WorleyParsons
resources & energy

EcoNomics

BERGRIVIER MUNICIPALITY

Water Services Development Plan (WSDP) – IDP Water Sector Input Report

For IDP incorporation as directed by the Water Services Act (Act 108 of 1997)

FY 2016/2017

BERGRIVIER MUNICIPALITY

PO Box 60
Piketberg
7320

Tel: (022) 913 6000
Fax: (022) 913 1406

Ref 270930-015

WorleyParsons RSA (Pty) Ltd
Contact person: Jaco Human
31 Allen Drive, Loevenstein 7530
PO Box 398, Bellville 7535
South Africa
Telephone: +27 (0)21 912 3000
Facsimile: +27 (0)21 912 3222
email: jaco.human@worleyparsons.com
ABN 61 001 279 812

WorleyParsons
resources & energy

EcoNomics

BERGRIVIER MUNICIPALITY

Disclaimer

This report has been prepared on behalf of and for the exclusive use of BERGRIVIER MUNICIPALITY, and is subject to and issued in accordance with the agreement between BERGRIVIER MUNICIPALITY and Worley Parsons RSA (Pty) Ltd. Worley Parsons RSA (Pty) Ltd accepts no liability or responsibility whatsoever for it in respect of any use of or reliance upon this report by any third party.

Copying this report without the permission of BERGRIVIER MUNICIPALITY and Worley Parsons RSA (Pty) Ltd is not permitted.

Version Control:

Status	Description	Date	Reference
Draft Documents	WSDP Documents for 2017-2022 (First Cycle): • WSDP-IDP Water Sector Input Report • eWSDP • Module 2: Base Data and Compliance Data • Module 3: Strategies	Busy with drafting	Draft Documents
Approval	WSDP Documents for 2017-2022 (First Cycle): • WSDP-IDP Water Sector Input Report • eWSDP • Module 2: Base Data and Compliance Data • Module 3: Future Plans and Strategies	Will be submitted to Council	Council Resolution for approval will be forwarded by the Mun. to the DWS.

Prepared by:

Designation	Name	Contact No.	E-mail
Engineer	Jaco Human	021 912 3000 / 084 431 8728	jaco.human@worleyparsons.com

PROJECT 270930-15- BERGRIVIER MUNICIPALITY'S WSDP FOR 2017-2022 (FIRST CYCLE)

REV	DESCRIPTION	ORIG	REVIEW	WORLEY-PARSONS APPROVAL	DATE	CLIENT APPROVAL	DATE
Draft	Draft issued for external review	R Kuffner Author	JT Human A Reviewer	Approval		Approval	
Final	Final for Council approval	R Kuffner Author	JT Human A Reviewer	Approval		Approval	

BERGRIVIER MUNICIPALITY

WSDP – IDP WATER SECTOR INPUT REPORT (EXECUTIVE SUMMARY)

ITEM **DESCRIPTION** **PAGE**

LIST OF TABLES

Section A: Status Quo Overview

Section B: State of Water Services Planning

Section C: Water Services Existing Needs Perspective

LIST OF TABLES

Section D: Water Services Objectives and Strategies

Section E: Water Services MTEF Projects

Section F: WSDP Projects

ABBREVIATIONS

AADD	Average Annual Daily Demand
ACIP	Accelerated Community Infrastructure Programme
ADWF	Average Dry Weather Flow
AIDS	Acquired Immune Deficiency Syndrome
AMP	Asset Management Plan
AMR	Automatic Meter Reading
ART	Anti-Retroviral Treatment
BDS	Blue Drop System
CBA	Critical Biodiversity Areas
CFO	Chief Financial Officer
COD	Chemical Oxygen Demand
CRC	Current Replacement Cost
CRR	Cumulative Risk Ratio
DRC	Depreciated Replacement Cost
DWQ	Drinking Water Quality
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
GAMAP	General Accepted Municipal Accounting Practice
GDPR	Regional Gross Domestic Product
HDI	Human Development Index
HIV	Human Immunodeficiency Virus
ICT	Information and Communications Technology
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
IGR	Inter-Governmental Relations
ILI	Infrastructure Leakage Index
IMP	Incident Management Protocol
IMQS	Infrastructure Management Query System
LED	Local Economic Development
m	Metre
MAR	Mean Annual Runoff
MFMA	Municipal Finance Management Act
MIG	Municipal Infrastructure Grant
Ml	Mega Litre
Mℓ	Mega Litre
Ml/a	Mega Litre per Annum
MTEF	Medium Term Expenditure Framework
NGA	National Groundwater Archive
NGDB	National Groundwater Database
NRW	Non-Revenue Water
NWRS	National Water Resource Strategy
PAT	Progress Assessment Tool
PDD	Peak Daily Demand
RDP	Reconstruction and Development Programme
RSA	Republic of South Africa
RUL	Remaining Useful Life

SANS	South African National Standard
SCM	Supply Chain Management
SCOA	Standard Chart of Accounts
SDBIP	Service Delivery and Budget Implementation Plan
SDF	Spatial Development Framework
TMG	Table Mountain Group
TWL	Top Water Level
VAT	Value Added Tax
WARMS	Water Use Licensing, Registration and Revenue Collection
WCDM	West Coast District Municipality
WCWSS	Western Cape Water Supply System
WDM	Water Demand Management
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSP	Water Services Provider
WTW	Water Treatment Works
WWTW	Waste Water Treatment Works

KEY TERMS	INTERPRETATION
Basic Water Supply Facility	The infrastructure necessary to supply 25 litres of potable water per person per day supplied within 200 metres of a household and with a minimum flow of 10 litres per minute (in the case of communal water points) or 6 000 litres of potable water supplied per formal connection per month (in the case of yard or house connections).
Basic Water Supply Service	The provision of a basic water supply facility, the sustainable operation of the facility (available for at least 350 days per year and not interrupted for more than 48 consecutive hours per incident) and the communication of good water-use, hygiene and related practices.
Basic Sanitation Facility	The infrastructure necessary to provide a sanitation facility which is safe, reliable, private, protected from the weather and ventilated, keeps smells to the minimum, is easy to keep clean, minimises the risk of the spread of sanitation-related diseases by facilitating the appropriate control of disease carrying flies and pests, and enables safe and appropriate treatment and/or removal of human waste and wastewater in an environmentally sound manner.
Basic Sanitation Service	The provision of a basic sanitation facility which is easily accessible to a household, the sustainable operation of the facility, including the safe removal of human waste and wastewater from the premises where this is appropriate and necessary, and the communication of good sanitation, hygiene and related practices.
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.
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.
IDP	A municipal plan as defined in the Municipal Systems Act.
MIG	A conditional grant from national government to support investment in basic municipal infrastructure.
RUL	The time remaining over which an asset is expected to be used.
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.
WSA	A WSA is any municipality that has the executive authority to provide water services within its area of jurisdiction in terms of the Municipal Structures Act 118 of 1998 or the ministerial authorisations made in terms of this Act. 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.
WSDP	A plan for water and sanitation services in terms of the Water Services Act.

KEY TERMS

TERM	INTERPRETATION
WSP	A Water services provider is • Any person who has a contract with a water services authority or another water services provider to sell water to, and/or accept wastewater for the purpose of treatment from, that authority or provider (bulk water services provider); and / or • Any person who has a contract with a water services authority to assume operational responsibility for providing water services to one or more consumers (end users) within a specific geographic area (retail water services provider); or • A water services authority which provides either or both of the above services itself
WC	The minimisation of loss or waste, the care and protection of water resources and the efficient and effective use of water.
WDM	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.

WSDP – IDP Water Sector Input Report (Executive Summary)

Introduction

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

Sections 12 and 13 of the Water Services Act (Act No 108 of 1997) place a duty on WSAs to prepare and maintain a WSDP, as part of the process of preparing an IDP. The DWS has developed a new eWSDP system to assist WSAs with their WSDP process and to provide a framework for the capturing of the data. The business elements included in the eWSDP system and in the guidelines and addressed in detail in the eWSDP system and in the two Modules of Bergrivier Municipality's WSDP are as follows:

- Administration
- Demographics Profile
- Service Levels Profile
- Socio Economic Background Profile
- Water Services Infrastructure Profile
- Operation and Maintenance Profile
- Associated Services Profile
- Water Resources Profile
- Conservation and Demand Management Profile
- Financial Profile
- Institutional Arrangements Profile
- Social and Customer Service Requirements Profile
- Needs Development Plan

The 2017-2022 WSDP (First Cycle) of Bergrivier Municipality consists of the following documents.

- WSDP-IDP Water Sector Input Report (For Council approval and Public Participation Process)
- eWSDP: Base data and an overview and assessment of the status of information and strategies on a WSA level.
- Module 2: Base Data and Compliance Data.
- Module 3: Strategies.

The primary instrument of planning in the water services sector is the WSDP. The following principles apply to the WSDP, as taken from the Strategic Framework for Water Services (2003):

- All WSAs must develop a WSDP.
- A new plan must be developed every five years and the plan should be updated as necessary and appropriate in the interim years.
- The WSDP must be integrated with the IDP of the municipality, as required in terms of the Municipal Systems Act.
- The WSDP must integrate water supply planning with sanitation planning.

- The WSDP must integrate technical planning with social, institutional, financial and environmental planning. The planning of capital expenditures must also be integrated with the associated operation and maintenance requirements and expenditures.

- The WSDP must be informed by the business plans developed by water services providers and with the plans of any regional water services providers, as relevant.

- The plan must take into account the impact of HIV/Aids on future water demand.

- The WSDP must integrate with the catchment management strategy.

- The planning process must take into account the views of all important stakeholders, including communities, through a consultative and participatory process. Every effort must be made to ensure the adequate and meaningful participation of women in consultation forums.

- The draft plan must be made available for public and stakeholder comment and all comments made must be considered when preparing the final plan.

- The contents of the WSDP must be communicated to all important stakeholders, including the DWS.

- A WSA must report annually and in a public way on progress in implementing the plan.

The purpose of this report is to provide relevant and summarised WSDP inputs for incorporation into Bergrivier Municipality's IDP process and is structured as follows:

Section A: Status Quo Overview: Provides a summarised overview of the water services status quo in terms of the water services functional business elements as aligned to the WSDP framework.

Section B: State of Water Services Planning: Presents the status of- and references the water services planning within Bergrivier Municipality.

Section C: Water Services Existing Needs Perspective: Gives an overview of Bergrivier Municipality's assessment and interpretation of its water services, with specific focus on problem definition statements.

Section D: Water Services Objectives and Strategies: Outlines the 5-year water services objectives and strategies as developed through the WSDP process for incorporation in terms of the IDP and aligned to the water services functional business elements.

Section E: Water Services MTEF Projects: The agreed water services projects for the medium-term expenditure framework and inclusive of funding sources.

Section F: WSDP Projects: Presents the projects identified during the WSDP process in order to meet the water services strategies of Bergrivier Municipality, as aligned to the outflow from the situation analysis per water services business element.

SECTION A: STATUS QUO OVERVIEW

Business Element 1: Administration

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

The 2017-2022 (First Cycle) WSDP will be distributed to the public as part of the IDP public participation process. The draft WSDP will also be distributed to all the neighbouring WSAs for their comments. All relevant comments received on the draft WSDP will be included in the final WSDP.

The Administrative Governance of Bergrivier Municipality is summarized in the table below.

Table A.1: Roles and responsibilities of the Municipal Manager and the Directors

Position	Roles and Responsibilities
Municipal Manager: Adv H Linde	The functions of the Municipal Manager are contained in Section 55 of the Local Government Municipal Systems Act, 2000. As accounting officer of the municipality the municipal manager is responsible and accountable for- • All income and expenditure of the municipality; • All assets and the discharge of all liabilities of the municipality; and • Proper and diligent compliance with applicable municipal finance management legislation The Office of the Municipal Manager is also responsible for the following: • International Fund Raising • International Relations • Tourism (Strategic) • Communication • Intergovernmental Relations • Internal Audit • Strategic Services
Director Corporate Services: Mr JWA Kotzee	Responsible for all administrative functions of the Municipality including: • Administration • Human Resource Management • Community Services • Planning and Development
Director Financial Services: Mr JA Van Niekerk	Responsible for all financial functions of the Municipality including: • Income • Expenditure • Budget and Treasury
Director Technical Services: Mr H Kröhn	Responsible for all technical functions of the Municipality including: • Civil • Electricity • Project Management

Business Element 2: Demographics

Bergrivier Municipality is located within the newly established Berg-Olifants Water Management Area. The Municipality further falls within the West Coast Region of the Western Cape Province, in which the following Local Municipalities are also located:

- Matzikama Municipality;
- Cederberg Municipality;
- Swartland Municipality; and
- Saldanha Bay Municipality

The Municipality covers a geographic area of approximately 4 407.04 km² and is geographically diverse. The Municipality comprises of nine (9) urban settlements, approximately 40 kilometres of coastline and a vast rural area. The main urban settlements that constitute the Municipality are Piketberg which is the administrative seat, Porterville, Velddrif (which include Port Owen, Laaiplek and Noordhoek), Dwarskersbos, Eendekuil, Aurora, Redelinghuys, Goedverwacht and Wittewater. The latter two towns are Moravian settlements on private land.

The Municipality consists of seven (7) individual wards, and is the only WSA within this municipal area. It is also the Water Services Provider (WSP). Bulk potable water is however provided to the towns of Velddrif and Dwarskersbos by the West Coast District Municipality through their Withoogte bulk water distribution system. The bulk potable water supplied from the Withoogte WTW is augmented by abstraction of groundwater from the Langebaan Road Groundwater Aquifer System. The bulk distribution scheme is a cross-border scheme and supply water to Bergrivier Municipality, Swartland Municipality and Saldanha Bay Municipality. A Service Level Agreement between the West Coast District Municipality and Bergrivier Municipality is in place for the provision of bulk potable water to these two towns. Bergrivier Municipality's responsibility as WSA also extends to the rural areas within its Municipal boundary.

Bergrivier Municipality's Management Area includes the following areas (***Water Distribution Systems***):

- Porterville - ***Porterville Water Distribution System***

  Bulk raw water is supplied to the Porterville WTW from two springs (South and North) and the Voorberg Stream. The raw water flows through a balancing tank to the WTW and the overflow water is stored in a dam just below the WTW from where it can also be pumped back to the WTW. The WTW consists of four pressure sand filters. The potable water is stored in the town's main reservoir with a storage capacity of 3.250 Ml from where it gravitates to the town and the two Monte Bertha reservoirs, with a total storage capacity of 0.735 Ml.

- Piketberg – ***Piketberg Water Distribution System***

  Bulk raw water is primarily supplied to Piketberg from the Berg River. Water is pumped from the Berg River pump station to the Piketberg WTW, where the water is treated and the final water is pumped to the town. Piketberg is allowed to abstract up to 0.704 million m^3/a from the Berg River. Bulk water is also supplied to Piketberg from the Voëlvlei Spring, with roughly 16% of Piketberg's total system input volume for the last three years supplied from this source. Potable water is stored in two reservoirs with a total storage capacity of 5.700 Ml before it is distributed to the consumers in Piketberg.

- Velddrif – ***Velddrif Water Distribution System***

  Potable water is supplied to Velddrif by the West Coast District Municipality as part of the Withoogte Regional Scheme which forms part of the Western Cape Water Supply System. The Voëlvlei Dam is the main storage dam to supply water to this part of the system, as well as the Berg River. Water can also be released from the Berg River Dam in the upper part of the Berg River should it be necessary. Raw water is pumped from the Misverstand Weir to the Withoogte WTW for treatment, before distribution to the various West Coast District Municipality's consumers. The potable water supplied by the West Coast District Municipality to Velddrif is stored in two reservoirs in Velddrif, with a total storage capacity of 5.000 Ml. There are also two water towers with a total storage capacity of 0.500 Ml in Velddrif.

- Dwarskersbos – ***Dwarskersbos Water Distribution System***

  Potable water is also supplied to Dwarskersbos from the Withoogte WTW. The potable water is stored in two reservoirs in Dwarskersbos, with a total storage capacity of 0.900 Ml and a water tower with a capacity of 0.228 Ml.

- Aurora – ***Aurora Water Distribution System***

  Bulk raw water supply to Aurora is from five boreholes. The water is pumped from the boreholes to the Aurora WTW for treatment. The WTW consists of ten pressure sand filters, with soda-ash dosing. The treated water from the WTW is pumped to the town's two reservoirs with a total storage capacity of 0.550 Ml. The water gravitates from the two reservoirs to the consumers in Aurora.

- Eendekuil – ***Eendekuil Water Distribution System***

  Bulk raw water gravitates to the Eendekuil WTW from two raw water storage dams (Capacity of 64 Ml) outside the town. The drainage to the dams is from the Waboomfontein spring. The supply from the dams can also be supplemented with groundwater from one borehole outside the town. There are two pressure filters on the bulk supply pipeline to the WTW (Package Plant). Treated water from the WTW is stored in a 0.400 Ml reservoir form where it gravitates to the consumers in Eendekuil.

- Redelinghuys – ***Redelinghuys Water Distribution System***

  Bulk raw water gravitates to the Redelinghuys WTW from the Matroosfontein Springs via a 315mm diameter pipeline. The WTW consists of three pressure filters, with sodium hypochlorite and lime dosing. Final treated water from the WTW is pumped to the two storage reservoirs with a total capacity of 0.440 Ml, from where it gravitates to the consumers in Redelinghuys.

The towns managed by the Moravian Church, for which Bergrivier Municipality only provides a support service, are as follows:

- Wittewater, managed by the Moravian Church

  The town relies on surface water abstracted from the local stream and a fountain that also feed the stream. Groundwater is also pumped from two boreholes to the WTW. The WTW consists of two sand pressure filters that treat the raw water, before the potable water is pumped to the town's main storage reservoir with a storage capacity of 0.350 Ml.

- Goedverwacht, managed by the Moravian Church

  Raw water is abstracted from the Riet River and distributed via a 150mm diameter pipeline to the WTW. The WTW consists of two pressure filters with sodium hypochlorite dosing. From there the treated water is distributed to four reservoirs, with a total capacity of 0.626 Ml. Potable water gravitates from these reservoirs to the consumers in Goedverwacht.

The farms utilise their own water resources and Bergrivier Municipality provides no services to the farms in the rural areas.

Physical Perspective:

Global warming:

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

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

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

- All resources, especially surface water resources, need to be re-evaluated, especially where demand is close to the safe one in twenty year yields. It is therefore important to establish assurance of supply levels of all water sources;

- increase assurance of supply of the water resources by ensuring that there is at least 10% additional capacity (headroom), when considering the maximum 24 hour demand on the peak month of the year;

- do not undertake new developments unless a proper investigation of the implication on water sources and sustainability in the long term has been undertaken;

- vigorously implement WDM measures, especially in terms of the following:

- increased water efficiency
- frequent monitoring of the water supply system, from the sources to the consumers; and
- regular and adequate system maintenance and repairs.

- Diversify water resources, e.g. surface water, groundwater, wastewater re-use and sea water desalination.

Bergrivier Municipality has a defined role to play in the mitigation of and adaptation to the impacts of climate change. The Western Cape is particularly vulnerable to climate change and the hotter drier conditions predicted for the West Coast could have far reaching impacts. The Municipality's local economy is driven by agriculture and there is concern about the negative impacts of climate change on the agriculture sector which will turn impact on the local economy.

A Climate Change Adaption Plan was adopted by Council during March 2014. This plan was developed for the Municipality in partnership with the Climate Change Sub Directorate of the Western Cape Department of Environmental Affairs and Development Planning as part of their Municipal Support Programme and is in process of implementing initiatives contained therein. Climate change initiatives that have been implemented / commenced include the Bergrivier Climate Knowledge Network. The Municipality received accolades for its work in climate change adaptation and biodiversity management in the Greenest Municipality Competition.

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

Natural Environment:

The Berg River is located within one of the richest biodiversity areas of South Africa and forms part of the Cape Flora Region. The Groot Winterhoek Wilderness area and Berg River Mouth are of significant in terms of global conservation. To conserve critically endangered areas to avoid the loss of natural habitat, Critical Biodiversity Areas (CBA) were identified to ensure appropriate land-use for the best possible sustainable benefits to society, and to promote integrated use and management of natural resources. The development of objectives, strategies and proposals for the Bergrivier Municipal Area are set out in the SDF (May 2013).

Key natural resources in Bergrivier Municipality's Management Area are as follows:

Table A.2: Natural Resources and their significance to the community

Natural Resource	Significance to the community
Berg River and Estuary	• Provides a range of eco system services (primary water source of Municipality) • Recreation (especially angling, canoeing, boating) • Agriculture (irrigation)
Coastal Zone (Including Berg River Estuary)	• Recreation (especially angling, canoeing, boating) • Conservation • Tourism (especially birding) • Fishing industry • Salt industry
Verlorenvlei (Upper reaches near Redelinghuys)	• Conservation • Tourism (especially birding) • Recreation
Rocherpan	• Conservation • Tourism (especially birding) • Recreation
Groot Winterhoek Wilderness Area	• Conservation • Tourism (especially eco-tourism) • Recreation

The Municipality works in partnership with various organs of state and private institutions to ensure that it gives effect to its environmental obligations. Bergrivier Municipality consciously strives to conserve the natural environment by minimising the impact of its own activities. It also strives to minimise the impact of other parties' activities through the utilisation of mechanisms provided by law. There are a number of factors that impact on the environment, one of the most critical being poverty which forces impoverished people to rely on natural resources which are often used unsustainably. Conversely private and public development initiatives which are needed to address poverty also have the potential to impact negatively on the environment if not managed correctly. The challenge that the Municipality faces is to ensure that all development is done in a sustainable manner.

Demographic Perspective

Economics: The West Coast economy was affected by the global recession. During 2013 the real GDPR only grew by 2% and in 2014 it dropped to 1.1%. The growth rates of the West Coast District of 2013/2014 are below the average rate of 2.6% which occurred between 2010 – 2014. For the 2015-2020 forecast period the estimated average annual growth is projected at 2.6%.

The 2014/2015 population of Bergrivier Municipality was estimated by applying an annual growth rate of 2.3% to the 2011 Census population figures. The annual population growth percentages for the individual towns are included in Table A.13, which were agreed with the Municipality during January 2014. The current estimated population figures and the annual population growth percentages used in this WSDP-IDP Water Sector Input Report are aligned with the figures used in DWS's National GeoDatabase, which forms the baseline for the WSDP Guide Framework.

The table below gives an overview of the population and households and the water and sanitation service level categories in Bergrivier Municipality's Management Area.

Table A.3: Water Services Overview

Settlement Type	2011/2012 Households	2011/2012 Population	2014/2015 Households	2014/2015 Population	Water 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	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**		**Adequate**			**Below RDP**					**None**	
Sub-Total	**0**	**0**	**0**	**0**																				
Formal Town					**Adequate**			**Below RDP**					**None**		**Adequate**			**Below RDP**					**None**	
Porterville	1,949	7,057	2,038	7,379	P		P								P		P							
Piketberg	2,920	12,075	3,099	12,814	P		P								P		P							
Wittewater	190	848	193	861	P		P								P		P							
Goedverwacht	539	1,979	572	2,100	P		P								P		P							
Velddrif	3,622	10,677	4,113	12,434	P		P								P		P							
Dwarskersbos	211	670	234	743	P		P								P		P							
Aurora	199	578	234	679	P		P								P		P							
Eendekuil	379	1,530	402	1,624	P		P								P		P							
Redelinghuys	139	574	141	583	P		P								P		P							
Sub-Total	**10,148**	**35,988**	**11,025**	**39,216**	**9**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Townships					**Adequate**			**Below RDP**					**None**		**Adequate**			**Below RDP**					**None**	
Sub-Total	**0**	**0**	**0**	**0**																				
Informal Settlements					**Adequate**			**Below RDP**					**None**		**Adequate**			**Below RDP**					**None**	
Velddrif	85	340	80	320		P										P								
Sub-Total	**85**	**340**	**80**	**320**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Working towns & service centres					**Adequate**			**Below RDP**					**None**		**Adequate**			**Below RDP**					**None**	
Sub-Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Sub-Total: (Urban)	**10,233**	**36,328**	**11,105**	**39,536**	**9**	**1**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**1**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
RURAL																								
Rural / Farming					**Adequate**			**Below RDP**					**None**		**Adequate**			**Below RDP**					**None**	
Farms	6,162	25,570	6,443	26,738	P		P						P		P		P							P
Sub-Total	**6,162**	**25,570**	**6,443**	**26,738**	**1**		**1**						**1**		**1**		**1**							**1**
Informal Settlements					**Adequate**			**Below RDP**					**None**		**Adequate**			**Below RDP**					**None**	
Sub-Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Sub-Total (Rural)	**6,162**	**25,570**	**6,443**	**26,738**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
TOTAL	**16,395**	**61,898**	**17,549**	**66,274**	**10**	**1**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**10**	**1**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**1**

The 2011 Census data indicated that there are still a number of households on the farms in the rural areas without basic water and sanitation services and the current service levels for the farms were therefore taken from the 2011 Census data.

The Growth Potential Study 2014, of the Western Cape Government determined the growth potential and socio-economic needs of settlements in the Western Cape using quantitative data (e.g. factors relating to socio-economic, economic, physical-environmental, infrastructure and institutional aspects). The table below gives an overview of the growth potential indicators for the towns in Bergrivier Municipality's Management Area, as included in the Growth Potential Study.

Table A.4: Growth potential indicators for the towns in Bergrivier Municipality's Management Area (Settlement Level Classification)

Indicator	Porterville	Piketberg	Goedverwacht	Velddrif	Dwarskersbos	Aurora	Eendekuil	Redelinghuys
Absolute socio-economic needs	Medium	Medium	Low	Low	Very Low	Very Low	Very Low	Very Low
Proportional socio-economic needs	Medium	Medium	Medium	Low	Low	High	High	Very High
Human capital index	Very High	High	Medium	High	High	Medium	Medium	High
Economic index	Medium	Medium	Low	Low	Very Low	Very Low	Very Low	Very Low
Physical index	Very High	Medium	Medium	Medium	Medium	Medium	High	Low
Infrastructure	High	Medium	Low	High	High	Low	Low	Low
Institutional	High	High	High	High	High	High	High	High

The table below indicates the revised housing needs per town as reflected by the Municipality's Housing Waiting List as at 30 June 2015.

Table A.5: Housing needs of Bergrivier Municipality (Number of applicants)

Town	2014/2015	2013/2014	2012/2013	2011/2012
Piketberg	1 898	1 616	1 786	1 672
Wittewater	10	10	12	11
Goedverwacht	11	11	15	30
Porterville	1 012	980	953	1 000
Velddrif (Including Noordhoek, Laaiplek and Port Owen)	1 178	1 087	827	900
Aurora	192	183	293	100
Redelinghuys	240	148	179	178
Eendekuil	196	181	220	220
Total	**4 737**	**4 216**	**4 285**	**4 111**

Note: Designates area of origin of applicant and not where houses could be built.

Business Element 3: Service Levels

The Municipality has been providing basic services at the prescribed level to all urban households within its area of jurisdiction since the 2008/2009 financial year, but still faces major challenges when it comes to ensuring that residents of the private Moravian towns have access to minimum service standards. There are ongoing discussions between the Municipality, Moravian Church of South Africa, West Coast District Municipality and Province to find a sustainable service delivery solution.

The table and graph below give an overview of the water service delivery access profile in Bergrivier Municipality's Management Area.

Table A.6: Residential water services delivery access profile: Water

Census Category	Description	Year 0 FY2014/15		Year -1 FY2013/14		Year -2 FY2012/13	
		Nr	%	Nr	%	Nr	%
	WATER (ABOVE MIN LEVEL)						
Piped (tap) water inside dwelling/institution	House connections	14,120	80%	13,693	79%	13,281	79%
Piped (tap) water inside yard	Yard connections	3,291	19%	3,291	19%	3,291	19%
Piped (tap) water on community stand: distance less than 200m from dwelling/institution	Standpipe connection < 200 m	208	1%	208	1%	208	1%
	Sub-Total: Minimum Serivce Level and Above	**17,619**	**99%**	**17,192**	**99%**	**16,780**	**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	12	0%	12	0%	12	0%
Piped (tap) water on community stand: distance between 500m and 1000m (1km) from dwelling /institution	Standpipe connection: > 500 m < 1 000 m	5	0%	5	0%	5	0%
Piped (tap) water on community stand: distance greater than 1000m (1km) from dwelling/institution	Standpipe connection: > 1 000 m	6	0%	6	0%	6	0%
No access to piped (tap) water	No services	76	0%	76	0%	76	0%
	Sub-Total: Below Minimum Service Level	**99**	**1%**	**99**	**1%**	**99**	**1%**
	Total number of household	**17,718**	**100%**	**17,291**	**100%**	**16,879**	**100%**

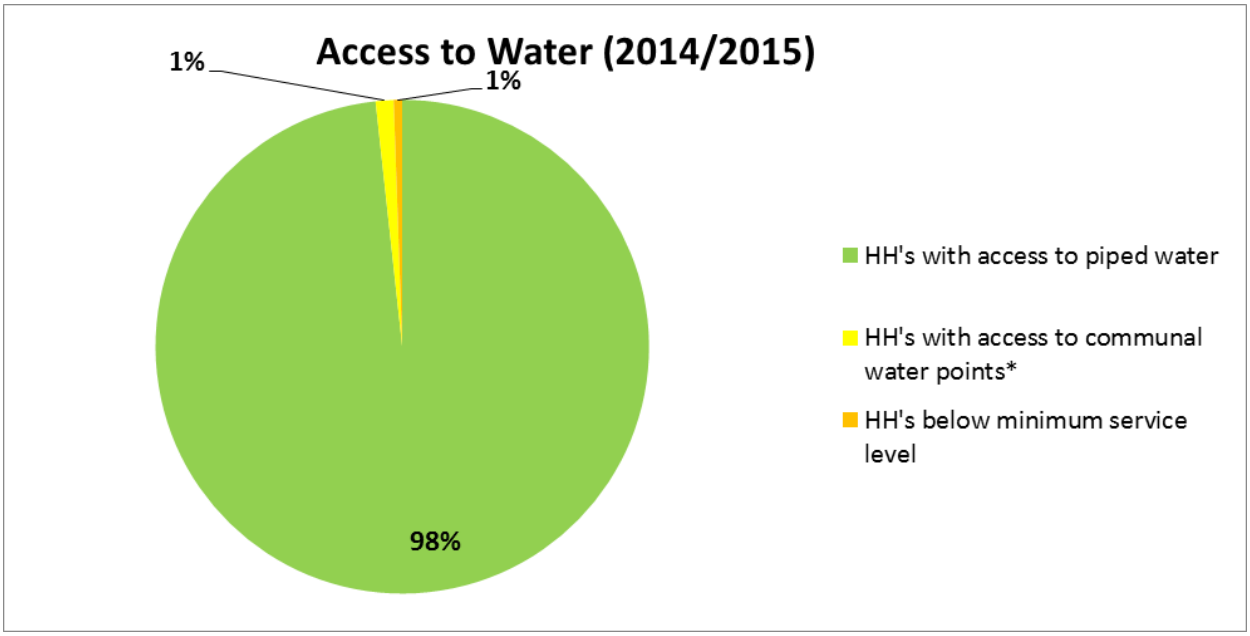


Figure A.1: Access to water services in 2014/2015.

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

Table A.7: Residential water service levels (Residential Consumer Units)

Service Level	Piketberg	Porterville	Velddrif	Dwarskersbos	Aurora	Wittewater	Redelinghuys	Eendekuil	Goedverwacht	Farms	Total
No Water Services	0	0	0	0	0	2 [2)]	0	0	0	74 [2)]	76
Below RDP: Infrastructure Upgrade	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure Extension	0	0	0	0	0	0	0	0	0	23 [3)]	23
Below RDP: Infrastructure Refurbishment	0	0	0	0	0	0	0	0	0	0	0
Below RDP: O&M Needs	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Water Resource Needs	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure and O&M Needs	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure, O&M and Water Resource Needs	0	0	0	0	0	0	0	0	0	0	0
Total Basic Need (RDP)	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**97**	**99**
Below Housing Interim [4)]	0	0	0	0	0	0	0	0	0	0	0
Adequate Housing Permanent [5)]	0	0	80	0	0	0	0	0	0	0	80
Total Housing Need	**0**	**0**	**80**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**80**
Standpipes	0	0	0	0	0	2	0	0	2	124	128
Yard Connections [6)]	693	509	961	0	0	0	0	68	0	1 060	3 291
House Connections [1)]	2 406	1 529	3 152	358	241	189	179	334	570	5 162	14 120
Total Adequate	**3 099**	**2 038**	**4 113**	**358**	**241**	**191**	**179**	**402**	**572**	**6 346**	**17 539**
Total per Area	**3 099**	**2 038**	**4 193**	**358**	**241**	**193**	**179**	**402**	**572**	**6 443**	**17 718**

Notes: 1) Number of residential consumer units for the various towns for 2014/2015, as calculated from the financial data. The estimated number of commercial units was subtracted from the total number of consumer units, in order to calculate the residential consumer units per town.

2) Census 2011: Number of households with no access to piped (tap) water 74 and 2

3) Census 2011: Number of households with communal services (200m – 500m) 12, (500m – 1000m) 5 and (>1000m) 6.

4) Below Housing Interim in the above table is the number of shacks in informal areas without basic water services.

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

6) Projected number of residential households (2014/2015) – Number of residential consumers units (2014/2015) = Estimated number of backyard dwellers

The table and graph below give an overview of the sanitation service delivery access profile in Bergrivier Municipality's Management Area.

Table A.8: Residential water services delivery access profile: Sanitation							
Census Category	Description	Year 0		Year -1		Year -2	
		FY2014/15		FY2013/14		FY2012/13	
		Nr	%	Nr	%	Nr	%
	SANITATION (ABOVE MIN LEVEL)						
Flush toilet (connected to sewerage system)	Waterborne	8,609	49%	8,392	49%	8,161	48%
	Waterborne: Low Flush	0	0%	0	0%	0	0%
Flush toilet (with septic tank)	Septic tanks / Conservancy	7,818	44%	7,608	44%	7,427	44%
Chemical toilet	Non-waterborne (above min. service level)	35	0%	35	0%	35	0%
Pit toilet with ventilation (VIP)		83	0%	83	0%	83	0%
Other		80	0%	80	0%	80	0%
	Sub-Total: Minimum Serivce Level and Above	**16,625**	**94%**	**16,198**	**94%**	**15,786**	**94%**
	SANITATION (BELOW MIN LEVEL)						
Pit toilet without ventilation	Pit toilet	36	0%	36	0%	36	0%
Bucket toilet	Bucket toilet	177	1%	177	1%	177	1%
Other toilet provision (below min. service level	Other	364	2%	364	2%	364	2%
No toilet provisions	No services	516	3%	516	3%	516	3%
	Sub-Total: Below Minimum Service Level	**1,093**	**6%**	**1,093**	**6%**	**1,093**	**6%**
	Total number of household	**17,718**	**100%**	**17,291**	**100%**	**16,879**	**100%**

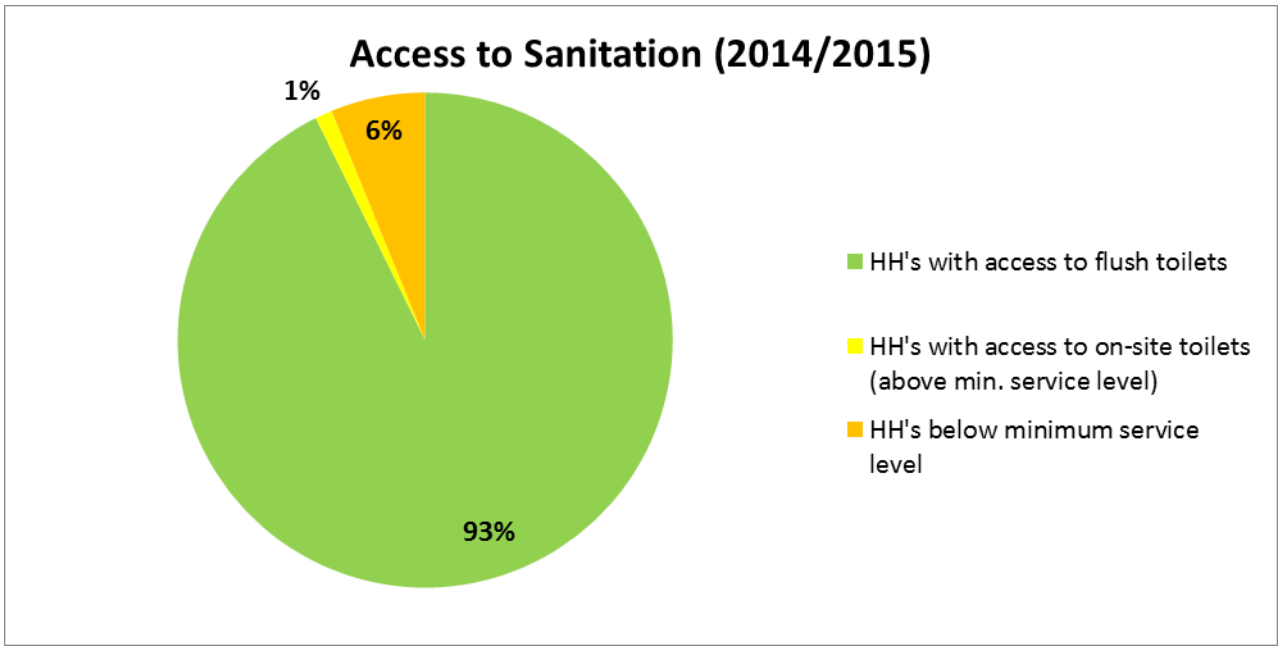


Figure A.2: Access to sanitation services in 2014/2015.

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

Table A.9: Residential sanitation service levels (Residential Consumer Units)											
Service Levels	**Piketberg**	**Porterville**	**Velddrif**	**Dwarskersbos**	**Aurora**	**Wittewater**	**Redelinghuys**	**Eendekuil**	**Goedverwacht**	**Farms**	**Total**
No Sanitation Services [3]	0	0	0	0	0	0	0	0	10	506	516
Below RDP: Infrastructure Upgrade [4]	0	0	0	0	0	24	0	0	70	518	612
Below RDP: Infrastructure Extension	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure Refurbishment	0	0	0	0	0	0	0	0	0	0	0
Below RDP: O&M Needs	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Water Resource Needs	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure and O&M Needs	0	0	0	0	0	0	0	0	0	0	0
Below RDP: Infrastructure, O&M and Water Resource Needs	0	0	0	0	0	0	0	0	0	0	0
Total Basic Need (RDP)	**0**	**0**	**0**	**0**	**0**	**24**	**0**	**0**	**80**	**1 024**	**1 128**
Below Housing Interim [5]	0	0	0	0	0	0	0	0	0	0	0
Adequate Housing Permanent [6]	0	0	80	0	0	0	0	0	0	0	80
Total Housing Need	**0**	**0**	**80**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**80**
None Waterborne	0	0	0	0	0	30	0	0	9	44	83
Waterborne Low Flush	0	0	0	0	0	0	0	0	0	0	0
Septic Tanks / Conservancy [1]	0	0	1 050	217	241	139	179	134	483	5 375	7 818
Waterborne WWTW	3 099	2 038	3 063	141	0	0	0	268	0	0	8 609
Total Adequate [2]	**3 099**	**2 038**	**4 113**	**358**	**241**	**169**	**179**	**402**	**492**	**5 419**	**16 510**
Total per Area	**3 099**	**2 038**	**4 193**	**358**	**241**	**193**	**179**	**402**	**572**	**6 443**	**17 718**

1) Waterborne Low Flush, Septic Tanks and Conservancy tanks as agreed with the Municipality during January 2014, as part of DWS's Backlog Eradication Strategy process.

2) House Connections for 2014/2015 were projected from the 2011 Census data, except for Dwarskersbos, Aurora and Redelinhuys where the number of consumer units as calculated from the financial system were used. The Backyard dwellers are included in these figures.

3) Census 2011: Number of households with no toilet facility 506 + 10.

4) Census 2011: Number of households with existing buckets 131 + 39 +7, chemical toilets 23 + 12, pit toilets without ventilation 30 +2 + 4 and "other" 334 + 29 +1.

5) Below Housing Interim in the above table is the number of shacks in informal areas without basic sanitation services.

6) Adequate Housing Permanent in the above table is the number of shacks in informal areas with communal ablution facilities, as confirmed by the Municipality.

All the households in the urban areas are supplied with water connections inside the houses, except 80 households in Velddrif that still make use of communal services. Informal areas are supplied with shared services as an intermediary measure. The only other areas where communal water services are currently still in use is on some of the farms in the rural areas.

The number of user connections in each user sector, for the various distribution systems in Bergrivier Municipality's Management Area, is summarised in the table below:

Table A.10: Number of user connections in each user sector per town

Town	Year	Residential and Commercial	Industrial	Total
Porterville	13/14	1 589	-	**1 589**
	14/15	1 595	-	**1 595**
Piketberg	13/14	2 441	50	**2 491**
	14/15	2 512	53	**2 565**
Velddrif	13/14	3 228	-	**3 228**
	14/15	3 288	-	**3 288**
Dwarskersbos	13/14	353	-	**353**
	14/15	373	-	**373**
Aurora	13/14	250	-	**250**
	14/15	251	-	**251**
Eendekuil	13/14	343	4	**347**
	14/15	349	4	**353**
Redelinghuys	13/14	182	-	**182**
	14/15	187	-	**187**
TOTAL	**13/14**	**8 386**	**54**	**8 440**
	14/15	**8 555**	**57**	**8 612**

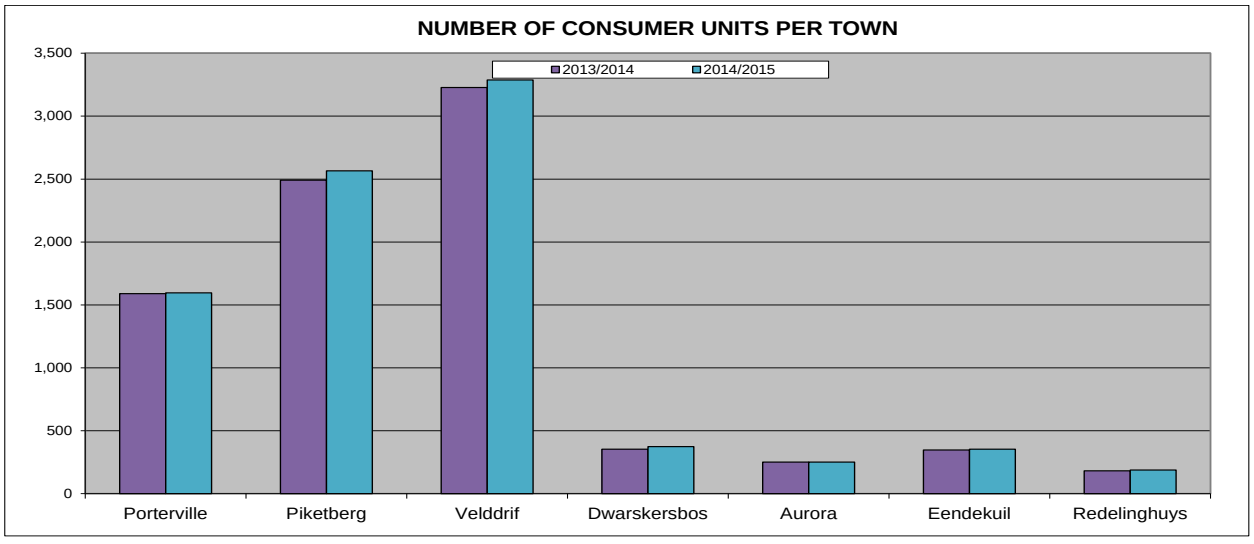


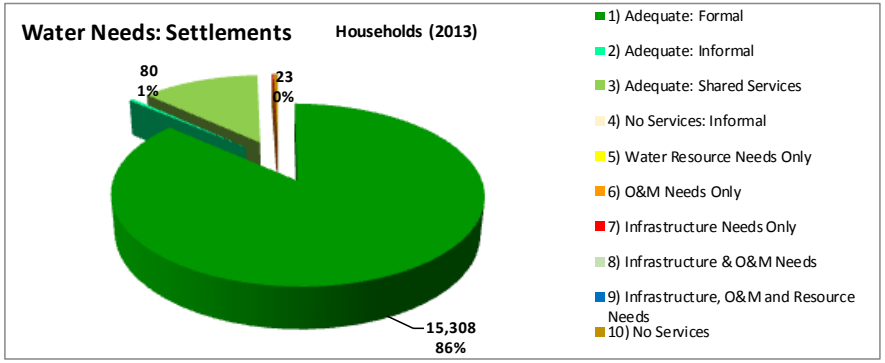
Figure A.3: Number of consumer units per town for the 2013/2014 and 2014/2015 financial years.

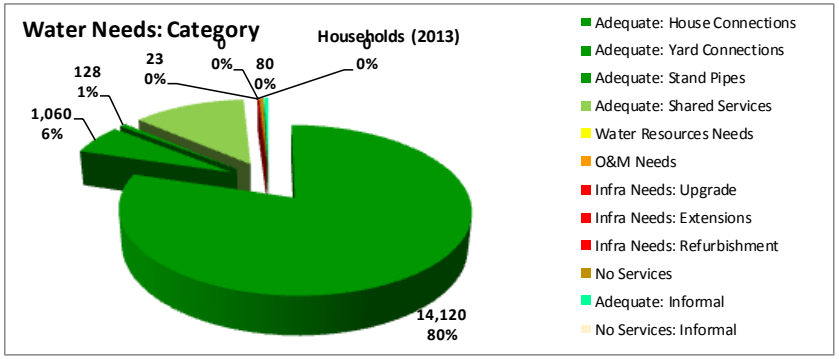
Table A.11: Total number of consumer units per town and percentage growth from 2010/2011 to 2014/2015

Distribution System	Annual Growth % (13/14 – 14/15)	14/15	13/14
Porterville	0.38%	1 595	1 589
Piketberg	2.97%	2 565	2 491
Velddrif	1.86%	3 288	3 228
Dwarskersbos	5.67%	373	353
Aurora	0.40%	251	250
Eendekuil	1.73%	353	347
Redelinghuys	2.75%	187	182
TOTALS	**2.04%**	**8 612**	**8 440**

Table A.12(a): Residential water services delivery adequacy profile (Water)

Water Categorisation	Number of settlements	FORMAL																				INFORMAL			
		Adequate								Water Resource needs		O & M Needs		Infrastructure Needs						No services		Adequate		No services	
		House Connections		Yard Connections		Stand Pipes		Shared Services						Upgrades		Extensions		Refurbishment							
		HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%
1	37	14,120	100%	1,060	100%	128	100%																		
2	1																					80	100%		
3	10							2,231	100%																
4	0																								
5	0																								
6	0																								
7	3															23	100%								
8	0																								
9	0																								
10	3																			76	100%				
Total Household Interventions required		14,120		1,060		128		2,231		0		0		0		23		0		76		80		0	

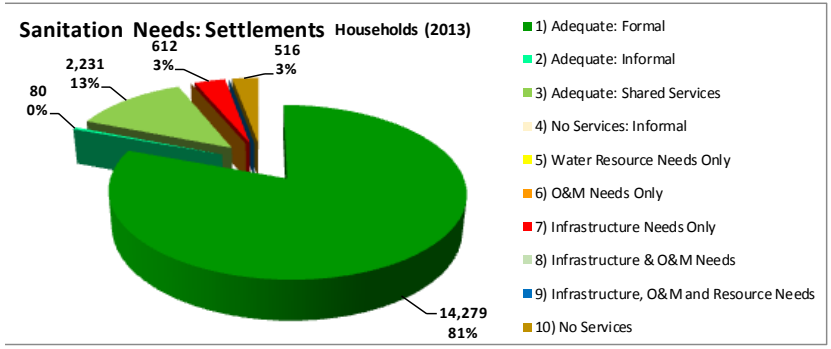


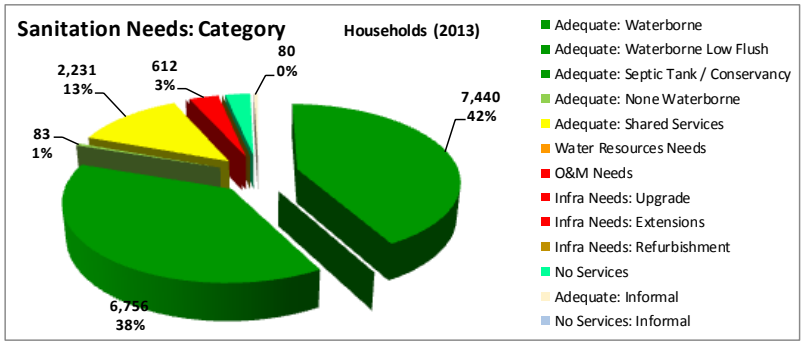


1	Adequate	3	Adequate: Shared services	5	Water Resources Needs **Only**	7	Infrastructure Needs **Only**	9	Infrastructure, O&M & Resource Needs
2	Adequate: Informal	4	No Services: Informal	6	O & M Needs **Only**	8	Infrastructure& O&M needs	10	No Services

Table A.12(b): Residential water services delivery adequacy profile (Sanitation)

Water Categorisation	Number of settlements	FORMAL																				INFORMAL			
		Adequate										Water Resource needs		O & M Needs		Infrastructure Needs						No services		Adequate		No services	
		Waterborne		Waterborne Low flush		Septic Tank/ Conservancy		None Waterborne		Shared Services						Upgrades		Extensions		Refurbishment							
		HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%	HH	%
1	37	7,440	100%			6,756	100%	83	100%																		
2	1																							80	100%		
3	10									2,231	100%																
4	0																										
5	0																										
6	0																										
7	3															612	100%										
8	0																										
9	0																										
10	3																					516	100%				
Total Household Interventions required		7,440		0		6,756		83		2,231		0		0		612		0		0		516		80		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

Business Element 4: Socio Economic

The 2001 Census recorded the population in the Bergrivier Municipality's Management Area at 46 326 (11 706 Households) and the 2011 Census data recorded the population at 61 898 (16 274 Households), which is indicative of extensive migration into the Municipal Area. The population of Bergrivier Municipality is currently estimated at approximately 66 274 persons (17 549 Households) for 2014/2015.

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

Table A.13: Historical population and household figures and population growth rates and projected present population and number of households

Distribution System	Census 2001			Census 2011			Future Population Growth per year (2011 Onwards)	2014/2015		Number of Residential and Commercial CUs (Financial System)
	P	H	P / H	P	H	P / H		Projected Population	Number of Households (Permanent)	
Porterville	5 847	1 622	3.6	7 057	1 949	3.6	1.5%	7 379	2 038	1 595
Piketberg	9 271	2 326	4.0	12 075	2 920	4.1	2.0%	12 814	3 099	2 512
Wittewater	939	218	4.3	848	190	4.5	0.5%	861	193	-
Goedverwacht	1 410	376	3.7	1 979	539	3.7	2.0%	2 100	572	-
Velddrif	7 363	2 192	3.4	11 017	3 622	3.0	5.0%	12 754	4 193	3 288
Dwarskersbos	473	213	2.2	670	211	3.2	3.5%	743	234	373
Aurora	342	92	3.7	578	199	2.9	5.5%	679	234	251
Eendekuil	1 192	294	4.0	1 530	379	4.0	2.0%	1 624	402	349
Redelinghuys	588	156	3.7	574	139	4.1	0.5%	583	141	187
Farms	1 8901	4 217	4.5	25 570	6 126	4.2	1.5%	26 737	6 443	-
TOTALS	**46 326**	**11 706**	**4.0**	**61 898**	**16 274**	**3.8**	**2.3%**	**66 274**	**17 549**	**8 555**

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

The graph below gives an overview of the 2011 Census male and female distribution per age category for Bergrivier Municipality.

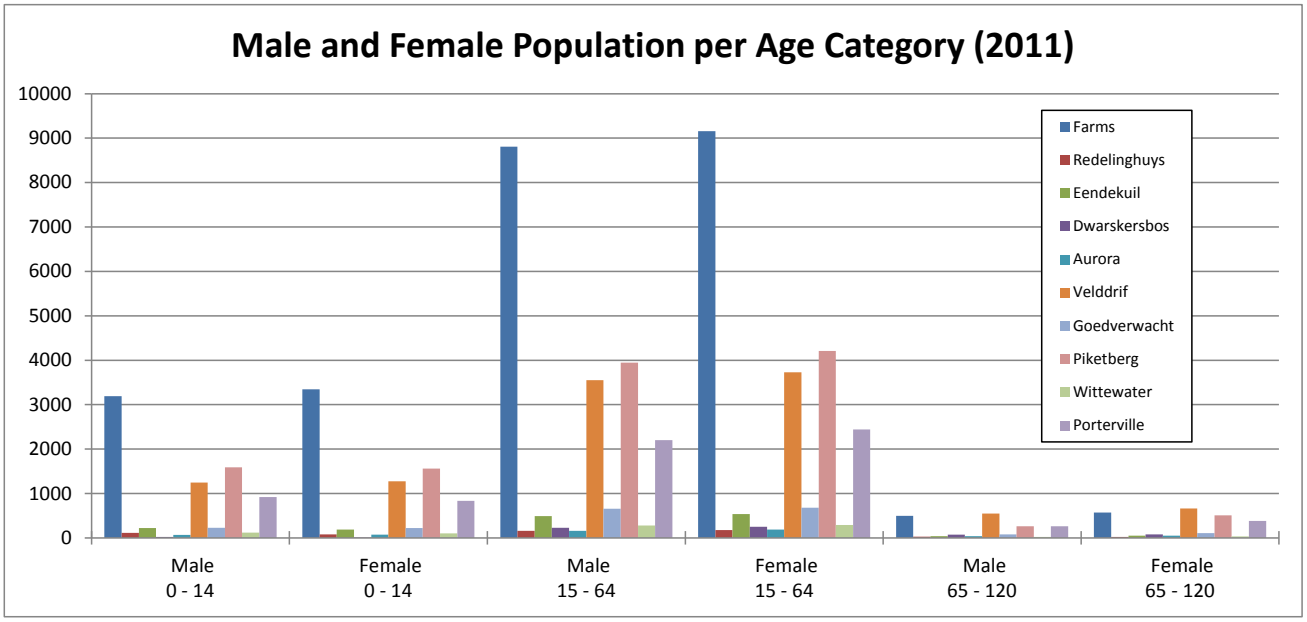


Figure A.3: Male and Female population per age category for 2011.

The gender composition from 2001 to 2011 remains relatively unchanged and well balanced, with a slightly higher ratio of female to males. The population is predominantly youthful with 58% of the population falling within the national definition of youth (under 35). There is a significant increase of 24.2% in this age group.

The following table provides a summary of Bergrivier Municipality's development indicators, as included in the 2014/2015 Annual Report.

Table A.14: Bergrivier Municipality's social development indicators

Indicator	Description	Bergrivier Municipality		West Coast	Western Cape
		2001	2014	2014	2014
Poverty Rate (2010)	The percentage of people living in households with an income less than the poverty income. The poverty income is defined as the minimum monthly income needed to sustain a household and varies according to household size.	34.2%	33.8%	30.4%	22.1%
Literacy (2011)	The literacy rate is an indication of the levels of education and skill in the economy.	70.0%	76.4%	79.1%	87.2%
Gini Coefficient (2011)	The Gini coefficient is a summary statistic of income inequality, which varies from 0 (in the case of perfect equality where all households earn equal income) to 1 (in the case where one household earns all the income and other households earn nothing).	0.56	0.58	0.58	0.58
Human Development Index (2012)	The HDI is a composite, relative index that quantifies the extent of human development of a community. It is based on measures of life expectancy, literacy and income.	0.66	0.66	0.67	0.68
Unemployment Rate (2011)	Unemployed are those people within the economically active population who did not work in the seven days prior to census night, wanted to work and were available to start work within a week of census night, and had taken active steps to look for work or start some form of self-employment in the four weeks prior to census night.	7.6%	6.8%	14.8%	21.6%

Note: Newest indicators vary from 2010 to 2013 and the date of the newest indicator is indicated in column 1.

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

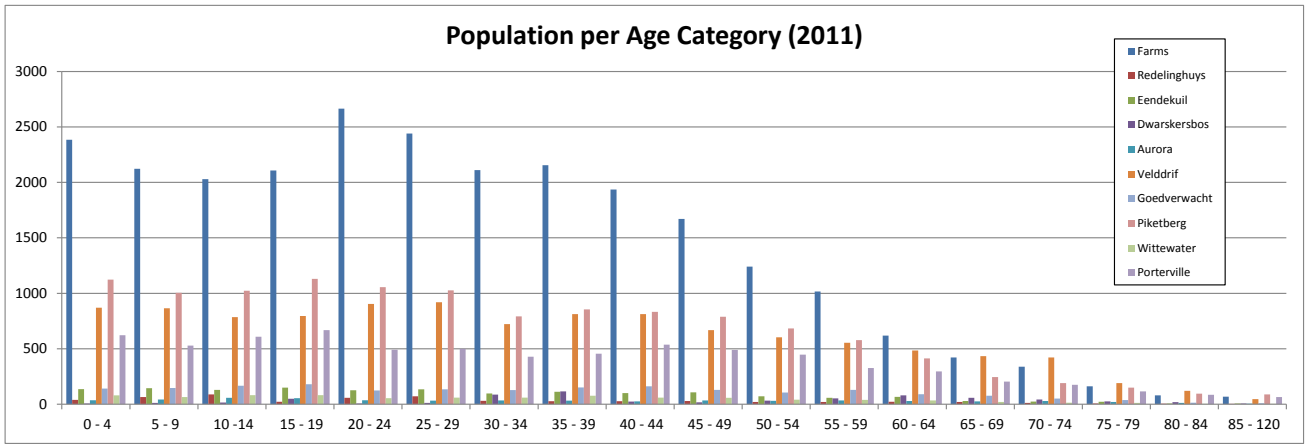


Figure A.4: Population distribution per age category for 2011.

In relation to the Age Distribution within the Bergrivier Municipality, the Working Age segment of the population accounts for 68 per cent, while 25 per cent is attributable to the "Children" category and 7 per cent making up the "Aged" category. From an economic standpoint, the labour force appeared to be well endowed with a fair sparkling of youth. The "Aged" category is small in comparison.

The 2011 unemployment rate for Bergrivier is 6.8% according to Census 2011, compared to the unemployment rate of 14.8% for the West Coast District and 21.6% for the Western Cape.

The Agriculture, forestry and fishing sector has always been regarded as the Municipalities most dominant employment sector, but this picture changed in 2009 when the Wholesale and retail trade, catering and accommodation sector became most dominant. A total of 11 277 jobs were lost in the Agriculture, forestry and fishing sector between 2000 and 2011. Agriculture nevertheless remains a very important economic driver of the Bergrivier economy and it is imperative that the Municipality focus on ways to support this sector.

The largest contributing sectors to GDPR (2011) within Bergrivier Municipality are Wholesale and retail trade, catering and accommodation (22.5%) followed by Manufacturing (20.6%). The smallest contributing sector is Mining and quarrying.

Business Element 5: Water Services Infrastructure Management (Infrastructure)

Water is supplied via independent water distribution systems to all the towns in the Bergrivier Municipal Area., except for Velddrif and Dwarskersbos that receive bulk potable water from the West Coast District Municipality. The raw water supply originates from both surface and ground water sources.

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

Table A.15: Summary of existing main water infrastructure

Water Distribution System	Bulk Supply (Resources)	WTW (Capacity in Ml/d)	Network Bulk and Reticulation (km)	Number of Water PS (RW/PW)	Number of Reservoirs (Storage in Ml)
Porterville	Voorberg Mountain Stream Two Springs	3.910	35.090	1 (RW) 1 (TW)	3 (3.985)
Piketberg	Berg River Voëlvlei Spring	3.200	73.530	1 (RW) 4 (TW)	2 (5.700)
Wittewater	Mountain Stream Fountain Two Boreholes	Unknown	6.640	1 (RW) 1 (TW)	4 (0.500)
Goedverwacht	Riet River	Unknown	14.570	1 (RW)	4 (0.626)
Velddrif	Withoogte Bulk Scheme (WCDM)	-	87.325	1 (TW)	4 (5.500)
Dwarskersbos	Withoogte Bulk Scheme (WCDM)	-	15.605	1 (TW)	3 (1.128)
Aurora	Five Boreholes	0.220	12.945	1 (RW)	2 (0.550)
Eendekuil	Waboomfontein River and Spring Borehole	0.200	7.180	-	1 (0.400)
Redelinghuys	Matroosfontein Springs	0.260	8.515	1 (RW) 1 (TW)	2 (0.440)

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

Table A.16: Summary of existing main sewerage infrastructure

Sewer Drainage Systems	Sewer Drainage Network (km)	Number of Sewer PS	WWTW (Capacity in Ml/d)
Porterville	Gravity 28.1	1	Activated Sludge (1.200)
Piketberg	Gravity 45.9; Rising 0.9	2	Activated Sludge (3.100)
Wittewater	-	-	-
Goedverwacht	-	-	-
Velddrif	Gravity 34.0; Rising 15.5	48	Activated Sludge (1.800)
Dwarskersbos	Gravity 6.3; Rising 5.2	5	Oxidation Ponds (0.290)
Aurora	-	-	-
Eendekuil	Gravity 2.4; Rising 1.5	2	Oxidation Ponds (0.080)
Redelinghuys	-	-	-

Water Infrastructure: The current and depreciated replacement cost of the water infrastructure of Bergrivier Municipality, as included in the Asset Register, is summarised in the table below (June 2015):

Table A.17: Current and depreciated replacement cost of the water infrastructure

Asset Type	CRC (1)	DRC (2)	% DRC/CRC
Boreholes	R782 843	R375 931	48.02%
Reticulation Pipeline	R25 591 164	R18 123 655	70.82%
Pump Station	R3 764 622	R2 345 017	62.29%
Reservoir	R6 750 269	R4 541 274	67.28%
Water Meter	R213 094	R171 255	80.37%
WTW	R20 180 949	R17 859 552	88.50%
Total	**R57 282 941**	**R43 416 684**	**75.79%**

Notes: 1) CRC, as included in the June 2015 Asset Register

2) 2014 Book Value, as included in the June 2015 Asset Register

The above implies that about 24.21% of the value of the water infrastructure has been consumed.

The following table gives an overview of the remaining useful life and the age distribution by facility type for the water infrastructure (CRC):

Table A.18: Overview of the remaining useful life and age distribution by facility type for the water infrastructure (CRC)

Asset Type	0 – 5 yrs	6 – 10 yrs	11 – 15 yrs	16 – 20 yrs	> 20 yrs
RUL					
Boreholes	R612 443	R170 400	R0	R0	R0
Reticulation Pipeline	R0	R15 821	R16 980	R0	R25 558 363
Pump Station	R348 815	R2 274 295	R280 728	R0	R860 784
Reservoir	R39 822	R131 884	R0	R0	R6 578 563
Water Meter	R0	R169 882	R0	R0	R43 213
WTW	R12 216 179	R3 035 784	R1 363 290	R0	R3 565 695
Total	**R13 217 259**	**R5 798 066**	**R1 660 998**	**R0**	**R36 606 618**
Age distribution by Facility Type					
Boreholes	R170 400	R612 443	R0	R0	R0
Reticulation Pipeline	R10 759 160	R14 832 005	R0	R0	R0
Pump Station	R603 926	R3 160 696	R0	R0	R0
Reservoir	R1 027 900	R5 722 368	R0	R0	R0
Water Meter	R139 667	R73 427	R0	R0	R0
WTW	R19 199 101	R981 849	R0	R0	R0
Total	**R31 900 154**	**R25 382 788**	**R0**	**R0**	**R0**

The table and graph below give an overview of the condition grading per facility for the water infrastructure (June 2015):

Table A.19: Condition grading per water facility type

Asset Type	Very Good	Good	Fair	Poor	Very Poor
Boreholes	R349 943	R0	R22 770	R410 130	R0
Reticulation Pipeline	R1 511 694	R0	R11 771 676	R12 307 794	R0
Pump Station	R448 878	R0	R145 281	R3 170 463	R0
Reservoir	R1 027 900	R0	R5 722 368	R0	R0
Water Meter	R96 455	R0	R116 640	R0	R0
WTW	R12 341 786	R0	R0	R7 839 164.00	R0
Total	**R15 776 656**	**R0**	**R17 778 735**	**R23 727 551**	**R0**

It can be noted from the above tables that not all the existing water infrastructure is included in Bergrivier Municipality's existing Asset Register.

Sewerage Infrastructure: The current and depreciated replacement cost of the sewerage infrastructure of Bergrivier Municipality is summarised in the table below (June 2015):

Table A.20: Current and depreciated replacement cost of the sewerage infrastructure			
Asset Type	**CRC (1)**	**DRC (2)**	**% DRC/CRC**
Sewer Pump Stations	R2 511 552	R1 358 705	54.10%
Sewer Reticulation Pipelines	R11 227 237	R7 895 051	70.32%
Porterville WWTW (0001)	R10 362 642	R8 922 580	86.10%
Velddrif WWTW (0002)	R31 987 702	R30 782 706	96.23%
Eendekuil WWTW (0003)	R138 232	R90 113	65.19%
Piketberg WWTW (0004)	R12 858 948	R8 646 309	67.24%
Septic Tanks	R129 443	R91 307	70.54%
Totals	**R69 215 756**	**R57 786 771**	**83.49%**

Notes: 1) CRC, as included in the June 2015 Asset Register

2) 2014 Book Value, as included in the June 2015 Asset Register

The above implies that about 16.51% of the value of the sewerage infrastructure has been consumed.

The following table gives an overview of the remaining useful life and the age distribution by facility type for the sewerage infrastructure (CRC):

Table A.21: Overview of the remaining useful life and age distribution by facility type for the sewerage infrastructure (CRC)					
Asset Type	**0 – 5 yrs**	**6 – 10 yrs**	**11 – 15 yrs**	**16 – 20 yrs**	**> 20 yrs**
RUL					
Sewer Pump Stations	R47 749	R1 496 687	R67 624	R0	R899 491
Sewer Reticulation Pipelines	R0	R0	R0	R493 988	R10 733 249
Porterville WWTW (0001)	R202 740	R0	R0	R0	R10 159 902
Velddrif WWTW (0002)	R1 585 855	R8 114 836	R0	R0	R22 287 010
Eendekuil WWTW (0003)	R138 232	R0	R0	R0	R0
Piketberg WWTW (0004)	R42 499	R8 821 500	R1 955 556	R0	R2 039 393
Septic Tanks	R80 723	R0	R0	R0	R48 720
Totals	**R2 097 798**	**R18 433 023**	**R2 023 180**	**R493 988**	**R46 167 765**
Age distribution by Facility Type					
Sewer Pump Stations	R2 056 419	R455 133	R0	R0	R0
Sewer Reticulation Pipelines	R5 121 276	R6 105 961	R0	R0	R0
Porterville WWTW (0001)	R9 319 512	R1 043 130	R0	R0	R0
Velddrif WWTW (0002)	R31 987 702	R0	R0	R0	R0
Eendekuil WWTW (0003)	R39 179	R99 053	R0	R0	R0
Piketberg WWTW (0004)	R11 300 231	R1 558 718	R0	R0	R0
Septic Tanks	R80 723	R48 720	R0	R0	R0
Totals	**R59 905 042**	**R9 310 715**	**R0**	**R0**	**R0**

The table below give's an overview of the condition grading per facility for the sewerage infrastructure (June 2015):

Table A.22: Condition grading per sewerage facility type					
Asset Type	**Very Good**	**Good**	**Fair**	**Poor**	**Very Poor**
Sewer Pump Stations	R174 565	R0	R212 944	R0	R2 124 043
Sewer Reticulation Pipelines	R2 345 155	R2 001 383	R0	R6 880 699	R0
Porterville WWTW (0001)	R62 900	R0	R0	R10 299 741	R0
Velddrif WWTW (0002)	R28 533 825	R103 349	R0	R3 350 528	R0
Eendekuil WWTW (0003)	R39 179	R0	R0	R99 053	R0
Piketberg WWTW (0004)	R0	R0	R9 714	R12 740 811	R108 423
Septic Tanks	R80 723	R0	R0	R48 720	R0
Totals	**R31 236 347**	**R2 104 732**	**R222 658**	**R33 419 552**	**R2 232 466**

It can be noted from the tables on the previous page that not all the existing sewerage infrastructure is included in Bergrivier Municipality's existing Asset Register.

Business Element 6: Water Services Infrastructure Management (O&M)

Bergrivier Municipality's Maintenance Team mainly performs their own repair and preventative maintenance work to the equipment and infrastructure of the Municipality, except when specialised repair work is required, in which case the work is sub-contracted to approved sub-contractors on the municipal database.

Water Safety Plans for the various distribution systems are in place. W_2RAPs for the various WWTWs are 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 Bergrivier 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.

An Incident Response Management Protocol is in place and forms part of Bergrivier 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.

The Bergrivier Municipality has implemented a comprehensive drinking water sampling programme for its formal water supply schemes, which includes schemes supplied by surface water, groundwater and potable bulk water supplied by the West Coast District Municipality. The current compliance monitoring is done by an external accredited laboratory. The Municipality continuously strive to provide good quality water and strive to achieve Blue Drop Status for all their water supply networks.

A compliance sampling programme for wastewater quality at the various WWTWs is also implemented by Bergrivier Municipality. The compliance monitoring is also done by an external accredited laboratory.

DWS's Blue Drop Process

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

Table A.23: Blue Drop Performance of the Municipality (DWS's 2014 Blue Drop Report)

Municipal Blue Drop Score	2011 – 85.20%, 2012 – 90.60% and 2014 - 63.79%

Regulatory Impression: The improvements observed in the previous assessments have not been demonstrated during this assessment cycle. A significant and substantial decrease in Municipal Score for Bergrivier Local Municipality is noted across each water system.

A number of areas are identified where the Bergrivier Local Municipality and their bulk water supplier for Velddrif, the West Coast District Municipality, should implement actions to improve compliance. These include:

- The system specific Water Safety Plan should be informed by the recommendations of the process audit, the results of the full SANS assessment of the raw, final water and distribution system, operational and compliance monitoring and non-conformance to the water quality limits. The Municipality is encouraged to align their Water Safety Plan for Velddrif with the Water Safety Plan for the Withoogte WTW managed by the West Coast District Municipality, which has not been updated since 2011. Evidence of the planning process and implementation of corrective actions to mitigate significant risks, should be maintained.
- Based on the water quality monitoring data, a risk based monitoring programme that complies with the requirements of SANS 241 with regard to sampling points and coverage of the distribution system, frequency of analyses and the determinants analysed, should be developed and implemented.
- The IMP should be updated to be risk based and aligned with limits set out in the latest version of SANS:241. This must be communicated to all relevant stakeholders to ensure the appropriate response to any incidents.
- All compliance monitoring data should be timeoulsy uploaded to the BDS.
- Budget and expenditure information should be compiled for each water system.
- Operational flows at the treatment plants should be recorded daily and monitored against design capacity.
- Water balances should be completed for each water system and initiatives developed and implemented to reduce non-revenue water.

Of concern is the poor microbiological compliance in the systems of Eendekuil, Piketberg and Redelinghuys. This needs to be addressed urgently to ensure that water supplied to the community meets the drinking water quality criteria to prevent health impacts. High failures of turbidity, aluminium and residual chlorine levels indicate that improved operational practices may be required.

Based on the above Audit results, the DWS has serious concerns on the poor microbiological drinking water quality and the resultant risk to consumers of the Eendekuil, Piketberg and Redelinghuys water supply systems. These concerns have to be addressed as a matter of urgency and drinking water quality results and appropriate actions must be communicated to consumers should the water be found to be unfit for human consumption.

The Bergrivier Local Municipality was well prepared for the assessment and demonstrated a positive approach to the Blue Drop Certification Programme. Consequently, it is anticipated that through acknowledgement of the identified gaps that progressive improvement in compliance will once again be achieved in future assessments.

Site Inspection Report: Piketberg and Porterville WTWs Score:

Piketberg WTW: 87%
Porterville WTW: 85%

The site inspection impression at the Piketberg WTW was considered to be very good. Areas for improvement include the installation of standby equipment for flocculent dosing and chlorination.

The site inspection impression at the Porterville WTW was considered to be very good.

Performance Area	Aurora	Eendekuil	Piketberg	Porterville	Redelinghuys	Velddrif
Water Services Provider(s)	**Bergrivier LM**	**Bergrivier LM**	**Bergrivier LM**	**Bergrivier LM**	**Bergrivier LM**	**West Coast DM**
Water Safety Planning	24.85	21.18	24.33	22.40	23.63	18.99
Treatment Process Management	6.80	4.00	6.00	6.80	6.00	6.00
DWQ Compliance	23.25	6.75	6.75	22.65	6.75	24.23
Management Accountability	7.30	7.30	7.75	7.75	7.75	7.60
Asset Management	5.78	4.41	5.25	8.33	4.41	7.11
Use Efficiency, Loss Management	0.23	0.23	0.23	0.23	0.23	0.23
Bonus Scores	2.86	6.75	6.71	4.78	6.00	4.57
Penalties	1.50	1.32	0.00	0.00	0.00	1.75
Blue Drop Score (2014)	**69.56%**	**49.29%**	**57.01%**	**72.93%**	**54.76%**	**66.96%**
Blue Drop Score (2012)	90.98%	90.16%	87.52%	95.00%	73.34%	97.57%
Blue Drop Score (2011)	77.88%	76.15%	68.78%	78.21%	52.69%	93.15%
Blue Drop Score (2010)	58.69%	57.81%	62.19%	62.19%	54.19%	67.38%
System Design Capacity (Ml/d)	0.200	0.200	3.000	3.900	0.300	75.400
Operational Capacity (% i.t.o. Design)	100%	80%	71%	36%	NI	80%
Average daily consumption (l/p/d)	30.8	266.7	214.1	175.0	500.0	N/A
Microbiological Compliance (%)	**99.9%**	**80.0%**	**90.9%**	**99.9%**	**82.6%**	**98.8%**
Chemical Compliance (%)	**99.9%**	**99.9%**	**99.9%**	**99.9%**	**99.9%**	**99.9%**

Table A.24: DWS's 2014 Blue Drop Risk Profile Progress Report results for Bergrivier Municipality						
Municipal Blue Drop Risk Rating						**52%**
The overall 2014 Risk Rating for Bergrivier is 52% which translates into the 9th worst performance (or position 17 out of 25 WSAs) in the Western Cape. Note that this value is based on the 3 specific areas indicated below and shows concerns (medium to critical risks) for Process Control (which risks reflect compliance in terms of draft Regulation 813) in 4 of the 6 systems; Drinking Water Quality in 3 out of the 6 systems; and Risk Management in none of 6 systems.						
Assessment Area	**Aurora**	**Eendekuil**	**Piketberg**	**Porterville**	**Redelinghuys**	**Velddrif**
2014						
Blue Drop Risk Rating (2014)	**51.2%**	**52.0%**	**65.8%**	**52.2%**	**76.3%**	**32.2%**
Process Control RR	64.7%	47.1%	64.1%	62.2%	82.4%	43.9%
Drinking Water Quality RR	40.7%	70.4%	70.4%	40.7%	70.4%	40.7%
Risk Management RR	34.8%	34.8%	34.8%	34.8%	34.8%	39.1%
2013						
Blue Drop Risk Rating (2013)	**31.3%**	**55.6%**	**50.3%**	**36.9%**	**56.7%**	**13.2%**
Process Control RR	41.2%	76.5%	56.4%	48.6%	58.8%	31.7%
Drinking Water Quality RR	11.1%	11.1%	40.7%	11.1%	40.7%	11.1%
Risk Management RR	73.9%	73.9%	82.6%	73.9%	82.6%	30.4%
2012						
Blue Drop Risk Rating (2012)	**54.1%**	**66.0%**	**80.2%**	**62.8%**	**63.9%**	**78.3%**
Process Control RR	76.5%	94.1%	94.9%	78.4%	76.5%	80.5%
Drinking Water Quality RR	11.1%	11.1%	11.1%	11.1%	33.3%	11.1%
Risk Management RR	52.2%	43.5%	52.2%	52.2%	52.2%	21.7%

DWS's Green Drop Process

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

Table A.25: Green Drop Performance of the Municipality (DWS's 2013 Green Drop Report)	
Average Green Drop Score	**2009 – 11.00%, 2011 – 70.00%, 2013 - 44.21%**

Regulatory Impression: Bergrivier Local Municipality's performance is not on par with the Regulator's expectations. The significant decline in the municipal Green Drop score from 70% (2011) to 44.2% indicates that the gains of 2011 have not been carried forward. The Regulator finds it hard to justify the current performance of the municipality, given that a skilled and competent supervisory structure is in place, albeit shortcomings in the support structures were observed. The score awarded to Bergrivier also impacts on the Provincial Green Drop score for Western Cape, and the municipality is to realise that not only does the score fails the good that has been done in the municipality, but also in the region.

The Green Water Services Audit revealed substantial shortcomings in the areas of risk- and asset management, as well as effluent quality. As risk management and effluent quality comprises of 45% of the total Green Drop score, this is possibly the areas that the municipality need to focus going forward. The mismatch between the good site inspection score 79% and the 62% Green Drop score (see Porterville site assessment) suggest that the municipality has indeed evidence of good practice, but that such evidence has not been organised to represent the municipality to its full potential. The Regulatory wish to encourage the municipality to return to its previous benchmark and build on the good work previously achieved.

The decline in the Green Drop score is reflected in the CRR ratings as well, with 2 plants having moved from a low risk to a high risk position.

Green Drop findings:

1. Three (3) of five (5) plants do not keep operational logbooks at the sites, whilst two (2) plants do not have O&M manuals in place
2. Despite good registration status of supervisor/s, the Process Controllers category is lacking.
3. Two (2) of the plants do not have evidence of design capacity and are not monitoring the inflow to the plants, which compromise the daily operation of the plants and medium term forward planning. The awarding of -40% attest to the seriousness of this default
4. Despite a good attempt to maintain best practice in compliance monitoring, none of the systems have succeeded in presenting operational monitoring regimes. This in part, could be the reason why better effluent quality has not been achieved.
5. The W_2RAP has been drafted, but is of sub-standard quality and does not represent a forward thinking and acting process to guide planning and implementation actions and resources. No incident management protocol is available. No signature by the Municipal Manager and/or CFO could be presented.
6. All systems failed in terms of asset registers, condition of assets, as well as cost pertaining to collection and treatment of sewage in the municipality. This again impacts on the ability to set tariffs and enhance revenue practices.
7. Four (4) of five (5) systems failed in terms of proof that pump stations are being maintained, and that all wastewater reaches the treatment plant.

Site Inspection Score: Porterville WWTW 70%

GREEN DROP REPORT CARD					
Key Performance Area	**Porterville**	**Dwarskersbos**	**Velddrif**	**Eendekuil**	**Piketberg**
Process Control and Maintenance Skills	**76**	**42**	**56**	**42**	**71**
Monitoring Programme	**83**	**83**	**75**	**59**	**88**
Submission of Results	**100**	**100**	**100**	**100**	**100**
Effluent Quality Compliance	**66**	**10**	**10**	**10**	**34**
Risk Management	**25**	**25**	**25**	**25**	**25**
Local Regulation	**24**	**24**	**24**	**24**	**24**
Treatment Capacity	**66**	**-40**	**66**	**-40**	**26**
Asset Management	**38**	**13**	**13**	**13**	**13**
Bonus Scores	7.54	6.75	9.63	2.07	9.09
Penalties	3.48	3.60	3.60	3.60	3.60
Green Drop Score (2013)	**62.60%**	**32.48%**	**40.91%**	**24.23%**	**48.94%**
Green Drop Score (2011)	**81.50%**	**73.30%**	**58.40%**	**38.00%**	**73.80%**
Green Drop Score (2009)	**16.60%**	**11.00%**	**5.00%**	**NA (0%)**	**11.00%**
System Design Capacity (Ml/d)	1.088	NI (1)	0.97	NI (1)	3.15
Capacity Utilisation (% ADWF i.t.o. Design Capacity)	66.36%	151.00%	60.00%	151.00%	74.29%
Resource Discharged into	Golf course	Golf course	Golf course	Golf course	Golf course
Microbiological Compliance	83.33%	75.00%	41.67%	58.33%	50.00%
Chemical Compliance	93.75%	70.83%	29.17%	29.17%	68.75%

GREEN DROP REPORT CARD					
Key Performance Area	**Porterville**	**Dwarskersbos**	**Velddrif**	**Eendekuil**	**Piketberg**
Physical Compliance	100.00%	33.33%	61.11%	75.00%	91.67%
Overall Compliance	94.79%	57.29%	42.71%	50.00%	75.00%
Wastewater Risk Rating (2012)	**41.20%**	**52.90%**	**58.80%**	**58.80%**	**58.80%**
Wastewater Risk Rating (2013)	**41.18%**	**76.47%**	**58.82%**	**76.47%**	**58.82%**

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

Table A.26: DWS's 2014 Green Drop Risk Profile Progress Report results for Bergrivier Municipality					
Technology Description	**Porterville**	**Dwarskersbos**	**Velddrif**	**Porterville**	**Dwarskersbos**
Technology (Liquid)	Activated sludge and extended aeration	Aerated ponds/ Oxidation ponds	Activated sludge	Activated sludge and extended aeration	Aerated ponds / Oxidation ponds
Technology (Sludge)	Sludge lagoon / pond	Anaerobic digestion	Sludge lagoon / pond	Sludge lagoon / pond	Anaerobic digestion
Key Risk Areas					
ADWF Design Capacity (Ml/d)	1.200	0.294	0.970	1.200	0.294
Operational flow (% of Design Capacity)	58%	34%	60%	58%	34%
Annual Average Effluent Quality Compliance (2012-2013)	83.3%	60.4%	34.5%	83.3%	60.4%
Microbiological Compliance	66.7%	100.0%	16.7%	66.7%	100.0%
Physical Compliance	100.0%	50.0%	58.3%	100.0%	50.0%
Chemical Compliance	75.0%	41.7%	16.7%	75.0%	41.7%
Technical skills (Reg 813)	No	Partial	No	No	Partial
2014 Wastewater Risk Rating (%CRR/CRR$_{max}$)	**64.7%**	**41.2%**	**76.5%**	**64.7%**	**41.2%**
2013 Wastewater Risk Rating (%CRR/CRR$_{max}$)	41.2%	76.5%	58.8%	41.2%	76.5%
Risk Abatement Planning					
Highest Risk Areas based on the CRR	Wastewater quality, technical skills	Wastewater quality, technical skills	Wastewater quality, technical skills	Wastewater quality; technical skills	Wastewater quality; technical skills
WW Risk Abatement Status	Final document annual review no. 2	Final document annual review no. 3	Draft document (unapproved by Council)	Final document annual review no. 2	Final document annual review no. 3
Capital & Refurbishment expenditure for Financial Year 2012-2013 (Rand)	NI	NI	R15m	NI	NI
Description of Projects' Expenditure 2012-2013	NI	NI	Upgrade from Oxidation ponds to Activated Sludge	NI	NI
W$_2$RAP Abatement Document and Status Commentary	W$_2$RAPs (undated) were provided for review by the Moderator. Intermittent reference is made to dates in the document referring to June 2011. Within the W$_2$RAP, there is no process description, no involvement of relevant staff and stakeholders evident. There is however asset related risks that have been identified, but unfortunately no matrix has been used. O&M actions have been described besides budgetary provision to address identified risks. From images provided in W$_2$RAP for some of the systems, plants appear to be well operated and maintained. The municipality is encouraged to follow the procedure and develop W$_2$RAPs for their systems in line with the Department's guideline. It would be well worth the effort to add this value to their wastewater systems. • Dwarskersbos: The document contains SOPs, risk and condition assessment for assets, no risk matrix provided; actions indicated should risk identified materialize. • Piketberg: SOPs provided, no risk matrix, asset risks identified, maintenance required indicated, actions should risk materialize. Porterville: Standard operating procedures provided, asset risks identified, no risk matrix provided, maintenance indicated, actions should risk materialise identified, budget to address risk identified included.				

Regulatory Impression

Berg River Municipality was not able to maintain the improvements in its wastewater Green Drop score of 2011 compared to the 2009 results. The average score decreased from 70% in 2011 to 44.21 % in 2013. The Municipality needs to implement urgent and immediate interventions to halt any further deterioration in the provision of their wastewater services. In the present 2013-14 Green Drop Progress Reporting, the wastewater risk rating deteriorated at two systems (Porterville & Velddrif), remained the same at one system (Piketberg) and improved in the cases of the Dwarskersbos and Eendekuil treatment systems.

The main concerns that the DWS have, as evident from the scorecards, are that very little to no supervisory and process control competencies are available in all of the wastewater systems, and that the wastewater quality is in general non-compliant. The Municipality needs to ensure that these competencies are established as this will most probably result in improved operations and maintenance at the plants, and ultimately in improvement in final effluent quality. More than sufficient operational capacity is available in all systems. The Municipality is encouraged to maintain this very possible contribution to their wastewater system management.

For the 2014 assessment, 5 of 5 plants are in moderate risk positions, all of which show short term promise to move into low risk positions if the necessary corrective measures be implemented.

Business Element 7: Associated Services

All the schools, hospitals and clinics in Bergrivier Municipality's Management Area are supplied with a higher level of water and sanitation services.

The Municipality's literacy level is 76.4%, which is lower than the Provincial and District norms of 87.2% and 79.1% respectively (Municipal Economic Review and Outlook, 2014).

Business Element 8: Conservation and Demand Management

Bergrivier Municipality's WC/WDM Strategy was recently updated, but was previously approved by Council in 2013. The implementation of Bergrivier Municipality's WC/WDM Strategy has been extremely successful and the Municipality was able to reduce the water requirements of the towns significantly. The overall percentage of non-revenue water for all the internal distribution systems was only 9.6% for the 2014/2015 financial year, which is very good. The average annual growth percentage in total raw water requirements for Bergrivier Municipality over the period 2010/2011 to 2014/2015 was -1.06%/a.

Bergrivier Municipality's try to keep their water losses below 10%, as indicated in their updated WC/WDM Strategy. Bergrivier Municipality has no dedicated funding for WC/WDM measures, but most of the current WC/WDM measures are done through the Municipality's O&M budget. The Municipality focussed during the last financial year mostly on the replacement of old residential water meters. PRVs are also in place in Porterville and Piketberg to reduce pressures within the various networks and all water pump stations are provided with standby pumps. Internal plumbing leaks are also repaired at low income households on an ad-hoc basis.

The proposed WC/WDM measures, as included in the updated WC/WDM Strategy, include the following measures to keep water losses as low as possible:

- Reduce number of estimates or try to never estimate values;
- Budget to replace old asbestos pipelines (Plot areas with the highest number of pipe bursts and use IMQS (database system) to identify specific areas)
- Implementation of pressure management measures (Pressure management systems / Taps)
- Water meter audit – To determine which meters need to be replaced first, as well as determining the age and the accuracy of the meters.
- The use of telemetry systems and the correct installation of telemetry systems at strategic places (Data collection / monitoring, improved metering system and control, accurate flow monitoring, early warning system).

- Replacement of bulk, industrial and residential water meters on a regular basis.
- Ensure all Municipal buildings are metered, as well as public open spaces (If not known, determine and budget / install).
- Monthly reporting is important.
- The logical identification of zones and the installation of bulk and residential water meters for monitoring, specific in problematic areas.
- Raise public awareness on WC/WDM measures (Pamphlets, Schools, Notice signs that indicate savings / losses.
- Try continuously to improve timelines for the calculation of losses (administrative losses).
- Install data loggers to determine MNFs in order to identify areas with high water losses.

Bergrivier Municipality received R1.65 million funding from the DWS for the 2015/2016 financial year for the implementation of WC/WDM measures (ACIP funding). The Business Plan for the project includes the following activities:

- Confirmation of current water balance components per town;
- Identification of water reducing options;
- Benefit / cost analysis of above options;
- Prioritisation of options; and
- Implementation of options.

It is expected that the appointed consultant will comply with the following:

- Engage with relevant stakeholders;
- Obtain and study all relevant documentation;
- Confirm water losses, etc. where necessary;
- Identify water saving options per town;
- Prioritise these and make recommendations with a cost programme, including estimates of the funding and resources required to operate and maintain the WC/WDM activities;
- Implement and oversee the implementation of the agreed programme.
- Establish a Project Steering Committee, hold regular meetings and compile progress reports.

The project will focus on Piketberg, Porterville and Redelinghuys.

The table below gives a summary of the non-revenue water and the ILI for the various distribution systems in Bergrivier Municipality's Management Area.

Table A.27: Non revenue water and ILI for the various distribution systems

Description	Unit	14/15	Record : Prior (Ml/a)				
			13/14	12/13	11/12	10/11	09/10
Porterville	Volume	82.417	63.469	60.389	83.727	63.903	59.099
	Percentage	16.0%	13.7%	13.0%	17.6%	12.9%	12.9%
	ILI	**1.27**					
Piketberg	Volume	74.577	163.765	133.370	147.009	73.832	74.109
	Percentage	8.8%	19.5%	16.7%	18.1%	9.0%	9.9%
	ILI	**0.54**					
Velddrif	Volume	56.034	53.310	80.846	7.863	13.207	-
	Percentage	6.3%	6.00%	8.8%	1.5%	2.6%	-
	ILI	**1.98**					
Dwarskersbos	Volume	-0.108	7.571	16.181	2.898	6.489	-
	Percentage	-0.1%	7.3%	16.3%	3.1%	7.8%	-
	ILI	**-0.04**					
Aurora	Volume	-3.401	5.285	-1.275	-5.872	-5.522	7.961
	Percentage	-8.2%	12.4%	-3.3%	-14.6%	-13.4%	14.5%
	ILI	**-0.29**					
Eendekuil	Volume	11.147	-1.282	6.275	1.148	-0.033	4.861
	Percentage	14.0%	-1.9%	8.2%	1.6%	0.0%	7.7%
	ILI	**1.38**					
Redelinghuys	Volume	21.918	24.531	23.313	24.820	19.546	7.079
	Percentage	36.5%	39.6%	39.9%	40.3%	31.0%	12.0%
	ILI	**6.05**					
Total	**Volume**	**242.584**	**316.649**	**319.099**	**261.593**	**171.422**	**153.109**
	Percentage	**9.6%**	**12.8%**	**13.0%**	**10.6%**	**6.6%**	**11.0%**
	ILI	**1.34**					

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

Category A = No specific intervention required.

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

Category C = Requires attention

Category D = Requires immediate water loss reduction interventions

The Infrastructure Leakage Index (ILI) is 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. 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 often occur since this implies that the actual leakage is less than the theoretical minimum level of leakage.

Business Element 9: Water Resources

The graph and table below gives an overview of the historical bulk water supply, over the last twelve years, to the towns in Bergrivier Municipality's Management Area (Ml/a).

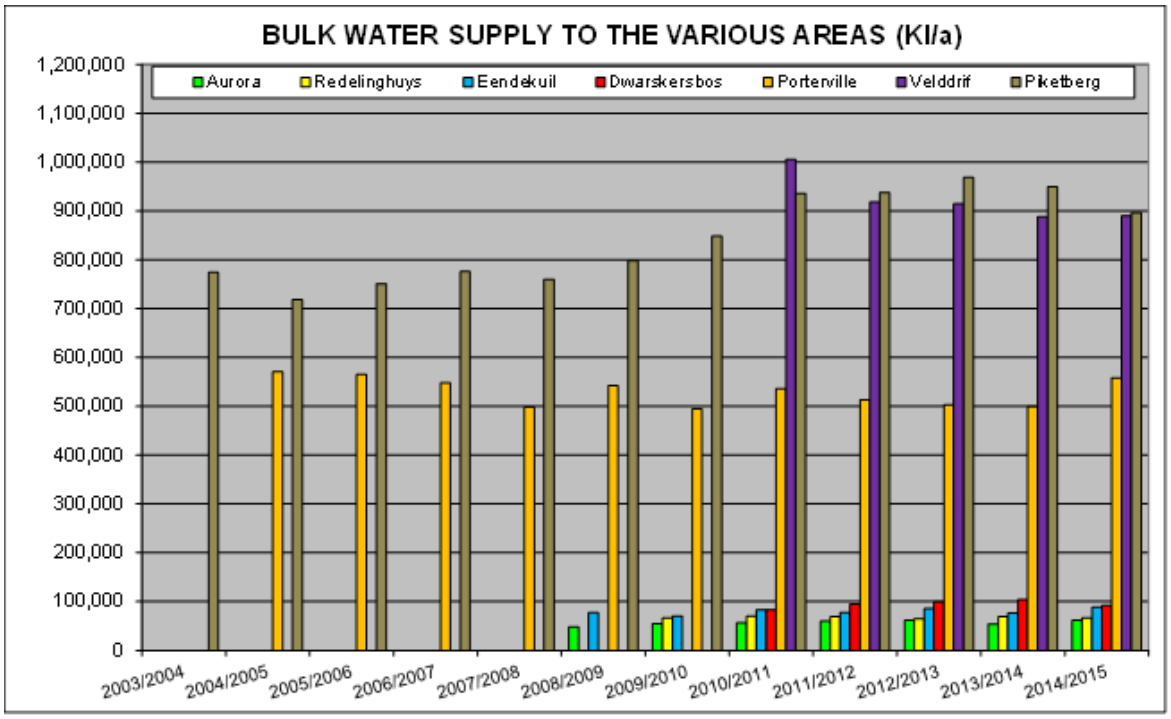


Figure A.5: Annual bulk raw water supplied to the various areas.

The table below summarise the bulk raw water supplied to the various towns in Bergrivier Municipality's Management Area.

Table A.28: Bulk water supply to the various towns

Distribution System	Source	14/15	Record : Prior (Ml/a)				
			13/14	12/13	11/12	10/11	09/10
Porterville	Voorberg Mountain Stream and two Fountains	558.218	499.063	502.797	512.885	536.159	494.744
Piketberg	Berg River and Voëlvlei Spring	896.897	949.923	968.489	937.772	935.813	848.571
Velddrif	Withoogte Scheme (Berg River)	889.858	888.237	914.335	918.982	1 005.660	
Dwarskersbos	Withoogte Scheme (Berg River)	92.183	104.298	99.369	94.760	83.274	
Aurora	Boreholes	61.633	54.077	61.657	59.680	55.943	54.797
Eendekuil	Waboomfontein River and Spring and Borehole	88.247	76.476	85.511	77.443	82.492	70.198
Redelinghuys	Matroosfontein Spring	66.669	68.806	64.919	68.503	70.079	65.784
Total		**2 653.705**	**2 640.880**	**2 697.077**	**2 670.025**	**2 769.420**	**1 534.094**

Water Quality: Bergrivier Municipality makes use of an accredited external laboratory to conduct the drinking water compliance sampling and analysis. Samples are taken at various locations in each system and analysed to evaluate the compliance. The water quality results are loaded onto DWS's BDS via the internet. Once entered the data is automatically compared to SANS241. This real-time system allows for immediate intervention to rectify any problems.

The overall percentage of compliance of the water quality samples taken over the period July 2014 to June 2015 is summarised in the table below per distribution system (DWS's 2014 Blue Drop Limits).

Table A.29: Percentage compliance of the water quality samples for the period July 2014 to June 2015			
Performance Indicator	**Performance Indicator categorised as unacceptable Yes / No (Table 4 of SANS 241-2:2011)**	**% Sample Compliance according to DWS's 2014 Blue Drop Limits**	**Number of Samples taken into account**
Porterville			
Acute Health – 1 Microbiological	No (Good)	95.3%	64
Chronic Health	Yes (Unacceptable)	79.8%	89
Aesthetic	No (Excellent)	100.0%	185
Risk assessment defined Health (Acute or Chronic)	Yes (Unacceptable)	88.6%	185
Operational Efficiency	Yes (Unacceptable)	85.8%	218
Piketberg			
Acute Health – 1 Microbiological	No (Good)	95.2%	63
Chronic Health	Yes (Unacceptable)	90.0%	90
Aesthetic	No (Excellent)	96.4%	248
Risk assessment defined Health (Acute or Chronic)	No (Good)	93.5%	186
Operational Efficiency	Yes (Unacceptable)	81.8%	220
Dwarskersbos			
Acute Health – 1 Microbiological	Yes (Unacceptable)	94.4%	54
Chronic Health	No (Excellent)	100.0%	57
Aesthetic	No (Excellent)	98.4%	126
Risk assessment defined Health (Acute or Chronic)	No (Excellent)	97.5%	122
Operational Efficiency	No (Excellent)	96.2%	202
Velddrif			
Acute Health – 1 Microbiological	No (Excellent)	100.0%	90
Chronic Health	No (Excellent)	99.2%	127
Aesthetic	No (Excellent)	98.6%	294
Risk assessment defined Health (Acute or Chronic)	No (Excellent)	99.6%	251
Operational Efficiency	No (Excellent)	95.5%	403
Aurora			
Acute Health – 1 Microbiological	No (Good)	95.5%	44
Chronic Health	Yes (Unacceptable)	67.7%	62
Aesthetic	No (Excellent)	97.4%	154
Risk assessment defined Health (Acute or Chronic)	Yes (Unacceptable)	82.8%	128
Operational Efficiency	No (Excellent)	98.1%	154
Eendekuil			
Acute Health – 1 Microbiological	No (Good)	95.2%	42
Chronic Health	Yes (Unacceptable)	78.3%	60
Aesthetic	No (Excellent)	97.1%	171
Risk assessment defined Health (Acute or Chronic)	Yes (Unacceptable)	87.9%	124
Operational Efficiency	Yes (Unacceptable)	70.7%	147
Redelinghuys			
Acute Health – 1 Microbiological	Yes (Unacceptable)	94.2%	52
Chronic Health	Yes (Unacceptable)	61.3%	62
Aesthetic	No (Excellent)	97.1%	173
Risk assessment defined Health (Acute or Chronic)	Yes (Unacceptable)	80.1%	136
Operational Efficiency	Yes (Unacceptable)	82.1%	162

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

Table A.30: Five 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 - 1	Routinely quantifiable determinand that poses an immediate unacceptable health risk if consumed with water at concentration values exceeding the numerical limits specified in SANS 241.
Acute Health - 2	Determinand that is presently not easily quantifiable and lacks information pertaining to viability and human infectivity which, however, does pose immediate unacceptable health risks if consumed with water at concentration values exceeding the numerical limits specified in 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

Effluent Quality: The overall Microbiological, Chemical and Physical compliance percentages of the final effluent samples taken over the period July 2014 to June 2015 at the various WWTWs are summarised in the table below.

Table A.31: Microbiological, chemical and physical compliance percentages of the final effluent taken at the various WWTW over the period July 2014 to June 2015

WWTW	Micro-biological	Chemical					Physical			
	Faecal Coliforms	Ammonia	Nitrates & Nitrites	COD	Ortho-Phosphates	Overall	pH	EC	SS	Overall
Dwarskersbos	100.0%	N/A	N/A	50.0%	N/A	50.0%	10.0%	0.0%	N/A	5.0%
Eendekuil	100.0%	N/A	N/A	18.2%	N/A	18.2%	100.0%	100.0%	N/A	100.0%
Piketberg	54.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	90.9%	97.0%
Porterville	81.8%	63.6%	90.9%	90.9%	90.9%	84.1%	100.0%	100.0%	100.0 %	100.0%
Velddrif	100.0%	90.0%	70.0%	70.0%	50.0%	70.0%	100.0%	50.0%	90.0%	80.0%
Total	**86.8%**	**84.4%**	**87.5%**	**66.0%**	**81.3%**	**77.9%**	**83.0%**	**71.7%**	**93.8%**	**81.2%**

Industrial Consumers:

The volumes and nutrient loads of effluent discharged by industrial consumers in Bergrivier Municipality's Management Area into the Municipality's sewer system are not yet monitored by Bergrivier Municipality.

Bergrivier Municipality's existing Water Services Bylaws include the following industrial effluent sections:

- Application for disposal of industrial effluent;
- Unauthorised discharge of industrial effluent;
- Quality standards for disposal of industrial effluent;
- Conditions for disposal of industrial effluent;
- Withdrawal of written permission for disposal of industrial effluent;
- Measurement of quantity of industrial effluent discharged;
- Limits of concentration of substances that may be discharged to the municipality's sanitation system; and
- Formula for the calculation of effluent discharge charges.

Business Element 10: Financial

Capital Budget:

There was a significant improvement in the financial position of Bergrivier Municipality during the 2014/2015 financial year. The 2014/2015 financial year was closed with a net surplus of R36 322 38, which was a vast improvement on the net surplus of R23 187 819 for the 2013/2014 financial year.

Bergrivier Municipality successfully completed various capital projects over the last financial year. The capital budget expenditure, for the 2014/2015 financial year, was R13.738 million (91.2% of the budget) for the water infrastructure projects and R1.972 million (89.7% of the budget) for the sewerage infrastructure projects.

Operational Budget:

The table below gives a summary of the total operating costs and income for water and sanitation services for the last five financial years:

Table A.32: Summary of Operational Budget for water and sanitation services for the last five financial years

Service	Expenditure / Income	Actual 14/15	Actual 13/14	Actual 12/13	Actual 11/12	Actual 10/11
Water	Expenditure	R17 869 715-73	R16 489 805-52	R17 977 803-63	R14 372 824-55	R13 899 805-33
	Income	-R39 000 512-21	-R21 182 113-66	-R19 773 371-64	-R17 327 831-49	-R15 101 448-29
	Surplus / Deficit	R21 130 796-48	R4 692 308-14	R1 795 568-01	R2 955 006-94	R1 201 642-96
Sanitation	Expenditure	R6 669 974-61	R8 359 993-41	R7 955 336-06	R7 717 089-03	R7 169 416-10
	Income	R17 974 594-76	R27 065 082-86	R21 107 779-12	R18 071 571-79	R16 480 565-19
	Surplus / Deficit	R11 304 620-15	R18 705 089-45	R13 152 443-06	R10 354 482-76	R9 311 149-09

It can be noted from the above table that water and sanitation services are currently managed in a financial sustainable manner by Bergrivier Municipality, because of the surplus funds generated from both water and sanitation services for the last five financial years.

The operating ratios in the table below give an overview of the financial performance of Bergrivier Municipality.

Table A.33: Financial operating ratios of Bergrivier Municipality

Ratio	2014/2015	2013/2014	2012/2013
Liquidity ratio	112%	82.98%	34.71%
Cost coverage ratio	6.35	5.44	2.02
Oustanding service debtors to revenue	35.47%	34.4%	34.9%
Debt coverage	19.08	33.20	47.39
Creditor's systems efficiency	97%	95%	95%
Capital charges to operating expenditure	5.09%	4.87%	4.48%
Employee costs	32.77%	33.71%	38.55%
Repairs and maintenance	1.82%	1.82%	2.51%

Ratings Africa (Pty) Ltd did an assessment of the Financial Stability and Sustainability Index of most Municipalities in South Africa during April 2015. The table below summarise the findings made for Bergrivier Municipality. The points awarded for the financial sustainability (60 for 2014) is a mark out of 100. In comparison to 20 other Municipalities measured in the Western Cape, Bergrivier Municipality received the seventh (7) best rating.

Table A.34: Financial stability and sustainability index of Bergrivier Municipality

Financial Sustainability Index	2014	2013	2012	2011	2010
Budget position	59	37	26	26	16
Operating performance	38	27	9	13	39
Liabilities management	58	59	60	54	70
Liquidity management	75	53	51	55	74
Financial Stability	**60**	**45**	**39**	**40**	**55**
Affordability	62	64	63	63	66
Infrastructure Development	43	35	48	54	51
Sustainability Index Score	**58**	**47**	**45**	**47**	**56**

Tariff and Charges:

A detail nine block step tariff system is implemented by Bergrivier 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, due to the huge bulk infrastructure needs of Bergrivier Municipality over the next number of years.

The first six (6) kl of water is provided free to all indigent households. Bergrivier 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 six (6) kilolitres per month.

Business Element 11: Water Services Institutional Arrangements

Bergrivier Municipality is the WSA for the entire Municipal Management Area. A Service Level Agreement is in place with the West Coast District Municipality for the provision of bulk water to Velddrif and Dwarskersbos.

The Municipality employed 380 employees at the end of June 2015 and the total vacancy rate inclusive of funded is 16.48%. Currently 47 funded posts and 28 unfunded posts are still vacant. The vacancy rate for funded posts is 10.33%, which is still quite high and higher than the 9.9% of 2013/2014. The table below gives an overview of the 2013/2014 and 2014/2015 vacancy rate for Water and Sanitation services.

Table A.35: Employees and vacancy rates for Water and Sanitation Services.

Service	2014/2015				2013/2014			
	Approved Posts (Funded)	Employees	Vacancies (Funded)	% Vacancies	Approved Posts (Funded)	Employees	Vacancies (Funded)	% Vacancies
Water	22	18	4	18%	21	18	3	14%
Sanitation	15	14	1	7%	16	15	1	6%

Bergrivier Municipality is currently busy with the updating of their WSDP according to DWS's new eWSDP format. A Water Services Audit Report is compiled annually and taken to Council with the Annual Report. Water Services By-laws are also in place and was promulgated.

The education of users in low cost income areas 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 staff is continuously exposed to training opportunities, skills development and capacity building at a technical, operations and management level in an effort to create a more efficient overall service to the users. A Workplace Skills Plan is compiled annually and the specific training needs of the personnel, with regard to water and wastewater management are determined annually.

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

Bergrivier Municipality is currently effectively managing its water and sanitation services. Special focus is however required to ensure adequate rehabilitation and maintenance of the existing water and sewerage infrastructure. All forward planning for water and sanitation services is guided by the Water and Sewer Master Plans.

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.

Business Element 12: Social and Customer Service Requirements

A comprehensive Customer Services and Complaints system is in place at Bergrivier Municipality and the Municipality has maintained a high and a very consistent level of service to its urban water consumers. After hour emergency requests are being dealt with by the control room on a twenty four hour basis. All water and sanitation related complaints are logged through the system in order to ensure quick response to complaints.

Bergrivier Municipality further developed a Client Services Charter in collaboration with various stakeholders to affirm their commitment to providing unsurpassed service delivery within the Bergrivier Municipality's Management Area. The standards for water and sewerage services, as stipulated in the Client Services Charter, are summarised in the table below:

Table A.36: Water and Sewerage standards as included in the Client Services Charter

Water	
Connection	Done within five (5) working days after receipt of the completed application form.
Replacement of meters	Done within three (3) working days after the incident. Bulk meters are replaced within four (4) working days after receipt of completed application form.
Resumption of service	Within one (1) working day after payment.
Broken pipes	Repaired within one (1) working day after the incident. Repair main line broken pipes within two (2) days after the incident.
Storm damage of water source	Repaired within four (4) working days after the incident.
Sewerage	
Connection	Done within five (5) working days after receipt of the completed application form.
Collection	Done within one (1) working day after receipt of the request.
Obstruction and damage	Repaired within one (1) day after the incident.

"Community involvement and excellent client services are the building blocks of Bergrivier Municipality"

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. Bergrivier Municipality is therefore committed to ensure that their water quality always complies with national safety standards.

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

- Service Delivery Agreement between the West Coast District Municipality and Bergrivier Municipality. A Monitoring Committee with the following powers and functions are in place:
  - To co-ordinate integrated development planning in respect of the services;
  - To monitor the performance of the District Municipality in respect of service levels;
  - To monitor the implementation of this agreement;
  - To provide a forum for the local municipalities to interact with the District Municipality;
  - To accept delivery, on behalf of the Local Municipalities, of reports which the District Municipality is required to produce in terms of this agreement;
  - To consider and make recommendations to the District Municipality on the District Municipality's high level budget and key performance indicators and targets;
  - In consultation with the District Municipality, to handle, manage and make recommendations to the parties in respect of any matter related to the services which is not dealt with by this agreement;
  - To ensure that the expenses incurred by the District Municipality in respect of the services do not exceed the amount allocated therefore in the District Municipality's annual budget;
  - To formulate a written document that records the rules and procedures, which will be binding on itself, regulating the manner and legislative obligations, powers and functions to the Monitoring Committee.
- Participate in catchment management and water source protection initiatives.
- Protection at points of abstraction such as river intakes and dams (Abstraction Management).
- Correct operation and maintenance of the 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 Bergrivier Municipality against poor quality drinking water that are a prerequisite to those listed above are as follows:

- A well informed Council and municipal managers that understand the extreme importance of and are committed to providing adequate resources for continuous professional operation and maintenance of the water supply system.
- Competent managers and supervisors in the technical department who are responsible for water supply services lead by example and are passionate about monitoring and safeguarding drinking water quality.

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

SECTION B: STATE OF WATER SERVICES PLANNING

This WSDP is for 2017-2022 (First Cycle) and Bergrivier Municipality is committed to update their WSDP for the interim years and to compile a new WSDP every five years, as required by legislation. The 2017-2022 (First Cycle) WSDP will also be populated on the eWSDP website of the DWS.

Bergrivier Municipality also compiled annual WSDP Performance- and Water Services Audit Reports for the last number of years. The WSDP Performance- and Water Services Audit Report gives an overview of the implementation of the Municipality's previous year's WSDP and can be seen as an annexure to Bergrivier Municipality's Annual Report.

Bergrivier Municipality's Water and Sewer Master Plan process entails the establishment of computer models for the water systems and the sewer systems in Bergrivier Municipality, the linking of these models to the stand and water meter databases of the treasury financial system, evaluation and master planning of the networks and the posting of all the information to IMQS. The Water and Sewer Master Plans lists the analyses and findings of the study on Bergrivier Municipality's water distribution and sewer drainage systems.

The latest Water and Sewer Master Plans, which were available for inclusion in Bergrivier Municipality's WSDP, were as follows:

- Water Master Plan, Bergrivier Municipality, 2015, GLS Consulting
- Sewer Master Plan, Bergrivier Municipality, 2015, GLS Consulting

W_2RAPs were also drafted for all the WWTWs and drainage systems during the last financial year.

SECTION C: WATER SERVICES EXISTING NEEDS PERSPECTIVE

The existing needs perspective as presented below was developed through a systematic and comprehensive review of the water services function in terms of the WSDP Guide Framework. The output from this process is presented below and includes compliance assessment in terms of:

- Quality: Assessment current status against compliancy requirements.
- Quantity: An indication of the representation of the total area to address the issue.
- Future plan assessment: Degree in which future demand has been established.
- Strategy assessment: Whether a Strategy is in place to address the need.

The water services situation analysis prompted the development of problem statements which formed the input for the development of the water services objectives and strategies which follows in Section D.

Business Element 1: Administration

Table C.1 : Business Element 1: Administration (Topic 1)					
Overview of Topic	**Status Quo and Knowledge Interpretation Statistics**				
This topic provides knowledge on the status of the WSA's 5-year WSDP as well as with the contact particulars of the key role-players which have contributed to the development of the WSDP.	**Item**	**Quality (%)** assessment of current status against compliancy requirements	**Quantity (%)** an indication of the representation of the total area to address the issue	**Future Plan Assessment**	**Strategy Assessment**
	n/a	n/a	n/a	n/a	n/a
	TOTAL for Topic	**n/a**	**n/a**	**n/a**	**n/a**

Problem Definition Statements		
Nr	**Statements - Short Comings**	**Possible Improvement / Project**
1	Key issues raised in the WSDP need to be taken to the IDP	Ensure Executive Summary of WSDP (WSDP-IDP Water Sector Input Report) is included in the IDP.

Community Participation: Bergrivier Municipality makes use of the following public participation structures:

- Public meetings
- Ward Committees
- IDP Representative Forum meetings: The objectives of these meetings are to provide the formal sectors of the community with an opportunity to give input into the IDP and budget process. The IDP Forum meetings also assisted greatly in the Joint Planning process with Provincial Government by assisting the Municipality with the identification and prioritisation of game changers in the Municipality's Area.
- Sector Engagements: Sector engagements take the form of two way dialogues between and amongst sector representatives and the Municipality and are proving to be very effective as it focusses on issues as well as ways and means of resolving issues jointly. It also enables the Municipality to solicit more detailed inputs that it is possible to do in public meetings. During the 2014/2015 financial year Bergrivier focused on local economic development and had sector engagements with tourism, business and the hospitality industry.

The Vision, Mission, Core Values and Strategic Objectives of Bergrivier Municipality, as included in their 2015-2016 IDP, are as follows:

Vision: "We strive towards a satisfied community through sustainable service delivery"

Mission:"To create an effectively governed administration that is committed to sustainable development of the Municipal Area and the delivery of services that are responsive to the unique needs of the Bergrivier Community."

Core Values:

- We are part of Bergrivier Municipality;
- We strive to render good service so that all people in our community can live together happily and harmoniously;
- We believe in good relationships;
- We believe in close partnerships;
- We believe in social and economic development of the area;
- We are disciplined;
- We render good service;
- We care about our work and our colleagues;

- We serve with pride.

The **Strategic Objectives** of Bergrivier Municipality are as follows:

- To budget strategically, grow and diversify our revenue and ensure value for money services;
- To create an efficient, effective and accountable administration;
- To provide open transparent corruption free governance;
- To communicate effectively and be responsive to the needs of the Community;
- To provide and maintain bulk and service infrastructure that will address backlogs and provide for future development;
- To promote the well-being, health, safety and security of our community;
- To develop, manage and regulate the built environment;
- To conserve and manage the natural environment and mitigate the impacts of climate change;
- To promote cultural and socio-economic development of our community.

Business Element 2: Demographics

Table C.2: Business Element 2: Demographics (Topic 2)					
Overview of Topic	**Status Quo and Knowledge Interpretation Statistics**				
This topic provides an overview of demographics of the WSA as sourced from the National Geo-Referenced Database, aligned to Census figures as well as the number of public amenities and private facilities within the jurisdictional area of the WSA.	**Item**	**Quality (%)** assessment of current status against compliancy requirements	**Quantity (%)** an indication of the representation of the total area to address the issue	**Future Plan Assessment**	**Strategy Assessment**
	Settlement Types (Urban, Rural , Farming)	Scores will be finalised once the new eWSDP website is fully populated.			
	Public Amenities Consumer types				
	TOTAL for Topic				

Problem Definition Statements		
Nr	**Statements - Short Comings**	**Possible Improvement / Project**
1	Conservative approach is followed regarding the management of water sources, due to the possible impact of climate change.	All resources, especially surface water resources, need to be re-evaluated, especially where demand is close to the safe one in twenty year yields. Establish assurance of supply levels of all water sources.
2	Municipality needs to evaluate all land use planning applications against the broad SDF principles before approvals and recommendations are made.	Continue with the implementation of the SDF for each of the towns and ensure that new developments are in line with these priority action plans.
3	Ensure that the required bulk water and sewerage infrastructure are in place before housing projects are implemented.	Ensure that the provision of bulk water and sewerage infrastructure are aligned with the Housing Strategy and that housing projects only continue once the required bulk water and sewerage infrastructure are in place.
4	High housing demand and the expanding presence of backyard dwellers due to home owners renting out structures in their yards	Continue with the implementation of the Housing Strategy (Pipeline). Identify suitable land for housing, as well as optimal utilization of vacant serviced land (infill housing) and source all possible external funding to assist with housing delivery.

A SDF is in place for Bergrivier Municipality. The SDF sets out broad principles for future developments, as well as where such developments can take place within the demarcated urban edges of all towns and in the rural areas. All land use planning applications will be evaluated against these broad principles before recommendations for decision making will be made.

A key challenge that is emerging is the high housing demand and the expanding presence of backyard dwellers due to home owners renting out structures in their yards. A ten year housing and infrastructure pipeline was approved by Council on 25 November 2014 as well as an updated housing selection policy. Key challenges are the scarcity of suitable land for housing and the high cost of bulk and service infrastructure. The Municipality was able to commence with the implementation of its Housing Pipeline that was approved in the 2012/13 financial year. Housing challenges that still need to be addressed include the following:

- The scarcity of suitable land for housing;
- The optimal utilization of vacant serviced land for housing provision (infill housing);
- The high cost of bulk and service of infrastructure;
- Sourcing of sufficient MIG and DoRA funding;
- Continuous influx of people who require housing; and
- Staff shortages

Business Element 3: Service Levels

Table C.3 : Business Element 3: Service Levels (Topic 3)					
Overview of Topic	**Status Quo and Knowledge Interpretation Statistics**				
Topic 3 information is presented in terms of the Department of Water and Sanitations' service level classification which considers the adequacy of services in establishing the service level profile. The profile is presented in terms of settlements, population and households.	**Item**	**Quality (%)** assessment of current status against compliancy requirements	**Quantity (%)** an indication of the representation of the total area to address the issue	**Future Plan Assessment**	**Strategy Assessment**
	Water - Below: No Services (Formal)	Scores will be finalised once the new eWSDP website is fully populated.			
	Water - Below: Infra. Needs				
	Water - Below: O&M Needs				
	Water - Below No Services (Informal)				
	Sanitation – Below: No Services (Formal)				
	Sanitation – Below: Infra. Needs				
	Sanitation – Below: O&M Needs				
	Sanitation – Below: No Services (Informal)				
	Residential, Public Institutions and Industries Amenities				
	TOTAL for Topic				

Problem Definition Statements		
Nr	**Statements - Short Comings**	**Possible Improvement / Project**
1	Ensure that all households on the farms in the rural areas with existing services below RDP standard are provided with at least basic water and sanitation services	Assist private landowners on the farms as far as possible with the provision of basic water and sanitation services to all the households with existing service levels still below RDP standard.
2	Find a sustainable service delivery solution for providing services to the Moravian Church settlements.	Continue with discussions with the Moravian Church of South Africa, the West Coast District Municipality and Province to find a sustainable service delivery solution for these settlements.

As a priority it is the responsibility of Bergrivier 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 Bergrivier Municipality are not yet in place, but the service levels to be provided by the Municipality to the consumers in their Management Area are however addressed in the Municipality's Water Services By-laws.

All water and sanitation services provided by Bergrivier Municipality to consumers within the Municipal Management Area are linked to the Municipality's Tariff Policy and Rates Policy and poor households are incorporated through Bergrivier Municipality's Indigent Policy.

The large number of residents in the lowest income groups places a major challenge on Bergrivier Municipality to provide suitable housing. Bergrivier Municipality works towards providing all households in the towns with a water connection inside the house and connecting all households to a waterborne sanitation system.

All the formal households in the urban areas of Bergrivier Municipality's Management Area are provided with water connections inside the houses (Higher level of service). Communal standpipes and ablution facilities are only provided as an emergency service. Bergrivier 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.

The Municipality will continue with the discussions with the Moravian Church of South Africa, the West Coast District Municipality and Province to find a sustainable service delivery solution for the Moravian Church settlements. Bergrivier Municipality is also 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.

Bergrivier Municipality is 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 West Coast District Municipality responsible for environmental health and Bergrivier Municipality.

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

The ownership of water services assets may be in the hands of the person owning the land where an "on-site" water or sanitation facility is provided to a household. There is no legal impediment to the use of government grants to fund infrastructure for a poor household on private land not owned by that household, provided that the intermediary (the private land owner) makes a financial contribution (This is because the intermediary becomes the owner of the infrastructure once it is installed). Government is looking at specific policies with regard to the appropriate level of contribution.

The clinics and hospital in Bergrivier Municipality's Management Area have adequate and safe water supply and sanitation services. All the schools in Bergrivier Municipality's Management Area also have adequate and safe water supply and sanitation services. It is important for the schools in Bergrivier Municipality's Management Area to focus on Water Demand Management activities and for Bergrivier Municipality to support the schools with a WDM programme.

Business Element 4: Socio Economic

Table C.4 : Business Element 4: Socio-Economic (Topic 4)					
Overview of Topic	**Status Quo and Knowledge Interpretation Statistics**				
The socio-economic information contained in the WSDP provides a broad overview of the socio-economic status of the municipality in terms of population growth rates, age and gender profile, employment profile, migration patterns, household income and economics. The topic also contains a quick reference to water services affordability by expressing the typical monthly water bill in terms of average monthly income in the municipal area.	**Item**	**Quality (%)** assessment of current status against compliancy requirements	**Quantity (%)** an indication of the representation of the total area to address the issue	**Future Plan Assessment**	**Strategy Assessment**
	General	Scores will be finalised once the new eWSDP website is fully populated.			
	Age and gender profile				
	Employment profile				
	Demographic trends and migration patterns				
	Household income				
	Water Affordability				
	Sanitation Affordability				
	Economics				
	TOTAL for Topic	**n/a**	**n/a**	**n/a**	**n/a**

Problem Definition Statements		
Nr	**Statements - Short Comings**	**Possible Improvement / Project**
1	Various socio-economic challenges (Unemployment, lack of education and training facilities, develop the tourism sector, etc.)	Continue to actively engage with all Government Departments constituting what is known as the Social Cluster in the Municipal Area (Health, Social Development and Community Safety) in a bid to collectively address the health, social and community safety issues.
2	Eduction / Youth development and economic development need to be the key focus of Bergrivier Municipality.	Implement the Youth Development Strategy as to address a need for a strategic focus on the youth as part of the Education sector's initiatives. Implement the approved LED Strategy.
3	Challenges of poverty in the area	Alleviation of poverty by means of the Municipality's Indigent Policy, Local Labour Promotion Projects, LED projects and the use of Supply Chain Management Policy as an instrument to enforce the maximum use of local labour.
4	Lack of job opportunities	Collaborate with the private sector and local non-profit organizations to provide needed skills at all levels, commission a skills audit and gap assessment and a skills development exercise focusing on specific priorities. The projects should focus on socio-economic upliftment, as part of Bergrivier Municipality's strategy to bring about poverty alleviation through job creation whilst enhancing the prospects of reducing outstanding municipal consumer debt.

The Municipality faces a number of challenges relating to unemployment, the most fundamental being that it must find ways and means to stimulate the local economy which will in turn lead to job creation. Coupled to this is the need to facilitate the establishment of education and training facilities in the Municipal Area that will provide access to training and skills development. This will enable the local community to take advantage of available employment opportunities. A further challenge is ensuring that job opportunities within the Municipal Area are utilised by local communities. There is dissatisfaction in the Community because migrant labour is being brought in from other places to work on farms. The extent and reasons for this trend are not known and need to be investigated through engagement with appropriate stakeholders.

The Municipality actively engages with all Government Departments constituting what is known as the Social Cluster in the Municipal Area (Health, Social Development and Community Safety) in a bid to collectively address the health, social and community safety issues and they form an integral component of the Municipalities IDP Representative Forum.

There are significant opportunities in the Bergrivier Municipal Area that should be utilized for the economic growth, especially the proximity to the Saldanha IDZ and to Cape Town. Bergrivier Municipality also needs to focus on the development of the tourism sector and optimally utilise their natural resources and their ability to offer unique experiences. There are a number of role players who are already contributing to the development of the economy of Bergrivier who needs support and need to work together with organisation such as the Bergrivier Tourism Association whom the Municipality supports through an annual grant. Other role players include the agriculture sector and the Piketberg, Wittewater, Goedverwacht Community Engagement Forum which comprises representatives from civic organisations within Piketberg, Wittewater and Goedverwacht and which was established for the purpose of consultation and identification of community needs and projects.

A revised LED Strategy was drafted during the 2014/2015 financial year and adopted in May 2015. The main objectives of the LED Strategy are as follows:

- To provide a situational analysis of the economy of Bergrivier Municipal Area to serve as baseline information for the LED strategy;
- To define and describe the institutional mechanism for implementation of the LED Strategy;
- To identify and describe potential short term projects to commence with a process towards achieving the strategic objective of LED; and
- To enhance the Local Economy of the Bergrivier Municipal Area.

Two of the main game changers for Bergrivier Municipality are education / youth development and economic development. In the light of these initiatives and the large percentage of youth relative to other age groups in the Municipal area, the Municipality decided to draft a Youth Development Strategy as to address a need for a strategic focus on the youth as part of the Education sector's initiatives. The pillars of the Youth Development Strategy include the following:

- Youth ICT Empowerment;
- Environmental Action;
- Awareness and Participation; and
- Education and Skills Development.

A critical aspect of infrastructure development is the obligation and commitment to create jobs. Direct job creation takes place through the development, operation and management of water infrastructure, which indirect job creation flows from the associated water supplies to economic activities such as mining, manufacturing, power generation and agriculture.

Investment in infrastructure development could create employment for local workers and provide skills development and work experience at a number of levels, from the highly technical jobs to manual labour, particularly where labour-intensive construction methods are used. The operation and management of water infrastructure also offers opportunities for job creation.

Bergrivier Municipality is conscious of the challenges of poverty in the area and strives to contribute towards the alleviation thereof by means of e.g. their indigent support, Local labour Promotion Projects, LED projects and the use of Supply Chain Management Policy as in instrument to enforce the maximum use of local labour.

The Municipality does not have a dedicated department or budget for social development, but works jointly with other organs of state and the West Coast District Municipality to promote social development within the Municipal Area. A Memorandum of Agreement has also been signed between Bergrivier Municipality and the Department of Social Development.

Some of the social programmes that were rolled out during 2014/2015 are as follows:

- Golden Games
- Community Safety Plan
- Occupational Readiness programme (West Coast College)
- IDP Representative Forum – Social Sector
- Thusong Outreach Programme

Urbanisation is likely to continue with more and more farmworkers moving to the nearest urban settlements. This trend will increase the demand for low cost housing within the various towns and the Municipality will need to keep up with the demand for houses, which is subject to the availability of land and funds made available by the relevant Provincial departments. The economy, job opportunities and the influx of people into the municipal area also impact on the need for houses and the provision of water and sanitation services. A Housing Strategy is in place to manage housing delivery in Bergrivier Municipality's Management Area.

Bergrivier Municipality needs to collaborate with the private sector and local non-profit organizations to provide needed skills at all levels, commission a skills audit and gap assessment and a skills development exercise focusing on specific priorities. The projects should focus on socio-economic upliftment, as part of Bergrivier Municipality's strategy to bring about poverty alleviation through job creation whilst enhancing the prospects of reducing outstanding municipal consumer debt.

Bergrivier Municipality's free basic services and indigent support caters for a proportion of the population not being able to afford water and sanitation services. The proportion of the population who cannot afford water and sanitation is also examined each year during the budgeting and tariff setting process and tariffs are adjusted accordingly. Households that cannot afford to pay can register as indigent on the Municipality's Indigent Register.

Investing in infrastructure creates an enabling environment for economic growth and is an important precondition for sustainable growth. Failure to adequately budget for the rehabilitation and maintenance of the existing infrastructure poses a serious threat to the local economy. The deterioration of the existing networks and rapid development, which is not always matched by growing capital expenditure, further exacerbates the situation. Adequate rehabilitation and maintenance of the existing infrastructure is critical in order to ensure the medium to long term sustainability of the existing infrastructure.

Business Element 5: Water Services Infrastructure Management (Infrastructure)

Table C.5: Business Element 5: Water Services Infrastructure Management (Topic 5)					
Overview of Topic	**Status Quo and Knowledge Interpretation Statistics**				
Topic 5.1 provides an overview of the extent-, functionality- and asset status of the municipality's water services infrastructure. It also provides an overview of the municipality's compliance in terms of legislation- and regulations concerning asset management, disaster management, water quality management, water resource licensing, etc. It should be emphasized that the topic does not provide the detail per infrastructure element, but	**Item**	**Quality (%)** assessment of current status against compliancy requirements	**Quantity (%)** an indication of the representation of the total area to address the issue	**Future Plan Assessment**	**Strategy Assessment**
	General Information	Scores will be finalised once the new eWSDP website is fully populated.			
	Operation				
	Monitoring and sample failure				
	Functionality				
	Institutional status				
	Asset assessment spectrum				
	Type and capacity				
	TOTAL for Topic				

Problem Definition Statements		
Nr	**Statements - Short Comings**	**Possible Improvement / Project**
1	Ensure adequate reservoir storage capacity for the various towns	Provide additional reservoir storage capacity for the towns with inadequate storage capacity, as identified through the WSDP and Water Master Plans.
2	Inadequate capacities of water pump stations and reticulation networks.	Upgrade existing water pump stations and provide new water pump stations for specific areas, as identified in the Water Master Plan. Upgrade sections of the water reticulation network as proposed in the Water Master Plan.
3	Inadequate capacities of sewer pump stations and sewer drainage networks.	Upgrade existing sewer pump stations and provide new sewer pump stations for specific areas, as identified in the Sewer Master Plan. Upgrade sections of the sewer drainage network as proposed in the Sewer Master Plan.
4	Priority should be given to rehabilitating existing infrastructure as this generally makes best use of financial resources and can achieve an increased 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.
5	Ensure that an appropriate maintenance and rehabilitation plan (AMP) is developed and implemented.	Develop an Asset Management Plan (AMP) from the updated Asset Register. 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.
6	Records need to be kept of the number of breakages / failures per infrastructure type in order to assist the Municipality with their refurbishment and maintenance planning.	Keep record of all breakages / failures per infrastructure type.
7	The Municipality needs to differentiate between budget allocated towards the operation and maintenance of the water and sewerage infrastructure and budget allocated towards the replacement of the water and sewerage infrastructure.	A budget of approximately 2% of the total asset value per annum should be allocated towards the replacement of existing water and sewerage infrastructure. In the case of operations and maintenance of the system, a budget of approximately 1% to 2% of the value of the system is typically required to ensure that the system remains in good condition.
8	Ensure that all the assets, as listed under the various tables in this chapter, are included in the Asset Register.	Update the Asset Register to include all the water and sewerage infrastructure assets.

The key water and sewerage infrastructure challenges of Bergrivier Municipality are as follows:

- Ensure adequate funds are allocated annually towards the rehabilitation and maintenance of the existing water and sewerage infrastructure.
- The provision of sustainable basic water and sanitation services to households on privately owned farms, with existing services below standard, and to ensure that the residents of the private Moravian towns have access to at least minimum service standards.
- Provide sewer drainage networks for Aurora and Redelinghuys and oxidation pond systems.
- Provide the required bulk water and sewerage infrastructure for future developments and low cost housing projects in the various towns.
- Upgrading of the Porterville WWTW to accommodate future low cost housing developments.
- The operation of the WTWs and WWTW in a sustainable manner in order to achieve Blue Drop and Green Drop status for these systems.

The Water and Sewer Master Plans (2016) for the various distribution and drainage systems in Bergrivier Municipality's Management Area recommends upgrades of the water and sewer reticulation networks to the values indicated in the tables below in the foreseeable future in order to accommodate development and population growth according to the SDF.

Table C.6: Summary of the future water and sewer infrastructure requirements for Bergrivier Municipality, as included in the latest Water and Sewer Master Plans

Zone / Area	Water Infrastructure *	Sewerage Infrastructure **	Total
Porterville	R23 715 000	R1 420 500	R25 135 500
Piketberg	R22 749 000	R2 018 500	R24 767 500
Velddrif	R37 124 000	R42 426 500	R79 550 500
Dwarskerbos	R10 978 000	R9 378 400	R20 356 400
Aurora	R4 090 000	R9 165 900	R13 255 900
Eendekuil	R8 558 000	R4 701 800	R13 259 800
Redelinghuys	R4 095 000	R9 211 800	R13 306 800
Goedverwacht	R5 393 000	R15 447 000	R20 840 000
Wittewater	R422 000	R5 467 600	R5 889 600
Total	**R117 124 000**	**R99 238 000**	**R216 362 000**

Note: * 2013/2014 and ** 2014/2015 Values, which include P&Gs, Contingencies and Fees, but exclude EIA studies, registration of servitudes and / or land acquisition and VAT.

WATER TREATMENT WORKS INFRASTRUCTURE

The table below gives a summary of the existing capacities and current flows at each of the WTWs (Ml/d)

Table C.7: Existing capacities and flows at each of the WTWs (Ml/d)

WTW	Existing Hydraulic Capacity	Peak Month Average Daily Flow	Average Daily Flow (July 2014 – June 2015)	Required Treatment Capacity (1.5 x AADD10yr)
Porterville	3.910	2.093 (Jan'15)	1.415 (Out flow)	2.592
Piketberg	3.200	2.851 (Jan'15)	1.897 (Out flow)	4.025
Aurora	0.220	0.252 (Febr'15)	0.169 (In flow)	0.266
Eendekuil	0.200	0.399 (Febr'15)	0.218 (Out flow)	0.419
Redelinghuys	0.260	0.233 (Dec'14)	0.164 (Out flow)	0.273

It can be noted from the above table that the Piketberg, Aurora and Eendekuil WTW will need to be upgraded in the nearby future in order to meet the future water treatment requirements.

BULK WATER INFRASTRUCTURE

The Water Master Plan (2015) has indicated that based on the most likely land-use development scenario, it will be necessary to upgrade the following bulk water supply pipelines.

Table C.8: Future bulk water supply pipelines required

Distribution System	Recommendations included in the Water Master Plan	Year	Diameter (mm)	Length (m)	* Cost (R)
Piketberg	New pipeline to augment bulk water supply to the lower reservoir	2020	286	470	R929 600
Velddrif	New feeder main to booster PS when Velddrif reservoir No.3 is constructed.	2015	445	55	R304 080
Dwarskersbos	New pipeline when the AADD exceeds 500 kl/d	2020	286	75	R181 020
Redelinghuys	New pipeline when new reservoir is constructed.	2025	150	45	R60 480
Goedverwacht	New pipeline when future area GV2 develops	2035	80	470	R265 160
Total				**1 115**	**R1 740 340**

Note: * 2013/2014 Values

WATER PUMP STATIONS

The Water Master Plan (2015) has indicated that based on the most likely land-use development scenario, it will be necessary for the following water pump stations:

Table C.9: Future water pump stations required

Distribution System	Recommendations included in the Water Master Plan	Year	Capacity (l/s)	Head (m)	* Cost (R)
Piketberg	Upgrade existing PS when PS reaches capacity	2025	105	180	R1 644 300
	Upgrade existing PS when PS reaches capacity	2025	105	135	R1 386 280
Velddrif	Upgrade existing PS capacity	2015	165	45	R934 360
	New booster PS when AADD exceeds 4 000 kl/d.	2030	275	45	R3 282 300
Dwarskersbos	Upgrade existing PS (Verify existing capacity first)	2015	25	35	R130 200
	New PS required when AADD exceeds 500 kl/d.	2020	75	40	R1 480 780
Eendekuil	New PS required when areas EK4 and EK5 develops	2020	7.5	35	R909 020
	New PS required when area EK7 develops	2035	1.5	35	R880 600
Goedverwacht	New PS required when area GV2 develops	2035	5.0	50	R893 060
Total					**R11 540 900**

Note: * 2013/2014 Values

RESERVOIR INFRASTRUCTURE

Bergrivier Municipality's overall storage factors of the reservoirs for the various towns for 2014/2015, based on 1 x PDD (24 hours storage capacity), are 1.35 for Porterville, 1.17 for Piketberg, 2.04 for Velddrif (With new 5 Ml reservoir included), 1.55 for Dwarskersbos, 1.52 for Aurora, 0.76 for Eendekuil and 1.23 for Redelinghuys.

Even though the Municipality's overall storage capacity might be adequate there might be some distribution zones within the Municipality's networks with inadequate storage capacity, as identified through the Water Master Plan (2015) and indicated in the table below:

Table C.10: Future reservoirs required

Distribution System	Recommendations included in the Water Master Plan	Year	Capacity (Ml)	* Cost (R)
Porterville	New reservoir required (TWL 166.2m)	2015	0.800	R3 259 200
	New reservoir when AADD exceeds 2 000 kl/d (TWL 235m)	2025	2.500	R7 000 000
Piketberg	New reservoir when AADD exceeds 2 850 kl/d (TWL 315m)	2020	3.500	R8 844 640
Velddrif	New reservoir (TWL 10.05m, Under Construction)	2015	5.000	R11 270 000
	New reservoir when AADD exceeds 5 000 kl/d (TWL 10.05m)	2030	5.000	R11 270 000
Dwarskersbos	New reservoir when AADD exceeds 500 kl/d (TWL 5.27m)	2020	1.200	R4 295 200
	New reservoir when AADD exceeds 1 000 kl/d (TWL 5.27m)	2030	1.000	R3 766 000
Aurora	New reservoir when AADD exceeds 200 kl/d (TWL 165.2m)	2025	0.500	R2 408 000
Eendekuil	New reservoir when AADD exceeds 225 kl/d (TWL 137.46m)	2015	1.000	R3 766 000
Redelinghuys	New reservoir when AADD exceeds 200 kl/d (TWL 25.3m)	2025	0.500	R2 408 000
Goedverwacht	New reservoir when AADD exceeds 310 kl/d (TWL 227.15m)	2020	0.500	R2 408 000
	New reservoir when area GV2 develops (TWL 265m)	2035	0.200	R1 162 000
Total			**21.700**	**R61 857 040**

Note: * 2013/2014 Values

WATER AND SEWER RETICULATION INFRASTRUCTURE

The Water Master Plan (2015) has indicated that based on the most likely land-use development scenario, the following future water reticulation infrastructure components will be necessary.

Table C.11: Future water reticulation infrastructure required

Distribution System	Recommendations included in the Water Master Plan	Year	Diameter (mm)	Length (m)	* Cost (R)
Porterville	To improve network conveyance and when future areas PORT3, PORT5, PORT6 and PORT7 develop	2020	100 and 150	155 and 1 580	R2 125 200
	To improve network conveyance and when future areas PORT14-PORT16 develop and when the AADD exceeds 1 750 kl/d	2025	227 and 286	640 and 2 555	R6 449 240
	When future areas PORT1, PORT4, PORT13 and PORT14 develop and when supply problems occurs to Mont Bertha	2030	150 and 182	555 and 1 775	R3 624 180
	When future areas PORT2, PORT15 and PORT16 develop	2035	150 and 227	155 and 605	R1 106 980
Piketberg	To improve network conveyance and when future areas PIK4 and PIK5 develop	2020	150	365	R392 280
	To improve network conveyance and when future areas PIK1 – PIK7, PIK12, PIK13 and PIK16-PIK19 develop	2025	150, 182 and 227	555, 1 580and 1 775	R6 223 200
	When future areas PIK1 – PIK3 develop.	2030	150	1 095	R1 058 540
	When future area PIK16 develop	2035	182	700	R805 000
Velddrif	To improve network conveyance and when future areas V6 and V7 develop	2020	150, 182 and 227	1 515, 1 645 and 1 440	R5 399 240
	When future areas V3, V4, V11 and V12 develop	2025	100 and 150	250 and 595	R708 400
	When future areas V17 – V20 develop and when the AADD exceeds 4 000 kl/d	2030	150, 182 and 322	510, 895, 195	R2 022 860
Dwarskersbos	When future areas DW1, DW2, DW7 and DW8 develop	2020	227	655	R1 024 100
Aurora	When future areas A1, A7, A8 and A9 develop	2020	100	405	R288 260
	When future areas A1 and A2 develop	2025	150	790	R702 100
	When future areas A3 – A6 develop	2030	150	660	R590 800
Eendekuil	To improve network conveyance	2015	100, 150 and 182	570, 450 and 575	R1 448 020
	When future areas EK4 and EK5 develop	2020	150	440	R402 220
	To improve network conveyance	2025	150	715	R663 180
	When future areas EK1, EK2, EK6 and EK7 develop	2035	150	395	R388 920
Redelinghuys	Replace existing pipes when future areas RH1 and RH2 develop	2020	150	630	R565 040
	Replace existing pipes to improve network conveyance	2025	100	1 165	R755 440
	When future area RH3 develop	2030	150	210	R205 240
Goedverwacht	When future area GV4 develop	2030	150	330	R283 080
	When future area GV2 develop	2035	150	200	R181 440
Wittewater	When future areas WW1 and WW2 develop	2020	100	145	R108 780
Total				**29 470**	**R37 521 740**

Note: * 2013/2014 Values

The Sewer Master Plan (2015) has indicated that based on the most likely land-use development scenario, the following future sewer reticulation infrastructure components will be necessary.

Table C.12: Future sewer drainage infrastructure required

Distribution System	Recommendations included in the Sewer Master Plan	Year	Diameter (mm)	Length (m)	* Cost (R)
Porterville	New gravity pipeline	2030	160	788	R888 700
	New rising main		110	231	R142 000
Piketberg	Upgrade existing gravity pipeline	2025	250	841	R1 328 400
	Upgrade existing gravity pipelines	2030	200 and 315	323 and 70	R690 100
Velddrif	New gravity pipelines to service Noordhoek, Hawe and Port Owen	2015	160	7 034	R7 758 100
	New gravity pipelines to service Velddrif and Hawe	2020	160	6 599	R7 213 600
	Upgrade existing rising main and new rising mains to service existing erven.		90, 110 and 140	479, 521 and 2 033	R2 013 600
	New gravity pipelines	2025	160, 200 and 250	8 760, 330 and 32	R10 125 800
	New rising main and upgrade existing rising main		140 and 200	1 956 and 937	R2 351 900
	New gravity pipelines to service existing erven.	2030	160	6 905	R7 618 700
	New rising mains to service existing erven		90 and 140	1 077 and 1 045	R1 343 900
	New rising main	2035	110	620	R361 800
Dwarskersbos	New gravity pipelines to service existing erven	2015	160	1 838	R2 061 900
	New rising main		200	1 367	R1 387 400
	New gravity pipelines to service existing erven	2020	160 and 200	1 485 and 279	R2 027 600
	New rising mains to service existing erven		160	359	R294 600
	New gravity pipelines to service existing erven	2025	160	1 273	R1 414 500
	New rising mains to service existing erven		160	362	R296 500
Aurora	New gravity pipelines required to service existing erven	2015	160	8 436	R9 165 900
Eendekuil	New gravity pipelines required to service existing erven	2015	160	1 573	R1 738 600
	New gravity pipelines required to service existing erven	2020	160	2 704	R2 963 200
Redelinghuys	New gravity pipelines required to service existing erven	2015	160	7 411	R8 056 700
	New rising main		125	1 557	R989 900
Goedverwacht	New gravity pipelines required to service existing erven	2015	160	7 865	R8 584 000
	New gravity pipelines required to service existing erven	2020	160	6 241	R6 863 000
Wittewater	New gravity pipelines required to service existing erven	2015	160	5 019	R5 467 600
Total				**88 350**	**R93 148 000**

SEWER PUMP STATIONS

The Sewer Master Plan (2015) has indicated that based on the most likely land-use development scenario, it will be necessary for the following new sewer pump stations, as well as upgrading of the existing sewer pump stations:

Table C.13: Future sewer pump stations required

Drainage System	Recommendations included in the Sewer Master Plan	Year	Capacity (l/s)	* Cost (R)
Porterville	New sewer PS (BPoS1.2)	2030	5.5	R364 800
Velddrif	Upgrade sewer PS to service existing erven (BVS2.3)	2020	Unknown	R480 900
	Upgrade sewer PS - Investigate first (BVS2.5)	2020	16	R163 300
	Upgrade sewer PS - Investigate first (BVS4.2)	2020	Unknown	R151 500
	Upgrade existing PS (BVS1.4)	2025	40	R799 400
	Upgrade existing PS – Investigate first (BVS5.2)	2025	Unknown	R167 800
	Upgrade existing PS – Investigate first (BVS5.5)	2030	Unknown	R139 100

Table C.13: Future sewer pump stations required				
Drainage System	**Recommendations included in the Sewer Master Plan**	**Year**	**Capacity (l/s)**	*** Cost (R)**
	Upgrade existing PS – Investigate first (BVS5.8)	2030	Unknown	R139 100
	Upgrade existing PS – Investigate first (BVS5.11)	2030	Unknown	R139 100
	Upgrade existing PS – Investigate first (BVS5.14)	2030	Unknown	R139 100
	Upgrade existing PS (BVS6.1)	2030	Unknown	R545 400
	Upgrade existing PS (BVS7.1)	2035	Unknown	R499 400
Dwarskersbos	New sewer PS (BDS1.2)	2015	18	R600 400
	New sewer PS (BDS1.5)	2020	16	R581 900
	New sewer PS (BDS1.8)	2025	14	R563 600
Redelinghuys	New sewer PS - Investigate first (BRS1.2)	2015	Unknown	R140 200
Total				**R5 615 300**

Note: * 2014/2015 Values

WASTE WATER TREATMENT INFRASTRUCTURE

The table below gives a summary of the existing capacities and current flows at each of the WWTWs (Ml/d)

Table C.14: Existing capacities and flows at each of the WWTWs (Ml/d)				
WWTW	**Existing Hydraulic Capacity**	**Peak Month Average Daily Flow**	**Average Daily Flow (July 2014 – June 2015)**	**Average Wet Weather Flow (Jun'15, Jul'14, Aug'14)**
Porterville	1.200	1.002 (Jul'14)	0.709	0.863
Piketberg	3.150	2.801 (Sept'14)	2.483	2.434
Velddrif	1.800	0.777 (Jan'15)	0.588	0.591
Dwarskersbos	0.290	0.266 (Jan'15)	0.152	0.093
Eendekuil	0.080	Unknown	Estimated 0.094	Unknown

Bergrivier Municipality revises on an annual basis the capacity and suitability of the WWTWs to meet the requirements of DWS for the quality of the final effluent being discharged to the receiving water bodies. When the water quality requirements for the final effluent becomes stricter and / or when the inflow to the WWTW has increased to such an extent that the capacity of the plant needs to be increased, the Municipality appoints reputed consulting engineering firms to undertake feasibility studies to perform technical and economical evaluation of the different options available for upgrading or extending the capacity of the treatment works.

Asset Management Assessment:

Bergrivier Municipality needs to differentiate between budget allocated towards the operation and maintenance of the water and sewerage infrastructure and the budget allocated towards the replacement of the water and sewerage infrastructure. A budget of approximately 2% of the total asset value per annum should be allocated towards the replacement of the existing water and sewerage infrastructure. In the case of operations and maintenance of the system, a budget of approximately 1% to 2% of the value of the system is typically required to ensure that the system remains in good condition.

A proxy for asset consumption can be considered the level of depreciation each asset incurs on an annual basis. Preserving the investment in existing infrastructure needs to be considered a significant strategy in ensuring the future sustainability of infrastructure and the Municipality's revenue base. Assets are managed and maintained by the Directorate under which they resort and provision is made under their respective operational budgets for maintenance over the life cycle of the asset. The Asset Unit within Financial Services is responsible for maintaining the asset register, annual asset counts, capturing of newly acquired assets on the asset register and the removal of obsolete or written off assets from the asset register.

It is important for Bergrivier Municipality to develop an AMP from their Asset Register. The objective of an AMP is to support the achievement of the strategic goals of the Municipality and facilitate prudent technical and financial decision-making. It is also a vehicle for improved internal communication and to demonstrate to external stakeholders the Municipality's ability to effectively manage its existing infrastructure as well as the new infrastructure to be developed over the next 20 years.

The AMP 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. Bergrivier Municipality must 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. The potential renewal projects for water and sewerage infrastructure need to be identified from the Asset Register. All assets with a condition grading "Poor" and "Very Poor" need to be prioritised.

Business Element 6: Water Services Infrastructure Management (O&M)

Table C.15: Business Element 6: Operation and Maintenance (Topic 6)

Overview of Topic	**Status Quo and Knowledge Interpretation Statistics**				
This topic provides an overview of the sufficiency of resources and processes in place to effectively operate and maintain the water services. It reflects whether the municipality has an Operation and Maintenance Plan in place. The topic also illustrates whether the WSA has implemented good practice as directed in the Blue- and Green Drop certification processes	**Item**	**Quality (%)** assessment of current status against compliancy requirements	**Quantity (%)** an indication of the representation of the total area to address the issue	**Future Plan Assessment**	**Strategy Assessment**
	Operation & Maintenance Plan	Scores will be finalised once the new eWSDP website is fully populated.			
	Resources				
	Information				
	Activity Control & Management				
	Water Supply & Quality				
	Waste Water Supply & Quality				
	TOTAL for Topic				

Problem Definition Statements		
Nr	**Statements - Short Comings**	**Possible Improvement / Project**
1	It is important for Bergrivier Municipality to classify all treatment works and operators along the lines of the regulations by establishing a programme for certification of works, operators, technicians and managers. The process will include reviewing the skills needed and aligning resources to these needs as well as reviewing total staff numbers necessary to meet all the objectives in the National Water Act.	Establish a mentoring role for operators ensuring an adequately trained and classified workforce with dedicated training programmes for supervisors and operators. Establish budgets to address the shortfall of skilled staff, rethink methods to retain qualified personnel and plan for succession and clear career paths for experienced staff. With such a program a source of specific resources of skilled operators, technicians and managers will be established.
2	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 Bergrivier Municipality to compile a Legal Compliance Audit of their WTWs and WWTWs, which will provide the management of Bergrivier Municipality with the necessary information to establish whether the Municipality is in compliance with the legislation or not.	Compile an Occupational Health and Safety Audit at all the WTWs and WWTWs.
3	Shortcomings were identified as part of the Water Safety Plans and W_2RAPs.	Implement Improvement / Upgrade Plans of Water Safety Plans and W_2RAPs
4	Ensure proper asset management, operation and maintenance of the existing bulk water and sewerage infrastrucuture and the training of staff involved in the operation and maintenance of the infrastructure.	Bergrivier Municipality needs to continue to focus on asset management, the operation and maintenance of the existing bulk water and sewerage infrastructure and the training of all staff involved in the operation and maintenance of the infrastructure.

The Water Safety Plan and W_2RAP Teams of Bergrivier 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.

It is important for Bergrivier Municipality to classify all WTWs and WWTWs and operators along the lines of the regulations by establishing a programme for certification of works, operators, technicians and managers. The process will include reviewing the skills needed and aligning resources to these needs as well as reviewing total staff numbers necessary to meet all the objectives in the National Water Act.

Bergrivier Municipality is also committed to manage and operate sewage pump stations effectively to prevent any possible spillages. It is important for Bergrivier Municipality to continue with the upgrading of the WWTWs when necessary, in order to reduce the risk of source contamination. The WWTWs will be managed and operated to comply with the permitted standards.

It is important for Bergrivier Municipality to establish a mentoring role for operators ensuring an adequately trained and classified workforce with dedicated training programmes for supervisors and operators. Budgets also need to be established to address the shortfall of skilled staff, rethink methods to retain qualified personnel and plan for succession and clear career paths for experienced staff. With such a program a source of specific resources of skilled operators, technicians and managers will be established.

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

Bergrivier Municipality is committed to work with the DWS and the other role-players in order to improve on their 2014 Blue Drop Score for the various distribution systems. The Improvement / Upgrade Plan, which was compiled as part of the Water Safety Plan process, will be implemented in order to address the potential risks identified through the Water Safety Plan process.

Bergrivier Municipality is also committed to work with the DWS and the other role-players in order to improve on their 2013 Green Drop Score and to reduce the Wastewater Risk Ratings for the various WWTWs and to get the Municipality ready for the next round of assessments. The W_2RAP that are in place for all the WWTWs will assist in reducing the current CRRs for the various WWTWs. The following will also further assist in the process of reducing the CRRs.

- Forward planning and upgrading / refurbishment of treatment plants to ensure adequate capacity for the flows received;
- Operate and maintain the WWTWs within design- and equipment specifications;
- Have trained, qualified and registered staff in place;
- Get support contracts in place where there is a great demand for adequately skilled process controllers and supervision;
- Monitoring of flow to- and from the plants;
- Sampling and monitoring of effluent quality;
- Appropriate authorisation in accordance with the National Water Act (36 of 1998); and / or
- Where plant is overloaded, introduce innovative methods to ensure enhancement of effluent quality.

Business Element 7: Associated Services

Table C.16: Business Element 7: Associated Services (Topic 7)						
Overview of Topic	**Status Quo and Knowledge Interpretation Statistics**					
This topic has been established to ensure adequate focus on the water services levels and needs of educational and health facilities. The water services planner will use this information to establish short-term solutions and to prioritize water services infrastructure projects to educational- and health facilities.	**Item**	**Quality (%)** assessment of current status against compliancy requirements	**Quantity (%)** an indication of the representation of the total area to address the issue	**Future Plan Assessment**	**Strategy Assessment**
	Water services – Education	Scores will be finalised once the new eWSDP website is fully populated.			
	Water services - Hospitals				
	Water services – Health Centers				
	Water services - Clinics				
	Sanitation - Education				
	Sanitation - Hospitals				
	Sanitation – Health Centers				
	Sanitation - Clinics				
	TOTAL for Topic				

Problem Definition Statements		
Nr	**Statements - Short Comings**	**Possible Improvement / Project**
1	Very low number of health facilities in the Municipality's Management Area. People have to walk great distances to access services.	Work with the Department of Health to identify additional health facilities for the Municipality's Management Area, especially for the rural areas.

Education: All education facilities in Bergrivier Municipality's Management Area are provided with adequate water services and no specific strategies, with regard to the provision of water services to these facilities, were therefore identified. Bergrivier Municipality is however committed to work with the Education Department to address any possible shortcomings with regard to the provision of water services that might exist.

Education and skills will improve access to available employment opportunities. The low education and skills levels of the Bergrivier Community are contributing to unemployment and poverty and are cause for concern. Further education and training opportunities are limited by the absence of any tertiary education facilities in the Municipal Area. The problem is exacerbated by a low literacy rate, which is an indicator of the levels of education and skill in the economy.

A major concern is that the number of children of school going aged is increasing yet learner enrolments are decreasing.

Health: The monitoring of provision of basic minimum services to farm dwellers remains a challenge, in view of the limited funding and human resources. The establishment and functioning of effective health systems and health care services is critical for not only the upliftment of communities but more so for the sustainability of communities. Health services are rendered throughout the area by a network of clinics. The environmental health function is currently with the West Coast District Municipality.

The Municipal Health Services of the West Coast District Municipality also report monthly to the Department of Health on water quality. The quality of life of the people within a Municipality is influenced by the available health care. Various things influence the health conditions of people in any region, for example access to clean water, good sanitation, proper nutrition and adequate housing. Critical health issues in the Bergrivier Municipality's Management Area are as follows:

- There are 14 health care facilities in the Municipal Area, including 3 clinics, 5 satellite clinics, 4 mobile clinics and 2 district hospitals. The Municipality has the lowest number of health facilities in the District. There is a need for improved access to service delivery points especially in the rural areas, where people have to walk great distances to access services.

- HIV/AIDS remains a major concern. The Anti-Retroviral Treatment (ART) patient load in the Municipal Area as at June 2011 was 253 patients who had access to 9 ART Sites. This is the lowest patient load in the District which may be attributable to the fact that the Municipality has the highest number of treatment sites.

- Oral Health, especially the high burden of dental caries amongst young children.

- Teenage pregnancies which are increasing and which are also a major cause of school drop outs.

- Increase in violence-related injuries most of which arise as a result of substance abuse.

It is important that a co-operative relationship exist between the West Coast District Municipality and Bergrivier Municipality with regard to environmental health issues and that a good communication protocol is followed between the District Municipality and Bergrivier Municipality to report on health issues.

Bergrivier Municipality needs to continue to actively engage with service providers and NGO's in the fight against illnesses such as HIV/Aids and TB. A solution to the sustainability of the community health worker's position and employment within the community has been to link their position and function to the activities of the Department of Health. In addition support can be provided to the Community Health Workers through local clinics and through the programmes of the EHPs. Education on the HIV/Aids pandemic would play a key role in stemming the spread of the disease.

Basic services need to be provided by the private landowners to the households on the farms with existing services below standard. The supply of basic sanitation services on the farms needs to be linked to the provision of health and hygiene education. Improved health requires behaviour change, which also cannot be achieved with a single health education talk given by an outside expert. Behaviour change requires sustained monitoring and promotion within the community. This is the key-function of the community health workers employed on sanitation projects.

Bergrivier Municipality will therefore endeavour to improve their efforts to foster partnership-driven development in planning and implementation where partnerships include community members, CBOs, NGOs, the private sector and other spheres of government. In this regard the Department of Health is considered a particularly important partner whose collaboration is much needed.

Business Element 8: Conservation and Demand Management

Table C.17: Business Element 8: Conservation and Demand Management (Topic 8.1)					
Overview of Topic	**Status Quo and Knowledge Interpretation Statistics**				
The topic provides an overview of the activities pursued by the WSA in the past financial year towards water conservation and demand management. It also contains an overview of the water sources of the WSA.	**Item**	**Quality (%)** assessment of current status against compliancy requirements	**Quantity (%)** an indication of the representation of the total area to address the issue	**Future Plan Assessment**	**Strategy Assessment**
	Reducing unaccounted water and water inefficiencies	Scores will be finalised once the new eWSDP website is fully populated.			
	Reducing high pressures for residential consumers				
	Leak and meter repair programmes				
	Consumer/end-use demand management				
	TOTAL for Topic				

Problem Definition Statements		
Nr	**Statements - Short Comings**	**Possible Improvement / Project**
1	Further reduce the percentage of NRW and Water Losses, especially in Aurora and Redelinghuys	Continue with the implementation of the WC/WDM Strategy and WDM measures to reduce the NRW for the various distribution systems even further. Adequate funds need to be allocated under the Capital and Operational budgets towards the implementationof the WDM initiatives.
2	Some of the existing water reticulation networks are old, which result in regular pipe bursts.	Continue with the Pipeline Replacement Programme. Budget to replace old asbestos pipelines (Plot areas with the highest number of pipe bursts and use IMQS (database system) to identify specific areas)
3	It is recommended that Bergrivier Municipality compile a detail water meter audit of all their water consumer meters, in order to identify any potential un-metered connections. All un-metered connections need to be provided with meters as soon as they are noticed by the Municipality. All irrigation water used on parks and all un-metered standpipes also need to be provided with meters.	Compile a detail water meter audit of all residential and non-residential water meters. All illegible / broken / old meters should be replaced. Any un-metered stands identified should be metered and meter readings in the billing system should be updated where required. As part of the audit all meter boxes should also be cleaned. Implement a Meter Maintenance and Management Strategy, whereby a phased is followed for the replacement of all water meters older than eight years.
4	It is important for Bergrivier Municipality to continue with the implementation of their Leakage Management Programme (Measure the volume of water that is lost, Identify and quantify losses, Conduct operational and network audits, Improve performance: network upgrade, design actions plans and sustain performance with good staffing / organization structures).	Actively implement the existing WDM Strategy measures and the planned future measures. Ensure that adequate funding is allocated under their Capital and Operational budgets towards the implementation of the WC/WDM initiatives.
5	The WC/WDM Strategy of Bergrivier Municipality and the comprehensive list of WDM activities included in the WSDP needs to be used by Bergrivier Municipality to prioritise those activities that can be implemented within the available funding and personnel resources of the Municipality.	Prioritise from the list of WDM activities those activities that can be implemented with the available budget and personnel and the activities which will have the biggest impact.
6	Leak detection should be conducted by means of a specialized leak detection company in areas of high MNF. The activity can be performed after the MNFs were calculated and the specific areas with high MNFs were determined.	Continue with the calculation of MNFs for the different zones and implement leak detection or pressure reduction for areas with high MNFs (Install data loggers).
7	Bergrivier Municipality needs to investigate all leaks at domestic properties in poor areas with consumption above 15 kl / month.	Implement leaks repair assistance programmes in poor areas.
8	Continue with the implementation of an extensive schools WDM programme. Schools should be encouraged to make WDM programmes part of a long term project, where learners should be actively involved.	At least once a year, a schools education programme on water conservation should be undertaken. The Municipality should assist the school(s) with the monitoring (water audit) of their water consumption. Bergrivier Municipality can also focus on the implementation of an extensive schools WDM programme, which can include annual competitions between schools (Say with a prize for the lowest consumption, the lowest per capita consumption and for the best WDM Strategy poster design, etc.). A schools WDM programme should receive a high priority.
9	Bergrivier Municipality needs to continue to focus on the installation of water saving devices (specific water efficient toilets). The Municipality also needs to focus on raising awareness regarding conservation projects and the installation of water efficient devices in order to reduce the water demand and their percentage of NRW.	In order to reduce the water demand and the percentage NRW in the future it is important for the Municipality to raise awareness regarding conservation products and the installation of these products.
10	The NRW can be calculated for each town, but not yet for specific zones within each town (At present each town comprises a district zone). This is not considered to be sufficient for Piketberg, Porterville and Velddrif. A further break down into smaller district zones should be implemented.	The logical identification of zones and the installation of bulk water meters for specific zones and linking the financial data (Billed metered consumption) with the relevant bulk water meters in order to identify the NRW for specific zones needs to be implemented.

Table C.18: Business Element 8: Conservation and Demand Management - Water Balance (Topic 8.2 & 8.3)					
Overview of Topic	**Status Quo and Knowledge Interpretation Statistics**				
The topic provides an overview of the activities pursued by the WSA in the past financial year towards water conservation and demand management. It also contains an overview of the water sources of the WSA.	**Item**	**Quality (%)** assessment of current status against compliancy requirements	**Quantity (%)** an indication of the representation of the total area to address the issue	**Future Plan Assessment**	**Strategy Assessment**
	Surface water purchased	Scores will be finalised once the new eWSDP website is fully populated.			
	Surface water abstraction				
	Ground water abstraction				
	Raw water supplied				
	Total Influent				
	Total treated TW				
	Potable water to other Neighbours				
	Purchased Treated water				
	Ground water not treated				
	Authorised consumption				
	Total losses				
	Billed unmetered				
	Apparent losses				
	Waste water treatment works				
	Recycled				
	TOTAL for Topic				

Problem Definition Statements		
Nr	**Statements - Short Comings**	**Possible Improvement / Project**
1	Some of the towns require additional bulk water meters in order to ensure that the raw water abstracted from all sources are metered, the raw water supplied to the WTW and the final potable water supplied from the WTW are all metered.	Ensure the meter readings of all bulk water meters and zone meters are recorded. All raw water abstracted, raw water supplied to the WTW and treated water supplied from the WTW (System Input Volume), as well as specific zones need to be metered and the readings need to be recorded for each of the towns.
2	Ensure all flow received at the WWTW, final flow discharge from the WWTW and treated effluent re-used for irrigation purposes are metered and recorded.	Install the required flow meters at the WWTW in order to ensure that the incoming flow, final flow and the treated effluent re-used for irrigation purposes are all metered.
3	WWTW flows at Eendekuil and Dwarskersbos WWTW are not yet monitored.	Install flow meters at the Dwarskersbos and Eendekuil WWTWs.

Bergrivier Municipality has responded to the need to address water losses and NRW within their jurisdiction by actively implementing WC/WDM measures over the last number of years. The Municipality will continue to implement these measures in order to reduce the NRW and improve the water use efficiency within the various distributions even further. The table below gives an overview of the current NRW and the commitment w.r.t. the reduction of NRW over the next number of years.

Table C.19: Commitment to reduce NRW			
Distribution System	**2014/2015 (%/a)**	**2019 (%/a)**	**2039 (%/a)**
Porterville	16.0%	10.0%	10.0%
Piketberg	8.8%	10.0%	10.0%
Velddrif	6.3%	10.0%	10.0%
Dwarskersbos	Negative	10.0%	10.0%
Aurora	27.0%	15.0%	10.0%
Eendekuil	14.0%	10.0%	10.0%
Redelinghuys	36.5%	25.0%	15.0%

Ongoing night flow analyses should be implemented as part of the normal operational activities of the Municipality. This will provide information on system performance and give direction for interventions. Bergrivier Municipality is therefore committed to start in the future with the monitoring the MNFs for specific zones, in order to identify areas for the implementation of specific WDM activities (Pressure Management, Repair of leaks, etc.).

Adequate bulk water meters are in place to ensure accurate calculation of the NRW for the various distribution systems. District zone meters are however required to enable the identification of poor performing and leaking distribution infrastructure for specific zones. At present each town comprises a district zone. This is not considered to be sufficient for Piketberg, Porterville and Velddrif. A further break down into smaller district zones should be implemented. The district zones should also be provided with equipment that enables remote flow and pressure logging.

According to the Municipality there are no known un-authorised connections. Bergrivier Municipality will continue to monitor all erven with 0 kl consumption on a monthly basis from their financial data in order pick up on any illegal connections. The IMQS will also be used to identify erven with zero consumption.

It is recommended that Bergrivier Municipality compile a detail water meter audit of all their water consumer meters, in order to identify any potential un-metered connections. All un-metered connections need to be provided with meters as soon as they are noticed by the Municipality. Replacing all meters after a certain age is not economically feasible and a more sophisticated approach needs to be developed and implemented, which recognises that certain meters under certain conditions may be accurate for several more years than others.

A rough estimate of the number of meters that need to be replaced every year is the number of meters divided by 12, assuming that the life of the meters is not more than 12 years. Although it is assumed that the average lifespan of a meter is 12 years for budgeting purposes, it is necessary to carry out research to determine the most optimal replacement of age for each type of meter in various circumstances. The research should identify the different types of meters, in different pressure zones and carry out accuracy tests for a number of samples at different ages. In this way a policy can be developed of when each type of meter under various circumstances should be replaced. It is also recommended that, where deemed necessary new meters should be specified with AMR capacity to allow for remote meter reading. Such meters will assist in reducing meter-reading errors significantly.

The monthly consumption of all consumers should be checked to immediately identify a problem meter (where a reading suddenly becomes very high) and have it inspected. This will ensure that faulty or leaking meters are replaced as soon as possible and thus resulting in less water wastage and a greater income for the Municipality. Volume controllers can also be installed in areas where people cannot afford to pay for water. This ensures less water being wasted in the event of a leak or a tap left running.

A Leak Repair and Assistance Programme that investigates and repairs leaks at all domestic households in low cost housing developments and poor areas with consumption above 15 kl / month should be implemented. Mechanisms for ensuring the customer repairs new water leaks, maintains an affordable consumption and does not build up arrears need to be addressed in the early stages of such a project, in order to ensure a sustainable solution (on-going water and cost savings) is achieved. The consumptions of the repaired properties need to be monitored so that rapid action can be taken should leaks re-occur. Further efforts should be made to ensure that those who qualify as “Indigent” on an income basis will also qualify on a water consumption basis.

Bergrivier Municipality also needs to focus on raising awareness regarding conservation projects and the installation of these products in order to reduce the water demand and their percentage of NRW. The use and installation of these fittings should be included as a condition for the approval of building plans as well as provided for in the Water Services Bylaws.

At least once a year, a schools education programme on water conservation should be undertaken. The Municipality should assist the school(s) with the monitoring (water audit) of their water consumption. Water saving by schools often forms the basis of WDM programmes elsewhere, because it also involves learners who experience implementation of WDM measures first hand. Schools should be encouraged to make WDM programmes part of a long term project, where learners should be actively involved.

Bergrivier Municipality can also focus on the implementation of an extensive schools WDM programme, which can include annual competitions between schools (Say with a prize for the lowest consumption, the lowest per capita consumption and for the best WDM Strategy poster design, etc.).

Education and awareness-raising campaigns are important mechanisms to bring the need for WC/WDM to the public and to trigger committed public actions and response. Social awareness is one of the key pillars of WC/WDM and is essential for the balanced and sustained use of South Africa's water resources. Engagement with the public and stakeholders through media and other mediums will highlight important principles of the efficient use of water, to ensure that relevant information is shared and the public is educated and that the profile of WC/WDM is heightened to achieve buy-in, involvement and accountability from citizens.

Bergrivier Municipality is committed to continue with the allocation of budget towards the implementation of their WC/WDM Strategy. Bergrivier Municipality needs to ensure that adequate funding is allocated under their Capital and Operational budgets towards the implementation of the WDM initiatives. All external funding that could be utilised by Bergrivier Municipality for this purpose should be sourced.

Bergrivier Municipality's current water information database appears adequate from a water services management perspective. Bergrivier Municipality is committed to continue with the metering of all the influent received at their WWTWs, the quantity of treated effluent re-used and the quantity of treated effluent returned to the Water Resource System. This information is critical for planning purposed with regard to WWTWs upgrading.

Bergrivier Municipality is also committed to keep on updating the water balance models on a monthly basis in order to determine locations of wastage and to enable Bergrivier Municipality to actively implement their newly developed WC/WDM Strategy to reduce the percentage of NRW even further. The water balance will not directly lead to the reduction of the demand, but is an imperative management tool that will inform the implementation of demand- side management initiatives.

The following commitments are set by Bergrivier Municipality with regard to the water balances for the various towns.

- The water losses and future water requirement models developed for the various towns will be managed by Bergrivier Municipality on a monthly basis and the existing NRW will be reduced further through the implementation of their WC/WDM Strategy.

- Bergrivier Municipality will ensure that the influent at all their WWTWs, the quantity of treated effluent re-used and the quantity of treated effluent returned to the Water Resource System is metered.

- Bergrivier Municipality will factor in committed water conservation and demand management targets in their future projected water requirements.

Business Element 9: Water Resources

Table C.20: Business Element 9: Water Resources (Topic 9)					
Overview of Topic	**Status Quo and Knowledge Interpretation Statistics**				
The volumes and sources of raw water supply to the WSA are presented in this topic, which also presents the status of the WSA's abstraction licenses and future needs. An overview of the WSA's monitoring programme for its raw water sources is presented. The topic also outlines the degree of industrial and 'raw' water use and effluent discharge within the WSA.	**Item**	**Quality (%)** assessment of current status against compliancy requirements	**Quantity (%)** an indication of the representation of the total area to address the issue	**Future Plan Assessment**	**Strategy Assessment**
	Sources and Volumes	Scores will be finalised once the new eWSDP website is fully populated.			
	Monitoring				
	Water Quality				
	Wet Industries				
	Raw Water consumers				
	Industrial Consumer Units				
	Permitted effluent releases				
	TOTAL for Topic				

Problem Definition Statements		
Nr	**Statements - Short Comings**	**Possible Improvement / Project**
1	The DWS registered volumes (WARMS) for Eendekuil, Redelinghuys and Aurora are exceeded.	Ensure all bulk water abstraction from the various sources is registered with the DWS and legalised.
2	Ensure that the raw water quality of all production boreholes are monitored at least once a year.	Water quality samples must be taken at least annually at each of the production boreholes or whenever a pump is removed for servicing and maintenance. A full macro-chemical analysis must be carried out on these samples at an accredited laboratory.
3	Actively implement Groundwater monitoring programme.	Ensure that the key groundwater management functions are implemented. The monitoring data must be analysed by a geohydrologist on an annual basis in order to assess the effects of abstraction and recharge on the boreholes and aquifer. Groundwater monitoring must continue on at least a monthly basis. Monthly monitoring of water levels, water chemistry and abstraction must be conducted by the Municipal staff. Bergrivier Municipality needs to ensure that all electronic data (i.e. dataloggers) are downloaded once quarterly by a geohydrologist. Monitoring data must be annually reviewed by a geohydrologist.
4	The Municipality's existing Water Quality Operational Sampling Programme needs to comply with the minimum SANS241:2011 monitoring frequency for process indicators.	Upgrade the existing Water Quality Operational Sampling Programme in order to comply with the minimum SANS241:2011 monitoring frequency for process indicators.
5	The safe yield of the existing resources supplying Piketberg, Porterville, Aurora and Redelinghuys with water will be exceeded in the nearby future.	Continue with the further augmentation of the water resources for Piketberg, Porterville, Aurora and Redelinghuys.
6	The West Coast District Municipality is over their legal allocation for abstraction from the Berg River. Additional sources to augment the existing bulk water distribution system urgently need to be identified for the West Coast District Municipality (Supply to Velddrif and Dwarskersbos).	Continue to work with the West Coast District Municipality in order to augment their bulk water sources. The possible interventions currently being investigated are desalination or an increased allocation from the Berg River. A licence application for an increased allocation from the Berg River was submitted to the DWS.
7	The industrial consumers in Bergrivier Municipality's Management Area are not yet monitored, with regard to the quality and volume of effluent discharged by them.	Ensure that all industries apply for the discharge of industrial effluent into the sewer system, to monitor the quality and volume of industrial effluent discharged and to implement the set of by-laws with regard to the discharge of industrial effluent into Bergrivier Municipality's sewer system in order to determine whether the quality comply with the standards and criteria.

Metering of all water supplied is one of the most significant steps in order to properly plan and manage water sources. Without metering no management is possible. Bergrivier Municipality needs to continue with the monthly reading of all their existing bulk water meters, which is a valuable source of information.

The uncertainty in projected water-related climate change impacts is one of the biggest challenges facing water managers. The managers must understand how this uncertainty influences the management decisions to be made and that decisions must be appropriate to a possible range of scenarios. A critical tool in this regard is adaptive management, in which water resource systems are carefully monitored and management actions are tailored and revised in relation to the measured changes on the ground. One cannot predict climate change impacts with any certainty, and the recognition of this uncertainty must be built into all climate change response strategies.

Detail future water requirement projection models were developed for each of the distribution systems in Bergrivier Municipality's Management Area. These models include the future projections up to 2039 and were calibrated by using historic billed metered consumption data and bulk metered abstraction data. The percentage NRW was determined for each of the distribution systems and growth in demand 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.21: Projected future water requirements and yield/allocation surplus (+) / shortfall (-) based on WSDP model						
Distribution System	**Model**	**PROJECTED FUTURE WATER REQUIREMENTS (Ml/a)**				
		2019	**2024**	**2029**	**2034**	**2039**
Porterville	1% Annual Growth	586.693	616.620	648.074	681.133	715.877
	2% Annual Growth	616.318	680.465	751.288	829.483	915.816
	WSDP Model	**571.226**	**630.882**	**698.712**	**776.107**	**864.733**
	Yield surplus (+) / shortfall (-)	**-38.691**	**-98.347**	**-166.177**	**-243.572**	**-332.198**
Piketberg	3% Annual Growth	1 039.750	1 205.355	1 397.337	1 619.896	1 877.904
	4% Annual Growth	1 091.213	1 327.627	1 615.261	1 965.212	2 390.981
	WSDP Model	**1 010.435**	**1 125.126**	**1 255.944**	**1 405.548**	**1 577.085**
	Allocation surplus (+) / shortfall (-)	**-65.360**	**-180.051**	**-310.869**	**-460.473**	**-632.010**
Velddrif	2% Annual Growth	982.475	1 084.732	1 197.632	1 322.282	1 459.906
	3% Annual Growth	1 031.589	1 195.895	1 386.370	1 607.183	1 863.165
	WSDP Model	**1 137.096**	**1 395.676**	**1 718.080**	**2 120.781**	**2 624.606**
	Allocation surplus (+) / shortfall (-)	**West Coast DM exceeds their allocation from the WCWSS**				
Dwarskersbos	2% Annual Growth	101.777	112.371	124.066	136.979	151.236
	3% Annual Growth	106.865	123.886	143.618	166.493	193.011
	WSDP Model	**119.119**	**139.960**	**164.697**	**194.085**	**229.028**
	Allocation surplus (+) / shortfall (-)	**West Coast DM exceeds their allocation from the WCWSS**				
Aurora	1.5% Annual Growth	66.396	71.528	77.056	83.011	89.426
	2.5% Annual Growth	69.732	78.895	89.263	100.993	114.264
	WSDP Model	**64.752**	**78.234**	**95.167**	**116.505**	**143.474**
	Allocation surplus (+) / shortfall (-)	**-8.752**	**-22.234**	**-39.167**	**-60.505**	**-87.474**
Eendekuil	2% Annual Growth	97.431	107.572	118.768	131.130	144.778
	3% Annual Growth	102.302	118.596	137.485	159.383	184.769
	WSDP Model	**93.946**	**104.298**	**115.905**	**128.929**	**143.556**
	Yield surplus (+) / shortfall (-)	**+22.489**	**+12.137**	**+0.530**	**-12.494**	**-27.121**
Redelinghuys	1% Annual Growth	70.070	73.644	77.401	81.349	85.498
	2% Annual Growth	73.608	81.269	89.728	99.067	109.378
	WSDP Model	**59.126**	**59.925**	**60.914**	**62.105**	**63.514**
	Allocation surplus (+) / shortfall (-)	**-12.626**	**-13.425**	**-14.414**	**-15.605**	**-17.014**

Note: Velddrif and Dwarskersbos - Bulk potable water is supplied by the West Coast DM from the WCWSS. The system is currently under pressure to meet future water requirements. Next augmentation scheme needs to be implemented.

The table below gives an overview of the years in which the annual water requirement is likely to exceed the sustainable yield from the various resources.

Table C.22: Years in which the annual water requirement will exceed the allocations from the various water resources				
Distribution System	**Allocation (A) / Yield (Y) (Ml/a)**	**Annual Growth on 2014/2015 requirement (%)**	**Annual Growth on 2014/2015 requirement (%)**	**WSDP Projection Model**
Porterville	532.535 (Y)	Over (1%)	Over (2%)	Over
Piketberg	945.075 (A)	2015 (3%)	2015 (4%)	2015
Velddrif	WCWSS	Over (2%)	Over (3%)	Over
Dwarskerbos	WCWSS	Over (2%)	Over (3%)	Over
Aurora	56.000 (A)	Over (1.5%)	Over (2.5%)	Over
Eendekuil	75.686 (Y)	2028 (2%)	2023 (3%)	2029
Redelinghuys	46.500 (A)	Over (1%)	Over (2%)	Over

The DWS also updated their 2010/2011 All Towns Reconciliation Strategies during 2015 and the table below gives an overview of the recommended potential future water resources as included in the updated All Towns Reconciliation Strategies for Bergrivier Municipality.

Table C.23: Potential future water resources for the various towns (DWS's All Towns Reconciliation Strategies)

Distribution System	Option	Potential
Porterville	Re-use of water	• Re-use of water from the WWTW can only be allowed if the existing works is able to provide a 95% assurance of supply in terms of quality requirements. • The final treated effluent from the WWTW is currently discharged into an on-site stream that leads to a farmer's irrigation dam. The re-use of treated effluent is however not regarded as an option as according to the Land Purchase Agreement of 1972, the Knoetzen family has the right to use the final effluent and they intend to carry on using all the final effluent from the WWTW.
	Groundwater	• There are two springs at the foothills of the Porterville Mountains registered in the WARMS database, with a 6 l/s and 7 l/s estimated yield, respectively. Some boreholes drilled into the Malmesbury shale are scattered around the town. Borehole yields can go up to 1.2 l/s, according to the NGA. • Considering the limited available surface water resources, groundwater is likely to be the most suitable alternative option. The TMG sandstones and the Malmesbury shale bear a similar potential for groundwater development whereas the TMG is currently used to a lower degree. This unit in general presents a good aquifer system with typical yields of 10 l/s – 20 l/s and a good water quality.
	Surface Water	• Supply from the Berg River or Voëlvlei Dam: These water resources are already over allocated and to provide the required infrastructure would be costly and the operation and maintenance cost will also be high. • Surface water resources in the vicinity of Porterville and the construction of an additional dam near Porterville: A detailed hydrological study must be undertaken to ensure the optimal utilization of the various streams from the mountains above Porterville. It seems that a substantial quantity of water is available during the winter months which could be stored and used to augment the water supply of Porterville. • Purchasing of water rights: The purchasing of water rights of the current resources could be an economical option as the water quality is high and all the necessary infrastructure is already in place.
	Other Sources	• Rainwater harvesting is not a suitable option for the area because the mean annual precipitation is considered too low.
	Summary	**The current water sources have adequate supply to cater for the medium and longer term future water requirements under all scenarios. The following sources are identified as potential sources to augment the water supply, in order of priority and implementation sequence:** • Continue with the implementation of the existing WC/WDM measures to reduce the non-revenue water and water losses. • Development of alternative groundwater resources, when required.
Piketberg	Re-use of water	• Water re-use may be seen as a suitable intervention for Piketberg, provided that the Bergrivier Municipality can provide a 95% assurance of supply in terms of quality requirements. • A portion of the final effluent is currently re-used for the irrigation of the cricket, rugby and soccer town sport fields and the golf course.
	Groundwater	• Boreholes in the immediate surroundings of the town are few. These boreholes were drilled into the Malmesbury rocks and are registered in the NGDB with yields of up to 2.9 l/s. Further north (about 7 km) borehole density is much higher. Yields of the boreholes drilled into the TMG are generally much higher, exceeding 7 l/s in places. There are about 76 existing boreholes in the TMG rocks of the Piketberg Mountains according to the DWS's National Groundwater Database (NGDB). Statistics from 35 boreholes show an average yield of 2.3 l/s. • The groundwater potential for the whole catchment is generally higher for the intergranular and fractured Malmesbury rocks, but these are also the ones that are currently being used to a much higher degree than the TMG aquifers. In addition catchment G30H only comprises TMG rocks towards its margin in the area around Piketberg whereas the Malmesbury rocks are spread over the whole catchment area. Therefore the TMG rocks in the nearby Piketberg Mountains are deemed a potential source for groundwater development in future. • There would appear to be 4 approaches to developing groundwater in this area: ➢ Drilling into or adjacent to the De Hoek Fault. This fault has an effective length of approximately 25 km. ➢ Drilling into the Peninsula Formation where targets are accessible. Many of these targets may already be exploited by existing private boreholes.

Table C.23: Potential future water resources for the various towns (DWS's All Towns Reconciliation Strategies)		
Distribution System	**Option**	**Potential**
		➢ Drilling into subsidiary NW-SE trending fault splays in the lower-lying northern slopes of the Piketberg Mountains (i.e. on the farms). ➢ Drilling through the Cenozoic sand cover into the Piekenierskloof Formation to the north-west of the strategy area. • The mean annual volume of recharge to this unit is approximately 8.0 million m^3/a during periods of normal rainfall, which is expected to decline to 5.6 million m^3/a during droughts. The long-term sustainable yield of the unit is estimated at 4.5 million m^3/a, although it may only be possible to safely abstract 3.1 million m^3/a during drier periods. The quantity and quality of the groundwater from the Piketberg unit makes it suitable for development as part of a bulk water supply, which would also supply towns such as Piketberg, Moorreesburg, Koringberg and Aurora. It is, however, important to note that existing groundwater use in this unit may be substantial and that this has not been factored into the estimated available resources of 4.5 million m^3/a.
	Surface Water	The following surface water options may be potential sources for this town: • Piketberg obtains most of its water out of the Berg River from the WCWSS. A License application for an increased allocation from the Berg River (WCWSS) should be submitted to the DWS. • An off-channel storage dam in one of the small non-perennial streams located close to Piketberg is a possibility to utilise the unused winter irrigation water use rights. This water should be bought through a water trading process.
	Other Sources	• Rainwater harvesting is not a suitable option for the area because the Mean Annual Precipitation is considered too low.
	Summary	**The current allocated water sources have inadequate supply to cater for the future water requirements under all scenarios. The following sources are identified as potential sources to augment the water supply, in order of priority and implementation sequence:** • Continue with the full-implementation of the existing WC/WDM Strategy. • Increased allocation from the Berg River (WCWSS). • Groundwater development.
Velddrif	Re-use of water	• Water re-use may be seen as a suitable intervention for Velddrif, provided that the Municipality can provide a 95% assurance of supply in terms of quality requirements. The potential re-use option must be considered for Velddrif in the medium to long-term. • The final treated effluent from the WWTW is currently re-used for the irrigation of the rugby field, golf course, cricket field and bowls field.
	Groundwater	• The town of Velddrif is located at the mouth of the Groot Berg River with significant river alluvium in its surroundings. • Just south of the Groot Berg River there is a large patch of the Langebaan Formation comprising locally bedded and cross bedded consolidated to unconsolidated limestone and lime-rich sand. The Langebaan Formation is considered a major aquifer system with generally good groundwater potential referred to as the Langebaan Road aquifer system. However, in this area the thickness of this aquifer is limited to less than 20 m. • The tertiary intergranular deposits in the area generally bear a great potential for groundwater development in the area but it is not clear whether the limited thickness of these strata allows the abstraction of volumes relevant for municipal water supply. Further hydrogeological information and / or investigation are required to assess the feasibility of groundwater use for drinking water purposes in the area.
	Surface Water	The following surface water options may be potential sources for this town: • Velddrif is located at the mouth of the Berg River. Due to the ecological sensitivity of the area and the poor water quality, direct abstraction from the Berg River is not an option for Velddrif. An increase in the allocation from the Berg River to the West Coast District Municipality is much more likely. • The West Coast District Municipality completed various studies for the augmentation of their existing bulk water sources and also applied to the DWS for an increased allocation from the Berg River. • The Voëlvlei Dam is under stress to meet the projected requirements and thus various options to augment its yield have been considered. It is essential that the portion of the safe yield of the Voëlvlei Dam allocated to Velddrif as part of the West Coast DM's license be determined and included in the Service Level Agreement, in order to make more accurate shortfall projections. This action should be the first priority when considering alternative sources.
	Other Sources	• Rainwater harvesting is not a suitable option for the area because the mean annual precipitation is considered too low. • A desalination plant with a capacity of 25.5 Ml/d is at present under consideration as part of

Table C.23: Potential future water resources for the various towns (DWS's All Towns Reconciliation Strategies)		
Distribution System	**Option**	**Potential**
		the long-term planning for the West Coast area. If implemented, such a plant will provide relief to possible water shortages at Velddrif due to the integrated system operated by the West Coast DM.
	Summary	**The current water sources do not have adequate supply to cater for the short, medium and longer term future water requirements under all growth scenarios. The following sources are identified as potential sources to augment the water supply, in order of priority and implementation sequence:** • Continue with the implementation of the existing WC/WDM Strategy to keep the water losses and non-revenue water low and achieve savings in water consumption. • Increased allocation from the WCWSS. • Incremental groundwater development. • Desalination of seawater
Dwarskersbos	Re-use of water	• The re-use of treated effluent is not a feasible option for Dwarskersbos, considering the current treatment process at the WWTW as well as the limited volumes of treated effluent available. • Effluent evaporates from the ponds, but the works has an alternative to irrigate kikuyu grass when there is excess effluent from the last pond. A pump station for irrigation is located below the last pond.
	Groundwater	• The Quaternary sands in the area form a shallow, unconfined, intergranular aquifer. The underlying Malmesbury Group is not considered to form an aquifer. Median borehole yields in the area are low, ranging from 0.1 to 0.5 l/s • Although the potential of the intergranular aquifer is high, the saturated thickness of the aquifer is insufficient for abstracting reasonable quantities of groundwater. Further, the groundwater quality is such that it cannot be used for domestic supply purposes without treatment. It is therefore concluded that the underlying aquifer is not of regional significance, and can only be used at a local scale for garden irrigation and stock watering purposes.
	Surface Water	• There are no major surface water resources near Dwarskersbos. • The West Coast District Municipality completed various studies for the augmentation of their existing bulk water sources and also applied to the DWS for an increased allocation from the Berg River. • The Voëlvlei Dam is under stress to meet the projected future requirements and thus various options to augment its yield have been considered. It is essential that the portion of the safe yield of the Voëlvlei Dam allocated to Dwarskersbos as part of the West Coast DM's license be determined and included in the Service Level Agreement, in order to make more accurate shortfall projections. This action should be the first priority when considering alternative sources.
	Other Sources	• Rainwater harvesting is not a suitable option for the area because the mean annual precipitation is considered too low. • Desalination of seawater is a feasible option specifically to address the peak holiday requirements. This option should be investigated further, specific for Dwarskersbos. • A desalination plant with a capacity of 25.5 Ml/d is at present under consideration as part of the long-term planning for the West Coast area. If implemented, such a plant will provide relief to possible water shortages at Dwarskersbos due to the integrated system.
	Summary	**The current water sources do not have adequate supply to cater for the short, medium and longer term future water requirements under all growth scenarios. The following sources are identified as potential sources to augment the water supply, in order of priority and implementation sequence:** • Continue with the implementation of the existing WC/WDM Strategy in order to keep the water losses and non-revenue water low and achieve savings in water consumption. • Increasing the allocation to the West Coast District Municipality from the WCWSS. • Incremental groundwater development. • Desalination of seawater.
Aurora	Re-use of water	• Re-use of treated effluent is currently not a feasible option in Aurora as there is no water-borne sanitation system in place.
	Groundwater	• There are numerous boreholes, mostly in the area north-northwest of Aurora, registered in the NGA. Usually borehole yields range below 2 l/s. One borehole drilled into the Peninsula sandstone, however, is registered with a yield of 5 l/s. • The town itself is underlain by an extensive quaternary sand layer which is part of the Adamboerskraal Aquifer System. The safe yield and licensed abstraction of the municipal boreholes and spring are unknown. It is essential that these be determined in order to perform a more accurate prediction of the future water scenario in Aurora.

Table C.23: Potential future water resources for the various towns (DWS's All Towns Reconciliation Strategies)		
Distribution System	**Option**	**Potential**
		• The potential for groundwater use is very high for the intergranular aquifers. The number for the TMG aquifers is very small because they only constitute a small proportion of the catchment surface. However, since Aurora is located at the transition between intergranular deposits and the TMG outcrops, both might be a reasonable option for groundwater development. • There are two target options: ➢ The quaternary sand: an aquifer system with possible yields of 2 – 5 l/s, but sensitive to abstraction and periods of low rainfall and susceptible to contamination. The advantages of use of this system are ease of access and development. ➢ Fractured sandstone of the Peninsula Formation. This unit generally presents a good aquifer system with typical yields of 10 l/s – 20 l/s and a good water quality. • The report Development Potential of the Groundwater Resources of the WCDM [4] states the groundwater quality in the Cenozoic deposits to the north of the Papkuils River (Aurora) as generally good (50 – 170 mS/m) due to significant lateral inflows of fresh groundwater from the TMG aquifer system between Aurora and Piketberg.
	Surface Water	• There are limited local surface water resources available in the area but it can be linked to the Saldanha Regional Scheme at Velddrif.
	Other Sources	• Rainwater harvesting is not a suitable option for the area because the mean annual precipitation is considered too low.
	Summary	**It is not known whether the current water sources have adequate supply to cater for the medium and longer-term future water requirements, as their yields are unknown. It is recommended that the yields of all available sources be determined before any other interventions are considered. The following sources are identified as potential sources to augment the water supply, if the existing yield is not adequate, in order of priority and implementation sequence:** • Continue with the implementation of the existing WC/WDM Strategy in order to reduce the existing water losses and non-revenue water even further. • Incremental groundwater development. • Link up with the Saldanha Regional Scheme at Velddrif.
Eendekuil	Re-use of water	• Eendekuil is not entitled to use the minimal effluent from the Eendekuil WWTW. If any, it is used by the neighbouring farmer as part of the land agreement for the WWTW. • The re-use of treated effluent is further not a feasible option for Eendekuil, considering the current treatment process at the WWTW as well as the limited volumes of treated effluent available.
	Groundwater	• On the 1:500 000 hydrogeological map the intergranular and fractured aquifer is reported to show a low average borehole yield of 0.1 to 0.5 l/s. Water quality is low, too, with an electrical conductivity of 300 to 1 000 mS/m. Groundwater recharge is 25 to 37 mm/a (medium). • There are a few boreholes registered in the NGA in the area around Eendekuil. The registered yields are in the order of 1.2 l/s. • There is a high groundwater potential for the intergranular and fractured Malmesbury rocks. The limiting factor for development of this source is the low borehole yields most likely caused by low hydraulic conductivity of the shale. The groundwater potential of the quaternary deposits is assessed significantly lower. This aquifer system shows available yields of 2 – 5 l/s, but is sensitive to abstraction and periods of low rainfall and susceptible to contamination. The advantages of use of this system are ease of access and development. The TMG only exhibits a potential of 1.38 million m^3/a. However, this unit in general presents a good aquifer system with typical yields of 10 l/s – 20 l/s and a good water quality. • Borehole density and yields increase significantly towards the west. There is intensive groundwater use along the foothills of the outcrops of the TMG about 8km west. The adjacent tertiary deposits also seem to be more practicable for groundwater development. To assess the options of groundwater usage for municipal supply in the Eendekuil area in detail, further hydrogeological investigation is required.
	Surface Water	Eendekuil is currently supplied with water from the Waboom River and the Waboomfontein Spring. Apart from the Waboom dams, it seems that all other existing dams are privately owned and that no water in these dams is available to Eendekuil. The current water supply will meet the future water requirements until 2030. Should the high-growth scenario be realised, the following surface water options may be potential sources for this town: • The Kruismans Stream runs alongside Eendekuil. The Stream appears to be non-perennial and, therefore, the potential for abstraction is probably quite limited. An option to consider is to use water from the above-mentioned stream to recharge the aquifers in the surrounding area. This will require a hydrological analysis of the stream, and recharge

Table C.23: Potential future water resources for the various towns (DWS's All Towns Reconciliation Strategies)		
Distribution System	**Option**	**Potential**
		potential of the aquifer. • The two options to provide additional water storage at the Waboom dams are to construct an additional dam adjacent to the existing two dams or to increase the wall height of the existing dams. There might be surplus water in years with above average rainfall and the additional storage could be created for this water and for storing water from the fountains. • The Diepkloof catchment area is 2.9 km², which is slightly larger than the Waboom dams' catchment area. The estimated MAR for this catchment is approximately 115 000 m³/a. It will however be difficult to intercept peak flows if a dam is not constructed within the river. The Diepkloof catchment could supply, in terms of the future Eendekuil requirement, a significant portion of the required water, but the following must be noted: ➢ The possible construction of a dam will be in an area defined as a water stressed area; ➢ The dam will be constructed on private land; ➢ A license must be obtained to abstract water, alter the water course and store water, and ➢ A comprehensive Environmental Impact Assessment must be undertaken. An advantage of this option is however that a dam will be constructed in close proximity to the proposed pressure break tank of the existing bulk system. Only limited additional infrastructure would therefore be required to connect to the existing bulk supply system.
	Other Sources	• Rainwater harvesting is not a suitable option for the area because the mean annual precipitation is considered too low.
	Summary	**The current water sources have adequate supply to cater for the medium and longer-term future water requirements under a high-growth scenario until 2030.** Pending the outcome of a detailed groundwater study and the future development of Eendekuil, it is not recommended at this stage to develop surface water resources by constructing an additional dam. Should the boreholes not yield any water and growth takes place in Eendkuil, the construction of a new dam in the Diepkloof catchment area or the construction of an additional dam to store water from the Waboom River should be investigated in detail. **The following sources are identified as potential sources to augment the current water supply, in order of priority and implementation sequence:** • Continue with the full implementation of the existing WC/WDM Strategy. • Incremental groundwater development. • Recharge of aquifers from the Kruismans Stream, when required.
Redelinghuys	Re-use of water	• Water re-use is not a suitable option as there is no water-borne sanitation system in the town.
	Groundwater	• There are a few boreholes in the immediate surroundings of the town with unregistered geology and yield. Another borehole about 2.5 km north-east was drilled into the Peninsula Formation and has a registered yield of 2.4 l/s. • There are several NGA entries in the area of Matroozefontein about 3.5 km south-east with registered yields of up to 20 l/s. • The available target options are: ➢ The quaternary sand: an aquifer system with possible yields of 2 – 5 l/s, but sensitive to abstraction and periods of low rainfall and susceptible to contamination. Water quality is reported to be good (0-70 mS/m) and groundwater recharge is low (37-50 mm/a). The advantages of use of this system are ease of access and development. ➢ Fractured sandstone of the Peninsula or Piekenierskloof Formation in the northern or western outcrop. This unit in general presents a good aquifer system with typical yields of 10 l/s – 20 l/s and a good water quality. • There is no detailed information on the nature of the springs used for water supply.
	Surface Water	• Redelinghuys is located on the Verlorevlei Wetland. It is unlikely that surface water abstraction will be possible due to the sensitive ecology of the wetland.
	Other Sources	• Rainwater harvesting is not a suitable option for the area because the mean annual precipitation is considered too low.
	Summary	**The current water sources have inadequate supply to cater for the medium and longer term future water requirements. The following sources are identified as potential sources to augment the current water supply, in order of priority and implementation sequence:** • Continue with the full implementation of WC/WDM measures to reduce water losses and non-revenue water. • Incremental groundwater development.

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

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

Water Quality: The number of current and required sampling for E.Coli (or faecal coliforms) in the distribution systems of Bergrivier Municipality are summarised in the table below:

Table C.24: Current and required sampling for E.Coli (or faecal coliforms) in the distribution systems

Distribution System	Population served	Required number of monthly samples (SANS 241-2:2011: Table 2)	Average number of monthly microbiological compliance samples taken by the Bergrivier Municipality and the West Coast District Municipality during 2014/2015
Porterville	7 379	2	5.3
Piketberg	12 814	2.6	5.3
Velddrif	12 754	2.6	7.5
Dwarskersbos	743	2	4.5
Aurora	679	2	3.7
Eendekuil	1 624	2	3.5
Redelinghuys	583	2	4.3
Total	**39 536**	**15.2**	**34.1**

It can be noted from the above table that the number of current monthly microbiological samples taken at the various towns during the last financial year are adequate.

Bergrivier Municipality however needs to upgrade their existing Water Quality Operational Sampling Programme in order to ensure that it complies with the minimum requirement specified in SANS 241:2011 for characterising raw water quality, on-going levels of operational efficiency in a water treatment system and acceptable final water quality to the point of delivery.

Table C.25: Minimum monitoring frequency for process indicators (SANS241-2:2011: Table 1)

Determinand	Intake Water	Final Water	Distribution System
Conductivity or total dissolved solids	Daily	Daily	-
pH value	Daily	Once per shift [a]	Fortnightly
Turbidity	Daily	Once per shift [a]	Fortnightly
Disinfectant residuals [b]	Not applicable	Once per shift [a]	Fortnightly
E.Coli (or faecal coliforms) [c]	Not applicable	Weekly	Fortnightly but dependent on population served [d]
Heterotrophic plate count [c]	Not applicable	Weekly	Fortnightly
Treatment chemicals	Not applicable	Weekly	Fortnightly

a: A shift is defined as an eight-hour work period.

b: Disinfection shall be sustained at a value defined by the water services institution and water services intermediary throughout the distribution system such that the water services institution and water services intermediary ensure that all microbiological indicators listed in SANS 241-1:2011, table 1, are achieved on a continuous basis.

c: If non-compliant with the numerical limits specified in SANS 241-1, implement corrective action and instigate immediate follow-up sampling at an increased sampling frequency.

These requirements may be relaxed to a monthly frequency for groundwater supply systems (due to the reduced variability of groundwater quality), provided that no health-related determinands are detected at levels exceeding the numerical limits in SANS 241-1 during the risk assessment.

Industrial Consumers:

A "Form of Application for Permission to Discharge Industrial Effluent into the Municipality's sewer" is included in Bergrivier Municipality's water services by-laws and all industries need to formally apply for the discharge of industrial effluent into the sewer system. The following gaps with regard to industrial consumers and their discharge of effluent into Bergrivier Municipality's sewer system were identified:

- Industrial effluent discharge into the sewer system needs to be quantified.
- All industries need to formally apply for the discharge of industrial effluent into the sewer system.
- Regular sampling of the quality of industrial effluent discharged into the sewer system is necessary.
- Any returns from the industries direct to the Water Resource System needs to be metered.

Bergrivier Municipality is committed to ensure that all industries apply for the discharge of industrial effluent into the sewer system, to monitor the quality and volume of industrial effluent discharged and to implement the set of by-laws with regard to the discharge of industrial effluent into Bergrivier Municipality's sewer system in order to determine whether the quality comply with the standards and criteria

The industrial consumers in Bergrivier Municipality's Management Area are not yet monitored, with regard to the quality and volume of effluent discharged by them. Bergrivier Municipality needs to adopt an approach whereby the various parameters at all the industrial consumers are monitored, as well as volumetric monitoring at the larger users. Adaptation of procedures must be undertaken in accordance with any changes to the wastewater discharge criteria set by DWS. It will also be necessary to consider limits above which volumetric monitoring will be necessary at new industries and existing smaller industries, where expansion is likely to take place.

All current industrial consumers need to apply for discharge permits and they must supply and maintain a flow meter measuring the volume of water that is discharged into Bergrivier Municipality's sewerage system. It is also recommended that the accounts generated by the Municipality include for each cycle a summary of the COD and flow results to enable industries to keep a record and look at ways of improving where possible.

Business Element 10: Financial

Table C.26: Business Element 10: Financial Profile (Topic 10)

Overview of Topic	**Status Quo and Knowledge Interpretation Statistics**				
The financial profile is aligned with the Water Services Standard Chart of Accounts [SCOA] which addresses the expenditure, revenue & capex for the water services function.	**Item**	**Quality (%)** assessment of current status against compliancy requirements	**Quantity (%)** an indication of the representation of the total area to address the issue	**Future Plan Assessment**	**Strategy Assessment**
	Capital Expenditure	Scores will be finalised once the new eWSDP website is fully populated.			
	Operation and Maintenance Budget				
	Tariff & Charges				
	Free Basic Services				
	Metering, Billing, Income and Sales				
	TOTAL for Topic				

Problem Definition Statements		
Nr	**Statements - Short Comings**	**Possible Improvement / Project**
1	Maintenance activities have been increasingly focused on reactive maintenance as a result of the progressive deterioration and failure of old infrastructure. Consequently, there has been dilution of preventative maintenance of other infrastructure. Expenditure on repairs and maintenance does not keep track with the increase in asset values as well as the ageing of the infrastructure.	An Integrated Maintenance Plan is necessary that optimises maintenance activities, appropriate to its specific needs and the local environment, and identifies the systems and resources required to support this. A regime of planned preventative maintenance should be established for all infrastructure assets classified as critical and important in the Asset Register. The maintenance management system will enable Bergrivier Municipality to better manage its risks, and more effectively plan and prioritise the wave of renewals that are going to be required over the next 20 years.
2	Monitoring of effluent discharged by industrial consumers and the billing of industrial consumers according to the quality of effluent discharged by them.	The quantity of wastewater discharged by the industrial consumers into Bergrivier Municipality's sewer system needs to be metered and the quality needs to be monitored regularly by Bergrivier Municipality. Industrial consumers need to be billed according to the quality of effluent discharged by them.
3	Investigate the possibility of linking the sewerage tariffs to the volume of water use. Volumetric usage, whereby charges are determined according to water usage with maximum ceilings and charged accordingly.	Investigate the financial impact of linking the sewerage tariffs to the water usage.
4	It is important for Bergrivier Municipality to enforce their indigent qualification criteria rigorously in order to ensure that those who do not qualify are removed from the allocation list. The Municipality needs to determine whether the current Indigent Policy is not too generous and creates a situation where too many citizens in Bergrivier Municipality's Management Area are making no monetary contribution toward the cost of delivering services to the community.	Investigate the current indigent qualification criteria in order to determine whether the existing criteria is not too generous
5	Various financial challenges: Indigent households, inadequate and declining revenue base, unfunded manadates, infrastructure and bulk service backlogs, cost of compliance and standard chart of accounts.	Financial development priorities are Sound Financial Management, proper expenditure / SCM / assets management, financial sustainability (Income / Debtors / Credit Control / Enquiries) and Systems / Property Valuations and Rates.

Capital Budget:

The next three year planned capital expenditure for water and sanitation infrastructure is R13.646 million for 2016/2017, R12.985 million for 2017/2018 and R11.195 million for 2018/2019, as included in the draft 2016/2017 Capital Budget.

One of Bergrivier Municipality's Strategic Objectives is "To Budget Strategically, Grow and Diversify our Revenue and Ensure Value for Money Services". Bergrivier Municipality's revenue is derived from three sources namely property rates, municipal service charges and government grants and subsidies. The municipality remains highly dependent on internal revenue sources to fund the budget. For this reason, the municipality should strive to maintain these revenue streams and if possible explore relevant avenues to increase these revenue sources. Some of the current financial challenges are as follows:

- Indigent households: Poverty is impacting on the Municipality's financial viability and manifests in a high number of indigent households who qualify for indigent support. The indigent grant is no longer adequate to cover the actual service costs. This is being exacerbated by increased migration into the area.
- An inadequate and declining revenue base: The Municipality's existing sources of revenue are no longer adequate to financially sustain the Municipality. The Municipality has a narrow rates base, but cannot consider excessive increases on rates and service fees as the ability of many of the Municipality's consumers to pay their accounts is already severally impaired by the declining economy.

- Unfunded mandates: The Municipality performs a number of functions that are not core municipal functions for which the Municipality are not subsidised or only partially subsidised namely housing, vehicle licencing and libraries.
- Infrastructure and bulk service backlogs: The Municipality's bulk services and service infrastructure is already exceeding its design capacity and the Municipality's inability to provide sufficient bulk capacity makes the Municipality unable to respond to development opportunities.
- The cost of compliance: Compliance, although essential comes at a substantial cost to the Municipality in terms of man hours and systems.
- Standard Chart of Accounts: National Treasury introduced the SCOA project during the 2014/2015 financial year. This reform is seen as the biggest reform in local government since the implementation of the MFMA. It is due for implementation from 1 July 2017.

The financial Development Priorities for Bergrivier Municipality are as follows:

- Sound Financial Management: The Municipality has sound financial management policies and procedures which it implements judiciously and high priority is placed on financial compliance.
- Expenditure / Supply Chain Management / Assets: The Municipality is committed to fully develop and resource the SCM unit. Standard operating procedures have been implemented and this has proved to be effective. Improved Expenditure management, especially expenditure on consultants. An expenditure control and cost saving intervention plan was adopted by the Finance Portfolio Committee. The SCM Unit, which is also responsible for asset management, was centralized at the Municipality's main office in Piketberg.
- Financial sustainability (Income / Debtors / Credit Control / Enquiries):
  - The identification and application for alternative revenue sources and continuous efforts to identify alternative revenue resources through IGR structures as well as other avenues.
  - Stringent credit control measures and application of the credit control policy.
  - Improving debtor management, especially alternative measures to collect overdue accounts.
  - Improving the management of water and electricity losses.
  - The review of the indigent register to ensure that all indigents qualify for their indigent grant and expansion of the indigent grant programme to qualifying indigents.
  - The development of a long term financial plan.
  - Improved financial reporting as required by Legislation and National and Provincial Treasury Guidelines.
- Systems / Property Valuations and Rates:
  - Improving financial systems. The financial management system hardware and software must be upgraded in accordance with the Municipality's needs.
  - The Municipal property rates are one of the Municipality's most important sources of income and it is imperative that the Municipality's rates are based on credible valuations, which are undertaken in terms of the Local Government Municipal Property Rates Act.
  - Implementation of SCOA

The recommendations for Bergrivier Municipality, with regard to their Capital Funding, are as follows:

- To focus strongly on revenue collection, in order to improve the Municipality's own funding sources, because most of the funds for the current water and sewerage capital projects come from the Municipality's own funding and MIG. The Municipality also needs to actively implement their Credit Control and Debt Collection measures in order to minimize the percentage of non-payment of municipal services.
- To identify all possible sources of external funding over the next three years to assist Bergrivier Municipality to address the bulk infrastructure backlogs that exist in the various towns.
- Develop AMPs for all water and sewerage infrastructure, which will indicate the real replacement values, the service life of the assets and the funds required to provide for adequate asset replacement. The renewals burden is set to increase sharply over the next 20 years and it is therefore important for Bergrivier Municipality to commit to a substantial and sustained programme of capital renewal works.

Operational Budget:

Maintenance activities have been increasingly focused on reactive maintenance as a result of the progressive deterioration and failure of old infrastructure. Consequently, there has been dilution of preventative maintenance of other infrastructure. Expenditure on repairs and maintenance does not keep track with the increase in asset values as well as the ageing of the infrastructure.

An Integrated Maintenance Plan is necessary that optimises maintenance activities, appropriate to its specific needs and the local environment, and identifies the systems and resources required to support this. A regime of planned preventative maintenance should be established for all infrastructure assets classified as critical and important in the Asset Register. Consideration should be given to the establishment of a maintenance management system to enable Bergrivier Municipality to better manage its risks, and more effectively plan and prioritise the wave of renewals that are going to be required over the next 20 years.

It is important to note that the maintenance budget requirements are going to increase substantially over the next twenty years in real terms, in line with the envisaged pace of development, and the upgrading of the existing infrastructure that's taking place. It is estimated that the budget requirements will double over this period.

The recommendations for Bergrivier Municipality, with regard to their Operational Budgets, are as follows:

- Develop an AMP, which will indicate the real replacement values and service lives of the assets and the funds required to provide for adequate operation and maintenance of the infrastructure. Current gaps include unrealistically low depreciation charges, which have to be rectified and ring-fenced into an asset replacement fund, as well as additional budget requirements above inflation for infrastructure development.
- The new depreciation charges will have to form part of the operating budget and subsequent tariffs, linked to a ring-fenced asset replacement fund.
- It is critical for Bergrivier Municipality to ensure that sufficient funding is allocated towards an asset replacement fund, in order to ensure adequate rehabilitation and maintenance of the existing infrastructure. A financial sustainability strategy is necessary, which needs to include the implementation of an aggressive revenue management framework for ongoing revenue enhancement.
- Water services operational surpluses have to be allocated to essential water services requirements in the future.
- Bergrivier Municipality needs to ensure that the Credit Control and Debt Collection Policy and By-laws are strictly enforced.

Tariff and Charges:

Bergrivier Municipality's current nine block step water tariff structure adequately promotes the efficient use of water by consumers and discourages the wastage of water. Higher tariffs are charge for the higher consumption blocks.

The table below gives some comments on the specific blocks, with regard to Bergrivier Municipality's water tariff structure for the last three financial years.

Table C.27: Comments on Bergrivier Municipality's block step tariff structure

Block (kl/month)	14/15	13/14	12/13	Comments
0 - 6	R5-85	R5-42	R5-02	Free Basic Water
7 - 15	R11-79	R10-91	R10-10	Low volume use
16 - 20				Typical use volume, including garden irrigation
21 - 30	R11-79	R10-92	R10-11	
31 - 50				Above average use, including garden irrigation
51 - 60	R13-58	R12-57	R11-64	
61 - 100				Wasteful use and/or severe garden irrigation
101 - 200	R14-26	R13-21	R12-23	Significant waste and/or unnecessary garden irrigation
201 – 1 000	R15-01	R13-90	R12-87	
1 001 – 1 500	R12-75	R11-80	R10-92	
1 501 – 2 000	R10-83	R10-03	R9-29	
> 2 000	R9-17	R8-49	R7-87	

Wasteful or inefficient use of water is discouraged through increased tariffs. It is suggested that the following tariff structure characteristics should remain in Bergrivier Municipality's Structure in order to ensure efficient water use.

- Maintain a rising block tariff structure.
- Keep number of blocks in the tariff to a minimum. One block to address free basic water (the first step) and another to address the "cut-off" volume where consumers are discouraged to use water above this monthly volume (highest block) are required. In addition another three blocks could be used to distinguish between low users, typical use of high water use.
- The volumetric steps should be kept the same for all the areas within Bergrivier Municipality's Management Area.
- The cost of water in the maximum step should severely discourage use in this category. The volumetric use for the highest category could be 60 kl/month, above which residential water use could be considered to be wasteful or unnecessary. Garden use requiring in excess of this volume should be reduced in accordance with xeriscape practices.
- Develop tariff codes, which adequately differentiate between the different types of consumers, for example residential, commercial, churches, schools, departmental, old age homes, etc.

The Municipality should investigate the possibility of volumetric usage for their sanitation tariffs, whereby charges are determined according to water usage with maximum ceilings and charged accordingly. Bergrivier Municipality will continue to re-evaluate the tariffs they charge for their water and sanitation services on an annual basis in order to put the Municipality in a better financial position to address the bulk infrastructure backlogs and to ensure the adequate rehabilitation and maintenance of all existing water and sewerage infrastructure within the various towns.

Bergrivier 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 Bergrivier Municipality's Indigent Policy and all indigent households receive free basic water and sanitation services.

It is important for Bergrivier Municipality to enforce their indigent qualification criteria rigorously in order to ensure that those who do not qualify are removed from the allocation list. The Municipality needs to determine whether the current Indigent Policy is not too generous and creates a situation where too many citizens in Bergrivier Municipality's Management Area are making no monetary contribution toward the cost of delivering services to the community.

It is important for Bergrivier Municipality to continue with the reading of all their bulk water meters. The bulk meters and meter chambers also need to be properly maintained and the meters need to be protected from possible vandalism. Bergrivier Municipality can also investigate the possibility of dividing the distribution networks into even smaller zones, with a bulk water meter for each zone, in order to identify the non-revenue water for each of the individual zones. Bergrivier Municipality is committed to ensure that all water used for irrigation purposes are metered.

Bergrivier Municipality's Credit Control and Debt Collection By-laws provide a framework to enable Bergrivier Municipality to proactively manage and collect all money due for services rendered and outstanding property taxes, subject to the provisions of the Municipal Systems Act of 2000 and any other applicable legislation and internal policies of Council. The By-laws provides for credit control procedures which are fair and equitable, provide for warnings and adequate notice, provide for consumer representations, allow alternative payment arrangements and set out fair procedures that will be applied in the event of non-payment. The By-laws further allows for actions that will limit the Municipality's financial loss and promote good payment habits, where a consumer continues to fail to pay for services provided after the application of such procedures and a fair warning.

The Technical Department needs to continue to work with the Financial Department in order to ensure that all water used is metered, which include the free basic water and also the water used for irrigation purposes on the parks.

It is recommended that Bergrivier Municipality compile a detail water meter audit of all their bulk and consumer water meters. All residential water meters older than eight years need to be replaced if they are found to be not accurate. New technology, including remote meter reading will most probably become more affordable and widely used in the future and Bergrivier Municipality can investigate the possibility to make use of these systems in the future.

Business Element 11: Water Services Institutional Arrangements

Table C.28: Business Element 11: Water Services Institutional Arrangements (Topic 11)

Overview of Topic	**Status Quo and Knowledge Interpretation Statistics**				
The institutional arrangements profiles presents an overview of the WSA's compliance with respect to water services regulations and policy and as aligned also with the Regulatory Performance Monitoring System. It also provides an overview of the water services provider arrangements which are in place, including the WSA's perception of the sufficiency of WSP staffing levels.	**Item**	**Quality (%)** assessment of current status against compliancy requirements	**Quantity (%)** an indication of the representation of the total area to address the issue	**Future Plan Assessment**	**Strategy Assessment**
	Policy development	Scores will be finalised once the new eWSDP website is fully populated.			
	Regulation and tariffs				
	Infrastructure development (projects)				
	Performance management and monitoring				
	WSDP				
	Bulk and Retail functions				
	TOTAL for Topic				

Problem Definition Statements		
Nr	**Statements - Short Comings**	**Possible Improvement / Project**
1	All critical vacant water and sanitation positions as indicated on the approved Organogram needs to be filled as soon as possible. Bergrivier Municipality needs to review the skills needed at each of their WTWs and WWTWs according to the classification of the WTWs and WWTWs and need to align resources to these needs as well as reviewing the total staff numbers necessary to meet all the objectives in the National Water Act.	Filling the vacant positions will ensure the adequate operation and maintenance of the existing infrastructure. Aligning the career paths to the occupational categories will assist the personnel to understand levels within across teams. Simplification of job titles to conform to respective occupational categories will assist in developing compatible and comparable career paths within the different Departments. Occupational categories will provide differentiation between levels. This approach will allow for more specific job designations in organograms with explicit career path connotations.
2	Bergrivier Municipality will continue with their mentoring role for operational personnel ensuring an adequately trained and classified workforce with dedicated training programmes for supervisors and operational personnel. Budgets need to be established to address the shortfall of skilled personnel, rethink methods to retain qualified personnel and plan for succession and clear career paths for experienced staff.	Ensure all required water and sanitation training is included in the Municipality's Workplace Skills Plan. Establish budgets to address the shortfall of skilled personnel, rethink methods to retain qualified personnel and plan for clear career paths. With such a program a source of specific resources of skilled operational personnel, technicians and managers will be established.
3	Bergrivier Municipality can also continue to actively focus on in-house training, which requires the identification of trainers (from senior operators / officers / professional ranks) for the development and facilitation of courses which relate to specific organizational knowledge and systems requirements.	Bergrivier Municipality's internal reports such as the Water Safety Plans, Wastewater Risk Abatement Plans, Operation and Maintenance Manuals and this WSDP have the necessary information on which the in-house courses can be based. This will assist Bergrivier Municipality's Human Resource Department in general and the skills development facilitator in particular to develop and implement effective workplace skills plans relevant to Human Capacity Development requirements.

Bergrivier Municipality is committed to develop a new WSDP every five years and to update the WSDP as necessary and appropriate in the interim years. The Municipality will also continue to report annually and in a public way on progress in implementing the plan (WSDP Performance and Water Services Audit Report), as part of Bergrivier Municipality's Annual Report.

It is important for Bergrivier Municipality to develop a schedule of all policies and bylaws, which needs to indicate an annual rotation plan for the reviewing of all policies and by-laws. This process will assist the Municipality to be developmental and innovative in doing business.

Mechanisms are in place to effectively monitor the compliance of consumers with regard to the Water Supply, Sanitation Services and Industrial Effluent By-laws

Bergrivier Municipality needs to focus strongly on the rehabilitation and the maintenance of the existing infrastructure; augmentation of their existing water sources and all planning for new services should be guided by the Water and Sewer Master Plans. Water and sanitation services are currently effectively managed by Bergrivier Municipality.

Bergrivier Municipality will continue with their mentoring role for operational personnel ensuring an adequately trained and classified workforce with dedicated training programmes for supervisors and operational personnel. Budgets need to be established to address the shortfall of skilled personnel, rethink methods to retain qualified personnel and plan for succession and clear career paths for experienced staff. With such a program a source of specific resources of skilled operational personnel, technicians and managers will be established.

The West Coast District Municipality will remain the only bulk potable WSP for Bergrivier Municipality, with regard to bulk potable water supply to Velddrif and Dwarskersbos. A Service Delivery Agreement is in place and the Monitoring Committee, with specific powers and functions, monitors the performance.

All critical vacant water and sanitation positions as indicated on the approved Organogram needs to be filled as soon as possible. Bergrivier Municipality needs to review the skills needed at each of the WTWs and WWTWs according to the classification of the WTWs and WWTWs and need to align resources to these needs as well as reviewing the total staff numbers necessary to meet all the objectives in the National Water Act.

Aligning the career paths to the occupational categories will assist the personnel to understand levels within across teams. Simplification of job titles to conform to respective occupational categories will assist in developing compatible and comparable career paths within the different Departments. Occupational categories will provide differentiation between levels. This approach will allow for more specific job designations in organograms with explicit career path connotations.

The training of Bergrivier Municipality's personnel involved in the management of water and sanitation services is the most important factor that determines the ability of Bergrivier Municipality to deliver safe and reliable water and to treat the effluent at the WWTWs to an acceptable standard. Training of all staff involved in water supply and sanitation services on matters related to treatment processes and quality monitoring and control is essential because their actions (or failure to act) will have a major impact on the well-being of the communities and the environment.

Bergrivier Municipality can also continue to actively focus on in-house training, which requires the identification of trainers (from senior operators / officers / professional ranks) for the development and facilitation of courses which relate to specific organizational knowledge and systems requirements. Bergrivier Municipality's internal reports such as the Water Safety Plans, Wastewater Risk Abatement Plans, Operation and Maintenance Manuals and this WSDP have the necessary information on which the in-house courses can be based. This will assist Bergrivier Municipality's Human Resource Department in general and the skills development facilitator in particular to develop and implement effective workplace skills plans relevant to Human Capacity Development requirements.

Business Element 12: Social and Customer Service Requirements

Table C.29 : Business Element 12: Customer Service Requirements (Topic 12)					
Overview of Topic	**Status Quo and Knowledge Interpretation Statistics**				
This topic provides an overview of the quality of the water services provision function when considered from a customer perspective including the summary of the WSA's responsiveness to customer complaints and queries.	**Item**	**Quality (%)** assessment of current status against compliancy requirements	**Quantity (%)** an indication of the representation of the total area to address the issue	**Future Plan Assessment**	**Strategy Assessment**
	Resources available to perform this function	Scores will be finalised once the new eWSDP website is fully populated.			
	Attending to complaints for water				
	Attending to complaints for Sanitation: Discharge to treatment works				
	Attending to complaints for Sanitation: Pit/ tank pumping				
	TOTAL for Topic	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
Problem Definition Statements					
Nr	**Statements - Short Comings**	**Possible Improvement / Project**			
1	Bergrivier Municipality needs to continue to record and monitor on a monthly basis all critical water and sanitation stats (Number of complaints, pipe breakages, sewer blockages, meters tested, replaced and repaired, septic tanks pumped, etc.)	Ensure all water and sanitation stats are kept up to date and included in the Monthly Reports.			

The Client Services Survey of 2014/2015 indicated the following feedback from consumers with regard to the water (supply of water, new connections, replacement of meters, the repair of broken pipes, etc.) and sanitation (new connections, repair blockages, etc.) services delivered by Bergrivier Municipality.

Table C.30: Client Services Survey feedback during 2014/2015 with regard to water and sanitation services					
Service	**Very Happy**	**Happy**	**OK**	**Unhappy**	**Very Unhappy**
Water	577	1 453	663	503	190
Sanitation	516	1 100	821	816	133

Bergrivier Municipality is committed to maintain the existing high levels of customer service in their urban areas and to record all the necessary information for the WSDP on an annual basis. The present Customer Services and Complaints System adequately allow for the recording and management of all water and sanitation related complaints. The Municipality is committed to ensure that all water and sanitation related complaints are recorded and that the complaints are addressed within the time period stipulated in the Client Services Charter.

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. Bergrivier Municipality is therefore committed to ensure that their water quality always complies with national safety standards.

The Water Safety Plans of Bergrivier Municipality includes an Improvement / Upgrade Plan. The purpose of the Improvement / Upgrade Plan is to address the existing significant risks where the existing controls were not effective or absent. Barriers implemented by Bergrivier Municipality against contamination and deteriorating water quality include the following:

- Participate in catchment management and water source protection issues.
- Correct operation and maintenance of the WTWs.
- Protection and maintenance of the distribution system. 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.

Four other important barriers against poor quality drinking water that are a prerequisite to those listed above are:

- 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.
- A Service Delivery Agreement with the West Coast District Municipality is in place for the provision of bulk potable water to Velddrif and Dwarskersbos.
- Competent managers and supervisors in the technical department who are responsible for water supply services lead by example and are passionate about monitoring and safeguarding drinking water quality.
- Well informed community members and other consumers of water supply services that know how to protect the water from becoming contaminated once it has been delivered, that have respect for water as a precious resource and that adhere to safe hygiene and sanitation practices.

SECTION D: WATER SERVICES OBJECTIVES AND STRATEGIES

The recommended objectives, strategies and projects for each of the WSDP Business Elements were also discussed under Section C “Water Services Existing Needs Perspective” of this WSDP-IDP Water Sector Input Report and are therefore not repeated under this Section D.

The water services objectives and strategies presented below are however a summary of the KPIs developed from the water services situational analysis as summarised under Section C “Water Services Existing Needs Perspective” and as taken from the Municipality’s approved SDBIP and presents the 5-year Water Services Objectives and Strategies as established in the WSA’s WSDP..

Table D.1: WSDP FY2016/17: Water Services Objectives and Strategies

Nr	Objective / Strategy	Key Performance Indicator	Baseline (FY2014/15 status quo)	WSDP Year 1 FY2015/16 Target	WSDP Year 2 FY2016/17 Target	WSDP Year 3 FY2017/18 Target	WSDP Year 4 FY2018/19 Target	WSDP Year 5 FY2019/20 Target
WSDP Topic 1: Administration								
(New)	Report on the implementation of the WSDP annually by the end of October each year.	Compile annual WSDP Performance- and Water Services Audit Report by October	▪ Compile Annual WSDP Performance- and Water Services Audit Report by October ▪ Take Annual WSDP Performance- and Water Services Audit Report to Council for approval	▪ Compile Annual WSDP Performance- and Water Services Audit Report by October ▪ Take Annual WSDP Performance- and Water Services Audit Report to Council for approval	▪ Compile Annual WSDP Performance- and Water Services Audit Report by October ▪ Take Annual WSDP Performance- and Water Services Audit Report to Council for approval	▪ Compile Annual WSDP Performance- and Water Services Audit Report by October ▪ Take Annual WSDP Performance- and Water Services Audit Report to Council for approval	▪ Compile Annual WSDP Performance- and Water Services Audit Report by October ▪ Take Annual WSDP Performance- and Water Services Audit Report to Council for approval	▪ Compile Annual WSDP Performance- and Water Services Audit Report by October ▪ Take Annual WSDP Performance- and Water Services Audit Report to Council for approval
(New)	Update WSDP every two to three years.	Compile updated WSDP	-	▪ Compile updated WSDP. ▪ Advertise for public comment. ▪ Take WSDP to Council for approval (WSDP-IDP Water Sector Input Report)	-	-	▪ Compile updated WSDP. ▪ Advertise for public comment. ▪ Take WSDP to Council for approval (WSDP-IDP Water Sector Input Report)	-
	Revise WSDP and submit to Council by 30 June 2015.	WSDP revised and submitted to Council by 30 June 2015.	1	-	-	-	-	-
WSDP Topic 2: Demographics								
WSDP Topic 3: Service levels								
TL1	Number of formal households that receive piped water (credit and prepaid water) that is connected to the municipal water infrastructure network as at 30 June.	Number of households which are billed for water or have prepaid meters as at 30 June	8400	8658	8658	8658	8658	8658
TL3	Number of formal households connected to the municipal waste water sanitation / sewerage network for sewerage service, irrespective of the number of closets (toilets) at 30 June.	Number of households which are billed for sewerage at 30 June	8530	6861	6861	6861	6861	6861
TL5	Provide free basic water to indigent households	Number of households receiving free basic water	2349	1882	1882	1882	1882	1882
TL7	Provide free basic sanitation to indigent households	Number of households receiving free basic sanitation	2160	2100	2100	2100	2100	2100
(New)	Ensure all households on the farms are provided with at least basic water services, subject to DWS guidance.	Support all applications received for basic water services on the farms (Subject to availability of financial resources and sustainability of type of service)	-	-	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)
(New)	Ensure all households on the farms are provided with at least basic sanitation services, subject to DWS guidance.	Support all applications received for basic sanitation services on the farms (Subject to availability of financial resources and sustainability of type of service)	-	-	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)	100% of applications received are supported (Subject to availability of funding and sustainability of type of service)
WSDP Topic 4: Socio economic								
TL10	Create full time equivalents (FTE's) ito the EPWP programme by 30 June	Number of FTE's created by 30 June	36	36	36	36	36	36

Table D.1: WSDP FY2016/17: Water Services Objectives and Strategies

Nr	Objective / ~~Strategy~~	Key Performance Indicator	Baseline (FY2014/15 status quo)	WSDP Year 1 FY2015/16 Target	WSDP Year 2 FY2016/17 Target	WSDP Year 3 FY2017/18 Target	WSDP Year 4 FY2018/19 Target	WSDP Year 5 FY2019/20 Target
WSDP Topic 5: Water Services Infrastructure								
TL36	100% of MIG funding allocated to build a new reservoir in Velddrif spent by 30 June.	% of MIG funding allocated to built Velddrif reservoir spent by 30 June	100%	100%	-	-	-	-
TL37	100% of MIG funding allocated to upgrade the water infrastructure in Porterville spent by 30 June.	% of MIG funding allocated to the upgrading of water infrastructure in Porterville spent by 30 June	100%	100%	-	-	-	-
TL39	100% of the MIG conditional grant spent by 30 June to upgrade infrastructure	% of MIG conditional grant spent by 30 June	100%	100%	100%	100%	100%	100%
(New)	Implement recommendations from detail WTW Process Audits.	% Of recommendations, as included in the WTW Process Audits, implemented.	-	-	40% of recommendations implemented.	55% of recommendations implemented.	70% of recommendations implemented.	85% of recommendations implemented.
(New)	Implement recommendations from detail WWTW Process Audits.	% Of recommendations, as included in the WWTW Process Audits, implemented.	-	-	40% of recommendations implemented.	55% of recommendations implemented.	70% of recommendations implemented.	85% of recommendations implemented.
(New)	Implement Improvement / Upgrade Plan of the Water Safety Plan	% Of recommendations, as included in the Improvement / Upgrade Plan of the Water Safety Plan, implemented.	-	-	40% of recommendations implemented.	55% of recommendations implemented.	70% of recommendations implemented.	85% of recommendations implemented.
(New)	Implement Improvement / Upgrade Plan of the W_2RAP	% Of recommendations, as included in the Improvement / Upgrade Plan of the W2RAP, implemented.	-	-	40% of recommendations implemented.	55% of recommendations implemented.	70% of recommendations implemented.	85% of recommendations implemented.
(New)	Ensure adequate reservoir storage capacity	Ensure adequate storage capacity for all towns (At least 48hrs AADD)	-	-	All nine towns with an overall storage capacity above 48hrs AADD	All nine towns with an overall storage capacity above 48hrs AADD	All nine towns with an overall storage capacity above 48hrs AADD	All nine towns with an overall storage capacity above 48hrs AADD
(New)	Ensure all water and sewerage infrastructure assets are included in the Asset Register	Ensure all water and sewerage infrastructure assets are included in the Asset Register	-	-	Annual reporting to the Financial Department on water and sewerage assets not yet included in the Asset Register.	Annual reporting to the Financial Department on water and sewerage assets not yet included in the Asset Register.	Annual reporting to the Financial Department on water and sewerage assets not yet included in the Asset Register.	Annual reporting to the Financial Department on water and sewerage assets not yet included in the Asset Register.
(New)	Ensure adequate budget for the Refurbishment and Replacement of existing infrastructure.	Ensure a budget of at least 2% of the total value of the water and sewerage assets is allocated towards the replacement of existing infrastructure per annum.	-	-	A budget of 2% or more of the value of the water and sewerage assets is allocated towards the replacement of existing infrastructure.	A budget of 2% or more of the value of the water and sewerage assets is allocated towards the replacement of existing infrastructure.	A budget of 2% or more of the value of the water and sewerage assets is allocated towards the replacement of existing infrastructure.	A budget of 2% or more of the value of the water and sewerage assets is allocated towards the replacement of existing infrastructure.
(New)	Ensure adequate budget for the O&M of the existing infrastructure.	Ensure a budget of at least 1% fo the total value of the water and sewerage assets is allocated towards the annual O&M of the systems.	-	-	A budget of 1% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.	A budget of 1% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.	A budget of 1% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.	A budget of 1% or more of the value of the water and sewerage assets is allocated towards the O&M of the systems.
WSDP Topic 6: Operation and Maintenance								
TL48	Purchase stand-by generator by 31 March 2016 to ensure the functionality of sewerage pump station in the event of prolonged electricity interruptions.	Number of stand-by generators purchased by 31 March 2016	-	1	-	-	-	-
TL49	95% water quality level obtained as per SANS241 physical and micro parameters as at 31 December and 30 June.	% water quality level as at 31 December and 30 June	-	95%	95%	95%	95%	95%
(New)	Ensure final effluent quality compliance.	Quality of final effluent discharged from the WWTW comply 90% with the quality requirements (According to Authorisation)	-	-	90% final effluent quality compliance	90% final effluent quality compliance	90% final effluent quality compliance	90% final effluent quality compliance

Table D.1: WSDP FY2016/17: Water Services Objectives and Strategies

Nr	Objective / Strategy	Key Performance Indicator	Baseline (FY2014/15 status quo)	WSDP Year 1 FY2015/16 Target	WSDP Year 2 FY2016/17 Target	WSDP Year 3 FY2017/18 Target	WSDP Year 4 FY2018/19 Target	WSDP Year 5 FY2019/20 Target
WSDP Topic 7: Associated services								
WSDP Topic 8: Conservation and Demand management								
TL35	Limit unaccounted for water to 10% by 30 June	% Unaccounted water by 30 June	10%	10%	10%	10%	10%	10%
(New)	Ensure all bulk water is metered at source, WTW and at bulk storage reservoirs.	Ensure all bulk water is metered at source, at WTW (incoming and outgoing) and at bulk storage reservoirs and the meters are read and recorded on at least a monthly basis.	-	-	95% Of all sources metered and bulk water meters read and recorded at least monthly	95% Of all sources metered and bulk water meters read and recorded at least monthly	95% Of all sources metered and bulk water meters read and recorded at least monthly	95% Of all sources metered and bulk water meters read and recorded at least monthly
(New)	Ensure all incoming and outgoing flow at WWTWs are metered, as well as final effluent re-used for irrigation purposes.	Ensure all incoming and outgoing flow at WWTWs are metered, as well as final effluent re-used for irrigation purposes and that meters are read and recorded on at least a monthly basis.	-	-	95% of all flows at WWTW metered and meters read and recorded at least monthly	95% of all flows at WWTW metered and meters read and recorded at least monthly	95% of all flows at WWTW metered and meters read and recorded at least monthly	95% of all flows at WWTW metered and meters read and recorded at least monthly
WSDP Topic 9: Water Resources								
(New)	Ensure all sources are registered and authorised by the DWS	% of Abstraction from sources registered and authorised by the DWS	-	-	75% Compliance	80% Compliance	85% Compliance	90% Compliance
(New)	Ensure yields and allocations are adequate to meet future water requirements.	Ensure yields and allocations are adequate to meet at least the projected five year water requirements for all nine towns.	-	-	100% Adequate supply to meet future water requirements for all nine towns.	100% Adequate supply to meet future water requirements for all nine towns.	100% Adequate supply to meet future water requirements for all nine towns.	100% Adequate supply to meet future water requirements for all nine towns.
(New)	Monitor all industrial effluent discharged by industrial consumers.	% Monitoring of effluent discharged by industrial consumers (Quantity and Quality)	-	-	20% Of all industrial consumers monitored wrt quality and quantity of effluent discharged by them	40% Of all industrial consumers monitored wrt quality and quantity of effluent discharged by them	60% Of all industrial consumers monitored wrt quality and quantity of effluent discharged by them	80% Of all industrial consumers monitored wrt quality and quantity of effluent discharged by them
3								
TL9	The percentage of the municipal capital budget actually spent on capital projects as at 30 June.	% of Capital budget spent as at 30 June	95%	95%	95%	95%	95%	95%
TL50	Institute legal processes by 30 June against 95% of non-exchange debtors to improve credit control	% of non-exchange debtors against whom legal action can be and was instituted by 30 June	95%	95%	95%	95%	95%	95%
TL51	Achieve a payment percentage of 96% as at 30 June	Payment % as at 30 June	96%	96%	96%	96%	96%	96%
TL15	Financial viability measured in terms of the available cash to cover fixed operating expenditure as at 30 June	Cost coverage as at 30 June	4.5	14.5	14.5	14.5	14.5	14.5
TL13	Financial viability measured in terms of the municipality's ability to meet it's service debt obligations as at 30 June	Debt to Revenue as at 30 June	20.38	2.4	2.4	2.4	2.4	2.4
TL14	Financial viability measured in terms of the outstanding service debtors as at 30 June	Service debtors to revenue as at 30 June	32%	32%	32%	32%	32%	32%
WSDP Topic 11: Institutional Arrangements profile								
TL12	The percentage of a municipality's personnel budget actually spent on implementing its workplace skills plan as at 30 June	% of personnel budget spent on training	1%	1%	1%	1%	1%	1%
TL34	95% of the training budget spent by 30 June to implement the Work Place Skills Plan	% of the training budget spent by 30 June to implement the Work Place Skills Plan	-	95%	95%	95%	95%	95%
WSDP Topic 12: Customer service requirements								
TL23	Undertake an annual Customer Service evaluation and submit report with recommendations on the improvement of customer service to the Mayoral Committee by 30 June	Customer service evaluations completed and report with recommendations submitted to the Mayoral Committee by 30 June	1	1	1	1	1	1

SECTION E: WATER SERVICES MTEF PROJECTS

The Water Services Medium-Term Expenditure Framework (MTEF) projects are presented below and outline the water services projects which are funded for implementation within the next three years. Table E.2a provides the projects identified for implementation in FY2016/17, Table E.2b provides the projects identified for implementation in FY 2017/18 and Table E.2c provides the projects identified for implementation in FY2018/19. The table below gives an overview of the water services projects, as included in the MTEF.

Table E.1: Summary of MTEF Projects

Project Main Category	FY2016/17		FY2017/18		FY2018/19		MTEF Total	
	Nr	Value (R'000)	Nr	Value (R'000)	Nr	Value (R'000)	**Nr**	**Value (R'000)**
Water Projects	10	R6,317	10	R3,415	11	R1,270	**15**	**R11,002**
Sanitation Projects	7	R7,499	8	R10,540	6	R10,095	**8**	**R28,134**
Combined Water & Sanitation Projects	**17**	**R13,816**	**18**	**R13,955**	**17**	**R11,365**	**23**	**R39,136**

Table E.2a: Water Services MTEF Projects - FY2016/17 (1st year MTEF period)

Nr	Project Reference Number	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Project Budget / Funding Sources										MTEF Project Source
								Prev spent FY2015/16	FY2016/17 Budget	Own	MIG	RBIG	ACIP	DR	MWIG	Other	Total Cost	
1. Infrastructure Projects								**R0**	**R12,726**								**R12,726**	
1.1	WATR0098	Build new reservoir (Veddrif)	Additional reservoir storage capacity for Velddrif	Storage Capacity	Water	Bulk	Reservoir		**R5,562**	R1,620	R3,942						**R5,562**	MTREF
1.2	WATR0105	Install Ozone filters at Albatros/Astr	Provide filtration capacity	Water quality	Water	Bulk	WTW		**R35**	R35							**R35**	MTREF
1.3	–	Refurbishment and upgrade of	Refurbishment and upgrade of	Capacity	Sanitation	Bulk	WWTW		**R7,019**	R7,019							**R7,019**	MTREF
1.4	–	Fence WWTW	Improve Safety and Security	Safety	Sanitation	Bulk	WWTW		**R60**	R60							**R60**	MTREF
1.5	–	Basket screens for pumpstations	Screens for sewer pumpstations	Operation	Sanitation	Bulk	Pump		**R50**	R50							**R50**	MTREF
2. Source Development Projects								**R0**	**R0**								**R0**	
																	R0	
3. Demand Management projects								**R0**	**R0**								**R0**	
																	R0	
4. O&M Commitments								**R0**	**R1,090**								**R1,090**	
Operations																		
4.1	MATR0171	Purchase new borehole pumps	Replace borehole pumps	Operation	Water	Bulk	Pumps		**R50**	R50							**R50**	MTREF
4.2	WATR0103	Pumps (standby)	Standby Pumps	Operation	Water	Reticulation	Pumps		**R230**	R230							**R230**	MTREF
4.3	-	Telemetry	Telemetry	Operation	Water	Bulk	Other		**R100**	R100							**R100**	MTREF
4.4	WATR0093	Dam Safety report (Waboomspruit)	Dam Safety	Operation	Water	Bulk	Source		**R35**	R35							**R35**	MTREF
4.5	WATR0097	Dam safety report (Porterville Dam)	Dam Safety	Operation	Water	Bulk	Source		**R35**	R35							**R35**	MTREF
4.6	MATR0158	Switchgear and pumps	Switchgear and pumps	Operation	Sanitation	Bulk	Pumps		**R120**	R120							**R120**	MTREF
4.7	RIOL0043	Telemetry	Telemetry	Operation	Sanitation	Bulk	Other		**R50**	R50							**R50**	MTREF
4.8	MATR0157	Sewerage standby pumps	Standby Pumps	Operation	Sanitation	Drainage	Pumps		**R150**	R150							**R150**	MTREF
Maintenance																		
4.9	WATR0073	Replace water meters	Replace old water meters	Maintenance	Water	WC/WDM	Other		**R120**	R120							**R120**	MTREF
4.10	WATR0095	Replace redundant meters	Replace old water meters	Maintenance	Water	WC/WDM	Other		**R100**	R100							**R100**	MTREF
4.11	–	Water Renewals	Water Renewals	Maintenance	Water	Reticulation	Pipelines		**R50**	R50							**R50**	MTREF
4.12	–	Sewer Renewals	Sewer Renewals	Maintenance	Sanitation	Drainage	Pipelines		**R50**	R50							**R50**	MTREF
5. Institutional								**R0**	**R0**								**R0**	
																	R0	
6. Water Services Programmes								**R0**	**R0**								**R0**	
Awareness Programs																		
																	R0	
WASH Programs																		
																	R0	
		Total						**R0**	**R13,816**								**R13,816**	

Table E.2b: Water Services MTEF Projects - FY2017/18 (2nd year MTEF period)

Nr	Project Reference Number	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Project Budget / Funding Sources										MTEF Project Source
								Prev spent FY2015/16	FY2017/18								Total Cost	
									Budget	Own	MIG	RBIG	ACIP	DR	MWIG	Other		
1. Infrastructure Projects								**R0**	**R12,640**								**R12,640**	
1.1	–	Pumpline PV	Pump pipeline for Porterville	Water Requirement	Water	Reticulation	Reticulation		**R1,250**	R1,250							**R1,250**	MTREF
1.2	–	Pumpline VD	Pump pipeline for Velddrif	Water Requirement	Water	Reticulation	Reticulation		**R1,250**	R1,250							**R1,250**	MTREF
1.3	–	Pump Station with sewer line at Dwarskersbos	Pump Station and sewer pipeline	Waterborne Sanitation	Sanitation	Drainage	Pump Station and		**R800**	R800							**R800**	MTREF
1.4	–	Fence WWTW	Improve Safety and Security	Safety	Sanitation	Bulk	WWTW		**R60**	R60							**R60**	MTREF
1.5	–	Refurbishment and upgrade of	Refurbishment and upgrade of	Capacity	Sanitation	Bulk	WWTW		**R9,180**	R9,180							**R9,180**	MTREF
1.6	–	Basket screens for pumpstations	Screens for sewer pumpstations	Operation	Sanitation	Bulk	Pump		**R100**	R100							**R100**	MTREF
2. Source Development Projects								**R0**	**R0**								**R0**	
																	R0	
3. Demand Management projects								**R0**	**R200**								**R200**	
3.1	-	Pipe Replacement Programme	Replace old water pipelines	WC/WDM	Water	WC/WDM	Pipelines		**R200**	R200							**R200**	MTREF
4. O&M Commitments								**R0**	**R1,115**								**R1,115**	
Operations																		
4.1	MATR0171	Purchase new borehole pumps	Replace borehole pumps	Operation	Water	Bulk	Pumps		**R50**	R50							**R50**	MTREF
4.2	WATR0103	Pumps (standby)	Standby Pumps	Operation	Water	Reticulation	Pumps		**R200**	R200							**R200**	MTREF
4.3	-	Telemetry	Telemetry	Operation	Water	Bulk	Other		**R100**	R100							**R100**	MTREF
4.4	WATR0102	Water meter at source	Install additional bulk water meters	Operation	Water	Bulk	Other		**R75**	R75							**R75**	MTREF
4.5	MATR0158	Switchgear and pumps	Switchgear and pumps	Operation	Sanitation	Bulk	Pumps		**R120**	R120							**R120**	MTREF
4.6	RIOL0043	Telemetry	Telemetry	Operation	Sanitation	Bulk	Other		**R50**	**R50**							**R50**	MTREF
4.7	MATR0157	Sewerage standby pumps	Standby Pumps	Operation	Sanitation	Drainage	Pumps		**R180**	R180							**R180**	MTREF
Maintenance																		
4.8	WATR0073	Replace water meters	Replace old water meters	Maintenance	Water	WC/WDM	Other		**R120**	R120							**R120**	MTREF
4.9	WATR0095	Replace redundant meters	Replace old water meters	Maintenance	Water	WC/WDM	Other		**R120**	R120							**R120**	MTREF
4.10	–	Water Renewals	Water Renewals	Maintenance	Water	Reticulation	Pipelines		**R50**	R50							**R50**	MTREF
4.1	–	Sewer Renewals	Sewer Renewals	Maintenance	Sanitation	Drainage	Pipelines		**R50**	R50							**R50**	MTREF
5. Institutional								**R0**	**R0**								**R0**	
																	R0	
6. Water Services Programmes								**R0**	**R0**								**R0**	
Awareness Programs																	**R0**	
																	R0	
WASH Programs																	**R0**	
																	R0	
		Total						**R0**	**R13,955**								**R13,955**	

Table E.2c: Water Services MTEF Projects - FY2018/19 (3rd year MTEF period)

Nr	Project Reference Number	Project Name	Description	Project Driver	Main Category "W" or "S"	Sub Category	Component type	Project Budget / Funding Sources										MTEF Project Source
								Prev spent FY2015/16	FY2018/19 Budget	Own	MIG	RBIG	ACIP	DR	MWIG	Other	Total Cost	
1. Infrastructure Projects								**R0**	**R9,655**								**R9,655**	
	-	Refurbishment and upgrade of	Refurbishment and upgrade of	Capacity	Sanitation	Bulk	WWTW		**R9,505**	R9,505							**R9,505**	MTREF
	-	Basket screens for pumpstations	Screens for sewer pumpstations	Operation	Sanitation	Bulk	Pump		**R150**	R150							**R150**	MTREF
2. Source Development Projects								**R0**	**R0**								**R0**	
																	R0	
3. Demand Management projects								**R0**	**R200**								**R200**	
	-	Pipe Replacement Programme	Replace old water pipelines	WC/WDM	Water	WC/WDM	Pipelines		**R200**	R200							**R200**	MTREF
4. O&M Commitments								**R0**	**R1,510**								**R1,510**	
Operations																		
	MATR0171	Purchase new borehole pumps	Replace borehole pumps	Operation	Water	Bulk	Pumps		**R50**	R50							**R50**	MTREF
	WATR0103	Pumps (standby)	Standby Pumps	Operation	Water	Reticulation	Pumps		**R220**	R220							**R220**	MTREF
	-	Telemetry	Telemetry	Operation	Water	Bulk	Other		**R100**	R100							**R100**	MTREF
	WATR0102	Water meter at source	Install additional bulk water meters	Operation	Water	Bulk	Other		**R200**	R200							**R200**	MTREF
	WATR0093	Dam Safety report (Waboomspruit)	Dam Safety	Operation	Water	Bulk	Source		**R35**	R35							**R35**	MTREF
	WATR0097	Dam safety report (Porterville Dam)	Dam Safety	Operation	Water	Bulk	Source		**R35**	R35							**R35**	MTREF
	MATR0158	Switchgear and pumps	Switchgear and pumps	Operation	Sanitation	Bulk	Pumps		**R120**	R120							**R120**	MTREF
	RIOL0043	Telemetry	Telemetry	Operation	Sanitation	Bulk	Other		**R80**	R80							**R80**	MTREF
	MATR0157	Sewerage standby pumps	Standby Pumps	Operation	Sanitation	Drainage	Pumps		**R180**	R180							**R180**	MTREF
Maintenance																		
	WATR0073	Replace water meters	Replace old water meters	Maintenance	Water	WC/WDM	Other		**R120**	R120							**R120**	MTREF
	WATR0095	Replace redundant meters	Replace old water meters	Maintenance	Water	WC/WDM	Other		**R150**	R150							**R150**	MTREF
	WATR0101	Presure valve (Renew)	Replace PRV	Maintenance	Water	WC/WDM	Other		**R100**	R100							**R100**	MTREF
	–	Water Renewals	Water Renewals	Maintenance	Water	Reticulation	Pipelines		**R60**	R60							**R60**	MTREF
	–	Sewer Renewals	Sewer Renewals	Maintenance	Sanitation	Drainage	Pipelines		**R60**	R60							**R60**	MTREF
5. Institutional								**R0**	**R0**								**R0**	
																	R0	
6. Water Services Programmes								**R0**	**R0**								**R0**	
Awareness Programs																	**R0**	
																	R0	
WASH Programs																	**R0**	
																	R0	
		Total						**R0**	**R11,365**								**R11,365**	

SECTION F: WSDP PROJECTS

The identification of projects necessary to ensure the provision of adequate levels of water and sanitation services is based primarily on the findings of the Water and Sewer Master Plans, in consultation with the Municipality's town planning consultants. Master Planning is typically based on a forward planning horizon of 20 years, but is usually updated every three to five years, taking into account improved water demand estimates and subsequent infrastructure developments which may have taken place. Water and Sewer Master Plans were drafted for Bergrivier Municipality by GLS Consulting during 2015 for all the systems. The recommended projects from these Master Plans were incorporated into the WSDP.

The Master Plans represent the ideal infrastructure development required to meet projected water demands over the next few years, while realistic capital investment in infrastructure projects is determined by budget availability. As a result, prioritization of projects is necessary to identify what can be done within the available and projected budget constraints. The prioritization of projects is done through the IDP and annual budget planning process. Recommended infrastructure projects for implementation in the future will be based on the following plans and processes:

- Water and Sewer Master Plans for the internal water reticulation and sewer drainage networks and Waste Water Treatment Works Master Plans and Process Audits.
- Infrastructure replacement needs (Asset Register)
- Budget proposals
- Asset Management Plans

Bergrivier Municipality's two key capital infrastructure projects for the next three years are as follows:

- Complete the construction of the new 5 Ml reservoir in Velddrif.
- Upgrading and refurbishment of the Porterville WWTW.

The new NWRS 2 list the following steps to raise the water profile in development planning:

- Water must be placed at the centre of integrated planning and decision-making, with a specific aim to respond to and support the achievement of national development and sector goals.
- Current budgets need to adequately provide for water, which might mean they have to be doubled to cater for the present needs.
- Current financial values need to appreciate water as a scarce resource and should thus reflect the real value of water. This requires a new value system across all sectors and stakeholders.
- Water efficiency and curbing water losses should be high on the agenda of each individual and institution in the country.
- Water management must be formally embedded in the sector businesses with associated accountability.

The DWS will insist in the future that all water infrastructure which they fund is value engineered against the life-cycle cost with a specific emphasis on energy costs. Evidence will be required that the technical design is appropriate for the nature of the resource and that operation and maintenance of the assets is reasonably within the capability of the responsible institution. New water resources infrastructure will also not be developed or authorized unless effective WC/WDM interventions have been put in place in the affected area.

Bergrivier Municipality's implementation strategies, with regard to new water and sewerage infrastructure, are as follows:

- Take the recommended projects, as identified through the Water and Sewer Master Plans and the WSDP, into account during the planning and prioritization process for new infrastructure. Prioritize from the desired list, those items which can be implemented from available funding in the particular financial year.

- Undertake revised master planning at least every three to five years and to use the Master Plans to list the desired infrastructure development requirements and reflect these in the IDP.

- Assign a high priority to the implementation of the approved WC/WDM Strategy in order to postpone additional capital investment for as long as possible, both from the water availability perspective as well as from the treatment of increased effluent volumes. The costs of physical water loss, the capital requirements for new water resources infrastructure, and the constraints of poor water availability on water dependent economic growth means that WC/WDM is a critical management priority for stretching the financial resources of the Municipality. WC/WDM is almost always a more cost-effective solution than the implementation of new infrastructure, and no new infrastructure should be developed until unauthorized water has been reduced to manageable volumes.

- To adopt appropriate technology solutions for the water and sewerage infrastructure challenges. Techniques such as value engineering should also be adopted to ensure that investments in infrastructure and other solutions are cost effective over the full life-cycle and designed to be fit for purpose.

- To ensure adequate funding for the full lifecycle cost of the new water and sewerage infrastructure, which will include funds for the operation and maintenance of the infrastructure and regular refurbishment.

- Balance land-use and development planning (SDFs) in accordance with the availability of water and the capacity of WTWs and WWTWs that are in place or that will be implemented.

The current needs projects are estimated at R55.527 million of which 70% are funded, as included in the MTEF project list. It should however be emphasised that additional funding will be required to address the full achievement of the water services strategies as outlined in Sections C and D, but that the extent of such additional funding can only be determined, once initial investigations and activities have been concluded.

Table F.1: WSDP FY2016/17: LIST OF CONCEPTUAL PROJECTS

Nr	Situation Assessment (Problem Definition)	Solution description as defined by topic situation assessment (Strategy)	Conceptual project	Is there an existing project addressing this problem?	Existing Projects Information			Does this current listed project address the problem totally?	Approved by Council, in project database and part of 5 year IDP cycle projects?	Project listed in 3yr MTEF - cycle?
					Project Number	Project Title	Project Cost R'000			
CURRENT NEEDS										
Water Services Development Planning										
1.1	WSDP Performance and Water Services Audit Report needs to be drafted annually	Compile annual WSDP Performance and Water Services Audit Report	WSDP	Yes	O&M	Compile annual WSDP Performance and Water Services Audit Report	R175	Yes	Yes	Yes
1.2	Regular updating of WSDP	Update WSDP every two to three years	WSDP	Yes	O&M	Regular updating of WSDP	R400	Yes	Yes	Yes
Business Element 2: Demographics (Topic 2)										
	Done by other Department									
Business Element 3: Service Levels (Topic 3)										
3.1	Some households on the farms without basic water services.	Ensure all households on farms and in the Moravian Church settlements are provided with at least basic water services, subject to DWS guidance.	WSDP	No		Provide basic water services on the farms in the rural areas and at the Moravian Church settlements for all the households without basic water services.	R792	Yes	No	No
3.2	Some households on the farms without basic sanitation services.	Ensure all households on the farms and in the Moravian Church settlements are provided with at least basic sanitation services, subject to DWS guidance.	WSDP	No		Provide basic sanitation services on the farms in the rural areas and at the Moravian Church settlements for all the households without basic sanitation services.	R9,024	Yes	No	No
Business Element 4: Socio-Economic Background (Topic 4)										
	Done by other Department									
Business Element 5: Water Services Infrastructure Management (Topic 5)										
	Inadequate reservoir storage capacity	Additional reservoir storage capacity for Velddrif	MTEF Project	Yes	WATR0098	Build new 5 Ml reservoir for Velddrif	R5,562	Yes	Yes	Yes
	Existing bulk pipeline capacity is inadequate	Increase bulk pipeline capacity	MTEF Project	Yes	-	Install new water pump pipeline for Porterville	R1,250	Yes	Yes	Yes
	Existing bulk pipeline capacity is inadequate	Increase bulk pipeline capacity	MTEF Project	Yes	-	Install new water pump pipeline for Velddrif	R1,250	Yes	Yes	Yes
	Existing filtration capacity is inadequate	Ensure adequate filtration capacity	MTEF Project	Yes	WATR0105	Install Ozone filters at Albatros Street	R35	Yes	Yes	Yes
	Existing WWTW is not fenced	Improve safety and security at WWTW	MTEF Project	Yes	-	Provide fence at WWTW	R120	Yes	Yes	Yes
	Sewer blockages on pipelines	Provide screens at sewer pump stations	MTEF Project	Yes	-	Basket screens for pumpstations	R300	No	Yes	Yes
	Existing WWTW needs to be refurbished and the capacity of the WWTW needs to be increased.	Reduce CRR of WWTW and ensure adequate refurbishment of the existing WWTW	MTEF Project	Yes	-	Refurbishment and upgrade of the Porterville WWTW	R25,704	No	Yes	Yes
	Existing pump capacity is inadequate	Ensure adequate drainage capacity	MTEF Project	Yes	-	Pump Station with sewer line at Dwarskersbos	R800	Yes	Yes	Yes
Business Element 6: Operation and Maintenance (Topic 6)										
	Existing borehole pumps need to be replaced.	Sustainable operation of boreholes	MTEF Project	Yes	MATR0171	Purchase new borehole pumps	R150	Yes	Yes	Yes
	Dam Safety Reports need to be done	Dam Safety Assessment (Eendekuil)	MTEF Project	Yes	WATR0093	Dam Safety report (Waboomspruit)	R70	Yes	Yes	Yes
	Dam Safety Reports need to be done	Dam Safety Assessment (Porterville)	MTEF Project	Yes	WATR0097	Dam Safety report (Porterville Dam)	R70	Yes	Yes	Yes
	High pressure result in higher water losses and NRW	Implement Pressure Management	MTEF Project	Yes	WATR0101	Replace PRV	R100	Yes	Yes	Yes
	Inadequate standby pump capacity	Sustainable operation of pump stations	MTEF Project	Yes	WATR0103	Provide standby water pumps	R650	No	Yes	Yes
	Existing telemetry system needs to be upgraded	Telemetry system to monitor water supply	MTEF Project	Yes	-	Water Telemetry	R300	No	Yes	Yes
	Some of the existing infrastructure needs to be refurbished	Refurbishment of existing water infrastructure	MTEF Project	Yes	-	Water Renewals	R160	No	Yes	Yes
	Inadequate standby pump capacity	Prevent any possible spillages from sewer pump stations	MTEF Project	Yes	MATR0157	Provide standby sewerage pumps	R510	No	Yes	Yes
	Existing telemetry system needs to be upgraded	Telemetry system to monitor flows and sewer pump stations	MTEF Project	Yes	RIOL0043	Sewerage Telemetry	R180	No	Yes	Yes
	Some of the existing infrastructure needs to be refurbished	Refurbishment of existing sewerage infrastructure	MTEF Project	Yes	-	Sewer Renewals	R160	No	Yes	Yes
	Inadequate sewer pump capacity	Ensure adequate sewer pump capacity	MTEF Project	Yes	MATR0158	Provide switchgear and pumps for sewer pump stations	R360	No	Yes	Yes
	WTW Process Audits need to be done annually	Sustainable operation	WSDP	Yes		Annual WTW Process Audits	R150	Yes	No	No
	WWTW Process Audits need to be done annually	Sustainable operation	WSDP	Yes		Annual WWTW Process Audits	R150	Yes	No	No

Table F.1: WSDP FY2016/17: LIST OF CONCEPTUAL PROJECTS

Nr	Situation Assessment (Problem Definition)	Solution description as defined by topic situation assessment (Strategy)	Conceptual project	Is there an existing project addressing this problem?	Existing Projects Information			Does this current listed project address the problem totally?	Approved by Council, in project database and part of 5 year IDP cycle projects?	Project listed in 3yr MTEF - cycle?
					Project Number	Project Title	Project Cost R'000			
CURRENT NEEDS										
Business Element 7: Associated Services (Topic 7)										
	None									
Business Element 8: Conservation and Demand Management - Water Resource (Topic 8.1)										
	Some of the water reticulation networks are old, which result in regular pipe bursts.	Implement Pipeline Replacement Programme to reduce water losses and NRW.	MTEF Project	Yes	-	Pipeline Replacement Programme	R400	No	Yes	Yes
	A survey needs to be done in order to ensure that all residential properties and other properties are metered and also to determine the age of the existing water meters.	Ensure all properties are metered and determine the age of the existing water meters in order to implement a Meter Management and Replacement Programme.	WSDP	No		Compile a detail water meter audit	R1,500	Yes	No	No
	Reduce water losses and NRW for the various towns	Implement WC/WDM Strategy	WSDP	Partly		Implement WC/WDM Measures	R3,000	No	Partly	Partly
Business Element 8: Conservation and Demand Management - Water Balance (Topic 8.2 & 8.3)										
	Some of the water meters are old and need to be replaced (less accurate).	Keep water losses and NRW as low as possible	MTEF Project	Yes	WATR0073	Replace water meters	R360	No	Yes	Yes
	Some of the existing water meters are redundant	Keep water losses and NRW as low as possible	MTEF Project	Yes	WATR0095	Replace redundant meters	R370	No	Yes	Yes
	Additional bulk water meters need to be installed at some of the existing water resources.	Ensure all bulk water abstracted is metered	MTEF Project	Yes	WATR0102	Water meter at source	R275	No	Yes	Yes
	WWTW flows at the Eendekuil and Dwarskersbos WWTW are not yet monitored.	Ensure all WWTW flows are metered and recorded	WSDP	No		Install flow meters at the Eendekuil and Dwarskersbos WWTW	R600	Yes	No	No
Business Element 9: Water Resources (Topic 9)										
	Groundwater resources in Aurora, Eendekuil and Wittewater needs to be managed in a sustainable manner.	A Groundwater monitoring programme needs to be implemented.	WSDP	No		Implement a Groundwater Monitoring Programme	R300	No	No	No
	Industrial consumers not yet monitored wrt quality and quantity of effluent discharged	Ensure that all industrial consumers are monitored wrt the quality and quantity of effluent discharged by them	WSDP	No		Monthly monitoring of industrial effluent	R300	Yes	No	No
Business Element 10: Financial Profile (Topic 10)										
	Done by other Department									
Business Element 11: Water Services Institutional Arrangements (Topic 11)										
	Done internally									
Business Element 12: Social and Customer Service Requirements (Topic 12)										
	Done internally									
TOTAL: CURRENT NEEDS							**R55,527**			
	Funded						R39,136			
	% funded						70%			

Table F.1: WSDP FY2016/17: LIST OF CONCEPTUAL PROJECTS

Nr	Situation Assessment (Problem Definition)	Solution description as defined by topic situation assessment (Strategy)	Conceptual project	Is there an existing project addressing this problem?	Existing Projects Information			Does this current listed project address the problem totally?	Approved by Council, in project database and part of 5 year IDP cycle projects?	Project listed in 3yr MTEF - cycle?
					Project Number	Project Title	Project Cost R'000			
FUTURE NEEDS										
Infrastructure										
F.1	Inadequate capacity of existing bulk water pipelines	Ensure adequate bulk water pipeline capacity	Water Master Plan	No	Various	Future bulk water pipeline items for Piketberg	R930	Yes	No	No
F.2			Water Master Plan	No	Various	Future bulk water pipeline items for Velddrif	R304	Yes	No	No
F.3			Water Master Plan	No	Various	Future bulk water pipeline items for Dwarskersbos	R181	Yes	No	No
F.4			Water Master Plan	No	Various	Future bulk water pipeline items for Redelinghuys	R60	Yes	No	No
F.5			Water Master Plan	No	Various	Future bulk water pipeline items for Goedverwacht	R265	Yes	No	No
F.6	Inadequate capacity of existing water pump stations	Ensure adequate water pump capacity	Water Master Plan	No	Various	Future water pump station items for Piketberg	R3,031	Yes	No	No
F.7			Water Master Plan	No	Various	Future water pump station items for Velddrif	R4,217	Yes	No	No
F.8			Water Master Plan	No	Various	Future water pump station items for Dwaskersbos	R1,611	Yes	No	No
F.9			Water Master Plan	No	Various	Future water pump station items for Eendekuil	R1,790	Yes	No	No
F.10			Water Master Plan	No	Various	Future water pump station items for Goedverwacht	R893	Yes	No	No
F.11	Existing reservoir capacity is inadequate to meet future reservoir storage requirements.	Ensure adequate reservoir storage capacity	Water Master Plan	No	Various	Future reservoir items for Porterville	R10,259	Yes	No	No
F.12			Water Master Plan	No	Various	Future reservoir items for Piketberg	R8,845	Yes	No	No
F.13			Water Master Plan	Yes	Various	Future reservoir items for Velddrif	R22,540	Yes	Partly	Partly
F.14			Water Master Plan	No	Various	Future reservoir items for Dwarskersbos	R8,061	Yes	No	No
F.15			Water Master Plan	No	Various	Future reservoir items for Aurora	R2,408	Yes	No	No
F.16			Water Master Plan	No	Various	Future reservoir items for Eendekuil	R3,766	Yes	No	No
F.17			Water Master Plan	No	Various	Future reservoir items for Redelinghuys	R2,408	Yes	No	No
F.18			Water Master Plan	No	Various	Future reservoir items for Goedverwacht	R3,570	Yes	No	No
F.19	Inadequate capacity of existing internal water reticulation networks	Ensure adequate internal water reticulation capacity	Water Master Plan	No	Various	Future internal reticulation items for Porterville	R13,306	Yes	No	No
F.20			Water Master Plan	No	Various	Future internal reticulation items for Piketberg	R8,479	Yes	No	No
F.21			Water Master Plan	No	Various	Future internal reticulation items for Velddrif	R8,131	Yes	No	No
F.22			Water Master Plan	No	Various	Future internal reticulation items for Dwarskersbos	R1,024	Yes	No	No
F.23			Water Master Plan	No	Various	Future internal reticulation items for Aurora	R1,581	Yes	No	No
F.24			Water Master Plan	No	Various	Future internal reticulation items for Eendekuil	R2,902	Yes	No	No
F.25			Water Master Plan	No	Various	Future internal reticulation items for Redelinghuys	R1,526	Yes	No	No
F.26			Water Master Plan	No	Various	Future internal reticulation items for Goedverwacht	R465	Yes	No	No
F.27			Water Master Plan	No	Various	Future internal reticulation items for Wittewater	R109	Yes	No	No
F.28	Reduce NRW	Implementation of WDM measures	Water Master Plan	No	BGR1415042	Future WDM items for Bergrivier Municipality	R4,470	No	No	No
F.29	Inadequate capacity of existing sewer pump stations	Ensure adequate sewer pump capacity	Sewer Master Plan	No	Various	Future sewer pump stations for Porterville	R365	Yes	No	No
F.30			Sewer Master Plan	No	Various	Future sewer pump stations for Velddrif	R3,364	Yes	No	No
F.31			Sewer Master Plan	No	Various	Future sewer pump stations for Dwarskersbos	R1,746	Yes	No	No
F.32			Sewer Master Plan	No	Various	Future sewer pump stations for Redelinghuys	R140	Yes	No	No
F.33	Inadequate capacity of existing internal sewer drainage network	Ensure adequate internal sewer drainage capacity	Sewer Master Plan	No	Various	Future internal sewer drainage network items for Porterville	R1,031	Yes	No	No
F.34			Sewer Master Plan	No	Various	Future internal sewer drainage network items for Piketberg	R2,019	Yes	No	No
F.35			Sewer Master Plan	No	Various	Future internal sewer drainage network items for Velddrif	R38,787	Yes	No	No
F.36			Sewer Master Plan	No	Various	Future internal sewer drainage network items for Dwarskersbos	R7,483	Yes	No	No
F.37			Sewer Master Plan	No	Various	Future internal sewer drainage network items for Aurora	R9,166	Yes	No	No
F.38			Sewer Master Plan	No	Various	Future internal sewer drainage network items for Eendekuil	R4,702	Yes	No	No
F.39			Sewer Master Plan	No	Various	Future internal sewer drainage network items for Redelinghuys	R9,047	Yes	No	No
F.40			Sewer Master Plan	No	Various	Future internal sewer drainage network items for Goedverwacht	R15,447	Yes	No	No
F.41			Sewer Master Plan	No	Various	Future internal sewer drainage network items for Wittewater	R5,468	Yes	No	No

Table F.1: WSDP FY2016/17: LIST OF CONCEPTUAL PROJECTS

Nr	Situation Assessment (Problem Definition)	Solution description as defined by topic situation assessment (Strategy)	Conceptual project	Is there an existing project addressing this problem?	Existing Projects Information			Does this current listed project address the problem totally?	Approved by Council, in project database and part of 5 year IDP cycle projects?	Project listed in 3yr MTEF - cycle?
					Project Number	Project Title	Project Cost R'000			
FUTURE NEEDS										
F.42	Capacity of existing WTW is inadequate to meet future requirements	Ensure adequate water treatment capacity	WSDP	No		Increase capacity of Piketberg WTW	R15,000	Yes	No	No
F.43	Capacity of existing WTW is inadequate to meet future requirements	Ensure adequate water treatment capacity	WSDP	No		Increase capacity of Aurora WTW	R4,000	Yes	No	No
F.44	Capacity of existing WTW is inadequate to meet future requirements	Ensure adequate water treatment capacity	WSDP	No		Increase capacity of Eendekuil WTW	R8,000	Yes	No	No
F.45	No WWTW	Ensure adequate treatment capacity	WSDP	No	BGR1415010	Construction of oxidation ponds for Goedverwacht	R12,000	Yes	No	No
F.46	No WWTW	Ensure adequate treatment capacity	WSDP	No	BGR1415039	Construction of oxidation ponds for Wittewater	R6,500	Yes	No	No
F.47	No WWTW	Ensure adequate treatment capacity	WSDP	No	BGR1415002	Construction of oxidation ponds for Aurora	R12,000	Yes	No	No
F.48	No WWTW	Ensure adequate treatment capacity	WSDP	No	BGR1415029	Construction of oxidation ponds for Redelinghuys	R12,000	Yes	No	No
F.49	Capacity of existing WWTW is inadequate	Ensure adequate treatment capacity	WSDP	No	BGR1415004	Upgrade Dwarskersbos WWTW	R10,000	Yes	No	No
F.50	Capacity of existing WWTW is inadequate	Ensure adequate treatment capacity	WSDP	No	BGR1415032	Upgrade Velddrif WWTW Phase 2	R38,000	Yes	No	No
F.51	Existing bulk water pipeline capacity is inadequate	Ensure adequate bulk water pipeline capacity	WSDP	No	BGR1415019	Phase 2 Main supply for Porterville	R3,700	Yes	No	No
F.52	Existing bulk water pipeline capacity is inadequate	Ensure adequate bulk water pipeline capacity	WSDP	No	BGR1415020	Phase 3 Main supply for Porterville	R5,200	Yes	No	No
F.53	Existing raw water storage capacity is inadequate to meet future storage requirements.	Ensure adequate raw water storage capacity	WSDP	No	BGR1415024	Phase 4 upgrading of dam for additional raw water storage	R6,000	Yes	No	No
F.54	Capacity of existing bulk water infrastructure is inadequate to meet future requirements.	Ensure adequate bulk water supply capacity	WSDP	No	BGR1415009	Upgrade inlet structure, bulk pipeline capacity and PS capacity at Goedverwacht	R4,100	Yes	No	No
F.55	Capacity of existing bulk water infrastructure is inadequate to meet future requirements.	Ensure adequate bulk water supply capacity	WSDP	No	BGR1415007	Upgrade bulk water supply capacity at Eendekuil	R4,200	Yes	No	No
F.56	Existing resources are inadequate to meet future water requirements.	Ensure adequate water resources to meet future water requirements.	WSDP	No	BGR1415013	New external water supply for Piketberg	R7,000	Yes	No	No
F.57	Capacity of existing water reticulation network and WTW are inadequate to meet future requirements.	Ensure adequate network and WTW capacity	WSDP	No	BGR1415038	Upgrading of water network and WTW at Wittewater	R2,500	Yes	No	No
Resources										
F.58	Yields of some of the existing water resources are inadequate to meet future water requirements.	Ensure adequate water resources (Yields) to meet future water requirements.	WSDP	No	BGR1415041	Water resource investigation	R1,500	Yes	No	No
TOTAL: FUTURE NEEDS							**R367,593**			