-32	R446 781-80	R1 315 873-07
Households	-R9 090 648-50	R28 336 809-27	R7 371 804-97	R5 536 482-40	R5 176 557-11	R101 734 191-88	R139 065 197-13
Other	R0	R0	R0	R0	R0	R0	R0
Total	**-R9 396 897-19**	**R29 443 744-73**	**R7 584 901-97**	**R5 750 963-13**	**R5 382 504-00**	**R105 546 685-14**	**R144 311 901-78**

Table C.3.3.8: Analysis of Debtors age by customer group as at 30 June for the last five financial years							
Service	**Future**	**0 – 30 days**	**31 – 60 days**	**61 – 90 days**	**91 - 120 days**	**Over 121 days**	**Total**
2016/2017							
Government	-R261 716-85	R302 411-54	R140 273-87	R113 303-17	R127 051-87	R943 537-79	R1 364 861-39
Business	-R139 605-10	R661 456-73	R104 516-47	R73 859-20	R51 813-65	R1 218 384-96	R1 970 425-91
Households	-R5 049 300-22	R26 154 418-37	R5 770 838-49	R4 654 158-38	R3 254 750-80	R73 565 634-80	R108 350 500-62
Other	R0	R0	R0	R0	R0	R0	R0
Total	**-R5 450 622-17**	**R27 118 286-64**	**R6 015 628-83**	**R4 841 320-75**	**R3 433 616-32**	**R75 727 557-55**	**R111 685 787-92**

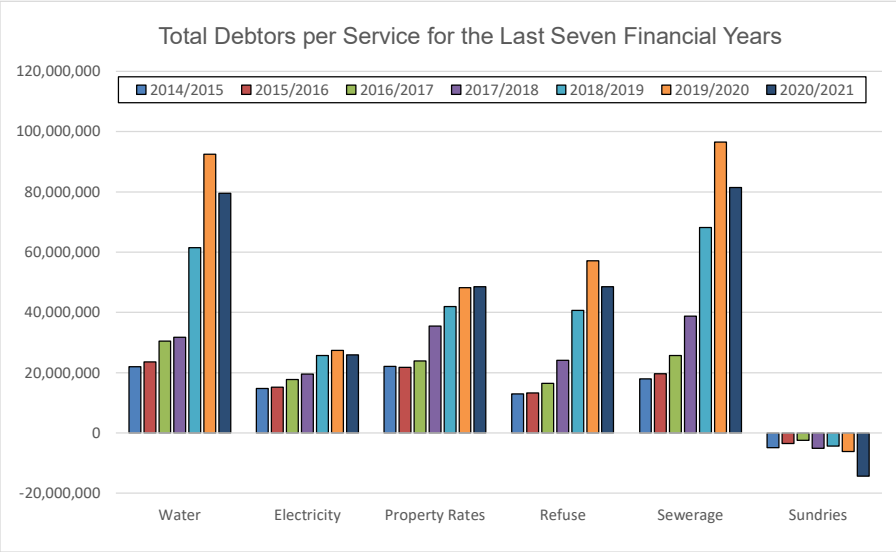


Figure C.3.3.3: Total Debtors per service for the last seven financial years

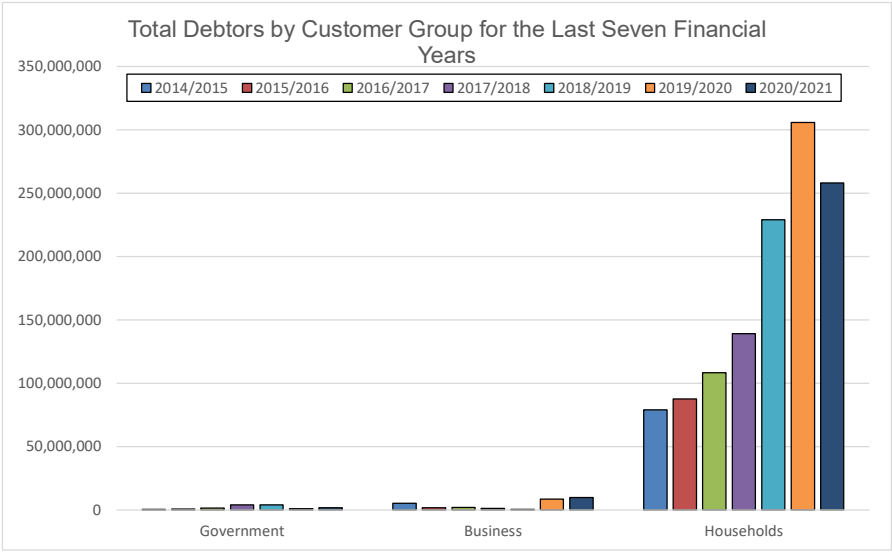


Figure C.3.3.4: Total Debtors by customer group for the last seven financial years

C.4. Water Quality

C.4.1. Sampling Programme

Comprehensive Operational and Compliance Water Quality and Final Effluent Monitoring Programmes are implemented by Bitou Municipality. The tables below give an overview of Bitou Municipality's Network Compliance Monitoring Programmes for potable water quality.

Table C.4.1.1: Sampling Programme for Potable Water Quality for Plettenberg Bay

Treated Water Schemes: Plettenberg Bay

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
1	Green Valley Reservoir (WEBMGR-002)	Yes	Yes	Yes	**Microbiological (Health)**			
2	Harkerville Reservoir (WEBMHV-002)	Yes	Yes	Yes	Escherichia Coli (Count per 100ml)	7	7	7
3	Keurboomstrand Reservoir (WEBMKE-002)	Yes	Yes	Yes				
4	Kranshoek Reservoir (WEBMKH-002)	Yes	Yes	Yes	**Aesthetic**			
5	Kwanokuthula Reservoir (WEBMKW-002)	Yes	Yes	Yes	Colour (mg/l)	7	7	7
6	New Horizon Reservoir (WEBMNH-003)	Yes	Yes	Yes	Conductivity at 25 °C (mS/m)	7	7	7
7	Plettenberg Bay Reservoir (WEBMPG-002)	Yes	Yes	Yes	Total Dissolved Solids (mg/l)	7	7	7
8	Wittedrift Reservoir (WEBMWD-003)	Yes	Yes	Yes	Iron	30	30	30
9	Bowtei Tap (WEBMBO-001)	Yes	Yes	Yes	Sulfate	30	30	30
10	Green Valley Tap (WEBMGR-001)	Yes	Yes	Yes				
11	Harkerville Tap (WEBMHV-001)	Yes	Yes	Yes	**Operational**			
12	Keurboomstrand Tap (WEBMKE-001)	Yes	Yes	Yes	pH at 25°C	7	7	7
13	Kranshoek Tap (WEBMKH-001)	Yes	Yes	Yes	Turbidity NTU	7	7	7
14	Kwanokuthula Tap (WEBMKW-001)	Yes	Yes	Yes	Aluminium as Al (µg/l)	15	15	15
15	Longships Tap (WEBMLO-001)	Yes	Yes	Yes				
16	New Horizon Tap (WEBMNH-002)	Yes	Yes	Yes	**Chronic Health**			
17	Poortjies Tap (WEBMPO-001)	Yes	Yes	Yes	Calcium as Ca (mg/l)	7	7	7
18	Robberg Tap (WEBMRO-001)	Yes	Yes	Yes	Magnesium as Mg (mg/l)	7	7	7
19	Wittedrift Tap (WEBMWD-002)	Yes	Yes	Yes	Copper	30	30	30
					Free Chlorine (mg/l)	7	7	7
	Reservoirs samples taken every 30 days							
	Tap samples taken every 7 days				**Not in STD / Limit Set**			
					Alkalinity as $CaCO_3$ (mg/l)	7	7	7
					Total Hardness as CaCO3 (mg/l)	7	7	7

Table C.4.1.2: Sampling Programme for Potable Water Quality for Kurland

Treated Water Schemes: Kurland

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
1	Kurland Reservoir	Yes	Yes	Yes	**Microbiological (Health)**			
2	Kurland Tap (WEBMKU-001)	Yes	Yes	Yes	Escherichia Coli (Count per 100ml)	7	7	7
	Reservoirs samples taken every 30 days				**Aesthetic**			
	Tap samples taken every 7 days				Colour (mg/l)	7	7	7
					Conductivity at 25 °C (mS/m)	7	7	7
					Total Dissolved Solids (mg/l)	7	7	7
					Iron	30	30	30
					Sulfate	30	30	30
					Operational			
					pH at 25°C	7	7	7
					Turbidity NTU	7	7	7
					Aluminium as Al (µg/l)	15	15	15
					Chronic Health			
					Calcium as Ca (mg/l)	7	7	7
					Magnesium as Mg (mg/l)	7	7	7
					Copper	30	30	30
					Free Chlorine (mg/l)	7	7	7
					Not in STD / Limit Set			
					Alkalinity as $CaCO_3$ (mg/l)	7	7	7
					Total Hardness as CaCO3 (mg/l)	7	7	7

Table C.4.1.3: Sampling Programme for Potable Water Quality for Natures Valley								
Treated Water Schemes: Natures Valley								
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**
1	Natures Valley Reservoir (WEBMNV-002)	Yes	Yes	Yes	**Microbiological (Health)**			
2	Natures Valley Tap	Yes	Yes	Yes	Escherichia Coli (Count per 100ml)	7	7	7
	Reservoirs samples taken every 30 days				**Aesthetic**			
	Tap samples taken every 7 days				Colour (mg/l)	7	7	7
					Conductivity at 25 °C (mS/m)	7	7	7
					Total Dissolved Solids (mg/l)	7	7	7
					Iron	30	30	30
					Sulfate	30	30	30
					Operational			
					pH at 25°C	7	7	7
					Turbidity NTU	7	7	7
					Aluminium as Al (µg/l)	15	15	15
					Chronic Health			
					Calcium as Ca (mg/l)	7	7	7
					Magnesium as Mg (mg/l)	7	7	7
					Copper	30	30	30
					Free Chlorine (mg/l)	7	7	7
					Not in STD / Limit Set			
					Alkalinity as $CaCO_3$ (mg/l)	7	7	7
					Total Hardness as CaCO3 (mg/l)	7	7	7

Water Quality sampling is done by Bitou Municipality's own laboratory at the Plettenberg Bay WTW. The table below gives an overview of the current operational and compliance water quality parameters sampled by Bitou Municipality.

Table C.4.1.4: Current parameters sampled by Bitou Municipality: Routine monitoring of Process Indicators				
Current / Proposed	**Sampling point**	**Frequency of sampling**	**Samples taken by**	**Current Parameters Sampled**
Plettenberg Bay				
Current	Intake	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids, Colour, Turbidity
		Daily	Lab	Total Hardness, Magnesium Hardness, Calcium Hardness
		Monthly	Lab	E.Coli
	Flocculation Channel	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids
	Clarifier (Settling Tank or DAF)	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids, Colour, Turbidity
	Filtered Water	4 Times per Shift	Lab	Colour, Turbidity
	Final Water	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids, Colour, Turbidity, Free Chlorine
		Daily	Lab	Total Hardness, Magnesium Hardness, Calcium Hardness
		Weekly	Lab	E.Coli, Aluminium
	Distribution System	Weekly	Lab	Alkalinity, Aluminium, Calcium, Colour, Conductivity, Copper, E.Coli, Free Chlorine, Iron, Magnesium, pH, Sulphate, Total Dissolved Solids, Total Hardness, Turbidity
Kurland				
Current	Intake	Daily	Lab	pH, Conductivity, Total Dissolved Solids, Colour, Turbidity
		Monthly	Lab	Total Hardness, Magnesium Hardness, Calcium Hardness, E.Coli
	Flocculation Channel	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids
	Clarifier (Settling Tank)	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids, Turbidity
	Filtered Water	4 Times per Shift	Lab	Colour, Turbidity

Table C.4.1.4: Current parameters sampled by Bitou Municipality: Routine monitoring of Process Indicators				
Current / Proposed	**Sampling point**	**Frequency of sampling**	**Samples taken by**	**Current Parameters Sampled**
	Final Water	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids, Colour, Turbidity, Free Chlorine
		Weekly	Lab	Total Hardness, Magnesium Hardness, Calcium Hardness, Aluminium, E.Coli
	Distribution System	Weekly	Lab	Alkalinity, Aluminium, Calcium, Colour, Conductivity, Copper, E.Coli, Free Chlorine, Iron, Magnesium, pH, Sulphate, Total Dissolved Solids, Total Hardness, Turbidity
Natures Valley				
Current	Intake	Daily	Lab	pH, Conductivity, Total Dissolved Solids, Colour, Turbidity
		Monthly	Lab	Total Hardness, Magnesium Hardness, Calcium Hardness, E.Coli
	Filtered Water	4 Times per Shift	Lab	Colour, Turbidity
	Final Water	4 Times per Shift	Lab	pH, Conductivity, Total Dissolved Solids, Colour, Turbidity, Free Chlorine
		Weekly	Lab	Total Hardness, Magnesium Hardness, Calcium Hardness, Aluminium, E.Coli
	Distribution System	Weekly	Lab	Alkalinity, Aluminium, Calcium, Colour, Conductivity, Copper, E.Coli, Free Chlorine, Iron, Magnesium, pH, Sulphate, Total Dissolved Solids, Total Hardness, Turbidity

The objectives of the water quality operational monitoring are for Bitou Municipality to monitor each control measure in a timely manner to enable effective system management and to ensure that health-based targets are achieved. It ensures that all the risks identified during the risk assessment process are adequately monitored and that the drinking water quality requirements as set out in SANS:241:2015 are fully complied with. Appropriate data capturing and record keeping systems are in place to satisfy the requirements of the Water Services Act.

Operational sampling is done on a frequent basis by the treatment plant personnel at the various WTWs. The Water quality results from operational monitoring are used as a trigger for immediate short – term corrective action to operational procedures, to improve drinking water quality. The following Protocols for the different treatment components are also in place.

- Protocol for Coagulation and Flocculation;
- Protocol for PRE pH Control;
- Protocol for POST pH Control;
- Protocol for Sedimentation;
- Protocol for Filters; and
- Protocol for Biological Failure.

The current Operational and Compliance sampling programmes of Bitou Municipality comply with SANS 241-2:2015 requirements with regard to the minimum monitoring frequency for process risk indicators and no additional sampling is proposed for any of the water distribution systems.

The table below indicates the compliance of the E.Coli monitoring frequency in the water distributions systems of Bitou 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.4.1.5: Bitou Municipality's compliance of the monthly E.Coli monitoring frequency in the water distributions systems 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 by the Municipality during 2020/2021
Plettenberg Bay	63 761	12.8	59.3
Kurland	5 739	2	9.6
Natures Valley	655	2	10.7

It can be noted from the above table that the number of monthly E.Coli samples taken by the Municipality during the 2020/2021 financial year was more than the required number of samples for all the systems.

Operational and Compliance sampling is done at both the Plettenberg Bay WWTW and the Kurland WWTW. The table below gives an overview of Bitou Municipality's compliance sampling programme for wastewater (final effluent) quality.

Table C.4.1.6: Sampling Programme for Wastewater Effluent Quality for Plettenberg Bay WWTW

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
	Plettenberg Bay WWTW	Yes	Yes	Yes	**Microbiological**			
					E Coli (org/100mℓ)	2	2	2
					Chemical			
					Ammonia as N (mg/ℓ)	2	2	2
					Nitrate & Nitrite as Nitrogen (mg/ℓ)	2	2	2
					Ortho-Phosphate (mg/ℓ)	2	2	2
					COD (mg/ℓ)	2	2	2
					Alkalinity as CaCo3 (mg/ℓ)	2	2	2
					Physical			
					Free Chlorine (mg/ℓ)	2	2	2
					Electrical Conductivity (mS/m)	2	2	2
					pH	2	2	2
					Suspended Solids (mg/ℓ)	2	2	2
					Total Dissolved Solids (mg/ℓ)	2	2	2

Table C.4.1.7: Sampling Programme for Wastewater Effluent Quality for Kurland WWTW								
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
	Kurland WWTW	Yes	Yes	Yes	**Microbiological**			
					E Coli (org/100mℓ)	7	7	7
					Chemical			
					Ammonia as N (mg/ℓ)	7	7	7
					Nitrate & Nitrite as Nitrogen (mg/ℓ)	7	7	7
					Ortho-Phosphate (mg/ℓ)	7	7	7
					COD (mg/ℓ)	7	7	7
					Alkalinity as CaCo3 (mg/ℓ)	7	7	7
					Physical			
					Free Chlorine (mg/ℓ)	7	7	7
					Electrical Conductivity (mS/m)	7	7	7
					pH	7	7	7
					Suspended Solids (mg/ℓ)			
					Total Dissolved Solids (mg/ℓ)	7	7	7

The table below gives an overview of the current operational and compliance sampling done at the Plettenberg Bay WWTW and the Kurland WWTW.

Table C.4.1.8: Operational and Compliance sampling programme for the WWTWs						
Determinand	Raw	Aeration Basin	Clarifier	Final	Upstream of Effluent Discharge	Downstream of Effluent Discharge
Plettenberg Bay WWTW (Gansevlei)						
Faecal Coliforms	Weekly	-	Weekly	Weekly	Weekly	Weekly
Chemical Oxygen Demand	Weekly	-	Weekly	Weekly	Weekly	Weekly
pH	Weekly	-	Weekly	Weekly	Weekly	Weekly
Ammonia as Nitrogen	Weekly	-	Weekly	Weekly	Weekly	Weekly
Nitrate/Nitrite as Nitrogen	Weekly	-	Weekly	Weekly	Weekly	Weekly
Chlorine as Free Chlorine	Weekly	-	Weekly	Weekly	Weekly	Weekly
Suspended Solids	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly
Electrical Conductivity	Weekly	-	Weekly	Weekly	Weekly	Weekly
Ortho-Phosphate	Weekly	-	Weekly	Weekly	Weekly	Weekly
SSV	-	Weekly	-	-	-	-
Kurland WWTW						
Faecal Coliforms	Weekly	-	Weekly	Weekly	-	-
Chemical Oxygen Demand	Weekly	-	Weekly	Weekly	-	-
pH	Weekly	-	Weekly	Weekly	-	-
Ammonia as Nitrogen	Weekly	-	Weekly	Weekly	-	-
Nitrate/Nitrite as Nitrogen	Weekly	-	Weekly	Weekly	-	-
Chlorine as Free Chlorine	Weekly	-	Weekly	Weekly	-	-
Suspended Solids	Weekly	Weekly	Weekly	Weekly	-	-
Electrical Conductivity	Weekly	-	Weekly	Weekly	-	-
Ortho-Phosphate	Weekly	-	Weekly	Weekly	-	-
SSV	-	Weekly	-	-	-	-

Bitou Municipality actively implement their Operational and Compliance Water and Effluent Quality Sampling Programmes in order to promptly identify water and effluent quality failures and to react accordingly. The water quality compliance sample results and the effluent quality compliance sample results are loaded onto DWS's IRIS via the internet. Once entered the water quality data is automatically compared to SANS:241:2015 limits and the final effluent data to the authorisations for the WWTWs. These real-time systems allow for immediate intervention to rectify any problems.

The water quality compliance of Bitou Municipality is "Excellent" and it was therefore not yet necessary to take any steps to inform the consumers of any health risk regarding the potable water supplied by Bitou Municipality. Safety Management Procedures are however in place, to inform the Municipality's consumers about any potential health risks regarding the water quality, should it become necessary.

The table below gives an overview of the compliance with regard to the water quality and final effluent compliance sampling programmes, as taken from the IRIS.

Table C.4.1.9: Compliance to the Sampling Programme (s)

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	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 %	100%	100%	100%	100%	100%	6%	100%	100%	100%	100%	100%	9%	100%	100%	100%	100%	100%	31%
Data Credibility	Average %	100%	100%	40%	100%	100%	0%	100%	100%	41%	100%	100%	0%	100%	100%	40%	100%	100%	0%
BDS In-Time Submission	Annual %	100%	100%	100%	100%	100%	100%	98%	100%	99%	99%	99%	98%	100%	100%	100%	100%	100%	100%
Wastewater Quality																			
		M	C	P	O			M	C	P	O			M	C	P	O		
Monitoring compliance	Average %	100%	100%	100%	-			100%	100%	100%	-			100%					
Certified Data	Average %	100%	49%	53%	-			100%	48%	53%	-								
In-Time Submission	Average %	100%	100%	100%	-			99%	99%	99%	-								

Legend **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.4.1.10: Water Quality Monitoring Overview from WSDP Guide Framework Perspective					
WSDP Ref #	Measurable / Enabling Factor	Unit	Year 0	Year - 1	Year - 2
			FY2020/21	FY2019/20	FY2018/19
6.3	**Water Supply and Quality**				
6.3.2	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 %	N/A	N/A	N/A
9.2.6	Water quality for formal schemes? (1: daily, 2: weekly, 3: monthly, 4: annually, 5: never)	frequency	Daily	Daily	Daily
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	Yes
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 %	100%	100%	100%
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.4.1.11 : Wastewater Quality Monitoring Overview from WSDP Guide Framework Perspective					
WSDP Ref #	Measurable / Enabling Factor	Unit	Year 0	Year - 1	Year - 2
			FY2020/21	FY2019/20	FY2018/19
5.3.1	**Monitoring and Sample Failure**				
5.3.1.1	Monitoring: % of tests performed as required by general limits /special limits/ license requirements (Average % over previous 12 months)	Annual %	100%	100%	100%
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	Quality of water returned to the resource: urban	yes/total WWTW in %	100%	100%	100%
9.3.3	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 is currently busy with the new Blue Drop PAT for the WSAs. Blue drop status is awarded to those towns that comply with 95% criteria on drinking water quality management. The blue drop performance of Bitou Municipality is summarised as follows in the DWS's 2014 Blue Drop Report, which was the last assessment done by the DWS.

Table C.4.1.12: Blue Drop Performance of the Municipality (DWS's 2014 Blue Drop Report)	
Municipal Blue Drop Score	**2011 – 96.12%, 2012 – 97.74%, 2014 – 90.44%**

Regulatory Impression: The Bitou Local Municipality team was well prepared and demonstrated their commitment to the Blue Drop assessment and water quality excellence. A decreased Municipal Score was however achieved with lower scores for all systems. The reason for the observed decrease in compliance includes:

- Monitoring programmes uploaded to the BDS did not include a WTW final water sampling point as required to comply with the requirements of SANS 241.
- Compliance monitoring data uploaded to the BDS did not include results for both final water and the network for the Nature's Valley and Kurland systems, and chemical determinants were not monitored in the network in the Plettenberg Bay system. The limited number of chemical determinants being tested was highlighted as an issue of concern in the previous Blue Drop report.
- Municipal budgets and costs were available only at a municipal level and not system specific.
- Water balance data needs verification to enable the correct calculation of the water loss indicators for No Drop compliance.

It is anticipated that with the commitment to the Blue Drop programme that the municipal team will ensure that the identified gaps are addressed and that an upward trend towards compliance will once again be achieved.

Performance Area	Kurland	Natures Valley	Plettenberg Bay
Water Safety Planning	**33.43**	**33.43**	**33.43**
Treatment Process Management	**6.80**	**8.00**	**8.00**
DWQ Compliance	**15.00**	**15.00**	**23.25**
Management, Accountability	**8.50**	**8.50**	**8.50**
Asset Management	**11.48**	**12.74**	**12.74**
Use Efficiency, Loss Management	**2.18**	**2.18**	**2.18**
Bonus Scores	4.58	3.78	2.77
Penalties	0.00	0.00	0.00
Blue Drop Score (2014)	**81.96%**	**83.62%**	**90.86%**
Blue Drop Score (2012)	97.4%	97.8%	97.8%
Blue Drop Score (2011)	95.0%	95.0%	96.2%
System Design Capacity (Ml/d)	0.6	0.0	22.0
Operational Capacity (% i.t.o. Design)	75%	30%	41%
Average daily consumption (l/p/d)	180.0	2.0	252.8
Microbiological Compliance (%)	**99.9%**	**99.9%**	**99.9%**
Chemical Compliance (%)	**99.9%**	**99.9%**	**96.1%**

Table C.4.1.13: DWS's 2014 Blue Drop Risk Profile Progress Report results for Bitou Municipality			
Municipal Blue Drop Risk Rating			
The overall 2014 Risk Rating for Bitou is 16% which translates into the best performance in the Western Cape. Note that this value is based on the 3 specific areas indicated below and shows no concerns (medium to critical risks) for Process Control (which risks reflect compliance in terms of draft Regulation 813), Drinking Water Quality and Risk Management in any of the 3 systems.			
Assessment Area	**Kurland**	**Natures Valley**	**Plettenberg Bay**
2014			
Blue Drop Risk Rating (2014)	**21.7%**	**21.7%**	**15.8%**
Process Control RR	33.3%	33.3%	28.2%
Drinking Water Quality RR	40.7%	40.7%	40.7%
Risk Management RR	21.7%	21.7%	21.7%
2013			
Blue Drop Risk Rating (2013)	**29.9%**	**36.9%**	**19.1%**
Process Control RR	41.0%	48.7%	33.3%
Drinking Water Quality RR	18.5%	11.1%	11.1%
Risk Management RR	39.1%	39.1%	39.1%
2012			

Table C.4.1.13: DWS's 2014 Blue Drop Risk Profile Progress Report results for Bitou Municipality			
Municipal Blue Drop Risk Rating			
Blue Drop Risk Rating (2012)	**72.1%**	**72.1%**	**72.1%**
Process Control RR	79.5%	79.5%	79.5%
Drinking Water Quality RR	11.1%	11.1%	11.1%
Risk Management RR	13.0%	13.0%	13.0%

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

Table C.4.1.14: 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 consumption (l/p/d)**	**Estimated Permanent Population**	**Aver. Daily Billed Metered Residential Consumption (kl)**	**Aver. Daily consumption (l/p/d)**
Plettenberg Bay	63 761	5 854	**92**	60 494	6 045	**100**
Kurland	5 739	340	**59**	5 518	394	**71**
Natures Valley	655	111	**169**	630	109	**173**
Distribution System	**2018/2019**			**2017/2018**		
	Estimated Permanent Population	**Aver. Daily Billed Metered Residential Consumption (kl)**	**Aver. Daily consumption (l/p/d)**	**Estimated Permanent Population**	**Aver. Daily Billed Metered Residential Consumption (kl)**	**Aver. Daily consumption (l/p/d)**
Plettenberg Bay	57 395	5 929	**103**	54 454	5 501	**101**
Kurland	5 306	300	**57**	5 102	358	**70**
Natures Valley	605	110	**182**	582	103	**177**

DWS's Green Drop Process

The DWS is currently busy with the new Green Drop assessment for the WSAs. Green drop status is awarded to those WSAs that comply with 90% criteria on key selected indicators on wastewater quality management. The green drop performance of Bitou Municipality is summarised as follows in the DWS's 2013 Green Drop Report, which was the last complete Green Drop assessment done by the DWS.

Table C.4.1.15: Green Drop Performance of the Bitou Municipality (DWS's 2013 Green Drop Report)	
Average Green Drop Score	**2009 – 78.00%, 2011 – 96.40%, 2013 – 98.82%**

Regulatory Impression: The Bitou Municipality is on peak form and once again did not fail to confirm their position as one of the top performers in the South African wastewater industry. To maintain a score of 96.4% is no small feat, yet the Bitou team managed to further improve to a municipal Green Drop score of 98.8%, supported by two Green Drop Certificates (>98%).

The Regulator has appreciation for the WSA's consistency, the team's discipline, supported by first-rate preparations in having appropriate and high quality evidence in place for auditing. The presence of the Technical Director during the entire assessment represents the tenure in best management that sets a benchmark for managers across the country. Notably is the municipality's concerted effort to ensure that shortcomings had been addressed since 2011. The W_2RAP is a 'home-grown' process and the product of in-house preparation, drafting and implementation by the very team who earned this 2013 Green Drop Certification. The document displays the knowledge and practical application approach that is a trademark of this edge-cutting municipality.

The excellent Green Drop score is equally reflected in the low CRR risk rating of 22 and 35% for both systems. In addition, it is worth mention that both site inspections resulted in 99% and 100% scores. The Regulator acknowledges Bitou for its top performing team at the edge of their discipline, extremely proud of their work and truly making a difference in their town

Green Drop findings:
1. Fractional scores were lost as both systems do not have sufficient stormwater ingress management plans and proof of implementation.
2. Gansevlei lost fractional scores for enforcement of bylaws (presentation of package plants enforcement) and Regulation 17 (Class II instead of Class III compliance)
3. Fractional scores subtracted for ring-fenced budget expenditure not compared to best practice expenditure (5-8% of budget to repairs and maintenance).

Site Inspection Report:

Gansevlei (Plettenberg Bay) WWTW 99%

Kurland WWTW 100%

Two plants were inspected to verify the Green Drop findings:

- The inspectors commented as follow:
  - "we could not fault any of the two plants...";
  - "the wastewater treatment facilities of Bitou surpass any of the drinking water plants inspected recently...";
  - "the plants have not been cleaned in anticipation of the inspections, this is standard practice every day running the plant...".
- The Gansevlei WWTW received a partial score for one safety contravention, namely the guards on the wheels of one of the clarifiers had been removed for galvanising. No temporary additional sign was displayed to warn of the added danger. A piece of rectagrid over one of the screen channels had also been removed and no danger tape had been put between the handrails. The screenings conveyer belt rollers were not guarded.
- Apart from the above, the Gansevlei plant complied with all criteria of the inspection scorecard. The Kurland plant complied 100% with all criteria. The following highlights are reported:
  - Flow and electricity metering taken; all process control monitoring conducted.
  - Manual, drawings, flow diagrams, incident management protocols, etc. in place and plant and staff certificates displayed.
  - The plant and surroundings are impressive, neat and tidy and the staff is happy in their setting.

Table C.4.1.15: Green Drop Performance of the Bitou Municipality (DWS's 2013 Green Drop Report)

- Screenings and grit removed and measures, covered with sand to control odours.
- Pump stations have warning system for pump failures, all equipment calibrated.
- The activated sludge plant is well maintained and operated; no fault could be found. Most impressive is the process knowledge and the cooperation between the laboratory and plant staff.
- Residual chlorine measured to remain at 0.2 mg/l and increase to with 0.8 mg/l when rain events occur to counter for upstream pollution from informal settlements.

Table C.4.1.15: Green Drop Performance of the Municipality (DWS's 2013 Green Drop Report)

GREEN DROP REPORT CARD		
Key Performance Area	**Plettenberg Bay (Gansevlei)**	**Kurland**
Process Control, Maintenance and Management Skill	**96**	**100**
Monitoring Programme	**100**	**100**
Submission of Results	**100**	**100**
Effluent Quality Compliance	**100**	**100**
Risk Management	**100**	**100**
Local Regulation	**88**	**100**
Treatment Capacity	**100**	**100**
Asset Management	**95**	**95**
Bonus Scores	1.19	0.86
Penalties	0.00	0.00
Green Drop Score (2013)	**98.77%**	**99.45%**
Green Drop Score (2011)	**96.50%**	**96.10%**
Green Drop Score (2009)	**79.00%**	**77.50%**
System Design Capacity (Ml/d)	9.000	0.650
Capacity Utilisation (% ADWF i.t.o. Design Capacity)	46.10%	36.92%
Resource Discharged into	Bitou River into Keurbooms Estuary	Salt River
Microbiological Compliance	100.00%	100.00%
Chemical Compliance	99.19%	99.07%
Physical Compliance	98.12%	99.07%
Overall Compliance	98.81%	99.18%
Wastewater Risk Rating (2012)	**22.70%**	**17.60%**
Wastewater Risk Rating (2013)	**22.73%**	**35.29%**

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 Bitou Municipality were summarised as follow in DWS's 2014 Green Drop Risk Profile Progress Report.

Table C.4.1.16: DWS's 2014 Green Drop Risk Profile Progress Report results for Bitou Municipality		
Technology Description	**Kurland**	**Plettenberg Bay (Gansevallei)**
Technology (Liquid)	Activated sludge	Activated sludge
Technology (Sludge)	Sludge lagoon/pond	Sludge lagoon/pond
Key Risk Areas		
ADWF Design Capacity (Ml/d)	0.65	9
Operational flow (% of Design Capacity)	26%	30%
Annual Average Effluent Quality Compliance (2012-2013)	**97.9%**	**99.0%**
Microbiological Compliance (%)	**100.0%**	**100.0%**
Physical Compliance (%)	**98.1%**	**99.8%**
Chemical Compliance (%)	**97.2%**	**98.1%**
Technical skills (Reg 813)	Yes	Yes
2014 Wastewater Risk Rating (%CRR/CRR$_{max}$)	**17.6%**	**22.7%**
2013 Wastewater Risk Rating (%CRR/CRR$_{max}$)	**35.3%**	**22.7%**
Risk Abatement Planning		
Highest Risk Areas based on the CRR	None	None
WW Risk Abatement Status	Final document plus implementation	Final document plus implementation
Capital & Refurbishment expenditure for Fin Year 2012-2013 (Rand)	None specified	R0,439m
Description of Projects' Expenditure 2012-2013	Replace floating Aerator, Install Kurland Sewer Pump station 3 services link to Housing	Platform 75 kW aerator, services link to housing, relocation of pump station 1,1A. The latter two projects are in the process
W$_2$RAP Abatement Document and Status Commentary	W2RAPs were provided for the 2 wastewater systems dated 2012/13, approved by Municipal Manager. No indication of multi-disciplinary team involved in development and implementation. Wastewater systems described, existing system assessed - general comments regarding systems stated. Specific hazard assessment done for catchment (Wit River catchment) and improvement plan provided for all priorities. Three high risks identified. General comments made on sewage pump stations and plants as well as control measures. Specific hazard assessment then done (with hazard risk matrix). >90 risks identified for Gansevlei plant and >80 for Kurland. Four high risks identified for Gansevlei before mitigation. All residual risks low. Risks are identified for screenings, degritting, inflow metering, anaerobic zone, disinfection, wastewater monitoring, human resources, management, etc. Six high risks identified for Kurland before mitigation. All residual risks low. Monitoring included in control measures. Measurement and evaluation of wastewater quality included in control measures. Appears as if W$_2$RAP is effective and meets health and environmental based targets. Management procedures and support programmes included. Sections included on incident alert levels and notifications as well as an emergency protocol . Commendable work by the municipality.	

Regulatory Impression

Bitou Municipality continues to perform excellently in managing their wastewater systems. During the Green Drop assessment (2013), both systems achieved well beyond the 90% benchmark and the Municipality is competing amongst the best performing municipalities in South Africa. This is a feat that requires great competency, care and willful planning and should be safeguarded at all cost in the future. The Municipality is congratulated for their accomplished contribution to wastewater management in South Africa.

It is often difficult to show further progress once a state of excellence has already been achieved. However, Bitou shows in the present 2014 Green Drop Performance Progress Assessment an even further reduction in the Wastewater Risk Rating for Kurland, whist Plettenberg Bay (Gansevlei) remained constant. The latter is mainly due to not all the required process controller competency being available at the plant during all the shifts worked. The Municipality should aim to improve the situation. Wastewater quality discharged at both works remains excellent, while sufficient wastewater treatment capacity is available.

C.4.2. Water Quality Compliance

The table below gives an overview of Bitou 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	D
	Results from Integrated Regulatory Information System																			
n/a		Total	963	324	1608	4499	2366	960	968	332	1633	4551	2389	969	953	323	1591	4428	2399	950
n/a	Analysis compliance	Nr Failures	0	0	0	1	0	903	0	0	3	1	0	881	0	0	1	3	4	660
n/a		Compliance %	100%	100%	100%	100%	100%	6%	100%	100%	100%	100%	100%	9%	100%	100%	100%	100%	100%	31%
n/a	Samples frequency	Total	958	322	955	958	958	955	954	324	955	958	958	955	950	323	947	950	950	947
n/a	**(Information on IRIS is**	Nr Failures	287	165	287	287	287	287	289	169	290	290	290	290	277	157	277	277	277	277
n/a	**not correct)**	Compliance %	70%	49%	70%	70%	70%	70%	70%	48%	70%	70%	70%	70%	71%	51%	71%	71%	71%	71%
n/a	Sites compliance	Total	307	307	307	307	307	307	304	303	305	305	305	305	297	294	297	297	297	297
n/a	**(Information on IRIS is**	Nr Failures	151	151	151	151	151	151	148	149	149	149	149	149	141	141	141	141	141	141
n/a	**not correct)**	Compliance %	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	53%	52%	53%	53%	53%	53%
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 %	84%						85%						88%					

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

Note The Compliance for the samples frequency and the sites in the above table, as taken from DWS's IRIS, is not correct for Bitou Municipality. Will be further discussed with DWS.

The table below gives an overview of the number of compliance samples taken during the last two financial years throughout the various water distribution networks.

Table C.4.2.2: Number of water quality samples taken throughout the various water distribution systems for the last two financial years

Number of Sampling points within distribution system	20		3		3	
Parameter Sampled	**20/21**	**19/20**	**20/21**	**19/20**	**20/21**	**19/20**
	Plettenberg Bay		**Kurland**		**Natures Valley**	
Alkalinity (as $CaCO_3$)	712	692	115	109	128	127
Aluminium (as Al)	277	264	73	68	88	86
Calcium (as Ca)	712	692	115	109	128	126
Colour	712	692	115	109	128	127
Conductivity	712	692	115	109	128	127
Copper (as Cu)	238	228	35	33	49	49
E.Coli	712	692	115	109	128	127
Free Chlorine	710	692	114	106	128	127
Iron (as Fe)	238	456	35	55	49	98
Magnesium (as Mg)	712	692	115	109	128	127
pH (at 25°C)	712	692	115	109	128	127
Sulphate (as SO4)	238	228	35	55	49	98
Total Dissolved Solids	711	691	115	109	128	127
Total Hardness (as $CaCO_3$)	712	692	115	109	128	127
Turbidity	712	692	115	109	128	127
Total	**8 820**	**8 787**	**1 442**	**1 407**	**1 643**	**1 727**

The water quality of all the water distribution systems in Bitou Municipality is "Excellent", according to the SANS 241:2015 classification. The water quality compliance sample results are included in Annexure D for each of the distribution systems. The overall percentage of compliance of the water quality samples taken over the last two financial years are summarised in the table below per distribution system (SANS 241: 2015 Limits).

Table C.4.2.3: Percentage compliance of the water quality samples for the last two financial years				
Performance Indicator	Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2015)		% Sample Compliance according to SANS 241-2015 Limits	
	2020/2021	2019/2020	2020/2021	2019/2020
Plettenberg Bay				
Acute Health Microbiological	No (Excellent)	No (Excellent)	100.0%	100.0%
Acute Health Chemical	No (Excellent)	No (Excellent)	100.0%	100.0%
Chronic Health	No (Excellent)	No (Excellent)	100.0%	100.0%
Aesthetic	No (Excellent)	No (Excellent)	99.9%	100.0%
Operational Efficiency	No (Excellent)	No (Excellent)	100.0%	100.0%
Kurland				
Acute Health Microbiological	No (Excellent)	No (Excellent)	100.0%	100.0%
Acute Health Chemical	No (Excellent)	No (Excellent)	100.0%	100.0%
Chronic Health	No (Excellent)	No (Excellent)	99.5%	98.5%
Aesthetic	No (Excellent)	No (Excellent)	100.0%	100.0%
Operational Efficiency	No (Excellent)	No (Excellent)	100.0%	100.0%
Natures Valley				
Acute Health Microbiological	No (Excellent)	No (Excellent)	100.0%	100.0%
Acute Health Chemical	No (Excellent)	No (Excellent)	100.0%	100.0%
Chronic Health	No (Excellent)	No (Excellent)	100.0%	100.0%
Aesthetic	No (Excellent)	No (Excellent)	99.9%	100.0%
Operational Efficiency	No (Excellent)	No (Excellent)	99.8%	100.0%

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 Bitou 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	190	664	712	-	200	689	751	-	-	-	-	-
n/a		Nr Failures	0	2	3	-	0	4	1	-	-	-	-	-
n/a		Compliance %	100%	100%	100%	N/A	100%	99%	100%	N/A	100%	100%	98%	N/A
n/a	Operational compliance	Total	Not captured on IRIS and 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 %	0%	0%	0%	N/A	0%	1%	0%	N/A	0%	0%	2%	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 complies with the authorised Microbiological, Chemical and Physical limits for both WWTWs. The overall Microbiological, Chemical and Physical compliance percentages of the final effluent samples taken over the period July to June for the last two financial years at the Plettenberg Bay and Kurland WWTWs are summarised in the tables below.

Table C.4.2.6: Percentage microbiological (E.Coli) compliance of the compliance samples taken at the various WWTWs for the last two financial years.

WWTW	2020/2021	2019/2020
Plettenberg Bay	100.0%	100.0%
Kurland	100.0%	100.0%
Total	**100.0%**	100.0%

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

WWTW	2020/2021					2019/2020				
	Ammonia	Nitrites & Nitrates	COD	Ortho-Phosphate	Overall	Ammonia	Nitrites & Nitrates	COD	Ortho-Phosphate	Overall
Plettenberg Bay	99.3%	100.0%	100.0 %	100.0%	99.8%	100.0%	100.0%	100.0%	100.0%	100.0%
Kurland	100.0%	100.0%	100.0 %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total	**99.4%**	**100.0%**	**100.0%**	**100.0%**	**99.9%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

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

WWTW	2020/2021				2019/2020			
	pH	Electrical Conductivity	Suspended Solids	Overall	pH	Electrical Conductivity	Suspended Solids	Overall
Plettenberg Bay	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table C.4.2.8: Percentage physical compliance of the compliance samples taken at the various WWTWs for the last two financial years.								
WWTW	2020/2021				2019/2020			
	pH	Electrical Conductivity	Suspended Solids	Overall	pH	Electrical Conductivity	Suspended Solids	Overall
Kurland	97.6%	100.0%	100.0%	99.2%	100.0%	100.0%	100.0%	100.0%
Total	**99.5%**	**100.0%**	**100.0%**	**99.8%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

The effluent quality compliance sampling results per parameter per WWTW for the 2020/2021 financial year is also included in Annexure D.

C.4.3. Incident Management

A comprehensive Water Safety Plan is in place for Bitou Municipality. A qualified, dedicated team was established by Bitou Municipality to compile the Water Safety Plan. The following Catchments, WTWs and distribution systems were evaluated as part of the Water Safety Plan.

- Keurbooms River Catchment, Piesang River Catchment, Plettenberg Bay WTW and Plettenberg Bay distribution system.
- Wit River Catchment, Kurland WTW and Kurland distribution system.
- Groot River Catchment, Natures Valley WTW and Natures Valley distribution system.

A detailed risk assessment was executed as part of the Water Safety Plan and the existing control measures implemented by Bitou Municipality were summarised. The effectiveness of the existing control measures were also evaluated. The impact of each of the hazards or hazardous events were characterised by assessing the severity of the likely health outcome and the probability of occurrence as part of Bitou Municipality's Water Safety Plan. An Improvement / Upgrade Plan was compiled for all the existing significant risks, where the existing controls were not effective or absent. Each identified improvement was linked to one of the Water Safety Plan Team members to take responsibility for implementation together with an appropriate time frame for implementation of these controls.

A W_2RAP for the various WWTWs is also in place. 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 Bitou Municipality are committed to meet regularly to review the implementation of all the aspects of the Water Safety Plan and W_2RAP 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_2RAP 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.

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

An Incident Response Management Protocol is in place and forms part of Bitou Municipality's Water Safety Plan and W_2RAP. 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 various WTWs and 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.

An Operational and Compliance Water Quality and Final Effluent Monitoring Programme, which meets the requirements of the DWS as stipulated in their Blue and Green Drop criteria, were drawn up by Bitou Municipality and are implemented by the Municipality (Included under Section C.4.1).

Bitou Municipality's Maintenance Team mainly performs their own repair and preventative maintenance work to the equipment and infrastructure of the Municipality, except when specialized repair work is required, in which case the work is sub-contracted to approve Contractors on the Municipality's Supplier database.

Table C.4.3.1: Incident Management and Reporting Overview

WSDP Ref #	Measurable / Enabling Factor	Unit	Year 0 FY2020/21	Year - 1 FY2019/20	Year - 2 FY2018/19
6.3	**Water Supply and Quality**				
6.3.1	Incident Management Protocol in place	yes/total schemes in %	100%	100%	100%
6.3.5	Failure Response Management in place	yes/total schemes in %	100%	100%	100%
6.4	**Waste Water Supply and Quality**				
6.4.1	Incident Management Protocol in place	yes/total schemes in %	100%	100%	100%
6.4.5	Failure Response Management in place	yes/total schemes in %	100%	100%	100%

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 Micriobiological	Acute Health Chemical	Chronic Health	Acute Health Micriobiological	Acute Health Chemical	Chronic Health	Acute Health Micriobiological	Acute Health Chemical	Chronic Health
Failures in terms of Analysis	Total nr	955	322	1596	968	332	1633	953	323	1591
	Nr of failures	0	0	1	0	0	3	0	0	1
	Failure %	0.0%	0.0%	0.1%	0.0%	0.0%	0.2%	0.0%	0.0%	0.1%
	Nr reported	0	0	1	0	0	3	0	0	1
	Reported % of failure	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Failures in terms of Samples	Total	955	322	1596	968	332	1633	953	323	1591
	Nr of failures	0	0	1	0	0	3	0	0	1
	Failure %	0.0%	0.0%	0.1%	0.0%	0.0%	0.2%	0.0%	0.0%	0.1%
	Nr reported	0	0	1	0	0	3	0	0	1
	Reported % of failure	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Failures in terms of Sites	Total	955	322	1596	968	332	1633	953	323	1591
	Nr of failures	0	0	1	0	0	3	0	0	1
	Failure %	0.0%	0.0%	0.1%	0.0%	0.0%	0.2%	0.0%	0.0%	0.1%
	Nr reported	0	0	1	0	0	3	0	0	1
	Reported % of failure	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: The Failures in terms of Samples and Sites were kept the same as the Analysis failures, because the information on DWS's IRIS for the failures in terms of sample frequency and site compliance are not correct.

C.5. Water Conservation and Water Demand Management

The table below gives an overview of the WC/WDM activities implemented by Bitou 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	15,319	100%	15,257	100%	13,953	100%	0	0%	0	0%	0	0%
7.1.1.3		Reticulation leaks fixed (Pipe bursts)	893	100%	943	100%	810	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	6,587	43%	6,561	43%	6,000	43%	0	0%	0	0%	0	0%
7.1.2.2		300 kPa - 600 kPa	4,289	28%	4,272	28%	3,907	28%	0	0%	0	0%	0	0%
7.1.2.3		600 kPa - 900 kPa	2,145	14%	2,136	14%	1,953	14%	0	0%	0	0%	0	0%
7.1.2.4	10.2.b.iii	> 900 kPa	2,298	15%	2,289	15%	2,093	15%	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	Unknown	0%	Unknown	0%	Unknown	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	10	0%	22	0%	24	0%	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	11	0%	11	0%	11	0%	0	0%	0	0%	0	0%
7.1.4.2		Number of consumers (people) targeted by public information programmes	15,319	100%	15,257	100%	13,953	100%	0	0%	0	0%	0	0%

Quantity of water unaccounted for (Ml/year):

WC/WDM measures were recommended for Bitou Municipality as part of the updated WSDP. The WC/WDM measures will enable the Municipality to meet the challenge of the growing water requirements on the raw water resources and to reduce the current NRW and Water Losses for the various distribution systems.

Bitou Municipality adopted a Drought Management Policy during the 2016 to 2018 drought experienced in the Western Cape. The levels of water restrictions are indicated in the table below:

Table C.5.2: Levels of water restrictions (Drought Management Policy)

Level of Water Restriction	Trigger Point	Percentage target reduction in potable water supply and demand	Target Consumption of Potable Water Demand (Ml/d)	Calculated number of remaining weeks of bulk raw water supply (Weeks)
Water Conservation Measures	Permanent 100% - 81%	Baseline	9.20	11.27
1: Moderate	80% - 66%	0% - 10%	8.28	9.68
2: High	65% - 51%	10% - 20%	8.16	6.93
3: Very High	50% - 36%	20% - 30%	6.44	5.12
4: Severe	35% - 21%	30% - 40%	5.52	5.69
5: Emergency	< 20%	40% - 50%	4.60	6.83

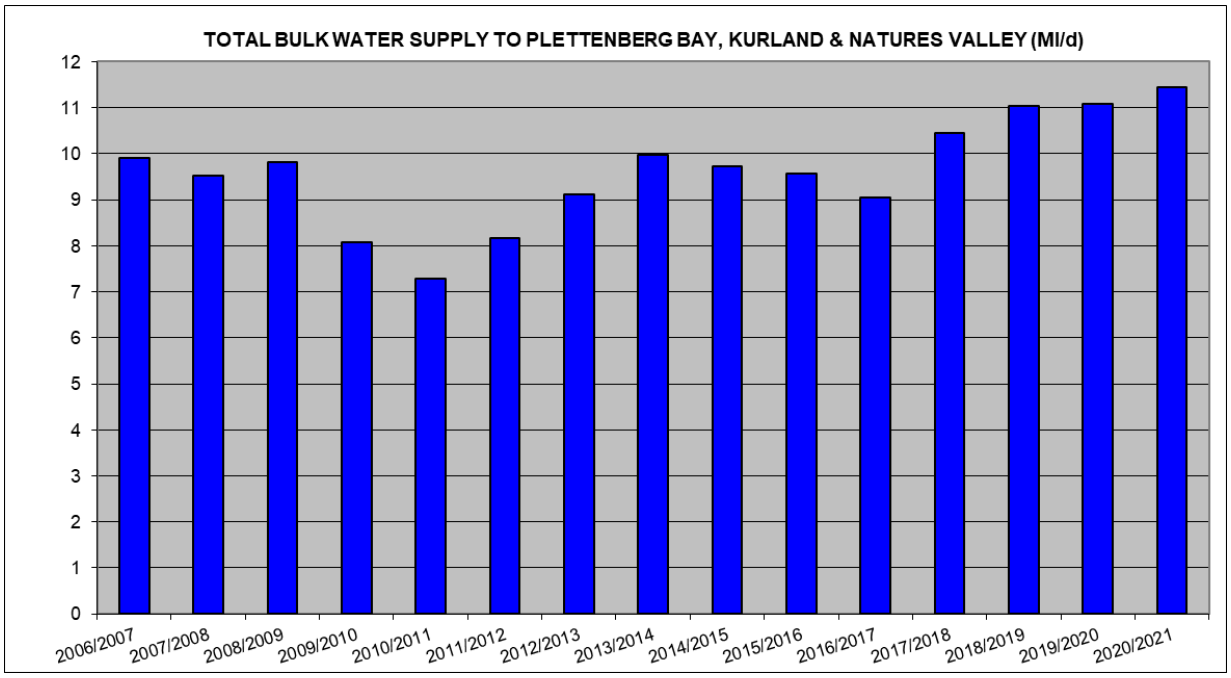


Figure C.5.1: Total Daily Bulk Raw Water Supply to Plettenberg Bay, Kurland and Natures Valley.

The drought measures, water restrictions and other WC/WDM measures implemented by Bitou Municipality over the drought periods 2009/2010 to 2010/2011 and again over the period 2015/2016 to 2016/2017 resulted in a reduction of the overall water requirements for the towns, as can be noted from the above graph. There was however a steady increase in total water requirement experienced over the last four financial years.

The following water demand measures were also adopted as part of the Drought Management Policy:

(1) The Municipality may in general or in emergencies by public notice, require any owner or consumer to comply with good water conservation and demand management practices as set out hereunder:

(a) No person may without prior written authority from the Head of Department: Engineering Services water a garden, park, golf course or other grassed area using potable water, between the hours of 10:00 and 16:00.

(b) Where a hosepipe is used to irrigate a garden, park, or sports field from a potable water source a controlling device such as a sprayer shall be attached to the hose end, depending on the dam levels and river flows.

(c) A hosepipe used for washing vehicles, boats, and caravans must be fitted with an automatic self-closing device, depending on the dam levels and river flows.

(d) Automatic top up systems using a float valve fed from a potable water source to supply swimming pools and garden ponds are not allowed.

(e) Commercial car wash industries must recycle a minimum of 50% of the water used in operations.

(f) Wash-hand basins provided in public facilities must be fitted with demand type taps.

(g) Showers provided at public facilities must be fitted with demand type valves.

(h) Potable water may not be used to dampen building sand and other building material to prevent it from being blown away.

(i) Stand pipe draw-off taps must be at a height of at least 450mm, measured above ground level.

(j) Water closet cisterns may not exceed 9.5 litres in capacity and such cistern must be of dual flushing mechanisms.

(k) No automatic cistern or tipping tank may be used for flushing a urinal.

(l) Within two years after the promulgation of this Policy all automatic flushing cisterns fitted to urinals, must be replaced with either manually operated systems or non-manual apparatus which causes the flushing device to operate after each use of such urinal.

(m) Terminal water fittings installed outside any buildings other than a residential dwelling must-

(i) Incorporate a self-closing device;

(ii) Have a removable handle for operating purposes;

(iii) Be capable of being locked to prevent unauthorized use; or

(iv) Be of a demand type that limits the quantity of water discharged in each operation;

(n) Each new dwelling must be fitted with a 5000l tank to collect rain water

(o) Turn-around time for repairing water leaks must be reduced to 2hrs

(2) Additional measures or practices, as deemed necessary may be implemented.

(3) Infrastructure Maintenance - Installation of isolation valves in the network, rezone the areas for maintenance purposes.

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

Table C.5.3: Treatment Losses, 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
Plettenberg Bay	Treatment Losses	Volume	167.337	198.056	252.564	278.997	168.139	168.763
		Percentage	4.3%	5.8%	7.2%	8.3%	6.0%	5.5%
	NRW	Volume	1 330.010	1 084.239	973.853	984.733	387.339	836.629
		Percentage	36.0%	30.5%	27.8%	29.9%	13.3%	27.0%
	Water Losses	Volume	891.142	1 062.643	930.383	944.893	321.049	766.964
		Percentage	24.1%	29.9%	26.5%	28.7%	11.0%	24.8%
	ILI		2.83	3.75	3.36			
	The treatment losses are at an acceptable level. There was an increase in the NRW for the last financial year. The Water Losses came down, due to a more accurate calculation of the estimated unbilled unmetered consumption for 2020/2021. The proposed WC/WDM Strategy, as included in the WSDP, needs to be implemented. Sufficient funding needs to be allocated towards the implementation of the WC/WDM measures. Municipality needs to work towards a NRW of 25% and Water Losses of 20% for Plettenberg Bay. The ILI of 2.83 is good, but should be monitored carefully.							
Kurland	Treatment Losses	Volume	23.320	4.158	2.917	12.436	16.107	11.144
		Percentage	9.9%	1.9%	1.5%	6.6%	9.4%	6.3%
	NRW	Volume	81.446	69.368	79.841	40.584	29.327	43.027
		Percentage	38.5%	31.7%	41.4%	23.0%	18.8%	25.9%
	Water Losses	Volume	63.011	52.167	54.159	27.134	26.054	39.185
		Percentage	29.8%	23.9%	28.1%	15.4%	16.7%	23.6%
	ILI		3.47	2.91	3.32			
	The NRW and Water Losses increased during the last financial year. Municipality needs to work towards a NRW of 25% and Water Losses of 20% for Kurland. The ILI of 3.47 is good, but should be monitored carefully.							
Natures Valley	Treatment Losses	Volume	26.011	26.653	18.775	9.880	1.622	2.588
		Percentage	30.9%	33.9%	24.6%	17.4%	3.4%	4.9%
	NRW	Volume	16.361	10.602	15.854	6.884	0.087	9.056
		Percentage	28.2%	20.4%	27.5%	14.7%	0.2%	18.0%
	Water Losses	Volume	11.222	10.498	15.739	6.790	0	8.445
		Percentage	19.3%	20.2%	27.3%	14.5%	0.0%	16.8%
	ILI		2.40	1.59	2.39			
	The treatment losses is very high and needs to be reduced. The NRW increased during the last financial year. The Water Losses came down, due to a more accurate calculation of the estimated unbilled unmetered consumption for 2020/2021. Municipality needs to work towards a NRW of 25% and Water Losses of 20% for Natures Valley. The ILI of 2.40 is good, but should be monitored carefully.							
TOTAL	**Treatment Losses**	Volume	**216.668**	**228.867**	**274.256**	**301.313**	**185.868**	**182.495**
		Percentage	**5.18%**	**6.11%**	**7.25%**	**8.33%**	**6.13%**	**5.51%**
	NRW	**Volume**	**1 427.817**	**1 164.209**	**1 069.548**	**1 032.201**	**416.753**	**888.712**
		Percentage	**36.02%**	**30.47%**	**28.46%**	**29.37%**	**13.37%**	**26.84%**
	Water Losses	**Volume**	**965.375**	**1 125.308**	**1 000.281**	**978.817**	**347.103**	**814.594**
		Percentage	**24.35%**	**29.46%**	**26.62%**	**27.86%**	**11.13%**	**24.60%**
	ILI		2.77	3.66	3.34			
	The overall treatment losses are at an acceptable level. The overall NRW for all the systems is high and needs to be reduced. The overall Water Losses came down during the last financial year, due to a more accurate calculation of the estimated unbilled unmetered consumption for 2020/2021. Municipality needs to work towards an overall NRW of 25% and Water Losses of 20%. The ILI of 2.77 is good, but should be monitored carefully.							

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) in the above table 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 and ILI = 1 is a theoretical limit, which is the minimum water loss in an operational water reticulation system. A value of less than 1 should not occur since this implies that the actual leakage is less than the theoretical minimum level of leakage.

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.5.4: 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	Plettenberg Bay	Kurland	Natures Valley
System Input Volume	945	825	409
Average Billed Metered Cons.	605	507	294
Non-Revenue Water	340	318	115

Plettenberg Bay is the town with the highest system input volume, average billed metered consumption and Non-Revenue Water per connection per day, because it is the only large town of Bitou Municipality and the town with the biggest commercial centre.

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

The implementation of pressure management options for the Plettenberg Bay and the Kurland distribution systems were indicated as low priority in the November 2007 CES draft WDM Strategy. The estimated saving by pressure reduction for Plettenberg Bay, leading to an average reduction of 3 bar is about 73 000 kl/year. The saving potential for both Plettenberg Bay and Kurland was estimated at 2%.

The updated Water Master Plans will be consulted in conjunction with the WDM Strategy to identify further areas where pressure reduction can be implemented. The table below gives an overview of the average and maximum static and residual pressures for the various water distribution systems and zones (Nov 2019).

Table C.5.5: Average and maximum static and residual pressure experienced by consumers for the various water distribution systems and zones

Distribution System	Zone (PRV Setting in m)	Static Pressure		Residual Pressure	
		Average (m)	Max (m)	Average (m)	Max (m)
Archiewood and Brackenridge Reservoir	Archiewood Reservoir	55	105	54	102
	Brackenridge from Archiewood Reservoir	84	148	83	147
	Archiewood PRV (30m)	46	57	46	57
Brakkloof Reservoir	Brakkloof Reservoir	46	115	45	115
Goose Valley Reservoir	Goose Valley	73	104	72	104
Green Valley Reservoir	Green Valley Reservoir	36	80	36	79
Green Valley Tower	Green Valley Tower	9	12	9	12
Keurboomstrand Reservoir	Keurboomstrand Reservoir	42	68	42	67
Kranshoek Tower	Kranshoek Tower	28	80	26	78
Kurland Reservoir	Kurland Reservoir	42	55	20	32
Kwanokuthula Towers	Kwanokuthula Tower High	29	47	19	34
Lower Tower	Lower Tower	34	66	31	61
Upper Tower	Upper Tower	24	46	24	46
Matjiesfontein Reservoir	Matjiesfontein Reservoir	47	54	46	54
Natures Valley PRV	Natures Valley Reservoir	24	38	23	37
Natures Valley Reservoir	Natures Valley PRV (30m)	29	30	29	30

Table C.5.5: Average and maximum static and residual pressure experienced by consumers for the various water distribution systems and zones					
Distribution System	Zone (PRV Setting in m)	Static Pressure		Residual Pressure	
		Average (m)	Max (m)	Average (m)	Max (m)
New Horizon Reservoir	New Horizon Reservoir	36	128	36	128
	New Horizon PRV (30m)	40	67	40	67
	Schoongezight PRV (45m)	83	95	83	95
Quarry Reservoir	Quarry Reservoir	34	73	34	72
Town Reservoirs	Town Reservoirs	55	114	49	113
	Town PRV1	55	84	53	75
	Town PRV2	47	82	46	77
	Town PRV3	48	58	47	57
	Town PRV4	49	86	37	82
Whale Rock Reservoir	Whale Rock Reservoir	60	78	53	75
Wittedrift Reservoirs	Wittedrift Reservoir	41	84	40	84
Aventura Reservoir (Private)	Aventura	26	35	27	35
Keurview Reservoir (Private)	Keurview Reservoir	46	87	45	86

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

Section 3.3.1 of the Future Demand and Functionality Requirements WSDP Report includes the recommendations with regard to the future proposed distribution zones and systems and required works for the water reticulation networks.

Demand management activities undertaken:

All bulk water supplied from the various water resources to the Plettenberg Bay, Kurland and Natures Valley systems are metered through bulk water meters. The outflows from some of the reservoirs are also logged through the Municipality's Telemetry System and the night flows are therefore also monitored at some of the reservoirs. The Municipality will also start in the future with the logging of Minimum Night Flows (MNF) for specific zones for the monitoring of the flows and the implementation of pressure management. This process will enable the Municipality to establish comprehensive water management zones for the various distributions systems, as part of the Water Master Planning process, which will enable the Municipality to manage the NRW and Water Losses for specific zones better in the future.

The main water demand management interventions implemented by Bitou Municipality over the last few years were as follows:

- The 2014/2015 Water and Sewer Master Plans were updated during 2020.
- Customer Services and Complaints System is implemented by the Municipality (Burst pipes, etc.). Standby teams are also available after hours and over weekends for immediate repairs of burst pipes and water leaks.
- Strict municipal service standards for the installation of new water reticulation networks for own and private developments. Reticulation material and quality standards checks.
- Meter and record all bulk water supply to the various distribution systems and improve the quality of data regarding the monthly consumer usage in order to carry out more detail IWA water balances for the various systems.
- Implement a seven (7) block step water tariff structure that promotes the efficient use of water and discourage wastages. Regular review of water and sewerage tariffs.
- Pressure reduction (PRVs), re-zoning of network from various reservoirs (bulk meters for each zone) and automatic meter reading (Scada system). Focused leak detections and repairs.
- Implementation of pipeline and meter replacement programmes. Various bulk water meters were replaced during the 2018/2019 financial year. Pre-paid water meters were also installed.

- Assistance programmes in low income areas to reduce water leakages (Domestic leak repairs at indigent households).
- Various Water Week and Water Conservation Awareness Campaigns.
- "War on Leaks" project. Municipal plumbers awareness on water losses.
- Re-use of treated effluent for irrigation purposes.

DWS's scorecard for assessing the potential for WC/WDM efforts, as completed for Bitou Municipality, is included in Annexure B. 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 Bitou Municipality is 74 out of 100 suggesting that the Municipality is making good progress with regard to the implementation of specific WC/WDM activities.**

The proposed WC/WDM Strategy, as included in the new WSDP, is also based on these 25 KPIs and the recommendations and budget requirements for each of the KPIs are summarised in the table below.

Table C.5.6: Proposed WSDP WC/WDM Strategy

Recommendation and Strategy	Funding and Budget Requirements
Item 1: Development of a standard water balance	
• Continue with the monthly updating of the IWA Water Balances for all the systems and reporting on the NRW and Water Losses for each of the systems to management. • Continue with the drafting of an annual WSDP Performance and Water Services Audit Report, as required by the Water Services Act, which include the IWA Water Balances. • Implement the recommended WC/WDM activities in order to reduce the NRW and Water Losses even further. • Determine all unbilled authorized consumption by firstly identify all the relevant consumers, e.g. Municipal buildings, parks, fire services, sport fields, etc. Unbilled consumption do not generate income, but will enable the municipality to better quantify their actual water losses.	No specific budget requirements. The IWA Water Balances for the systems are updated on a monthly basis by the municipality.
Item 2: Pressurised system at all times	
• Adequate human resources, technical skills and O&M budgets need to be allocated towards the operation, maintenance and refurbishment of the existing infrastructure, in order to ensure that systems are always pressurised. • Existing water pump stations that are in a poor condition needs to be refurbished. • PRVs to be serviced regularly.	Budgets as indicated under the individual items of the WC/WDM Strategy. Increase O&M budget allocations towards the refurbishment and replacement of old water infrastructure.
Item 3 and 4: Metering System	
• All un-metered water connections, as identified through the WSMP process, need to be provided with water meters. Meters need to be read on a monthly basis and consumers need to be billed monthly according to their actual water usage. In addition to water theft, many water accounts go unnoticed in the system or have some type of data inconsistency that results in no revenue being generated for the particular water use event. The Treasury data therefore needs to be cleaned and the municipality needs to identify and correct any inaccurate data in the system. • Consumer consumption checks / investigations need to be carried out where water usage are very low, but there are households on the property. This project will give a clear indication of where illegal or unregistered connections is being made and whether the meter is under reading the actual consumption, thus water is being used but not billed or recorded. • Municipality needs to continue with the implementation of their Meter Management / Replacement program. • Relevant activities need to be budgeted for.	Install water meters for all un-metered water connections. Estimated budget requirement for the installation of individual water meters is R3 260 000.
Item 5: Effective and Informative Billing System	

Table C.5.6: Proposed WSDP WC/WDM Strategy	
Recommendation and Strategy	**Funding and Budget Requirements**
• Municipality needs to ensure that all customer's meters are read on a monthly basis and that the customers are billed on a monthly basis according to the actual volume of water used for the specific month. • Municipality needs to continue with the commercial data analysis done on the billed metered consumption data, which include the identification of un-metered erven, investigating meters with zero consumption, investigating abnormal low and high consumption readings, oversized / undersized meters, etc. • Additional measures can be implemented to make the consumer bills more informative.	Estimated cost to enhance the user friendliness of the municipal bill is R275 000.
Item 6 and 7: General Complaints System	
• The municipality needs to ensure that all consumers are familiar with the telephone numbers to lodge complaints and report leaks. Suggestions would be to include these numbers on the monthly water bills, on the Municipality's website, strategically located notice boards, radio broadcasts, etc. • Implement projects and measures for passive leakage control. • Consumer Charter to include all relevant information.	Budget requirement for improved customer awareness raising with regard to the Municipality's Complaints System R130 000/annum.
Item 8: Asset Register for Water Infrastructure	
• The municipality needs to ensure that all the existing water and sewerage infrastructure is included in the Asset Register. The CRC of the infrastructure also needs to be indicated.	None - To be done as part of the annual updating of the Asset Register by the municipality.
Item 9: Asset Management Capital Works	
• Allocate a budget of at least 2% of the total water asset value per annum towards the replacement of existing infrastructure. Municipality needs to differentiate in their capital budget between new projects and projects that are for the replacement of existing infrastructure, in order to accurately calculate the annual percentage allocated towards the replacement of existing infrastructure.	Capital budget of at least 2% of the total water and sewerage asset value allocated towards the replacement of the existing water and sewerage infrastructure.
Item 10: Asset Management Operation and Maintenance	
• The municipality needs to differentiate between budget allocated towards the operation and maintenance of the water infrastructure and the budget allocated towards the replacement of the water and sewerage infrastructure. A budget of approximately 1% to 2% of the value of the system is typically required for the operations and maintenance of the system to ensure that the system remains in good condition. • The municipality needs to compile an Asset Management Plan (AMP) to ensure efficient, effective and optimal management, operation and maintenance of all assets, which includes treatment plants, reservoirs, structures, buildings, pipelines, sites, etc. • This plan must be based on the principle of preventative maintenance in order to ensure that, as far as this is practical, damage to assets is prevented before it occurs. The municipality needs to ensure that the maintenance and rehabilitation plan is part of the WSDP and that the plan is implemented. Assets must be rehabilitated and / or replaced before the end of their economic life and the necessary capital funds must be allocated for this purpose. Priority should be given to rehabilitating existing infrastructure as this generally makes best use of financial resources and can achieve an increase in (operational) services level coverage's most rapidly. The preparation of maintenance plans and the allocation of sufficient funding for maintenance are required to prevent the development of a large condition backlog. The potential renewal projects for the water infrastructure need to be identified from the Asset Register. All assets with a condition grading of "poor" and "very poor" need to be prioritised. • The O&M Budget allocated towards repairs and maintenance should include the replacement of malfunctioning and old bulk water meters and consumer water meters, clearing of meter chambers, buying replacement mechanisms for bulk water meters, speedy repair of leaks, leak detection in areas with high water losses and NRW and higher than expected night flows, etc.	Additional budget should be allocated towards the repairs and maintenance of the existing water infrastructure. The additional budget should be determined by the municipality once an AMP is developed. A budget of approximately 1% to 2% of the value of the system is typically required for the operations and maintenance of the system to ensure that the system remains in good condition. An estimated budget for the drafting of an AMP for all the water and sewerage infrastructure is R650 000.
Item 11: Dedicated WC/WDM Support	
• The municipality should allocate at least one (1) person to head WC/WDM for a start. The number of people involved with WC/WDM measures can later be increased as and when required.	The municipality may be able to use one of their existing staff members. If a new person has to be appointed the municipality can determine the costs involved with such an appointment.

Table C.5.6: Proposed WSDP WC/WDM Strategy	
Recommendation and Strategy	**Funding and Budget Requirements**
Item 12: Active Leakage Control	
• Leakage control of the reticulation network; • Leak detection; and • Repair of leaks once identified.	R200 000 to undertake leak detection in zones with high excess night flows. In addition allocate approximately R125 000 per year for general visual leak inspections.
Item 13: Sectorization of Reticulation Systems	
• The billed metered data, which is currently linked to the distribution systems, should also be linked to the different reservoir zones in the future where possible, in order to accurately determine the NRW and water losses for the specific reservoir zones. Faulty bulk water meters need to be replaced and new meters need to be installed for the reservoirs and pump stations with no bulk water meters. • The Financial Department needs to continue to provide the billed metered consumption data separately for each of the systems. • Night flows need to be measured for zones with expected high water losses. It is recommended to re-log the night flows every few years to determine if there was an increase in leakage.	The estimated cost for the logging of flows and pressures for zones with expected high water losses is R300 000. The logging exercise should be repeated at least every three years. A budget should be allocated to investigate and resolve possible zone interconnections. It is however difficult to price such investigations at this stage.
Item 14: Effective Bulk Metering Management System	
• All bulk water meters at existing WTWs, reservoirs and pump stations need to be read and recorded on at least a weekly basis. • Broken bulk water meters need to be repaired or replaced. • All bulk water meters need to be installed in lockable meter chambers and reservoir sites and water pump stations need to be secured in order to prevent unauthorised access and possible damage to the water meters. • New bulk water meters need to be correctly installed. Ideally a straight pipe section upstream of the meter of at least 5x the meter dia. and 3x the meter dia. downstream of the meter. Strainers need to be installed to protect the meters. These strainer elements must be removable from the top, for ease of cleaning. Gate valves are required for maintenance before and after meters. • Every informal area with communal services to be supplied with a bulk water meter in order to determine the unbilled metered consumption. All discrete zones are to be supplied with a bulk water meter. The meter readings must be recorded on at least a weekly basis. The readings can be used to quantify both the water supplied and the leakage for a specific area.	Allow an annual budget of approximately R350 000 for the installation of new bulk water meters, the replacement of faulty bulk water meters and to adequately protect existing bulk water meters.
Item 15: Effective Zone Meter Management and Assessment of Night Flows	
• See recommendations under Item 14.	See funding and budget requirements included under Item 14.
Item 16: Pressure Management	
• The reticulation networks need to be divided into pressure zones, prior to implementing pressure management, and the pressures and flows need to be metered and logged. • Undertake feasibility studies to determine the ranking of areas / projects. • Implement advanced pressure management in areas identified. • Impact assessment. • The on-going operation, maintenance and optimisation of advanced pressure management installations.	Funding and Budget requirements for pressure management to be determined once a decision is taken on the further areas prioritised for pressure management (From recommended flow and pressure logging exercise).
Item 17: As-built drawings of bulk and reticulation infrastructure	
• Continue with the regular updating of the Water and Sewer Master Plans.	Allow a budget of approximately R1.5 million for the updating of the Water and Sewer Master Plans every five years.
Item 18: Schematic layouts of water reticulation systems	
• Municipality needs to continue to update the schematic layouts on a regular basis, in order to ensure they remain accurate.	None
Item 19: Regulation and Bylaws	
• The By-law needs to be enforced and adequate human resources need to be allocated for this purpose.	No additional budget or funding requirements. Enforcement of bylaw to be implemented through existing

Table C.5.6: Proposed WSDP WC/WDM Strategy	
Recommendation and Strategy	**Funding and Budget Requirements**
	budgets.
Item 20: Tariffs	
• See Section 7.3 under Topic 7 of the WSDP.	Financial study to determine the impact of changing the sanitation tariff structure from a fixed monthly amount, which is also not based on the number of toilet pans, to a stepped tariff based on water consumption in the future. Estimated cost R250 000.
Item 21: Technical Support to Customers	
• The objective of a Technical Support programme is not limited to assisting consumers in reducing their water demand, but is also to look at wastewater, monitor compliance with by-laws and service conditions and offer general customer support. Once a dedicated person has been allocated to WC/WDM it is recommended to engage with large customers and to identify areas where the municipality can provide assistance.	No additional funding – pending the appointment of a dedicated person for WC/WDM.
Item 22: Removal of Un-authorised Connections	
• Meters need to be installed at the estimated 1 304 unmetered erven (1 354 units), as identified through the Water Master Plan process.	Estimated budget of R3.260 million is required to install water meters at the unmetered erven.
Item 23: Community Awareness on WDM	
• See Section 5.1.3 under Topic 5 of the WSDP	It is estimated that R120 000 / year should be allocated for WC/WDM awareness campaigns and activities, material to be included with monthly water bills, placing notices in newspapers, billboards, competitions, etc.
Item 24: Schools Education on WDM	
• See Section 5.1.3.1 under Topic 5 of the WSDP	It is estimated that a budget of R50 000 per year should be allocated for the establishment of a schools education programme in Bitou Municipality. The DWS can also assist the municipality with pamphlets and posters on WC/WDM initiatives.
Item 25: Retrofitting	
• See Sections 5.1.2.1 and 5.1.2.2 under Topic 5 of the WSDP	Leak repair assistance programmes: R250 000 per annum for ongoing exercise to repair leakages at indigent properties using in excess of 20 kl/month. WSIG funding or "War on Leaks" funding from DWS can be requested in this regard. Retrofitting: R300 000 for a pilot project in one of the public buildings.

Large Water Users: Bitou Municipality also determined the large water users through their Water Master Planning process. The table below gives an overview of the large water users in Bitou Municipality for the twelve month periods ending November 2019 and January 2021 (AADD > 10 kl/d).

Table 5.7: Large water users for twelve month periods ending November 2019 and January 2021 (AADD > 10 kl/d)				
Consumer	**Address**	**Suburb Category**	**AADD (Kl/d)**	
			2019	**2021**
Whale Rock Developments Pty Ltd	Whale Rock Ridge	Plettenberg Bay	206	212
Municipality (Waterworks)	Sewell 1	Plettenberg Bay	170	185
Dune Park Sectional Title	Dune Park Sectional Title	Keurboomstrand	97	21
Beacon Island Hotel	Main Beach	Plettenberg Bay	93	59

Table 5.7: Large water users for twelve month periods ending November 2019 and January 2021 (AADD > 10 kl/d)				
Consumer	Address	Suburb Category	AADD (Kl/d)	
			2019	2021
The Plettenberg Golf Estate Pty Ltd	Roodefontein Ptn 74 W.7	Plettenberg Bay	91	75
Holding Family Trust	Rest Ganse Vallei W.7	Farms	86	56
River Club Homeowners Association	Piesang Valley Road Plettenberg Bay	Plettenberg Bay	86	91
Turtle Creek Homeowners Association	Turtle Creek	Plettenberg Bay	80	76
Goose Valley Homeowners Association	N2 Highway / 15 Rosheen	Plettenberg Bay	66	31
The Dunes Body Corporate	The Dunes Body Corporate	Plettenberg Bay	-	64
Schoongezicht Homeowners Association	Rem Ptn 39 Brakkloof	Plettenberg Bay	64	55
Waterlevel Prop (Pty) Ltd	Water Level	Plettenberg Bay	62	36
Mr CD Vergos	Brakkloof Rem Ptn 24 W.7	Plettenberg Bay	57	43
Whale Rock Gardens HOA	Whale Rock Gardens	Plettenberg Bay	51	47
Keurbooms Lagoon Car	Rest Ganse Vallei W.7	Farms	-	50
Robberg Beach End H/Owner	Brakkloof Ptn 73	Plettenberg Bay	48	37
Strandmeer Share Block Pty	Strandmeer Share Block Pty	Keurboomstrand	45	39
Mr/Ms AT Coetzee	Hangklip Street	Farms	42	42
Proud Heritage Properties 309 Pty Ltd	Strandmeer - Keurboomstrand	Keurboomstrand	39	42
Beau Rivage Body Corp.	Pharos Drive	Plettenberg Bay	37	34
Ifafi Body Corporate	Strandmeer - Keurboomstrand	Keurboomstrand	35	25
Santini Village Body Corporate	Santini Village	Plettenberg Bay	33	31
Mr C Siwela	Mbeki Street Kranshoek 1330	Kranshoek	-	32
Whale Rock Developments Pty Ltd	Whale Rock Beach	Plettenberg Bay	32	36
San Marino Homeowners Association	Phindana Prop 85 Pty Ltd	Keurboomstrand	31	29
Mev AR Koopman	Redford Street Kurland 19	Kurland	29	-
Forever Resorts Pty Ltd	Bitou River Outspan W.8	Farms	27	22
Keurbooms River Lodge Body Corp	Keurbooms River Lodge Body Corp	Keurboomstrand	-	26
Homeowners Assoc-Plettenberg Bay Heights	Whale Rock Heights	Plettenberg Bay	25	35
The Emira Prop Fund	Beacon Way Plettenberg Bay	Plettenberg Bay	23	16
The Hill Private Estate HOA	The Hill	Plettenberg Bay	22	23
Amatuli Kyalami Prop Holdings Cc	Mallard Remainder	Farms	21	13
Silver Moon Investments 160 Cc	Beachy Head 117	Plettenberg Bay	20	-
Montmar Pty Ltd	Montmar	Plettenberg Bay	19	22
Silverranch Chalets	Silverranch Chalets	Keurboomstrand	19	22
Sanderlings Homeowners Association	Sanderlings Estate	Keurboomstrand	17	16
Matjesfontein Homeowners Association	Oakley Pty Ltd	Keurboomstrand	17	16
Mun Bitou	Strand Street Keurboomsrivier	Plettenberg Bay	-	17
Silver Stream Estate Homeowners Association	Keurbooms	Keurboomstrand	16	-
Watersong Investments	Breach Street Plettenberg Bay 16	Plettenberg Bay	-	15
Plettenberg Bay Retirement Apartment	Rest Ganse Vallei W.7	Farms	-	15
Mrs EC Yonn	Flowerstraat Kurland 349	Kurland	15	-
Beacon Island Centre Body Corp	Beacon Island Centre 8	Plettenberg Bay	15	14
The Waves Homeowners Association	Dummy Site Address	Plettenberg Bay	15	-
Republic of South Africa	Jackson 7	Plettenberg Bay	15	-
Lokam Homes Pty Ltd	Waterberry Ridge	Plettenberg Bay	-	14
Mr GO Read	Ptn 5 Farm 296 Arch Rock 2	Keurboomstrand	14	-
The Government Employees Pension Fund	Main Street Plettenberg Bay	Plettenberg Bay	14	10
Keurview Estate Homeowners Association	Keurview Shareblock	Keurboomstrand	14	18

Table 5.7: Large water users for twelve month periods ending November 2019 and January 2021 (AADD > 10 kl/d)				
Consumer	Address	Suburb Category	AADD (Kl/d)	
			2019	2021
Bell Rock Corp.	Bell Rock Longships Drive Plettenberg Bay	Plettenberg Bay	14	11
The Plettenberg Bay Comfort Village HOA	Glen Eden Retirement Village	Plettenberg Bay	14	13
Tri Plett Pty Ltd	Pharos Link	Plettenberg Bay	14	11
Robberg Estate Homeowners Association	Robberg Estate	Plettenberg Bay	13	16
Tramonto Pty Ltd	Jack Case Street Plettenberg Bay 7	Plettenberg Bay	13	12
Lookout Hotel	Church Street 40 / Ganse Valley	Plettenberg Bay	12	12
Sugar Sweet Props 26 Pty Ltd	Thulana Hill Marine Drive	Plettenberg Bay	12	11
Green Point Mews Body Corporate	Green Point Avenue Piesangvalley 49	Plettenberg Bay	12	12
Selectria Inv 42 Pty	Main Street Plettenberg Bay 9	Plettenberg Bay	12	-
Miss NA Ngam	Xhiphula	Kwanokuthula	12	-
Enrico Restaurants / Keurbooms Rock Pty Ltd	Ptn 5 Farm 296 Arch Rock 9	Farms	11	11
Keursands Homeowners Association	Keursands	Keurboomstrand	11	10
Body Corp The Villas	The Villas / Aquarella	Plettenberg Bay	11	11
Mnr/Me W & BS Harris / Viz Dolden Trading 7	Hoofweg- SS Bitou Lane Wittedrift 219 / Piesang Valley Road Plettenberg Bay	Kurland / Plettenberg Bay	11	11
Bowtie Private Estate	Bowtie Private Estate	Plettenberg Bay	11	10
Mr M Stemele Mzinani	Tshembese Street Kwanokuthula 10	Kwanokuthula	11	-
Mr M Kriga	Draai 150	Kurland	11	-
Simbas Den Cc	Beachy Head 89	Plettenberg Bay	11	18
Western Cape Education Dept Phakamisani	Hillview 4700	Kwanokuthula	11	11
Spindrift Body Corporate	Beacon Way Plettenberg Bay 49	Plettenberg Bay	10	10
Municipality	N/H Pinetrees Water Conn	New Horizon	10	69 / 10
Shoprite Checkers Pty Ltd	Cuthbert Close	Plettenberg Bay	10	12 / 10
Robberg Fast Foods Sa Pty Ltd	Theron	Plettenberg Bay	10	10

The above large users in Bitou Municipality might have potential to reduce water consumption via reuse of water. It is suggested that meetings should be arranged with these large users. These meetings should be informative on the current water consumption status; potential water saving volumes; cultivate a water saving awareness within each large user and at least involve 50% of large users. Issues to be taken into account include the end user, the water quality and the infrastructure required.

The Study to analyse treasury data and identify projects that promote WC/WDM in Bitou Local Municipality (June 2021) proposed the WC/WDM projects included in the table below.

Table 5.8: Proposed WC/WDM projects (June 2021 Study)			
No.	Item	Description and summary of tasks	Estimated Costs (VAT Excluded)
1	Improved billing by continued co-operation with Finance Department	Improve the integrity of metering and billing data through an investigation into the list of treasury records without a GIS link, the list of occupied stands with a zero water demand, the list of occupied stands without a water meter as well as investigations into the list of stands with substantial increases and decreases in water demands.	Can be performed by Bitou Municipality or in combination with a contractor R1 000 000
2	Continue with water meter replacement	Replace all eligible/broken meters and any un-metered stands identified should be metered. A new water meter audit will be beneficial to this process.	To be determined by the Municipality R1 000 000
3	Dedicated WC/WDM Control Officer with team	Bitou Municipality should consider increasing the number of people involved with WC/WDM for Bitou Municipality as and when required.	To be determined by the Municipality R1 500 000
4	Refine zone water balancing	Replace existing old bulk meters to improve the	Study Investigation R100 000

Table 5.8: Proposed WC/WDM projects (June 2021 Study)			
No.	**Item**	**Description and summary of tasks**	**Estimated Costs (VAT Excluded)**
		accuracy of NRW figures. Investigate and identify possible new bulk meter positions in order to create additional sub-zone district management areas (DMAs). Install new bulk meters at these locations and record bulk meter readings monthly for all bulk water meters.	Installation of bulk meters (First phase of roughly 10 meters) at assumed cost of R200 000 per meter, therefore R2 000 000.
5	Large water users	Investigate the sites of large water users in order to assess potential water saving measures.	Can be performed by Bitou Municipality or outsourced R300 000
6	Continue with pipe replacement	Continue with pipe replacement programme based on pipe replacement prioritisation (PRP) study dated June 2016. Update PRP study whereby a list of the top 200 pipes with the highest priority to be replaced is produced, including an estimated replacement costs for each pipe.	R6 000 000 required as indicated by Bitou Municipality. Update PRP study R300 000.
7	Pressure management	Investigate, including hydraulic analysis, identify and implement additional pressure management projects.	Study to identify new pressure management zones in separate investigation: R400 000 Budget to implement Pressure Management 1) to be determined after the investigation 2) Refer to projects PRJ-BMW-003 & PRJ-BMW-004 in the June 2020 Bitou Water Master Plan: R864 000
8	Monitoring of ILIs per zone	Investigate and identify zones with high ILI values, determine which zones need to be monitored and where to implement additional WDM measures to lower ILIs.	To be determined by Bitou Municipality
9	Continue with leak detection and repair	Continue with the current process of leak detection and pipe repair throughout the Municipality.	To be determined by Bitou Municipality
10	Public / Schools awareness campaign	Continue with public awareness campaign in order to educate consumers to reduce water wastage. Once a year a schools education programme on water conservation should be undertaken.	R100 000/year for WC/WDM awareness activities and material. R70 000/year for school education programmes.

The immediate projects and interventions required to further promote WC/WDM in order to reduce NRW are therefore as follows:

- Improved billing by continued co-operation with Finance Department.
- Continue with water meter replacement.
- Appoint a dedicated WC/WDM team under the water loss control officer.
- Refine zone water balancing per DMA.
- Investigate large water users.
- Continue with pipe replacement.
- Investigate additional pressure management projects.
- Monitoring of ILIs per zone.
- Continue with leak detection and repair.
- Public/schools awareness campaign.

Progress made with the installation of water efficient devices:

Bitou Municipality still needs to focus on the installation of water saving devices (specific water efficient toilets). It is important for the Municipality to raise awareness regarding conservation products and the installation of these products in order to reduce the future water requirements.

C.6. Water Services Asset Management

The most significant challenges, from a Water Services perspective, are the augmentation of the existing water resources for Plettenberg Bay, the refurbishment and upgrading of the existing water and sewer networks and pump stations and the provision of sustainable communal services in the informal areas.

Bitou Municipality updated their current Asset Register during the 2020/2021 financial year. The tables below give an overview of Bitou Municipality's water and sewerage assets as included in the Municipality's Asset Register on the 30th of June 2021, as received from the Finance Department.

Water Infrastructure: The opening costs and the carrying values of the water infrastructure of Bitou Municipality are summarised in the table below, as included in the June 2021 Asset Register.

Table C.6.1: Opening costs and carrying values of the water infrastructure

Asset Type	Opening Cost (OC)	Carrying Value (CV)	% CV / OC
Boreholes	R11 041 026	R8 310 603	75.3%
Bulk Water Pipelines	R60 305 160	R55 830 792	92.6%
Reservoirs	R46 300 806	R26 375 399	57.0%
Water Pump Stations	R32 899 403	R24 248 921	73.7%
Water Pipelines	R65 077 307	R46 249 368	71.1%
Nature's Valley WTW	R1 385 705	R182 787	13.2%
Kurland WTW	R1 569 379	R713 244	45.4%
Harkerville WTW	R1 871 661	R1 682 491	89.9%
Plettenberg Bay WTW	R53 199 093	R32 078 757	60.3%
Totals	**R273 649 540**	**R195 672 362**	**71.5%**

The previous table indicates that 28.5% of the value of the water infrastructure has been consumed.

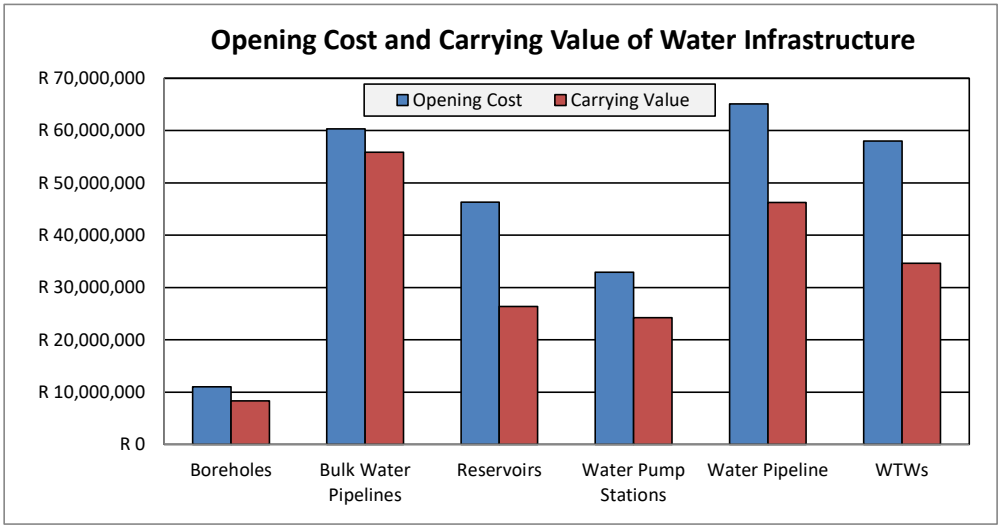


Figure C.6.1: Opening Costs and Carrying Values of the Water Infrastructure

The following table and graph give an overview of the RUL by facility type for the water infrastructure, as included in the June 2021 Asset Register.

Table C.6.2: Overview of the RUL by facility type for the water infrastructure (Opening Costs)					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Boreholes	R198 002	R722 928	R6 085 150	R1 079 162	R2 955 784
Bulk Water Pipelines	R16 713 018	R0	R632 461	R0	R42 959 681
Reservoirs	R7 178 213	R851 157	R5 855 581	R11 194 814	R21 221 041
Water Pump Stations	R5 598 197	R4 161 058	R2 388 536	R157 545	R20 594 067
Water Pipeline	R4 612 842	R3 199 415	R0	R2 784 113	R54 480 937
Nature's Valley WTW	R1 181 252	R157 583	R13 671	R32 186	R1 013
Kurland WTW	R872 860	R72 674	R46 238	R189 425	R388 182
Harkerville WTW	R0	R0	R7 898	R0	R1 863 763
Plettenberg Bay WTW	R12 428 976	R13 174 320	R4 024 572	R1 104 679	R22 466 546
Totals	**R48 783 360**	**R22 339 135**	**R19 054 107**	**R16 541 924**	**R166 931 014**

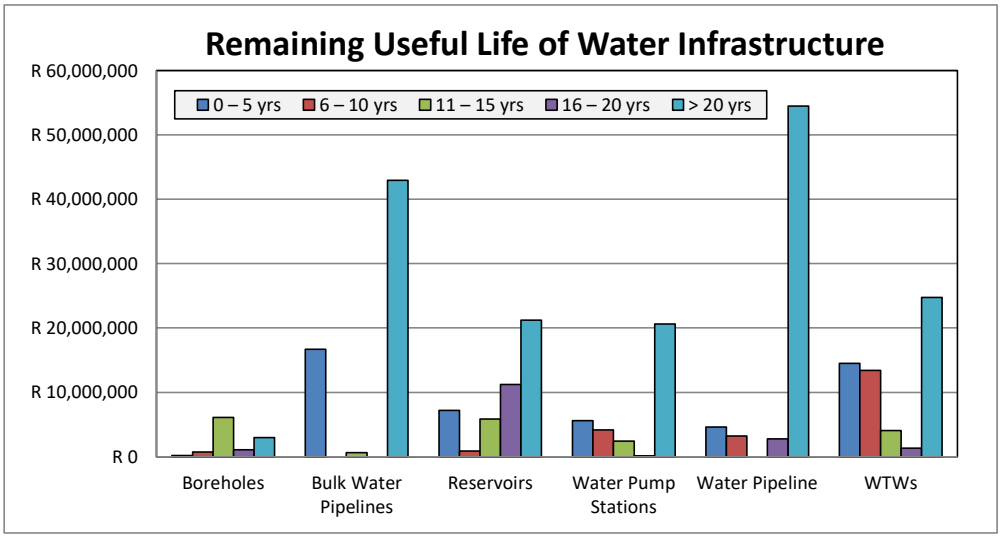


Figure C.6.2: Remaining Useful Life of the water infrastructure

The following table and graph give an overview of the age distribution by facility type for the water infrastructure, as included in the June 2021 Asset Register.

Table C.6.3: Overview of age distribution by facility type for the water infrastructure (Opening Costs)					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Boreholes	R7 849 771	R3 118 516	R0	R3 664	R69 075
Bulk Water Pipelines	R32 867 282	R22 037 467	R1 955 607	R512 559	R2 932 245
Reservoirs	R13 427 823	R7 010 596	R1 486 793	R5 028 603	R19 346 991
Water Pump Stations	R14 190 388	R14 391 742	R899 683	R714 255	R2 703 335
Water Pipeline	R15 976 862	R12 066 717	R4 171 807	R5 376 512	R27 485 409
Nature's Valley WTW	R11 900	R195 423	R993 033	R0	R185 349
Kurland WTW	R377 188	R865 578	R43 507	R105 210	R177 896
Harkerville WTW	R1 871 661	R0	R0	R0	R0
Plettenberg Bay WTW	R9 765 130	R37 627 949	R529 881	R905 021	R4 371 112
Totals	**R96 338 005**	**R97 313 988**	**R10 080 311**	**R12 645 824**	**R57 271 412**

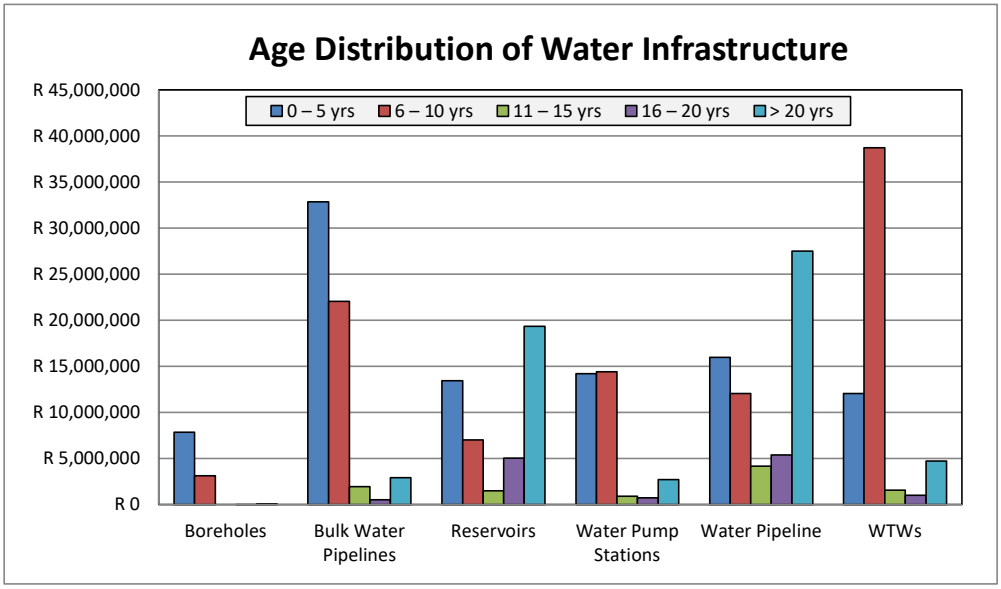


Figure C.6.3: Age distribution of water infrastructure

The asset renewal needs for the water infrastructure assets over the next 10 years is R7.112 million per year. The reinvestment required is R48.783 million in the first 5 years and R22.339 million in the second 5-year period. The age of 22.93% of the water infrastructure assets is greater than 20 years.

Sewerage Infrastructure: The opening costs and carrying values of the sewerage infrastructure of Bitou Municipality are summarised in the table below, as included in the June 2021 Asset Register.

TableC.6.4: Opening costs and carrying values of all sewerage infrastructure

Asset Type	Opening Cost (OC)	Carrying Value (CV)	% CV / OC
Bulk Sewer Pipelines	R30 628 206	R27 126 831	88.6%
Sewer Pipelines	R57 700 346	R43 044 320	74.6%
Sewer Pump Stations	R62 081 789	R39 878 725	64.2%
Kurland WWTW (WTW-001)	R1 996 664	R1 309 156	65.6%
Plettenberg Bay WWTW (WTW-002)	R9 329 592	R5 722 439	61.3%
Totals	**R161 736 597**	**R117 081 471**	**72.4%**

The previous table indicates that 27.6% of the value of the sewerage infrastructure has been consumed.

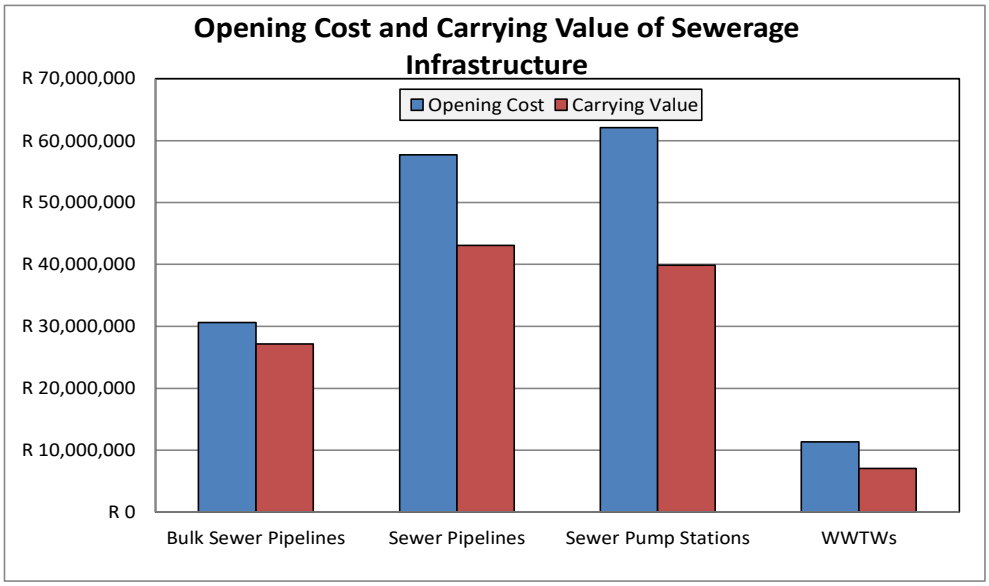


Figure C.6.4: Opening Costs and Carrying Values of the sewerage infrastructure

The following table and graph give an overview of the RUL by facility type for the sewerage infrastructure, as included in the June 2021 Asset Register.

Table C.6.5: Overview of the RUL by facility type for the sewerage infrastructure (Opening Costs)					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
RUL					
Bulk Sewer Pipelines	R3 725 607	R0	R818 574	R395 248	R25 688 777
Sewer Pipelines	R571 538	R736 433	R3 693 606	R7 014 253	R45 684 516
Sewer Pump Stations	R11 531 872	R9 218 972	R15 988 964	R2 399 409	R22 942 572
Kurland WWTW (WTW-001)	R78 911	R79 263	R585 480	R369 061	R883 949
Plettenberg Bay WWTW (WTW-002)	R2 178 834	R1 284 720	R659 935	R2 059 038	R3 147 065
Totals	**R18 086 762**	**R11 319 388**	**R21 746 559**	**R12 237 009**	**R98 346 879**

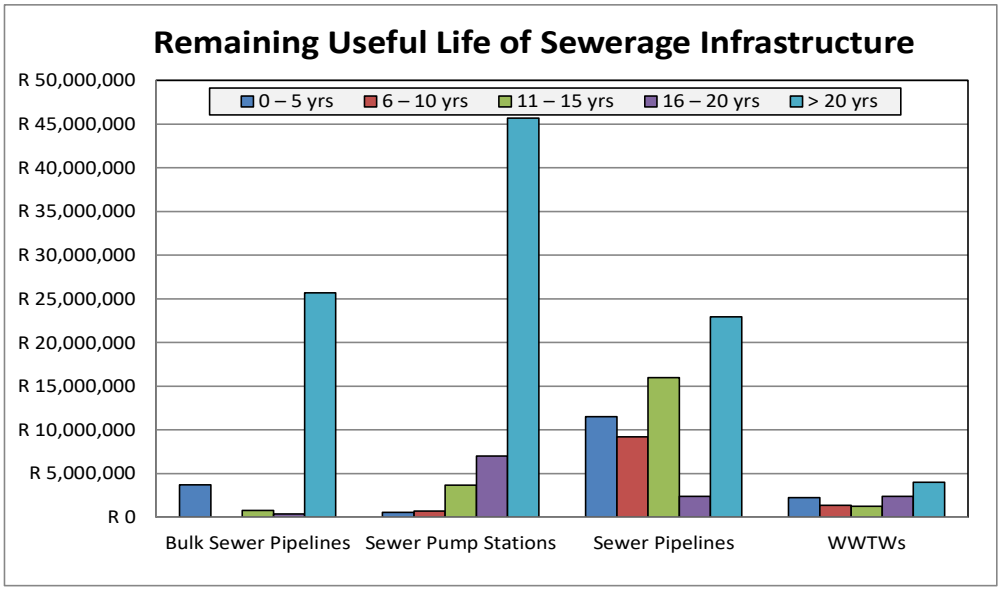


Figure C.6.5: Remaining Useful Life of the sewerage infrastructure

The following table and graph give an overview of the age distribution by facility type for the sewerage infrastructure, as included in the June 2021 Asset Register

Table C.6.6: Overview of the age distribution by facility type for the sewerage infrastructure (Opening Costs)					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
Age Distribution by Facility Type					
Bulk Sewer Pipelines	R19 380 126	R289 550	R688 358	R2 873 438	R7 396 734
Sewer Pipelines	R10 220 407	R23 401 828	R2 250 922	R4 944 478	R16 882 711
Sewer Pump Stations	R29 157 601	R18 917 785	R8 909 359	R601 662	R4 495 382
Kurland WWTW (WTW-001)	R881 487	R581 536	R15 951	R21 267	R496 423
Plettenberg Bay WWTW (WTW-002)	R4 211 109	R1 409 969	R1 346 911	R8 460	R2 353 143
Totals	**R63 850 730**	**R44 600 668**	**R13 211 501**	**R8 449 305**	**R31 624 393**

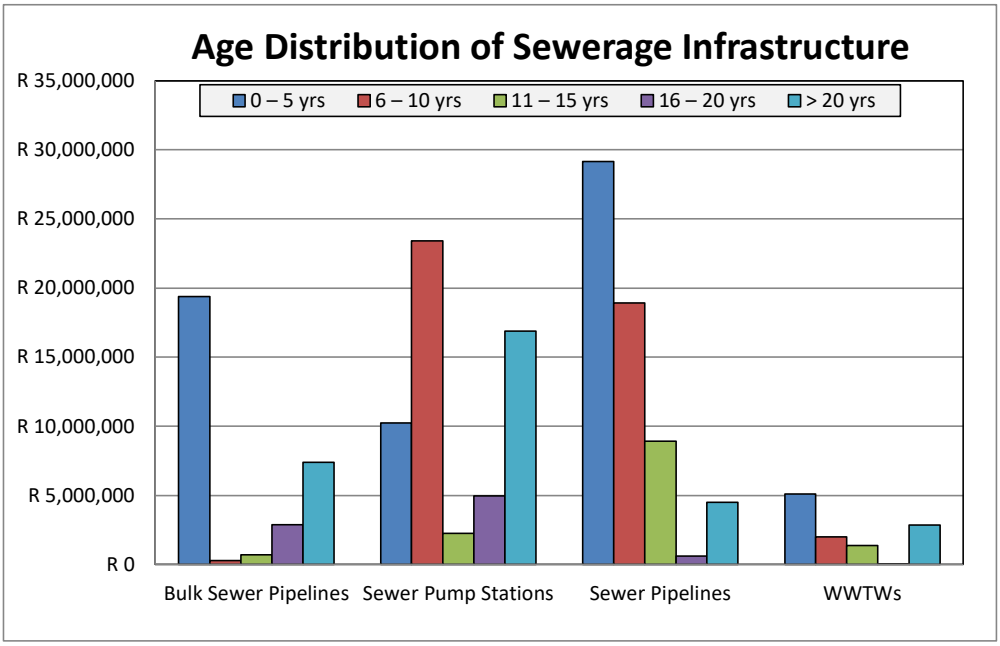


Figure C.6.6: Age distribution of the sewerage infrastructure

The asset renewal needs for the sewerage infrastructure assets over the next 10 years is R2.941 million per year. The reinvestment required is R18.087 million in the first 5 years and R11.319 million in the second 5-year period. The age of 19.55% of the sewerage infrastructure assets is greater than 20 years.

One of the key challenges of Bitou Municipality is to identify adequate funds for the rehabilitation and maintenance of the existing infrastructure, which is critical to ensure the sustainability of the services that are provided by the Municipality. 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. An Asset Management Plan needs to indicate the risks associated with the inadequate refurbishment and maintenance of the various water and sewerage infrastructure.

C.7. Water Services Operation and Maintenance

Bitou 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 Bitou 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. 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.

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

Table C.7.2: Bitou 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.	Adequate: Current Process Controllers at the WTWs and WWTWs comply with the legislative requirements with regard to the number and Class of Process Controllers per Class of WTW and WWTW. Work Place Skills Programme is compiled annually to ensure adequate training of staff. The Technical Staff Capacity (Numbers) KPI was however indicated as moderate vulnerability in the 2020 MuSSA assessment.
External Resources	Need for external resource providers. Competency level and value for money. Management and control over these providers.	Not applicable: All Water Service Provider functions are currently done internally by Bitou 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 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 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. Budget allocated towards the rehabilitation and maintenance of the existing water and sewerage infrastructure to be increased.
Information		
Manuals	Existence of manuals (operation / maintenance or manufacturer). Record keeping / safekeeping and control.	Adequate: O&M Manuals are in place for the bulk water and sewerage infrastructure. These Manuals are also used by the Process Controllers at the plants.

Table C.7.2: Bitou Municipality's Operation and Maintenance Assessments and Plans		
Element	**Assessment Criteria**	**Status Quo**
	Utilisation of manuals by staff.	
Asset Register	Existence of an asset register. Maintenance / updating of asset register. Accessibility of information. Control over assets. Stock taking.	Below minimum requirement: The current Asset Register for the water and sewerage infrastructure indicates the Openings Costs and the Carrying Values. The RUL, Age and Condition of the infrastructure are also included in the Asset Register. The Asset Register is updated annually. The CRC of the water and sewerage infrastructure also needs to be indicated. An Asset Management Plan needs to be compiled to ensure efficient, effective and optimal management , operation and maintenance of all assets. The Financial Asset Management KPI was indicated as extreme vulnerability in the 2020 MuSSA assessment.
As-built Information	Existence of as-built drawings. Existence of important reports e.g. design reports etc. Record keeping / safekeeping and control. Accessibility of information. Updating of records.	Adequate: As-built information is available for all the 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 Plans are updated.
Tools and Equipment	Existence of information on tools and equipment. Record keeping / safekeeping and control. Accessibility of information.	Adequate: Municipality ensures adequate tools and equipment are available. Monitored by the 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: Water Safety Plans and W_2RAPs are in place for all the areas. WTW and WWTW Process Audits are done when required. Incident Management Protocols, as included in the Water Safety Plans 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 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, as indicated in the new WSDP.
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 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 Manager Water Services report on a monthly basis to Management and the 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 Bitou Municipality. O&M is a continuous process for Bitou 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. Bitou 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.

Bitou Municipality has 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 Bitou 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 ensures 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 Opening Costs and Carrying Values of the water and sewerage infrastructure included in Bitou 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 of the water and sewerage infrastructure included in the WSDP, 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		CRC (WSDP)	Required Annual Replacement Budget	Required Annual O&M Budget	Depreciation and Amortisation Expenditure
	Opening Costs	Carrying Values		2.0% of CRC	1.5% of CRC	2020/2021
Boreholes	R11 041 026	R8 310 603	R4 709 000	R94 180	R70 635	R7 135 671
Bulk Water Pipelines	R60 305 160	R55 830 792	R317 235 000	R6 344 700	R4 758 525	
Reservoirs	R46 300 806	R26 375 399	R258 974 000	R5 179 480	R3 884 610	
Water Pump Stations	R32 899 403	R24 248 921	R52 305 000	R1 046 100	R784 575	
Water Pipelines	R65 077 307	R46 249 368	R335 650 000	R6 713 000	R5 034 750	
Nature's Valley WTW	R1 385 705	R182 787	R12 000 000	R240 000	R180 000	
Kurland WTW	R1 569 379	R713 244	R7 200 000	R144 000	R108 000	
Harkerville WTW	R1 871 661	R1 682 491	-	-	-	
Plettenberg Bay WTW	R53 199 093	R32 078 757	R246 296 000	R4 925 920	R3 694 440	
Sub Total Water	**R273 649 540**	**R195 672 362**	**R1 234 369 000**	**R24 687 380**	**R18 515 535**	**R7 135 671**
Bulk Sewer Pipelines	R30 628 206	R27 126 831	R620 586 000	R12 411 720	R9 308 790	R4 684 900
Sewer Pipelines	R57 700 346	R43 044 320				
Sewer Pump Stations	R62 081 789	R39 878 725	R42 379 000	R847 580	R635 685	
Kurland WWTW	R1 996 664	R1 309 156	R9 000 000	R180 000	R135 000	
Plettenberg Bay WWTW	R9 329 592	R5 722 439	R162 000 000	R3 240 000	R2 430 000	
Sub Total Sewerage	**R161 736 597**	**R117 081 471**	**R833 965 000**	**R16 679 300**	**R12 509 475**	**R4 684 900**
Total Water and Sewerage	**R435 386 137**	**R312 753 833**	**R2 068 334 000**	**R41 366 680**	**R31 025 010**	**R11 820 571**

Most of the major replacement of old water and sewerage infrastructure in Bitou Municipality is done through the Municipality's annual capital budget. The capital budget however also includes new infrastructure. The table below gives an overview of the total historical water and sewerage capital expenditure for the last six 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	R17 274 758	R18 224 146	R15 151 729	R24 934 232	R12 117 001	R10 053 920
Sewerage	R17 307 395	R7 638 784	R16 344 299	R14 628 839	R13 331 865	R11 516 097
Total	**R34 582 153**	**R25 862 930**	**R31 496 028**	**R39 563 071**	**R25 448 866**	**R21 570 017**

The historical capital expenditure for water and sewerage infrastructure for the last six financial years was between R20 million and R40 million per annum for Bitou Municipality, which included the replacement of existing infrastructure and the installation of new infrastructure.

C.8. Water Resources

IWA Water balance models were developed for each of the towns within Bitou Municipality's Management Area, which are included in Annexure A. Graphs of the total water requirements (bulk raw water supply, system input volume and billed metered consumption), peak month factors, annual treatment losses, NRW and water losses per town and water usage per sector are also included in Annexure A.

A number of boreholes were developed during the 2017/2018 and 2018/2019 financial years to augment the water supply to Plettenberg Bay, Forest View, Harkerville and Kurland. The Municipality is currently busy with WULAs for these boreholes. Detail future water requirement projections models were developed for each of the towns within Bitou Municipality's Management Area, which are included in Annexure C. The table below gives an overview of the years in which the annual water requirement is likely to exceed the sustainable yields / registration volumes of the various water resources.

Table C.8.1: Years in which the annual water requirement will exceed the sustainable yield / registration volumes from the various resources

Distribution System	Total sustainable Yield or Registration (x 10^6 m^3/a)	Annual Growth on 2020/2021 requirement (1.5% or 3.5%)	Annual Growth on 2020/2021 requirement (3.5% or 5.5%)	WSDP Projection Model
Plettenberg Bay	4.125 (Registration)	2021 (3.5%)	2021 (5.5%)	2022
	8 778.805 (Yield)	2043 (3.5%)	2035 (5.5%)	2043
Kurland	0.256 (Yield)	2026 (1.5%)	2022 (3.5%)	2026
Natures Valley	0.120 (Registration)	2043 (1.5%)	2030 (3.5%)	2037

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

Table C.8.2: Projected future water requirements and yield / registration surplus (+) / shortfall (-) based on WSDP model

Distribution System	Model	PROJECTED FUTURE WATER REQUIREMENTS (Ml/a)				
		2025	2030	2035	2040	2045
Plettenberg Bay	3.5% Annual Growth	4 587.184	5 448.136	6 470.676	7 685.134	9 127.528
	5.5% Annual Growth	5 047.853	6 597.342	8 622.463	11 269.214	14 728.412
	WSDP Model	**4 399.185**	**5 224.971**	**6 245.867**	**7 510.677**	**9 081.040**
	Registration surplus (+) / shortfall (-)	**-274.185**	**-1 099.971**	**-2 120.867**	**-3 385.677**	**-4 956.040**
	Yield surplus (+) / shortfall (-)	**+4 379.620**	**+3 553.834**	**+2 532.938**	**+1 268.128**	**-302.235**
Kurland	1.5% Annual Growth	252.807	272.345	293.393	316.068	340.495

Table C.8.2: Projected future water requirements and yield / registration surplus (+) / shortfall (-) based on WSDP model						
Distribution System	Model	PROJECTED FUTURE WATER REQUIREMENTS (Ml/a)				
		2025	2030	2035	2040	2045
	3.5% Annual Growth	278.716	331.027	393.156	466.946	554.585
	WSDP Model	**246.451**	**279.372**	**317.999**	**363.337**	**416.578**
	Yield surplus (+) / shortfall (-)	**+9.693**	**-23.228**	**-61.855**	**-107.193**	**-160.434**
Natures Valley	1.5% Annual Growth	90.628	97.632	105.177	113.306	122.062
	3.5% Annual Growth	99.915	118.668	140.940	167.393	198.810
	WSDP Model	**92.229**	**102.139**	**113.711**	**127.242**	**143.089**
	Registration surplus (+) / shortfall (-)	**+27.771**	**+17.861**	**+6.289**	**-7.242**	**-23.089**

Plettenberg Bay: The historical firm yield of all Bitou Municipality's supply systems was previously determined to be 4.33 million m³/a (Feasibility Study Phase of the Regional Integration of the Bulk Water Supply Systems of the Knysna and Bitou Municipalities, Phase 2A: Feasibility Option Analysis Report). With the 2020/2021 total water demand of 3.862 million m³/a for Plettenberg Bay alone, there is currently surplus water supply available. Based on the current rapid increase in water demand as a result of the drought recovery period, the time period of surplus supply could be limited. The successful implementation of WC/WDM measures could however delay the need for the implementation of a bulk water augmentation scheme.

The Feasibility Option Analysis Report short-listed the following stand-alone options for Plettenberg Bay.

Table C.8.3 Short-listed Bitou stand-alone options (Feasibility Option Analysis Report, 2014)						
Scheme Elements	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Groundwater Wellfield	N/A	N/A	George Fault East	George Fault East	Plettenberg Bay Central	N/A
Storage Reservoir	Wadrif (3 Mm³)	Wadrif (4.5 Mm³)	Wadrif (3 Mm³)	Wadrif (4.5 Mm³)	Wadrif (3 Mm³)	2.0 Ml/d Desalination Plant
Total Cost (R million)	65.7	80.25	73.8	86.52	102.0	24.0
Incremental Yield (Mm³/a)	5.09	6.55	6.22	6.51	6.51	0.73
URV (R/m³)	3.30	3.63	2.89	3.27	4.71	9.76*

Note: * URV not directly comparable since this scheme does not supply the necessary demand over the entire record period

The Feasibility Study Phase of the Regional Integration of the Bulk Water Supply Systems of the Knysna and Bitou Municipalities: Phase 2B: Preliminary Design Report, 2015 include the following future water demand-supply balance graph for Plettenberg Bay.

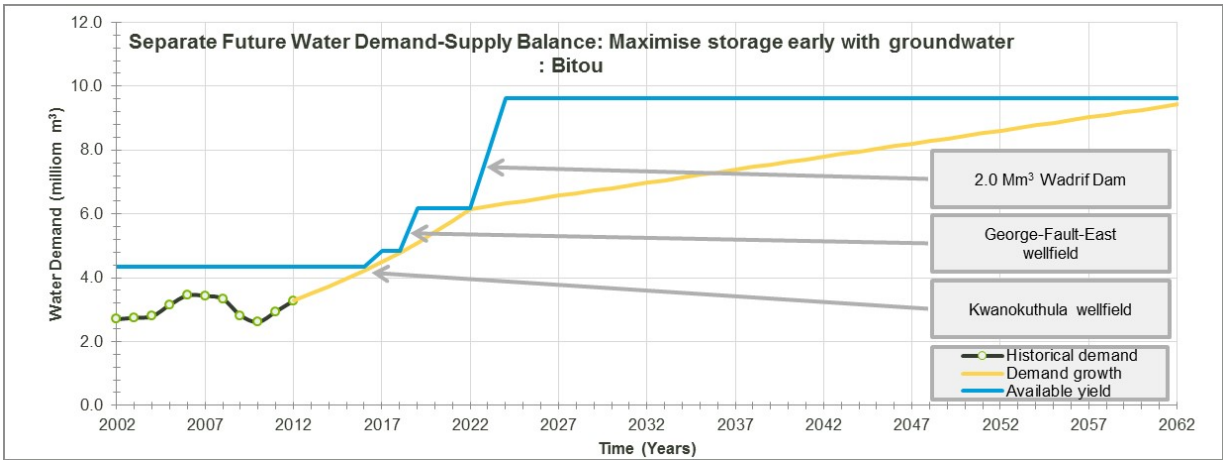


Figure C.7.1: Future Water Demand-Supply Balance for Plettenberg Bay

Two groundwater sites, GFE1 and GFE2, in the eastern end of the George Fault on the Plettenberg Bay Game Farm were explored during 2017 to assess their potential for municipal bulk water supplies. Seven deep boreholes (>60 m) and two shallow boreholes (<30 m) were drilled in total at the two sites. The groundwater quality is marginal with slightly elevated salinities and manganese concentrations. The combined electrical conductivities of the borehole waters are ~180 mS/m (the SANS-241 limit is 170 mS/m), but when blended with Keurbooms River water which has an EC of ~10 mS/m, the resulting water should be suitable for domestic consumption.

Sites GFE1 and GFE2, could supply 0.7 and 0.6 Ml/day respectively, or 1.3 Ml/day in total. The maximum potential for the area is estimated to be ~3.7 Ml/day. To achieve this yield, 6 production boreholes dispersed along a line on the southern side of the fault would probably be needed.

Groundwater abstraction from this area will affect the water table (or piezometric level) in the area, and this will predominantly be on the southern side of the fault line. In order to assess the possible effect on neighbouring boreholes, abstraction from a linear wellfield along the fault line was numerically simulated and the effect on water levels in neighbouring boreholes assessed. It was found that using the boreholes for periods of 30 days to cover peak-demand periods has a significantly less impact on neighbouring boreholes than continuous use for 300 days (which is also equivalent to 20 hrs/day for 365 days).

Should existing boreholes or a wellfield be developed in this area, it will be essential to install a water level monitoring system for three main reasons:

i. To optimise the abstraction rates from pumping boreholes.

ii. To establish the aquifer yield in the long term and to ensure it is not over-pumped and steadily dewatered.

iii. To ensure the effect of abstraction does not have a major impact on other groundwater users.

In order for the municipality to optimise the available groundwater resources in this area, it is recommended that a wellfield be developed in two stages:

1st: Equip sites GFE1 and GFE2 with pumps and monitor the pumping boreholes and nearby un-used boreholes. Analyse the data after a season of pumping and assess the optimum number of additional production boreholes that should be added to the wellfield. Borehole GFE1C can be used as is, but GFE2E should be replaced with a larger diameter borehole that is lined with uPVC casing.

2nd: If the results from the 1st stage indicate that additional boreholes could be put into production, then site, drill, test and equip them and expand the monitoring network and review the data after a season of pumping. Adjust the pumping rates based on the reviewed data.

Irrespective of whether the wellfield is expanded after the 1st stage, a robust monitoring system would have to be installed to ensure the aquifer is utilised optimally, and this would include ensuring no significant negative effects on neighbouring users.

Possible resource augmentation options for the Plettenberg Bay system include the following:

- Continue with the active implementation of the proposed WC/WDM Strategy.
- Expansion of the existing wellfield in the Kwanokathula Aquifer.
- Development of the George Fault East wellfield.
- Keurbooms River off-channel Wadrif dam to store surplus winter water and use in conjunction with groundwater.
- Additional desalination or indirect water re-use through pumping treated effluent into the Roodefontein Dam.

Kurland: Two new boreholes were drilled in 2018/2019 at the Kurland WTW, but the one borehole is blocked and current supply is only from the second borehole. The current supply from the Wit River and the second borehole is only adequate to meet the projected future water requirements for Kurland for the short term. Two new boreholes were recently drilled for Kurland (October 2021), which will be pump tested and the safe yields of the existing and new boreholes will be recalculated.

Natures Valley: The current supply from the Groot River is adequate to meet the projected future water requirements for Natures Valley for the long term. The Municipality plan to drill a borehole for Natures Valley, which will be used as back-up water supply for Natures Valley during the peak holiday periods.

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 2015 All Towns Reconciliation Strategies for Bitou Municipality.

Table C.8.4: Potential future water resources for the various towns (DWS's All Towns Reconciliation Strategies)

Distribution System	Option	Potential
Plettenberg Bay	Re-use of water	• The bulk of the treated wastewater outflow is currently utilised for irrigation of non-food crops (golf courses, park lands, etc.) This has potential to be extended in future, as water requirements and effluent increase in line with water use. • Provided that the Municipality can provide a 95% assurance of supply in terms of quality requirements, treated effluent could replace irrigation requirements currently supplied from the Roodefontein Dam, and the option exists of further storage of effluent treated to an acceptable standard in Roodefontein Dam during extended droughts. • The use of treated sewage effluent is still more expensive than the development of surface water sources, but is more environmentally desirable.
	Groundwater	• It is recommended that the municipality increases groundwater abstraction from existing boreholes to the registered use of 362 366 m^3/a (11.5 l/s). • It is proposed that with artificial recharge the supply from the aquifer could increase to over 1 million m^3/a. The intention would be to transfer treated water from the Keurbooms River to the Kwanokathula Aquifer via existing boreholes in winter, and abstract the water from the same boreholes (and possibly other, down-gradient boreholes as well), in summer. • It is recommended that the 3D geometry of the Kwanokathula aquifer be determined to support accurate yield determination and assessment of storage potential, in order to address whether this aquifer can be pumped at significantly higher yields even if for short drought relief periods only. This must also include the Peninsula Formation further afield. • Several further possible wellfield areas, mostly targeting the TMG aquifers, were identified in the recent cross-border augmentation study (Groundwater Africa, Parsons & Associates, 2013) ➢ George Fault West, George Fault Central, George Fault East; ➢ Bitou Valley; ➢ Gouna West, Gouna East; ➢ Plett North, Plett West, Plett Central, Plett South; and ➢ Roodefontein.
	Surface Water	• The proposed further raising of the Roodefontein Dam, to provide additional storage for proposed increased transfers out of the Keurbooms River would require further investigation. Raising the dam wall could further increase its capacity by 0.400 to 0.700 million m^3/a. • The development of additional yield in the Keurbooms River through off-channel storage has been studied and identified as a potential option for augmenting supply to Plettenberg Bay. • The Feasibility Study of the Regional Integration of the Bulk Water Supply Systems of the Knysna and Bitou Municipalities (2013, 2014) identified two options; viz. 3 million m^3 or 4.5 million m^3 off-channel storage dam. These could be developed subsequently to the groundwater development mentioned above. The total costs were estimated between R65.7 million and R86.5 million, with URVs of between R3-31 for the 3 million m^3 off-channel storage (additional yield of 5.09 million m^3/a) and R3-92 for the 4.5 million m^3 off-channel storage and groundwater development (additional yield of 6.51 million m^3/a).
	Other Sources	• Rainwater harvesting is a suitable option for Plettenberg Bay as part of the WDM Strategy. This water could be used for garden watering in the holiday periods when water could become scarce. • Desalination of seawater is a more viable option for water supply to coastal towns because

Table C.8.4: Potential future water resources for the various towns (DWS's All Towns Reconciliation Strategies)		
Distribution System	**Option**	**Potential**
		of the high assurance of supply. A 2 Ml/day desalination plant was constructed during 2010 in Plettenberg Bay as a result of the severe drought experienced in the region. The cost of desalination is however still high, although technical advances are being made that will reduce the costs of some components. The rapidly increasing cost of electricity has a significant influence on the overall cost of desalination. The mode of operation, to mainly use desalination when other sources run low, or during high-peak demand periods, means that the unit cost of desalinated water is extremely high. On-going operational costs are also required to keep the plant in good working order. Desalination of seawater at this stage is not a competitive option compared to long-term surface water augmentation, unless a strategic decision is made to provide such water to improve the overall assurance of supply.
	Summary	**Plettenberg Bay has sufficient water to meet its current and near future water requirements. A shortfall in water supply can be expected after 2020, which would increase to 4.552 million m³/a by 2040 for the low-growth scenario and 10.344 million m³/a for the high-growth scenario. The following sources are identified as potential sources to augment the current water supply, in order of priority and implementation sequence:** • Implementation of the Water Conservation and Water Demand Management Strategy to reduce water losses and achieve savings in water consumption. • Expansion of the existing wellfield in the Kwanokathula Aquifer. • Artificial recharge of TMG aquifer with surplus water and abstraction during peak months. • Keurbooms River off-channel dam (Wadrif) to store surplus winter water and use in conjunction with groundwater. • Indirect water re-use through pumping treated effluent into the Roodefontein Dam.
Kurland	Re-use of water	• The treated water volumes are too small for water re-use being considered as a feasible option to augment the water supply. • However, Bitou Municipality should encourage or oblige future developments to install their own purification package plants for water re-use for irrigation purposes (e.g. polo fields and golf courses).
	Groundwater	• According to the 1:250 000 geological map the best target option for large-scale abstraction is the unconfined Peninsula Formation exposed in the northern part of the town. This is a suitable option for large-scale schemes as the Peninsula has high reliability of yield and an extensive recharge area. A wellfield sited here could supply Kurland, Natures Valley and other coastal areas. However local-scale mapping is required to confirm the geology as the topography suggests the Peninsula only outcrops north of the town in steep mountains. Nevertheless, there is significant potential in the area from TMG aquifers. The expected water quality for the TMG aquifers in Kurland is Class 1 and yields of 5 – 20 l/s are possible. • It is recommended that local geological mapping accompanied by drilling exploration be initiated. If yields such as 6 l/s are attained, four boreholes are required to meet the additional water requirement of 0.39 million m^3/a in 2040. Two borehole yielding 10 l/s would also be sufficient. An aquifer management strategy and a well-field management plan are essential for sustainable aquifer management.
	Surface Water	• The rivers in the greater Plettenberg Bay area have a high conservation status, particularly the Keurbooms River. The development of the whole region must thus be integrated with the careful management of these water resources. • The Keurbooms River is 8 km west of Kurland. The development of yield in the Keurbooms River, through off-channel storage has been studied and identified as a potential option for augmenting supply to Plettenberg Bay. It would entail the abstraction of surplus winter water by pumping from the Keurbooms River into a new off-channel storage facility, with a yield increase of approximately 3 to 6 million m³/a. This remains a suitable intervention for supply of a significant portion to Plettenberg Bay and smaller portions to Kurland, Natures Valley and Wittedrift. However, supply to Kurland would involve significant capital and operational costs.
	Other Sources	• Rainwater harvesting is a suitable option for Kurland as the rainfall is distributed throughout the year and available during the peak summer months.
	Summary	**The supply from the Wit River has been sufficient for the previous water requirements. Based on the preliminary water balance, a shortfall of 0.030 million m³/a in water supply is already experienced. The shortfall would increase to 0.274 million m³/a by 2040 for the medium-growth scenario and 0.393 million m³/a for the high-growth scenario. The following sources are identified as potential sources to augment the current water supply, in order of priority and implementation sequence:** • Groundwater development of the TMG Aquifer. • Rainwater harvesting as part of a Water Demand Management Strategy to reduce the

Table C.8.4: Potential future water resources for the various towns (DWS's All Towns Reconciliation Strategies)		
Distribution System	**Option**	**Potential**
		requirement for potable water.
Natures Valley	Re-use of water	• At this stage, water re-use is not an option as a suitable water resource for Natures Valley, as the town is serviced by septic tanks with no WWTW as a treated effluent resource.
	Groundwater	• It is recommended that a local feasibility study compares the Skurweberg and Peninsula Formations to determine the potential for large scale abstraction. To meet the water requirement of 0.229 million m3/a in 2040, one borehole yielding 5 l/s is required. The summer daily water requirement can be met with an additional two boreholes yielding the same. If borehole yields are lower than 5 l/s additional boreholes will be needed. An aquifer management and monitoring strategy and well-field management plan are essential.
	Surface Water	• The rivers in the greater Plettenberg Bay area have a high conservation status, particularly the Keurbooms River. The development of the whole region must thus be integrated with the careful management of these water resources. • The Keurbooms River is 14 km west of Natures Valley. The development of yield in the Keurbooms River, through off-channel storage has been studied and identified as a potential option for augmenting supply to Plettenberg Bay. It would entail the abstraction of surplus winter water by pumping from the Keurbooms River into a new off-channel storage facility, with a yield increase of approximately 3 to 6 million m³/a. This remains a suitable intervention for supply of a significant portion to Plettenberg Bay and smaller portions to Kurland, Natures Valley and Wittedrift. However, supply to Kurland would involve significant capital and operational costs, because of the need for a pump station and pipeline.
	Other Sources	• Rainwater harvesting is not a suitable option for Natures Valley as the peak water requirement is during the dry summer months. • Desalination of seawater at Natures Valley is also a potential source as it has a high assurance of supply, and because the perception was that it may have some environmental advantages over a surface water scheme. A study is required for this option, specifically on the financial feasibility of small-scale seawater desalination in a sensitive ecological and marine environment.
	Summary	**The supply from the Groot River seems to be sufficient for the current water requirements. A shortfall in water supply is expected in 2028 (i.e. high-growth scenario), which would increase to 0.229 million m³/a by 2040 for the high-growth scenario). The following sources are identified as potential sources to augment the water supply, in order of priority and implementation sequence:** • Development and implementation of a Water Conservation and Water Demand Management Strategy to reduce water losses and achieve savings in water consumption. • Groundwater development of TMG Aquifer in close proximity to Natures Valley. • Desalination of seawater.

Industrial Effluent Monitoring: There are no wet industrial consumers in Bitou Municipality's Management Area that discharge industrial effluent into the Municipality's sewer system that requires monitoring.

C.9. Water Services Institutional Arrangements and Customer Services

Bitou Municipality is the official WSA for the entire Municipal Management Area and act as the WSP for the whole area. An updated WSDP was compiled for Bitou Municipality during 2020, which was approved by Council on the 8th of June 2021. The required Policies and Bylaws for water and sanitation provision are in place. The Water Services By-laws cover the provision of services for water supply, sanitation and industrial effluent. The Water and Sewer Master Plans were also updated during 2020 and the Municipality will continue to use the Master Plans to guide all future water and sewerage infrastructure planning.

Bitou Municipality's Organogram, which include water and sanitation services, is included in Annexure F. Bitou Municipality is currently effectively managing its water and sanitation services. Urgent attention is however required to address the backlog in infrastructure rehabilitation and maintenance.

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 Bitou Municipality across the eighteen key service areas, as identified through the Municipal Strategic Self-Assessment of Water Services process.

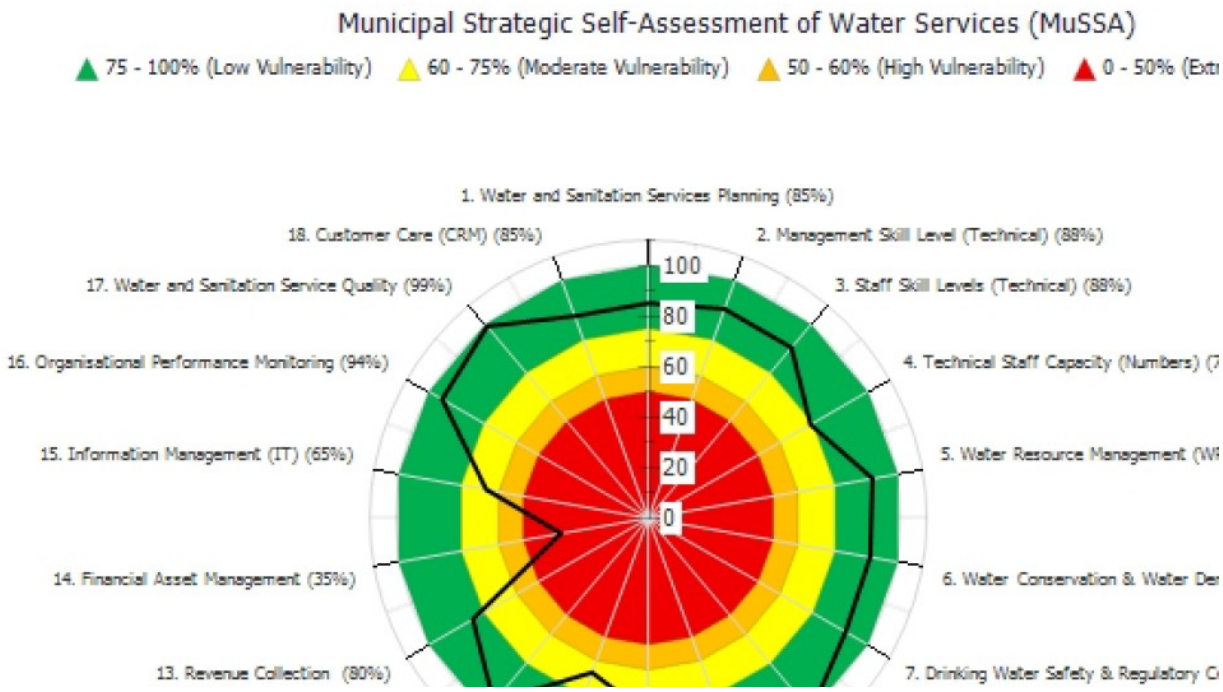


Figure C.9.1: Spider Diagram of the Vulnerability Levels of Bitou Municipality for 2020

Bitou Municipality's Vulnerability Index for 2020 was indicated as 0.26 "Moderate Vulnerability". The only area of concern evident from the 2020 assessment is Financial Asset Management (Extreme Vulnerability, 35.0%). All other key service areas were indicated as low vulnerability, except Operation and Maintenance of Assets, Information Management and Technical Staff Capacity (Numbers) that were indicated as Moderate Vulnerability.

Table C.9.1: Municipal Strategic Self-Assessment (MuSSA) of Water Services for Bitou 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.	**Low (99.0%)**

Table C.9.1: Municipal Strategic Self-Assessment (MuSSA) of Water Services for Bitou Municipality	
Section	**Vulnerability**
• 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.	
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 (85.0%)**
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 (85.0%)**
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 (90.0%)**
WC/WDM • Your WSA has developed a council approved WC/WDM Strategy, which includes a standard water balance (e.g. 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).	**Low (89.0%)**
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.	**Low (90.0%)**

Table C.9.1: Municipal Strategic Self-Assessment (MuSSA) of Water Services for Bitou Municipality	
Section	**Vulnerability**
• 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.	
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).	**Low (100.0%)**
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 (95.0%)**
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 (78.0%)**
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. • 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 (%).	**Moderate (65.0%)**
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.	**Moderate (65.0%)**

Table C.9.1: Municipal Strategic Self-Assessment (MuSSA) of Water Services for Bitou Municipality	
Section	**Vulnerability**
• 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.	
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 (94.0%)**
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 (95.0%)**
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 (80.0%)**
Financial Asset Management • 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.	**Extreme (35.0%)**
Management Skill Level (Technical)	**Low (88.0%)**

Table C.9.1: Municipal Strategic Self-Assessment (MuSSA) of Water Services for Bitou Municipality	
Section	**Vulnerability**
• 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.	
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 (88.0%)**
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.	**Moderate (74.0%)**

Bitou Municipality continues to undertake basic public awareness programmes. 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

The Municipal personnel 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 every year and the specific training needs of the personnel, with regard to water and wastewater management are determined annually.

The following training relating to the Water and Sanitation Services personnel commenced during the 2020/2021 financial year and will roll over to the 2021/2022 financial year.

- Water and Wastewater Treatment Process Operations: NQF 2 (Wastewater)
- Water and Wastewater Process Control (NQF3)

All the WTWs and WWTWs in Bitou 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 Bitou Municipality to compile a Legal Compliance Audit of all their WTWs and WWTWs, which will provide the management of Bitou Municipality with the necessary information to establish whether the Municipality is in compliance with the legislation or not.

A comprehensive Customer Services and Complaints system is in place at Bitou 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. Requests are furthermore captured on an electronic mail or works-order system to ensure execution thereof.

The table and graphs below give an overview of the indicators logged by Bitou Municipality for water services.

Table C.9.2: Water Services Indicators logged by Bitou Municipality

Year	Pipe Bursts	Water Leaks	No Water / Poor Pressure	Dirty Water	Meter Related	New Meters Installed	Meters Replaced
2010/2011	167	892	106	9	94	252	105
2011/2012	162	679	175	23	91	170	102
2012/2013	170	650	135	9	279	253	86
2013/2014	170	825	133	-	270	600	60
2014/2015	190	855	94	-	216	210	70
2015/2016	165	1 063	130	-	103	462	74
2016/2017	112	1 113	114	35	182	79	95
2017/2018	167	1 198	178	-	179	30	133
2018/2019	128	682	104	-	249	50	24
2019/2020	230	713	150	-	80	27	22
2020/2021	208	685	221	-	79	6	10

The graphs below gives an overview of the number of water complaints received for the various financial years.

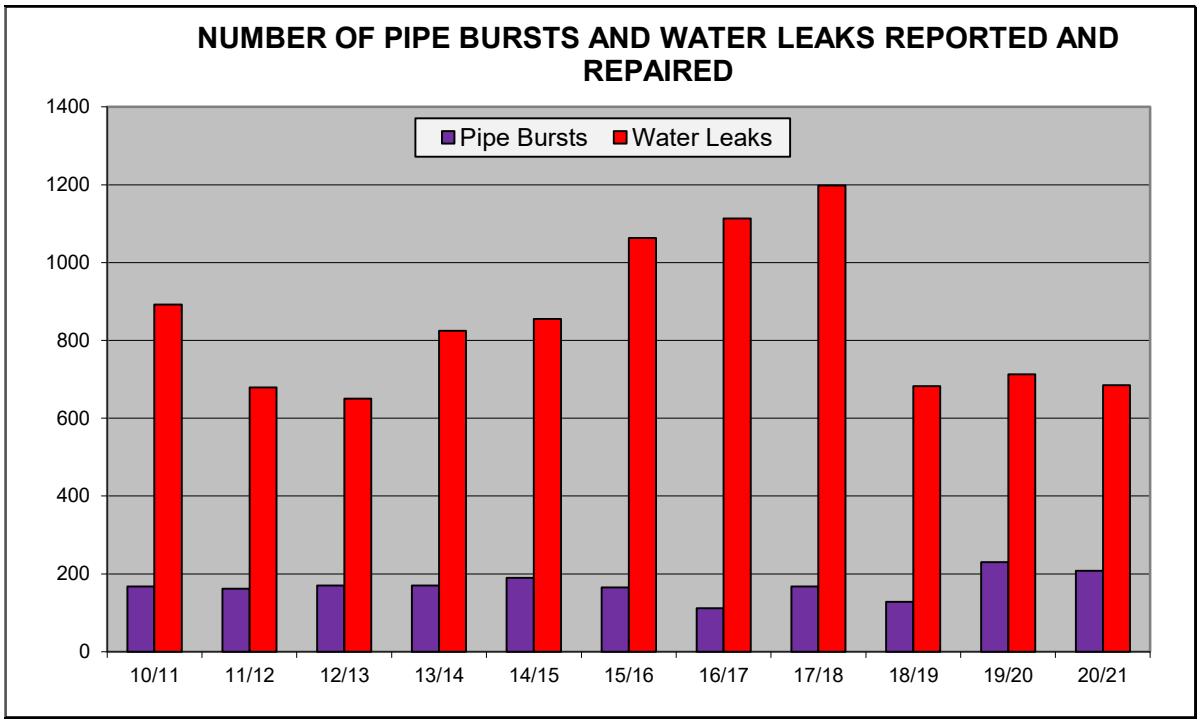


Figure C.9.2: Number of pipe bursts and water leaks reported and repaired.

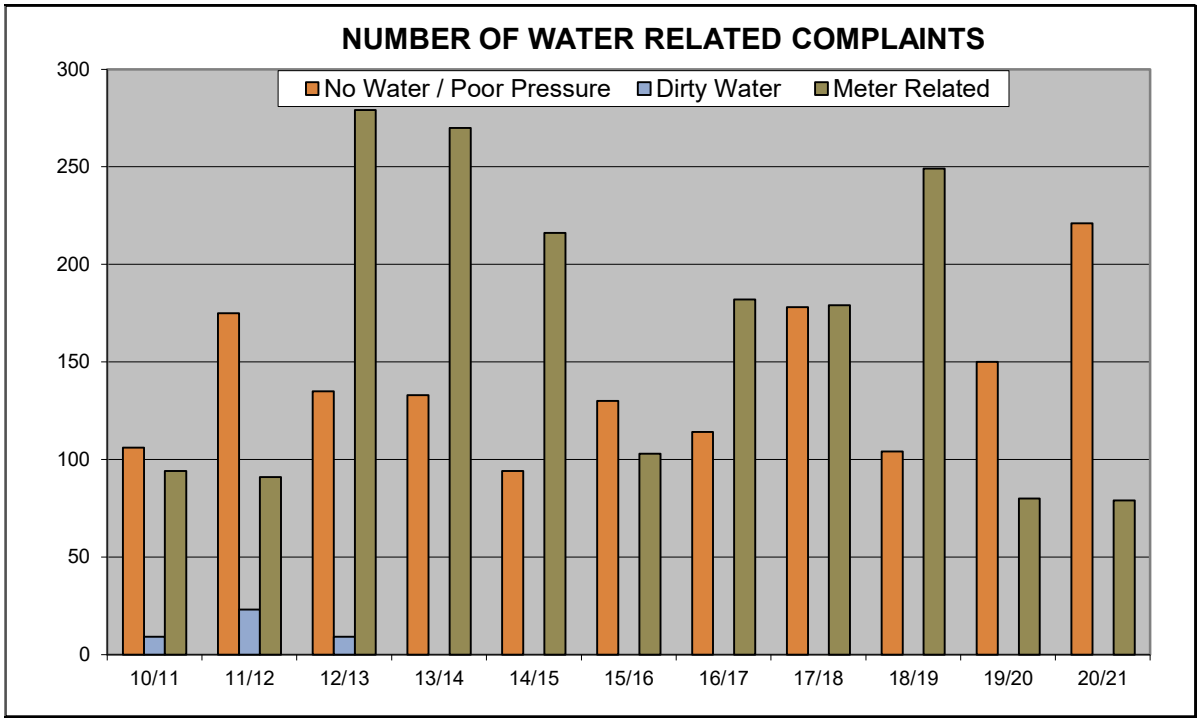


Figure C.9.3: Number of water related complaints.

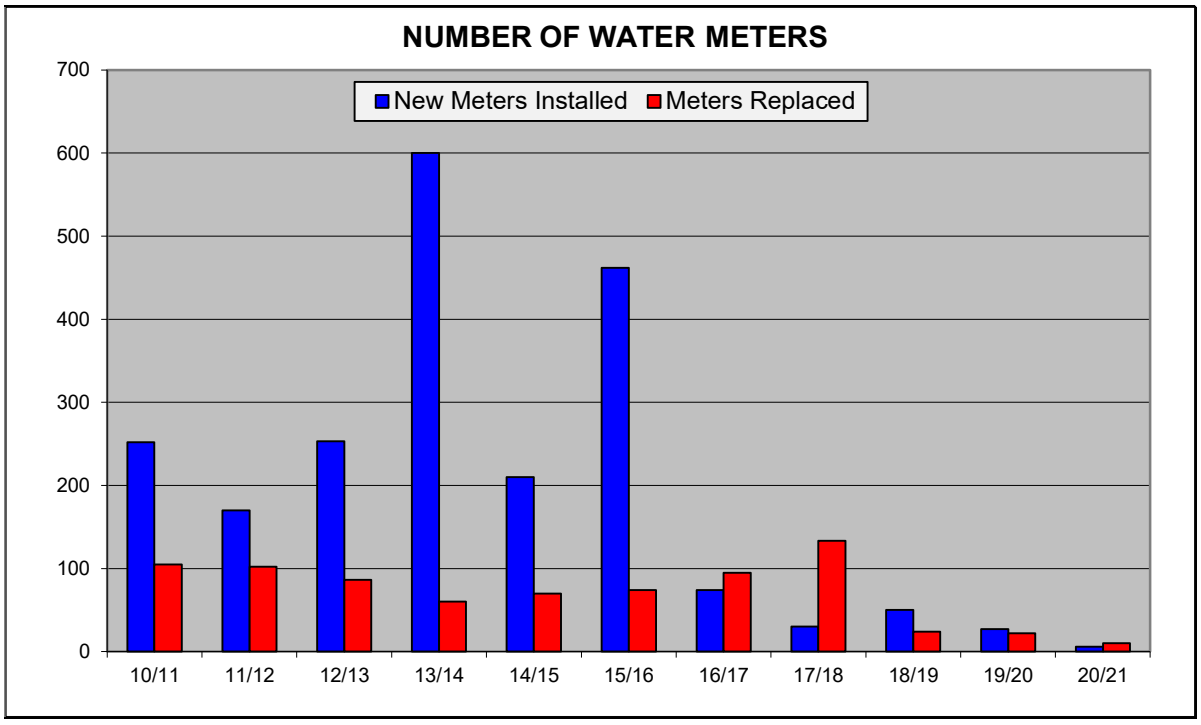


Figure C.9.4: Number of new water meters installed and replaced.

The table and graph below give an overview of the indicators logged by Bitou Municipality for sanitation services.

Table C.9.3: Sanitation Services Indicators logged by Bitou Municipality									
Year	Blockages	New Sewer Connections	Sewers Repaired	Sewers / Manholes Cleaned	Excavate Backfilling	Bush Clearing	Paving Repaired	Manholes Lifted Repaired	Total Complaints
2012/2013	2 070	215	68	293	78	15	23	17	**2 779**
2013/2014	2 262	591	83	319	120	55	48	14	**3 492**
2014/2015	2 473	180	64	252	83	19	32	9	**3 112**
2015/2016	2 104	460	85	482	119	0	42	18	**3 310**
2016/2017	3 102	66	134	442	191	14	41	26	**4 016**
2017/2018	2 825	13	82	847	77	19	39	13	**3 915**
2018/2019	2 062	11	23	131	36	-	-	4	**2 267**
2019/2020	2 524	5	28	102	31	-	-	12	**2 702**
2020/2021	3 117	7	25	96	41	-	-	4	**3 290**

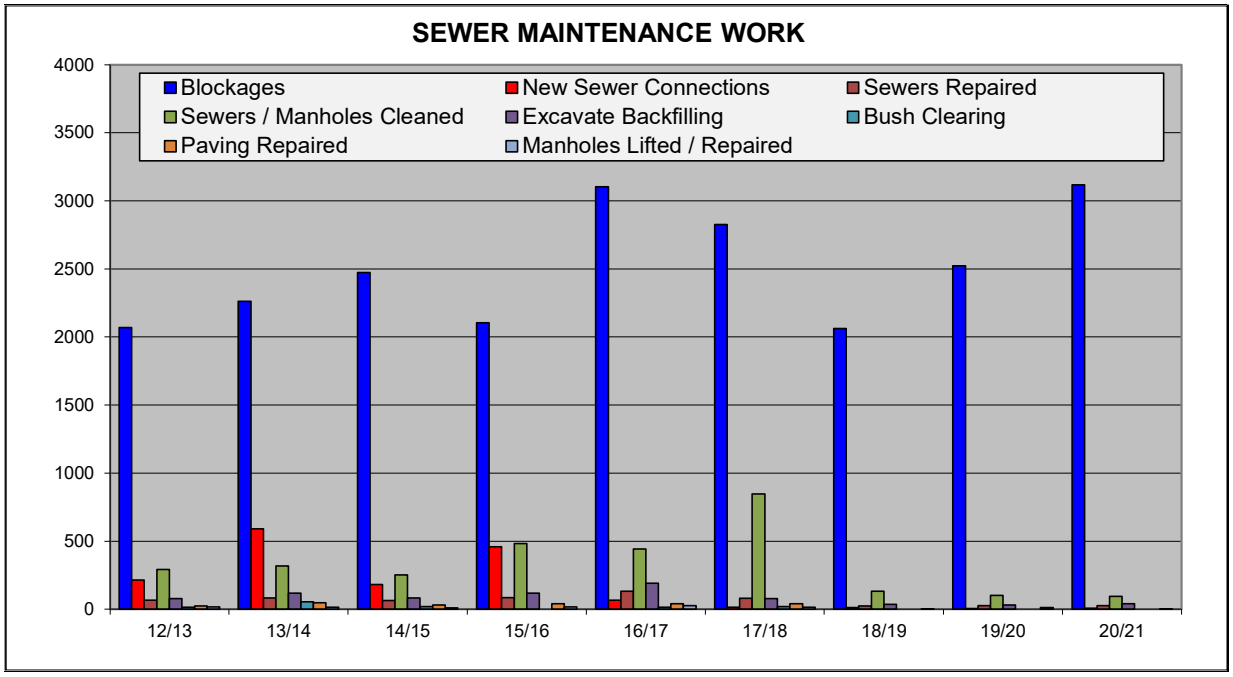


Figure C.9.5: Overview of sanitation indicators recorded for the past nine years.

Access to safe drinking water is essential to health and is human right. Safe drinking water that complies with the SANS:241 Drinking Water specifications do not pose a significant risk to health over a lifetime of consumption, including different sensitivities that may occur between life stages. Bitou Municipality is therefore committed to ensure that their water quality always complies with SANS241:2015 limits.

Water Safety Plans are in place for Plettenberg Bay, Kurland and Natures Valley, which include Improvement / Upgrade Plans. The purpose of the Improvement / Upgrade Plans is to address the existing significant risks where the existing controls were not effective or absent. Barriers implemented by Bitou Municipality against contamination and deteriorating water quality include the following:

- Participate in Catchment management and water resource protection initiatives.
- Protection at points of abstraction such as river intakes and dams (Abstraction Management).

- Correct operation and maintenance of WTWs (Coagulation, flocculation, sedimentation and filtration).
- 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 Bitou 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 have respect for water as a precious resource.

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 Date
Name: F Samuel
Title: Manager: Water Services

_____ _____
Signature Date
Name: Michael J Rhode
Title: Director: Engineering Services

APPROVED:

_____ _____
Signature Date
Name: L Ngoqo
Title: Municipal Manager

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.
- DWS's All Towns Reconciliation Strategy Documents for each of the towns in Bitou Municipality's Management Area, April 2014.
- Municipal Services Strategic Assessment (MuSSA) for Bitou Municipality, 2020, DWS.
- Bitou Municipality's Annual WSDP Performance- and Water Services Audit Report for 2019/2020, iX engineers, 9 December 2020.
- Bitou Municipality's Operational and Maintenance Budgets and Tariffs.
- Asset Register for Water and Sewerage Infrastructure Assets, June 2021.
- SDBIP of Bitou Municipality for 2020/2021.
- 2020 Socio Economic Profile for Bitou Municipality, Western Cape Government.
- Study to Analyse Treasury Data and Identify Projects that promote WC/WDM in Bitou Local Municipality, Lyners and GLS Consulting, June 2021 (Final).

ATTENDANCE REGISTER (DISCUSSION OF DRAFT REPORT)

Virtual Meeting, 10:00 – 11:30, ……

Attendees:

……..NQF

Apologies:

…….

ANNEXURE A

IWA Water balances for the various distribution systems
Rainfall and WWTW's flows and capacities
WTW's flows and capacities
Billed metered consumption and number of consumer units

ANNEXURE B

DWS's No Drop Spreadsheet

ILI for the various distribution systems

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

ANNEXURE C

Future Water Requirement Projections for the Various Distribution Systems

ANNEXURE D

Water Quality Compliance Sample Results
Final Effluent Quality Compliance Sample Results

ANNEXURE E

Summary of Water and Sanitation O&M Budgets

ANNEXURE F

Bitou Municipality's Approved Micro Structure 29 June 2018