

## WATER SERVICES DEVELOPMENT PLAN MASTER PLAN

### INDEX

DESCRIPTION	PAGE NO
<b>LIST OF TABLES.....</b>	<b>vi</b>
<b>ABBREVIATIONS AND DEFINITIONS .....</b>	<b>x</b>
<b>1. SETTLEMENT DEMOGRAPHICS AND PUBLIC AMENITIES.....</b>	<b>1.1</b>
1.1 SETTLEMENTS DEMOGRAPHICS.....	1.1
1.2 PUBLIC AMENITIES .....	1.7
1.3 SOCIO ECONOMIC BACKGROUND .....	1.7
1.3.1 Population and Households.....	1.7
1.3.2 Population Growth Rates.....	1.8
1.3.3 Age and Gender Profile .....	1.8
1.3.4 Employment Profile .....	1.8
1.3.5 Household Income.....	1.9
<b>2. SERVICE LEVELS PROFILE .....</b>	<b>2.1</b>
2.1 RESIDENTIAL WATER PROFILE .....	2.7
2.2 RESIDENTIAL SANITATION PROFILE.....	2.8
2.3 PUBLIC AMENITIES .....	2.9
2.3.1 Water Services .....	2.9
2.3.2 Sanitation Services.....	2.11
<b>3. WATER SERVICES ASSET MANAGEMENT .....</b>	<b>3.1</b>
3.1 GENERAL INFORMATION .....	3.1
3.1.1 Asset Management Plan .....	3.1
3.1.2 Disaster Management Plan .....	3.2
3.1.3 Untreated Effluent Management Plan .....	3.7
3.2 FUTURE WATER AND SEWERAGE INFRASTRUCTURE REQUIREMENTS .....	3.7
3.2.1 Groundwater infrastructure (Boreholes) .....	3.8
3.2.2 Surface water infrastructure (Abstraction Points).....	3.9
3.2.3 Bulk water pipeline infrastructure .....	3.10
3.2.4 Water Treatment Works infrastructure .....	3.13
3.2.5 Water pump stations.....	3.14
3.2.6 Reservoir infrastructure .....	3.17
3.2.7 Water reticulation infrastructure .....	3.19
3.2.8 Bulk sewer pipeline and sewer drainage network infrastructure .....	3.21

3.2.9	Sewer pump stations .....	3.25
3.2.10	Waste Water Treatment Works .....	3.26
3.3	<b>WATER AND SANITATION SCHEMES .....</b>	<b>3.28</b>
3.3.1	Water Schemes .....	3.28
3.3.2	Sanitation Schemes.....	3.29
<b>4.</b>	<b>WATER SERVICES OPERATION AND MAINTENANCE .....</b>	<b>4.1</b>
4.1	OPERATION AND MAINTENANCE PLAN .....	4.2
4.1.1	Groundwater Infrastructure .....	4.3
4.1.2	Surface Water Infrastructure .....	4.6
4.1.3	Bulk and Water Network Reticulation Networks and Fittings .....	4.7
4.1.4	Water Treatment Works .....	4.8
4.1.5	Water Pump Stations.....	4.14
4.1.6	Reservoirs .....	4.16
4.1.7	Remote Monitoring and Control Systems.....	4.17
4.1.8	Sewer Pump Stations .....	4.19
4.1.9	Bulk and Sewer Drainage Networks.....	4.21
4.1.10	Waste Water Treatment Works .....	4.22
<b>5.</b>	<b>CONSERVATION AND DEMAND MANAGEMENT .....</b>	<b>5.1</b>
5.1	WATER RESOURCE MANAGEMENT .....	5.14
5.1.1	Reducing Unaccounted Water and Water Inefficiencies .....	5.14
5.1.1.1	Night flow metering .....	5.16
5.1.1.2	Day flow metering .....	5.17
5.1.1.3	Reticulation leaks .....	5.17
5.1.1.4	Illegal connections .....	5.18
5.1.1.5	Un-metered connections .....	5.19
5.1.2	Leak and Meter Repair Programmes .....	5.19
5.1.2.1	Leak Repair Assistance Programmes .....	5.19
5.1.2.2.	Retro-fitting of water efficient toilets .....	5.21
5.1.2.3	Meter repair programme.....	5.22
5.1.3	Consumer / End-use Demand Management: Public Information and Education Programmes .....	5.22
5.1.3.1	Schools targeted by Education Programmes .....	5.23
5.1.3.2	Consumers targeted by Public Information Programmes .....	5.23
5.1.4	Conjunctive use of Surface- and Groundwater .....	5.24
5.1.5	Working for Water.....	5.24
5.1.6	Water Resource Management Projects .....	5.25
5.2	WATER BALANCE .....	5.25
5.2.1	IWA Water Balance for Plettenberg Bay .....	5.26

<b>INDEX</b>
--------------

- 5.2.2 IWA Water Balance for Kurland .....5.27
- 5.2.3 IWA Water Balance for Natures Valley .....5.27
- 5.2.4 IWA Water Balance for Harkerville .....5.27
- 5.2.5 IWA Water Balance for Covie .....5.27
- 5.3 WATER LOSSES .....5.27
- 6. WATER RESOURCES..... 6.1**
- 6.1 SOURCES AND VOLUMES .....6.2
- 6.2 MONITORING .....6.8
- 6.2.1 Percentage of Water Abstracted Monitored: Surface Water .....6.8
- 6.2.2 Percentage of Water Abstracted Monitored: Groundwater .....6.8
- 6.2.3 Percentage of Water Abstracted Monitored: External Sources (Bulk Purchase) .....6.9
- 6.2.4 Surface Water Levels .....6.9
- 6.2.5 Groundwater Water Levels .....6.9
- 6.2.6 Water Quality for Formal Schemes .....6.9
- 6.2.7 Water Quality for Rudimentary Schemes .....6.10
- 6.2.8 Borehole Abstraction .....6.10
- 6.3 WATER QUALITY .....6.11
- 6.3.1 Reporting on Quality of Water taken from Source: Urban and Rural .....6.16
- 6.3.2 Quality of Water Returned to the Resource: Urban .....6.20
- 6.3.3 Quality of Water Returned to the Resource: Rural .....6.26
- 6.3.4 Pollution Contingency Measures Plan .....6.26
- 6.3.5 Quality of Water taken from Source: Urban – Percentage Monitored by WSA .....6.26
- 6.3.6 Quality of Water taken from Source: Rural – Percentage Monitored by WSA .....6.27
- 6.3.7 Quality of Water Returned to the Source: Urban – Percentage Monitored by WSA .....6.27
- 6.3.8 Quality of Water Returned to the Source: Rural – Percentage Monitored by WSA .....6.28
- 6.3.9 Water Quality Results in Electronic Format .....6.28
- 6.3.10 Percentage Time (Days) within SANS241 Standards per Year .....6.28
- 6.4 OPERATION .....6.28
- 7. FINANCIAL PROFILE..... 7.1**
- 7.1 EXPENDITURE .....7.2
- 7.1.1 Ratios and Efficacy Indicators .....7.2
- 7.1.2 Water Balance Cost / Revenue .....7.3
- 7.1.3 Operating Cost .....7.4
- 7.1.3.1 Operating Cost: Water .....7.5
- 7.1.3.2 Operating Cost: Sanitation .....7.5
- 7.1.4 Capital Expenditure .....7.6
- 7.1.4.1 Capital Expenditure: Water .....7.8

7.1.4.2	Capital Expenditure: Sanitation .....	7.9
7.2	INCOME .....	7.11
7.2.1	Operating Income .....	7.11
7.2.1.1	Operating Income: Subsidies .....	7.12
7.2.1.2	Operating Income: Water .....	7.13
7.2.1.3	Operating Income: Sanitation .....	7.13
7.2.2	Capital Income.....	7.13
7.2.2.1	Capital Income: Water .....	7.14
7.2.2.2	Capital Income: Sanitation .....	7.14
7.3	TARIFF AND CHARGES.....	7.14
7.4	FREE BASIC SERVICES .....	7.17
7.5	METERING, BILLING AND INCOME.....	7.17
<b>8.</b>	<b>WATER SERVICES INSTIUTIONAL ARRANGEMENTS AND CUSTOMER SERVICES .....</b>	<b>8.1</b>
8.1	MUNICIPAL STRATEGIC SELF-ASSESSMENT (MuSSA).....	8.1
8.1.1	Water and Sanitation Services Planning .....	8.1
8.1.2	Management Skill Level (Technical) .....	8.1
8.1.3	Staff Skill Level (Technical) .....	8.2
8.1.4	Technical Staff Capacity (Numbers).....	8.4
8.1.5	Water Resource Management (WRM) .....	8.4
8.1.6	Water Conservation and Water Demand Management (WC/WDM).....	8.4
8.1.7	Drinking Water Safety and Regulatory Compliance .....	8.4
8.1.8	Basic Sanitation.....	8.9
8.1.9	Waste Water / Environmental Safety and Regulatory Compliance.....	8.9
8.1.10	Infrastructure Asset Management (IAM) .....	8.10
8.1.11	Operation and Maintenance of Assets .....	8.10
8.1.12	Financial Management .....	8.10
8.1.13	Revenue Collection .....	8.11
8.1.14	Financial Asset Management .....	8.11
8.1.15	Information Management (IT).....	8.11
8.1.16	Organisational Performance Monitoring.....	8.11
8.1.17	Water and Sanitation Service Quality.....	8.12
8.1.18	Customer Care (CRM).....	8.13

**9. EXISTING NEEDS PERSPECTIVE, WATER MASTER PLAN PERSPECTIVE AND OVERALL TOPIC STRATEGIES..... 9.1**

9.1 Existing Needs Perspective..... 9.1

9.2 Water Master Plan Perspective..... 9.5

9.3 Overall Topic Strategies ..... 9.9

**ANNEXURES**

**ANNEXURE A (Water and Sewer Master Plans)**

Figure BMW 4.1a: Potential future developments – Plettenberg Bay & Harkerville

Figure BMW 4.1b: Potential future developments – Kurland & Natures Valley

Figure BMW 6.4a: Future distribution zones - Plettenberg Bay & Harkerville

Figure BMW 6.4b: Future distribution zones – Kurland & Natures Valley

Figure BMS 6.3a: Future drainage areas – Plettenberg Bay

Figure BMS 6.3b: Future drainage areas - Kurland

Figure BMW 6.5a: Required works – Plettenberg Bay & Harkerville

Figure BMW 6.5b: Required works – Kurland & Natures Valley

Figure BMS 6.4a: Required works – Plettenberg Bay

Figure BMS 6.4b: Required works – Kurland

Table BMW6.4a: Proposed works, cost estimates & phasing - Future System

Table BMW6.4b: Proposed projects, cost estimates & phasing - Future System

Table BMW6.4c: Priority water projects - Bitou Municipality

Table BMS6.5a: Proposed works, cost estimates & phasing - Future System

Table BMS6.5b: Proposed projects, cost estimates & phasing - Future System

Table BMS6.5c: Priority sewer projects - Bitou Municipality

**ANNEXURE B (Future Water Requirement Projections)**

- Plettenberg Bay Water Projection
- Kurland Water Projection
- Natures Valley Water Projection

**REFERENCES**

**1. SETTLEMENT DEMOGRAPHICS AND PUBLIC AMENITIES**

Table 1.1	Master Plan for settlement demographics and public amenities.....	1.1
Table 1.1.1	Spatial Structure and Development proposals for the various towns, as included in the SDF .....	1.1
Table 1.1.2	Three Year Housing Pipeline .....	1.6
Table 1.3.1.1	Projected future population .....	1.7
Table 1.3.1.2	Estimated number of permanent future households .....	1.7
Table 1.3.3.1	Age Cohorts, 2019 - 2025 .....	1.8

**2. SERVICE LEVELS PROFILE**

Table 2.1	Master Plan for service levels .....	2.5
Table 2.2	Norms and standards for levels of water supply services .....	2.6
Table 2.3	Norms and standards for levels of sanitation services .....	2.6
Table 2.4	Interim water and sanitation services (National Norms and Standards for Domestic Water and Sanitation Services).....	2.7

**3. WATER SERVICE ASSET MANAGEMENT**

Table 3.1	Master Plan for Water Services Asset Management .....	3.1
Table 3.1.2.1	Disaster risks and risk reduction recommendations .....	3.2
Table 3.2.1	Challenges for water provision and sanitation reticulation .....	3.7
Table 3.2.2	Summary of the future water infrastructure requirements for Bitou Municipality, as included in the 2020 Water Master Plan .....	3.7
Table 3.2.3	Summary of the future sewer infrastructure requirements for Bitou Municipality, as included in the 2020 Sewer Master Plan.....	3.8
Table 3.2.1.1	Key groundwater management functions.....	3.8
Table 3.2.2.1	Current raw water storage capacity available, the current water requirements of the towns and number of days for which storage is available.....	3.9
Table 3.2.3.1	Future bulk water supply pipelines required.....	3.10
Table 3.2.3.2	Cost of future bulk water supply pipelines required .....	3.11
Table 3.2.4.1	Existing capacities and flows at each of the WTWs (Ml/d) .....	3.13
Table 3.2.4.2	WTWs to be upgraded in the future .....	3.13
Table 3.2.4.3	Recommended improvements for the WTWs as identified during the WSDP inspection .....	3.14
Table 3.2.5.1	Future water pump stations required .....	3.16
Table 3.2.6.1	Future reservoir storage capacities required.....	3.19
Table 3.2.7.1	Future water reticulation infrastructure required .....	3.19
Table 3.2.7.2	Future water demand management infrastructure required.....	3.21
Table 3.2.8.1	Future bulk sewer pipeline and sewer drainage network infrastructure required .....	3.21
Table 3.2.9.1	Future sewer pump stations required.....	3.25
Table 3.2.10.1	Existing capacities, flows and required future flows for the two WWTWs (Ml/d) .....	3.26

**LIST OF TABLES**

Table 3.2.10.2	WWTWs to be upgraded in the future .....	3.27
Table 3.2.10.3	Recommended improvements for the two WWTWs as included in the W <sub>2</sub> RAP and identified during the WSDP inspection .....	3.27
Table 3.3.1.1	Future water reticulation infrastructure required .....	3.28
Table 3.3.2.1	Future sewer reticulation infrastructure required.....	3.29

**4. WATER SERVICES OPERATION AND MAINTENANCE**

Table 4.1	Master Plan for Water Services Operation and Maintenance .....	4.2
Table 4.1.1.1	Recommended daily, weekly, monthly and six monthly O&M activities for the boreholes .....	4.4
Table 4.1.3.1	Maintenance activities for the water reticulation networks and fittings .....	4.7
Table 4.1.4.1	Recommended daily O&M tasks for the WTW.....	4.11
Table 4.1.4.2	Recommended monthly O&M tasks for the WTW .....	4.12
Table 4.1.10.1	O&M tasks for Process Controllers at a conventional WWTW .....	4.23
Table 4.2	Recommended replacement budget and O&M budget for water and sewerage infrastructure.....	4.26

**5. CONSERVATION AND DEMAND MANAGEMENT**

Table 5.1.1	Master Plan for Water Resource Management.....	5.14
Table 5.1.1.1	Commitment to reduce NRW, Water Losses and water inefficiencies.....	5.14
Table 5.1.1.2	Large water users November 2019 (AADD > 10 kl/d).....	5.14
Table 5.1.1.3.1	Tasks and tools that can be included in the Leakage Management component of a WDM Strategy .....	5.18

**6. WATER RESOURCES**

Table 6.1	Master Plan for Water Resources .....	6.1
Table 6.1.1	Projected future water requirements and yield / registration volumes surplus (+) / shortfall (-) based on WSDP model.....	6.2
Table 6.1.2	Years in which the annual water requirement will exceed the sustainable yield / registration volumes from the various resources .....	6.3
Table 6.1.3	Short-listed Bitou stand-alone options (Feasibility Option Analysis Report, 2014) .....	6.3
Table 6.1.4	Potential future water resources for the various towns (DWS's All Towns Reconciliation Strategies).....	6.5
Table 6.3.1	Example of Drinking Water Quality Incident Register .....	6.11
Table 6.3.2	Improvement / Upgrade measures for the remaining medium and high hazards .....	6.12
Table 6.3.1.1	Water Quality constituents to be analysed to optimize treatment processes for drinking water quality .....	6.17
Table 6.3.2.1	Control measures implemented by the Process Controllers at the WWTWs .....	6.24
Table 6.3.7.1	Design and operating capacities of the two WWTWs .....	6.27
Table 6.3.7.2	Cumulative Risk Ratio of the various WWTWs (% Deviation = Actual CRR / Max CRR).....	6.27

**7. FINANCIAL PROFILE**

Table 7.1.1.1	Financial Performance Indicators and benchmarks .....	7.2
Table 7.1.3.1	Expenditure items by type, as included in the 2019/2020 Budget .....	7.4
Table 7.1.3.1.1	Estimated future operational costs for water services .....	7.5
Table 7.1.3.2.1	Estimated future operational costs for sanitation services .....	7.5
Table 7.1.4.1	Estimated capital expenditure per standard classification of Bitou Municipality's future capital budget .....	7.6
Table 7.1.4.1.1	Future water capital projects .....	7.8
Table 7.1.4.1.2	Future water capital requirements per town .....	7.9
Table 7.1.4.2.1	Future sewerage capital projects .....	7.9
Table 7.1.4.2.2	Future sewerage capital requirements per town .....	7.10
Table 7.2.1.1	Revenue items by source, as included in the 2019/2020 Budget .....	7.11
Table 7.2.1.1.1	Operating income: Transfers and Grants .....	7.12
Table 7.2.1.2.1	Estimated future operational income for water services .....	7.13
Table 7.2.1.3.1	Estimated future operational income for sanitation services.....	7.13
Table 7.2.2.1	Sources of funding for the future capital budgets of Bitou Municipality .....	7.13
Table 7.2.2.1.1	Future capital funding sources for the water capital projects.....	7.14
Table 7.2.2.2.1	Future capital funding sources for the sewerage capital projects .....	7.14
Table 7.3.1	Comments on the Municipality's block step tariff structure .....	7.15

**8. WATER SERVICES INSTITUTIONAL ARRANGEMENTS AND CUSTOMER SERVICES**

Table 8.1.3.1	Annual Process Controller and Supervisor training requirements .....	8.2
Table 8.1.7.1	Minimum monitoring frequency for process risk indicators (SANS241-2:2015 Table 1) .....	8.4
Table 8.1.7.2	Minimum sample numbers for E.Coli (or faecal coliforms) in schemes (SANS241-2:2015 Table 2) .....	8.5
Table 8.1.7.3	Bitou Municipality's compliance of the monthly E.Coli monitoring frequency in the schemes in terms of the minimum requirements of SANS 241-2:2015 (Table 2). .....	8.5
Table 8.1.7.4	Frequency of analysis for determinands identified during the risk assessment exceeding the numerical limits in SANS 241-1 (SANS 241-2:2015: Table 3) .....	8.5
Table 8.1.7.5	Percentage compliance of the water quality samples for the period July 2018 to June 2019.....	8.7
Table 8.1.7.6	Four categories under which the risks posed by micro-organism, physical or aesthetic property or chemical substance of potable water is normally classified. ....	8.7
Table 8.1.16.1	Future water and sanitation KPIs (SDBIP) .....	8.12



**9. EXISTING NEEDS PERSPECTIVE, WATER MASTER PLAN PERSPECTIVE AND OVERALL TOPIC STRATEGIES**

Table 9.1.1 Existing Needs Perspective for Bitou Municipality .....9.1

Table 9.2.1 Water Master Plan Perspective.....9.5

Table 9.2.2 List of approved capital water and sewerage infrastructure projects of Bitou Municipality .....9.6

Table 9.2.3 List of MIG Technical Reports for water and sewerage infrastructure projects in Bitou Municipality.....9.8

Table 9.3.1 Strategies, Objectives and Key Performance Indicators for Bitou Municipality .....9.9

## LIST OF ABBREVIATIONS

AADD	Average Annual Daily Demand
AIDS	Acquired Immune Deficiency Syndrome
AMP	Asset Management Plan
AMR	Automatic Meter Reading
BOD	Biochemical Oxygen Demand
CAFES	Conserving, Adequate, Fair, Enforceable and Simple
CBD	Central Business District
CMA	Catchment Management Agency
COD	Chemical Oxygen Demand
CRC	Current Replacement Cost
CRM	Customer Relationship Management
CRR	Cumulative Risk Ratio
DAF	Dissolved Air Flotation
DORA	Division of Revenue Act
DRC	Depreciated Replacement Cost
DSVI	Diluted sludge volume index
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EPWP	Expanded Public Works Programme
FCV	Flow Control Valve
FDA	Future Development Area
FLISP	Finance Linked Individual Subsidy Programme
FPSU	Farmer Production Support Unit
GHG	Greenhouse gas
HDPE	High-density polyethylen
HIV	Human Immunodeficiency Virus
IAM	Infrastructure Asset Management
IBT	Inclining Block Tariff
ICM	Integrated Coastal Management
ICT	Information and Communications Technology
IDP	Integrated Development Plan
ILI	Infrastructure Leakage Index
IMP	Incident Management Protocol
IRDP	Integrated Rural Development Program
IRIS	Integrated Regulatory Information System
IWA	International Water Association
km <sup>2</sup>	Square Kilometre
KPI	Key Performance Indicator
LED	Local Economic Development
LOFLOS	Low flow on site
m	Metre
MFMA	Municipal Finance Management Act
MIG	Municipal Infrastructure Grant
Ml	Mega Litre
Ml/a	Mega Litre per Annum
MLSS	Mixed Liquor Suspended Solids
MNF	Minimum Night Flow

## LIST OF ABBREVIATIONS

MPCC	Multi-Purpose Community Center
MTEF	Medium-Term Expenditure Framework
MTREF	Medium Term Revenue Expenditure Framework
NERSA	National Energy Regulator of South Africa
NRW	Non-Revenue Water
NTU	Nephelometric Turbidity Unit
NWA	National Water Act
NWRS	National Water Resource Strategy
OSCA	Outeniqua Sensitive Coastal Area
PDD	Peak Daily Demand
PHP	People's Housing Process
PPE	Personnel Protective Equipment
PRV	Pressure Reducing Valve
RAS	Return Activated Sludge
RDP	Reconstruction and Development Programme
RUL	Remaining Useful Life
SABS	South African Bureau Standard
SANBI	South African National Biodiversity Institute
SANS	South African National Standard
SCADA	Supervisory Control and Data Acquisition
SCFPA	Southern Cape Fire Protection Association
SDBIP	Service Delivery and Budget Implementation Plan
SDF	Spatial Development Framework
SFWS	Strategic Framework for Water Services
STED	Septic tank effluent drainage
SVI	Sludge Volume Index
TKN	Total Kjeldahl Nitrogen
TMG	Table Mountain Group
TSS	Total Suspended Solids
TWL	Top Water Level
UISP	Upgrading of Informal Settlements Programme
UPS	Uninterrupted Power Supply
URV	Unit Reference Value
VAT	Value Added Tax
VIP	Ventilated Improved Pit
VMLSS	Volatile fraction of MLSS
WARMS	Water Authorisation Registration and Management System
WCP	Water Conservation Products
WDM	Water Demand Management
WHO	World Health Organisation
WRM	Water Resource Management
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSIG	Water Services Infrastructure Grant
WSMP	Water Services Master Plan
WSP	Water Services Provider
WTP	Water Treatment Plant

**LIST OF ABBREVIATIONS**

WTW	Water Treatment Works
WWTW	Waste Water Treatment Works

## **ANNEXURE A (Water and Sewer Master Plans)**

Figure BMW 4.1a:	Potential future developments – Plettenberg Bay & Harkerville
Figure BMW 4.1b:	Potential future developments – Kurland & Natures Valley
Figure BMW 6.4a:	Future distribution zones - Plettenberg Bay & Harkerville
Figure BMW 6.4b:	Future distribution zones – Kurland & Natures Valley
Figure BMS 6.3a:	Future drainage areas – Plettenberg Bay
Figure BMS 6.3b:	Future drainage areas - Kurland
Figure BMW 6.5a:	Required works – Plettenberg Bay & Harkerville
Figure BMW 6.5b:	Required works – Kurland & Natures Valley
Figure BMS 6.4a:	Required works – Plettenberg Bay
Figure BMS 6.4b:	Required works – Kurland
Table BMW6.4a:	Proposed works, cost estimates & phasing - Future System
Table BMW6.4b:	Proposed projects, cost estimates & phasing - Future System
Table BMW6.4c:	Priority water projects - Bitou Municipality
Table BMS6.5a:	Proposed works, cost estimates & phasing - Future System
Table BMS6.5b:	Proposed projects, cost estimates & phasing - Future System
Table BMS6.5c:	Priority sewer projects - Bitou Municipality

---

## **ANNEXURE B (Future Water Requirement Projections)**

Plettenberg Bay Water Projection

Kurland Water Projection

Natures Valley Water Projection

## References

- 2001 and 2011 SA Census Data. 2016 Community Survey data of STATSSA.
  - DWS's All Towns Reconciliation Strategy Documents for each of the towns in Bitou Municipality's Management Area, Version 2, April 2014.
  - Bitou Municipality Revised IDP 2017-2022 (2020/2021).
  - Final Annual Report 2018/19, Bitou Municipality.
  - Medium Term Revenue and Expenditure Framework Budget Tables, Bitou Municipality.
  - Operational and Capital Budgets and Tariffs of Bitou Municipality.
  - Bitou Municipality's Asset Register, June 2019.
  - Socio-Economic Profile for Bitou Municipality, 2019, Western Cape Government Provincial Treasury.
  - DWS's 2014 Blue Drop Report
  - DWS's 2013 Green Drop Report
  - DWS's 2014 Green Drop Progress Report.
  - Growth Potential Study, 2014, Western Cape Government, Environmental Affairs & Development Planning.
  - Municipal Services Strategic Assessment (MuSSA) for Bitou Municipality, 2019
  - Spatial Development Framework, Bitou Local Municipality, November 2019.
  - Bitou Municipality Disaster Risk Assessment 2019, Document prepared for Western Cape Disaster Management Centre and Bitou Local Municipality.
  - Bitou Municipality Emergency Groundwater Supplies: Borehole Rehabilitation and Drilling, Groundwater Africa, March 2011.
  - Bitou Municipality Groundwater Exploration of the George Fault in the Uplands Area, Groundwater Africa, October 2017.
  - Bitou Municipality Plettenberg Bay 2018 Drilling Report, Groundwater Africa, November 2018.
  - Water and Sewer Master Plans for Bitou Municipality, GLS Consulting, 2020.
  - Kurland Boreholes, 2<sup>nd</sup> Monitoring Report, 6 July 2018, Groundwater Africa.
  - Water Safety Plans for Plettenberg Bay, Kurland and Natures Valley, Bitou Municipality.
  - Bitou Municipality: Wastewater Risk Abatement Plan (W<sub>2</sub>RAP), Final Document: 2017-2019, Prepared by Bitou Municipality.
  - Bitou Municipality's Drought Management Policy, October 2017.
  - 2018/2019 WSDP Performance- and Water Services Audit Report, iX engineers, 13 December 2019.
  - Technical Report: Plettenberg Bay: Upgrading of Roodefontein Dam Raw Water Supply Pipeline, Neil Lyners & Associates, July 2015.
  - Technical Report: Plettenberg Bay: Kranshoek Bulk Water Supply, Neil Lyners & Associates, October 2015.
  - Technical Report: Bitou: Upgrading of Kwanokuthula main outfall sewer and pumping main, Tuiniqua Consulting Engineers, October 2015.
  - Technical Report: New Horizons Extension (Ebenezer) Bulk Sewer Outfall, Nadeson Consulting Engineers, July 2016.
  - Technical Report: Green Valley: Upgrading of Sewerage Services: Phase 1, Aurecon, October 2016.
  - Technical Report: Natures Valley: Upgrading of bulk water supply scheme, Neil Lyners & Associates, February 2016.
-

## REFERENCES

- Technical Report: Wittedrift / Green Valley Bulk Water Services, Aurecon, March 2017.
  - Technical Report: Kwanokuthula Bulk Water Rising Main, Aurecon, July 2017.
  - Technical Report: Upgrading of Kwanokkuthula Sewer Infrastructure, Neil Lyners & Associates, February 2020.
  - Catchment Management Strategy for the Breede-Gouritz Water Management Area, July 2017, Breede-Gouritz Catchment Management Agency.
-