BLUE DROP

PROGRESS REPORT

2022

" Water is Life, Sanitation is Dignity "

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP

blue drop
CERTIFICATION
drinking water quality
REGULATION

EXECUTIVE SUMMARY

BACKGROUND

Access to sufficient, safe water is a basic right enshrined by South Africa's Constitution. The Water Services Act (Act 108 of 1997) places the responsibility for provision of water services to Local Government, while the oversight and monitoring duties are delegated to Provincial and National Government.

Incentive-based regulation was introduced in 2008 in the form of the Blue Drop Certification programme, whereby the Department of Water and Sanitation (DWS) measure all aspects contributing to a sustainable Water Services Business, and provision of safe water to the citizens of South Africa. This programme gives prominence to the World Health Organisation's (WHO) ***Water Safety Planning*** concept as the basis for a proactive, risk-based approach to drinking water quality management from catchment to consumer. Since then, DWS has been monitoring the risk of each water supply system based on performance against Blue Drop Certification criteria. These results create an enabling environment whereby the Water Services Authority (WSA) and DWS identify, prioritise and implement targeted and specific interventions to improve performance.

This risk-based approach extends to the compulsory South African National Standard SANS 241:2015 which is the minimum requirement for drinking water that is considered safe for human consumption. SANS 241 requirements include the microbiological, aesthetic, chemical and physical parameters and acceptable levels that do not pose a risk to human health over a lifetime of consumption. It also provides direction on the evaluation of water quality risks from catchment to consumer, monitoring and verification of water quality to enable the management of any identified risks and assurance that the water is deemed to present no risk to consumers.

In 2015, the Department used the experience built-up during the previous four Blue Drop assessments to formulate a ***Blue Drop Progress Assessment Tool*** (BD PAT) to calculate the Blue Drop Risk Rating ***(BDRR)*** of each water supply system. While ***incentive-based regulation*** in the form of the Blue Drop assessment evaluates compliance against set criteria which includes risk-management, ***risk-based regulation*** in the form of the BDRR seeks to establish a scientific baseline comprising of critical risk areas within water services provision and to use continuous risk measurement and reporting to drive risk management. ***BDRR*** focuses on four critical risk areas namely treatment capacity, water quality, technical skills and Water Safety Planning. Risk-based regulation therefore allows the municipality to identify and prioritise these critical risk areas within its drinking water treatment process and to take corrective measures to abate these.

In keeping with the Minister's commitment to provide the water sector and its stakeholders with **ongoing, current, accurate, verified** and relevant information on the status of water services in South Africa, the 2022 Blue Drop PAT Report provides the findings and report progress pertaining to the current status and risk trend of municipal drinking water treatment facilities.

In 2021, the BD PAT assessment was conducted on 144 Water Services Authorities in South Africa comprising of 1186 water supply systems. Innovative use of the web-based Integrated Regulatory Information System (IRIS) facilitated online submission of data by WSA's and completion of the BDRR scorecards by DWS champions directly on IRIS thereby improving data management and trend analysis. The period under review for the 2021 BDRR assessment was 1 July 2020 to 30 June 2021.

NATIONAL BDRR PROFILE

The ***National BDRR*** profile for the country is summarised as follows:

- ✓ 48% of water supply systems are in the low risk category,
- ✓ 18% are in the medium risk category,
- ✓ 11% are in the high risk category, and
- ✓ 23% are in the critical risk category.

In order to use the BDRR score as a tool to implement strategic, targeted actions that will result in an improved risk rating and sustainable water services delivery, WSA's must critically evaluate the individual components of the BDRR score to understand the reason for the current risk rating and the desired risk category for delivery of safe drinking water.

Risk Indicator A: Design Capacity and Risk Indicator B: Operational Capacity in terms of design capacity, are important indicators to determine if the plant can provide sufficient, safe drinking water now and in the near future. Once daily production approaches 90% of design capacity, the WSA must plan, budget and implement projects to increase the capacity of the treatment plant to ensure there is sufficient supply, not only for human consumption, but also for economic activities. The 2021 result indicate 62% of treatment plants are small plants with capacity <2 M/d and typically include boreholes and rural systems located in remote areas. In order to address the challenges faced with operation and management of large number of rural schemes located across a large geographical area, WSA's must ensure there is sufficient resources such as staff, chemical supplies, spares and vehicles to ensure optimal operations of these systems. Analysis of Indicator B could not be conducted due to lack of design capacity information, lack of daily flow meter readings, or incorrect

flow data due to lack of calibrated flow meters. WSA's are reminded that installation of flow meters and daily flow recording is a regulatory requirement as per their Water Use License as well as an essential operational tool to ensure delivery of sufficient water at all times.

Risk Indicator C: Water Quality Compliance is critical to ensure delivery of safe drinking water that does not present a health risk to consumers. Risk Indicator C reports on both water quality compliance and monitoring compliance which reports on a sufficient number of sample points to verify the water quality at all points in the distribution network as outlined in SANS 241:2015. The results for Indicator C for the period January to December 2020 are summarised below:

- ✓ 40% of water supply systems achieved microbiological water quality compliance and 23% have achieved chemical water quality compliance.
- ✓ 66% of water supply systems have adequate microbiological monitoring compliance and 17% have adequate chemical monitoring compliance.

The poor water quality compliance results are of serious concern to DWS as the majority of supply systems present a potential health risk to consumers. WSA's must investigate the root cause of the failure and implement remedial actions to ensure compliance against limits outlined in SAN S241:2015. Remedial actions include 'Boil Water' notices issued in systems with sustained microbiological failures, 'Water Quality' Advisories issued in systems with sustained chemical failures for chronic health determinands, and alternative water sources provided to communities until the water is safe for human consumption.

With regards to monitoring compliance, WSA's must ensure there are sufficient microbiological and chemical sampling points as outlined in SANS 241:2015 to verify the safety of water at all points in the distribution network.

Risk Indicator D: Technical Skills evaluates the required technical skills to ensure effective operations and maintenance of water treatment plants and distribution networks. In general, technical skills is poor throughout the country with 12% of supply system in low risk category (90-100% compliance), 27% of supply systems with sufficient number of suitably classified process controllers per shift, 52% of supply systems with qualified supervisors, and 28% of systems with full maintenance teams in place i.e. civil, mechanical and electrical personnel.

To improve technical skills, WSAs must evaluate the performance of each system with regards to process control and determine the operational model which is best suited to ensure effective operations and maintenance of each water supply system. Sufficient budget must be allocated to appoint suitably qualified process control staff to ensure water quality compliance improves through ongoing process optimisation, and qualified maintenance teams to reduce water losses and maintain integrity of the supply system.

Risk Indicator E: Water Safety Plans is a measure of risk management procedures as outlined in SANS 241: 2015 and WHO guidelines. The results indicate only 33% of supply systems in the country have Water Safety Plans and 9% have comprehensive Water Safety Plans with all required components including management approval, risk assessment, a risk-based monitoring program and implementation of corrective measures. As per the Water Safety Planning approach, all water quality risks must be incorporated into a comprehensive Water Safety Plan with clearly outlined mitigating measures to reduce high and medium risks. The WSA must ensure all risks associated with their current BDRR scores forms part of the Water Safety Plan with medium and high risks targeted for implementation. It is critical that WSA's allocate sufficient budget and resources for implementation of risks to ensure effective risk management over time.

While DWS is encouraged by the 48% of supply system in the low risk category, the 34% of systems which reside in the high and critical risk categories is of concern to the Department and are placed under **regulatory focus.** In such cases, a red note is assigned that requires the WSI to submit a detailed corrective action plan within 60 days of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvements as outlined in the Regulatory Comment. The plan will be considered against the Regulatory Comment and recommended for approval by a national regulation committee...". This note serves to initiate the Department's Enforcement Protocol. Section 151 of the National Water Act and Section 63 of the Water Services Act are key to developing and submitting these plans as required. Other water supply systems which are in the high risk category will also be targeted for corrective action plans and municipalities are urged to initiate a process of addressing the regulatory comment as a matter of priority.

In conclusion, WSA's must review the performance of each supply system under their authority and interrogate the BDRR score as well as the individual risk indicator which make up the BDRR score to identify areas of poor performance. Through effective risk management procedures embodied in the Water Safety Planning approach, the WSA must identify and implement remedial actions to improve the overall risk rating that will lead to effective water services provision and delivery of safe drinking water for all the citizens of South Africa.

Moving forward, the Department is committed to conducting annual Blue (and Green) Drop Assessments, with a full Blue Drop Assessment planned for 2022 followed by BD PAT assessment in 2023. Through regular cycles of Blue Drop assessments and BDRR evaluations, an enabling environment is created where both WSA's and DWS identify, prioritise and implement targeted and specific interventions to improve water services performance in a structured manner based on risk management principles.

BLUE DROP PROGRESS ASSESSMENT TOOL (BDPAT) REPORT 2022 INDEX

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ACRONYMS

ACRONYMS	DESCRIPTION	ACRONYMS	DESCRIPTION
BD	Blue Drop	**NA**	Not Assessed or Not Applied
BDPAT	Blue Drop Progress Assessment Tool	**N/I**	No information
BDRR	Blue Drop Risk Rating	**NQF**	National Qualifications Framework
%BDRRmax	Maximum BDRR of system	**O&M**	Operation and Maintenance
BWSA	Blue Water Services Assessment	**PC**	Process Controller
CFO	Chief Financial Officer	**POE**	Portfolio of evidence
CRR	Cumulative Risk Ratio	**PSP**	Professional Service Provider
DM	District Municipality	**RI**	Risk Indicator
DPW	Department of Public Works	**SAHRC**	(South African) Human Rights Commission
DWS	Department of Water and Sanitation	**SALGA**	South African Local Government Association
GD	Green Drop	**SLA**	Service Level Agreement
GWSA	Green Water Services Assessment	**TSA**	Technical Site Assessment
IMP	Incident Management Protocol	**WF**	Weighting Factor
IRIS	Integrated Regulatory Information System	**WHO**	World Health Organisation
ito	In terms of	**WRC**	Water Research Commission
KPA	Key Performance Area	**WSA**	Water Services Authority
LM	Local Municipality	**WSI**	Water Services Institution
MIG	Municipal Infrastructure Grant	**WSP**	Water Services Provider
Ml	Mega liter	**WSS**	Water Supply System
Ml/d	Mega liters per day	**WTW**	Water Treatment Works
MIS	Municipal Information Sheet	**WUL**	Water Use License

Provinces			
EC	Eastern Cape	**MP**	Mpumalanga
FS	Free State	**NW**	North West
GP	Gauteng	**NC**	Northern Cape
KZN	KwaZulu Natal	**WC**	Western Cape
LP	Limpopo		

CHAPTER 1: INTRODUCTION TO BLUE DROP PROGRESS ASSESMENT REPORT

PURPOSE AND INTENT OF BLUE DROP CERTIFICATION

The Blue Drop regulation programme seeks to identify and develop the core competencies required for the sector that, if strengthened, will gradually and sustainably improve the level of drinking water management in South Africa. It is a form of regulation that holds the intent to synergise the current goodwill exhibited by municipalities, business, Department of Public Works, as well as existing government support programmes to give the focus, commitment and planning needed to achieve excellence in drinking water management.

The Blue Water Services Assessment is the tool whereby incentive- and risk-based regulation is conducted in South Africa. Regulation is important to ensure effective and efficient delivery of sustainable water services and has been commended by South African authorities and accoladed by international peers. A good regulation approach is characterised by its ability to clarify the requirements and obligations placed on water service institutions, thereby protecting consumers from a potentially unsustainable and unsafe service.

The Bue Drop process has been developed against the philosophy that if DWS as Regulator can inspire a path whereby disciplined people, disciplined thought, and disciplined action can be measured and reported, that the South African drinking water industry will be building greatness to last.

UNDERSTANDING INCENTIVE-BASED REGULATION IN SOUTH AFRICA: MUNICIPAL BLUE DROP CERTIFICATION

Incentive-based regulation has gained significant momentum and support in the Water Sector, since its inception on 11 September 2008 (Minister of Water Affairs, National Municipal Indaba, Johannesburg). The concept was defined by two programmes: the ***Blue Drop Certification*** Programme for Drinking Water Quality Management Regulation; and the ***Green Drop Certification*** Programme for Wastewater Quality Management Regulation.

The Blue Drop process measures and compares the results of the performance of Water Service Institutions, and subsequently rewards (or penalises) the institution upon evidence of their excellence (or failures) according to the minimum standards or requirements that has been defined. Awareness of this performance is obtained by pressure via consumers, the media, politicians, business and NGOs. The strategy revolves around the identification of mediocre performing municipalities who consequently correct the identified shortcomings, as well as the introduction of competitiveness amongst the municipalities and using benchmarking in a market where competition is difficult to implement.

RISK-BASED REGULATION IN SOUTH AFRICA: MUNICIPAL BDRR PROFILES

Whilst the ***Blue Drop assessment*** focuses on the entire value chain (source, pumping, treatment, reticulation network) of the drinking water business within the municipal (or other) water services business, the ***Blue Drop Risk Rating (BDRR)*** assessment focuses on critical risk areas within water services provision. The latter approach is a form of risk-based regulation which allows the municipality to identify and prioritise the critical risk areas within its drinking water process and to take corrective measures to abate these. Risk analysis is used by the Department of Water and Sanitation to identify, quantify and manage the corresponding risks according to their potential impact on human health and to ensure a prioritised and targeted regulation of high-risk municipalities.

The ***Blue Drop*** score reflects the status of the *complete water business* over a period of 12 months based on full Blue Drop assessment, whereas the ***BDRR*** focuses on *specific risk indictors* at a specific moment in time (i.e. snapshot view), or a more prolonged period in time (i.e. BD 12 month period).

- ✓ Is a concise and focussed benchmarking exercise which extracts some of the key risk areas that would individually and collectively, give a snapshot view of the status of water quality.
- ✓ Is an indicator of 'progress or digress' which can be run efficiently and accurately, annually or at any given time, without having to go through a comprehensive assessment process.
- ✓ allows the Water Services Authority (WSA) to identify, quantify and manage the risks associated with drinking water services provision thereby empowering them to take relevant strategic management and operational decisions to support and improve sustainable water services provision.

CALCULATION OF BDRR

A. First BDRR formular

In 2015, the Department used the experience built-up during the previous four Blue Drop assessments to formulate a Blue Drop Risk Rating (BDRR) that represents a progressive combination of incentive and risk-based regulation. The BDRR allows for uniform measurement of all systems across the country with regards to treatment capacity, process control and water quality compliance and to answer the following questions:

- ✓ Does the system have sufficient capacity to meet safe drinking water quality limits?
- ✓ Is the WSA complying with technical (process controller and maintenance staff) requirements?
- ✓ Is the WSA complying with SANS 241 (or any limits set by the Department)?
- ✓ Is the WSA managing drinking water quality according to the principles of risk management?

The original BDRR formula was: **BDRR = 0.25A + 0.25B + 0.5C**

Where the weighting factor is based on the following three risk indicators:

- ✓ A: Treatment Capacity = Population X Operational Capacity
- ✓ B: Process Control = Process Controllers + Supervisor + Maintenance Team
- ✓ C: Water Quality Compliance = Population X [(0.8*(0.5Micro + 0.2Chem + 0.3Risk)) + (0.2*(0.6WSP + 0.2Monitoring + 0.2Full SANS))] where
  - Micro = Microbiological compliance
  - Chem = Chemical compliance
  - Risk = Risk-defined monitoring
- ✓ WSP = Water Safety Plan (Yes/No/Partial)
  - Monitoring = % Monitoring compliance
  - Full SANS = Full SANS, risk-based monitoring programme (Yes/No/Partial)

The BDRR calculation is weighted against population size taking into account the population risk factor i.e. the larger the population served by the water supply system, the larger the impact should any hazardous event occur in the system, viz. the number of people who may be impacted.

The BDRR formular was used by the DWS to determine the level of risk at which water services and water quality was delivered to the citizens of South Africa thereby facilitating implementation of regulatory actions to improve water quality where critical and high risks were identified.

B. Alignment of BDRR with DWS Risk-based Regulation

The DWS Risk-based Regulation allows for four key risk indicators that apply to *Blue Drop* (water), *Green Drop* (wastewater), and *No Drop* (water use efficiency):

- ✓ A: Design capacity
- ✓ B: Operational flow
- ✓ C: Compliance
- ✓ D: Technical skill of the supervisor, process controllers and maintenance team

The Green Drop Cumulative Risk Ratio (CRR) was the first to be developed and has a successful track record that allows for identification of high risk treatment plants. One of the reasons why the CRR has enjoyed high uptake and impact, was that it is used as part of the wastewater risk abatement plan (W_2RAP) [the equal of the Water Safety Plan]. The (existing) formula calculates the Green Drop Risk rating as follows: **CRR = A x B + C + D**

Where:

- ✓ A: Installed design capacity: Larger plants present a higher risk
- ✓ B: Operational capacity: Plants operating above its capacity present a higher risk
- ✓ C: Effluent quality compliance: A high number of non-compliant effluent quality parameters present a higher risk
- ✓ D: Technical skills: Poor technical, management and maintenance skills base present a collective and individual high risk.

C. *Updated BDRR Formular*

The updated BDRR formular adopts the same approach with an added risk indicator, E: Water Safety Planning, to address the risk assessment requirements outlined in SANS 241. The updated BDRR formular is:

BDRR = (A x B) + C + D + E

Where the weighting factor is based on the following five risk indicators

- ✓ A: Design Capacity: Larger plants present a higher risk as they supply water to a larger population
- ✓ B. Operational Capacity: Plants operating above its installed capacity present a higher risk as its capability is compromised to deliver safe drinking water
- ✓ C: Water Quality Compliance: C1 Microbiological (70%) + C2 Chemical (30%)
- ✓ D. Technical Skills: Poor technical, management and maintenance skills base present a collective and individual high risk.
- ✓ E. Water Safety Plan: The absence of a WSP, risk-defined monitoring programme based on full SANS 241 assessment and implementation of actions to reduce risk, would represent a high risk due to non-compliance with SANS 241 requirements and lack of risk-management procedures.

The proportional risk allocation between the components is 35 : 35 : 20 : 10 for A/B : C : D : E.

Therefore full BDRR formular **= (35% (A*B)) +[35% C (70% C1 (Micro compliance X monitoring compliance) + 30% C2 (Chemical compliance x monitoring compliance)] + 20% D + 10% E.**

The benefits of the updated BDRR formular are:

- ✓ Aligned with CRR and DWS Risk-based approach
- ✓ Simplified calculation which uses available information on IRIS
- ✓ Provide calculation of **baseline BDRR** for each plant based on size
- ✓ Includes Risk Rating Indicator for ***Water Safety Planning*** – requirement for SANS 241
- ✓ Provides a **quick, scientific-based impression** of national WTW risk profiles
- ✓ **Standardised, uniform** approach - rates all plans on equal level

A ***BDRR value*** is calculated for each municipal water supply system in South Africa, as provided in this Blue Drop PAT Report. The municipal BDRR profiles are usually sent to the respective Executive Mayors from the Minister's office, to inform the political principals of the facilities that reside in the high and critical risk space.

A ***BDRR %deviation*** is used throughout the Report and calculated using the following formular:

BDRR% deviation = BDRR / BDRRmax x 100

Where ***BDRRmax*** = Maximum BDRR of System

The ***BDRR %deviation*** is a calculated unit of measurement of risk which indicate the variance of a BDRR value before it reaches its maximum BDRR value. This unit of measurement allows DWS to compare all sized and types of plants equally.

All water supply systems are categorised according to their risk rating placing them in one of four categories as per table below.

Table 1: BDRR Categorisation

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

The higher the ***BDRR %deviation*** value, the closer the BDRR risk is to the maximum value it can obtain.

- ✓ Example 1: a 95% BDRR %deviation value means the supply system has only 5% space remaining before the system will reach its maximum critical state (100%) – this is a highly undesirable state and the supply system is categorised as a critical risk system.
- ✓ Example 2: a 25% BDRR %deviation value means the supply system holds a low and manageable risk position and is not close to the limits that define a critical state (90-100%) – this is a desirable status and the supply system is categorised as a low risk system.

The rationale and weighting of each risk indicator is outlined below.

Risk Indicator A: Design capacity and Risk Indicator B: Operational Capacity in terms of design

Table 2: Weighting factor for Criteria A and B

A = CAPACITY	
Category / Description	Weighting Factor
Unknown / Multiple sources	**6**
>25	**5**
>10 to 25	**4**
>2 to 10	**3**
>0.5 to 2	**2**
< or = 0.5	**1**
B = % OPERATIONAL CAPACITY IN TERMS OF DESIGN CAPACITY	
Category / Description	Weighting Factor
> 150% or Unknown	**5**
>100 – 150%	**4**
>50 – 100%	**3**
>10 – 50%	**2**
0 – 10%	**1**

Criterion A represents the design capacity of the treatment plant.

Every water treatment plant must be classified with DWS as per Regulation 2834. The classification of the treatment plant is based on a number of components, including size, complexity and electrical consumption, as per set criteria. The plant classification certificate is available on IRIS and supporting evidence provided by the WSA during plant registration is used to determine the risk rating for criterion A.

The risk rating is allocated according to the size of the treatment plant with higher risk rating given for a larger plant and lower risk rating for a smaller plant. The rationale is that a larger plant serves a larger community and therefore presents a higher risk if the plant is not functioning or is producing unsafe drinking water than a smaller plant which serves less people. The risk rating for criteria A remains the same provided the capacity stays the same, and all plants which have the same design capacity range will have the same maximum BDRR.

Risk Indicator B represents the % operational capacity in terms of design capacity.

The daily production versus the design capacity of the treatment plant is an important indicator to determine if the plant can provide sufficient, safe drinking water to all the consumers now and in the near future. When the plant is operating above its design capacity, major unit processes are overloaded and cannot achieve their operational limits which leads to water quality failures. Once daily production approaches 90% of design capacity, the WSA must plan, budget for and implement upgrades to the treatment facility to ensure there is sufficient supply, not only for human consumption, but also for economic activities such as mining, agriculture and industries.

Criterion B reports on the percentage operational flow in terms of design capacity. The ideal value is between 50 – 100%; higher values indicate the plant is overloaded and lower values indicate the plant is receiving too little flow which may also compromise performance due to lack of retention time (flocculation, sedimentation).

Risk Indicator C: Water Quality Compliance

In South Africa, the SANS 241:2015 is the definitive reference on acceptable limits for drinking water quality parameters and provides limits for a range of water quality characteristics and water meeting this standard is deemed safe for lifetime consumption.

In addition, the SANS 241: 2015 standard stipulates the frequency of sampling as well as the number of sample points required per supply system to ensure sufficient coverage of the network. The frequency and number of required sample points is dependent on the population

size as outlined in Table 1 of SANS241:2015. Monitoring compliance is therefore critical to guarantee the safety of the supply at all points in the network.

Risk Indicator C is directly linked to the safety of the drinking water in the supply systems as it reports on compliance against the microbiological and chemical determinands and on the monitoring compliance.

Risk Indicator C: Water Quality compliance = C1(70%) + C2 (30%)

Both microbiological and chemical compliance accounts for monitoring compliance to ensure compliance is based on minimum required number of samples based on population size.

Expanded Formular is **C = (C1a x C1b) + (C2a x C2b)**

Where

- **C1: Microbiological compliance = C1a X C1b**
  - **C1a**: micro compliance, different weighting based on population size
  - **C1b**: micro monitoring compliance (MNR%) – monitoring compliance against registered programme, based on population size as per Table 2 in SANS 241-2: 2015
- **C2: Chemical compliance = C2a X C2b**
  - **C2a**: chemical compliance against all required determinands, different weighting based on population size
    - The chemical quality of the water supply must comply with the excellent requirements set by the Blue Drop Programme for all chemical-health determinands listed in the 2014 Blue Drop Limits, derived from SANS241:2006 and 2011 and includes, NO3- and NO2- as N, SO42-, Sb, As, Cd, Cr, Co, Cu, CN-, Pb, Hg, Ni, Se, V, DOC or TOC, and Total THM.
    - Performance assessment is based on the following:
      - Excellent Compliance (95% for <100 000 population) & (97% for >100 000 population)
      - Good Compliance (93% for 100 000 population) & (95% for >100 000 population)
  - **C2b**: chemical monitoring compliance calculated against Blue Drop requirements:
      - Actual monitoring occurs according to registered monitoring programme (>80%)
      - Number of samples: One sample each at treatment plant final and one distribution point, both of which must be analysed for at least 80% of determinands listed above (13 of the 17 determinands) i.e. at least 26 data points are required.

Table 3: Weighting for Ca – water quality compliance

Ca= WATER QUALITY COMPLIANCE* Micro (70%) + Chemical (30%) compliance based on population – data from IRIS	
Category / Description	Weighting Factor
Population <100 000	
<94% or No Information	**9**
94 < 95%	**7**
95% < 96%	**5**
96% < 97%	**3**
97% < 98%	**2**
≥ 98%	**1**
Population >100 000	
<96% or No Information	**9**
96% < 97%	**7**
97% < 98%	**5**
98% < 99%	**3**
≥ 99%	**1**

Table 4: Weighting for Cb - monitoring compliance

C1b: Microbiological Monitoring compliance – results provided by IRIS, based on registered monitoring programme which is aligned with the required number of sample sites for population as per SANS 241	
Category / Description	Weighting Factor
>80%	**1**
50% - 80%	**2**
30% - 49%	**3**
<30%	**4**
C2b: Chemical Monitoring Compliance – calculated based on % of determinands monitored / total number of determinands as per Blue Drop requirements	
Category / Description	Weighting Factor
>80%	**1**
50% - 80%	**2**
30% - 49%	**3**
<30%	**4**

Risk Indicator D: Technical Skills

Under Section 9 (1) of the Water Services Act (108 0f 1997), regulations relating to Compulsory National Standards for Process Controllers and Water Service Works stipulate the requirements for registration of all water and wastewater treatment plants. Regulation 2834 outlines the requirements for:

- ✓ Classification of water and wastewater treatment plants: based on size, complexity, and electrical consumption,
- ✓ Classification of process controllers and supervisors: based on qualifications and years of experience,
- ✓ Required number and classification of staff per shift based on the classification of the plant: more complex plants requires more skilled process controllers per shift.

Based on the shift patterns, the WSAs must align with the Regulation to ensure treatment plants are effectively operated and maintained for sustainable water services delivery.

Risk Indicator D: Technical Skills evaluates the compliance of technical staff against Blue Drop requirements as outlined below:

Table 5: Technical skills evaluation as per Blue Drop requirements

Works Class	Class Of Process Controller Per Shift	Class Of Process Controller for Supervision*	Operations And Maintenance Support Services Requirements*
E	Class I	Class V*	THESE PERSONNEL MUST BE AVAILABLE AT ALL TIMES BUT MAY BE IN-HOUSE OR OUTSOURCED - electrician - fitter - instrumentation technician
D	Class II	Class V*	
C	Class III	Class V*	
B	Class IV	Class V	
A	Class IV	Class V	

**does not have to be at the works at all times but must be available at all times. If the Water Services Institution or owner of a waterwork has no person of this class employed on that work, a contractor / consultant with the required qualifications as prescribed in Schedule III in respect of that particular class of persons, shall be appointed to visit the work weekly.*

Risk indicator D is calculated from three separate components which each carry the same weighting (1/3 of total)

- ✓ Compliance for process controllers: required number and class of process controllers per shift for specific class of plant.
- ✓ Compliance for supervisor: Class V required, either at the plant or available at all times.
- ✓ Compliance for maintenance team, subdivided into 3 sections, each with equal, proportional weighting:
    - civil team: plumbing qualification / trade test.
    - mechanical team: millwright or similar mechanical qualification.
    - electrical team: electrical qualification / trade test

Table 6: Weighting Factor for Criteria D

D = TECHNICAL SKILLS	
Category / Description	Weighting Factor
Supervisor + Process Controllers + Maintenance Team	**1**
Supervisor + Maintenance Team but no Process Controllers	**2**
Process Controllers + Maintenance Team but no Supervisor	
Process Controllers + Supervisor but no Maintenance Team	
Supervisor & no Maintenance Team & no Process Controllers	**3**
Process Controllers but no Maintenance Team & no Supervisor	
Maintenance Team but no Supervisor & no Process Controllers	4
No Supervisor + no Process Controllers + no Maintenance Team	**5**

Risk Indicator E: Water Safety Plans

The concept of using risk management processes to manage water supply systems effectively was introduced by the World Health Organisation (WHO) in 2004 and described as Water Safety Planning. The WHO states:

"The most effective means of consistently ensuring the safety of a drinking-water supply is through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer. In these Guide lines, such approaches are called water safety plans (WSPs)." (WSP Manual,2007)

Since then more than 93 countries have adopted Water Safety Planning as a method for drinking water quality management with more than 70 countries having policies and regulations requiring Water Safety Plans.

In South Africa, the WSP is a requirement for Blue Drop Certification with a scoring of 35% for comprehensive WSP and response monitoring. The National Drinking Water Standard, SANS241:2015 is closely aligned with the Water Safety Plans risk based approach with following specifications to ensure delivery of safe drinking water at all times:

Water quality risk assessment:

- ✓ At least annually or when quality changes
- ✓ Identify problem determinands + increase frequency of monitoring for problem determinands based on level of risk
- ✓ Risk-based monitoring programme unique to each supply system
- ✓ Routine compliance monitoring: based on population size and area
- ✓ Response monitoring: Incident Management Protocol to address incidents
- ✓ Verification of water quality: calculation of indices
- ✓ Water Safety Plan: adopt and implement

The Water Safety Plan is therefore a critical component of drinking water management and forms part of the BDRR calculation.

Risk Indicator E evaluates the following three critical components which are required for effective risk management:

- ✓ Completeness of the WSP as per World Health Organisation Water Safety Planning Manual,
- ✓ Development and adoption of risk-based monitoring programme as per SANS 241:2015, and
- ✓ Proof of implementation of the findings of the WSP to ensure there is continuous risk management and movement towards an overall lower risk rating.

The requirements are divided into 11 sub-elements that are evaluated to calculate the risk rating for this indicator as illustrated in the table below.

Table 7: Weighting Factor for Criteria E

E – WATER SAFETY PLAN	
i. Signature from Technical Director / Municipal Manager, ii: Risk prioritisation method, iii: Risk assessment of catchment, iv: Risk assessment of plant, v: Risk assessment of network, vi: Final risk rating, vii: Mitigating measures for all high and medium risks. viii: Full SANS 241 analysis of raw and final water, ix: Identification of risk determinands, x: Addition of risk determinands to monthly compliance monitoring as per SANS 241 - frequency based on category of risk (acute/chronic/aesthetic) xi: Proof that >25% of mitigating measures have been implemented – proof in form of purchase order, pictures, water quality results, tender document, etc	
Description	Weighting Factor / Calculation
No WSP	5
WSP contains X sub- elements	5 – (X / 55)
Note: if shortcomings for any of the sub-elements, then a higher risk rating is given.	

D. Multiple systems

In many supply systems, there are more than one source of water and more than one water treatment plant. These multiple sources will all feed into one network and will therefore be combined. To calculate the BDRR for such multiple systems, the input data sheet makes allowance for selection of multiple systems. A BDRR score is then completed for each water source/treatment plant i.e. scores for A, B, C, D and E are calculated for each water source/treatment plant. A combined BDRR score is then calculated based on the proportion of flow supplied by each water source/treatment plant.

In summary, a proportional scoring is given for each risk indicator and for the system as a whole based on quantity of water provided by each water source/treatment plant.

BLUE DROP PROGRESS ASSESSMENT TOOL (BDPAT)

The ***Blue Drop Progress Assessment Tool (BDPAT)*** is a web-enabled assessment tool used to collect risk-associated data and calculate % BDRR. This data is collated into the Blue Drop Progress Report outlining the risk status of WTWs in South Africa.

In order to streamline the process of conducting BDRR assessments, both now and in the future, the BDRR formular was incorporated into the IRIS system. This facilitated capturing of information directly from the IRIS with links to supporting data provided by the WSI for purposes of verification. The BDPAT on the IRIS system has the following functionality:

- ✓ Input value for each risk indictor with separate section for comments.
- ✓ Resource pack with supporting information for each WSI as submitted on IRIS.
- ✓ Some input values are transferred directly from IRIS into the BDPAT: population served, plant design capacity, plant classification, process controller and supervisor classification, water quality compliance and monitoring compliance results.
- ✓ Option to create and export results, per supply system or in report with number of systems.
- ✓ State of completion for each risk indicator.

PROCEDURE TO CONDUCT BDRR ASSESSMENTS

The procedure for conducting the 2021 BDRR assessment outlined below is characterised by constant quality checks and oversight by DWS to ensure results are accurate based on data submitted by the WSI. The BDRR assessment period was 1 July 2020 – 30 June 2021.

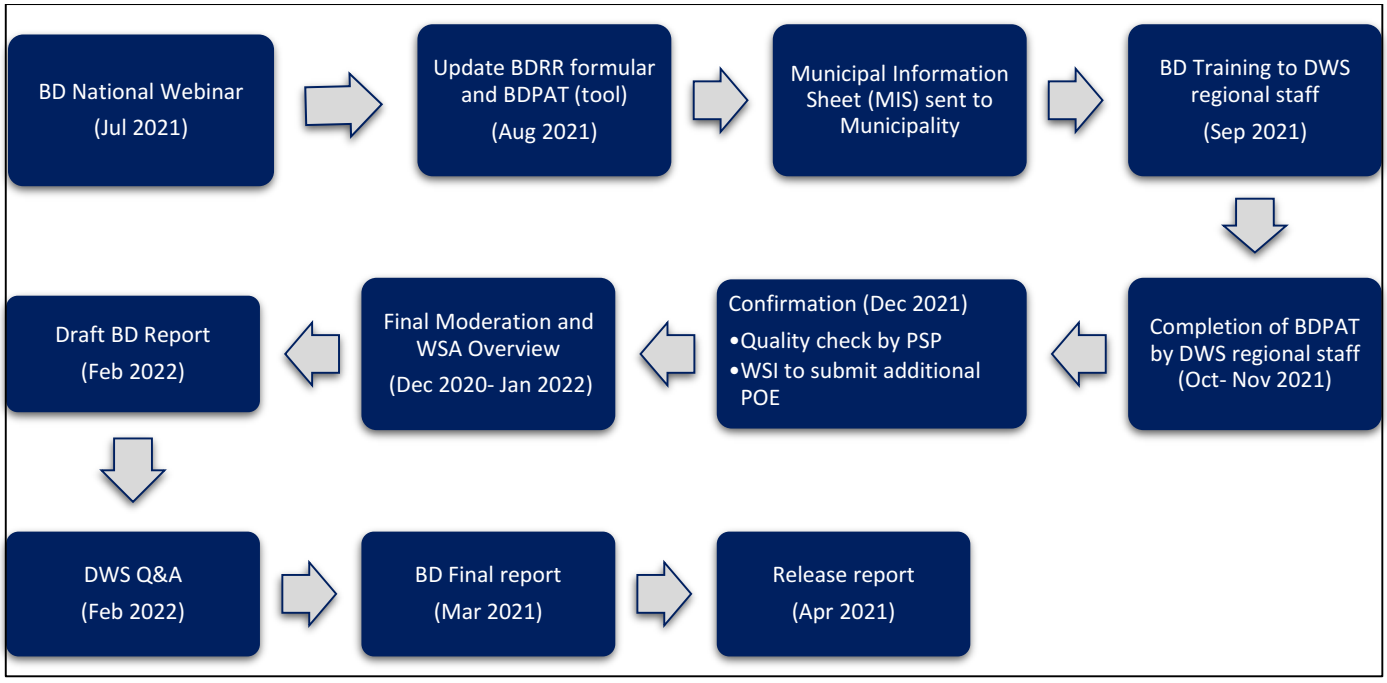


Figure 1: Procedure for conducting BDPAT assessment

The completion of the BDPAT was conducted by DWS regional staff that attended BDPAT training event which covered all aspects of BDRR i.e. rationale for BDRR, formular, explanation of each risk rating, and calculation of each risk indicator based on weighting. The training session includes real-time demonstration of the online BDPAT tool with its various functionalities including links to POE submitted by WSI. This training together with support from regional DWS personnel was sufficient to ensure accurate capturing of data based on POE provided by the WSI and uploaded on IRIS.

A comprehensive quality assurance process was followed which included confirmation and moderation:

- ✓ The initial results were interrogated by the PSP as part of quality assurance to check for errors/omissions when completing the scorecards.
- ✓ Where there were issues, the WSI was required to provide clarity and upload supporting data on IRIS for purposes of verification.
- ✓ The PSP team amended the BDRR score based on information provided as part of confirmation phase with full record of changes.
- ✓ The final data set was interrogated by DWS and municipal reports with supporting data sheet were generated from the IRIS system.

The draft report was also subjected to quality assurance which allowed the Regulator to interrogate the findings and refine recommendations and observations aligned to legislative requirements.

BLUE DROP REPORTING

In keeping with the Minister's commitment to provide the water sector and its stakeholders with **ongoing, current, accurate, verified** and **relevant** information on the status of drinking water services in South Africa, this BD PAT Report provides feedback and progress pertaining to current risk trend of municipal water treatment plant for 2020/2021 period.

The 2022 BDPAT Report has been designed with the objective to provide information on three distinct levels:

1. ***System specific*** data and information pertaining to the performance of each drinking water supply system on WSI level,
2. ***Province specific*** figures and information that highlight the strengths, weaknesses and trends for the collective of WSIs within the Province, and
3. ***National overview*** that collate and elevate the detailed findings on a system level to that of a provincial overview, which is then compared and inculcated as a national view of water service performance.

It is, however, a practical reality that a national assessment programme of this scale and magnitude required significant resources, which need to be rationalised within the available resource base of the participating and regulating entities. Hence, the following sequence of events is practiced:

- ✓ Blue Drop assessments and certification takes place every 2nd year, using the full set of BWSA criteria to assess performance of the water supply system: Output = Blue Drop Report.
- ✓ Progress assessments takes place during the Blue Drop 'gap' year, using the PAT to assess the cumulative risk status of treatment systems: Output = Blue Drop Progress Report.

HOW TO READ THE REPORT CARD

The following is an example of a typical municipal report card that appears in the Blue Drop PAT Report 2022.

The results provided for each risk indicator can be interpreted as follows:

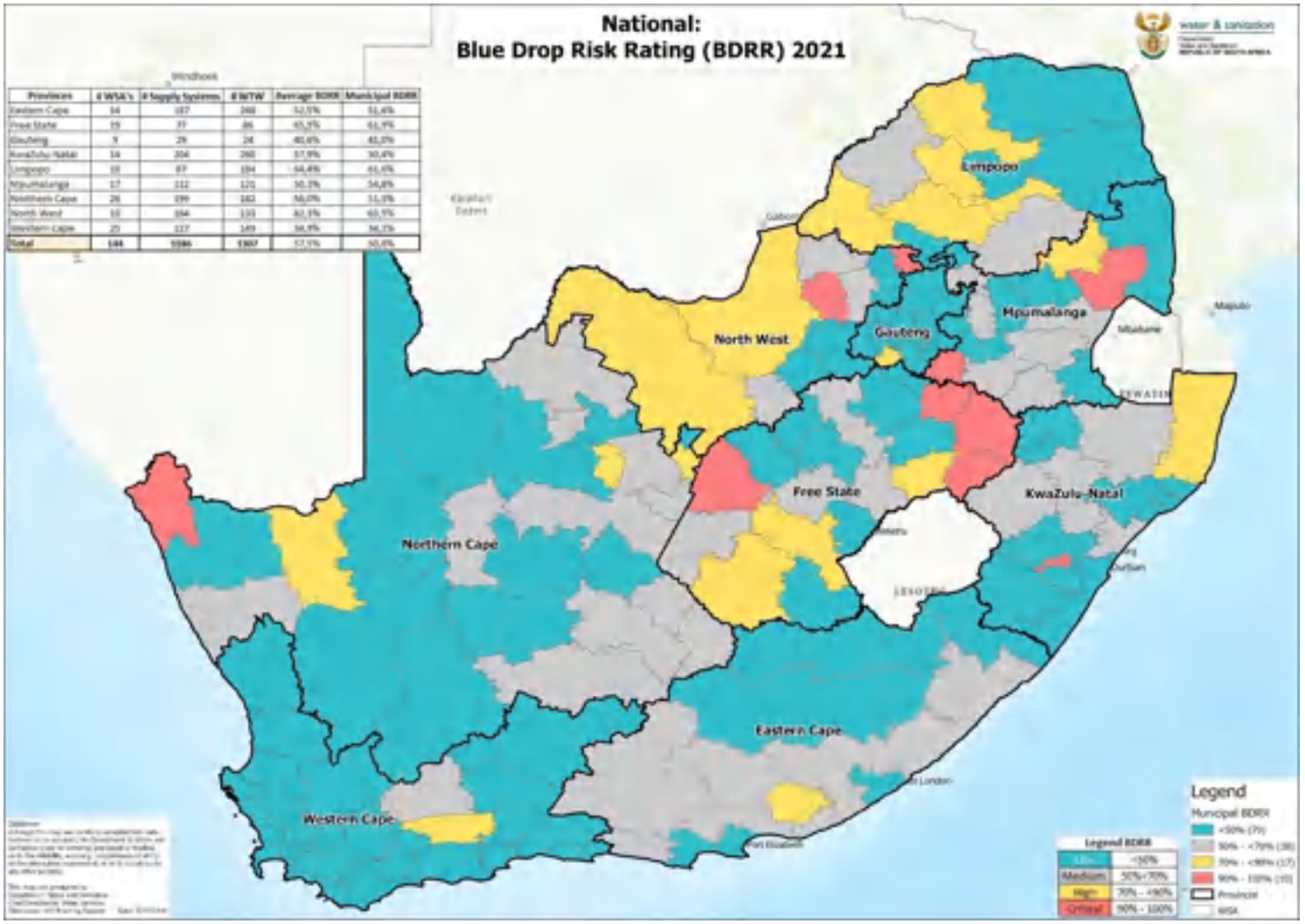
- ✓ A: Total design capacity in Ml/d.
- ✓ B, C, D, E: Percentage compliance for each risk indicator.
    - The lower the value the higher the risk presented by that indicator. The implementation of corrective actions is a must to increase the compliance of the indicator.
- ✓ The overall %BDRR/BDRRmax score reflects the total risk rating of each supply system expressed as % of the maximum risk that a plant can potentially reach.
    - A higher value indicates a high risk state that requires urgent intervention to improve the overall risk rating of the supply system.
    - The results are provided in a colour coded format – each colour has a specific meaning and performance reference as indicated in Table 1 and shown below for reference.

Table 1: BDRR Categorisation

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

Table 8:Interpretation of BDRR scorecard

Water Service Institution	ABC Local Municipality	→	Name of Water Services Institution
Municipal BDRR	XY%		Overall Municipal BDRR score is a weighted score calculated by percentage contribution of each supply system based on their design capacity. Note: WSA may have high/critical risk rating for a number of water supply systems but achieve an overall low risk rating if the largest system has a low risk rating.
Name of Supply system	XYZ System	→	Supply System name
Water Service Provider / Bulk supplier	ABC WSP		Details of Water service Provider / Bulk supplier
A: Total Design Capacity (Ml/d)	54.00		Total design capacity expressed in Ml/d
B: % Operational Capacity	82.41	→	% Operational capacity in terms of design. Ideal value is <90%
C1a: % Microbiological Compliance	97.57		Actual microbiological compliance: Population >100 000 - Ideal value is >99% Population <100 000 - ideal value is >98%
C1b: % Microbiological Monitoring Compliance	76.98	→	% Microbiological samples compared to required number of samples based on population size. Ideal value is >80%
C2a: % Chemical Compliance	83.99		Actual chemical compliance: Population >100 000 - Ideal value is >99% Population <100 000 - Ideal value is >98%
C2b: % Chemical Monitoring Compliance	20.59	→	% Chemical samples compared to required number of samples based on population size. Ideal value is >80%
D: % Technical Skills	81.25		% Compliance of technical skills reflecting process control, supervisor and maintenance team.
E: % Water Safety Plan Status	0.00		% Compliance of WSP against 11 key components.
%BDRR/BDRRmax for system	**70.06**	→	The BDRR% Deviation (BDRR/BDRRmax) score is specific to the water supply system. This score indicates the actual risk as a % of the maximum risk that the plant potentially can reach. A yellow and red block indicate that the plant is in high or critical risk that warrants urgent attention. A higher value reflects a high risk state (undesirable). A lower value reflects a lower risk state.



BACKGROUND

Risk-based regulation is used by the DWS (the Regulator) to identify, quantify and manage the corresponding risks associated with water services provision according to their potential impact on human health and to ensure a prioritised and targeted regulation of high-risk water supply systems. Risk is defined and calculated using the Blue Drop Risk Rating (BDRR) which focuses on specific risk indicators and serves as a tool for both DWS and the WSA to monitor and track the levels of risk in the country. The 2021 BDRR will serve as a baseline for future BDRR assessments that will be used by DWS to monitor and manage drinking water supply systems to ensure delivery of safe drinking water to all communities.

The BDRR value is a calculated unit of measurement of risk which indicate the variance of a BDRR value before it reaches its maximum BDRR value. This unit of measurement allows DWS to compare all sized and types of water supply systems equally.

The BDRR is therefore a % BDRR deviation but reported as BDRR in this report for ease of reference.

The BDRR score for each supply system is calculated and categorised as either low, medium, high and critical risk rating, according to the following range of values to enable both WSA and DWS to monitor performance.

Table 1: BDRR Categorisation

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

The BDRR formular is made up of five risk indicators with an overall BDRR for each supply system. The overall performance of each WSA is reported in two ways:

- ✓ Average % BDRR: average % BDRR for all supply systems per province.
- ✓ % Municipal (weighted) BDRR: The Municipal BDRR for each WSA is calculated by the proportional contribution of each water supply system based on design capacity of each system. This weighted average may provide a skewed picture i.e. a supply system which receives a small fraction of the total flow from a larger treatment plant will carry a higher weighting compared to a system which received 100% from a smaller treatment plant.

Therefore, the WSA must evaluate the individual % BDRR scores of each system to determine the risk associated with provision of drinking water for each system and not use the % Municipal BDRR score to evaluate their performance. Regardless of the size of the supply systems, all consumers have a right to safe drinking water and the WSA must be wary of neglecting the management of smaller, rural schemes in favour of larger urban water supply systems.

The % Municipal (weighted) BDRR for all WSA's in the province is provided at the end of each provincial chapter for reference.

NATIONAL OVERVIEW

BD PAT Assessment was conducted in 2021 on 144 Water Services Authorities in South Africa comprising of 1186 water supply systems. Every WSA was requested to complete the Municipal Information Sheet (MIS) and submit all supporting information to DWS via the IRIS system. DWS regional champions evaluated the data provided and used supporting historical data on IRIS (drinking water quality compliance, plant and process controller registration) to calculate the BDRR score for each system. The period under review for the 2021 BDRR assessment was: 1 July 2020 to 30 June 2021.

The graph below shows the number of WSA's and supply systems per province that were assessed during the 2021 BD PAT assessment.

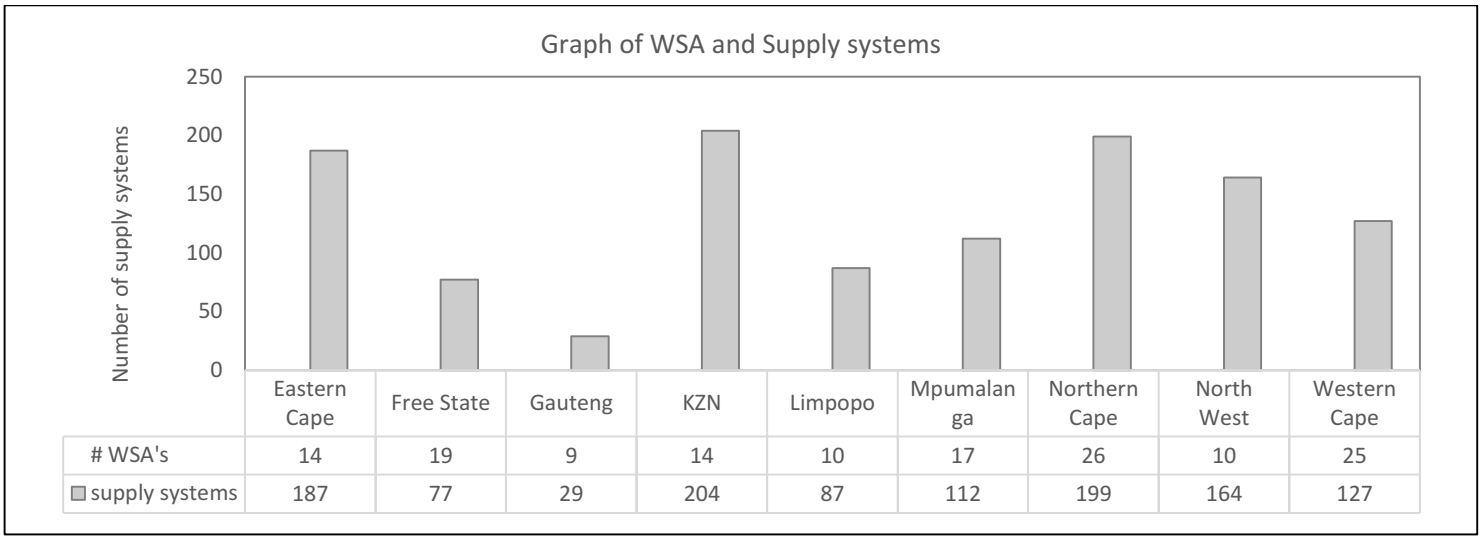


Figure 2: Graph of # WSA's and Supply systems for 2021 BDPAT assessments

The results show Gauteng has the smallest number of supply systems (29) and KZN has the largest number of supply systems (204).

EC, KZN and NW have large number of supply systems (>150) with low number of WSA's. This is indicative of large district municipalities who are responsible for providing water to large number of smaller, rural schemes either directly as WSA or managing water service provision through local municipalities which operate as WSP. This presents challenges with regards to resources as the WSA must ensure there is sufficient resources to operate and manage all the systems including dedicated maintenance teams for each local municipality.

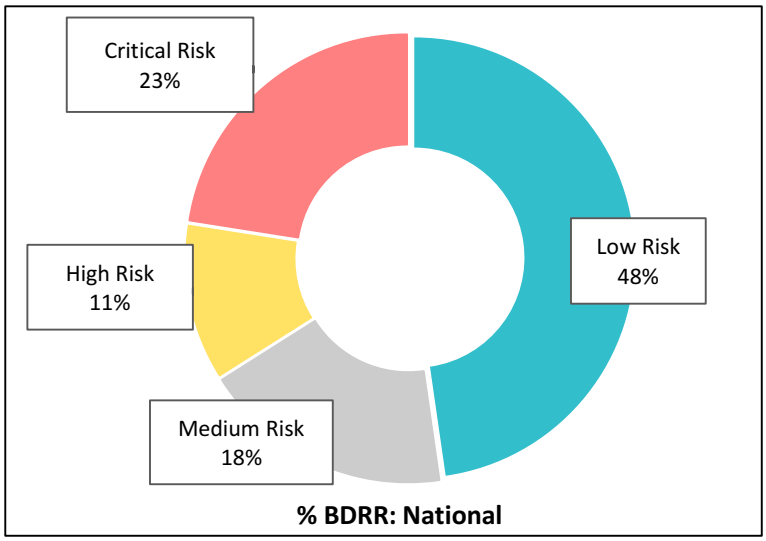
The overall performance of the country with regards to BDRR and the individual risk indicators which comprise the overall BDRR score are summarised in the Table below.

Table 9: National Risk Performance trends for 2021

Risk Rating	Average	Minimum	Maximum
% Municipal BDRR (Weighted Score)	50.8%	14.4%	100%
% BDRR per Supply System	57.5%	10.1%	100%
A: Design Capacity (Ml/d)	63.3	4800	0.001
C1a: % Microbiological Compliance	72.2%	0%	100%
C1b: % Microbiological Monitoring Compliance	55.1%	0%	100%
C2a: % Chemical Compliance	73.3%	0%	100%

C2b: % Chemical Monitoring Compliance	33%	0%	97.1%
D: % Technical Skills	44.9%	0%	100%
E: % Water Safety Plan Status	24.5%	0%	100%

The National BDRR profile is outlined in the figure below.



The BDRR results are summarised as follows:

- ✓ 48% of supply systems are in the low risk category,
- ✓ 18% are in the medium risk category,
- ✓ 11% are in the high risk category, and
- ✓ 23% are in the critical risk category.

Figure 3: National BDRR profile 2021

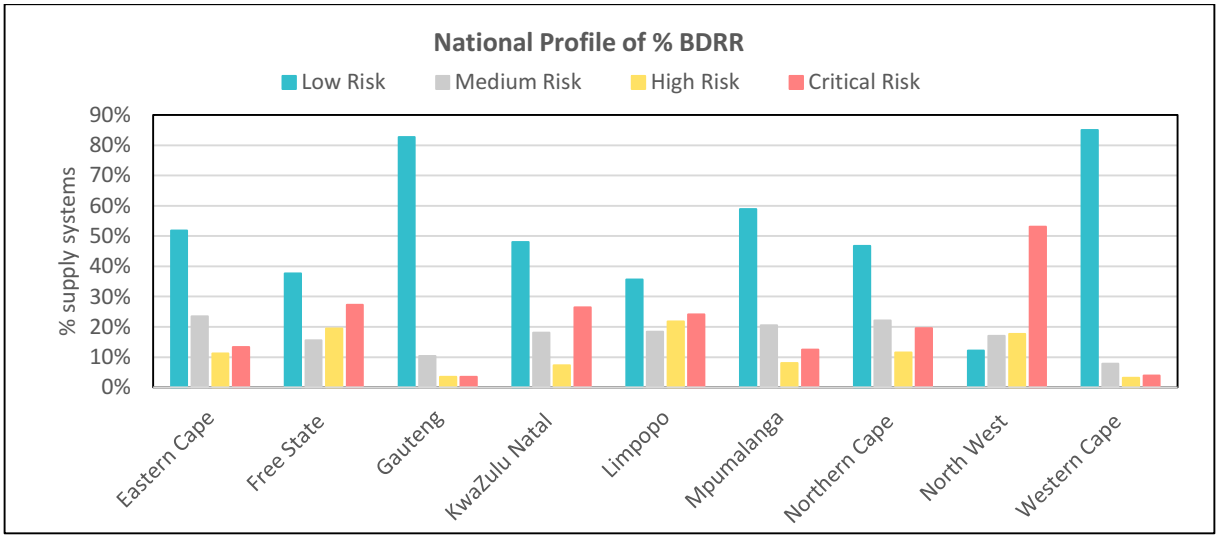


Figure 4: Breakdown of % BDRR scores per category

While DWS is encouraged by the 48% of supply system in the low risk category, the 34% of systems which reside in the high and critical risk categories is of concern to the Department as this presents a potential risk to consumers who are supplied by these supply systems. The large proportion of low risk supply systems in the Gauteng and Western Cape provinces is a positive trend which must be followed by the rest of the country to ensure effective risk management of water services provision for all citizens in the country.

To use the 2021 BDRR score as a tool to implement strategic, targeted actions that will result in improved risk rating and sustainable water services delivery, the individual components of the BDRR score must be critically evaluated by the WSA to understand the reason for the current risk rating and the desired risk category for delivery of safe drinking water.

The BDRR scorecards reports on the following system-specific risk indicators which ultimately feed into the BDRR score:

- ✓ Risk Indicator A: Design Capacity,
- ✓ Risk Indicator B: Operational Capacity,

- ✓ Risk Indicator C: Water Quality Compliance,
- ✓ Risk Indicator D: Technical Skills, and
- ✓ Risk Indicator E: Water Safety Plans.

The trends with regard to the risk rating of the individual indicator which make up the overall BDRR score is discussed below. This will provide insight on the risk status of each indicator and enable the WSA to implement targeted actions to reduce risk of specific risk indicators which are negatively impacting on the final BDRR score of the supply system.

Risk Indicator A: Design Capacity and Risk Indicator B: Operational Capacity

Criterion A represents the design capacity of the treatment plant.

Every water treatment plant must be classified with DWS as per Regulation 2834 and classification is based on a number of components, including size, complexity and electrical consumption.

The risk rating is allocated according to size of the treatment plant with higher risk rating given for a larger plant and lower risk rating for a smaller plant. The rationale is that a larger plant serves a larger community and therefore presents a higher risk if the plant is not functioning or producing unsafe drinking water than a smaller plant which serves less people. The risk rating for criteria A remains the same provided the capacity stays the same, and all plants which have the same design capacity range will have the same maximum BDRR.

Information from the IRIS system was collected to provide a profile of the design capacities of all treatment plants in the province. Some of the treatment plants are large regional bulk schemes which supply water to a number of supply systems in various municipalities and across provinces. The figure below reports on the design capacity of treatment plants located in the province in Ml/d.

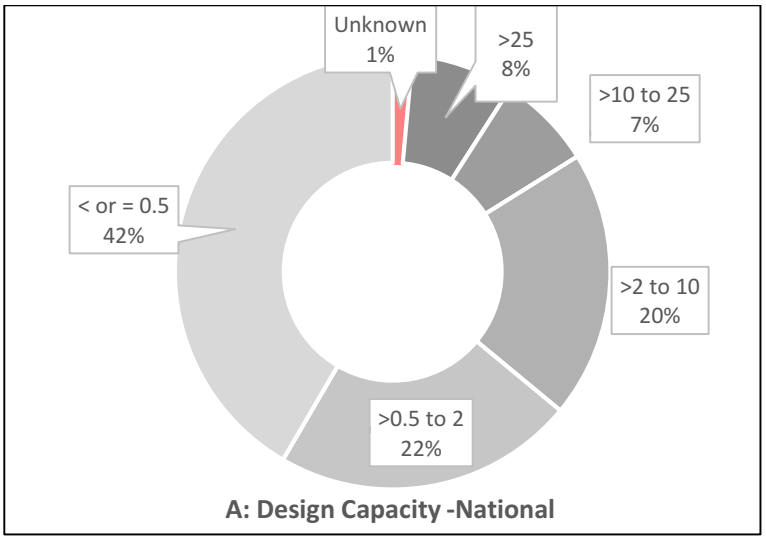


Figure 5: National Profile of design capacity for water treatment plants reported in Ml/d

The results are summarised as follows:

- ✓ There are 1307 WTW operated by WSA in South Africa with a combined capacity of 31 911.3 Ml/d as reported on IRIS,
- ✓ Average design capacity =63.3 Ml/d,
- ✓ Largest plant in the country = 4 800 Ml/d,
- ✓ Smallest plant in province = 0.001Ml/d,
- ✓ 42% of plant are <=0,5Ml/d, 22% are between 0.5 and 2 Ml/d, 20% are between 2 and 10Ml/d, 7 % are between 10 and 25Ml/d and 8% are >25Ml/d,
- ✓ 1% of plants have not provided design capacity. WSA's must ensure design capacity of the treatment plant is determined by a qualified engineer and this information is submitted to DWS for registration of all WTW.

In summary, 62% of plants are categorised as small plants (<2 Ml/d) and these include boreholes and rural systems. Operation and management of a large number of rural schemes present challenges as these plants are usually located across a large geographical area with some plants in remote areas. The WSA must ensure there is sufficient resources such as staff, chemical supplies, spares and vehicles to ensure optimal operations of these supply systems.

27% are medium sized plants (between 2 and 25 Ml/d) and 8% are large plants (>25 Ml/d) which are typically located in metropolitan areas in the province or are part of bulk regional schemes.

With regards to **Risk Indicator B: Operational Capacity**, daily production versus the design capacity of the treatment plant is an important indicator to determine if the plant can provide sufficient, safe drinking water to all the consumers now and in the near future. The ideal value is between 50 – 100%; higher values indicate the plant is operating above its design capacity resulting in overloading of major unit processes which many result in water quality failures. Similarly, if a plant is receiving too little flow, this may compromise performance due to lack of retention time (flocculation, sedimentation). Once daily production approaches 90% of design capacity, the WSA must plan, budget and implement projects to increase the capacity of the treatment plant to ensure there is sufficient supply, not only for human consumption, but also for economic activities.

Although operational capacity has been reported for some of the supply systems, there are a number of large regional plants which supply a large number of supply systems in various municipalities and across provincial borders. Analysis of Indicator B must therefore be conducted at plant level as collating operational capacity data at municipal or provincial level will not provide an accurate reflection of the current operational capacity of each individual plant.

Many of the supply systems did not provide daily operational flow data and this presents a serious risk: WSAs are reminded that installation of flow meters and daily flow recording is a regulatory requirement as per their Water Use License.

Risk Indicator C: Water Quality Compliance

In South Africa, the SANS 241:2015 is the definitive reference on acceptable limits for drinking water quality parameters and provides limits for a range of water quality characteristics and water meeting this standard is deemed safe for lifetime consumption. The actual water quality depends on both microbiological and chemical determinands:

- ✓ Microbiological compliance reports on the actual compliance of the final water for the past 12 months against microbiological determinands E. Coli / Faecal Coliforms. The presence of these determinands in water is a strong indication of recent sewage or animal waste contamination and there is potential for contracting diseases from pathogens.
- ✓ Chemical quality is determined by a number of determinands which may be acute or chronic health determinands with specific health risks associated with each determinands. Acute health risks can result in death if the limit is exceeded, while chronic limits provide maximum limits that can be ingested over a period of time before health effects are observed.

Both microbiological and chemical compliance limits outlined in SANS 241:2015 is evaluated against the population size:

- for a population <100 000, compliance is >98%,
- for a population >100 000, compliance limit is >99%.

In addition, the SANS 241:2015 standard stipulates the frequency of sampling as well as the number of sample points required per supply system to ensure sufficient coverage of the network. The frequency and number of required sample points is dependent on the population size as outlined in Table 1 of SANS241:2015. Monitoring compliance is therefore critical to guarantee the safety of the supply at all points in the network.

Risk Indicator C: Water Quality Compliance reports on both water quality compliance and monitoring compliance as per SANS 241:2015 for both microbiological and chemical determinands. The formular to calculate C is made up of four sub-indicators with microbiological compliance carrying a higher weighting than chemical compliance as this presents a serious, acute health risk.

The formular for Risk Indicator C and the description and categorisation of each sub-indicator is presented in the table below. The categorisation is aligned with the risk rating for each sub-indicator and all supply systems which fall in the low risk category are regarded as compliant systems.

Table 10: Formular, description and categorisation for Criteria C

<table>
<tr><th colspan="3">C = [0.7(C1a x C1b)] + [0.3(C2a x C2b)]</th></tr>
<tr><td rowspan="2">Ca: Water Quality Compliance</td><td>C1a: Microbiological compliance as per SANS 241: 2015.</td><td rowspan="2"><table><tr><th>High Risk</th><th>Medium Risk</th><th>Low Risk</th></tr><tr><td><95%</td><td>95% - <97%</td><td>97% - 100%</td></tr></table></td></tr>
<tr><td>C2a: Chemical compliance as per Blue Drop requirements</td></tr>
<tr><td rowspan="2">Cb: Monitoring Compliance</td><td>C1b: Micro monitoring compliance against registered programme, based on population size as per SANS 241:2015</td><td rowspan="2"><table><tr><th>High Risk</th><th>Medium Risk</th><th>Low Risk</th></tr><tr><td><50%</td><td>50% - 80%</td><td>>80%</td></tr></table></td></tr>
<tr><td>C2b: Chemical monitoring compliance calculated as per Blue Drop requirements</td></tr>
</table>

The National overview for Indicator C: Water Quality Compliance and sub-indicators are presented in the table below. This is based on data for the period January to December 2020.

Table 11: National overview for Indicator C: Water Quality Compliance (Jan – Dec 2020)

Indicator C: Water Quality Compliance	C1a Microbiological Compliance	C1b Chemical Compliance	C2a Microbiological Monitoring Compliance	C2b Chemical Monitoring Compliance
Eastern Cape	79.0%	77.9%	60.4%	38.0%
Free State	57.3%	65.3%	43.9%	27.1%
Gauteng	94.7%	93.1%	83.7%	57.0%
KwaZulu Natal	69.7%	68.9%	59.5%	36.1%
Limpopo	69.8%	69.7%	35.6%	13.8%
Mpumalanga	73.8%	79.0%	62.8%	44.3%
Northern Cape	73.2%	72.5%	42.3%	13.8%
North West	38.5%	42.6%	25.2%	16.5%
Western Cape	93.7%	91.0%	82.1%	50.4%
National Average	**72.2%**	**73.3%**	**55.1%**	**33.0%**
Minimum	**38.5%**	**42.6%**	**25.2%**	**13.8%**
Maximum	**94.7%**	**93.1%**	**83.7%**	**57.0%**

The national profile for microbiological and chemical compliance is illustrated below providing % of supply systems per risk category.

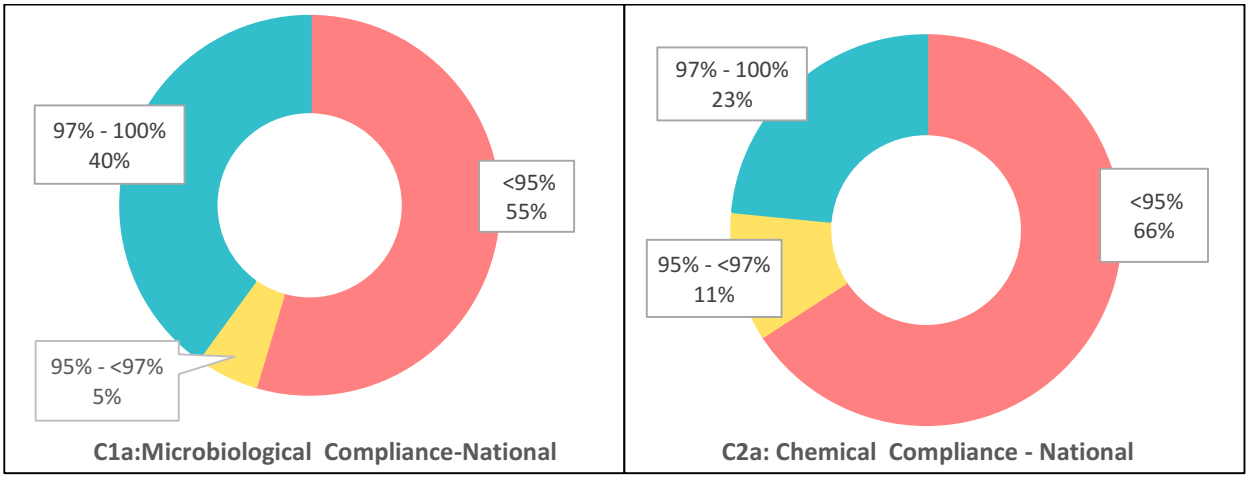


Figure 6: National overview of Microbiological and Chemical Compliance (Jan – Dec 2020)

The results are summarised as follows:

- ✓ 40% of supply systems achieved microbiological compliance and 23% of supply systems have achieved chemical compliance. The low compliance results are of serious concern to DWS as the majority of supply systems present a potential health risk to consumers.
- ✓ 60% of supply systems do not comply with microbiological determinands: this indicates microbiological failures which presents a serious health risk to the consumers in these supply systems. For sustained failure, 'Boil Water' notices must be issued to safeguard consumers while the root cause of the failure is investigated and resolved.
- ✓ 77% of supply systems do not comply with chemical determinands. This may present immediate or potential long term health risks depending on whether non-compliance is for acute health determinands or chronic health determinands. The WSA must ensure compliance for all chemical - health determinands as per Blue Drop requirements and these includes, NO3- and NO2- as N, SO42, Sb, As, Cd, Cr, Co, Cu, CN-, Pb, Hg, Ni, Se, V, DOC or TOC, and Total THM.

The national overview for microbiological and chemical monitoring compliance is illustrated below providing % of supply systems per risk category.

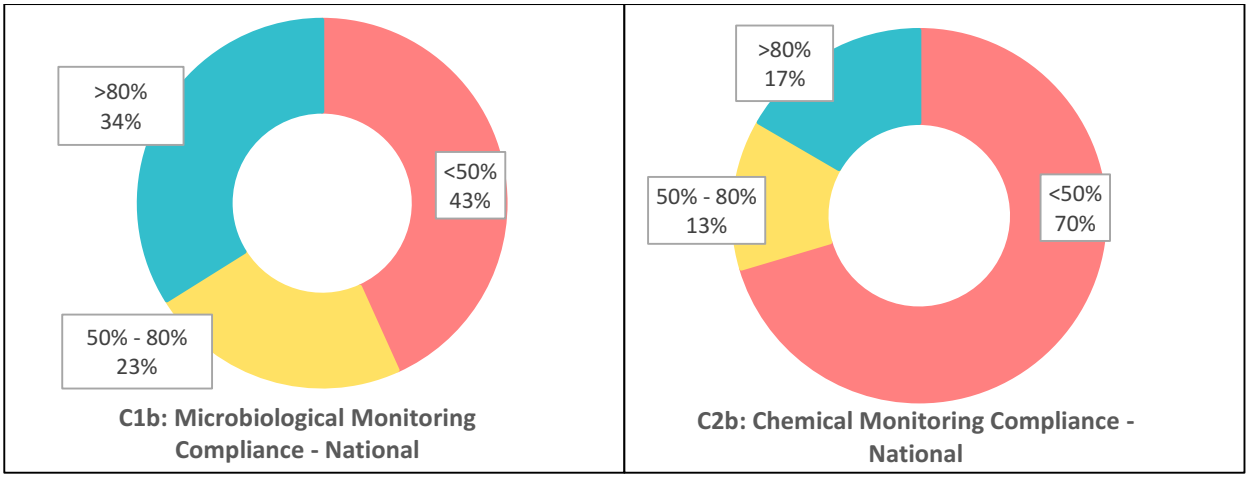


Figure 7: National Overview of Microbiological and Chemical Monitoring Compliance (Jan – Dec 2020)

The results are summarised as follows:

- ✓ 34% of supply systems have sufficient microbiological samples based on population size as per SANS 241-2.
- ✓ 66% of supply systems have <80% for microbiological monitoring compliance. This indicates there is an insufficient number of microbiological samples to guarantee the safety of water at all points in the distribution system. These supply systems therefore do not comply with table 2 in SANS 241-2 which outlines required number of sample points based on population size.
- ✓ Only 17% of supply systems have sufficient chemical monitoring samples.
- ✓ 83% of supply systems have <80% for chemical monitoring compliance. This indicates either insufficient number of samples were collected or insufficient chemical determinands were analysed as per the requirement outlined in SANS 241:2015, i.e.
    - Actual monitoring occurs according to registered IRIS monitoring programme (>80%),
    - Number of samples: One sample each at treatment plant final and one distribution point, both of which must be analysed for at least 80% of determinands listed (13 of the 17 determinands) i.e. at least 26 data points are required.

The graph below provides an overview of the percentage supply system which have achieved low risk rating for water quality (>97%) and low risk rating for monitoring compliance (>80 %).

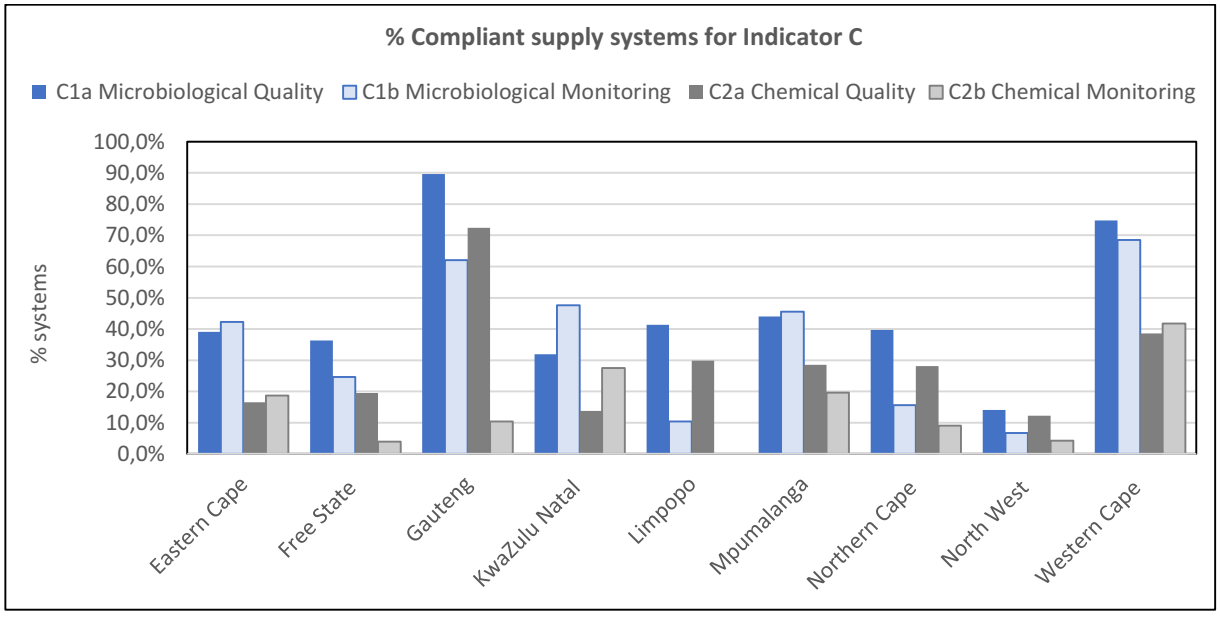


Figure 8: National profile of Low risk systems for Indicator C: Water quality

Gauteng has the largest percentage of systems which comply with microbiological and chemical water quality limits while the Western Cape has the largest percentage of system which comply with microbiological and chemical monitoring compliance i.e. systems with sufficient number of monitoring samples to verify water quality at all points in the network.

Although some regions have performed better than others, DWS is concerned about the poor water quality in the country. Microbiological and chemical failures present serious health risks to consumers while low monitoring compliance indicates the lack of sufficient samples to verify safety of water at all points in network.

All WSA's must urgently adopt and implement mitigating measures to improve water quality compliance. In the event of water quality failures:

- ✓ Precautionary measures including 'Boil Water' notices must be issued to consumers in systems with sustained microbiological failures.
- ✓ 'Water Quality' Advisories must be issued to consumers in systems with sustained chemical failures for chronic health determinands.
- ✓ WSAs must investigate the root cause of the failure and implement remedial actions to ensure compliance. If this cannot be achieved, an alternative water supply must be provided to ensure safety of consumers.

To address poor monitoring compliance, WSA must consult SANS 241:2015 to ensure there are sufficient sample sites:

- ✓ Microbiological monitoring frequency and minimum number of samples in distribution network as outlined in Table 2 in SANS 241:2015.
- ✓ Chemical monitoring as per Blue Drop requirements, and implementation risk-based chemical monitoring programme based on water quality assessment of raw, final and distribution network to identify both current and potential problem determinands thereby ensuring all risk determinands are monitored.

All WSA's must ensure there is sufficient budget for monthly compliance monitoring to be conducted at all required sample points by an accredited laboratory.

Risk Indicator D: Technical Skills

Regulation 2834 states all plant personnel must be classified as per their qualifications and years of experience. This is conducted by DWS and plant personnel are provided with a classification certificate which reflects their current classification based on qualification and years of experience. Ongoing training is a requirement under the Regulation to allow for continuous learning that will enable process controllers to improve their classification over time to achieve Class V that allows them to act as plant supervisor. The required number and classification of staff required at a treatment plant per shift is dependent of the classification of the plant and the number of shifts.

The Blue Drop requirements acknowledge excellence in water services provision. The Blue Drop requirements therefore outlines the number and classification of process controllers and supervisors required for each shift. The Blue Drop requirements make provision for sharing of supervisors: this reduces the burden of providing permanent staff for small, remote systems as a roaming supervisor can visit a number of facilities once or twice a week.

In addition, the Blue Drop requirements outline the requirements for plant maintenance teams to ensure effective maintenance of water infrastructure for ongoing operations. The maintenance team must have a variety of artisans with electrical, mechanical and civil expertise for effective asset management with assets reaching their expected useful lifespan. The Blue Drop requirements were used to evaluate Risk Indicator D: Technical Skills as per Table below

Table 12: Blue Drop requirements to evaluate technical skills at treatment plants

Works Class	Class Of Process Controller Per Shift	Class Of Process Controller for Supervision*	Operations And Maintenance Support Services Requirements*
E	Class I	Class V*	THESE PERSONNEL MUST BE AVAILABLE AT ALL TIMES BUT MAY BE IN-HOUSE OR OUTSOURCED - electrician - fitter - instrumentation technician
D	Class II	Class V*	
C	Class III	Class V*	
B	Class IV	Class V	
A	Class IV	Class V	

NB. Fluoridation – for any class works, minimum process controller classification should be class IV

**does not have to be at the works at all times but must be available at all times. If the Water Services Institution or owner of a waterwork has no person of this class employed on that work, a contractor / consultant with the required qualifications as prescribed in Schedule III in respect of that particular class of persons, shall be appointed to visit the work weekly.*

Risk Indicator D: Technical Skills is calculated from three separate components:

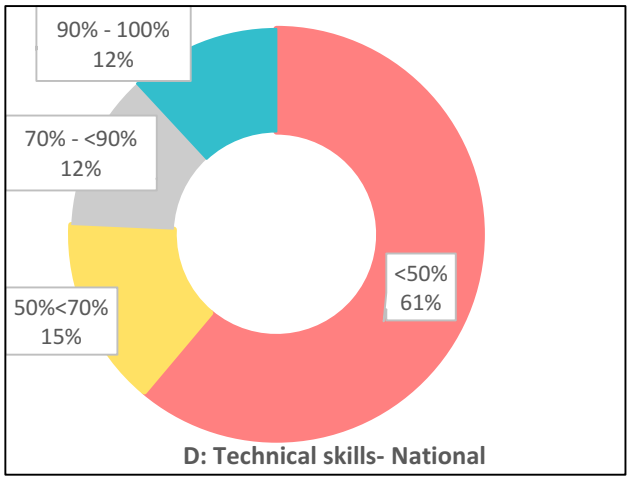
- ✓ Process controllers compliance as per Blue Drop requirements: required number and class of process controllers per shift for specific class of treatment plant.
- ✓ Supervisor compliance as per Blue Drop requirements: Class V required, either at the plant or available at all times.
- ✓ Maintenance team compliance as per Blue Drop requirements: civil, mechanical and electrical expertise required.
    - Civil team: plumbing qualification / trade test.
    - Mechanical team: millwright or similar mechanical qualification.
    - Electrical team: electrical qualification / trade test.

The Table and figures below provides a profile of the technical skills in the country for 2020 – 2021 period.

Table 13: National Overview for Indicator D: Technical Skills

National	Average	Minimum	Maximum
D: Technical Skills	44.9%	0%	100%
Process Controller Compliance	46.1%	0%	100%
Supervisor Compliance	55.8%	0%	100%

The national profile for Risk Indicator D: Technical skills is presented in Figure 9.



The results are summarised as follows:

- ✓ Only 12% of supply system have excellent technical skills: 90-100% compliance,
- ✓ 12% of supply systems have good technical skills: 70-<90% compliance,
- ✓ 15% of supply systems have average technical skills: 50-<70% compliance,
- ✓ 61% of supply systems have poor technical skills: <50% compliance.

Figure 9: National Profile for Indicator D: Technical Skills

In general, there is lack of sufficient technical skills at water treatment plants and distribution networks. This presents a serious risk as there is either insufficient number of staff or lack of suitably qualified personnel to optimise the treatment process and maintain the integrity of the assets to produce clean, safe water.

The national profile for process controllers and supervisors compliance is outlined in the figures below.

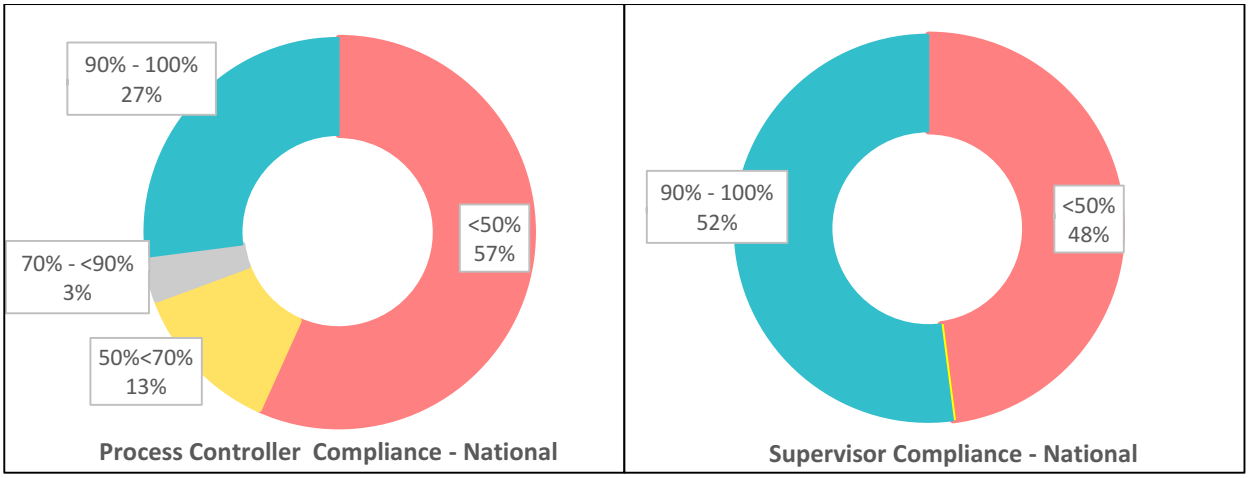


Figure 10: National Profile for Process Controller and Supervisor compliance

The results are summarised as follows:

- ✓ Process controller compliance is poor with only 27% of supply systems with sufficient number of suitably classified process controllers per shift. Lack of sufficient number of process controllers presents a serious risk due to lack of daily operations, monitoring and process optimisation.
- ✓ Only 52% of supply systems are compliant with regards to supervisors. These plants either have Class V supervisors permanently based at the plant or available as a roaming supervisor available at all times to assist process controllers. The presence of a qualified supervisor can mitigate some of the risks associated with insufficient number of process controllers on site provided the supervisor is available at all times.

The national profile for maintenance teams as well as breakdown of maintenance teams is outlined in the figures below.

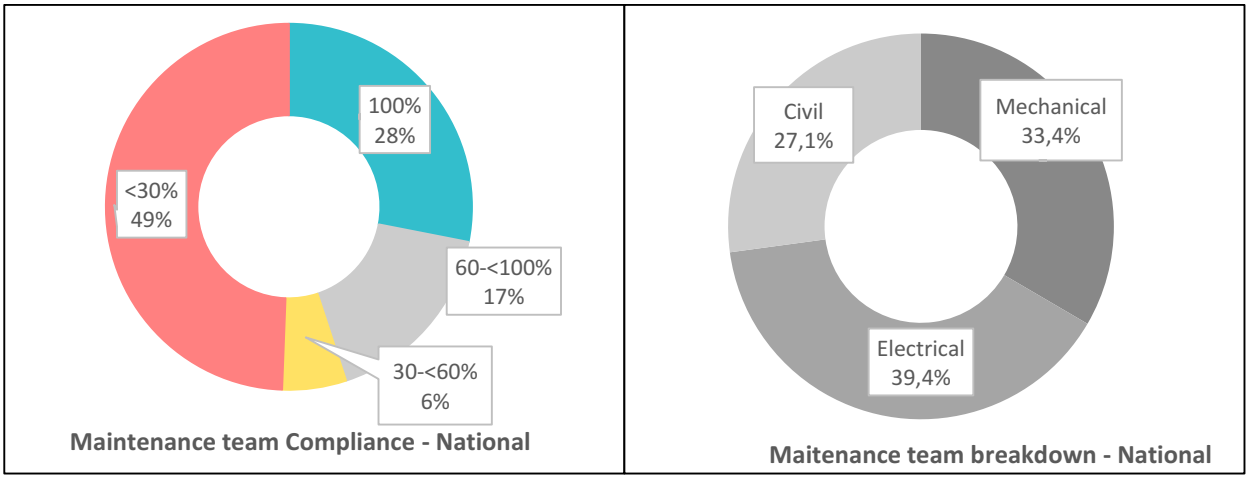


Figure 11: National profile for Maintenance team compliance and maintenance team breakdown

The results are summarised as follows:

- ✓ 28% of all supply systems have full maintenance teams in place i.e. civil, mechanical and electrical personnel. However, the remaining 72% have insufficient maintenance teams and this can lead to shutdown of treatment plant or processes which will affect quality and quantity of water.
- ✓ 39.4% have electrical staff, 33.4% have mechanical competency, and 27.1% have civil staff. Civil works at treatment plants and in the distribution network is conducted by plumbers: lack to this skill will lead to water losses which will negatively impact on water supply.

The figure below reports on the percentage of systems which have excelled with regards to technical skills and are therefore in low risk category for Indicator D i.e. % of system with >90% for overall technical skills, process controllers, supervisors and maintenance teams.

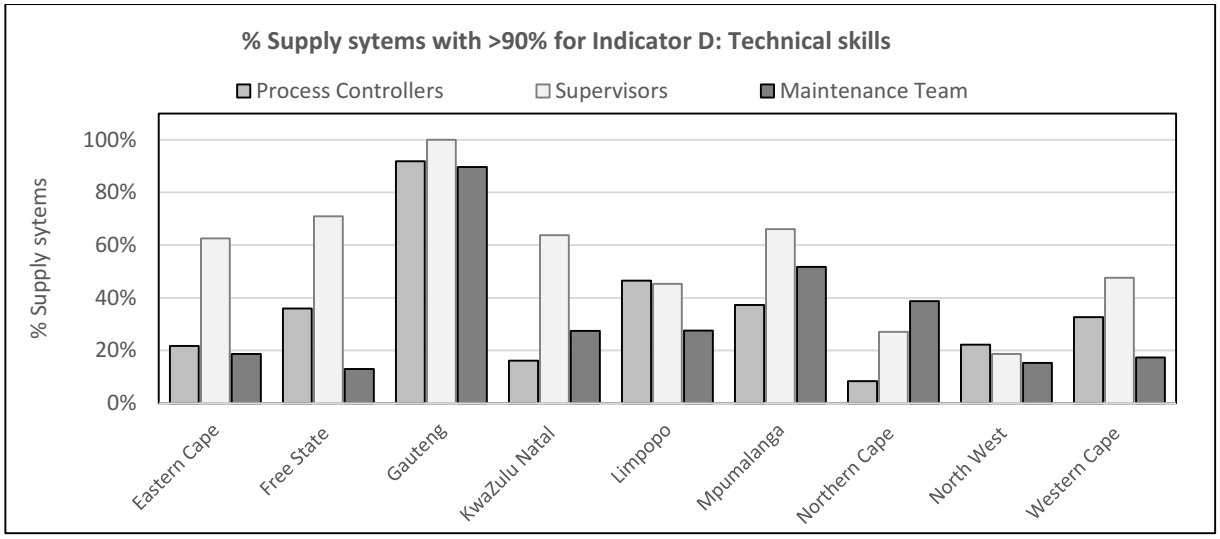


Figure 12: National profile of low risk systems for Indicator D: Technical Skills

While the overall result for technical skills is poor, Gauteng province has performed excellent with regard to process controllers, supervisors and maintenance teams. The results indicate that there are supply systems who have achieved >90% for technical skills throughout the country thereby providing comfort that this is achievable in all provinces.

In general, technical skills is poor throughout the country. Only 27% of systems have the required number of process controllers and 28% of supply systems have maintenance teams. Although supervisor compliance is better with 52% of supply systems having qualified supervisors on site, technical skills remains a high risk. The following remedial actions are required to improve the current status:

- ✓ WSAs are encouraged to evaluate the performance of each system with regards to process control and use this information to determine the operational model which is best suited to ensure effective operations and maintenance.
- ✓ WSA must allocate budget to appoint suitably qualified process controllers and supervisors to ensure water quality compliance improves through ongoing process optimisation.
- ✓ The WSA must appoint a qualified maintenance teams to ensure that the life span of the treatment plant is increased by regular maintenance and ensure there are sufficient number of personnel to cover the entire distribution network to reduce water losses and maintain integrity of the supply system.

Risk Indicator E: Water Safety Plans

Risk management is the cornerstone of risk-based regulation and a fundamental part of the SANS 241:2015 requirements to ensure effective management of both current and future potential risks. The application of risk management in drinking water management is through the Water Safety Planning concept developed by the WHO which is a comprehensive risk assessment and risk management approach that encompasses all steps in a drinking-water supply chain, from catchment to consumer to ensure continuous feedback and improvement to manage all current and future potential risks. The Water Safety Plan advocates for development of a risk-based monitoring programme and this is also a requirement as per SANS 241:2015.

Risk indicator E: Water Safety Plans evaluates the following three critical components which are required for effective risk management as per the WHO guidelines and the SANS 241:2015 requirements.

- ✓ Completeness of the Water Safety Plan as per WHO Water Safety Planning Manual[1]:
  - 1: Signature from Technical Director / Municipal Manager
  - 2: Risk prioritisation method
  - 3: Risk assessment of catchment
  - 4: Risk assessment of plant
  - 5: Risk assessment of network

[1] *Water Safety Planning manual, World Health Organisation. 2007*

- 6: Final risk rating
- 7: Mitigating measures for all high and medium risks.

✓ Development and adoption of risk-based monitoring programme as per SANS 241:2015

- 8: Full SANS 241:2015 analysis of raw and final water,
- 9: Identification of risk determinands,
- 10: Addition of risk determinands to monthly compliance monitoring as per SANS 241:2015.

✓ Proof of implementation of the findings of the Water Safety Plan to ensure there is continuous risk management and movement towards overall lower risk rating:

- 11: Proof that >25% of mitigating measures have been implemented – proof in form of purchase order, pictures, water quality results, tender document, etc.

This makes up 11 equal sub-elements that are evaluated during the BDPAT assessment to calculate the final risk rating for this indicator.

The Table and figures below provides the national profile for Risk indicator E for 2021.

Table 14: National Overview for Indicator E: Water Safety Plans

National Overview	Value
E: Water Safety Plans - Average	24.5%
E: Water Safety Plans - Minimum	0%
E: Water Safety Plans - Maximum	100%
% Systems with Water Safety Plans	33%

The national profile for E: Water Safety Plans is presented in the figure below.

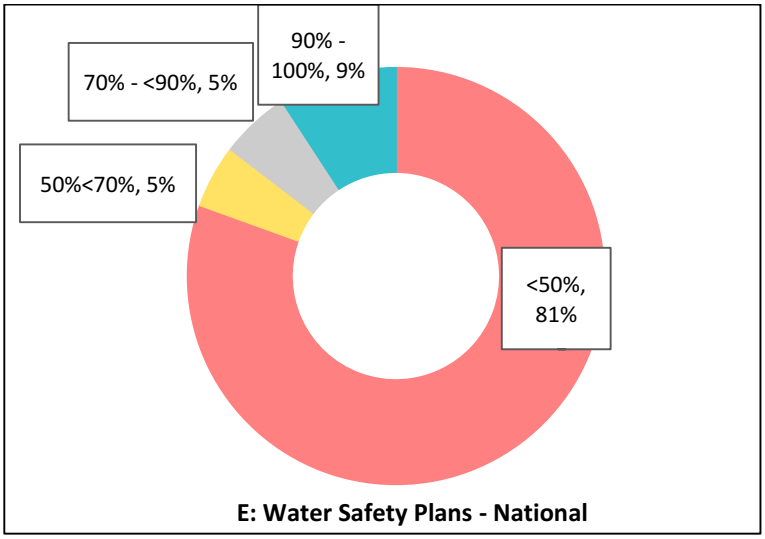


Figure 13: National Profile for Indicator E – Water Safety Plans

The results are summarised as follows:

✓ Only 9% have excellent Water Safety Plans in place with >=90% compliance indicating comprehensive Water Safety Plans with all required components.

✓ 81% of supply systems in the country have inadequate or no Water Safety Plans in place with <50% compliance for Indicator E.

✓ The average compliance is 24.5% which indicates poor understanding of the Water Safety Planning process amongst the WSA's in the country.

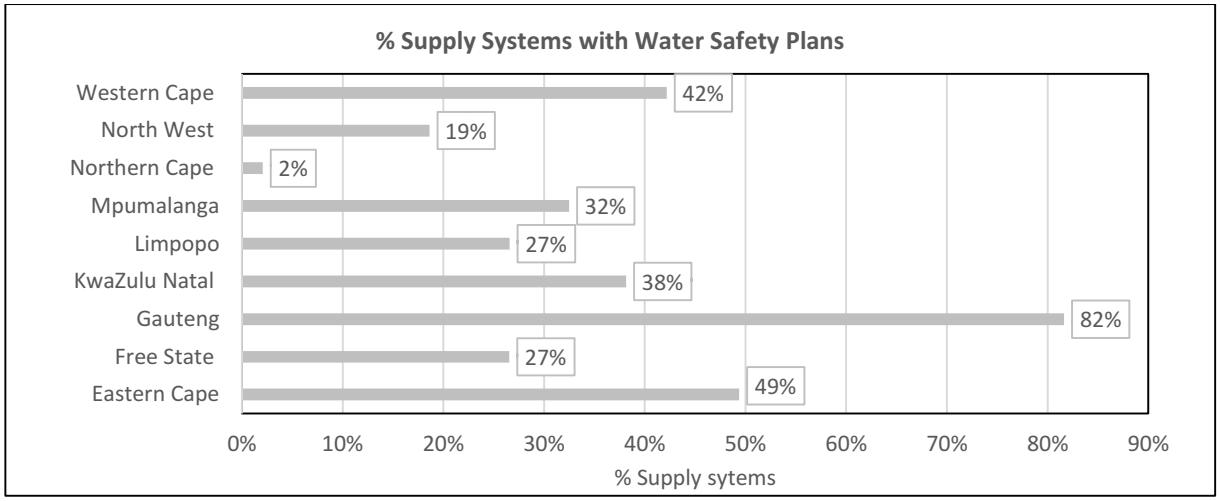


Figure 14: % supply systems with Water Safety Plan in place

The figure above outlines the percentage of supply systems with Water Safe Plans in place. Gauteng is the province with highest proportion of supply systems which have a Water Safety Plan in place and all other provinces have less than 50% of supply systems with Water Safety Plans in place.

The figure below provides details on the completeness of the Water Safety Plan by indicating the percentage of supply systems which comply with each of the 11 individual components which make up the Water Safety Plan.

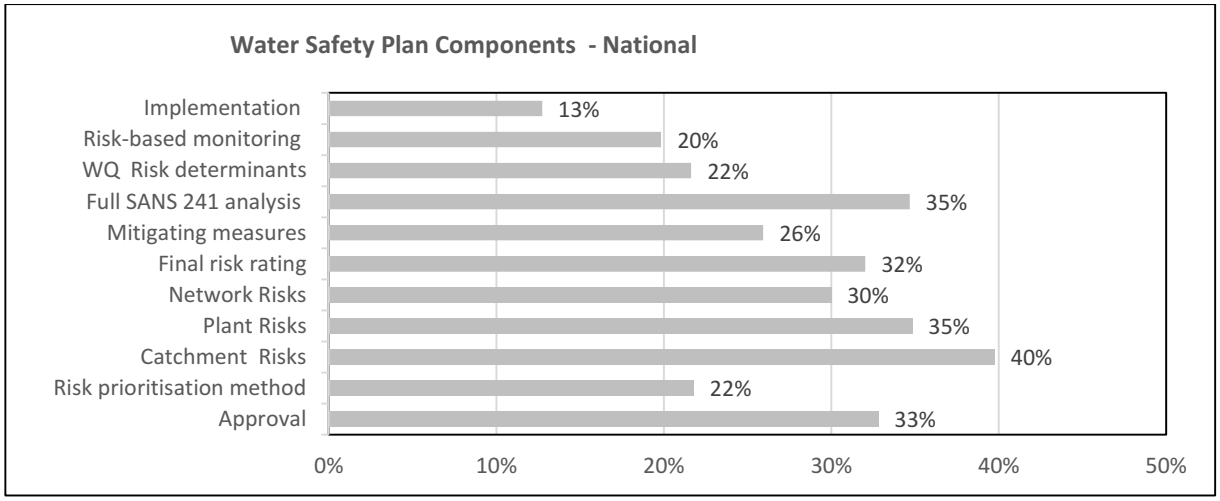


Figure 15: National Overview of Water Safety Plan Components

The results are summarised as follows:

- ✓ 33% have approval indicating management's commitment to implementing the findings of the Water Safety Plan,
- ✓ Identification of risks is poor for various components of the water supply system:
  - 40% of systems have identified risks in catchment,
  - 35% of systems have identified risks at plant,
  - 30% have identified risks in network,
- ✓ 22% have risk prioritisation method in place with 32% having final risk rating,
- ✓ 26% have identified mitigating measures to reduce risks,
- ✓ Development of risk-based monitoring is poor as full SANS 241:2015 analysis was only conducted on 35% of systems with only 20% using this information to develop risk-based monitoring programmes. Risk-based monitoring is a requirement of SANS 241:2015 and must be reviewed annually based on updated full SANS 241:2015 of raw and final water.

- ✓ Implementation of mitigating measures is low at only 13%. Although 33% of Water Safety Plans have been approved, there has been minimal implementation of findings. Management must ensure that when approval is given for a Water Safety Plan, this is supported by resources in the form of staff and budget to implement mitigating measures.

In summary, Water Safety Planning is being implemented in only 33% of supply systems in the country. All WSAs must adopt risk management principles embodied in the Water Safety Planning approach as this is a regulatory requirement as per SANS 241:2015 and will assist in driving down risks in the entire supply system from catchment to consumer.

In addition, the completeness and quality of the Water Safety Plans are below average with lack of risk-based monitoring and implementation of mitigating measures to reduce risks. This indicates a lack of understanding of the water safety planning process and risk management in general.

All WSA's must consult the WHO Water Safety Planning Manual to understand the process of conducting a risk assessment of the water supply system and implementing risk management procedures at all levels in the organisation. The Water Safety Plan is a valuable tool to identify projects and allocate funds based on risk rating of each action. The risks which are targeted for implementation will form the basis of the annual budget for water service while the annual review and verification process measures efficacy of implemented actions to reduce risks and demonstrate that implemented actions are not "wasteful expenditure".

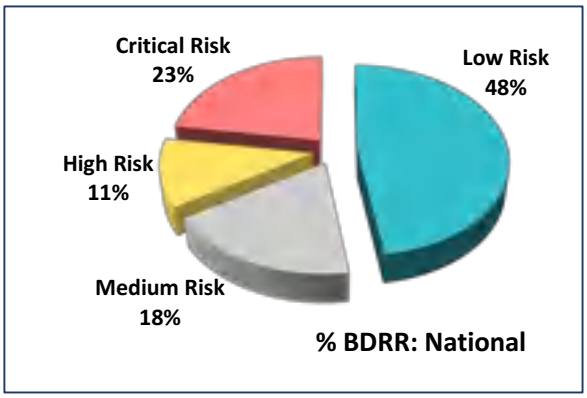
One of the key outcomes of the Water Safety Plan is the annual water quality assessment that will assist the WSA to proactively monitor and control any potential water quality risks thereby ensuring the safety of water at all times.

Summary

The National performance for BDRR is summarised as follows:

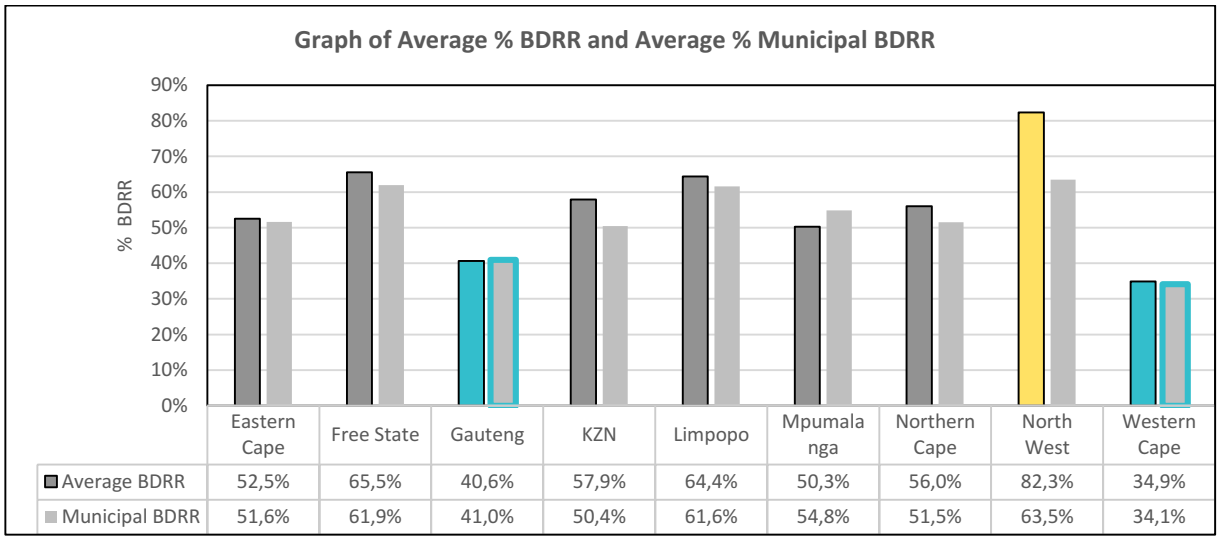
- ✓ 48% (566) of supply systems are in the low risk category,
- ✓ 18% (217) of supply systems are in the medium risk category,
- ✓ 11% (136) of supply systems are in the high risk category, and
- ✓ 23% (267) of supply systems are in the critical risk category

DWS is encouraged by the 45% of systems in the low risk category.



However, DWS is concerned by the 34% of systems which are in the high and critical risk categories. Lack of technical skills, poor microbiological and chemical water quality, lack of sufficient sampling points, and lack of Water Safety Plans are all areas of concern.

The figure below shows the Average % BDRR and the Average % Municipal (weighted) BDRR score for all WSA's in the province.



	Eastern Cape	Free State	Gauteng	KZN	Limpopo	Mpumalanga	Northern Cape	North West	Western Cape
Average BDRR	52,5%	65,5%	40,6%	57,9%	64,4%	50,3%	56,0%	82,3%	34,9%
Municipal BDRR	51,6%	61,9%	41,0%	50,4%	61,6%	54,8%	51,5%	63,5%	34,1%

Figure 16: Graph of Average % BDRR and Average % Municipal BDRR for each province.

The results are summarised as follows:

- ✓ One province is in the high risk category based on average BDRR scores,

- ✓ Six provinces are in the medium risk category for both average and Municipal BDRR scores,
- ✓ Two provinces are in the low risk category for both average and Municipal BDRR scores.
- ✓ There are notable differences between average % BDRR and average % Municipal BDRR scores in the following provinces: KZN, Mpumalanga, Northern Cape and North West. This can be attributed to higher proportional weighting allocated for larger supply systems which are typically large bulk systems. This has affected the risk rating of North West province with high risk rating based on average BDRR score and medium risk rating based on Municipal BDRR score.

In summary, the average and Municipal BDRR scores provides an overview of provincial performance but this does not reflect the true level of risk at supply system level as a WSA may have low Municipal risk rating but have a number of supply system in the critical and high risk categories.

DWS will evaluate risk based on the individual BDRR score for each supply system. Water supply systems which fall in the critical risk category are placed under regulatory focus. In such cases, a red note is assigned that requires the WSI to "...submit a detailed corrective action plan within 60 days of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvements as outlined in the Regulatory Comment. The plan will be considered against the Regulatory Comment and recommended for approval by a national regulation committee...." This note serves to initiate the Department's Enforcement Protocol.

Note Section 151 of the National Water Act (NWA) and Section 63 of the Water Services Act in developing and submitting these plans as required:

- ✓ Section 63 of the Water Services Act enables the Minister in consultation with COGTA to request a relevant Province to intervene in terms of Section 139 of the Constitution in local government. Such requests will be supported by the outcomes of this performance monitoring and WSIs responsiveness on regulatory responses raised.
- ✓ Section 151 of the NWA provides a number of non-compliances as criminal offences, amongst others using water otherwise than is permitted under the Act, failure to provide access to any books, accounts, documents or assets, unlawfully and intentionally or negligently commit any act or omission which affects or is likely to affect a water resource.

Other water supply systems which are in the high risk category will also be targeted for corrective action plans and municipalities are urged to initiate a process of addressing the regulatory comment as a matter of priority.

All WSA's must therefore review the individual BDRR score of each supply system, evaluate risk indicators which make up the total BDRR score per supply system and implement mitigating measures to improve compliance for poor performing risk indicators.

Installation of flow meters and daily monitoring of flow is critical to ensure all water treatment plants have sufficient capacity to meet current and future demand thereby improving compliance for Risk Indicator B: Operational Capacity.

To improve Risk Indicator C: Water Quality Compliance, the WSA must develop and implement microbiological and chemical monitoring programmes as per requirements to verify the safety of the water at all points in the network. In the event of failures, the WSA must implement remedial action which include water quality advisories and process optimisation to improve compliance.

Sufficiently trained process controllers and supervisors are required for daily process control and optimisation which will lead to improvement in water quality compliance. Qualified maintenance teams are an important part of Risk Indicator D: Technical Skills, to ensure integrity of water infrastructure and effective asset management.

As per the Water Safety Planning approach, all water quality risks must be incorporated into a comprehensive Water Safety Plan with clearly outlined mitigating measures to reduce high and medium risks. The WSA must ensure all risks associated with their current BDRR scores forms part of the Water Safety Plan with medium and high risks targeted for implementation. It is critical that WSA allocate sufficient budget and resources for implementation of risks to ensure effective risk management over time.

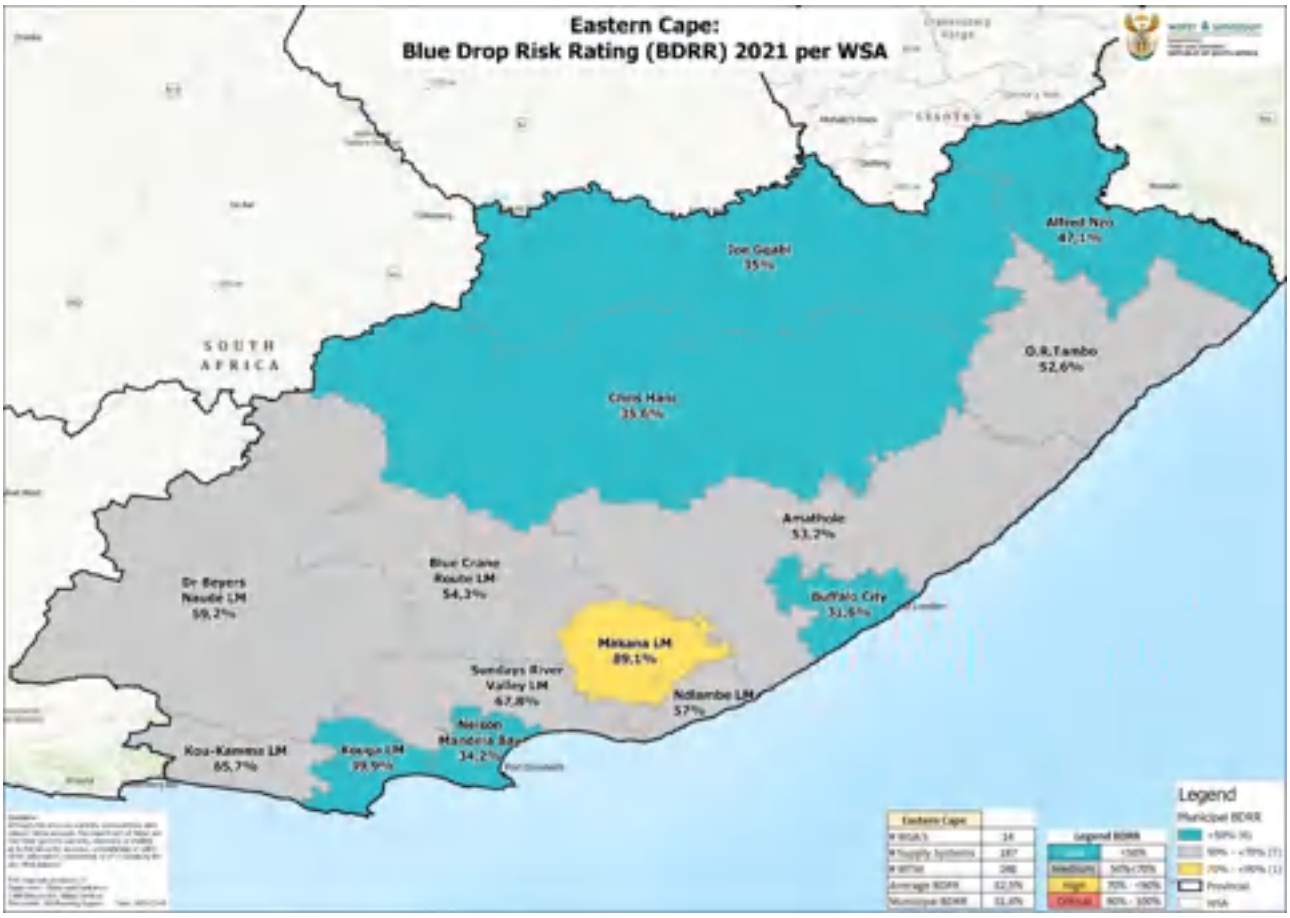
Below is the list of Top 20 Performing Supply Systems in the country. DWS acknowledges their low risk rating status and encourages them to continue with risk management to ensure the delivery of safe drinking water to all citizens of South Africa.

The list of critical risk supply systems which are under Regulatory focus is provided at the end of each provincial chapter. WSA's must immediately implement corrective actions to reduce the risk for these systems to safeguard consumers in those areas.

Table 15: National Top 20 performing water supply systems, from a risk-based perspective

Top 20 Performing Water Supply Systems in the Country			
Province	**WSA**	**Supply System**	**%BDRR**
Kwazulu-Natal	uMgungundlovu District Municipality	Rosetta	10.1
Kwazulu-Natal	Newcastle Local Municipality	Charlestown Water System (Pixley Ka Seme WTW)	11.7
Eastern Cape	Joe Gqabi District Municipality	Senqu LM - Rhodes (Rhodes WTW)	12.4
Western Cape	Overstrand Local Municipality	Baardskeerdersbos Supply System	12.8
Western Cape	Bitou Local Municipality	Nature`s Valley	13.7
Western Cape	Overstrand Local Municipality	Pearly Beach Supply System	13.8
North West	JB Marks Local Municipality	Potchefstroom	13.8
Mpumalanga	Steve Tshwete Local Municipality	Borehole: Doornkop #2 / Kwa-Mapimpane WSS	13.9
Western Cape	Bergrivier Local Municipality	Redelinghuys	14.3
Northern Cape	Dawid Kruiper Local Municipality	NC083: Lambrechtsdrift	14.4
Western Cape	Drakenstein Local Municipality	Bainskloof (Bainskloof WTW)	15.5
Kwazulu-Natal	uMgungundlovu District Municipality	Lidgetton West	15.5
Western Cape	Knysna Local Municipality	Rheenendal	15.6
Western Cape	Bergrivier Local Municipality	Eendekuil	15.6
Mpumalanga	Steve Tshwete Local Municipality	Borehole: Bankfontein / Somaphepa WSS	15.6
Northern Cape	Dawid Kruiper Local Municipality	NC083: Karos Supply System	15.7
Northern Cape	Hantam Local Municipality	Swartkop	15.7
Western Cape	Beaufort West Local Municipality	Beaufort West	15.7
Northern Cape	Hantam Local Municipality	Middelpos	15.8
Eastern Cape	Nelson Mandela Metropolitan Municipality	Rocklands WTW	15.8
Northern Cape	Dawid Kruiper Local Municipality	NC083: Raaswater	15.9
Western Cape	Bergrivier Local Municipality	Aurora	16.0
Western Cape	Theewaterskloof Local Municipality	Botrivier	16.1
Western Cape	Overstrand Local Municipality	Kleinmond Supply System	16.2
Western Cape	Overstrand Local Municipality	Buffeljags Bay Supply System	16.2
Mpumalanga	Mbombela / Umjindi Local Municipality	White River Country Estates (White River CE WTW)	16.2
Kwazulu-Natal	iLembe District Municipality	Ngcebo Supply System	16.3
Northern Cape	Thembelihle Local Municipality	Strydenburg (Boreholes)	16.4
Western Cape	Overstrand Local Municipality	Buffelsrivier Supply System	16.7

CHAPTER 3: EASTERN CAPE PROVINCE



PROVINCIAL BDRR TREND ANALYSIS

One of the outcomes of Incentive and Risk-based Regulation is the regular monitoring and reporting on the performance of the WSA to ensure strategic operational and management plans are constantly realigned to achieve compliance and effectively manage risks for provision of sustainable water services. For risk-based regulation, the movement in BDRR is a vital tool for both the Department and the WSA to monitor and track the levels of risk in the country. The 2021 BDRR will serve as a baseline for future BDRR assessments that will be used by DWS to monitor and manage drinking water supply systems to ensure delivery of safe drinking water to all communities.

BDRR is calculated and categorised as either low, medium, high and critical risk rating, calculated according to the following range of values to enable both WSA and DWS to monitor performance.

Table 1: BDRR Categorisation

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

The BDRR formula is made up of five risk indicators with an overall BDRR for each supply system. The overall performance of each WSA is reported in two ways:

- ✓ Average % BDRR: average % BDRR for all supply systems per province.
- ✓ % Municipal (weighted) BDRR: The Municipal BDRR for each WSA is calculated by the proportional contribution of each water supply system based on design capacity of each system. This weighted average may provide a skewed picture i.e. a supply system which receives a small fraction of the total flow from a larger treatment plant will carry a higher weighting compared to a system which received 100% from a smaller treatment plant.

Therefore the WSA must evaluate the individual % BDRR scores of each system to determine the risk associated with provision of drinking water for each system and not use the % Municipal BDRR score to evaluate their performance. Regardless of the size of the systems, all consumers have a right to safe drinking water and the WSA must be wary of neglecting the management of smaller, rural schemes in favour of larger urban systems.

The % Municipal (weighted) BDRR for all WSA's in the province is provided at the end of each provincial chapter for reference.

In 2021, 14 WSA's were assessed in the Eastern Cape province with a total to 187 water supply systems. The assessment period for all Risk Indicators was July 2020 to June 2021 except for Risk Indicator C: Water Quality compliance where assessment period was January to December 2020.

The risk performance trends for Eastern Cape are summarised below to provide a provincial overview of BDRR.

Table 16: 2021 Risk Performance trends for Eastern Cape

Risk Rating	Average	Minimum	Maximum
% Municipal BDRR (Weighted Score)	51.6%	31.6%	89.1%
% BDRR	52.5%	12.4%	100%
A: Design Capacity (Ml/d)	5.1	0.001	140
C1a: % Microbiological Compliance	79%	0%	100%
C1b: % Microbiological Monitoring Compliance	60.4%	0%	100%
C2a: % Chemical Compliance	77.9%	0%	100%
C2b: % Chemical Monitoring Compliance	38%	0%	97.1%
D: % Technical Skills	42.5%	0%	100%
E: % Water Safety Plan Status	28%	0%	100%

The BDRR profile for Eastern Cape province is outlined in the figure below.

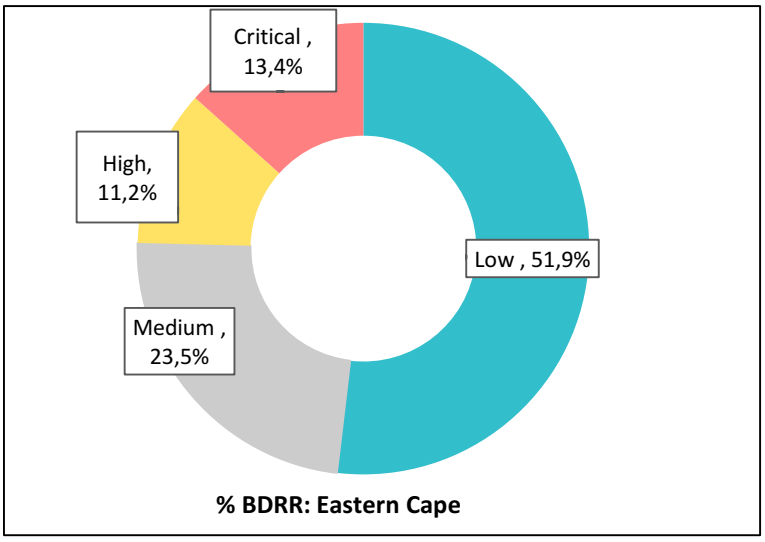


Figure 17: BDRR profile for Eastern Cape

The results for Eastern Cape are summarised as follows:

- ✓ 51.9% of supply systems are in the low risk category,
- ✓ 23.5% are in the medium risk category,
- ✓ 11.2% are in the high risk category, and
- ✓ 13.4% are in the critical risk category.

To use the 2021 BDRR score as a tool to implement strategic, targeted actions that will result in an improved risk rating and sustainable water services delivery, the individual components of the BDRR score must be critically evaluated by the WSA to understand the reason for the current risk rating and the desired risk category for delivery of safe drinking water.

The BDRR scorecards reports on the following system-specific risk indicators which ultimately feed into the BDRR score:

- ✓ Risk Indicator A: Design Capacity,
- ✓ Risk Indicator B: Operational Capacity,
- ✓ Risk Indicator C: Water Quality Compliance,
- ✓ Risk Indicator D: Technical Skills, and
- ✓ Risk Indicator E: Water Safety Plans

The trends with regard to the risk rating of the individual indicator which make up the overall BDRR score is discussed below. This will provide insight on the risk status of each indicator and enable the WSA to implement targeted actions to reduce risk of specific risk indicators which are negatively impacting on the final BDRR score of the supply system.

Risk Indicator A: Design Capacity and Risk Indicator B: Operational Capacity

Criterion A represents the design capacity of the treatment plant.

Every water treatment plant must be classified with DWS as per Regulation 2834. The classification of the treatment plant is based on a number of components, including size, complexity and electrical consumption, as per set criteria. The plant classification certificate is available on IRIS and used to determine the risk rating for criterion A as it states the capacity of the plant.

The risk rating is allocated according to size of the treatment plant with higher risk rating given for a larger plant and lower risk rating for a smaller plant. The rationale is that a larger plant serves a larger community and therefore presents a higher risk if the plant is not functioning or producing unsafe drinking water than a smaller plant which serves less people. The risk rating for criteria A remains the same provided the capacity stays the same, and all plants which have the same design capacity range will have the same maximum BDRR.

Information from the IRIS system was collected to provide a profile of the design capacities of all treatment plants in the province. Many of the treatment plants are large regional bulk schemes which supply water to a number of supply systems in various municipalities and across provinces. The figure below reports on the design capacity of treatment plants located in the province in Ml/d.

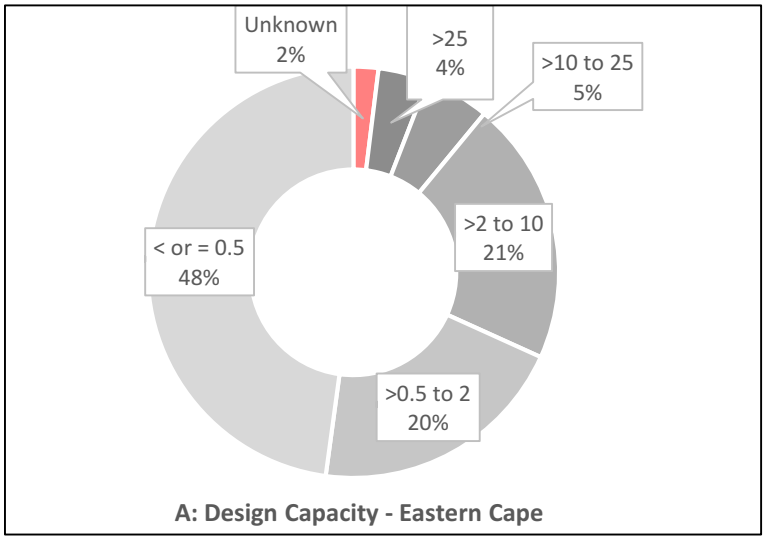


Figure 18: Profile of design capacity in Eastern Cape (Ml/d)

The results are summarised as follows:

- ✓ There are 248 water treatment plants in Eastern Cape with a combined capacity of 1285.1 Ml/d,
- ✓ Reported population served = 5.33 million people,
- ✓ Average design capacity in province = 5.1Ml/d,
- ✓ Largest plant in province = 140 Ml/d,
- ✓ Smallest plant in province = 0.001Ml/d,
- ✓ 48% of plants are <= 0,5Ml/d, 20% are between 0.5 and 2 Ml/d, 21% are between 2 and 10Ml/d, 5 % are between 10 and 25Ml/d and 4% are > 25Ml/d,
- ✓ 2% of plants have not provided design capacity.

In summary, Eastern Cape has 68% of small plants (up to 2Ml/d) which can include rural borehole schemes. Medium sized plants (>2 – 25Ml/d) make up 26% of systems with only 4% of large plants (>25Ml/d) which are typically located in metropolitan areas in the province. Operation and management of a large number of rural schemes present challenges as these plants are usually located across a large geographical area with some plants in remote areas. This requires additional resources such as staff, chemical supplies, spares and vehicles to ensure optimal operations of these systems.

With regards to **Risk Indicator B: Operational Capacity**, daily production versus the design capacity of the treatment plant is an important indicator to determine if the plant can provide sufficient safe drinking water to all the consumers now and in the near future. When the plant is operating above its design capacity, major unit processes are overloaded and cannot achieve their operational limits which leads to water quality failures.

Risk Indicator C indicates the current operational capacity of the treatment plant in each supply system as a percentage of the design capacity of the plant. The ideal value is between 50 – 100%; higher values indicate the plant is overloaded and lower values indicate the plant is receiving too little flow which may also compromise performance due to lack of retention time (flocculation, sedimentation). Once daily production approaches 90% of design capacity, the WSA must plan, budget and implement projects to increase the capacity of the treatment plant to ensure there is sufficient supply, not only for human consumption, but also for economic activities.

Although operational capacity has been reported for all supply systems, there are a number of large regional plants which supply a large number of supply systems in various municipalities and across provincial borders. Analysis of Indicator B must therefore be conducted at plant level as collating operational capacity data at municipal or provincial level will not provide an accurate reflection of the current operational capacity of each individual plant.

There are a large number of plants which do not measure flow or have not reported flow meter data ("Unknown"). This presents a serious health risk as coagulant and disinfection dosage is based on flow and without this data there may be insufficient dosage to achieve drinking water quality standards.

WSAs are reminded that installation of flow meters and daily flow recording is a regulatory requirement as per their Water Use License.

Recommendations

- ✓ WSAs must ensure all treatment plants have updated plant registration certificates on IRIS.
- ✓ WSAs must provide updated copies of plant registration certificates supported with documents on the design capacity of treatment plant for future BDRR assessments.
- ✓ WSA to install flow meters at raw and final water points, monitor daily flows and ensure annual calibration of meters for accuracy of results.
- ✓ Budget and plan for upgrade of treatment plant when operational capacity is at 90% to ensure sufficient time for implementation of civil projects.
- ✓ Consult Census, WSDP and Reconciliation strategies to determine current and future allocation and demand, use a 10-year forecast period.

Risk Indicator C: Water Quality Compliance

In South Africa, the SANS 241:2015 is the definitive reference on acceptable limits for drinking water quality parameters and provides limits for a range of water quality characteristics and water meeting this standard is deemed safe for lifetime consumption. The actual water quality depends on both microbiological and chemical determinands:

- ✓ Microbiological compliance reports on the actual compliance of the final water for the past 12 months against microbiological determinands E. Coli / Faecal Coliforms. The presence of these determinands in water is a strong indication of recent sewage or animal waste contamination and there is potential for contracting diseases from pathogens.
- ✓ Chemical quality is determined by a number of determinands which may be acute or chronic health determinands with specific health risks associated with each determinands. Acute health risks can result in death if the limit is exceeded, while chronic limits provide maximum limits that can be ingested over a period of time before health effects are observed.

Both microbiological and chemical compliance limits outlined in SANS 241 is evaluated against the population size: for a population <100 000, compliance is >98% while for a population >100 000, the compliance limit is > 99%.

In addition, the SANS 241 standard stipulates the frequency of sampling as well as the number of sample points required per supply system to ensure sufficient coverage of the network. The frequency and number of required sample points is dependent on the population size as outlined in Table 1 of SANS241:2015. Monitoring compliance is therefore critical to guarantee the safety of the supply at all points in the network.

Indicator C: Water Quality Compliance reports on both water quality compliance and monitoring compliance as per SANS 241 for both microbiological and chemical determinands. The formula to calculate C is made up of four sub-indicators with microbiological compliance carrying a higher weighting than chemical compliance as this presents a serious, acute health risk.

The formular for Indicator C, description and categorisation of each sub-indicator is presented in the table below. The categorisation is aligned with the risk rating for each sub-indicator and results are reported for all supply systems in the province. All supply systems which fall in the Low Risk category are regarded as compliant systems.

Table 10: Formular, description and categorisation for Criteria C

<table>
<tr><th colspan="3">C =[0.7(C1a x C1b)] + [0.3(C2a x C2b)]</th></tr>
<tr><td rowspan="2">Ca: Water Quality Compliance</td><td>C1a: Microbiological compliance as per SANS 241: 2015.</td><td rowspan="2"><table><tr><th>High Risk</th><th>Medium Risk</th><th>Low Risk</th></tr><tr><td><95%</td><td>95% - <97%</td><td>97% - 100%</td></tr></table></td></tr>
<tr><td>C2a: Chemical compliance as per Blue Drop requirements</td></tr>
<tr><td rowspan="2">Cb: Monitoring Compliance</td><td>C1b: Micro monitoring compliance against registered programme, based on population size as per SANS 241:2015</td><td rowspan="2"><table><tr><th>High Risk</th><th>Medium Risk</th><th>Low Risk</th></tr><tr><td><50%</td><td>50% - 80%</td><td>>80%</td></tr></table></td></tr>
<tr><td>C2b: Chemical monitoring compliance calculated as per Blue Drop requirements</td></tr>
</table>

The Eastern Cape results for Indicator C and sub-indicators are presented in the table below. This is based on data for the period January to December 2020.

Table 17: Eastern Cape Province summary of results for Indicator C: Water Quality Compliance (Jan – Dec 2020)

Eastern Cape	Average Compliance	Minimum	Maximum	% Systems Which Comply (Low Risk)
C1a: Microbiological Quality	79%	0%	100%	39%
C2a: Chemical Quality	77.9%	0%	100%	17%
C1b: Microbiological Monitoring Compliance	60.4%	0%	100%	42%
C2b: Chemical Monitoring Compliance	38%	0%	97.1%	19%

The categorisation for microbiological and chemical compliance is illustrated below providing % of supply systems per category

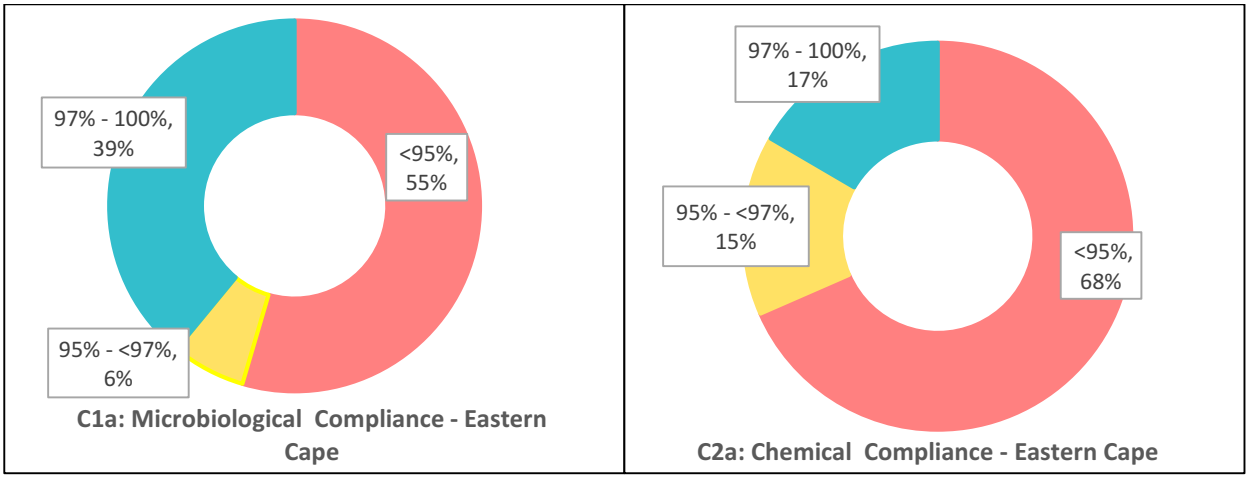


Figure 19: Microbiological and Chemical Compliance for Eastern Cape (Jan – Dec 2020)

The results are summarised as follows:

- ✓ Only 39% of systems achieved microbiological compliance and 17% achieved chemical compliance. This is of serious concern to DWS as the majority of supply systems present a potential health risk to consumers.
- ✓ 61% of systems do not comply with microbiological determinands: this indicates microbiological failures which presents a serious health risk to the consumers in these supply systems. For sustained failures, 'Boil Water' notices must be issued to safeguard consumers while the root cause of the failure is investigated and resolved.
- ✓ 83% of systems do not comply with chemical determinands. This may present immediate or potential long term health risks depending on whether non-compliance is for acute health determinands or chronic health determinands.

- WSA must ensure compliance for all chemical-health determinands as per Blue Drop requirements which includes, NO3- and NO2- as N, SO42-, Sb, As, Cd, Cr, Co, Cu, CN-, Pb, Hg, Ni, Se, V, DOC or TOC, and Total THM.

The categorisation for microbiological and chemical monitoring compliance is illustrated below providing percentages of supply systems per category.

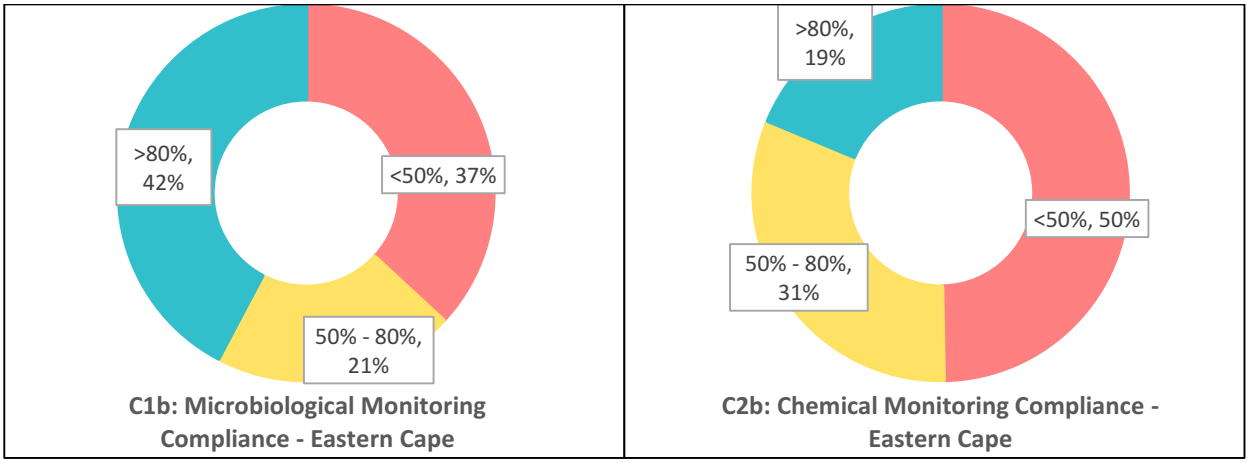


Figure 20: Microbiological and Chemical Monitoring Compliance for Eastern Cape (Jan – Dec 2020)

The results are summarised as follows:

- ✓ 42% of supply systems have sufficient microbiological samples based on population size as per SANS 241-2: 2015.
- ✓ 58% of supply systems have <80% for microbiological monitoring compliance. This indicates there is an insufficient number of microbiological samples to guarantee the safety of water at all points in the distribution system. These supply systems therefore do not comply with table 2 in SANS 241-2:2015 which outlines the required number of sample points based on population size.
- ✓ 19% of supply systems have sufficient chemical monitoring samples.
- ✓ 81% of supply systems have <80% for chemical monitoring compliance. This indicates either an insufficient number of samples collected or insufficient chemical determinands were analysed. The requirement as per SANS 241:2015 is:
  - Actual monitoring occurs according to registered IRIS monitoring programme (>80%),
  - Number of samples: One sample each at treatment plant final and one distribution point, both of which must be analysed for at least 80% of determinands listed (13 of the 17 determinands) i.e. at least 26 data points are required.

Recommendations

The poor water quality in the Eastern Cape is of concern to DWS.

All WSAs must urgently implement the following steps to ensure both microbiological and chemical compliance is improved so that all the citizens of South Africa can have access to safe drinking water, which is a basic human right enshrined under our Constitution:

- ✓ Develop and implement microbiological monitoring as per SANS 241 requirements:
  - Monitor final water weekly,
  - Monitor distribution fortnightly,
  - Ensure the number of sample points in the distribution network is based on population size as per Table 2 in SANS 241-2 given below.

Table 18: Minimum number of samples for E.Coli (or Faecal Coliforms) in distribution network (Table 2 SANS 241-2: 2015)

Population served	Total number of samples per month [a]
<5000	2
5000 - 100 000	1 per 5000 head of population + 1 additional sample [b]
100 000 - 500 000	1 per 10 000 head of population + 11 additional sample [b]
≥500 000	1 per 20 000 head of population + 36 additional sample [b]
[a] During rainy season, sampling should be carried out more frequently to ensure that all spatial and temporal risks are identified. [b] see *WHO, Guidelines for drinking water quality*	

- ✓ Develop and implement risk-based chemical monitoring programme as per SANS 241 requirements:
    - Conduct full SANS 241 analysis annually on raw, final and distribution network to identify current problem determinands.
    - Conduct risk assessment of system including catchment, treatment plant and reticulation to identify current and potential water quality risks and their associated determinands. e.g. presence of pit latrines means possibility of nitrates in ground water and surface water.
    - Develop and implement risk-based chemical monitoring programme for all identified determinands.
        - Sample points are raw, final and critical distribution points depending on impact of determinands.
        - Frequency as per Table 3 in SANS 241- 2. i.e. acute health 1 = weekly, acute health 2, chronic health, and aesthetic = monthly,
        - Operational monitoring dependant on unit processes.
- ✓ In the event of non-compliance:
    - Precautionary measures including 'Boil Water' notices must be issued to consumers in systems with sustained microbiological failures.
    - 'Water Quality' Advisories must be issued to consumers in systems with sustained chemical failures for chronic health determinands.
    - WSAs must investigate the root cause of the failure and implement remedial actions to ensure compliance. If this cannot be achieved, an alternative water supply must be provided to ensure safety of consumers.
- ✓ Compliance monitoring to be undertaken by accredited laboratory:
    - WSA to ensure that there is sufficient budget for compliance monitoring.
    - Laboratory to comply with accreditation requirement as per Blue Drop: SANAS accredited, participation in proficiency testing with acceptable Z-Score, or Quality Assurance system.

Risk Indicator D: Technical Skills

Regulation 2834 states all plant personnel must be classified as per their qualifications and years of experience. This is conducted by DWS and plant personnel are provided with a classification certificate which reflects their current classification based on qualification and years of experience. Ongoing training is a requirement under the Regulation to allow for continuous learning that will enable process controllers to improve their classification over time to achieve Class V that allows them to act as plant supervisor. The required number and classification of staff required at a treatment plant per shift is dependent of the classification of the plant and the number of shifts.

The Blue Drop requirements acknowledge excellence in water services provision. The Blue Drop requirements therefore outlines the number and classification of process controllers and supervisors required for each shift. The Blue Drop requirements make provision for sharing of supervisors: this reduces the burden of providing permanent staff for small, remote systems as a roaming supervisor can visit a number of facilities once or twice a week.

In addition, the Blue Drop requirements outline the requirements for a plant maintenance team to ensure effective maintenance of water infrastructure for ongoing operations. The maintenance team must have a variety of artisans with electrical, mechanical and civil expertise for effective asset management with assets reaching their expected useful lifespan. The Blue Drop requirements were used to evaluate Risk Indicator D: Technical Skills as per Table below

Table 12: Blue Drop requirements to evaluate technical skills at treatment plants

Works Class	Class Of Process Controller Per Shift	Class Of Process Controller for Supervision*	Operations And Maintenance Support Services Requirements*
E	Class I	Class V*	THESE PERSONNEL MUST BE AVAILABLE AT ALL TIMES BUT MAY BE IN-HOUSE OR OUTSOURCED - electrician - fitter - instrumentation technician
D	Class II	Class V*	
C	Class III	Class V*	
B	Class IV	Class V	
A	Class IV	Class V	

NB. Fluoridation – for any class works, minimum process controller classification should be class IV

**does not have to be at the works at all times but must be available at all times. If the Water Services Institution or owner of a waterwork has no person of this class employed on that work, a contractor / consultant with the required qualifications as prescribed in Schedule III in respect of that particular class of persons, shall be appointed to visit the work weekly.*

Risk Indicator D: Technical Skills is calculated from three separate components:

- ✓ Process controllers compliance as per Blue Drop requirements: required number and class of process controllers per shift for specific class of plant.
- ✓ Supervisor compliance as per Blue Drop requirements: Class V required, either at plant or available at all times.
- ✓ Maintenance Team compliance as per Blue Drop requirements: civil, mechanical and electrical expertise required.
    - Civil team: plumbing qualification / trade test.
    - Mechanical team: millwright or similar mechanical qualification.
    - Electrical team: electrical qualification / trade test.

The Table and figures below provides a profile of the technical skills in Eastern Cape Province for July 2020 to June 2021.

Table 19: Eastern Cape Province Summary of results for Indicator D: Technical Skills

Eastern Cape	Average	Minimum	Maximum
D: Technical Skills	42.5%	0%	100%
Process Controller Compliance	33.1%	0%	100%
Supervisor Compliance	62.6%	**0%**	100%

The provincial profile for Risk Indicator D: Technical skills is presented in the figure below.

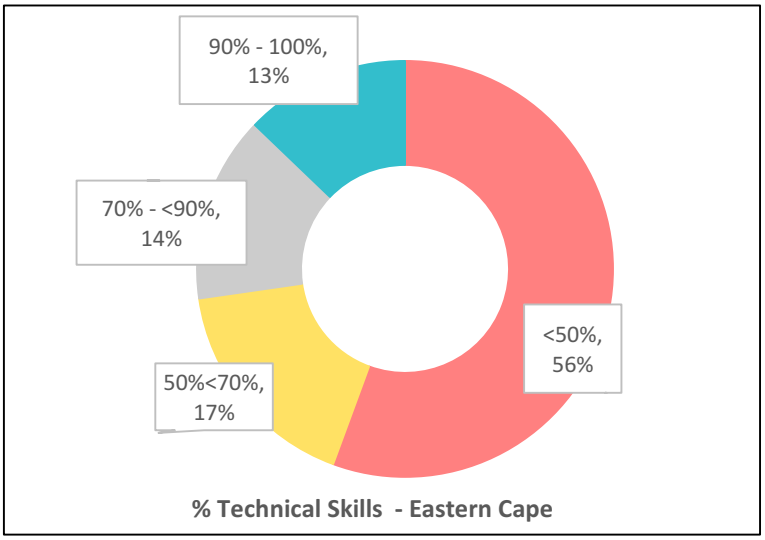


Figure 21: Eastern Cape profile for Indicator D: Technical Skills

The results are summarised as follows:

- ✓ 13% of supply system have excellent technical skills: 90-100% compliance,
- ✓ 14% of supply systems have good technical skills: 70-<90% compliance,
- ✓ 17% of supply systems have average technical skills: 50-<70% compliance,
- ✓ 56% of supply systems have poor technical skills: <50% compliance.

In general, the province has performed poorly with regards to technical skills.

The provincial profile for process controllers and supervisors compliance is outlined in the figures below.

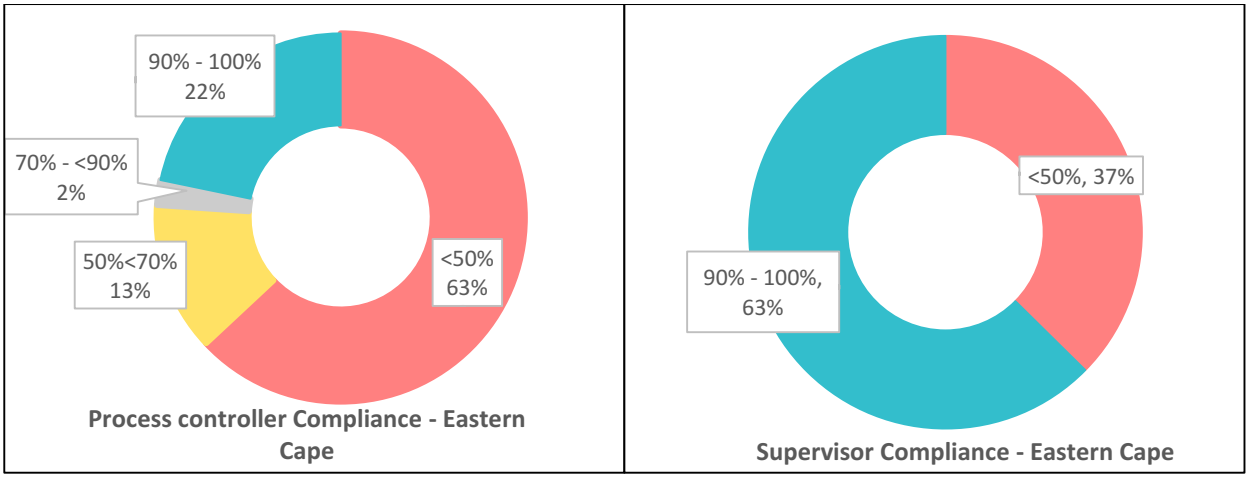


Figure 22: Process controller and Supervisor compliance for Eastern Cape

The resutls are summarised as follows:

- ✓ Process controller compliance is poor with only 22% of supply systems with sufficient number of suitably classified process controllers per shift. Lack of sufficient number of process controllers presents a serious risk due to lack of daily monitoring and process optimisation.
- ✓ 63% of supply systems are compliant with regard to supervisors. These plants either have Class V supervisors permanently based at the plant or available as a roaming supervisor, available at all times to assist process controllers. The presence of a qualified supervisor can mitigate some of the risks associated with insufficient number of process controllers on site provided the supervisor is available at all times.

The provincial profile for maintenance team as well as breakdown of maintenance team is outlined in the figures below.

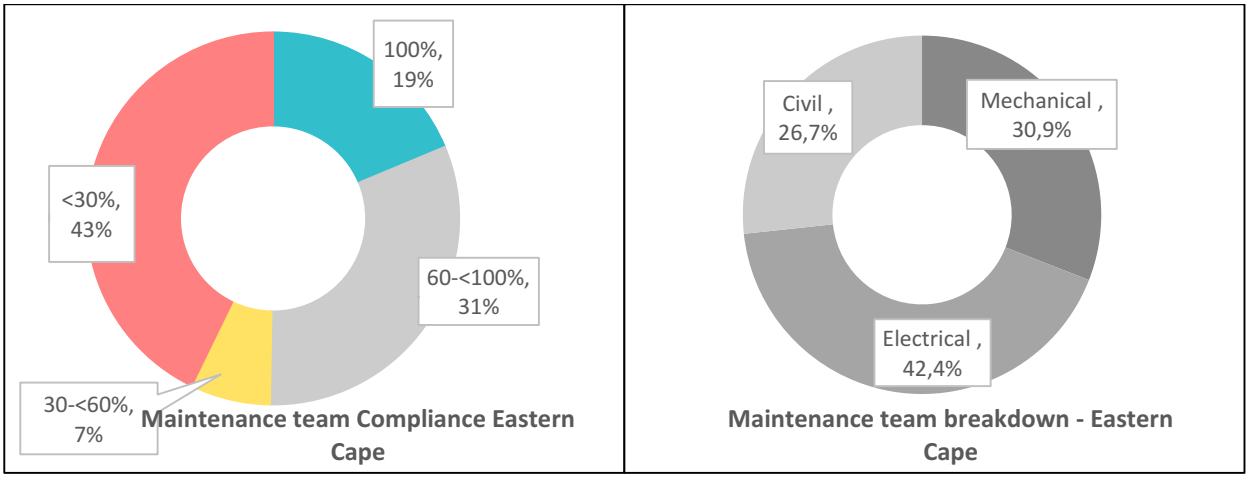


Figure 23: Maintenance team compliance and maintenance team breakdown for Eastern Cape

The results are summarised as follows:

- ✓ Only 19% of all supply systems have full maintenance teams in place i.e. civil, mechanical and electrical personnel. However, the remaining 81% have insufficient maintenance teams and this can lead to a shutdown of the treatment plant or processes which will affect quality and quantity of water.
- ✓ 42.4 % have electrical staff, 30.9% have mechanical competency, and only 26.7% have civil staff. Civil works at treatment plants and in the distribution network is conducted by plumbers: lack of this skill will lead to water losses which will negatively impact on water supply.

The Eastern Cape has performed poorly with regards to technical skills. WSAs are encouraged to evaluate the performance of each system with regards to process control and use this information to determine the operational model which is best suited to ensure effective operations and maintenance.

WSA must allocate budget to appoint suitably qualified process controllers and supervisors to ensure water quality compliance improves through ongoing process optimisation. The WSA must appoint a qualified maintenance team to ensure that the life span of the treatment plant is increased by regular maintenance and ensure there are sufficient number of personnel to cover the entire distribution network to reduce water losses and maintain integrity of the supply system.

Recommendations

- ✓ Register all process controllers and supervisors on IRIS as per Regulation 2834.
- ✓ Ensure all process control staff complies with Blue Drop requirements.
- ✓ Ensure maintenance team includes civil, mechanical and electrical personnel.
- ✓ Provide details of operational staff at all future assessments: copies of process controller and supervisor registration certificates, organograms with shift patterns, copies of qualifications/certificates/current training.
- ✓ Provide details of maintenance team at all future assessments: organogram, shift patterns, names and qualifications of team, copies of qualifications/certificates/current training, details of external service providers.

Risk Indicator E: Water Safety Plans

Risk management is the cornerstone of risk-based regulation and a fundamental part of the SANS 241:2015 requirements to ensure effective management of both current and future potential risks. The application of risk management in drinking water management is through the Water Safety Plan developed by the WHO which is a comprehensive risk assessment and risk management approach that encompasses all steps in a drinking-water supply chain, from catchment to consumer to ensure continuous feedback and improvement to manage all current and future potential risks. The Water Safety Plan advocates for development of a risk-based monitoring programme and this is also a requirement as per SANS 241.

This risk indicator E: Water Safety Plans evaluates the following three critical components which are required for effective risk management as per the WHO guidelines and the SANS 241 requirements.

- ✓ Completeness of the Water Safety Plans as per World Health Organisation Water Safety Planning Manual:
  - 1: Signature from Technical Director / Municipal Manager
  - 2: Risk prioritisation method
  - 3: Risk assessment of catchment
  - 4: Risk assessment of plant
  - 5: Risk assessment of network
  - 6: Final risk rating
  - 7: Mitigating measures for all high and medium risks.
- ✓ Development and adoption of risk-based monitoring programme as per SANS 241:2015:
  - 8: Full SANS 241 analysis of raw and final water.
  - 9: Identification of risk determinands.
  - 10: Addition of risk determinands to monthly compliance monitoring as per SANS 241: 2015.
- ✓ Proof of implementation of the findings of the Water Safety Plans to ensure there is continuous risk management and movement towards an overall lower risk rating:
  - 11: Proof that >25% of mitigating measures have been implemented – proof in the form of purchase order, pictures, water quality results, tender document, etc.

This makes up 11 equal sub-elements that are evaluated during the BDPAT assessment to calculate the final risk rating for this indicator.

The Table 20 and Figure 24 below provides a profile of Risk indicator E in Eastern Cape Province and Figure 25 provides details on the completeness of the Water Safety Plan by indicating the percentage of supply systems which comply with each of the 11 individual components which make up the Water Safety Plan.

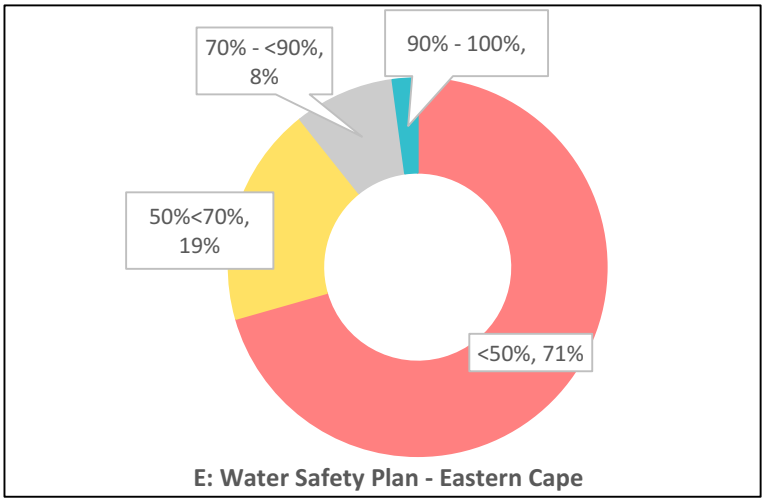


Figure 24: Eastern Cape Profile for Indicator E – Water Safety Plans

Table 20: Eastern Cape Province summary of results for Indicator E: Water Safety Plans

Eastern Cape	Value
E: Water Safety Plans - Average	28%
E: Water Safety Plans - Minimum	0%
E: Water Safety Plans - Maximum	100%
% Systems with Water Safety Plans	49%

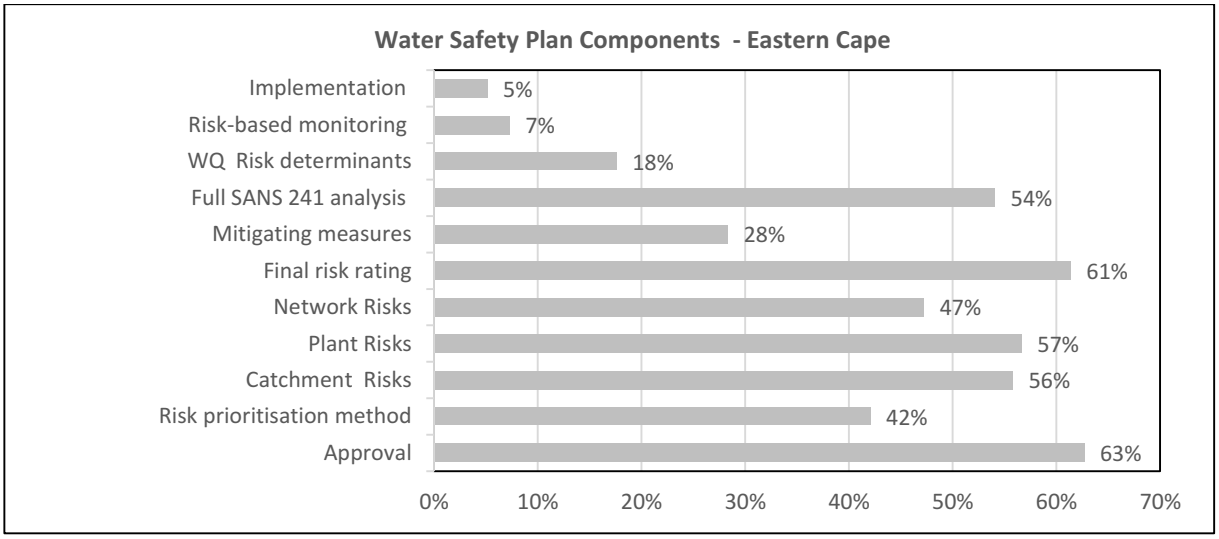


Figure 25: Water Safety Plan components for Eastern Cape

The results are summarised as follows:

- ✓ Only 48% of supply systems have Water Safety Plans in place. This presents a serious risk as effective risk-management is not taking place as per SANS 241 requirement.
- ✓ Only 2% have excellent Water Safety Plans in place with >=90% compliance indicating comprehensive Water Safety Plans with all required components.
- ✓ The average compliance for the province is 28% which indicates poor understanding of the Water Safety Planning process amongst the WSA's in this province.
- ✓ The quality and completeness of the Water Safety Plans is as follows:
  - 63% have approval indicating management's commitment to implementing the findings of the Water Safety Plan,
  - Completeness of the Water Safety Plan is average with around 50% for identification and risk prioritisation of risks. This demonstrates below average understanding of the risk assessment process,

- Development of risk-based monitoring is poor as full SANS 241:2015 only conducted on 54% with only 7% using this information to develop a risk-based monitoring programme. Risk-based monitoring is a requirement of SANS 241 and must be reviewed annually based on updated full SANS 241:2015 of raw and final water.
- Implementation of mitigating measures is very low at only 5%. Although 63% of Water Safety Plans have been approved, there has been minimal implementation of findings. Management must ensure that when approval is given for a Water Safety Plan, this is supported by resources in the form of staff and budget to implement mitigating measures.

In summary, Water Safety Planning is being implemented in the province in 48% of supply systems. The completeness and quality of these Water Safety Plans is below average with the lack of risk-based monitoring and implementation of mitigating measures to reduce risks.

All WSAs must adopt risk management principles embodied in the Water Safety Planning approach as this is a regulatory requirement as per SANS 241:2015 and will assist in driving down risks in the entire supply system from catchment to consumer.

Recommendations

- ✓ Conduct full SANS 241:2015 analysis on raw, final, and distribution network to identify problem determinands.
- ✓ Develop and implement risk-based monitoring programme to include all current and potential determinands
- ✓ Register SANS 241:2015 compliant monitoring programme on IRIS.
- ✓ Conduct monitoring as per programme and upload information on a monthly basis.
- ✓ Develop Water Safety Plan: conduct annual risk assessment of supply system, assign risk rating, validate control measures and determine residual remaining risk.
- ✓ Develop and implement action plan to mitigate remaining risk. Action plan to include budget, responsibility and timeframe for implementation. Note approval for implementation and budget must be given by senior management (municipal manager of WSA).
- ✓ WSA to provide copy of signed approved Water Safety Plan with proof of implementation of corrective actions from previous risk assessment; uploaded on IRIS.

Summary

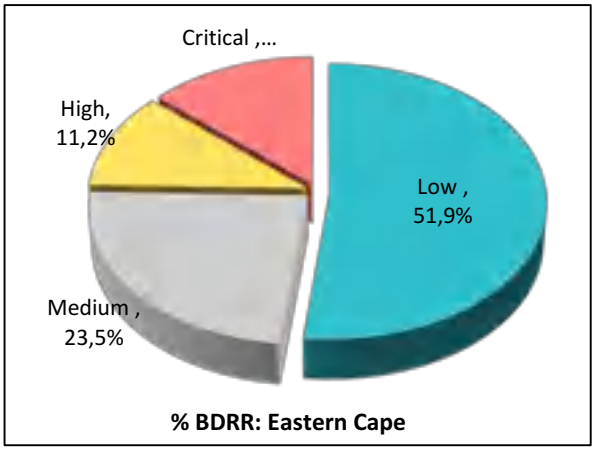
Overall performance for Eastern Cape is summarised as follows:

- ✓ 51.9% (97) of supply systems are in the low risk category,
- ✓ 23.5% (44) of supply systems are in the medium risk category,
- ✓ 11.2% (21) of supply systems are in the high risk category, and
- ✓ 13.4% (25) of supply systems are in the critical risk category

DWS is encouraged by the 51.9% of systems in the low risk category.

However, DWS is concerned about 24.6% of systems which are in the high and critical risk categories.

The figure below shows the % Municipal (weighted) BDRR score for all WSA's in the province.



% BDRR: Eastern Cape

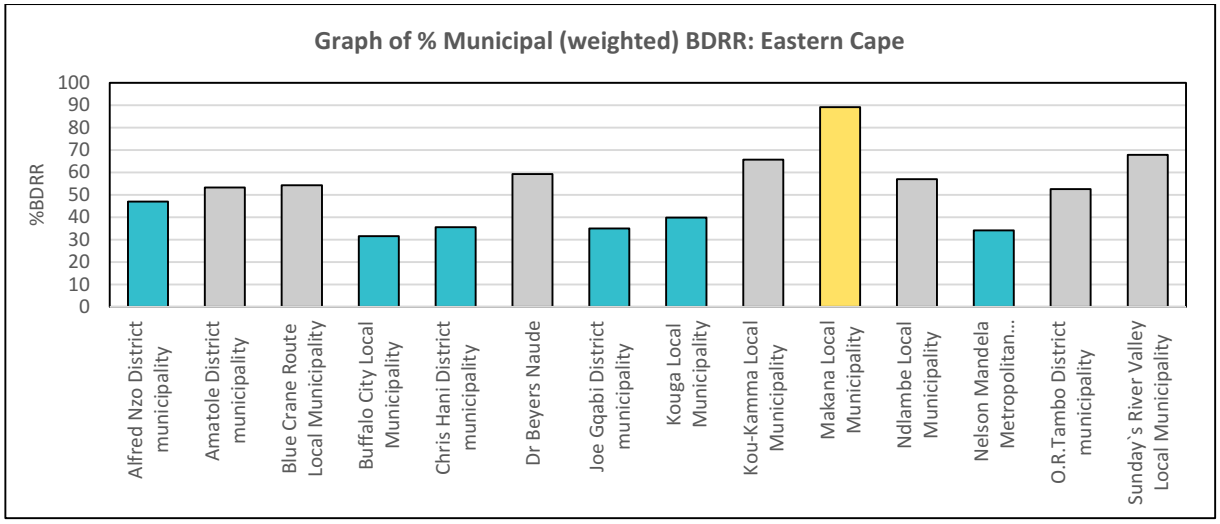


Figure 26: Graph of % Municipal (Weighted) BDRR for each WSA in Eastern Cape

The figure indicates one WSA is in the high risk category based on % municipal BDRR. However, within the province there are 25 supply systems in the critical risk category and 21 supply systems in the high risk category.

DWS will evaluate risk based on the individual BDRR score for each supply system. Water supply systems which fall in the critical risk category are placed under regulatory focus. In such cases, a red note is assigned that requires the WSI to "...submit a detailed corrective action plan within 60 days of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvements as outlined in the Regulatory Comment. The plan will be considered against the Regulatory Comment and recommended for approval by a national regulation committee...." This note serves to initiate the Department's Enforcement Protocol.

Note Section 151 of the NWA and Section 63 of the Water Services Act in developing and submitting these plans as required:

- ✓ Section 63 of the Water Services Act enables the Minister in consultation with COGTA to request a relevant Province to intervene in terms of Section 139 of the Constitution in local government. Such requests will be supported by the outcomes of this performance monitoring and WSIs responsiveness on regulatory responses raised.
- ✓ Section 151 of the NWA provides a number of non-compliances as criminal offences, amongst others using water otherwise than is permitted under the Act, failure to provide access to any books, accounts, documents or assets, unlawfully and intentionally or negligently commit any act or omission which affects or is likely to affect a water resource.

Other water supply systems which are in the high risk category will also be targeted for corrective action plans and municipalities are urged to initiate a process of addressing the regulatory comment as a matter of priority.

The WSA must therefore review the individual BDRR score of each supply system, evaluate each risk indicators which make up the total BDRR score and implement mitigating measures to improve compliance for poor performing risk indicators as outlined below:

- ✓ A: Design Capacity.
  - WSA to report design capacity of treatment plant,
- ✓ B: Operational Capacity.
  - WSA to install flow meters, record daily flow and implement upgrades when operational capacity is above 90%.
- ✓ C: Water Quality Compliance.
  - WSA to develop and implement microbiological and chemical monitoring programmes as per requirements to verify the safety of the water at all points in the network.
  - In the event of failures, WSA must implement remedial action which include water quality advisories and process optimisation to improve compliance.
- ✓ D: Technical Skills.
  - WSA to ensure there are sufficient number of qualified technical staff to undertake operations and maintenance of treatment plants and distribution networks.
- ✓ E: Water Safety Plans.
  - WSA to develop and implement comprehensive Water Safety Plan as per WHO and SANS 241:2015 requirements,

- WSA to conduct water quality assessment as part of Water Safety Planning process, identify risk determinands, and develop and implement risk-based monitoring programme to manage current and future potential risks.
- Budget and resources to be made available to implement mitigating measures to reduce risk.

In conclusion, WSA's must review the performance of each supply system, interrogate each risk indicator to identify areas of poor performance, and implement remedial actions to improve overall risk rating.

Below is a summary of performance in Eastern Cape for the following categories:

- ✓ List of % Average BDRR, % Municipal (Weighted) BDRR, and number of supply systems for all WSA's in the province.
- ✓ List of Low risk supply systems,
- ✓ List of Critical Risk supply systems which require immediate attention,
- ✓ Top 10 Performing supply systems.

Table 21: List of % Average BDRR, % Municipal BDRR, and number of supply systems for all WSA's in Eastern Cape

WSA	# Supply Systems	% Municipal BDRR	% Average BDRR per WSA
Alfred Nzo District Municipality	8	47.1	58.6
Amatole District Municipality	37	53.2	55.1
Blue Crane Route Local Municipality	3	54.3	34.7
Buffalo City Local Municipality	10	31.6	40.8
Chris Hani District Municipality	32	35.6	50.8
Dr Beyers Naude Local Municipality	12	59.2	69.7
Joe Gqabi District Municipality	20	35.0	42.9
Kouga Local Municipality	8	39.9	42.4
Kou-Kamma Local Municipality	11	65.7	56.8
Makana Local Municipality	3	89.1	63.8
Ndlambe Local Municipality	6	57.0	52.2
Nelson Mandela Metropolitan Municipality	9	34.2	30.0
O.R.Tambo District Municipality	22	52.6	56.6
Sunday`s River Valley Local Municipality	6	67.8	72.0
Average		**51.6**	**51.9**
Maximum		**89.1**	**72.0**
Minimum		**31.6**	**30.0**

Table 22: List of Low Risk supply systems in Eastern Cape

Eastern Cape: Supply Systems in Low Risk Category		
WSA	**Supply System**	**%BDRR**
Alfred Nzo District Municipality	Matatiele LM - Belfort WTW	29.3
	Matatiele LM - Matatiele WTW	27.5
	Mbizana LM - Nomlacu WTW System	42.9
Amatole District Municipality	Amahlahti LM - Kei Road	40.8
	Amahlathi LM- Cathcart	46.3
	Amahlathi LM- Stutterheim	40.3
	Great Kei LM - Kei Bridge WTW	43.4
	Great Kei LM - Haga - Haga	35.6
	Great Kei LM - Kei Mouth	24.7
	Great Kei LM - Morgans Bay	28.9

Eastern Cape: Supply Systems in Low Risk Category		
WSA	**Supply System**	**%BDRR**
	Mbashe LM - Cwebe	48.9
	Mbashe LM - Elliotdale	22.6
	Mbashe LM - Willowvale	27.8
	Mbhashe LM - Qwaninga WTW	42.9
	Mbhashe LM - Mbhashe North WTW	21.2
	Mnquma LM - Nqamakwe WTW	37.7
	Mnquma LM - Kotana/Ehlobo	24.4
	Mnquma LM - Qolorha	38.3
	Nkonkobe LM - Seymor	40.7
	Nxuba LM - Bedford	39.0
Blue Crane Route Local Municipality	Pearston	44.5
Buffalo City Local Municipality	Kei Road System	49.7
	Kidds Beach (Borehole) Scheme	29.8
	King Williams Town (KWT Water Treatment Works)	29.0
	Laing Network Supply	49.7
	Majali (Borehole) System	25.5
	Siyathemba	37.4
	Umzonyana WTW (East London)	31.0
Chris Hani District Municipality	Emalahleni - Indwe Supply System	18.2
	Emalahleni - Machubeni Supply System	28.5
	Emalahleni- Dordrecht Supply System	22.7
	Engcobo - Engcobo Town Supply System	25.7
	Engcobo-Nkobongo Supply System	33.0
	Inkwanca - Molteno Supply System	29.3
	Inkwanca - Sterkstroom Supply System	30.9
	Intsika Yethu - Ncora Water Supply	19.9
	Intsika Yethu - Tsojana Supply System	33.0
	Intsika Yethu -Tsomo Service System	20.9
	Inxuba Yethemba - Cradock Supply System	27.5
	Inxuba Yethemba - Middelburg Supply System - Treated	40.0
	Lukhanji - Queenstown Supply System	40.3
	Lukhanji - Whittlesea Supply System	24.2
	Sakhisizwe - Cala Supply System	26.0
	Sakhisizwe - Elliot Supply System	25.7
	Sakhisizwe - Xhalanga Supply System	19.1
	Tsolwana: Hofmeyer Supply System	22.1
Dr Beyers Naude Local Municipality	Aberdeen	45.0
	Klipplaat	39.9
	Rietbron	24.3
	Willowmore	30.0
Joe Gqabi District Municipality	Elundini LM - Maclear (Aucamp WTW) and (Mooiriver WTW)	17.1
	Elundini LM - Ugie (Ugie WTW)	30.0
	Elundini LM - Mt Fletcher (Mount Fletcher WTW)	19.1
	Gariep LM - Burgersdorp (Burgersdorp WTW)	35.7
	Gariep LM - Oviston (Oviston WTW)	33.3

Eastern Cape: Supply Systems in Low Risk Category		
WSA	**Supply System**	**%BDRR**
	Maletswai LM - Aliwal North (Aliwal North WTW)	35.4
	Maletswai LM - Jamestown (Jamestown WTW)	23.5
	Senqu LM - Barkly East (Barkly East WTW)	21.0
	Senqu LM - Lady Grey (Lady Grey WTW)	26.6
	Senqu LM - Rhodes (Rhodes WTW)	12.4
	Senqu LM -Jozana (Jozana WTW)	25.2
	Senqu LM - Rossouw (Boreholes)	24.5
	Senqu LM - Sterkspruit (Sterkspruit WTW)	38.2
	Walter Sisulu LM - Steynsburg (Steynsburg WTW)	32.7
Kouga Local Municipality	Hankey	21.7
	Humansdorp	39.1
	Jeffreys Bay	29.5
	Patensie	29.8
Kou-Kamma Local Municipality	Blikkiesdorp	39.1
	Coldstream	18.7
	Misgund	20.4
	Storms River	38.5
	Woodlands	36.3
Makana Local Municipality	Alicedale	47.8
	Riebeeck East	48.7
Ndlambe Local Municipality	Bathurst WTW	49.4
	Cannon Rock WTW	23.9
	Seafield / Kleinemonde	42.1
Nelson Mandela Metropolitan Municipality	Churchill WTW	31.9
	Elandsjagt WTW	23.2
	Groendal (Kabah) WTW	19.0
	Linton WTW	24.3
	Loerie WTW	21.8
	Nelson Mandela Metropolitan Municipality (Whole System)	38.7
	Nooitgedacht WTW	39.1
	Rocklands WTW	15.8
O.R.Tambo District Municipality	Coffee Bay WTW	48.8
	Corana WTW	21.5
	Lusikisiki WTW	48.8
	Mdlankala WTW	48.8
	Mhlahlane WTW	41.6
	Mqanduli WTW	41.1
	Ngqeleni WTW	37.2
	Tsolo WTW	35.5
Sunday`s River Valley Local Municipality	Enon / Bersheba WTW	45.4
	Kirkwood WTW	40.1
	Paterson Boreholes	49.9

Table 23: List of Critical Risk supply systems in Eastern Cape

Eastern Cape: Critical Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Alfred Nzo District Municipality	Mbizana LM - Borehole Systems (Rural)	100.0
Amatole District Municipality	Amabele WTW (Decommissioned)	100.0
Amatole District Municipality	Glenmore Network Supply	100.0
Amatole District Municipality	Masincedane Network Supply	91.0
Amatole District Municipality	Sandile Network Supply	91.0
Chris Hani District Municipality	Emalahleni - Lukhavala Supply System	96.8
Chris Hani District Municipality	Emalahleni - Noluthando Supply System	96.8
Chris Hani District Municipality	Emalahleni (Rural & Farms - Untreated)	100.0
Chris Hani District Municipality	Engcobo - Gqaga Supply System	97.4
Chris Hani District Municipality	Engcobo - Sitholeni Supply System	97.2
Chris Hani District Municipality	Engcobo - Tora Water Treatment Works	97.2
Chris Hani District Municipality	Intsika Yethu - Lubisi Supply System	95.9
Chris Hani District Municipality	Intsika Yethu (Untreated)	100.0
Dr Beyers Naude Local Municipality	ec103:Waterford	96.8
Dr Beyers Naude Local Municipality	ec107:Miller	100.0
Dr Beyers Naude Local Municipality	ec107:Vondeling	100.0
Dr Beyers Naude Local Municipality	Wolwefontein	96.8
Joe Gqabi District Municipality	Gariep LM - Teebus (DWA Boreholes)	100.0
Joe Gqabi District Municipality	Senqu LM - Rossouw Police (Borehole)	100.0
Makana Local Municipality	Grahamstown	95.0
O.R.Tambo District Municipality	Lutsheko WTW	92.3
O.R.Tambo District Municipality	PSJ LM - BH	100.0
Sunday`s River Valley Local Municipality	Addo WTW	96.7
Sunday`s River Valley Local Municipality	Glenconnor Borehole	100.0
Sunday`s River Valley Local Municipality	Kleinpoort Borehole	100.0

Table 24: List of Top 10 Performing systems in Eastern Cape

Top 10 Performing Supply Systems in Eastern Cape		
WSA	**Supply System**	**%BDRR**
Joe Gqabi District Municipality	Senqu LM - Rhodes (Rhodes WTW)	12.4
Nelson Mandela Metropolitan Municipality	Rocklands WTW	15.8
Joe Gqabi District Municipality	Elundini LM - Maclear (Aucamp WTW) and (Mooiriver WTW)	17.1
Chris Hani District Municipality	Emalahleni - Indwe Supply System	18.2
Kou-Kamma Local Municipality	Coldstream	18.7
Nelson Mandela Metropolitan Municipality	Groendal (Kabah) WTW	19.0
Joe Gqabi District Municipality	Elundini LM -Mt Fletcher (Mount Fletcher WTW)	19.1
Chris Hani District Municipality	Sakhisizwe- Xhalanga Supply System	19.1
Chris Hani District Municipality	Intsika Yethu - Ncora Water Supply	19.9
Kou-Kamma Local Municipality	Misgund	20.4

Alfred Nzo District Municipality

Municipal BDRR Score: 47.1%

Assessment Areas	Matatiele LM - Belfort WTW	Matatiele LM - Matatiele WTW	Mbizana LM - Borehole Systems (Rural)	Mbizana LM - Nomlacu WTW System
BULK / WSP				
A: Total Design Capacity (Ml/d)	1.1%	3%	N/I	9.98
B: % Operational Capacity in terms of design	109.1%	66.7%	N/I	100.2%
C1a: % Microbiological Compliance	98.8%	100%	0%	92.9%
C1b: % Microbiological Monitoring Compliance	83.3%	83.3%	0%	83.3%
C2a: % Chemical Compliance	97%	96.2%	0%	97.8%
C2b: % Chemical Monitoring Compliance	5.9%	5.9%	0%	5.9%
D: % Technical Skills	0%	75%	0%	37.5%
E: % Water Safety Plan Status	54.6%	54.6%	0%	72.7%
%BDRR/BDRR max	29.3%	27.5%	100%	42.9%

Assessment Areas	Ntabankulu LM - Borehole Systems (Rural)	Ntabankulu LM - Ntabankulu WTW	Umzimvubu LM - Kwabhaca WTW	Umzimvubu LM - Mount Ayliff WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	0.72	0.5%	0.5%
B: % Operational Capacity in terms of design	N/I	166.7%	600%	360%
C1a: % Microbiological Compliance	89.8%	82.8%	77.6%	83.9%
C1b: % Microbiological Monitoring Compliance	26.1%	48.3%	55.3%	91.6%
C2a: % Chemical Compliance	96.8%	97%	96%	93.5%
C2b: % Chemical Monitoring Compliance	5.9%	5.9%	5.9%	5.9%
D: % Technical Skills	0%	37.5%	25%	25%
E: % Water Safety Plan Status	0%	72.7%	72.7%	81.8%
%BDRR/BDRR max	89.8%	68.3%	54.2%	56.4%

WSA Overview

Alfred Nzo DM has eight drinking water supply systems in their area of jurisdiction. Belfort, Matatiele and Nomlacu systems are in the low-risk rating category while Kabhaca, Mount Ayliff and Ntabankulu systems are in the medium-risk rating category and Ntabankulu Boreholes and Mbizana Boreholes systems are in the high and critical-risks ratings categories respectively. Mbizana Boreholes system has no information for any of the Risk Indicators placing them in the critical-risk category. Ntabankulu Borehole System has no information for criteria A, B and E, this impacted negatively on the risks rating for this system.

For systems with operational capacity information, only Matatiele supply system is operating within capacity and the remainder of the systems are operating above 100% of the design capacity indicating insufficient capacity to meet current and future demand.

Under criteria C, Belfort and Matatiele achieved excellent microbiological and chemical compliance and microbiological monitoring programmes are aligned with SANS 241:2015 requirements indicating that water may be safe for domestic use. The remainder of the systems achieved unacceptable microbiological compliance but only Nomlacu and Mount Ayliff systems' have SANS 241:2015 aligned microbiological monitoring programmes therefore this presents serious health risks to the consumers. Although chemical compliance is acceptable to excellent for most supply systems, inadequate alignment of chemical monitoring programmes to SANS 241:2015 requirements impacted on the performance under this criterion.

Technical skills performance is poor for most supply systems as only Matatiele achieved an acceptable score. This indicates that staff compliments are not aligned to SANS 241:2015 requirements and may have impact on delivery of water to consumers. Kwabhaca, Mount Ayliff, Nomalcu and Ntabakulu supply systems achieved adequate scores for Water Safety Planning. This indicates implementation of Water Safety Plans and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015. However, this is lacking for the remainder of the systems.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Linking and classification of WTW for Mbizana and Ntabankulu boreholes systems. Operational information should also be provided to the Regulator.
- ✓ A and B: Planning and budgeting to address capacity exceedance at all WTW, operating above 100% of the design capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of a Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high-risks.

Amatole District Municipality

Municipal BDRR Score: 53.2%

Assessment Areas	Amabele WTW	Amahlahti LM - Kei Road	Amahlathi LM - Cathcart	Amahlathi LM - Stutterheim
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	4.7	2.45	5.8
B: % Operational Capacity in terms of design	N/I	61.7%	77.6%	91.4%
C1a: % Microbiological Compliance	0%	89.3%	95.6%	69.1%
C1b: % Microbiological Monitoring Compliance	0%	90.3%	100%	89.3%
C2a: % Chemical Compliance	0%	91.1%	87.9%	86.6%
C2b: % Chemical Monitoring Compliance	0%	55.9%	23.5%	55.9%
D: % Technical Skills	0%	83.3%	58.3%	83.3%
E: % Water Safety Plan Status	0%	63.6%	54.6%	45.5%
%BDRR/BDRR max	100%	40.8%	46.3%	40.3%

Assessment Areas	Binfield Network Supply	Debe Nek Network Supply	Glenmore Network Supply	Great Kei LM - Kei Bridge WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	0.70
B: % Operational Capacity in terms of design	N/I	N/I	N/I	150%
C1a: % Microbiological Compliance	92.5%	100%	0%	93%
C1b: % Microbiological Monitoring Compliance	78.3%	45.8%	0%	87.5%
C2a: % Chemical Compliance	86.4%	89.3%	0%	88.8%
C2b: % Chemical Monitoring Compliance	2.9%	2.9%	0%	52.9%
D: % Technical Skills	0%	0%	0%	70.8%
E: % Water Safety Plan Status	0%	0%	0%	63.6%
%BDRR/BDRR max	82.1%	67.1%	100%	43.5%

Assessment Areas	Great Kei LM - Cinsta East	Great Kei LM - Haga-Haga	Great Kei LM - Kei Mouth	Great Kei LM - Morgans Bay
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	0.30	1.9	N/I
B: % Operational Capacity in terms of design	N/I	43.3%	21.1%	N/I
C1a: % Microbiological Compliance	93.9%	89.5%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	91.7%	87.5%	83.3%
C2a: % Chemical Compliance	92.4%	88.3%	82.6%	89.5%
C2b: % Chemical Monitoring Compliance	55.9%	55.9%	55.9%	55.9%
D: % Technical Skills	8.3%	58.3%	58.3%	83.3%
E: % Water Safety Plan Status	0%	63.6%	54.6%	72.7%
%BDRR/BDRR max	65.2%	35.6%	24.7%	28.9%

Assessment Areas	Masincedane Network Supply	Mbashe LM - Cwebe	Mbashe LM - Dutywa	Mbashe LM - Dwesa
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	0.5	2.6	0.6
B: % Operational Capacity in terms of design	N/I	36%	76.9%	41.7%
C1a: % Microbiological Compliance	93.9%	83.3%	90.9%	92.3%
C1b: % Microbiological Monitoring Compliance	45.4%	50%	27.8%	41.7%
C2a: % Chemical Compliance	90.9%	83.7%	92.1%	86.9%
C2b: % Chemical Monitoring Compliance	2.9%	55.9%	23.5%	23.5%
D: % Technical Skills	0%	70.8%	29.2%	41.7%
E: % Water Safety Plan Status	0%	63.6%	54.6%	63.6%
%BDRR/BDRR max	91%	48.9%	86.8%	72.6%

Assessment Areas	Mbashe LM - Elliotdale	Mbashe LM - Mendu	Mbashe LM - Willowvale	Mbhashe LM - Qwaninga WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.7	0.3	0.72	0.86
B: % Operational Capacity in terms of design	71.4%	73.3%	68.1%	69.4%
C1a: % Microbiological Compliance	100%	92.3%	100%	100%
C1b: % Microbiological Monitoring Compliance	70.8%	75%	43.8%	15%
C2a: % Chemical Compliance	97.2%	91.7%	94.7%	80.3%
C2b: % Chemical Monitoring Compliance	23.5%	55.9%	55.9%	2.9%
D: % Technical Skills	91.7%	35.4%	91.7%	79.2%
E: % Water Safety Plan Status	54.6%	63.6%	63.6%	63.6%
%BDRR/BDRR max	22.6%	52.9%	27.8%	42.9%

Assessment Areas	Mbhashe LM - Mbhashe North WTW	Mbhashe LM - Nqadu WTW	Mbhashe - Mncwasa WTW	Mnquma LM - Nqamakwe WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	3.8	0.72	2.5	0.1
B: % Operational Capacity in terms of design	50%	69.4%	56%	60%
C1a: % Microbiological Compliance	100%	92.9%	72%	95.8%
C1b: % Microbiological Monitoring Compliance	70.8%	58.3%	26%	50%
C2a: % Chemical Compliance	96%	87.9%	77.1%	84.3%
C2b: % Chemical Monitoring Compliance	55.9%	55.9%	55.9%	55.9%
D: % Technical Skills	54.2%	91.7%	66.7%	91.7%
E: % Water Safety Plan Status	63.6%	63.6%	9.1%	63.6%
%BDRR/BDRR max	21.2%	51.1%	74.3%	37.7%

Assessment Areas	Mnquma LM - Kotana / Ehlobo	Mnquma LM - Qolorha	Mnquma LM - Tholeni	Mnquma LM - Butterworth WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	4.5	0.3	2.8	24
B: % Operational Capacity in terms of design	27.8%	100%	57.1%	33.3%
C1a: % Microbiological Compliance	97.4%	95%	90.5%	87.1%
C1b: % Microbiological Monitoring Compliance	63.3%	75%	43.8%	41.7%
C2a: % Chemical Compliance	95.6%	83%	77.1%	85.9%
C2b: % Chemical Monitoring Compliance	55.9%	55.9%	35.3%	52.9%
D: % Technical Skills	91.7%	79.2%	91.7%	91.7%
E: % Water Safety Plan Status	63.6%	63.6%	63.6%	72.7%
%BDRR/BDRR max	24.4%	38.3%	68.1%	56.6%

Assessment Areas	Nkonkobe LM - Alice WTW	Nkonkobe LM - Fort Beaufort WTW	Nkonkobe LM - Hogsback	Nkonkobe LM - Seymor
BULK / WSP				
A: Total Design Capacity (Ml/d)	6.5	8.2	0.78	0.64
B: % Operational Capacity in terms of design	92.3%	80.5%	43.6%	84.4%
C1a: % Microbiological Compliance	79%	87.5%	73.3%	90%
C1b: % Microbiological Monitoring Compliance	72.6%	57.1%	62.5%	91.7%
C2a: % Chemical Compliance	80.6%	89.3%	72.3%	85.5%
C2b: % Chemical Monitoring Compliance	55.9%	55.9%	2.9%	55.9%
D: % Technical Skills	75%	75%	75%	37.5%
E: % Water Safety Plan Status	63.6%	63.6%	63.6%	54.6%
%BDRR/BDRR max	52.6%	52.6%	58.6%	40.7%

Assessment Areas	Nxuba LM - Adelaide	Nxuba LM - Bedford	Peddie Network Supply	Sandile Network Supply
BULK / WSP				
A: Total Design Capacity (Ml/d)	2.75	1.88	N/I	N/I
B: % Operational Capacity in terms of design	90.9%	85.1%	N/I	N/I
C1a: % Microbiological Compliance	89.3%	82.7%	67.5%	93.9%
C1b: % Microbiological Monitoring Compliance	46.7%	89.6%	64.8%	42.9%
C2a: % Chemical Compliance	90.5%	85.2%	85.4%	86.2%
C2b: % Chemical Monitoring Compliance	55.9%	55.9%	2.9%	2.9%
D: % Technical Skills	75%	75%	0%	0%
E: % Water Safety Plan Status	63.6%	54.6%	0%	0%
%BDRR/BDRR max	63.9%	39%	82.1%	91%

Assessment Areas	Upper Mnyameni Network Supply
BULK / WSP	
A: Total Design Capacity (Ml/d)	N/I
B: % Operational Capacity in terms of design	N/I
C1a: % Microbiological Compliance	100%
C1b: % Microbiological Monitoring Compliance	50%
C2a: % Chemical Compliance	90.5%
C2b: % Chemical Monitoring Compliance	2.9%
D: % Technical Skills	0%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	66.1%

WSA Overview

Thirty-seven drinking water supply systems under Amatole DM were assessed. Seventeen of these supply systems are in the low-risk rating category (achieved <50% BDRR), while five are in the medium-risk rating category (achieved between 50% and <70% BDRR) and five are in the high-risk rating category (achieved between 70% and <90% BDRR). Four supply systems achieved critical-risk rating (achieved ≥90% BDRR).

Under Operational Capacity(B), Stutterheim, Kei Bridge, Qolorha, Alice and Adelaide supply systems are operating above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

With regards to drinking water quality risk rating, excellent microbiological and microbiological monitoring compliance were achieved for Cathcart, Kei Mouth, Morgans Bay, Elliotdale, Mbhashe North and Qolorha supply systems indicating that the health risk associated with microbiological determinands is significantly reduced for these systems. Unacceptable microbiological and/or microbiological monitoring compliance achieved at the remainder of the systems indicate that water supplied may still present health risks to the consumers. Most supply systems also achieved unacceptable chemical compliance and this coupled with inadequate alignment of chemical monitoring programmes to SANS 241:2015 requirements indicate that water supplied may present health and aesthetic risks to the consumers.

The Regulator notes that most supply systems achieved acceptable (>70%) to excellent (>90%) scores under technical skills. However inadequate alignment of staff (supervisors, process controllers and maintenance teams) to the set criteria observed at Cathcart, Binfield Network Supply, Debe Nek Network, Cinsta East, Haga-Haga, Kei Mouth, Masincedane Network, Dutywa, Dwesa, Mendu, Mbhashe North, Mncwasa, Seymor, Peddie Network and Upper Mnyameni Network supply systems may impact on delivery of water services due to inadequate process control and maintenance practice.

Under criteria E, Water Safety Plans are available for all systems where information was provided. However, adequate scores (>70%) were only achieved for Butterworth and Morgans Bay. This indicates that most supply systems Water Safety Plans are not adequately aligned to SANS 241:2015 requirements.

The Regulator urges the WSA to urgently implement the following measures to reduce risk ratings and ensure supply to safe drinking water to consumers:

- ✓ A and B: Linking and classification of WTW for Amabele, Binfield Network, Debe Nek Network, Glenmore Network, Cinsta East, Masincedane Network, Peddie Network, Sandile Network and Upper Mnyameni Network supply systems.
- ✓ A and B: Planning and budgeting to address capacity exceedance at all WTW operating above 90% of design.
- ✓ C:: Implementation of corrective measures to address microbiological and chemical failures. Effectiveness of such measure should also be monitored to ensure delivery of safe drinking water to consumers. Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015. Especially for systems where microbiological and chemical monitoring is not undertaken or where these are not aligned to the requirements.
- ✓ D: Ensure compliance to set criteria with regards to supervisors and process controllers and provide evidence of competent maintenance teams for all supply systems.
- ✓ Reviewal and adoption of water safety plans to align with SANS 241:2015 and WHO guidelines which include, risk assessment, risk- based monitoring, full SANS 241: 2015 analysis of raw & final water and implementation of corrective measures.

Blue Crane Route Local Municipality

Municipal BDRR Score: 54.3%

Assessment Areas	Cookhouse	Pearston	Sommerset East
BULK / WSP			
A: Total Design Capacity (Ml/d)	2.2	1.5	0.01
B: % Operational Capacity in terms of design	N/I	N/I	N/I
C1a: % Microbiological Compliance	85%	95.5%	79.6%
C1b: % Microbiological Monitoring Compliance	83.3%	91.7%	91.7%
C2a: % Chemical Compliance	77.5%	95.5%	81.8%
C2b: % Chemical Monitoring Compliance	0%	0%	0%
D: % Technical Skills	52.5%	0%	37.5%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	61.1%	44.5%	53.2%

WSA Overview

Blue Crane Route LM is responsible for three drinking water supply systems. Pearston achieved a low-risk rating while Cookhouse and Sommerset East supply systems achieved medium-risk ratings.

Operational flow information is not available for all supply systems in the municipality. Lack of flow monitoring has a negative impact on planning and water conservation and demand management implementation and has also affected the score achieved under criteria B.

Pearston supply system achieved good compliance on microbiological determinands and microbiological monitoring indicating that the water supplied may be safe for domestic use. Although Cookhouse and Sommerset East achieved excellent microbiological monitoring compliance, poor microbiological compliance coupled with poor chemical compliance achieved for these systems means that the safety of water supplied cannot be guaranteed.

All water supply systems' staff are not adequately aligned to the regulations requirements. This may impact on the operation and maintenance of the plants and ultimately affect service delivery to the customers. Furthermore, the three systems within the WSA achieved poor scores on Water Safety Plan availability indicating that SANS 241:2015 and WHO aligned Water Safety Plans have not been developed and implemented in the WSA.

To improve the risk rating and ensure supply of safe drinking water to the consumers, the Regulator urges the WSA to implement the following recommendations:

- ✓ A and B: Installation and calibration of flow meters to verify operational capacity at all WTW. Flow data should then be submitted to the regulator.
- ✓ C1a and C2a: Development and implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ C2b: Alignment of chemical monitoring programmes to SANS 241:2015 requirements in terms of sampling points, number of samples and frequency of monitoring.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria. Existing staff can also be subjected to relevant training in order to meet the requirements.
- ✓ E: Adoption and implementation of Water Safety Plans inclusive of risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high-risks as per SANS 241:2015 and WHO guidelines.

Buffalo City Local Municipality

Municipal BDRR Score: 31.6%

Assessment Areas	Kei Road System	Kidds Beach (Borehole)	King Williams Town (KWT WTYW	Laing Network Supply
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	0.26	12.5	N/I
B: % Operational Capacity in terms of design	N/I	N/I	80.00	N/I
C1a: % Microbiological Compliance	100%	82.1%	99.7%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%	98%	100%
C2a: % Chemical Compliance	98.2%	97.8%	91.8%	98.7%
C2b: % Chemical Monitoring Compliance	94.1%	94.1%	94.1%	94.1%
D: % Technical Skills	16.7%	100%	91.7%	16.7%
E: % Water Safety Plan Status	0%	72.7%	90.9%	0%
%BDRR/BDRR max	49.7%	29.8%	28.9%	49.7%

Assessment Areas	Majali (Borehole) System	Mdantsane (Umz, Nahoon, Laing)	Peddie Supply Scheme	Sandile Network Supply
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.22	N/I	N/I	N/I
B: % Operational Capacity in terms of design	77.2%	N/I	N/I	N/I
C1a: % Microbiological Compliance	84.6%	98.1%	100%	98.6%
C1b: % Microbiological Monitoring Compliance	100%	96.7%	62.5%	58.3%
C2a: % Chemical Compliance	98.3%	98.4%	99.3%	95.6%
C2b: % Chemical Monitoring Compliance	94.1%	94.1%	94.1%	94.1%
D: % Technical Skills	91.7%	8.3%	16.7%	16.7%
E: % Water Safety Plan Status	81.8%	0%	0%	0%
%BDRR/BDRR max	25.5%	52.8%	50.7%	52.4%

Assessment Areas	Siyathemba	Umzonyana WTW (East London)
BULK / WSP		
A: Total Design Capacity (Ml/d)	0.04	120
B: % Operational Capacity in terms of design	105.3%	83.3%
C1a: % Microbiological Compliance	97.6%	99.7%
C1b: % Microbiological Monitoring Compliance	0%	100%
C2a: % Chemical Compliance	89.3%	95.5%
C2b: % Chemical Monitoring Compliance	52.9%	94.1%
D: % Technical Skills	91.7%	100%
E: % Water Safety Plan Status	81.8%	90.9%
%BDRR/BDRR max	37.4%	31%

WSA Overview

Ten drinking water supply systems under Buffalo City LM were assessed. Seven of these supply systems are in the low-risk rating category (achieved <50% BDRR) while eleven are in the medium-risk rating category (achieved between 50% and <70% BDRR).

Kei Road, Laing network, Mdantshane, Sandile network and Peddie supply systems do not have linked WTW on IRIS and this impacted on their score under criteria A, B and E. Mjali, Umzonyanaand, and King Williams Town are operating well within the design capacity while Siyathemba is operating above design capacity. This indicates that Siyathemba system may not be able to meet the current and future water demand.

With regards to criteria C, seven of the ten supply systems achieved good to excellent microbiological and chemical compliance. This coupled with implementation of SANS 241:2015 aligned monitoring programmes indicates that water supplied from these systems may be safe for domestic use. Kidds Beach, Majali and Siyathemba supply systems achieved inadequate microbiological and/or chemical compliance indicating that water supplied may present health and aesthetic risk to the consumers and this should be urgently addressed.

The Regulator notes that technical skills for Kidds Beach, Majali, Umzonyana, King Williams Town and Siyathemba supply systems are aligned to the regulations requirements and the WSA and WSP are commended for that. Low technical skills scores achieved for the remainder of the supply systems indicate that staff are not adequately aligned to the set criteria and this may impact on water supply to customers.

All supply systems with information on Water Safety Plans achieved adequate scores for Criteria E: Water Safety Planning. This indicates implementation of Water Safety Plans and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015.

The Regulator encourages the WSA and WSP to implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Linking and classification of WTW for Kei Road, Laing Network, Mdantshane, Sandile network and Peddie supply systems.
- ✓ A and B: Planning and budgeting to address capacity exceedance at Siyathemba WTW, operating above 100% of the design capacity.
- ✓ C1a and C2a: Development and implementation of corrective measures for microbiological and chemical failures to ensure delivery of safe drinking water at all times. This is especially for systems that achieved poor microbiological and chemical compliance.
- ✓ C2b and C2b: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015. This is especially for systems that achieved poor microbiological and chemical monitoring compliance.
- ✓ D: Appointment of suitably qualified and/or training of existing staff (supervisors, process controllers and maintenance teams) to improve compliance with the set criteria.

Chris Hani District Municipality

Municipal BDRR Score: 35.6%

Assessment Areas	Emalahleni - Indwe WSS	Emalahleni - Lukhavala WSS	Emalahleni - Machubeni	Emalahleni - Noluthando
BULK / WSP				
A: Total Design Capacity (Ml/d)	12	0.1	3.4	0.2
B: % Operational Capacity in terms of design	10%	N/I	73.5%	N/I
C1a: % Microbiological Compliance	100%	0%	99.3%	0%
C1b: % Microbiological Monitoring Compliance	100%	0%	100%	0%
C2a: % Chemical Compliance	89.3%	0%	96.9%	0%
C2b: % Chemical Monitoring Compliance	85.3%	0%	11.8%	0%
D: % Technical Skills	8.3%	0%	17.7%	0%
E: % Water Safety Plan Status	63.6%	0%	0%	0%
%BDRR/BDRR max	18.2%	96.9%	28.5%	96.9%

Assessment Areas	Emalahleni (Rural & Farms - Untreated)	Emalahleni - Dordrecht WSS	Engcobo - Engcobo Town	Engcobo - Gqaga WSS
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	2	1.8	2.5
B: % Operational Capacity in terms of design	N/I	85%	38.9%	N/I
C1a: % Microbiological Compliance	0%	97.4%	85.3%	0%
C1b: % Microbiological Monitoring Compliance	0%	100%	100%	0%
C2a: % Chemical Compliance	0%	99.2%	96.3%	0%
C2b: % Chemical Monitoring Compliance	0%	88.2%	97.1%	0%
D: % Technical Skills	0%	8.3%	100%	0%
E: % Water Safety Plan Status	0%	72.7%	81.8%	0%
%BDRR/BDRR max	100%	22.7%	25.7%	97.4%

Assessment Areas	Engcobo - Sitholeni WSS	Engcobo - Tora WTW	Engcobo - (Rural Treated Boreholes)	Engcobo - Nkobongo WSS
BULK / WSP				
A: Total Design Capacity (Ml/d)	1.3	1.5	N/I	0.72
B: % Operational Capacity in terms of design	N/I	N/I	N/I	68.1%
C1a: % Microbiological Compliance	0%	0%	98.9%	79.3%
C1b: % Microbiological Monitoring Compliance	0%	0%	82.1%	100%
C2a: % Chemical Compliance	0%	0%	92.1%	90.2%
C2b: % Chemical Monitoring Compliance	0%	0%	17.7%	97.1%
D: % Technical Skills	0%	0%	0%	100%
E: % Water Safety Plan Status	0%	0%	0%	72.7%
%BDRR/BDRR max	97.2%	97.2%	65.1%	33%

Assessment Areas	Inkwanca - Molteno WSS	Inkwanca - Sterkstroom	Intsika Yethu - Lubisi WSS	Intsika Yethu - Ncora WSS
BULK / WSP				
A: Total Design Capacity (Ml/d)	2.86	2.3	4.2	5
B: % Operational Capacity in terms of design	63%	47.8%	N/I	30%
C1a: % Microbiological Compliance	100%	100%	0%	100%
C1b: % Microbiological Monitoring Compliance	77.8%	75%	0%	0.6%
C2a: % Chemical Compliance	92.7%	94.3%	0%	100%
C2b: % Chemical Monitoring Compliance	94.1%	79.4%	0%	85.3%
D: % Technical Skills	34.4%	47.8%	37.5%	54.12%
E: % Water Safety Plan Status	72.7%	58.9%	0%	18.2%
%BDRR/BDRR max	29.3%	30.9%	95.9%	19.7%

Assessment Areas	Intsika Yethu - Tsojana WSS	Intsika Yethu (Untreated)	Intsika Yethu - Tsomo Service	Inxuba Yethemba - Cradock
BULK / WSP				
A: Total Design Capacity (Ml/d)	5	N/I	25	24
B: % Operational Capacity in terms of design	70%	N/I	3.6%	66.7%
C1a: % Microbiological Compliance	99%	0%	100%	100%
C1b: % Microbiological Monitoring Compliance	64.2%	0%	94.4%	90.4%
C2a: % Chemical Compliance	91%	0%	91.2%	97.3%
C2b: % Chemical Monitoring Compliance	79.4%	0%	73.5%	82.4%
D: % Technical Skills	63.5%	0%	79.2%	37.5%
E: % Water Safety Plan Status	72.7%	0%	100%	90.9%
%BDRR/BDRR max	33%	100%	20.9%	27.5%

Assessment Areas	Inxuba Yethemba - Middelburg	Lukhanji - Queenstown WSS	Lukhanji - Whittlesea WSS	Lukhanji (Rural & Farms - Untreated)
BULK / WSP				
A: Total Design Capacity (Ml/d)	8.91	40	11	N/I
B: % Operational Capacity in terms of design	N/I	51.3%	45.5%	N/I
C1a: % Microbiological Compliance	88.7%	96.4%	98.9%	96.8%
C1b: % Microbiological Monitoring Compliance	91.7%	63.3%	95.8%	58.3%
C2a: % Chemical Compliance	99.5%	90.9%	90.1%	95.1%
C2b: % Chemical Monitoring Compliance	55.9%	79.4%	88.2%	11.8%
D: % Technical Skills	26.5%	62.5%	37.5%	0%
E: % Water Safety Plan Status	62.7%	18.2%	81.8%	0%
%BDRR/BDRR max	39.9%	40.3%	24.2%	63.3%

Assessment Areas	Sakhisizwe - Cala WSS	Sakhisizwe - (Farms & Rural - Treated)	Sakhisizwe - Elliot WSS	Sakhisizwe - Xhalanga WSS
BULK / WSP				
A: Total Design Capacity (Ml/d)	5.14	N/I	4.05	N/I
B: % Operational Capacity in terms of design	44.8%	N/I	79.0%	N/I
C1a: % Microbiological Compliance	98.7%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	91.7%	23.9%	83.3%	54.2%
C2a: % Chemical Compliance	94.9%	98.8%	95.7%	95.4%
C2b: % Chemical Monitoring Compliance	85.3%	5.9%	97.1%	97.1%
D: % Technical Skills	45.1%	0%	52.2%	54.2%
E: % Water Safety Plan Status	9.5%	0%	17.7%	9.1%
%BDRR/BDRR max	26%	54.5%	25.7%	19.1%

Assessment Areas	Sakhisizwe - Cala Package System	Tsolwana: Hofmeyer Supply System	Tsolwana: Ntabathemba WSS	Tsolwana: Tarkastad Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.24	0.11	6.25	1.26
B: % Operational Capacity in terms of design	247.9%	0%	N/I	N/I
C1a: % Microbiological Compliance	84.2%	100%	98.8%	93.3%
C1b: % Microbiological Monitoring Compliance	45.8%	58.3%	66.7%	30.9%
C2a: % Chemical Compliance	92.5%	100%	91.5%	100%
C2b: % Chemical Monitoring Compliance	97.06	11.8%	11.8%	88.2%
D: % Technical Skills	54.2%	54.2%	23.7%	56.3%
E: % Water Safety Plan Status	18.2%	54.6%	54.6%	72.7%
%BDRR/BDRR max	62.9%	22.1%	52.6%	59.2%

WSA Overview

Chris Hani DM is responsible for thirty-two drinking water supply system in the area of jurisdiction. Eighteen of these supply systems are in the low-risk rating category (achieved <50% BDRR), while six are in the medium-risk rating category (achieved between 50% and <70% BDRR), and eight achieved a critical-risk rating (achieved ≥90% BDRR).

Lukhavala, Noluthando, Emalahleni Rural & Farms - Untreated, Gqaga, Sitholeni, Tora, Lubisi and Intsika Yethu untreated supply systems have no information for any of the Risk Indicators placing them in the critical-risk category. Xhalanga, Hofmeyer, Ntabathemba and Tarkastad do not have information on operational capacity and this impacted on their score under criteria B. For system with information on operational capacity only Cala supply system is operating above 100% of design, indicating insufficient treatment capacity to supply current and future requirements.

With regards to drinking water quality risk rating, excellent microbiological and microbiological monitoring compliance were achieved for Indwe, Dordrecht, Engcobo Rural Treated Boreholes, Molteno, Sterkstroom, Tsomo and Whittlesea supply systems indicating that the health risk associated with microbiological determinands is significantly reduced for these systems. Unacceptable microbiological and/or microbiological monitoring compliance achieved at the remainder of the systems indicate that water supplied may still present health risks to the consumers. Indwe, Dordrecht, Engcobo Town, Sterkstroom, Tarkastad, Ncora, Cradock, Cala, Elliot and Xhalanga supply systems achieved acceptable to excellent chemical and chemical monitoring compliance. The remainder of the systems achieved unacceptable chemical and chemical monitoring compliance indicating that the water supplied may still pose health and aesthetic risks to the consumers and this should be addressed urgently.

Under technical skills only Tsomo, Nkobongo and Engcobo Town systems achieved adequate scores indicating adequate alignment of staff to the set criteria. The other systems achieved inadequate score under this criterion indicating that staff is not adequately aligned to regulations requirements and this may impact on operation and maintenance activities which ultimately impacts on service delivery.

Dordrecht, Engcobo Town, Nkobongo, Molteno, Tsojana, Tsomo, Cradock and Tarkastad supply systems achieved adequate scores under criteria E, indicating that Water Safety Plans are available and implemented. Poor score achieved for the rest of the systems indicate that SANS 241: 2015 aligned Water Safety Plans are not available or lack key elements.

The regulator urges the WSA to urgently implement the following measures to reduce risk ratings and ensure supply to safe drinking water to consumers:

- ✓ A and B: Linking and classification of WTW for supply systems where there are no linked plants or boreholes.
- ✓ A and B: Installation and calibration of flow meters to verify operational capacity at all WTW where flow monitoring is not taking place. Flow data should then be submitted to the Regulator.
- ✓ C1a and C2a: Development and implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ C2b: Alignment of chemical monitoring programmes to SANS 241:2015 requirements in terms of sampling points, number of samples and frequency of monitoring.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria. Existing staff can also be subjected to relevant training in order to meet the requirements.
- ✓ E: Adoption and implementation of Water Safety Plans inclusive of risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high-risks as per SANS 241:2015 and WHO guidelines.

Dr Beyers Naude Local Municipality

Municipal BDRR Score: 59.2%

Assessment Areas	Aberdeen	ec103 : Waterford	ec107 : Miller	ec107 : Vondeling
BULK / WSP				
A: Total Design Capacity (Ml/d)	3.4	0.5	N/I	N/I
B: % Operational Capacity in terms of design	66%	N/I	N/I	N/I
C1a: % Microbiological Compliance	100%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	25%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	45%	96.9%	100%	100%

Assessment Areas	Graaf-Reinet	Jansenville	Klipplaat	Nieu-bethesda
BULK / WSP				
A: Total Design Capacity (Ml/d)	16	2	2	0.83
B: % Operational Capacity in terms of design	47.7%	60.7%	24.3%	27.1%
C1a: % Microbiological Compliance	93.4%	0%	100%	71.4%
C1b: % Microbiological Monitoring Compliance	76.2%	0%	4.2%	37.5%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	53.1%	16.7%	16.7%	16.7%
E: % Water Safety Plan Status	18.2%	0%	0%	18.2%
%BDRR/BDRR max	55.2%	88.5%	39.9%	72.5%

Assessment Areas	Rietbron	Steytleville	Willowmore	Wolwefontein
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.25	3.4	3.7	0.10
B: % Operational Capacity in terms of design	N/I	54.2%	N/I	N/I
C1a: % Microbiological Compliance	100%	82.6%	100%	0%
C1b: % Microbiological Monitoring Compliance	29.2%	16.7%	33.3%	0%
C2a: % Chemical Compliance	100%	75.00	100%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	37.5%	46.9%	47.6%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	24.3%	87.1%	29.9%	96.6%

WSA Overview

Dr Beyers Naude LM has twelve drinking water supply systems in their area of jurisdiction. Klipplaat, Willowmore, Aberdeen and Rietbron systems achieved low-risk rating, while Graaf-Reinet achieved medium-risk rating and Jansenville, Steytleville and Nieu-bethesda achieved high-risk ratings. No information was submitted for any of the criteria for Waterford, Miller, Vondeling and Wolwefontein which resulted in these systems achieving critical BDRR. All systems with operational capacity information are operating well within the design capacity indicating that there is adequate capacity to meet demands. Willowmore and Reitbron also lack operational capacity information and this affected their scores negatively.

Unacceptable microbiological and chemical compliance evident in most systems coupled with poor alignment of monitoring programmes to SANS 241: 2015 requirements present serious health risks to the consumers and should be urgently addressed. Only Klipplaat, Willowmore, Aberdeen and Reitbron systems achieved excellent microbiological compliance, however, unacceptable chemical compliance and poor alignment of monitoring programmes to the requirements means that the water supplied still presents risks to the consumers.

Supervisors, process controllers and maintenance teams for all supply systems are not adequately aligned to the regulations requirements and presents a risk of poor operations and maintenance which ultimately impacts on water supply. With regards to Water Safety Planning, all supply systems do not have SANS 241: 2015 and WHO aligned Water Safety Plans.

The Regulator urges the WSA to implement the following measure to ensure supply of safe drinking water to consumers:

- ✓ Criteria A and B: Installation and calibration of flow meters at al WTW where flow monitoring is not taking place. Operational flow data should then be submitted to the Regulator.
- ✓ Criteria C: Development and implementation of SANS 241: 2015 aligned microbiological and chemical programmes and subsequent water quality results should be submitted to the Regulator.
- ✓ Criteria C1a and C2a: Development and implementation of corrective measures for microbiological and chemical failures. Effectiveness of such measured should also be reviewed.
- ✓ Criteria D: Appointment and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure compliance with the regulation.
- ✓ Criteria E: Development and implementation of Water Safety Plans that are aligned to SANS 241: 2015 and WHO guidelines which include risk assessment of entire system, risk-based monitoring and implementation of corrective measures.

Joe Gqabi District Municipality

Municipal BDRR Score: 35%

Assessment Areas	Elundini LM - Maclear (Aucamp WTW) and (Mooiriver WTW)	Elundini LM - Maclear Rural (Boreholes & Springs)	Elundini LM - Mount Fletcher Rural (Boreholes & Springs)	Elundini LM - Mt Fletcher (Mount Fletcher WTW)
BULK / WSP				
A: Total Design Capacity (Ml/d)	1.75	N/I	N/I	6.5
B: % Operational Capacity in terms of design	57.8%	N/I	N/I	23.1%
C1a: % Microbiological Compliance	98.5%	94.9%	95.6%	99.5%
C1b: % Microbiological Monitoring Compliance	100%	96.4%	100%	100%
C2a: % Chemical Compliance	95%	88.2%	90.2%	95.9%
C2b: % Chemical Monitoring Compliance	88.2%	0%	0%	88.2%
D: % Technical Skills	64.9%	16.7%	16.7%	65.7%
E: % Water Safety Plan Status	12.9%	0%	0%	8.4%
%BDRR/BDRR max	17.1%	70.6%	68.6%	19.1%

Assessment Areas	Elundini LM - Ugie (Ugie WTW)	Elundini LM - Ugie Rural (Boreholes & Springs)	Gariep LM - Burgersdorp (Burgersdorp WTW)	Gariep LM - Oviston (Oviston WTW)
BULK / WSP				
A: Total Design Capacity (Ml/d)	6	N/I	4.8	4.5
B: % Operational Capacity in terms of design	50%	N/I	83.3%	77.8%
C1a: % Microbiological Compliance	78.2%	92.9%	83.6%	93.4%
C1b: % Microbiological Monitoring Compliance	97.9%	100%	91.7%	100%
C2a: % Chemical Compliance	85.4%	91.9%	73%	95.2%
C2b: % Chemical Monitoring Compliance	88.2%	0%	94.1%	94.1%
D: % Technical Skills	66.7	16.7%	66.7%	66.7%
E: % Water Safety Plan Status	18.2%	N/I	27.3%	18.2%
%BDRR/BDRR max	30%	72.6%	35.7%	33.3%

Assessment Areas	Gariep LM - Teebus (DWA Boreholes)	Maletswai LM - Aliwal North	Maletswai LM - Jamestown	Senqu LM - Barkly East
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	14.4	1.2	4.8
B: % Operational Capacity in terms of design	N/I	86.8%	75%	52.1%
C1a: % Microbiological Compliance	0%	94.8%	96.6%	99.1%
C1b: % Microbiological Monitoring Compliance	0%	87.2%	83.3%	100%
C2a: % Chemical Compliance	0%	91.7%	86.4%	96.8%
C2b: % Chemical Monitoring Compliance	0%	91.2%	94.1%	88.2%
D: % Technical Skills	0%	66.7%	91. %	91.7%
E: % Water Safety Plan Status	0%	27.2%	18.2%	18.2%
%BDRR/BDRR max	100%	35.4%	23.5%	21%

Assessment Areas	Senqu LM - Jozana (Jozana WTW)	Senqu LM - Lady Grey (Lady Grey WTW)	Senqu LM - Rhodes (Rhodes WTW)	Senqu LM - Rossouw (Boreholes)
BULK / WSP				
A: Total Design Capacity (Ml/d)	1.08	4.8	0.5	0.08
B: % Operational Capacity in terms of design	55.6%	83.3%	80%	40%
C1a: % Microbiological Compliance	96%	97.6%	100%	96.2%
C1b: % Microbiological Monitoring Compliance	87.5%	100%	100%	100%
C2a: % Chemical Compliance	88%	87.6%	97.3%	89.6%
C2b: % Chemical Monitoring Compliance	91.2%	88.2%	88.2%	61.8%
D: % Technical Skills	54.2%	72.9%	72.9%	72.9%
E: % Water Safety Plan Status	18.2%	27.3%	9.1%	27.3%
%BDRR/BDRR max	25.2%	26.6%	12.4%	24.5%

Assessment Areas	Senqu LM - Rossouw Police (Borehole)	Senqu LM - Sterkspruit (Sterkspruit WTW)	Senqu LM - Sterkspruit Rural (Boreholes & Springs)	Walter Sisulu LM - Steynsburg (Steynsburg WTW)
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	12	N/I	2
B: % Operational Capacity in terms of design	N/I	73.3%	N/I	66%
C1a: % Microbiological Compliance	0%	83.8%	84.8%	87.2%
C1b: % Microbiological Monitoring Compliance	0%	100%	95%	100%
C2a: % Chemical Compliance	0%	85.5%	69.6%	90.4%
C2b: % Chemical Monitoring Compliance	0%	91.2%	0%	97.1%
D: % Technical Skills	0%	54.2%	16.7%	66.7%
E: % Water Safety Plan Status	0%	27.3%	0%	9.1%
%BDRR/BDRR max	100%	38.2%	72.6%	32.7%

WSA Overview

Joe Gqabi DM is comprised of twenty drinking water supply systems. Fourteen supply systems are in the low-risk rating category. Mount Fletcher Rural system achieved a medium-risk rating while Maclear Rural, Ugie Rural and Sterkspruit Rural achieved high-risk ratings. Teebus and Rossouw Police have no information for any of the Risk Indicators placing them in the critical-risk category.

All systems with operational information are operating well within design capacity indicating that there is no threat of not meeting current demand requirements and resulted in good performance under criteria B. Unavailability of SANS 241: 2015 and WHO aligned Water Safety Plans has negatively impacted on the scores under criteria E.

With regard to drinking water quality management risk rating, unacceptable microbiological compliance was achieved for Burgersdorp, Ugie, Ugie Rural, Oviston, Sterkspruit, Sterkspruit Rural and Steynsburg supply systems. Poor microbiological compliance increases the health risk to the consumers and should be addressed urgently. Microbiological monitoring is adequately aligned to SANS 241: 2015 requirements for all systems where monitoring is undertaken. Only Maclear, Barkly East, Mt Fletcher, Rhodes and Oviston supply systems achieved acceptable chemical compliance with the remainder of the systems achieving poor chemical compliance. Poor chemical compliance indicates that water supplied may still present health and aesthetic risks to the consumers. Alignment of chemical monitoring programme to SANS 241: 2015 requirements is lacking for Burgersdorp, Rossouw, Mount Fletcher Rural and Sterkspruit Rural supply systems.

Alignment of process controllers and maintenance teams to the regulations requirements is also lacking in most supply systems as only five (Barkly East, Lady Grey, Jamestown, Rhodes and Rossouw) of the twenty supply systems achieved good to excellent scores under criteria E. This should also be addressed urgently as it places the WSA at risk of poor operations and maintenance which may ultimately impact on water supply to customers.

The Department urges the Joe Gabi District Municipality to implement the following measures to reduce the risk rating:

- ✓ A and B: Linking and classification of WTW for Mount Fletcher Rural, Rossouw Police and Sterkspruit Rural supply systems.
- ✓ C1a and C2a: Implementation of corrective measures to address microbiological and chemical failures. Effectiveness of such measure should also be monitored to ensure delivery of safe drinking water to consumers.
- ✓ C2b and C2b: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015. Especially for systems where microbiological and chemical monitoring is not undertaken or where these are not aligned to the requirements.
- ✓ D: Ensure compliance to set criteria with regards to supervisors and process controllers and provide evidence of competent maintenance teams for all supply systems.
- ✓ E: Development and implementation of Water Safety Plans that are aligned to SANS 241: 2015 and WHO guidelines which include risk assessment of entire system, risk-based monitoring and implementation of corrective measures.

Kouga Local Municipality

Municipal BDRR Score: 39.9%

Assessment Areas	Hankey	Humansdorp	Jeffreys Bay	Loerie
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	2.50	2.00	N/I
B: % Operational Capacity in terms of design	420%	144%	155%	N/I
C1a: % Microbiological Compliance	100%	95.6%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%	97.6%	100%
C2a: % Chemical Compliance	98.4%	96%	98.3%	96.9%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	25%	43.8%	25%	0%
E: % Water Safety Plan Status	45.5%	45.5%	45.5%	0%
%BDRR/BDRR max	21.7%	39.1%	29.5%	54.9%

Assessment Areas	Oyster Bay	Patensie	St. Francis Bay	Thornhill
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.28	1.90	N/I	N/I
B: % Operational Capacity in terms of design	100%	100%	N/I	N/I
C1a: % Microbiological Compliance	88.9%	100%	95.6%	100%
C1b: % Microbiological Monitoring Compliance	91.7%	100%	100%	100%
C2a: % Chemical Compliance	90.3%	95.5%	95.6%	100%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	25%	25%	0%	25%
E: % Water Safety Plan Status	45.5	0%	0%	0%
%BDRR/BDRR max	50.9%	29.8%	62.3%	50.7%

WSA Overview

Eight drinking water supply systems were assessed under Kouga LM. Humansdorp, Jeffreys Bay, Patensie and Hankey are in the low-risk rating category while St. Francis Bay, Loerie, Oyster Bay and Thornhill supply systems are in the medium-risk rating category.

Three supply systems do not have a linked WTW on IRIS and this impacted on the performance under criteria A, B and E. All other systems are operating above 90% of the design capacities indicating insufficient capacity to meet current and future needs and this should be urgently addressed.

With regards to criteria C, most supply systems achieved acceptable to excellent compliance on microbiological and chemical compliance indicating that the water supplied may be safe for domestic use. Only Oyster Bay system achieved poor microbiological and chemical compliance indicating that the water supplied may presents serious health and aesthetic risks to the consumer and this should be addressed urgently. Chemical monitoring compliance should also be aligned to SANS 241: 2015 monitoring.

Inadequate alignment of staff (supervisors, process controllers and maintenance teams) observed in all supply systems has negatively impacted on the score under criteria D and presents a risk of poor operations and maintenance practices and ultimately effect service delivery. The Water Safety Planning processes is also not adequately aligned to SANS 241: 2015 and WHO guidelines and should be reviewed to improve performance under criteria E.

The WSA is encouraged to implement the following measures to maintain low-risk rating and improve on the medium-risk ratings while ensuring continued supply of safe drinking water to the consumers:

- ✓ A and B: Linking and classification of WTW for St. Francis Bay, Loerie and Thornhill systems.

- ✓ Planning and budgeting to address capacity exceedance at all WTW operating above 90% of design capacity.
- ✓ C1a and C1b: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times. This is especially for the Oyster Bay system which achieved poor microbiological and chemical compliance.
- ✓ C2a: Alignment of chemical monitoring programme to SANS 241: 2015 requirements which includes number of samples, frequency and coverage.
- ✓ Appointment and/or training of existing staff to ensure adequate alignment to the regulations requirements.
- ✓ Reviewal and adoption of Water Safety Plans to align with SANS 241: 2015 and WHO guidelines which include, risk assessment, risk- based monitoring, raw & final water full SANS analysis and implementation of corrective measures.

Kou-Kamma Local Municipality

Municipal BDRR Score: 65.7%

Assessment Areas	Blikkiesdorp	Clarkson	Coldstream	Joubetina
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.08	0.35	0.37	0.69
B: % Operational Capacity in terms of design	100%	100%	100%	100%
C1a: % Microbiological Compliance	100%	22.2%	100%	31.3%
C1b: % Microbiological Monitoring Compliance	54.2%	33.3%	62.5%	33.3%
C2a: % Chemical Compliance	84.4%	83%	97.7%	18.8%
C2b: % Chemical Monitoring Compliance	11.76	11.8%	11.8%	0%
D: % Technical Skills	43.8%	100%	81.3%	100%
E: % Water Safety Plan Status	45.5%	45.5%	45.5%	45.5%
%BDRR/BDRR max	39.1%	74.9%	18.7%	73.4%

Assessment Areas	Kareedouw	Krakeel	Louterwater	Misgund
BULK / WSP				
A: Total Design Capacity (Ml/d)	2.4	0.41	0.72	0.29
B: % Operational Capacity in terms of design	100%	100%	100%	100%
C1a: % Microbiological Compliance	52.6%	0%	75%	100%
C1b: % Microbiological Monitoring Compliance	37.5%	4.2%	12.5%	16.7%
C2a: % Chemical Compliance	68.3%	0%	75%	100%
C2b: % Chemical Monitoring Compliance	11.8%	0%	0%	0%
D: % Technical Skills	100%	100%	100%	43.8%
E: % Water Safety Plan Status	45.5%	45.5%	45.5%	27.3%
%BDRR/BDRR max	72.2%	88.8%	85.9%	20.4%

Assessment Areas	Sanddrif	Storms River	Woodlands
BULK / WSP			
A: Total Design Capacity (Ml/d)	0.25	0.29	0.36
B: % Operational Capacity in terms of design	100%	100%	100%
C1a: % Microbiological Compliance	46.2%	100%	100%
C1b: % Microbiological Monitoring Compliance	41.7%	66.7%	66.7%
C2a: % Chemical Compliance	51.4%	87.9%	88.6%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%	11.8%
D: % Technical Skills	62.5%	56.3%	100%
E: % Water Safety Plan Status	45.5%	45.5%	45.5%
%BDRR/BDRR max	76.8%	38.5%	36.3%

WSA Overview

Kou-Kamma LM is responsible for eleven drinking water supply systems. Woodlands, Coldstream, Storms River, Blikkiesdorp and Misgund achieved low DRDD while the other six supply systems are in the medium-risk rating category.

All water supply systems are indicated to be operating at 100% of design capacities and this may be an indication of no flow monitoring. Nonetheless, operating at 100% of design capacity presents a risk of not meeting current and future water demands. While lack of flow monitoring has a direct impact on planning and implementation of water conservation and demand management plans.

With regards to criteria C, Woodlands, Coldstream, Storms River, Blikkiesdorp and Misgund achieved excellent microbiological and microbiological monitoring compliance. However, the remainder of supply systems achieved poor microbiological and/or microbiological monitoring compliance and this presents health risks to the consumers and should be urgently addressed. Chemical compliance is also unacceptable for most supply systems (except Misgund), this coupled with poor alignment of chemical monitoring programmes to SANS 241: 2015 requirements indicates that the water may still present some aesthetic and health risks.

Six of the eleven supply systems have staff compliment that is aligned with the regulations requirements, the WSA is commended for this. However, staff compliment for Coldstream, Sanddrif, Storms River, Blikkiesdorp and Misgund are not adequately aligned to the set criteria and this may lead to interruptions on water supply due to poor operations and maintenance practices.

Under Water Safety Plan status, all supply systems have Water Safety Plans in place, however, the low score achieved under this criterion indicate that available Water Safety Plans are not adequately aligned to SANS 241: 2015 and WHO guidelines which includes signatures for approval of documents and implementation of medium and high risks.

The Regulator urges the WSA to implement the following measures to ensure supply of safe drinking water to the consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity. Planning and budgeting to address capacity exceedance should also be undertaken for systems that are operating above 90% of design capacity.
- ✓ C1a and C1b: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times. This is especially for the Krakeel system which achieved poor microbiological and chemical compliance.
- ✓ C2a: Alignment of chemical monitoring programme to SANS 241: 2015 requirements which includes number of samples, frequency and coverage.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ Reviewal and adoption of Water Safety Plans to align with SANS 241: 2015 and WHO guidelines which include, risk assessment, risk-based monitoring, raw & final water full SANS 241: 2015 analysis and implementation of corrective measures.

Makana Local Municipality

Municipal BDRR Score: 89.1%

Assessment Areas	Alicedale	Grahamstown	Riebeeck East
BULK / WSP			
A: Total Design Capacity (Ml/d)	1.6	18	1
B: % Operational Capacity in terms of design	N/I	N/I	N/I
C1a: % Microbiological Compliance	100%	83.9%	100%
C1b: % Microbiological Monitoring Compliance	45.8%	20.5%	45.8%
C2a: % Chemical Compliance	81.8%	58.1%	81.8%
C2b: % Chemical Monitoring Compliance	0%	0%	0%
D: % Technical Skills	75%	58.3%	56.3%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	47.8%	95%	48.7%

WSA Overview

There are three drinking water supply systems under Makana LM. Alicedale and Riebeeck East supply systems are in the low-risk rating category while Grahamstown is in the critical-risk category. Unavailability of operational flow data for all supply systems may impact on planning and water conservation and demand management initiatives and also impacted negatively on the score under criteria B.

Alicedale and Riebeeck East supply systems achieved excellent compliance under microbiological compliance, however, inadequate alignment of microbiological monitoring programmes to SANS 241: 2015 requirements. This coupled with poor chemical and chemical monitoring compliance means that the safety of water supplied from these systems cannot be guaranteed. Grahamstown supply system achieved poor microbiological and chemical compliance and monitoring programmes are not aligned to SANS 241: 2015 requirements, this presents a serious health risk to the consumers as the safety of water supplied cannot be guaranteed.

With regards to technical skills, Alicedale has a supervisor and process controllers that are adequately aligned to the regulations requirements while Grahamstown and Riebeeck East are lacking in this regard. Maintenance teams are also lacking for all supply systems and therefore presents a risk of poor infrastructure maintenance which may lead to water supply interruptions.

Poor Water Safety Plan availability scores were achieved for all supply systems. This indicates that adoption and implementation of SANS 241: 2015 aligned Water Safety Planning process inclusive of risk assessments, risk-based monitoring and implementation of corrective measures is lacking for all supply systems.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Installation of calibrated inflow meters to verify operational capacity at all WTW.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ Appointment of suitably qualified maintenance teams that complies with the regulations requirements. Supervisors and process controllers for Grahamstown and Riebeeck East WTW should also be aligned to the regulations requirements through appointment of qualified staff and/or training of new staff.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Ndlambe Local Municipality

Municipal BDRR Score: 57%

Assessment Areas	Albany Coast Network	Alexandria WTW	Bathurst WTW	Cannon Rock WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	N/I	0.5	0.65
B: % Operational Capacity in terms of design	N/I	N/I	100	115.4%
C1a: % Microbiological Compliance	85.5%	100%	93.9%	100%
C1b: % Microbiological Monitoring Compliance	91.7%	88.9%	91.7%	61.1%
C2a: % Chemical Compliance	81.8%	90.9%	54.6%	100%
C2b: % Chemical Monitoring Compliance	14.7%	14.7%	14.7%	14.71%
D: % Technical Skills	0%	25%	25%	62.5%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	73.1%	64.3%	49.4%	23.9%

Assessment Areas	Port Alfred	Seafield / Kleinemonde
BULK / WSP		
A: Total Design Capacity (Ml/d)	5	1
B: % Operational Capacity in terms of design	N/I	100%
C1a: % Microbiological Compliance	88.2%	100%
C1b: % Microbiological Monitoring Compliance	91.7%	30.6%
C2a: % Chemical Compliance	72.7%	72.7%
C2b: % Chemical Monitoring Compliance	14.7%	14.7%
D: % Technical Skills	71.9%	25%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	60.3%	42.1%

WSA Overview

Ndlambe LM has six drinking water supply systems. Cannon Rock, Bathurst and Seafield achieved low-risk ratings, Alexandria and Port Alfred achieved a medium-risk rating and Albany Coast achieved a high-risk rating. No WTW are linked for the Albany Coast and Alexandria systems and this impacted on the scores under criteria A and B. Furthermore, all systems with information on operational capacities are operating at or above 100% of the design capacities indicating a risk of not meeting current and future demands.

Under criteria C, although Alexandria, Cannon Rock and Seafield achieved excellent microbiological compliance, poor chemical compliance and inadequate alignment of chemical and microbiological monitoring programmes indicates that water supplied may still present potential risks to the consumers. Poor microbiological and chemical compliance achieved in the remainder of the systems also means that the safety of water supplied cannot be guaranteed and may present health and aesthetic risks to the consumers.

Alignment of process controllers and maintenance teams to the regulations requirements is lacking throughout the municipality as only Port Alfred and Cannon Rock achieved acceptable scores under criteria D. This indicates that most systems are at a risk of poor operation and maintenance which may in turn affect delivery of services to the customers.

SANS 241: 2015 and WHO aligned Water Safety Planning process which includes risk assessment, risk-based monitoring and implementation of corrective measures for medium and high-risks has not been adopted and implemented for all supply systems and this resulted in poor performance under criteria E.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Linking and classification of WTW for Albany Coast and Alexandria systems.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity for Port Alfred.
- ✓ A and B: Planning and budgeting to address capacity exceedance at all WTW operating at or above 100% of design capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Nelson Mandela Metropolitan Municipality

Municipal BDRR Score: 34.2%

Assessment Areas	Churchill WTW	Elandsjagt WTW	Groendal (Kabah) WTW	Linton WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	100	100	20	20
B: % Operational Capacity in terms of design	77.9%	15.6%	49.5%	27.2%
C1a: % Microbiological Compliance	97.6%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	83.3%	52.8%	88.9%	91.7%
C2a: % Chemical Compliance	95.8%	96.2%	97.9%	94.5%
C2b: % Chemical Monitoring Compliance	64.7%	64.7%	64.7%	67.7%
D: % Technical Skills	91.7%	72.9%	91.7%	82.3%
E: % Water Safety Plan Status	45.5%	54.6%	54.6%	54.6%
%BDRR/BDRR max	31.9%	23.2%	18.9%	24.3%

Assessment Areas	Loerie WTW	Nelson Mandela Metropolitan Municipality (Whole System)	Nooitgedacht WTW	Rocklands WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	100	486.75	140	0.25
B: % Operational Capacity in terms of design	34.4%	63%	113.1%	56%
C1a: % Microbiological Compliance	100%	98.4%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	97.9%	91.7%	91.7%
C2a: % Chemical Compliance	96.4%	94.6%	95.9%	97.6%
C2b: % Chemical Monitoring Compliance	67.7%	67.7%	64.7%	64.7%
D: % Technical Skills	82.3%	62.9%	72.9%	54.2%
E: % Water Safety Plan Status	54.6%	49.6%	45.6%	45.5%
%BDRR/BDRR max	21.8%	38.7%	39.1%	15.8%

Assessment Areas	Springs WTW
BULK / WSP	
A: Total Design Capacity (Ml/d)	6.5
B: % Operational Capacity in terms of design	76.9%
C1a: % Microbiological Compliance	68.4%
C1b: % Microbiological Monitoring Compliance	36.1%
C2a: % Chemical Compliance	97.6%
C2b: % Chemical Monitoring Compliance	67.7%
D: % Technical Skills	54.2%
E: % Water Safety Plan Status	18.2%
%BDRR/BDRR max	56%

WSA Overview

Nine drinking water supply systems under Nelson Mandela Bay MM were assessed and eight supply systems achieved low-risk ratings with only the Springs supply system achieving a medium-risk rating. With the exception of Nooitgedacht system, all other supply systems are operating within the design capacities. Therefore, only Nooigedacht, may be at risk of not meeting current and future demands as it is operating above 100% of the design capacity.

Acceptable to excellent microbiological and chemical monitoring compliance was achieved for six of the seven supply systems indicating that the water supplied from these systems may be suitable for domestic use. Although the Springs system achieved good chemical compliance, unacceptable microbiological compliance still presents health risks to the consumers. On monitoring programmes, although some programmes are adequately aligned to SANS 241: 2015 requirements, most still require to be aligned to the requirements to achieve greater than 80% compliance.

Under criteria D, only Churchill and Groendal achieved excellent scores indicating adequate alignment to regulations requirements. Although the remainder of the systems have staff in place, alignment to the regulations requirements is inadequate and this resulted in lower scores for these systems and has a potential to impact on water supply to consumers due to poor operation and maintenance practices associated with inadequate alignment of staff to the requirements.

Water Safety Plans are available for all supply systems in the municipality. However poor alignment of the Water Safety Plans to SANS 241: 2015 and WHO guidelines has resulted in low scores achieved under this criterion.

The WSA is encouraged to implement the following measure in order to maintain low-risk rating and improve on the medium-risk rating:

- ✓ A and B: Planning and budgeting to address capacity exceedance at Nooitgedacht WTW, operating above 100% of the design capacity.
- ✓ Development and implementation of corrective measures for microbiological and chemical failures, especially for Springs which achieved poor microbiological compliance. Effectiveness of such measures should also be reviewed.
- ✓ Alignment of microbiological and chemical monitoring programmes to SANS241 requirements which includes sampling points, frequencies and coverage.
- ✓ Training of existing staff and appointment of new staff to ensure adequate compliance to the set criteria.
- ✓ Reviewal and adoption of Water Safety Plans to align with SANS 241: 2015 and WHO guidelines which include risk assessment, risk-based monitoring, raw & final water full SANS analysis and implementation of corrective measures.

O.R. Tambo District Municipality

Municipal BDRR Score: 52.6%

Assessment Areas	Coffee Bay WTW	Corana WTW	Flagstaff WTW	Ingquza Hill LM - BH
BULK / WSP				
A: Total Design Capacity (Ml/d)	3	3.5	0.01	N/I
B: % Operational Capacity in terms of design	26.7%	20%	N/I	N/I
C1a: % Microbiological Compliance	28.9%	100%	42.9%	100%
C1b: % Microbiological Monitoring Compliance	66.7%	8.3%	29.2%	4.2%
C2a: % Chemical Compliance	90.7%	96.9%	94.7%	92.6%
C2b: % Chemical Monitoring Compliance	55.9%	52.9%	52.9%	50%
D: % Technical Skills	0%	75%	37.5%	0%
E: % Water Safety Plan Status	9.1%	9.1%	0%	0%
%BDRR/BDRR max	48.8%	21.5%	80.4%	60.5%

Assessment Areas	KSD LM - BH	Lusikisiki WTW	Lutsheko WTW	Mdlankala WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	2.8	N/I	2.2
B: % Operational Capacity in terms of design	N/I	33.2%	N/I	25%
C1a: % Microbiological Compliance	69%	43.8%	25%	89.5%
C1b: % Microbiological Monitoring Compliance	100%	76%	9.5%	52.8%
C2a: % Chemical Compliance	95.7%	91.2%	83.9%	93.1%
C2b: % Chemical Monitoring Compliance	52.9%	55.9%	55.9%	55.9%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	9.1%	N/A	9.1%
%BDRR/BDRR max	62%	48.8%	92.3%	48.8%

Assessment Areas	Mhlahlane WTW	Mhlanga WTW	Mhlontlo LM - BH	Mqanduli WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	2%	N/I	1
B: % Operational Capacity in terms of design	N/I	41%	N/I	65%
C1a: % Microbiological Compliance	69.2%	70.8%	73.2%	39.4%
C1b: % Microbiological Monitoring Compliance	82.4%	46.2%	83.3%	87.5%
C2a: % Chemical Compliance	93.4%	92.4%	91.1%	87.9%
C2b: % Chemical Monitoring Compliance	55.9%	55.9%	52.9%	55.9%
D: % Technical Skills	37.5%	37.5%	0%	0%
E: % Water Safety Plan Status	9.1%	9.1%	0%	9.1%
%BDRR/BDRR max	41.6%	60.5%	65.4%	41.1%

Assessment Areas	Mvumelwano WTW	Ngqeleni WTW	Nyandeni LM - BH	Port St Johns WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	2.4	0.4	N/I	2.5
B: % Operational Capacity in terms of design	27.1%	100%	N/I	95.6%
C1a: % Microbiological Compliance	70%	28.9%	77.4%	62.2%
C1b: % Microbiological Monitoring Compliance	47.6%	91.7%	79.2%	50%
C2a: % Chemical Compliance	91.6%	85%	95.2%	91.6%
C2b: % Chemical Monitoring Compliance	55.9%	55.9%	52.9%	52.9%
D: % Technical Skills	37.5%	37.5%	0%	0%
E: % Water Safety Plan Status	9.1%	9.1%	0%	9.1%
%BDRR/BDRR max	58.7%	37.2%	70.9%	54.24

Assessment Areas	PSJ LM - BH	Sidwadweni WTW	Thornhill WTW	Tsolo WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	1.8	60	1.4
B: % Operational Capacity in terms of design	N/I	86.7%	88.3%	45%
C1a: % Microbiological Compliance	0%	88.6%	87.8%	83.9%
C1b: % Microbiological Monitoring Compliance	0%	45.8%	54.5%	87.5%
C2a: % Chemical Compliance	0%	97.6%	94.5%	90.1%
C2b: % Chemical Monitoring Compliance	0%	55.9%	52.9%	55.9%
D: % Technical Skills	0%	37.5%	75%	37.5%
E: % Water Safety Plan Status	0%	9.1%	9.1%	9.1%
%BDRR/BDRR max	100.00	56.14	52.50	35.46

Assessment Areas	Umzimvubu WTW	Upper Chulunca WTW
BULK / WSP		
A: Total Design Capacity (Ml/d)	4	2.5
B: % Operational Capacity in terms of design	59.8%	46%
C1a: % Microbiological Compliance	69.8%	85.7%
C1b: % Microbiological Monitoring Compliance	58.3%	32.4%
C2a: % Chemical Compliance	91.6%	94.7%
C2b: % Chemical Monitoring Compliance	55.9%	55.9%
D: % Technical Skills	37.5%	75%
E: % Water Safety Plan Status	9.1%	9.1%
%BDRR/BDRR max	52.7%	54.9%

WSA Overview

Twenty-two drinking water supply systems under OR Tambo DM were assessed. Coffee Bay, Corana, Lusikisiki, Mdlankala, Mhlahlane, Mqanduli, Ngqeleni and Tsolo supply systems are in the low-risk rating category. Ingquza Hill LM BH, KSD LM -BH, Mhlanga, Mhlontlo LM-

BH, Mvumelwano, Port St Johns, Sidwadweni, Thornhill, Umzimvubu and Upper Chulunca supply systems are in the medium-risk rating category. High-risk ratings were achieved for Flagstaff and Nyandeni LM -BH supply systems and critical-risk ratings for Lutsheko and PSJ LM-BH.

The are no WTW for all boreholes supply systems and this impacted on the scores under Criteria A, B and E. Ngqeleni and Port St Johns supply systems are operating above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements and no flow monitoring is taking place for the Flagstaff supply system.

With regards to drinking water quality management, inadequate microbiological and/or inadequate alignment of microbiological monitoring programmes to SANS 241: 2015 requirements has impacted on the scores under these criteria and also indicate that water supplied may present health risks associated with microbiological parameters to the consumers. This should be addressed urgently. Most supply systems also achieved inadequate chemical compliance and this coupled with lack of SANS 241: 2015 aligned monitoring programmes means the water supplied may still carry health and aesthetic risks to the consumers.

Corana, Thornhill and Upper Chulunca systems achieved acceptable scores under technical skills as they have process controllers and supervisors that are aligned with the regulations requirements. However, maintenance teams are lacking for these systems. The remainder of the supply systems supervisors, process controllers and maintenance teams are not adequately aligned to the requirements. This presents a risk of poor operation and maintenance procedures which may in turn affect water supply to the customers. All supply systems also achieved low scores under criteria E indicating that a SANS 241: 2015 and WHO aligned Water Safety Planning process is not adopted and implemented for all supply systems.

The regulator urges the WSA to urgently implement the following measures to reduce risk ratings and ensure supply to safe drinking water to consumers:

- ✓ A and B: Linking and classification of WTW for supply systems where there are no linked plants or boreholes.
- ✓ A and B: Planning and budgeting to address capacity exceedance at Ngqeleni and Port St Johns WTW.
- ✓ C1a and C2a: Development and implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ C2b: Alignment of chemical monitoring programmes to SANS 241: 2015 requirements in terms of sampling points, number of samples and frequency of monitoring.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria. Existing staff can also be subjected to relevant training in order to meet the requirements.
- ✓ E: Adoption and implementation of Water Safety Plans inclusive of risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks as per SANS 241: 2015 and WHO guidelines.

Sundays River Valley Local Municipality

Municipal BDRR Score: 67.8%

Assessment Areas	Addo WTW	Enon / Bersheba WTW	Glenconnor Borehole	Kirkwood WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	7.78	N/I	N/I	5.13
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	92.3%	100%	83.3%	100%
C1b: % Microbiological Monitoring Compliance	20.8%	41.7%	0%	33.3%
C2a: % Chemical Compliance	76.4%	74.8%	60%	97.9%
C2b: % Chemical Monitoring Compliance	2.9%	2.9%	2.9%	2.9%
D: % Technical Skills	34.4%	25%	0%	25%
E: % Water Safety Plan Status	27.3%	27.3%	0%	27.3%
%BDRR/BDRR max	96.7%	45.4%	100%	40.1%

Assessment Areas	Kleinpoort Borehole	Paterson Boreholes
BULK / WSP		
A: Total Design Capacity (Ml/d)	N/I	8.28
B: % Operational Capacity in terms of design	N/I	N/I
C1a: % Microbiological Compliance	20%	100%
C1b: % Microbiological Monitoring Compliance	0%	25%
C2a: % Chemical Compliance	55.9%	92.1%
C2b: % Chemical Monitoring Compliance	2.9%	2.9%
D: % Technical Skills	0%	3.1%
E: % Water Safety Plan Status	0%	27.3%
%BDRR/BDRR max	100%	49.9%

WSA Overview

Sundays River Valley LM has three drinking water quality supply systems in their area of jurisdiction. Three systems (Enon / Bersheba, Kirkwood and Paterson Boreholes) achieved a low-risk rating while the other three systems (Addo, Glenconnor and Kleinpoort) achieved critical-risk ratings. No design capacity information was provided for Enon / Bersheba, Glenconnor and Kleinpoort, moreover, operational monitoring is not undertaken for all systems within the municipality indicating that planning and water demand management initiatives cannot be adequately implemented.

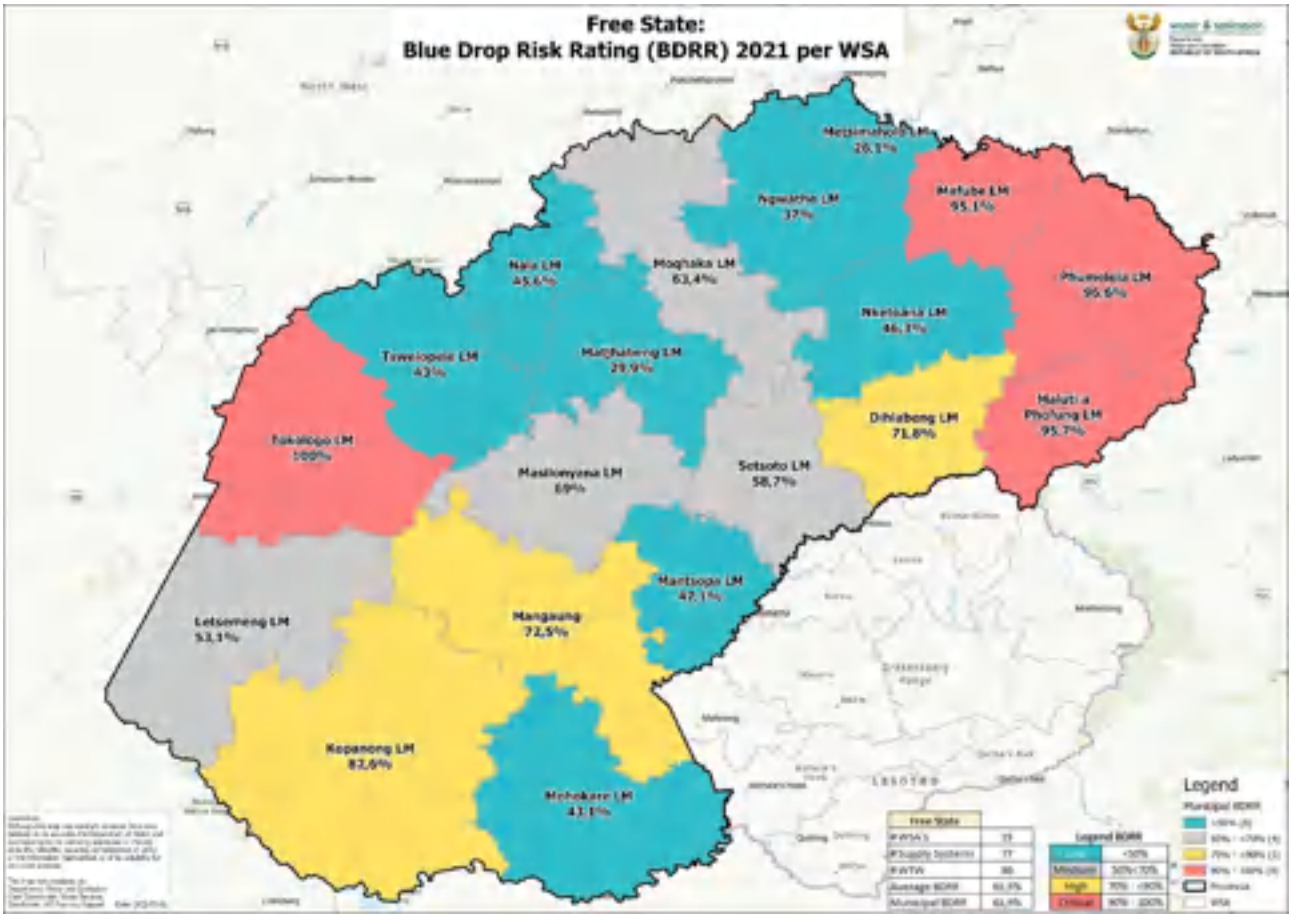
With regards to drinking water quality compliance, Enon / Bersheba, Kirkwood and Paterson Boreholes systems achieved excellent microbiological compliance, however, inadequate chemical compliance, coupled with insufficient alignment of microbiological and chemical monitoring programmes to SANS 241: 2015 requirements presents potential for health and chemical risks to the consumers. Addo, Glenconnor and Kleinpoort systems achieved poor microbiological compliance, this coupled with poor chemical monitoring and alignment of microbiological and chemical monitoring programmes to SANS 241: 2015 requirements means that the supplied water presents serious health and aesthetic risks to the consumers and should be urgently addressed.

Under criteria D, all supply systems achieved poor scores indicating that supervisors, process controllers and maintenance teams are not adequately aligned to the regulations requirements. This may impact operation of the WTW and lead to water supply interruptions. Unavailability of SANS 241: 2015 and WHO aligned Water Safety Plans, full SANS 241: 2015 analysis for raw and final water and risk-based monitoring impacted on the performance under criteria E.

The WSA are urged to implement the following measure to ensure supply of safe drinking water to all consumers:

- ✓ A and B: Linking and classification of WTW for Enon / Bersheba, Glenconnor and Kleinpoort systems.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times. Monitoring programmes should also be aligned to SANS 241: 2015 requirements in terms of number of sampling points, frequency and coverage.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plans as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

CHAPTER 4: FREE STATE PROVINCE



PROVINCIAL BDRR TREND ANALYSIS

One of the outcomes of Incentive and Risk-based Regulation is the regular monitoring and reporting on the performance of the WSA to ensure strategic operational and management plans are constantly realigned to achieve compliance and effectively manage risks for provision of sustainable water services. For risk-based regulation, the movement in BDRR is a vital tool for both the Department and the WSA to monitor and track the levels of risk in the country. The 2021 BDRR will serve as a baseline for future BDRR assessments that will be used by DWS to monitor and manage drinking water supply systems to ensure delivery of safe drinking water to all communities.

BDRR is calculated and categorised as either low, medium, high and critical risk rating, calculated according to the following range of values to enable both WSA and DWS to monitor performance.

Table 1: BDRR categorisation

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

The BDRR formular is made up of five risk indicators with an overall BDRR for each supply system. The overall performance of each WSA is reported in two ways:

- ✓ Average % BDRR: average % BDRR for all supply systems per province.
- ✓ % Municipal (weighted) BDRR: The Municipal BDRR for each WSA is calculated by the proportional contribution of each water supply system based on design capacity of each system. This weighted average may provide skewed picture i.e. a supply system which receives a small fraction of the total flow from a larger treatment plant will carry a higher weighting compared to a system which received 100% from a smaller treatment plant.

Therefore the WSA must evaluate the individual % BDRR scores of each system to determine the risk associated with provision of drinking water for each system and not use the % Municipal BDRR score to evaluate their performance. Regardless of the size of the systems, all consumers have a right to safe drinking water and the WSA must be wary of neglecting the management of smaller, rural schemes in favour of larger urban systems.

The % Municipal (weighted) BDRR for all WSA's in the province is provided at the end of each provincial chapter for reference.

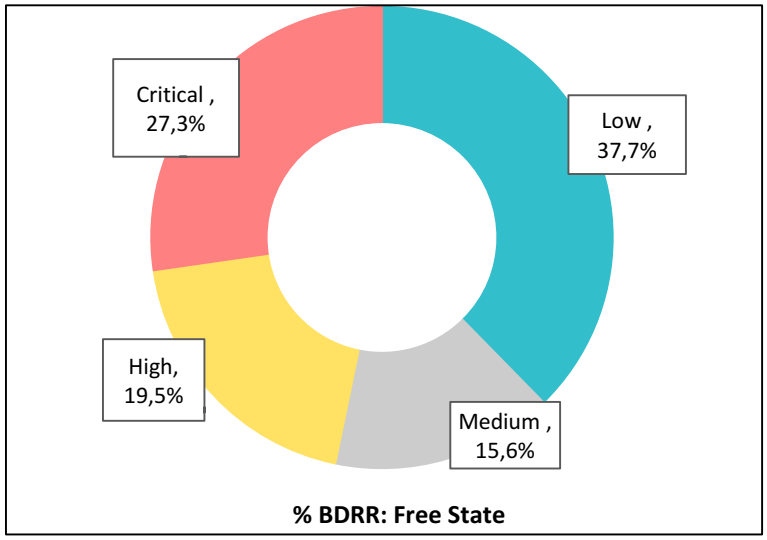
In 2021, 19 WSA's were assessed in Free State province with a total to 77 water supply systems. The assessment period for all Risk Indicators was July 2020 to June 2021 except for Risk Indicator C: Water Quality compliance where assessment period was January to December 2020.

The risk performance trends for Free State Province are summarised below to provide a provincial overview of BDRR.

Table 25: 2021 Risk Performance trends for Free State

Risk Rating	Average	Minimum	Maximum
% Municipal BDRR (Weighted Score)	61.9%	26.1%	100%
% BDRR	65.5%	24.9%	100%
A: Design Capacity (Ml/d)	13.5	0.11	360
C1a: % Microbiological Compliance	57.3%	0%	100%
C1b: % Microbiological Monitoring Compliance	43.9%	0%	100%
C2a: % Chemical Compliance	65.3%	0%	99.8%
C2b: % Chemical Monitoring Compliance	27.1%	0%	91.2%
D: % Technical Skills	53%	0%	100%
E: % Water Safety Plan Status	23.6%	0%	100%

The BDRR profile for Free State province is outlined in the figure below.



The results for Free State are summarised as follows:

- ✓ 37.7% of supply systems are in the low risk category,
- ✓ 15.6% are in the medium risk category,
- ✓ 19.5% are in the high risk category, and
- ✓ 27.3% are in the critical risk category.

Figure 27: BDRR profile for Free State

To use the 2021 BDRR score as a tool to implement strategic, targeted actions that will result in an improved risk rating and sustainable water services delivery, the individual components of the BDRR score must be critically evaluated by the WSA to understand the reason for the current risk rating and the desired risk category for delivery of safe drinking water.

The BDRR scorecards reports on the following system-specific risk indicators which ultimately feed into the BDRR score:

- ✓ Risk Indicator A: Design capacity,
- ✓ Risk Indicator B: Operational Capacity,
- ✓ Risk Indicator C: Water Quality Compliance,

- ✓ Risk Indicator D: Technical skills, and
- ✓ Risk Indicator E: Water Safety Plans.

The trends with regard to the risk rating of the individual indicator which make up the overall BDRR score is discussed below. This will provide insight on the risk status of each indicator and enable the WSA to implement targeted actions to reduce risk of specific risk indicators which are negatively impacting on the final BDRR score of the supply system.

Risk Indicator A: Design Capacity and Risk Indicator B: Operational Capacity

Criterion A represents the design capacity of the treatment plant.

Every water treatment plant must be classified with DWS as per Regulation 2834. The classification of the treatment plant is based on a number of components, including size, complexity and electrical consumption, as per set criteria. The plant classification certificate is available on IRIS and used to determine the risk rating for criterion A as it states the capacity of the plant.

The risk rating is allocated according to size of the treatment plant with higher risk rating given for a larger plant and lower risk rating for a smaller plant. The rationale is that a larger plant serves a larger community and therefore presents a higher risk if the plant is not functioning or producing unsafe drinking water than a smaller plant which serves less people. The risk rating for criteria A remains the same provided the capacity stays the same, and all plants which have the same design capacity range will have the same maximum BDRR.

Information from the IRIS system was collected to provide a profile of the design capacities of all treatment plants in the province. Some of the treatment plants are large regional bulk schemes which supply water to a number of supply systems in various municipalities and across provinces. The figure below reports on the design capacity of treatment plants located in the province in Ml/d.

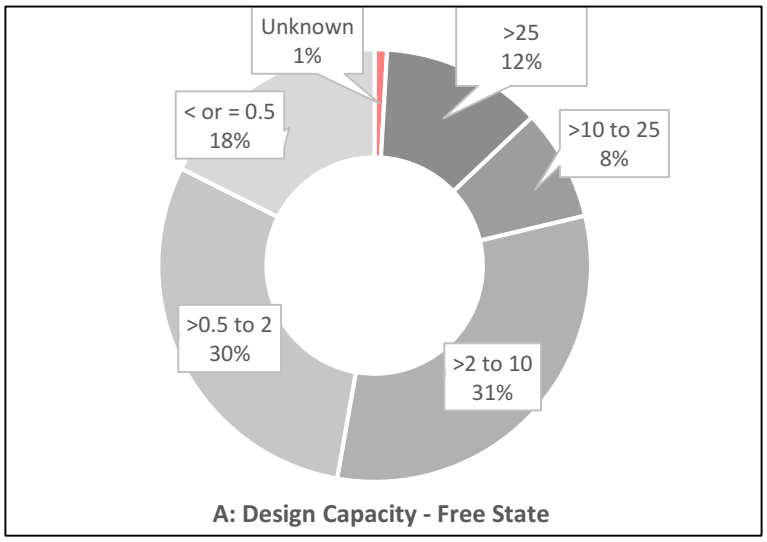


Figure 28: Profile of design capacity in Free State (Ml/d)

The results are summarised as follows:

- ✓ There are 86 water treatment plants situated in the Free State province with a combined capacity of 1443.8 Ml/d
- ✓ Reported population served = 3.67 million people,
- ✓ Average design capacity in province =13.5 Ml/d,
- ✓ Largest plant in province = 360 Ml/d,
- ✓ Smallest plant in province = 0.11 Ml/d,
- ✓ 18% of plant are <=0,5Ml/d, 30% are between 0.5 and 2 Ml/d, 31% are between 2 and 10 Ml/d, 8 % are between 10 and 25Ml/d and 12% are >25 Ml/d,
- ✓ 1% of plant have not provided design capacity.

In summary, the province has 48% of small plants (up to 2Ml/d) which can include rural borehole schemes. Medium sized plants (>2 – 25 Ml/d) make up 29% of systems with 12% of large plants (>25 Ml/d). Operation and management of large number of rural schemes present

challenges as these plants are usually located across a large geographical area with some plants in remote areas. This requires additional resources such as staff, chemical supplies, spares and vehicles to ensure optimal operations of these systems

With regards to **Risk Indicator B: Operational capacity**, daily production versus the design capacity of the treatment plant is an important indicator to determine if the plant can provide sufficient, safe drinking water to all the consumers now and in the near future. When the plant is operating above its design capacity, major unit processes are overloaded and cannot achieve their operational limits which leads to water quality failures.

Risk Indicator C indicates the current operational capacity of the treatment plant in each supply system as a percentage of the design capacity of the plant. The ideal value is between 50 – 100%; higher values indicate the plant is overloaded and lower values indicate the plant is receiving too little flow which may also compromise performance due to lack of retention time (flocculation, sedimentation). Once daily production approaches 90% of design capacity, the WSA must plan, budget and implement projects to increase the capacity of the treatment plant to ensure there is sufficient supply, not only for human consumption, but also for economic activities

Although operational capacity has been reported for all supply systems, there are a number of large regional plants which supply a large number of supply systems in various municipalities and across provincial borders. Analysis of Indicator B must therefore be conducted at plant level as collating operational capacity data at municipal or provincial level will not provide an accurate reflection of the current operational capacity of each individual plant.

There are a large number of plants which do not measure flow or have not reported flow meter data ("Unknown"). This presents a serious health risk as coagulant and disinfection dosage is based on flow and without this data there may be insufficient dosage to achieve drinking water quality standards.

WSAs are reminded that installation of flow meter and daily flow recording is a regulatory requirement as per their Water Use License.

Recommendations

- ✓ WSAs must ensure all treatment plants have updated plant registration certificates on IRIS.
- ✓ WSAs must provide updated copies of plant registration certificates supported with documents on the design capacity of treatment plant for future BDRR assessments.
- ✓ WSA to install flow meters at raw and final water points, monitor daily flows and ensure annual calibration of meters for accuracy of results.
- ✓ Budget and plan for upgrade of treatment plant when operational capacity is at 90% to ensure sufficient time for implementation of civil projects.
- ✓ Consult Census, WSDP and Reconciliation strategies to determine current and future allocation and demand, use a 10-year forecast period

Risk Indicator C: Water Quality Compliance

In South Africa, the SANS 241:2015 is the definitive reference on acceptable limits for drinking water quality parameters and provides limits for a range of water quality characteristics and water meeting this standard is deemed safe for lifetime consumption. The actual water quality depends on both microbiological and chemical determinands:

- ✓ Microbiological compliance reports on the actual compliance of the final water for the past 12 months against microbiological determinands E. Coli / Faecal Coliforms. The presence of these determinands in water is a strong indication of recent sewage or animal waste contamination and there is potential for contracting diseases from pathogens.
- ✓ Chemical quality is determined by a number of determinands which may be acute or chronic health determinands with specific health risks associated with each determinands. Acute health risks can result in death if the limit is exceeded, while chronic limits provide maximum limits that can be ingested over a period of time before health effects are observed.

Both microbiological and chemical compliance limits outlined in SANS 241:2015 is evaluated against the population size: for a population <100 000, compliance is >98% while for a population >100 000, the compliance limit is > 99%.

In addition, the SANS 241:2015 standard stipulates the frequency of sampling as well as the number of sample points required per supply system to ensure sufficient coverage of the network. The frequency and number of required sample points is dependent on the population size as outlined in Table 1 of SANS241: 2015 Monitoring compliance is therefore critical to guarantee the safety of the supply at all points in the network.

Indicator C: Water Quality Compliance reports on both water quality compliance and monitoring compliance as per SANS 241:2015 for both microbiological and chemical determinands. The formular to calculate C is made up of four sub-indicators with microbiological compliance carrying a higher weighting than chemical compliance as this presents a serious, acute health risk.

The formular for Indicator C, description and categorisation of each sub-indicator is presented in the table below. The categorisation is aligned with the risk rating for each sub-indicator and results are reported for all supply systems in the province. All supply systems which fall in the Low Risk category are regarded as compliant systems.

Table 10: Formular, description and categorisation for Criteria C

<table>
<tr><th colspan="4">C =[0.7(C1a x C1b)] + [0.3(C2a x C2b)]</th></tr>
<tr><td rowspan="2">Ca: Water Quality Compliance</td><td>C1a: Microbiological compliance as per SANS 241:2015.</td><td colspan="2" rowspan="2"><table><tr><th>High Risk</th><th>Medium Risk</th><th>Low Risk</th></tr><tr><td><95%</td><td>95% - <97%</td><td>97% - 100%</td></tr></table></td></tr>
<tr><td>C2a: Chemical compliance as per Blue Drop requirements</td></tr>
<tr><td rowspan="2">Cb: Monitoring Compliance</td><td>C1b: Micro monitoring compliance against registered programme, based on population size as per SANS 241:2015</td><td colspan="2" rowspan="2"><table><tr><th>High Risk</th><th>Medium Risk</th><th>Low Risk</th></tr><tr><td><50%</td><td>50% - 80%</td><td>>80%</td></tr></table></td></tr>
<tr><td>C2b: Chemical monitoring compliance calculated as per Blue Drop requirements</td></tr>
</table>

The Free State results for Indicator C and sub-indicators are presented in the table below. This is based on data for the period January to December 2020.

Table 26: Free State Province summary of results for Indicator C: Water Quality Compliance (Jan – Dec 2020)

Free State	Average Compliance	Minimum	Maximum	% Systems Which Comply (Low Risk)
C1a: Microbiological Quality	57.3%	0%	100%	37%
C2a: Chemical Quality	65.3%	0%	99.8%	19%
C1b: Microbiological Monitoring Compliance	43.9%	0%	100%	25%
C2b: Chemical Monitoring Compliance	27.1%	0%	91.2%	4%

The categorisation for microbiological and chemical compliance is illustrated below providing % of supply systems per category

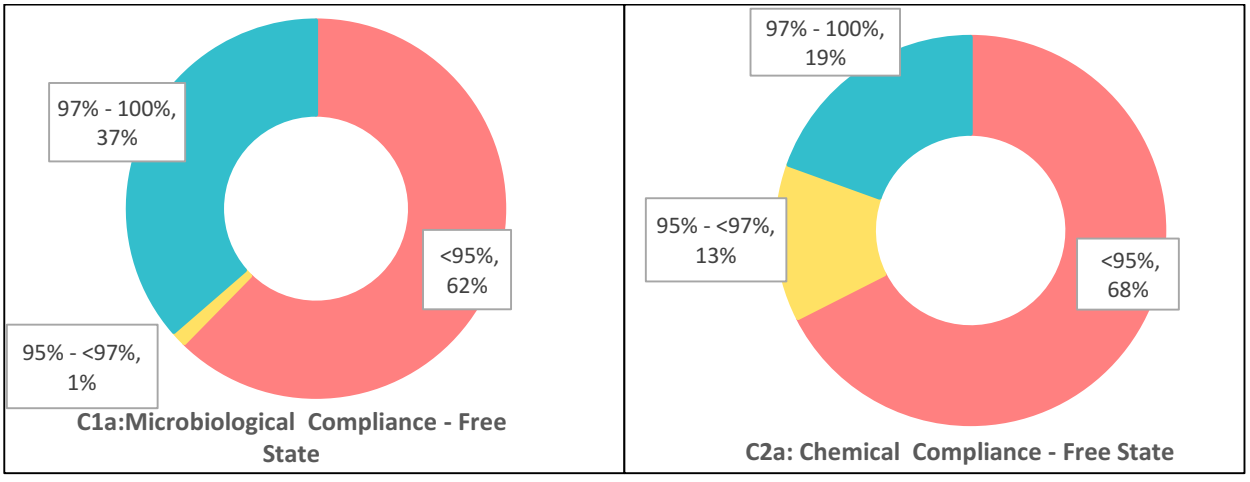


Figure 29: Microbiological and Chemical Compliance for Free State (Jan – Dec 2020)

The results are summarised as follows:

- ✓ Only 37% of systems achieved microbiological compliance and 19% achieved chemical compliance. This is of serious concern to DWS as the majority of supply systems present a potential health risk to consumers.

- ✓ 63% of systems do not comply with microbiological determinands: this indicates microbiological failures which presents a serious health risk to the consumers in these supply systems. For sustained failures, 'Boil Water' notices must be issued to safeguard consumers while the root cause of the failure is investigated and resolved.
- ✓ 81% of systems do not comply with chemical determinands. This may present immediate or potential long term health risks depending on whether non-compliance is for acute health determinands or chronic health determinands.
    - WSA must ensure compliance for all chemical-health determinands as per Blue Drop requirements which includes, NO3- and NO2- as N, SO42-, Sb, As, Cd, Cr, Co, Cu, CN-, Pb, Hg, Ni, Se, V, DOC or TOC, and Total THM.

The categorisation for microbiological and chemical monitoring compliance is illustrated below providing percentages of supply systems per category.

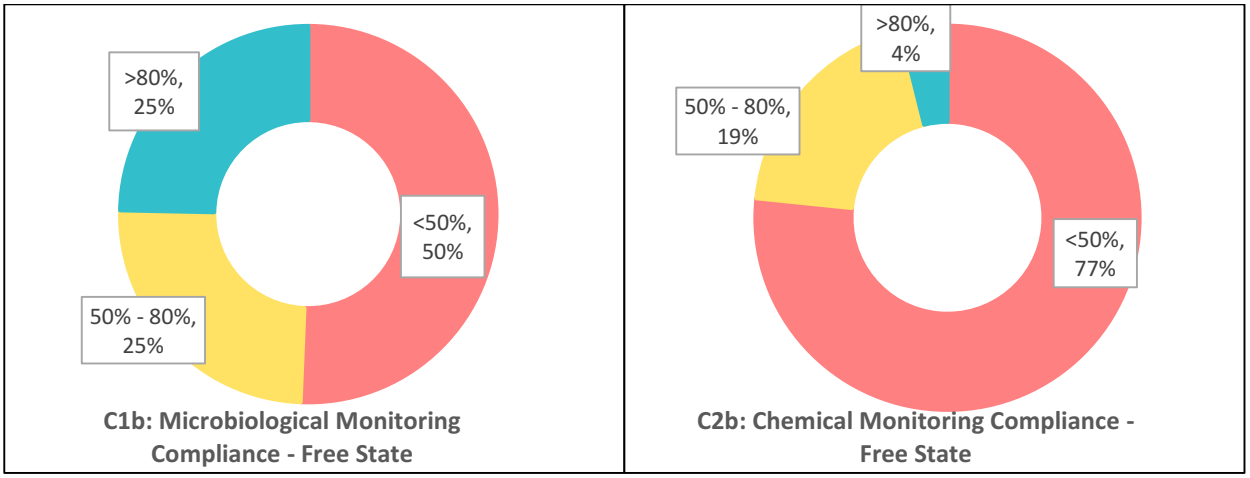


Figure 30: Microbiological and Chemical Monitoring Compliance for Free State (Jan – Dec 2020)

The results are summarised as follows:

- ✓ 25% of supply systems have sufficient microbiological samples based on population size as per SANS 241-2.
- ✓ 75% of supply systems have <80% for microbiological monitoring compliance. This indicates there is an insufficient number of microbiological samples to guarantee the safety of water at all points in the distribution system. These supply systems therefore do not comply with table 2 in SANS 241-2 which outlines required number of sample points based on population size.
- ✓ Only 4% of supply systems have sufficient chemical monitoring samples.
- ✓ 96% of supply systems have <80% for chemical monitoring compliance. This indicates either insufficient number of samples collected or insufficient chemical determinands were analysed as per the requirement outlined in SANS 241:2015.
    - Actual monitoring occurs according to registered IRIS monitoring programme (>80%),
    - Number of samples: One sample each at treatment plant final and one distribution point, both of which must be analysed for at least 80% of determinands listed (13 of the 17 determinands) i.e. at least 26 data points are required.

Recommendations

The poor water quality in the Free State is of concern to DWS.

All WSAs must urgently implement the following steps to ensure both microbiological and chemical compliance is improved so that all the citizens of South Africa can have access to safe drinking water, which is a basic human right enshrined under our Constitution:

- ✓ Develop and implement microbiological monitoring as per SANS 241:2015 requirements:
    - Monitor final water weekly.
    - Monitor distribution fortnightly
    - Ensure the number of sample points in the distribution network is based on population size as per Table 2 in SANS 241-2 given below

Table 18: Minimum number of samples for E.Coli (or Faecal Coliforms) in distribution network (Table 2 SANS 241-2: 2015)

Population served	Total number of samples per month[a]
<5000	2
5000-100 000	1 per 5000 head of population + 1 additional sample [b]
100 000 – 500 000	1 per 10 000 head of population + 11 additional sample [b]
≥500 000	1 per 20 000 head of population + 36 additional sample [b]
[a] During rainy season, sampling should be carried out more frequently to ensure that all spatial and temporal risks are identified. [b] see *WHO, Guidelines for drinking water quality*	

- ✓ Develop and implement risk-based chemical monitoring programme as per SANS 241:2015 requirements:
  - Conduct full SANS 241:2015 analysis annually on raw, final and distribution network to identify current problem determinands.
  - Conduct risk assessment of system including catchment, treatment plant and reticulation to identify current and potential water quality risks and their associated determinands. e.g. presence of pit latrines means possibility of nitrates in ground water and surface water.
  - Develop and implement risk-based chemical monitoring programme for all identified determinands.
    - Sample points are raw, final and critical distribution points depending on impact of determinands.
    - Frequency as per Table 3 in SANS 241- 2. i.e. acute health 1 = weekly, acute health 2 – monthly, chronic health = monthly, aesthetic = monthly,
    - Operational monitoring dependant on unit processes.
- ✓ In the event of non-compliance:
  - Precautionary measures including 'Boil Water' notices must be issued to consumers in systems with sustained microbiological failures.
  - 'Water Quality' Advisories must be issued to consumers in systems with sustained chemical failures for chronic health determinands.
  - WSAs must investigate the root cause of the failure and implement remedial actions to ensure compliance. If this cannot be achieved, an alternative water supply must be provided to ensure safety of consumers.
- ✓ Compliance monitoring to be undertaken by accredited laboratory
  - WSA to ensure that there is sufficient budget for compliance monitoring
  - Laboratory to comply with accreditation requirement as per Blue Drop: SANAS accredited, participation in proficiency testing with acceptable Z-Score, or Quality Assurance system.

Risk Indicator D: Technical Skills

Regulation 2834 states all plant personnel must be classified as per their qualifications and years of experience. This is conducted by DWS and plant personnel are provided with a classification certificate which reflects their current classification based on qualification and years of experience. Ongoing training is a requirement under the Regulation to allow for continuous learning that will enable process controller to improve their classification over time to achieve Class V that allows them to act as plant supervisor. The required number and classification of staff required at a treatment plant per shift is dependent of the classification of the plant and the number of shifts.

The Blue Drop requirements acknowledge excellence in water services provision. The Blue Drop requirements therefore outlines the number and classification of process controllers and supervisors required for each shift. The Blue Drop requirements make provision for sharing of supervisors: this reduces the burden of providing permanent staff for small, remote systems as a roaming supervisor can visit a number of facilities once or twice a week.

In addition, the Blue Drop requirements outline the requirements for plant maintenance team to ensure effective maintenance of water infrastructure for ongoing operations. The maintenance team must have variety of artisans with electrical, mechanical and civil expertise for effective asset management with assets reaching their expected useful lifespan. The Blue Drop requirements were used to evaluate Risk Indicator D: Technical Skills as per Table below.

Table 12: Blue Drop requirements to evaluate technical skills at treatment plants

Works Class	Class of Process Controller per shift	Class Of Process Controller for Supervision*	Operations And Maintenance Support Services Requirements*
E	Class I	Class V*	THESE PERSONNEL MUST BE AVAILABLE AT ALL TIMES BUT MAY BE IN-HOUSE OR OUTSOURCED - electrician - fitter - instrumentation technician
D	Class II	Class V*	
C	Class III	Class V*	
B	Class IV	Class V	
A	Class IV	Class V	

NB. Fluoridation – for any class works, minimum process controller classification should be class IV

**does not have to be at the works at all times but must be available at all times. If the Water Services Institution or owner of a waterwork has no person of this class employed on that work, a contractor / consultant with the required qualifications as prescribed in Schedule III in respect of that particular class of persons, shall be appointed to visit the work weekly.*

Risk Indicator D: Technical Skills is calculated from three separate components:

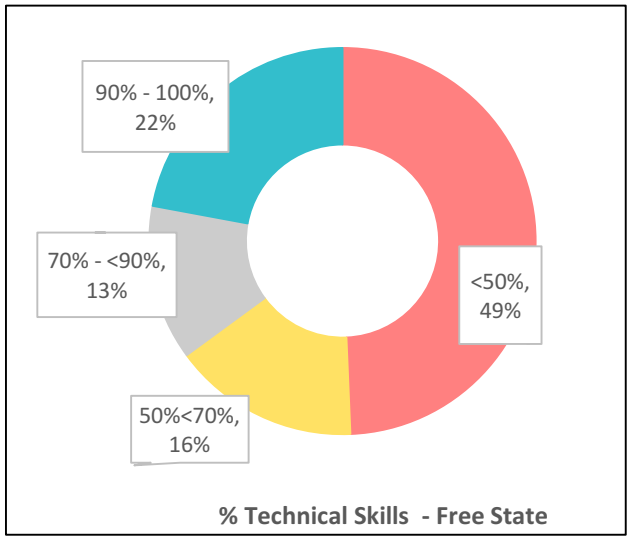
- ✓ Process controllers compliance as per Blue Drop requirements: required number and class of process controllers per shift for specific class of plant.
- ✓ Supervisor compliance as per Blue Drop requirements: Class V required, either at plant or available at all times.
    - Maintenance Team compliance as per Blue Drop requirements: civil, mechanical and electrical expertise required.
    - Civil team: plumbing qualification / trade test.
    - Mechanical team: millwright or similar mechanical qualification.
    - Electrical team: electrical qualification / trade test.

The Table and figures below provides a profile of the technical skills in Free State Province for July 2020 to June 2021

Table 27: Free State Province Summary of results for Indicator D: Technical Skills

Free State	Average	Minimum	Maximum
D: Technical Skills	53%	0%	100%
Process Controller Compliance	47.5%	0%	100%
Supervisor Compliance	71%	**0%**	100%

The provincial profile for Risk Indicator D: Technical skills is presented in the figure below.



The results are summarised as follows:

- 22% of supply system have excellent technical skills:90 - 100% compliance,
- 13% of supply systems have good technical skills: 70 - <90% compliance,
- 16% of supply systems have average technical skills: 50 - <70% compliance,
- 49% of supply systems have poor technical skills:<50% compliance.

Figure 31 Free State profile for Indicator D: Technical Skills

In general, the province has performed poorly with regards to technical skills.

The provincial profile for process controllers and supervisors compliance is outlined in the figures below.

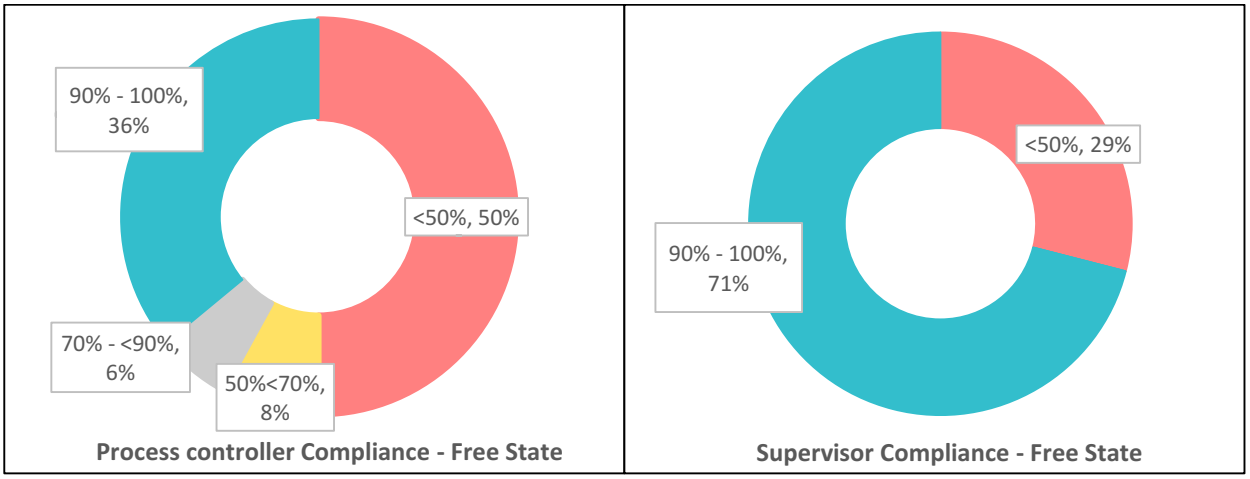


Figure 32: Process controller and Supervisor compliance for Free State

The results are summarised as follows:

- ✓ Process controller compliance is poor with only 36% of supply systems with sufficient number of suitably classified process controllers per shift. Lack of sufficient number of process controllers presents a serious risk due to lack of daily monitoring and process optimisation.
- ✓ 71% of supply systems are compliant with regards to Supervisors. These plants either have Class V supervisors permanently based at the plant or available as a roaming supervisor available at all times to assist process controllers. The presence of a qualified supervisor can mitigate some of the risks associated with insufficient number of process controllers on site provided the supervisor is available at all times.

The provincial profile for maintenance team as well as breakdown of maintenance team is outlined in the figures below.

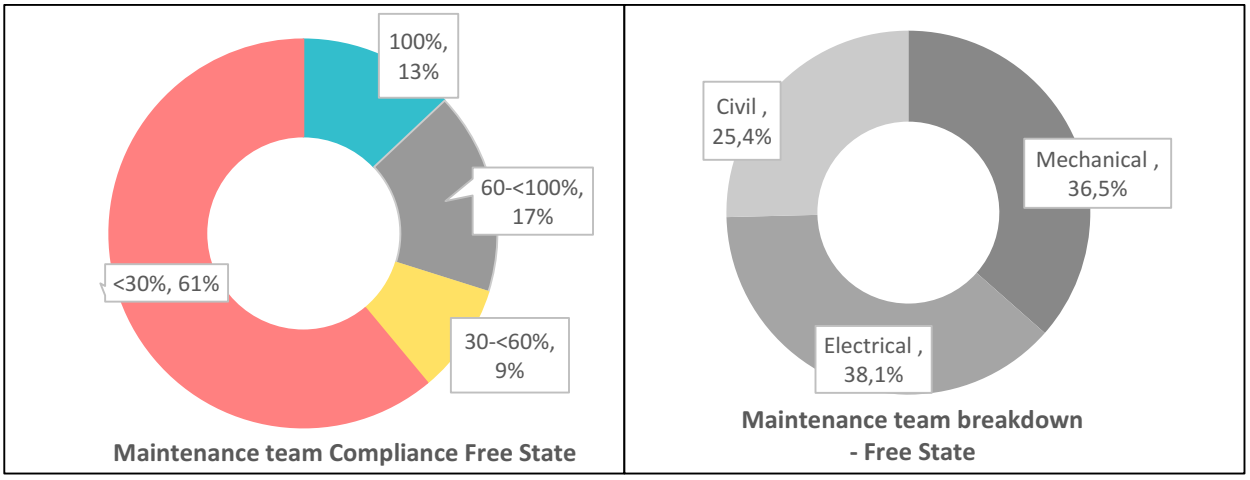


Figure 33: Maintenance team compliance and maintenance team breakdown for Free State

The results are summarised as follows:

- ✓ Only 13% of all supply systems have full maintenance teams in place i.e. civil, mechanical and electrical personnel. However, the remaining 87% have insufficient maintenance teams and this can lead to shutdown of treatment plant or processes which will affect quality and quantity of water.
- ✓ 38.1 % have Electrical staff, 36.5% have mechanical competency, and only 25.4% have civil staff. Civil works at treatment plants and in the distribution network is conducted by plumbers: lack to this skill will lead to water losses which will negatively impact on water supply.

The Free State has performed poorly with regards to technical skills. WSAs are encouraged to evaluate the performance of each system with regards to process control and use this information to determine the operational model which is best suited to ensure effective operations and maintenance.

WSA must allocate budget to appoint suitably qualified process controllers and supervisors to ensure water quality compliance improves through ongoing process optimisation. The WSA must appoint a qualified maintenance team to ensure that the life span of the treatment plant is increased by regular maintenance and ensure there are sufficient number of personnel to cover the entire distribution network to reduce water losses and maintain integrity of the supply system.

Recommendations

- ✓ Register all process controllers and supervisors on IRIS as per Regulation 2834.
- ✓ Ensure all process control staff complies with Blue Drop requirements.
- ✓ Ensure maintenance team includes civil, mechanical and electrical personnel.
- ✓ Provide details of operational staff at all future assessments: copies of process controller and supervisor registration certificates, organograms with shift patterns, copies of qualifications/certificates/current training.
- ✓ Provide details of maintenance team at all future assessments: organogram, shift patterns, names and qualifications of team, copies of qualifications/certificates/current training, details of external service providers.

Risk Indicator E: Water Safety Plans

Risk management is the cornerstone of risk-based regulation and a fundamental part of the SANS 241:2015 requirements to ensure effective management of both current and future potential risks. The application of risk management in drinking water management is through the Water Safety Plan developed by the WHO which is a comprehensive risk assessment and risk management approach that encompasses all steps in a drinking-water supply chain, from catchment to consumer to ensure continuous feedback and improvement to manage all current and future potential risks. The Water Safety Plan advocates for development of a risk-based monitoring program and this is also a requirement as per SANS 241:2015.

This risk indicator E: Water Safety Plans evaluates the following three critical components which are required for effective risk management as per the WHO guidelines and the SANS 241:2015 requirements.

- ✓ Completeness of the Water Safety Plans as per World Health Organisation Water Safety Planning Manual:
  - 1: Signature from Technical director/Municipal Manager
  - 2: Risk prioritisation method
  - 3: Risk assessment of catchment
  - 4: Risk assessment of plant
  - 5: Risk assessment of network
  - 6: Final risk rating
  - 7: Mitigating measures for all high and medium risks.
- ✓ Development and adoption of risk-based monitoring programme as per SANS 241:2015
  - 8: Full SANS 241:2015 analysis of raw and final water
  - 9: Identification of risk determinands
  - 10: Addition of risk determinands to monthly compliance monitoring as per SANS 241:2015
- ✓ Proof of implementation of the findings of the Water Safety Plans to ensure there is continuous risk management and movement towards overall lower risk rating:
  - 11: Proof that >25% of mitigating measures have been implemented – proof in form of purchase order, pictures, water quality results, tender document, etc.

This makes up 11 equal sub-elements that are evaluated during the BDPAT assessment to calculate the final risk rating for this indicator.

The Table and figures below provides a profile of Risk indicator E in Free State Province for July 2020 to June 2021.

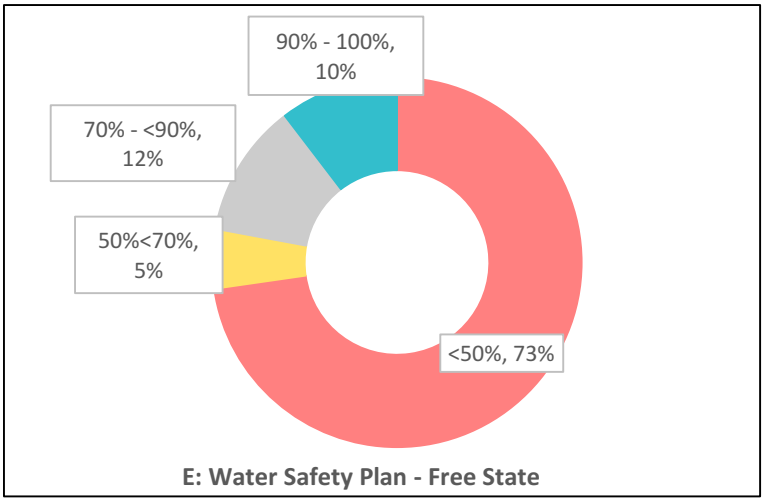


Figure 34:Free State Profile for Indicator E – Water Safety Plans

Table 28: Free State Province summary of results for Indicator E: Water Safety Plans

Free State	Value
E: Water Safety Plans - Average	23.6%
E: Water Safety Plans - Minimum	0%
E: Water Safety Plans - Maximum	100%
% Systems with Water Safety Plans	27%

The figure below provides details on the completeness of the Water Safety Plan by indicating the percentage of supply systems which comply with each of the 11 individual components which make up the Water Safety Plan. This is based on 27% of supply systems in the province with a Water Safety Plan in place.

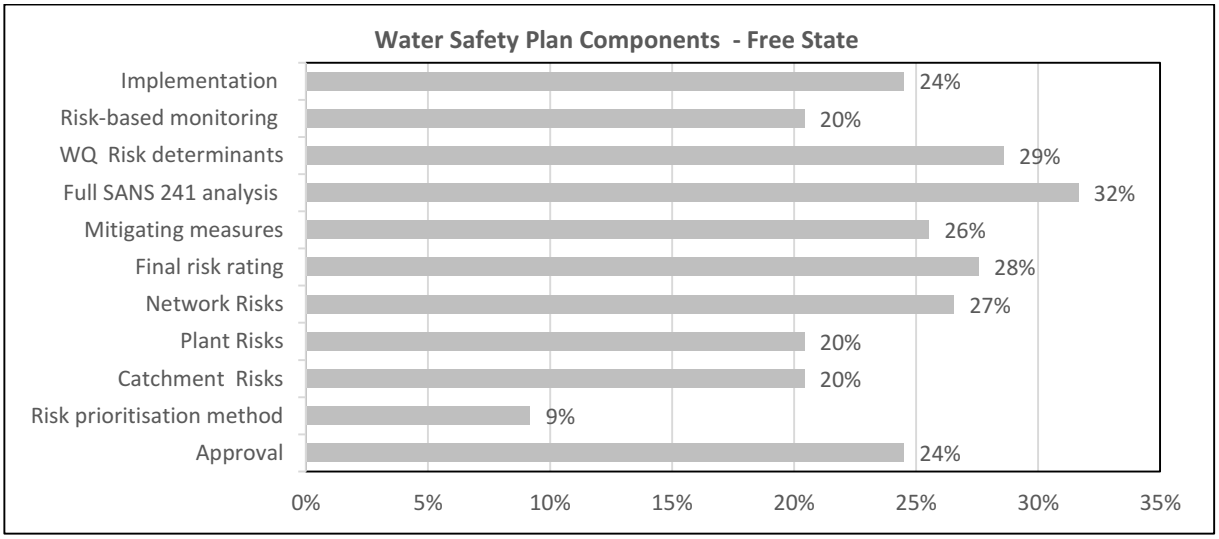


Figure 35: Water Safety Plan components for Free State

The results are summarised as follows:

- ✓ Only 27% of supply systems have Water Safety Plans in place. This presents a serious risk as effective risk-management is not taking place as per SANS 241:2015 requirements.
- ✓ Only 10% have excellent water safety plans in place with >=90% compliance indicating comprehensive Water Safety Plans with all required components.
- ✓ The average compliance for the province is 23.6% which indicates poor understanding of the Water Safety Planning process amongst the WSA's in this province.
- ✓ The quality and completeness of the Water Safety Plans is as follows:
  - 24% have approval indicating management's commitment to implementing the findings of the Water Safety Plan.
  - Completeness of the Water safety plan is average with around 20% for identification of risks in the network, only 9% have risk prioritisation method and this indicates poor understanding of the risk assessment process.
  - Development of risk-based monitoring is poor as full SANS 241:2015 only conducted on 32% with only 20% using this information to develop risk-based monitoring programme. Risk-based monitoring is a requirement of SANS 241:2015 and must be reviewed annually based on updated full SANS 241:2015 of raw and final water.

- Implementation of mitigating measures is low at only 24%. Although 24% of Water Safety Plans have been approved, there has been minimal implementation of findings. Management must ensure that when approval is given for a Water Safety Plan, this is supported by resources in the form of staff and budget to implement mitigating measures.

In summary, Water Safety Planning is being implemented in the province in only 27% of supply systems. The completeness and quality of these Water Safety Plans is below average with lack of risk-based monitoring and implementation of mitigating measures to reduce risks.

All WSAs must adopt risk management principles embodied in the Water Safety Planning approach as this is a regulatory requirement as per SANS 241:2015 and will assist in driving down risks in the entire supply system from catchment to consumer.

Recommendations

- ✓ Conduct full SANS 241:2015 analysis on raw, final, and distribution network to identify problem determinands.
- ✓ Develop and implement risk-based monitoring programme to include all current and potential determinands
- ✓ Register SANS 241:2015 compliant monitoring programme on IRIS.
- ✓ Conduct monitoring as per programme and upload information on a monthly basis.
- ✓ Develop WSP: conduct annual risk assessment of supply system, assign risk rating, validate control measures and determine residual remaining risk.
- ✓ Develop and implement action plan to mitigate remaining risk. Action plan to include budget, responsibility and timeframe for implementation. Note approval for implementation and budget must be given by senior management (municipal manager of WSA).
- ✓ WSA to provide copy of signed approved Water safety plan with proof of implementation of corrective actions from previous risk assessment; uploaded on IRIS.

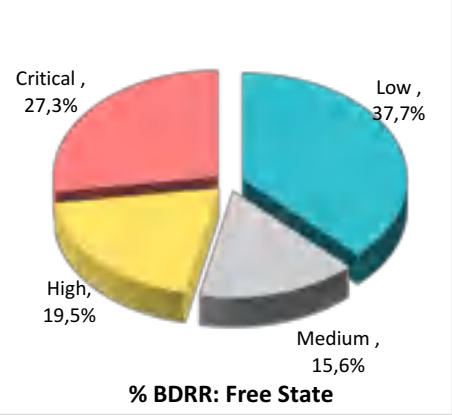
Summary

Overall performance for Free State is summarised as follows:

- ✓ 37.7% (29) of supply systems are in the low risk category,
- ✓ 15.6% (12) of supply systems are in the medium risk category,
- ✓ 19.5% (15) of supply systems are in the high risk category, and
- ✓ 27.3% (21) of supply systems are in the critical risk category

DWS is encouraged by the 37.7% of systems in the low risk category.

However, DWS is concerned about 46.8% of systems which are in high and critical risk categories.



The figure below shows the Average Municipal (weighted) BDRR score for all WSA's in the province.

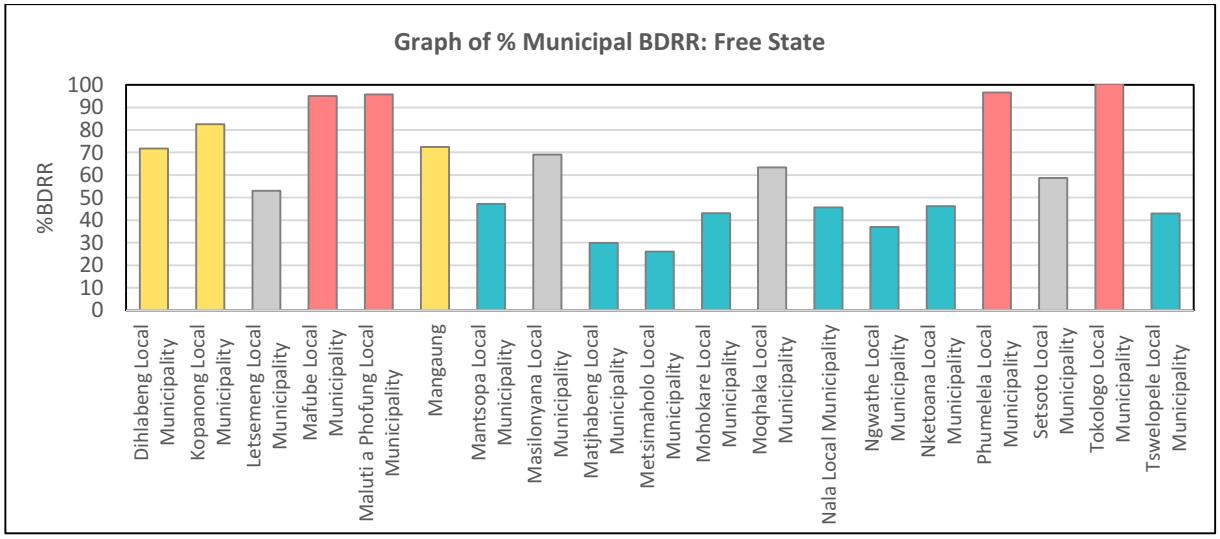


Figure 36: Graph of % Municipal (Weighted) BDRR for each WSA in Free State

The figure indicates four WSA's are in the critical risk category while three WSA's are in the high risk category based on % municipal BDRR. However, within the province there are 22 supply systems in the critical risk category and 15 supply systems in the high risk category.

DWS will evaluate risk based on the individual BDRR score for each supply system. Water supply systems which fall in the critical risk category are placed under regulatory focus. In such cases, a red note is assigned that requires the WSI to "...submit a detailed corrective action plan within 60 days of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvements as outlined in the Regulatory Comment. The plan will be considered against the Regulatory Comment and recommended for approval by a national regulation committee...." This note serves to initiate the Department's Enforcement Protocol.

Note Section 151 of the NWA and Section 63 of the Water Services Act in developing and submitting these plans as required:

- ✓ Section 63 of the Water Services Act enables the Minister in consultation with COGTA to request a relevant Province to intervene in terms of section 139 of the Constitution in local government. Such requests will be supported by the outcomes of this performance monitoring and WSIs responsiveness on regulatory responses raised.
- ✓ Section 151 of the NWA provides a number of non-compliances as criminal offences, amongst others using water otherwise than is permitted under the Act, failure to provide access to any books, accounts, documents or assets, unlawfully and intentionally or negligently commit any act or omission which affects or is likely to affect a water resource.

Other water supply systems which are in the high risk category will also be targeted for corrective action plans and municipalities are urged to initiate a process of addressing the regulatory comment as a matter of priority.

The WSA's must therefore review the individual BDRR score of each supply system, evaluate risk indicators which make up the total BDRR score and implement mitigating measures to improve compliance for poor performing risk indicators as outlined below:

- ✓ A: Design Capacity
  - WSA to report design capacity of treatment plant,
- ✓ B: Operational Capacity
  - WSA to install flow meters, record daily flow and implement upgrades when operational capacity is above 90%.
- ✓ C: Water Quality Compliance
  - WSA to develop and implement microbiological and chemical monitoring programmes as per requirements to verify the safety of the water at all points in the network.
  - In the event of failures, WSA must implement remedial action which include water quality advisories and process optimisation to improve compliance.
- ✓ D: Technical Skills
  - WSA to ensure there are sufficient number of qualified technical staff to undertake operations and maintenance of treatment plants and distribution networks.
- ✓ E: Water Safety Plans
  - WSA to develop and implement comprehensive Water Safety Plan as per WHO and SANS 241: 2015 requirements,
  - WSA to conduct water quality assessment as part of water safety planning process, identify risk determinands, and develop and implement risk-based monitoring programme to manage current and future potential risks.
  - Budget and resources to be made available to implement mitigating measures to reduce risk.

In conclusion, WSA's must review the performance of each supply system, interrogate individual risk indicators to identify areas of poor performance, and implement remedial actions to improve overall risk rating.

Below is a summary of performance in Free State for the following categories:

- ✓ List of % Average BDRR, % Municipal (Weighted) BDRR, and number of supply systems for all WSA's in the province.
- ✓ List of Low risk supply systems,
- ✓ List of Critical Risk supply systems which require immediate attention,
- ✓ Top 10 Performing supply systems,

Table 29: List of % Average BDRR, % Municipal BDRR, and number of supply systems for all WSA's in Free State

WSA	# Supply Systems	% Municipal BDRR	% Average BDRR per WSA
Dihlabeng Local Municipality	4	71.8	66.4
Kopanong Local Municipality	9	82.6	89.9
Letsemeng Local Municipality	5	53.1	48.7
Mafube Local Municipality	3	95.1	94.9
Maluti a Phofung Local Municipality	3	95.7	92.6
Mangaung Metropolitan Municipality	7	72.5	77.2
Mantsopa Local Municipality	5	47.1	53.5
Masilonyana Local Municipality	4	69.0	50.3
Matjhabeng Local Municipality	6	29.9	29.9
Metsimaholo Local Municipality	3	26.1	35.1
Mohokare Local Municipality	3	43.1	43.1
Moqhaka Local Municipality	3	63.4	54.2
Nala Local Municipality	1	45.6	45.6
Ngwathe Local Municipality	5	37.0	76.6
Nketoana Local Municipality	4	46.3	42.0
Phumelela Local Municipality	3	96.6	96.2
Setsoto Local Municipality	4	58.7	76.8
Tokologo Local Municipality	3	100	99.1
Tswelopele Local Municipality	2	43.0	44.7
Average		**61.9**	**64.0**
Maximum		**100**	**100.0**
Minimum		**26.1**	**29.9**

Table 30: List of Low Risk supply systems in Free State

Free State: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Dihlabeng Local Municipality	Clarens Water Supply System	47.1
Letsemeng Local Municipality	Jacobsdal WTW	46.3
	Luckhoff	46.7
	Petrusburg	31.6
Mantsopa Local Municipality	Ladybrand Water Supply System	43.1
	Tweespruit Water Supply System	43.0
Masilonyana Local Municipality	Brandfort Supply System	42.8
Masilonyana Local Municipality	Verkeerdevlei Supply System	24.9
Masilonyana Local Municipality	Winburg Supply System	46.7
Matjhabeng Local Municipality	Allanridge Water Supply System	29.7
	Hennenman Water Supply System	30.5
	Odendaalsrus Water Supply System	28.8
	Ventersburg Water Supply System	28.3
	Virginia Water Supply System	28.8
	Welkom Water Supply System	33.5
Metsimaholo Local Municipality	Deneysville	40.2
	Oranjeville	39.0
	Sasolburg	26.0
Mohokare Local Municipality	Rouxville Conventional Water Treatment Plant	39.0

Free State: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
	Smithfield Conventional Water Treatment Plant	37.8
Moqhaka Local Municipality	Steynsrus	48.3
	Viljoenskroon	48.3
Nala Local Municipality	Balkfontein (Sedibeng Water)	45.6
Ngwathe Local Municipality	Heilbron (WSA)	36.7
Nketoana Local Municipality	Arlington	29.6
	Lindley	37.3
	Reitz	48.5
Setsoto Local Municipality	Ficksburg (Ficksburg WTW)	35.8
Tswelopele Local Municipality	Bultfontein Supply Zone	36.8

Table 31: List of Critical Risk supply systems in Free State

Free State: Critical Risk Supply systems		
WSA	**Supply System**	**%BDRR**
Kopanong Local Municipality	Edenburg Supply System (supplied by Bloem Water WSP)	100
Kopanong Local Municipality	Fauresmith Supply System (supplied by Bloem Water WSP)	91.6
Kopanong Local Municipality	Jagersfontein Supply System (supplied by Bloem Water WSP)	95.4
Kopanong Local Municipality	Philippolis Supply System (supplied by Bloem Water WSP)	94.2
Kopanong Local Municipality	Reddersburg Supply System (supplied by Bloem Water WSP)	100
Mafube Local Municipality	Frankfort	95.1
Mafube Local Municipality	Tweeling	94.6
Mafube Local Municipality	Villiers	95.1
Maluti a Phofung Local Municipality	Qwaqwa (Makwane WTW)	98.5
Maluti a Phofung Local Municipality	Tshiame (Dr Limpho Letsela WTW)	90.1
Mangaung Metropolitan Municipality	Botshabelo	93.8
Mangaung Metropolitan Municipality	Soutpan (Krugersdrift Dam)	97.2
Ngwathe Local Municipality	Edenville (Boreholes)	92
Phumelela Local Municipality	Memel Supply System	95.5
Phumelela Local Municipality	Vrede Supply System	96.3
Phumelela Local Municipality	Warden	97
Setsoto Local Municipality	Marquard (Marquard WTW)	95.9
Setsoto Local Municipality	Senekal (Cyferfontein and De Put WTW)	95.9
Tokologo Local Municipality	Boshof Water Supply System	97.2
Tokologo Local Municipality	Dealesville Water Supply System	97.2
Tokologo Local Municipality	Hertzogville Water Supply System	100

Table 32: List of top 10 performing systems in Free State

Top 10 Performing supply systems in Free State		
WSA	**Supply System**	**%BDRR**
Masilonyana Local Municipality	Verkeerdevlei Supply System	24.9
Metsimaholo Local Municipality	Sasolburg	26.0
Matjhabeng Local Municipality	Ventersburg Water Supply System	28.3
Matjhabeng Local Municipality	Odendaalsrus Water Supply System	28.8
Matjhabeng Local Municipality	Virginia Water Supply System	28.8
Nketoana Local Municipality	Arlington	29.6
Matjhabeng Local Municipality	Allanridge Water supply System	29.7
Matjhabeng Local Municipality	Hennenman Water Supply System	30.5
Letsemeng Local Municipality	Petrusburg	31.6
Matjhabeng Local Municipality	Welkom Water Supply System	33.5
Setsoto Local Municipality	Ficksburg (Ficksburg WTW)	35.8

Dihlabeng Local Municipality

Municipal BDRR Score: 71.8%

Assessment Areas	Bethlehem Water Supply System	Clarens Water Supply System	Fouriesburg Water Supply System	Rosendal Water Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	40	1	6.91	40
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	92.6%	61.5%	76%	21.1%
C1b: % Microbiological Monitoring Compliance	58.3%	100%	47.9%	66.7%
C2a: % Chemical Compliance	90.4%	83.9%	91.8%	60.8%
C2b: % Chemical Monitoring Compliance	73.5%	76.5%	76.5%	2.9%
D: % Technical Skills	75%	37.5%	37.5%	75%
E: % Water Safety Plan Status	9.1%	0%	0%	0%
%BDRR/BDRR max	67.8%	47.1%	74.7%	75.9%

WSA Overview

Dihlabeng LM is responsible for four drinking water supply systems. Clarens and Bethlehem achieved low and medium risk ratings respectively while Fouriesburg and Rosendal supply systems achieved high risk ratings. Unavailability of information on operational capacity has resulted in poor scores for all supply systems under Criteria B.

With regards to drinking water quality management, all supply systems achieved unacceptable Microbiological compliance and three of the four supply systems achieved poor Microbiological compliance. Therefore, the safety of water supplied cannot be guaranteed. Although the Regulator notes that acceptable Chemical Monitoring compliance was achieved for three supply systems (with the exception of Rosendal), the unacceptable Chemical compliance that was achieved for all supply systems remains a concern to the Regulator as it indicates potential health and aesthetic risks.

Under technical skills, Bethlehem and Rosendal process controllers and supervisor are aligned to regulations requirements while Clarens and Fouriesburg process controllers and supervisors are lacking in this regard. Furthermore, unavailability of maintenance team information for all supply systems also contributed negatively under this criterion.

The lack of a Water Safety Plan and associated risk-based monitoring programme including an annual full SANS 241: 2015 analysis has contributed to a high-risk rating for criteria E (Water Safety Plan Status) for all four systems.

The following recommendations should be implemented to ensure consistent supply of good quality water to the consumers:

- ✓ A and B: Installation and calibration of flow meters to monitor operational capacity at all WTW. Records of such should then be made available to the Regulator.
- ✓ C1a and C2a: Development and implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ C2a and C2b: Development and implementation of microbiological and chemical monitoring programme in line with SANS 241: 2015 requirements i.e. frequency, coverage and number of samples.
- ✓ D: Alignment of supervisors and process controllers to regulations requirements especially for Clarens and Fouriesburg. Maintenance teams for all supply systems should also be aligned to the set criteria.
- ✓ E: Adoption and implementation of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programme and implementation of mitigating measures to address all medium and high risks.

Kopanong Local Municipality

Municipal BDRR Score: 82.6%

Assessment Areas	Bethulie Supply System	Edenburg Supply System	Fauresmith Supply System	Gariep Water Supply System
BULK / WSP	Bloem Water	Bloem Water	Bloem Water	Bloem Water
A: Total Design Capacity (Ml/d)	12	N/I	0.63	2.80
B: % Operational Capacity in terms of design	16.3%	N/I	119%	40%
C1a: % Microbiological Compliance	60%	0%	60%	60%
C1b: % Microbiological Monitoring Compliance	55%	0%	51.3%	51.3%
C2a: % Chemical Compliance	59.7%	0%	59.4%	59.7%
C2b: % Chemical Monitoring Compliance	17.7%	0%	17.7%	17.7%
D: % Technical Skills	90.6%	0%	91.7%	100%
E: % Water Safety Plan Status	72.7%	0%	90.9%	63.6%
%BDRR/BDRR max	76%	100%	91.6%	78.7%

Assessment Areas	Jagersfontein Supply System	Philippolis Supply System	Reddersburg Supply System	Springfontein Supply System
BULK / WSP	Bloem Water	Bloem Water	Bloem Water	Bloem Water
A: Total Design Capacity (Ml/d)	2.12	1.62	N/I	0.43
B: % Operational Capacity in terms of design	61.3%	64.7%	N/I	97.7%
C1a: % Microbiological Compliance	60%	58.1%	0%	60%
C1b: % Microbiological Monitoring Compliance	55%	46.3%	0%	38.8%
C2a: % Chemical Compliance	59.8%	58%	0%	60%
C2b: % Chemical Monitoring Compliance	17.7%	17.7%	0%	17.7%
D: % Technical Skills	100%	94.4%	0%	100%
E: % Water Safety Plan Status	63.6%	81.8%	0%	45.5%
%BDRR/BDRR max	95.4%	94.2%	100%	88.8%

Assessment Areas	Trompsburg Supply System
BULK / WSP	Bloem Water
A: Total Design Capacity (Ml/d)	0.62
B: % Operational Capacity in terms of design	51.8%
C1a: % Microbiological Compliance	60%
C1b: % Microbiological Monitoring Compliance	53.8%
C2a: % Chemical Compliance	59.5%
C2b: % Chemical Monitoring Compliance	17.7%
D: % Technical Skills	100%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	84.7%

WSA Overview

Kopanong LM has nine drinking water supply systems and Bloem Water is the Water Services Provider for all supply systems. All supply systems are in the high and critical risk rating categories. Edenburg and Reddersburg WSS do not have any linked supply system on IRIS and this impacted negatively on Criteria A, B and E. This coupled with the lack of water quality monitoring and unavailability of information on the maintenance teams resulted in the supply systems achieving 100% risk rating (critical risk).

Fauresmith and Springfontein are operating above 90% of the design capacity, indicating insufficient treatment capacity to supply current and future requirements. The remainder of the systems with operation capacity information are operating well within capacity.

Under criteria C, all supply systems achieved poor Microbiological and Chemical compliance. This coupled with inadequate alignment of the monitoring programme to SANS 241: 2015 requirements means that the safety of water provided to the consumers cannot be guaranteed and the water supplied may present serious health risks to the consumers.

All supply systems except Edenburg and Reddersburg supply systems achieved excellent scores on technical skills, indicating that maintenance teams are aligned with the regulations requirements.

With regards to Water Safety Planning, Bethulie, Philippolis and Fauresmith water supply systems achieved good scores indicating implementation of Water Safety Plans and development of risk-based water quality monitoring programme as outlined in SANS 241: 2015 with room for improvement. Although Water Safety Plans are available for Springfontein, Gariep and Jagersfontein supply systems, inadequate scores were achieved and this indicated that there is a big room for improvements and implementation.

The following recommendations should be implemented to ensure consistent supply of good quality water to the consumers:

- ✓ A and B: Linking and classification of WTW for Edenburg and Reddersburg. Operational information should also be provided to the Regulator.
- ✓ A and B: Planning and budgeting to address capacity exceedance at all WTW, in particular Fauresmith WTW operating at 119% of design.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria, especially for Edenburg and Reddersburg supply systems.
- ✓ E: Review of Water Safety Plan to ensure alignment with SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Letsemeng Local Municipality

Municipal BDRR Score: 53.1%

Assessment Areas	Jacobsdal WTW	Koffiefontein	Luckhoff	Oppermangronde
BULK / WSP				
A: Total Design Capacity (Ml/d)	1.98	5.9	1.35	0.72
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	98.9%	87.9%	98.1%	88.4%
C1b: % Microbiological Monitoring Compliance	100%	91.7%	100%	91.7%
C2a: % Chemical Compliance	84.8%	87.7%	87.7%	90.7%
C2b: % Chemical Monitoring Compliance	26.5%	26.5%	26.5%	26.5%
D: % Technical Skills	46.9%	56.3%	37.5%	37.5%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	46.3%	60.9%	46.7%	57.9%

Assessment Areas	Petrusburg
BULK / WSP	
A: Total Design Capacity (Ml/d)	1.29
B: % Operational Capacity in terms of design	N/I
C1a: % Microbiological Compliance	100%
C1b: % Microbiological Monitoring Compliance	100%
C2a: % Chemical Compliance	96.1%
C2b: % Chemical Monitoring Compliance	29.4%
D: % Technical Skills	56.3%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	31.6%

WSA Overview

Letsemeng LM has five drinking water supply systems. Jacobsdal, Luckhoff and Petrusburg achieved low BDRR while Koffiefontein and Oppermangronde achieved medium BDRR. Lack of operational flow information and unavailability of SANS 241: 2015 and WHO aligned a Water Safety Planning process for all supply systems has negatively scores under criteria B and E respectively.

Three of the five supply systems achieved excellent Microbiological compliance. This coupled with excellent Microbiological Monitoring compliance is commended by the Regulator. Poor Microbiological compliance achieved from Koffiefontein and Oppermangronde means the safety of water supplied by these systems cannot be guaranteed. Only Petrusburg achieved acceptable Chemical compliance while the other four system's Chemical compliance was unacceptable. Furthermore, all systems achieved poor Chemical Monitoring compliance and this impacted on the scores achieved under this requirement.

Under criteria D, all systems achieved low scores as a result of inadequate alignment of staff (process controllers, supervisors and maintenance teams) to the regulations requirements.

There is no Water safety plan for this system.

The WSA is encouraged to implement the following measures in order to maintain the low-risk ratings and improve the medium-risk ratings for the applicable systems:

- ✓ A and B: Installation and calibration of flow meters to monitor operational capacity at all WTW. Records of such should then be made available to the Regulator.

- ✓ C1a and C2c: Development and implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ C2b: Alignment of chemical water quality monitoring programmes to SANS 241: 2015 requirements in terms of frequency, coverage and number of samples.
- ✓ D: Appointment of suitably qualified staff (process controllers and maintenance teams) to ensure compliance with regulations requirements. Existing staff can also be subjected to relevant training to ensure adequate compliance with the set criteria.
- ✓ E: Development and implementation of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Mafube Local Municipality

Municipal BDRR Score: 95.1%

Assessment Areas	Frankfort	Tweeling	Villiers
BULK / WSP			
A: Total Design Capacity (Ml/d)	14.4	2	5
B: % Operational Capacity in terms of design	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%
D: % Technical Skills	65.6%	56.3%	56.3%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	95.1%	94.6%	95.1%

WSA Overview

Mafube LM owns and operates three water supply systems all of which are in the critical-risk rating category. The municipality does not conduct flow monitoring at all three supply systems and this resulted in poor scores under criteria B.

All three supply systems under the municipality achieved poor scores under criteria C as Microbiological and Chemical water quality monitoring is not undertaken for all three supply systems. This presents a serious health risk to the consumers within the municipality's area of jurisdiction. Therefore, the Regulator has no confidence in the quality of water supplied by the municipality.

Alignment of staff (process controllers and maintenance teams) to the regulations requirements and a SANS 241: 2015 WHO aligned Water Safety Plan, inclusive of risk-based monitoring, are also lacking throughout all supply systems. These resulted in all systems achieving poor scores under criteria D and criteria E.

The Regulator is concerned about drinking water management at the municipality and urges the WSA to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity. Flow data should then be submitted to the Regulator.
- ✓ C: Develop and implement microbiological and chemical monitoring programmes in line with SANS 241: 2015 requirements i.e. frequency, coverage and number of samples. Subsequent water quality results should then be submitted to the Regulator.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Maluti-A-Phofung Local Municipality

Municipal BDRR Score: 95.7%

Assessment Areas	Harrismith (Wilge WTW)	Qwaqwa (Makwane WTW)	Tshiame (Dr Limpho Letsela WTW)
BULK / WSP		Maluti-A-Phofung Local Municipality	
A: Total Design Capacity (Ml/d)	11.2	46	10
B: % Operational Capacity in terms of design	116.1%	19.6%	112%
C1a: % Microbiological Compliance	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%
D: % Technical Skills	45.8%	55.8%	45.8%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	89.3%	98.5%	90.1%

WSA Overview

Maluti-A-Phufong LM has three drinking water supply systems. Harrismith supply system achieved a high-risk rating while Qwaqwa-Makwane and Tshiame supply systems achieved critical-risk ratings. Operational flow information was provided for all systems. Harrismith and Tshiame are operating above capacity indicating insufficient treatment capacity to supply current and future requirements.

The WSA did not conduct drinking water quality monitoring at all of their supply systems. This present a serious health risk to the consumers receiving water from these systems as the safety of water cannot be confirmed. Therefore, the Regulator is concerned by the quality of water supplied by the WSA.

Process controllers, supervisors and maintenance teams are not adequately aligned to the regulations requirements. This has a serious impact on the operation and maintenance of the supply systems and ultimately impacts on service delivery.

Furthermore, all systems achieved 0% on Water Safety Planning, indicating that SANS 241: 2015 aligned Water Safety Plans inclusive or risk assessment and risk-based monitoring is not available for all systems.

The Regulator is concerned about drinking water management at the municipality and urges the WSA and WSP to implement the following recommendations to ensure delivery of safety drinking water to the consumers:

- ✓ A and B: Planning and budgeting to address capacity exceedance at Harrismith and Tshiame WTW which are operating at above 100% of the design capacity.
- ✓ C: Development and implementation of SANS 241: 2015 aligned drinking water quality monitoring programmes and submission of subsequent results to the Regulator.
- ✓ D: Appointment of suitably qualified staff (process controllers, supervisors, maintenance teams) as per regulation requirements. Existing process controllers should be subjected to relevant training to improve their classification.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Mangaung Metropolitan Municipality

Municipal BDRR Score: 72.5%

Assessment Areas	Bloemfontein	Botshabelo	FS164: Dewetsdorp Supply System (Bloem Water)	FS164: Vanstadensrus WTW
BULK / WSP	Bloem Water	Bloem Water	Bloem Water	
A: Total Design Capacity (Ml/d)	282	100.5	145	0.3
B: % Operational Capacity in terms of design	N/I	N/I	84.5%	N/I
C1a: % Microbiological Compliance	98.9%	58.1%	59.9%	0%
C1b: % Microbiological Monitoring Compliance	59.8%	26.5%	57.7%	0%
C2a: % Chemical Compliance	95.8%	98.9%	96.7%	98.6%
C2b: % Chemical Monitoring Compliance	38.8%	38.8%	20%	35.3%
D: % Technical Skills	80.3%	74.6%	100%	12.5%
E: % Water Safety Plan Status	0%	0%	63.6%	0%
%BDRR/BDRR max	69.6%	93.8%	69.4%	74.4%

Assessment Areas	FS164: Wepener Supply System (Bloem Water)	Soutpan (Krugersdrift Dam)	Thaba Nchu
BULK / WSP	Bloem Water		Bloem Water
A: Total Design Capacity (Ml/d)	145	1	118.5
B: % Operational Capacity in terms of design	84.5%	N/I	N/I
C1a: % Microbiological Compliance	59.9%	0%	98.4%
C1b: % Microbiological Monitoring Compliance	57.7%	0%	29.7%
C2a: % Chemical Compliance	95.4%	66.4%	97.9%
C2b: % Chemical Monitoring Compliance	20%	5.9%	38.8%
D: % Technical Skills	100%	0%	74.7%
E: % Water Safety Plan Status	54.6%	0%	28.8%
%BDRR/BDRR max	80.2%	97.2%	55.8%

WSA Overview

Mangaung MM has seven drinking water supply systems in their area of jurisdiction. For five (Bloemfontein, Dewetsdorp, Wepener, Botshabelo and Thaba Nchu) of the seven supply systems, Bloem Water is the Water Services provider to the municipality. Bloemfontein, Dewetsdorp and Thaba Nchu supply systems achieved medium BDRR while Vanstadensrus and Wepener achieved high-risk ratings and Botshabelo and Soutpan are in the critical-risk rating category.

Under operational capacity, only Dewetsdorp and Wepener have operational flow data while the remainder of the systems do not have information in this regard. Unavailability of operational information may impact on planning and implementation of water conservation and demand management and therefore requires attention.

Only Bloemfontein and Thaba Nchu supply systems achieved excellent Microbiological compliance. However, inadequate alignment of the Microbiological Monitoring programme to SANS 241: 2015 means that the safety of water supplied from these systems cannot be guaranteed. Poor Microbiological compliance coupled with inadequate Microbiological Monitoring compliance from the remaining systems also means that the safety of water supplied cannot be guaranteed and therefore presents a serious health risk to the consumers.

Under Chemical compliance, all supply systems but Soutpan achieved acceptable to excellent compliance. However, poor Chemical Monitoring compliance also impact on the suitability of the water supplied for domestic use.

Vanstadensrus and Soutpan supply systems achieved scores of less than 50% on technical skills, with the remainder of the systems achieving acceptable to excellent compliance. Poor alignment of staff to the regulations requirements has a direct impact on the operation of the WTW and should be addressed.

With regards to Water Safety Planning, some systems do not have a water safety plan and others have performed poorly against the requirements for a comprehensive water safety plant as per SANS 241: 2015 and WHO requirements.

Therefore, the Regulator urges the WSA and WSP to implement the following recommendation in order to improve their risk rating and ensure supply of safe drinking water to the community:

- ✓ A and B: Installation and calibration of flow meters to monitor operational capacity at all water treatment works where flow monitoring is lacking. Records of such should then be made available to the Regulator.
- ✓ C1a and C2a: Development and implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ C1b and C2b: Alignment of microbiological and chemical water quality monitoring programmes to SANS 241: 2015 requirements in terms of frequency, coverage and number of samples.
- ✓ D: Appointment of suitably qualified staff process controllers and maintenance teams to ensure compliance with the regulations requirements. Existing staff can also be subjected to relevant training to ensure adequate compliance with the set criteria.
- ✓ E: Development and implementation of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Mantsopa Local Municipality

Municipal BDRR Score: 47.1%

Assessment Areas	Excelsior Water Supply System	Hobhouse Water Supply System	Ladybrand Water Supply System	Thaba Phatchoa Water Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.72	1.64	10.8	0.6
B: % Operational Capacity in terms of design	100%	38.4%	100%	100%
C1a: % Microbiological Compliance	95.2%	62.5%	100%	94.7%
C1b: % Microbiological Monitoring Compliance	41.7%	41.7%	57.1%	50%
C2a: % Chemical Compliance	94.6%	88.9%	78.3%	89.9%
C2b: % Chemical Monitoring Compliance	14.7%	17.7%	17.7%	17.7%
D: % Technical Skills	37.5%	37.5%	46.9%	37.5%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	53.5%	70.9%	43.1%	56.9%

Assessment Areas	Tweespruit Water Supply System
BULK / WSP	
A: Total Design Capacity (Ml/d)	1.4
B: % Operational Capacity in terms of design	100%
C1a: % Microbiological Compliance	97.2%
C1b: % Microbiological Monitoring Compliance	50%
C2a: % Chemical Compliance	83.7%
C2b: % Chemical Monitoring Compliance	17.7%
D: % Technical Skills	37.5%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	42.9%

WSA Overview

There are four supply systems under Mantsopa LM. Ladybrand and Tweespruit achieved low-risk ratings while Excelsior and Thaba Phatchoa achieved medium-risk ratings and Hobhouse being the only system in the high-risk rating category. On operational capacity, only Hobhouse supply system is operating within capacity while the remaining four system are operating at 100% of the design capacity. This indicates insufficient treatment capacity to supply current and future demands.

Although four of the five (with the exception Hobhouse) supply systems achieved acceptable to excellent Microbiological compliance, inadequate alignment of the Microbiological Monitoring programme to SANS 241: 2015 requirements mean the safety of water provided cannot be guaranteed. Only Excelsior supply system achieved acceptable Chemical compliance while the remaining four systems achieved poor compliance. This coupled with poor Chemical Monitoring compliance achieved for all systems, further reduces the confidence in the quality of water supplied.

For all water supply systems staff compliment i.e. process controllers, supervisors and maintenance teams are not adequately aligned to the regulations requirements and there is no Water Safety Plan as per SANS 241: 2015 and WHO requirements. These have impacted the scores under criteria D and E respectively.

The Regulator urges the WSA to implement the following recommendations to ensure supply of safe drinking water to the consumers:

- ✓ A and B: Planning and budgeting to address capacity exceedance at Excelsior, Ladybrand, Thaba Phatchoa and Tweespruit WTW.

- ✓ C1a and C2a: Alignment of microbiological and chemical water quality monitoring programmes to SANS 241: 2015 requirements in terms of frequency, coverage and number of samples.
- ✓ C1b and C2b: Development and implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ D: Appointment of suitably qualified staff i.e. process controllers and maintenance teams to ensure compliance with the regulations requirements. Existing staff can also be subjected to relevant training to ensure adequate compliance with the set criteria
- ✓ E: Development and implementation of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Masilonyana Local Municipality

Municipal BDRR Score: 69%

Assessment Areas	Brandfort Supply System	Theunissen Supply System	Verkeerdevlei Supply System	Winburg Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	2.4	6.8	0.11	2.4
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	100%	75%	100%	100%
C1b: % Microbiological Monitoring Compliance	6.7%	7.4%	8.3%	8.3%
C2a: % Chemical Compliance	95.5%	93.5%	99.5%	88.9%
C2b: % Chemical Monitoring Compliance	64.7%	70.6%	64.7%	64.7%
D: % Technical Skills	0%	18.8%	0%	9.4%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	42.8%	86.9%	24.9%	46.7%

WSA Overview

Masilonyana LM has four drinking water supply systems in their area of jurisdiction. Brandfort, Verkeerdevlei and Winburg achieved low Blue Drop risk ratings while Theunissen supply system achieved a high Blue Drop risk rating. Operational capacity information was not provided for all systems and this has negatively impacted on the scores under criteria B.

On criteria C (Water Quality Compliance), Brandfort, Verkeerdevlei and Winburg supply systems achieved excellent Microbiological compliance while Theunissen supply system achieved poor Microbiological compliance. However poor Microbiological Monitoring compliance achieved for all systems reduced the Regulators confidence in the quality of water supplied. Winburg supply system achieved poor Chemical compliance (<98%) while the remaining three system achieved excellent Chemical compliance. Poor Chemical Monitoring compliance achieved in all systems (<80%) and this impacted negatively on the performance under this criterion.

All four water supply systems also achieved poor performance under technical skills and Water Safety Planning indicating poor alignment of process controllers, supervisor and maintenance teams to regulations requirements and lack of adoption and implementation of Water Safety Planning processes as prescribed by SANS 241:2015 and WHO.

The Regulator urges the WSA to implement the following recommendation in order to improve the high-risk rating and maintain low-risk ratings for applicable systems:

- ✓ A and B: Installation and calibration of flow meters to verify operational capacities and submission of subsequent flow data to the Regulator.
- ✓ C1a and C2a: Development and implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ C1b and C2b: Alignment of microbiological and chemical water quality monitoring programmes to SANS 241: 2015 requirements in terms of frequency, coverage and number of samples.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Matjhabeng Local Municipality

Municipal BDRR Score: 29.9%

Assessment Areas	Allanridge Water Supply System	Hennenman Water Supply System	Odendaalsrus Water Supply System	Ventersburg Water Supply System
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	360	360	360	360
B: % Operational Capacity in terms of design	55.6%	55.6%	55.6%	55.6%
C1a: % Microbiological Compliance	99.9%	98.9%	99.3%	99.8%
C1b: % Microbiological Monitoring Compliance	88.7%	88.4%	87.5%	89.2%
C2a: % Chemical Compliance	98.2%	98.3%	98.3%	98.7%
C2b: % Chemical Monitoring Compliance	77.7%	78.8%	78.8%	78.8%
D: % Technical Skills	91.7%	91.7%	91.7%	91.7%
E: % Water Safety Plan Status	72.7%	72.7%	72.7%	72.7%
%BDRR/BDRR max	29.7%	30.5%	28.8%	28.3%

Assessment Areas	Virginia Water Supply System	Welkom Water Supply System
BULK / WSP	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	480	360
B: % Operational Capacity in terms of design	59.4%	55.6%
C1a: % Microbiological Compliance	99.4%	99.3%
C1b: % Microbiological Monitoring Compliance	86.4%	86.5%
C2a: % Chemical Compliance	99.1%	98.5%
C2b: % Chemical Monitoring Compliance	77.7%	78.8%
D: % Technical Skills	91.7%	91.7%
E: % Water Safety Plan Status	72.7%	72.7%
%BDRR/BDRR max	28.8%	33.6%

WSA Overview

Matjhabeng LM has six drinking water supply systems in their area of jurisdiction and Sedibeng Water is the Water Services Provider for all supply systems. The Regulator commends the WSA and WSP for achieving Low Blue Drop Risk Ratings for all supply systems.

All supply system provided operational flow information and are operating within capacity. Therefore, there is no immediate threat of overcapacity and inadequate supply from these systems.

Excellent Microbiological and Chemical compliance was achieved for all supply systems. This coupled with excellent Monitoring compliance (>80%) achieved for all systems provides the Regulator with confidence that the quality of water supplied is safe for consumption. However chemical monitoring compliance must be improved to ensure there is sufficient number of chemical monitoring sampling points as per SANS 241: 2015 requirements so as to ensure quality of water at all points in the network.

Alignment of supervisors, process controllers, and maintenance teams is also excellent for all supply systems, indicating that operations and maintenance are well undertaken for all systems. Although all systems have Water Safety Plan in place, the quality of these Water Safety plans must be improved to ensure they comply with SANS 241: 2015 and WHO requirements.

Therefore, the Regulator encourages the WSA and WSP to continue with good drinking water quality management practices and improve where required.

Metsimaholo Local Municipality

Municipal BDRR Score: 26.1%

Assessment Areas	Deneysville	Oranjeville	Sasolburg
BULK / WSP			Rand Water
A: Total Design Capacity (Ml/d)	9.90	2.59	4800
B: % Operational Capacity in terms of design	70%	46.3%	0.3%
C1a: % Microbiological Compliance	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	79.2%	81.4%
C2a: % Chemical Compliance	88.7%	91.4%	99.5%
C2b: % Chemical Monitoring Compliance	14.7%	14.7%	64.1%
D: % Technical Skills	54.2%	35.4%	100%
E: % Water Safety Plan Status	9.1%	90.9%	100%
%BDRR/BDRR max	40.2%	39%	26%

WSA Overview

The Regulator acknowledges the efforts made by the municipality and Rand Water in ensuring that all three supply systems achieve low-risk ratings. All systems are operating within capacity indicating that there is no immediate risk of operating overcapacity.

Microbiological water quality compliance is excellent for all three systems. Furthermore, all systems achieved excellent scores on Microbiological Monitoring. Under Chemical water quality compliance, Sasolburg achieved excellent compliance while Deneysville and Oranjeville achieved unacceptable results and this impacted on their score under criteria C. Water quality compliance scores were further impacted by poor Chemical Monitoring compliance achieved in all three systems.

The Department notes excellent score achieved for Sasolburg supply system under criteria D. Nonetheless, process controllers, supervisors and maintenance teams for Deneysville and Oranjeville are not adequately aligned to the regulations requirements. This may have a direct impact on the operation and maintenance of the WTW, thereby affecting service delivery to the customers.

Under Water Safety Planning, Oranjeville and Sasolburg water supply systems achieved excellent scores indicating that SANS 241: 2015 and WHO aligned Water Safety Plans are available and adequately implemented. Lack of information on Water Safety Planning has resulted in a poor score for Deneysville supply system under this criterion.

In order to maintain the low-risk rating category for all supply systems, the Regulator advises the WSA and WSP to implement the following recommendations:

- ✓ C1b and C2b: Implementation of microbiological (especially for Oranjeville) and chemical (for all systems) monitoring programmes aligned to SANS 241: 2015 requirements in terms of number of sample frequency and coverage.
- ✓ D: Appointment of suitably qualified staff (process controllers, supervisors, maintenance team) as per set criteria for Deneysville and Oranjeville. Existing process controllers should be subjected to relevant training to improve their classification.
- ✓ E: Development and implementation of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks. This especially applicable for Deneysville supply system.

Mohokare Local Municipality

Municipal BDRR Score: 43.1%

Assessment Areas	Rouxville Conventional Water Treatment Plant	Smithfield Conventional Water Treatment Plant	Zastron Conventional Water Treatment Plant
BULK / WSP			
A: Total Design Capacity (Ml/d)	2.88	3.22	3.03
B: % Operational Capacity in terms of design	72.9%	55.9%	125.6%
C1a: % Microbiological Compliance	10.1%	10.4%	9.6%
C1b: % Microbiological Monitoring Compliance	91.7%	91.7%	89.6%
C2a: % Chemical Compliance	96.1%	96.4%	94.9%
C2b: % Chemical Monitoring Compliance	17.7%	17.7%	17.7%
D: % Technical Skills	7.5%	37.5%	30%
E: % Water Safety Plan Status	0%	0%	9.1%
%BDRR/BDRR max	39%	37.8%	52.5%

WSA Overview

Mohokare LM has three drinking water supply systems. Two of the three supply systems achieved low-risk ratings while one supply system (Zastron) achieved a medium-risk rating. Rouxville and Smithfield are operating within the design capacity, indicating that there is no immediate threat of overcapacity. On the other hand, Zastron supply system is operating above capacity and this indicates that the WTW may not meet the current and future demands.

Under criteria C although, the Regulator notes excellent Microbiological Monitoring compliance, the safety of water provided by all systems cannot be guaranteed due to poor microbiological compliance and this poses a serious health risk to consumers. All systems achieved excellent Chemical water quality compliance (>98%), however chemical monitoring compliance is poor as the chemical water quality cannot be verified due to insufficient monitoring.

All three systems under the municipality achieved poor scores under criteria D and E. This indicates that staff including process controllers, supervisors and maintenance teams are not adequately aligned to the regulations requirements and there is no adoption and implementation of a Water Safety Planning process that is in line with SANS 241: 2015 and WHO guidelines.

The Regulator encourages the WSA to implement the following recommendations:

- ✓ A and B: Planning and budgeting to address capacity exceedance Zastron WTW, operating at 125% of design.
- ✓ C1a: Development and implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ C2b: Implementation of chemical monitoring programme aligned to SANS 241: 2015 requirements in terms of number of sample frequency and coverage.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development and implementation of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Moqhaka Local Municipality

Municipal BDRR Score: 63.4%

Assessment Areas	Kroonstad	Steynsrus	Viljoenskroon
BULK / WSP			
A: Total Design Capacity (Ml/d)	60	2.9	6.9
B: % Operational Capacity in terms of design	N/I	N/I	N/I
C1a: % Microbiological Compliance	81%	83.2%	76.4%
C1b: % Microbiological Monitoring Compliance	72.5%	100%	89.3%
C2a: % Chemical Compliance	93.5%	92.8%	85.3%
C2b: % Chemical Monitoring Compliance	91.2%	91.2%	88.2%
D: % Technical Skills	69.2%	69.2%	69.2%
E: % Water Safety Plan Status	100%	100%	100%
%BDRR/BDRR max	65.9%	48.3%	48.3%

WSA Overview

Moqhaka LM has three supply systems in their area of jurisdiction. Two of the three systems achieved low BDRR while one system (Kroonstad) achieved a medium-risk rating. On Criteria A and B, all systems do not have information on operational capacities therefore poor scores were achieved.

Although all system achieved good to excellent scores for alignment of Microbiological and Chemical Monitoring to SANS 241: 2015 requirements, unacceptable water quality compliance achieved in both categories means that the water supplied may present serious health risks to the consumer as the safety cannot be guaranteed.

Under technical skills, although the Regulator notes that supervisors for all systems are adequately aligned with the regulations requirements, inadequate alignment of process controllers and maintenance teams to the regulations requirements has a direct impact on the operational and maintenance of the WTW and ultimately on the service delivery.

On criteria E, the WSA is commended for the adoption and implementation of Water Safety Planning process in line with SANS 241: 2015 and WHO guidelines which includes risk assessment of entire system, risk-based water quality monitoring and implementation of measures to reduced high and medium risks.

In order to maintain the low-risk ratings for Steynsrus and Viljoenskloof supply systems and improve the risk rating for Kroonstad supply system, the WSA should implement the following recommendations:

- ✓ A and B: Installation and calibration of flow meters to verify operational capacities and submission of subsequent flow data to the Regulator.
- ✓ C1a: Implementation of corrective measures for microbiological and chemical failures to ensure that safe drinking water is supplied at all times.
- ✓ D: Appointment of suitably qualified staff process controllers and maintenance teams to ensure compliance with the regulations requirements. Existing staff can also be subjected to relevant training to ensure adequate compliance with the set criteria.

Nala Local Municipality

Municipal BDRR Score: 45.6%

Assessment Areas	Balkfontein (Sedibeng Water)
BULK / WSP	Sedibeng Water
A: Total Design Capacity (Ml/d)	360
B: % Operational Capacity in terms of design	55.6%
C1a: % Microbiological Compliance	100%
C1b: % Microbiological Monitoring Compliance	78.4%
C2a: % Chemical Compliance	96.9%
C2b: % Chemical Monitoring Compliance	19.41
D: % Technical Skills	75%
E: % Water Safety Plan Status	100%
%BDRR/BDRR max	45.6%

WSA Overview

The municipality has one drinking water supply system and Sedibeng water is their Water Services Provider. A low-risk rating was achieved for the supply systems and the Regulator commends the WSA and WSP for that.

Under criteria A and B, the WSA is operating well within the design capacity, indicating that there is no immediate threat of not meeting water demand. Furthermore, the supply system has process controllers and supervisors that are adequately aligned to the regulations requirements but the lack of a maintenance team is a concern to the Regulator as it has a direct impact on delivery of water to the consumers.

The supply system achieved excellent Microbiological and acceptable Chemical compliance. However Microbiological Monitoring compliance should be improved while Chemical Monitoring compliance is poor and this negatively affected performance on criteria C.

An excellent score was achieved under Water Safety Planning, indicating that the WSA and WSP are adequately implementing a Water Safety Planning process including adoption of risk-based water quality monitoring and implementation of control measure for high and medium risks.

The Regulator encourages the WSA and WSP to implement the following recommendations to ensure that a low-risk rating is maintained:

- ✓ C1a: Implementation of corrective measures for microbiological and chemical failures to ensure that safe drinking water is supplied at all times.
- ✓ C1b: Alignment of microbiological and chemical water quality monitoring programmes to SANS 241: 2015 requirements in terms of frequency, coverage and number of samples.
- ✓ D: Appointment of suitably qualified staff and / or training of existing maintenance team to ensure adequate alignment with the set criteria and details of such should be provided to the Regulator.

Ngwathe Local Municipality

Municipal BDRR Score: 37%

Assessment Areas	Edenville (Boreholes)	Heilbron (WSA)	Koppies (WSA)	Parys (WSA)
BULK / WSP		Rand Water		
A: Total Design Capacity (Ml/d)	0.38	4800	3.8	25
B: % Operational Capacity in terms of design	67.9%	98.2%	100%	91.1%
C1a: % Microbiological Compliance	0%	100%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	74.3%	0%	0%
C2a: % Chemical Compliance	0%	99.8%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	72.4%	0%	0%
D: % Technical Skills	8.3%	91.7%	8.3%	83.3%
E: % Water Safety Plan Status	0%	100%	72.7%	9.1%
%BDRR/BDRR max	92%	36.7%	88.1%	81.4%

Assessment Areas	Vredefort (WSA)
BULK / WSP	
A: Total Design Capacity (Ml/d)	3.7
B: % Operational Capacity in terms of design	100%
C1a: % Microbiological Compliance	0%
C1b: % Microbiological Monitoring Compliance	0%
C2a: % Chemical Compliance	0%
C2b: % Chemical Monitoring Compliance	0%
D: % Technical Skills	45.8%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	84.7%

WSA Overview

Ngwathe LM has five drinking water supply systems in their area of jurisdiction. For Heilbron supply system, Rand Water is the water safety provider and is the only system that achieved a low-risk rating. Supply systems where the municipality is both WSA and WSP achieved high-risk ratings while Edenville achieved a critical-risk rating. Only Edenville supply system is operating well within the design capacity while the remaining four supply systems are operating above 90% of the design capacity which presents a risk of not achieving current and future water demands.

Water quality monitoring was only undertaken for Heilbron supply system which achieved excellent Microbiological and Chemical compliance. However microbiological and chemical monitoring compliance is poor (<80%) and must be improved to ensure there are sufficient monitoring points to verify the safety of water at all points in the network. The remaining four systems do not have any water quality data and this presents as serious health risk to these communities as the quality of water cannot be guaranteed in these systems. Urgent implementation of compliance monitoring programs are required to verify the safety of the water in these systems.

Under technical skills, only Heilbron and Parys supply systems staff compliment are adequately aligned with the regulations requirements while the remaining three systems staff compliment is not adequately aligned to the requirements. This may impact negatively on the delivery of water services from the associated supply systems.

With regards to Water Safety Planning, Heilbron supply system achieved an excellent score indicating the Water Safety Plan is available and adequately implemented. Koppies water supply system also achieved a good score on Water Safety Plan availability indicating that

the plan is available but may lack some of the requirements such as implementation. Edenville, Parys and Vredefort do not have Water Safety Plans and therefore achieved poor scores under this requirement.

The Regulator urges the WSA and WSP (where applicable) to implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Criteria A and B: Planning and budgeting to address capacity exceedance at Heilbron, Koppies, Parys and Vredefort WTW.
- ✓ Criteria C: Implementation of microbiological and chemical monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ Criteria D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ Criteria E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Nketoana Local Municipality

Municipal BDRR Score: 46.3%

Assessment Areas	Arlington	Lindley	Petrus Steyn	Reitz
BULK / WSP				
A: Total Design Capacity (Ml/d)	2	2.5	3.5	15
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	41.7%	41.7%	41.7%	41.7%
C2a: % Chemical Compliance	98.5%	97.5%	89.4%	95.9%
C2b: % Chemical Monitoring Compliance	5.9%	5.9%	5.9%	5.9%
D: % Technical Skills	56.3%	75%	75%	75%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	29.60%	37.34	52.53	48.51

WSA Overview

Nketoana LM has four drinking water supply systems. Three systems achieved low-risk ratings while one system (Petrus Steyn) achieved a moderate-risk rating. All four systems do not have information on operational capacity and this resulted in poor scores being achieved under criteria B.

With regards to water quality monitoring, all systems achieved excellent scores for Microbiological compliance. However, Microbiological Monitoring programmes are not adequately aligned to the SANS 241: 2015 requirements which resulted in poor scores for Microbiological Monitoring. Three of the four systems achieved acceptable to excellent scores while only Petrus Steyn achieved an unacceptable score on Chemical compliance. Chemical Monitoring compliance is also poor as only 5.9% was achieved for all systems.

Lindely, Petrus Steyn and Reitz supply systems have process controllers and supervisors that are adequately aligned to the regulations requirements while Arlington process controllers are not adequately aligned to the requirements. Nonetheless, unavailability of maintenance teams for all systems has impact on the delivery of services and has negatively impacted the score under criteria D.

All four supply systems achieved a poor score under criteria E (Water Safety Planning). This indicates lack of implementation of Water Safety Planning process and risk-based water quality monitoring as outlined in SANS 241: 2015and WHO guidelines.

In order to maintain the low-risk ratings and improve on the moderate-risk rating (Petrus Steyn), the Regulator encourages the WSA to implement the following recommendations:

- ✓ A and B: Installation and calibration of flow meters to verify operational capacities and submission of subsequent flow data to the Regulator.
- ✓ C1a: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ C1b and C2b: Revision of microbiological and chemical water quality monitoring programmes to ensure adequate alignment to SANS 241: 2015 requirements in terms of sampling points, frequency and coverage.
- ✓ D: Appointment of suitably qualified staff, process controllers and supervisors for systems that do not comply and maintenance teams for all systems to ensure compliance with the regulations requirements.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Phumelela Local Municipality

Municipal BDRR Score: 96.6%

Assessment Areas	Memel Supply System	Vrede Supply System	Warden
BULK / WSP			
A: Total Design Capacity (Ml/d)	2%	3.5%	7.5%
B: % Operational Capacity in terms of design	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%
D: % Technical Skills	37.5%	28.1%	9.4%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	95.5%	96.3%	97%

WSA Overview

Phumelela LM has three drinking water supply systems in their area of jurisdiction. All three water supply system achieved critical-risk ratings as the municipality did not provide adequate information to the Regulator.

Although information on the design capacity is available for the three system, unavailability of operational capacities has resulted in all systems achieving critical-risk ratings on criteria B. Poor scores were also achieved on criteria D (technical skills) as process controllers, supervisors and maintenance teams are not adequately aligned to the regulations requirements.

The municipality also achieved poor scores for all drinking water supply systems under water quality compliance. This is due to unavailability of drinking water quality results indicating that water quality monitoring may not be taking place and this presents a serious health risk to the consumers.

With regards to Water Safety Planning and implementation, all three systems also achieved poor scores as there is no information presented therefore Water Safety Planning including full SANS 241: 2015 analysis for raw and final water could be lacking in the municipality.

The Regulator is concerned about drinking water management in the municipality and urges the municipality to urgently implement the following recommendations in order to improve drinking water quality management within the municipality:

- ✓ A and B: Installation and calibration of flow meters to verify operational capacity and submission of subsequent flow data to the Regulator.
- ✓ C: Develop and implement microbiological and chemical monitoring programmes in line with SANS 241: 2015 requirements i.e. frequency, coverage and number of samples. Subsequent water quality results should then be submitted to the Regulator.
- ✓ D: Process controllers, supervisors and maintenance teams should be aligned with the regulations requirements through appointment of suitably qualified personnel and / or training of current staff to meet requirements.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Setsoto Local Municipality

Municipal BDRR Score: 58.7%

Assessment Areas	Clocolan (Clocolan WTW)	Ficksburg (Ficksburg WTW)	Marquard (Marquard WTW)	Senekal (Cyferfontein and De Put WTW)
BULK / WSP				
A: Total Design Capacity (Ml/d)	5.95	32	7.3	9
B: % Operational Capacity in terms of design	41%	56.3%	N/I	N/I
C1a: % Microbiological Compliance	0%	100%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	8.3%	0%	0%
C2a: % Chemical Compliance	0%	96.6%	0%	82.9%
C2b: % Chemical Monitoring Compliance	0%	17.7%	0%	2.9%
D: % Technical Skills	37.5%	37.5%	37.5%	37.5%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	79.6%	35.8%	95.9%	95.9%

WSA Overview

Setsoto LM is responsible for four drinking water supply systems. Ficksburg supply system achieved a low-risk rating. Clocolan supply system achieved a high-risk rating while Marquard and Senekal supply systems achieved critical-risk ratings.

On design and operational capacities, Clocolan and Ficksburg supply systems are operating well within the design capacity indicating sufficient capacity is available to meet the current demands. There is no flow monitoring at Marquard and Senekal supply systems, therefore the highest risk ratings were allocated for the systems.

Under drinking water quality management, both Microbiological and Chemical monitoring were not undertaken for Clocolan and Marquard supply systems and therefore the supplied water may present serious health risks to the consumers. Although Ficksburg supply system achieved excellent and good compliance for Microbiological and Chemical determinands respectively, poor alignment of the Monitoring programmes to SANS 241: 2015 requirements reduces the Regulator's confidence in the quality of water supplied from these systems. The safety of water supplied from Senekal system cannot be guaranteed as Microbiological Monitoring was not undertaken and poor compliance was achieved for Chemical compliance and Chemical Monitoring compliance.

All supply systems staff is not adequately aligned to the regulations requirements and there are no Water Safety Plans and this has negatively impacted the scores under criteria D and E respectively.

To ensure supply of safe drinking water to the consumers, the Regulator urges the WSA to implement the following recommendations:

- ✓ A and B: Installation and calibration of flow meters to monitor operational capacity at Marquard and Senekal WTW. Records of such should then be made available to the Regulator.
- ✓ C: Develop and implement microbiological and chemical monitoring programmes in line with SANS 241: 2015 requirements i.e. frequency, coverage and number of samples. Subsequent water quality results should then be provided to the Regulator.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Tokologo Local Municipality

Municipal BDRR Score: 100%

Assessment Areas	Boshof Water Supply System	Dealesville Water Supply System	Hertzogville Water Supply System
BULK / WSP			
A: Total Design Capacity (Ml/d)	2	2	5
B: % Operational Capacity in terms of design	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%
D: % Technical Skills	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	97.2%	97.2%	100%

WSA Overview

Tokologo LM has three drinking water supply systems and all three systems achieved critical-risk ratings. This was largely as a result of the municipality not submitting information to the Regulator. All three systems achieved lowest scores on operational capacity (Criteria B) as no information was presented to the Regulator.

On drinking water quality compliance, the municipality did not upload any information indicating that there may be no water quality monitoring. This presents a serious health risk to the consumers supplied by the municipality and should be addressed urgently. The municipality also did not provide any information for criteria D and E, this has resulted in the three systems achieving the lowest scores under these criteria.

The Regulator is concerned about drinking water management in the municipality and encourages the WSA to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and calibration of flow meters to verify operational capacity. Flow information should then be presented to the Regulator.
- ✓ C: Development and implementation of SANS 241: 2015 aligned drinking water quality monitoring programmes and submission of subsequent results to the Regulator.
- ✓ D: Appointment of suitably qualified staff (process controllers, supervisors, and maintenance teams) as per regulations requirements. Existing process controllers should be subjected to relevant training to improve their classification.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Tswelopele Local Municipality

Municipal BDRR Score: 43%

Assessment Areas	Bultfontein Supply Zone	Hoopstad Supply Zone
BULK / WSP		
A: Total Design Capacity (Ml/d)	6	3.9
B: % Operational Capacity in terms of design	N/I	N/I
C1a: % Microbiological Compliance	100%	100%
C1b: % Microbiological Monitoring Compliance	66.7%	55.6%
C2a: % Chemical Compliance	97.1%	88.2%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%
D: % Technical Skills	62.5%	50%
E: % Water Safety Plan Status	9.1%	9.1%
%BDRR/BDRR max	36.8%	52.5%

WSA Overview

Tswelopele LM has two drinking water supply systems of which one system achieved a low-risk rating and the other system achieved a medium-risk rating.

With regards to criteria B (operational capacity), both Bultfontein and Hoopstad supply systems achieved the highest risk rating due to unavailability of information on operational capacities.

On water quality compliance both systems achieved excellent compliance for Microbiological compliance. However, Monitoring compliance achieved for both systems is low and may pose a safety risk to the consumers. Bultfontein supply system achieved good compliance on Chemical determinands while Hoopstad Chemical compliance is low (<98%). Moreover, low chemical monitoring compliance indicates lack of sufficient sampling points to verify the chemical quality of water at all points in the network.

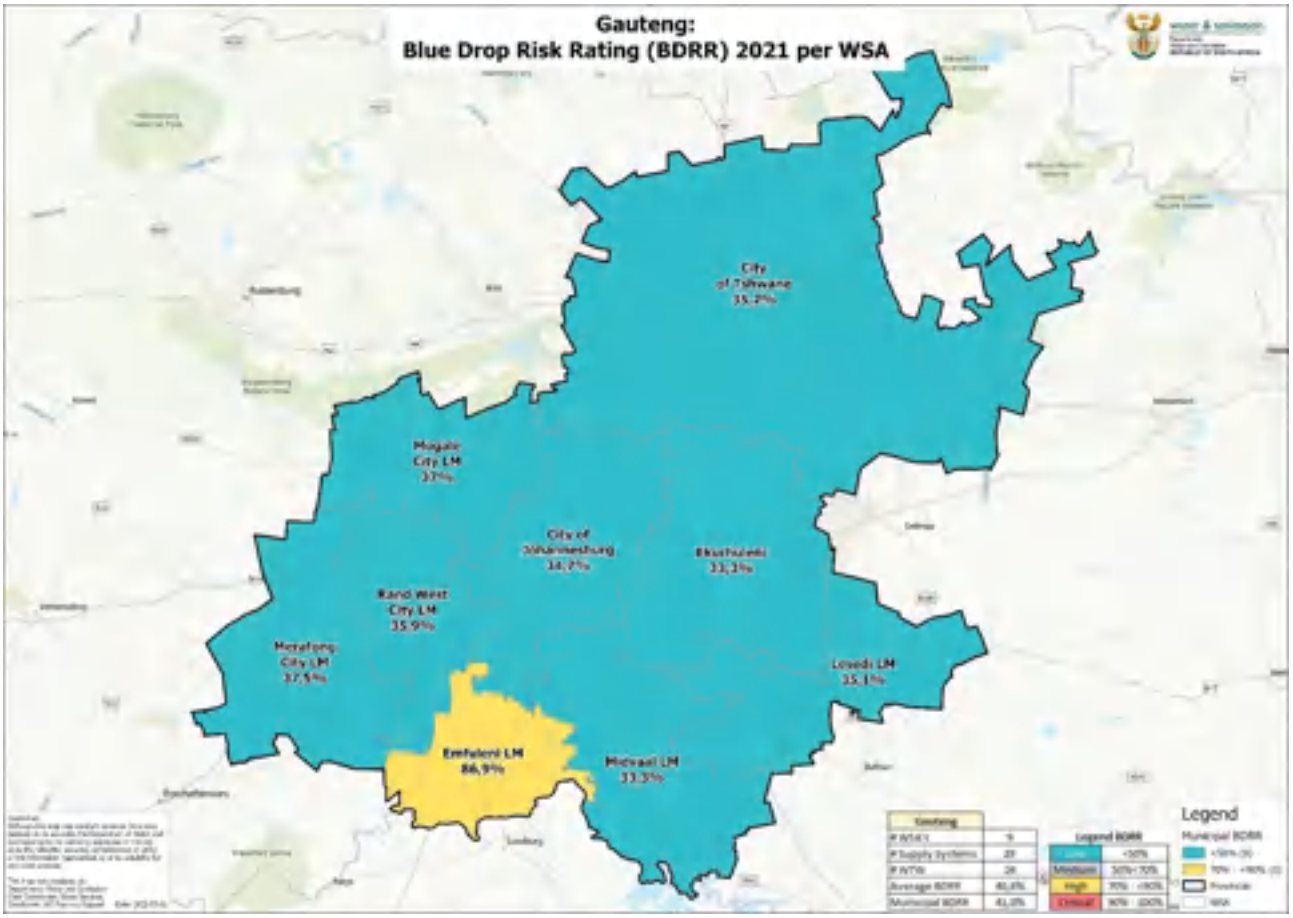
Tswelopele LM did not provide any information on maintenance teams. This, coupled with inadequate alignment of process controllers to regulations requirements has resulted in reduced scores for both systems under technical skills and has impact on delivery of services to the customers.

Both Bultfontein and Hoopstad supply systems achieved low scores on Water Safety Planning. This is due to the unavailability of Water Safety Plan documents and subsequent implementation of the plan.

In order to maintain the low-risk rating for Bultfontein supply system and improve the risk rating for Hoopstad supply system, the Regulator encourages the municipality to implement the following recommendations.

- ✓ A and B: Installation and calibration of flow meters to verify operational capacity. Flow information should then be presented to the Regulator.
- ✓ C1b and C2b: Develop and implement monitoring programmes that are aligned to SANS 241: 2015 requirements.
- ✓ C2a: Implementation of corrective measure in the event of chemical failures to ensure delivery of safe drinking water to consumers. This is especially for Hoopstad supply system.
- ✓ D: Appointment of suitably qualified staff (process controllers, supervisors, and maintenance teams) as per regulations requirements. Existing process controllers should be subjected to relevant training to improve their classification.
- ✓ E: Development of Water Safety Plans as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

CHAPTER 5: GAUTENG PROVINCE



PROVINCIAL BDRR TREND ANALYSIS

One of the outcomes of Incentive and Risk-based Regulation is the regular monitoring and reporting on the performance of the WSA to ensure strategic operational and management plans are constantly realigned to achieve compliance and effectively manage risks for provision of sustainable water services. For risk-based regulation, the movement in BDRR is a vital tool for both the Department and the WSA to monitor and track the levels of risk in the country. The 2021 BDRR will serve as a baseline for future BDRR assessments that will be used by DWS to monitor and manage drinking water supply systems to ensure delivery of safe drinking water to all communities.

BDRR is calculated and categorised as either low, medium, high and critical risk rating, calculated according to the following range of values to enable both WSA and DWS to monitor performance.

Table 1: BDRR categorisation

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

The BDRR formular is made up of five risk indicators with an overall BDRR for each supply system. The overall performance of each WSA is reported in two ways:

- ✓ Average % BDRR: average % BDRR for all supply systems per province.
- ✓ % Municipal (weighted) BDRR: The Municipal BDRR for each WSA is calculated by the proportional contribution of each water supply system based on design capacity of each system. This weighted average may provide skewed picture i.e. a supply system which receives a small fraction of the total flow from a larger treatment plant will carry a higher weighting compared to a system which received 100% from a smaller treatment plant.

Therefore, the WSA must evaluate the individual % BDRR scores of each system to determine the risk associated with provision of drinking water for each system and not use the % Municipal BDRR score to evaluate their performance. Regardless of the size of the systems, all consumers have a right to safe drinking water and the WSA must be wary of neglecting the management of smaller, rural schemes in favour of larger urban systems.

The % Municipal (weighted) BDRR for all WSA's in the province is provided at the end of each provincial chapter for reference.

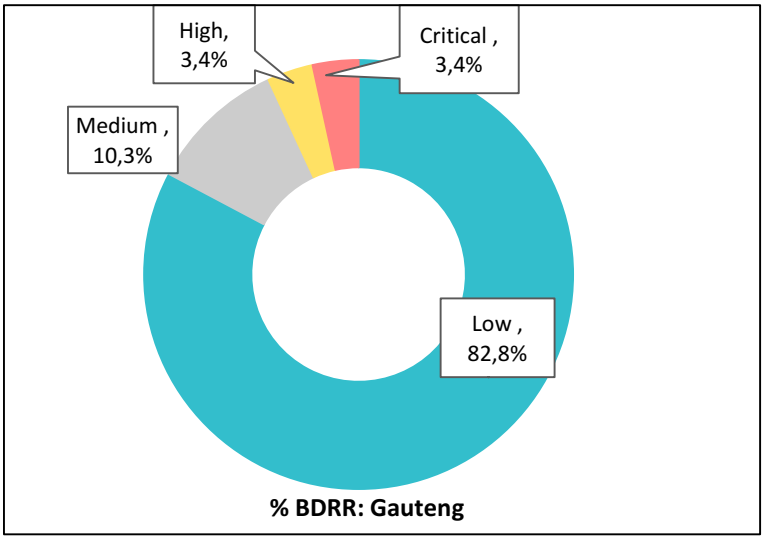
In 2021, 9 WSA's were assessed in Gauteng province with a total to 29 water supply systems. The assessment period for all Risk Indicators was July 2020 to June 2021 except for Risk Indicator C: Water Quality compliance where assessment period was January to December 2020.

The risk performance trends for Gauteng are summarised below to provide a provincial overview of BDRR.

Table 33: Risk Performance trends for Gauteng 2021

Risk Rating	Average	Minimum	Maximum
% Municipal BDRR (Weighted Score)	41.0%	33.3%	86.9%
% BDRR	40.6%	16.8%	93.8%
A: Design Capacity (Ml/d)	425.6	0.01	4800
C1a: % Microbiological Compliance	94.7%	0%	100%
C1b: % Microbiological Monitoring Compliance	83.7%	0%	100%
C2a: % Chemical Compliance	93.1%	0%	100%
C2b: % Chemical Monitoring Compliance	57%	0%	97%
D: % Technical Skills	90.3%	25%	100%
E: % Water Safety Plan Status	70.4%	0%	100%

The BDRR profile for Gauteng province is outlined in the figure below.



The results for Gauteng are summarised as follows:

- ✓ 82.8% of supply systems are in the low risk category,
- ✓ 10.3% are in the medium risk category,
- ✓ 3.4% are in the high risk category, and
- ✓ 3.4% are in the critical risk category.

Figure 37: BDRR profile for Gauteng

To use the 2021 BDRR score as a tool to implement strategic, targeted actions that will result in an improved risk rating and sustainable water services delivery, the individual components of the BDRR score must be critically evaluated by the WSA to understand the reason for the current risk rating and the desired risk category for delivery of safe drinking water.

The BDRR scorecards reports on the following system-specific risk indicators which ultimately feed into the BDRR score:

- ✓ Risk Indicator A: Design Capacity,
- ✓ Risk Indicator B: Operational Capacity,

- ✓ Risk Indicator C: Water Quality Compliance,
- ✓ Risk Indicator D: Technical Skills, and
- ✓ Risk Indicator E: Water Safety Plans.

The trends with regard to the risk rating of the individual indicator which make up the overall BDRR score is discussed below. This will provide insight on the risk status of each indicator and enable the WSA to implement targeted actions to reduce risk of specific risk indicators which are negatively impacting on the final BDRR score of the supply system.

Risk Indicator A: Design Capacity and Risk Indicator B: Operational Capacity

Criterion A represents the design capacity of the treatment plant.

Every water treatment plant must be classified with DWS as per Regulation 2834. The classification of the treatment plant is based on a number of components, including size, complexity and electrical consumption, as per set criteria. The plant classification certificate is available on IRIS and used to determine the risk rating for criterion A as it states the capacity of the plant.

The risk rating is allocated according to size of the treatment plant with higher risk rating given for a larger plant and lower risk rating for a smaller plant. The rationale is that a larger plant serves a larger community and therefore presents a higher risk if the plant is not functioning or producing unsafe drinking water than a smaller plant which serves less people. The risk rating for criteria A remains the same provided the capacity stays the same, and all plants which have the same design capacity range will have the same maximum BDRR.

Information from the IRIS system was collected to provide a profile of the design capacities of all treatment plants in the province. Many of the treatment plants are large regional bulk schemes which supply water to a number of supply systems in various municipalities and across provinces. The figure below reports on the design capacity of treatment plants located in the province in Ml/d.

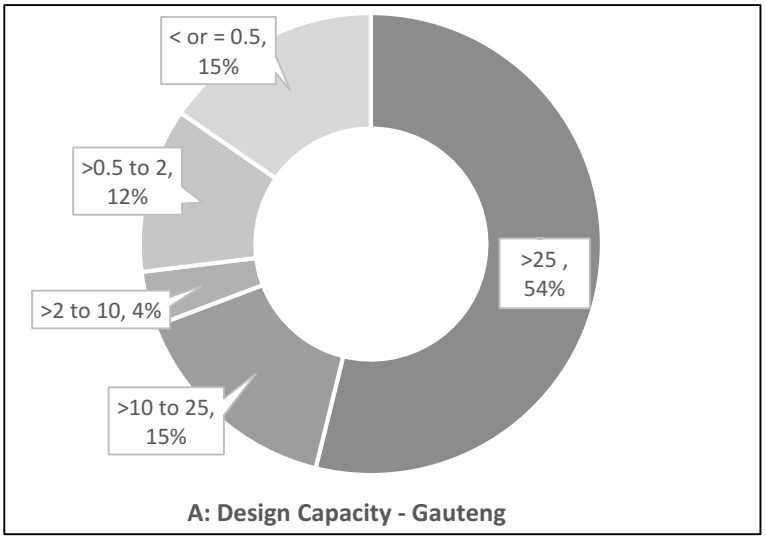


Figure 38: Profile of design capacity in Gauteng (Ml/d)

The results are summarised as follows:

- ✓ There are 26 water treatment plants in Gauteng with a combined capacity of 1106.5 Ml/d,
- ✓ Reported population served = 2.274 million people,
- ✓ Average design capacity in Gauteng =425.6 Ml/d,
- ✓ Largest plant in province = 4800 Ml/d,
- ✓ Smallest plant in province = 0.01 Ml/d,
- ✓ 15% of plant are <=0.5 Ml/d, 12% are between 0.5 and 2 Ml/d, 4% are between 2 and 10 Ml/d, 15 % are between 10 and 25 Ml/d and 54% are >25 Ml/d,
- ✓ All plants have provided design capacities.

In summary, Gauteng has number of treatment plants which are shared between WSA: this is evident by low proportion of plants (26) to supply systems (24). The two largest water treatment plants in the region which are responsible for supplying 98% of the total population are the Rand Water Zuikerbosch WTW (3 600 Ml/d) and Rand Water Vereeniging WWTW (1 200 Ml/d).

With regards to **Risk Indicator B: Operational capacity**, daily production versus the design capacity of the treatment plant is an important indicator to determine if the plant can provide sufficient, safe drinking water to all the consumers now and in the near future. When the plant is operating above its design capacity, major unit processes are overloaded and cannot achieve their operational limits which leads to water quality failures.

Risk Indicator C indicates the current operational capacity of the treatment plant in each supply system as a percentage of the design capacity of the plant. The ideal value is between 50 – 100%; higher values indicate the plant is overloaded and lower values indicate the plant is receiving too little flow which may also compromise performance due to lack of retention time (flocculation, sedimentation). Once daily production approaches 90% of design capacity, the WSA must plan, budget and implement projects to increase the capacity of the treatment plant to ensure there is sufficient supply, not only for human consumption, but also for economic activities

Although operational capacity has been reported for all supply systems, there are a number of large regional plants which supply a large number of supply systems in various municipalities and across provincial borders. Analysis of Indicator B must therefore be conducted at plant level as collating operational capacity data at municipal or provincial level will not provide an accurate reflection of the current operational capacity of each individual plant.

There are a large number of plants which do not measure flow or have not reported flow meter data ("Unknown"). This presents a serious health risk as coagulant and disinfection dosage is based on flow and without this data there may be insufficient dosage to achieve drinking water quality standards.

WSAs are reminded that installation of flow meter and daily flow recording is a regulatory requirement as per their Water Use License.

Recommendations

- ✓ WSAs must ensure all treatment plants have updated plant registration certificates on IRIS.
- ✓ WSAs must provide updated copies of plant registration certificates supported with documents on the design capacity of treatment plant for future BDRR assessments.
- ✓ WSA to install flow meters at raw and final water points, monitor daily flows and ensure annual calibration of meters for accuracy of results.
- ✓ Budget and plan for upgrade of treatment plant when operational capacity is at 90% to ensure sufficient time for implementation of civil projects.
- ✓ Consult Census, WSDP and Reconciliation strategies to determine current and future allocation and demand, use a 10-year forecast period

Risk Indicator C: Water Quality Compliance

In South Africa, the SANS 241:2015 is the definitive reference on acceptable limits for drinking water quality parameters and provides limits for a range of water quality characteristics and water meeting this standard is deemed safe for lifetime consumption. The actual water quality depends on both microbiological and chemical determinands:

- ✓ Microbiological compliance reports on the actual compliance of the final water for the past 12 months against microbiological determinands E. Coli / Faecal Coliforms. The presence of these determinands in water is a strong indication of recent sewage or animal waste contamination and there is potential for contracting diseases from pathogens.
- ✓ Chemical quality is determined by a number of determinands which may be acute or chronic health determinands with specific health risks associated with each determinands. Acute health risks can result in death if the limit is exceeded, while chronic limits provide maximum limits that can be ingested over a period of time before health effects are observed.

Both microbiological and chemical compliance limits outlined in SANS 241:2015 is evaluated against the population size: for a population <100 000, compliance is >98% while for a population >100 000, compliance limit is >99%.

In addition, the SANS 241:2015 standard stipulates the frequency of sampling as well as the number of sample points required per supply system to ensure sufficient coverage of the network. The frequency and number of required sample points is dependent on the population size as outlined in Table 1 of SANS241: 2015. Monitoring compliance is therefore critical to guarantee the safety of the supply at all points in the network.

Indicator C: Water Quality Compliance reports on both water quality compliance and monitoring compliance as per SANS 241:2015 for both microbiological and chemical determinands. The formular to calculate C is made up of four sub-indicators with microbiological compliance carrying a higher weighting than chemical compliance as this presents a serious, acute health risk.

The formular for Indicator C, description and categorisation of each sub-indicator is presented in the table below. The categorisation is aligned with the risk rating for each sub-indicator and results are reported for all supply systems in the province. All supply systems which fall in the Low Risk category are regarded as compliant systems.

Table 10: Formular, description and categorisation for Criteria C

<table>
<tr><th colspan="3">C = [0.7(C1a x C1b)] + [0.3(C2a x C2b)]</th></tr>
<tr><td rowspan="2">Ca: Water Quality Compliance</td><td>C1a: Microbiological compliance as per SANS 241:2015.</td><td rowspan="2"><table><tr><th>High Risk</th><th>Medium Risk</th><th>Low Risk</th></tr><tr><td><95%</td><td>95% - <97%</td><td>97% - 100%</td></tr></table></td></tr>
<tr><td>C2a: Chemical compliance as per Blue Drop requirements</td></tr>
<tr><td rowspan="2">Cb: Monitoring Compliance</td><td>C1b: Micro monitoring compliance against registered programme, based on population size as per SANS 241:2015</td><td rowspan="2"><table><tr><th>High Risk</th><th>Medium Risk</th><th>Low Risk</th></tr><tr><td><50%</td><td>50% - 80%</td><td>>80%</td></tr></table></td></tr>
<tr><td>C2b: Chemical monitoring compliance calculated as per Blue Drop requirements</td></tr>
</table>

The Gauteng results for Indicator C and sub-indicators are presented in the table below. This is based on data for the period January to December 2020.

Table 34: Gauteng Province summary of results for Indicator C: Water Quality Compliance (Jan – Dec 2020)

Gauteng	Average Compliance	Minimum	Maximum	% Systems Which Comply (Low Risk)
C1a: Microbiological Quality	94.7%	0%	100%	90%
C2a: Chemical Quality	93.1%	0%	100%	72%
C1b: Microbiological Monitoring Compliance	83.7%	0%	100%	62%
C2b: Chemical Monitoring Compliance	57.0%	0%	97%	10%

The categorisation for microbiological and chemical compliance is illustrated below providing % of supply systems per risk category

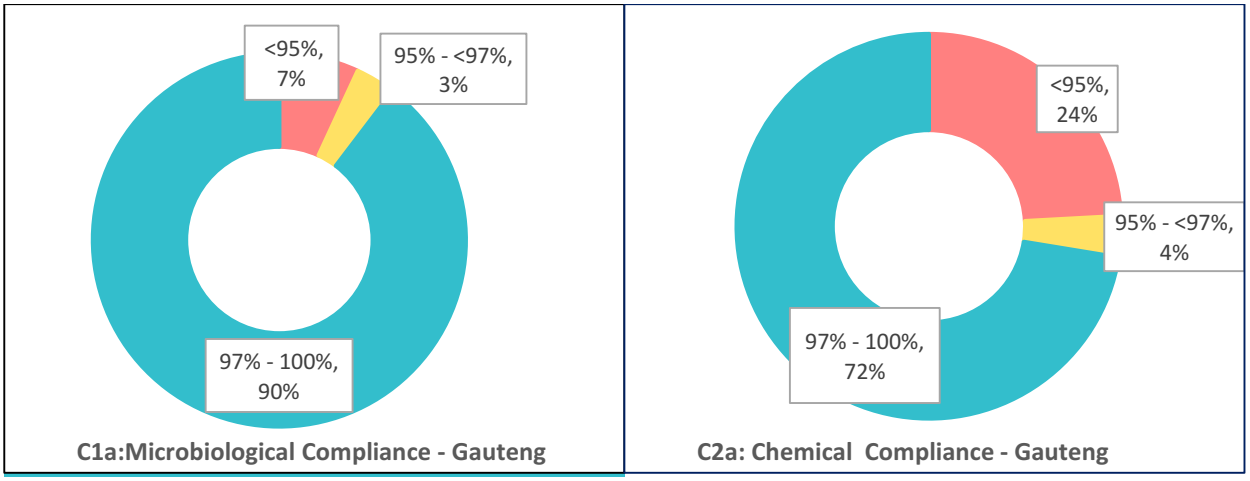


Figure 39: Microbiological and Chemical Compliance for Gauteng (Jan – Dec 2020)

The results are summarised as follows:

- ✓ 90% of systems achieved microbiological compliance and 72% achieved chemical compliance.
- ✓ 10% of systems do not comply with microbiological determinands: this indicated microbiological failures which presents a serious health risk to the consumers in these supply systems. For sustained failure, 'Boil Water' notices must be issued to safeguard consumers while the root cause of the failure is investigated and resolved.

- ✓ 28% of systems do not comply with chemical determinands. This may present immediate or potential long term health risk depending on whether non-compliance is for acute health determinant or chronic health determinands.
    - WSA must ensure compliance for all chemical-health determinands as per Blue Drop requirements and this includes, NO3- and NO2- as N, SO42-, Sb, As, Cd, Cr, Co, Cu, CN-, Pb, Hg, Ni, Se, V, DOC or TOC, and Total THM.

The categorisation for microbiological and chemical monitoring compliance is illustrated below providing percentages of supply systems per category.

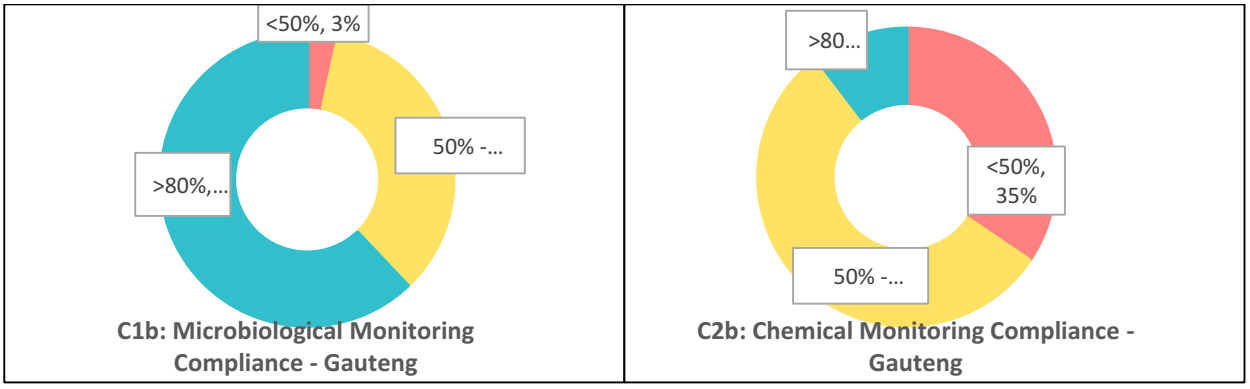


Figure 40: Microbiological and Chemical Monitoring Compliance for Gauteng (Jan – Dec 2020)

The results are summarised as follows:

- ✓ 62% of supply systems have sufficient microbiological samples based on population size as per SANS 241-2.
- ✓ 38% of supply systems have <80% for microbiological monitoring compliance. This indicates there is an insufficient number of microbiological samples to guarantee the safety of water at all points in the distribution system. These supply systems therefore do not comply with table 2 in SANS 241-2 which outlines required number of sample points based on population.
- ✓ 10% of supply systems have sufficient chemical monitoring samples.
- ✓ 90% of supply systems have <80% for chemical monitoring compliance. This indicates either insufficient number of samples collected or insufficient chemical determinands were analysed. The requirement as per SANS 241:2015 is
    - Actual monitoring occurs according to registered IRIS monitoring programme (>80%),
    - Number of samples: One sample each at treatment plant final and one distribution point, both of which must be analysed for at least 80% of determinands listed (13 of the 17 determinands) i.e. at least 26 data points are required.

Recommendations

All WSAs must urgently implement the following steps to ensure both microbiological and chemical compliance is improved so that all the citizens of South Africa can have access to safe drinking water, which is a basic human right enshrined under our Constitution:

- ✓ Develop and implement microbiological monitoring as per SANS 241:2015 requirements:
    - Monitor final water weekly.
    - Monitor distribution fortnightly
    - Ensure the number of sample points in the distribution network is based on population size as per Table 2 in SANS 241-2 given below

Table 18: Minimum number of samples for E.Coli (or Faecal Coliforms) in distribution network (Table 2 SANS 241-2: 2015)

Population served	Total number of samples per month[a]
<5000	2
5000-100 000	1 per 5000 head of population + 1 additional sample [b]
100 000 – 500 000	1 per 10 000 head of population + 11 additional sample [b]
≥500 000	1 per 20 000 head of population + 36 additional sample [b]
[a] During rainy season, sampling should be carried out more frequently to ensure that all spatial and temporal risks are identified. [b] see *WHO, Guidelines for drinking water quality*	

- ✓ Develop and implement risk-based chemical monitoring programme as per SANS 241:2015 requirements:
    - Conduct full SANS 241:2015 analysis annually on raw, final and distribution network to identify current problem determinands.
    - Conduct risk assessment of system including catchment, treatment plant and reticulation to identify current and potential water quality risks and their associated determinands. e.g. presence of pit latrines means possibility of nitrates in ground water and surface water.
    - Develop and implement risk-based chemical monitoring programme for all identified determinands.
        - Sample points are raw, final and critical distribution points depending on impact of determinands,
        - Frequency as per Table 3 in SANS 241- 2. i.e. acute health 1 = weekly, acute health 2 – monthly, chronic health = monthly, aesthetic = monthly,
        - Operational monitoring dependant on unit processes.
- ✓ In the event of non-compliance:
    - Precautionary measures including 'Boil Water' notices must be issued to consumers in systems with sustained microbiological failures.
    - 'Water Quality' Advisories must be issued to consumers in systems with sustained chemical failures for chronic health determinands.
    - WSAs must investigate the root cause of the failure and implement remedial actions to ensure compliance. If this cannot be achieved, an alternative water supply must be provided to ensure safety of consumers.
- ✓ Compliance monitoring to be undertaken by accredited laboratory
    - WSA to ensure that there is sufficient budget for compliance monitoring.
    - Laboratory to comply with accreditation requirement as per Blue Drop: SANAS accredited, Participation in proficiency testing with acceptable Z-Score, or Quality Assurance system.

Risk Indicator D: Technical Skills

Regulation 2834 states all plant personnel must be classified as per their qualifications and years of experience. This is conducted by DWS and plant personnel are provided with a classification certificate which reflects their current classification based on qualification and years of experience. Ongoing training is a requirement under the Regulation to allow for continuous learning that will enable process controller to improve their classification over time to achieve Class V that allows them to act as plant supervisor. The required number and classification of staff required at a treatment plant per shift is dependent of the classification of the plant and the number of shifts.

The Blue Drop requirements acknowledge excellence in water services provision. The Blue Drop requirements therefore outlines the number and classification of process controllers and supervisors required for each shift. The Blue Drop requirements make provision for sharing of supervisors: this reduces the burden of providing permanent staff for small, remote systems as a roaming supervisor can visit a number of facilities once or twice a week.

In addition, the Blue Drop requirements outline the requirements for plant maintenance team to ensure effective maintenance of water infrastructure for ongoing operations. The maintenance team must have variety of artisans with electrical, mechanical and civil expertise for effective asset management with assets reaching their expected useful lifespan. The Blue Drop requirements were used to evaluate Risk Indicator D: Technical Skills as per Table below

Table 12: Blue Drop requirements to evaluate technical skills at treatment plants

Works Class	Class Of Process Controller Per Shift	Class Of Process Controller for Supervision*	Operations And Maintenance Support Services Requirements*
E	Class I	Class V*	THESE PERSONNEL MUST BE AVAILABLE AT ALL TIMES BUT MAY BE IN-HOUSE OR OUTSOURCED - electrician - fitter - instrumentation technician
D	Class II	Class V*	
C	Class III	Class V*	
B	Class IV	Class V	
A	Class IV	Class V	

NB. Fluoridation – for any class works, minimum process controller classification should be class IV

**does not have to be at the works at all times but must be available at all times. If the Water Services Institution or owner of a waterwork has no person of this class employed on that work, a contractor / consultant with the required qualifications as prescribed in Schedule III in respect of that particular class of persons, shall be appointed to visit the work weekly.*

Risk Indicator D: Technical Skills is calculated from three separate components:

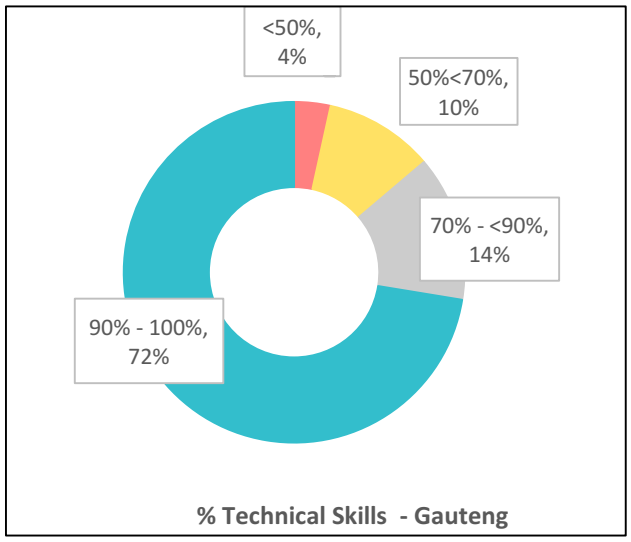
- ✓ Process controllers compliance as per Blue Drop requirements: required number and class of process controllers per shift for specific class of plant.
- ✓ Supervisor compliance as per Blue Drop requirements: Class V required, either at plant or available at all times
- ✓ Maintenance Team compliance as per Blue Drop requirements: civil, mechanical and electrical expertise required.
    - Civil team: plumbing qualification / trade test.
    - Mechanical team: millwright or similar mechanical qualification.
    - Electrical team: electrical qualification / trade test.

The Table and figures below provides a profile of the technical skills in Gauteng Province for July 2020 to June 2021.

Table 35: Gauteng Province Summary of results for Indicator D: Technical Skills

Gauteng	Average	Minimum	Maximum
D: Technical Skills	90.3%	25%	100%
Process Controller Compliance	100%	100%	100%
Supervisor Compliance	92.9%	-	100%

The provincial profile for Risk Indicator D: Technical skills is presented in the figure below.



The results are summarised as follows:

- ✓ 72% of supply system have excellent technical skills: 90 - 100% compliance,
- ✓ 14% of supply systems have good technical skills: 70 - <90% compliance,
- ✓ 10% of supply systems have average technical skills: 50 - <70% compliance,
- ✓ 4% of supply systems have poor technical skills: <50% compliance,

Figure 41: Gauteng profile for Indicator D: Technical Skills

In general Gauteng province has performed well with regards to technical skills.

The provincial profile for process controllers and supervisors compliance is outlined in the figures below.

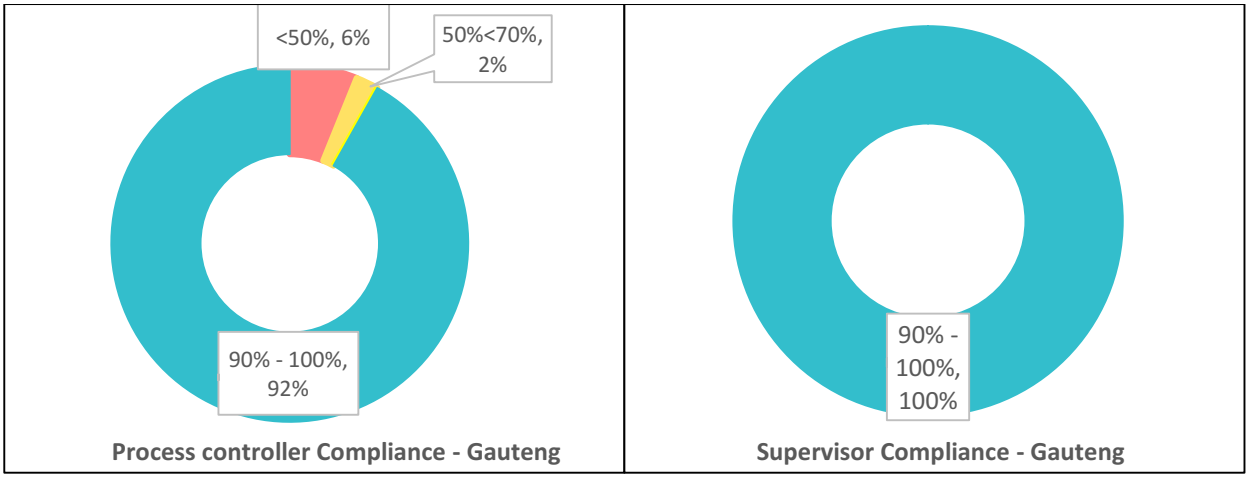


Figure 42: Process controller and Supervisor compliance for Gauteng

The resutls are summarised as follows:

- ✓ Process controller compliance is excellent with 92% of supply systems with sufficient number of suitably classified process controllers per shift,
- ✓ Supervisor compliance is excellent with 100% of supply systems having Class V supervisors either permanently based at the plant or as roaming supervisors which are available at all times to assist process controllers.

The provincial profile for maintenance team as well as breakdown of maintenance team is outlined in the figures below.

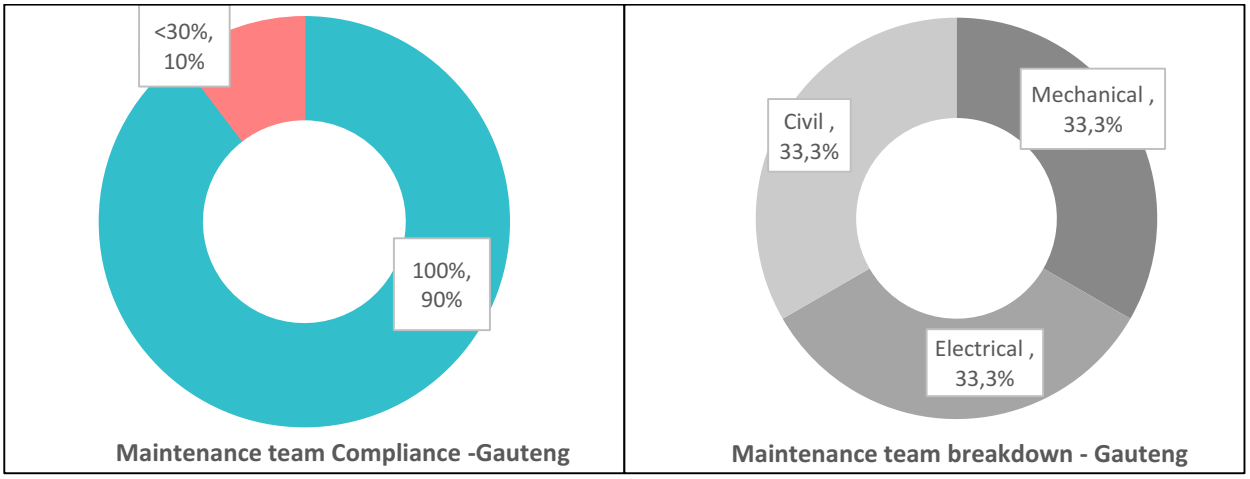


Figure 43: Maintenance team compliance and maintenance team breakdown for Gauteng

The results are summarised as follows:

- ✓ 90% of all supply systems have full maintenance teams in place i.e. civil, mechanical and electrical personnel.
- ✓ There is equal distribution between civil, mechanical and electrical staff indicating sufficient skills are available to ensure effective asset management.

Appointment of suitably qualified process controllers, supervisor and maintenance teams will ensure that the life span of the treatment plant is increased by regular maintenance while water quality compliance improves through process optimisation.

WSAs are encouraged to evaluate the performance of each system with regards to process control and using this information, determine the operational model which is best suited to ensure effective operations and maintenance.

Recommendations

- ✓ Register all process controllers and supervisors on IRIS as per Regulation 2834
- ✓ Ensure all process control staff complies with Blue Drop requirements.
- ✓ Ensure maintenance team includes civil, mechanical and electrical personnel.

- ✓ Provide details of operational staff at all future assessments: copies of process controller and supervisor registration certificates, organograms with shift patterns, copies of qualifications/certificates/current training.
- ✓ Provide details of maintenance team at all future assessments: organogram, shift patterns, names and qualifications of team, copies of qualifications/certificates/current training, details of external service providers.

Risk Indicator E: Water Safety Plans

Risk management is the cornerstone of risk-based regulation and a fundamental part of the SANS 241:2015 requirements to ensure effective management of both current and future potential risks. The application of risk management in drinking water management is through the Water Safety Plan developed by the WHO which is a comprehensive risk assessment and risk management approach that encompasses all steps in a drinking-water supply chain, from catchment to consumer to ensure continuous feedback and improvement to manage all current and future potential risks. The Water Safety Plan advocates for development of a risk-based monitoring programme and this is also a requirement as per SANS 241:2015

This risk indicator E: Water Safety Plans evaluates the following three critical components which are required for effective risk management as per the WHO guidelines and the SANS 241:2015 requirements.

- ✓ Completeness of the Water Safety Plan as per World Health Organisation Water Safety Planning Manual:
  - 1: Signature from Technical director/Municipal Manager
  - 2: Risk prioritisation method
  - 3: Risk assessment of catchment
  - 4: Risk assessment of plant
  - 5: Risk assessment of network
  - 6: Final risk rating
  - 7: Mitigating measures for all high and medium risks.
- ✓ Development and adoption of risk-based monitoring programme as per SANS 241:2015
  - 8: Full SANS 241:2015 analysis of raw and final water
  - 9: Identification of risk determinands
  - 10: Addition of risk determinands to monthly compliance monitoring as per SANS 241:2015
- ✓ Proof of implementation of the findings of the Water Safety Plan to ensure there is continuous risk management and movement towards overall lower risk rating:
  - 11: Proof that >25% of mitigating measures have been implemented – proof in form of purchase order, pictures, water quality results, tender document, etc.

This makes up 11 equal sub-elements that are evaluated during the BDPAT assessment to calculate the final risk rating for this indicator.

The Table and figures below provides a profile of Risk indicator E in Gauteng Province for 2021.

Table 36: Gauteng Province summary of results for Indicator E: Water Safety Plans

Gauteng	Value
E: Water Safety Plans - Average	70.4%
E: Water Safety Plans - Minimum	0%
E: Water Safety Plans - Maximum	100%
% Systems with Water Safety Plans	82%

The provincial profile for E: Water Safety Plans is presented in Figure 44 below and Figure 45 provides details on the completeness of the Water Safety Plan by indicating the percentage of supply systems which comply with each of the 11 individual components which make up the Water Safety Plan.

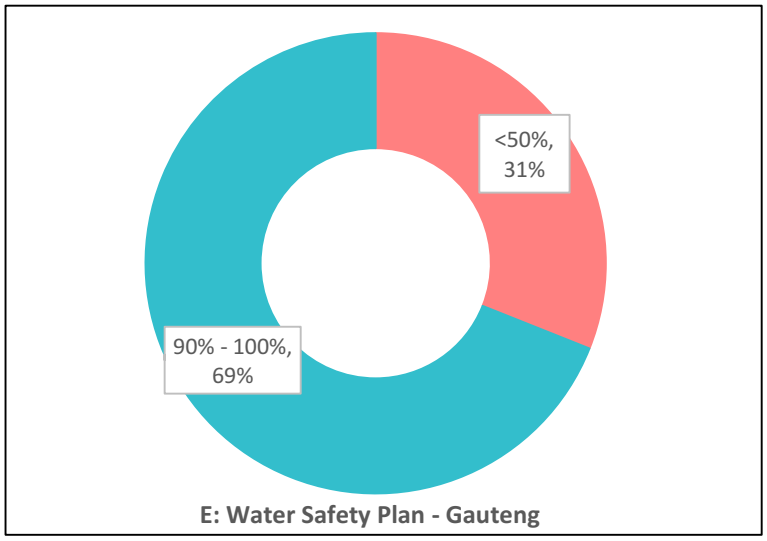


Figure 44: Gauteng Profile for Indicator E: Water Safety Plans

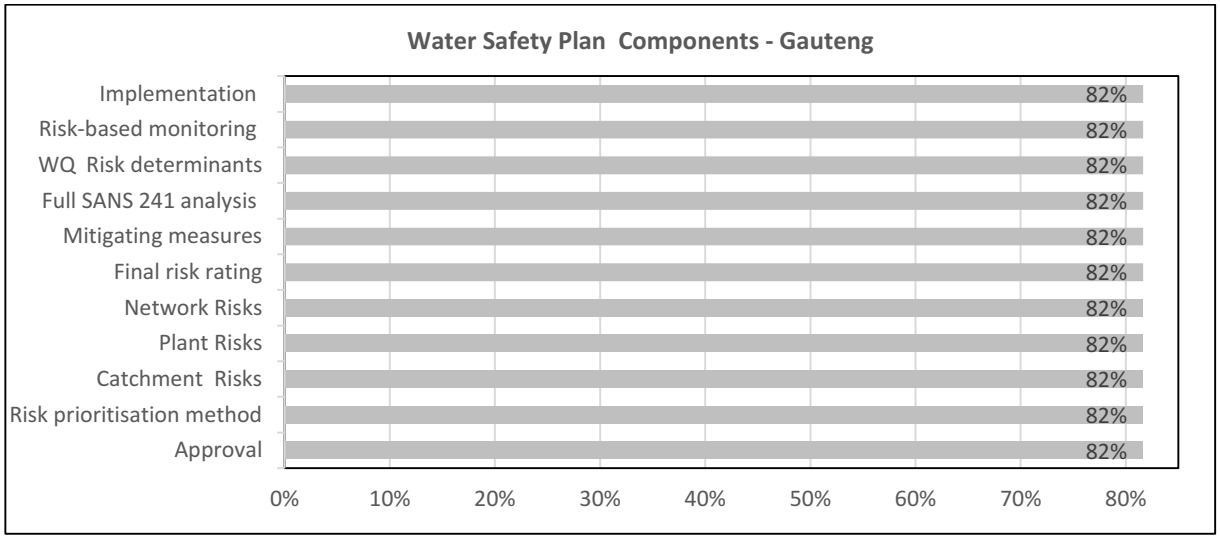


Figure 45: Water Safety Plan components for Gauteng

The results are summarised as follows:

- ✓ 82% of supply systems have Water Safety Plans in place,
- ✓ 69% of supply systems have excellent Water Safety Plans in place with >=90% compliance indicating comprehensive Water Safety Plans with all required components.
- ✓ The average compliance for the province is 70,4% which indicates good understanding of the Water Safety Planning process amongst the WSA's in this province.
- ✓ 82% of water safety plans have all 11 components for a comprehensive plan including approvals, risk assessment, risk-based monitoring programmes and implementation of mitigating measures to address high risks.

In summary, Water Safety Planning is being implemented in the province in 82% of supply systems. The completeness and quality of these Water Safety Plans must be reviewed to ensure all 11 components form part of the plan.

All WSAs must adopt risk management principles embodied in the Water Safety Planning approach as this is a regulatory requirement as per SANS 241:2015 and will assist in driving down risks in the entire supply system from catchment to consumer.

Recommendations

- ✓ Conduct full SANS 241:2015 analysis on raw, final, and distribution network to identify problem determinands.
- ✓ Develop and implement risk-based monitoring programme to include all current and potential determinands

- ✓ Register SANS 241:2015 compliant monitoring programme on IRIS.
- ✓ Conduct monitoring as per programme and upload information on a monthly basis.
- ✓ Develop WSP: conduct annual risk assessment of supply system, assign risk rating, validate control measures and determine residual remaining risk.
- ✓ Develop and implement action plan to mitigate remaining risk. Action plan to include budget, responsibility and timeframe for implementation. Note approval for implementation and budget must be given by senior management (municipal manager of WSA).
- ✓ WSA to provide copy of signed and approved Water safety plan with proof of implementation of corrective actions from previous risk assessment; uploaded on IRIS.

Summary

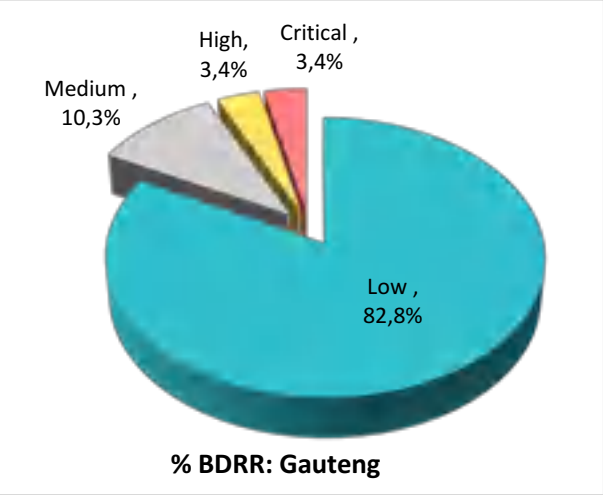
Overall performance for Gauteng is summarised as follows:

- ✓ 83% (24) of supply systems are in the low risk category,
- ✓ 10% (3) of supply systems are in the medium risk category,
- ✓ 3% (1) of supply systems are in the high risk category, and
- ✓ 3% (1) of supply systems are in the critical risk category

DWS is encouraged as the majority of systems in Gauteng are in the low risk category.

The results indicate adequate performance for each risk indictor which will ensure delivery of clean water to all consumers.

However the Department is concerned about the 2 supply systems, one in high risk category and one in the critical risk category.



The figure below shows the % Municipal (weighted) BDRR score for all WSA's in the province.

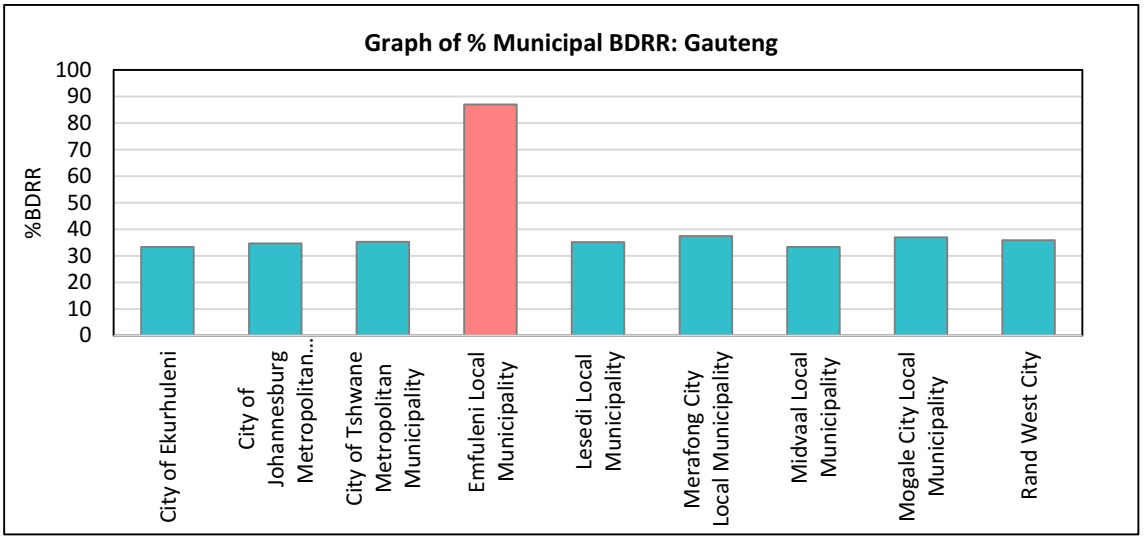


Figure 46: Graph of % Municipal (Weighted) BDRR for each WSA in Gauteng Province

The figure indicates one WSA is in the critical risk category based on % municipal BDRR. Within the province there is 1 supply system in the critical risk category and 1 supply systems in the high risk category.

DWS will evaluate risk based on the individual BDRR score for each supply system. Water supply systems which fall in the critical risk category are placed under regulatory focus. In such cases, a red note is assigned that requires the WSI to "...submit a detailed corrective action plan within 60 days of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvements as outlined in the Regulatory Comment. The plan will be considered against the Regulatory Comment and recommended for approval by a national regulation committee...." This note serves to initiate the Department's Enforcement Protocol.

Note Section 151 of the NWA and Section 63 of the Water Services Act in developing and submitting these plans as required:

- ✓ Section 63 of the Water Services Act enables the Minister in consultation with COGTA to request a relevant Province to intervene in terms of Section 139 of the Constitution in local government. Such requests will be supported by the outcomes of this performance monitoring and WSIs responsiveness on regulatory responses raised.
- ✓ Section 151 of the NWA provides a number of non-compliances as criminal offences, amongst others using water otherwise than is permitted under the Act, failure to provide access to any books, accounts, documents or assets, unlawfully and intentionally or negligently commit any act or omission which affects or is likely to affect a water resource.

Other water supply systems which are in the high risk category will also be targeted for corrective action plans and municipalities are urged to initiate a process of addressing the regulatory comment as a matter of priority.

The WSA's must therefore review the individual BDRR score of each supply system, evaluate the risk indicators which make up the total BDRR score and implement mitigating measures to improve compliance for poor performing risk indicators as outlined below:

- ✓ A: Design Capacity.
  - WSA to report design capacity of treatment plant,
- ✓ B: Operational Capacity.
  - WSA to install flow meters, record daily flow and implement upgrades when operational capacity is above 90%.
- ✓ C: Water Quality compliance
  - WSA to develop and implement microbiological and chemical monitoring programmes as per requirements to verify the safety of the water at all points in the network.
  - In the event of failures, WSA must implement remedial action which include water quality advisories and process optimisation to improve compliance.
- ✓ D: Technical skills
  - WSA to ensure there are sufficient number of qualified technical staff to undertake operations and maintenance of treatment plants and distribution networks.
- ✓ E: Water Safety Plans
  - WSA to develop and implement comprehensive Water Safety Plan as per WHO and SANS 241: 2015 requirements,
  - WSA to conduct water quality assessment as part of water safety planning process, identify risk determinands, and develop and implement risk-based monitoring programme to manage current and future potential risks.
  - Budget and resources to be made available to implement mitigating measures to reduce risk.

In conclusion, WSA's must review the performance of each supply system, interrogate each risk indicator to identify areas of poor performance, and implement remedial actions to improve overall risk rating.

Below is a summary of performance in Gauteng for the following categories:

- ✓ List of % Average BDRR, % Municipal (Weighted) BDRR, and number of supply systems for all WSA's in the province
- ✓ List of Low risk supply systems,
- ✓ List of Critical Risk supply systems which require immediate attention,
- ✓ Top 10 Performing supply systems.

Table 37: List of % Average BDRR, % Municipal BDRR, and number of supply systems for all WSA's in Gauteng

WSA	# Supply Systems	% Municipal BDRR	% Average BDRR per WSA
City of Ekurhuleni Metropolitan Municipality	1	33.3	33.3
City of Johannesburg Metropolitan Municipality	1	34.7	34.7
City of Tshwane Metropolitan Municipality	11	35.2	40.3
Emfuleni Local Municipality	2	86.9	90.3
Lesedi Local Municipality	1	35.1	35.1
Merafong City Local Municipality	3	37.5	37.5
Midvaal Local Municipality	2	33.3	25.1

WSA	# Supply Systems	% Municipal BDRR	% Average BDRR per WSA
Mogale City Local Municipality	1	37.0	37.0
Rand West City Municipality	7	35.9	35.9
Average		**41.0**	**40.6**
Maximum		**86.9**	**93.8**
Minimum		**33.3**	**16.8**

Table 38: List of Low Risk supply systems in Gauteng

Gauteng: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
City of Ekurhuleni Metropolitan Municipality	Ekurhuleni	33.3
City of Johannesburg Metropolitan Municipality	Greater Johannesburg Water Supply System	34.7
City of Tshwane Metropolitan Municipality	Kungwini (Summerplace WTW)	47.0
	Magalies (Cullinan WTW)	26.4
	Magalies (Walmansthal WTW)	30.4
	Onverwacht Informal Settlement	27.1
	Pretoria Central & South (Rietvlei WTW & Rand Water)	34.6
	Pretoria Findley (Fountains)	43.4
	Pretoria North - (Roodeplaat WTW)	20.2
	Sokhulumi Informal Settlement	28.0
Lesedi Local Municipality	Lesedi Main (Rand Water)	35.1
Merafong City Local Municipality	Carletonville (Rand Water)	37.5
	Fochville (Rand Water)	37.5
	Wedela (Rand Water)	37.5
Midvaal Local Municipality	Meyerton (Rand Water)	33.3
	Vaal Marina (Vaal Marina WTW)	16.8
Mogale City Local Municipality	Mogale City Water Supply Systems	37.0
Rand West City Municipality	GT483:Bekkersdal (RW)	37.5
	GT483:Glenharvie (RW)	34.2
	GT483:Suurbekom (RW)	36.4
	GT483:Wagterskop (RW)	36.4
	GT483:Waterpan (RW)	36.4
	GT483:Westonaria RW	34.2
	Randfontein Water Supply Systems	36.2

Table 39: List of Critical Risk supply systems in Gauteng

Gauteng: Critical Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Emfuleni Local Municipality	Vaaloewer (Vaaloewer WTW)	93.8

Table 40: List of Top 10 performing systems in Gauteng

Top 10 Performing Supply Systems in Gauteng		
WSA	**Supply System**	**%BDRR**
Midvaal Local Municipality	Vaal Marina (Vaal Marina WTW)	16.8
City of Tshwane Metropolitan Municipality	Pretoria North - (Roodeplaat WTW)	20.2

Top 10 Performing Supply Systems in Gauteng		
WSA	**Supply System**	**%BDRR**
City of Tshwane Metropolitan Municipality	Magalies (Cullinan WTW)	26.4
City of Tshwane Metropolitan Municipality	Onverwacht Informal Settlement	27.1
City of Tshwane Metropolitan Municipality	Sokhulumi Informal Settlement	28.0
City of Tshwane Metropolitan Municipality	Magalies (Walmansthal WTW)	30.4
City of Ekurhuleni Metropolitan Municipality	Ekurhuleni	33.3
Midvaal Local Municipality	Meyerton (Rand Water)	33.3
Rand West City Municipality	GT483:Glenharvie (RW)	34.2
Rand West City Municipality	GT483:Westonaria RW	34.2

City of Ekurhuleni Metropolitan Municipality

Municipal BDRR Score: 33.3%

Assessment Areas	Ekurhuleni
BULK / WSP	Rand Water
A: Total Design Capacity (Ml/d)	4800
B: % Operational Capacity in terms of design	98.2%
C1a: % Microbiological Compliance	99.9%
C1b: % Microbiological Monitoring Compliance	100%
C2a: % Chemical Compliance	99.8%
C2b: % Chemical Monitoring Compliance	97.1%
D: % Technical Skills	100%
E: % Water Safety Plan Status	100%
%BDRR/BDRR max	**33.3%**

WSA Overview

City of Ekurhuleni MM has one drinking water supply system and Rand Water is their Water Services Provider. A low-risk rating was achieved for the supply system and the Regulator commends the WSA and WSP for that. Under criteria A and B, the WSA is operating above 90% of design capacity, indicating insufficient treatment capacity to supply current and future requirements. Therefore, WSA and WSP are encouraged to initiate planning and budgeting to address capacity exceedance.

The supply system achieved excellent microbiological and good chemical compliance and monitoring programmes are adequately aligned to SANS 241:2015 requirements. This indicates that the water supplied to consumers may not pose serious health risks to the consumers.

An excellent score was achieved under criteria D since the supply system has process controllers and supervisors and maintenance teams that are adequately aligned to the Regulation requirements. Furthermore, excellent score was achieved under Water Safety Planning, indicating that the WSA and WSP are adequately implementing a Water Safety Planning process including adoption of risk-based water quality monitoring and implementation of control measure for high and medium risks.

Overall, the regulator commends the WSA and WSP for the low BDRR achieved and encourages them to continue with good drinking water quality management practices.

City of Johannesburg Metropolitan Municipality

Municipal BDRR Score: 34.7%

Assessment Areas	Greater Johannesburg Water Supply System
BULK / WSP	Rand Water
A: Total Design Capacity (Ml/d)	4800
B: % Operational Capacity in terms of design	98.2%
C1a: % Microbiological Compliance	99.7%
C1b: % Microbiological Monitoring Compliance	97.8%
C2a: % Chemical Compliance	99.8%
C2b: % Chemical Monitoring Compliance	70%
D: % Technical Skills	100%
E: % Water Safety Plan Status	100%
%BDRR/BDRR max	34.7%

WSA Overview

City of Johannesburg MM has one drinking water supply system and Rand Water is their Water Services Provider. A low-risk rating was achieved for the supply system and the Regulator commends the WSA and WSP for that. Under criteria A and B, the supply system is operating above 90% of design capacity, indicating insufficient treatment capacity to supply current and future requirements. Therefore, WSA and WSP are encouraged to initiate planning and budgeting to address capacity exceedance.

The supply system achieved excellent microbiological and good chemical compliance and microbiological monitoring programme is adequately aligned to SANS 241:2015 requirements. This indicates that the water supplied to consumers may not pose serious health risks to the consumers. Although the chemical monitoring programme is to a degree aligned to SANS 241:2015 requirements, WSA and WSP are encouraged to review it to achieve the required 80% alignment.

An excellent score was achieved under criteria D since the supply system has process controllers and supervisors and maintenance teams that are adequately aligned to the Regulation requirements. Furthermore, excellent score was achieved under Water Safety Planning, indicating that the WSA and WSP are adequately implementing a Water Safety Planning process including adoption of risk-based water quality monitoring and implementation of control measure for high and medium risks.

Overall, the regulator commends the WSA and WSP for the low BDRR achieved and encourages them to continue with good drinking water quality management practices.

City of Tshwane Metropolitan Municipality

Municipal BDRR Score: 35.2%

Assessment Areas	Pretoria Central & South (Rietvlei WTW & RW)	Pretoria Findley (Fountains)	Pretoria Temba (Temba WTW; Klipdrift WTW)	Onverwacht Informal Settlement
BULK / WSP	Rand Water		Magalies Water	
A: Total Design Capacity (Ml/d)	4840	30	102	0.15
B: % Operational Capacity in terms of design	98%	N/I	78.4%	N/I
C1a: % Microbiological Compliance	99.9%	99.9%	99.7%	96.7%
C1b: % Microbiological Monitoring Compliance	93.1%	100%	80.1%	87.5%
C2a: % Chemical Compliance	99.9%	99.7%	95.0%	97.2%
C2b: % Chemical Monitoring Compliance	66.5%	20.6%	48.8%	20.6%
D: % Technical Skills	100%	62.6%	100%	62.5%
E: % Water Safety Plan Status	99.2%	0%	41.2%	0%
%BDRR/BDRR max	34.6%	43.4%	54.3%	27.1%

Assessment Areas	Pretoria North (Roodeplaat WTW)	Sokhulumi Informal Settlement	Kungwini 1 (Bronkhorstpruit Town WTW)	Kungwini 2 (Bronkhorstbaai WTW)
BULK / WSP				
A: Total Design Capacity (Ml/d)	60	1.55	54	N/I
B: % Operational Capacity in terms of design	41.7%	7.5%	82.4%	N/I
C1a: % Microbiological Compliance	100%	99.2%	97.6%	98.3%
C1b: % Microbiological Monitoring Compliance	52.7%	95.8%	77%	95.8%
C2a: % Chemical Compliance	99.6%	92.1%	91.1%	86.9%
C2b: % Chemical Monitoring Compliance	20.6%	20.6%	20.6%	20.6%
D: % Technical Skills	100%	100%	81.3%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	20.2%	28.0%	67.2%	64.3%

Assessment Areas	Kungwini (Summerplace WTW)	Magalies (Cullinan WTW)	Magalies (Walmansthal WTW)
BULK / WSP		Magalies Water	Magalies Water
A: Total Design Capacity (Ml/d)	0.7	16	12
B: % Operational Capacity in terms of design	N/I	63.1%	96.7%
C1a: % Microbiological Compliance	97.3%	99.8%	100%
C1b: % Microbiological Monitoring Compliance	95.8%	96.5%	99.3%
C2a: % Chemical Compliance	88.9%	98.7%	96.7%
C2b: % Chemical Monitoring Compliance	20.6%	56%	48.8%
D: % Technical Skills	62.5%	100%	100%
E: % Water Safety Plan Status	0%	100%	100%
%BDRR/BDRR max	47.0%	26.4%	30.4%

WSA Overview

Eleven drinking water supply systems were assessed under the City of Tshwane MM. Nine supply systems achieved a low-risk rating while the other two (Pretoria Temba and Onverwacht) achieved medium-risk ratings.

With regards to criteria A and B, Kungwini 2 supply system does not have a linked WSS on IRIS and this impacted on the score under criteria A and B. Pretoria Findley, Onverwacht and Kungwini – Summer place supply systems do not have operational capacity information. This may indicate that flow monitoring is not undertaken at the associated WSS. The remainder of the supply systems have information on both design and operational capacities. However, Pretoria Central & South and Magalies – Walmansthal supply systems are operating above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

Criteria C reports on the actual water quality in the supply systems: Seven supply systems achieved acceptable to excellent microbiological and chemical compliance, indicating health risks associated with poor water quality are reduced for these systems. However, both microbiological and chemical monitoring programmes are not adequately aligned to SANS 241:2015 requirements (achieved <80% monitoring compliance) and this reduces the Regulators confidence in the quality of water supplied. Therefore, this should be addressed urgently. Although the remainder of the supply systems achieved acceptable to excellent microbiological compliance, poor chemical compliance achieved at these systems coupled with inadequate alignment of monitoring programmes (for some systems) to SANS 241:2015 requirements means that water supplied may still present health and aesthetic risks to the consumer. This should be addressed urgently.

Pretoria Central & South, Pretoria Temba, Pretoria North, Sokhulumi Informal Settlement, Magalies - Cullinan and Magalies – Walmansthal achieved excellent scores under criteria D. This indicated that supervisors, process controllers and maintenance teams are adequately aligned to the regulation's requirements. Although staff is also available at the remainder of the supply systems, alignment to the regulations requirements is lacking and should be addressed.

Three supply systems (Pretoria Central & South, Magalies - Cullinan and Magalies – Walmansthal) achieved excellent scores for Criteria E: Water Safety Planning. This indicates implementation of Water Safety Plans and development of risk-based water quality monitoring s as outlined in SANS 241:2015. For the remainder of the systems a Water Safety Planning process has either not been adopted and implemented or is not aligned to SANS 241:2015 requirements and this impacted on criteria E scores.

The Regulator encourages the WSA (and WSPs) to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity at all WTW where flow monitoring is not taking place.
- ✓ A and B: Planning and budgeting to address capacity exceedance at all WTW which are operating above 90% of capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015. This is especially applicable to all systems that achieved <80% monitoring compliance.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS.
- ✓ E: Development and implementation of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Emfuleni Local Municipality

Municipal BDRR Score: 86.9%

Assessment Areas	Emfuleni Water Supply System	Vaaloewer (Vaaloewer WTW)
BULK / WSP	Rand Water	
A: Total Design Capacity (Ml/d)	4800	2.00
B: % Operational Capacity in terms of design	98.2%	N/I
C1a: % Microbiological Compliance	60%	0%
C1b: % Microbiological Monitoring Compliance	60%	0%
C2a: % Chemical Compliance	60%	0%
C2b: % Chemical Monitoring Compliance	58.2%	0%
D: % Technical Skills	100%	75%
E: % Water Safety Plan Status	100%	0%
%BDRR/BDRR max	86.9%	93.8%

WSA Overview

Emfuleni LM has two drinking water supply systems in their area of jurisdiction. Emfuleni supply system (with Rand Water as waster services provider) achieved a high-risk rating while Vaaloewer supply system achieved a critical-risk rating.

With regards to criteria A and B, Emfuleni supply system is operating above 90% of design capacity, indicating insufficient treatment capacity to supply current and future requirements. Operational capacity information for Vaaloewer system was not provided, indicating that flow monitoring may not be taking place. Unavailability of flow monitoring information can impact on the municipality's planning process and also effect implementation of water conservation and demand management.

With regards to Criteria C reports no water quality monitoring information was provided for Vaaloewer supply system indicating that water quality monitoring may not be taking place. This presents serious health risks to the consumers and should be urgently addressed. Although water quality monitoring is undertaken at Emfuleni supply system, poor microbiological and chemical compliance was achieved and the associated monitoring programmes are not adequately aligned to SANS 241:2015.

Under criteria D, Emfuleni supply system achieved an excellent score indicating the supervisors, process controllers and maintenance teams are adequately aligned to the Regulations requirements. Although Vaaloewer system's supervisor and process controllers are adequately aligned to the regulation's requirements, the maintenance team is lacking. This has impacted on the score under criteria D and has potential to affect the delivery of safe drinking water to consumers.

Emfuleni supply system achieved an excellent score under Water Safety Plan availability. This indicates implementation of Water Safety Plans and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015. However, a SANS 241:2015 and WHO aligned Water Safety Plan is not available for Vaaloewer supply system and this resulted in poor score under this criterion.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and calibration of inflow meters to verify operational capacity at Vaaloewer WTW.
- ✓ A and B: Planning and budgeting to address capacity exceedance at Emfuleni supply system operating above 90% of design.
- ✓ C: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times. Implementation of monitoring programme with sufficient samples based on population size as outlined in SANS 241:2015. Subsequent results should then be submitted to the Regulator through IRIS.
- ✓ D: Appointment of suitably qualified and/or training of existing staff (maintenance team) for Vaaloewer supply system to ensure adequate alignment to set criteria.
- ✓ E: Development of a Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks. This is applicable for Valour supply system.

Lesedi Local Municipality

Municipal BDRR Score: 35.1%

Assessment Areas	Lesedi Main (Rand Water)
BULK / WSP	Rand Water
A: Total Design Capacity (Ml/d)	4800
B: % Operational Capacity in terms of design	98.2%
C1a: % Microbiological Compliance	100%
C1b: % Microbiological Monitoring Compliance	98.8%
C2a: % Chemical Compliance	99.9%
C2b: % Chemical Monitoring Compliance	67.7%
D: % Technical Skills	75%
E: % Water Safety Plan Status	100%
%BDRR/BDRR max	35.1%

WSA Overview

The municipality has one drinking water supply system and Rand Water is their Water Services Provider. A low-risk rating was achieved for the supply system and the Regulator commends the WSA and WSP for that.

Under criteria A and B, the supply system is operating above 90% of design capacity, indicating insufficient treatment capacity to supply current and future requirements. Therefore, WSA and WSP are encouraged to initiate planning and budgeting to address capacity exceedance.

The supply system achieved excellent microbiological and chemical compliance and the microbiological monitoring programme is adequately aligned to SANS 241:2015 requirements. This indicates that the water supplied to consumers may not pose serious health risks to the consumers. Although the chemical monitoring programme is to a degree aligned to SANS 241:2015 requirements, WSA and WSP are encouraged to review it to achieve the required 80% alignment.

An adequate score was achieved under criteria D since the supply system's process controllers and supervisors are adequately aligned to the Regulation requirements. However, the maintenance team is lacking in this regard.

An excellent score was achieved under Water Safety Planning, indicating that the WSA and WSP are adequately implementing a Water Safety Planning process including adoption of risk-based water quality monitoring and implementation of control measure for high and medium risks.

Overall, the regulator commends the WSA and WSP for the low BDRR achieved and encourages them to continue with good drinking water quality management practices.

Merafong City Local Municipality

Municipal BDRR Score: 37.5%

Assessment Areas	Carletonville (Rand Water)	Fochville (Rand Water)	Wedela (Rand Water)
BULK / WSP	Rand Water	Rand Water	Rand Water
A: Total Design Capacity (Ml/d)	4800	4800	4800
B: % Operational Capacity in terms of design	98.2%	98.2%	98.2%
C1a: % Microbiological Compliance	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	69.6%	70.2%	70.6%
C2a: % Chemical Compliance	100%	99.7%	100%
C2b: % Chemical Monitoring Compliance	73.5%	74.7%	73.5%
D: % Technical Skills	100%	100%	100%
E: % Water Safety Plan Status	100%	100%	100%
%BDRR/BDRR max	37.5%	37.5%	37.5%

WSA Overview

Merafong City LM has three drinking water supply systems and Rand Water is their Water Services Provider. All supply systems achieved a low-risk rating and the Regulator commends the WSA and WSP for that.

Under criteria A and B, WTWs that feeds all three supply system are operating above 90% of design capacity, indicating insufficient treatment capacity to supply current and future requirements. Therefore, WSA and WSP are encouraged to initiate planning and budgeting to address capacity exceedance.

All supply system achieved excellent microbiological and chemical compliance indicating that the water supplied to consumers may not pose serious health risks to the consumers. Although the microbiological and chemical monitoring programme is to a degree aligned to SANS 241:2015 requirements, WSA and WSP are encouraged to review it to achieve the required 80% alignment since low alignment of monitoring programmes to SANS 241:2015 requirements reduces the confidence in the quality of water supplied.

The three supply systems achieved excellent score under criteria D. This indicates that they are adequately aligned to the Regulation requirements. Furthermore, excellent scores were achieved under Water Safety Planning, indicating that the WSA and WSP are adequately implementing a Water Safety Planning process including adoption of risk-based water quality monitoring and implementation of control measure for high and medium risks.

Overall, the Regulator commends the WSA and WSP for the low BDRR achieved and encourages them to continue with good drinking water quality management practices.

Midvaal Local Municipality

Municipal BDRR Score: 33.3%

Assessment Areas	Meyerton (Rand Water)	Vaal Marina (Vaal Marina WTW)
BULK / WSP	Rand Water	
A: Total Design Capacity (Ml/d)	4800	10
B: % Operational Capacity in terms of design	98.2%	13.5%
C1a: % Microbiological Compliance	100%	98.4%
C1b: % Microbiological Monitoring Compliance	99.2%	100%
C2a: % Chemical Compliance	99.8%	97.3%
C2b: % Chemical Monitoring Compliance	95.9%	94.1%
D: % Technical Skills	100%	100%
E: % Water Safety Plan Status	100%	100%
%BDRR/BDRR max	33.3%	16.8%

WSA Overview

Midvaal LM has two drinking water supply system and Rand Water is the Water Services Provider at the Meyerton supply system. Low-risk ratings were achieved for both supply systems and the Regulator commends the WSA and WSP for that.

Under criteria A and B, the Meyerton supply system is operating above 90% of design capacity, indicating insufficient treatment capacity to supply current and future requirements. Therefore, WSA and WSP are encouraged to initiate planning and budgeting to address capacity exceedance. Vaal Marina WTW is indicated to be operating at 13% of design capacity. This may be an error or may be an indication that flow meters are not calibrated. Therefore, WSA and WSP are urged to calibrate flow meters and verify operational capacity for this system.

Both supply systems achieved excellent microbiological and chemical compliance and monitoring programmes are adequately aligned to SANS 241:2015 requirements. This indicates that the water supplied to consumers may not pose serious health risks to the consumers.

With regards to criteria D, both Meyerton and Vaal Marina supply systems achieved excellent scores. This indicates that they are adequately aligned to the Regulation requirements. Furthermore, excellent scores were achieved under Water Safety Planning, indicating that the WSA and WSP are adequately implementing a Water Safety Planning process including adoption of risk-based water quality monitoring and implementation of control measure for high and medium risks.

Overall, the regulator commends the WSA and WSP for the low BDRR achieved and encourages them to continue with good drinking water quality management practices.

Mogale City Local Municipality

Municipal BDRR Score: 37%

Assessment Areas	Mogale City Water Supply Systems
BULK / WSP	Rand Water
A: Total Design Capacity (Ml/d)	4800
B: % Operational Capacity in terms of design	98.2%
C1a: % Microbiological Compliance	99.9%
C1b: % Microbiological Monitoring Compliance	98.8%
C2a: % Chemical Compliance	99.5%
C2b: % Chemical Monitoring Compliance	77.1%
D: % Technical Skills	100%
E: % Water Safety Plan Status	100%
%BDRR/BDRR max	37.0%

WSA Overview

Mogale City LM has one drinking water supply system and Rand Water is their Water Services Provider. A low-risk rating was achieved for the supply system and the Regulator commends the WSA and WSP for that. Under criteria A and B, the supply system is operating above 90% of design capacity, indicating insufficient treatment capacity to supply current and future requirements. Therefore, WSA and WSP are encouraged to initiate planning and budgeting to address capacity exceedance.

The supply system achieved excellent microbiological and chemical compliance and the microbiological monitoring programme is adequately aligned to SANS 241:2015 requirements. This indicates that the water supplied to consumers may not pose serious health risks to the consumers. Although the chemical monitoring programme is to a degree aligned to SANS 241:2015 requirements, WSA and WSP are encouraged to review it to achieve the required 80% alignment.

An excellent score was achieved under criteria D since the supply system has process controllers and supervisors and maintenance teams that are adequately aligned to the Regulation requirements. Furthermore, excellent score was achieved under Water Safety Planning, indicating that the WSA and WSP are adequately implementing a Water Safety Planning process including adoption of risk-based water quality monitoring and implementation of control measure for high and medium risks.

Overall, the regulator commends the WSA and WSP for the low BDRR achieved and encourages them to continue with good drinking water quality management practices.

Rand West City Local Municipality

Municipal BDRR Score: 35.9%

Assessment Areas	GT483: Bekkersdal (RW)	GT483: Glenharvie (RW)	GT483: Suurbekom (RW)	GT483: Wagterskop (RW)
BULK / WSP	Rand Water	Rand Water	Rand Water	Rand Water
A: Total Design Capacity (Ml/d)	4800	4800	4800	4800
B: % Operational Capacity in terms of design	98.2%	98.2%	98.2%	98.2%
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	71.3%	96.7%	78.3%	78.3%
C2a: % Chemical Compliance	100%	100%	100%	100%
C2b: % Chemical Monitoring Compliance	72.4%	72.4%	72.4%	72.4%
D: % Technical Skills	100%	100%	100%	100%
E: % Water Safety Plan Status	100%	100%	100%	100%
%BDRR/BDRR max	37.5%	34.2%	36.4%	36.4%

Assessment Areas	GT483: Waterpan (RW)	GT483: Westonaria RW	Randfontein Supply System
BULK / WSP	Rand Water	Rand Water	Rand Water
A: Total Design Capacity (Ml/d)	4800	4800	4800
B: % Operational Capacity in terms of design	98.2%	98.2%	98.2%
C1a: % Microbiological Compliance	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	78.3%	96.7%	89%
C2a: % Chemical Compliance	100%	100%	100%
C2b: % Chemical Monitoring Compliance	72.4%	72.4%	72.4%
D: % Technical Skills	100%	100%	75.0%
E: % Water Safety Plan Status	100%	100%	100%
%BDRR/BDRR max	36.4%	34.2%	36.2%

WSA Overview

Rand West City LM has seven drinking water supply systems and Rand Water is their Water Services Provider. All supply systems achieved low-risk rating and the Regulator commends the WSA and WSP for that.

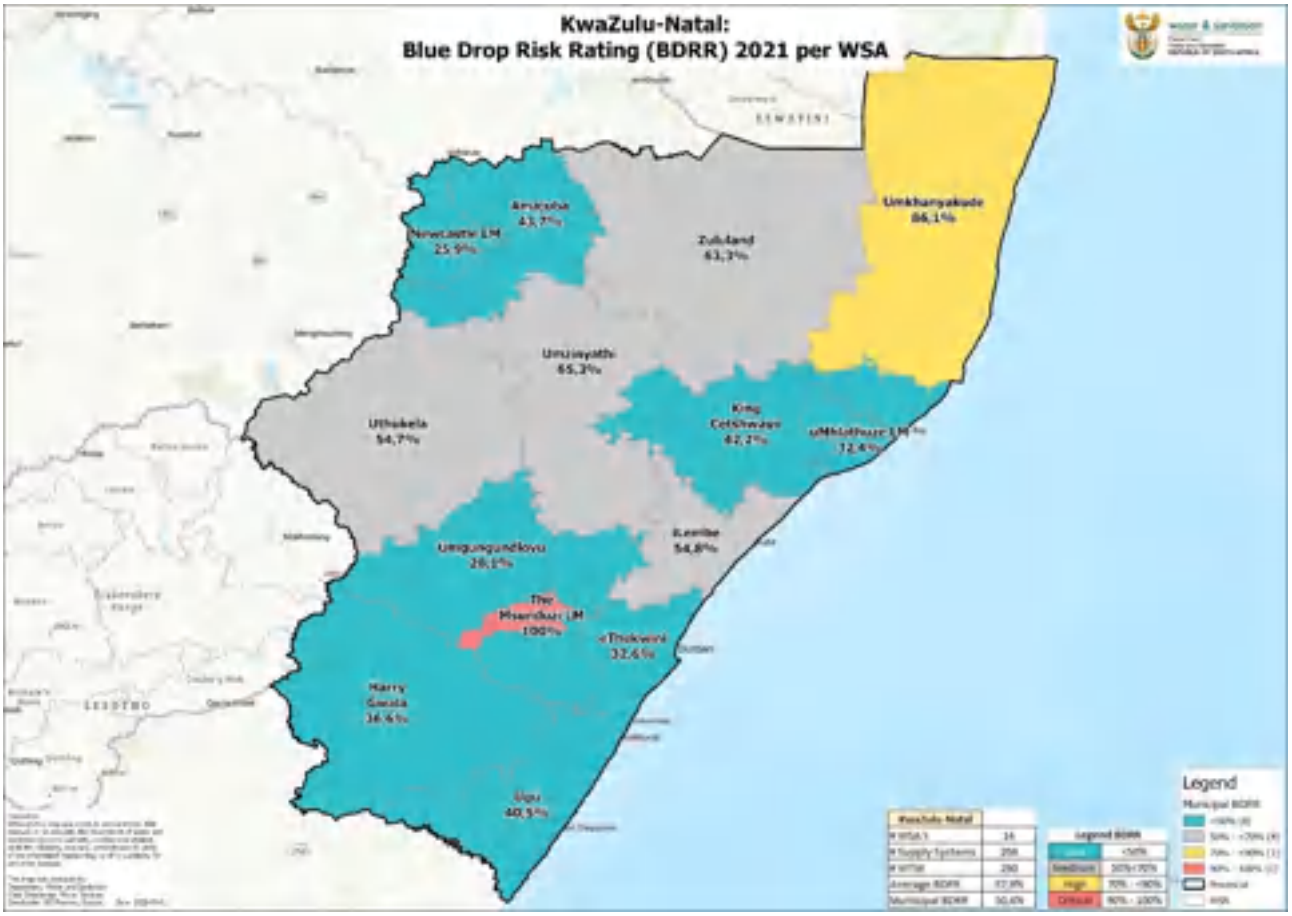
Under criteria A and B, WTWs that feeds all seven supply system are operating above 90% of design capacity, indicating insufficient treatment capacity to supply current and future requirements. Therefore, WSA and WSP are encouraged to initiate planning and budgeting to address capacity exceedance.

All supply system achieved excellent microbiological and chemical compliance indicating that the water supplied to consumers may not pose serious health risks to the consumers. Although the microbiological and chemical monitoring programme is to a degree aligned to SANS 241:2015 requirements, WSA and WSP are encouraged to review it to achieve the required 80% alignment since low alignment of monitoring programmes to SANS 241:2015 requirements reduces the confidence in the quality of water supplied.

Under criteria D, all supply systems achieved excellent scores. This indicates that process controllers, supervisors and maintenance teams are adequately aligned to the Regulation requirements. Furthermore, excellent scores were achieved under Water Safety Planning, indicating that the WSA and WSP are adequately implementing a Water Safety Planning process including adoption of risk-based water quality monitoring and implementation of control measure for high and medium risks.

Overall, the regulator commends the WSA and WSP for the low BDRR achieved and encourages them to continue with good drinking water quality management practices.

CHAPTER 6: KWAZULU NATAL PROVINCE



PROVINCIAL BDRR TREND ANALYSIS

One of the outcomes of Incentive and Risk-based Regulation is the regular monitoring and reporting on the performance of the WSA to ensure strategic operational and management plans are constantly realigned to achieve compliance and effectively manage risks for provision of sustainable water services. For risk-based regulation, the movement in BDRR is a vital tool for both the Department and the WSA to monitor and track the levels of risk in the country. The 2021 BDRR will serve as a baseline for future BDRR assessments that will be used by DWS to monitor and manage drinking water supply systems to ensure delivery of safe drinking water to all communities.

BDRR is calculated and categorised as either low, medium, high and critical risk rating, calculated according to the following range of values to enable both WSA and DWS to monitor performance.

Table 1: BDRR categorisation

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

The BDRR formular is made up of five risk indicators with an overall BDRR for each supply system. The overall performance of each WSA is reported in two ways:

- ✓ Average % BDRR: average % BDRR for all supply systems per province.
- ✓ % Municipal (weighted) BDRR: The Municipal BDRR for each WSA is calculated by the proportional contribution of each water supply system based on design capacity of each system. This weighted average may provide skewed picture i.e. a supply system which receives a small fraction of the total flow from a larger treatment plant will carry a higher weighting compared to a system which received 100% from a smaller treatment plant.

Therefore, the WSA must evaluate the individual % BDRR scores of each system to determine the risk associated with provision of drinking water for each system and not use the % Municipal BDRR score to evaluate their performance. Regardless of the size of the systems, all consumers have a right to safe drinking water and the WSA must be wary of neglecting the management of smaller, rural schemes in favour of larger urban systems.

The % Municipal (weighted) BDRR for all WSA's in the province is provided at the end of each provincial chapter for reference.

In 2021, 14 WSA's were assessed in KZN province with a total to 204 water supply systems. The assessment period for all Risk Indicators was July 2020 to June 2021 except for Risk Indicator C: Water Quality compliance where assessment period was January to December 2020.

The risk performance trends for KZN Province are summarised below to provide a provincial overview of BDRR.

Table 41: 2021 Risk Performance trends for KZN

Risk Rating	Average	Minimum	Maximum
% Municipal BDRR (Weighted Score)	50.4%	25.9%	100%
% BDRR	57.9%	10.1%	100%
A: Design Capacity (Ml/d)	10.7	0.01	614
C1a: % Microbiological Compliance	69.7%	0%	100%
C1b: % Microbiological Monitoring Compliance	59.5%	0%	100%
C2a: % Chemical Compliance	68.9%	0%	100%
C2b: % Chemical Monitoring Compliance	36.1%	0%	97.1%
D: % Technical Skills	41.6%	0%	100%
E: % Water Safety Plan Status	24.4%	0%	100%

The BDRR profile for KZN province is outlined in the figure below.

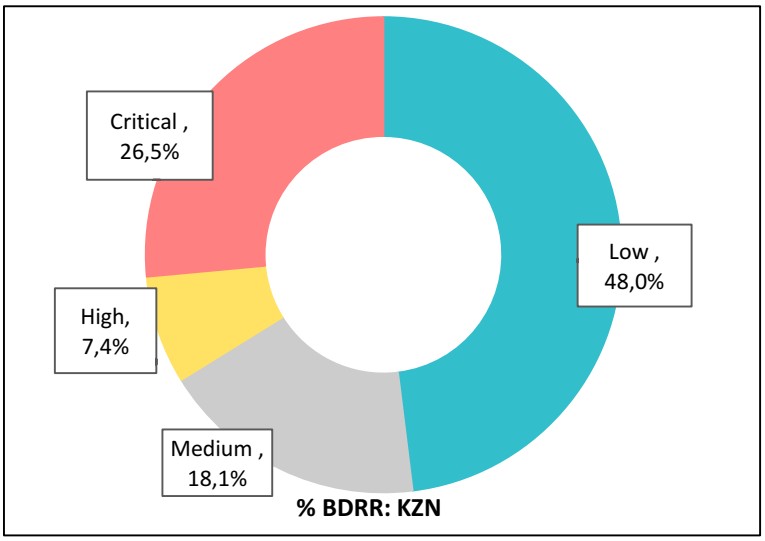


Figure 47: BDRR profile for KZN

The results for KZN are summarised as follows:

- ✓ 48% of supply systems are in the low risk category,
- ✓ 18.1% are in the medium risk category,
- ✓ 7.4% are in the high risk category, and
- ✓ 26.5% are in the critical risk category.

To use the 2021 BDRR score as a tool to implement strategic, targeted actions that will result in an improved risk rating and sustainable water services delivery, the individual components of the BDRR score must be critically evaluated by the WSA to understand the reason for the current risk rating and the desired risk category for delivery of safe drinking water.

The BDRR scorecards reports on the following system-specific risk indicators which ultimately feed into the BDRR score:

- ✓ Risk Indicator A: Design capacity,
- ✓ Risk Indicator B: Operational Capacity,

- ✓ Risk Indicator C: Water Quality Compliance,
- ✓ Risk Indicator D: Technical skills, and
- ✓ Risk Indicator E: Water Safety Plans.

The trends with regard to the risk rating of the individual indicator which make up the overall BDRR score is discussed below. This will provide insight on the risk status of each indicator and enable the WSA to implement targeted actions to reduce risk of specific risk indicators which are negatively impacting on the final BDRR score of the supply system.

Risk Indicator A: Design Capacity and Risk Indicator B: Operational Capacity

Criterion A represents the design capacity of the treatment plant.

Every water treatment plant must be classified with DWS as per Regulation 2834. The classification of the treatment plant is based on a number of components, including size, complexity and electrical consumption, as per set criteria. The plant classification certificate is available on IRIS and used to determine the risk rating for criterion A as it states the capacity of the plant.

The risk rating is allocated according to size of the treatment plant with higher risk rating given for a larger plant and lower risk rating for a smaller plant. The rationale is that a larger plant serves a larger community and therefore presents a higher risk if the plant is not functioning or producing unsafe drinking water than a smaller plant which serves less people. The risk rating for criteria A remains the same provided the capacity stays the same, and all plants which have the same design capacity range will have the same maximum BDRR.

Information from the IRIS system was collected to provide a profile of the design capacities of all treatment plants in the province. Some of the treatment plants are large regional bulk schemes which supply water to a number of supply systems in various municipalities and across provinces. The figure below reports on the design capacity of treatment plants located in the province in Ml/d.

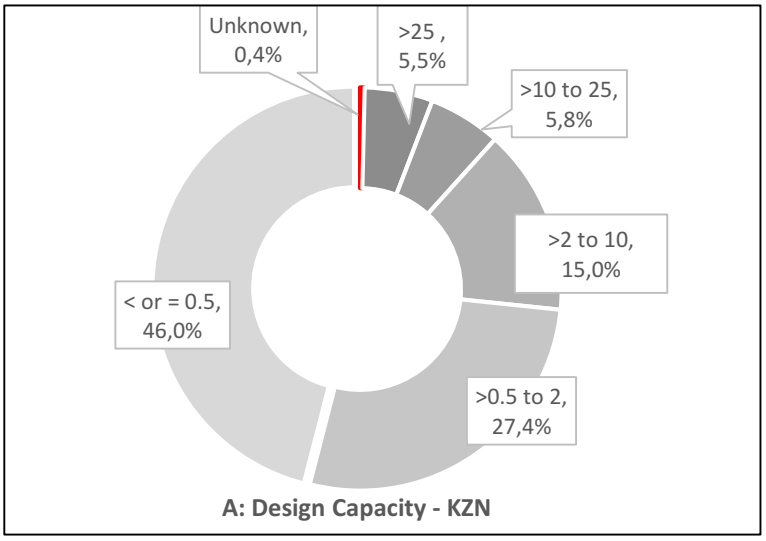


Figure 48: Profile of design capacity in KZN (Ml/d)

The results are summarised as follows:

- ✓ There are 260 water treatment plants situated in the KZN province with a combined capacity of 2 955 Ml/d,
- ✓ Reported population served = 8.6 million people,
- ✓ Average design capacity in province = 10.7 Ml/d,
- ✓ Largest plant in province = 614 Ml/d,
- ✓ Smallest plant in province = 0.01 Ml/d,
- ✓ 46% of plant are <=0.5 Ml/d, 27.4% are between 0.5 and 2 Ml/d, 15% are between 2 and 10 Ml/d, 5.8 % are between 10 and 25 Ml/d and 5.5% are >25 Ml/d,
- ✓ 0.4% of plants have not provided design capacity.

In summary, 73% of treatment plants in KZN are categorised as small plants (0 – 2 Ml/d) which can include rural borehole schemes. 20.8% are in the medium category (>2 – 25 Ml/d) and only 5.5% are large plants (>25 Ml/d) which are typically located in metropolitan areas in

the province or are part of bulk regional schemes. Operation and management of large number of rural schemes present challenges as these plants are usually located across a large geographical area with some plants in remote areas. This requires additional resources such as staff, chemical supplies, spares and vehicles to ensure optimal operations of these systems.

With regards to **Risk Indicator B: Operational capacity**, daily production versus the design capacity of the treatment plant is an important indicator to determine if the plant can provide sufficient, safe drinking water to all the consumers now and in the near future. When the plant is operating above its design capacity, major unit processes are overloaded and cannot achieve their operational limits which leads to water quality failures.

Risk Indicator C indicates the current operational capacity of the treatment plant in each supply system as a percentage of the design capacity of the plant. The ideal value is between 50 – 100%; higher values indicate the plant is overloaded and lower values indicate the plant is receiving too little flow which may also compromise performance due to lack of retention time (flocculation, sedimentation). Once daily production approaches 90% of design capacity, the WSA must plan, budget and implement projects to increase the capacity of the treatment plant to ensure there is sufficient supply, not only for human consumption, but also for economic activities

Although operational capacity has been reported for all supply systems, there are a number of large regional plants which supply a large number of supply systems in various municipalities and across provincial borders. Analysis of Indicator B must therefore be conducted at plant level as collating operational capacity data at municipal or provincial level will not provide an accurate reflection of the current operational capacity of each individual plant.

WSAs are reminded that installation of flow meter and daily flow recording is a regulatory requirement as per their Water Use License.

Recommendations

- ✓ WSAs must ensure all treatment plants have updated plant registration certificates on IRIS.
- ✓ WSAs must provide updated copies of plant registration certificates supported with documents on the design capacity of treatment plant for future BDRR assessments.
- ✓ WSA to install flow meters at raw and final water points, monitor daily flows and ensure annual calibration of meters for accuracy of results.
- ✓ Budget and plan for upgrade of treatment plant when operational capacity is at 90% to ensure sufficient time for implementation of civil projects.
- ✓ Consult Census, WSDP and Reconciliation strategies to determine current and future allocation and demand, use a 10-year forecast period

Risk Indicator C: Water Quality Compliance

In South Africa, the SANS 241:2015 is the definitive reference on acceptable limits for drinking water quality parameters and provides limits for a range of water quality characteristics and water meeting this standard is deemed safe for lifetime consumption. The actual water quality depends on both microbiological and chemical determinands:

- ✓ Microbiological compliance reports on the actual compliance of the final water for the past 12 months against microbiological determinands E. Coli / Faecal Coliforms. The presence of these determinands in water is a strong indication of recent sewage or animal waste contamination and there is potential for contracting diseases from pathogens.
- ✓ Chemical quality is determined by a number of determinands which may be acute or chronic health determinands with specific health risks associated with each determinands. Acute health risks can result in death if the limit is exceeded, while chronic limits provide maximum limits that can be ingested over a period of time before health effects are observed.

Both microbiological and chemical compliance limits outlined in SANS 241:2015 is evaluated against the population size: for a population <100 000, compliance is >98% while for a population >100 000, compliance limit is >99%.

In addition, the SANS 241:2015 standard stipulates the frequency of sampling as well as the number of sample points required per supply system to ensure sufficient coverage of the network. The frequency and number of required sample points is dependent on the population size as outlined in Table 1 of SANS241:2015 Monitoring compliance is therefore critical to guarantee the safety of the supply at all points in the network.

Indicator C: Water Quality Compliance reports on both water quality compliance and monitoring compliance as per SANS 241:2015 for both microbiological and chemical determinands. The formular to calculate C is made up of four sub-indicators with microbiological compliance carrying a higher weighting than chemical compliance as this presents a serious, acute health risk.

The formular for Indicator C, description and categorisation of each sub-indicator is presented in the table below. The categorisation is aligned with the risk rating for each sub-indicator and results are reported for all supply systems in the province. All supply systems which fall in the Low Risk category are regarded as compliant systems.

Table 10: Formular, description and categorisation for Criteria C

<table>
<tr><th colspan="3">C = [0.7(C1a x C1b)] + [0.3(C2a x C2b)]</th></tr>
<tr><td rowspan="2">Ca: Water Quality Compliance</td><td>C1a: Microbiological compliance as per SANS 241: 2015.</td><td rowspan="2"><table><tr><th>High Risk</th><th>Medium Risk</th><th>Low Risk</th></tr><tr><td><95%</td><td>95% - <97%</td><td>97% - 100%</td></tr></table></td></tr>
<tr><td>C2a: Chemical compliance as per Blue Drop requirements</td></tr>
<tr><td rowspan="2">Cb: Monitoring Compliance</td><td>C1b: micro monitoring compliance against registered programme, based on population size as per SANS 241:2015</td><td rowspan="2"><table><tr><th>High Risk</th><th>Medium Risk</th><th>Low Risk</th></tr><tr><td><50%</td><td>50% - 80%</td><td>>80%</td></tr></table></td></tr>
<tr><td>C2b: chemical monitoring compliance calculated as per Blue Drop requirements</td></tr>
</table>

The KZN results for Indicator C and sub-indicators are presented in the table below. This is based on data for the period January to December 2020.

Table 42: KZN Province summary of results for Indicator C: Water Quality Compliance (Jan – Dec 2020)

KZN	Average Compliance	Minimum	Maximum	% Systems Which Comply (Low Risk)
C1a: Microbiological Quality	69.7%	0%	100%	32%
C2a: Chemical Quality	68.9%	0%	100%	14%
C1b: Microbiological Monitoring Compliance	59.5%	0%	100%	47%
C2b: Chemical Monitoring Compliance	36.1%	0%	97.1%	27%

The categorisation for microbiological and chemical compliance is illustrated below providing % of supply systems per risk category.

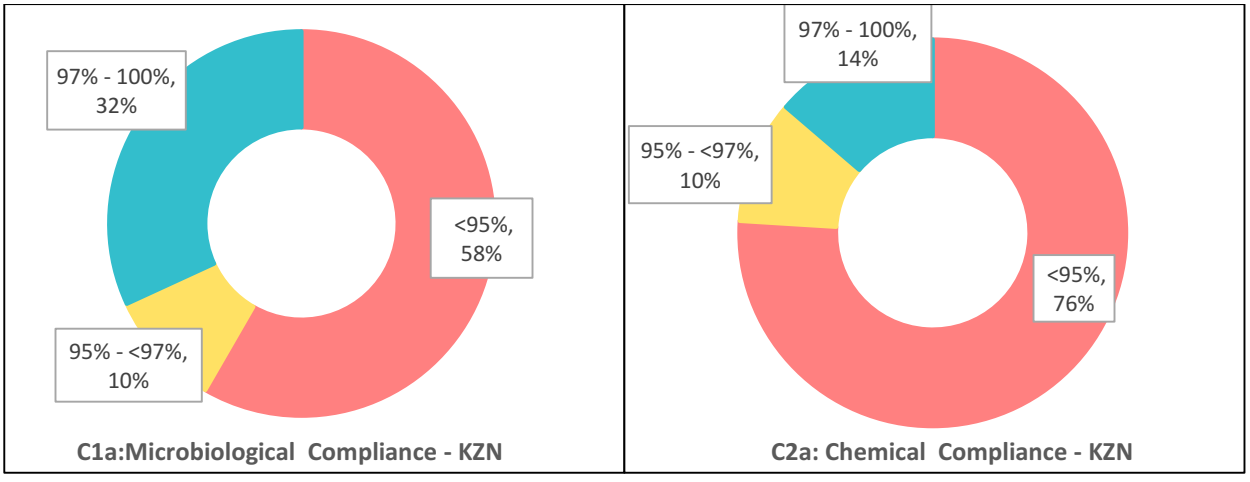


Figure 49: Microbiological and Chemical Compliance for KZN (Jan – Dec 2020)

The results are summarised as follows:

- ✓ Only 32% of systems achieved microbiological compliance and 14% achieved chemical compliance. This is of serious concern to DWS as the majority of supply systems present a potential health risk to consumers.
- ✓ 68% of systems do not comply with microbiological determinands: this indicates microbiological failures which presents a serious health risk to the consumers in these supply systems. For sustained failure, 'Boil Water' notices must be issued to safeguard consumers while the root cause of the failure is investigated and resolved.
- ✓ 86% of systems do not comply with chemical determinands. This may present immediate or potential long term health risks depending on whether non-compliance is for acute health determinands or chronic health determinands.

- WSA must ensure compliance for all chemical-health determinands as per Blue Drop requirements and includes, NO3- and NO2- as N, SO42-, Sb, As, Cd, Cr, Co, Cu, CN-, Pb, Hg, Ni, Se, V, DOC or TOC, and Total THM.

The categorisation for microbiological and chemical monitoring compliance is illustrated below providing percentages of supply systems per category.

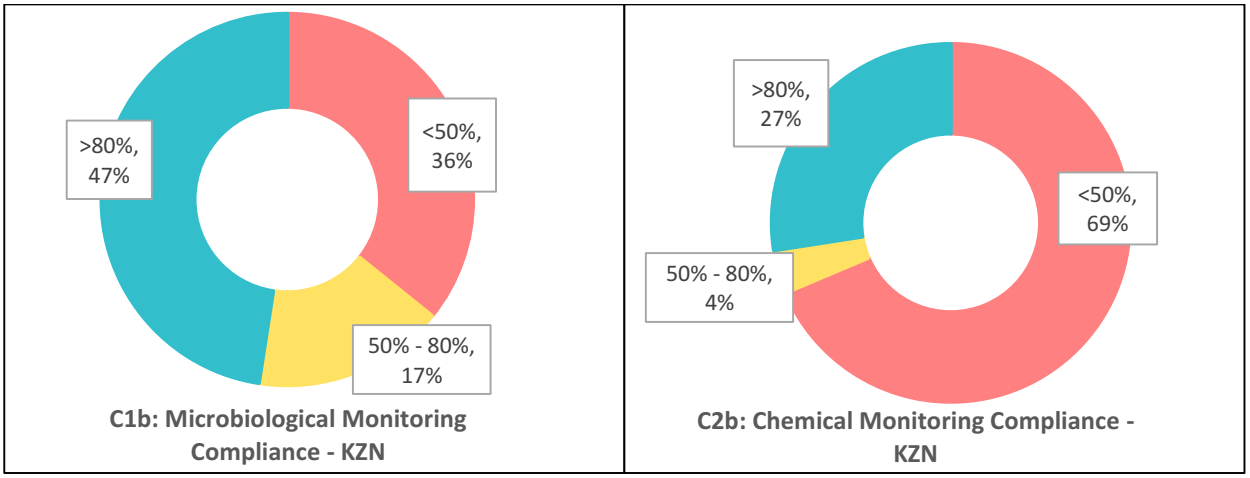


Figure 50: Microbiological and Chemical Monitoring Compliance for KZN (Jan – Dec 2020)

The results are summarised as follows:

- ✓ 47% of supply systems have sufficient microbiological samples based on population size as per SANS 241-2.
- ✓ 53% of supply systems have <80% for microbiological monitoring compliance. This indicates there is an insufficient number of microbiological samples to guarantee the safety of water at all points in the distribution system. These supply systems therefore do not comply with table 2 in SANS 241-2 which outlines required number of sample points based on population size.
- ✓ 27% of supply systems have sufficient chemical monitoring samples.
- ✓ 73% of supply systems have <80% for chemical monitoring compliance. This indicates either insufficient number of samples collected or insufficient chemical determinands were analysed as per the requirement outlined in SANS 241:2015 i.e.
    - Actual monitoring occurs according to registered IRIS monitoring programme (>80%),
    - Number of samples: One sample each at treatment plant final and one distribution point, both of which must be analysed for at least 80% of determinands listed (13 of the 17 determinands) i.e. at least 26 data points are required.

Recommendations

The poor water quality in KZN is of concern to DWS.

All WSAs must urgently implement the following steps to ensure both microbiological and chemical compliance is improved so that all the citizens of South Africa can have access to safe drinking water, which is a basic human right enshrined under our Constitution:

- ✓ Develop and implement microbiological monitoring as per SANS 241:2015 requirements:
    - Monitor final water weekly.
    - Monitor distribution fortnightly
    - Ensure the number of sample points in the distribution network is based on population size as per Table 2 in SANS 241-2 given below

Table 18: Minimum number of samples for E.Coli (or Faecal Coliforms) in distribution network (Table 2 SANS 241-2: 2015)

Population served	Total number of samples per month[a]
<5000	2
5000-100 000	1 per 5000 head of population + 1 additional sample [b]
100 000 – 500 000	1 per 10 000 head of population + 11 additional sample [b]
≥500 000	1 per 20 000 head of population + 36 additional sample [b]
[a] During rainy season, sampling should be carried out more frequently to ensure that all spatial and temporal risks are identified. [b] see *WHO, Guidelines for drinking water quality*	

- ✓ Develop and implement risk-based chemical monitoring programme as per SANS 241:2015 requirements:
    - Conduct full SANS 241:2015 analysis annually on raw, final and distribution network to identify current problem determinands.
    - Conduct risk assessment of system including catchment, treatment plant and reticulation to identify current and potential water quality risks and their associated determinands. e.g. presence of pit latrines means possibility of nitrates in ground water and surface water.
    - Develop and implement risk-based chemical monitoring programme for all identified determinands.
        - Sample points are raw, final and critical distribution points depending on impact of determinands.
        - Frequency as per Table 3 in SANS 241- 2. i.e. acute health 1 = weekly, acute health 2 – monthly, chronic health = monthly, aesthetic = monthly,
        - Operational monitoring dependant on unit processes.
- ✓ In the event of non-compliance:
    - Precautionary measures including 'Boil Water' notices must be issued to consumers in systems with sustained microbiological failures.
    - 'Water Quality' Advisories must be issued to consumers in systems with sustained chemical failures for chronic health determinands.
    - WSAs must investigate the root cause of the failure and implement remedial actions to ensure compliance. If this cannot be achieved, an alternative water supply must be provided to ensure safety of consumers.
- ✓ Compliance monitoring to be undertaken by accredited laboratory
    - WSA to ensure that there is sufficient budget for compliance monitoring
    - Laboratory to comply with accreditation requirement as per Blue Drop: SANAS accredited, participation in proficiency testing with acceptable Z-Score, or Quality Assurance system.

Risk Indicator D: Technical Skills

Regulation 2834 states all plant personnel must be classified as per their qualifications and years of experience. This is conducted by DWS and plant personnel are provided with a classification certificate which reflects their current classification based on qualification and years of experience. Ongoing training is a requirement under the Regulation to allow for continuous learning that will enable process controller to improve their classification over time to achieve Class V that allows them to act as plant supervisor. The required number and classification of staff required at a treatment plant per shift is dependent of the classification of the plant and the number of shifts.

The Blue Drop requirements acknowledge excellence in water services provision. The Blue Drop requirements therefore outlines the number and classification of process controllers and supervisors required for each shift. The Blue Drop requirements make provision for sharing of supervisors: this reduces the burden of providing permanent staff for small, remote systems as a roaming supervisor can visit a number of facilities once or twice a week.

In addition, the Blue Drop requirements outline the requirements for plant maintenance team to ensure effective maintenance of water infrastructure for ongoing operations. The maintenance team must have variety of artisans with electrical, mechanical and civil expertise for effective asset management with assets reaching their expected useful lifespan. The Blue Drop requirements were used to evaluate Risk Indicator D: Technical Skills as per Table below

Table 12: Blue Drop requirements to evaluate technical skills at treatment plants

Works Class	Class Of Process Controller Per Shift	Class Of Process Controller for Supervision*	Operations And Maintenance Support Services Requirements*
E	Class I	Class V*	THESE PERSONNEL MUST BE AVAILABLE AT ALL TIMES BUT MAY BE IN-HOUSE OR OUTSOURCED - electrician - fitter - instrumentation technician
D	Class II	Class V*	
C	Class III	Class V*	
B	Class IV	Class V	
A	Class IV	Class V	

NB. Fluoridation – for any class works, minimum process controller classification should be class IV

**does not have to be at the works at all times but must be available at all times. If the Water Services Institution or owner of a waterwork has no person of this class employed on that work, a contractor / consultant with the required qualifications as prescribed in Schedule III in respect of that particular class of persons, shall be appointed to visit the work weekly.*

Risk Indicator D: Technical Skills is calculated from three separate components:

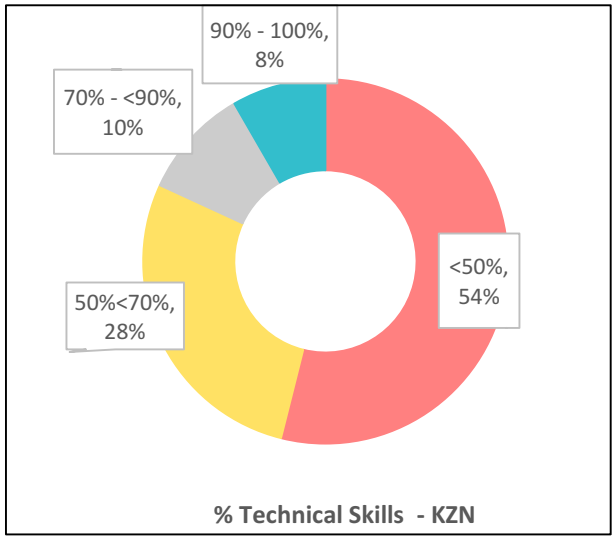
- ✓ Process controllers compliance as per Blue Drop requirements: required number and class of process controllers per shift for specific class of plant.
- ✓ Supervisor compliance as per Blue Drop requirements: Class V required, either at plant or available at all times.
- ✓ Maintenance Team compliance as per Blue Drop requirements: civil, mechanical and electrical expertise required.
    - Civil team: plumbing qualification / trade test.
    - Mechanical team: millwright or similar mechanical qualification.
    - Electrical team: electrical qualification / trade test.

The Table and figures below provides a profile of the technical skills in KZN Province for July 2020 to June 2021

Table 43: KZN Province Summary of results for Indicator D: Technical Skills

KZN	Average	Minimum	Maximum
D: Technical Skills	41.6%	0%	100%
Process Controller Compliance	28.3%	0%	100%
Supervisor Compliance	63.8%	0%	100%

The provincial profile for Risk Indicator D: Technical skills is presented in the figure below.



The results are summarised as follows:

✓ Only 8% of supply system have excellent technical skills: 90 - 100% compliance,

✓ 10% of supply systems have good technical skills: 70 - <90% compliance,

✓ 28% of supply systems have average technical skills: 50 - <70% compliance,

✓ 54% of supply systems have poor technical skills: <50% compliance.

Figure 51: KZN profile for Indicator D: Technical Skills

In general, the province has performed poorly with regards to technical skills.

The provincial profile for process controllers and supervisors compliance is outlined in the figures below.

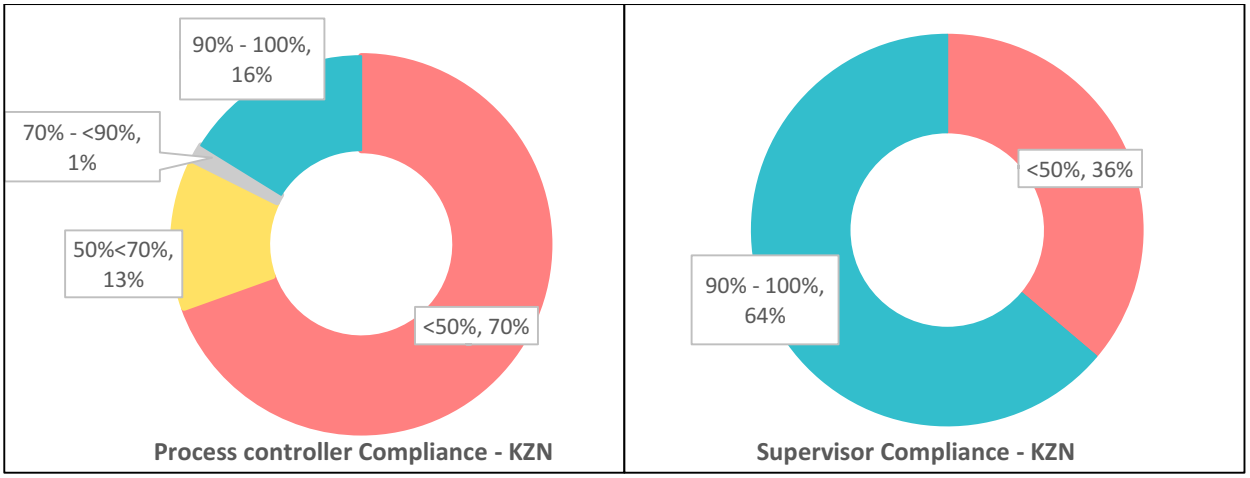


Figure 52: Process controller and Supervisor compliance for KZN

The resutls are summarised as follows:

- ✓ Process controller compliance is poor with only 16% of supply systems with sufficient number of suitably classified process controllers per shift. Lack of sufficient number of process controllers presents a serious risk due to lack of daily monitoring and process optimisation.
- ✓ 64% of supply systems are compliant with regards to Supervisors. These plants either have Class V supervisors permanently based at the plant or available as a roaming supervisor available at all times to assist process controllers. The presence of a qualified supervisor can mitigate some of the risks associated with insufficient number of process controllers on site provided the supervisor is available at all times.

The provincial profile for maintenance team as well as breakdown of maintenance team is outlined in the figures below.

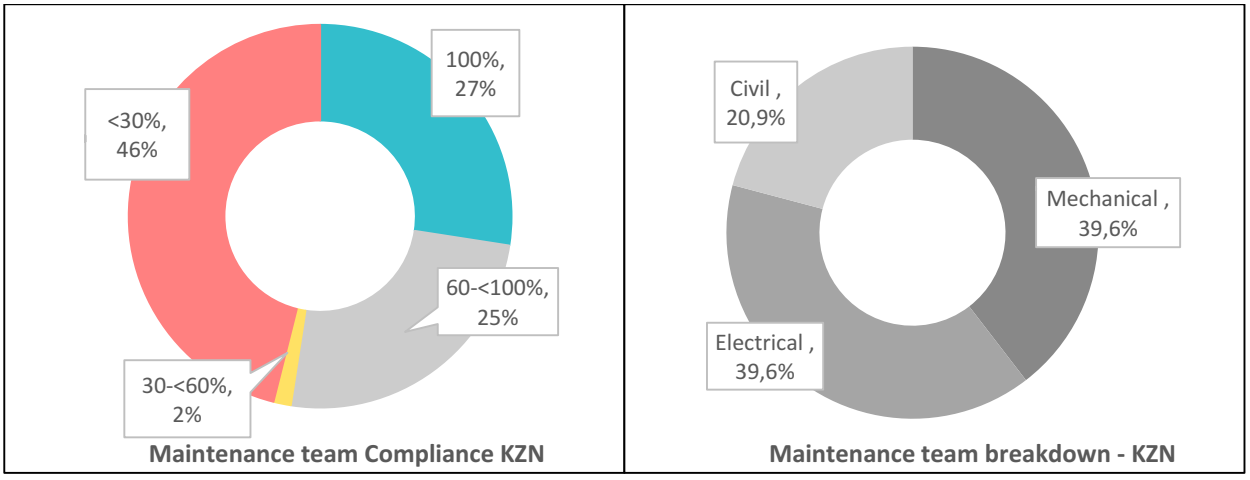


Figure 53: Maintenance team compliance and maintenance team breakdown for KZN

The results are summarised as follows:

- ✓ 27% of all supply systems have full maintenance teams in place i.e. civil, mechanical and electrical personnel. However, the remaining 73% have insufficient maintenance teams and this can lead to shutdown of treatment plant or processes which will affect quality and quantity of water.
- ✓ 39.6 % have Electrical staff and mechanical competency, and only 20.9% have civil staff. Civil works at treatment plants and in the distribution network is conducted by plumbers: lack to this skill will lead to water losses which will negatively impact on water supply.

The KZN province has performed poorly with regards to technical skills. WSAs are encouraged to evaluate the performance of each system with regards to process control and use this information to determine the operational model which is best suited to ensure effective operations and maintenance.

WSA must allocate budget to appoint suitably qualified process controllers and supervisors to ensure water quality compliance improves through ongoing process optimisation. The WSA must appoint a qualified maintenance team to ensure that the life span of the treatment plant is increased by regular maintenance and ensure there are sufficient number of personnel to cover the entire distribution network to reduce water losses and maintain integrity of the supply system.

Recommendations

- ✓ Register all process controllers and supervisors on IRIS as per Regulation 2834
- ✓ Ensure all process control staff complies with Blue Drop requirements.
- ✓ Ensure maintenance team includes civil, mechanical and electrical personnel.
- ✓ Provide details of operational staff at all future assessments: copies of process controller and supervisor registration certificates, organograms with shift patterns, copies of qualifications/certificates/current training.
- ✓ Provide details of maintenance team at all future assessments: organogram, shift patterns, names and qualifications of team, copies of qualifications/certificates/current training, details of external service providers.

Risk Indicator E: Water Safety Plans

Risk management is the cornerstone of risk-based regulation and a fundamental part of the SANS 241:2015 requirements to ensure effective management of both current and future potential risks. The application of risk management in drinking water management is through the Water Safety Plan developed by the WHO which is a comprehensive risk assessment and risk management approach that encompasses all steps in a drinking-water supply chain, from catchment to consumer to ensure continuous feedback and improvement to manage all current and future potential risks. The Water Safety Plan advocates for development of a risk-based monitoring programme and this is also a requirement as per SANS 241:2015

This risk indicator E: Water Safety Plans evaluates the following three critical components which are required for effective risk management as per the WHO guidelines and the SANS 241:2015 requirements.

- ✓ Completeness of the Water Safety Plan as per World Health Organisation Water Safety Planning Manual:
  - 1: Signature from Technical director/Municipal Manager
  - 2: Risk prioritisation method
  - 3: Risk assessment of catchment
  - 4: Risk assessment of plant
  - 5: Risk assessment of network
  - 6: Final risk rating
  - 7: Mitigating measures for all high and medium risks.
- ✓ Development and adoption of risk-based monitoring programme as per SANS 241:2015
  - 8: Full SANS 241:2015 analysis of raw and final water
  - 9: Identification of risk determinands
  - 10: Addition of risk determinands to monthly compliance monitoring as per SANS 241:2015
- ✓ Proof of implementation of the findings of the Water Safety Plan to ensure there is continuous risk management and movement towards overall lower risk rating:
  - 11: Proof that >25% of mitigating measures have been implemented – proof in form of purchase order, pictures, water quality results, tender document, etc.

This makes up 11 equal sub-elements that are evaluated during the BDPAT assessment to calculate the final risk rating for this indicator.

The Table and figures below provides a profile of Risk indicator E in KZN Province for 2021.

The provincial profile for E: Water Safety Plans is presented in Figure and Figure provides details on the completeness of the Water Safety Plan by indicating the percentage of supply systems which comply with each of the 11 individual components which make up the Water Safety Plan

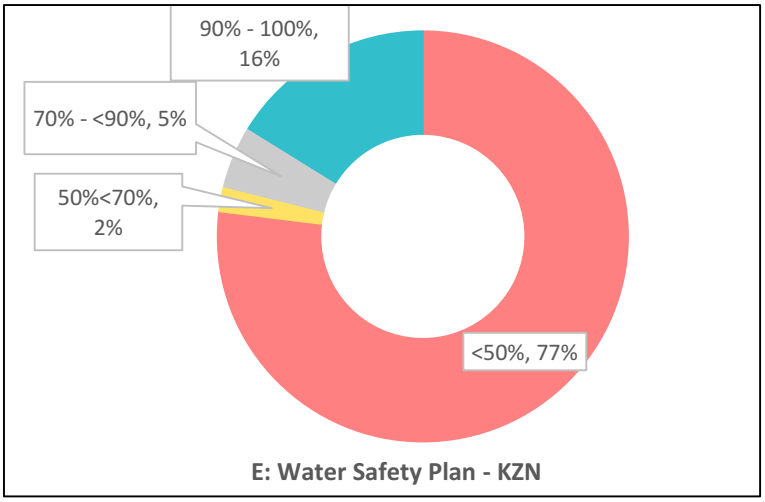


Table 44: Table 36: Gauteng Province summary of results for Indicator E: Water Safety Plans

KZN	Value
E: Water Safety Plans - Average	24.4%
E: Water Safety Plans - Minimum	0%
E: Water Safety Plans - Maximum	100%
% Systems with Water Safety Plans	38%

Figure 54: KZN profile for Risk Indicator E: Water Safety Plans

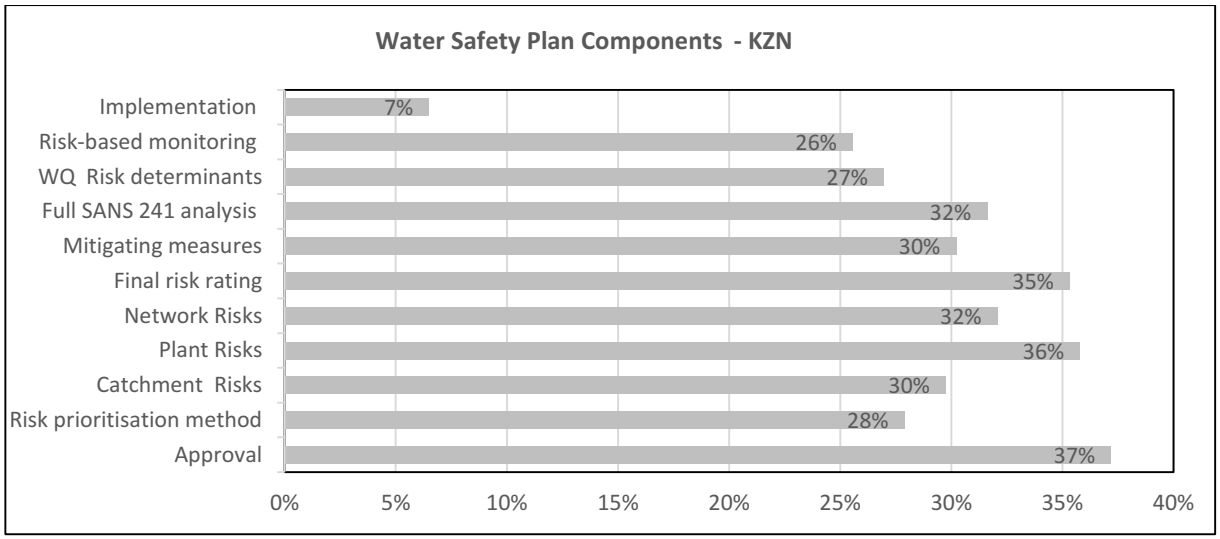


Figure 55: Water Safety Plan components for KZN

The results are summarised as follows:

- ✓ Only 38% of supply systems have Water Safety Plans in place. This presents a serious risk as effective risk-management is not taking place as per SANS 241:2015 requirement.
- ✓ Only 16% have excellent Water Safety Plans in place with >=90% compliance indicating comprehensive Water Safety Plans with all required components.
- ✓ The average compliance for the province is 24.4% which indicates poor understanding of the Water Safety Planning process amongst the WSA's in this province.
- ✓ The quality and completeness of the Water Safety Plans is as follows:
    - 37% have approval indicating management's commitment to implementing the findings of the Water Safety Plan.
    - Completeness of the Water Safety Plan is average with around 32% for identification of risks. 28% have risk prioritisation method in place, with 30% having mitigating measures. These results indicates poor understanding of the risk assessment process.
    - Development of risk -based monitoring is poor as full SANS 241:2015 only conducted on 32% of systems with only 26% using this information to develop risk-based monitoring programme. Risk-based monitoring is a requirement of SANS 241:2015 and must be reviewed annually based on updated full SANS 241:2015 of raw and final water.

- Implementation of mitigating measures is low at only 7%. Although 37% of Water Safety Plans have been approved, there has been minimal implementation of findings. Management must ensure that when approval is given for a Water Safety Plan, this is supported by resources in the form of staff and budget to implement mitigating measures.

In summary, Water Safety Planning is being implemented in the province in only 38% of supply systems. The completeness and quality of these Water Safety Plans is below average with lack of risk-based monitoring and implementation of mitigating measures to reduce risks.

All WSAs must adopt risk management principles embodied in the Water Safety Planning approach as this is a regulatory requirement as per SANS 241:2015 and will assist in driving down risks in the entire supply system from catchment to consumer.

Recommendations

- ✓ Conduct full SANS 241:2015 analysis on raw, final, and distribution network to identify problem determinands.
- ✓ Develop and implement risk-based monitoring programme to include all current and potential determinands
- ✓ Register SANS 241:2015 compliant monitoring programme on IRIS.
- ✓ Conduct monitoring as per programme and upload information on a monthly basis.
- ✓ Develop WSP: conduct annual risk assessment of supply system, assign risk rating, validate control measures and determine residual remaining risk.
- ✓ Develop and implement action plan to mitigate remaining risk. Action plan to include budget, responsibility and timeframe for implementation. Note approval for implementation and budget must be given by senior management (municipal manager of WSA).
- ✓ WSA to provide copy of signed approved Water safety plan with proof of implementation of corrective actions from previous risk assessment; uploaded on IRIS.

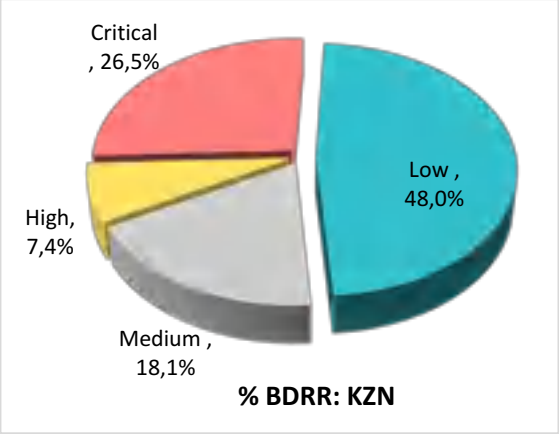
Summary

Overall performance for KZN is summarised as follows:

- ✓ 48% (98) of supply systems are in the low risk category,
- ✓ 18.1% (37) of supply systems are in the medium risk category,
- ✓ 7.4% (15) of supply systems are in the high risk category, and
- ✓ 26.5% (54) of supply systems are in the critical risk category

DWS is encouraged by the 48% of systems in the low risk category.

However, DWS is concerned about 46.8% of systems which are in high and critical risk categories.



The figure below shows the % Municipal (weighted) BDRR score for all WSA's in the province.

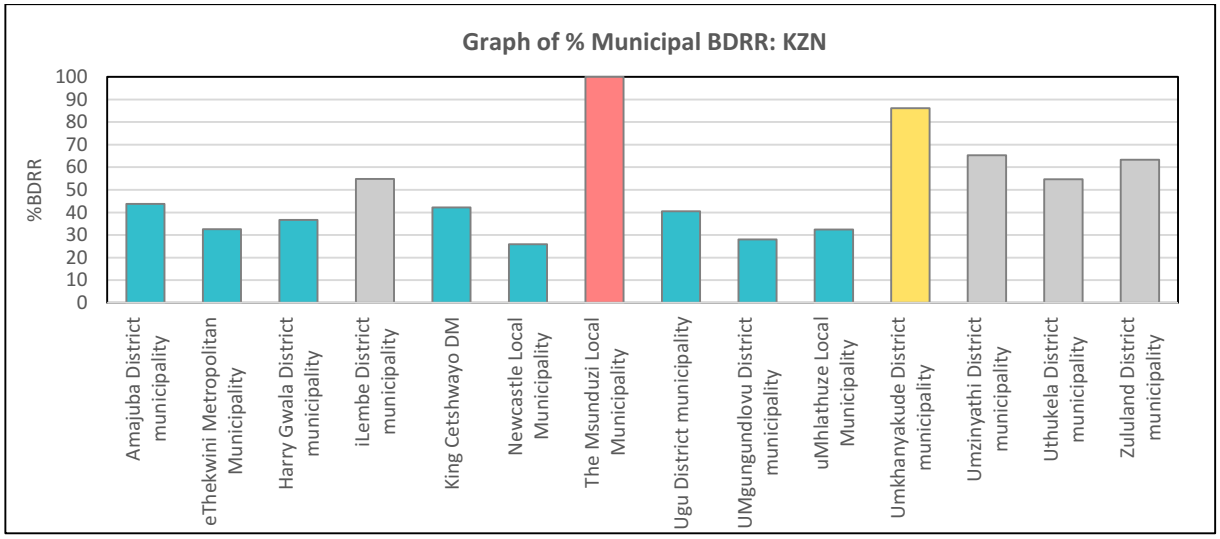


Figure 56: : Graph of % Municipal (Weighted) BDRR for each WSA in KwaZulu Natal

The figure indicates one WSA is in the critical risk category one WSA is in the high risk category based on % municipal BDRR. However, within the province there are 54 supply systems in the critical risk category and 15 supply systems in the high risk category.

DWS will evaluate risk based on the individual BDRR score for each supply system. Water supply systems which fall in the critical risk category are placed under regulatory focus. In such cases, a red note is assigned that requires the WSI to "...submit a detailed corrective action plan within 60 days of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvements as outlined in the Regulatory Comment. The plan will be considered against the Regulatory Comment and recommended for approval by a national regulation committee...." This note serves to initiate the Department's Enforcement Protocol.

Note Section 151 of the NWA and Section 63 of the Water Services Act in developing and submitting these plans as required:

- ✓ Section 63 of the Water Services Act enables the Minister in consultation with COGTA to request a relevant Province to intervene in terms of Section 139 of the Constitution in local government. Such requests will be supported by the outcomes of this performance monitoring and WSIs responsiveness on regulatory responses raised.
- ✓ Section 151 of the NWA provides a number of non-compliances as criminal offences, amongst others using water otherwise than is permitted under the Act, failure to provide access to any books, accounts, documents or assets, unlawfully and intentionally or negligently commit any act or omission which affects or is likely to affect a water resource.

Other water supply systems which are in the high risk category will also be targeted for corrective action plans and municipalities are urged to initiate a process of addressing the regulatory comment as a matter of priority.

The WSA's must therefore review the individual BDRR score of each supply system, evaluate risk indicators which make up the total BDRR score and implement mitigating measures to improve compliance for poor performing risk indicators as outlined below:

- ✓ A: Design Capacity
  - WSA to report design capacity of treatment plant,
- ✓ B: Operational Capacity
  - WSA to install flow meters, record daily flow and implement upgrades when operational capacity is above 90%.
- ✓ C: Water Quality Compliance
  - WSA to develop and implement microbiological and chemical monitoring programmes as per requirements to verify the safety of the water at all points in the network.
  - In the event of failures, WSA must implement remedial action which include water quality advisories and process optimisation to improve compliance.
- ✓ D: Technical Skills
  - WSA to ensure there are sufficient number of qualified technical staff to undertake operations and maintenance of treatment plants and distribution networks.
- ✓ E: Water Safety Plans
  - WSA to develop and implement comprehensive Water Safety Plan as per WHO and SANS 241: 2015 requirements,
  - WSA to conduct water quality assessment as part of water safety planning process, identify risk determinands, and develop and implement risk-based monitoring programme to manage current and future potential risks.
  - Budget and resources to be made available to implement mitigating measures to reduce risk.

In conclusion, WSA's must review the performance of each supply system, interrogate each risk indicator to identify areas of poor performance, and implement remedial actions to improve overall risk rating.

Below is a summary of performance in KZN for the following categories:

- ✓ List of % Average BDRR, % Municipal (weighted) BDRR, and number of supply systems for all WSA's in the province.
- ✓ List of Low risk supply systems,
- ✓ List of Critical Risk supply systems which require immediate attention,
- ✓ Top 10 Performing supply systems.

Table 45: List of % Average BDRR, % Municipal BDRR and number of supply systems for all WSA's in KZN

WSA	# Supply Systems	% Municipal BDRR	% Average BDRR per WSA
Amajuba District Municipality	6	43.7	52.3
eThekwini Metropolitan Municipality	4	32.6	45.1
Harry Gwala District Municipality	22	36.6	41.8
iLembe District Municipality	26	54.8	59.8
King Cetshwayo District Municipality	15	42.2	55.0
Newcastle Local Municipality	2	25.9	32.9
Msunduzi Local Municipality	1	100.0	100.0
Ugu District Municipality	18	40.5	58.4
uMgungundlovu District Municipality	12	28.1	37.7
uMhlathuze Local Municipality	4	32.4	85.6
uMkhanyakude District Municipality	25	86.1	94.1
uMzinyathi District Municipality	15	65.3	67.0
uThukela District Municipality	15	54.7	55.8
Zululand District Municipality	39	63.3	52.0
Average		**50.4**	**57.9**
Maximum		**100.0**	**100**
Minimum		**25.9**	**10.1**

Table 46: List of Low Risk supply systems in KZN

KZN: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Amajuba District Municipality	Dannhauser LM - Dannhauser (Dannhauser WTW) - uTW (WSP)	38.9
	Dannhauser LM - Durnacol (Durnacol WTW) - uTW (WSP)	31.7
	Utrecht LM - Utrecht (Utrecht WTW) - uTW (WSP)	35.0
eThekwini Metropolitan Municipality	eThekwini Main (Umgeni, Kloof WTW, Mdhloti WTW)	32.6
	Ogunjini (Ogunjini WTW)	22.5
	Tongaat	26.1
Harry Gwala District Municipality	Bulwer	48.1
	Chibini	44.8
	Creighton	30.3
	Esiqandulweni	26.4
	Franklin	26.8
	Hlanganani / Polela	31.8
	Ibisi	24.0
	Ixopo	16.8
	Kokstad	29.4
	Mqatsheni WTW	23.7
	Nokweja	48.4
	Rietvlei	30.7
	Riverside	37.3
	St Apollinaris	32.3
	Umzimkhulu	35.8
	Underberg	45.5
	Washbank / Highlands	38.5
iLembe District Municipality	Esidumbini Supply System	37.0

KZN: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
	Isiminya Supply System	42.9
	Isithundu Supply System	27.8
	Lower Tukela Bulk Water Scheme	28.1
	Maphumulo Borehole Supply System	29.2
	Montebello Supply System	21.5
	Ngcebo Supply System	16.3
	Nsuze Water Supply System	34.2
	Sundumbili	36.0
	Umvoti Water Supply System	27.9
	Vukile Supply System	22.6
King Cetshwayo District Municipality	Gingindlovu (Gingindlove WTW)	17.0
	Greater Mthonjaneni	38.0
	Melmoth (Melmoth WTW)	36.1
	Middledrift	41.1
	Mtunzini (City of uMhlathuze)	19.7
	Nkandla (Nkandla WTW)	23.0
Newcastle Local Municipality	Charlestown Water System (Pixley Ka Seme WTW)	11.7
Ugu District Municipality	Bhobhoyi	35.2
	KwaHlongwa	27.1
	KwaLembe	35.1
	KwaNdelu	19.7
	KwaNyuswa 1	30.2
	KwaNyuswa 2	23.6
	Umtwalume	28.4
	Umzinto	27.9
	Vulamehlo	32.7
uMgungundlovu District Municipality	Appelsbosch	44.7
	Boreholes (Untreated)	21.7
	Gomane Boreholes	27.5
	Lidgetton West	15.5
	Mpofana	22.5
	Mtulwa	48.3
	Ntanzi	42.1
	Nzinga	21.2
	Rosetta	10.1
uMhlathuze Local Municipality	Esikhaleni WTW	30.8
	Mzingazi WTW	28.5
	Ngwelezane WTW	28.2
	Nsezi WTW	42.0
uMzinyathi District Municipality	Msinga LM - Keat`s Drift (Ethembeni) WTW	42.7
	Nqutu LM - Qudeni WTW	28.4
	Umvoti LM Kranskop WTW	40.5
uThukela District Municipality	Emnambithi / Ladysmith - Ezakheni	47.0
	Indaka - Ekuvukeni Township and Surrounding Rural Areas	35.3
	Indaka - Tugela Estates	28.9

KZN: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
	Okhahlamba - Langkloof	42.4
	Okhahlamba - Winterton Town, Khethani Township	45.9
Zululand District Municipality	Babanango	40.9
	Belgrade	43.4
	Belgrade New	48.3
	eDumbe	47.8
	eMakhosini	45.4
	Enyathi Town	28.7
	Enyokeni Palace	45.1
	Frischgewaagd Bilanyoni	41.7
	Gumbi Rural Supply Scheme	36.3
	Itshelejuba Hospital	30.0
	Khambi	41.6
	Khangela Palace	48.6
	Khiphunyawo	38.5
	Kombuzi	35.8
	Mandlakazi	35.8
	Mountain View	41.3
	Msibi	44.6
	Mvuzini	43.1
	Nkosentsha	36.3
	Ophuzane	41.6
	Osingisingini	36.3
	Pongola	35.9
	Purim Rural Water Supply	39.1
	Sidinsi	37.2
	Sovane WTW	30.8
	Thulasizwe Hospital	36.3
	Ulundi Nkonjeni	38.1

Table 47: List of Critical Risk supply systems in KZN

KZN: Critical Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Amajuba District Municipality	Dannhauser LM - Buffalo Flats - (Ngagane WTW) - uTW (WSP)	100.0
eThekwini Metropolitan Municipality	Rural Boreholes	99.2
iLembe District Municipality	Amatigulu	92.0
	Hlanganani Supply System	90.2
	Ifalethu	90.2
	KwaSathane	100.0
	Lambothi Supply System	90.2
	Ndulinde Water Scheme	100.0
	Ntabaskop Water Supply	91.6
	Wosiyane Water Supply	95.5
King Cetshwayo District Municipality	Nkandla Rudimentary (Boreholes)	90.2
	Rudimentary Schemes - Mthonjaneni (Boreholes)	90.2

KZN: Critical Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Msunduzi Local Municipality	Umsunduzi	100.0
Ugu District Municipality	Assissi	96.8
	Boreholes	100.0
	Hlokozi	96.8
	KwaFodo	96.8
	KwaMbotho	96.8
	Phungashe	96.8
uMgungundlovu District Municipality	Makeni	94.0
uMkhanyakude District Municipality	Block 6	100.0
	Borehole Clusters	100.0
	Enkanyezini	94.2
	Hlabisa	95.5
	Hluhluwe Phase1	94.9
	Hluhluwe Phase2	94.4
	Ingwavuma	95.0
	Jozini (New)	95.6
	Jozini (Old)	95.6
	Makhonyeni	94.9
	Malobeni	95.0
	Manguzi	94.6
	Manguzi Airfield	94.8
	Mbazwana	95.1
	Mjindi Central	95.0
	Mkuze	96.1
	Mpembeni	95.0
	Mseleni	94.8
	Mshudu	95.5
	Nkolokotho	94.9
	Nondubuya	95.0
	Othobothini	95.0
	Shemula	95.9
	Thengane	95.5
uMzinyathi District Municipality	Msinga Rudimentary Scheme	100.0
	Nquthu Rudimentary Scheme	100.0
	Umvoti Rudimentary Scheme	100.0
uThukela District Municipality	Imbabazane - Loskop (Rural Scheme)	100.0
Zululand District Municipality	Coronation	99.7
	eMondlo Town	98.2
	Hlobane	99.8
	Louwsberg	99.7
	Masokaneni	95.1
	Vryheid	100.0

Table 48: List of Top 10 performing systems in KZN

Top 10 Performing Supply Systems in KZN		
WSA	**Supply System**	**%BDRR**
uMgungundlovu District Municipality	Rosetta	10.1
Newcastle Local Municipality	Charlestown Water System (Pixley Ka Seme WTW)	11.7
uMgungundlovu District Municipality	Lidgetton West	15.5
iLembe District Municipality	Ngcebo Supply System	16.3
Harry Gwala District Municipality	Ixopo	16.8
King Cetshwayo District Municipality	Gingindlovu (Gingindlove WTW)	17.0
King Cetshwayo District Municipality	Mtunzini (City of uMhlathuze)	19.7
Ugu District Municipality	KwaNdelu	19.7
uMgungundlovu District Municipality	Nzinga	21.2
iLembe District Municipality	Montebello Supply System	21.5
uMgungundlovu District Municipality	Boreholes (Untreated)	21.7

Amajuba District Municipality

Municipal BDRR Score: 43.7%

Assessment Areas	Dannhauser LM - Buffalo Flats - (Ngagane WTW) - UTW (WSP)	Dannhauser LM - Dannhauser (Dannhauser WTW) - UTW (WSP)	Dannhauser LM - Durnacol (Durnacol WTW) - UTW (WSP)	Hattingspruit - (Biggersburg WTW) - UTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	2	2	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	99.3%	99.3%	97%
C1b: % Microbiological Monitoring Compliance	0%	100%	100%	100%
C2a: % Chemical Compliance	0%	95.8%	97.8%	96.1%
C2b: % Chemical Monitoring Compliance	0%	26.5%	26.5%	23.5%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	38.9%	31.7%	55.9%

Assessment Areas	Utrecht LM - Waterval Prison (Ngagane WTW) - UTW (WSP)	Utrecht LM - Utrecht (Utrecht WTW) - UTW (WSP)
BULK / WSP		
A: Total Design Capacity (Ml/d)	N/I	5
B: % Operational Capacity in terms of design	N/I	N/I
C1a: % Microbiological Compliance	97.8%	100%
C1b: % Microbiological Monitoring Compliance	95.8%	100%
C2a: % Chemical Compliance	98.8%	98.6%
C2b: % Chemical Monitoring Compliance	26.5%	26.5%
D: % Technical Skills	0%	18.8%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	52.5%	34.9%

WSA Overview

Amajuba DM has five drinking water supply systems in their area of jurisdiction and uThukela Water is The Water Services Provider for all supply systems. Dannhauser, Durnacol and Utrecht supply systems achieved low BDRR while Hattingspruit and Waterval Prison supply systems achieved a medium-risk rating. Buffalo Flats supply system has no information for any of the Risk Indicators placing them in the critical-risk category.

Under criteria B, operational capacity data is not available for all supply systems and this has impacted on the scores achieved in this criterion. Lack of operational capacity data may impact on the planning and implementation of water conservation and demand management measures and should be addressed urgently.

With regards, to drinking water management, four of the five supply systems achieved good to excellent microbiological compliance and microbiological monitoring programmes are adequately aligned to SANS 241:2015 requirements. This indicates that water supplied may not present health risk associated with microbiological contamination. Although acceptable to excellent chemical compliance was

achieved for the five systems, chemical monitoring programmes alignment to SANS 241:2015 requirements is inadequate. No microbiological and chemical monitoring was conducted for Buffalo Flats and this presents a serious health risk to the consumers as the quality of water supplied cannot be guaranteed.

Low score achieved under technical skills indicate that both supply systems staff is not adequately aligned to the Regulations requirements and presents a risk of poor operation and maintenance practices which may also impact the water supply to consumers. SANS 241:2015 and WHO aligned Water Safety Plans are also unavailable for both supply systems and this resulted in poor scores under criteria E.

The Regulator encourages the WSA and WSP to implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Classification and Linking of WTW for Buffalo Flats, Hattingspruit and Waterval Prison supply systems.
- ✓ B: Installation and calibration of inflow meters to verify operational capacity.
- ✓ C1 and C2: Development and implementation of microbiological and chemical monitoring programmes that are aligned with SANS 241:2015 requirements in terms of sample points, number of samples and frequency. Subsequent water quality results should then be submitted to the Regulator. This is especially for the Buffalo Flats system.
- ✓ C2b: Alignment of the chemical monitoring programme to SANS 241:2015 requirements for all supply systems to ensure adequate monitoring compliance.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Adoption and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high-risks.

eThekwini Metropolitan Municipality

Municipal BDRR Score: 32.6%

Assessment Areas	eThekwini Main (Umgeni, Kloof WTW, Mdhloti WTW)	Ogunjini (Ogunjini WTW)	Rural Boreholes	Tongaat
BULK / WSP	Heartland Leasing (Pty), Umgeni Water			
A: Total Design Capacity (Ml/d)	1543.5	0.90	N/I	21
B: % Operational Capacity in terms of design	82.5%	73.3%	N/I	66.6%
C1a: % Microbiological Compliance	99.8%	96.6%	0%	99.1%
C1b: % Microbiological Monitoring Compliance	100%	100%	0%	100%
C2a: % Chemical Compliance	99.2%	98.8%	0%	99.3%
C2b: % Chemical Monitoring Compliance	87.7%	20.6%	0%	73.5%
D: % Technical Skills	99.2%	100%	25%	81.3%
E: % Water Safety Plan Status	100%	100%	0%	100%
%BDRR/BDRR max	32.6%	22.5%	99.2%	26.1%

WSA Overview

Four drinking water supply systems were assessed under eThekwini MM. Three of the four supply systems achieved a low-risk rating while the Rural boreholes system achieved a critical-risk rating.

The Rural Boreholes system does not have information on IRIS and this impacted on the scores under criteria A, B, C and E. eThekwini Main, Ogunjini and Tongaat supply systems are all operating well within design capacities which will ensure sufficient supply to meet consumer demands.

Excellent microbiological and microbiological monitoring compliance was achieved for the three systems where monitoring is undertaken. This indicates that water supplied from these systems are safe for human consumption. Chemical compliance is also excellent for these three systems. However, alignment of the chemical monitoring programme to SANS 241:2015 requirements is lacking for Ogunjini supply system.

Good to excellent scores achieved under Criteria D indicate that eThekwini Main, Ogunjini and Tongaat supply systems staff are adequately aligned with the regulatory requirements for technical skills. However, the Rural Boreholes system which achieved a poor score under this criterion indicating that operations and maintenance may be lacking for this system. This should be addressed urgently to reduce the risk of water supply interruptions which may arise from poor operations and maintenance practices.

With the exception of the Rural Boreholes system, all other systems achieved excellent scores under criteria E, indicating availability and adequate implementation of SANS 241:2015 and WHO aligned Water Safety Plans for effective risk management of these systems.

The Regulator encourages the WSA and WSP to implement the following recommendations to maintain a low-risk rating and improve on the high-risk rating:

- ✓ A and B: Registration and classification of the borehole systems on IRIS.
- ✓ C1 and C2: Development and implementation of microbiological and chemical monitoring programmes that are aligned with SANS 241:2015 requirements in terms of sample points, number of samples and frequency. Subsequent water quality results should then be submitted to the Regulator. This is especially for the Rural Boreholes system.
- ✓ C2b: Alignment of Ogunjini supply systems chemical monitoring programme to SANS 241:2015 requirements in terms of sample points, number of samples and frequency.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Adoption and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high-risks

Harry Gwala District Municipality

Municipal BDRR Score: 36.6%

Assessment Areas	Bulwer	Chibini	Creighton	Esiqandulweni
BULK / WSP				
A: Total Design Capacity (Ml/d)	1	1	1	1
B: % Operational Capacity in terms of design	80%	70%	95%	80%
C1a: % Microbiological Compliance	40.6%	88.1%	94.2%	95.7%
C1b: % Microbiological Monitoring Compliance	100%	70.8%	100%	100%
C2a: % Chemical Compliance	78.3%	82.7%	86.5%	87.9%
C2b: % Chemical Monitoring Compliance	11.8%	94.1%	94.1%	94.1%
D: % Technical Skills	100%	100%	81.3%	100%
E: % Water Safety Plan Status	36.4%	45.5%	45.5%	36.4
%BDRR/BDRR max	48.1%	44.8%	30.3%	26.4%

Assessment Areas	Franklin	Hlanganani / Polela	Ibisi	Ixopo
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	0.25	5	0.5
B: % Operational Capacity in terms of design	70%	88%	36%	100%
C1a: % Microbiological Compliance	94.2%	75.7%	95.1%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	100%
C2a: % Chemical Compliance	86.6%	96.7%	92%	95.5%
C2b: % Chemical Monitoring Compliance	94.1%	11.8%	94.1%	94.1%
D: % Technical Skills	81.3%	81.3%	100%	25%
E: % Water Safety Plan Status	36.4%	36.4%	36.4%	9.1%
%BDRR/BDRR max	26.8%	31.8%	24%	16.8%

Assessment Areas	Jolivet / Ugu	Kokstad	Machunwini	Mangwaneni WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	18	0.6	1
B: % Operational Capacity in terms of design	N/I	66.7%	90%	95%
C1a: % Microbiological Compliance	100%	95.1%	68.4%	33.3%
C1b: % Microbiological Monitoring Compliance	41.7%	88.3%	50%	8.3%
C2a: % Chemical Compliance	96%	97.5%	86.3%	83.3%
C2b: % Chemical Monitoring Compliance	11.8%	94.1%	11.8%	11.8%
D: % Technical Skills	25%	82.3%	62.5%	62.5%
E: % Water Safety Plan Status	0%	45.5%	45.5%	18.2%
%BDRR/BDRR max	56.1%	29.4%	62.6%	86.9%

Assessment Areas	Mnqumeni WTW	Mqatsheni WTW	Njunga	Nokweja
BULK / WSP				
A: Total Design Capacity (Ml/d)	2	1.2	0.48	1.8
B: % Operational Capacity in terms of design	85%	91.7%	95.8%	60%
C1a: % Microbiological Compliance	85.7%	100%	50%	82.9%
C1b: % Microbiological Monitoring Compliance	20.8%	12.5%	25%	100%
C2a: % Chemical Compliance	94.5%	97.1%	79.3%	78.2%
C2b: % Chemical Monitoring Compliance	94.1%	11.8%	94.1%	11.8%
D: % Technical Skills	62.5%	100%	62.5%	100%
E: % Water Safety Plan Status	36.4%	9.1%	45.5%	45.5%
%BDRR/BDRR max	70.1%	23.7%	72.8%	48.4%

Assessment Areas	Rietvlei	Riverside	St Apollinaris	Umzimkhulu
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	0.5	0.66	5
B: % Operational Capacity in terms of design	80%	98%	81.8%	80%
C1a: % Microbiological Compliance	83.7%	92.2%	86.9%	88.6%
C1b: % Microbiological Monitoring Compliance	91.7%	100%	100%	100%
C2a: % Chemical Compliance	85.8%	82.3%	90.8%	82.4%
C2b: % Chemical Monitoring Compliance	94.1%	79.4%	94.1%	94.1%
D: % Technical Skills	75%	62.5%	100%	81.3%
E: % Water Safety Plan Status	54.6%	54.6%	45.5%	54.6%
%BDRR/BDRR max	30.8%	37.4%	32.3%	35.8%

Assessment Areas	Underberg	Washbank / Highlands
BULK / WSP		
A: Total Design Capacity (Ml/d)	4.5	0.82
B: % Operational Capacity in terms of design	77.8%	87.8%
C1a: % Microbiological Compliance	89.6%	72.1%
C1b: % Microbiological Monitoring Compliance	100%	100%
C2a: % Chemical Compliance	94.9%	80.1%
C2b: % Chemical Monitoring Compliance	11.8%	79.4%
D: % Technical Skills	90.6%	81.3%
E: % Water Safety Plan Status	45.5%	45.5%
%BDRR/BDRR max	45.5%	38.5%

WSA Overview

Harry Gwala DM is responsible for twenty-two drinking water supply systems. Seventeen of these supply systems are in the low-risk rating category (achieved <50% BDRR), while two are in the medium-risk rating category (achieved between 50% and <70% BDRR), and three are in the high-risk rating category (achieved between 70% and <90% BDRR).

Design and operational capacity information for Jolivet/Ugu system is not available. Majority of supply systems are operating below 90% of design indicating that there is no immediate risk of not meeting demand. Supply systems of Creighton, Ixopo, Machunwini, Mangwaneni, Mqatsheni, Njunga and Riverside are operating above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

Criteria C reports on the actual water quality in the supply systems: Majority of the supply systems achieved unacceptable compliance in microbiological and/or chemical compliance indicating that water supplied may present health and aesthetic risks to the consumers and this should be urgently addressed. Monitoring programmes for some of the systems are not adequately aligned (<80% monitoring compliance) to SANS 241:2015 requirements. Only Ixopo and Kokstad supply systems achieved acceptable microbiological and chemical compliance and the programmes are adequately aligned to SANS 241:2015 requirements indicating that the water supplied from these two systems may be safe for consumption.

With regards to criteria D, eight supply systems have adequate technical skills (>90%). However the remaining supply systems have insufficient technical skills and this will affect process optimisation and maintenance of the supply systems. Alignment of staff to the Regulations requirements is important in ensuring that process control and maintenance practices do not impact negatively on water supply.

Under Water Safety Plan availability, all supply systems have Water Safety Plans in place. However, these are not aligned to SANS 241:2015 and WHO guidelines which includes risk assessment, full SANS analysis, risk-based monitoring and implementation of measures to reduce risks.

The Regulator urges the WSA (and WSP) to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Classification and linking of applicable WTW or boreholes to Jolivet/Ugu supply system.
- ✓ A and B: Planning and budgeting to address capacity exceedance at all WTW operating above 90% of design.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS.
- ✓ E: Reviewal and implementation of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high-risks.

iLembe District Municipality

Municipal BDRR Score: 54.8%

Assessment Areas	Amatigulu	Esidumbini Supply System	Ethembeni	Glendale
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	1	0.05	0.05
B: % Operational Capacity in terms of design	100%	110%	60%	46%
C1a: % Microbiological Compliance	77.1%	75.4%	75%	48.6%
C1b: % Microbiological Monitoring Compliance	0%	100%	37.5%	0%
C2a: % Chemical Compliance	90.3%	70.7%	59.1%	95.1%
C2b: % Chemical Monitoring Compliance	8.8%	94.1%	8.8%	94.1%
D: % Technical Skills	8.3%	54.2%	25%	72.9%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	92%	37%	77.3%	66%

Assessment Areas	Hazelmere WTW – Groutville Water Supply	Hazelmere WTW - Ndwedwe Water Supply	Hlanganani Supply System	Hlimbithwa Water Scheme
BULK / WSP	Umgeni Water	Umgeni Water		
A: Total Design Capacity (Ml/d)	150	75	0.05	N/I
B: % Operational Capacity in terms of design	50%	100%	46%	N/I
C1a: % Microbiological Compliance	98.7%	60%	81.6%	92%
C1b: % Microbiological Monitoring Compliance	65%	60%	0%	70.8%
C2a: % Chemical Compliance	97.6%	59.9%	68.5%	96.7%
C2b: % Chemical Monitoring Compliance	61.8%	58.2%	8.8%	8.8%
D: % Technical Skills	54.2%	91.7%	0%	0%
E: % Water Safety Plan Status	27.3%	0%	0%	0%
%BDRR/BDRR max	59.4%	79.3%	90.2%	71.8%

Assessment Areas	Ifalethu	Isiminya Supply System	Isithundu Supply System	KwaSathane
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.05	0.25	0.5	N/I
B: % Operational Capacity in terms of design	40%	100%	12%	N/I
C1a: % Microbiological Compliance	84.2%	47.5%	93.8%	0%
C1b: % Microbiological Monitoring Compliance	0%	54.2%	100%	0%
C2a: % Chemical Compliance	69%	79.3%	73.1%	0%
C2b: % Chemical Monitoring Compliance	8.8%	94.1%	94.1%	0%
D: % Technical Skills	0%	75%	56.3%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	90.2%	42.9%	27.8%	100%

Assessment Areas	Lambothi Supply System	Lower Tukela Bulk Water Scheme	Makwanini	Maphumulo Borehole Supply System
BULK / WSP		Umgeni Water		
A: Total Design Capacity (Ml/d)	0.05	55	0.05	3.4
B: % Operational Capacity in terms of design	46%	64.4%	42%	2.9%
C1a: % Microbiological Compliance	68.2%	99.1%	80.6%	95.7%
C1b: % Microbiological Monitoring Compliance	0%	96.7%	62.5%	100%
C2a: % Chemical Compliance	65.7%	99.6%	75%	97.5%
C2b: % Chemical Monitoring Compliance	11.8%	62.9%	8.8%	94.1%
D: % Technical Skills	0%	91.7%	0%	27.6%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	90.2%	28.1%	62.4%	29.2%

Assessment Areas	Maphumulo WTW - Reticulation	Montebello Supply System	Ndulinde Water Scheme	Ngcebo Supply System
BULK / WSP	Umgeni Water			
A: Total Design Capacity (Ml/d)	12	0.5	N/I	4
B: % Operational Capacity in terms of design	100%	160%	N/I	25.5%
C1a: % Microbiological Compliance	97.2%	99.3%	0%	100%
C1b: % Microbiological Monitoring Compliance	63.5%	100%	0%	97.9%
C2a: % Chemical Compliance	95.6%	85.5%	0%	98.8%
C2b: % Chemical Monitoring Compliance	61.8%	94.1%	0%	94.1%
D: % Technical Skills	37.5%	66.7%	0%	37.5%
E: % Water Safety Plan Status	4.6%	0%	0%	0%
%BDRR/BDRR max	66.1%	21.5%	100%	16.3%

Assessment Areas	Nsuze Water Supply System	Ntabaskop Water Supply	Sundumbili	Umvoti Water Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	2	0.25	40	12
B: % Operational Capacity in terms of design	60.00%	60.00%	62.50%	32.50%
C1a: % Microbiological Compliance	63.16%	0%	90.04%	92.29%
C1b: % Microbiological Monitoring Compliance	100.00%	0%	100.00%	94.70%
C2a: % Chemical Compliance	77.31%	0%	96.84%	96.92%
C2b: % Chemical Monitoring Compliance	94.12%	0%	94.12%	94.12%
D: % Technical Skills	29.17%	16.67%	66.67%	54.17%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	34.2%	91.6%	36.1%	27.9%

Assessment Areas	Vukile Supply System	Wosiyane Water Supply
BULK / WSP		
A: Total Design Capacity (Ml/d)	0.50	2
B: % Operational Capacity in terms of design	2.00%	0%
C1a: % Microbiological Compliance	94.87%	0%
C1b: % Microbiological Monitoring Compliance	100.00%	0%
C2a: % Chemical Compliance	93.74%	0%
C2b: % Chemical Monitoring Compliance	94.12%	0%
D: % Technical Skills	54.17%	37.5%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	22.6%	95.5%

WSA Overview

iLembe DM is responsible for twenty-six drinking water supply systems. Eleven WSS are in the low-risk rating category four are in the medium-risk rating category and three are in the high-risk rating category. Eight supply systems achieved critical-risk rating and this is concerning to the Regulator.

Hlimbithwa, KwaSathane and Ndulinde supply systems do not have linked WTW or boreholes on IRIS and this impacted on the scores under criteria A and B. With regards to Operational Capacity (B), supply systems of Amatigulu, Esidumbini, Ndwedwe, Isiminya, Maphumulo WSS Reticulation and Montebello are operating above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

With regards to Criteria C, Lower Tukela Bulk, Hazelmere, Montebello and Ngcebo supply systems achieved excellent microbiological compliance (>98%), and Lower Tukela, Hazelmere, Maphumplo and Ngcebo achieved chemical. This indicates that water supplied from these systems may be safe for consumption. The remainder of the supply systems achieved unacceptable compliance to microbiological and/or chemical compliance indicating that water supplied may present health and aesthetic risks to the consumers and this should be urgently addressed. Monitoring programmes for some of the systems are not adequately aligned (<80% monitoring compliance) to SANS 241:2015 requirements: the WSA must ensure all microbiological and chemical monitoring program have sufficient sampling points as per SANS 241: 2015 requirements to verify the safety of the water at all points in the network.

With regards to criteria D, only Lower Tukela Bulk and Ndwedwe systems staff is adequately aligned to the set criteria while the remainder of the systems are lacking in this regard. This should be addressed urgently as it has a potential to impact on the operation and maintenance practices and may ultimately impact on water supply to customers.

Most supply systems have performed poorly for criteria E indicating lack of SANS 241:2015 and WHO aligned Water Safety Plans.

The Regulator urges the WSA (and WSP) to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Criteria A and B: Classification and linking of applicable WTW or boreholes to Hlimbithwa, KwaSathane and Ndulinde supply systems.
- ✓ A and B: Planning and budgeting to address capacity exceedance at all WTW operating above 90% of design.
- ✓ C: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times. Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ Criteria D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS.
- ✓ Criteria E: Development and implementation of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high-risks.

King Cetshwayo District Municipality

Municipal BDRR Score: 42.2%

Assessment Areas	Eshowe	Gingindlovu (Gingindlove WTW)	Greater Mthonjaneni	Mbonambi Bulk Supply (Nsezi Plant WTW - City of uMhlathuze)
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	2	31	N/I
B: % Operational Capacity in terms of design	N/I	50%	61.3%	N/I
C1a: % Microbiological Compliance	97.9%	100%	95.9%	86.9%
C1b: % Microbiological Monitoring Compliance	62.9%	68.3%	65.9%	50%
C2a: % Chemical Compliance	93.7%	96.8%	92.4%	90.8%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%	97.1%	20.6%
D: % Technical Skills	25%	77.5%	63.3%	25%
E: % Water Safety Plan Status	0%	81.8%	0%	0%
%BDRR/BDRR max	55.8%	17%	37.9%	81.3%

Assessment Areas	Melmoth (Melmoth WTW)	Middledrift	Mtunzini (City of uMhlathuze)	Nkandla (Package Plants)
BULK / WSP				
A: Total Design Capacity (Ml/d)	3.6	10	2	2.35
B: % Operational Capacity in terms of design	52.8%	109.6%	50%	57.5%
C1a: % Microbiological Compliance	89.8%	100%	96.1%	84.6%
C1b: % Microbiological Monitoring Compliance	84.7%	69.4%	91.7%	78.7%
C2a: % Chemical Compliance	92.9%	90.2%	93.8%	83.9%
C2b: % Chemical Monitoring Compliance	97.1%	32.4%	97.1%	97.1%
D: % Technical Skills	40%	71.9%	77.5%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	36.1%	41.1%	19.7%	54.7%

Assessment Areas	Nkandla (Nkandla WTW)	Nkandla Rudementary (Boreholes)	Ntambanana (Package Plants)	Rudimentary Schemes - Mthonjaneni
BULK / WSP				
A: Total Design Capacity (Ml/d)	3.8	N/I	N/I	N/I
B: % Operational Capacity in terms of design	88.4%	N/I	N/I	N/I
C1a: % Microbiological Compliance	98.9%	80.3%	100%	87.5%
C1b: % Microbiological Monitoring Compliance	69.4%	49.2%	4.6%	44.4%
C2a: % Chemical Compliance	98.6%	83.9%	89.5%	93.9%
C2b: % Chemical Monitoring Compliance	97.1%	23.5%	38.2%	2.9%
D: % Technical Skills	81.3%	25%	25%	25%
E: % Water Safety Plan Status	72.7%	0%	0%	0%
%BDRR/BDRR max	23%	90.2%	63.5%	90.2%

Assessment Areas	Rudimentary Schemes - Ntambanana (Boreholes)	Rudimentry Schemes – Umlalazi (Boreholes)	Umlalazi (Package Plants)
BULK / WSP			
A: Total Design Capacity (Ml/d)	N/I	N/I	5.5
B: % Operational Capacity in terms of design	N/I	N/I	3.6%
C1a: % Microbiological Compliance	90.9%	83.2%	83.8%
C1b: % Microbiological Monitoring Compliance	58.3%	50%	66.7%
C2a: % Chemical Compliance	91.3%	82.9%	86.3%
C2b: % Chemical Monitoring Compliance	20.6%	5.9%	97.1%
D: % Technical Skills	25%	25%	25%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	81.3%	81.3%	52.3%

WSA Overview

King Cetshwayo DM has fifteen drinking water supply systems. Gingindlovu, Greater Mthonjaneni, Melmoth, Middledrift, Mtunzini and Nkandla supply systems achieved low-risk ratings while Eshowe, Nkandla-Package Plants, Ntambanana and Umlalazi supply systems achieved moderate-risk rating. Mbonambi Bulk, Rudimentary Schemes - Ntambanana and Rudimentry Schemes - Umlalazi supply systems achieved high-risk ratings. Nkandla Rudimentary and Rudimentary Schemes - Mthonjaneni supply systems are in the critical-risk rating category.

There are no WTWs or boreholes linked to Eshowe, Mbonambi Bulk, Ntambanana and all Rudimentary supply systems on IRIS and this impacted on the scores under criteria A and B. All other systems provided operational flow information and only Middledrift is operating above design capacity. Operating above design capacity indicates insufficient treatment capacity to supply current and future requirements.

Microbiological and chemical compliance achieved for most supply systems is unacceptable and this coupled with inadequate alignment of monitoring programmes to SANS 241:2015 requirements evident at most supply systems indicates that the water supplied may still present consumers with health and microbiological risks. Although some of the systems achieved adequate microbiological or chemical compliance, monitoring programmes are not aligned to SANS 241:2015 requirements. These should be addressed urgently to ensure safety of water supplied.

Under criteria C, Gingindlovu, Middledrift, Mtunzini and Nkandla supply stems achieve adequate score indicating process controllers and supervisors are adequately aligned to the Regulations requirements. Lower scores achieved at the remainder of the systems indicates that only supervisors are aligned to the Regulations requirements wile process controllers are lacking. Maintenance team information is also lacking and this further impacted on scores under the technical skill criteria.

Most supply systems do not have Water Safety Plans in place indicating that there is no risk assessment, full SANS analysis, risk-based monitoring and implementation of measure to reduce risks as prescribed by SANS 241:2015 and WHO. Only Gingindlovu and Nkandla supply systems achieved adequate score under criteria E.

The Regulator urges the WSA (and WSP) to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Classification and linking of applicable WTW or boreholes to all supply systems that are not linked to WTW or boreholes on IRIS. Operational flow data should then be submitted to the Regulator.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high-risks.

Newcastle Local Municipality

Municipal BDRR Score: 25.9%

Assessment Areas	Charlestown Water System (Pixley Ka Seme WTW)	Newcastle (Ngagane WTW) - UTW (WSP)
BULK / WSP		
A: Total Design Capacity (Ml/d)	2	N/I
B: % Operational Capacity in terms of design	9%	N/I
C1a: % Microbiological Compliance	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%
C2a: % Chemical Compliance	99.4%	98.6%
C2b: % Chemical Monitoring Compliance	29.4%	26.5%
D: % Technical Skills	37.5%	25%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	11.7%	54.1%

WSA Overview

Newcastle LM has two drinking water supply systems. uThukela water is the water services provider for Newcastle supply system. Charlestown supply system has a low-risk rating and Newcastle supply system achieved a medium-risk rating.

Ngangane WTW is not linked to Newcastle WTW on IRIS and this impacted on the scores under criteria A, B and E. Although operational flow information for Charlestown supply system is available, low flows recorded may indicate the lack of flow meter calibration.

Excellent microbiological compliance was achieved for both supply systems. This coupled with excellent alignment on microbiological monitoring programmes to SANS 241:2015 requirements indicates that water supplied from these systems may not pose any health risk associated with microbiological contamination. Excellent chemical compliance was also achieved for both systems, however, alignment of monitoring programmes to SANS 241:2015 requirements is lacking in this regard.

Low score achieved under technical skills indicate that both supply systems staff is not adequately aligned to the Regulations requirements and presents a risk of poor operation and maintenance practices which may also impact of water supply to consumers. SANS 241:2015 and WHO aligned water safety plans are also unavailable for both supply systems and this resulted in poor scores under criteria E.

The Regulator urges the WSA and WSP to implement the following recommendations to maintain low-risk rating and improve on the medium-risk rating:

- ✓ A: Calibration of flow meters for Charlestown WTW. Subsequent flow data to be submitted to the Regulator.
- ✓ B: Classification and linking of Ngangane WTW to Newcastle supply system on IRIS.
- ✓ C: Alignment and implementation of chemical monitoring programmes which is aligned with SANS 241:2015 requirements in terms of sampling points, number of samples and frequency.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high-risks.

Msunduzi Local Municipality

Municipal BDRR Score: 100%

Assessment Areas	Umsunduzi
BULK / WSP	
A: Total Design Capacity (Ml/d)	N/I
B: % Operational Capacity in terms of design	N/I
C1a: % Microbiological Compliance	0%
C1b: % Microbiological Monitoring Compliance	0%
C2a: % Chemical Compliance	0%
C2b: % Chemical Monitoring Compliance	0%
D: % Technical Skills	0%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	100%

WSA Overview

The Msunduzi LM is responsible for one drinking water supply system and the system achieved a critical-risk rating.

There is no information on the design and operational capacity as there is no WTW linked to this system on IRIS. This had a negative impact on criteria A and B scores. No process controllers are registered for this system and maintenance team information is not available.

The WSA does not conduct drinking water quality monitoring, and this did not only impact on the score achieved but also presents a serious health risk to the consumers as the quality of water supplied from this system cannot be confirmed or guaranteed. The Msunduzi LM is urged to address this issue urgently. A Water Safety Planning process has not been adopted and implemented, indicating that risk assessment and full SANS 241:2015 analysis and risk mitigation has not been conducted.

The Regulator is concerned with drinking water quality management by the WSA and urges the LM to implement the following measures to reduce their risk rating and ensure supply of safe drinking water to the consumers:

- ✓ A and B: Classification and linking of applicable WTW to Msundizi supply system on IRIS. Operational flow data should then be submitted to the Regulator.
- ✓ C: Development and implementation of microbiological and chemical monitoring programmes with sufficient samples and adequate frequency based on population size as outlined in SANS 241:2015. Subsequent water quality results should then be submitted to the Regulator through IRIS.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS.
- ✓ E: Development and implementation of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high-risks.

Ugu District Municipality

Municipal BDRR Score: 40.5%

Assessment Areas	Assissi	Bhobhoyi	Boreholes	Harding
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.36	81	N/I	2.8
B: % Operational Capacity in terms of design	N/I	86.4%	N/I	64.3%
C1a: % Microbiological Compliance	0%	100%	0%	93.3%
C1b: % Microbiological Monitoring Compliance	0%	12.8%	0%	41.7%
C2a: % Chemical Compliance	0%	91.7%	0%	85.1%
C2b: % Chemical Monitoring Compliance	0%	97.1%	0%	97.1%
D: % Technical Skills	0%	16.7%	0%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	96.9%	35.2%	100%	59.5%

Assessment Areas	Hlokozi	KwaFodo	KwaHlongwa	KwaLembe
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	0.25	0.25	0.75
B: % Operational Capacity in terms of design	N/I	N/I	200%	93.3%
C1a: % Microbiological Compliance	0%	0%	96%	90.7%
C1b: % Microbiological Monitoring Compliance	0%	0%	100%	100%
C2a: % Chemical Compliance	0%	0%	93.7%	86.6%
C2b: % Chemical Monitoring Compliance	0%	0%	97.1%	97.1%
D: % Technical Skills	0%	0%	16.7%	8.3%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	96.9%	96.85%	27.11%	35.13%

Assessment Areas	KwaMbotho	KwaNdelu	KwaNyuswa 1	KwaNyuswa 2
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.25	1.4	0.25	0.75
B: % Operational Capacity in terms of design	N/I	92.9%	72%	80%
C1a: % Microbiological Compliance	66.7%	98.1%	91.5%	100%
C1b: % Microbiological Monitoring Compliance	12.5%	95.8%	100%	100%
C2a: % Chemical Compliance	76%	96.2%	94.4%	85.4%
C2b: % Chemical Monitoring Compliance	8.8%	97.1%	97.1%	97.1%
D: % Technical Skills	0%	25%	25%	16.7%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	96.85%	19.66%	30.22%	23.62%

Assessment Areas	Phungashe	Umtamvuna	Umtwalume	Umzinto
BULK / WSP			Umgeni Water	
A: Total Design Capacity (Ml/d)	0.5	22.4	38	12
B: % Operational Capacity in terms of design	N/I	102.7%	88.5%	95.8%
C1a: % Microbiological Compliance	0%	76.5%	100%	100%
C1b: % Microbiological Monitoring Compliance	0%	17%	69.6%	20.6%
C2a: % Chemical Compliance	0%	96.9%	99.9%	99.7%
C2b: % Chemical Monitoring Compliance	0%	97.1%	97.1%	97.1%
D: % Technical Skills	0%	16.7%	92.6%	100%
E: % Water Safety Plan Status	0%	0%	19.4%	81.8%
%BDRR/BDRR max	96.85%	75.93%	28.44%	27.93%

Assessment Areas	Vulamehlo	Weza
BULK / WSP		
A: Total Design Capacity (Ml/d)	4.5	3.6
B: % Operational Capacity in terms of design	122.2%	100%
C1a: % Microbiological Compliance	100%	86.3%
C1b: % Microbiological Monitoring Compliance	52.1%	21.5%
C2a: % Chemical Compliance	94.7%	80.1%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%
D: % Technical Skills	12.5%	16.7%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	32.69%	71.22%

WSA Overview

Ugu DM has eighteen drinking water supply systems in their area of jurisdiction. Bhobhoyi, KwaHlongwa, KwaLembe, KwaNdelu, KwaNyuswa 1, KwaNyuswa 2, Umtwalume, Umzinto and Vulamehlo systems achieved a low-risk rating while Harding supply system achieved a medium-risk rating and Umtamvuna and Weza systems achieved a high-risk rating. Assissi, Boreholes, Hlokozi, KwaFodo, KwaMbotho and Phungashe have no information for any of the risk indicators placing them in the critical-risk category.

Under criteria B, KwaHlongwa, KwaLembe, KwaNdelu, Umtamvuna, Umzinto, Vulamehlo and Weza systems are operating above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

Criteria C reports on the actual water quality in the supply systems. Assissi, Boreholes, Hlokozi, KwaFodo, KwaMbotho and Phungashe have no water quality monitoring data and this presents a serious health risk as the quality of water supplied cannot be verified or guaranteed. For the remainder of the systems unacceptable compliance was achieved for one or more of the requirements indicating that water supplied may still present some risks to the consumers.

With regards to criteria D, only Umzinto and Umtwalume systems staff is adequately aligned to the set criteria while the remainder of the systems are lacking in this regard. This should be addressed urgently as it has a potential to impact on the operation and maintenance practices and may ultimately impact on water supply to customers. Most supply systems also achieved inadequate score under criteria E indication that adoption and implementation of SANS 241:2015 and WHO aligned water safety plans is lacking throughout the municipality.

The Regulator urges the WSA (and WSP) to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Criteria A and B: Classification and linking of applicable WTW or boreholes to boreholes supply system.

- ✓ Criteria B: Installation of calibrated inflow meters to verify operational capacity at the WTW where flow measurement is not taking place.
- ✓ A and B: Planning and budgeting to address capacity exceedance at all WTW operating above 90% of design.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high-risks.

uMgungundlovu District Municipality

Municipal BDRR Score: 28.1%

Assessment Areas	Appelsbosch	Boreholes (Untreated)	Gomane Boreholes	Impendle Spring
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.79	0.04	0.43	0.17
B: % Operational Capacity in terms of design	N/I	N/I	60.2%	N/I
C1a: % Microbiological Compliance	100%	97.5%	91.2%	76.7%
C1b: % Microbiological Monitoring Compliance	45.8%	91.7%	91.7%	91.7%
C2a: % Chemical Compliance	94.8%	96.5%	96.9%	90%
C2b: % Chemical Monitoring Compliance	5.9%	94.1%	94.1%	2.9%
D: % Technical Skills	37.5%	25%	43.8%	25%
E: % Water Safety Plan Status	0%	18.2%	27.3%	27.3%
%BDRR/BDRR max	44.7%	21.7%	27.5%	54.7%

Assessment Areas	Lidgetton West	Makeni	Mpofana	Mtulwa
BULK / WSP				
A: Total Design Capacity (Ml/d)	2	0.38	7	0.35
B: % Operational Capacity in terms of design	18.5%	N/I	90.3%	N/I
C1a: % Microbiological Compliance	97.5%	0%	99.2%	88.9%
C1b: % Microbiological Monitoring Compliance	100%	0%	100%	50%
C2a: % Chemical Compliance	97.9%	0%	95.9%	87.9%
C2b: % Chemical Monitoring Compliance	97.1%	0%	97.1%	94.1%
D: % Technical Skills	81.3%	56.3%	100%	56.3%
E: % Water Safety Plan Status	54.6%	0%	45.5%	0%
%BDRR/BDRR max	15.5%	94%	22.5%	48.3%

Assessment Areas	Ntanzi	Nzinga	Rosetta	UW - uMgungundlovu District Municipality
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.04	0.25	0.32	N/I
B: % Operational Capacity in terms of design	N/I	92.5%	81.3%	N/I
C1a: % Microbiological Compliance	94.4%	96.1%	100%	99.1%
C1b: % Microbiological Monitoring Compliance	62.5%	91.7%	100%	92.4%
C2a: % Chemical Compliance	90.3%	88.2%	99.8%	98.2%
C2b: % Chemical Monitoring Compliance	94.1%	94.1%	88.2%	97.1%
D: % Technical Skills	56.3%	62.5%	100%	25%
E: % Water Safety Plan Status	0%	27.3%	0%	0%
%BDRR/BDRR max	42.1%	21.2%	10.1%	50.2%

WSA Overview

uMgungundlovu DM is responsible for twelve drinking water supply systems in their area of jurisdiction. Nine of the twelve supply systems are in the low-risk rating category, two (Impendle Spring and UW-uMgungundlovu) supply systems are in the medium-risk rating category and one (Makeni) system in the critical-risk rating category.

There is no WTW linked to UW-uMngungundlovu DM supply system on IRIS and this impacted on the scores under criteria A and B. Mpofana and Nzinga systems are operating above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements. Furthermore, Appelsbosch, Boreholes - Untreated, Impendle, Makeni, Mtulwa and Ntanzi do not have operational flow information indicating that flow measurement may not be taking place. This can have a negative impact on municipality planning and on implementation of water conservation and demand management plans.

With regards to drinking water quality compliance (Criteria C), Boreholes - Untreated, Gomane Boreholes, Lidgetton West, Mpofana, Rosetta and UW-uMngungundlovu DM supply systems achieved good to excellent microbiological and chemical compliance, this coupled with adequate alignment of monitoring programmes to SANS 241:2015 requirements indicates that water supplied from these systems may not pose health and aesthetic risks to the consumers. Although good chemical compliance was achieved and monitoring programmes are aligned to SANS 241:2015 requirements, poor microbiological compliance achieved for these systems indicate that supplied water may still present health risks associated with microbiological contamination. Water quality monitoring was not undertaken for Makeni supply system, this should be addressed urgently as it presents a serious health risk to the consumers as the quality of water supplied from this system cannot be confirmed or guaranteed. Inadequate compliance to one or two sub-requirements for the others has impacted on the scores that these systems achieved under criteria C.

Inadequate score achieved under technical skills (Criteria D) indicate that most supply systems staff are not aligned to the Regulation requirements. This can negatively impact on operations and maintenance practices and may ultimately effect water supply to consumers.

Most supply systems also achieved low scores under criteria E since Water Safety Plans are lacking for most systems and where these are available, they are not adequately aligned to SANS 241:2015 requirements.

The Regulator urges the WSA (and WSP) to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Classification and linking of applicable WTW to UW-uMngungundlovu DM supply system on IRIS. Operational flow data should then be submitted to the Regulator.
- ✓ B: Installation of calibrated inflow meters to verify operational capacity at all WTW without operational capacity information.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of microbiological and chemical monitoring programmes with sufficient samples and adequate frequency based on population size as outlined in SANS 241:2015. This is especially for systems where programmes are to be aligned to SANS 241:2015 requirements.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS.
- ✓ E: Reviewal/Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high-risks.

uMhlathuze Local Municipality

Municipal BDRR Score: 32.4%

Assessment Areas	Esikhaleni WTW	Mzingazi WTW	Ngwelezane WTW	Nsezi WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	36	65	8	204
B: % Operational Capacity in terms of design	99.6%	99.9%	118.8%	N/I
C1a: % Microbiological Compliance	100%	99.9%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%	97.4%	100%
C2a: % Chemical Compliance	98.2%	99.7%	99.5%	99.6%
C2b: % Chemical Monitoring Compliance	32.4%	32.4%	32.4%	55.9%
D: % Technical Skills	50%	37.5%	37.5%	75%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	30.8%	28.5%	28.2%	42%

WSA Overview

uMhlathuze LM has four drinking water supply systems in their area of jurisdiction and the WSA is commended for achieving low-risk ratings for all four systems. Nsezi supply system achieved low score on Criteria B as there is no information on operational flows indicating that flow measurement may not be taking place for this WTW. Esikhaleni, Mzingazi and Ngwelezan are all operating above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

The WSA achieved excellent microbiological compliance for all systems, this coupled with implementation of a microbiological monitoring programme that is aligned with SANS 241:2015 requirements indicates that the water supplied from all four systems may not present health risk associated with microbiological contamination. The Regulator also noted that chemical compliance is excellent for all supply systems, however, chemical monitoring programmes are not aligned to SANS 241:2015 requirements.

Of the four supply systems, only Nsezi achieved a good score on technical skills as process controllers for this WTW are adequately aligned to SANS 241:2015 requirements. Lower scores achieved for the remainder of the systems indicate that process controllers are not adequately aligned to the Regulations requirements. A maintenance team is lacking for all supply systems and this should be addressed to prevent the risk of water supply interruption due to poor maintenance practices.

SANS 241:2015 and WHO aligned Water Safety Plans are also not available for all systems and this impacted on scores under criteria E.

The Regulator urges the WSA to implement the following measures to maintain low-risk rating in all supply system:

- ✓ B: Installation and calibration of inflow meters to verify operational capacity at Nsezi WTW.
- ✓ A and B: Planning and budgeting to address capacity exceedance at all WTW operating above 90% of design.
- ✓ C2b: Implementation of chemical monitoring programmes with sufficient samples and adequate frequency based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS and evidence of maintenance team must be submitted to the Regulator.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high-risks.

uMkhanyakude District Municipality

Municipal BDRR Score: 86.1%

Assessment Areas	Block 6	Borehole Clusters	Enkanyezini	Hlabisa
BULK / WSP				
A: Total Design Capacity (Ml/d)	1.5	N/I	0.5	0.8
B: % Operational Capacity in terms of design	N/I	N/I	N/I	NI
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	37.5%	0%	52.5%	37.5%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	100%	94.2%	95.5%

Assessment Areas	Hluhluwe Phase1	Hluhluwe Phase2	Ingwavuma	Jozini (New)
BULK / WSP				
A: Total Design Capacity (Ml/d)	10	1.8	0.5	5
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	60%	60%	37.5%	45%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	94.9%	94.4%	94.9%	95.6%

Assessment Areas	Jozini (Old)	Makhonyeni	Malobeni	Manguzi
BULK / WSP				
A: Total Design Capacity (Ml/d)	3	0.8	0.5	0.5
B: % Operational Capacity in terms of design	N/I	N/I	0%	0%
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	45%	50%	37.5%	45%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	95.6%	94.9%	94.9%	94.6%

Assessment Areas	Manguzi Airfield	Mbazwana	Mjindi Central	Mkuze
BULK / WSP				
A: Total Design Capacity (Ml/d)	1	2	0.35	1.5
B: % Operational Capacity in terms of design	0%	0%	0%	N/I
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	52.5%	45%	37.5%	22.5%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	94.8%	95.1%	94.9%	96.1%

Assessment Areas	Mpembeni	Mseleni	Mshudu	Mtubatuba
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.38	0.8	1	20
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	0%	100.00%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	3.17%
C2a: % Chemical Compliance	0%	0%	0%	87.50%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	5.88%
D: % Technical Skills	37.5%	52.5%	37.5%	75%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	94.9%	94.8%	95.5%	57.6%

Assessment Areas	Nkolokotho	Nondubuya	Othobothini	Shemula
BULK / WSP				
A: Total Design Capacity (Ml/d)	5	0.3	0.5	20
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	60%	37.5%	37.5%	45%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	94.9%	94.9%	94.9%	95.9%

Assessment Areas	Thengane
BULK / WSP	
A: Total Design Capacity (Ml/d)	1
B: % Operational Capacity in terms of design	N/I
C1a: % Microbiological Compliance	0%
C1b: % Microbiological Monitoring Compliance	0%
C2a: % Chemical Compliance	0%
C2b: % Chemical Monitoring Compliance	0%
D: % Technical Skills	37.5%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	95.5%

WSA Overview

uMkhanyakude DM is responsible for twenty-five drinking water supply systems and all supply systems achieved a critical-risk rating.

There is no information on operational capacity for all supply systems. This had a negative impact on criteria B scores and means that the WSA may not be implementing flow measurement at all WTWs. Therefore, they may not be able to plan for water demand. All supply systems also achieved inadequate scores under technical assessments, indicating that staff (process controllers, supervisors and maintenance teams) are not aligned to the Regulations requirements. This may impact on operations and maintenance practices and ultimately on water supply to customers.

The WSA does not conduct drinking water quality monitoring and this did not only impact on the score achieved but also presents a serious health risk to the consumers as the quality of water supplied from this system cannot be confirmed or guaranteed. uMkhanyakude DM is urged to address this issue urgently.

A Water Safety Planning process has not been adopted and implemented, indicating that risk assessment and full SANS 241:2015 analysis and risk mitigation has not been conducted as per Indicator E.

The Regulator is concerned with drinking water quality management by the WSA and urges the uMkhanyakude DM to implement the following measures to reduce their risk rating and ensure supply of safe drinking water to the consumers:

- ✓ A and B: Installation and calibration of inflow meters to verify operational capacity at all WTW.
- ✓ C: Development and Implementation of microbiological and chemical monitoring programmes with sufficient samples and adequate frequency based on population size as outlined in SANS 241:2015. Subsequent water quality results should then be submitted to the Regulator through IRIS.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high-risks.

uMzinyathi District Municipality

Municipal BDRR Score: 65.3%

Assessment Areas	Msinga LM - Fabeni WTW	Msinga LM - Keat`s Drift (Ethembeni)	Msinga LM - Pomeroy WTW	Msinga LM - Sampofu WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.50	0.50	0.50	3
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	71.4%	98.2%	90%	70%
C1b: % Microbiological Monitoring Compliance	29.2%	86.1%	75%	60.4%
C2a: % Chemical Compliance	97.2%	93.8%	96%	88.2%
C2b: % Chemical Monitoring Compliance	8.8%	8.8%	8.8%	8.8%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	78.30	42.74	53.12	74.63

Assessment Areas	Msinga Rudimentary Scheme	Nquthu Rudimentary Scheme	Nqutu LM - Isandlwana WTW	Nqutu LM - Nondweni WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	N/I	0.50	2
B: % Operational Capacity in terms of design	N/I	N/I	0%	0%
C1a: % Microbiological Compliance	0%	0%	88.9%	94.4%
C1b: % Microbiological Monitoring Compliance	0%	0%	79.2%	58.3%
C2a: % Chemical Compliance	0%	0%	87.9%	80%
C2b: % Chemical Monitoring Compliance	0%	0%	8.8%	8.8%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100.00	100%	69%	66.5%

Assessment Areas	Nqutu LM - Nqutu (Vant`s Drift) WTW	Nqutu LM - Qudeni WTW	Umvoti LM - Amakhabaleni WTW	Umvoti LM - Greytown WTW
BULK / WSP				
A: Total Design Capacity (Ml/d)	8	0.30	2	5
B: % Operational Capacity in terms of design	0%	0%	N/I	N/I
C1a: % Microbiological Compliance	88.5%	97.9%	82.6%	98.3%
C1b: % Microbiological Monitoring Compliance	76%	87.5%	75%	77.1%
C2a: % Chemical Compliance	95.6%	96%	90.9%	94.7%
C2b: % Chemical Monitoring Compliance	8.8%	8.8%	8.8%	8.8%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	65.9%	28.4%	72.1%	50%

Assessment Areas	Umvoti LM - Muden WTW	Umvoti LM Kranskop WTW	Umvoti Rudimentary Scheme
BULK / WSP			
A: Total Design Capacity (Ml/d)	3	2	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I
C1a: % Microbiological Compliance	88.3%	85.7%	0%
C1b: % Microbiological Monitoring Compliance	83.3%	83.3%	0%
C2a: % Chemical Compliance	92.7%	98.5%	0%
C2b: % Chemical Monitoring Compliance	8.8%	8.8%	0%
D: % Technical Skills	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	63.2%	40.5%	100%

WSA Overview

uMzinyathi DM is responsible for fifteen drinking water supply systems. Keat`s Drift, Qudeni and Kranskopsystems are in the low-risk rating category while Pomeroy, Sandlwana, Nondweni, Nqutu, Greytown and Muden systems are in the medium-risk rating category. Fabeni, Sampofu and Amakhabalen supply systems are in the high-risk rating category. The three Rudimentary supply systems have no information for any of the Risk Indicators placing them in the critical-risk category.

Poor scores were achieved under criteria B since all supply systems do not have operational flow data indicating that flow monitoring may not be taking place. Lack of flow monitoring information may impact of the municipality's planning and also effect implementation of water conservation and demand management initiatives.

Under drinking water quality monitoring, Keat`s Drift, Qudeni and Greytown supply systems achieved acceptable to excellent microbiological and chemical compliance and their microbiological monitoring programmes are aligned to SANS 2341 requirements. This indicates that the water supplied may not presents serious health risk to the consumers. Chemical monitoring programmes for these systems are still required to be aligned with SANS 241:2015 requirements. The remainder of the systems either achieved unacceptable microbiological and/or chemical compliance. This coupled with inadequate alignment of chemical monitoring programmes to SANS241 requirements indicates that the water supplied from these systems may still present health and aesthetic risk to the consumers. Water quality monitoring is also not taking place for the three Rudimentary systems and this may present consumer with health and aesthetic risk as the quality of water supplied cannot be verified or guaranteed.

Poor scores achieved under criteria D indicate that all supply systems supervisors, process controllers and maintenance teams are not adequately aligned to the Regulations requirements. This should be addressed urgently as it has a potential to impact on the operation and maintenance practices and may ultimately impact on water supply to customers.

Similarly, to criteria D, poor score achieved under criteria E also indicate that all supply systems do not have Water Safety Plans that are aligned to SAN241 and WHO guidelines. Therefore, risk assessment, full SANS analysis, risk-based monitoring and implementation of measure to reduce risks are not taking place.

The Regulator urges uMzinyathi LM to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Classification and linking of applicable WTW or boreholes to all Rudimentary supply systems.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programme with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high-risks.

uThukela District Municipality

Municipal BDRR Score: 54.7%

Assessment Areas	Emnambithi / Ladysmith - Colenso Town	Emnambithi / Ladysmith - Ezakheni	Emnambithi / Ladysmith - Ladysmith Town	Imbabazane - Loskop
BULK / WSP				
A: Total Design Capacity (Ml/d)	1.2	32	23	8
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	94.4%	98.8%	99.3%	87.7%
C1b: % Microbiological Monitoring Compliance	95.8%	84.8%	66.7%	97.2%
C2a: % Chemical Compliance	85.8%	86.9%	86.3%	82.7%
C2b: % Chemical Monitoring Compliance	26.5%	97.1%	26.5%	26.5%
D: % Technical Skills	27.1%	25%	37.5%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	55.6%	47%	56.7%	63.7%

Assessment Areas	Imbabazane - Loskop (Rural Scheme)	Indaka - Ekuvukeni Township and Surrounding Areas	Indaka - Tugela Estates	Okhahlamba - Bergville Town and Surrounding Areas
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	8	1.2	2.6
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	98.1%	100%	92.3%
C1b: % Microbiological Monitoring Compliance	0%	93.8%	100%	83.3%
C2a: % Chemical Compliance	0%	83.4%	86.1%	83.6%
C2b: % Chemical Monitoring Compliance	0%	88.2%	88.2%	26.5%
D: % Technical Skills	0%	75%	75%	56.3%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	35.4%	28.9%	60.9%

Assessment Areas	Okhahlamba - Langkloof	Okhahlamba – Moyeni / Zwelisha	Okhahlamba - Winterton Town, Khethani Township	Umtshezi - Archie Rodel
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.01	2.4	1.2	12
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	97.8%	95%	100%	89.4%
C1b: % Microbiological Monitoring Compliance	91.7%	78.3%	87.5%	100%
C2a: % Chemical Compliance	75.7%	92.5%	77.2%	82.4%
C2b: % Chemical Monitoring Compliance	29.4%	26.5%	26.5%	26.5%
D: % Technical Skills	37.5%	65.6%	56.3%	9.4%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	42.4%	61.8%	45.9%	65.9%

Assessment Areas	Umtshezi - George Cross	Umtshezi - Weenen 2	Umtshezi - Weenen Town
BULK / WSP			
A: Total Design Capacity (Ml/d)	21	5	1.5
B: % Operational Capacity in terms of design	N/I	N/I	N/I
C1a: % Microbiological Compliance	98.6%	82.1%	95%
C1b: % Microbiological Monitoring Compliance	76.4%	91.7%	100%
C2a: % Chemical Compliance	80.9%	74.7%	78.9%
C2b: % Chemical Monitoring Compliance	26.5%	26.5%	26.5%
D: % Technical Skills	12.5%	18.8%	12.5%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	57.7%	62.5%	53.4%

WSA Overview

uThukela DM is responsible for fifteen drinking water supply systems in their area of jurisdiction. Five of these supply systems are in the low-risk rating category (achieved <50% BDRR), while nine are in the medium-risk rating category (achieved between 50% and <70% BDRR), and one supply system achieved critical-risk rating (achieved ≥90% BDRR).

Poor scores were achieved under criteria B since all supply systems do not have operational flow data indicating that flow monitoring may not be taking place. Lack of flow monitoring information may impact of the municipality's planning and also effect implementation of water conservation and demand management initiatives.

Supply systems achieved excellent microbiological and microbiological monitoring compliance indicating that the water supplied from these systems may not present a health risk associated with microbiological contamination. However, unacceptable chemical compliance achieved for these systems indicates that water supplied may still present health and aesthetic risks to the consumers. Drinking water quality monitoring is not taking place for Loskop Rural system. Unacceptable microbiological and chemical monitoring was achieved for the remainder of the systems. This presents serious health and aesthetic risks to the consumers as the quality of water supplied cannot be guaranteed and should be addressed urgently.

Majority of the supply systems achieved poor score under criteria D indicating the WTWs staff compliment is not adequately aligned with the Regulations requirements. Only Colenso Town and Ezakheni supply systems have adequate process controllers and supervisors. However, all supply systems maintenance teams are inadequate. This should be urgently addressed to reduce the risk of poor operations and maintenance practices which may further impact on water supply.

Poor score achieved under criteria E also indicate that all supply systems do not have Water Safety Plans that are aligned to SAN241 and WHO guidelines. Therefore, risk assessment, full SANS analysis, risk-based monitoring and implementation of measure to reduce risks are not taking place.

The Regulator urges uThukela DM to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Classification and linking of applicable WTW or boreholes to Loskop Rural supply system
- ✓ B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS.
- ✓ Criteria E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high-risks.

Zululand District Municipality

Municipal BDRR Score: 63.3%

Assessment Areas	Babanango	Belgrade	Belgrade New	Ceza Water Supply
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.33	1.1	4	0.4
B: % Operational Capacity in terms of design	87.9%	75.5%	50.3%	75%
C1a: % Microbiological Compliance	96.3%	96.3%	94.1%	92.3%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	100%
C2a: % Chemical Compliance	86.9%	81.1%	80.1%	88.8%
C2b: % Chemical Monitoring Compliance	17.7%	17.7%	17.7%	17.7%
D: % Technical Skills	66.7%	54.2%	54.2%	54.2%
E: % Water Safety Plan Status	90.9%	90.9%	27.3%	90.9%
%BDRR/BDRR max	40.9%	43.4%	48.3%	50.8%

Assessment Areas	Coronation	eDumbe	eMakhosini	eMondlo Town
BULK / WSP				
A: Total Design Capacity (Ml/d)	2	2.4	0.7	8.5
B: % Operational Capacity in terms of design	N/I	139.7%	107.1%	N/I
C1a: % Microbiological Compliance	0%	99.1%	95.8%	0%
C1b: % Microbiological Monitoring Compliance	0%	100%	95.8%	0%
C2a: % Chemical Compliance	0%	87.5%	94.5%	0%
C2b: % Chemical Monitoring Compliance	0%	17.7%	11.8%	0%
D: % Technical Skills	0%	54.2%	54.2%	37.5%
E: % Water Safety Plan Status	90.9%	90.9%	90.9%	90.9%
%BDRR/BDRR max	99.7%	47.8%	45.4%	98.2%

Assessment Areas	Enyathi Town	Enyokeni Palace	Frischgewaagd Bilanyoni	Gumbi Rural Supply Scheme
BULK / WSP		Zululand District Municipality		
A: Total Design Capacity (Ml/d)	1	2.02	1.5	0.5
B: % Operational Capacity in terms of design	20%	123.8%	60%	46%
C1a: % Microbiological Compliance	92.3%	100%	97.6%	100%
C1b: % Microbiological Monitoring Compliance	100%	7.6%	100%	100%
C2a: % Chemical Compliance	98.1%	95.6%	78.6%	91.7%
C2b: % Chemical Monitoring Compliance	11.8%	18.8%	17.7%	11.8%
D: % Technical Skills	54.2%	63.5%	54.2%	54.2%
E: % Water Safety Plan Status	90.9%	90.9%	81.8%	90.9%
%BDRR/BDRR max	28.7%	45.1%	41.7%	36.2%

Assessment Areas	Hlobane	Itshelejuba Hospital	Khambi	Khangela Palace
BULK / WSP				
A: Total Design Capacity (Ml/d)	4.5	0.5	0.5	0.15
B: % Operational Capacity in terms of design	0%	3.4%	88%	28.7%
C1a: % Microbiological Compliance	0%	100%	96.2%	63.9%
C1b: % Microbiological Monitoring Compliance	0%	50%	100%	100%
C2a: % Chemical Compliance	0%	94.5%	93.3%	92.5%
C2b: % Chemical Monitoring Compliance	0%	17.7%	11.8%	17.7%
D: % Technical Skills	0%	54.2%	54.2%	54.2%
E: % Water Safety Plan Status	90.9%	81.8%	90.9%	90.9%
%BDRR/BDRR max	99.8%	30%	41.6%	48.6%

Assessment Areas	Khiphunyawo	Kombuzi	Louwsberg	Mandlakazi
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.37	0.2	0.72	2.25
B: % Operational Capacity in terms of design	94.6%	45%	N/I	164.4%
C1a: % Microbiological Compliance	100%	100%	0%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%	0%	100%
C2a: % Chemical Compliance	92.2%	88.8%	0%	98.4%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%	0%	17.7%
D: % Technical Skills	54.2%	63.6%	0%	54.2%
E: % Water Safety Plan Status	90.9%	90.9%	90.9%	90.9%
%BDRR/BDRR max	38.5%	35.8%	99.7%	35.9%

Assessment Areas	Masokaneni	Mountain View	Mpungamhlope	Msibi
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.05	0.2	0.8	0.5
B: % Operational Capacity in terms of design	N/I	65%	55%	52%
C1a: % Microbiological Compliance	0%	96%	63.6%	95.8%
C1b: % Microbiological Monitoring Compliance	0%	100%	100%	100%
C2a: % Chemical Compliance	0%	85.4%	93.5%	81.4%
C2b: % Chemical Monitoring Compliance	0%	11.8%	17.7%	11.8%
D: % Technical Skills	91.7%	54.2%	63.5%	54.2%
E: % Water Safety Plan Status	90.9%	81.8%	90.9%	90.9%
%BDRR/BDRR max	95.1%	41.3%	51.3%	44.6%

Assessment Areas	Mvuzini	Nkonjeni Hospital	Nkosentsha	Nongoma
BULK / WSP				Zululand District Municipality
A: Total Design Capacity (Ml/d)	0.8	0.1	0.13	6.8
B: % Operational Capacity in terms of design	78.8%	200%	46.2%	92.1%
C1a: % Microbiological Compliance	96%	90.9%	100%	98.5%
C1b: % Microbiological Monitoring Compliance	100%	45.8%	100%	7.6%
C2a: % Chemical Compliance	93.2%	90.3%	89.7%	94.3%
C2b: % Chemical Monitoring Compliance	11.8%	17.7%	11.8%	17.7%
D: % Technical Skills	54.2%	54.2%	54.2%	54.2%
E: % Water Safety Plan Status	81.8%	81.8%	90.9%	90.9%
%BDRR/BDRR max	43.1%	82.8%	36.3%	61.5%

Assessment Areas	Ophuzane	Osingisingini	Pongola	Purim Rural Water Supply
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	0.06	10.3	0.5
B: % Operational Capacity in terms of design	66%	50%	77.7%	98%
C1a: % Microbiological Compliance	96%	100%	99.7%	95.6%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	95.8%
C2a: % Chemical Compliance	80.5%	89.2%	95.2%	94.9%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%	17.7%	11.8%
D: % Technical Skills	54.2%	54.2%	54.2%	54.2%
E: % Water Safety Plan Status	90.9%	90.9%	90.9%	81.8%
%BDRR/BDRR max	41.6%	36.3%	35.9%	39.1%

Assessment Areas	Sidinsi	Sovane WTW	Spekboom	Tholakele
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.28	0.2	1.2	0.5
B: % Operational Capacity in terms of design	53.6%	30%	68.3%	60%
C1a: % Microbiological Compliance	100%	100%	79.2%	77.8%
C1b: % Microbiological Monitoring Compliance	91.7%	100%	50%	95.8%
C2a: % Chemical Compliance	80.8%	94.1%	86.8%	90.8%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%	11.8%	11.8%
D: % Technical Skills	72.9%	16.7%	54.2%	54.2%
E: % Water Safety Plan Status	81.8%	27.3%	90.9%	90.9%
%BDRR/BDRR max	37.2%	30.8%	64.3%	50.8%

Assessment Areas	Thulasizwe Hospital	Ulundi Nkonjeni	Vryheid
BULK / WSP			
A: Total Design Capacity (Ml/d)	0.2	26.4	20.5
B: % Operational Capacity in terms of design	24%	47.1%	N/I
C1a: % Microbiological Compliance	100%	97.6%	0%
C1b: % Microbiological Monitoring Compliance	100%	100%	0%
C2a: % Chemical Compliance	91.3%	90.6%	0%
C2b: % Chemical Monitoring Compliance	17.7%	17.7%	0%
D: % Technical Skills	54.2%	63.5%	13.7%
E: % Water Safety Plan Status	90.9%	90.9%	90.9%
%BDRR/BDRR max	36.3%	38.2%	104.9%

WSA Overview

Thirty nine drinking water supply systems under Zululand DM were assessed. Twenty-seven of these supply systems are in the low-risk rating category (achieved <50% BDRR), while five are in the medium-risk rating category (achieved between 50% and <70% BDRR), and one is in the high-risk rating category (achieved between 70% and <90% BDRR). Six supply systems achieved a critical-risk rating (achieved ≥90% BDRR).

Poor score was achieved for Coronation, eMondlo Town, Hlobane, Louwsberg, Masokaneni and Vryheid systems as there is no information on operational capacity indicating that flow measurement may not be taking place. eDumbe, eMakhosini, Enyokeni Palace, Khiphunyawo, Malakai, Nkonjeni Hospital, Nongoma and Purim Rural supply systems are operating above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

eMakhosini, Khiphunyawo, Mandlakazi, Pongola, Purim Rural, Sovane achieved adequate microbiological and chemical compliance and their microbiological monitoring programmes are aligned to SANS 241:2015 requirements. This indicates that health risk potential from water supplied from these systems is reduced. However chemical monitoring programmes are still required to be aligned to SANS 241:2015 requirements. The remainder of the supply systems achieved unacceptable compliance in microbiological and/or chemical compliance indicating that water supplied may present health and aesthetic risks to the consumers and this should be urgently addressed. Microbiological and chemical monitoring programmes for most of the systems are not adequately aligned (<80% monitoring compliance) to SANS 241:2015 requirements.

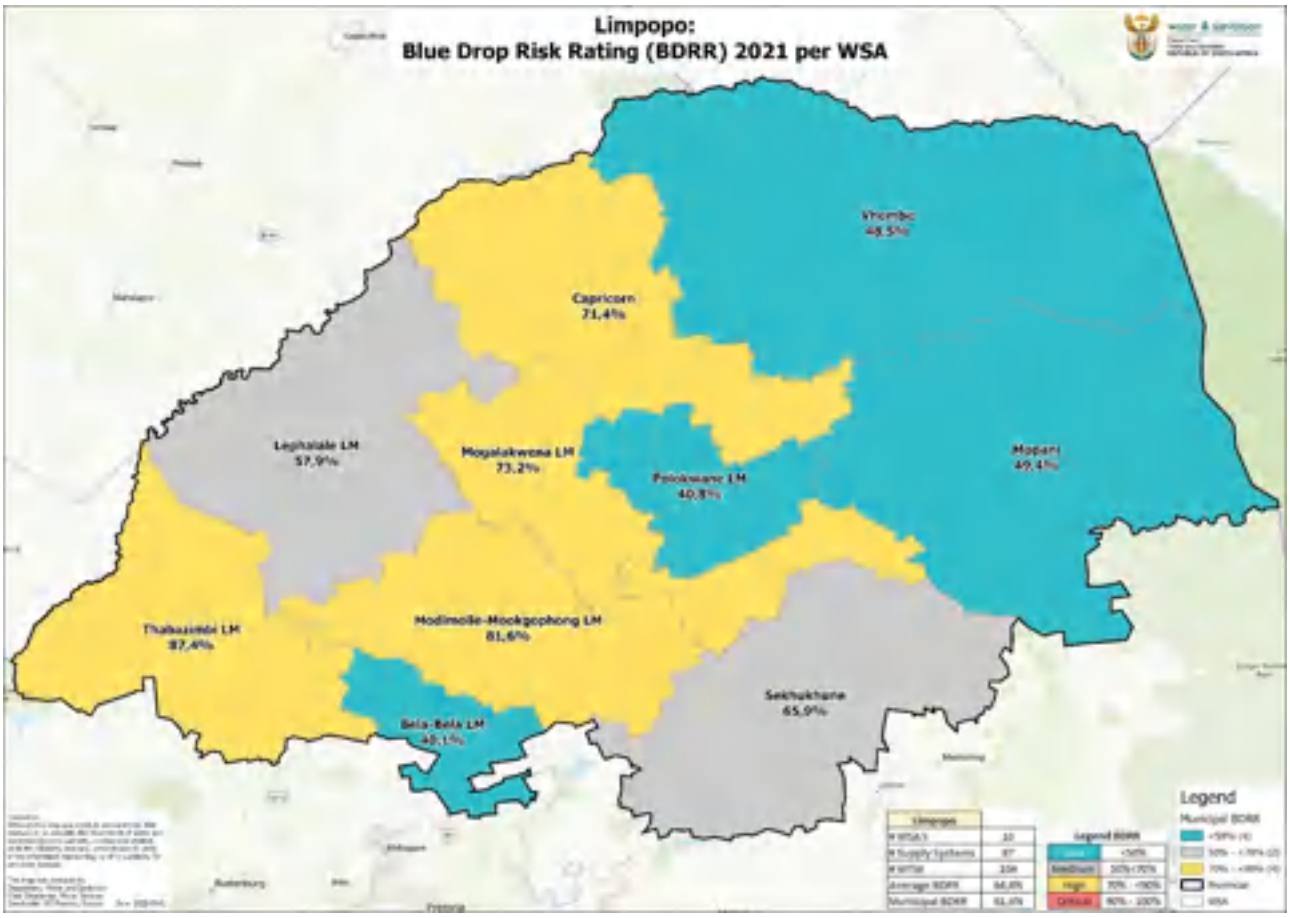
Except for Masokaneni, all supply systems have low scores for Indicator D: Technical skills. Lack of qualified process controllers, supervisors and maintenance teams presents a serious risk to delivery of safe drinking water and maintaining the water infrastructure.

The WSA is commended for the excellent scores achieved for Indicator E by most supply systems. This indicates availability and adequate implementation of SANS 241:2015 and WHO aligned Water Safety Plans that will lead to effective risk management.

The Regulator urges the WSA (and WSP) to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Planning and budgeting to address capacity exceedance at all WTW operating above 90% of design.
- ✓ A and B: Installation and calibration of inflow meters to verify operational capacity at all WTW without operational flow data.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS

CHAPTER 7: LIMPOPO PROVINCE



PROVINCIAL BDRR TREND ANALYSIS

One of the outcomes of Incentive and Risk-based Regulation is the regular monitoring and reporting on the performance of the WSA to ensure strategic operational and management plans are constantly realigned to achieve compliance and effectively manage risks for provision of sustainable water services. For risk-based regulation, the movement in BDRR is a vital tool for both the Department and the WSA to monitor and track the levels of risk in the country. The 2021 BDRR will serve as a baseline for future BDRR assessments that will be used by DWS to monitor and manage drinking water supply systems to ensure delivery of safe drinking water to all communities.

BDRR is calculated and categorised as either low, medium, high and critical risk rating, calculated according to the following range of values to enable both WSA and DWS to monitor performance.

Table 1: BDRR categorisation

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

The BDRR formular is made up of five risk indicators with an overall BDRR for each supply system. The overall performance of each WSA is reported in two ways:

- ✓ Average % BDRR: average % BDRR for all supply systems per province.
- ✓ % Municipal (weighted) BDRR: The Municipal BDRR for each WSA is calculated by the proportional contribution of each water supply system based on design capacity of each system. This weighted average may provide skewed picture i.e. a supply system

which receives a small fraction of the total flow from a larger treatment plant will carry a higher weighting compared to a system which received 100% from a smaller treatment plant.

Therefore, the WSA must evaluate the individual % BDRR scores of each system to determine the risk associated with provision of drinking water for each system and not use the % Municipal BDRR score to evaluate their performance. Regardless of the size of the systems, all consumers have a right to safe drinking water and the WSA must be wary of neglecting the management of smaller, rural schemes in favour of larger urban systems.

The % Municipal (weighted) BDRR for all WSA's in the province is provided at the end of each provincial chapter for reference.

In 2021, 10 WSA's were assessed in Limpopo province with a total to 87 water supply systems. The assessment period for all Risk Indicators was July 2020 to June 2021 except for Risk Indicator C: Water Quality compliance where assessment period was January to December 2020.

The risk performance trends for Limpopo Province are summarised below to provide a provincial overview of BDRR.

Table 49: 2021 Risk Performance trends for Limpopo

Risk Rating	Average	Minimum	Maximum
% Municipal BDRR (Weighted Score)	61.6%	40.1%	87.4%
% BDRR	64.4%	18.7%	100%
A: Design Capacity (Ml/d)	10.4	0.1	270
C1a: % Microbiological Compliance	69.8%	0%	100%
C1b: % Microbiological Monitoring Compliance	35.6%	0%	100%
C2a: % Chemical Compliance	69.7%	0%	100%
C2b: % Chemical Monitoring Compliance	13.8%	0%	50%
D: % Technical Skills	37.9%	0%	100%
E: % Water Safety Plan Status	15.7%	0%	100%

The BDRR profile for Limpopo province is outlined in the figure below.

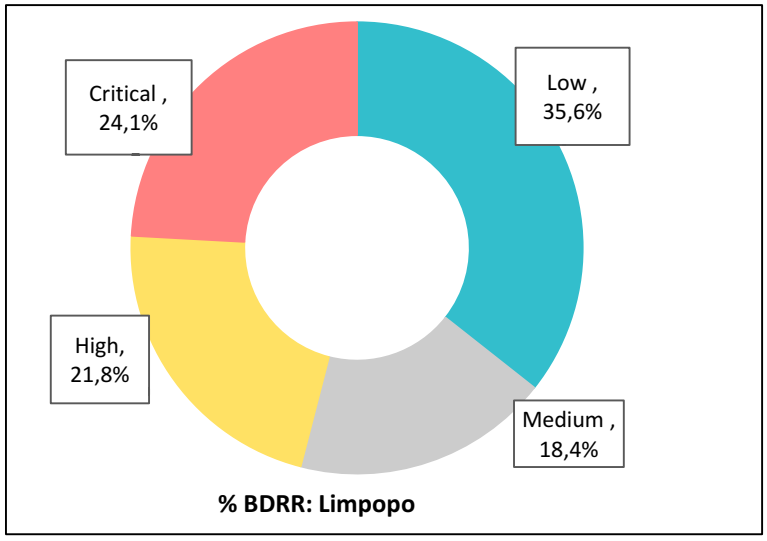


Figure 57: BDRR profile for Limpopo

The results for Limpopo are summarised as follows:

- ✓ 35.6% of supply systems are in the low risk category,
- ✓ 18.4% are in the medium risk category,
- ✓ 21.8% are in the high risk category, and
- ✓ 24.1% are in the critical risk category.

To use the 2021 BDRR score as a tool to implement strategic, targeted actions that will result in an improved risk rating and sustainable water services delivery, the individual components of the BDRR score must be critically evaluated by the WSA to understand the reason for the current risk rating and the desired risk category for delivery of safe drinking water.

The BDRR scorecards reports on the following system-specific risk indicators which ultimately feed into the BDRR score:

- ✓ Risk Indicator A: Design capacity,
- ✓ Risk Indicator B: Operational Capacity,

- ✓ Risk Indicator C: Water Quality Compliance,
- ✓ Risk Indicator D: Technical skills, and
- ✓ Risk Indicator E: Water Safety Plans.

The trends with regard to the risk rating of the individual indicator which make up the overall BDRR score is discussed below. This will provide insight on the risk status of each indicator and enable the WSA to implement targeted actions to reduce risk of specific risk indicators which are negatively impacting on the final BDRR score of the supply system.

Risk Indicator A: Design Capacity and Risk Indicator B: Operational Capacity

Criterion A represents the design capacity of the treatment plant.

Every water treatment plant must be classified with DWS as per Regulation 2834. The classification of the treatment plant is based on a number of components, including size, complexity and electrical consumption, as per set criteria. The plant classification certificate is available on IRIS and used to determine the risk rating for criterion A as it states the capacity of the plant.

The risk rating is allocated according to size of the treatment plant with higher risk rating given for a larger plant and lower risk rating for a smaller plant. The rationale is that a larger plant serves a larger community and therefore presents a higher risk if the plant is not functioning or producing unsafe drinking water than a smaller plant which serves less people. The risk rating for criteria A remains the same provided the capacity stays the same, and all plants which have the same design capacity range will have the same maximum BDRR.

Information from the IRIS system was collected to provide a profile of the design capacities of all treatment plants in the province. Some of the treatment plants are large regional bulk schemes which supply water to a number of supply systems in various municipalities and across provinces. The figure below reports on the design capacity of treatment plants located in the province in Ml/d.

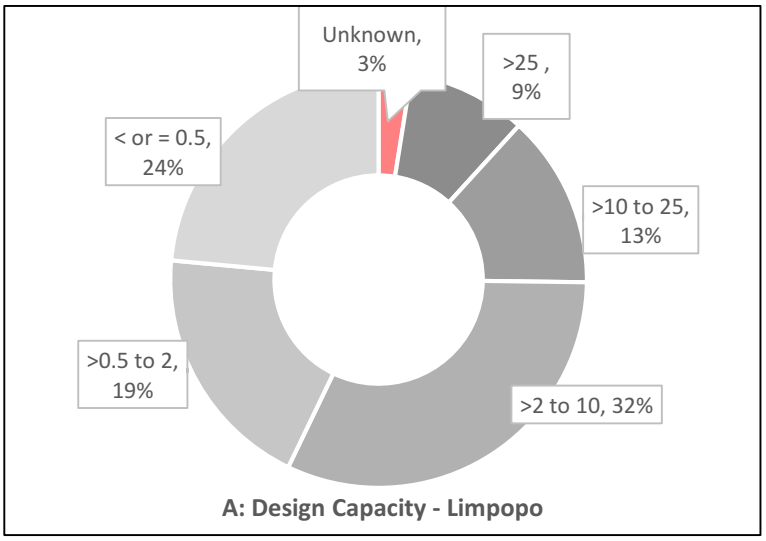


Figure 58: Profile of design capacity in Limpopo (Ml/d)

The results are summarised as follows:

- ✓ There are 104 water treatment plants situated in the Limpopo province with a combined capacity of 1 237.1 Ml/d
- ✓ Reported population served = 4.07 million people,
- ✓ Average design capacity in province =10.4 Ml/d,
- ✓ Largest plant in province = 270 Ml/d,
- ✓ Smallest plant in province = 0.1 Ml/d,
- ✓ 24% of plant are <=0.5 Ml/d, 19% are between 0.5 and 2 Ml/d, 32% are between 2 and 10 Ml/d, 13 % are between 10 and 25 Ml/d and 9% are >25 Ml/d,
- ✓ 3% of plants have not provided design capacity.

In summary, 45% of plants in Limpopo are medium sized plants (between 2 and 25 Ml/d) and 43% are small plants (<2Ml/d) which include rural borehole schemes. Large (>25 Ml/d) water treatment plants account for only 9% of the total supply systems and these are typically located in metropolitan areas in the province or are part of bulk regional schemes. Operation and management of large number of rural

schemes present challenges as these plants are usually located across a large geographical area with some plants in remote areas. This requires additional resources such as staff, chemical supplies, spares and vehicles to ensure optimal operations of these systems

With regards to **Risk Indicator B: Operational capacity**, daily production versus the design capacity of the treatment plant is an important indicator to determine if the plant can provide sufficient, safe drinking water to all the consumers now and in the near future. When the plant is operating above its design capacity, major unit processes are overloaded and cannot achieve their operational limits which leads to water quality failures.

Risk Indicator C indicates the current operational capacity of the treatment plant in each supply system as a percentage of the design capacity of the plant. The ideal value is between 50 – 100%; higher values indicate the plant is overloaded and lower values indicate the plant is receiving too little flow which may also compromise performance due to lack of retention time (flocculation, sedimentation). Once daily production approaches 90% of design capacity, the WSA must plan, budget and implement projects to increase the capacity of the treatment plant to ensure there is sufficient supply, not only for human consumption, but also for economic activities

Although operational capacity has been reported for all supply systems, there are a number of large regional plants which supply a large number of supply systems in various municipalities and across provincial borders. Analysis of Indicator B must therefore be conducted at plant level as collating operational capacity data at municipal or provincial level will not provide an accurate reflection of the current operational capacity of each individual plant.

WSAs are reminded that installation of flow meter and daily flow recording is a regulatory requirement as per their Water Use License.

Recommendations

- ✓ WSAs must ensure all treatment plants have updated plant registration certificates on IRIS
- ✓ WSAs must provide updated copies of plant registration certificates supported with documents on the design capacity of treatment plant for future BDRR assessments.
- ✓ WSA to install flow meters at raw and final water points, monitor daily flows and ensure annual calibration of meters for accuracy of results.
- ✓ Budget and plan for upgrade of treatment plant when operational capacity is at 90% to ensure sufficient time for implementation of civil projects.
- ✓ Consult Census, WSDP and Reconciliation strategies to determine current and future allocation and demand, use a 10-year forecast period.

Risk Indicator C: Water Quality Compliance

In South Africa, the SANS 241:2015 is the definitive reference on acceptable limits for drinking water quality parameters and provides limits for a range of water quality characteristics and water meeting this standard is deemed safe for lifetime consumption. The actual water quality depends on both microbiological and chemical determinands:

- ✓ Microbiological compliance reports on the actual compliance of the final water for the past 12 months against microbiological determinands E. Coli / Faecal Coliforms. The presence of these determinands in water is a strong indication of recent sewage or animal waste contamination and there is potential for contracting diseases from pathogens.
- ✓ Chemical quality is determined by a number of determinands which may be acute or chronic health determinands with specific health risks associated with each determinands. Acute health risks can result in death if the limit is exceeded, while chronic limits provide maximum limits that can be ingested over a period of time before health effects are observed.

Both microbiological and chemical compliance limits outlined in SANS 241:2015 is evaluated against the population size: for a population <100 000, compliance is >98% while for a population >100 000, compliance limit is >99%.

In addition, the SANS 241:2015 standard stipulates the frequency of sampling as well as the number of sample points required per supply system to ensure sufficient coverage of the network. The frequency and number of required sample points is dependent on the population size as outlined in Table 1 of SANS241: 2015 Monitoring compliance is therefore critical to guarantee the safety of the supply at all points in the network.

Indicator C: Water Quality Compliance reports on both water quality compliance and monitoring compliance as per SANS 241:2015 for both microbiological and chemical determinands. The formular to calculate C is made up of four sub-indicators with microbiological compliance carrying a higher weighting than chemical compliance as this presents a serious, acute health risk.

The formular for Indicator C, description and categorisation of each sub-indicator is presented in the table below. The categorisation is aligned with the risk rating for each sub-indicator and results are reported for all supply systems in the province. All supply systems which fall in the Low Risk category are regarded as compliant systems.

Table 10: Formular, description and categorisation for Criteria C

<table>
<tr><th colspan="3">C =[0.7(C1a x C1b)] + [0.3(C2a x C2b)]</th></tr>
<tr><td rowspan="2">**Ca**: Water Quality Compliance</td><td>**C1a**: Microbiological compliance as per SANS 241: 2015.</td><td rowspan="2"><table><tr><th>High Risk</th><th>Medium Risk</th><th>Low Risk</th></tr><tr><td><95%</td><td>95% - <97%</td><td>97% - 100%</td></tr></table></td></tr>
<tr><td>**C2a**: Chemical compliance as per Blue Drop requirements</td></tr>
<tr><td rowspan="2">**Cb**: Monitoring Compliance</td><td>**C1b**: Micro monitoring compliance against registered programme, based on population size as per SANS 241:2015</td><td rowspan="2"><table><tr><th>High Risk</th><th>Medium Risk</th><th>Low Risk</th></tr><tr><td><50%</td><td>50% - 80%</td><td>>80%</td></tr></table></td></tr>
<tr><td>**C2b**: Chemical monitoring compliance calculated as per Blue Drop requirements</td></tr>
</table>

The Limpopo province results for Indicator C and sub-indicators are presented in the table below. This is based on data for the period January to December 2020.

Table 50: Limpopo Province summary of results for Indicator C: Water Quality Compliance (Jan – Dec 2020)

Limpopo	Average Compliance	Minimum	Maximum	% Systems Which Comply (Low Risk)
C1a: Microbiological Quality	69.8%	0%	100%	41%
C2a: Chemical Quality	69.7%	0%	100%	30%
C1b: Microbiological Monitoring Compliance	35.6%	0%	100%	10%
C2b: Chemical Monitoring Compliance	13.8%	0%	50%	0%

The categorisation for microbiological and chemical compliance is illustrated below providing % of supply systems per risk category

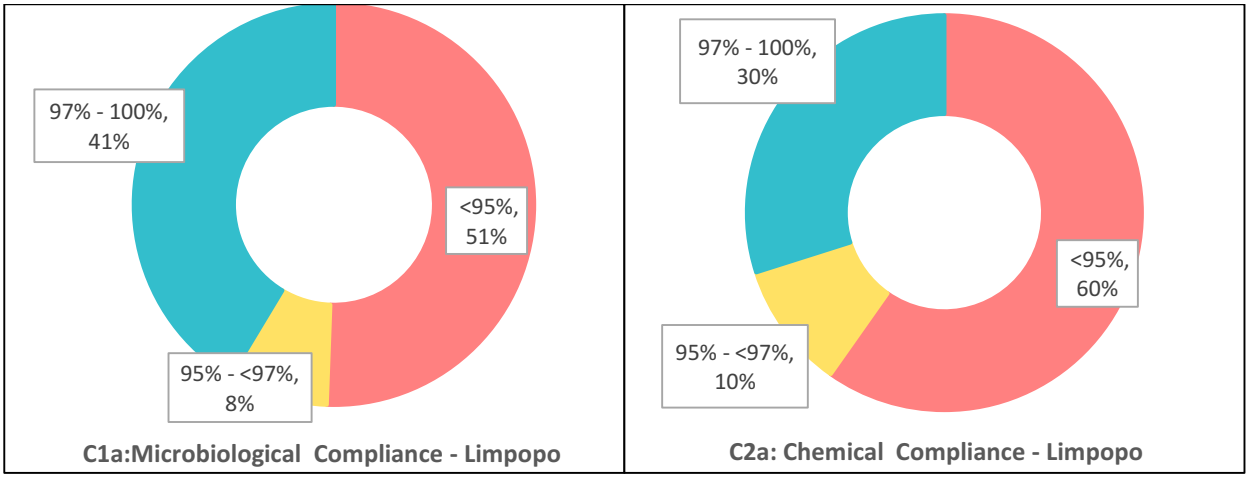


Figure 59: Microbiological and Chemical Compliance for Limpopo (Jan – Dec 2020)

The results are summarised as follows:

- ✓ Only 41% of systems achieved microbiological compliance and 30% achieved chemical compliance. This is of serious concern to DWS as the majority of supply systems present a potential health risk to consumers.
- ✓ 59% of systems do not comply with microbiological determinands: this indicates microbiological failures which presents a serious health risk to the consumers in these supply systems. For sustained failures, 'Boil Water' notices must be issued to safeguard consumers while the root cause of the failure is investigated and resolved.
- ✓ 70% of systems do not comply with chemical determinands. This may present immediate or potential long term health risks depending on whether non-compliance is for acute health determinands or chronic health determinands.
    - WSA must ensure compliance for all chemical-health determinands as per Blue Drop requirements which includes, NO3- and NO2- as N, SO42-, Sb, As, Cd, Cr, Co, Cu, CN-, Pb, Hg, Ni, Se, V, DOC or TOC, and Total THM.

The categorisation for microbiological and chemical monitoring compliance is illustrated below providing percentages of supply systems per category.

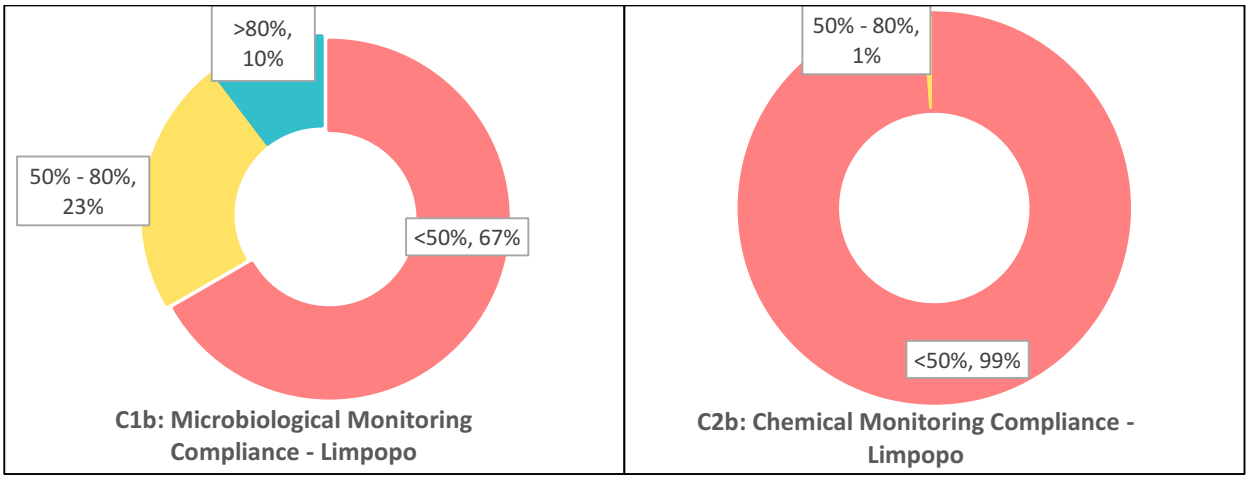


Figure 60: Microbiological and Chemical Monitoring Compliance for Limpopo (Jan – Dec 2020)

The results are summarised as follows:

- ✓ Only 10% of supply systems have sufficient microbiological samples based on population size as per SANS 241-2.
- ✓ 90% of supply systems have <80% for microbiological monitoring compliance. This indicates there is an insufficient number of microbiological samples to guarantee the safety of water at all points in the distribution system. These supply systems therefore do not comply with table 2 in SANS 241-2 which outlines required number of sample points based on population size.
- ✓ None of the supply systems have sufficient chemical monitoring samples.
- ✓ 100% of supply systems have <80% for chemical monitoring compliance. This indicates either insufficient number of samples collected or insufficient chemical determinands were analysed as per the requirement outlined in SANS 241, i.e.
    - Actual monitoring occurs according to registered IRIS monitoring programme (>80%),
    - Number of samples: One sample each at treatment plant final and one distribution point, both of which must be analysed for at least 80% of determinands listed (13 of the 17 determinands) i.e. at least 26 data points are required.

Recommendations

The poor water quality in Limpopo Province is of concern to DWS, in particular the lack of chemical monitoring for 99% of supply systems.

All WSAs must urgently implement the following steps to ensure both microbiological and chemical compliance is improved so that all the citizens of South Africa can have access to safe drinking water, which is a basic human right enshrined under our Constitution:

- ✓ Develop and implement microbiological monitoring as per SANS 241:2015 requirements:
    - Monitor final water weekly.
    - Monitor distribution fortnightly
    - Ensure the number of sample points in the distribution network is based on population size as per Table 2 in SANS 241-2 given below

Table 18: Minimum number of samples for E.Coli (or Faecal Coliforms) in distribution network (Table 2 SANS 241-2: 2015)

Population served	Total number of samples per month[a]
<5000	2
5000-100 000	1 per 5000 head of population + 1 additional sample [b]
100 000 – 500 000	1 per 10 000 head of population + 11 additional sample [b]
≥500 000	1 per 20 000 head of population + 36 additional sample [b]
[a] During rainy season, sampling should be carried out more frequently to ensure that all spatial and temporal risks are identified. [b] see *WHO, Guidelines for drinking water quality*	

- ✓ Develop and implement risk-based chemical monitoring programme as per SANS 241:2015 requirements:
    - Conduct full SANS 241:2015 analysis annually on raw, final and distribution network to identify current problem determinands.
    - Conduct risk assessment of system including catchment, treatment plant and reticulation to identify current and potential water quality risks and their associated determinands. e.g. presence of pit latrines means possibility of nitrates in ground water and surface water.
    - Develop and implement risk-based chemical monitoring programme for all identified determinands.
        - Sample points are raw, final and critical distribution points depending on impact of determinands.
        - Frequency as per Table 3 in SANS 241- 2. i.e. acute health 1 = weekly, acute health 2 – monthly, chronic health = monthly, aesthetic = monthly,
        - Operational monitoring dependant on unit processes.
- ✓ In the event of non-compliance:
    - Precautionary measures including 'Boil Water' notices must be issued to consumers in systems with sustained microbiological failures.
    - 'Water Quality' Advisories must be issued to consumers in systems with sustained chemical failures for chronic health determinands.
    - WSAs must investigate the root cause of the failure and implement remedial actions to ensure compliance. If this cannot be achieved, an alternative water supply must be provided to ensure safety of consumers.
- ✓ Compliance monitoring to be undertaken by accredited laboratory
    - WSA to ensure that there is sufficient budget for compliance monitoring.
    - Laboratory to comply with accreditation requirement as per Blue Drop: SANAS accredited, participation in proficiency testing with acceptable Z-Score, or Quality Assurance system.

Risk Indicator D: Technical Skills

Regulation 2834 states all plant personnel must be classified as per their qualifications and years of experience. This is conducted by DWS and plant personnel are provided with a classification certificate which reflects their current classification based on qualification and years of experience. Ongoing training is a requirement under the Regulation to allow for continuous learning that will enable process controller to improve their classification over time to achieve Class V that allows them to act as plant supervisor. The required number and classification of staff required at a treatment plant per shift is dependent of the classification of the plant and the number of shifts.

The Blue Drop requirements acknowledge excellence in water services provision. The Blue Drop requirements therefore outlines the number and classification of process controllers and supervisors required for each shift. The Blue Drop requirements make provision for sharing of supervisors: this reduces the burden of providing permanent staff for small, remote systems as a roaming supervisor can visit a number of facilities once or twice a week.

In addition, the Blue Drop requirements outline the requirements for plant maintenance team to ensure effective maintenance of water infrastructure for ongoing operations. The maintenance team must have variety of artisans with electrical, mechanical and civil expertise for effective asset management with assets reaching their expected useful lifespan. The Blue Drop requirements were used to evaluate Risk Indicator D: Technical Skills as per Table below

Table 12: Blue Drop requirements to evaluate technical skills at treatment plants

Works Class	Class Of Process Controller Per Shift	Class Of Process Controller for Supervision*	Operations And Maintenance Support Services Requirements*
E	Class I	Class V*	THESE PERSONNEL MUST BE AVAILABLE AT ALL TIMES BUT MAY BE IN-HOUSE OR OUTSOURCED - electrician - fitter - instrumentation technician
D	Class II	Class V*	
C	Class III	Class V*	
B	Class IV	Class V	
A	Class IV	Class V	

NB. Fluoridation – for any class works, minimum process controller classification should be class IV

**does not have to be at the works at all times but must be available at all times. If the Water Services Institution or owner of a waterwork has no person of this class employed on that work, a contractor / consultant with the required qualifications as prescribed in Schedule III in respect of that particular class of persons, shall be appointed to visit the work weekly.*

Risk Indicator D: Technical Skills is calculated from three separate components:

- ✓ Process controllers compliance as per Blue Drop requirements: required number and class of process controllers per shift for specific class of plant.
- ✓ Supervisor compliance as per Blue Drop requirements: Class V required, either at plant or available at all times
- ✓ Maintenance Team compliance as per Blue Drop requirements: civil, mechanical and electrical expertise required.
    - Civil team: plumbing qualification / trade test.
    - Mechanical team: millwright or similar mechanical qualification.
    - Electrical team: electrical qualification / trade test.

The Table and figures below provides a profile of the technical skills in Limpopo Province for July 2020 to June 2021.

Table 51: Limpopo Province Summary of results for Indicator D: Technical Skills

Limpopo	Average	Minimum	Maximum
D: Technical Skills	37.9%	0%	100%
Process Controller Compliance	64.4%	0%	100%
Supervisor Compliance	45.3%	**0%**	100%

The provincial profile for Risk Indicator D: Technical skills is presented in the figure below.

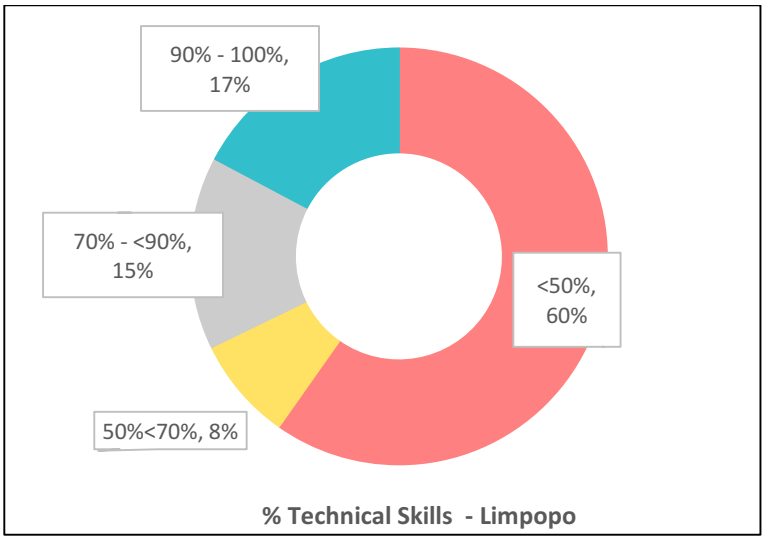


Figure 61: Limpopo profile for Indicator D: Technical Skills

The results are summarised as follows:

- ✓ Only 17% of supply system have excellent technical skills: 90 - 100% compliance,
- ✓ 15% of supply systems have good technical skills: 70 - <90% compliance,
- ✓ 8% of supply systems have average technical skills: 50 - <70% compliance,
- ✓ 60% of supply systems have poor technical skills: <50% compliance,

In general, the province has performed poorly with regards to technical skills.

The provincial profile for process controllers and supervisors compliance is outlined in the figures below.

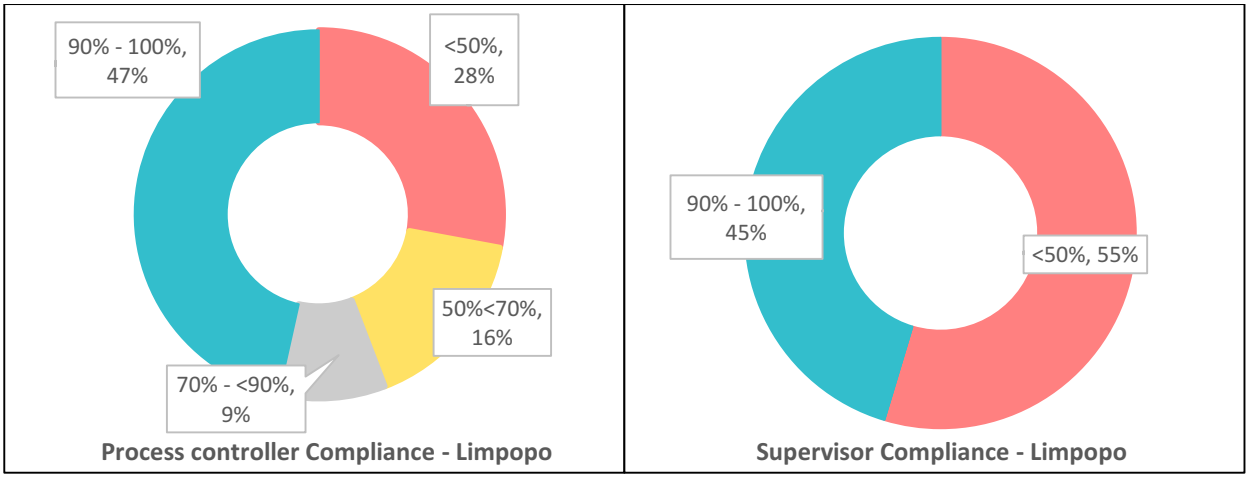


Figure 62: Process controller and Supervisor compliance for Limpopo

The resutls are summarised as follows:

- ✓ Process controller compliance is poor with 47% of supply systems with sufficient number of suitably classified process controllers per shift. Lack of sufficient number of process controllers presents a serious risk due to lack of daily monitoring and process optimisation.
- ✓ 45% of supply systems are compliant with regards to supervisors. These plants either have Class V supervisors permanently based at the plant or available as a roaming supervisor available at all times to assist process controllers. The presence of a qualified supervisor can mitigate some of the risks associated with insufficient number of process controllers on site provided the supervisor is available at all times.

The provincial profile for maintenance team as well as breakdown of maintenance team is outlined in the figures below.

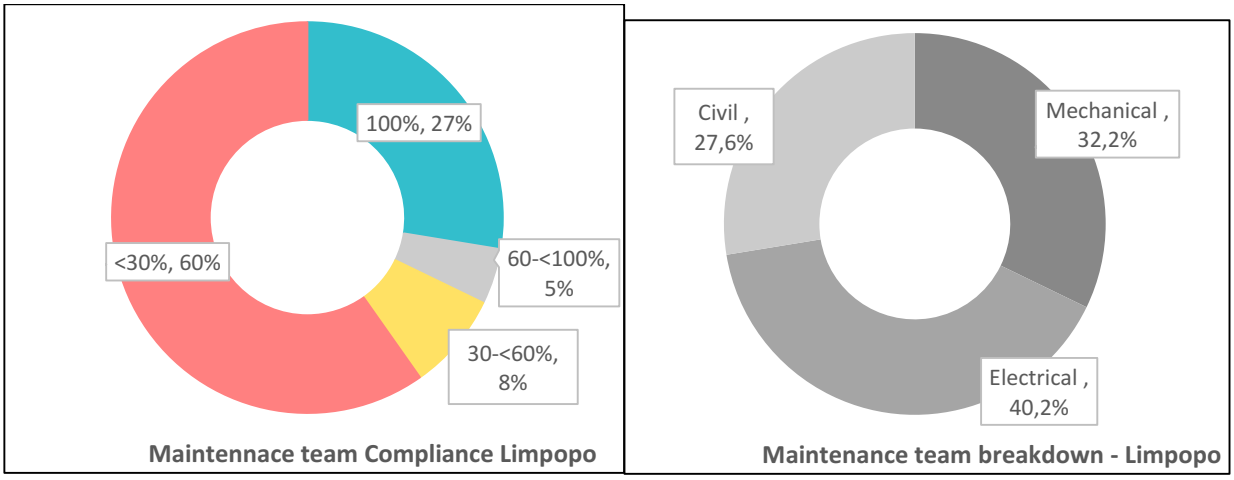


Figure 63: Maintenance team compliance and maintenance team breakdown for Limpopo

The results are summarised as follows:

- ✓ 27% of all supply systems have full maintenance teams in place i.e. civil, mechanical and electrical personnel. However, the remaining 72% have insufficient maintenance teams and this can lead to shutdown of treatment plant or processes which will affect quality and quantity of water.
- ✓ 40.2 % have Electrical staff, 32.2% have mechanical competency, and 27.6% have civil staff. Civil works at treatment plants and in the distribution network is conducted by plumbers: lack to this skill will lead to water losses which will negatively impact on water supply.

The Limpopo province has performed poorly with regards to technical skills. WSAs are encouraged to evaluate the performance of each system with regards to process control and use this information to determine the operational model which is best suited to ensure effective operations and maintenance.

WSA must allocate budget to appoint suitably qualified process controllers and supervisors to ensure water quality compliance improves through ongoing process optimisation. The WSA must appoint a qualified maintenance team to ensure that the life span of the treatment plant is increased by regular maintenance and ensure there are sufficient number of personnel to cover the entire distribution network to reduce water losses and maintain integrity of the supply system.

Recommendations

- ✓ Register all process controllers and supervisors on IRIS as per Regulation 2834
- ✓ Ensure all process control staff complies with Blue Drop requirements.
- ✓ Ensure maintenance team includes civil, mechanical and electrical personnel.
- ✓ Provide details of operational staff at all future assessments: copies of process controller and supervisor registration certificates, organograms with shift patterns, copies of qualifications/certificates/current training.
- ✓ Provide details of maintenance team at all future assessments: organogram, shift patterns, names and qualifications of team, copies of qualifications/certificates/current training, details of external service providers.

Risk Indicator E: Water Safety Plans

Risk management is the cornerstone of risk-based regulation and a fundamental part of the SANS 241:2015 requirements to ensure effective management of both current and future potential risks. The application of risk management in drinking water management is through the Water Safety Plan developed by the WHO which is a comprehensive risk assessment and risk management approach that encompasses all steps in a drinking-water supply chain, from catchment to consumer to ensure continuous feedback and improvement to manage all current and future potential risks. The Water Safety Plan advocates for development of a risk-based monitoring programme and this is also a requirement as per SANS 241:2015

This risk indicator E: Water Safety Plans evaluates the following three critical components which are required for effective risk management as per the WHO guidelines and the SANS 241:2015 requirements.

- ✓ Completeness of the Water Safety Plan as per World Health Organisation Water Safety Planning Manual:
    - 1: Signature from Technical director/Municipal Manager
    - 2: Risk prioritisation method
    - 3: Risk assessment of catchment
    - 4: Risk assessment of plant
    - 5: Risk assessment of network
    - 6: Final risk rating
    - 7: Mitigating measures for all high and medium risks.
- ✓ Development and adoption of risk-based monitoring programme as per SANS 241:2015
    - 8: Full SANS 241:2015 analysis of raw and final water
    - 9: Identification of risk determinands
    - 10: Addition of risk determinands to monthly compliance monitoring as per SANS 241:2015.
- ✓ Proof of implementation of the findings of the Water Safety Plan to ensure there is continuous risk management and movement towards overall lower risk rating:
    - 11: Proof that >25% of mitigating measures have been implemented – proof in form of purchase order, pictures, water quality results, tender document, etc.

This makes up 11 equal sub-elements that are evaluated during the BDPAT assessment to calculate the final risk rating for this indicator.

Figure 64 outlines the provincial profile for E: Water Safety Plans in Limpopo, and Figure 65 below provides details on the completeness of the Water Safety Plan by indicating the percentage of supply systems which comply with each of the 11 individual components which make up the Water Safety Plan.

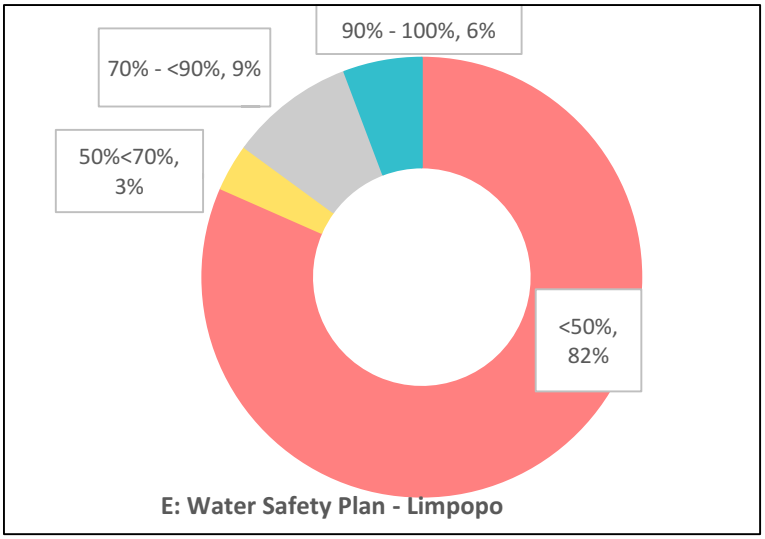


Figure 64: Limpopo Profile for Indicator E – Water Safety Plans

Table 52: Limpopo Province summary of results for Indicator E: Water Safety Plans

Limpopo	Value
E: Water Safety Plans - Average	15.7%
E: Water Safety Plans - Minimum	0%
E: Water Safety Plans - Maximum	100%
% Systems with Water Safety Plans	27%

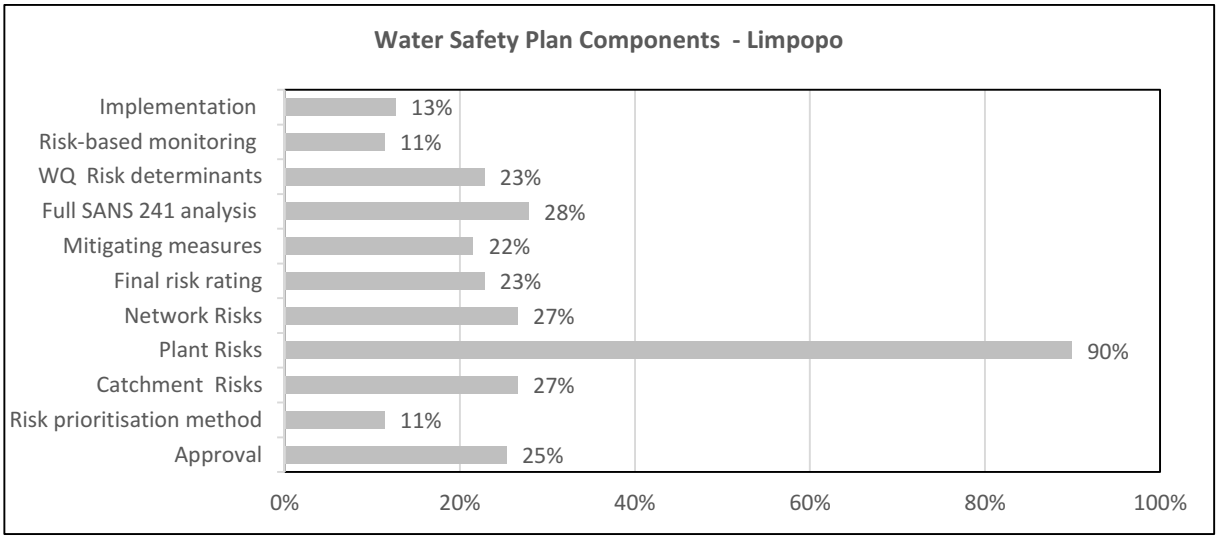


Figure 65: Water Safety Plan components for Limpopo

The results are summarised as follows:

- ✓ Only 27% of supply systems have water safety plans in place. This presents a serious risk as effective risk-management is not taking place as per SANS 241:2015 requirement.
- ✓ Only 6% have excellent water safety plans in place with >=90% compliance indicating comprehensive Water Safety Plans with all required components.
- ✓ The average compliance for the province is 15.7% which indicates poor understanding of the Water Safety Planning process amongst the WSA's in this province.
- ✓ The quality and completeness of the Water Safety Plans is as follows:
    - 25% have approval indicating management's commitment to implementing the findings of the Water Safety Plan.
    - Completeness of the Water Safety Plans is poor for catchment and network risks. However, 90% of plans have plant risks. Only 11% have risk prioritisation method in place, with 22% having mitigating measures. These results indicates poor understanding of the risk assessment process.
    - Development of risk-based monitoring is poor as full SANS 241:2015 only conducted on 28% of systems with only 11% using this information to develop risk-based monitoring programme. Risk-based monitoring is a requirement of SANS 241:2015 and must be reviewed annually based on updated full SANS 241:2015 of raw and final water.

- Implementation of mitigating measures is low at only 13%. Although 25% of Water Safety Plans have been approved, there has been minimal implementation of findings. Management must ensure that when approval is given for a Water Safety Plan, this is supported by resources in the form of staff and budget to implement mitigating measures.

In summary, Water Safety Planning is being implemented in the province in only 27% of supply systems. The completeness and quality of these Water Safety Plans is below average with lack of risk-based monitoring and implementation of mitigating measures to reduce risks.

All WSAs must adopt risk management principles embodied in the Water Safety Planning approach as this is a regulatory requirement as per SANS 241:2015 and will assist in driving down risks in the entire supply system from catchment to consumer.

Recommendations

- ✓ Conduct full SANS 241:2015 analysis on raw, final, and distribution network to identify problem determinands.
- ✓ Develop and implement risk-based monitoring programme to include all current and potential determinands
- ✓ Register SANS 241:2015 compliant monitoring programme on IRIS.
- ✓ Conduct monitoring as per programme and upload information on a monthly basis.
- ✓ Develop WSP: conduct annual risk assessment of supply system, assign risk rating, validate control measures and determine residual remaining risk.
- ✓ Develop and implement action plan to mitigate remaining risk. Action plan to include budget, responsibility and timeframe for implementation. Note approval for implementation and budget must be given by senior management (municipal manager of WSA).
- ✓ WSA to provide copy of signed approved Water safety plan with proof of implementation of corrective actions from previous risk assessment; uploaded on IRIS.

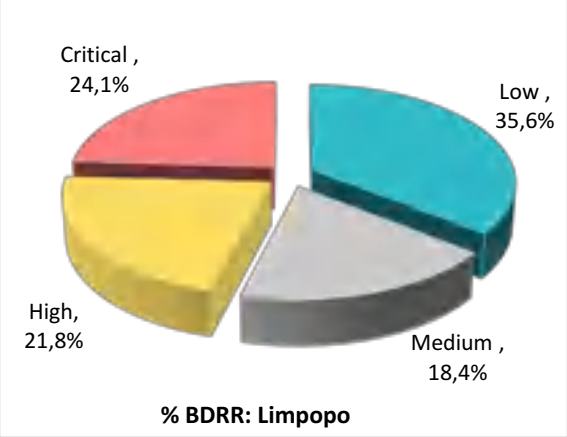
Summary

Overall performance for Limpopo Province is summarised as follows:

- ✓ 35.6% (31) of supply systems are in the low risk category,
- ✓ 18.4% (16) of supply systems are in the medium risk category,
- ✓ 21.8% (19) of supply systems are in the high risk category, and
- ✓ 24.1% (21) of supply systems are in the critical risk category.

DWS is encouraged by the 35.6% of systems in the low risk category.

However, DWS is concerned about the 45.9% of systems which are in high and critical risk categories.



% BDRR: Limpopo

The figure below shows the % Municipal (weighted) BDRR score for all WSA's in the province.

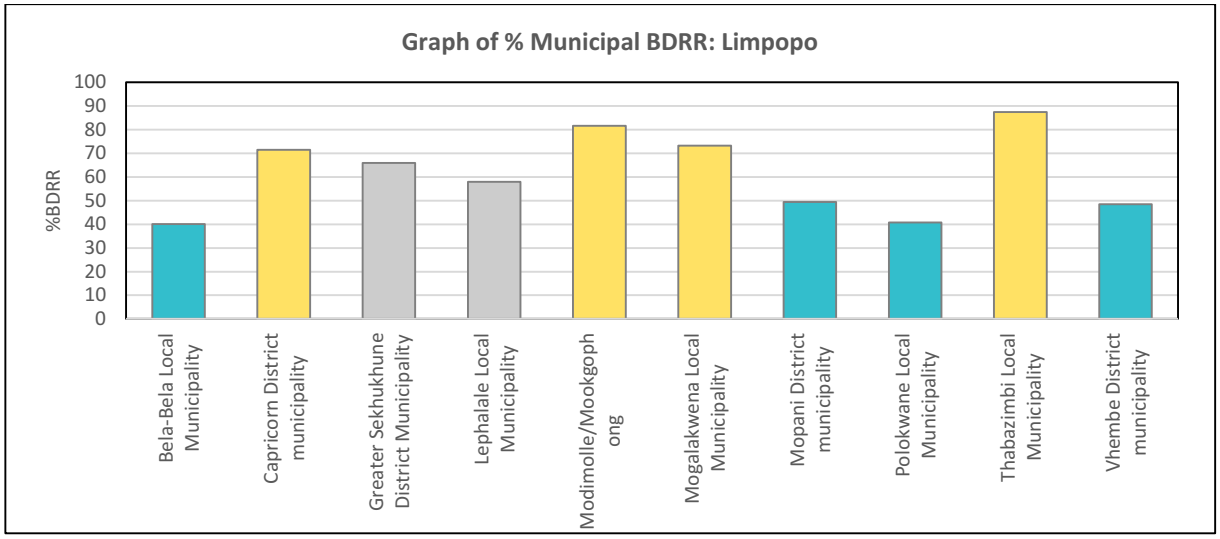


Figure 66: Graph of % Municipal (Weighted) BDRR for each WSA in Limpopo Province

The figure indicates four WSA's are in the high risk category based on % municipal BDRR. However, within the province there are 21 supply systems in the critical risk category and 19 supply systems in the high risk category.

DWS will evaluate risk based on the individual BDRR score for each supply system. Water supply systems which fall in the critical risk category are placed under regulatory focus. In such cases, a red note is assigned that requires the WSI to "...submit a detailed corrective action plan within 60 days of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvements as outlined in the Regulatory Comment. The plan will be considered against the Regulatory Comment and recommended for approval by a national regulation committee...." This note serves to initiate the Department's Enforcement Protocol.

Note section 151 of the NWA and Section 63 of the Water Services Act in developing and submitting these plans as required:

- ✓ Section 63 of the Water Services Act enables the Minister in consultation with COGTA to request a relevant Province to intervene in terms of Section 139 of the Constitution in local government. Such requests will be supported by the outcomes of this performance monitoring and WSIs responsiveness on regulatory responses raised.
- ✓ Section 151 of the NWA provides a number of non-compliances as criminal offences, amongst others using water otherwise than is permitted under the Act, failure to provide access to any books, accounts, documents or assets, unlawfully and intentionally or negligently commit any act or omission which affects or is likely to affect a water resource.

Other water supply systems which are in the high risk category will also be targeted for corrective action plans and municipalities are urged to initiate a process of addressing the regulatory comment as a matter of priority

The WSA's must therefore review the individual BDRR score of each supply system, evaluate risk indicators which make up the total BDRR score and implement mitigating measures to improve compliance for poor performing risk indicators as outlined below:

- ✓ A: Design Capacity.
  - WSA to report design capacity of treatment plant,
- ✓ B: Operational Capacity.
  - WSA to install flow meters, record daily flow and implement upgrades when operational capacity is above 90%.
- ✓ C: Water Quality compliance
  - WSA to develop and implement microbiological and chemical monitoring programmes as per requirements to verify the safety of the water at all points in the network.
  - In the event of failures, WSA must implement remedial action which include water quality advisories and process optimisation to improve compliance.
- ✓ D: Technical skills
  - WSA to ensure there are sufficient number of qualified technical staff to undertake operations and maintenance of treatment plants and distribution networks.
- ✓ E: Water Safety Plans
  - WSA to develop and implement comprehensive Water Safety Plan as per WHO and SANS 241: 2015 requirements,
  - WSA to conduct water quality assessment as part of water safety planning process, identify risk determinands, and develop and implement risk-based monitoring programme to manage current and future potential risks.
  - Budget and resources to be made available to implement mitigating measures to reduce risk.

In conclusion, WSA's must review the performance of each supply system, interrogate each risk indicator to identify areas of poor performance, and implement remedial actions to improve overall risk rating.

Below is a summary of performance in Limpopo for the following categories:

- ✓ List of % Average BDRR, % Municipal (weighted) BDRR, and number of supply systems for all WSA's in the province.
- ✓ List of Low risk supply systems,
- ✓ List of Critical Risk supply systems which require immediate attention,
- ✓ Top 10 Performing supply systems.

Table 53: List of % Average BDRR, % Municipal BDRR, and number of supply systems for all WSA's in Limpopo province

WSA	# Supply Systems	% Municipal BDRR	% Average BDRR per WSA
Bela-Bela Local Municipality	3	40.1	60.4
Capricorn District Municipality	8	71.4	70.6
Greater Sekhukhune District Municipality	18	65.9	68.1
Lephalale Local Municipality Local Municipality	6	57.9	89.2
Modimolle / Mookgophong Local Municipality	5	81.6	94.1
Mogalakwena Local Municipality	2	73.2	85.5
Mopani District Municipality	21	49.4	56.8
Polokwane Local Municipality	6	40.8	33.5
Thabazimbi Local Municipality	5	87.4	90.6
Vhembe District Municipality	13	48.5	46.9
Average		**61.6**	**69.6**
Maximum		**87.4**	**94.1**
Minimum		**40.1**	**33.5**

Table 54: List of Low Risk supply systems in Limpopo

Limpopo: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Bela-Bela Local Municipality	Bela Bela/ Magalies Water Supply System	38.2
	Radium Borehole Water System	44.7
Greater Sekhukhune District Municipality	Burgersfort Water Supply System	24.3
	Groblersdal Water Supply System	43.1
	Hlogotlou Water Supply System	39.3
	Penge Water Supply System	28.9
	Roosenekal Water Supply System	45.9
Mopani District Municipality	Giyani Water Supply Area	33.7
	Greater Tzaneen Municipality	25.0
	Letaba Politsi and Modjadji	32.3
	Letsitele	18.7
	Nkowankowa	38.3
	Phalaborwa, Lulekani and Namakgale	43.7
	Semarela	33.3
	Thapane	28.2
	The Oaks	36.4
Polokwane Local Municipality	Chuenemaja	44.3
	City Polokwane	36.2
	Mankweng Area	38.0
	Molepo	19.9
	Moletjie Area	18.8
	Seshego	44.1
Vhembe District Municipality	Luphephe-Nwanedi Water System	24.1
	Makhado (Louis Trichardt) Water System	39.4
	Musina Water System	36.5
	Mutale water system	44.5
	Mutshedzi Water System	31.5
	Nzhelele Water System	45.0

Limpopo: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
	Thohoyandou Water System	33.9
	Tshedza Water Supply System	49.9
	Tshifhire Murunwa Water System	42.0

Table 55: List of Critical Risk supply systems in Limpopo

Limpopo: Critical Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Bela-Bela Local Municipality	Rapotokwane Borehole Water System	98.3
Greater Sekhukhune District Municipality	Mapodile Sand Pit	100.0
	Marishane Water Supply System	96.8
	Moroke Borehole	100.0
	Moutse Water Supply System	100.0
	Nkosini Water Supply System	95.9
	Vlakplaats Package Plant	91.0
Lephalale Local Municipality	Mokuruanyane Regional Water Supply Scheme	100.0
	Seleka Water Supply Scheme	100.0
	Shongoane Water Supply Scheme	100.0
	Witpoort Regional Water Supply Scheme	100.0
Modimolle / Mookgophong Local Municipality	LIM365:Mabaleng Res (Borehole MM 006/2010)	99.7
	LIM365:Mabatlane Res (Borehole MM 007/2010)	100.0
	Roedtan Borehole System	99.7
	Welgewonden Water Works	91.6
Mogalakwena Local Municipality	Mokopane Supply System	100.0
Mopani District Municipality	Muyexe Reverse Osmosis	97.2
	Nkambako	95.6
	Sekororo	100.0
Thabazimbi Local Municipality	Schilpadnest Water Scheme	100.0
	The Greater Thabazimbi -Magalies	92.9

Table 56: List of top 10 performing systems in Limpopo

Top 10 Performing Supply Systems in Limpopo		
WSA	**Supply System**	**%BDRR**
Mopani District Municipality	Letsitele	18.7
Polokwane Local Municipality	Moletjie Area	18.8
Polokwane Local Municipality	Molepo	19.9
Vhembe District Municipality	Luphephe-Nwanedi Water System	24.1
Greater Sekhukhune District Municipality	Burgersfort Water Supply System	24.3
Mopani District Municipality	Greater Tzaneen Municipality	25.0
Mopani District Municipality	Thapane	28.2
Greater Sekhukhune District Municipality	Penge Water Supply System	28.9
Vhembe District Municipality	Mutshedzi Water System	31.5
Mopani District Municipality	Letaba Politsi and Modjadji	32.3

Bela-Bela Local Municipality

Municipal BDRR Score: 40.1%

Assessment Areas	Bela Bela /Magalies Water Supply System	Radium Borehole Water System	Rapotokwane Borehole Water System
BULK / WSP	Magalies Water		
A: Total Design Capacity (Ml/d)	47	1	1.47
B: % Operational Capacity in terms of design	82.6%	80%	108.8 %
C1a: % Microbiological Compliance	98.8%	100%	0%
C1b: % Microbiological Monitoring Compliance	81.3%	0%	0%
C2a: % Chemical Compliance	98.5%	90.9%	0%
C2b: % Chemical Monitoring Compliance	50%	20.6%	17.7%
D: % Technical Skills	71%	0%	0%
E: % Water Safety Plan Status	73.1%	0%	0%
%BDRR/BDRR max	**38.2%**	**44.7%**	**98.4%**

WSA Overview

The Bela Bela/Magalies WSS and Radium borehole falls in the Low-risk category and the Rapotokwane borehole falls in the Critical-risk category.

Criteria B - The Bela Bela/Magalies WSS and Radium borehole are operating within their design capacity (<90%) which makes the water systems to be at Low-risk. However, the Rapotokwane borehole is operating above its design capacity (>90%) which makes it non-compliant, and this must be addressed by the WSA.

Criteria C – The Bela Bela/Magalies WSS indicates excellent compliance for Microbiological compliance (>98%), Microbiological Monitoring compliance (>80%) and Chemical compliance (>98%). However, the WSS achieved adequate score for Chemical Monitoring compliance. The Radium borehole only achieved an excellent Microbiological compliance (>98%), the Microbiological Monitoring compliance is not monitored by the WSA and there is non-compliance with Chemical compliance (<98%) and Chemical Monitoring compliance (<80%) which presents a serious health risk to the end users. The Rapotokwane borehole indicates no monitoring for Microbiological compliance, Microbiological Monitoring compliance and Chemical compliance, and non-compliance with Chemical Monitoring compliance (<80%) which presents a serious health risk to the consumers as quality of water cannot be guaranteed for consumption.

Criteria D – The Bela Bela/Magalies WSS achieved adequate score for compliance with technical skills and Radium borehole and Rapotokwane borehole indicated no presence of technical skills, which indicates that there is insufficient or an absence of the relevant process control staff and maintenance teams.

Criteria E – The Bela Bela/Magalies WSS indicated the presence and implementation of a Water Safety Plan and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015. However, Radium borehole and Rapotokwane borehole indicated the absence of a Water Safety Plan.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity at Rapotokwane borehole which is operating at 108.84% of its design.
- ✓ C: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water. Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.

- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risk.

Capricorn District Municipality

Municipal BDRR Score: 71.4%

Assessment Areas	Alldays Water Supply System	Botlokwa Regional Water Supply System	Lebowakgomo Water Supply System	Mashashane Water Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	1	N/I	1.46
B: % Operational Capacity in terms of design	N/I	100%	N/I	68.5%
C1a: % Microbiological Compliance	50%	95.7%	96.6%	0%
C1b: % Microbiological Monitoring Compliance	58.3%	52.4%	28.6%	0%
C2a: % Chemical Compliance	85%	56.5%	100%	0%
C2b: % Chemical Monitoring Compliance	11.8%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	56.3%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	**82.1%**	**53%**	**62.4%**	**86.7%**

Assessment Areas	Mogwadi Water Supply System	Olifantspoort Water Supply System	Senwabarwana Water Supply System	Zebidiela Water Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	2	N/I	2	N/I
B: % Operational Capacity in terms of design	100%	N/I	100%	N/I
C1a: % Microbiological Compliance	95.8%	100%	77.8%	95.3%
C1b: % Microbiological Monitoring Compliance	54.2%	11.5%	12.5%	15.2%
C2a: % Chemical Compliance	37.5%	100%	84.2%	85.7%
C2b: % Chemical Monitoring Compliance	0%	0%	11.8%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	**53%**	**54.5%**	**89.2%**	**84.1%**

WSA Overview

The Alldays WSS, Mashashane WSS, Senwabarwana WSS and Zebidiela WSS falls in the High-Risk category and Botlokwa WSS, Lebowakgomo WSS, Mogwadi WSS and Olifantspoort WSS falls in the Medium-risk category.

Criteria A – There was no information provided for Design Capacity for Alldays WSS, Lebowakgomo WSS, Olifantspoort WSS and Zebidiela WSS. This is an indication of lack of flow management and absence of Treatment Works Classification.

Criteria B - The Botlokwa WSS, Mogwadi WSS and Senwabarwana WSS are operating above the design capacity and Alldays WSS, Lebowakgomo WSS, Olifantspoort WSS and Zebidiela WSS do not have information of the operational capacity. This is an indication of non-compliance and must be addressed by the WSA. Only the Mashashane WSS is operating within its design capacity.

Criteria C – The Olifantspoort WSS achieved excellent compliance (>98%) for the Microbiological compliance and Chemical compliance. Lebowakgomo WSS achieved excellent compliance for Chemical compliance. Alldays WSS, Botlokwa WSS, Lebowakgomo WSS, Mogwadi WSS, Senwabarwana and Zebidiela WSS achieved low (<98%) compliance for Microbiological Monitoring compliance, Chemical

compliance and Chemical Monitoring compliance (<80%). The Mashashane WSS has no water quality results provided and this indicates a high-risk for the end consumers.

Criteria D – All the water systems indicated absence of technical skills available which includes relevant process controllers, supervisors, and maintenance teams, except Mashashane WSS which has achieved the compliance of 56,3%.

Criteria E – All the water systems do not have the indication of water safety planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of Design Capacity for Alldays WSS, Lebowakgomo WSS, Olifantspoort WSS and Zebidiela WSS
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity at Alldays WSS, Lebowakgomo WSS, Olifantspoort WSS and Zebidiela WSS.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Greater Sekhukhune District Municipality

Municipal BDRR Score: 65.9%

Assessment Areas	Burgersfort Water Supply System	Fetakgomo Supply System	Flag Boshielo East Water	Groblersdal
BULK / WSP	Lepelle Northern Water		Lepelle Northern Water	
A: Total Design Capacity (Ml/d)	0.5	N/I	12	1.87
B: % Operational Capacity in terms of design	1500%	N/I	100%	668.5%
C1a: % Microbiological Compliance	99.5%	100%	59.9%	100%
C1b: % Microbiological Monitoring Compliance	75.2%	68.8%	30.7%	32.6%
C2a: % Chemical Compliance	99%	95.7%	98.5%	95.3%
C2b: % Chemical Monitoring Compliance	18.2%	14.7%	13.5%	11.8%
D: % Technical Skills	8.3%	0%	74%	25%
E: % Water Safety Plan Status	100%	N/I	0%	90.9%
%BDRR/BDRR max	24.3%	59.3%	65.6%	43.1%

Assessment Areas	Hlogotlou Water Supply System	Mapodile Sand Pit	Marble Hall	Marishane Water Supply System
BULK / WSP	Lepelle Northern Water		Lepelle Northern Water	
A: Total Design Capacity (Ml/d)	2.9	N/I	8	0.15
B: % Operational Capacity in terms of design	0%	N/I	41.3%	0%
C1a: % Microbiological Compliance	99.6%	0%	58.5%	0%
C1b: % Microbiological Monitoring Compliance	57.3%	0%	37.8%	0%
C2a: % Chemical Compliance	96.9%	0%	99.1%	0%
C2b: % Chemical Monitoring Compliance	15.3%	14.7%	13.5%	14.7%
D: % Technical Skills	21.9%	0%	64.4%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	39.3%	100.00%	75.9%	96.9%

Assessment Areas	Masemola Water Supply System	Moroke Borehole	Moutse Water Supply System	Ngwaabe Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	2	N/I	N/I	N/I
B: % Operational Capacity in terms of design	0%	N/I	N/I	N/I
C1a: % Microbiological Compliance	75%	0%	0%	100%
C1b: % Microbiological Monitoring Compliance	56.3%	0%	0%	36.1%
C2a: % Chemical Compliance	91.2%	0%	0%	100%
C2b: % Chemical Monitoring Compliance	14.7%	0%	0%	14.7%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	N/I
%BDRR/BDRR max	72.10%	100%	100.00%	53.5%

Assessment Areas	Nkosini Water Supply System	Penge Water Supply System	Roosenekal Water Supply System	Tubatse
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	2	0.5	5
B: % Operational Capacity in terms of design	0%	0%	0%	0%
C1a: % Microbiological Compliance	0%	100%	100%	92.3%
C1b: % Microbiological Monitoring Compliance	0%	100%	41.7%	43.3%
C2a: % Chemical Compliance	0%	98.6%	92.1%	98.2%
C2b: % Chemical Monitoring Compliance	0%	14.7%	11.8%	14.7%
D: % Technical Skills	18.8%	9.4%	50%	18.8%
E: % Water Safety Plan Status	0%	0%	81.8%	90.9%
%BDRR/BDRR max	95.9%	28.92%	45.9%	70.2%

Assessment Areas	Vergelegen Water Supply System	Vlakplaats Package Plant
BULK / WSP		
A: Total Design Capacity (Ml/d)	5	N/I
B: % Operational Capacity in terms of design	0%	N/I
C1a: % Microbiological Compliance	81.5%	77.8%
C1b: % Microbiological Monitoring Compliance	91.7%	37.5%
C2a: % Chemical Compliance	90.4%	89.8%
C2b: % Chemical Monitoring Compliance	14.7%	14.7%
D: % Technical Skills	62.5%	0%
E: % Water Safety Plan Status	90.9%	0%
%BDRR/BDRR max	63%	91%

WSA Overview

The Burgersfort WSS, Groblersdal WSS, Hlogotlou WSS, Roosenekal WSS and Penge WSS falls in the Low-risk category followed by Flag Boshielo East WSS, Ngwaabe WSS, Vergelegen WSS and Fetakgomo WSS falls in the Medium-risk category followed by Tubatse WSS, Marble Hall WSS and Masemola WSS falls in the High-risk category followed by Nkosini WSS, Marishane WSS, Moutse WSS, Mapodile WSS, Moroke Borehole and Vlakplaats WSS falls in the Critical-risk category.

Criteria A - There was no information provided for Design Capacity for Ngwaabe WSS, Fetakgomo WSS, Moutse WSS, Mapodile WSS, Moroke Borehole and Vlakplaats WSS. This is an indication of lack of flow management and absence of Treatment Works Classification.

Criteria B - The Burgersfort WSS, Groblersdal WSS and Flag Boshielo East WSS are operating above their design capacity. The Hlogotlou WSS, Nkosini WSS, Tubatse WSS, Ngwaabe WSS, Roosenekal WSS, Vergelegen WSS, Fetakgomo WSS and Marishane WSS, Masemola WSS, Moutse WSS, Penge WSS and Mapodile WSS, Moroke Borehole, and Vlakplaats WSS do not have the operational capacity. This is an indication of non-compliance and must be addressed by the WSA. Only the Marble Hall WSS is operating within its design capacity.

Criteria C - The Burgersfort WSS, Groblersdal WSS, Hlogotlou WSS, Ngwaabe WSS, Roosenekal WSS and Penge WSS achieved excellent compliance (>98%) for the Microbiological compliance and Burgersfort WSS, Hlogotlou WSS, Tubatse WSS, Flag Boshielo East WSS, Marble Hall, Ngwaabe WSS and Penge WSS achieved excellent compliance (>98%) for Chemical compliance. All the Water Supply systems are non-compliant (<80%) for Microbiological Monitoring compliance except Vergelegen WSS and Penge WSS and are all non-compliant with Chemical Monitoring compliance (<80%) which indicates a high-risk for the end consumers.

Criteria D – Most the Water systems indicated low compliance or non-compliance with the technical skills available which includes relevant process controllers, supervisors, and maintenance teams, except Flag Boshielo East WSS (74%), Marble Hall WSS (64.4%) Vergelegen WSS (50%).

Criteria E – All the water systems do not have the indication of water safety planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015 except Roosenekal WSS, Vergelegen WSS, Burgersfort WSS and Groblersdal WSS.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of Design Capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Lephalale Local Municipality

Municipal BDRR Score: 57.9%

Assessment Areas	Lephalale LM/ Matimba WTW - Reticulation System	Lephalale LM/ Zeeland WTW - Reticulation System	Mokuruanyane Regional Water Supply Scheme	Seleka Water Supply Scheme
BULK / WSP		EXXARO		
A: Total Design Capacity (Ml/d)	N/I	40	N/I	N/I
B: % Operational Capacity in terms of design	N/I	45%	N/I	N/I
C1a: % Microbiological Compliance	93.2%	86.8%	0%	0%
C1b: % Microbiological Monitoring Compliance	68.8%	37.4%	0%	0%
C2a: % Chemical Compliance	92.9%	94.6%	0%	0%
C2b: % Chemical Monitoring Compliance	2.9%	30.6%	0%	0%
D: % Technical Skills	0%	75%	0%	0%
E: % Water Safety Plan Status	0%	9.1%	0%	0%
%BDRR/BDRR max	82.1%	53.1%	100%	100%

Assessment Areas	Shongoane Water Supply Scheme	Witpoort Regional Water Supply Scheme
BULK / WSP		
A: Total Design Capacity (Ml/d)	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I
C1a: % Microbiological Compliance	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%
C2a: % Chemical Compliance	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%
D: % Technical Skills	0%	0%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	100%	100%

WSA Overview

The Zeeland WSS falls in the Medium-risk category followed by Matimba WSS which falls in the High-risk category followed by Mokuruanyane WSS, Shongoane WSS, Witpoort WSS and Seleka WSS falls in the Critical-risk category.

Criteria A - There was no information provided for Design Capacity for all the Water Supply Systems except for Zeeland WSS. This is an indication of lack of flow management and absence of Treatment Works Classification.

Criteria B - There was no information provided for Operational Capacity for all the Water Supply Systems except for Zeeland WSS which is operating 45% of its design capacity. This is an indication of non-compliance and must be addressed by the WSA.

Criteria C – All the Water Supply Systems are non-compliant with the Microbiological compliance, Chemical compliance, Microbiological Monitoring compliance and Chemical Monitoring compliance which indicates a high-risk for the end consumers.

Criteria D – All the Water Supply Systems indicated non-compliance with the technical skills available which includes relevant process controllers, supervisors, and maintenance teams, except Zeeland WSS which achieved 75.00% compliance.

Criteria E – All the Water Supply Systems do not have the indication of water safety planning or have low compliance and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of Design Capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Modimolle/ Mookgophong Local Municipality

Municipal BDRR Score: 81.6%

Assessment Areas	LIM365: Mabaleng Res (Borehole MM 006/2010)	LIM365: Mabatlane Res (Borehole MM 007/2010)	LIM365: Modimolle / Magalies Water System	Roedtan Borehole System
BULK / WSP			Magalies Water	
A: Total Design Capacity (Ml/d)	N/I	N/I	47%	N/I
B: % Operational Capacity in terms of design	N/I	N/I	17%	N/I
C1a: % Microbiological Compliance	0%	0%	92.4%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	60.7%	0%
C2a: % Chemical Compliance	0%	0%	93.4%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	42.9%	0%
D: % Technical Skills	8.3%	0%	81.3%	8.3%
E: % Water Safety Plan Status	0%	0%	65%	0%
%BDRR/BDRR max	99.7%	100%	79.3%	99.7%

Assessment Areas	Welgewonden Water Works
BULK / WSP	
A: Total Design Capacity (Ml/d)	5
B: % Operational Capacity in terms of design	134%
C1a: % Microbiological Compliance	0%
C1b: % Microbiological Monitoring Compliance	0%
C2a: % Chemical Compliance	0%
C2b: % Chemical Monitoring Compliance	0%
D: % Technical Skills	8.3%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	91.7%

WSA Overview

The Modimolle/ Magalies WSS falls in the High-risk category followed by Mabaleng Borehole, Mabatlane Borehole, Roedtan Borehole and Welgewonden WSS falls in the Critical-risk category.

Criteria A - There was no information provided for Design Capacity for Mabaleng Borehole, Mabatlane Borehole, and Roedtan Borehole. This is an indication of lack of flow management and absence of Treatment Works Classification.

Criteria B - There is no information provided for Operational Capacity for Mabaleng Borehole, Mabatlane Borehole, and Roedtan Borehole. The Welgewonden WSS is operating above the Design Capacity. This is an indication of non-compliance and must be addressed by the WSA. The Modimolle/ Magalies WSS is operating within its Design Capacity.

Criteria C – All the Water Supply Systems are non-compliant with the Microbiological compliance, Chemical compliance, Microbiological Monitoring compliance and Chemical Monitoring compliance which indicates a high-risk for the end consumers.

Criteria D – All the Water Supply Systems indicated non-compliance with the technical skills available which includes relevant process controllers, supervisors, and maintenance teams, except Modimolle/ Magalies WSS which achieved 81.3% compliance.

Criteria E – All the Water Supply Systems do not have an indication of Water Safety Planning in place and the development of risk-based water quality monitoring programmes as outlined in SANS 241:2015, except Modimolle/ Magalies WSS for which achieved 65% compliance.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of Design Capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Mogalakwena Local Municipality

Municipal BDRR Score: 73.2%

Assessment Areas	Mokopane Mahwelereng	Mokopane Supply System
BULK / WSP	Lepelle Northern Water	
A: Total Design Capacity (Ml/d)	12	N/I
B: % Operational Capacity in terms of design	75%	N/I
C1a: % Microbiological Compliance	92.1%	0%
C1b: % Microbiological Monitoring Compliance	57.3%	0%
C2a: % Chemical Compliance	94.4%	0%
C2b: % Chemical Monitoring Compliance	13.5%	0%
D: % Technical Skills	83.3%	0%
E: % Water Safety Plan Status	9.1%	0%
%BDRR/BDRR max	71%	100%

WSA Overview

The Mokopane Mahwelereng WSS falls in the High-risk category and the Mokopane WSS falls in the Critical-risk category.

Criteria A - There was no information provided for Design Capacity for Mokopane WSS. This is an indication of lack of flow management and absence of Treatment Works Classification.

Criteria B - There is no information provided for Operational Capacity for Mokopane WSS, this is an indication of non-compliance and must be addressed by the WSA. The Mokopane Mahwelereng WSS is operating within its design capacity.

Criteria C – Both the Water Supply Systems are non-compliant with the Microbiological compliance, Chemical compliance, Microbiological Monitoring compliance and Chemical Monitoring compliance which indicates a high-risk for the end consumers.

Criteria D – The Mokopane WSS indicated non-compliance with the technical skills available which includes relevant process controllers, supervisors, and maintenance teams, and the Mokopane Mahwelereng WSS achieved 83.3% compliance.

Criteria E – The Mokopane Mahwelereng WSS achieved an exceptionally low compliance for Water Safety Planning, and Mokopane WSS Both do not have an indication of Water Safety Planning in place and the development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of Design Capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Mopani District Municipality

Municipal BDRR Score: 49.4%

Assessment Areas	Drakensig (Hoedspruit)	Ebenezer	Finale	Giyani Water Supply Area
BULK / WSP				
A: Total Design Capacity (Ml/d)	9	N/I	N/I	36.7
B: % Operational Capacity in terms of design	0%	N/I	N/I	79.3%
C1a: % Microbiological Compliance	88.9%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	58.3%	16.7%	12.5%	26.5%
C2a: % Chemical Compliance	92.3%	98.9%	97.7%	98.4%
C2b: % Chemical Monitoring Compliance	20.6%	20.6%	20.6%	20.6%
D: % Technical Skills	0%	0%	0%	100%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	74.6%	54.5%	56.2%	33.7%

Assessment Areas	Greater Tzaneen Municipality	Letaba Politsi and Modjadji	Letsitele	Mapuve
BULK / WSP		Lepelle Northern Water		
A: Total Design Capacity (Ml/d)	15	17.5	1.8	4
B: % Operational Capacity in terms of design	113.3%	101.7%	55.7%	60%
C1a: % Microbiological Compliance	100%	98.2%	100%	91.3%
C1b: % Microbiological Monitoring Compliance	100%	56%	100%	41.7%
C2a: % Chemical Compliance	99%	98.9%	100%	92.1%
C2b: % Chemical Monitoring Compliance	38.5%	17.5%	35.3%	20.6%
D: % Technical Skills	86.9%	74.3%	90.6%	90.6%
E: % Water Safety Plan Status	81.8%	0%	72.7%	72.7%
%BDRR/BDRR max	25%	32%	18.7%	73.3%

Assessment Areas	Middle Letaba	Muyexe Reverse Osmosis	Nkambako	Nkowankowa
BULK / WSP				Lepelle Northern Water
A: Total Design Capacity (Ml/d)	36	1.08	12	24
B: % Operational Capacity in terms of design	2.8%	0%	0%	87.5%
C1a: % Microbiological Compliance	95.2%	0%	81.8%	100%
C1b: % Microbiological Monitoring Compliance	7.6%	0%	10.8%	34.2%
C2a: % Chemical Compliance	90.2%	0%	90.8%	97.4%
C2b: % Chemical Monitoring Compliance	20.6%	0%	20.6%	17.1%
D: % Technical Skills	100%	0%	100%	100%
E: % Water Safety Plan Status	54.6%	0%	72.7%	0%
%BDRR/BDRR max	64.9%	97.2%	95.6%	38.3%

Assessment Areas	Nondweni	Phalaborwa, Lulekani and Namakgale	Sekororo	Semarela
BULK / WSP		Lepelle Northern Water		
A: Total Design Capacity (Ml/d)	4.7	76	N/I	1
B: % Operational Capacity in terms of design	42.6%	101.3%	N/I	10%
C1a: % Microbiological Compliance	75%	99.3%	0%	100%
C1b: % Microbiological Monitoring Compliance	77.8%	55%	0%	37.5%
C2a: % Chemical Compliance	80.2%	97.8%	0%	88.3%
C2b: % Chemical Monitoring Compliance	20.6%	22.4%	0%	20.6%
D: % Technical Skills	100%	75%	0%	43.8%
E: % Water Safety Plan Status	90.9%	0%	0%	0%
%BDRR/BDRR max	56.6%	43.7%	100%	33.3%

Assessment Areas	Thabina	Thapane	The Oaks	Tours Water Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	12	8	1	9
B: % Operational Capacity in terms of design	33.3%	30%	20%	116.7%
C1a: % Microbiological Compliance	68.2%	100%	100%	94.4%
C1b: % Microbiological Monitoring Compliance	10.8%	19.1%	41.7%	13.6%
C2a: % Chemical Compliance	82.9%	95.9%	86.7%	88.7%
C2b: % Chemical Monitoring Compliance	23.6%	20.6%	20.6%	20.6%
D: % Technical Skills	53.1%	90.6%	62.5%	90.6%
E: % Water Safety Plan Status	63.6%	0%	0%	27.3%
%BDRR/BDRR max	77.2%	28.2%	36.5%	78.8%

Assessment Areas	Zava Water Supply System
BULK / WSP	
A: Total Design Capacity (Ml/d)	0.3
B: % Operational Capacity in terms of design	66.7%
C1a: % Microbiological Compliance	75%
C1b: % Microbiological Monitoring Compliance	45.8%
C2a: % Chemical Compliance	88.2%
C2b: % Chemical Monitoring Compliance	20.6%
D: % Technical Skills	62.5%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	75.4%

WSA Overview

The Giyani WSS, Greater Tzaneen WSS, Letaba Politsi and Modjadji WSS, Letsitele WSS, Nkowankowa WSS, Phalaborwa, Lulekani and Namakgale WSS, Semarela WSS, Thapane WSS and The Oaks WSS falls in the Low-risk category followed by the Ebenezer WSS, Finale WSS, Middle Letaba WSS and Nondweni WSS which falls in the Medium-risk category followed by Drakensig (Hoedspruit) WSS, Mapuve WSS, Thabina WSS, Tours Water WSS and Zava WSS which falls in the High-risk category followed by Muyexe WSS, Nkambako WSS and Sekororo WSS which falls in the Critical-risk category.

Criteria A – There was no information provided for Design Capacity for Sekororo WSS, Ebenezer WSS and Finale WSS. This is an indication of lack of flow management and absence of Treatment Works Classification.

Criteria B – The Giyani WSS, Letsitele WSS, Mapuve WSS, Middle Letaba WSS, Nkowankowa WSS, Nondweni WSS and Semarela WSS, Thabina WSS, Thapane WSS, The Oaks and Zava WSS are operating within their design capacity. The Greater Tzaneen WSS, Letaba Politsi and Modjadji WSS and Phalaborwa, Lulekani and Namakgale WSS are operating above their design capacity, and the operational capacity for Drakensig (Hoedspruit) WSS, Ebenezer WSS, Finale WSS, Muyexe WSS, Nkambako WSS, and Sekororo WSS are unknown. This is an indication of non-compliance and must be addressed by the WSA.

Criteria C – The Ebenezer WSS, Finale WSS, Giyani WSS, Greater Tzaneen WSS, Letaba, Politsi and Modjadji WSS, Letsitele WSS, Nkowankowa WSS, Phalaborwa WSS, Semarela WSS, Thapane and The Oaks achieved excellent Microbiological compliance (>98%). All the Water Supply Systems have achieved non-compliance for Microbiological compliance except for Tzaneen and Letsitele. These two systems are also the only system which achieved Chemical compliance. All the Water Supply Systems have achieved non-compliance for Chemical Monitoring compliance which indicates a high-risk for the end consumers.

Criteria D – Most the Water Supply Systems indicated excellent compliance with the technical skills except Greater Tzaneen WSS, Letaba Politsi and Modjadji WSS, Phalaborwa, Lulekani and Namakgale WSS and Semarela WSS which achieved adequate scores which have an indication of relevant process controllers, supervisors, and maintenance teams. The Drakensig (Hoedspruit) WSS, Ebenezer WSS, Finale WSS, Muyexe WSS and Sekororo WSS indicated the absence of relevant technical skills.

Criteria E – The Nondweni WSS achieved excellent compliance for the Water Safety Planning followed by Greater Tzaneen WSS, Letsitele WSS, Mapuve WSS, Middle Letaba WSS, Nkowankowa WSS and Thabina WSS which achieved adequate compliance followed by Drakensig (Hoedspruit) WSS, Ebenezer WSS, Finale WSS, Giyani WSS, Letaba Politsi and Modjadji WSS, Muyexe WSS, Nkowankowa WSS, Sekororo WSS, Phalaborwa, Lulekani and Namakgale WSS, Tours Water WSS, Thapane WSS, The Oaks and Zava WSS and Semarela WSS which are non-compliant or have no presence of the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of Design Capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

POLOKWANE LOCAL MUNICIPALITY

Municipal BDRR Score: 40.8%

Assessment Areas	Chuenemaja	City Polokwane	Mankweng Area	Molepo
BULK / WSP	Lepelle Northern Water		Lepelle Northern Water	
A: Total Design Capacity (Ml/d)	62.7	18	52	6
B: % Operational Capacity in terms of design	100.8%	55.7%	94.2%	36.7%
C1a: % Microbiological Compliance	96.7%	100%	99.7%	100%
C1b: % Microbiological Monitoring Compliance	57.4%	100.%	66.1%	100%
C2a: % Chemical Compliance	95.4%	96.3%	97.4%	96.9%
C2b: % Chemical Monitoring Compliance	8.8%	14.7%	7.7%	11.8%
D: % Technical Skills	98.4%	100%	100%	100%
E: % Water Safety Plan Status	0.4%	9.1%	9.1%	9.1%
%BDRR/BDRR max	44.3%	36.2%	38%	19.9%

Assessment Areas	Moletjie Area	Seshego
BULK / WSP		Lepelle Northern Water
A: Total Design Capacity (Ml/d)	3.4	63.9
B: % Operational Capacity in terms of design	44.1%	99.8%
C1a: % Microbiological Compliance	100%	97%
C1b: % Microbiological Monitoring Compliance	100%	65%
C2a: % Chemical Compliance	97.3%	96.5%
C2b: % Chemical Monitoring Compliance	11.8%	6.5%
D: % Technical Skills	75%	98.5%
E: % Water Safety Plan Status	9.1%	9.1%
%BDRR/BDRR max	18.8%	44.1%

WSA Overview

All the Water Supply Systems fall in the Low-risk category.

Criteria A – The design capacities for all the Water Supply Systems are known and the information is provided by the WSA. This is an indication of flow management.

Criteria B - The City Polokwane WSS, Molepo WSS and Moletjie Area WSS are operating within its design capacity. The City Polokwane WSS, Mankweng WSS and Seshego WSS are operating above its design capacity (>90%). This is an indication of non-compliance and must be addressed by the WSA.

Criteria C - The City Polokwane WSS, Mankweng WSS, Molepo WSS and Moletjie Area WSS achieved excellent compliance (>98%). The City Polokwane WSS, Molepo WSS and Moletjie Area WSS have also achieved excellent compliance (>98%) for Microbiological Monitoring compliance. None of the Water Supply Systems have achieved compliance for Chemical compliance and Chemical Monitoring compliance which indicates a high-risk for the end consumers.

Criteria D – All the Water Supply Systems indicated high compliance (>90%) with the technical skills available which includes relevant process controllers, supervisors, and maintenance teams, except for Moletjie Area which achieved adequate compliance of 75%.

Criteria E – All of the Water Supply Systems have achieved low water safety planning and development compliance of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of Design Capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Thabazimbi Local Municipality

Municipal BDRR Score: 87.4%

Assessment Areas	Leeupoort Water Scheme	Northam Water Supply	Rooiberg Water Scheme	Schilpadnest Water Scheme
BULK / WSP		Magalies Water		
A: Total Design Capacity (Ml/d)	1	270	1	N/I
B: % Operational Capacity in terms of design	100%	77%	100%	N/I
C1a: % Microbiological Compliance	0%	60%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	28.9%	0%	0%
C2a: % Chemical Compliance	0%	56.6%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	22.1%	0%	0%
D: % Technical Skills	0%	75%	0%	0%
E: % Water Safety Plan Status	0%	81.8%	0%	0%
%BDRR/BDRR max	89.2%	81.7%	89.2%	100%

Assessment Areas	The Greater Thabazimbi - Magalies
BULK / WSP	Magalies Water
A: Total Design Capacity (Ml/d)	280
B: % Operational Capacity in terms of design	148.9%
C1a: % Microbiological Compliance	60%
C1b: % Microbiological Monitoring Compliance	57.8%
C2a: % Chemical Compliance	56.6%
C2b: % Chemical Monitoring Compliance	44.1%
D: % Technical Skills	32.7%
E: % Water Safety Plan Status	78.9%
%BDRR/BDRR max	92.9%

WSA Overview

The Leeupoort WSS, Northam WSS and Rooiberg WSS falls in the High-risk category and the Schilpadnest WSS and The Greater Thabazimbi – Magalies WSS falls in the Critical-risk category.

Criteria A – There was no information provided for Design Capacity for Schilpadnest WSS. This is an indication of lack of flow management and absence of Treatment Works Classification.

Criteria B – The Northam WSS is operating within its design capacity. The Leeupoort WSS, Rooiberg WSS and The Greater Thabazimbi – Magalies WSS are operating above their design capacity, and the operational capacity for Schilpadnest WSS is unknown. This is an indication of non-compliance and must be addressed by the WSA.

Criteria C – All the Water Supply Systems have achieved non-compliance for Microbiological compliance, Chemical compliance, Microbiological Monitoring compliance and Chemical Monitoring compliance which indicates a high-risk for the end consumers.

Criteria D – All the Water systems indicated non-compliance with the technical skills available which includes relevant process controllers, supervisors, and maintenance teams.

Criteria E – The Northam WSS and The Greater Thabazimbi – Magalies WSS have achieved adequate compliance for the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015. The Leeupoort WSS, Rooiberg WSS and Schilpadnest WSS indicated no presence of Water Safety Planning therefore they are non-compliant.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of Design Capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Vhembe District Municipality

Municipal BDRR Score: 48.5%

Assessment Areas	Elim Water System	Kutama Sinthumule	Luphephe-Nwanedi	Makhado (Louis Trichardt)
BULK / WSP				
A: Total Design Capacity (Ml/d)	2.16	N/I	3.4	10.36
B: % Operational Capacity in terms of design	143.5%	N/I	24.7%	94.6%
C1a: % Microbiological Compliance	90%	100%	100%	95%
C1b: % Microbiological Monitoring Compliance	16.1%	0.7%	31.7%	56.8%
C2a: % Chemical Compliance	99.5%	100%	97.4%	96.8%
C2b: % Chemical Monitoring Compliance	17.7%	17.7%	17.7%	17.7%
D: % Technical Skills	35.4%	16.7%	5.7%	75%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	73.2%	53.9%	24.1%	39.4%

Assessment Areas	Malamulele Water System	Musekwa Water System	Musina Water System	Mutale water System
BULK / WSP	Lepelle Northern Water			
A: Total Design Capacity (Ml/d)	76	N/I	14.5	8.64
B: % Operational Capacity in terms of design	79%	N/I	124.1%	81.3%
C1a: % Microbiological Compliance	98%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	49.2%	29.2%	28.8%	29.4%
C2a: % Chemical Compliance	97.3%	93.5%	98%	93.7%
C2b: % Chemical Monitoring Compliance	19.4%	17.7%	17.7%	17.7%
D: % Technical Skills	75%	0%	37.5%	37.5%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	68.2%	68.1%	36.5%	44.5%

Assessment Areas	Mutshedzi	Nzhelele	Thohoyandou	Tshedza
BULK / WSP			Lepelle Northern Water	
A: Total Design Capacity (Ml/d)	17	7	60	1.47
B: % Operational Capacity in terms of design	69.7%	100%	85%	88.6%
C1a: % Microbiological Compliance	100%	100%	99.6%	90.2%
C1b: % Microbiological Monitoring Compliance	36.4%	28.4%	35.4%	91.7%
C2a: % Chemical Compliance	98.4%	93.5%	98.4%	91.7%
C2b: % Chemical Monitoring Compliance	17.7%	17.7%	19.4%	17.7%
D: % Technical Skills	75%	25.%	91.7%	37.5%
E: % Water Safety Plan Status	9.1%	0%	0%	0%
%BDRR/BDRR max	31.5%	45%	34%	49.9%

Assessment Areas	Tshifhire Murunwa Water System
BULK / WSP	
A: Total Design Capacity (Ml/d)	2.07
B: % Operational Capacity in terms of design	93.1%
C1a: % Microbiological Compliance	100%
C1b: % Microbiological Monitoring Compliance	79.2%
C2a: % Chemical Compliance	90.1%
C2b: % Chemical Monitoring Compliance	17.7%
D: % Technical Skills	37.5%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	42%

WSA Overview

The Luphephe-Nwanedi WSS, Makhado (Louis Trichardt) WSS, Musina WSS, Mutale WSS, Mutshedzi WSS, Nzhelele WSS, Thohoyandou WSS, Tshedza WSS and Tshifhire Murunwa WSS falls in the Low-risk category followed by Kutama Sinthumule WSS, Malamulele WSS and Musekwa WSS which falls in the Medium-risk category followed by Elim WSS which falls in the Critical-risk category.

Criteria A – There was no information provided for Design Capacity for Kutama Sinthumule WSS and Musekwa WSS. This is an indication of lack of flow management and absence of Treatment Works Classification.

Criteria B – The Luphephe-Nwanedi WSS, Malamulele WSS, Mutale WSS, Mutshedzi WSS, Thohoyandou WSS and Tshedza WSS are operating within their design capacity. The Elim WSS, Makhado (Louis Trichardt) WSS, Musina WSS, Nzhelele WSS and Tshifhire Murunwa WSS are operative above capacity and the Operational Capacity of Kutama Sinthumule WSS and Musekwa WSS are unknown. This is an indication of non-compliance and must be addressed by the WSA.

Criteria C – All the Water Supply Systems have achieved excellent compliance (>98%) for Microbiological compliance except Elim WSS, Makhado (Louis Trichardt) WSS and Tshedza WSS. The Elim WSS, Kutama Sinthumule WSS, Musina WSS, Mutshedzi WSS and Thohoyandou WSS have achieved excellent compliance for Chemical compliance. All the Water Supply Systems have achieved non-compliance for Microbiological Monitoring compliance and Chemical Monitoring compliance. The non-compliance is an indication of a high-risk for the end consumers.

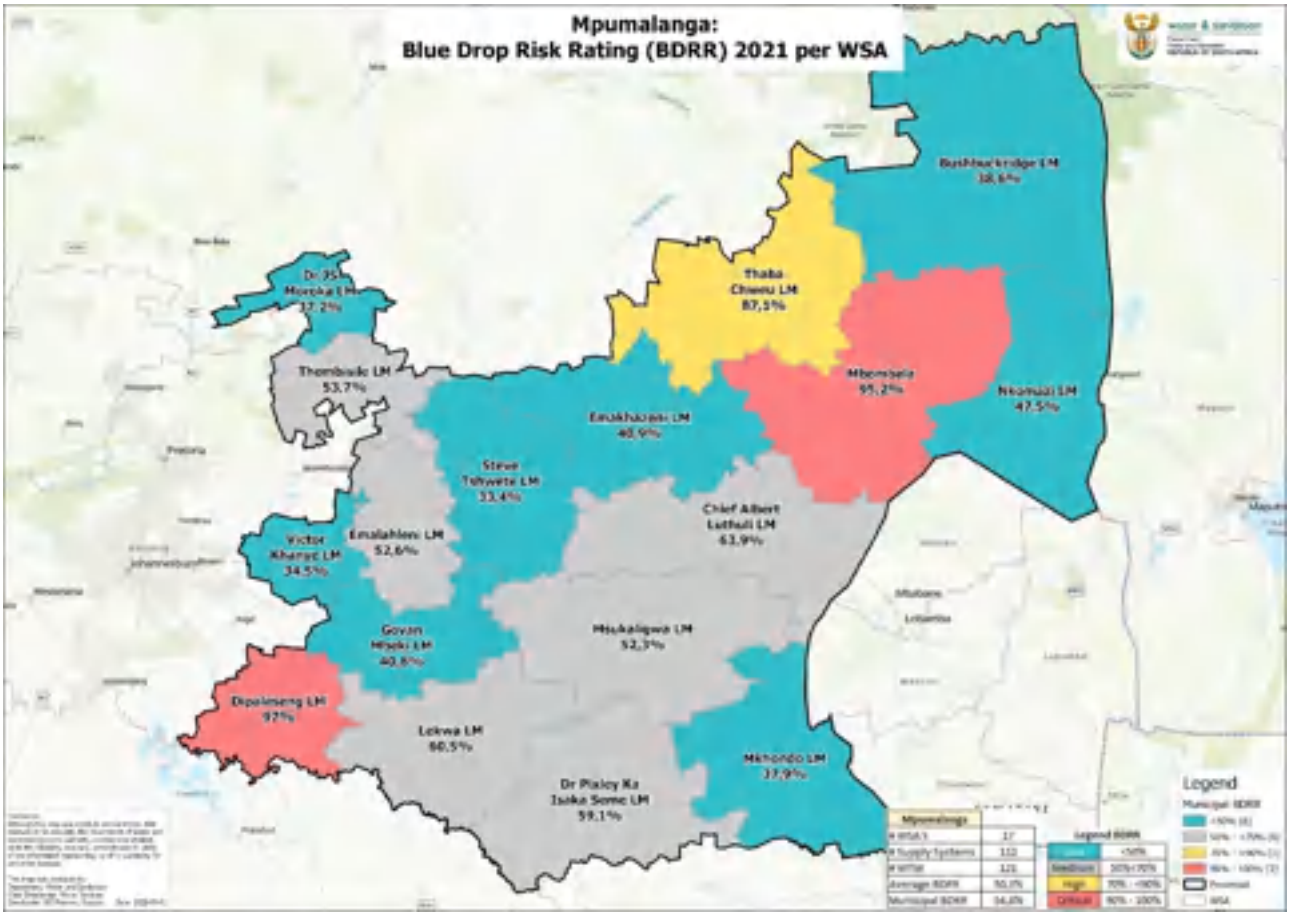
Criteria D – All the Water systems indicated non-compliance with the technical skills available which includes relevant process controllers, supervisors, and maintenance teams, except Thohoyandou WSS which achieved 91.67% compliance and Makhado (Louis Trichardt) WSS, Malamulele WSS and Mutshedzi WSS which achieved and adequate score of 75%.

Criteria E – All the Water Supply Systems achieved non-compliance for the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of Design Capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

CHAPTER 8: MPUMALANGA PROVINCE



PROVINCIAL BDRR TREND ANALYSIS

One of the outcomes of Incentive and Risk-based Regulation is the regular monitoring and reporting on the performance of the WSA to ensure strategic operational and management plans are constantly realigned to achieve compliance and effectively manage risks for provision of sustainable water services. For risk-based regulation, the movement in BDRR is a vital tool for both the Department and the WSA to monitor and track the levels of risk in the country. The 2021 BDRR will serve as a baseline for future BDRR assessments that will be used by DWS to monitor and manage drinking water supply systems to ensure delivery of safe drinking water to all communities.

BDRR is calculated and categorised as either low, medium, high and critical risk rating, calculated according to the following range of values to enable both WSA and DWS to monitor performance.

Table 1: BDRR categorisation

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

The BDRR formular is made up of five risk indicators with an overall BDRR for each supply system. The overall performance of each WSA is reported in two ways:

- ✓ Average % BDRR: average % BDRR for all supply systems per province.
- ✓ % Municipal (weighted) BDRR: The Municipal BDRR for each WSA is calculated by the proportional contribution of each water supply system based on design capacity of each system. This weighted average may provide skewed picture i.e. a supply system which receives a small fraction of the total flow from a larger treatment plant will carry a higher weighting compared to a system which received 100% from a smaller treatment plant.

Therefore the WSA must evaluate the individual % BDRR scores of each system to determine the risk associated with provision of drinking water for each system and not use the % Municipal BDRR score to evaluate their performance. Regardless of the size of the systems, all consumers have a right to safe drinking water and the WSA must be wary of neglecting the management of smaller, rural schemes in favour of larger urban systems.

The % Municipal (weighted) BDRR for all WSA's in the province is provided at the end of each provincial chapter for reference.

In 2021, 17 WSA's were assessed in Mpumalanga province with a total to 112 water supply systems. The assessment period for all Risk Indicators was July 2020 to June 2021 except for Risk Indicator C: Water Quality compliance where assessment period was January to December 2020.

The risk performance trends for Mpumalanga Province are summarised below to provide a provincial overview of BDRR.

Table 57: 2021 Risk Performance trends for Mpumalanga

Risk Rating	Average	Minimum	Maximum
% Municipal BDRR (Weighted Score)	54.5%	33.4%	97%
% BDRR	50.3%	13.9	100%
A: Design Capacity (Ml/d)	67.3	0.003	4800
C1a: % Microbiological Compliance	73.8%	0%	100%
C1b: % Microbiological Monitoring Compliance	62.8%	0%	100%
C2a: % Chemical Compliance	79%	0%	100%
C2b: % Chemical Monitoring Compliance	44.3%	0%	97.1%
D: % Technical Skills	52.8%	0%	100%
E: % Water Safety Plan Status	21.9%	0%	100%

The BDRR profile for Mpumalanga province is outlined in the figure below.

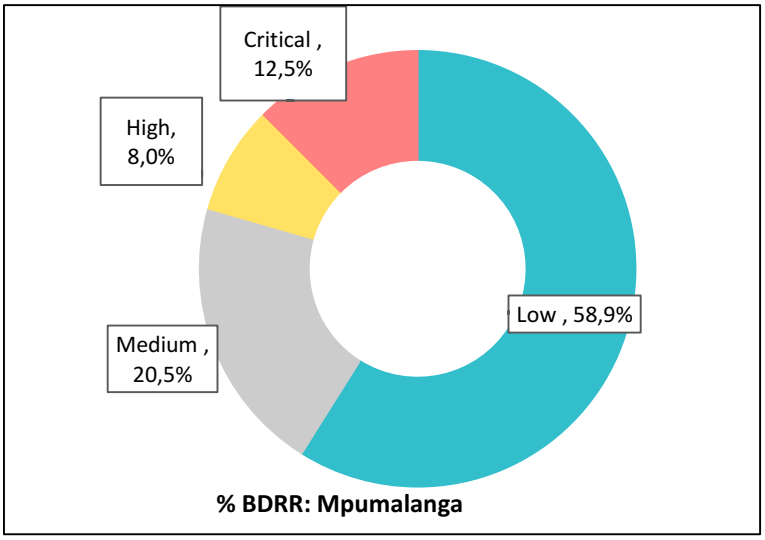


Figure 67:BDRR profile for Mpumalanga

The results for Mpumalanga are summarised as follows:

- ✓ 58.9% of supply systems are in the low risk category,
- ✓ 20.5% are in the medium risk category,
- ✓ 8% are in the high risk category, and
- ✓ 12.5% are in the critical risk category.

To use the 2021 BDRR score as a tool to implement strategic, targeted actions that will result in an improved risk rating and sustainable water services delivery, the individual components of the BDRR score must be critically evaluated by the WSA to understand the reason for the current risk rating and the desired risk category for delivery of safe drinking water.

The BDRR scorecards reports on the following system-specific risk indicators which ultimately feed into the BDRR score:

- ✓ Risk Indicator A: Design capacity,
- ✓ Risk Indicator B: Operational Capacity,
- ✓ Risk Indicator C: Water Quality Compliance,

- ✓ Risk Indicator D: Technical skills, and
- ✓ Risk Indicator E: Water Safety Plans.

The trends with regard to the risk rating of the individual indicator which make up the overall BDRR score is discussed below. This will provide insight on the risk status of each indicator and enable the WSA to implement targeted actions to reduce risk of specific risk indicators which are negatively impacting on the final BDRR score of the supply system.

Risk Indicator A: Design Capacity and Risk Indicator B: Operational Capacity

Criterion A represents the design capacity of the treatment plant.

Every water treatment plant must be classified with DWS as per Regulation 2834. The classification of the treatment plant is based on a number of components, including size, complexity and electrical consumption, as per set criteria. The plant classification certificate is available on IRIS and used to determine the risk rating for criterion A as it states the capacity of the plant.

The risk rating is allocated according to size of the treatment plant with higher risk rating given for a larger plant and lower risk rating for a smaller plant. The rationale is that a larger plant serves a larger community and therefore presents a higher risk if the plant is not functioning or producing unsafe drinking water than a smaller plant which serves less people. The risk rating for criteria A remains the same provided the capacity stays the same, and all plants which have the same design capacity range will have the same maximum BDRR.

Information from the IRIS system was collected to provide a profile of the design capacities of all treatment plants in the province. Some of the treatment plants are large regional bulk schemes which supply water to a number of supply systems in various municipalities and across provinces. The figure below reports on the design capacity of treatment plants located in the province in Ml/d.

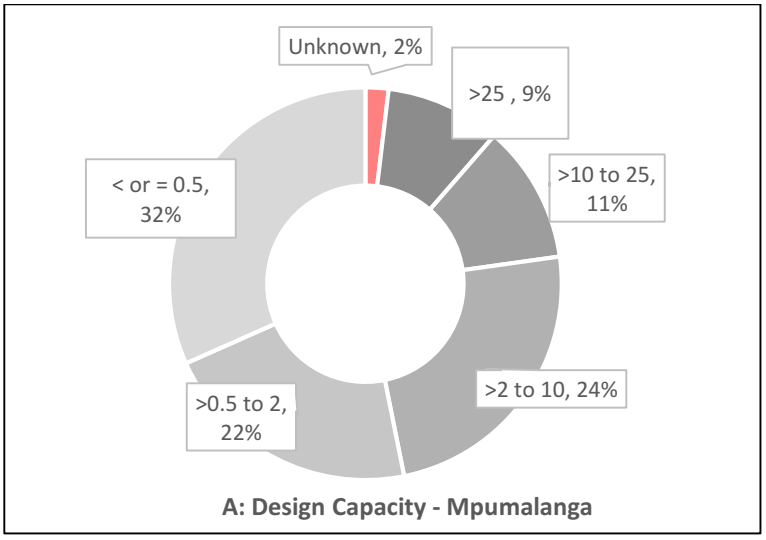


Figure 68: Profile of design capacity in Mpumalanga (Ml/d)

The results are summarised as follows:

- ✓ There are 122 water treatment plants situated in Mpumalanga province with a combined capacity of 8 152.9 Ml/d,
- ✓ Reported population served = 16.7 million people,
- ✓ Average design capacity in province = 67.3 Ml/d,
- ✓ Largest plant in province = 4800 Ml/d,
- ✓ Smallest plant in province = 0.003 Ml/d,
- ✓ 32% of plant are <=0.5 Ml/d, 22% are between 0.5 and 2 Ml/d, 24% are between 2 and 10Ml/d, 14 % are between 10 and 25 Ml/d and 9% are >25 Ml/d,
- ✓ 2% of plants have not provided design capacity.

In summary, 42% of plants in Mpumalanga are small plants (<2 M/d) and these include boreholes. 35% are medium sized plants (between 2 and 25 Ml/d) and 9% are large plants (>25 M/d) which are typically located in metropolitan areas in the province or are part of bulk regional schemes. Operation and management of large number of rural schemes present challenges as these plants are usually located across a large geographical area with some plants in remote areas. This requires additional resources such as staff, chemical supplies, spares and vehicles to ensure optimal operations of these systems

With regards to **Risk Indicator B: Operational capacity**, daily production versus the design capacity of the treatment plant is an important indicator to determine if the plant can provide sufficient, safe drinking water to all the consumers now and in the near future. When the plant is operating above its design capacity, major unit processes are overloaded and cannot achieve their operational limits which leads to water quality failures.

Risk Indicator C indicates the current operational capacity of the treatment plant in each supply system as a percentage of the design capacity of the plant. The ideal value is between 50 – 100%; higher values indicate the plant is overloaded and lower values indicate the plant is receiving too little flow which may also compromise performance due to lack of retention time (flocculation, sedimentation). Once daily production approaches 90% of design capacity, the WSA must plan, budget and implement projects to increase the capacity of the treatment plant to ensure there is sufficient supply, not only for human consumption, but also for economic activities

Although operational capacity has been reported for all supply systems, there are a number of large regional plants which supply a large number of supply systems in various municipalities and across provincial borders. Analysis of Indicator B must therefore be conducted at plant level as collating operational capacity data at municipal or provincial level will not provide an accurate reflection of the current operational capacity of each individual plant.

WSAs are reminded that installation of flow meter and daily flow recording is a regulatory requirement as per their Water Use License.

Recommendations

- ✓ WSAs must ensure all treatment plants have updated plant registration certificates on IRIS
- ✓ WSAs must provide updated copies of plant registration certificates supported with documents on the design capacity of treatment plant for future BDRR assessments.
- ✓ WSA to install flow meters at raw and final water points, monitor daily flows and ensure annual calibration of meters for accuracy of results.
- ✓ Budget and plan for upgrade of treatment plant when operational capacity is at 90% to ensure sufficient time for implementation of civil projects.
- ✓ Consult Census, WSDP and Reconciliation strategies to determine current and future allocation and demand, use a 10-year forecast period

Risk Indicator C: Water Quality Compliance

In South Africa, the SANS 241:2015 is the definitive reference on acceptable limits for drinking water quality parameters and provides limits for a range of water quality characteristics and water meeting this standard is deemed safe for lifetime consumption. The actual water quality depends on both microbiological and chemical determinands:

- ✓ Microbiological compliance reports on the actual compliance of the final water for the past 12 months against microbiological determinands E. Coli / Faecal Coliforms. The presence of these determinands in water is a strong indication of recent sewage or animal waste contamination and there is potential for contracting diseases from pathogens.
- ✓ Chemical quality is determined by a number of determinands which may be acute or chronic health determinands with specific health risks associated with each determinands. Acute health risks can result in death if the limit is exceeded, while chronic limits provide maximum limits that can be ingested over a period of time before health effects are observed.

Both microbiological and chemical compliance limits outlined in SANS 241:2015 is evaluated against the population size: for a population <100 000, compliance is >98% while for a population >100 000, compliance limit is >99%.

In addition, the SANS 241:2015 standard stipulates the frequency of sampling as well as the number of sample points required per supply system to ensure sufficient coverage of the network. The frequency and number of required sample points is dependent on the population size as outlined in Table 1 of SANS241: 2015. Monitoring compliance is therefore critical to guarantee the safety of the supply at all points in the network.

Indicator C: Water Quality Compliance reports on both water quality compliance and monitoring compliance as per SANS 241:2015 for both microbiological and chemical determinands. The formular to calculate C is made up of four sub-indicators with microbiological compliance carrying a higher weighting than chemical compliance as this presents a serious, acute health risk.

The formular for Indicator C, description and categorisation of each sub-indicator is presented in the table below. The categorisation is aligned with the risk rating for each sub-indicator and results are reported for all supply systems in the province. All supply systems which fall in the Low Risk category are regarded as compliant systems.

Table 10: Formular, description and categorisation for Criteria C

C = [0.7(C1a x C1b)] + [0.3(C2a x C2b)]				
Ca: Water Quality Compliance	**C1a**: Microbiological compliance as per SANS 241: 2015.	High Risk	Medium Risk	Low Risk
		<95%	95% - <97%	97% - 100%
	C2a: Chemical compliance as per Blue Drop requirements			
Cb: Monitoring Compliance	**C1b**: Micro monitoring compliance against registered programme, based on population size as per SANS 241:2015	High Risk	Medium Risk	Low Risk
		<50%	50% - 80%	>80%
	C2b: Chemical monitoring compliance calculated as per Blue Drop requirements			

The Mpumalanga province results for Indicator C and sub-indicators are presented in the table below. This is based on data for the period January to December 2020.

Table 58: Mpumalanga Province summary of results for Indicator C: Water Quality Compliance (Jan – Dec 2020)

Mpumalanga	Average Compliance	Minimum	Maximum	% Systems Which Comply (Low Risk)
C1a: Microbiological Quality	73.8%	0%	100%	44%
C2a: Chemical Quality	79%	0%	100%	29%
C1b: Microbiological Monitoring Compliance	62.8%	0%	100%	46%
C2b: Chemical Monitoring Compliance	44.3%	0%	97.1%	20%

The categorisation for microbiological and chemical compliance is illustrated below providing % of supply systems per risk category.

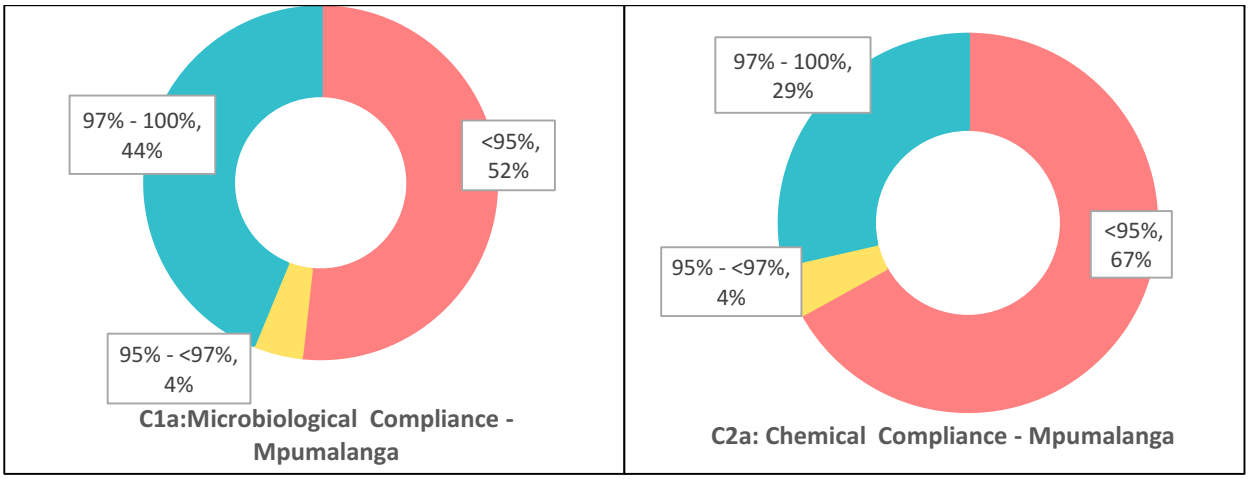


Figure 69: Microbiological and Chemical Compliance for Mpumalanga (Jan – Dec 2020)

The results are summarised as follows:

- ✓ Only 44% of systems achieved microbiological compliance and 29% achieved chemical compliance. This is of serious concern to DWS as the majority of supply systems present a potential health risk to consumers.
- ✓ 56% of systems do not comply with microbiological determinands: this indicates microbiological failures which presents a serious health risk to the consumers in these supply systems. For sustained failure, 'Boil Water' notices must be issued to safeguard consumers while the root cause of the failure is investigated and resolved.
- ✓ 71% of systems do not comply with chemical determinands. This may present immediate or potential long term health risks depending on whether non-compliance is for acute health determinands or chronic health determinands.
    - WSA must ensure compliance for all chemical-health determinands as per Blue Drop requirements and includes, NO3- and NO2- as N, SO42-, Sb, As, Cd, Cr, Co, Cu, CN-, Pb, Hg, Ni, Se, V, DOC or TOC, and Total THM.

The categorisation for microbiological and chemical monitoring compliance is illustrated below providing percentages of supply systems per category.

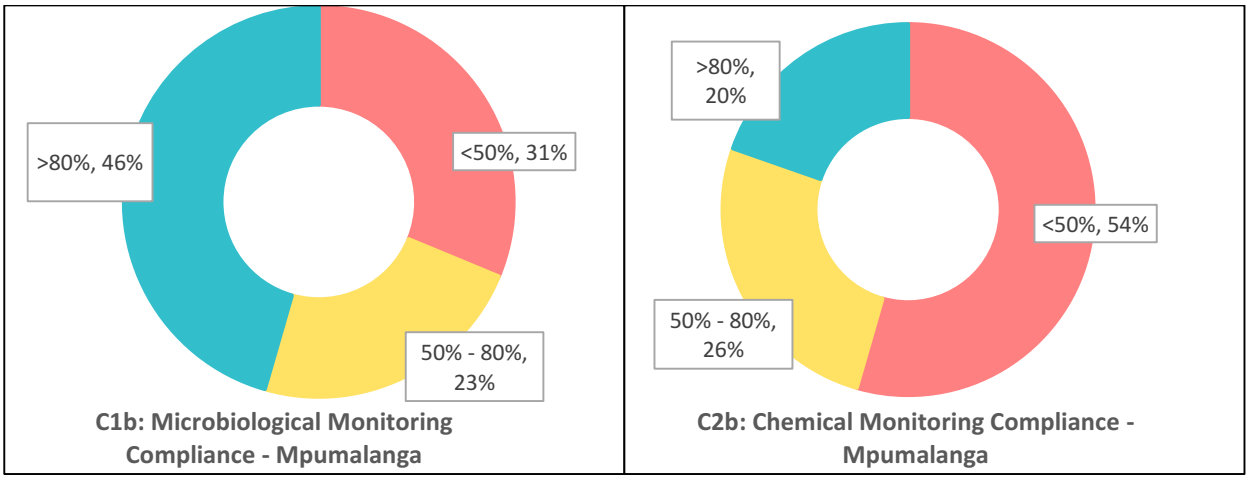


Figure 70: Microbiological and Chemical Monitoring Compliance for Mpumalanga (Jan – Dec 2020)

The results are summarised as follows:

- ✓ 46% of supply systems have sufficient microbiological samples based on population size as per SANS 241-2.
- ✓ 54% of supply systems have < 80% for microbiological monitoring compliance. This indicates there is an insufficient number of microbiological samples to guarantee the safety of water at all points in the distribution system. These supply systems therefore do not comply with table 2 in SANS 241-2 which outlines required number of sample points based on population size.
- ✓ Only 20% of supply systems have sufficient chemical monitoring samples.
- ✓ 80% of supply systems have < 80% for chemical monitoring compliance. This indicates either insufficient number of samples collected or insufficient chemical determinands were analysed as per the requirement outlined in SANS 241:2015, i.e.
    - Actual monitoring occurs according to registered IRIS monitoring programme (>80%)
    - Number of samples: One sample each at treatment plant final and one distribution point, both of which must be analysed for at least 80% of determinands listed (13 of the 17 determinands) i.e. at least 26 data points are required.

Recommendations

The poor water quality in Mpumalanga Province is of concern to DWS, in particular the lack of microbiological and chemical monitoring as per SANS 241:2015 requirements.

All WSAs must urgently implement the following steps to ensure both microbiological and chemical compliance is improved so that all the citizens of South Africa can have access to safe drinking water, which is a basic human right enshrined under our Constitution:

- ✓ Develop and implement microbiological monitoring as per SANS 241:2015 requirements:
    - Monitor final water weekly.
    - Monitor distribution fortnightly
    - Ensure the number of sample points in the distribution network is based on population size as per Table 2 in SANS 241-2 given below

Table 18: Minimum number of samples for E.Coli (or Faecal Coliforms) in distribution network (Table 2 SANS 241-2: 2015)

Population served	Total number of samples per month[a]
<5000	2
5000-100 000	1 per 5000 head of population + 1 additional sample [b]
100 000 – 500 000	1 per 10 000 head of population + 11 additional sample [b]
≥500 000	1 per 20 000 head of population + 36 additional sample [b]
[a] During rainy season, sampling should be carried out more frequently to ensure that all spatial and temporal risks are identified. [b] see *WHO, Guidelines for drinking water quality*	

- ✓ Develop and implement risk-based chemical monitoring programme as per SANS 241:2015 requirements:
    - Conduct full SANS 241:2015 analysis annually on raw, final and distribution network to identify current problem determinands.
    - Conduct risk assessment of system including catchment, treatment plant and reticulation to identify current and potential water quality risks and their associated determinands. e.g. presence of pit latrines means possibility of nitrates in ground water and surface water.
    - Develop and implement risk-based chemical monitoring programme for all identified determinands.
        - Sample points are raw, final and critical distribution points depending on impact of determinands.
        - Frequency as per Table 3 in SANS 241- 2. i.e. acute health 1 = weekly, acute health 2 = monthly, chronic health = monthly, aesthetic = monthly,
        - Operational monitoring dependant on unit processes.
- ✓ In the event of non-compliance:
    - Precautionary measures including 'Boil Water' notices must be issued to consumers in systems with sustained microbiological failures.
    - 'Water Quality' Advisories must be issued to consumers in systems with sustained chemical failures for chronic health determinands.
    - WSAs must investigate the root cause of the failure and implement remedial actions to ensure compliance. If this cannot be achieved, an alternative water supply must be provided to ensure safety of consumers.
- ✓ Compliance monitoring to be undertaken by accredited laboratory
    - WSA to ensure that there is sufficient budget for compliance monitoring.
    - Laboratory to comply with accreditation requirement as per Blue Drop: SANAS accredited, participation in proficiency testing with acceptable Z-Score, or Quality Assurance system.

Risk Indicator D: Technical Skills

Regulation 2834 states all plant personnel must be classified as per their qualifications and years of experience. This is conducted by DWS and plant personnel are provided with a classification certificate which reflects their current classification based on qualification and years of experience. Ongoing training is a requirement under the Regulation to allow for continuous learning that will enable process controller to improve their classification over time to achieve Class V that allows them to act as plant supervisor. The required number and classification of staff required at a treatment plant per shift is dependent of the classification of the plant and the number of shifts.

The Blue Drop requirements acknowledge excellence in water services provision. The Blue Drop requirements therefore outlines the number and classification of process controllers and supervisors required for each shift. The Blue Drop requirements make provision for sharing of supervisors: this reduces the burden of providing permanent staff for small, remote systems as a roaming supervisor can visit a number of facilities once or twice a week.

In addition, the Blue Drop requirements outline the requirements for plant maintenance team to ensure effective maintenance of water infrastructure for ongoing operations. The maintenance team must have variety of artisans with electrical, mechanical and civil expertise for effective asset management with assets reaching their expected useful lifespan. The Blue Drop requirements were used to evaluate Risk Indicator D: Technical Skills as per Table below

Table 12: Blue Drop requirements to evaluate technical skills at treatment plants

Works Class	Class Of Process Controller Per Shift	Class Of Process Controller for Supervision*	Operations And Maintenance Support Services Requirements*
E	Class I	Class V*	THESE PERSONNEL MUST BE AVAILABLE AT ALL TIMES BUT MAY BE IN-HOUSE OR OUTSOURCED - electrician - fitter - instrumentation technician
D	Class II	Class V*	
C	Class III	Class V*	
B	Class IV	Class V	
A	Class IV	Class V	

NB. Fluoridation – for any class works, minimum process controller classification should be class IV

**does not have to be at the works at all times but must be available at all times. If the Water Services Institution or owner of a waterwork has no person of this class employed on that work, a contractor / consultant with the required qualifications as prescribed in Schedule III in respect of that particular class of persons, shall be appointed to visit the work weekly.*

Risk Indicator D: Technical Skills is calculated from three separate components:

- ✓ Process controllers compliance as per Blue Drop requirements: required number and class of process controllers per shift for specific class of plant.
- ✓ Supervisor compliance as per Blue Drop requirements: Class V required, either at plant or available at all times
- ✓ Maintenance Team compliance as per Blue Drop requirements: civil, mechanical and electrical expertise required.
    - Civil team: plumbing qualification / trade test.
    - Mechanical team: millwright or similar mechanical qualification.
    - Electrical team: electrical qualification / trade test.

The Table and figures below provides a profile of the technical skills in Mpumalanga Province for 2021.

Table 59: Mpumalanga Province Summary of results for Indicator D: Technical Skills

Mpumalanga	Average	Minimum	Maximum
D: Technical Skills	52.8%	0%	100%
Process Controller Compliance	55%	0%	100%
Supervisor Compliance	66.1%	**0%**	100%

The provincial profile for Risk Indicator D: Technical skills is presented in the figure below.

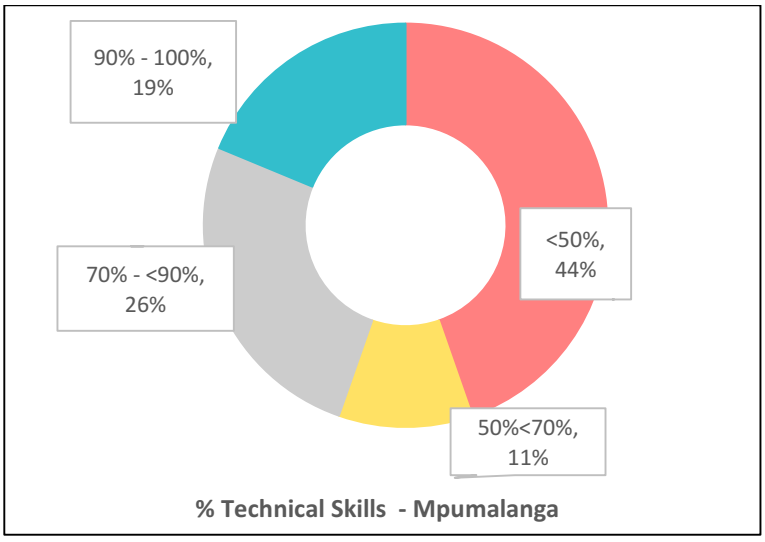


Figure 71: Mpumalanga profile for Indicator D: Technical Skills

The results are summarised as follows:

- ✓ Only 19% of supply system have excellent technical skills: 90 - 100% compliance,
- ✓ 26% of supply systems have good technical skills: 70 - <90% compliance,
- ✓ 11% of supply systems have average technical skills: 50 - <70% compliance,
- ✓ 44% of supply systems have poor technical skills: <50% compliance,

In general, the province has performed poorly with regards to technical skills.

The provincial profile for process controllers and supervisors compliance is outlined in the figures below.

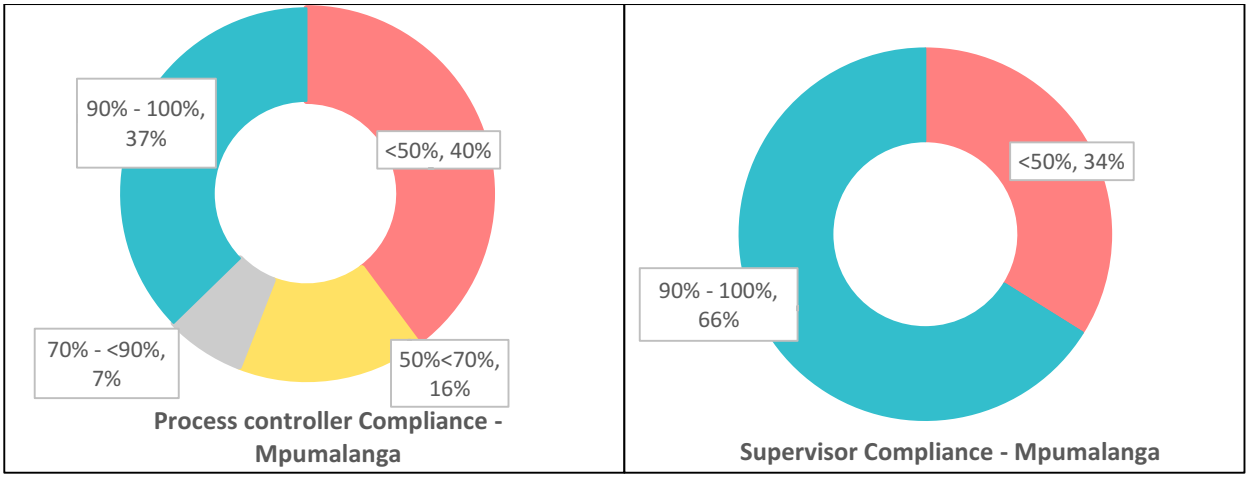


Figure 72: Process controller and Supervisor compliance for Mpumalanga

The resutls are summarised as follows:

- ✓ Process controller compliance is poor with 37% of supply systems with sufficient number of suitably classified process controllers per shift. Lack of sufficient number of process controllers presents a serious risk due to lack of daily monitoring and process optimisation.
- ✓ 66% of supply systems are compliant with regards to Supervisors. These plants either have Class V supervisors permanently based at the plant or available as a roaming supervisor available at all times to assist process controllers. The presence of a qualified supervisor can mitigate some of the risks associated with insufficient number of process controllers on site provided the supervisor is available at all times.

The provincial profile for maintenance team as well as breakdown of maintenance team is outlined in the figures below.

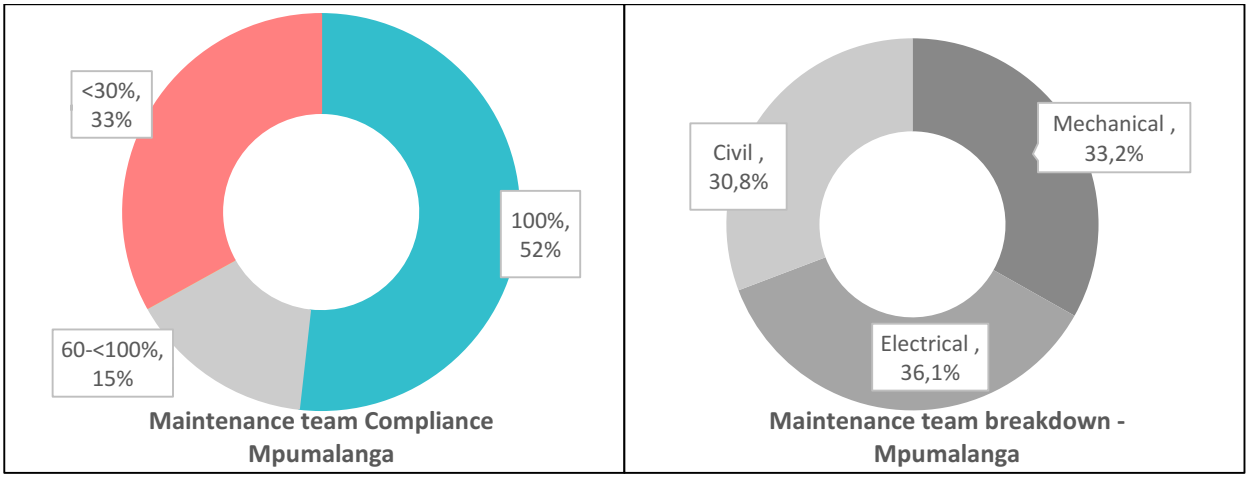


Figure 73: Maintenance team compliance and maintenance team breakdown for Mpumalanga

The results are summarised as follows:

- ✓ 52% of all supply systems have full maintenance teams in place i.e. civil, mechanical and electrical personnel. However, the remaining 481% have insufficient maintenance teams and this can lead to shutdown of treatment plant or processes which will affect quality and quantity of water.
- ✓ 36.1 % have Electrical staff, 33.2% have mechanical competency, and 30.8% have civil staff. Civil works at treatment plants and in the distribution network is conducted by plumbers: lack to this skill will lead to water losses which will negatively impact on water supply.

The Mpumalanga province has performed poorly with regards to technical skills. WSAs are encouraged to evaluate the performance of each system with regards to process control and use this information to determine the operational model which is best suited to ensure effective operations and maintenance.

WSA must allocate budget to appoint suitably qualified process controllers and supervisors to ensure water quality compliance improves through ongoing process optimisation. The WSA must appoint a qualified maintenance team to ensure that the life span of the treatment plant is increased by regular maintenance and ensure there are sufficient number of personnel to cover the entire distribution network to reduce water losses and maintain integrity of the supply system.

Recommendations

- ✓ Register all process controllers and supervisors on IRIS as per Regulation 2834
- ✓ Ensure all process control staff complies with Blue Drop requirements.
- ✓ Ensure maintenance team includes civil, mechanical and electrical personnel.
- ✓ Provide details of operational staff at all future assessments: copies of process controller and supervisor registration certificates, organograms with shift patterns, copies of qualifications/certificates/current training.
- ✓ Provide details of maintenance team at all future assessments: organogram, shift patterns, names and qualifications of team, copies of qualifications/certificates/current training, details of external service providers.

Risk Indicator E: Water Safety Plans

Risk management is the cornerstone of risk-based regulation and a fundamental part of the SANS 241:2015 requirements to ensure effective management of both current and future potential risks. The application of risk management in drinking water management is through the Water Safety Planning concept developed by the WHO which is a comprehensive risk assessment and risk management approach that encompasses all steps in a drinking-water supply chain, from catchment to consumer to ensure continuous feedback and improvement to manage all current and future potential risks. The Water Safety Plan advocates for development of a risk-based monitoring programme and this is also a requirement as per SANS 241:2015

This risk indicator E: Water Safety Plans evaluates the following three critical components which are required for effective risk management as per the WHO guidelines and the SANS 241:2015 requirements.

- ✓ Completeness of the Water Safety Plan as per World Health Organisation Water Safety Planning Manual:
  - 1: Signature from Technical director/Municipal Manager
  - 2: Risk prioritisation method
  - 3: Risk assessment of catchment
  - 4: Risk assessment of plant
  - 5: Risk assessment of network
  - 6: Final risk rating
  - 7: Mitigating measures for all high and medium risks.
- ✓ Development and adoption of risk-based monitoring programme as per SANS 241:2015
  - 8: Full SANS 241:2015 analysis of raw and final water
  - 9: Identification of risk determinands
  - 10: Addition of risk determinands to monthly compliance monitoring as per SANS 241:2015
- ✓ Proof of implementation of the findings of the Water Safety Plan to ensure there is continuous risk management and movement towards overall lower risk rating:
  - 11: Proof that >25% of mitigating measures have been implemented – proof in form of purchase order, pictures, water quality results, tender document, etc.

This makes up 11 equal sub-elements that are evaluated during the BDPAT assessment to calculate the final risk rating for this indicator.

Figure 74 below provides a profile of Risk indicator E in Mpumalanga Province and Figure 75 provides details on the completeness of the Water Safety Plan by indicating the percentage of supply systems which comply with each of the 11 individual components which make up the Water Safety Plan.

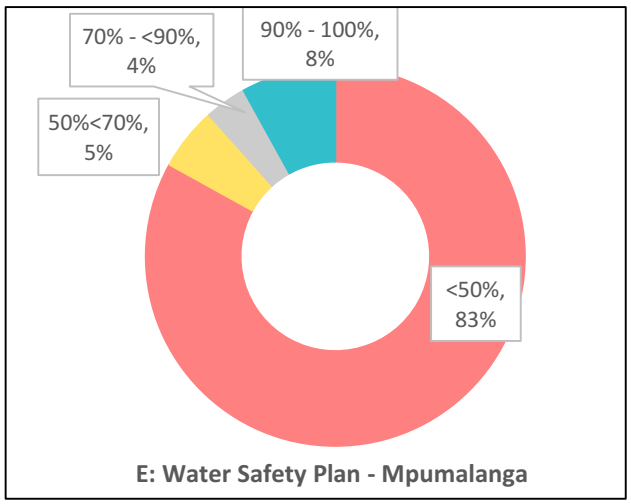


Figure 74: Mpumalanga Profile for Indicator E – Water Safety Plans

Table 60: : Mpumalanga Province summary of results for Indicator E: Water Safety Plans

Mpumalanga	Value
E: Water Safety Plans - Average	21.9%
E: Water Safety Plans - Minimum	0%
E: Water Safety Plans - Maximum	100%
% Systems with Water Safety Plans	32%

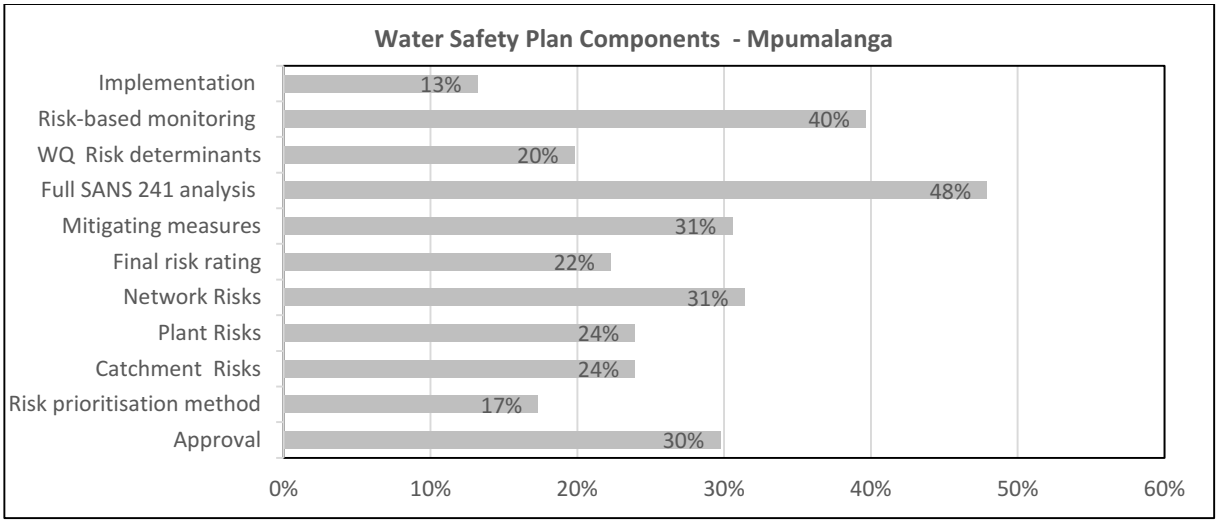


Figure 75: Water Safety Plan components for Mpumalanga

The results are summarised as follows:

- ✓ Only 32% of supply systems have Water Safety Plans in place. This presents a serious risk as effective risk-management is not taking place as per SANS 241:2015 requirement.
- ✓ Only 8% have excellent Water Safety Plans in place with >=90% compliance indicating comprehensive Water Safety Plans with all required components.
- ✓ The average compliance for the province is 21.9% which indicates poor understanding of the Water Safety Planning process amongst the WSA's in this province.
- ✓ The quality and completeness of the Water Safety Plans is as follows:
  - 30% have approval indicating management's commitment to implementing the findings of the Water Safety Plan.
  - Completeness of the Water Safety Plan is poor for catchment, plant and network risks (24%,24% and 31%). Only 17% have risk prioritisation method in place, with 31% having mitigating measures. These results indicates poor understanding of the risk assessment process.
  - Development of risk -based monitoring is poor as full SANS 241:2015 only conducted on 48% of systems with 40% using this information to develop risk-based monitoring programme. Risk-based monitoring is a requirement of SANS 241:2015 and must be reviewed annually based on updated full SANS 241:2015 of raw and final water.

- Implementation of mitigating measures is low at only 13%. Although 30% of Water Safety Plans have been approved, there has been minimal implementation of findings. Management must ensure that when approval is given for a Water Safety Plan, this is supported by resources in the form of staff and budget to implement mitigating measures.

In summary, Water Safety Planning is being implemented in the province in only 32% of supply systems. The completeness and quality of these Water Safety Plans is below average with lack of risk-based monitoring and implementation of mitigating measures to reduce risks.

All WSAs must adopt risk management principles embodied in the Water Safety Planning approach as this is a regulatory requirement as per SANS 241:2015 and will assist in driving down risks in the entire supply system from catchment to consumer.

Recommendations

- ✓ Conduct full SANS 241:2015 analysis on raw, final, and distribution network to identify problem determinands.
- ✓ Develop and implement risk-based monitoring programme to include all current and potential determinands.
- ✓ Register SANS 241:2015 compliant monitoring programme on IRIS.
- ✓ Conduct monitoring as per programme and upload information on a monthly basis.
- ✓ Develop WSP: conduct annual risk assessment of supply system, assign risk rating, validate control measures and determine residual remaining risk.
- ✓ Develop and implement action plan to mitigate remaining risk. Action plan to include budget, responsibility and timeframe for implementation. Note approval for implementation and budget must be given by senior management (municipal manager of WSA).
- ✓ WSA to provide copy of signed approved Water safety plan with proof of implementation of corrective actions from previous risk assessment; uploaded on IRIS.

Summary

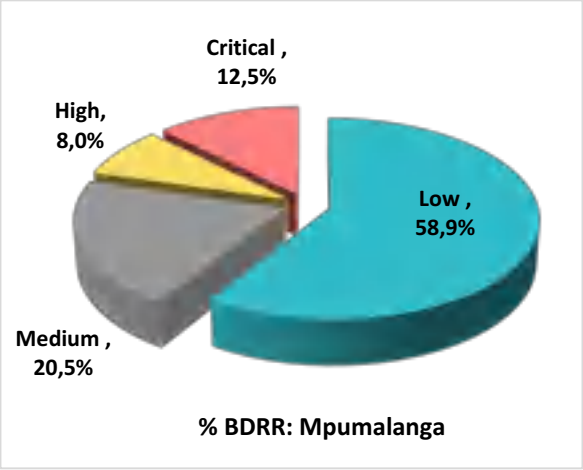
Overall performance for Mpumalanga Province is summarised as follows:

- ✓ 58.9% (66) of supply systems are in the low risk category,
- ✓ 20.5% (23) of supply systems are in the medium risk category,
- ✓ 8% (9) of supply systems are in the high risk category, and
- ✓ 12.5% (14) of supply systems are in the critical risk category

DWS is encouraged by the 58.9% of systems in the low risk category.

However, DWS is concerned about 20.5% of systems which are in high and critical risk categories.

The figure below shows the % Municipal (weighted) BDRR score for all WSA's in the province.



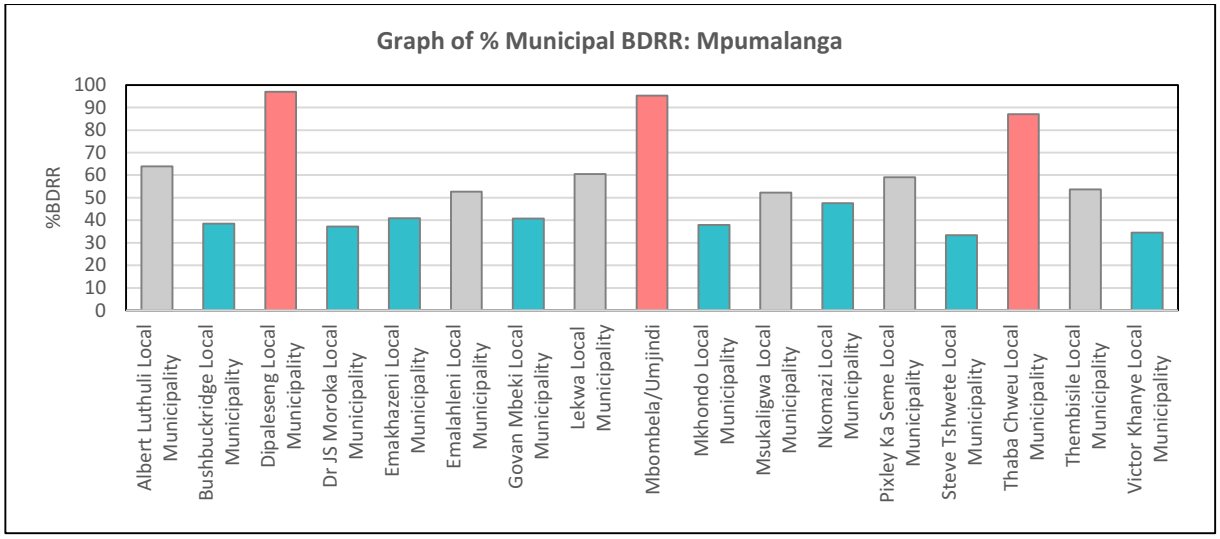


Figure 76: Graph of % Municipal (Weighted) BDRR for each WSA in Mpumalanga Province

The figure indicates three WSA's are in the critical risk category based on % municipal BDRR. However, within the province there are 14 supply systems in the critical risk category and 9 supply systems in the high risk category.

DWS will evaluate risk based on the individual BDRR score for each supply system. Water supply systems which fall in the critical risk category are placed under regulatory focus. In such cases, a red note is assigned that requires the WSI to "...submit a detailed corrective action plan within 60 days of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvements as outlined in the Regulatory Comment. The plan will be considered against the Regulatory Comment and recommended for approval by a national regulation committee...." This note serves to initiate the Department's Enforcement Protocol.

Note Section 151 of the NWA and Section 63 of the Water Services Act in developing and submitting these plans as required:

- ✓ Section 63 of the Water Services Act enables the Minister in consultation with COGTA to request a relevant Province to intervene in terms of section 139 of the Constitution in local government. Such requests will be supported by the outcomes of this performance monitoring and WSIs responsiveness on regulatory responses raised.
- ✓ Section 151 of the NWA provides a number of non-compliances as criminal offences, amongst others using water otherwise than is permitted under the Act, failure to provide access to any books, accounts, documents or assets, unlawfully and intentionally or negligently commit any act or omission which affects or is likely to affect a water resource.

Other water supply systems which are in the high risk category will also be targeted for corrective action plans and municipalities are urged to initiate a process of addressing the regulatory comment as a matter of priority.

The WSA's must therefore review the individual BDRR score of each supply system, evaluate risk indicators which make up the total BDRR score and implement mitigating measures to improve compliance for poor performing risk indicators as outlined below:

- ✓ A: Design Capacity
  - WSA to report design capacity of treatment plant,
- ✓ B: Operational Capacity
  - WSA to install flow meters, record daily flow and implement upgrades when operational capacity is above 90%.
- ✓ C: Water Quality compliance
  - WSA to develop and implement microbiological and chemical monitoring programmes as per requirements to verify the safety of the water at all points in the network.
  - In the event of failures, WSA must implement remedial action which include water quality advisories and process optimisation to improve compliance.
- ✓ D: Technical skills
  - WSA to ensure there are sufficient number of qualified technical staff to undertake operations and maintenance of treatment plants and distribution networks.

- ✓ E: Water Safety Plans
    - WSA to develop and implement comprehensive Water Safety Plan as per WHO and SANS 241: 2015 requirements,
    - WSA to conduct water quality assessment as part of water safety planning process, identify risk determinands, and develop and implement risk-based monitoring programme to manage current and future potential risks.
    - Budget and resources to be made available to implement mitigating measures to reduce risk.

In conclusion, WSA's must review the performance of each supply system, interrogate each risk indicator to identify areas of poor performance, and implement remedial actions to improve overall risk rating.

Below is a summary of performance in Mpumalanga for the following categories:

- ✓ List of % Average BDRR, % Municipal (weighted) BDRR, and number of supply systems for all WSA's in the province.
- ✓ List of Low risk supply systems,
- ✓ List of Critical Risk supply systems which require immediate attention,
- ✓ Top 10 Performing supply systems.

Table 61: List of % Average BDRR, % Municipal BDRR, and number of supply systems for all WSA's in Mpumalanga province

WSA	# Supply systems	% Municipal BDRR	% Average BDRR per WSA
Albert Luthuli Local Municipality	8	63.9	63.8
Bushbuckridge Local Municipality	12	38.6	37.7
Dipaleseng Local Municipality	1	97.0	97.0
Dr JS Moroka Local Municipality	1	37.2	37.2
Emakhazeni Local Municipality	4	40.9	40.5
Emalahleni Local Municipality	4	52.6	39.3
Govan Mbeki Local Municipality	1	40.8	40.8
Lekwa Local Municipality	2	60.5	51.6
Mbombela / Umjindi Municipality	22	95.2	67.7
Mkhondo Local Municipality	4	37.9	39.0
Msukaligwa Local Municipality	5	52.3	50.5
Nkomazi Local Municipality	17	47.5	44.3
Pixley Ka Seme Local Municipality	4	59.1	60.6
Steve Tshwete Local Municipality	13	33.4	34.2
Thaba Chweu Local Municipality	5	87.1	88.3
Thembisile Local Municipality	7	53.7	71.1
Victor Khanye Local Municipality	2	34.5	36.7
Average		**54.8**	**53.0**
Maximum		**97.0**	**97.0**
Minimum		**33.4**	**34.2**

Table 62: List of Low Risk supply systems in Mpumalanga

Mpumalanga: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Albert Luthuli Local Municipality	Bettysgoed	36.8
Bushbuckridge Local Municipality	Bushbuckridge- Dingleydale	35.0
	Bushbuckridge- Sigagule	38.0
	Bushbuckridge- Thorndale	35.1

Mpumalanga: Low Risk Supply Systems		
	Bushbuckridge- Zoeknog	36.1
	Mpumalanga Bushbuckridge Local Municipality - Acornhoek Supply System	36.5
	Mpumalanga Bushbuckridge Local Municipality - Edinburg Supply System	42.4
	Mpumalanga Bushbuckridge Local Municipality - Inyaka Supply System	30.1
	Mpumalanga Bushbuckridge Local Municipality - Marite Supply System	46.5
	Mpumalanga Bushbuckridge Local Municipality - Sandriver Supply System	30.6
	Mpumalanga Bushbuckridge Local Municipality - Thulamahashi Supply System	30.3
	Mpumalanga Bushbuckridge Local Municipality Sehlare Package Plant	21.1
Dr JS Moroka Local Municipality	Weltervreden	37.2
Emakhazeni Local Municipality	Belfast (Belfast Water Treatment Plant)	40.5
	Dullstroom (Dullstroom Water Treatment Plant)	30.3
	Emgwenya (Waterval Boven Water Treatment Plant)	33.1
Emalahleni Local Municipality	Kendal	22.5
	Kriel / Ganala	44.2
	Rietspruit	35.9
Govan Mbeki Local Municipality	The Greater Govan Mbeki Local Municipality	40.8
Lekwa Local Municipality	Morgenzon WTW	40.8
Mbombela / Umjindi Municipality	Elandshoek (Elandshoek Package Plant)	20.3
	Hazyview (Hazyview WTW)	20.9
	Kanyamazane Supply System (Rand Water -Bulk Supply) (Sembcorp - Reticulation)	25.3
	Karino Water Treatment Works	25.87
	Matsulu WTW	33.6
	Mjindini Trust - Madakwa Water Supply System	40.4
	Nelspruit Supply System	40.3
	New Hazyview Treatment Works	27.4
	Nsikazi South Supply System (Rand Water Mpumalanga - Bulk) (Sembcorp - Reticulation) (MLM - Reticulation)	38.4
	Rimers - Suid Kaap Water Supply System	45.1
	Primkop WTW	20.6
	White River (White River WTW)	24.1
	White River Country Estates (White River CE WTW)	16.2
Mkhondo Local Municipality	Amsterdam Water Supply System	39.2
	Mkhondo Water Supply System	44.9
	Rural Water Supply System	48.1
	Saul Mkhize Water Supply System	24.0
Msukaligwa Local Municipality	Davel Water Treatment Works	28.7
	South Works (Noitgedacht Farm)	49.2
Nkomazi Local Municipality	Fig Tree / Masibekele WSS	42.9
	Hectorspruit WSS	33.6
	Komatipoort WSS	40.1
	Low Creek WSS	34.2
	Madadeni WSS	31.4
	Magudu WSS	38.6
	Malalane WSS	37.2
	Marloth Park WSS	29.6
	Mbuzini WSS	28.5

Mpumalanga: Low Risk Supply Systems		
	Ntunda WSS	33.3
	Sibange WSS	37.0
	Tonga WSS	49.5
Pixley Ka Seme Local Municipality	Vukuzakhe	47.8
Steve Tshwete Local Municipality	Borehole: Doornkop #1 CPA WSS	19.6
	Borehole: Mafube / Sikhululiwe WSS	17.0
	Borehole:Bankfontein / Somaphepa WSS	15.6
	Borehole:Doornkop #2 / Kwa-Mapimpane WSS	13.9
	ESKOM:Arnot / Rietkuil WSS	49.4
	ESKOM:Hendrina Power Station WSS (Pullenshope)	49.4
	ESKOM:Komati / Blinkpan WSS	49.4
	Hendrina WSS (previously Steve Tshwete / Hendrina WSS-OPTIMUM COAL until 2019/02/28)	22.9
	Middelburg / Mhluzi WSS	32.8
	Presidentsrus WSS	19.5
Thembisile Local Municipality	Engwenyameni (Klipfontein)	46.0
Victor Khanye Local Municipality	Victor Khanye Water	38.9
	Delmas Rand Water	34.5

Table 63: List of Critical Risk supply systems in Mpumalanga

Mpumalanga: Critical Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Albert Luthuli Local Municipality	Rudimentary Boreholes	100.0
Dipaleseng Local Municipality	The Greater Dipaleseng Local Municipality	97.0
Mbombela/Umjindi Municipality	Kanyamazane Reticulation	100.0
	Mshadza	100.0
	Nyongane	100.0
	Rand Water Mpumalaga Mbombela - Mjejane Supply System	97.8
	Rand Water Mpumalanga Mbombela - Legogote Supply System	95.5
	Rand Water Mpumalanga Mbombela - Nyongane River Scheme	95.9
	Rand Water Mpumalanga Mbombela - Dwaleni Supply System	94.4
	Rand Water Mpumulanga Mbombela - Mshadza Supply System	94.4
Nkomazi Local Municipality	Nkomazi Rudimentary Boreholes	90.2
Thaba Chweu Local Municipality	Rural Water Supply System	100.0
	Sabie Water Supply System	91.0
Thembisile Local Municipality	Machipe (Goederede)	100.0

Table 64: List of Top 10 performing systems in Mpumalanga

Top 10 Performing Supply Systems in Mpumalanga		
WSA	**Supply System**	**%BDRR**
Bushbuckridge Local Municipality	Mpumalanga Bushbuckridge Local Municipality Sehlare Package Plant	21.1
Mbombela / Umjindi	Elandshoek (Elandshoek Package Plant)	20.3
Mbombela / Umjindi	Hazyview (Hazyview WTW)	20.9
Mbombela / Umjindi	Primkop WTW	20.6
Mbombela / Umjindi	White River Country Estates (White River CE WTW)	16.2
Steve Tshwete Local Municipality	Borehole: Doornkop #1 CPA WSS	19.6
Steve Tshwete Local Municipality	Borehole: Mafube / Sikhululiwe WSS	17.0
Steve Tshwete Local Municipality	Borehole:Bankfontein / Somaphepa WSS	15.6
Steve Tshwete Local Municipality	Borehole:Doornkop #2 / Kwa-Mapimpane WSS	13.9
Steve Tshwete Local Municipality	Presidentsrus WSS	19.5

Albert Luthuli Local Municipality

Municipal BDRR Score: 63.9%

Assessment Areas	Badplaas	Bettysgoed	Carolina	Ekulindeni
BULK / WSP				
A: Total Design Capacity (Ml/d)	3	2	4.6	5
B: % Operational Capacity in terms of design	0%	0%	0%	0%
C1a: % Microbiological Compliance	100%	0%	76.3%	37.5%
C1b: % Microbiological Monitoring Compliance	72.9%	91.7%	91.7%	83.3%
C2a: % Chemical Compliance	83.3%	78.3%	73.5%	80.3%
C2b: % Chemical Monitoring Compliance	14.7%	17.7%	14.7%	14.7%
D: % Technical Skills	18.8%	18.8%	75%	37.5%
E: % Water Safety Plan Status	54.6%	0%	0%	0%
%BDRR/BDRR max	55%	36.8%	60.1%	61.7%

Assessment Areas	Elukwatini	Empuluzi / Mayflower	Fernie	Rudimentary Boreholes
BULK / WSP				
A: Total Design Capacity (Ml/d)	16.8	8.7	3	N/I
B: % Operational Capacity in terms of design	0%	0%	0%	N/I
C1a: % Microbiological Compliance	53.5%	14.5%	2%	0%
C1b: % Microbiological Monitoring Compliance	96.9%	73.8%	85.4%	0%
C2a: % Chemical Compliance	90.2%	77.9%	76.2%	0%
C2b: % Chemical Monitoring Compliance	14.7%	14.7%	14.7%	0%
D: % Technical Skills	37.5%	75%	75%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	64.9%	71.5%	60.1%	100%

WSA Overview

The Bettysgoed WSS falls in the low-risk category followed by Badplaas WSS, Carolina WSS, Ekulindeni WSS, Elukwatini WSS and Fernie WSS which falls in the medium-risk category followed by Empuluzi/Mayflower WSS which falls in the high-risk category followed by Rudimentary Boreholes which falls in the critical-risk category.

Criteria A – There was no information provided for design capacity for Rudimentary Boreholes. This is an indication of lack of flow management and absence of Treatment Works Classification.

Criteria B – There is no operational capacity information provided for all the WSS which makes them non-compliant, and this must be addressed by the WSA.

Criteria C – The Badplaas WSS indicates excellent compliance for Microbiological compliance (>98%), The Bettysgoed WSS, Carolina WSS, Ekulindeni WSS, Elukwatini WSS and Fernie WSS achieved excellent compliance with Microbiological Monitoring compliance (>80%). None of the WSS achieved compliance for Chemical compliance and Chemical Monitoring compliance which presents a serious health risk to the consumers as quality of water cannot be guaranteed for consumption.

Criteria D – The Carolina WSS, Empuluzi/Mayflower WSS and Fernie WSS achieved adequate compliance of 75% for technical skills. The rest of the WSS indicated an insufficient or an absence of the relevant process control staff and maintenance teams.

Criteria E – The Badplaas WSS indicated the presence and implementation of a Water Safety Plan and development of risk-based water quality monitoring programmes as outlined in SANS 24 with 54,6% compliance. The rest of the WSS indicated the absence of Water safety Planning.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Bushbuckridge Local Municipality

Municipal BDRR Score: 38.6%

Assessment Areas	Bushbuckridge - Cork	Bushbuckridge - Dingleydale	Bushbuckridge - Sigagule	Bushbuckridge - Thorndale
BULK / WSP	Bushbuckridge Local Municipality			
A: Total Design Capacity (Ml/d)	36.5	1.5	1.5	1.5
B: % Operational Capacity in terms of design	68.5%	20%	15.5%	9.1%
C1a: % Microbiological Compliance	60%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	75.7%	100%	75%	41.7%
C2a: % Chemical Compliance	59.9%	87.2%	93.9%	88.1%
C2b: % Chemical Monitoring Compliance	5.3%	17.7%	20.60%	17.7%
D: % Technical Skills	96.9%	62.5%	32.5%	32.5%
E: % Water Safety Plan Status	34.9%	45.5%	54.6%	45.5%
%BDRR/BDRR max	71.2%	35%	38%	35.1%

Assessment Areas	Bushbuckridge - Zoeknog	Mpumalanga Bushbuckridge LM - Acornhoek	Mpumalanga Bushbuckridge LM - Edinburg	Mpumalanga Bushbuckridge LM - Inyaka
BULK / WSP				
A: Total Design Capacity (Ml/d)	3	106	3	100
B: % Operational Capacity in terms of design	25.7%	95%	73.3%	95%
C1a: % Microbiological Compliance	98.3%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	59.4%	26.7%	43.8%	47.1%
C2a: % Chemical Compliance	85.7%	98.9%	93.2%	99.5%
C2b: % Chemical Monitoring Compliance	17.7%	8.8%	8.8%	8.8%
D: % Technical Skills	77.5%	100%	92.5%	100%
E: % Water Safety Plan Status	45.5%	27.3%	54.6%	54.6%
%BDRR/BDRR max	36.1%	36.5%	42.4%	30.1%

Assessment Areas	Mpumalanga Bushbuckridge LM - Marite	Mpumalanga Bushbuckridge LM - Sandriver	Mpumalanga Bushbuckridge LM - Sehlare Plant	Mpumalanga Bushbuckridge LM - Thulamahashi
BULK / WSP				
A: Total Design Capacity (Ml/d)	103	1	1.5	109
B: % Operational Capacity in terms of design	94.3%	10%	13.3%	93.7%
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	55.2%	81.3%	2.1%	72.6%
C2a: % Chemical Compliance	89.4%	80.9%	100%	99.9%
C2b: % Chemical Monitoring Compliance	8.8%	8.8%	8.8%	8.8%
D: % Technical Skills	99.1%	70%	40%	100%
E: % Water Safety Plan Status	27.8%	45.5%	45.5%	37.8%
%BDRR/BDRR max	46.5%	30.6%	21.1%	30.3%

WSA Overview

The Acornhoek WSS, Dingleydale WSS, Edinburg WSS, Inyaka WSS, Marite WSS, Sandriver WSS, Sehlare WSS, Sigagule WSS, Thorndale WSS, Thulamahashi WSS and Zoeknog WSS falls in the low-risk category and the Bushbuckridge Cork WSS falls in the high-risk category.

Criteria A – The design capacity information for all the Water Treatment Works and Water Supply Systems was provided. This is an indication of the presence of flow management and of Treatment Works Classification.

Criteria B – All the WSS and WSSs are operating within their design capacity except Acornhoek WSS, Inyaka WSS, Marite WSS and Thulamahashi WSS which are operating above their design capacity (>90%). This is an indication of non-compliance and must be addressed by the WSA.

Criteria C – The Acornhoek WSS, Dingleydale WSS, Edinburg WSS, Inyaka WSS, Marite WSS, Sandriver WSS, Sehlare WSS, Sigagule WSS, Thorndale WSS, Thulamahashi WSS and Zoeknog WSS have achieved excellent Microbiological compliance (>98%): only Bushbuckridge Cork WSS is non-compliant with Microbiological compliance. The Dingleydale WSS and Sandriver WSS achieved excellent Microbiological Monitoring compliance (>80%) and the rest of the systems are non-compliant with insufficient sampling sites as per SANS 241: 2015 requirements. The Acornhoek WSS, Inyaka WSS, Sehlare WSS and Thulamahashi WSS have achieved excellent Chemical compliance (>98%). All the WSSs are non-compliant with Chemical Monitoring compliance which indicates a high-risk for the end consumers.

Criteria D – The Acornhoek WSS, Cork WSS, Edinburg WSS, Inyaka WSS, Marite WSS and Thulamahashi WSS indicated excellent compliance with technical skills except Dingleydale WSS, Sandriver WSS, Sehlare WSS, Sigagule WSS, Thorndale WSS and Zoeknog WSS which indicated inadequate presence or non-compliance of relevant process controllers, supervisors, and maintenance teams.

Criteria E – All the WSSs and WSS indicated to be non-compliant with the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the WSSs that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Dipaleseng Local Municipality

Municipal BDRR Score: 97%

Assessment Areas	The Greater Dipaleseng Local Municipality
BULK / WSP	
A: Total Design Capacity (Ml/d)	6
B: % Operational Capacity in terms of design	0%
C1a: % Microbiological Compliance	0%
C1b: % Microbiological Monitoring Compliance	0%
C2a: % Chemical Compliance	0%
C2b: % Chemical Monitoring Compliance	0%
D: % Technical Skills	9.4%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	97%

WSA Overview

The Greater Dipaleseng WSS falls in the critical-risk category.

Criteria A – The design capacity for the Greater Dipaleseng WSS is 6 Ml/day.

Criteria B – The operational capacity information for Greater Dipaleseng WSS was not provided. This is an indication of the absence of flow management and of Treatment Works Classification.

Criteria C – There is no water quality monitoring data for Microbiological and Chemical compliance provided for Greater Dipaleseng WSS. This is an indication of non-compliance and must be addressed by the WSA.

Criteria D – Greater Dipaleseng WSS achieved 9.4% compliance for technical skills which is an indication of inadequate presence of relevant process controllers, supervisors, and maintenance teams.

Criteria E – There is no presence of Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015 presented for Greater Dipaleseng WSS.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the Water Supply System that has not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Dr JS Moroka Local Municipality

Municipal BDRR Score: 37.2%

Assessment Areas	Weltervreden
BULK / WSP	
A: Total Design Capacity (Ml/d)	60
B: % Operational Capacity in terms of design	48.3%
C1a: % Microbiological Compliance	100%
C1b: % Microbiological Monitoring Compliance	0.9%
C2a: % Chemical Compliance	91.1%
C2b: % Chemical Monitoring Compliance	20.6%
D: % Technical Skills	100%
E: % Water Safety Plan Status	9.1%
%BDRR/BDRR max	37.2%

WSA Overview

The Weltervreden WSS falls in the low-risk category.

Criteria A – The design capacity for the Weltervreden WSS is 60 Ml/day.

Criteria B – The Weltervreden WSS indicated the operational capacity of 48.3%, which is within its design capacity. This is an indication of the presence of flow management and of Treatment Works Classification.

Criteria C – The Weltervreden WSS achieved excellent Microbiological compliance. It achieved poor Chemical compliance and non-compliance with Microbiological Monitoring compliance and Chemical Monitoring compliance, and this must be addressed by the WSA as this presents serious health risk due to chemical failures and insufficient number of sampling sites to verify quality of water.

Criteria D – The Weltervreden WSS achieved excellent compliance (100%) for technical skills which is an indication of adequate presence of relevant process controllers, supervisors, and maintenance teams.

Criteria E – There is low compliance (9.1%) for Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015 presented for Weltervreden WSS.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Emakhazeni Local Municipality

Municipal BDRR Score: 40.9%

Assessment Areas	Belfast (Belfast Water Treatment Plant)	Dullstroom (Dullstroom Water Treatment Plant)	Emgwenya (Waterval Boven Water Treatment Plant)	Entokozweni (Machadodorp Water Treatment Plant)
BULK / WSP				
A: Total Design Capacity (Ml/d)	4	2	3	2.7
B: % Operational Capacity in terms of design	32.9%	33%	33%	32.6%
C1a: % Microbiological Compliance	95.8%	98.3%	100%	87%
C1b: % Microbiological Monitoring Compliance	83.3%	66.7%	61.1%	66.7%
C2a: % Chemical Compliance	90.7%	94.2%	94.7%	92.4%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	44.8%	72.9%	26%	16.7%
E: % Water Safety Plan Status	18.2%	18.2%	18.2%	18.2%
%BDRR/BDRR max	40.5%	30.3%	33.1%	58.1%

WSA Overview

The Belfast WSS, Dullstroom WSS and Emgwenya WSS falls in the low-risk category and the Entokozweni WSS falls in the medium-risk category.

Criteria A – The design capacities for the four Water Treatment Works were provided.

Criteria B – All the WSS are operating within their design capacity, and this is an indication of flow management and of Treatment Works Classification.

Criteria C – The Emgwenya WSS and Dullstroom WSS achieved excellent Microbiological compliance (>98%). The Belfast WSS achieved excellent Microbiological Monitoring compliance (>80%). The four WSS achieved adequate compliance for Chemical compliance and none of the WSS achieved Chemical Monitoring compliance indicating lack of sufficient sampling points to verify the chemical quality of water at all points in the network.

Criteria D – None of the WSS achieved excellent compliance for technical skills, which is an indication of inadequate presence of relevant process controllers, supervisors, and maintenance teams.

Criteria E – All the WSS achieved low compliance (18.2%) for Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Emalahleni Local Municipality

Municipal BDRR Score: 52.6%

Assessment Areas	Kendal	Kriel / Ganala	Rietspruit	Witbank
BULK / WSP				Optimum Coal Holdings
A: Total Design Capacity (Ml/d)	0.01	15	4	105
B: % Operational Capacity in terms of design	0%	50.7%	80%	99.7%
C1a: % Microbiological Compliance	100%	94.6%	88.2%	94.8%
C1b: % Microbiological Monitoring Compliance	62.5%	60.7%	91.7%	58.8%
C2a: % Chemical Compliance	96.3%	94.6%	94.1%	94.8%
C2b: % Chemical Monitoring Compliance	55.9%	97.1%	97.1%	97.1%
D: % Technical Skills	37.5%	62.5%	34.4%	59.7%
E: % Water Safety Plan Status	0%	90.9%	27.3%	64.8%
%BDRR/BDRR max	22.5%	44.2%	35.9%	54.5%

WSA Overview

The Kriel/Ganala WSS, Kendal WSS and Rietspruit WSS falls in the low-risk category and Witbank WSS falls in the medium-risk category.

Criteria A – The design capacities for the four WSS were provided.

Criteria B – The Kriel/Ganala WSS and Rietspruit WSS are operating within their design capacity. The Kendal WSS indicates no presence of operational flow management and Witbank WSS is operating above its design capacity. This is an indication of lack of flow management and of Treatment Works Classification.

Criteria C – The Kendal WSS is the only system which achieved excellent Microbiological compliance and all WSS did not achieve chemical compliance indicating potential health risk to consumers. Only Rietspruit WSS achieved excellent Microbiological Monitoring compliance (>80%) while three systems achieved excellent chemical monitoring (>80%): Kriel/Ganala WSS, Rietspruit WSS and Witbank WSS. The WSA must ensure all failures are addressed and there is sufficient number of sampling points to verify the quality of water.

Criteria D – None of the four WSS achieved excellent compliance for technical skills, which is an indication of inadequate presence of relevant process controllers, supervisors, and maintenance teams.

Criteria E – The Kriel/Ganala WSS achieved excellent compliance, Kendal WSS indicated no presence and Rietspruit WSS and Witbank WSS indicated low compliance of Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Govan Mbeki Local Municipality

Municipal BDRR Score: 40.8%

Assessment Areas	The Greater Govan Mbeki Local Municipality
BULK / WSP	Rand Water
A: Total Design Capacity (Ml/d)	4800
B: % Operational Capacity in terms of design	98.2%
C1a: % Microbiological Compliance	100%
C1b: % Microbiological Monitoring Compliance	85.9%
C2a: % Chemical Compliance	98.9%
C2b: % Chemical Monitoring Compliance	73.5%
D: % Technical Skills	100%
E: % Water Safety Plan Status	100%
%BDRR/BDRR max	40.8%

WSA Overview

The Greater Govan Mbeki WSS falls in the low-risk category.

Criteria A – The design capacity for the Greater Govan Mbeki WSS was provided.

Criteria B – The Greater Govan Mbeki WSS is operating above its design capacity as it operates above 90%. This is an indication of lack of flow management.

Criteria C – The Greater Govan Mbeki WSS achieved excellent Microbiological compliance, Microbiological Monitoring compliance and Chemical compliance. However, chemical Monitoring compliance is poor and there are insufficient chemical monitoring to verify the chemical quality of water in the supply system.

Criteria D – The Greater Govan Mbeki WSS achieved excellent compliance (100%) for technical skills, which is an indication of adequate presence of relevant process controllers, supervisors, and maintenance teams.

Criteria E – The Greater Govan Mbeki WSS achieved excellent compliance (100%) for Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.

Lekwa Local Municipality

Municipal BDRR Score: 60.5%

Assessment Areas	Morgenzon	Standerton
BULK / WSP		
A: Total Design Capacity (Ml/d)	2	20
B: % Operational Capacity in terms of design	120%	200%
C1a: % Microbiological Compliance	100%	58.9%
C1b: % Microbiological Monitoring Compliance	87.5%	86.7%
C2a: % Chemical Compliance	89.1%	71.7%
C2b: % Chemical Monitoring Compliance	2.9%	2.9%
D: % Technical Skills	81.3	100%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	40.8%	62.5%

WSA Overview

The Morgenzon WSS falls in the low-risk category and the Standerton WSS falls in the medium-risk category.

Criteria A – The design capacities for both the WSS were provided.

Criteria B – The Morgenzon WSS and Standerton WSS are operating above their design capacities as they operate above 90%. This is an indication of lack of flow management.

Criteria C - The Morgenzon WSS achieved excellent Microbiological compliance and Microbiological Monitoring compliance, while achieving non-compliance for Chemical compliance and Chemical Monitoring compliance. The Standerton WSS did not achieve water quality compliance indicating failures for both microbiological and chemical determinants with insufficient number of samples to verify the quality of water. This represents a serious health risk to consumers in the Standerton WSS.

Criteria D – The Standerton WSS achieved excellent compliance (100%) and Morgenzon WSS achieved adequate compliance for technical skills, which is an indication of adequate presence of relevant process controllers, supervisors, and maintenance teams.

Criteria E – Both the WSS indicated the absence of Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Mbombela/Umjindi Local Municipality

Municipal BDRR Score: 95.2%

Assessment Areas	Elandshoek (Package Plant)	Hazyview Old (Hazyview WTW)	Kanyamazane I	Kanyamazane II Supply System
BULK / WSP			Reticulation: Mbombela LM	Bulk & Reticulation: Sembcorp
A: Total Design Capacity (Ml/d)	1	0.003	N/I	5
B: % Operational Capacity in terms of design	70%	0%	N/I	80.%
C1a: % Microbiological Compliance	100%	100%	0%	100%
C1b: % Microbiological Monitoring Compliance	66.7%	47.2%	0%	100%
C2a: % Chemical Compliance	100%	100%	0%	86%
C2b: % Chemical Monitoring Compliance	26.5%	8.8%	0%	88.2%
D: % Technical Skills	54.1%	75%	0%	67.5%
E: % Water Safety Plan Status	0%	0%	0%	18.2%
%BDRR/BDRR max	20.3%	20.9%	100%	25.3%

Assessment Areas	Karino	Matsulu	Mjindini Trust - Madakwa WSS	Mshadza
BULK / WSP	Sembcorp Silulumanzi	Sembcorp Silulumanzi		
A: Total Design Capacity (Ml/d)	2	12	2.12	N/I
B: % Operational Capacity in terms of design	140%	128%	61.3%	N/I
C1a: % Microbiological Compliance	100%	100%	97.4%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	50%	0%
C2a: % Chemical Compliance	97.5%	99.7%	94.4%	0%
C2b: % Chemical Monitoring Compliance	88.2%	88.2%	14.7%	0%
D: % Technical Skills	100%	91.7%	74.1%	0%
E: % Water Safety Plan Status	72.3%	27.3%	0%	0%
%BDRR/BDRR max	25.8%	33.6%	40.4%	100%

Assessment Areas	Nelspruit (Nelspruit Old & New WTW	New Hazyview Treatment Works	Nsikazi South Supply System	Nyongane
BULK / WSP	Sembcorp Silulumanzi	Sembcorp Silulumanzi	Bulk: Rand Water Reticulation: Sembcorp and MLM	
A: Total Design Capacity (Ml/d)	53	6	47	N/I
B: % Operational Capacity in terms of design	90.9%	78.3%	106.4%	0%
C1a: % Microbiological Compliance	99.9%	100%	99.9%	0%
C1b: % Microbiological Monitoring Compliance	0%	38.9%	100%	0%
C2a: % Chemical Compliance	99.8%	99.5%	84.5%	0%
C2b: % Chemical Monitoring Compliance	88.2%	26.5%	88.2%	0%
D: % Technical Skills	88.7%	0%	52.5%	0%
E: % Water Safety Plan Status	81.8%	0%	0%	0%
%BDRR/BDRR max	40.4%	27.4%	38.9%	100%

Assessment Areas	Rand Water Mbombela - Mjejane	Rand Water Mbombela - Legogote	Rand Water Nyongane River	Rand Water Mbombela-Dwaleni
BULK / WSP	Rand Water	Rand Water	Rand Water	Rand Water
A: Total Design Capacity (Ml/d)	2000	2.0	14	2
B: % Operational Capacity in terms of design	0%	0%	0%	0%
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	0%	37.5%	45%	60%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	97.8%	95.5%	95.9%	94.4%

Assessment Areas	Rand Water Mbombela - Mshadza WSS	Rimers - Suid Kaap WSS	Sheba WSS	Tekwane (Primkop WTW)
BULK / WSP	Rand Water			Sembcorp Silulumanzi
A: Total Design Capacity (Ml/d)	2	20	0.5	2
B: % Operational Capacity in terms of design	0%	67.5%	0%	51.5%
C1a: % Microbiological Compliance	0%	98.2%	95%	99.6%
C1b: % Microbiological Monitoring Compliance	0%	45.2%	50%	0%
C2a: % Chemical Compliance	0%	93%	88.2%	99.3%
C2b: % Chemical Monitoring Compliance	0%	17.7%	14.7%	88.2%
D: % Technical Skills	60%	98.1%	62.5%	81.3%
E: % Water Safety Plan Status	0%	0%	0%	81.8%
%BDRR/BDRR max	94.4%	45.1%	53.5%	20.6%

Assessment Areas	White River (White River WTW)	White River Country Estates, (White River CE)
BULK / WSP		
A: Total Design Capacity (Ml/d)	6	1.5
B: % Operational Capacity in terms of design	88.3%	33.3%
C1a: % Microbiological Compliance	100%	100%
C1b: % Microbiological Monitoring Compliance	66.7%	66.7%
C2a: % Chemical Compliance	100%	99.5%
C2b: % Chemical Monitoring Compliance	26.5%	26.5%
D: % Technical Skills	54.2%	62.5%
E: % Water Safety Plan Status	9.1%	9.1%
%BDRR/BDRR max	24.2%	16.2%

WSA Overview

The following is noted with regards to the supply systems:

- Sembcorp Silulumanzi is responsible for following supply systems including the network, agreement being finalised with WSA: Matsulu, Karino, Tekwane (Primkop) & Nelspruit
- Kanyamazane is divided into two systems based on responsibility for distribution network: Kamyamazane I under Mbombela LM and Kanyamazane II under Sembcorp Silulumanzi.
- There are two systems registered for Hazyview, the Old Hazyview system has since been decommissioned and must be deregistered on IRIS.
- No information was provided for Rand Water systems.

The Elandshoek, Hazyview Old, Kanyamazane II, Karino, Matsulu, Mjindini Trust - Madakwa, Nelspruit, New Hazyview, Nsikazi South, Rimers - Suid Kaap, Tekwane, White River and White River Country Estates WSS falls in the low-risk category. Sheba WSS falls in the medium-risk category and the following systems are in the critic risk category: Kanyamazane I, Mshadza, Nyongane, and all Rand Water Mpumalanga Mbombela systems namely Mjejane, Legogote, Nyongane River, Dwaleni, and Mshadza WSS.

Criteria A – There was no information provided for design capacity for Kanyamazane I, Mshadza and Nyongane WSS.

Criteria B – There is no flow measurement information provided for Hazyview, Kanyamazane, Mshadza, Noyngane, Sheba and all Rand Water systems. Karino, Matsulu, Nelspruit and Nsikazi WSS are operating above 90% of design capacity. The WSA must ensure there are daily flow meter readings for all plants and upgrades are planned for supply systems which are operating above 90% to ensure there is sufficient capacity to meet current and future demand.

Criteria C1a – There are 11 systems which have achieved excellent microbiological compliance (>98%) and 8 systems have achieved excellent chemical compliance. Only four supply systems have sufficient microbiological monitoring compliance (>80%) and six supply system have sufficient chemical monitoring compliance (>80%). Acknowledgement is given to the following systems which have achieved both microbiological and chemical compliance: Elandshoek, Karino, Hazyview, Matsulu, Nelspruit, New Hazyview, Tekwane (Primkop), White River, and White River Estates. The WSA must ensure all systems achieve water quality compliance to ensure the safety of consumers. In addition, all systems must have sufficient monitoring points for microbiological and chemical determinants as per SANS 241:2015 to ensure safety of water at all points in the network.

The Rand Water systems have not reported any water quality data and this presents a serious health risk as quality of water cannot be verified in these systems.

Criteria D – Only the Karino, Matsulu, and Rimers - Suid Kaap WSS has achieved excellent compliance (>90%) with technical skills. The rest of the WSS have achieved less than 90% for technical skills of have not reported technical skills.

Criteria E –Only Nelspruit and Tekwane (Primkop) have adequate water safety plans with >80% for this indicator with acknowledgement given to Karino WSS who achieved 72% for this indicator. The rest of the WSS have either low scores or no score which indicate lack of water safety plan and risk-based monitoring programmes as outlined in SANS 241: 2015.

The lack of information for the Rand Water systems has resulted in overall poor performance for this WSA. The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the WSSs that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Mkhondo Local Municipality

Municipal BDRR Score: 37.9%

Assessment Areas	Amsterdam Water Supply System	Mkhondo Water Supply System	Saul Mkhize Water Supply System	Rural Water Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	6.3	12.4	7.5	1
B: % Operational Capacity in terms of design	79.4%	125%	80%	0%
C1a: % Microbiological Compliance	64.4%	94.8%	96.9%	57%
C1b: % Microbiological Monitoring Compliance	100%	100%	94.1%	83.3%
C2a: % Chemical Compliance	89.4%	92.7%	98%	92.7%
C2b: % Chemical Monitoring Compliance	76.5%	76.5%	76.5%	76.5%
D: % Technical Skills	82.3%	91.7%	82.3%	16.7%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	39.2%	44.9%	24%	48.1%

WSA Overview

All the WSSs (The Amsterdam WSS, Mkhondo WSS, Saul Mkhize WSS and Rural WSS) falls in low-risk category.

Criteria A – The design capacities for all the WSSs were provided.

Criteria B – The Amsterdam WSS and Saul Mkhize WSS are operating within their design capacities. The Mkhondo WSS is indicated to be operating above its design capacity by operating at 125% and the Rural WSS indicated no flow measurement. This is an indication of non-compliance and must be addressed by the WSA.

Criteria C – All the Water Supply Systems have not achieved compliance for microbiological determinants (>98%) and one system has achieved chemical compliance: Saul Mkhize. Two systems have achieved excellent microbiological monitoring compliance (>80%) indicating sufficient monitoring sites to verify the quality of the water. All systems however do not have sufficient chemical monitoring sites and this presents a serious health risk as water quality cannot be verified at all points in the network.

Criteria D – Only the Mkhondo WSS indicated excellent compliance (>90%) with technical skills. Amsterdam WSS, Saul Mkhize WSS and Rural WSS indicated inadequate presence of technical skills which have an indication of relevant process controllers, supervisors, and maintenance teams.

Criteria E – All the WSS and WSSs indicated the absence of the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Msukaligwa Local Municipality

Municipal BDRR Score: 52.3%

Assessment Areas	Breyten Water Treatment Works	Davel Water Treatment Works	Douglas Dam Water Works	Lothair Water Treatment Works
BULK / WSP				
A: Total Design Capacity (Ml/d)	3	1	14	1
B: % Operational Capacity in terms of design	0%	0%	0%	0%
C1a: % Microbiological Compliance	91.4%	100%	90.5%	89.1%
C1b: % Microbiological Monitoring Compliance	91.7%	81.3%	96.8%	88.9%
C2a: % Chemical Compliance	90.5%	98.6%	94.2%	92.7%
C2b: % Chemical Monitoring Compliance	23.5%	23.5%	64.7%	23.5%
D: % Technical Skills	26%	26%	35.4%	35.4%
E: % Water Safety Plan Status	9.1%	18.2%	9.1%	9.1%
%BDRR/BDRR max	62.4%	28.7%	54.2%	58.2%

Assessment Areas	South Works (Noitgedacht Farm)
BULK / WSP	
A: Total Design Capacity (Ml/d)	13
B: % Operational Capacity in terms of design	0%
C1a: % Microbiological Compliance	97.6%
C1b: % Microbiological Monitoring Compliance	49.4%
C2a: % Chemical Compliance	94.2%
C2b: % Chemical Monitoring Compliance	64.7%
D: % Technical Skills	81.3%
E: % Water Safety Plan Status	18.2%
%BDRR/BDRR max	49.2%

WSA Overview

The Davel WSS and South Works (Noitgedacht Farm) falls in the low-risk category and Breyten WSS, Douglas dam WSS and Lothair WSS falls in the medium-risk category.

Criteria A – The design capacities for all the WSS were provided.

Criteria B – All the WSS indicated no flow measurement and this is an indication of non-compliance and must be addressed by the WSA.

Criteria C – The Davel WSS achieved excellent Microbiological and chemical compliance while the rest of the WSS did not achieve compliance and this indicates serious health risk with regards to water quality. The Davel WSS, Breyten WSS, Douglas Dam WSS and Lothair WSS achieved excellent Microbiological Monitoring compliance (>80%) while all the WSS indicated non-compliance for Chemical Monitoring compliance which indicates a high-risk for the end consumers.

Criteria D – None of the WSS achieved excellent compliance (>90%) with technical skills which is an indication of relevant process controllers, supervisors, and maintenance teams.

Criteria E – All the WSS indicated non-compliance of the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Nkomazi Local Municipality

Municipal BDRR Score: 47.5%

Assessment Areas	Driekoppies / Shoemansdal / Buffelspruit / Shongwe WSS	Fig Tree / Masibekele WSS	Hectorspruit WSS	Komatipoort WSS
BULK / WSP				
A: Total Design Capacity (Ml/d)	29	19	2	6
B: % Operational Capacity in terms of design	110.8%	62.1%	137%	67.2%
C1a: % Microbiological Compliance	89.7%	78%	96%	91.7%
C1b: % Microbiological Monitoring Compliance	70.5%	88.3%	100%	100%
C2a: % Chemical Compliance	85.8%	86%	92%	90.6%
C2b: % Chemical Monitoring Compliance	79.4%	73.5%	79.4%	79.4%
D: % Technical Skills	97.4	100%	81.3%	71.9%
E: % Water Safety Plan Status	9.1%	15.8%	27.3%	18.2%
%BDRR/BDRR max	64.9%	42.9%	33.6%	40.1%

Assessment Areas	Langeloop WSS	Low Creek WSS	Madadeni WSS	Magudu WSS
BULK / WSP				
A: Total Design Capacity (Ml/d)	2	1	2	2
B: % Operational Capacity in terms of design	124.5%	87%	41.5%	70.9%
C1a: % Microbiological Compliance	86.8%	90.7%	94.9%	91.1%
C1b: % Microbiological Monitoring Compliance	60%	100%	100%	87.5%
C2a: % Chemical Compliance	89.7%	87.2%	89.5%	92.6%
C2b: % Chemical Monitoring Compliance	79.4%	79.4%	79.4%	79.4%
D: % Technical Skills	81.3%	100%	71.9%	62.5%
E: % Water Safety Plan Status	18.2%	13.6%	18.2%	18.2%
%BDRR/BDRR max	54.2%	34.2%	31.4%	38.6%

Assessment Areas	Malalane WSS	Marloth Park WSS	Mbuzini WSS	Naas / Block C WSS
BULK / WSP				
A: Total Design Capacity (Ml/d)	6	3.5	20	8
B: % Operational Capacity in terms of design	69%	71.4%	2%	106.8%
C1a: % Microbiological Compliance	94.3%	98.6%	86.8%	82.7%
C1b: % Microbiological Monitoring Compliance	100%	100%	85%	73.6%
C2a: % Chemical Compliance	88.7%	90.4%	82.9%	91.4%
C2b: % Chemical Monitoring Compliance	79.4%	79.4%	79.4%	79.4%
D: % Technical Skills	81.3%	81.3%	71.9%	81.3%
E: % Water Safety Plan Status	18.2%	18.2%	18.2%	18.2%
%BDRR/BDRR max	37.2%	29.6%	28.5%	56.5%

Assessment Areas	Nkomazi Rudimentary Boreholes	Ntunda WSS	Nyathi WSS	Sibange WSS
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	1	12	0.35
B: % Operational Capacity in terms of design	N/I	50%	70.8%	120%
C1a: % Microbiological Compliance	59.3%	63.3%	89.9%	90.4%
C1b: % Microbiological Monitoring Compliance	40.9%	100%	79.2%	100%
C2a: % Chemical Compliance	91.2%	78.5%	93.2%	86.5%
C2b: % Chemical Monitoring Compliance	23.5%	79.4%	79.4%	79.4%
D: % Technical Skills	25%	90.6%	81.3%	90.6%
E: % Water Safety Plan Status	0%	18.2%	18.2%	18.2%
%BDRR/BDRR max	90.2%	33.3%	51.9%	37%

Assessment Areas	Tonga WSS
BULK / WSP	
A: Total Design Capacity (Ml/d)	35
B: % Operational Capacity in terms of design	66.9%
C1a: % Microbiological Compliance	77.4%
C1b: % Microbiological Monitoring Compliance	82.6%
C2a: % Chemical Compliance	88.4%
C2b: % Chemical Monitoring Compliance	79.4%
D: % Technical Skills	80.7%
E: % Water Safety Plan Status	18.2%
%BDRR/BDRR max	49.5%

WSA Overview

The Fig Tree / Masibekele WSS, Hectorspruit WSS, Komatipoort WSS, Low Creek WSS, Madadeni WSS, Magudu WSS, Malalane WSS, Marloth Park WSS, Mbuzini WSS, Ntunda WSS, Sibange WSS and Tonga WSS falls in the low-risk category followed by the Driekoppies / Shoemansdal / Buffelspruit / Shongwe WSS, Langeloop WSS, Naas / Block C WSS and Nyathi WSS which falls in the medium-risk category followed by Nkomazi Rudimentary Boreholes which falls in the critical-risk category.

Criteria A – The information of the design capacities for all the supply systems has been provided except for Nkomazi Rudimentary Boreholes. This is an indication of lack of flow management and absence of WSS Classification.

Criteria B – The Fig Tree / Masibekele WSS, Komatipoort WSS, Low Creek WSS, Madadeni WSS, Magudu WSS, Malalane WSS, Marloth Park WSS, Mbuzini WSS, Ntunda WSS, Nyathi WSS and Tonga WSS are operating within their design capacity. The Driekoppies / Shoemansdal / Buffelspruit / Shongwe WSS, Hectorspruit WSS, Langeloop WSS, Naas / Block C WSS and Sibange WSS are operating above their design capacity and the operational capacity for Nkomazi Rudimentary Boreholes is unknown. This is an indication of non-compliance and must be addressed by the WSA.

Criteria C – Only the Marloth Park WSS has achieved excellent compliance (>98%) for Microbiological compliance while all systems did not achieve chemical compliance. Thirteen WSS have achieved compliance for microbiological monitoring compliance (>80%) which indicated sufficient number of sampling points as per SANS 241:2015. However chemical monitoring compliance has not been achieved for any of

the supply systems and this presents possible health risk as there are insufficient chemical sampling points to verify the safety of the water at all points in the network.

Criteria D – Of all the supply systems only Driekoppies / Shoemansdal / Buffelspruit / Shongwe WSS, Fig Tree / Masibekele WSS, Low Creek WSS, Ntunda WSS and Sibange WSS indicated excellent compliance for technical skills which is an indication of relevant process controllers, supervisors, and maintenance teams. The rest of the supply systems indicated non-compliance or the absence of relevant technical skills.

Criteria E – All the supply systems achieved non-compliance for the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the WSSs that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Pixley Ka Seme Local Municipality

Municipal BDRR Score: 59.1%

Assessment Areas	Amesfoort	Volkrust	Vukuzakhe	Wakkerstroom
BULK / WSP				
A: Total Design Capacity (Ml/d)	4	4	4	2
B: % Operational Capacity in terms of design	162.5%	95%	80%	0%
C1a: % Microbiological Compliance	21.3%	40%	13%	10.3%
C1b: % Microbiological Monitoring Compliance	75.8%	77.8%	70.8%	58%
C2a: % Chemical Compliance	96%	94.4%	97.2%	91.6%
C2b: % Chemical Monitoring Compliance	26.5%	23.5%	26.5%	29.4%
D: % Technical Skills	25%	25%	25%	25%
E: % Water Safety Plan Status	9.1%	0%	9.1%	9.1%
%BDRR/BDRR max	65.1%	58.4%	47.8%	71.2%

WSA Overview

The Vukuzakhe WSS falls in low-risk category followed by Amesfoort WSS and Volkrust WSS which falls in the medium-risk category followed by Wakkerstroom WSS which falls in the high-risk category.

Criteria A – The design capacities for all the Water Supply Systems were provided.

Criteria B – The Vukuzakhe WSS is operating within its design capacity. The Amesfoort WSS and Volkrust WSS are indicated to be operating above their design capacity and the Wakkerstroom WSS indicated no flow measurement which is an indication of non-compliance and must be addressed by the WSA.

Criteria C – The four WSSs indicated non-compliance for Microbiological compliance, Microbiological Monitoring compliance, Chemical compliance and Chemical Monitoring compliance, which indicates a high-risk for the end consumers due to water quality failures and lack of sufficient number of sampling points to verify the quality of water at all points in the network.

Criteria D – None of the WSS achieved excellent compliance (>90%) with technical skills which is an indication of lack of relevant process controllers, supervisors, and maintenance teams.

Criteria E – All the WSS indicated non-compliance or absence of the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the WSSs that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Steve Tshwete Local Municipality

Municipal BDRR Score: 33.4%

Assessment Areas	Aventura Forever Loskopdam WSS	Borehole: Doornkop #1 CPA WSS	Borehole: Mafube / Sikhululiwe WSS	Borehole: Bankfontein / Somaphepa WSS
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	0.17	0.04	0.23
B: % Operational Capacity in terms of design	N/I	164.5%	93%	17.4%
C1a: % Microbiological Compliance	100%	100%	100%	100.%
C1b: % Microbiological Monitoring Compliance	41.7%	100%	91.7%	95.8%
C2a: % Chemical Compliance	95.4%	96.4%	98.6%	94.7%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%	97.1%	97.1%
D: % Technical Skills	0%	25%	25%	25%
E: % Water Safety Plan Status	0%	0%	100%	0%
%BDRR/BDRR max	53.9%	19.6%	17.0%	15.7%

Assessment Areas	Borehole: Doornkop #2 Kwa-Mapimpane	ESKOM: Arnot / Rietkuil WSS	ESKOM: Hendrina Power Station WSS (Pullenshope)	ESKOM: Komati / Blinkpan WSS
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.18	N/I	N/I	N/I
B: % Operational Capacity in terms of design	62.5%	N/I	N/I	N/I
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	91.7%	100%	100%	100%
C2a: % Chemical Compliance	98.9%	98.5%	98.9%	98.1%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%	97.1%	97.1%
D: % Technical Skills	25%	25%	25%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	13.9%	49.4%	49.4%	49.4%

Assessment Areas	Hendrina WSS	Kranspoort Vakansiedorp WSS	Middelburg / Mhluzi WSS	Presidentsrus WSS
BULK / WSP				
A: Total Design Capacity (Ml/d)	5	N/I	60	0.32
B: % Operational Capacity in terms of design	90%	N/I	81.7%	62.5%
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	83.3%	100%	100%
C2a: % Chemical Compliance	97%	97.7%	89.4%	92.8%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%	97.1%	97.1%
D: % Technical Skills	71.9%	0%	100%	81.3%
E: % Water Safety Plan Status	81.8%	0%	100%	100%
%BDRR/BDRR max	22.9%	50.6%	32.8%	19.5%

Assessment Areas	STLM / Middelburg Colliery WSS
BULK / WSP	
A: Total Design Capacity (Ml/d)	N/I
B: % Operational Capacity in terms of design	N/I
C1a: % Microbiological Compliance	100%
C1b: % Microbiological Monitoring Compliance	100%
C2a: % Chemical Compliance	98.4%
C2b: % Chemical Monitoring Compliance	97.1%
D: % Technical Skills	0%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	50.2%

WSA Overview

The Doornkop #1 CPA WSS, Mafube / Sikhululiwe WSS, Bankfontein / Somaphepa WSS, Doornkop #2 / Kwa-Mapimpane WSS, ESKOM: Arnot / Rietkuil WSS, ESKOM: Hendrina Power Station WSS, ESKOM: Komati/ Blinkpan WSS, Hendrina WSS, Middelburg / Mhluzi WSS and Presidentsrus WSS falls in the low-risk category and the Aventura Forever Loskopdam WSS, Kranspoort Vakansiedorp WSS and STLM / Middelburg Colliery WSS falls in the medium-risk category.

Criteria A – There was no information provided for design capacity for Aventura Forever Loskopdam WSS, ESKOM: Arnot / Rietkuil WSS, ESKOM: Hendrina Power Station WSS, ESKOM: Komati / Blinkpan WSS, Kranspoort Vakansiedorp WSS and STLM / Middelburg Colliery WSS. This is an indication of lack of flow management and absence of WSS Classification.

Criteria B – The Bankfontein / Somaphepa WSS, Doornkop #2 / Kwa-Mapimpane WSS, Hendrina WSS, Middelburg / Mhluzi WSS and Presidentsrus WSS are operating within their design capacity. The Doornkop #1 CPA WSS and Mafube / Sikhululiwe WSS are operating above their design capacity and the operational capacities for Aventura Forever Loskopdam WSS, ESKOM: Arnot / Rietkuil WSS, ESKOM: Hendrina Power Station WSS (Pullenshope), ESKOM: Komati / Blinkpan WSS, Kranspoort Vakansiedorp WSS and STLM / Middelburg Colliery WSS are unknown. This is an indication of non-compliance and must be addressed by the WSA.

Criteria C – All the WSS except for two systems have achieved excellent Microbiological and chemical compliance (>98%) with sufficient microbiological and chemical monitoring sites (>80% monitoring compliance). This indicates the water is safe to drink in these systems with sufficient sampling sites to verify water quality at all points in the network. For the remaining two systems namely Aventura Forever Loskopdam and Kranspoort Vakansiedorp, water quality compliance is achieved but there is insufficient number of sampling points in the network.

Criteria D – Only Middelburg / Mhluzi WSS indicated excellent compliance for technical skills, which is an indication of relevant process controllers, supervisors, and maintenance teams. The rest of the WSSs indicated noncompliance or the absence of relevant technical skills.

Criteria E – The Mafube / Sikhululiwe WSS, Middelburg / Mhluzi WSS, and Presidentsrus WSS achieved excellent compliance for the Water Safety Planning followed by Hendrina WSS which achieved adequate compliance. The rest of the WSSs indicated the absence of the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the WSSs that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ C: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Thaba Chweu Local Municipality

Municipal BDRR Score: 87.1%

Assessment Areas	Coromandel Water Treatment Plant	Graskop Water Supply System	Lydenburg Water Treatment Plant	Rural Water Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	1	6.5	18.5	N/I
B: % Operational Capacity in terms of design	40%	46.2%	83.8%	N/I
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	85.2%	81.1%	84.4%	100%

Assessment Areas	Sabie Water Supply System
BULK / WSP	
A: Total Design Capacity (Ml/d)	20
B: % Operational Capacity in terms of design	115%
C1a: % Microbiological Compliance	0%
C1b: % Microbiological Monitoring Compliance	0%
C2a: % Chemical Compliance	0%
C2b: % Chemical Monitoring Compliance	0%
D: % Technical Skills	0%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	91%

WSA Overview

The Coromandel WSS, Graskop WSS and Lydenburg WSS falls in the high-risk category and the Rural WSS and Sabie WSS falls in the critical-risk category.

Criteria A – The design capacities for all the Water Treatment and Water Supply Systems were provided except for the Rural WSS.

Criteria B – The Coromandel WSS, Graskop WSS and Lydenburg WSS are operating within their design capacity and Sabie WSS is indicated to be operating above its design capacity. There is no indicated flow measurement for the Rural WSS which is an indication of non-compliance and must be addressed by the WSA.

Criteria C – There is no indication of water quality monitoring results for all the WSS and WSSs which indicates a high-risk for the end consumers as water quality cannot be verified.

Criteria D – None of the WSS and WSSs indicated the presence of technical skills which is an indication of lack of relevant process controllers, supervisors, and maintenance teams.

Criteria E – All the WSS indicated the absence of the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the WSSs that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Thembisile Hani Local Municipality

Municipal BDRR Score: 53.7%

Assessment Areas	Engwenyameni (Klipfontein)	Kwaggafontein System	Kwamhlanga	Langkloof
BULK / WSP	Rand Water	Rand Water		
A: Total Design Capacity (Ml/d)	4800.00	4800.00	N/I	1.00
B: % Operational Capacity in terms of design	98.2%	98.2%	N/I	0%
C1a: % Microbiological Compliance	88.7%	86.1%	86%	50%
C1b: % Microbiological Monitoring Compliance	96.7%	90.6%	39.6%	41.7%
C2a: % Chemical Compliance	99%	98.2%	97.3%	95.6%
C2b: % Chemical Monitoring Compliance	68.8%	68.8%	26.5%	26.5%
D: % Technical Skills	75%	75%	0%	0%
E: % Water Safety Plan Status	100%	100%	0%	0%
%BDRR/BDRR max	46%	61.2%	84.2%	75.1%

Assessment Areas	Machipe (Goederede)	Moloto	Thembalethu
BULK / WSP			Rand Water
A: Total Design Capacity (Ml/d)	N/I	N/I	4800
B: % Operational Capacity in terms of design	N/I	N/I	98.2%
C1a: % Microbiological Compliance	0%	85.3%	96.9%
C1b: % Microbiological Monitoring Compliance	0%	31.5%	82.9%
C2a: % Chemical Compliance	0%	98.9%	99.3%
C2b: % Chemical Monitoring Compliance	0%	26.5%	68.8%
D: % Technical Skills	0%	0%	75%
E: % Water Safety Plan Status	0%	0%	100%
%BDRR/BDRR max	100%	77.4%	53.8%

WSA Overview

The Engwenyameni (Klipfontein) WSS falls in the low-risk category followed by Kwaggafontein WSS and Thembalethu WSS which falls in the medium-risk category followed by Kwamhlanga WSS, Langkloof WSS and Moloto WSS which falls in the high-risk category and Machipe (Goederede) WSS falls in the critical-risk category.

Criteria A – No information of the design capacities for Kwamhlanga WSS, Machipe (Goederede) WSS and Moloto WSS were provided.

Criteria B – The Engwenyameni (Klipfontein) WSS, Kwaggafontein WSS and Thembalethu WSS are indicated to be operating above their design capacity and the Kwamhlanga WSS, Langkloof WSS, Machipe (Goederede) WSS and Moloto WSS indicated no flow measurement which is an indication of non-compliance and must be addressed by the WSA.

Criteria C – All the WSS indicated non-compliance for Microbiological compliance with only three sits have sufficient number of microbiological sampling sites: Engwenyameni (Klipfontein), Kwaggafontein and Thembalethu. Acknowledgement is given for six out of the eight WSS having achieved excellent chemical compliance. However, all the supply systems do not have sufficient chemical monitoring compliance (>80%) and this presents a potential health risk as chemical water quality cannot be verified at all points in the network.

Criteria D – The Engwenyameni (Klipfontein) WSS, Kwaggafontein WSS and Thembalethu WSS achieved adequate compliance of 75% and the rest of the supply systems indicated the absence of technical skills which is an indication of lack of relevant process controllers, supervisors, and maintenance teams.

Criteria E – The Engwenyameni (Klipfontein) WSS, Kwaggafontein WSS and Thembalethu WSS indicated excellent compliance of the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015, and the rest of the WSS indicated the absence of Water Safety Planning.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the WSSs that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Victor Khanye Local Municipality

Municipal BDRR Score: 34.5%

Assessment Areas	Delmas Rand Water	Victor Khanye Water
BULK / WSP	Rand Water	
A: Total Design Capacity (Ml/d)	4800	15
B: % Operational Capacity in terms of design	98.2%	0%
C1a: % Microbiological Compliance	99.4%	99.7%
C1b: % Microbiological Monitoring Compliance	96.4%	89.3%
C2a: % Chemical Compliance	99.5%	98%
C2b: % Chemical Monitoring Compliance	74.7%	52.9%
D: % Technical Skills	91.7%	91.7%
E: % Water Safety Plan Status	100%	54.6%
%BDRR/BDRR max	34.5%	38.9%

WSA Overview

The Victor Khanye WSS and the Delmas Rand Water WSS falls in the low-risk category.

Criteria A – The design capacities for both WSS have been provided.

Criteria B – The Delmas Rand Water WSS is indicated to be operating above its design capacity and the Victor Khanye WSS indicated no flow measurement which is an indication of non-compliance and must be addressed by the WSA.

Criteria C – Both the WSS have achieved excellent Microbiological compliance (>98%), Microbiological Monitoring compliance (>80%) and Chemical compliance. However chemical monitoring compliance is low and this presents a potential health risk as there are insufficient number of chemical sampling points to verify the quality of water as per SANS 241:2015 requirements.

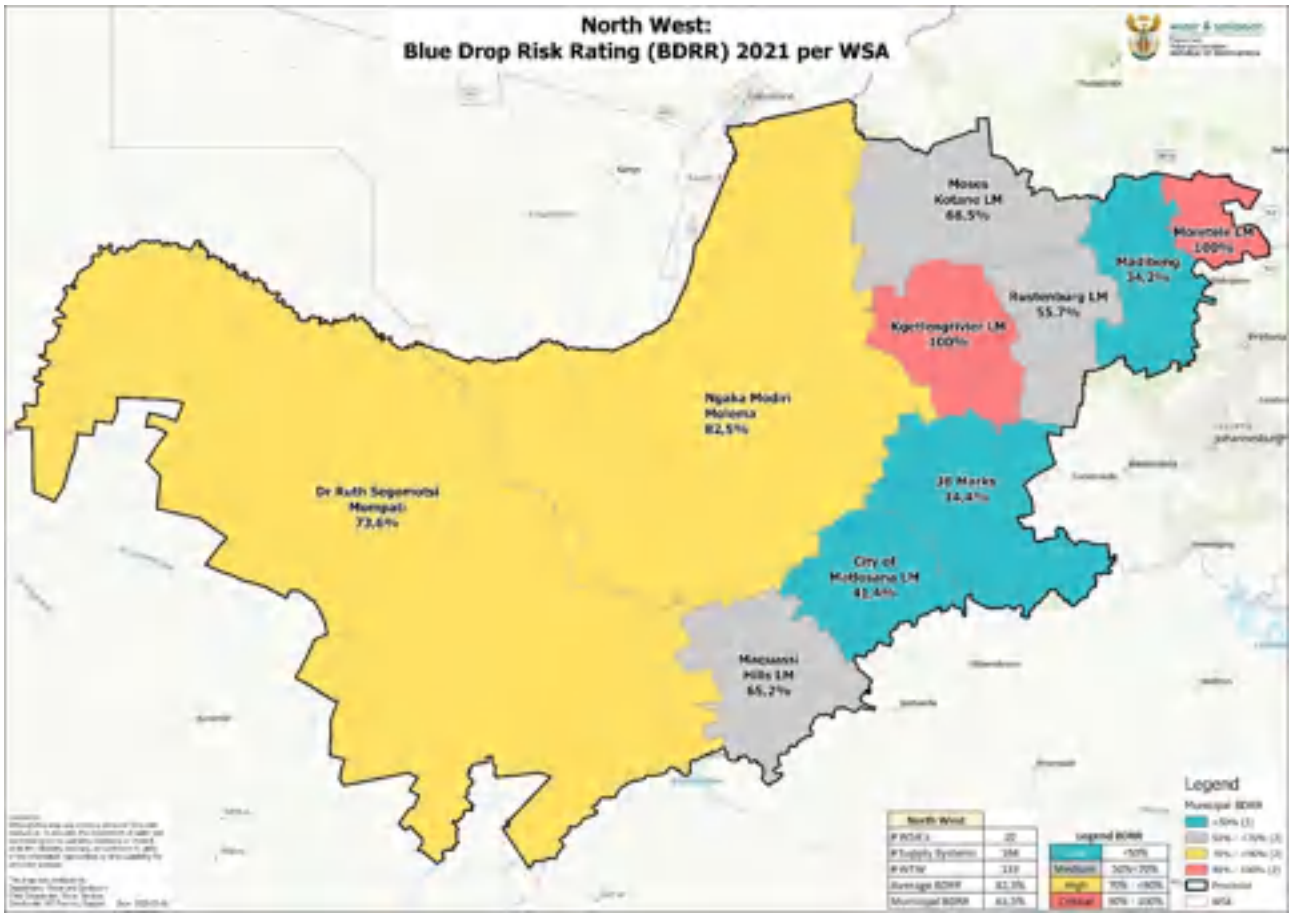
Criteria D – The Victor Khanye WSS and the Delmas Rand Water WSS have achieved excellent compliance (>90%) for technical skills which is an indication of relevant process controllers, supervisors, and maintenance teams.

Criteria E – The Delmas Rand Water WSS indicated excellent compliance of the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241: 2015, and the Victor Khanye WSS indicated the non-compliance for Water Safety Planning.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241: 2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241: 2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241: 2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

CHAPTER 9: NORTH WEST PROVINCE



PROVINCIAL BDRR TREND ANALYSIS

One of the outcomes of Incentive and Risk-based Regulation is the regular monitoring and reporting on the performance of the WSA to ensure strategic operational and management plans are constantly realigned to achieve compliance and effectively manage risks for provision of sustainable water services. For risk-based regulation, the movement in BDRR is a vital tool for both the Department and the WSA to monitor and track the levels of risk in the country. The 2021 BDRR will serve as a baseline for future BDRR assessments that will be used by DWS to monitor and manage drinking water supply systems to ensure delivery of safe drinking water to all communities.

BDRR is calculated and categorised as either low, medium, high and critical risk rating, calculated according to the following range of values to enable both WSA and DWS to monitor performance.

Table 1: BDRR categorisation

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

The BDRR formular is made up of five risk indicators with an overall BDRR for each supply system. The overall performance of each WSA is reported in two ways:

- ✓ Average % BDRR: average % BDRR for all supply systems per province.
- ✓ % Municipal (weighted) BDRR: The Municipal BDRR for each WSA is calculated by the proportional contribution of each water supply system based on design capacity of each system. This weighted average may provide skewed picture i.e. a supply system which receives a small fraction of the total flow from a larger treatment plant will carry a higher weighting compared to a system which received 100% from a smaller treatment plant.

Therefore, the WSA must evaluate the individual % BDRR scores of each system to determine the risk associated with provision of drinking water for each system and not use the % Municipal BDRR score to evaluate their performance. Regardless of the size of the systems, all consumers have a right to safe drinking water and the WSA must be wary of neglecting the management of smaller, rural schemes in favour of larger urban systems.

The % Municipal (weighted) BDRR for all WSA's in the province is provided at the end of each provincial chapter for reference.

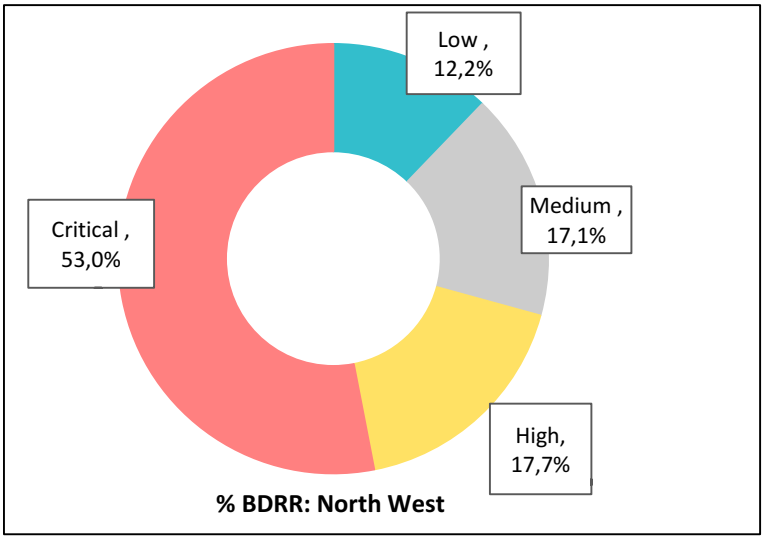
In 2021, 10 WSA's were assessed in North West province with a total to 164 water supply systems. The assessment period for all Risk Indicators was July 2020 to June 2021 except for Risk Indicator C: Water Quality compliance where assessment period was January to December 2020.

The risk performance trends for North West Province are summarised below to provide a provincial overview of BDRR.

Table 65: 2021 Risk Performance trends for North West Province

Risk Rating	Average	Minimum	Maximum
% Municipal BDRR (Weighted Score)	63.5%	14.4%	100%
%BDRR	82.3%	13.8%	100%
A: Design Capacity (Ml/d)	16.1	0.001	736
C1a: % Microbiological Compliance	38.5%	0%	100%
C1b: % Microbiological Monitoring Compliance	25.2%	0%	100%
C2a: % Chemical Compliance	42.6%	0%	99.7%
C2b: % Chemical Monitoring Compliance	16.5%	0%	94.7%
D: % Technical Skills	15.8%	0%	100%
E: % Water Safety Plan Status	7.5%	0%	100%

The BDRR profile for North West province is outlined in the figure below.



The results for North West are summarised as follows:

- ✓ 12.2% of supply systems are in the low risk category,
- ✓ 17.1% are in the medium risk category,
- ✓ 17.7% are in the high risk category, and
- ✓ 53% are in the critical risk category.

Figure 77: BDRR profile for North West

To use the 2021 BDRR score as a tool to implement strategic, targeted actions that will result in an improved risk rating and sustainable water services delivery, the individual components of the BDRR score must be critically evaluated by the WSA to understand the reason for the current risk rating and the desired risk category for delivery of safe drinking water.

The BDRR scorecards reports on the following system-specific risk indicators which ultimately feed into the BDRR score:

- ✓ Risk Indicator A: Design Capacity,
- ✓ Risk Indicator B: Operational Capacity,
- ✓ Risk Indicator C: Water Quality Compliance,

- ✓ Risk Indicator D: Technical Skills, and
- ✓ Risk Indicator E: Water Safety Plans.

The trends with regard to the risk rating of the individual indicator which make up the overall BDRR score is discussed below. This will provide insight on the risk status of each indicator and enable the WSA to implement targeted actions to reduce risk of specific risk indicators which are negatively impacting on the final BDRR score of the supply system.

Risk Indicator A: Design Capacity and Risk Indicator B: Operational Capacity

Criterion A represents the design capacity of the treatment plant.

Every water treatment plant must be classified with DWS as per Regulation 2834. The classification of the treatment plant is based on a number of components, including size, complexity and electrical consumption, as per set criteria. The plant classification certificate is available on IRIS and used to determine the risk rating for criterion A as it states the capacity of the plant.

The risk rating is allocated according to size of the treatment plant with higher risk rating given for a larger plant and lower risk rating for a smaller plant. The rationale is that a larger plant serves a larger community and therefore presents a higher risk if the plant is not functioning or producing unsafe drinking water than a smaller plant which serves less people. The risk rating for criteria A remains the same provided the capacity stays the same, and all plants which have the same design capacity range will have the same maximum BDRR.

Information from the IRIS system was collected to provide a profile of the design capacities of all treatment plants in the province. Some of the treatment plants are large regional bulk schemes which supply water to a number of supply systems in various municipalities and across provinces. The figure below reports on the design capacity of treatment plants located in the province in Ml/d.

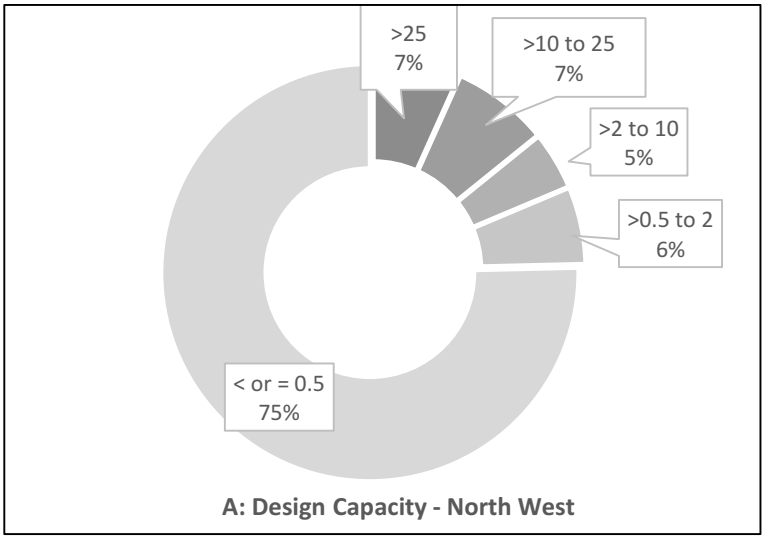


Figure 78: Profile of design capacity in North West Province (Ml/d)

The results are summarised as follows:

- ✓ There are 133 water treatment plants situated in North West province with a combined capacity of 2 142 Ml/d,
- ✓ Reported population served = 13.1 million people,
- ✓ Average design capacity in province =16.1 Ml/d,
- ✓ Largest plant in province =736 Ml/d,
- ✓ Smallest plant in province = 0.001 Ml/d,
- ✓ 75% of plant are <=0.5 Ml/d, 6% are between 0.5 and 2 Ml/d, 5% are between 2 and 10 Ml/d, 7 % are between 10 and 25 Ml/d and 7% are >25 Ml/d,
- ✓ All plants have provided design capacity.

In summary, 81% of plants in North West province are small plants (<2 M/d) and these include boreholes and rural systems. 11% are medium sized plants (between 2 and 25 Ml/d) and 7% are large plants (>25 M/d) which are typically located in metropolitan areas in the province or are part of bulk regional schemes. Operation and management of large number of rural schemes present challenges as these

plants are usually located across a large geographical area with some plants in remote areas. This requires additional resources such as staff, chemical supplies, spares and vehicles to ensure optimal operations of these systems

With regards to **Risk Indicator B: Operational capacity**, daily production versus the design capacity of the treatment plant is an important indicator to determine if the plant can provide sufficient, safe drinking water to all the consumers now and in the near future. When the plant is operating above its design capacity, major unit processes are overloaded and cannot achieve their operational limits which leads to water quality failures.

Risk Indicator C indicates the current operational capacity of the treatment plant in each supply system as a percentage of the design capacity of the plant. The ideal value is between 50 – 100%; higher values indicate the plant is overloaded and lower values indicate the plant is receiving too little flow which may also compromise performance due to lack of retention time (flocculation, sedimentation). Once daily production approaches 90% of design capacity, the WSA must plan, budget and implement projects to increase the capacity of the treatment plant to ensure there is sufficient supply, not only for human consumption, but also for economic activities

Although operational capacity has been reported for all supply systems, there are a number of large regional plants which supply a large number of supply systems in various municipalities and across provincial borders. Analysis of Indicator B must therefore be conducted at plant level as collating operational capacity data at municipal or provincial level will not provide an accurate reflection of the current operational capacity of each individual plant.

WSAs are reminded that installation of flow meter and daily flow recording is a regulatory requirement as per their Water Use License.

Recommendations

- ✓ WSAs must ensure all treatment plants have updated plant registration certificates on IRIS.
- ✓ WSAs must provide updated copies of plant registration certificates supported with documents on the design capacity of treatment plant for future BDRR assessments.
- ✓ WSA to install flow meters at raw and final water points, monitor daily flows and ensure annual calibration of meters for accuracy of results.
- ✓ Budget and plan for upgrade of treatment plant when operational capacity is at 90% to ensure sufficient time for implementation of civil projects.
- ✓ Consult Census, WSDP and Reconciliation strategies to determine current and future allocation and demand, use a 10-year forecast period.

Risk Indicator C: Water Quality Compliance

In South Africa, the SANS 241:2015 is the definitive reference on acceptable limits for drinking water quality parameters and provides limits for a range of water quality characteristics and water meeting this standard is deemed safe for lifetime consumption. The actual water quality depends on both microbiological and chemical determinands:

- ✓ Microbiological compliance reports on the actual compliance of the final water for the past 12 months against microbiological determinands E. Coli / Faecal Coliforms. The presence of these determinands in water is a strong indication of recent sewage or animal waste contamination and there is potential for contracting diseases from pathogens.
- ✓ Chemical quality is determined by a number of determinands which may be acute or chronic health determinands with specific health risks associated with each determinands. Acute health risks can result in death if the limit is exceeded, while chronic limits provide maximum limits that can be ingested over a period of time before health effects are observed.

Both microbiological and chemical compliance limits outlined in SANS 241:2015 is evaluated against the population size: for a population <100 000, compliance is >98% while for a population >100 000, compliance limit is >99%.

In addition, the SANS 241:2015 standard stipulates the frequency of sampling as well as the number of sample points required per supply system to ensure sufficient coverage of the network. The frequency and number of required sample points is dependent on the population size as outlined in Table 1 of SANS241: 2015. Monitoring compliance is therefore critical to guarantee the safety of the supply at all points in the network.

Indicator C: Water Quality Compliance reports on both water quality compliance and monitoring compliance as per SANS 241:2015 for both microbiological and chemical determinands. The formular to calculate C is made up of four sub-indicators with microbiological compliance carrying a higher weighting than chemical compliance as this presents a serious, acute health risk.

The formular for Indicator C, description and categorisation of each sub-indicator is presented in the table below. The categorisation is aligned with the risk rating for each sub-indicator and results are reported for all supply systems in the province. All supply systems which fall in the Low Risk category are regarded as compliant systems.

Table 10: Formular, description and categorisation for Criteria C

C = [0.7(C1a x C1b)] + [0.3(C2a x C2b)]				
Ca: Water Quality Compliance	**C1a**: Microbiological compliance as per SANS 241: 2015.	High Risk	Medium Risk	Low Risk
		<95%	95% - <97%	97% - 100%
	C2a: Chemical compliance as per Blue Drop requirements			
Cb: Monitoring Compliance	**C1b**:Micro monitoring compliance against registered programme, based on population size as per SANS 241:2015	High Risk	Medium Risk	Low Risk
		<50%	50% - 80%	>80%
	C2b: Chemical monitoring compliance calculated as per Blue Drop requirements			

The North West province results for Indicator C and sub-indicators are presented in the table below. This is based on data for the period January to December 2020.

Table 66: North West Province summary of results for Indicator C: Water Quality Compliance (Jan – Dec 2020)

North West	Average Compliance	Minimum	Maximum	% Systems Which Comply (Low Risk)
C1a: Microbiological Quality	38.5%	0%	100%	14%
C2a: Chemical Quality	42.6%	0%	99.7%	12%
C1b: Microbiological Monitoring Compliance	25.2%	0%	100%	7%
C2b: Chemical Monitoring Compliance	16.5%	0%	94.7%	4%

The categorisation for microbiological and chemical compliance is illustrated below providing % of supply systems per category

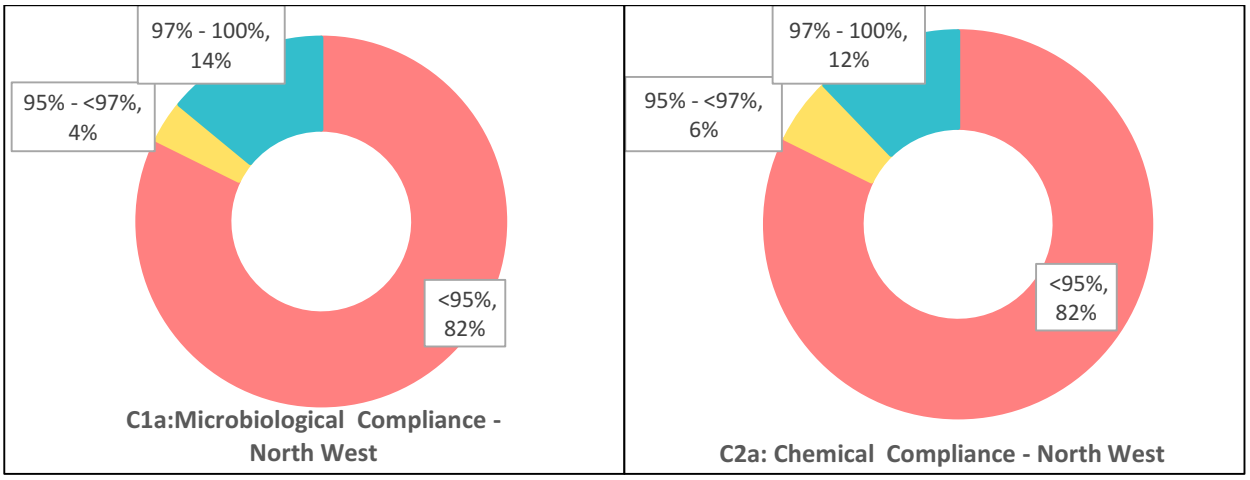


Figure 79: Microbiological and Chemical Compliance for North West (Jan – Dec 2020)

The results are summarised as follows:

- ✓ Only 14% of systems achieved microbiological compliance and 12% achieved chemical compliance. This is of serious concern to DWS as the majority of supply systems present a potential health risk to consumers.
- ✓ 84% of systems do not comply with microbiological determinands: this indicates microbiological failures which presents a serious health risk to the consumers in these supply systems. For sustained failures, 'Boil Water' notices must be issued to safeguard consumers while the root cause of the failure is investigated and resolved.
- ✓ 88% of systems do not comply with chemical determinands. This may present immediate or potential long term health risks depending on whether non-compliance is for acute health determinands or chronic health determinands.
    - WSA must ensure compliance for all chemical-health determinands as per Blue Drop requirements and includes, NO3- and NO2- as N, SO42-, Sb, As, Cd, Cr, Co, Cu, CN-, Pb, Hg, Ni, Se, V, DOC or TOC, and Total THM.

The categorisation for microbiological and chemical monitoring compliance is illustrated below providing percentages of supply systems per category.

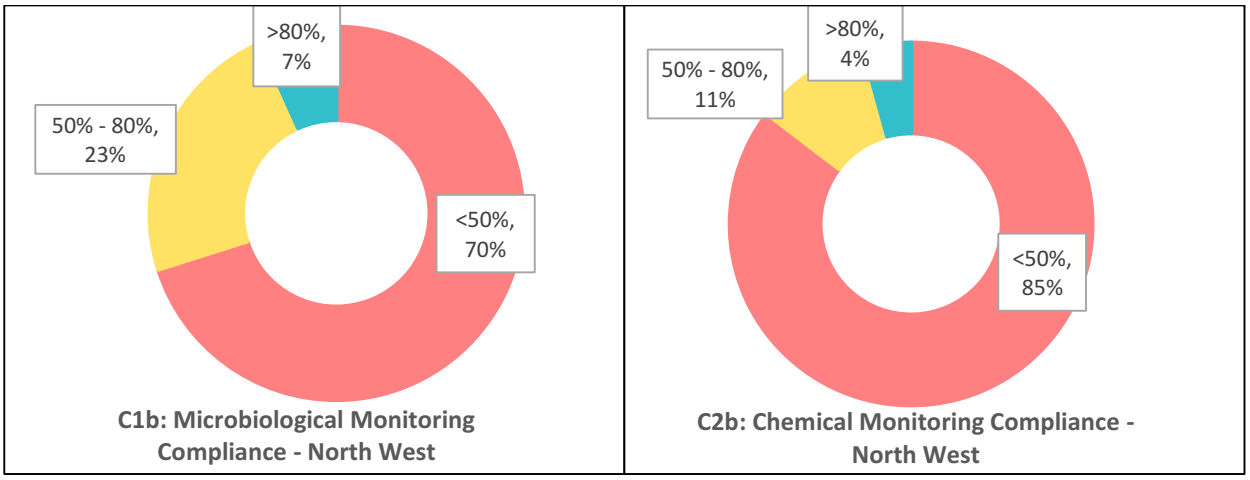


Figure 80: Microbiological and Chemical Monitoring Compliance for North West (Jan – Dec 2020)

The results are summarised as follows:

- ✓ Only 7% of supply systems have sufficient microbiological samples based on population size as per SANS 241-2.
- ✓ 93% of supply systems have <80% for microbiological monitoring compliance. This indicates there is an insufficient number of microbiological samples to guarantee the safety of water at all points in the distribution system. These supply systems therefore do not comply with table 2 in SANS 241-2 which outlines required number of sample points based on population size.
- ✓ Only 4% of supply systems have sufficient chemical monitoring samples.
- ✓ 96% of supply systems have <80% for chemical monitoring compliance. This indicates either insufficient number of samples collected or insufficient chemical determinands were analysed as per the requirement outlined in SANS 241:2015, i.e.
    - Actual monitoring occurs according to registered IRIS monitoring programme (>80%),
    - Number of samples: One sample each at treatment plant final and one distribution point, both of which must be analysed for at least 80% of determinands listed (13 of the 17 determinands) i.e. at least 26 data points are required.

Recommendations

The poor water quality in North West Province is of concern to DWS, in particular poor water quality and the lack of sufficient samples to verify safety of water at all points in network.

All WSAs must urgently implement the following steps to ensure both microbiological and chemical compliance is improved so that all the citizens of South Africa can have access to safe drinking water, which is a basic human right enshrined under our Constitution:

- ✓ Develop and implement microbiological monitoring as per SANS 241:2015 requirements:
    - Monitor final water weekly.
    - Monitor distribution fortnightly
    - Ensure the number of sample points in the distribution network is based on population size as per Table 2 in SANS 241-2 given below

Table 18: Minimum number of samples for E.Coli (or Faecal Coliforms) in distribution network (Table 2 SANS 241-2: 2015)

Population served	Total number of samples per month[a]
<5000	2
5000-100 000	1 per 5000 head of population + 1 additional sample [b]
100 000 – 500 000	1 per 10 000 head of population + 11 additional sample [b]
≥500 000	1 per 20 000 head of population + 36 additional sample [b]
[a] During rainy season, sampling should be carried out more frequently to ensure that all spatial and temporal risks are identified. [b] see *WHO, Guidelines for drinking water quality*	

- ✓ Develop and implement risk-based chemical monitoring programme as per SANS 241:2015 requirements:
    - Conduct full SANS 241:2015 analysis annually on raw, final and distribution network to identify current problem determinands.
    - Conduct risk assessment of system including catchment, treatment plant and reticulation to identify current and potential water quality risks and their associated determinands. e.g. presence of pit latrines means possibility of nitrates in ground water and surface water.
    - Develop and implement risk-based chemical monitoring programme for all identified determinands.
        - Sample points are raw, final and critical distribution points depending on impact of determinands.
        - Frequency as per Table 3 in SANS 241- 2. i.e. acute health 1 = weekly, acute health 2 = monthly, chronic health = monthly, aesthetic = monthly,
        - Operational monitoring dependant on unit processes.
- ✓ In the event of non-compliance:
    - Precautionary measures including 'Boil Water' notices must be issued to consumers in systems with sustained microbiological failures.
    - 'Water Quality' Advisories must be issued to consumers in systems with sustained chemical failures for chronic health determinands.
    - WSAs must investigate the root cause of the failure and implement remedial actions to ensure compliance. If this cannot be achieved, an alternative water supply must be provided to ensure safety of consumers.
- ✓ Compliance monitoring to be undertaken by accredited laboratory:
    - WSA to ensure that there is sufficient budget for compliance monitoring.
    - Laboratory to comply with accreditation requirement as per Blue Drop: SANAS accredited, participation in proficiency testing with acceptable Z-Score, or Quality Assurance system.

Risk Indicator D: Technical Skills

Regulation 2834 states all plant personnel must be classified as per their qualifications and years of experience. This is conducted by DWS and plant personnel are provided with a classification certificate which reflects their current classification based on qualification and years of experience. Ongoing training is a requirement under the Regulation to allow for continuous learning that will enable process controller to improve their classification over time to achieve Class V that allows them to act as plant supervisor. The required number and classification of staff required at a treatment plant per shift is dependent of the classification of the plant and the number of shifts.

The Blue Drop requirements acknowledge excellence in water services provision. The Blue Drop requirements therefore outlines the number and classification of process controllers and supervisors required for each shift. The Blue Drop requirements make provision for sharing of supervisors: this reduces the burden of providing permanent staff for small, remote systems as a roaming supervisor can visit a number of facilities once or twice a week.

In addition, the Blue Drop requirements outline the requirements for plant maintenance team to ensure effective maintenance of water infrastructure for ongoing operations. The maintenance team must have variety of artisans with electrical, mechanical and civil expertise for effective asset management with assets reaching their expected useful lifespan. The Blue Drop requirements were used to evaluate Risk Indicator D: Technical Skills as per Table below

Table 12: Blue Drop requirements to evaluate technical skills at treatment plant

Works Class	Class Of Process Controller Per Shift	Class Of Process Controller for Supervision*	Operations And Maintenance Support Services Requirements*
E	Class I	Class V*	THESE PERSONNEL MUST BE AVAILABLE AT ALL TIMES BUT MAY BE IN-HOUSE OR OUTSOURCED - electrician - fitter - instrumentation technician
D	Class II	Class V*	
C	Class III	Class V*	
B	Class IV	Class V	
A	Class IV	Class V	

NB. Fluoridation – for any class works, minimum process controller classification should be class IV

**does not have to be at the works at all times but must be available at all times. If the Water Services Institution or owner of a waterwork has no person of this class employed on that work, a contractor / consultant with the required qualifications as prescribed in Schedule III in respect of that particular class of persons, shall be appointed to visit the work weekly.*

Risk Indicator D: Technical Skills is calculated from three separate components:

- ✓ Process controllers compliance as per Blue Drop requirements: required number and class of process controllers per shift for specific class of plant.
- ✓ Supervisor compliance as per Blue Drop requirements: Class V required, either at plant or available at all times.
- ✓ Maintenance Team compliance as per Blue Drop requirements: civil, mechanical and electrical expertise required.
    - Civil team: plumbing qualification / trade test.
    - Mechanical team: millwright or similar mechanical qualification.
    - Electrical team: electrical qualification / trade test.

The Table and figures below provides a profile of the technical skills in North West Province for July 2020 to June 2021.

Table 67: North West Province Summary of results for Indicator D: Technical Skills

North West	Average	Minimum	Maximum
D: Technical Skills	15.8%	0%	100%
Process Controller Compliance	27%	0%	100%
Supervisor Compliance	18.8%	**0%**	100%

The provincial profile for Risk Indicator D: Technical skills is presented in the figure below.

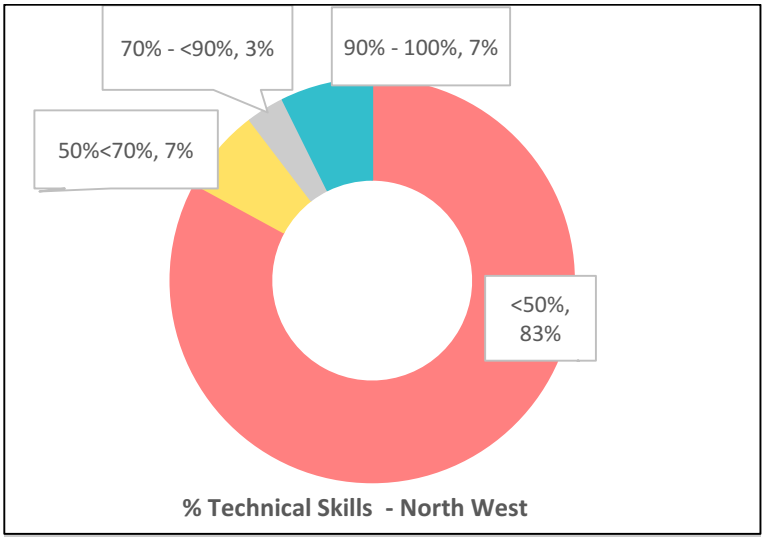


Figure 81: North West Province profile for Indicator D: Technical Skills

The results are summarised as follows:

- ✓ Only 7% of supply system have excellent technical skills: 90 - 100% compliance,
- ✓ 3% of supply systems have good technical skills: 70 - <90% compliance,
- ✓ 7% of supply systems have average technical skills: 50 - <70% compliance,
- ✓ 83% of supply systems have poor technical skills: <50% compliance,

In general, the province has performed very poorly with regards to technical skills.

The provincial profile for process controllers and supervisors compliance is outlined in the figures below.

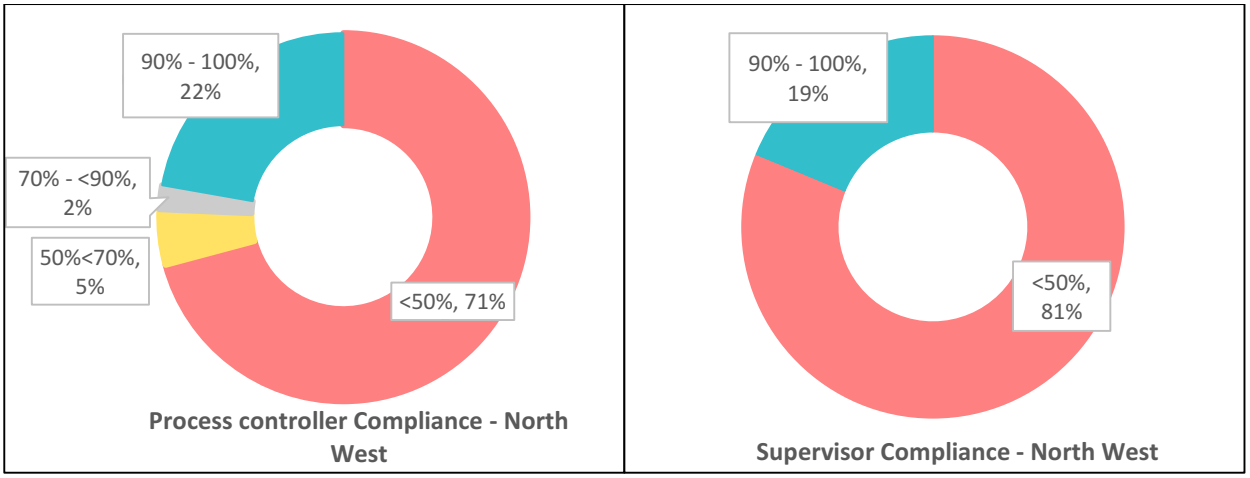


Figure 82: Process controller and Supervisor compliance for North West

The resutls are summarised as follows:

- ✓ Process controller compliance is poor with only 22% of supply systems with sufficient number of suitably classified process controllers per shift. Lack of sufficient number of process controllers presents a serious risk due to lack of daily monitoring and process optimisation.
- ✓ Only 19% of supply systems are compliant with regards to Supervisors. These plants either have Class V supervisors permanently based at the plant or available as a roaming supervisor available at all times to assist process controllers. The presence of a qualified supervisor can mitigate some of the risks associated with insufficient number of process controllers on site provided the supervisor is available at all times.

The provincial profile for maintenance team as well as breakdown of maintenance team is outlined in the figures below.

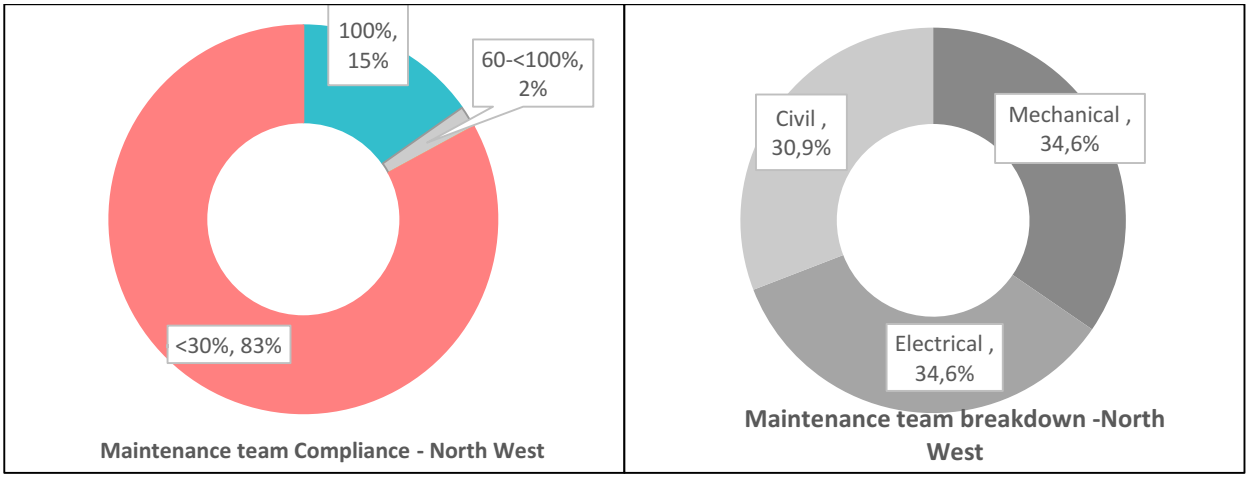


Figure 83: Maintenance team compliance and maintenance team breakdown for North West

The results are summarised as follows:

- ✓ Only 15% of all supply systems have full maintenance teams in place i.e. civil, mechanical and electrical personnel. However, the remaining 85% have insufficient maintenance teams and this can lead to shutdown of treatment plant or processes which will affect quality and quantity of water.
- ✓ 34.6 % have Electrical staff, 34.6% have mechanical competency, and 30.9% have civil staff. Civil works at treatment plants and in the distribution network is conducted by plumbers: lack to this skill will lead to water losses which will negatively impact on water supply.

The North West province has performed poorly with regards to technical skills. WSAs are encouraged to evaluate the performance of each system with regards to process control and use this information to determine the operational model which is best suited to ensure effective operations and maintenance.

WSA must allocate budget to appoint suitably qualified process controllers and supervisors to ensure water quality compliance improves through ongoing process optimisation. The WSA must appoint a qualified maintenance team to ensure that the life span of the treatment plant is increased by regular maintenance and ensure there are sufficient number of personnel to cover the entire distribution network to reduce water losses and maintain integrity of the supply system.

Recommendations

- ✓ Register all process controllers and supervisors on IRIS as per Regulation 2834.
- ✓ Ensure all process control staff complies with Blue Drop requirements.
- ✓ Ensure maintenance team includes civil, mechanical and electrical personnel.
- ✓ Provide details of operational staff at all future assessments: copies of process controller and supervisor registration certificates, organograms with shift patterns, copies of qualifications/certificates/current training.
- ✓ Provide details of maintenance team at all future assessments: organogram, shift patterns, names and qualifications of team, copies of qualifications/certificates/current training, details of external service providers.

Risk Indicator E: Water Safety Plans

Risk management is the cornerstone of risk-based regulation and a fundamental part of the SANS 241:2015 requirements to ensure effective management of both current and future potential risks. The application of risk management in drinking water management is through the Water Safety Plan developed by the WHO which is a comprehensive risk assessment and risk management approach that encompasses all steps in a drinking-water supply chain, from catchment to consumer to ensure continuous feedback and improvement to manage all current and future potential risks. The Water Safety Plan advocates for development of a risk-based monitoring programme and this is also a requirement as per SANS 241:2015

This risk indicator E: Water Safety Plans evaluates the following three critical components which are required for effective risk management as per the WHO guidelines and the SANS 241:2015 requirements.

- ✓ Completeness of the Water Safety Plan as per World Health Organisation Water Safety Planning Manual:
  - 1: Signature from Technical director/Municipal Manager
  - 2: Risk prioritisation method
  - 3: Risk assessment of catchment
  - 4: Risk assessment of plant
  - 5: Risk assessment of network
  - 6: Final risk rating
  - 7: Mitigating measures for all high and medium risks.
- ✓ Development and adoption of risk-based monitoring programme as per SANS 241:2015
  - 8: Full SANS 241:2015 analysis of raw and final water
  - 9: Identification of risk determinands
  - 10: Addition of risk determinands to monthly compliance monitoring as per SANS 241:2015
- ✓ Proof of implementation of the findings of the Water Safety Plan to ensure there is continuous risk management and movement towards overall lower risk rating:
  - 11: Proof that >25% of mitigating measures have been implemented – proof in form of purchase order, pictures, water quality results, tender document, etc.

This makes up 11 equal sub-elements that are evaluated during the BDPAT assessment to calculate the final risk rating for this indicator.

Figure 84 below provides a profile of Risk indicator E in North West Province and Figure 85 provides details on the completeness of the Water Safety Plan by indicating the percentage of supply systems which comply with each of the 11 individual components which make up the Water Safety Plan.

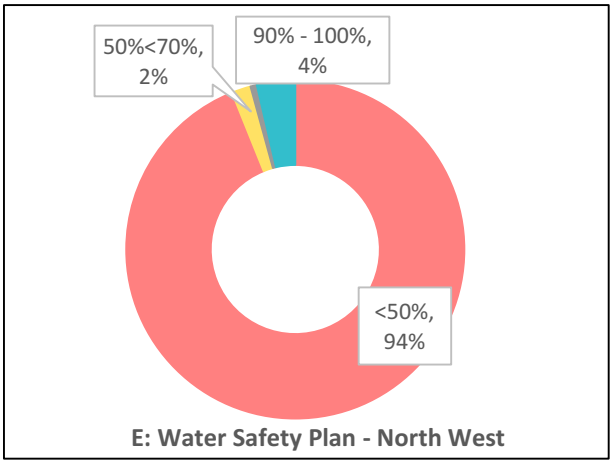


Figure 84: North West Profile for Indicator E – Water Safety Plans

Table 68: North West Province summary of results for Indicator E: Water Safety Plans

North West	Value
E: Water Safety Plans - Average	7.5%
E: Water Safety Plans - Minimum	0%
E: Water Safety Plans - Maximum	100%
% Systems with Water Safety Plans	19%

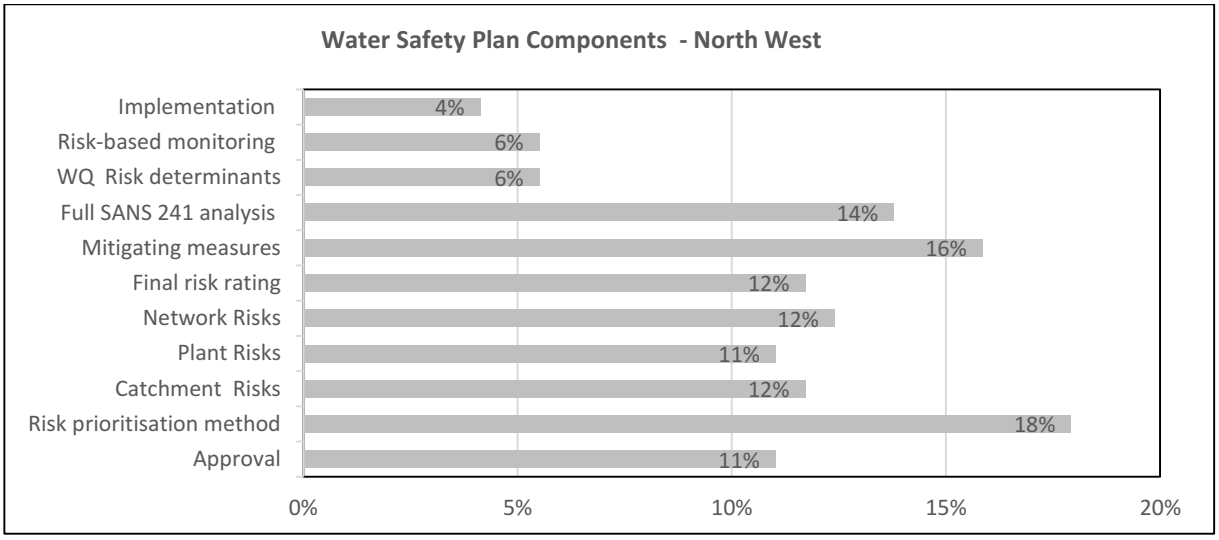


Figure 85: Water Safety Plan components for North West

The results are summarised as follows:

- ✓ Only 19% of supply systems have Water Safety Plans in place. This presents a serious risk as effective risk-management is not taking place as per SANS 241:2015 requirement.
- ✓ Only 4% have excellent Water Safety Plans in place with >=90% compliance indicating comprehensive Water Safety Plans with all required components.
- ✓ The average compliance for the province is 7.5% which indicates poor understanding of the Water Safety Planning process amongst the WSA's in this province.
- ✓ The quality and completeness of the Water Safety Plans is as follows:
    - 11% have approval indicating management's commitment to implementing the findings of the Water Safety Plan.
    - Completeness of the Water Safety Plan is poor for catchment, plant and network risks (average 11%). Only 18% have risk prioritisation method in place, with 16% having mitigating measures. These results indicate poor understanding of the risk assessment process.
    - Development of risk -based monitoring is poor as full SANS 241:2015 only conducted on in only 14% of systems and only 6% using this information to develop risk-based monitoring programme. Risk-based monitoring is a requirement of SANS 241:2015 and must be reviewed annually based on updated full SANS 241:2015 of raw and final water.

- Implementation of mitigating measures is low at only 4%. Although 14% of Water Safety Plans have been approved, there has been minimal implementation of findings. Management must ensure that when approval is given for a Water Safety Plan, this is supported by resources in the form of staff and budget to implement mitigating measures.

In summary, Water Safety Planning is being implemented in the province in only 19% of supply systems. The completeness and quality of these Water Safety Plans is below average with lack of risk-based monitoring and implementation of mitigating measures to reduce risks.

All WSAs must adopt risk management principles embodied in the Water Safety Planning approach as this is a regulatory requirement as per SANS 241:2015 and will assist in driving down risks in the entire supply system from catchment to consumer.

Recommendations

- ✓ Conduct full SANS 241:2015 analysis on raw, final, and distribution network to identify problem determinands.
- ✓ Develop and implement risk-based monitoring programme to include all current and potential determinands.
- ✓ Register SANS 241:2015 compliant monitoring programme on IRIS.
- ✓ Conduct monitoring as per programme and upload information on a monthly basis.
- ✓ Develop WSP: conduct annual risk assessment of supply system, assign risk rating, validate control measures and determine residual remaining risk.
- ✓ Develop and implement action plan to mitigate remaining risk. Action plan to include budget, responsibility and timeframe for implementation. Note approval for implementation and budget must be given by senior management (municipal manager of WSA).
- ✓ WSA to provide copy of signed approved Water safety plan with proof of implementation of corrective actions from previous risk assessment; uploaded on IRIS.

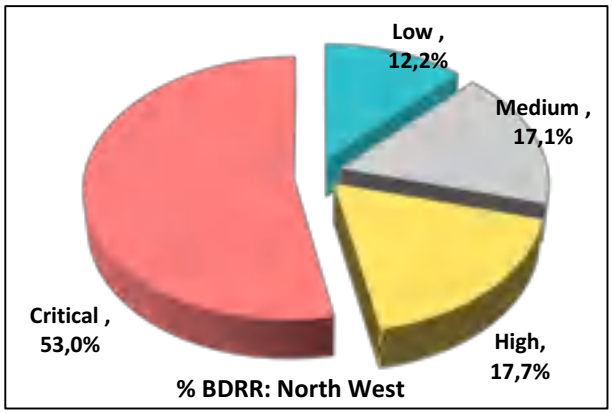
Summary

Overall performance for North West Province is summarised as follows:

- ✓ 12.2% (20) of supply systems are in the low risk category,
- ✓ 17.1% (28) of supply systems are in the medium risk category,
- ✓ 17.7% (29) of supply systems are in the high risk category, and
- ✓ 53% (87) of supply systems are in the critical risk category

DWS is encouraged by the 12.2% of systems in the low risk category.

However, DWS is concerned about 70.7% of systems which are in high and critical risk categories.



The figure below show the % Municipal (weighted) BDRR score for all WSA's in the province.

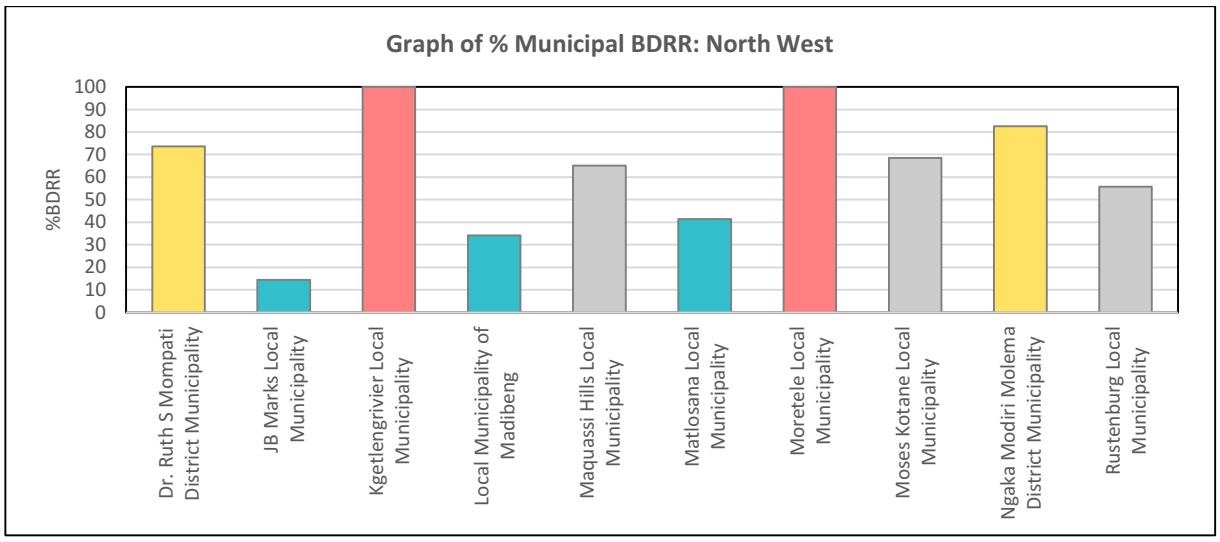


Figure 86: Graph of % Municipal (Weighted) BDRR for each WSA in North West Province

The figure indicates two WSA's are in the critical risk category and two WSA's are in the high risk category based on % municipal BDRR. However, within the province there are 87 supply systems in the critical risk category and 29 supply systems in the high risk category.

DWS will evaluate risk based on the individual BDRR score for each supply system. Water supply systems which fall in the critical risk category are placed under regulatory focus. In such cases, a red note is assigned that requires the WSI to "...submit a detailed corrective action plan within 60 days of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvements as outlined in the Regulatory Comment. The plan will be considered against the Regulatory Comment and recommended for approval by a national regulation committee...." This note serves to initiate the Department's Enforcement Protocol.

Note Section 151 of the NWA and Section 63 of the Water Services Act in developing and submitting these plans as required:

- ✓ Section 63 of the Water Services Act enables the Minister in consultation with COGTA to request a relevant Province to intervene in terms of Section 139 of the Constitution in local government. Such requests will be supported by the outcomes of this performance monitoring and WSIs responsiveness on regulatory responses raised.
- ✓ Section 151 of the NWA provides a number of non-compliances as criminal offences, amongst others using water otherwise than is permitted under the Act, failure to provide access to any books, accounts, documents or assets, unlawfully and intentionally or negligently commit any act or omission which affects or is likely to affect a water resource.

Other water supply systems which are in the high risk category will also be targeted for corrective action plans and municipalities are urged to initiate a process of addressing the regulatory comment as a matter of priority.

The WSA's must therefore review the individual BDRR score of each supply system, evaluate risk indicators which make up the total BDRR score and implement mitigating measures to improve compliance for poor performing risk indicators as outlined below:

- ✓ A: Design Capacity
  - WSA to report design capacity of treatment plant,
- ✓ B: Operational Capacity
  - WSA to install flow meters, record daily flow and implement upgrades when operational capacity is above 90%.
- ✓ C: Water Quality compliance
  - WSA to develop and implement microbiological and chemical monitoring programmes as per requirements to verify the safety of the water at all points in the network.
  - In the event of failures, WSA must implement remedial action which include water quality advisories and process optimisation to improve compliance.
- ✓ D: Technical skills
  - WSA to ensure there are sufficient number of qualified technical staff to undertake operations and maintenance of treatment plants and distribution networks.
- ✓ E: Water Safety Plans
  - WSA to develop and implement comprehensive Water Safety Plan as per WHO and SANS 241: 2015 requirements,
  - WSA to conduct water quality assessment as part of water safety planning process, identify risk determinands, and develop and implement risk-based monitoring programme to manage current and future potential risks.
  - Budget and resources to be made available to implement mitigating measures to reduce risk.

In conclusion, WSA's must review the performance of each supply system, interrogate each risk indicator to identify areas of poor performance, and implement remedial actions to improve overall risk rating.

Below is a summary of performance in North West Province for the following categories:

- ✓ List of % Average BDRR, % Municipal (weighted) BDRR, and number of supply systems for all WSA's in the province.
- ✓ List of Low risk supply systems,
- ✓ List of Critical Risk supply systems which require immediate attention,
- ✓ Top 10 Performing supply systems.

Table 69: List of % Average BDRR, % Municipal BDRR, and number of supply systems for all WSA's in North West province

WSA	# Supply Systems	% Municipal BDRR	% Average BDRR per WSA
Dr. Ruth S Mompati District Municipality	104	73.6	84.1
JB Marks Local Municipality	8	14.4	54.1
Kgetlengrivier Local Municipality	3	100.0	96.0
Local Municipality of Madibeng	3	34.2	47.6
Maquassi Hills Local Municipality	3	65.2	79.2
Matlosana Local Municipality	1	41.4	41.4
Moretele Local Municipality	1	100.0	100.0
Moses Kotane Local Municipality	5	68.5	66.9
Ngaka Modiri Molema District Municipality	26	82.5	96.9
Rustenburg Local Municipality	10	55.7	65.5
Average		**63.5**	**73.2**
Maximum		**100.0**	**100.0**
Minimum		**14.4**	**41.4**

Table 70: List of Low Risk supply systems in North West Province

North West: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Dr. Ruth S Mompati District Municipality	Bogosing (Greater Taung LM - Managed by Sedibeng Water)	41.8
	Buxton (Greater Taung LM Borehole Sedibeng Water)	43.2
	Kgomotso (Greater Taung LM - Managed by Sedibeng)	29.8
	Khaukwe (Greater Taung LM Borehole Sedibeng Water)	45.8
	Kokomeng (Greater Taung LM Boreholes Sedibeng Water)	47.4
	Lekwa - Teemane LM - Bloemhof	24.9
	Lekwa - Teemane LM - Christiana	26.7
	Madipelesa (Greater Taung LM Boreholes Sedibeng Water)	47.8
	Pudimoe (Greater Taung LM - Managed by Sedibeng Water)	48.3
	Takaneng (Greater Taung LM Borehole Sedibeng Water)	47.4
JB Marks Local Municipality	Potchefstroom	13.8
	Ventersdorp (Water Treatment Works Supply System)	35.7
	Welgevonden village (Bore Hole Supply System)	30.5
Local Municipality of Madibeng	Hartbeespoort	28.2
	Rand Water	34.1
Matlosana Local Municipality	City of Matlosana	41.4
Moses Kotane Local Municipality	Molatedi Water Treatment Plant	49.4
Rustenburg Local Municipality	Rustenburg Booster System	37.1
	Rustenburg Kloof Supply System	19.7
	Rustenburg Town System	39.8

Table 71: List of Critical Risk supply systems in North West Province

North West: Critical Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Dr. Ruth S Mompati District Municipality	Austrey (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	96.8
	Barolong (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Bray (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0
	De-Aar (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0

North West: Critical Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
	Dihetshwe (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0
	Dikgobane (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Dipodi (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Dithatadu (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0
	Draaihoek (Kagisano Molopo LM Borehole: Managed by Sedibeng Water)	100.0
	Erika (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Ethol-Mmadinonyane / Eckron (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Ga-Modikwe (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0
	Ga-Motsage (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Ganyesa (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Ga-Rapapi (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Goodwood (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0
	Highlandspan (Greater Taung LM Boreholes Sedibeng Water)	100.0
	Itireleng (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0
	Kaang (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0
	Kagisano-Molopo LM, Kagisano (Boreholes - Botshelo Water)	93.1
	Kagisano-Molopo LM, Molopo (Boreholes - Botshelo Water)	100.0
	Kgokgojane (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Kgokgole (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Khudunkgwane (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Kibitwe (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Kokwana (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0
	Kolong (Greater Taung LM Boreholes Sedibeng Water)	96.6
	Leeu-Aar (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Lokgeng (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0
	Lothwanyeng (Greater Taung LM Boreholes Sedibeng Water)	100.0
	Maagetlwa (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0
	Mabone (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0
	Maheng (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0
	Mamusa LM (Boreholes, Reservoirs - Mamusa LM)	99.7
	Mamusa LM 2 (Managed by Mamusa)	100.0
	Manyedi (Kagisano Molopo LM Borehole: Managed by Sedibeng Water)	100.0
	Mmagabong (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Morokweng (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Moshwana (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Naledi LM (Boreholes / Reservoirs - Naledi LM)	96.0
	Naledi LM 2 (Managed by Naledi LM)	100.0
	Naledi LM 3 (Managed by Naledi LM)	100.0
	Newham (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Oforo (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Pembrook (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Phaposane (Kagisano Molopo: Managed by Sedibeng Water)	100.0
	Phoufalo (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Piet Plessis (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Reivilo (Greater Taung LM - Managed by Greater Taung LM)	100.0

North West: Critical Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
	Southey (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Takapori (Greater Taung LM Borehole Sedibeng Water)	100.0
	Tamasikwa (Greater Taung LM Borehole Sedibeng Water)	91.0
	Tlakgameng (Kagisano Molopo: Managed by Sedibeng Water)	100.0
	Tlapeng A & B (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Tosca (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0
	Tseng (Kagisano Molopo LM Boreholes: Managed by Sedibeng Water)	100.0
	Vergenoeg (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
	Vragas (Kagisano Molopo LM: Managed by Sedibeng Water)	100.0
Kgetlengrivier Local Municipality	Derby B/H	100.0
	Koster	93.1
	Swartruggens	95.0
Maquassi Hills Local Municipality	Wolwaransstad Bore Hole System	100.0
Moretele Local Municipality	Temba Treatment Plant	100.0
Moses Kotane Local Municipality	Mmatau: fed by Boreholes	100.0
Ngaka Modiri Molema District Municipality	NMMDM Ditsobotla LM Biesiesvlei	100.0
	NMMDM Ditsobotla LM Coligny	100.0
	NMMDM Ditsobotla LM Ga - Motlatla	100.0
	NMMDM Mahikeng LM Bethel	100.0
	NMMDM Mahikeng LM Ottoshoop	100.0
	NMMDM Mahikeng LM Ramatlabama	100.0
	NMMDM Ramotshere LM Shuping Stat	100.0
	NMMDM Ramotshere LM Zeerust	100.0
	NMMDM Ratlou LM Disaneng	100.0
	NMMDM Ratlou LM Logageng	100.0
	NMMDM Tswaing LM Atamelang	100.0
	NMMDM Tswaing LM Gannalaagte	100.0
	NMMDM Tswaing LM Khunwana	100.0
	Ramotshere - Moiloa Great Marico Package Plant	100.0
	Ratlou: Kraaipan Cluster B/H	95.7
	Ratlou: Madibogo B/H	100.0
	Ratlou: Madibogopan B/H	100.0
	Ratlou: Makgobistad B/H	100.0
	Ratlou: Setlagole Cluster B/H	100.0
	Tswaing: De Larey B/H	100.0
	Tswaing: Ottosdal B/H	100.0
	Tswaing: Sannieshof - A Town B/H	100.0
Rustenburg Local Municipality	Rustenburg Boreholes System	100.0

Table 72: List of Top 10 performing systems in North West Province

Top 10 Performing Supply Systems in North West		
WSA	**Supply System**	**%BDRR**
Dr. Ruth S Mompati District Municipality	Kgomotso (Greater Taung LM - Managed by Sedibeng)	29.8
Dr. Ruth S Mompati District Municipality	Lekwa - Teemane LM - Bloemhof	24.9
Dr. Ruth S Mompati District Municipality	Lekwa - Teemane LM - Christiana	26.7

Top 10 Performing Supply Systems in North West		
WSA	**Supply System**	**%BDRR**
JB Marks Local Municipality	Potchefstroom	13.8
JB Marks Local Municipality	Ventersdorp (Water Treatment Works Supply System)	35.7
JB Marks Local Municipality	Welgevonden Village (Bore Hole Supply System)	30.5
Local Municipality of Madibeng	Hartbeespoort	28.2
Local Municipality of Madibeng	Rand Water	34.1
Rustenburg Local Municipality	Rustenburg Booster System	37.1
Rustenburg Local Municipality	Rustenburg Kloof Supply System	19.7

Dr. Ruth S Mompati District Municipality

Municipal BDRR Score: 73.6%

Assessment Areas	Austrey (Kagisano Molopo LM BH)	Barolong (Kagisano Molopo LM)	Bogosing (Greater Taung LM)	Bray (Kagisano Molopo LM BH)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	N/I	1.2	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	98.9%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	85%	0%
C2a: % Chemical Compliance	0%	0%	84.8%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	32.4%	0%
D: % Technical Skills	0%	0%	28.1%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	96.9%	100%	41.8%	100%

Assessment Areas	Buxton (Greater Taung LM Boreholes	De-Aar (Kagisano Molopo LM Boreholes	Dihetshwe (Kagisano Molopo LM Boreholes	Dikgobane (Kagisano Molopo LM
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	0.22	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	95.2%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	41.7%	0%	0%	0%
C2a: % Chemical Compliance	98.8%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	14.7%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	43.2%	100%	100%	100%

Assessment Areas	Dikhuting (Greater Taung LM Boreholes	Dipodi (Kagisano Molopo LM	Diretsaneng (Greater Taung LM Boreholes	Dithatadu (Kagisano Molopo LM Boreholes
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	N/I	0.09	N/I
B: % Operational Capacity in terms of design	N/I	0%	N/I	N/I
C1a: % Microbiological Compliance	57.1%	0%	83.3%	0%
C1b: % Microbiological Monitoring Compliance	58.3%	0%	45.8%	0%
C2a: % Chemical Compliance	89%	0%	94%	0%
C2b: % Chemical Monitoring Compliance	14.7%	0%	14.7%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	82.1%	100%	77.6%	100%

Assessment Areas	Draaihoek (Greater Taung LM Boreholes	Draaihoek (Kagisano Molopo LM Borehole	Erika (Kagisano Molopo LM:	Ga-Modikwe-Mmadinonyane / Eckron (Kagisano Molopo LM
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	100%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	33.3%	0%	0%	0%
C2a: % Chemical Compliance	94.9%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	14.7%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	63.7%	100%	100%	100%

Assessment Areas	Ga-Modikwe (Kagisano Molopo LM Boreholes)	Gamokake (Greater Taung LM Boreholes)	Ga-Motsage (Kagisano Molopo LM)	Ganyesa (Kagisano Molopo LM)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	73.7%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	62.5%	0%	0%
C2a: % Chemical Compliance	0%	88.5%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	14.7%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	82.0%	100%	100%

Assessment Areas	Ga-Rapapi (Kagisano Molopo LM	Goodwood (Kagisano Molopo LM Boreholes	Granspan (Greater Taung LM Boreholes)	Highlandspan (Greater Taung LM Boreholes)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	N/I	0.03	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	81.8%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	37.5%	0%
C2a: % Chemical Compliance	0%	0%	90.5%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	14.7%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	100%	82.9%	100%

Assessment Areas	Itireleng (Kagisano Molopo LM Boreholes)	Kaang (Kagisano Molopo LM Boreholes)	Kagisano - Molopo LM, Kagisano (Boreholes	Kagisano -Molopo LM, Molopo (Boreholes)
BULK / WSP	Sedibeng Water	Sedibeng Water	Botshelo Water	Botshelo Water
A: Total Design Capacity (Ml/d)	N/I	N/I	0.33	N/I
B: % Operational Capacity in terms of design	0%	N/I	4.26	N/I
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	0%	0%	2.2%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	100%	93.1%	100%

Assessment Areas	Karelstad (Greater Taung LM Boreholes)	Kgokgojane (Kagisano Molopo LM)	Kgokgole (Kagisano Molopo LM:)	Kgomotso (Greater Taung LM: Sedibeng)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	0.04	N/I	N/I	1.5
B: % Operational Capacity in terms of design	N/I	0%	N/I	N/I
C1a: % Microbiological Compliance	77.8%	0%	0%	99.3%
C1b: % Microbiological Monitoring Compliance	66.7%	0%	0%	86.1%
C2a: % Chemical Compliance	90.8%	0%	0%	96.6%
C2b: % Chemical Monitoring Compliance	14.7%	0%	0%	32.4%
D: % Technical Skills	0%	0%	0%	56.3%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	69.0%	100%	100%	29.8%

Assessment Areas	Khaukwe (Greater Taung LM Boreholes)	Khudunkgwane (Kagisano Molopo LM)	Khudutlou (Greater Taung LM Boreholes)	Kibitwe (Kagisano Molopo LM)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	0.05	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	100%	0%	45.5%	0%
C1b: % Microbiological Monitoring Compliance	41.7%	0%	66.7%	0%
C2a: % Chemical Compliance	93.3%	0%	91.1%	0%
C2b: % Chemical Monitoring Compliance	14.7%	0%	14.7%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	45.8%	100%	82.1%	100%

Assessment Areas	Kokomeng (Greater Taung LM Boreholes)	Kokwana (Kagisano Molopo LM Boreholes)	Kolong (Greater Taung LM Boreholes)	Leeu-Aar (Kagisano Molopo LM)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	0.4	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	100%	0%	83.3%	0%
C1b: % Microbiological Monitoring Compliance	4.2%	0%	25%	0%
C2a: % Chemical Compliance	72.7%	0%	94.5%	0%
C2b: % Chemical Monitoring Compliance	11.8%	0%	14.7%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	47.4%	100%	96.6%	100%

Assessment Areas	Lekwa -Teemane LM - Bloemhof	Lekwa -Teemane LM - Christiana	Leshobo (Greater Taung LM Boreholes)	Lokgabeng (Greater Taung LM Boreholes)
BULK / WSP			Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	14.4	8.6	N/I	N/I
B: % Operational Capacity in terms of design	72.9%	69.8%	N/I	N/I
C1a: % Microbiological Compliance	98.9%	97.8%	50%	52.1%
C1b: % Microbiological Monitoring Compliance	91.7%	86.9%	62.5%	70.8%
C2a: % Chemical Compliance	98.3%	96.8%	91.6%	91.2%
C2b: % Chemical Monitoring Compliance	73.5%	73.5%	14.7%	14.7%
D: % Technical Skills	50%	12.5%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	24.9%	26.7%	82.1%	82.1%

Assessment Areas	Lokgeng (Kagisano Molopo LM Boreholes)	Longaneng (Greater Taung LM Boreholes)	Loselong (Greater Taung LM Boreholes)	Lothwanyeng (Greater Taung LM Boreholes)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	0.19	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	82.8%	95.2%	75%
C1b: % Microbiological Monitoring Compliance	0%	66.7%	58.3%	25%
C2a: % Chemical Compliance	0%	97.7%	97.7%	82.5%
C2b: % Chemical Monitoring Compliance	0%	14.7%	14.7%	14.7%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	50.5	62.2%	100%

Assessment Areas	Lotlhapong (Greater Taung LM Boreholes)	Maagetlwa (Kagisano Molopo LM Boreholes)	Mabone (Kagisano Molopo LM Boreholes)	Madipelesa (Greater Taung LM Boreholes)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	0.18
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	100%	0%	0%	87%
C1b: % Microbiological Monitoring Compliance	33.3%	0%	0%	75%
C2a: % Chemical Compliance	98.1%	0%	0%	98.9%
C2b: % Chemical Monitoring Compliance	14.7%	0%	0%	14.7%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	53.5%	100%	100%	47.8%

Assessment Areas	Maheng (Kagisano Molopo LM Boreholes)	Majeakgoro (Greater Taung LM)	Makwating (Greater Taung LM Boreholes)	Mamasokwane (Greater Taung LM Boreholes)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	100%	100%	72.7%
C1b: % Microbiological Monitoring Compliance	0%	31.7%	25%	66.7%
C2a: % Chemical Compliance	0%	97.7%	91.9%	80.3%
C2b: % Chemical Monitoring Compliance	0%	8.8%	14.7%	14.7%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	55.2%	68.1%	82.1%

Assessment Areas	Mamusa LM (Boreholes, Reservoirs - Mamusa LM)	Mamusa LM 2 (Managed by Mamusa) Supply System Two	Manokwane (Greater Taung LM Boreholes)	Manthe (Greater Taung LM Boreholes)
BULK / WSP			Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	9.86	N/I	N/I	0.26
B: % Operational Capacity in terms of design	100%	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	100%	77.8%
C1b: % Microbiological Monitoring Compliance	0%	0%	20.8%	75.0%
C2a: % Chemical Compliance	0%	0%	87.8%	97.1%
C2b: % Chemical Monitoring Compliance	0%	0%	14.7%	14.7%
D: % Technical Skills	15.2%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	99.7%	100%	68.1%	50.5%

Assessment Areas	Manyedi (Kagisano Molopo LM Borehole)	Matlapaneng (Greater Taung LM Boreholes)	Matsheng (Greater Taung LM Boreholes)	Mmagabong (Kagisano Molopo LM)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	90%	95.7%	0%
C1b: % Microbiological Monitoring Compliance	0%	75%	58.3%	0%
C2a: % Chemical Compliance	0%	93%	94.7%	0%
C2b: % Chemical Monitoring Compliance	0%	14.7%	14.7%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	82.1%	70.7%	100%

Assessment Areas	Mocweding (Greater Taung LM Boreholes) Supply System One	Modimong / Madibaneng (Greater Taung LM Boreholes)	Mokasa 1 (Greater Taung LM Boreholes)	Mokasa 2 (Greater Taung LM Boreholes)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	0.56	N/I	0.15	0.26
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	84.0%	32.0%	52.2%	84.9%
C1b: % Microbiological Monitoring Compliance	58.3%	66.7%	58.3%	54.2%
C2a: % Chemical Compliance	95.2%	87.2%	85.4%	95.7%
C2b: % Chemical Monitoring Compliance	14.7%	14.7%	14.7%	14.7%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	58.4%	82.1%	69%	58.4%

Assessment Areas	Mokgareng (Greater Taung LM Boreholes)	Molelema (Greater Taung LM Boreholes)	Morokweng (Greater Taung LM Boreholes)	Morokweng (Kagisano Molopo LM) WSS Four
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	N/I	0.07	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	86%	70%	53.7%	0%
C1b: % Microbiological Monitoring Compliance	80.6%	33.3%	70.8%	0%
C2a: % Chemical Compliance	94.5%	94.0%	92.5%	0%
C2b: % Chemical Monitoring Compliance	14.7%	14.7%	14.7%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	69.7%	87.6%	69%	100%

Assessment Areas	Moshwana (Kagisano Molopo LM)	Mothanthanyaneng (Greater Taung LM Boreholes)	Naledi LM (Boreholes / Reservoirs - Naledi LM)	Naledi LM 2 (Managed by Naledi LM)
BULK / WSP	Sedibeng Water	Sedibeng Water		
A: Total Design Capacity (Ml/d)	N/I	0.08	3.12	N/I
B: % Operational Capacity in terms of design	N/I	N/I	20%	N/I
C1a: % Microbiological Compliance	0%	88.9%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	41.7%	0%	0%
C2a: % Chemical Compliance	0%	93.1%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	14.7%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	83.0%	96%	100%

Assessment Areas	Naledi LM 3 (Managed by Naledi LM)	Newham (Kagisano Molopo LM)	Ntshwanahatshe (Greater Taung LM Boreholes) WSS 3	Oforo (Kagisano Molopo LM)
BULK / WSP		Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	96.3%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	75%	0%
C2a: % Chemical Compliance	0%	0%	94.8%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	14.7%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	100%	66.7%	100%

Assessment Areas	Pembrook (Kagisano Molopo LM)	Phaposane (Kagisano Molopo)	Phoufalo (Kagisano Molopo LM)	Picong (Greater Taung LM Boreholes)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	0%	66.7%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	62.5%
C2a: % Chemical Compliance	0%	0%	0%	96.3%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	14.7%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	100%	100%	71.8%

Assessment Areas	Piet Plessis (Kagisano Molopo LM)	Pudimoe (Greater Taung LM)	Qho (Greater Taung LM Boreholes)	Reivilo (Greater Taung LM - Greater Taung LM)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	
A: Total Design Capacity (Ml/d)	N/I	19	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	95.7%	86.7%	0%
C1b: % Microbiological Monitoring Compliance	0%	90%	66.7%	0%
C2a: % Chemical Compliance	0%	95.7%	93.9%	0%
C2b: % Chemical Monitoring Compliance	0%	32.4%	14.7%	0%
D: % Technical Skills	0%	75%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	48.3%	82.1%	100%

Assessment Areas	Rietfontein (Greater Taung LM Boreholes)	Sedibeng (Greater Taung LM Boreholes)	Setlhabeng (Greater Taung LM Boreholes	Shaleng (Greater Taung LM Boreholes)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	0.12
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	100%	100%	100%	50%
C1b: % Microbiological Monitoring Compliance	8.3%	75%	33.3%	50%
C2a: % Chemical Compliance	97.4%	88%	91.7%	83.0%
C2b: % Chemical Monitoring Compliance	14.7%	14.7%	14.7%	14.7%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	56.2%	66.1%	67.1%	69%

Assessment Areas	Southey (Kagisano Molopo LM)	Takaneng (Greater Taung LM Boreholes)	Takapori (Greater Taung LM Borehole)	Tamasikwa (Greater Taung LM Boreholes)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	0.09	N/I	N/I
B: % Operational Capacity in terms of design	0%	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	100%	57.1%	78.6%
C1b: % Microbiological Monitoring Compliance	0%	25%	29.2%	45.8%
C2a: % Chemical Compliance	0%	92%	82.7%	88.3%
C2b: % Chemical Monitoring Compliance	0%	14.7%	14.7%	14.7%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	47.4%	100%	91.0%

Assessment Areas	Tlakgameng (Kagisano Molopo)	Tlapeng 1&2 (Greater Taung LM Boreholes)	Tlapeng A & B (Kagisano Molopo LM)	Tosca (Kagisano Molopo LM Boreholes)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	0%	N/I
C1a: % Microbiological Compliance	0%	78.6%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	62.5%	0%	0%
C2a: % Chemical Compliance	0%	90.6%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	14.7%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	82.1%	100%	100%

Assessment Areas	Tseng (Kagisano Molopo LM Boreholes)	Vaaltuin (Greater Taung LM Boreholes)	Vergenoeg (Kagisano Molopo LM)	Vragas (Kagisano Molopo LM)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	66.7%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	75%	0%	0%
C2a: % Chemical Compliance	0%	93.1%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	14.7%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	82.1%	100%	100%

WSA Overview

Dr. Ruth S Mompati DM is responsible for one hundred and four drinking water supply systems. Greater Taung LM, Sedibeng Water, Kagisano Molopo LM, Lekwa-Teemane LM, Mamusa LM and Naledi LM are the water services providers to the district municipality. Ten supply systems are in the low-risk rating category (achieved <50% BDRR), while nineteen are in the medium-risk rating category (achieved between 50% and <70% BDRR), and seventeen are in the high-risk rating category (achieved between 70% and <90% BDRR). The remainder of the supply systems achieved critical-risk rating (achieved ≥90% BDRR).

Under criteria A and B, design and operational capacity information is not available for most supply systems indicating that there are no linked boreholes or WTW to these systems on IRIS. Although some systems have design capacity information, operational capacity information is also lacking. This did not only impact on the score achieved under these criteria but also impacts on planning and implementation of water conservation and demand management. Only six supply systems have both design and operational capacity information.

With regards to Drinking Water Quality Monitoring (Criteria C), only Bloemhof and Christiana supply systems achieved good microbiological and chemical compliance with adequate alignment of monitoring programmes to SANS 241:2015 requirements. This indicates that the water supplied from these systems may not pose serious health risks to the consumers. Although Majeakgoro, Pudimoe, Rietfontein, Lotlhapong, Buxton and Loselong supply systems achieved acceptable microbiological and chemical compliance, insufficient sampling points as per SANS 241:2015 requirements reduces the confidence in the quality of water supplied. The remainder of the supply

systems do not have drinking water quality monitoring data indicating that water quality monitoring may not be taking place. This presents serious health risks to the consumers as the quality of water supplied from these systems cannot be verified or guaranteed.

Pudimoe supply system achieved adequate score under criteria D, as process controllers and supervisors for this system are aligned to the regulations requirements. However, a maintenance team is lacking for this system. The remainder of the supply systems, supervisors, process controllers and maintenance teams are not adequately aligned to the regulations requirements. This may impact on the operations and maintenance practices which may ultimately affect the ability to delivery safe drinking water to the consumers. All supply systems also achieved poor scores on Water Safety Plan availability indicating that SANS 241:2015 and WHO aligned Water Safety Plans have not been developed and implemented in the WSA.

The Regulator urges the WSA and WSPs to implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Classification and linking of applicable boreholes or WTW to all supply systems where this has not been done.
- ✓ A and B: Installation and calibration of flow meters to verify operational capacity for all supply systems where flow monitoring is not taking place. If operational capacity exceeds 90% of design for any systems, planning and budgeting to address capacity exceedance should be initiated.
- ✓ Ca and Cb: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times. Alignment and implementation monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015. This is for supply systems where water quality monitoring is currently taking place.
- ✓ Ca and Cb: Development and implementation of microbiological and chemical monitoring programmes with sufficient samples and adequate frequency based on population size as outlined in SANS 241:2015. Subsequent water quality results should then be submitted to the Regulator through IRIS. This is applicable to systems where water quality monitoring is not taking place.
- ✓ D: Appointment of suitably qualified and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS. Applicable to supply systems that achieved less than 90% compliance.
- ✓ E: Development and implementation of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

JB Marks Local Municipality

Municipal BDRR Score: 14.4%

Assessment Areas	Boikhutso Village (Bore Hole Supply System)	Boikhutsong Village (Bore Hole Supply System)	Gamogopa Village (Bore Hole Supply System)	Goedgevonden Village (Bore Hole Supply System)
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.86	0.3	0.43	0.43
B: % Operational Capacity in terms of design	N/I	100%	100%	100%
C1a: % Microbiological Compliance	75.0%	72.7%	82.1%	86.7%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	96%	97.9%	98.2%	99.5%
C2b: % Chemical Monitoring Compliance	61.8%	61.8%	61.8%	61.8%
D: % Technical Skills	62.5%	62.5%	62.5%	62.5%
E: % Water Safety Plan Status	45.5%	36.4%	54.6%	45.5%
%BDRR/BDRR max	77.7%	69.2%	68.5%	68.2%

Assessment Areas	Potchefstroom	Tsetse Village (Bore Hole Supply System)	Ventersdorp (Water Treatment Works Supply System)	Welgevonden Village (Bore Hole Supply System)
BULK / WSP				
A: Total Design Capacity (Ml/d)	736	0.17	14	0.22
B: % Operational Capacity in terms of design	7.9%	100%	64.3%	100%
C1a: % Microbiological Compliance	99.8%	68.2%	90.4%	96.2%
C1b: % Microbiological Monitoring Compliance	100%	0%	100%	0%
C2a: % Chemical Compliance	99.7%	98%	98.8%	99%
C2b: % Chemical Monitoring Compliance	64.7%	61.8%	61.8%	61.8%
D: % Technical Skills	39.2%	62.5%	43.8%	62.5%
E: % Water Safety Plan Status	54.6%	45.5%	54.6%	27.3%
%BDRR/BDRR max	13.9%	69.5%	35.7%	30.5%

WSA Overview

JB Marks LM has eight drinking water supply systems in their area of jurisdiction. Three supply systems achieved a low-risk rating, four supply systems achieved a medium-risk rating and one supply system achieved a high-risk rating.

With regards to operational capacity, Boikhutso Village supply system does not have information. The remainder of the borehole systems are also indicated to be operating at 100% of design capacity. This indicates that flow monitoring may not be taking place and values provided are estimates. Nonetheless, operating at 100% of capacity indicates that the supply systems are at a risk of not meeting the current and future demands. Potchefstroom WTW is indicated to be operating at 7.9%. This value may be an error or an indication that flow meters are not calibrated and should be verified.

Potchefstroom and Welgevonden achieved excellent microbiological and chemical compliance, however chemical monitoring compliance must be improved for Potchefstroom and both microbiological and chemical monitoring is insufficient for Welgevonden. The remainder of the supply systems achieved poor microbiological compliance and good chemical compliance. This coupled with inadequate alignment of monitoring programmes to SANS 241:2015 requirements indicates that the water supplied may present serious health risks to the consumers. Therefore, the Regulator urges the WSA to urgently address this.

Scores achieved under criteria D: Technical Skills, indicate the lack of process control and maintenance staff which will impact on the operations and maintenance and will ultimately impact on the delivery of safe drinking water to the consumers.

All supply systems also achieved inadequate scores under criteria E: Water Safety Plan indicating that although Water Safety Plans may be available, they are not adequately aligned to SANS 241:2015 and WHO guidelines.

The Regulator encourages the WSA and WSP to implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and calibration of flow meters at all boreholes systems and verification of flow for Potchefstroom system. If operational capacity exceeds 90% of design for any systems, planning and budgeting to address capacity exceedance should be initiated.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring Programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS. Applicable to supply systems that achieved less than 90% compliance.
- ✓ E: Reviewal and implementation of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Kgetlengrivier Local Municipality

Municipal BDRR Score: 100%

Assessment Areas	Derby B/H	Koster	Swartruggens
BULK / WSP			
A: Total Design Capacity (Ml/d)	N/I	0.01	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%
D: % Technical Skills	0%	75%	37.5%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	100%	93.1%	95.0%

WSA Overview

Three drinking water supply systems under Kgetlengrivier LM were assessed and all systems are in the critical-risk rating category. Only Koster supply system has design capacity information and the other two systems do not have the design capacity information. None of the three systems has operational capacity and this impacted on the scores under criteria B. Unavailability of flow monitoring information can impact on the municipality's planning process and also affect implementation of water conservation and demand management.

With regards to drinking water quality monitoring, no information was provided for all supply systems indicating that water quality monitoring may not be taking place. This presents serious health risks to the consumers as the quality of water supplied from these systems cannot be verified or guaranteed. Therefore, the WSA is urged to urgently address this to reduce the health risks to the consumers.

Derby Borehole and Swartruggens supply system achieved poor scores under criteria D, indicating inadequate alignment of supervisors, process controllers and maintenance teams to the regulatory requirements. Inadequate alignment of staff to the regulations requirements may impact on operations and maintenance practices which may ultimately impact on supply of drinking water to consumers.

The three systems within the WSA also achieved poor scores on Water Safety Plan availability indicating that SA241 and WHO aligned Water Safety Plans have not been developed and implemented in the WSA.

The Regulator is concerned with drinking water quality management by Kgetlengrivier municipality and urges the municipality to implement the following measures to ensure delivery of safe drinking water for all consumers and improve risk ratings:

- ✓ A and B: Provision of design capacity for Derby BH and Swartruggens supply system and installation and calibration inflow meters to verify operational capacity for all three supply systems.
- ✓ C: Development and implementation of microbiological and chemical monitoring programmes with sufficient samples and adequate frequency based on population size as outlined in SANS 241:2015. Subsequent water quality results should then be submitted to the Regulator through IRIS.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria. Existing staff can also be subjected to relevant training in order to meet the requirements.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Local Municipality of Madibeng

Municipal BDRR Score: 34.2%

Assessment Areas	Brits Water Treatment Plant	Hartbeespoort	Rand Water
BULK / WSP			Rand Water
A: Total Design Capacity (Ml/d)	6	1	4800
B: % Operational Capacity in terms of design	966.7%	N/I	98.2%
C1a: % Microbiological Compliance	91.1%	98.6%	100%
C1b: % Microbiological Monitoring Compliance	20.1%	93.3%	78.3%
C2a: % Chemical Compliance	86.8%	93.3%	99.4%
C2b: % Chemical Monitoring Compliance	91.2%	91.2%	94.7%
D: % Technical Skills	54.2%	91.7%	100%
E: % Water Safety Plan Status	0%	0%	38.64%
%BDRR/BDRR max	80.5%	28.2%	34.1%

WSA Overview

Three drinking water supply systems under local municipality of Madibeng were assessed. Hartbeespoort and Rand Water supply systems achieved low-risk rating while Brits supply system achieved high-risk rating. Operational capacity is not available for Hartbeespoort supply systems indicating that flow monitoring may not be taking place. Brits WTW is indicated to be operating at 966.7% design this may be an error in calculation of may be an indication that flow meters are not calibrated. Rand Water supply system is operating above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

Under criteria B, Hartbeespoort and Rand Water supply systems achieved excellent microbiological compliance and microbiological monitoring programmes are aligned to SANS 241:2015 requirements. Inadequate chemical compliance was noted for Brits and Hartbeespoort systems indicating that water supplied may present chronic or acute chemical risks to the consumers. In addition, the Brits supply system does not have sufficient chemical monitoring points to verify water quality at all points in the system. Rand Water supply system also achieved acceptable chemical compliance and excellent chemical monitoring compliance indicating sufficient sampling points to verify the quality of water at all points in the network

Hartbeespoort and Rand Water supply systems achieved excellent score under criteria D, indicating that staff are adequately aligned to the regulations requirements. However, Brits supply system achieved an inadequate score in this regard indicating insufficient process controllers and maintenance personnel which will negatively impact on final water quality.

With regards to criteria E, Brits and Hartbeespoort systems do not have SANS 241:2015 and WHO aligned Water Safety Plans while Rand Water system only has some components of the Water Safety Plan. This has negatively impacted on the scores achieved under this criterion and should be addressed.

The Regulator urges the WSA and WSP to implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and calibration of flow meters to verify operational capacity at Brits and Hartbeespoort WSS.
- ✓ A and B: Planning and budgeting to address capacity exceedance at WSSs linked to Rand Water system as they are operating above 90% of design.
- ✓ C: Implementation of corrective measures in the event of microbiological and chemical failures. Implementation of a monitoring programme with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria. Existing staff can also be subjected to relevant training in order to meet the requirements. This is especially applicable to Brits WSS.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Maquassi Hills Local Municipality

Municipal BDRR Score: 65.2%

Assessment Areas	Leeudoringstad - Witpoort System	Tswellelang - Lebaleng System	Wolwaransstad Borehole System
BULK / WSP	Sedibeng Water	Sedibeng Water	
A: Total Design Capacity (Ml/d)	360	720	N/I
B: % Operational Capacity in terms of design	55.6%	55.6%	N/I
C1a: % Microbiological Compliance	59.9%	59.8%	0%
C1b: % Microbiological Monitoring Compliance	56.6%	54.6%	0%
C2a: % Chemical Compliance	59.1%	59.3%	0%
C2b: % Chemical Monitoring Compliance	42.4%	42.4%	0%
D: % Technical Skills	75%	75%	0%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	79.9%	57.8%	100%

WSA Overview

Three drinking water supply systems were assessed under Maquassi Hills LM. Sedibeng Water is the service provider to the municipality. Tswellelang-Lebaleng system achieved a medium-risk rating while Leeudoringstad-Witpoort achieved a high-risk rating. Wolwaransstad Borehole supply system has no information for any of the Risk Indicators placing it in the critical-risk category.

Wolwaransstad Borehole system does not have any boreholes linked on IRIS and this impacted on the scores under criteria A and B since design and operational capacity figures are not available. The remaining two systems are operating within acceptable operational capacity (<90%) indicating there is no immediate risk of not meeting current and future demands.

Under criteria C, drinking water quality monitoring is not undertaken at Wolwaransstad Borehole supply system. This presents serious health risks to the consumers as the quality of water supplied from this system cannot be verified or guaranteed. Therefore, the WSA is urged to urgently address this to reduce the health risks to the consumers. Although, compliance monitoring is undertaken for the remaining two systems, poor compliance was achieved for microbiological and chemical determinands. This coupled with inadequate alignment of associated monitoring programmes to SANS 241:2015 requirements indicates that the water supplied from these systems may present serious health and aesthetic health risks to the consumers. The Regulator urges the WSA and WSP to urgently address this.

Two of the three supply systems achieved adequate scores under criteria D as supervisors and process controllers are adequately aligned to the regulations requirements. However, maintenance teams are lacking for these supply systems. The Boreholes system does not have a registered supervisor and process controllers and maintenance team is also lacking. This should be addressed as it has potential to impact on the ability to delivery safe drinking water to consumers.

The three systems within the WSA also achieved poor scores on Water Safety Plan availability indicating that the WSA and WSP have not developed and implemented SANS241 and WHO aligned Water Safety Plans.

- ✓ A and B: Classification and linking of applicable boreholes to the Wolwaransstad Borehole supply system. Flow meters should also be installed and operational capacity must be provided to the Regulator.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015. Subsequent water quality results should then be submitted to the Regulator, especially for the Boreholes system where this is not taking place.
- ✓ D: Appointment of suitably qualified and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS.
- ✓ E: Development and implementation of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Matlosana Local Municipality

Municipal BDRR Score: 41.4%

Assessment Areas	City of Matlosana
BULK / WSP	Midvaal Water
A: Total Design Capacity (Ml/d)	320.00
B: % Operational Capacity in terms of design	40%
C1a: % Microbiological Compliance	98.3%
C1b: % Microbiological Monitoring Compliance	88.6%
C2a: % Chemical Compliance	96.3%
C2b: % Chemical Monitoring Compliance	91.2%
D: % Technical Skills	100%
E: % Water Safety Plan Status	81.82%
%BDRR/BDRR max	41.4%

WSA Overview

The municipality has one drinking water supply system and Midvaal water is their Water Services Provider. A low-risk rating was achieved for the supply system and the Regulator commends the WSA and WSP for that.

Under criteria A and B, the WSA is operating well within the design capacity, indicating that there is no immediate threat of not meeting water demand. Furthermore, the supply system has process controllers, supervisors and maintenance teams that are adequately aligned to the Regulation requirements.

The supply system achieved excellent microbiological and good chemical compliance. Furthermore, microbiological monitoring and chemical monitoring programmes are adequately aligned to SANS 241:2015 requirements. This indicates that the water supplied from this system may not present serious health and aesthetic risks to the consumers.

A good score was achieved under Water Safety Planning, indicating that the WSA and WSP are adequately implementing a Water Safety Planning process including adoption of risk-based water quality monitoring and implementation of control measure for high and medium-risks as prescribed in the SANS 241:2015 AND WHO guidelines.

Overall, the regulator commends the WSA and WSP for the low BDRR achieved and encourages them to continue with good drinking water quality management practices.

Moretele Local Municipality

Municipal BDRR Score: 100%

Assessment Areas	Temba Treatment Plant
BULK / WSP	
A: Total Design Capacity (Ml/d)	N/I
B: % Operational Capacity in terms of design	N/I
C1a: % Microbiological Compliance	0%
C1b: % Microbiological Monitoring Compliance	0%
C2a: % Chemical Compliance	0%
C2b: % Chemical Monitoring Compliance	0%
D: % Technical Skills	0%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	100%

WSA Overview

The Moretele LM is responsible for one drinking water supply system and the system achieved a critical-risk rating.

There is no information on the design and operational capacity as there is no linking for Temba WTW on IRIS and capacity information was not provided. This had a negative impact on criteria A and B scores. No process controllers are registered for this system and maintenance team information is also not available. This does not only impact on criteria D score but can also impact on the municipality's ability to delivery safety drinking water to the consumers.

The WSA does not conduct drinking water quality monitoring and this did not only impact on the score achieved but also presents a serious health risk to the consumers as the quality of water supplied from this system cannot be confirmed or guaranteed. Moretele LM is urged to address this issue urgently. A Water Safety Planning process has not been adopted and implemented, indicating that risk assessment and full SANS 241:2015 analysis and risk mitigation has not been conducted.

The Regulator is concerned with drinking water quality management by Moretele municipality and urges the LM to implement the following measures to reduce their risk rating and ensure supply of safe drinking water to the consumers

- ✓ A and B: Classification and linking of Temba WTW to the supply system on IRIS. Operational flow data should then be submitted to the Regulator.
- ✓ C: Development and implementation of microbiological and chemical monitoring programmes with sufficient samples and adequate frequency based on population size as outlined in SANS 241:2015. Subsequent water quality results should then be submitted to the Regulator through IRIS.
- ✓ D: Appointment of suitably qualified and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Moses Kotane Local Municipality

Municipal BDRR Score: 68.5%

Assessment Areas	Madikwe Water Treatment Plant	Mmatau: Fed By Boreholes	Molatedi Water Treatment Plant	Pella Water Treatment Works
BULK / WSP				
A: Total Design Capacity (Ml/d)	2.6	N/I	0.6	1.4
B: % Operational Capacity in terms of design	N/I	N/I	83.3%	71.4%
C1a: % Microbiological Compliance	76.7%	0%	94.4%	83.3%
C1b: % Microbiological Monitoring Compliance	50%	0%	41.7%	41.7%
C2a: % Chemical Compliance	85.0%	0%	86.8%	83%
C2b: % Chemical Monitoring Compliance	91.2%	0%	88.2%	88.2%
D: % Technical Skills	53.1%	0%	62.5%	34.4%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	57.8%	100%	49.4%	59.0%

Assessment Areas	Vaalkop Water Treatment Plant
BULK / WSP	Magalies Water
A: Total Design Capacity (Ml/d)	270.
B: % Operational Capacity in terms of design	77%
C1a: % Microbiological Compliance	97%
C1b: % Microbiological Monitoring Compliance	70.7%
C2a: % Chemical Compliance	91.6%
C2b: % Chemical Monitoring Compliance	79.4%
D: % Technical Skills	100%
E: % Water Safety Plan Status	90.9%
%BDRR/BDRR max	68.6%

WSA Overview

Moses Kotane LM has five drinking water supply systems in their area of jurisdiction. Molatedi supply system achieved a low-risk rating while Madikwe, Pella and Vaalkop supply systems achieved a medium-risk rating. Mmatau supply system has no information for any of the Risk Indicators placing it in the critical-risk category.

There are no boreholes linked to Mmatau supply system and this has impacted on the scores achieved under criteria A and B. Molatedi, Pella and Vaalkop systems are operating well within design capacity whilst operational capacity information is not available for Madikwe supply system indicating that flow monitoring may not be taking place. Lack of flow information can impact on planning and implementation of water conservation and demand management measures.

Criteria C reports on the actual water quality in the supply systems. Molatedi and Vaalkop supply systems achieved acceptable and good microbiological compliance respectively. However microbiological monitoring programmes are not adequately aligned to SANS 241:2015 requirements and unacceptable chemical compliance was achieved indicating that the water supplied may still present health risks to consumers. Madikwe and Pella systems achieved unacceptable microbiological and chemical compliance, this coupled with monitoring programmes that are inadequately aligned to SANS 241:2015 requirements means that the water supplied from these systems may present health and aesthetic risks to the consumers. With regards to the Mmatau system, the quality of water supplied from this system

cannot be verified or guaranteed as no water quality monitoring is taking place and this presents consumers with serious health risks. The Regulator urges the municipality to address this urgently.

Only Vaalkop system achieved excellent scores under criteria D and E indicating that supervisors, process controllers and maintenance teams are adequately aligned with the regulations requirements and SANS 241:2015 and WHO aligned Water Safety Plan is available and implemented. The remainder of the systems achieved lower scores on Criteria D and poor scores on criteria E. This indicates inadequate alignment to the regulation and that SANS 241:2015 and WHO aligned Water Safety Plans are not available for these systems. This should be addressed as it has the potential to impact on the ability to supply safe drinking water to consumers.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Classification and linking of boreholes to Mmatau supply system on IRIS.
- ✓ C1a and C2a: Implementation of corrective measures in the event of microbiological failures. Implementation of a monitoring programme with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ C1b and C2b: Alignment and implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015. This is applicable for systems where less than 80% was achieved on microbiological and/or chemical monitoring compliance.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria. Existing staff can also be subjected to relevant training in order to meet the requirements.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Ngaka Modiri Molema District Municipality

Municipal BDRR Score: 82.5%

Assessment Areas	NMMDM Ditsobotla LM Biesiesvlei	NMMDM Ditsobotla LM Coligny	NMMDM Ditsobotla LM Ga-Motlatla	NMMDM Ditsobotla LM Itsoseng
BULK / WSP				Ngaka Modiri Molema DM
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	25
B: % Operational Capacity in terms of design	N/I	N/I	N/I	15.52%
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	100%	100%	76.8%

Assessment Areas	NMMDM Mafikeng LM Mmabatho	NMMDM Mahikeng LM Bethel	NMMDM Mahikeng LM Ottoshoop	NMMDM Mahikeng LM Ramatlabama
BULK / WSP	Ngaka Modiri Molema DM			
A: Total Design Capacity (Ml/d)	65	N/I	N/I	N/I
B: % Operational Capacity in terms of design	47.69%	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	36.5%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	78.6%	100%	100%	100%

Assessment Areas	NMMDM Ramotshere LM Dinokana	NMMDM Ramotshere LM	NMMDM Ramotshere LM Zeerust	NMMDM Ratlou LM Disaneng
BULK / WSP				
A: Total Design Capacity (Ml/d)	3.5	N/I	N/I	N/I
B: % Operational Capacity in terms of design	87.1%	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	43.8%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	84.8%	100%	100%	100%

Assessment Areas	NMMDM Ratlou LM Logageng	NMMDM Tswaing LM Atamelang	NMMDM Tswaing LM Gannalaagte	NMMDM Tswaing LM Khunwana
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	100%	100%	100%

Assessment Areas	Ramotshere Moiloa: Motswedi + Gopane	Ramotshere - Moiloa Great Marico Package Plant	Ratlou: Kraaipan Cluster B/H	Ratlou: Madibogo B/H
BULK / WSP				
A: Total Design Capacity (Ml/d)	2.	N/I	1.19	N/I
B: % Operational Capacity in terms of design	79.5%	N/I	100%	N/I
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	100%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	84.7%	100%	95.74	100%

Assessment Areas	Ratlou: Madibogopan B/H	Ratlou: Makgobistad B/H	Ratlou: Setlagole Cluster B/H	Tswaing: De Larey B/H
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	100%	100%	100%

Assessment Areas	Tswaing: Ottosdal B/H	Tswaing: Sannieshof – A Town B/H
BULK / WSP		
A: Total Design Capacity (Ml/d)	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I
C1a: % Microbiological Compliance	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%
C2a: % Chemical Compliance	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%
D: % Technical Skills	0%	0%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	100%	100%

WSA Overview

Twenty-six drinking water supply systems under Ngaka Modiri Molema DM were assessed. Itsoseng, Dinokana, Mmabatho and Motswedi & Gopane supply systems achieved high-risk ratings. The remainder of the supply systems are in the critical-risk rating category. Only Itsoseng, Dinokana, Mmabatho and Motswedi & Gopane supply systems have design and operational capacity information while the other systems do not have the design and operational capacity information as they are not linked to any boreholes or WTW on IRIS. Unavailability of flow monitoring information can impact on the municipality's planning process and also effect implementation of water conservation and demand management.

With regards to drinking water quality monitoring, no information was provided for all supply systems indicating that water quality monitoring may not be taking place. This presents serious health risks to the consumers as the quality of water supplied from these systems cannot be verified or guaranteed. Therefore, the WSA and WSPs are urged to urgently address this to reduce the health risks to the consumers.

Only Motswedi & Gopane supply system achieved excellent score under criteria D, as process controllers, supervisors and a maintenance team for this system are aligned to the regulations requirements. For the remainder of the supply systems, supervisors, process controllers and maintenance teams are not adequately aligned to the regulations requirements. This may impact on the operations and maintenance practices which may ultimately affect the ability to delivery safe drinking water to the consumers. All supply systems also achieved poor scores on Water Safety Plan availability indicating that SANS:241 and WHO aligned Water Safety Plans have not been developed and implemented in the WSA.

The Regulator is concerned with drinking water quality management by Ngaka Modiri Molema district municipality and urges the municipality to implement the following measures to ensure delivery of safe drinking water for all consumers and improve risk ratings:

- ✓ A and B: Classification and linking of WTW or boreholes to all supply system which do not have linked WTW or boreholes on IRIS.
- ✓ A and B: Installation and calibration of inflow meters to verify operational capacity for all supply systems where this is not taking place.
- ✓ C: Development and implementation of microbiological and chemical monitoring programmes with sufficient samples and adequate frequency based on population size as outlined in SANS 241:2015. Subsequent water quality results should then be submitted to the Regulator through IRIS.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria. Existing staff can also be subjected to relevant training in order to meet the requirements.
- ✓ E: Development and implementation of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Rustenburg Local Municipality

Municipal BDRR Score:

Assessment Areas	Marikana System	Rustenburg Booster System	Rustenburg Boreholes System	Rustenburg Kloof Supply System
BULK / WSP	Rand Water	Rand Water		
A: Total Design Capacity (Ml/d)	4800	4800	N/I	2.5
B: % Operational Capacity in terms of design	98.2%	98.2%	N/I	40%
C1a: % Microbiological Compliance	59.8%	99.8%	0%	100%
C1b: % Microbiological Monitoring Compliance	60%	67.7%	0%	100%
C2a: % Chemical Compliance	59.8%	99.4%	0%	97.1%
C2b: % Chemical Monitoring Compliance	58.2%	73.5%	0%	17.7%
D: % Technical Skills	100%	75%	0%	62.5%
E: % Water Safety Plan Status	45.5%	45.5%	0%	27.3%
%BDRR/BDRR max	85.7%	37.1%	100%	19.8%

Assessment Areas	Rustenburg North Supply System	Rustenburg Town System	Vaalkop Boitekong	Vaalkop North (La Patrie)
BULK / WSP	Magalies Water	Magalies Water, Rand Water	Magalies Water	Magalies Water
A: Total Design Capacity (Ml/d)	282	5084.5	270	270
B: % Operational Capacity in terms of design	77.3%	97.0%	77%	77.0%
C1a: % Microbiological Compliance	94.4%	99.8%	60%	60%
C1b: % Microbiological Monitoring Compliance	70.8%	65.6%	60%	60%
C2a: % Chemical Compliance	95%	97.9%	57.4%	93.6%
C2b: % Chemical Monitoring Compliance	70%	70.1%	44.1%	70%
D: % Technical Skills	99.2%	90.7%	100%	100%
E: % Water Safety Plan Status	96.7%	37.2%	100%	100%
%BDRR/BDRR max	64.3%	39.8%	81.2%	72.9%

Assessment Areas	Vaalkop S (Kortbegrip)	Vaalkop System
BULK / WSP	Magalies Water	Magalies Water
A: Total Design Capacity (Ml/d)	270	270
B: % Operational Capacity in terms of design	77%	77%
C1a: % Microbiological Compliance	60%	60%
C1b: % Microbiological Monitoring Compliance	60%	58.5%
C2a: % Chemical Compliance	94.4%	56.9%
C2b: % Chemical Monitoring Compliance	71.2%	44.1%
D: % Technical Skills	100%	100%
E: % Water Safety Plan Status	100%	100%
%BDRR/BDRR max	72.9%	81.2%

WSA Overview

Rustenburg LM has ten drinking water supply systems in their area of jurisdiction and Rand Water and Magalies Water are the water services providers. Rustenburg Town, Rustenburg Booster and Rustenburg Kloof supply systems achieved a low-risk rating while Rustenburg North supply system achieved a medium-risk rating and Marikana, Vaalkop, Vaalkop Boitekong, Vaalkop North and Vaalkop South achieved high-risk ratings. Rustenburg Boreholes supply system has no information for any of the Risk Indicators placing it in the critical-risk category.

The Boreholes system does not have any boreholes linked on IRIS and this impacted on the scores under criteria A and B. Marikana, Rustenburg Town, and Rustenburg Booster systems are operating above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements. The remainder of the systems are operating well within design capacity, therefore are not at immediate risk of not meeting demand.

Under criteria C, water quality monitoring is not undertaken for the Boreholes system. This presents serious health risks to the consumers as the quality of water supplied cannot be verified or guaranteed. Rustenburg LM is urged to urgently address this. Acceptable to excellent microbiological and chemical compliance was achieved for Rustenburg Town, Rustenburg Booster and Rustenburg Kloof supply systems, however, alignment of monitoring to SANS 241:2015 requirements still requires improvement. The remainder of the supply systems achieved poor microbiological and/or chemical compliance. This coupled with inadequate alignment of monitoring programmes to SANS 241:2015 requirements means that the water supplied may present health and aesthetic risks to the consumers and should be addressed urgently.

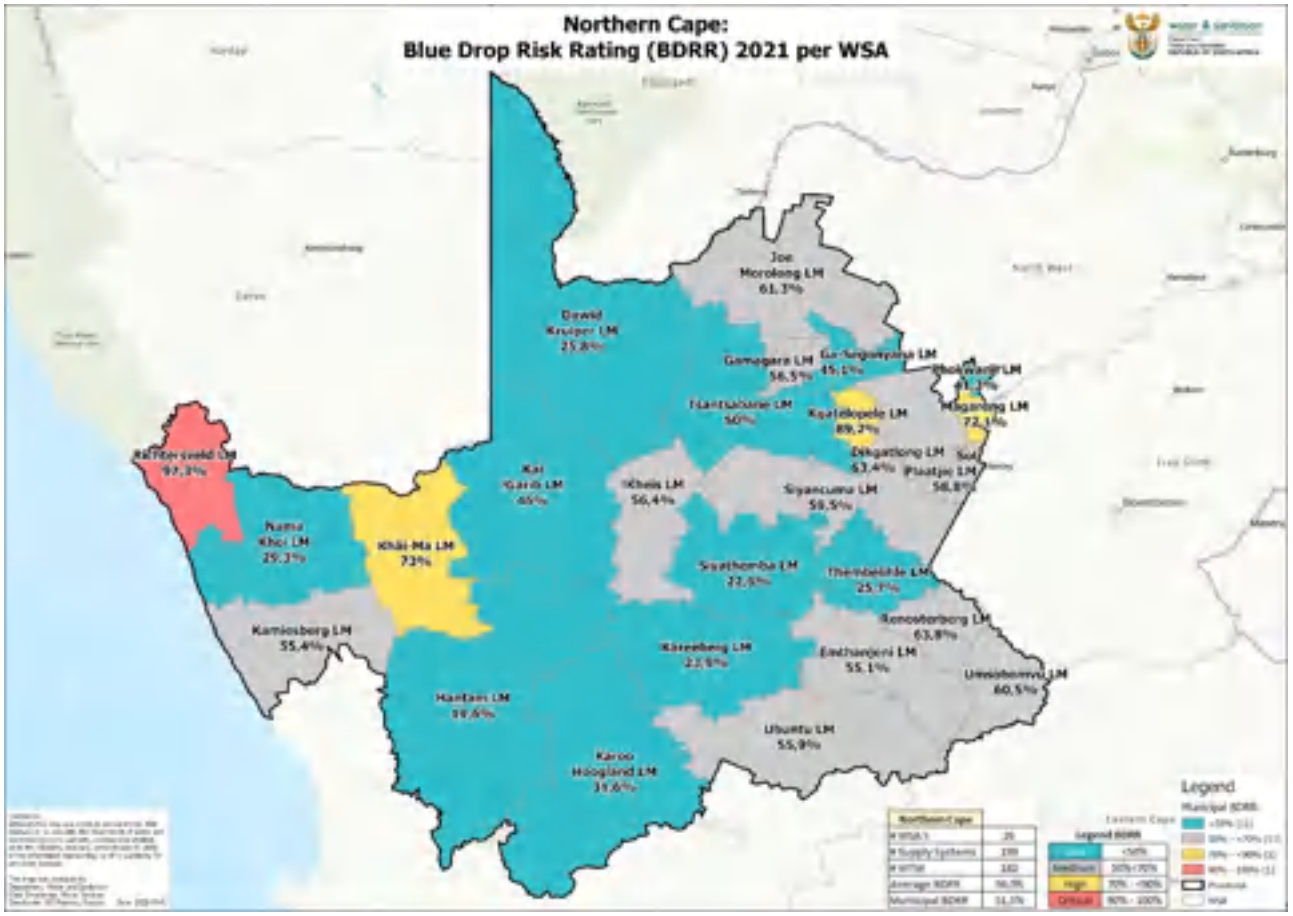
With regards to technical skills, most supply systems achieved excellent scores indicating that the staff is adequately aligned to the regulations requirements. Only Boreholes, Rustenburg Booster and Rustenburg Kloof systems are lacking in this regard. This should be addressed to reduce the risk of delivery of poor-quality water to the customers.

Vaalkop, Vaalkop Boitekong, Vaalkop North and Vaalkop South supply systems achieved excellent scores under criteria E. This indicates availability and implementation of Water Safety Plans and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015. The remainder of the supply systems achieved lower scores indicating that the Water Safety Planning process is not adequately aligned to SANS 241:2015 and WHO guidelines.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Classification and linking of applicable boreholes to the Boreholes supply system.
- ✓ A and B: Planning and budgeting to address capacity exceedance at all WTW operating above 90% of design.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria. Supervisors and process controllers should then be classified on IRIS. Applicable to supply systems that achieved less than 90% compliance.
- ✓ E: Reviewal and implementation of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

CHAPTER 10: NORTHERN CAPE PROVINCE



PROVINCIAL BDRR TREND ANALYSIS

One of the outcomes of Incentive and Risk-based Regulation is the regular monitoring and reporting on the performance of the WSA to ensure strategic operational and management plans are constantly realigned to achieve compliance and effectively manage risks for provision of sustainable water services. For risk-based regulation, the movement in BDRR is a vital tool for both the Department and the WSA to monitor and track the levels of risk in the country. The 2021 BDRR will serve as a baseline for future BDRR assessments that will be used by DWS to monitor and manage drinking water supply systems to ensure delivery of safe drinking water to all communities.

BDRR is calculated and categorised as either low, medium, high and critical risk rating, calculated according to the following range of values to enable both WSA and DWS to monitor performance.

Table 1: BDRR categorisation

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

The BDRR formular is made up of five risk indicators with an overall BDRR for each supply system. The overall performance of each WSA is reported in two ways:

- ✓ Average % BDRR: average % BDRR for all supply systems per province.
- ✓ % Municipal (weighted) BDRR: The Municipal BDRR for each WSA is calculated by the proportional contribution of each water supply system based on design capacity of each system. This weighted average may provide skewed picture i.e. a supply system which receives a small fraction of the total flow from a larger treatment plant will carry a higher weighting compared to a system which received 100% from a smaller treatment plant.

Therefore, the WSA must evaluate the individual % BDRR scores of each system to determine the risk associated with provision of drinking water for each system and not use the % Municipal BDRR score to evaluate their performance. Regardless of the size of the systems, all consumers have a right to safe drinking water and the WSA must be wary of neglecting the management of smaller, rural schemes in favour of larger urban systems.

The % Municipal (weighted) BDRR for all WSA's in the province is provided at the end of each provincial chapter for reference.

In 2021, 26 WSA's were assessed in Northern Cape province with a total to 199 water supply systems. The assessment period for all Risk Indicators was July 2020 to June 2021 except for Risk Indicator C: Water Quality compliance where assessment period was January to December 2020.

The risk performance trends for Northern Cape Province are summarised below to provide a provincial overview of BDRR.

Table 73: 2021 Risk Performance trends for Northern Cape Province

Risk Rating	Average	Minimum	Maximum
% Municipal BDRR (Weighted Score)	51.5%	19.6%	97.3%
% BDRR	56%	14.4%	100%
A: Design Capacity (Ml/d)	5.7	0.002	360
C1a: % Microbiological Compliance	73.2%	0%	100%
C1b: % Microbiological Monitoring Compliance	43.2%	0%	100%
C2a: % Chemical Compliance	72.5%	0%	100%
C2b: % Chemical Monitoring Compliance	13.8%	0%	97.1%
D: % Technical Skills	27.8%	0%	100%
E: % Water Safety Plan Status	2.2%	0%	100%

The BDRR profile for Northern Cape province is outlined in the figure below.

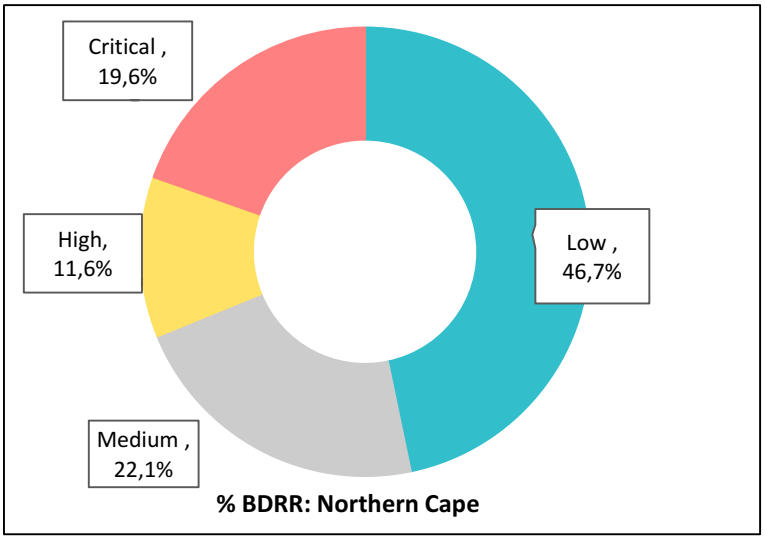


Figure 87: BDRR profile for Northern Cape

The results for Northern Cape province are summarised as follows:

- ✓ 46.7% of supply systems are in the low risk category,
- ✓ 22.1% are in the medium risk category,
- ✓ 11.6% are in the high risk category, and
- ✓ 19.6% are in the critical risk category.

To use the 2021 BDRR score as a tool to implement strategic, targeted actions that will result in an improved risk rating and sustainable water services delivery, the individual components of the BDRR score must be critically evaluated by the WSA to understand the reason for the current risk rating and the desired risk category for delivery of safe drinking water.

The BDRR scorecards reports on the following system-specific risk indicators which ultimately feed into the BDRR score:

- ✓ Risk Indicator A: Design capacity,
- ✓ Risk Indicator B: Operational Capacity,
- ✓ Risk Indicator C: Water Quality Compliance,
- ✓ Risk Indicator D: Technical skills, and

- ✓ Risk Indicator E: Water Safety Plans.

The trends with regard to the risk rating of the individual indicator which make up the overall BDRR score is discussed below. This will provide insight on the risk status of each indicator and enable the WSA to implement targeted actions to reduce risk of specific risk indicators which are negatively impacting on the final BDRR score of the supply system.

Risk Indicator A: Design Capacity and Risk Indicator B: Operational Capacity

Criterion A represents the design capacity of the treatment plant.

Every water treatment plant must be classified with DWS as per Regulation 2834. The classification of the treatment plant is based on a number of components, including size, complexity and electrical consumption, as per set criteria. The plant classification certificate is available on IRIS and used to determine the risk rating for criterion A as it states the capacity of the plant.

The risk rating is allocated according to size of the treatment plant with higher risk rating given for a larger plant and lower risk rating for a smaller plant. The rationale is that a larger plant serves a larger community and therefore presents a higher risk if the plant is not functioning or producing unsafe drinking water than a smaller plant which serves less people. The risk rating for criteria A remains the same provided the capacity stays the same, and all plants which have the same design capacity range will have the same maximum BDRR.

Information from the IRIS system was collected to provide a profile of the design capacities of all treatment plants in the province. Some of the treatment plants are large regional bulk schemes which supply water to a number of supply systems in various municipalities and across provinces. The figure below reports on the design capacity of treatment plants located in the province in Ml/d.

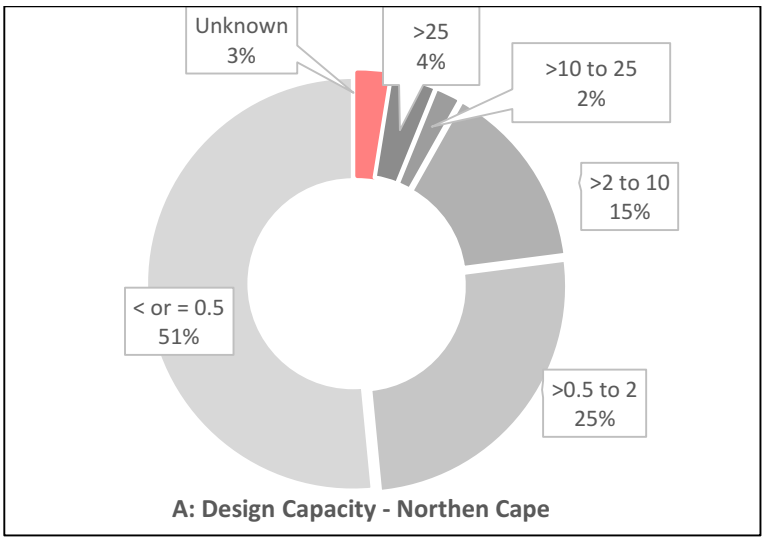


Figure 88: Profile of design capacity in Northern Cape Province (Ml/d)

The results are summarised as follows:

- ✓ There are 182 water treatment plants situated in Northern Cape province with a combined capacity of 1 121.6 Ml/d,
- ✓ Reported population served = 1.97 million people,
- ✓ Average design capacity in province =16.1 Ml/d,
- ✓ Largest plant in province = 5.7 Ml/d,
- ✓ Smallest plant in province = 0.002 Ml/d,
- ✓ 51% of plant are <=0.5 Ml/d, 25% are between 0.5 and 2 Ml/d, 15% are between 2 and 10Ml/d, 2 % are between 10 and 25 Ml/d and 4% are >25 Ml/d,
- ✓ 3% of plants have not provided design capacity.

In summary, 76% of plants in Northern Cape province are small plants (<2 Ml/d) and these include boreholes and rural systems. 17% are medium sized plants (between 2 and 25 Ml/d) and only 4% are large plants (>25 M/d) which are typically located in metropolitan areas in the province or are part of bulk regional schemes. Operation and management of large number of rural schemes present challenges as these plants are usually located across a large geographical area with some plants in remote areas. This requires additional resources such as staff, chemical supplies, spares and vehicles to ensure optimal operations of these systems

With regards to **Risk Indicator B: Operational capacity**, daily production versus the design capacity of the treatment plant is an important indicator to determine if the plant can provide sufficient, safe drinking water to all the consumers now and in the near future. When the plant is operating above its design capacity, major unit processes are overloaded and cannot achieve their operational limits which leads to water quality failures.

Risk Indicator C indicates the current operational capacity of the treatment plant in each supply system as a percentage of the design capacity of the plant. The ideal value is between 50 – 100%; higher values indicate the plant is overloaded and lower values indicate the plant is receiving too little flow which may also compromise performance due to lack of retention time (flocculation, sedimentation). Once daily production approaches 90% of design capacity, the WSA must plan, budget and implement projects to increase the capacity of the treatment plant to ensure there is sufficient supply, not only for human consumption, but also for economic activities

Although operational capacity has been reported for all supply systems, there are a number of large regional plants which supply a large number of supply systems in various municipalities and across provincial borders. Analysis of Indicator B must therefore be conducted at plant level as collating operational capacity data at municipal or provincial level will not provide an accurate reflection of the current operational capacity of each individual plant.

WSAs are reminded that installation of flow meter and daily flow recording is a regulatory requirement as per their Water Use License.

Recommendations

- ✓ WSAs must ensure all treatment plants have updated plant registration certificates on IRIS.
- ✓ WSAs must provide updated copies of plant registration certificates supported with documents on the design capacity of treatment plant for future BDRR assessments.
- ✓ WSA to install flow meters at raw and final water points, monitor daily flows and ensure annual calibration of meters for accuracy of results.
- ✓ Budget and plan for upgrade of treatment plant when operational capacity is at 90% to ensure sufficient time for implementation of civil projects.
- ✓ Consult Census, WSDP and Reconciliation strategies to determine current and future allocation and demand, use a 10-year forecast period

Risk Indicator C: Water Quality Compliance

In South Africa, the SANS 241:2015 is the definitive reference on acceptable limits for drinking water quality parameters and provides limits for a range of water quality characteristics and water meeting this standard is deemed safe for lifetime consumption. The actual water quality depends on both microbiological and chemical determinands:

- ✓ Microbiological compliance reports on the actual compliance of the final water for the past 12 months against microbiological determinands E. Coli / Faecal Coliforms. The presence of these determinands in water is a strong indication of recent sewage or animal waste contamination and there is potential for contracting diseases from pathogens.
- ✓ Chemical quality is determined by a number of determinands which may be acute or chronic health determinands with specific health risks associated with each determinands. Acute health risks can result in death if the limit is exceeded, while chronic limits provide maximum limits that can be ingested over a period of time before health effects are observed.

Both microbiological and chemical compliance limits outlined in SANS 241:2015 is evaluated against the population size: for a population <100 000, compliance is >98% while for a population >100 000, compliance limit is >99%.

In addition, the SANS 241:2015 standard stipulates the frequency of sampling as well as the number of sample points required per supply system to ensure sufficient coverage of the network. The frequency and number of required sample points is dependent on the population size as outlined in Table 1 of SANS241: 2015. Monitoring compliance is therefore critical to guarantee the safety of the supply at all points in the network.

Indicator C: Water Quality Compliance reports on both water quality compliance and monitoring compliance as per SANS 241:2015 for both microbiological and chemical determinands. The formular to calculate C is made up of four sub-indicators with microbiological compliance carrying a higher weighting than chemical compliance as this presents a serious, acute health risk.

The formular for Indicator C, description and categorisation of each sub-indicator is presented in the table below. The categorisation is aligned with the risk rating for each sub-indicator and results are reported for all supply systems in the province. All supply systems which fall in the Low Risk category are regarded as compliant systems.

Table 10: Formular, description and categorisation for Criteria C

C = [0.7(C1a x C1b)] + [0.3(C2a x C2b)]				
Ca: Water Quality Compliance	**C1a**: Microbiological compliance as per SANS 241: 2015.	High Risk	Medium Risk	Low Risk
		<95%	95% - <97%	97% - 100%
	C2a: Chemical compliance as per Blue Drop requirements			
Cb: Monitoring Compliance	**C1b**: Micro monitoring compliance against registered programme, based on population size as per SANS 241:2015	High Risk	Medium Risk	Low Risk
		<50%	50% - 80%	>80%
	C2b: Chemical monitoring compliance calculated as per Blue Drop requirements			

The Northern Cape province results for Indicator C and sub-indicators are presented in the table below. This is based on data for the period January to December 2020.

Table 74: Northern Cape Province summary of results for Indicator C: Water Quality Compliance (Jan – Dec 2020)

Northern Cape	Average Compliance	Minimum	Maximum	% Systems Which Comply (Low Risk)
C1a: Microbiological Quality	73.2%	0%	100%	40%
C2a: Chemical Quality	72.5%	0%	100%	28%
C1b: Microbiological Monitoring Compliance	42.3%	0%	100%	16%
C2b: Chemical Monitoring Compliance	13.8%	0%	97.1%	9%

The categorisation for microbiological and chemical compliance is illustrated below providing % of supply systems per risk category.

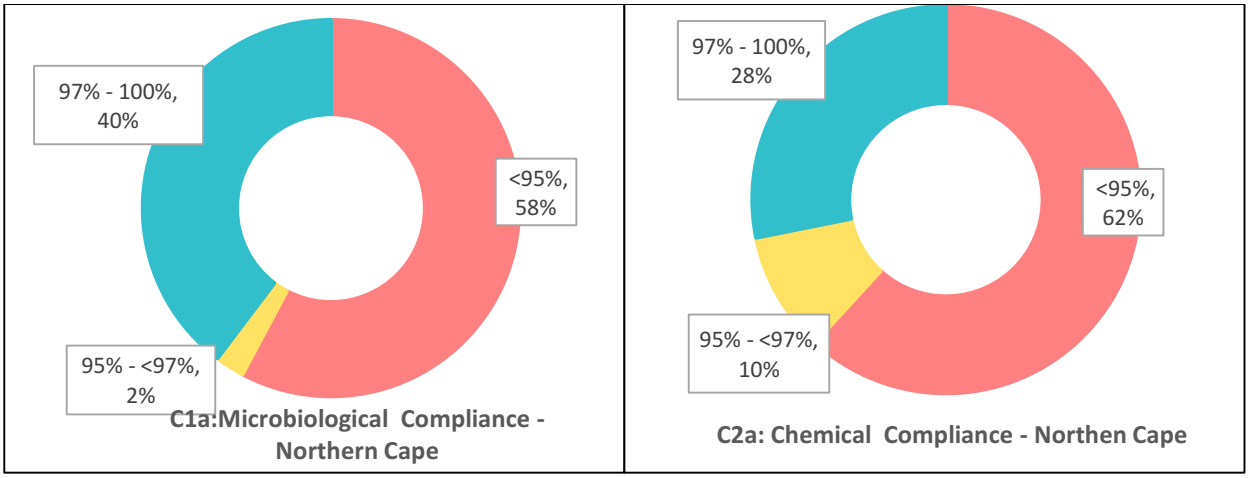


Figure 89: Microbiological and Chemical Compliance for Northern Cape (Jan – Dec 2020)

The results are summarised as follows:

- ✓ Only 40% of systems achieved microbiological compliance and 28% achieved chemical compliance. This is of serious concern to DWS as the majority of supply systems present a potential health risk to consumers.
- ✓ 60% of systems do not comply with microbiological determinands: this indicates microbiological failures which presents a serious health risk to the consumers in these supply systems. For sustained failure, 'Boil Water' notices must be issued to safeguard consumers while the root cause of the failure is investigated and resolved.
- ✓ 72% of systems do not comply with chemical determinands. This may present immediate or potential long term health risks depending on whether non-compliance is for acute health determinands or chronic health determinands.
    - WSA must ensure compliance for all chemical-health determinands as per Blue Drop requirements and includes, NO3- and NO2- as N, SO42-, Sb, As, Cd, Cr, Co, Cu, CN-, Pb, Hg, Ni, Se, V, DOC or TOC, and Total THM.

The categorisation for microbiological and chemical monitoring compliance is illustrated below providing percentages of supply systems per category.

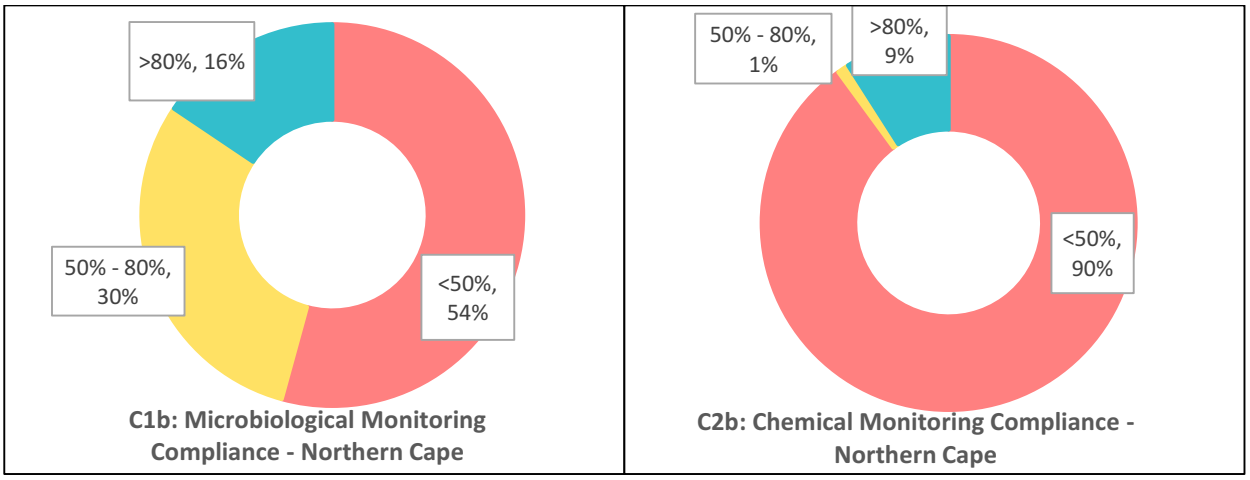


Figure 90: Microbiological and Chemical Monitoring Compliance for Northern Cape (Jan – Dec 2020)

The results are summarised as follows:

- ✓ Only 16% of supply systems have sufficient microbiological samples based on population size as per SANS 241-2.
- ✓ 84% of supply systems have <80% for microbiological monitoring compliance. This indicates there is an insufficient number of microbiological samples to guarantee the safety of water at all points in the distribution system. These supply systems therefore do not comply with table 2 in SANS 241-2 which outlines required number of sample points based on population size.
- ✓ Only 9% of supply systems have sufficient chemical monitoring samples.
- ✓ 91% of supply systems have <80% for chemical monitoring compliance. This indicates either insufficient number of samples collected or insufficient chemical determinands were analysed as per the requirement outlined in SANS 241:2015, i.e.
    - Actual monitoring occurs according to registered IRIS monitoring programme (>80%),
    - Number of samples: One sample each at treatment plant final and one distribution point, both of which must be analysed for at least 80% of determinands listed (13 of the 17 determinands) i.e. at least 26 data points are required.

Recommendations

The poor water quality in Northern Cape Province is of concern to DWS, in particular poor water quality compliance and the lack of sufficient samples to verify safety of water at all points in network.

All WSAs must urgently implement the following steps to ensure both microbiological and chemical compliance is improved so that all the citizens of South Africa can have access to safe drinking water, which is a basic human right enshrined under our Constitution:

- ✓ Develop and implement microbiological monitoring as per SANS 241:2015 requirements:
    - Monitor final water weekly.
    - Monitor distribution fortnightly
    - Ensure the number of sample points in the distribution network is based on population size as per Table 2 in SANS 241-2 given below

Table 18: Minimum number of samples for E.Coli (or Faecal Coliforms) in distribution network (Table 2 SANS 241-2: 2015)

Population served	Total number of samples per month[a]
<5000	2
5000-100 000	1 per 5000 head of population + 1 additional sample [b]
100 000 – 500 000	1 per 10 000 head of population + 11 additional sample [b]
≥500 000	1 per 20 000 head of population + 36 additional sample [b]
[a] During rainy season, sampling should be carried out more frequently to ensure that all spatial and temporal risks are identified. [b] see *WHO, Guidelines for drinking water quality*	

- ✓ Develop and implement risk-based chemical monitoring programme as per SANS 241:2015 requirements:

- Conduct full SANS 241:2015 analysis annually on raw, final and distribution network to identify current problem determinands.
- Conduct risk assessment of system including catchment, treatment plant and reticulation to identify current and potential water quality risks and their associated determinands. e.g. presence of pit latrines means possibility of nitrates in ground water and surface water.
- Develop and implement risk-based chemical monitoring programme for all identified determinands.
- Sample points are raw, final and critical distribution points depending on impact of determinands.
- Frequency as per Table 3 in SANS 241- 2. i.e. acute health 1 = weekly, acute health 2 =monthly, chronic health = monthly, aesthetic = monthly.
- Operational monitoring dependant on unit processes.

✓ In the event of non-compliance:

- Precautionary measures including 'Boil Water' notices must be issued to consumers in systems with sustained microbiological failures.
- 'Water Quality' Advisories must be issued to consumers in systems with sustained chemical failures for chronic health determinands.
- WSAs must investigate the root cause of the failure and implement remedial actions to ensure compliance. If this cannot be achieved, an alternative water supply must be provided to ensure safety of consumers.

✓ Compliance monitoring to be undertaken by accredited laboratory:

- WSA to ensure that there is sufficient budget for compliance monitoring.
- Laboratory to comply with accreditation requirement as per Blue Drop: SANAS accredited, participation in proficiency testing with acceptable Z-Score, or Quality Assurance system.

Risk Indicator D: Technical Skills

Regulation 2834 states all plant personnel must be classified as per their qualifications and years of experience. This is conducted by DWS and plant personnel are provided with a classification certificate which reflects their current classification based on qualification and years of experience. Ongoing training is a requirement under the Regulation to allow for continuous learning that will enable process controller to improve their classification over time to achieve Class V that allows them to act as plant supervisor. The required number and classification of staff required at a treatment plant per shift is dependent of the classification of the plant and the number of shifts.

The Blue Drop requirements acknowledge excellence in water services provision. The Blue Drop requirements therefore outlines the number and classification of process controllers and supervisors required for each shift. The Blue Drop requirements make provision for sharing of supervisors: this reduces the burden of providing permanent staff for small, remote systems as a roaming supervisor can visit a number of facilities once or twice a week.

In addition, the Blue Drop requirements outline the requirements for plant maintenance team to ensure effective maintenance of water infrastructure for ongoing operations. The maintenance team must have variety of artisans with electrical, mechanical and civil expertise for effective asset management with assets reaching their expected useful lifespan. The Blue Drop requirements were used to evaluate Risk Indicator D: Technical Skills as per Table below.

Table 12: Blue Drop requirements to evaluate technical skills at treatment plants

Works Class	Class Of Process Controller Per Shift	Class Of Process Controller for Supervision*	Operations And Maintenance Support Services Requirements*
E	Class I	Class V*	THESE PERSONNEL MUST BE AVAILABLE AT ALL TIMES BUT MAY BE IN-HOUSE OR OUTSOURCED - electrician - fitter - instrumentation technician
D	Class II	Class V*	
C	Class III	Class V*	
B	Class IV	Class V	
A	Class IV	Class V	

NB. Fluoridation – for any class works, minimum process controller classification should be class IV

**does not have to be at the works at all times but must be available at all times. If the Water Services Institution or owner of a waterwork has no person of this class employed on that work, a contractor / consultant with the required qualifications as prescribed in Schedule III in respect of that particular class of persons, shall be appointed to visit the work weekly.*

Risk Indicator D: Technical Skills is calculated from three separate components:

- ✓ Process controllers compliance as per Blue Drop requirements: required number and class of process controllers per shift for specific class of plant.
- ✓ Supervisor compliance as per Blue Drop requirements: Class V required, either at plant or available at all times.
- ✓ Maintenance Team compliance as per Blue Drop requirements: civil, mechanical and electrical expertise required.
    - Civil team: plumbing qualification / trade test.
    - Mechanical team: millwright or similar mechanical qualification.
    - Electrical team: electrical qualification / trade test.

The Table and figures below provides a profile of the technical skills in Northern Cape Province for July 2020 to June 2021

Table 75: Northern Cape Province Summary of results for Indicator D: Technical Skills

Northern Cape	Average	Minimum	Maximum
D: Technical Skills	27.8%	0%	100%
Process Controller Compliance	19.6%	0%	100%
Supervisor Compliance	27.1%	**0%**	100%

The provincial profile for Risk Indicator D: Technical skills is presented in the figure below.

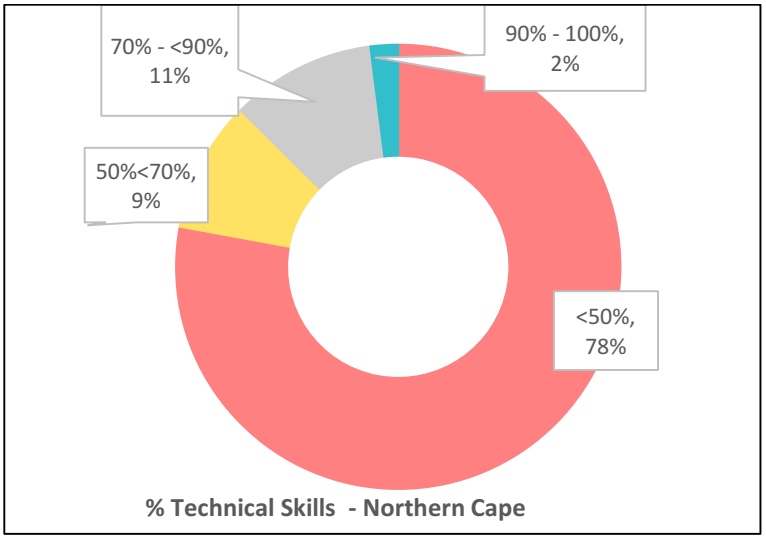


Figure 91: Northern Cape Province profile for Indicator D: Technical Skills

The results are summarised as follows:

- ✓ Only 2% of supply system have excellent technical skills: 90 - 100% compliance,
- ✓ 11% of supply systems have good technical skills: 70 - <90% compliance,
- ✓ 9% of supply systems have average technical skills: 50 - <70% compliance,
- ✓ 78% of supply systems have poor technical skills: <50% compliance,

In general, the province has performed very poorly with regards to technical skills.

The provincial profile for process controllers and supervisors compliance is outlined in the figures below.

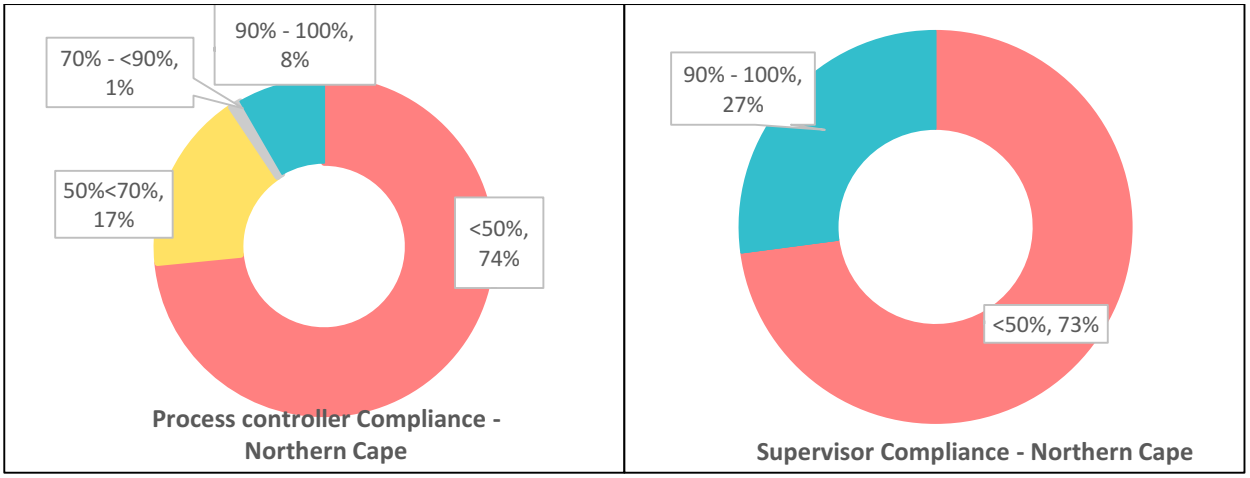


Figure 92: Process controller and Supervisor compliance for Northern Cape Province

The resutls are summarised as follows:

- ✓ Process controller compliance is poor with only 8% of supply systems with sufficient number of suitably classified process controllers per shift. Lack of sufficient number of process controllers presents a serious risk due to lack of daily monitoring and process optimisation.
- ✓ Only 27% of supply systems are compliant with regards to Supervisors. These plants either have Class V supervisors permanently based at the plant or available as a roaming supervisor available at all times to assist process controllers. The presence of a qualified supervisor can mitigate some of the risks associated with insufficient number of process controllers on site provided the supervisor is available at all times.

The provincial profile for maintenance team as well as breakdown of maintenance team is outlined in the figures below.

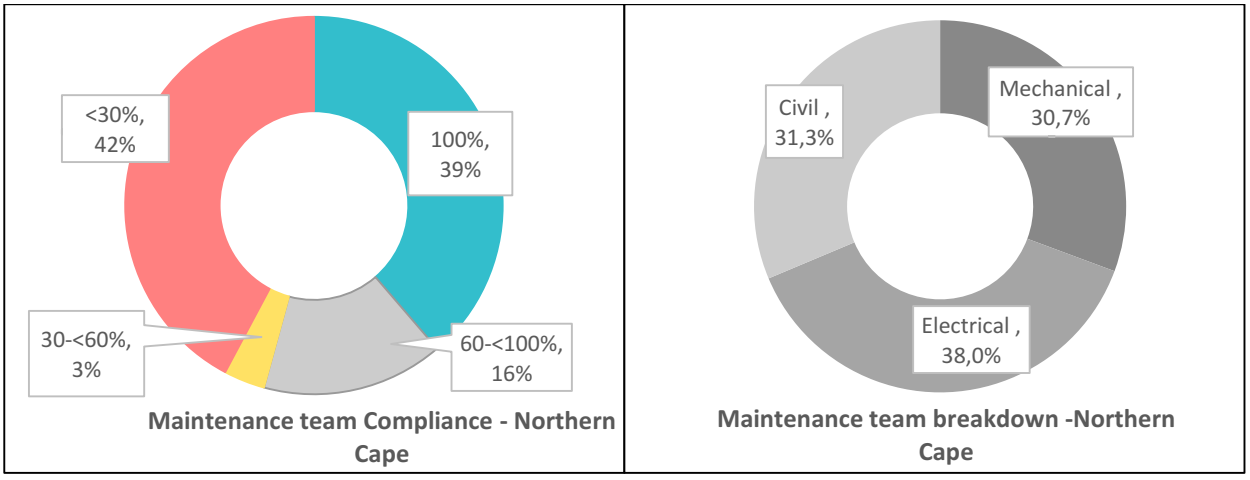


Figure 93: Maintenance team compliance and maintenance team breakdown for Northern Cape Province

The results are summarised as follows:

- ✓ 39% of all supply systems have full maintenance teams in place i.e. civil, mechanical and electrical personnel. However, the remaining 85% have insufficient maintenance teams and this can lead to shutdown of treatment plant or processes which will affect quality and quantity of water.
- ✓ 38 % have Electrical staff, 30.7% have mechanical competency, and 31.3% have civil staff. Civil works at treatment plants and in the distribution network is conducted by plumbers: lack to this skill will lead to water losses which will negatively impact on water supply.

The Northern Cape province has performed poorly with regards to technical skills. WSAs are encouraged to evaluate the performance of each system with regards to process control and use this information to determine the operational model which is best suited to ensure effective operations and maintenance.

WSA must allocate budget to appoint suitably qualified process controllers and supervisors to ensure water quality compliance improves through ongoing process optimisation. The WSA must appoint a qualified maintenance team to ensure that the life span of the treatment plant is increased by regular maintenance and ensure there are sufficient number of personnel to cover the entire distribution network to reduce water losses and maintain integrity of the supply system.

Recommendations

- ✓ Register all process controllers and supervisors on IRIS as per Regulation 2834
- ✓ Ensure all process control staff complies with Blue Drop requirements.
- ✓ Ensure maintenance team includes civil, mechanical and electrical personnel.
- ✓ Provide details of operational staff at all future assessments: copies of process controller and supervisor registration certificates, organograms with shift patterns, copies of qualifications/certificates/current training.
- ✓ Provide details of maintenance team at all future assessments: organogram, shift patterns, names and qualifications of team, copies of qualifications/certificates/current training, details of external service providers.

Risk Indicator E: Water Safety Plans

Risk management is the cornerstone of risk-based regulation and a fundamental part of the SANS 241:2015 requirements to ensure effective management of both current and future potential risks. The application of risk management in drinking water management is through the Water Safety Plan developed by the WHO which is a comprehensive risk assessment and risk management approach that encompasses all steps in a drinking-water supply chain, from catchment to consumer to ensure continuous feedback and improvement to manage all current and future potential risks. The Water Safety Plan advocates for development of a risk-based monitoring programme and this is also a requirement as per SANS 241:2015

This risk indicator E: Water Safety Plans evaluates the following three critical components which are required for effective risk management as per the WHO guidelines and the SANS 241:2015 requirements.

- ✓ Completeness of the Water Safety Plan as per World Health Organisation Water Safety Planning Manual:
    - 1: Signature from Technical director/Municipal Manager
    - 2: Risk prioritisation method
    - 3: Risk assessment of catchment
    - 4: Risk assessment of plant
    - 5: Risk assessment of network
    - 6: Final risk rating
    - 7: Mitigating measures for all high and medium risks.
- ✓ Development and adoption of risk-based monitoring programme as per SANS 241:2015
    - 8: Full SANS 241:2015 analysis of raw and final water
    - 9: Identification of risk determinands
    - 10: Addition of risk determinands to monthly compliance monitoring as per SANS 241:2015
- ✓ Proof of implementation of the findings of the Water Safety Plan to ensure there is continuous risk management and movement towards overall lower risk rating:
    - 11: Proof that >25% of mitigating measures have been implemented – proof in form of purchase order, pictures, water quality results, tender document, etc.

This makes up 11 equal sub-elements that are evaluated during the BDPAT assessment to calculate the final risk rating for this indicator.

Table 76 and Figure 94 below provides a profile of Risk indicator E in Northern Cape and Figure 95 provides details on the completeness of the Water Safety Plan by indicating the percentage of supply systems which comply with each of the 11 individual components which make up the Water Safety Plan

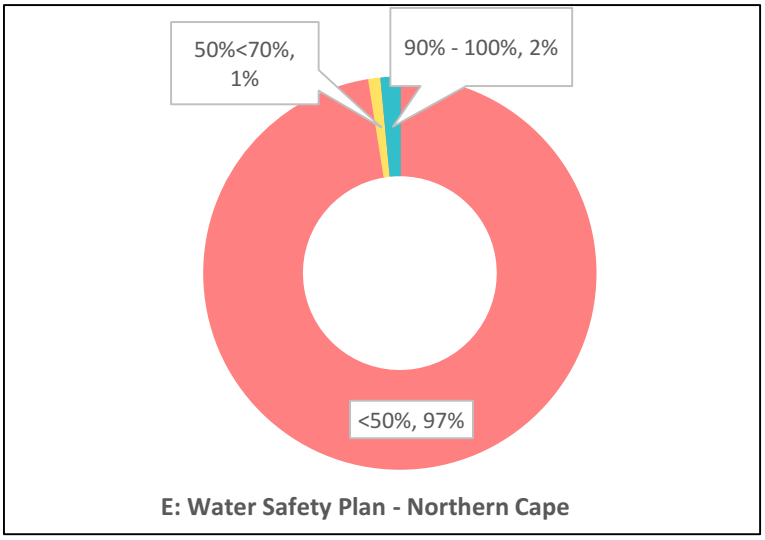


Figure 94: Northern Cape Profile for Indicator E – Water Safety Plans

Table 76: Northern Cape Province summary of results for Indicator E: Water Safety Plans

Northern Cape	Value
E: Water Safety Plans - Average	2.2%
E: Water Safety Plans - Minimum	0%
E: Water Safety Plans - Maximum	100%
% Systems with Water Safety Plans	2%

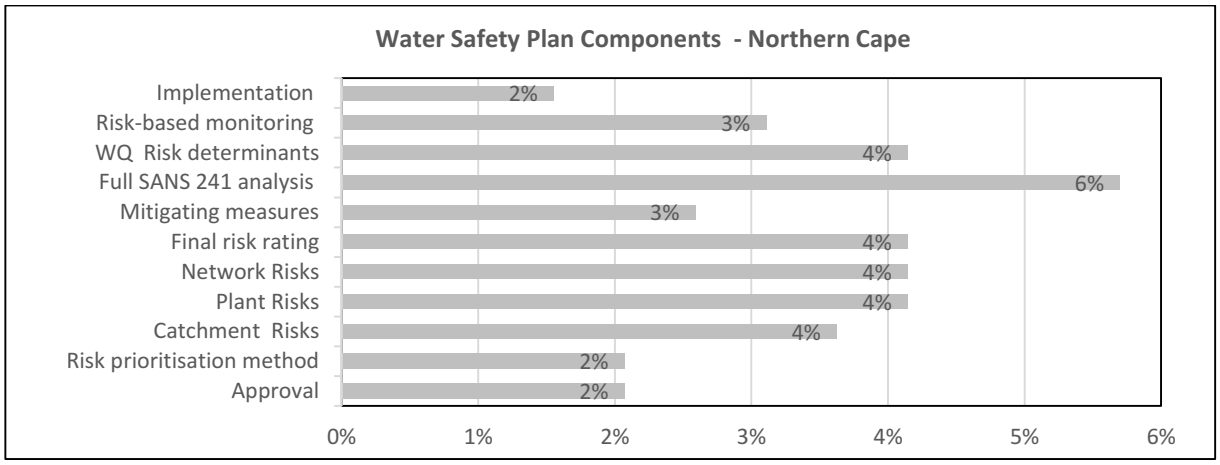


Figure 95: Water Safety Plan components for Northern Cape

The results are summarised as follows:

- ✓ Only 2% of supply systems have Water Safety Plans in place. This presents a serious risk as effective risk-management is not taking place as per SANS 241:2015 requirement.
- ✓ 2% have excellent Water Safety Plans in place with >=90% compliance indicating comprehensive Water Safety Plans with all required components.
- ✓ The average compliance for the province is 2.2% which indicates poor understanding of the Water Safety Planning process amongst the WSA's in this province.
- ✓ The quality and completeness of the Water Safety Plans is as follows:
    - 2% have approval indicating management's commitment to implementing the findings of the Water Safety Plan.
    - Completeness of the Water safety Plan is poor for catchment, plant and network risks (average 4%). Only 2% have risk prioritisation method in place, with 3% having mitigating measures. These results indicate poor understanding of the risk assessment process.
    - Development of risk-based monitoring is poor as full SANS 241:2015 only conducted in 3% of systems and only 3% using this information to develop risk-based monitoring programme. Risk-based monitoring is a requirement of SANS 241:2015 and must be reviewed annually based on updated full SANS 241:2015 of raw and final water.
    - Implementation of mitigating measures is low at only 2%. Although 2% of Water Safety Plans have been approved, there has been minimal implementation of findings. Management must ensure that when approval is given for a Water Safety Plan, this is supported by resources in the form of staff and budget to implement mitigating measures.

In summary, Water Safety Planning is being implemented in the province in only 2% of supply systems. The completeness and quality of these Water Safety Plans is below average with lack of risk-based monitoring and implementation of mitigating measures to reduce risks.

All WSAs must adopt risk management principles embodied in the Water Safety Planning approach as this is a regulatory requirement as per SANS 241:2015 and will assist in driving down risks in the entire supply system from catchment to consumer.

Recommendations

- ✓ Conduct full SANS 241:2015 analysis on raw, final, and distribution network to identify problem determinands.
- ✓ Develop and implement risk-based monitoring programme to include all current and potential determinands
- ✓ Register SANS 241:2015 compliant monitoring programme on IRIS.
- ✓ Conduct monitoring as per programme and upload information on a monthly basis.
- ✓ Develop WSP: conduct annual risk assessment of supply system, assign risk rating, validate control measures and determine residual remaining risk.
- ✓ Develop and implement action plan to mitigate remaining risk. Action plan to include budget, responsibility and timeframe for implementation. Note approval for implementation and budget must be given by senior management (municipal manager of WSA).
- ✓ WSA to provide copy of signed approved Water Safety Plan with proof of implementation of corrective actions from previous risk assessment; uploaded on IRIS.

Summary

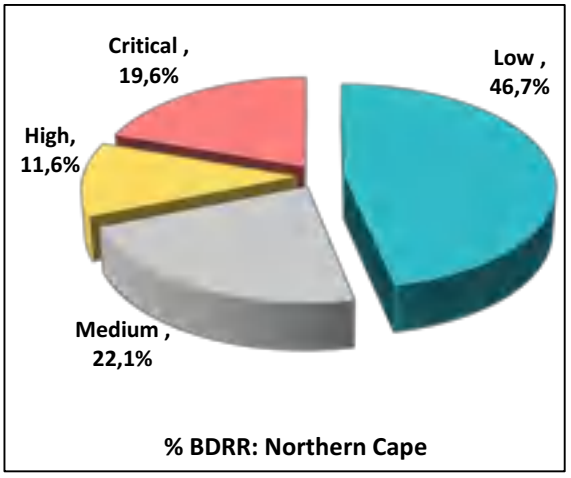
Overall performance for Northern Cape Province is summarised as follows:

- ✓ 46.7% (93) of supply systems are in the low risk category,
- ✓ 22.1% (44) of supply systems are in the medium risk category,
- ✓ 11.6% (23) of supply systems are in the high risk category, and
- ✓ 19.6% (39) of supply systems are in the critical risk category

DWS is encouraged by the 46.7% of systems in the low risk category.

However, DWS is concerned about 31.2% of systems which are in high and critical risk categories.

The figure below shows the % Municipal (weighted) BDRR score for all WSA's in the province.



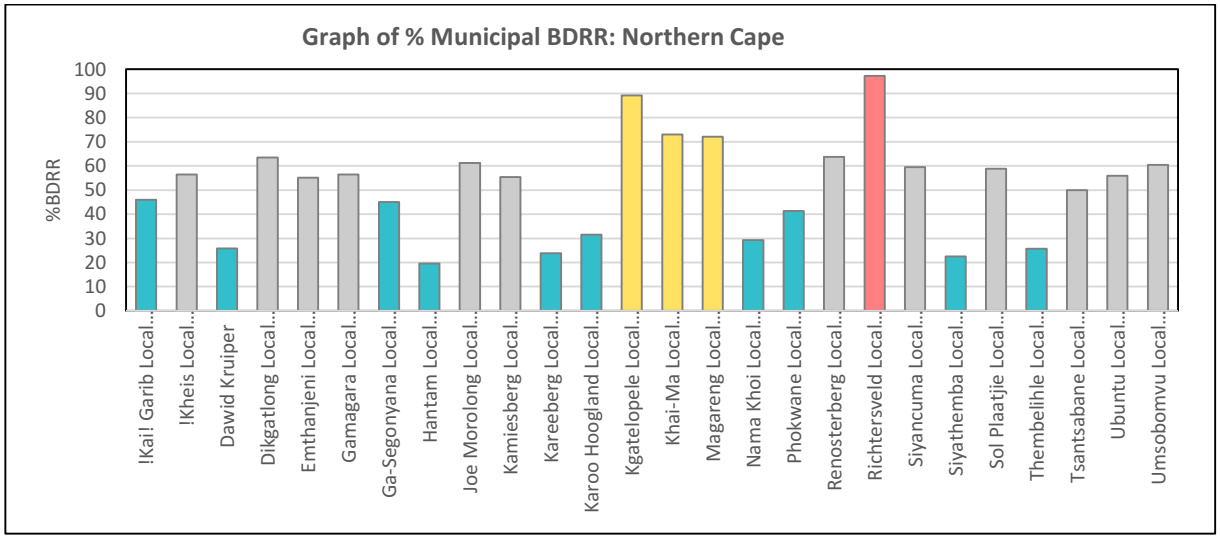


Figure 96: Graph of % Municipal (Weighted) BDRR for each WSA in Northern Cape Province

The figure indicates one WSA is in the critical risk category and three WSA's are in the high risk category based on % municipal BDRR. However, within the province there are 39 supply systems in the critical risk category and 23 supply systems in the high risk category.

DWS will evaluate risk based on the individual BDRR score for each supply system. Water supply systems which fall in the critical risk category are placed under regulatory focus. In such cases, a red note is assigned that requires the WSI to "...submit a detailed corrective action plan within 60 days of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvements as outlined in the Regulatory Comment. The plan will be considered against the Regulatory Comment and recommended for approval by a national regulation committee...." This note serves to initiate the Department's Enforcement Protocol.

Note Section 151 of the NWA and Section 63 of the Water Services Act in developing and submitting these plans as required:

- ✓ Section 63 of the Water Services Act enables the Minister in consultation with COGTA to request a relevant Province to intervene in terms of Section 139 of the Constitution in local government. Such requests will be supported by the outcomes of this performance monitoring and WSIs responsiveness on regulatory responses raised.
- ✓ Section 151 of the NWA provides a number of non-compliances as criminal offences, amongst others using water otherwise than is permitted under the Act, failure to provide access to any books, accounts, documents or assets, unlawfully and intentionally or negligently commit any act or omission which affects or is likely to affect a water resource.

Other water supply systems which are in the high risk category will also be targeted for corrective action plans and municipalities are urged to initiate a process of addressing the regulatory comment as a matter of priority.

The WSA's must therefore review the individual BDRR score of each supply system, evaluate risk indicators which make up the total BDRR score and implement mitigating measures to improve compliance for poor performing risk indicators as outlined below:

- ✓ A: Design Capacity
  - WSA to report design capacity of treatment plant,
- ✓ B: Operational Capacity
  - WSA to install flow meters, record daily flow and implement upgrades when operational capacity is above 90%.
- ✓ C: Water Quality compliance
  - WSA to develop and implement microbiological and chemical monitoring programmes as per requirements to verify the safety of the water at all points in the network.
  - In the event of failures, WSA must implement remedial action which include water quality advisories and process optimisation to improve compliance.
- ✓ D: Technical skills
  - WSA to ensure there are sufficient number of qualified technical staff to undertake operations and maintenance of treatment plants and distribution networks.
- ✓ E: Water Safety Plans
  - WSA to develop and implement comprehensive Water Safety Plan as per WHO and SANS 241: 2015 requirements,
  - WSA to conduct water quality assessment as part of water safety planning process, identify risk determinands, and develop and implement risk-based monitoring programme to manage current and future potential risks.
  - Budget and resources to be made available to implement mitigating measures to reduce risk.

In conclusion, WSA's must review the performance of each supply system, interrogate each risk indicator to identify areas of poor performance, and implement remedial actions to improve overall risk rating.

Below is a summary of performance in Northern Cape Province for the following categories:

- ✓ List of % Average BDRR, % Municipal (weighted) BDRR, and number of supply systems for all WSA's in the province,
- ✓ List of Low risk supply systems,
- ✓ List of Critical Risk supply systems which require immediate attention,
- ✓ Top 10 Performing supply systems.

Table 77: List of % Average BDRR, % Municipal BDRR, and number of supply systems for all WSA's in Northern Cape province

WSA	# Supply systems	% Municipal BDRR	% Average BDRR per WSA
!Kai! Garib Local Municipality	15	46.0	47.7
!Kheis Local Municipality	7	56.4	53.7
Dawid Kruiper Local Municipality	17	25.8	41.3
Dikgatlong Local Municipality	17	63.4	90.5
Emthanjeni Local Municipality	3	55.1	55.1
Gamagara Local Municipality	3	56.5	67.7
Ga-Segonyana Local Municipality	22	45.1	50.2
Hantam Local Municipality	6	19.6	18.6
Joe Morolong Local Municipality	24	61.3	56.7
Kamiesberg Local Municipality	16	55.4	61.8
Kareeberg Local Municipality	3	23.9	23.4
Karoo Hoogland Local Municipality	3	31.6	31.6
Kgatelopele Local Municipality	4	89.2	79.7
Khai-Ma Local Municipality	4	73.0	86.7
Magareng Local Municipality	4	72.1	90.5
Nama Khoi Local Municipality	15	29.3	34.3
Phokwane Local Municipality	3	41.3	45.9
Renosterberg Local Municipality	3	63.8	64.1
Richtersveld Local Municipality	5	97.3	97.0
Siyancuma Local Municipality	4	59.5	67.1
Siyathemba Local Municipality	3	22.6	30.7
Sol Plaatje Local Municipality	2	58.8	56.0
Thembelihle Local Municipality	2	25.7	21.1
Tsantsabane Local Municipality	6	50.0	66.7
Ubuntu Local Municipality	5	55.9	55.9
Umsobomvu Local Municipality	3	60.5	54.0
Average		**51.5**	**55.7**
Maximum		**97.3**	**97.0**
Minimum		**19.6**	**18.6**

Table 78: List of Low Risk supply systems in Northern Cape Province

Northern Cape: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Kai! Garib Local Municipality	Alheit	48.9
	Currieskamp	37.1
	Eksteenskuil	48.3
	Keimoes Bulk Water	28.4
	Lutzburg	39.4
	Marchand	25.9
	Riemvasmaak - Sending	23.5
	Riemvasmaak - Vredesvallei	37.1
!Kheis Local Municipality	Gariep	23.8
Dawid Kruiper Local Municipality	Loubos	20.9
	Mier (Boorgate)	39.0
	NC083:AH September (Upington)	21.2
	NC083:Karos Supply System	15.7
	NC083:Lambrechtsdrift	14.4
	NC083:Leerkrans	16.8

Northern Cape: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
	NC083:Leseding	16.8
	NC083:Louisvale	25.7
	NC083:Ntsikelelo	19.0
	NC083:Raaswater	15.9
	Philandersbron	24.2
	Welkom	44.3
Dikgatlong Local Municipality	Delportshoop and Longlands (Sedibeng Water)	31.2
Gamagara Local Municipality	Olifantshoek (Vaal Gamagara Bulk Supply Pipeline)	31.1
Ga-Segonyana Local Municipality	Bankhara-Bodulong (Managed by Ga-Segonyana LM)	49.8
	Batlharos/Maruping (GLM Boreholes Sedibeng Water)	45.5
	Ditshoswaneng (GLM Boreholes Sedibeng Water)	48.7
	Galotolo (GLM Boreholes Sedibeng Water)	49.7
	Gantatelang (GLM Boreholes Sedibeng Water)	39.9
	Gasebolao (GLM Boreholes Sedibeng Water)	45.5
	Gasehubane (GLM Boreholes Sedibeng Water)	29.6
	Kagung (GLM Boreholes Sedibeng Water)	42.3
	Kuruman-Wrenchville (Managed by Ga-Segonyana LM)	40.5
	Magobe/Magojaneng (GLM Boreholes Sedibeng Water)	47.1
	Mokalamosesane (GLM Boreholes Sedibeng Water)	42.3
	Ncweng (GLM Boreholes Sedibeng Water)	44.7
	Thamoyanche (GLM Boreholes Sedibeng Water)	46.1
Hantam Local Municipality	Brandvlei	21.7
	Calvinia	20.6
	Loeriesfontein	18.8
	Middelpos	15.8
	Nieuwoudtville	18.8
	Swartkop	15.7
Joe Morolong Local Municipality	Bothetheletsa Groundwater Management Area: D41L-M2	32.3
	Churchill Groundwater Management Area: D41L-M10	22.2
	Dithakong Groundwater Management Area D41G-02	19.6
	Gasehunelo Groundwater Management Area: D41L-M9	43.5
	Heiso Groundwater Management Area: D41L-M8	20.5
	Hotazel	26.9
	Kikahela Groundwater Management Area: D41L-M1	19.6
	Mamatwan / Hotazel Ground water Management Area D41K-G2	20.5
	Manyeding Lower Groundwater Management Area: D41L-M6	20.5
	Van Zylsrus (Boreholes)	18.6
	Ward 1 Heuningvlei Area	27.6
Kamiesberg Local Municipality	Kamassies	44.3
	Klipfontein	39.5
	Leliefontein	26.2
	Lepelfontein	39.5
	Nourivier	36.8
	Rooifontein	26.2
	Soebatsfontein	38.3
	Spoegrivier	39.5
	Tweerivier	47.4
Kareeberg Local Municipality	Carnarvon	25.8
	Vanwyksvlei	23.5
	Vosburg	20.9
Karoo Hoogland Local Municipality	Fraserburg	39.9
	Sutherland	18.7
	Williston	36.1
Kgatelopele Local Municipality	Danielskuil (Boreholes)	18.7
Nama Khoi Local Municipality	Bergsig	25.6
	Buffelsrivier	42.3

Northern Cape: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
	Bulletrap	25.6
	Carolusberg	26.8
	Concordia	25.6
	Matjieskloof	26.8
	Nababeep	26.8
	Okiep System	25.6
	Rooiwal	43.1
	Springbok	26.8
	Steinkopf	25.6
	Vioolsdrift	29.0
Phokwane Local Municipality	Pampierstad (Managed by Sedibeng Water)	25.0
Siyathemba Local Municipality	Marydale Borehole system	30.3
	Niekerkshoop Borehole System	41.0
	Prieska Orange River	20.8
Thembelihle Local Municipality	Hopetown (Orange River)	25.9
	Strydenburg (Boreholes)	16.4
Tsantsabane Local Municipality	Jenn Heaven Supply System	39.8
	Postdene Supply System	43.5
	Postmasburg	49.3
Ubuntu Local Municipality	Loxton	38.6
	Victoria West	43.0
Umsobomvu Local Municipality	Noupoort (Boreholes)	48.0

Table 79: List of Critical Risk supply systems in Northern Cape Province

Northern Cape: Critical Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Dawid Kruiper Local Municipality	Andriesvale	99.2
Dikgatlong Local Municipality	Blikfontein (Borehole)	100.0
	Boetsap SAP (Borehole)	100.0
	Eierfontein (Borehole)	100.0
	Gong-Gong (Borehole)	100.0
	Holpan (Borehole)	100.0
	Kalkfontein (Borehole)	100.0
	Longlands Clinic (Borehole)	100.0
	Pniel (Borehole)	100.0
	Pniel Estate (Borehole)	100.0
	Spitskop (Borehole)	100.0
	Stillwater	100.0
	Ulco (Mine)	100.0
	Windsorton	97.2
Gamagara Local Municipality	Dibeng (Boreholes)	93.5
Joe Morolong Local Municipality	Laxey Groundwater Management Area D41G-05	91.2
	Mc Carthy`s Rus (Boreholes)	99.2
	Middelputz (Boreholes)	99.2
	Severn SAPS (Borehole)	99.2
	Severn School (Borehole)	99.2
Kamiesberg Local Municipality	Garies	96.8
	Kamieskroon	96.8
	Kharkams	96.8

Northern Cape: Critical Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
	Kheis	97.4
	Paulshoek	96.8
Kgatelopele Local Municipality	Idwala (Boreholes)	100.0
	Lime Acres De Beers (Sedibeng)	100.0
	Owendale (Boreholes)	100.0
Khai-Ma Local Municipality	Onseepkans (Melkbosrand WTW)	92.0
	Onseepkans (RK)	92.0
	Witbank	92.0
Magareng Local Municipality	Majeng Water Tank (Private)	100.0
	Malekos Farm (Private)	100.0
	Nazareth House (Private)	100.0
Richtersveld Local Municipality	Eksteenfontein	96.8
	Kuboes	96.8
	Lekkersing	96.8
	Port Nolloth / Alexander Baai (Alexcor & 8 Myl)	97.4
	Sanddrift	96.8

Table 80: List of Top 10 performing systems in Northern Cape Province

Northern Cape: Top 10 Performing Supply Systems		
WSA	**Supply System**	**%BDRR**
Dawid Kruiper Local Municipality	NC083:Karos Supply System	15.7
Dawid Kruiper Local Municipality	NC083:Lambrechtsdrift	14.4
Dawid Kruiper Local Municipality	NC083:Leerkrans	16.8
Dawid Kruiper Local Municipality	NC083:Leseding	16.8
Dawid Kruiper Local Municipality	NC083:Ntsikelelo	19.0
Dawid Kruiper Local Municipality	NC083:Raaswater	15.9
Hantam Local Municipality	Loeriesfontein	18.8
Hantam Local Municipality	Middelpos	15.8
Hantam Local Municipality	Nieuwoudtville	18.8
Hantam Local Municipality	Swartkop	15.7
Joe Morolong Local Municipality	Van Zylsrus (Boreholes)	18.6
Karoo Hoogland Local Municipality	Sutherland	18.7
Kgatelopele Local Municipality	Danielskuil (Boreholes)	18.7
Thembelihle Local Municipality	Strydenburg (Boreholes)	16.4

Kai! Garib Local Municipality

Municipal BDRR Score: 46%

Assessment Areas	Alheit	Aughrabies	Bloemsmond	Cillie
BULK / WSP				
A: Total Design Capacity (Ml/d)	1	1.56	1	1.08
B: % Operational Capacity in terms of design	1%	100%	25%	100%
C1a: % Microbiological Compliance	94.1%	94.7%	77.3%	68.9%
C1b: % Microbiological Monitoring Compliance	62.5%	70.8%	70.8%	75.0%
C2a: % Chemical Compliance	88%	81.4%	83.9%	71.3%
C2b: % Chemical Monitoring Compliance	2.9%	2.9%	2.9%	2.9%
D: % Technical Skills	37.5%	54.1%	54.2%	54.2%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	48.9%	56.1%	57.7%	61.7%

Assessment Areas	Currieskamp	Eenduin Water Treatment Works	Eksteenskuil	Kakamas Bulk Water
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	1	1	6.4
B: % Operational Capacity in terms of design	86%	15%	30%	109.4%
C1a: % Microbiological Compliance	100%	0%	95.2%	95.1%
C1b: % Microbiological Monitoring Compliance	66.7%	0%	66.7%	91.7%
C2a: % Chemical Compliance	81.5%	0%	92.9%	81.3%
C2b: % Chemical Monitoring Compliance	2.9%	2.9%	2.9%	2.9%
D: % Technical Skills	54.2%	16.7%	16.7%	45.8%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	37.1%	84.5%	48.3%	50.8%

Assessment Areas	Keimoes Bulk Water	Lutzburg	Marchand	Riemvasmaak - Sending
BULK / WSP				
A: Total Design Capacity (Ml/d)	2.8	1.08	2	1.72
B: % Operational Capacity in terms of design	107.1%	100%	25%	58.1%
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	91.7%	75%	75%	54.1%
C2a: % Chemical Compliance	98.8%	73.9%	95%	97.7%
C2b: % Chemical Monitoring Compliance	2.9%	2.9%	2.9%	2.9%
D: % Technical Skills	45.8%	54.2%	54.2%	37.5%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	28.4%	39.4%	25.9%	23.5%

Assessment Areas	Riemvasmaak - Vredesvallei	Soverby	Warmsand Water Treatment Works
BULK / WSP			
A: Total Design Capacity (Ml/d)	0.5	1	1
B: % Operational Capacity in terms of design	100%	100%	25%
C1a: % Microbiological Compliance	100%	92.6%	93.8%
C1b: % Microbiological Monitoring Compliance	58.3%	75%	54.2%
C2a: % Chemical Compliance	83.3%	95%	87.7%
C2b: % Chemical Monitoring Compliance	2.9%	2.9%	2.9%
D: % Technical Skills	54.1%	54.2%	16.7%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	37.1%	56.9%	59.4%

WSA Overview

Fifteen drinking water supply systems under Kai! Garib LM were assessed. Eight of these supply systems are in the low-risk rating category (achieved <50% BDRR), while six are in the medium-risk rating category (achieved between 50% and <70% BDRR), and one is in the high-risk rating category (achieved between 70% and <90% BDRR).

Criteria A and B: Design and operational capacity figures were provided for all supply systems. However, most supply systems operational capacities are very low. This may be errors or may be an indication that flow meters are not calibrated and the WSA is encouraged to verify this. Seven supply systems are operating at or above 100% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

Criteria C reports on the actual water quality in the supply systems. Keimoes, Marchand, and Riemvasmaak achieved good to excellent microbiological and chemical compliance. However inadequate alignment of monitoring programmes to SANS 241:2015 requirements reduced the Regulator's confidence in the quality of water supplied. Cillie, Eenduin, Warmsand, Alheit, Aughrabies and Bloemsmond supply systems achieved unacceptable microbiological and chemical compliance. This coupled with inadequate alignment of monitoring programmes to SANS 241:2015 requirements presents serious health risks to the consumers. The remainder of the supply systems achieved poor microbiological and/or chemical compliance. This indicates that the water supplied from these systems may pose health and aesthetic risks to the consumer and should be addressed urgently.

Under criteria D, all supply systems achieved inadequate scores. This indicates that the supply systems process control staff and maintenance teams are not adequately aligned to the set criteria. SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems. These should be addressed as they have the potential to impact of the WSA's ability to delivery safe drinking water to the consumers.

The Regulator urges the WSA to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Calibration of inflow meters to verify operational capacity for all supply systems. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

!Kheis Local Municipality

Municipal BDRR Score: 56.4%

Assessment Areas	Brandboom / Boegoeberg	Gariep	Groblershoop	Grootdrink
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.76	0.1	1	0.72
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	88.9%	100%	80%	93.3%
C1b: % Microbiological Monitoring Compliance	66.7%	62.5%	62.5%	62.5%
C2a: % Chemical Compliance	96.9%	97.2%	99%	96.3%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%	11.8%	11.8%
D: % Technical Skills	37.5%	37.5%	37.5%	37.5%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	56.1%	23.9%	51.3%	56.1%

Assessment Areas	Opwag: Zuma Valley	Topline	Wegdraai
BULK / WSP			
A: Total Design Capacity (Ml/d)	0.5	0.61	0.69
B: % Operational Capacity in terms of design	N/I	N/I	N/I
C1a: % Microbiological Compliance	85.7%	87.5%	81.3%
C1b: % Microbiological Monitoring Compliance	25%	62.5%	62.5%
C2a: % Chemical Compliance	96.7%	97.2%	97.4%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%	11.8%
D: % Technical Skills	0%	37.5%	37.5%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	81.0%	53.7%	53.7%

WSA Overview

!Kheis LM has six drinking water supply systems in their area of jurisdiction. Gariep supply system achieved a low BDRR while Brandboom, Grootdrink, Topline, Wegdraai and Groblershoop achieved medium BDRR. Opwag: Zuma Valley supply system achieved a high BDRR.

Criteria A and B: Design capacity information was provided for all supply systems. However, none of the supply systems has operational capacity. This may indicate that flow monitoring is not undertaken at any of the WTW and has impacted on the scores under criteria B. Unavailability of flow monitoring information can impact on the municipality's planning process and also effect implementation of water conservation and demand management.

Criteria C reports on the actual water quality in the supply systems. Gariep supply system achieved excellent microbiological compliance and good chemical compliance. However inadequate alignment of monitoring programmes to SANS 21 requirements reduces the Regulator's confidence in the quality of water supplied from this system. Although the remainder of the supply systems achieved good to excellent chemical compliance, poor microbiological compliance coupled with inadequate alignment of monitoring programmes to SANS 241:2015 requirements means that the water supplied may still pose health risks to the consumers. Therefore, the Regulator urges the WSA to urgently address this.

Under criteria D, all supply systems achieved poor scores and this indicates inadequate alignment of supervisors, process controllers and maintenance teams to the Regulations requirements. Inadequate alignment of staff to the regulations requirements may impact on operation and maintenance practices which may ultimately impact on supply of drinking water to consumers.

With regards to criteria E, SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems and this impacted on scores under this criterion.

The Regulator urges the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and calibration of inflow meters to verify operational capacity for all supply systems. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Alignment of chemical and microbiological water quality monitoring programmes to SANS 241:2015 requirements in terms of frequency, coverage and number of samples.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Dawid Kruiper Local Municipality

Municipal BDRR Score: 25.8%

Assessment Areas	Andriesvale	Askham	Loubos	Mier (Boorgate)
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	2.00	0.50	0.50
B: % Operational Capacity in terms of design	N/I	100%	100%	100%
C1a: % Microbiological Compliance	0%	0%	100%	100%
C1b: % Microbiological Monitoring Compliance	0%	0%	16.7%	54.2%
C2a: % Chemical Compliance	0%	0%	100%	92.3%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	25%	16.7%	16.7%	16.7%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	99.2%	88.5%	20.9%	39.0%

Assessment Areas	NC083: AH September (Upington)	NC083: Karos Supply System	NC083: Lambrechtsdrift	NC083: Leerkrans
BULK / WSP				
A: Total Design Capacity (Ml/d)	80	0.29	0.29	0.29
B: % Operational Capacity in terms of design	46.3%	79.9%	83.3%	97.2%
C1a: % Microbiological Compliance	100%	97.4%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	100%
C2a: % Chemical Compliance	94.2%	95.5%	95.0%	90.8%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%	97.0%	97.1%
D: % Technical Skills	79.2%	72.9%	66.7%	72.9%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	21.2%	15.7%	14.4%	16.8%

Assessment Areas	NC083: Leseding	NC083: Louisvale	NC083: Ntsikelelo	NC083: Raaswater
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.43	0.29	0.29	1.78
B: % Operational Capacity in terms of design	60.2%	90.3%	107%	44.9%
C1a: % Microbiological Compliance	100%	94.9%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	100%
C2a: % Chemical Compliance	93.8%	93.6%	90.8%	94.3%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%	97.1%	97.1%
D: % Technical Skills	72.9%	79.2%	72.9%	72.9%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	16.8%	25.7%	19%	15.9%

Assessment Areas	Noenieput (Boorgat)	Philandersbron	Rietfontein	Swartkopdam
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.13	2	3.36	0.50
B: % Operational Capacity in terms of design	100%	100%	7.1%	10.0%
C1a: % Microbiological Compliance	90.9%	100%	0%	0%
C1b: % Microbiological Monitoring Compliance	45.8%	41.7%	0%	0%
C2a: % Chemical Compliance	75.0%	100%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	16.7%	0%	16.7%	16.7%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	77.7%	24.2%	75.0%	87.2%

Assessment Areas	Welkom
BULK / WSP	
A: Total Design Capacity (Ml/d)	0.04
B: % Operational Capacity in terms of design	119.1%
C1a: % Microbiological Compliance	100%
C1b: % Microbiological Monitoring Compliance	8.3%
C2a: % Chemical Compliance	50.0%
C2b: % Chemical Monitoring Compliance	0%
D: % Technical Skills	16.7%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	44.3%

WSA Overview

Seventeen drinking water supply systems under Dawid Kruiper LM were assessed. Twelve of these supply systems are in the low-risk rating category (achieved <50% BDRR), while four are in the high-risk rating category (achieved between 70% and <90% BDRR). One supply system achieved critical-risk rating (achieved ≥90% BDRR).

Criteria A and B: Andriesvale does not have a linked WTW or boreholes on IRIS and therefore design and operational capacity information is not available. The remainder of the supply systems design and operational capacity information was provided. Most supply systems are operating above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

With regards to criteria C, Lambrechtsdrift and Karos supply systems achieved excellent microbiological and chemical compliance and the associated monitoring programmes are adequately aligned to SANS 241:2015 requirements. This indicates that the water supplied from these systems may not present serious health and aesthetic risks to the consumers. Although Loubos and Philandersbron supply systems achieved excellent microbiological and chemical compliance, inadequate alignment of monitoring programmes to SANS 241:2015 requirements has reduced the Regulator's confidence in the quality of water supplied. Andriesvale, Askham, Rietfontein and Swartkopdam supply systems achieved 0% compliances under all requirements, indicating that drinking water quality monitoring is not taking place. This presents serious health risks to the consumers since the quality of water supplied cannot be verified or guaranteed and should be urgently addressed. The remainder of the systems achieved poor chemical compliance and this also indicates that the water supplied may present serious health and aesthetic risks to the consumers.

Eight supply system achieved acceptable scores under criteria D. This indicates that to some degree, process controllers and maintenance teams are aligned to the regulations requirements. However, there is still room for improvement. The remainder of the supply systems achieved poor scores and this indicates inadequate alignment of supervisors, process controllers and maintenance teams to the

regulations requirements. Inadequate alignment of staff to the regulations requirements may impact on operations and maintenance practices which may ultimately impact on supply of drinking water to consumers.

Poor scores achieved under criteria E are an indication that SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems.

The Regulator urges the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Linking and classification of WTW and boreholes to all systems that do not have linked WTW or boreholes on IRIS.
- ✓ A and B: Installation and/or calibration of inflow meters to verify operational capacity for all supply systems. For any of the systems that are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015. Subsequent water quality results should then be provided to the Regulator through IRIS.
- ✓ D: Appointment of suitably qualified and training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Dikgatlong Local Municipality

Municipal BDRR Score: 63.4%

Assessment Areas	Barkley West	Blikfontein (Borehole)	Boetsap SAP (Borehole)	Delportshoop and Longlands (Sedibeng Water)
BULK / WSP				Sedibeng Water
A: Total Design Capacity (Ml/d)	8	N/I	N/I	36
B: % Operational Capacity in terms of design	10%	N/I	N/I	100%
C1a: % Microbiological Compliance	0%	0%	0%	100%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	51.9%
C2a: % Chemical Compliance	0%	0%	0%	99.8%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	6.5%
D: % Technical Skills	9.4%	0%	0%	100%
E: % Water Safety Plan Status	0%	0%	0%	54.6%
%BDRR/BDRR max	75.3%	100%	100%	31.2%

Assessment Areas	District Management Area - Other	Eierfontein (Borehole)	Gong-Gong (Borehole)	Holpan (Borehole)
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	100%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	12.5%	0%	0%	0%
C2a: % Chemical Compliance	100%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	2.9%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	54.5%	100%	100%	100%

Assessment Areas	Kalkfontein (Borehole)	Koopmansfontein	Longlands Clinic (Borehole)	Pniel (Borehole)
BULK / WSP		Sedibeng Water		
A: Total Design Capacity (Ml/d)	N/I	36	N/I	N/I
B: % Operational Capacity in terms of design	N/I	100%	N/I	N/I
C1a: % Microbiological Compliance	0%	60%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	47.5%	0%	0%
C2a: % Chemical Compliance	0%	59.8%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	5.3%	0%	0%
D: % Technical Skills	0%	100%	0%	0%
E: % Water Safety Plan Status	0%	54.6%	0%	0%
%BDRR/BDRR max	100%	80.2%	100%	100%

Assessment Areas	Pniel Estate (Borehole)	Spitskop (Borehole)	Stillwater	Ulco (Mine)
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	N/I
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	100%	100%	100%

Assessment Areas	Windsorton
BULK / WSP	
A: Total Design Capacity (Ml/d)	1
B: % Operational Capacity in terms of design	N/I
C1a: % Microbiological Compliance	0%
C1b: % Microbiological Monitoring Compliance	0%
C2a: % Chemical Compliance	0%
C2b: % Chemical Monitoring Compliance	0%
D: % Technical Skills	0%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	97.16%

WSA Overview

Seventeen drinking water supply systems under Dikgatlong LM were assessed. One supply system is in the low-risk rating category (achieved <50% BDRR), while another one system is in the medium-risk rating category (achieved between 50% and <70% BDRR) and two are in the high-risk rating category (achieved between 70% and <90% BDRR). Thirteen supply systems achieved critical-risk rating (achieved ≥90% BDRR).

Under criteria A and B, only Barkley West, Koopmansfontein, Windsorton and Delportshoop & Longlands supply systems have linked WTW on IRIS. Koopmansfontein, Delportshoop & Longlands supply systems are operating at 100% of design capacity indicating insufficient treatment capacity to supply current and future requirements. The remainder of the supply systems do not have linked WTW or boreholes on IRIS and this impacted on the scores achieved under criteria A and B. Unavailability of flow monitoring information can impact on the municipality's planning process and also effect implementation of water conservation and demand management.

With regards to criteria C, drinking water quality monitoring is only undertaken at three water supply systems, namely, District Management Area, Koopmansfontein and Delportshoop & Longlands. District Management Area and Delportshoop & Longlands supply systems achieved excellent microbiological and chemical compliance. However inadequate alignment of the monitoring programmes to SANS 241:2015 requirements reduced the Regulator's confidence in the quality of water supplied. Poor microbiological and chemical compliance was achieved at Koopmansfontein system, this coupled with inadequate alignment of monitoring programmes to SANS 241:2015 requirements means that the water supplied may pose serious health risks to the consumers. The remainder of the supply systems achieved 0% compliances under all requirements indicating that drinking water quality monitoring is not taking place. This

presents serious health risks to the consumers since the quality of water supplied cannot be verified or guaranteed and should be urgently addressed. The WSA and WSP should urgently address these non-compliant issues to reduces the associated health risks.

Only Koopmansfontein and Delportshoop & Longlands supply systems achieved excellent scores under criteria D. The remainder of the systems achieved poor scores, indicating inadequate alignment of supervisors, process controllers and maintenance teams to the Regulations requirements. Inadequate alignment of staff to the regulations requirements may impact on operation and maintenance practices which may ultimately impact on supply of drinking water to consumers.

SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at most supply systems and this impacted on scores under criteria E.

The Regulator urges the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Linking and classification of WTW and boreholes to all systems that do not have linked WTW or boreholes on IRIS.
- ✓ A and B: Installation and/or calibration of inflow meters to verify operational capacity for all supply systems. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015. Subsequent water quality results should then be provided to the Regulator through IRIS.
- ✓ D: Appointment of suitably qualified and training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Emthanjeni Local Municipality

Municipal BDRR Score: 55.1%

Assessment Areas	Britstown Borehole Scheme	De Aar Borehole Scheme	Hanover Borehole Scheme
BULK / WSP			
A: Total Design Capacity (Ml/d)	0.04	0.2	0.04
B: % Operational Capacity in terms of design	N/I	N/I	N/I
C1a: % Microbiological Compliance	83.7%	86.8%	88.9%
C1b: % Microbiological Monitoring Compliance	91.7%	90.3%	91.7%
C2a: % Chemical Compliance	90%	90.6%	90%
C2b: % Chemical Monitoring Compliance	2.9%	2.9%	2.9%
D: % Technical Skills	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	55.1%	55.1%	55.1%

WSA Overview

Three drinking water supply systems under Emthanjeni LM were assessed and both supply systems achieved a medium-risk ratings.

Design capacity information was provided for all supply systems. However, none of the supply systems has operational capacity information and this impacted on the scores under criteria B. Unavailability of flow monitoring information can impact on the municipality's planning process and also affect implementation of water conservation and demand management.

Although water quality monitoring is taking place at all the supply systems, all these systems achieved poor microbiological and chemical compliance. This, coupled with inadequate alignment of chemical monitoring programmes to SANS 241:2015 requirements indicates that the water supplied also presents serous health risks to the consumers. Therefore, the Regulator urges the WSA to urgently address this. All supply systems microbiological monitoring programmes are aligned to SANS 241:2015 requirements.

All supply systems also achieved poor score under criteria D and E. This indicates that the supply systems supervisors, process controllers and maintenance teams are not adequately aligned to the set criteria and also that there are no SANS 241:2015 and WHO aligned Water Safety Plans. This should be addressed as it has the potential to impact of the WSAs ability to delivery safe drinking water to the consumers.

The Regulator urges Emthanjeni LM to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and calibration of inflow meters to verify operational capacity for all supply systems. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Alignment of chemical water quality monitoring programmes to SANS 241:2015 requirements in terms of frequency, coverage and number of samples.
- ✓ D: Appointment of suitably qualified and training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Gamagara Local Municipality

Municipal BDRR Score: 56.5%

Assessment Areas	Dibeng (Boreholes)	Kathu (Kathu WTW, Boreholes, Vaal Gamagara Bulk Supply)	Olifantshoek (Vaal Gamagara Bulk Supply Pipeline)
BULK / WSP		Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	0.68	40.5	36
B: % Operational Capacity in terms of design	100%	24.2%	100%
C1a: % Microbiological Compliance	50%	60%	100%
C1b: % Microbiological Monitoring Compliance	25.0%	45%	46.7%
C2a: % Chemical Compliance	93%	59.2%	99.2%
C2b: % Chemical Monitoring Compliance	11.8%	19.4%	24.1%
D: % Technical Skills	43.8%	71.3%	75%
E: % Water Safety Plan Status	0%	11.8%	9.1%
%BDRR/BDRR max	93.5%	78.5%	31.1%

WSA Overview

Three drinking water supply systems were assessed under Gamagara LM. Olifantshoek supply system achieved a low-risk rating while Kathu supply systems achieved a high-risk rating and Dibeng supply system achieved a critical-risk rating.

For criteria A and B, design and operational capacity information was provided for all systems. However, Sutherland and Williston systems are operating at 100% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

Under criteria C, Dibeng system and Kathu supply systems achieved poor microbiological and chemical compliance. This, coupled with inadequate alignment of monitoring programmes to SANS 241:2015 requirements indicates that the water supplied presents serous health risks to the consumers. Therefore, the Regulator urges the WSA to urgently address this. Although Olifantshoek system achieved excellent microbiological and chemical compliance, inadequate alignment of monitoring programmes to SANS 241:2015 requirements reduces the Regulators confidence in the quality of water supplied.

Adequate scores achieved for Kathu and Olifantshoek supply systems under criteria D indicate that process control staff is adequately aligned to the regulations requirements. However, maintenance team information for these supply systems is lacking. The Dibeng system achieved an inadequate score indicating that process control staff and maintenance teams are not adequately aligned to the regulations requirements. This should be addressed to reduce the potential impacts on the ability to deliver safe drinking water to consumers.

With regards to criteria E, all supply systems achieved poor scores indicating that SANS 241:2015 and a WHO aligned Water Safety Planning process has not been adequately adopted and implemented.

The Regulator urges the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Planning and budgeting to address capacity exceedance at all WTW operating above 90% of design.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times/
- ✓ Cb: Implementation of microbiological and chemical monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Ga-Segonyana Local Municipality

Municipal BDRR Score: 45.1%

Assessment Areas	Bankhara - Bodulong (Ga-Segonyana LM)	Batlharos / Maruping (GLM Boreholes)	Ditshoswaneng (GLM Boreholes)	Galotolo (GLM Boreholes)
BULK / WSP		Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	1	4.11	0.58	0.35
B: % Operational Capacity in terms of design	85%	62.8%	84.3%	13.6%
C1a: % Microbiological Compliance	68.4%	83.8%	83.3%	94.7%
C1b: % Microbiological Monitoring Compliance	52.8%	58.3%	50%	66.7%
C2a: % Chemical Compliance	96.5%	98.5%	96.6%	94.6%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%	11.8%	11.8%
D: % Technical Skills	0%	25%	25%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	49.8%	45.5%	48.7%	49.7%

Assessment Areas	Gamopedi (GLM Boreholes)	Gantatelang (GLM Boreholes)	Garuele (GLM Boreholes)	Gasebolao (GLM Boreholes)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	1.12	0.95	0.35	1.21
B: % Operational Capacity in terms of design	41.2%	17.8%	16.2%	2.5%
C1a: % Microbiological Compliance	92.9%	76.5%	90.9%	93.8%
C1b: % Microbiological Monitoring Compliance	58.3%	62.5%	41.7%	54.2%
C2a: % Chemical Compliance	93.8%	98%	92.4%	95.8%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%	11.8%	11.7%
D: % Technical Skills	0%	25%	25%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	60.2%	39.9%	75.1%	45.5%

Assessment Areas	Gasehubane (GLM Boreholes)	Kagung (GLM Boreholes	Kuruman - Wrenchville (Ga-Segonyana LM)	Lokaleng (GLM Boreholes)
BULK / WSP	Sedibeng Water	Sedibeng Water		Sedibeng Water
A: Total Design Capacity (Ml/d)	0.09	1.73	30	0.3
B: % Operational Capacity in terms of design	75.6%	43.9%	92%	31.5%
C1a: % Microbiological Compliance	100%	80.7%	89.4%	91.7%
C1b: % Microbiological Monitoring Compliance	41.7%	75%	100%	37.5%
C2a: % Chemical Compliance	95.7%	97.1%	97.0%	97.2%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%	11.8%	11.8%
D: % Technical Skills	25%	25%	25%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	29.6%	42.3%	40.5%	56.5%

Assessment Areas	Magobe / Magojaneng (GLM Boreholes)	Mapoteng / Mothibistad (GLM Boreholes)	Mokalamosesane (GLM Boreholes)	Ncweng (GLM Boreholes
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	1.73	7.74	0.52	0.86
B: % Operational Capacity in terms of design	148.7%	60.8%	12.9%	16%
C1a: % Microbiological Compliance	94.1%	89.3%	70.6%	85.7%
C1b: % Microbiological Monitoring Compliance	72.2%	91.7%	62.5%	58.3%
C2a: % Chemical Compliance	96.0%	93.7%	97.4%	96.6%
C2b: % Chemical Monitoring Compliance	11.8%	14.7%	14.7%	11.8%
D: % Technical Skills	25%	25%	25%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	47.1%	54.5%	42.3%	44.7%

Assessment Areas	Pietbos (GLM Boreholes)	Sedibeng (GLM Boreholes)	Seven Miles (GLM Boreholes)	Slouya (GLM Boreholes)
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	0.43	0.39	0.52	0.43
B: % Operational Capacity in terms of design	29.2%	31.1%	158.5%	4.6%
C1a: % Microbiological Compliance	86.7%	78.6%	84.2%	92.3%
C1b: % Microbiological Monitoring Compliance	54.2%	75%	66.7%	45.8%
C2a: % Chemical Compliance	89.9%	95.5%	97.7%	94.6%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%	11.8%	11.8%
D: % Technical Skills	25%	25%	25%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	61.1%	50.5%	54.3%	67.5%

Assessment Areas	Thamoyanche (GLM Boreholes)	Vergenoeg (GLM Boreholes)
BULK / WSP	Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	0.43	0.95
B: % Operational Capacity in terms of design	167.9%	25.2%
C1a: % Microbiological Compliance	100%	91.7%
C1b: % Microbiological Monitoring Compliance	25%	41.7%
C2a: % Chemical Compliance	93.1%	98.5%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%
D: % Technical Skills	25%	25%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	46.1%	52.5%

WSA Overview

Twenty-two drinking water supply systems under Ga-Segonyana LM were assessed. Thirteen supply systems are in the low-risk rating category (achieved <50% BDRR), while seven systems are in the medium-risk rating category (achieved between 50% and <70% BDRR), and two system are in the high-risk rating category (achieved between 70% and <90% BDRR).

Design and operational capacity figure were provided for all supply systems. However, most supply systems operational capacities are very low and this may be errors or may be an indication that flow meters are not calibrated and the WSA is encouraged to verify this. Four supply systems are operating above 90% of the design capacity indicating insufficient treatment capacity to supply current and future requirements.

Criteria C reports on the actual water quality in the supply systems. Gasehubane supply system achieved excellent microbiological and good chemical compliance. However, inadequate alignment of the associated monitoring programmes to SANS 241:2015 requirements reduces the Regulators confidence in the quality of water supplied. The remainder of the supply systems achieved poor microbiological and/or chemical compliance. This coupled with inadequate alignment of monitoring programmes to SANS 241:2015 requirements means that the water supplied may present health risks to the consumers. Therefore, the WSA is urged to urgently address this.

Under criteria D, all supply systems achieved poor scores and this indicates inadequate alignment of supervisors, process controllers and maintenance teams to the regulations requirements. Inadequate alignment of staff to the regulations requirements may impact on operation and maintenance practices which may ultimately impact on supply of drinking water to consumers.

With regards to criteria E, SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems and this impacted on scores under this criterion.

The Regulator encourages the WSA and WSP to implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and/or calibration of inflow meters to verify operational capacity for all supply systems. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Hantam Local Municipality

Municipal BDRR Score: 19.6%

Assessment Areas	Brandvlei	Calvinia	Loeriesfontein	Middelpos
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	4	0.6	0.36
B: % Operational Capacity in terms of design	58.3%	25.0%	40.0%	5.5%
C1a: % Microbiological Compliance	96.8%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	66.7%
C2a: % Chemical Compliance	84.4%	92.9%	79%	72.5%
C2b: % Chemical Monitoring Compliance	91.2%	91.2%	91.2%	91.2%
D: % Technical Skills	35.4%	37.5%	35.4%	35.4%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	21.8%	20.6%	18.8%	15.8%

Assessment Areas	Nieuwoudtville	Swartkop
BULK / WSP		
A: Total Design Capacity (Ml/d)	1	0.64
B: % Operational Capacity in terms of design	26.8%	5.3%
C1a: % Microbiological Compliance	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%
C2a: % Chemical Compliance	93.3%	87.8%
C2b: % Chemical Monitoring Compliance	91.2%	91.2%
D: % Technical Skills	35.4%	16.7%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	18.8%	15.7%

WSA Overview

Six drinking water supply systems were assessed under Hantam LM and all supply systems achieved low BDRR. The WSA is commended for that.

Design and operational capacity figure were provided for all supply systems. However, most supply systems operational capacities are very low. This may be errors or may be an indication that flow meters are not calibrated and the WSA is encouraged to verify this.

For criteria C, all supply systems achieved good to excellent microbiological compliance and the associated monitoring programmes are adequately aligned to SANS 241:2015 requirements. This indicates that the water supplied may not pose serious health risks associated with microbiological contamination. Although, all supply systems chemical monitoring programmes are adequately aligned to SANS 241:2015 requirements, poor chemical compliance achieved at all systems means that the water supplied may still carry some health and aesthetic risks to the consumers.

Under criteria D, all supply systems achieved inadequate scores and this indicates inadequate alignment of supervisors, process controllers and maintenance teams to the regulations requirements. Inadequate alignment of staff to the regulations requirements may impact on operation and maintenance practices which may ultimately impact on supply of drinking water to consumers.

With regards to criteria E, SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems and this impacted on scores under this criterion.

The Regulator urges the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Calibration of inflow meters to verify operational capacity for all supply systems. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Joe Morolong Local Municipality

Municipal BDRR Score: 61.3%

Assessment Areas	Black Rock	Bothetheletsa Groundwater Area: D41L-M2	Bothithong Groundwater Area: D41G-04	Churchill Groundwater Area: D41L-M10
BULK / WSP	Sedibeng Water			
A: Total Design Capacity (Ml/d)	36.00	1.17	0.43	0.18
B: % Operational Capacity in terms of design	100%	100%	100%	100%
C1a: % Microbiological Compliance	0%	100%	75.0%	100%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	95.5%	100%	97.3%
C2b: % Chemical Monitoring Compliance	0%	11.8%	11.8%	11.8%
D: % Technical Skills	100%	62.5%	34.4%	43.8%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	79%	32.3%	69.5%	22.2%

Assessment Areas	Dithakong Groundwater Area: D41G-02	Gasehunelo Groundwater Area: D41L-M9	Gasese Groundwater Area: D41L-K10	Heiso Groundwater Area: D41L-M8
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.24	0.89	0.04	0.13
B: % Operational Capacity in terms of design	100%	100%	100%	100%
C1a: % Microbiological Compliance	100%	100%	83.3%	100%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	100%	92.5%	98.5%	98.5%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%	11.8%	11.8%
D: % Technical Skills	43.8%	25%	25%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	19.6%	43.5%	70%	20.5%

Assessment Areas	Hotazel	Kikahela Groundwater Area: D41L-M1	Laxey Groundwater Area: D41G-05	Maipeng Groundwater Area: D41L-K9
BULK / WSP	Sedibeng Water			
A: Total Design Capacity (Ml/d)	37.33	0.45	0.41	0.49
B: % Operational Capacity in terms of design	100%	100%	100%	100%
C1a: % Microbiological Compliance	100%	100%	90.9%	83.3%
C1b: % Microbiological Monitoring Compliance	47.9%	0%	0%	0%
C2a: % Chemical Compliance	99.7%	100%	90.8%	98.5%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%	11.8%	11.8%
D: % Technical Skills	78.3%	43.8%	25.0%	25.0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	26.9%	19.6%	91.2%	70%

Assessment Areas	Mamatwan / Hotazel Ground Water Area: D41K-G2	Mamatwane	Manyeding A Groundwater Area: D41L-M5	Manyeding Lower Groundwater Area: D41L-M6
BULK / WSP		Sedibeng Water		
A: Total Design Capacity (Ml/d)	0.17	36	0.69	0.14
B: % Operational Capacity in terms of design	100%	100%	100%	100%
C1a: % Microbiological Compliance	100%	60%	50.0%	100%
C1b: % Microbiological Monitoring Compliance	0%	44.6%	0%	0%
C2a: % Chemical Compliance	100%	59.7%	90.9%	98.5%
C2b: % Chemical Monitoring Compliance	11.8%	7.1%	11.8%	11.8%
D: % Technical Skills	25.0%	100%	25%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	20.5%	79.0%	88.1%	20.5%

Assessment Areas	Mc Carthy's Rus (Boreholes)	Metsetswaneng Groundwater Area: D41L-M7	Middelputz (Boreholes)	Severn SAPS (Borehole)
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	0.57	N/I	N/I
B: % Operational Capacity in terms of design	N/I	100%	N/I	N/I
C1a: % Microbiological Compliance	0%	83.3%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	96.9%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	11.8%	0%	0%
D: % Technical Skills	25%	25%	25%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	99.2%	75.3%	99.2%	99.2%

Assessment Areas	Severn School (Borehole)	Tsineng Groundwater Area: D41L-M11	Van Zylsrus (Boreholes)	Ward 1 Heuningvlei Area
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	0.26	0.5	2.03
B: % Operational Capacity in terms of design	N/I	100%	100%	100%
C1a: % Microbiological Compliance	0%	87.5%	100%	100%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	98.9%	100%	100%
C2b: % Chemical Monitoring Compliance	0%	11.8%	11.8%	11.8%
D: % Technical Skills	25%	25%	62.5%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	99.2%	70%	18.6%	27.7%

WSA Overview

Twenty-four drinking water supply systems under Joe Morolong LM were assessed. Eleven of these supply systems are in the low-risk rating category (achieved <50% BDRR), while one is in the medium-risk rating category (achieved between 50% and <70% BDRR), and seven are in the high-risk rating category (achieved between 70% and <90% BDRR). Five supply systems achieved a critical-risk rating (achieved ≥90% BDRR).

McCarthy's Rus, Middelputz, Severn SAPS and Severn School boreholes systems do not have any linked WTW or boreholes on IRIS, therefore design and operational capacity figures are not available and this affected scores under criteria A and B. Design capacity information was provided for the remainder of the supply systems. However, these supply systems are all indicated to be operating at 100% of design capacity. This maybe an indication that flow monitoring is not taking place and estimated values were presented. Nonetheless, capacity exceedance indicates that the supply systems may not be able to meet current and future demands.

For criteria C, Black Rock, McCarthy's Rus, Middelputz, Severn SAPS and Severn School systems achieved 0% compliances under all requirements indicating that drinking water quality monitoring is not taking place. This presents serious health risks to the consumers since the quality of water supplied cannot be verified or guaranteed and should be urgently addressed. Ten supply systems achieved excellent microbiological compliance and acceptable to excellent chemical compliance. However, the associated monitoring programmes are not aligned to SANS 241:2015 requirements and this reduced the Regulators confidence in the quality of water supplied. The remainder of the supply systems achieved poor microbiological and/or chemical compliance, and this, coupled with inadequate alignment of monitoring programmes to SANS 241:2015 requirements, indicates that the water supplied may present serious health risks to the consumers. Therefore, the WSA and WSP are urged to address these non-compliant issues.

With regards to criteria E, SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems and this impacted on scores under this criterion.

- ✓ A and B: Linking and classification of boreholes to McCarthy's Rus, Middelputz, Severn SAPS and Severn School boreholes as these are not linked on IRIS.
- ✓ A and B: Installation and/or calibration of inflow meters to verify operational capacity for all supply systems. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Kamiesberg Local Municipality

Municipal BDRR Score: 55.4%

Assessment Areas	Garies	Hondeklipbaai	Kamassies	Kamieskroon
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	0.5	0.5	0.5
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	83.3%	75.0%	100%	85.7%
C1b: % Microbiological Monitoring Compliance	25.0%	33.3%	50%	29.2%
C2a: % Chemical Compliance	75%	75%	75%	93.8%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	96.9%	82.9%	44.3%	96.9%

Assessment Areas	Kharkams	Kheis	Klipfontein	Koiingnaas
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	5	5	0.5
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	75%	85.7%	100%	87.5%
C1b: % Microbiological Monitoring Compliance	16.7%	29.2%	29.2%	33.3%
C2a: % Chemical Compliance	75%	92.9%	100%	78.1%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	96.9%	97.4%	39.6%	82.9%

Assessment Areas	Leliefontein	Lepelfontein	Nourivier	Paulshoek
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	5	0.5	0.5
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	100%	100%	100%	83.3%
C1b: % Microbiological Monitoring Compliance	25%	25%	25%	25%
C2a: % Chemical Compliance	100%	100%	95.8%	75%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	26.2%	39.5%	36.8%	96.9%

Assessment Areas	Rooifontein	Soebatsfontein	Spoegrivier	Tweerivier
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	2	5	0.5
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	25%	29.2%	25%	25%
C2a: % Chemical Compliance	100%	96.9%	100%	73.1%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	26.2%	38.3%	39.5%	47.4%

WSA Overview

Sixteen drinking water supply systems under Kamiesberg LM were assessed. Nine of these supply systems are in the low-risk rating category (achieved <50% BDRR), while two systems are in the high-risk rating category (achieved between 70% and <90% BDRR) and five systems are in the critical-risk rating category (achieved ≥90% BDRR).

For criteria A and B, design capacity information was provided for all supply systems. However, all supply systems do not have operational capacity information, indicating that flow monitoring may not be taking place and this impacted on the scores under criteria B. Unavailability of flow monitoring information can impact on the municipality's planning process and also affect implementation of water conservation and demand management initiatives.

With regards to criteria C: Leliefontein, Lepelfontein, Nourivier, Spoegrivier, Rooifontein, Soebatsfontein and Klipfontein systems achieved excellent microbiological and chemical compliance. However, inadequate alignment of the monitoring programmes to SANS 241:2015 requirements has reduced the Regulator's confidence in the quality of water supplied. The remainder of the supply systems achieved poor microbiological and/or chemical compliance and this coupled with inadequate monitoring compliance indicated that the water supplied may presents serious health risks to the consumers and should be urgently addressed.

Under criteria D, all supply systems achieved poor scores and this indicates inadequate alignment of supervisors, process controllers and maintenance teams to the regulations requirements. Inadequate alignment of staff to the regulation requirements may impact on operations and maintenance practices which may ultimately impact on supply of drinking water to consumers.

With regards to criteria E, SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems and this impacted on scores under this criterion.

The Regulator urges the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and calibration of inflow meters to verify operational capacity for all supply systems. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Kareeberg Local Municipality

Municipal BDRR Score: 23.9%

Assessment Areas	Carnarvon	Vanwyksvlei	Vosburg
BULK / WSP			
A: Total Design Capacity (Ml/d)	0.8	0.07	0.5
B: % Operational Capacity in terms of design	100%	100%	100%
C1a: % Microbiological Compliance	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	54.2%	33.3%	33.3%
C2a: % Chemical Compliance	92.9%	91.4%	95.2%
C2b: % Chemical Monitoring Compliance	88.2%	85.3%	85.3%
D: % Technical Skills	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	25.8%	23.5%	20.9%

WSA Overview

Kareeberg LM has three drinking water supply systems and all supply systems achieved low Blue Drop Risk Ratings. The Regulator commends the municipality for the good performance of all its systems.

With regards to operational capacity, all supply systems are indicated to be operating at 100% of design capacity. This maybe an indication that flow monitoring is not taking place and estimated values were presented. Nonetheless, capacity exceedance indicates that the supply systems may not be able to meet current and future demands.

Under criteria C, Vosburg supply system achieved excellent microbiological and good chemical compliance. The chemical monitoring programme is also adequately aligned to SANS 241:2015 requirements. However, inadequate alignment of microbiological monitoring programmes to SANS 241:2015 requirements reduces the Regulators confidence in the quality of water supplied. Although Carnarvon and Vanwyksvlei supply systems achieved excellent microbiological compliance, unacceptable chemical compliance and inadequate alignment of microbiological monitoring programmes to SANS 241:2015 requirements means that the water supplied may still present health risks to the consumers.

All supply systems also achieved poor score under criteria D and E. This indicates that the supply systems supervisors, process controllers and maintenance teams are not adequately aligned to the set criteria and also that there are no SANS 241:2015 and WHO aligned Water Safety Plans. This should be addressed as it has the potential to impact of the WSAs ability to delivery safe drinking water to the consumers.

The Regulator encourages the WSA to urgently implement the following recommendations to maintain low BDRR and ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and/or calibration of inflow meters to verify operational capacity for all supply systems. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ C: Implementation of chemical water quality monitoring programmes which are aligned to SANS 241:2015 requirements in terms of frequency, coverage and number of samples.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Karoo Hoogland Local Municipality

Municipal BDRR Score: 31.6%

Assessment Areas	Fraserburg	Sutherland	Williston
BULK / WSP			
A: Total Design Capacity (Ml/d)	0.5	0.5	0.5
B: % Operational Capacity in terms of design	80%	100%	100%
C1a: % Microbiological Compliance	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	54.2%	58.3%	45.8%
C2a: % Chemical Compliance	90.5%	100%	94.4%
C2b: % Chemical Monitoring Compliance	0%	0%	0%
D: % Technical Skills	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	39.9%	18.7%	36.1%

WSA Overview

All three drinking water supply systems under Karoo Hoogland LM achieved low Blue Drop Risk Ratings.

Design and operational capacity information was provided for all systems. However, Sutherland and Williston systems are operating at 100% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

Criteria C reports on the actual water quality in the supply systems. Sutherland supply system achieved excellent microbiological and chemical compliance. However, inadequate alignment of monitoring programmes to SANS 241:2015 requirements reduces the Regulators confidence in the quality of water supplied. Although Fraserburg and Williston supply systems achieved excellent microbiological compliance, unacceptable chemical compliance and inadequate alignment of monitoring programmes to SANS 241:2015 requirements means that the water supplied may still present health risks to the consumers.

Under criteria D, all supply systems achieved poor scores and this indicates inadequate alignment of supervisors, process controllers and maintenance teams to the regulations requirements. Inadequate alignment of staff to the regulations requirements may impact on operation and maintenance practices which may ultimately impact on supply of drinking water to consumers.

With regards to criteria E, SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems and this impacted on scores under this criterion.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to maintain low-risk ratings and ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Planning and budgeting to addresses capacity exceedance at Sutherland and Williston supply systems which are operating above 90% of design.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times
- ✓ C: Alignment of microbiological and chemical water quality monitoring programmes to SANS 241:2015 requirements in terms of frequency, coverage and number of samples.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Kgatelopele Local Municipality

Municipal BDRR Score: 89.2%

Assessment Areas	Danielskuil (Boreholes)	Idwala (Boreholes)	Lime Acres De Beers (Sedibeng)	Owendale (Boreholes)
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.46	N/I	N/I	N/I
B: % Operational Capacity in terms of design	100%	N/I	N/I	N/I
C1a: % Microbiological Compliance	100%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	58.3%	0%	0%	0%
C2a: % Chemical Compliance	99.4%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	14.7%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	18.7%	100%	100%	100%

WSA Overview

Kgatelopele LM has four drinking water supply systems in their area of jurisdiction. One supply system (Danielskuil) achieved a low-risk rating while the other three systems achieved critical-risk ratings.

Under Criteria A and B, Idwala, Lime Acres De Beers and Owendale do not have any linked WTW or boreholes on IRIS and this affected scores under criteria A and B. Danielskuil system has both design and operational capacity information. However, the system is operating at 100% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

With regards to criteria C, Idwala, Lime Acres De Beers and Owendale systems achieved 0% compliances under all requirements indicating that drinking water quality monitoring is not taking place. This presents serious health risks to the consumers since the quality of water supplied cannot be verified or guaranteed and should be urgently addressed. Danielskuil achieved excellent microbiological and chemical compliance, however, inadequate alignment of monitoring programmes to SANS 241:2015 requirements reduces the Regulators confidence in the quality of water supplied.

All supply systems also achieved poor scores under criteria D and E. This indicates that the supply systems supervisors, process controllers and maintenance teams are not adequately aligned to the set criteria and also that there are no SANS 241:2015 and WHO aligned Water Safety Plans. This should be addressed as it has the potential to impact of the WSAs ability to delivery safe drinking water to the consumers.

The Regulator urges the WSA (and WSP) to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Linking and classification of WTW or boreholes to Idwala, Lime Acres De Beers and Owendale supply systems. Operational capacity information should also be provided.
- ✓ C: Implementation of microbiological and chemical water quality monitoring programmes which are aligned to SANS 241:2015 requirements in terms of frequency, coverage and number of samples. Subsequent water quality results should then be provided to the Regulator through IRIS.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Khai-Ma Local Municipality

Municipal BDRR Score: 73%

Assessment Areas	Onseepkans (Melkbosrand WTW)	Onseepkans (RK)	Pofadder / Aggeneys (Pelladrift)	Witbank
BULK / WSP			Sedibeng Water	
A: Total Design Capacity (Ml/d)	0.5	0.5	12	0.5
B: % Operational Capacity in terms of design	100%	100%	5%	100%
C1a: % Microbiological Compliance	0%	0%	58.3%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	11.3%	0%
C2a: % Chemical Compliance	0%	0%	52.2%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	1.8%	0%
D: % Technical Skills	8.3%	8.3%	12.5%	8.3%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	92%	92%	70.6%	92%

WSA Overview

Four drinking water supply systems under Khai-Ma LM area of jurisdiction were assessed. Pofadder/Aggeneys supply system achieved a high-risk rating while Onseepkans - Melkbosrand, Onseepkans - RK and Witbank supply systems achieved critical-risk ratings.

Onseepkans - Melkbosrand, Onseepkans - RK and Witbank supply systems are all indicated to be operating at 100% of design capacity. This maybe an indication that flow monitoring is not taking place and estimated values were presented. Nonetheless, capacity exceedance indicates that the supply systems may not be able to meet current and future demands. Pelladrift WTW is indicated to be operating at 5%. This value may not be an error or an indication that flow meters are not calibrated and should be verified.

Criteria C reports on the actual water quality in the supply systems. The three systems in the critical-risk rating category achieved 0% compliances under all requirements indicating that drinking water quality monitoring is not taking place. This presents serious health risks to the consumers since the quality of water supplied cannot be verified or guaranteed and should be urgently addressed. Although water quality monitoring is taking place at Pofadder/Aggeneys system, this system achieved poor microbiological and chemical compliance. This, coupled with inadequate alignment of monitoring programmes to SANS 241:2015 requirements indicates that the water supplied also presents serous health risks to the consumers. Therefore, the Regulator urges the WSA to urgently address this.

All supply systems also achieved poor scores under criteria D, indicating inadequate alignment of supervisors, process controllers and maintenance teams to the regulations requirements. Inadequate alignment of staff to the regulations requirements may impact on operation and maintenance practices which may ultimately impact on supply of drinking water to consumers.

With regards to criteria E, SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems and this impacted on scores under this criterion.

The Regulator urges the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and/or calibration of inflow meters to verify operational capacity for all supply systems. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ C: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times. Implementation of microbiological and chemical water quality monitoring programmes which are aligned to SANS 241:2015 requirements in terms of frequency, coverage and number of samples.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks

Magareng Local Municipality

Municipal BDRR Score: 72.1%

Assessment Areas	Majeng Water Tank (Private)	Malekos Farm (Private)	Nazareth House (Private)	Warrenton
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	8.4
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	84.6%	63.6%	0%	91.7%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	75%
C2a: % Chemical Compliance	85.7%	83.1%	0%	84.1%
C2b: % Chemical Monitoring Compliance	2.9%	2.9%	0%	61.8%
D: % Technical Skills	0%	0%	0%	65.6%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	100%	100%	100%	62.1%

WSA Overview

Four drinking water supply systems under Magareng LM area of jurisdiction were assessed. Warrenton supply system achieved a medium-risk rating while Majeng, Malekos Farm and Nazareth House supply systems achieved critical-risk ratings.

Majeng, Malekos Farm and Nazareth do not have any linked WTW or boreholes on IRIS and this affected scores under criteria A and B. Warrenton system only has design capacity information, this indicates that flow monitoring may not be taking place. Unavailability of flow monitoring information can impact on the municipality's planning process and also effect implementation of water conservation and demand management.

With regards to criteria C, the Nazareth House system achieved 0% compliances under all requirements indicating that drinking water quality monitoring is not taking place. This presents serious health risks to the consumers since the quality of water supplied cannot be verified or guaranteed and should be urgently addressed. Although water quality monitoring is taking place at the other three systems, all these systems achieved poor microbiological and chemical compliance. This, coupled with inadequate alignment of monitoring programmes to SANS 241:2015 requirements, indicates that the water supplied also presents serious health risks to the consumers. Therefore, the Regulator urges the WSA to urgently address this.

Only Warrenton system achieved a fair score while other supply systems achieved poor scores under criteria D. This indicates inadequate alignment of supervisors, process controllers and maintenance teams to the regulations requirements. Inadequate alignment of staff to the regulations requirements may impact on operation and maintenance practices which may ultimately impact on supply of drinking water to consumers.

SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems and this impacted on scores under criteria E.

The Regulator urges the WSA to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Classification and linking of WTW or boreholes to all supply systems that do not have linked WTW and boreholes on IRIS.
- ✓ A and B : Installation and/or calibration inflow meters to verify operational capacity for all supply systems. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ C: Development and implementation of microbiological and chemical monitoring programmes with sufficient samples and adequate frequency based on population size as outlined in SANS 241:2015. This is especially applicable for Nazareth House system where water quality monitoring is not taking place. Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Nama Khoi Local Municipality

Municipal BDRR Score: 29.3%

Assessment Areas	Bergsig	Buffelsrivier	Bulletrap	Carolusberg
BULK / WSP	Sedibeng Water		Sedibeng Water	Sedibeng Water
A: Total Design Capacity (Ml/d)	18	2	18	18
B: % Operational Capacity in terms of design	53.3%	16.4%	53.3%	53.3%
C1a: % Microbiological Compliance	100%	75.0%	100%	100%
C1b: % Microbiological Monitoring Compliance	47.2%	50.0%	50.6%	44%
C2a: % Chemical Compliance	100%	97.9%	99.1%	100%
C2b: % Chemical Monitoring Compliance	1.8%	0%	1.8%	1.8%
D: % Technical Skills	87.5%	25%	87.5%	87.5%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	25.6%	42.3%	25.6%	26.8%

Assessment Areas	Concordia	Fonteintjie	Goodhouse	Kommagas
BULK / WSP	Sedibeng Water	Sedibeng Water		
A: Total Design Capacity (Ml/d)	18	18	0.35	0.67
B: % Operational Capacity in terms of design	53.3%	53.3%	20.5%	48.8%
C1a: % Microbiological Compliance	100%	96.4%	70.0%	81.8%
C1b: % Microbiological Monitoring Compliance	45.6%	45.5%	41.7%	45.8%
C2a: % Chemical Compliance	100%	100%	100%	100%
C2b: % Chemical Monitoring Compliance	1.8%	1.8%	0%	0%
D: % Technical Skills	87.5%	87.5%	25%	25%
E: % Water Safety Plan Status	0%	0%	9.1%	100%
%BDRR/BDRR max	25.6%	54.7%	54.1%	55.3%

Assessment Areas	Matjieskloof	Nababeep	Okiep System	Rooiwal
BULK / WSP	Sedibeng Water	Sedibeng Water	Sedibeng Water	
A: Total Design Capacity (Ml/d)	18	18	18	0.5
B: % Operational Capacity in terms of design	53.3%	53.3%	53.3%	24.4%
C1a: % Microbiological Compliance	100%	100%	100%	83.3%
C1b: % Microbiological Monitoring Compliance	45.5%	47.1%	50.4%	50.0%
C2a: % Chemical Compliance	100%	99.3%	99.2%	100%
C2b: % Chemical Monitoring Compliance	1.8%	1.8%	1.8%	0%
D: % Technical Skills	87.5%	87.5%	87.5%	25%
E: % Water Safety Plan Status	0%	0%	0%	100%
%BDRR/BDRR max	26.8%	26.8%	25.6%	43.1%

Assessment Areas	Springbok	Steinkopf	Vioolsdrift
BULK / WSP	Sedibeng Water	Sedibeng Water	
A: Total Design Capacity (Ml/d)	18	18	0.5
B: % Operational Capacity in terms of design	53.3%	53.3%	22.0%
C1a: % Microbiological Compliance	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	43.9%	50.6%	50.0%
C2a: % Chemical Compliance	100%	99.1%	95.8%
C2b: % Chemical Monitoring Compliance	1.8%	1.8%	0%
D: % Technical Skills	87.5%	87.5%	25%
E: % Water Safety Plan Status	0%	0%	100%
%BDRR/BDRR max	26.8%	25.6%	29%

WSA Overview

Nama Khoi LM has fifteen drinking water supply systems in their area of jurisdiction and Sedibeng Water is the water services provider to the municipality. Twelve supply systems are in the low-risk rating category (achieved <50% BDRR) and three are in the medium-risk rating category (achieved between 50% and <70% BDRR),

For criteria A and B, design and operational capacity information was provided for all systems and all supply systems are operating well within the design capacity. This indicates that the risk of not meeting the current and future demands is low.

Under criteria C, eleven supply systems achieved acceptable to excellent microbiological and chemical compliance. However, inadequate alignment of the associated monitoring programmes reduces the Regulators confidence in the quality of the water supplied. Although Buffelsrivier, Goodhouse, Kommagas and Rooiwal supply systems achieved good to excellent chemical compliance, poor microbiological compliance coupled with inadequate alignment of chemical and microbiological monitoring programmes, means that the water supplied still present serious health risks to the consumers and the Regulator urges the WSA to urgently address this.

Ten supply systems achieved good scores under criteria D and this indicates that to some degree, process controllers and maintenance teams are aligned to the Regulation requirements. However, there is still room for improvement. The remaining five systems (Buffelsrivier, Goodhouse, Kommagas, Rooiwal and Vioolsdrift) achieved poor scores. This indicates inadequate alignment of supervisors, process controllers and maintenance teams to the regulations requirements. Inadequate alignment of staff to the regulations requirements may impact on operation and maintenance practices which may ultimately impact on supply of drinking water to consumers.

Kommagas, Rooiwal and Vioolsdrift achieved excellent scores for Criteria E: Water safety Planning. This indicates implementation of Water Safety Plans and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015. The remainder of the systems achieved poor scores and this indicates that a SANS 241:2015 and WHO aligned Water Safety Planning process including full SANS 241:2015 analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted for these supply systems.

The Regulator urges the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Phokwane Local Municipality

Municipal BDRR Score: 41.3%

Assessment Areas	Hartswater	Jan Kempdorp	Pampierstad (Managed by Sedibeng Water)
BULK / WSP			
A: Total Design Capacity (Ml/d)	5	5	9.2
B: % Operational Capacity in terms of design	N/I	N/I	89.1%
C1a: % Microbiological Compliance	97.9%	95.9%	98.8%
C1b: % Microbiological Monitoring Compliance	100%	100%	79.2%
C2a: % Chemical Compliance	85.6%	92.1%	97.4%
C2b: % Chemical Monitoring Compliance	8.8%	5.9%	32.4%
D: % Technical Skills	0%	0%	53.1%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	54.4%	58.2%	25%

WSA Overview

Three drinking water supply systems were assessed under Phokwane LM. One system (Pampierstad) achieved a low Blue Drop Risk Rating while the other two systems achieved a medium Blue Drop Risk Rating.

For criteria A and B, design capacity information was provided for all supply systems. However, only Pampierstad has operational capacity information. The other two supply systems do not have operational capacity information indicating that flow monitoring may not be taking place and this impacted on the scores under criteria B. Unavailability of flow monitoring information can impact on the municipality's planning process and also affect implementation of water conservation and demand management initiatives.

With regards to criteria C, only Pampierstad achieved excellent microbiological compliance. Hartswater and Jan Kempdorp achieved excellent microbiological monitoring compliance but the actual results indicate poor microbiological quality which presents a serious health risk to consumers. All systems did not achieve chemical compliance and did not have sufficient number of monitoring points to ensure delivery of safe drinking water at all points in the network

Only Pampierstad system achieved a fair score while the other supply systems achieved poor scores under criteria D. This indicates inadequate alignment of supervisors, process controllers and maintenance teams to the regulations requirements. Inadequate alignment of staff to the regulations requirements may impact on operation and maintenance practices which may ultimately impact on supply of drinking water to consumers.

SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems and this impacted on scores under criteria E.

The Regulator urges the WSA to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and calibration of inflow meters to verify operational capacity for Hartswater and Jan Kempdorp supply systems. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ C: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times. Alignment of chemical water quality monitoring programmes to SANS 241:2015 requirements in terms of frequency, coverage and number of samples.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Renosterberg Local Municipality

Municipal BDRR Score: 63.8%

Assessment Areas	Petrusville (from Vanderkloof)	Phillipstown Boreholes	Vanderkloof
BULK / WSP			
A: Total Design Capacity (Ml/d)	3.2	0.13	3.20
B: % Operational Capacity in terms of design	100%	100%	100%
C1a: % Microbiological Compliance	90.6%	87.5%	69%
C1b: % Microbiological Monitoring Compliance	66.7%	58.3%	66.7%
C2a: % Chemical Compliance	64.1%	79.2%	66.7%
C2b: % Chemical Monitoring Compliance	0%	0%	0%
D: % Technical Skills	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	63.8%	64.6%	63.8%

WSA Overview

Three drinking water supply systems under Renosterberg LM were assessed and all three supply systems achieved medium-risk ratings.

Under criteria A and B, design capacity information was provided for all supply systems. However, all supply systems are indicated to be operating at 100% of design capacity. This may be an indication that flow monitoring is not taking place and estimated values were presented. Nonetheless, capacity exceedance indicates that the supply systems may not be able to meet current and future demands.

With regards to criteria C, all supply systems achieved unacceptable microbiological and chemical compliance. This, coupled with inadequate alignment of associated monitoring programmes to SANS 241:2015 requirements, indicates that the water supplied may pose serious health risks to the consumers and should be addressed urgently.

All supply systems also achieved poor scores under criteria D, indicating inadequate alignment of supervisors, process controllers and maintenance teams to the regulations requirements. Inadequate alignment of staff to the regulations requirements may impact on operation and maintenance practices which may ultimately impact on supply of drinking water to consumers.

SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems and this impacted on scores under criteria E.

The Regulator urges the WSA to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and/or calibration of inflow meters to verify operational capacity for all three supply systems. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Alignment of microbiological and chemical water quality monitoring programmes to SANS 241:2015 requirements in terms of frequency, coverage and number of samples.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Richtersveld Local Municipality

Municipal BDRR Score: 97.3%

Assessment Areas	Eksteenfontein	Kuboes	Lekkersing	Port Nolloth / Alexander Baai (Alexcor & 8 Myl)
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.24	0.3	0.2	4
B: % Operational Capacity in terms of design	N/I	N/I	N/I	N/I
C1a: % Microbiological Compliance	0%	0%	0%	0%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	0%
C2a: % Chemical Compliance	0%	0%	0%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	96.9%	96.9%	96.9%	97.4%

Assessment Areas	Sanddrift
BULK / WSP	
A: Total Design Capacity (Ml/d)	0.1
B: % Operational Capacity in terms of design	N/I
C1a: % Microbiological Compliance	0%
C1b: % Microbiological Monitoring Compliance	0%
C2a: % Chemical Compliance	0%
C2b: % Chemical Monitoring Compliance	0%
D: % Technical Skills	0%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	96.9%

WSA Overview

Five drinking water supply systems under Richtersveld LM were assessed and all systems are in the critical-risk rating category. Design capacity information was provided for all supply systems. However, none of the supply systems has operational capacity information and this impacted on the scores under criteria B. Unavailability of flow monitoring information can impact on the municipality's planning process and also affect implementation of water conservation and demand management.

With regards to drinking water quality monitoring, no information was provided for all supply systems indicating that water quality monitoring may not be taking place. This presents serious health risks to the consumers as the quality of water supplied from these systems cannot be verified or guaranteed. Therefore, the WSA is urged to urgently address this to reduce the health risks to the consumers.

All supply systems also achieved poor scores under criteria D, indicating inadequate alignment of supervisors, process controllers and maintenance teams to the regulations requirements. Inadequate alignment of staff to the regulations requirements may impact on operation and maintenance practices which may ultimately impact on supply of drinking water to consumers.

The five supply systems within the WSA also achieved poor scores on Water Safety Plan availability indicating that SA241 and WHO aligned Water Safety Plans have not been developed and implemented in the WSA.

The Regulator is concerned with drinking water quality management by Richtersveld municipality and urges the municipality to implement the following measures to ensure delivery of safe drinking water for all consumers and improve risk ratings:

- ✓ A and B: Installation and calibration of inflow meters to verify operational capacity for all five supply systems. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ C: Development and implementation of microbiological and chemical monitoring programmes with sufficient samples and adequate frequency based on population size as outlined in SANS 241:2015. Subsequent water quality results should then be submitted to the Regulator through IRIS.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria. Existing staff can also be subjected to relevant training in order to meet the requirements.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Siyancuma Local Municipality

Municipal BDRR Score: 22.6%

Assessment Areas	Campbell Supply System	Douglas	Griekwastad Supply System	Schmidtsdrift Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.57	5	5.8	1.01
B: % Operational Capacity in terms of design	N/I	90%	100%	100%
C1a: % Microbiological Compliance	35%	87.3%	91.4%	44.4%
C1b: % Microbiological Monitoring Compliance	75%	52.1%	70.8%	37.5%
C2a: % Chemical Compliance	73.1%	84.9%	96.2%	61.3%
C2b: % Chemical Monitoring Compliance	5.9%	5.9%	5.9%	5.9%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	72.1%	63.8%	50.8%	81.8%

WSA Overview

Siyacuma LM has four drinking water supply systems. Douglas and Griekwastad systems achieved medium-risk ratings while Campbell and Schmidtsdrift systems achieved high-risk ratings.

With regards to operational capacity, no information on operational capacity information was provided for Campbell supply system indicating that flow monitoring may not be taking place. This did not only impact on the score achieved under criteria B but also impacts on the municipality's planning processes and implementation of water conservation and demand management initiatives. The remaining three systems are operating at or above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

Criteria C reports on the actual water quality in the supply systems. All supply systems achieved poor microbiological compliance and the associated monitoring programmes are not adequately aligned to SANS 241:2015 requirements. This coupled with poor chemical compliance (at three of the four systems) and inadequate alignment of monitoring programmes to SANS 241:2015 requirements, means that the water supplies may present serious health risks to the consumers. The Regulator urges the WSA to urgently address these risks to ensure delivery of safe water.

All supply systems also achieved poor scores under criteria D and E. This indicates that the supply systems supervisors, process controller and maintenance teams are not adequately aligned to the set criteria and also that there are no SANS 241:2015 and WHO aligned Water Safety Plans. This should be addressed as it has the potential to impact of the WSAs ability to delivery safe drinking water to the consumers.

The Regulator urges the WSA to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and calibration of inflow meters to verify operational capacity for Campbell supply system.
- ✓ A and B: Planning and budgeting to address capacity exceedance at all WTW operating at or above 90% of design capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ Cb: Implementation of monitoring programmes with sufficient number of samples and frequency based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Siyathemba Local Municipality

Municipal BDRR Score: 22.6%

Assessment Areas	Marydale Borehole System	Niekerkshoop Borehole System	Prieska Orange River
BULK / WSP			
A: Total Design Capacity (Ml/d)	1.20	0.98	15
B: % Operational Capacity in terms of design	65.0%	69.4%	38.5%
C1a: % Microbiological Compliance	97.8%	97.9%	100%
C1b: % Microbiological Monitoring Compliance	91.7%	100%	91.7%
C2a: % Chemical Compliance	88.4%	87.5%	94.5%
C2b: % Chemical Monitoring Compliance	76.5%	8.8%	85.3%
D: % Technical Skills	18.8%	18.8%	50%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	30.3%	41%	20.8%

WSA Overview

Siyathemba LM is commended for achieving low-risk ratings for all three drinking water supply systems in their area of jurisdiction.

With regards to criteria A and B, design and operational capacity figures were provided and all supply systems are operating well within capacity. This indicates that the risk of not meeting current and future supply demands is low.

Under criteria C, all three supply systems achieved good to excellent microbiological compliance and microbiological monitoring compliance. This indicates that the water supplied may not present health risks associated with microbiological contamination. However, poor chemical compliance achieved at all supply systems and inadequate alignment of chemical monitoring programmes (for Marydale and Niekerkshoop) to SANS 241:2015 requirements means that the water supplied may still present some health and aesthetic risks to consumers and this should be addressed urgently.

All supply systems achieved inadequate scores under criteria D This indicates that the supply systems process control staff and maintenance teams are not adequately aligned to the set criteria. SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems and this impacted on scores under criteria E. These should be addressed as they have potential to impact of the WSAs ability to delivery safe drinking water to the consumers.

The Regulator encourages the WSA to urgently implement the following recommendations to maintain low-risk ratings and ensure delivery of safe drinking water for all consumers

- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ C2b: Alignment of chemical monitoring programmes to SANS 241:2015 requirements (sample site, number of sample frequency and coverage) to ensure adequate monitoring compliance.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Sol Plaatje Local Municipality

Municipal BDRR Score: 58.8%

Assessment Areas	Kby Zone 16 : Riverton	Kby Zone A-E : Ritchie
BULK / WSP		
A: Total Design Capacity (Ml/d)	162	4.88
B: % Operational Capacity in terms of design	N/I	N/I
C1a: % Microbiological Compliance	98.4%	99.7%
C1b: % Microbiological Monitoring Compliance	100%	100%
C2a: % Chemical Compliance	88.1%	88.5%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%
D: % Technical Skills	37.5%	0%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	59.0%	53.1%

WSA Overview

Two drinking water supply systems under Sol Plaatje LM were assessed and both supply systems achieved medium-risk ratings.

No information on operational capacity information was provided for both supply systems indicating that flow monitoring may not be taking place. This did not only impact on the scores achieved under criteria B but also impacts on the municipality's planning processes and implementation of water conservation and demand management initiatives.

With regard to drinking water quality monitoring, both supply systems achieved excellent microbiological compliance and microbiological monitoring compliance. This indicates that the water does not present health risks associated with microbiological contamination. However, poor chemical compliance and inadequate alignment of chemical monitoring programmes to SANS 241:2015 requirements means that the water supplied may present some health and aesthetic risks to consumers and this should be addressed urgently.

Under criteria D, both supply systems achieved inadequate scores under criteria D. This indicates that the supply systems process control staff and maintenance teams are not adequately aligned to the set criteria. SANS 241:2015 and WHO aligned Water Safety Plans including full SANS 241:2015 analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems. These should be addressed as they have potential to impact of the WSAs ability to delivery safe drinking water to the consumers.

The Regulator urges the WSA to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and calibration of inflow meters to verify operational capacity at both WTW.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ C2b: Alignment of chemical monitoring programmes to SANS 241:2015 requirements (sample site, number of sample frequency and coverage) to ensure adequate monitoring compliance.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Thembelihle Local Municipality

Municipal BDRR Score: 25.7%

Assessment Areas	Hopetown (Orange River)	Strydenburg (Boreholes)
BULK / WSP		
A: Total Design Capacity (Ml/d)	5.6	0.13
B: % Operational Capacity in terms of design	94.6%	48.8%
C1a: % Microbiological Compliance	100%	98%
C1b: % Microbiological Monitoring Compliance	100%	100%
C2a: % Chemical Compliance	97.3%	97.0%
C2b: % Chemical Monitoring Compliance	5.9%	8.8%
D: % Technical Skills	27.1%	45.8%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	26%	16.4%

WSA Overview

Two drinking water supply systems under Thembelihle LM were assessed. Both supply systems achieved low-risk ratings and the WSA is commended for that.

Strydenburg supply system is operating well within capacity, indicating that the risk of not meeting current demands is low. However, Hopetown supply system is operating above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

With regards to criteria C, both supply systems achieved excellent microbiological and good chemical compliance and microbiological monitoring programmes are adequately aligned to SANS 241:2015 requirements. This indicates that the water is safe to drink in these systems. The chemical monitoring programmes alignment to SANS 241:2015 is lacking and this should be addressed.

Under criteria D, both supply systems achieved inadequate scores. This indicates that the supply systems process control staff and maintenance teams are not adequately aligned to the set criteria. SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems. These should be addressed as they have potential to impact of the WSAs ability to delivery safe drinking water to the consumers.

The Regulator urges the WSA to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Planning and budgeting to address capacity exceedance at Hopetown WTW which is operating above 90% of design.
- ✓ C2b: Alignment of chemical monitoring programmes to SANS 241:2015 requirements (sample site, number of sample frequency and coverage) to ensure adequate monitoring compliance.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Development and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Tsantsabane Local Municipality

Municipal BDRR Score: 50%

Assessment Areas	Groen Water Supply System	Jenn Heaven Supply System	Maremane Supply System	Postdene Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	0.5	0.5	3.5
B: % Operational Capacity in terms of design	100%	100%	100%	100%
C1a: % Microbiological Compliance	0%	100%	0%	100%
C1b: % Microbiological Monitoring Compliance	0%	4.2%	0%	12.5%
C2a: % Chemical Compliance	0%	0.0%	0%	87.2%
C2b: % Chemical Monitoring Compliance	0%	0.0%	0%	17.7%
D: % Technical Skills	62.5%	62.5%	62.5%	62.5%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	89.3%	39.8%	89%	43.5%

Assessment Areas	Postmasburg	Skeyfontein Supply System
BULK / WSP	Sedibeng Water	
A: Total Design Capacity (Ml/d)	44.15	0.5
B: % Operational Capacity in terms of design	68.9%	100%
C1a: % Microbiological Compliance	98.4%	0%
C1b: % Microbiological Monitoring Compliance	64.6%	0%
C2a: % Chemical Compliance	93.8%	0%
C2b: % Chemical Monitoring Compliance	12.4%	0%
D: % Technical Skills	89.6%	62.5%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	49.3%	89%

WSA Overview

Tsantsabane LM has six drinking water supply systems in their area of jurisdiction and Sedibeng water is the water services provider. Jenn Heaven, Postdene1 and Postdene2 supply systems achieved low-risk ratings while Groen Water, Maremane and Skeyfontein supply systems achieved high-risk ratings.

Under criteria A and B, design capacity information was provided for all supply systems. However, five (with the exception of Postdene) of the six supply systems are indicated to be operating at 100% of design capacity. This may be an indication that flow monitoring is not taking place and estimated values were presented. Nonetheless, capacity exceedance indicates that the supply systems may not be able to meet current and future demands.

With regarding to criteria C, Groen Water, Maremane and Skeyfontein supply systems achieved 0% compliances under all requirements indicating that drinking water quality monitoring is not taking place. This presents serious health risks to the consumers since the quality of water supplied cannot be verified or guaranteed and should be urgently addressed. Although Jenn Heaven, Postdene1 and Postdene2 supply systems achieved excellent microbiological compliance, poor chemical compliance and the inadequate alignment of monitoring programmes to SANS 241:2015 requirements means that the water supplied may still present health risks to the consumers and should be urgently addressed.

Postdene2 supply system achieved a good score while the remainder of the systems achieved fair scores under criteria D. This indicates that to some degree, process controllers and maintenance teams are aligned to the regulations requirements. However, there is still room for improvement.

SANS 241:2015 and WHO aligned Water Safety Plans including full SANS analysis, risk-based monitoring and implementation of measure to reduce risks has not been adopted at all supply systems and this impacted on scores under criteria E.

The Regulator urges the WSA to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Criteria A and B: Installation and calibration of inflow meters to verify operational capacity for the five supply system indicated to be operating at 100% capacity. If any of the systems are operating above 90% of design, planning and budgeting to addresses capacity exceedance should be initiated.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ C: Development and implementation of microbiological and chemical monitoring programmes with sufficient samples and adequate frequency based on population size as outlined in SANS 241:2015. Subsequent water quality results should then be submitted to the Regulator through IRIS.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria. Existing staff can also be subjected to relevant training in order to meet the requirements.
- ✓ E: Development of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Ubuntu Local Municipality

Municipal BDRR Score: 55.9%

Assessment Areas	Hutchinson	Loxton	Merriman	Richmond
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	0.5	0.5	0.5
B: % Operational Capacity in terms of design	100%	100%	100%	100%
C1a: % Microbiological Compliance	94.7%	100%	90%	90.9%
C1b: % Microbiological Monitoring Compliance	66.7%	58.3%	41.7%	75%
C2a: % Chemical Compliance	87.4%	69.8%	69.3%	92.2%
C2b: % Chemical Monitoring Compliance	14.7%	14.7%	14.7%	14.7%
D: % Technical Skills	25%	25%	25%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	57.2%	38.6%	77.3%	63.3%

Assessment Areas	Victoria West
BULK / WSP	
A: Total Design Capacity (Ml/d)	0.5
B: % Operational Capacity in terms of design	250%
C1a: % Microbiological Compliance	100%
C1b: % Microbiological Monitoring Compliance	50%
C2a: % Chemical Compliance	74.6%
C2b: % Chemical Monitoring Compliance	14.7%
D: % Technical Skills	25%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	43%

WSA Overview

Ubuntu LM has five drinking water supply systems in their area of jurisdiction. Loxton and Victoria West supply systems achieved low-risk ratings while Hutchinson and Richmond supply systems achieved a medium-risk rating. Merrimen supply systems is in the high-risk rating category.

Regarding criteria A and B, Victoria West is above the design capacity. Four of the five supply systems are indicated to be operating at 100% of design capacity. This maybe an indication that flow monitoring is not taking place and estimated values were presented. Nonetheless, capacity exceedance indicates that the supply systems may not be able to meet current and future demands.

Under water quality monitoring (criteria C), three of the five supply systems achieved unacceptable microbiological and chemical compliance and the associated monitoring programmes are not adequately aligned to SANS 241:2015 requirements. This indicates that the water supplied may present serious health risks to the consumers and should be addressed urgently. Although Loxton and Victoria West achieved excellent microbiological compliance, poor chemical compliance and inadequate alignment of monitoring programmes to SANS 241:2015 requirements means that the quality of water supplied may still present health risks to the consumers.

All supply systems achieved poor scores under criteria D and E. This indicates that the supply systems supervisors, process controllers and maintenance teams are not adequately aligned to the set criteria and also that there are no SANS 241:2015 and WHO aligned Water Safety Plans. This should be addressed as it has the potential to impact of the WSAs ability to delivery safe drinking water to the consumers.

The Regulator urges the WSA to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation and/or calibration of flow meters to verify operational capacity at all works. If capacity exceedance is confirmed at any WTW, planning and budgeting to address capacity exceedance should be initiated.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ C2b: Alignment of microbiological and chemical monitoring programmes to SANS 241:2015 requirements for all supply systems to ensure adequate monitoring compliance.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Adoption and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

Umsobomvu Local Municipality

Municipal BDRR Score: 60.5%

Assessment Areas	Colesberg (WTW & Boreholes)	Norvalspont (WTW)	Noupoort (Boreholes)
BULK / WSP			
A: Total Design Capacity (Ml/d)	8.21	0.17	1.79
B: % Operational Capacity in terms of design	97.4%	100%	100.5%
C1a: % Microbiological Compliance	77.9%	89.1%	94.4%
C1b: % Microbiological Monitoring Compliance	73.3%	91.7%	87.5%
C2a: % Chemical Compliance	84.2%	92.7%	94.4%
C2b: % Chemical Monitoring Compliance	0%	0%	0%
D: % Technical Skills	9.4%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	63.4%	50.7%	48%

WSA Overview

Umsobomvu LM has three drinking water supply systems. Noupoort is in the low-risk rating category while Colesburg and Norvalspont are in the medium-risk rating category. All supply systems are indicated to the operating above 90% of design capacity indicating insufficient treatment capacity to supply current and future requirements.

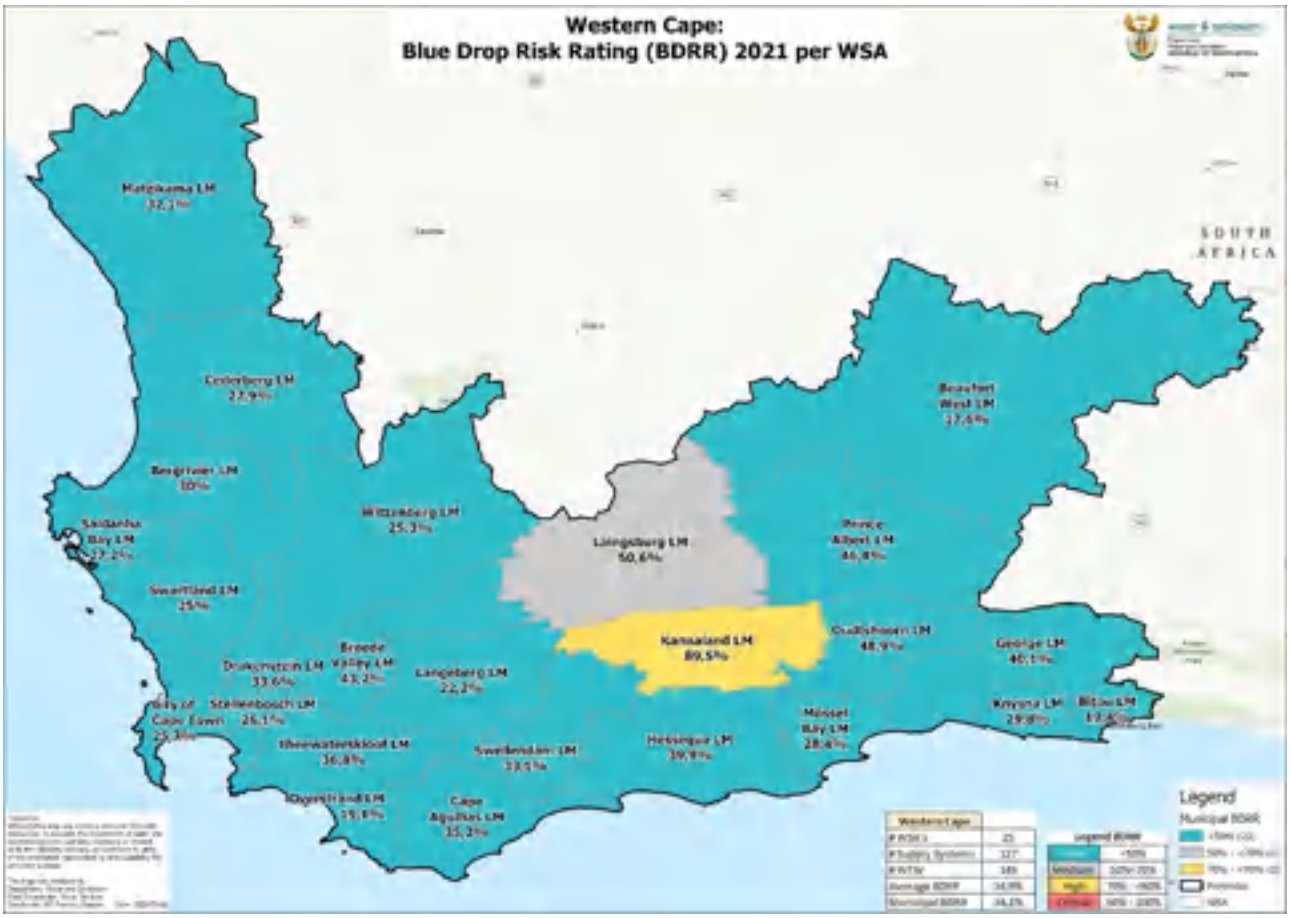
With regards to criteria C, all supply systems achieved unacceptable microbiological and chemical compliance. This indicates that the water supplied may pose serious health risks to the consumers and should be addressed urgently. Microbiological monitoring programmes are adequately aligned to SANS 241:2015 requirements while chemical monitoring programmes are lacking in this regard.

All supply systems also achieved poor scores under criteria D and E. This indicates that the supply systems supervisors, process controllers and maintenance teams are not adequately aligned to the set criteria and also that there are no SANS 241:2015 and WHO aligned Water Safety Plans. This should be addressed as it has the potential to impact of the WSAs ability to delivery safe drinking water to the consumers.

The Regulator encourages the WSA to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Planning and budgeting to address capacity exceedance at all WTW as they are operating above 90% of design.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to ensure delivery of safe drinking water at all times.
- ✓ C2b: Alignment of chemical monitoring programmes to SANS 241:2015 requirements for all supply systems to ensure adequate monitoring compliance.
- ✓ D: Appointment of suitably qualified staff and/or training of existing staff (supervisors, process controllers and maintenance teams) to ensure adequate alignment to set criteria.
- ✓ E: Adoption and implementation of Water Safety Plans as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, development of risk-based monitoring programmes and implementation of mitigating measures to address all medium and high risks.

CHAPTER 11: WESTERN CAPE PROVINCE



PROVINCIAL BDRR TREND ANALYSIS

One of the outcomes of Incentive and Risk-based Regulation is the regular monitoring and reporting on the performance of the WSA to ensure strategic operational and management plans are constantly realigned to achieve compliance and effectively manage risks for provision of sustainable water services. For risk-based regulation, the movement in BDRR is a vital tool for both the Department and the WSA to monitor and track the levels of risk in the country. The 2021 BDRR will serve as a baseline for future BDRR assessments that will be used by DWS to monitor and manage drinking water supply systems to ensure delivery of safe drinking water to all communities.

BDRR is calculated and categorised as either low, medium, high and critical risk rating, calculated according to the following range of values to enable both WSA and DWS to monitor performance.

Table 1: BDRR categorisation

Low	Medium	High	Critical
<50%	50%<70%	70% - <90%	90% - 100%

The BDRR formular is made up of five risk indicators with an overall BDRR for each supply system. The overall performance of each WSA is reported in two ways:

- ✓ Average % BDRR: average of % BDRR per supply system per province.
- ✓ % Municipal (weighted) BDRR: The Municipal BDRR for each WSA is calculated by the proportional contribution of each water supply system based on design capacity of each system. This weighted average may provide skewed picture i.e. a supply system which receives a small fraction of the total flow from a larger treatment plant will carry a higher weighting compared to a system which received 100% from a smaller treatment plant.

Therefore, the WSA must evaluate the individual % BDRR scores of each system to determine the risk associated with provision of drinking water for each system and not use the % Municipal BDRR score to evaluate their performance. Regardless of the size of the systems, all consumers have a right to safe drinking water and the WSA must be wary of neglecting the management of smaller, rural schemes in favour of larger urban systems.

The % Municipal (weighted) BDRR for all WSA's in the province is provided at the end of each provincial chapter for reference.

In 2021, 25 WSA's were assessed in Western Cape province with a total to 127 water supply systems. The assessment period for all Risk Indicators was July 2020 to June 2021 except for Risk Indicator C: Water Quality compliance where assessment period was January to December 2020.

The risk performance trends for Western Cape Province are summarised below to provide a provincial overview of BDRR.

Table 81: 2021 Risk Performance trends for Western Cape Province

Risk Rating	Average	Minimum	Maximum
% Municipal BDRR (Weighted Score)	34.1%	17.6%	89.5%
% BDRR	34.9%	12.8%	100%
A: Design Capacity (Ml/d)	15.2	0.08	500
C1a: % Microbiological Compliance	93.7%	0%	100%
C1b: % Microbiological Monitoring Compliance	82.1%	0%	100%
C2a: % Chemical Compliance	91%	0%	100%
C2b: % Chemical Monitoring Compliance	50.4%	0%	97.1%
D: % Technical Skills	42.5%	0%	100%
E: % Water Safety Plan Status	27.2%	0%	100%

The BDRR profile for Western Cape province is outlined in the figure below.

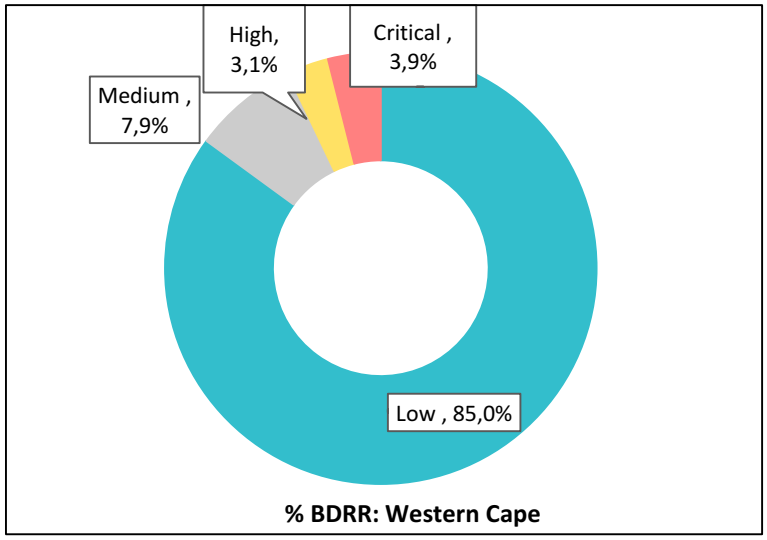


Figure 97: BDRR profile for Western Cape

The results for Western Cape province are summarised as follows:

- ✓ 85% of supply systems are in the low risk category,
- ✓ 7.9% are in the medium risk category,
- ✓ 3.1% are in the high risk category, and
- ✓ 3.9% are in the critical risk category.

To use the 2021 BDRR score as a tool to implement strategic, targeted actions that will result in an improved risk rating and sustainable water services delivery, the individual components of the BDRR score must be critically evaluated by the WSA to understand the reason for the current risk rating and the desired risk category for delivery of safe drinking water.

The BDRR scorecards reports on the following system-specific risk indicators which ultimately feed into the BDRR score:

- ✓ Risk Indicator A: Design capacity,
- ✓ Risk Indicator B: Operational Capacity,
- ✓ Risk Indicator C: Water Quality Compliance,
- ✓ Risk Indicator D: Technical skills, and

- ✓ Risk Indicator E: Water Safety Plans.

The trends with regard to the risk rating of the individual indicator which make up the overall BDRR score is discussed below. This will provide insight on the risk status of each indicator and enable the WSA to implement targeted actions to reduce risk of specific risk indicators which are negatively impacting on the final BDRR score of the supply system.

Risk Indicator A: Design Capacity and Risk Indicator B: Operational Capacity

Criterion A represents the design capacity of the treatment plant.

Every water treatment plant must be classified with DWS as per Regulation 2834. The classification of the treatment plant is based on a number of components, including size, complexity and electrical consumption, as per set criteria. The plant classification certificate is available on IRIS and used to determine the risk rating for criterion A as it states the capacity of the plant.

The risk rating is allocated according to size of the treatment plant with higher risk rating given for a larger plant and lower risk rating for a smaller plant. The rationale is that a larger plant serves a larger community and therefore presents a higher risk if the plant is not functioning or producing unsafe drinking water than a smaller plant which serves less people. The risk rating for criteria A remains the same provided the capacity stays the same, and all plants which have the same design capacity range will have the same maximum BDRR.

Information from the IRIS system was collected to provide a profile of the design capacities of all treatment plants in the province. Some of the treatment plants are large regional bulk schemes which supply water to a number of supply systems in various municipalities and across provinces. The figure below reports on the design capacity of treatment plants located in the province in Ml/d.

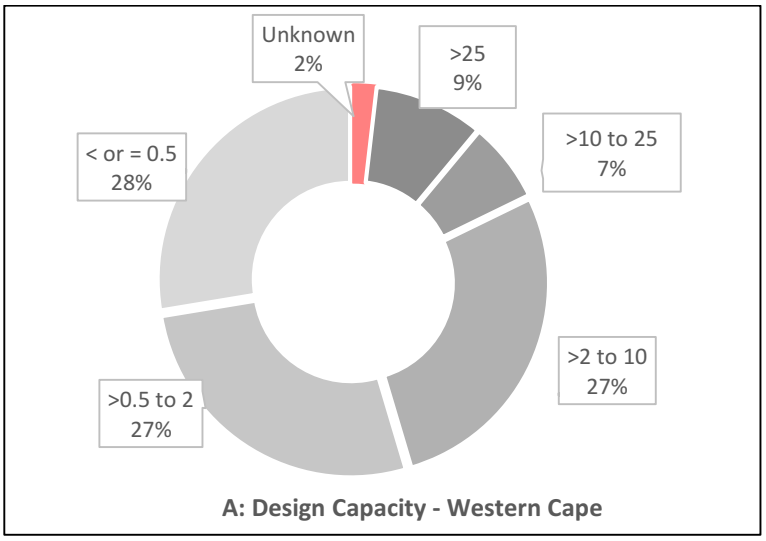


Figure 98: Profile of design capacity in Western Cape Province (Ml/d)

The results are summarised as follows:

- ✓ There are 149 water treatment plants situated in Western Cape province with a combined capacity of 2 509.1 Ml/d,
- ✓ Reported population served = 2.6 million people,
- ✓ Average design capacity in province =15.2 Ml/d,
- ✓ Largest plant in province = 500 Ml/d,
- ✓ Smallest plant in province = 0.08Ml/d,
- ✓ 28% of plant are <=0.5 Ml/d, 27% are between 0.5 and 2 Ml/d, 27% are between 2 and 10 Ml/d, 7 % are between 10 and 25 Ml/d and 9% are >25 Ml/d,
- ✓ 2% of plants have not provided design capacity.

In summary, 55% of plants in Western Cape province are small plants (<2 M/d) and these include boreholes and rural systems. 34% are medium sized plants (between 2 and 25 Ml/d) and only 9% are large plants (>25 M/d) which are typically located in metropolitan areas in the province or are part of bulk regional schemes. Operation and management of large number of rural schemes present challenges as these plants are usually located across a large geographical area with some plants in remote areas. This requires additional resources such as staff, chemical supplies, spares and vehicles to ensure optimal operations of these systems

With regards to **Risk Indicator B: Operational capacity**, daily production versus the design capacity of the treatment plant is an important indicator to determine if the plant can provide sufficient, safe drinking water to all the consumers now and in the near future. When the plant is operating above its design capacity, major unit processes are overloaded and cannot achieve their operational limits which leads to water quality failures.

Risk Indicator C indicates the current operational capacity of the treatment plant in each supply system as a percentage of the design capacity of the plant. The ideal value is between 50 – 100%; higher values indicate the plant is overloaded and lower values indicate the plant is receiving too little flow which may also compromise performance due to lack of retention time (flocculation, sedimentation). Once daily production approaches 90% of design capacity, the WSA must plan, budget and implement projects to increase the capacity of the treatment plant to ensure there is sufficient supply, not only for human consumption, but also for economic activities.

Although operational capacity has been reported for all supply systems, there are a number of large regional plants which supply a large number of supply systems in various municipalities and across provincial borders. Analysis of Indicator B must therefore be conducted at plant level as collating operational capacity data at municipal or provincial level will not provide an accurate reflection of the current operational capacity of each individual plant.

WSAs are reminded that installation of flow meter and daily flow recording is a regulatory requirement as per their Water Use License.

Recommendations

- ✓ WSAs must ensure all treatment plants have updated plant registration certificates on IRIS.
- ✓ WSAs must provide updated copies of plant registration certificates supported with documents on the design capacity of treatment plant for future BDRR assessments.
- ✓ WSA to install flow meters at raw and final water points, monitor daily flows and ensure annual calibration of meters for accuracy of results.
- ✓ Budget and plan for upgrade of treatment plant when operational capacity is at 90% to ensure sufficient time for implementation of civil projects.
- ✓ Consult Census, WSDP and Reconciliation strategies to determine current and future allocation and demand, use a 10-year forecast period

Risk Indicator C: Water Quality Compliance

In South Africa, the SANS 241:2015 is the definitive reference on acceptable limits for drinking water quality parameters and provides limits for a range of water quality characteristics and water meeting this standard is deemed safe for lifetime consumption. The actual water quality depends on both microbiological and chemical determinands:

- ✓ Microbiological compliance reports on the actual compliance of the final water for the past 12 months against microbiological determinands E. Coli / Faecal Coliforms. The presence of these determinands in water is a strong indication of recent sewage or animal waste contamination and there is potential for contracting diseases from pathogens.
- ✓ Chemical quality is determined by a number of determinands which may be acute or chronic health determinands with specific health risks associated with each determinands. Acute health risks can result in death if the limit is exceeded, while chronic limits provide maximum limits that can be ingested over a period of time before health effects are observed.

Both microbiological and chemical compliance limits outlined in SANS 241:2015 is evaluated against the population size: for a population <100 000, compliance is >98% while for a population >100 000, compliance limit is >99%.

In addition, the SANS 241:2015 standard stipulates the frequency of sampling as well as the number of sample points required per supply system to ensure sufficient coverage of the network. The frequency and number of required sample points is dependent on the population size as outlined in Table 1 of SANS241:2015 Monitoring compliance is therefore critical to guarantee the safety of the supply at all points in the network.

Indicator C: Water Quality Compliance reports on both water quality compliance and monitoring compliance as per SANS 241:2015 for both microbiological and chemical determinands. The formular to calculate C is made up of four sub-indicators with microbiological compliance carrying a higher weighting than chemical compliance as this presents a serious, acute health risk.

The formular for Indicator C, description and categorisation of each sub-indicator is presented in the table below. The categorisation is aligned with the risk rating for each sub-indicator and results are reported for all supply systems in the province. All supply systems which fall in the Low Risk category are regarded as compliant systems.

Table 10: Formular, description and categorisation for Criteria C

C = [0.7(C1a x C1b)] + [0.3(C2a x C2b)]				
Ca: Water Quality Compliance	**C1a**: Microbiological compliance as per SANS 241: 2015.	High Risk	Medium Risk	Low Risk
		<95%	95% - <97%	97% - 100%
	C2a: Chemical compliance as per Blue Drop requirements			
Cb: Monitoring Compliance	**C1b**: micro monitoring compliance against registered programme, based on population size as per SANS 241:2015	High Risk	Medium Risk	Low Risk
		<50%	50% - 80%	>80%
	C2b: chemical monitoring compliance calculated as per Blue Drop requirements			

The Western Cape province results for Indicator C and sub-indicators are presented in the table below. This is based on data for the period January to December 2020.

Table 82: Western Cape Province summary of results for Indicator C: Water Quality Compliance (Jan – Dec 2020)

Western Cape	Average Compliance	Minimum	Maximum	% Systems Which Comply (Low Risk)
C1a: Microbiological Quality	93.7%	0%	100%	75%
C2a: Chemical Quality	91%	0%	100%	39%
C1b: Microbiological Monitoring Compliance	82.1%	0%	100%	62%
C2b: Chemical Monitoring Compliance	50.4%	0%	97.1%	42%

The categorisation for microbiological and chemical compliance is illustrated below providing % of supply systems per risk category.

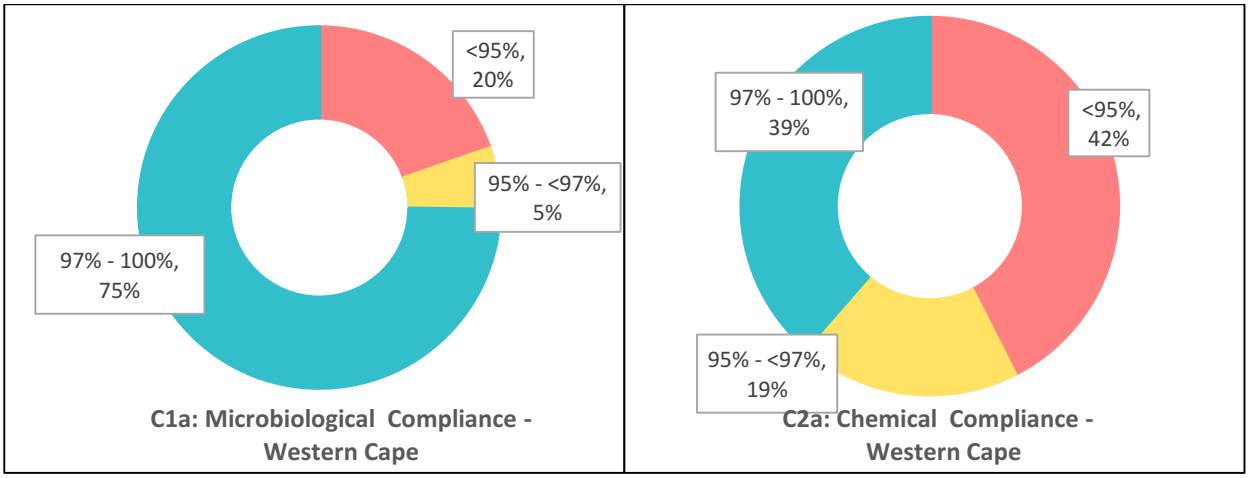


Figure 99: Microbiological and Chemical Compliance for Western Cape (Jan – Dec 2020)

The results are summarised as follows:

- ✓ 75% of systems achieved microbiological compliance and only 39% achieved chemical compliance. This is of serious concern to DWS as the majority of supply systems present a potential health risk to consumers.
- ✓ 25% of systems do not comply with microbiological determinands: this indicates microbiological failures which presents a serious health risk to the consumers in these supply systems. For sustained failure, 'Boil Water' notices must be issued to safeguard consumers while the root cause of the failure is investigated and resolved.
- ✓ 61% of systems do not comply with chemical determinands. This may present immediate or potential long term health risks depending on whether non-compliance is for acute health determinands or chronic health determinands.
    - WSA must ensure compliance for all chemical-health determinands as per Blue Drop requirements and includes, NO3- and NO2- as N, SO42-, Sb, As, Cd, Cr, Co, Cu, CN-, Pb, Hg, Ni, Se, V, DOC or TOC, and Total THM.

The categorisation for microbiological and chemical monitoring compliance is illustrated below providing percentages of supply systems per category.

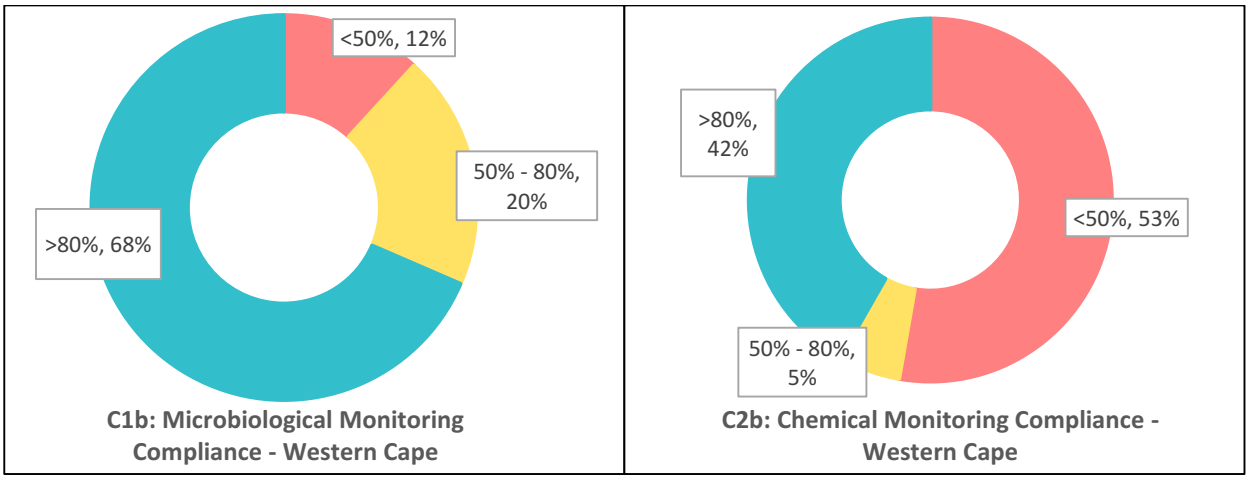


Figure 100: Microbiological and Chemical Monitoring Compliance for Western Cape (Jan – Dec 2020)

The results are summarised as follows:

- ✓ 68% of supply systems have sufficient microbiological samples based on population size as per SANS 241-2.
- ✓ 32% of supply systems have <80% for microbiological monitoring compliance. This indicates there is an insufficient number of microbiological samples to guarantee the safety of water at all points in the distribution system. These supply systems therefore do not comply with table 2 in SANS 241-2 which outlines required number of sample points based on population size.
- ✓ Only 42% of supply systems have sufficient chemical monitoring samples.
- ✓ 58% of supply systems have < 80% for chemical monitoring compliance. This indicates either insufficient number of samples collected or insufficient chemical determinands were analysed as per the requirement outlined in SANS 241:2015, i.e.
    - Actual monitoring occurs according to registered IRIS monitoring programme (>80%),
    - Number of samples: One sample each at treatment plant final and one distribution point, both of which must be analysed for at least 80% of determinands listed (13 of the 17 determinands) i.e. at least 26 data points are required.

Recommendations

The poor water quality in Western Cape Province is of concern to DWS, in particular chemical water quality and the lack of sufficient samples to verify safety of water at all points in network.

All WSAs must urgently implement the following steps to ensure both microbiological and chemical compliance is improved so that all the citizens of South Africa can have access to safe drinking water, which is a basic human right enshrined under our Constitution:

- ✓ Develop and implement microbiological monitoring as per SANS 241:2015 requirements:
    - Monitor final water weekly.
    - Monitor distribution fortnightly
    - Ensure the number of sample points in the distribution network is based on population size as per Table 2 in SANS 241-2 given below

Table 18: Minimum number of samples for E.Coli (or Faecal Coliforms) in distribution network (Table 2 SANS 241-2: 2015)

Population served	Total number of samples per month[a]
<5000	2
5000-100 000	1 per 5000 head of population + 1 additional sample [b]
100 000 – 500 000	1 per 10 000 head of population + 11 additional sample [b]
≥500 000	1 per 20 000 head of population + 36 additional sample [b]
[a] During rainy season, sampling should be carried out more frequently to ensure that all spatial and temporal risks are identified. [b] see *WHO, Guidelines for drinking water quality*	

- ✓ Develop and implement risk-based chemical monitoring programme as per SANS 241:2015 requirements:
    - Conduct full SANS 241:2015 analysis annually on raw, final and distribution network to identify current problem determinands.
    - Conduct risk assessment of system including catchment, treatment plant and reticulation to identify current and potential water quality risks and their associated determinands. e.g. presence of pit latrines means possibility of nitrates in ground water and surface water.
    - Develop and implement risk-based chemical monitoring programme for all identified determinands.
    - Sample points are raw, final and critical distribution points depending on impact of determinands.
    - Frequency as per Table 3 in SANS 241- 2. i.e. acute health 1 = weekly, acute health 2 = monthly, chronic health = monthly, aesthetic = monthly,
    - Operational monitoring dependant on unit processes.
- ✓ In the event of non-compliance:
    - Precautionary measures including 'Boil Water' notices must be issued to consumers in systems with sustained microbiological failures.
    - 'Water Quality' Advisories must be issued to consumers in systems with sustained chemical failures for chronic health determinands.
    - WSAs must investigate the root cause of the failure and implement remedial actions to ensure compliance. If this cannot be achieved, an alternative water supply must be provided to ensure safety of consumers.
- ✓ Compliance monitoring to be undertaken by accredited laboratory:
    - WSA to ensure that there is sufficient budget for compliance monitoring.
    - Laboratory to comply with accreditation requirement as per Blue Drop: SANAS accredited, participation in proficiency testing with acceptable Z-Score, or Quality Assurance system.

Risk Indicator D: Technical Skills

Regulation 2834 states all plant personnel must be classified as per their qualifications and years of experience. This is conducted by DWS and plant personnel are provided with a classification certificate which reflects their current classification based on qualification and years of experience. Ongoing training is a requirement under the Regulation to allow for continuous learning that will enable process controller to improve their classification over time to achieve Class V that allows them to act as plant supervisor. The required number and classification of staff required at a treatment plant per shift is dependent of the classification of the plant and the number of shifts.

The Blue Drop requirements acknowledge excellence in water services provision. The Blue Drop requirements therefore outlines the number and classification of process controllers and supervisors required for each shift. The Blue Drop requirements make provision for sharing of supervisors: this reduces the burden of providing permanent staff for small, remote systems as a roaming supervisor can visit a number of facilities once or twice a week.

In addition, the Blue Drop requirements outline the requirements for plant maintenance team to ensure effective maintenance of water infrastructure for ongoing operations. The maintenance team must have variety of artisans with electrical, mechanical and civil expertise for effective asset management with assets reaching their expected useful lifespan. The Blue Drop requirements were used to evaluate Risk Indicator D: Technical Skills as per Table below

Table 12: Blue Drop requirements to evaluate technical skills at treatment plants

Works Class	Class Of Process Controller Per Shift	Class Of Process Controller for Supervision*	Operations And Maintenance Support Services Requirements*
E	Class I	Class V*	THESE PERSONNEL MUST BE AVAILABLE AT ALL TIMES BUT MAY BE IN-HOUSE OR OUTSOURCED - electrician - fitter - instrumentation technician
D	Class II	Class V*	
C	Class III	Class V*	
B	Class IV	Class V	
A	Class IV	Class V	

NB. Fluoridation – for any class works, minimum process controller classification should be class IV

**does not have to be at the works at all times but must be available at all times. If the Water Services Institution or owner of a waterwork has no person of this class employed on that work, a contractor / consultant with the required qualifications as prescribed in Schedule III in respect of that particular class of persons, shall be appointed to visit the work weekly.*

Risk Indicator D: Technical Skills is calculated from three separate components:

- ✓ Process controllers compliance as per Blue Drop requirements: required number and class of process controllers per shift for specific class of plant.
- ✓ Supervisor compliance as per Blue Drop requirements: Class V required, either at plant or available at all times.
- ✓ Maintenance Team compliance as per Blue Drop requirements: civil, mechanical and electrical expertise required.
    - Civil team: plumbing qualification / trade test.
    - Mechanical team: millwright or similar mechanical qualification.
    - Electrical team: electrical qualification / trade test.

The Table and figures below provides a profile of the technical skills in Western Cape Province for 2021.

Table 83: Western Cape Province Summary of results for Indicator D: Technical Skills

Western Cape	Average	Minimum	Maximum
D: Technical Skills	42.5%	0%	100%
Process Controller Compliance	46.8%	0%	100%
Supervisor Compliance	47.6%	**0%**	100%

The provincial profile for Risk Indicator D: Technical skills is presented in the figure below.

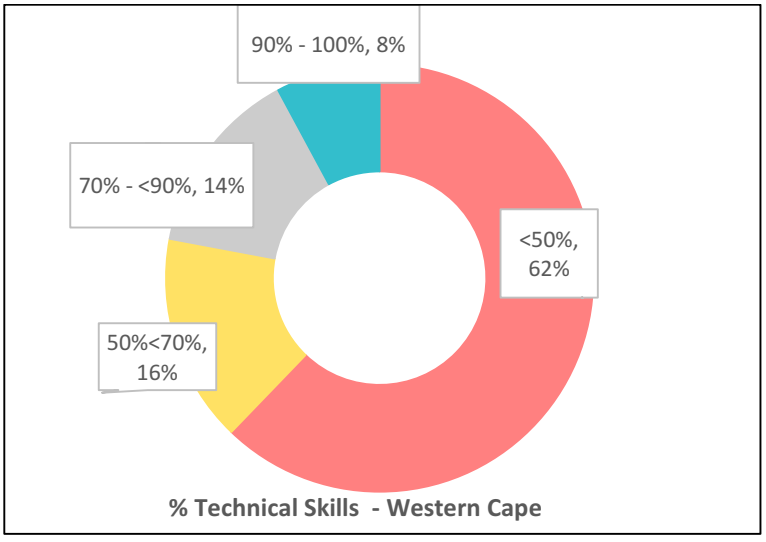


Figure 101: Western Cape Province profile for Indicator D: Technical Skills

The results are summarised as follows:

- ✓ Only 9% of supply system have excellent technical skills: 90 - 100% compliance,
- ✓ 14% of supply systems have good technical skills: 70 - <90% compliance,
- ✓ 16% of supply systems have average technical skills: 50 - <70% compliance,
- ✓ 62% of supply systems have poor technical skills: <50% compliance,

In general, the province has performed very poorly with regards to technical skills.

The provincial profile for process controllers and supervisors compliance is outlined in the figures below.

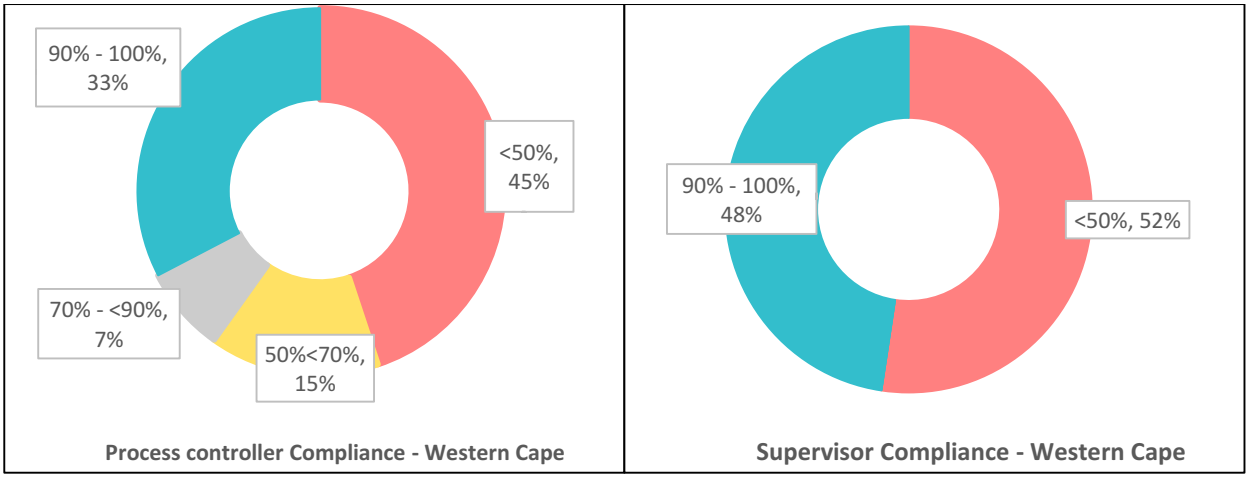


Figure 102: Process controller and Supervisor compliance for Western Cape Province

The results are summarised as follows:

- ✓ Process controller compliance is poor with only 33% of supply systems with sufficient number of suitably classified process controllers per shift. Lack of sufficient number of process controllers presents a serious risk due to lack of daily monitoring and process optimisation.
- ✓ Only 48% of supply systems are compliant with regards to Supervisors. These plants either have Class V supervisors permanently based at the plant or available as a roaming supervisor available at all times to assist process controllers. The presence of a qualified supervisor can mitigate some of the risks associated with insufficient number of process controllers on site provided the supervisor is available at all times.

The provincial profile for maintenance team as well as breakdown of maintenance team is outlined in the figures below.

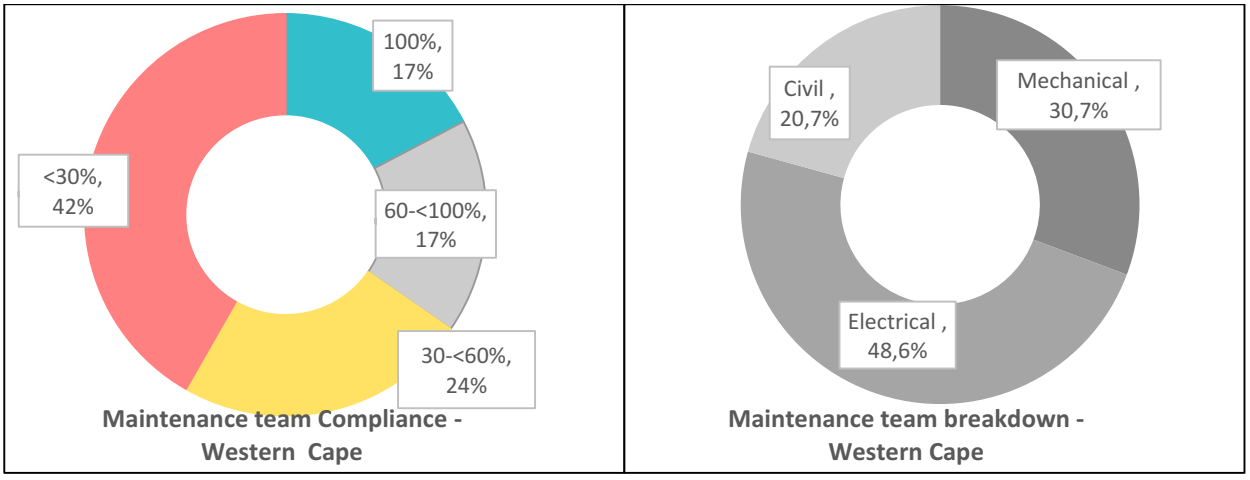


Figure 103: Maintenance team compliance and maintenance team breakdown for Western Cape Province

The results are summarised as follows:

- ✓ Only 17% of all supply systems have full maintenance teams in place i.e. civil, mechanical and electrical personnel. However, the remaining 83% have insufficient maintenance teams and this can lead to shutdown of treatment plant or processes which will affect quality and quantity of water.
- ✓ 48.6 % have Electrical staff, 30.7% have mechanical competency, and 20.7% have civil staff. Civil works at treatment plants and in the distribution network is conducted by plumbers: lack to this skill will lead to water losses which will negatively impact on water supply.

The Western Cape province has performed poorly with regards to technical skills. WSAs are encouraged to evaluate the performance of each system with regards to process control and use this information to determine the operational model which is best suited to ensure effective operations and maintenance.

WSA must allocate budget to appoint suitably qualified process controllers and supervisors to ensure water quality compliance improves through ongoing process optimisation. The WSA must appoint a qualified maintenance team to ensure that the life span of the treatment plant is increased by regular maintenance and ensure there are sufficient number of personnel to cover the entire distribution network to reduce water losses and maintain integrity of the supply system.

Recommendations

- ✓ Register all process controllers and supervisors on IRIS as per Regulation 2834
- ✓ Ensure all process control staff complies with Blue Drop requirements.
- ✓ Ensure maintenance team includes civil, mechanical and electrical personnel.
- ✓ Provide details of operational staff at all future assessments: copies of process controller and supervisor registration certificates, organograms with shift patterns, copies of qualifications/certificates/current training.
- ✓ Provide details of maintenance team at all future assessments: organogram, shift patterns, names and qualifications of team, copies of qualifications/certificates/current training, details of external service providers.

Risk Indicator E: Water Safety Plans

Risk management is the cornerstone of risk-based regulation and a fundamental part of the SANS 241:2015 requirements to ensure effective management of both current and future potential risks. The application of risk management in drinking water management is through the Water Safety Planning concept developed by the WHO which is a comprehensive risk assessment and risk management approach that encompasses all steps in a drinking-water supply chain, from catchment to consumer to ensure continuous feedback and improvement to manage all current and future potential risks. The Water Safety Plan advocates for development of a risk-based monitoring programme and this is also a requirement as per SANS 241:2015

This risk indicator E: Water Safety Plans evaluates the following three critical components which are required for effective risk management as per the WHO guidelines and the SANS 241:2015 requirements.

- ✓ Completeness of the Water Safety Plan as per World Health Organisation Water Safety Planning Manual:
  - 1: Signature from Technical director/Municipal Manager
  - 2: Risk prioritisation method
  - 3: Risk assessment of catchment
  - 4: Risk assessment of plant
  - 5: Risk assessment of network
  - 6: Final risk rating
  - 7: Mitigating measures for all high and medium risks.
- ✓ Development and adoption of risk-based monitoring programme as per SANS 241:2015
  - 8: Full SANS 241:2015 analysis of raw and final water
  - 9: Identification of risk determinands
  - 10: Addition of risk determinands to monthly compliance monitoring as per SANS 241:2015
- ✓ Proof of implementation of the findings of the Water Safety Plan to ensure there is continuous risk management and movement towards overall lower risk rating:
  - 11: Proof that >25% of mitigating measures have been implemented – proof in form of purchase order, pictures, water quality results, tender document, etc.

This makes up 11 equal sub-elements that are evaluated during the BDPAT assessment to calculate the final risk rating for this indicator.

Table 84 and Figure 104 below provides a profile of Risk indicator E in Western Cape Figure 105 provides details on the completeness of the Water Safety Plan by indicating the percentage of supply systems which comply with each of the 11 individual components which make up the Water Safety Plan.

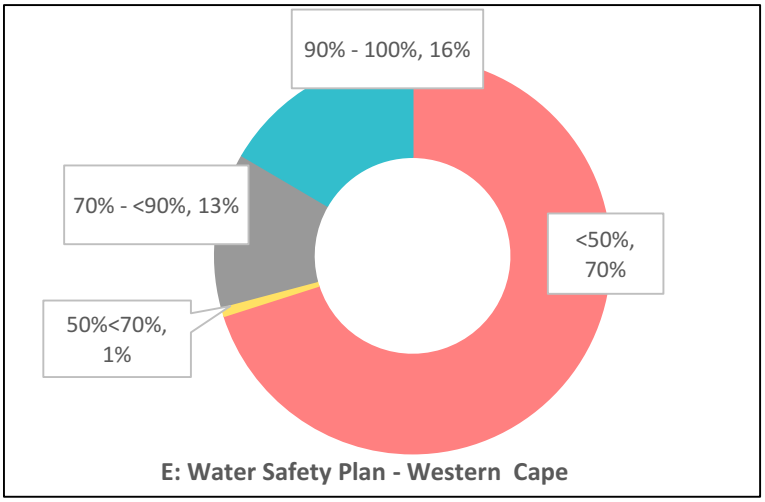


Figure 104: Western Cape Profile for Indicator E – Water Safety Plans

Table 84: Western Cape Province summary of results for Indicator E: Water Safety Plans

Western Cape	Value
E: Water Safety Plans - Average	27.2%
E: Water Safety Plans - Minimum	0%
E: Water Safety Plans - Maximum	100%
% Systems with Water Safety Plans	42%

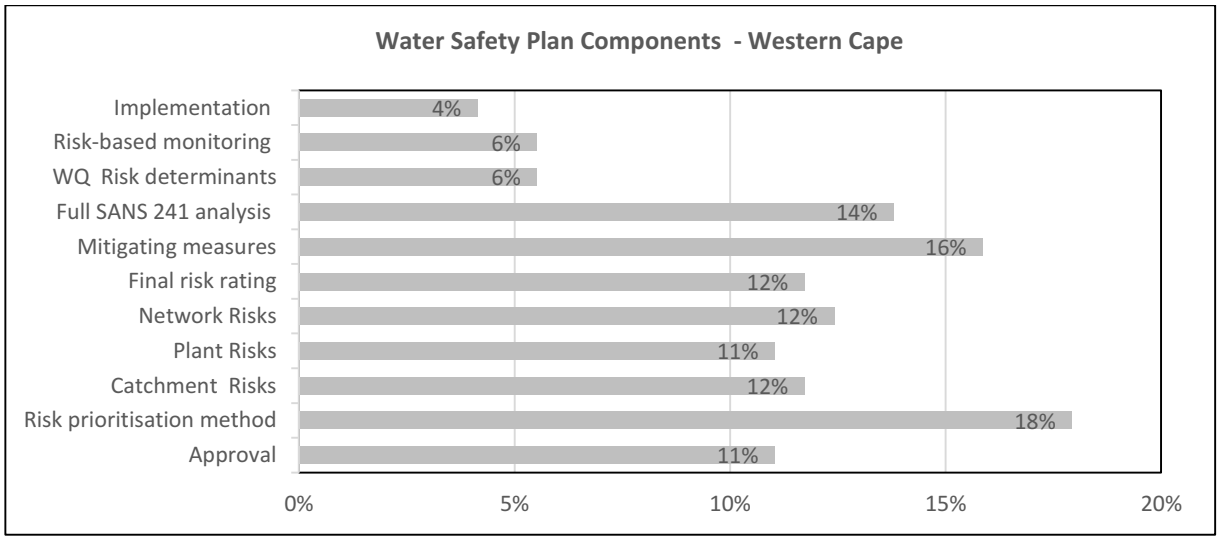


Figure 105: Water Safety Plan components for Western Cape

The results are summarised as follows:

- ✓ Only 42% of supply systems have Water Safety Plans in place. This presents a serious risk as effective risk-management is not taking place as per SANS 241:2015 requirement.
- ✓ 16% have excellent Water Safety Plans in place with >=90% compliance indicating comprehensive Water Safety Plans with all required components.
- ✓ The average compliance for the province is 27.2% which indicates poor understanding of the Water Safety Planning process amongst the WSA's in this province.
- ✓ The quality and completeness of the Water Safety Plans is as follows:
    - 11% have approval indicating management's commitment to implementing the findings of the Water Safety Plan,
    - Completeness of the Water Safety Plan is poor for catchment, plant and network risks (average 11%). 18% have risk prioritisation method in place, with 16% having mitigating measures. These results indicate poor understanding of the risk assessment process.
    - Development of risk-based monitoring is poor as full SANS 241:2015 only conducted in 14% of systems with only 6% using this information to develop risk-based monitoring programme. Risk-based monitoring is a requirement of SANS 241:2015 and must be reviewed annually based on updated full SANS 241:2015 of raw and final water.

- Implementation of mitigating measures is low at only 4%. Although 11% of Water Safety Plans have been approved, there has been minimal implementation of findings. Management must ensure that when approval is given for a Water Safety Plan, this is supported by resources in the form of staff and budget to implement mitigating measures.

In summary, Water Safety Planning is being implemented in the province in only 42% of supply systems. The completeness and quality of these Water Safety Plans is below average with lack of risk-based monitoring and implementation of mitigating measures to reduce risks.

All WSAs must adopt risk management principles embodied in the Water Safety Planning approach as this is a regulatory requirement as per SANS 241:2015 and will assist in driving down risks in the entire supply system from catchment to consumer.

Recommendations

- ✓ Conduct full SANS 241:2015 analysis on raw, final, and distribution network to identify problem determinands.
- ✓ Develop and implement risk-based monitoring programme to include all current and potential determinands
- ✓ Register SANS 241:2015 compliant monitoring programme on IRIS.
- ✓ Conduct monitoring as per programme and upload information on a monthly basis.
- ✓ Develop WSP: conduct annual risk assessment of supply system, assign risk rating, validate control measures and determine residual remaining risk.
- ✓ Develop and implement action plan to mitigate remaining risk. Action plan to include budget, responsibility and timeframe for implementation. Note approval for implementation and budget must be given by senior management (municipal manager of WSA).
- ✓ WSA to provide copy of signed approved Water safety plan with proof of implementation of corrective actions from previous risk assessment; uploaded on IRIS.

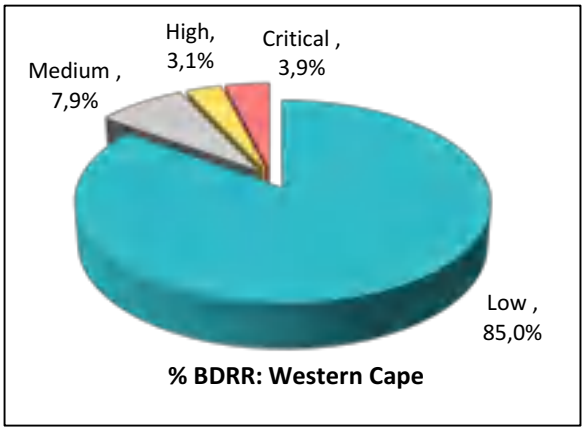
Summary

Overall performance for Western Cape Province is summarised as follows:

- ✓ 85% (108) of supply systems are in the low risk category,
- ✓ 7.9% (10) of supply systems are in the medium risk category,
- ✓ 3.1% (4) of supply systems are in the high risk category, and
- ✓ 3.9% (5) of supply systems are in the critical risk category

DWS is encouraged by the 85% of systems in the low risk category.

However, DWS is concerned by the 7% of systems which are in high and critical risk categories.



The figure below shows the % Municipal (weighted) BDRR score for all WSA's in the province.

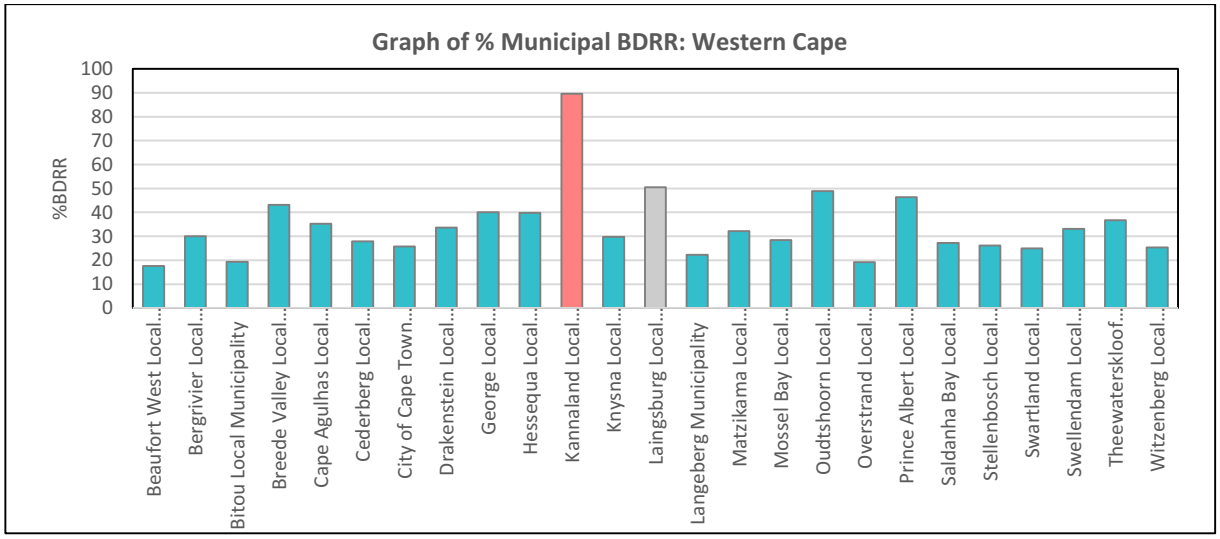


Figure 106: Graph of % Municipal (Weighted) BDRR for each WSA in Western Cape Province

The figure indicates one WSA is in the critical risk category based on % municipal BDRR. However, within the province there are 5 supply systems in the critical risk category and 4 supply systems in the high risk category.

DWS will evaluate risk based on the individual BDRR score for each supply system. Water supply systems which fall in the critical risk category are placed under regulatory focus. In such cases, a red note is assigned that requires the WSI to "...submit a detailed corrective action plan within 60 days of publishing of this report. The plan must map the activities, responsible persons, timelines, and expected improvements as outlined in the Regulatory Comment. The plan will be considered against the Regulatory Comment and recommended for approval by a national regulation committee...." This note serves to initiate the Department's Enforcement Protocol.

Note Section 151 of the NWA and Section 63 of the Water Services Act in developing and submitting these plans as required:

- ✓ Section 63 of the Water Services Act enables the Minister in consultation with COGTA to request a relevant Province to intervene in terms of Section 139 of the Constitution in local government. Such requests will be supported by the outcomes of this performance monitoring and WSIs responsiveness on regulatory responses raised.
- ✓ Section 151 of the NWA provides a number of non-compliances as criminal offences, amongst others using water otherwise than is permitted under the Act, failure to provide access to any books, accounts, documents or assets, unlawfully and intentionally or negligently commit any act or omission which affects or is likely to affect a water resource.

Other water supply systems which are in the high risk category will also be targeted for corrective action plans and municipalities are urged to initiate a process of addressing the regulatory comment as a matter of priority.

The WSA's must therefore review the individual BDRR score of each supply system, evaluate risk indicators which make up the total BDRR score and implement mitigating measures to improve compliance for poor performing risk indicators as outlined below:

- ✓ A: Design Capacity
  - WSA to report design capacity of treatment plant,
- ✓ B: Operational Capacity
  - WSA to install flow meters, record daily flow and implement upgrades when operational capacity is above 90%.
- ✓ C: Water Quality Compliance
  - WSA to develop and implement microbiological and chemical monitoring programmes as per requirements to verify the safety of the water at all points in the network.
  - In the event of failures, WSA must implement remedial action which include water quality advisories and process optimisation to improve compliance.
- ✓ D: Technical Skills
  - WSA to ensure there are sufficient number of qualified technical staff to undertake operations and maintenance of treatment plants and distribution networks.
- ✓ E: Water Safety Plans
  - WSA to develop and implement comprehensive Water Safety Plan as per WHO and SANS 241: 2015 requirements,
  - WSA to conduct water quality assessment as part of water safety planning process, identify risk determinands, and develop and implement risk-based monitoring programme to manage current and future potential risks.
  - Budget and resources to be made available to implement mitigating measures to reduce risk.

In conclusion, WSA's must review the performance of each supply system, interrogate each risk indicator to identify areas of poor performance, and implement remedial actions to improve overall risk rating.

Below is a summary of performance in Western Cape Province for the following categories:

- ✓ List of % Average BDRR, % Municipal (weighted) BDRR, and number of supply systems for all WSA's in the province,
- ✓ List of Low risk supply systems,
- ✓ List of Critical Risk supply systems which require immediate attention,
- ✓ Top 10 Performing supply systems.

Table 85: List of % Average BDRR, % Municipal BDRR, and number of supply systems for all WSA's in Western Cape province

WSA	# Supply systems	% Municipal BDRR	% Average BDRR per WSA
Beaufort West Local Municipality	4	17.6	28.2
Bergrivier Local Municipality	6	30.0	25.1
Bitou Local Municipality	3	19.4	17.0
Breede Valley Local Municipality	4	43.2	41.0
Cape Agulhas Local Municipality	10	35.2	33.9
Cederberg Local Municipality	9	27.9	42.4
City of Cape Town Metropolitan Municipality	1	25.7	25.7
Drakenstein Local Municipality	2	33.6	24.6
George Local Municipality	4	40.1	31.6
Hessequa Local Municipality	11	39.9	38.6
Kannaland Local Municipality	4	89.5	89.6
Knysna Local Municipality	8	29.8	50.5
Laingsburg Local Municipality	2	50.6	58.9
Langeberg Municipality	5	22.2	24.4
Matzikama Local Municipality	8	32.1	32.0
Mossel Bay Local Municipality	5	28.4	30.1
Oudtshoorn Local Municipality	3	48.9	45.0
Overstrand Local Municipality	8	19.1	16.4
Prince Albert Local Municipality	3	46.4	44.6
Saldanha Bay Local Municipality	1	27.2	27.2
Stellenbosch Local Municipality	5	26.1	29.5
Swartland Local Municipality	2	25.0	26.5
Swellendam Local Municipality	4	33.1	30.4
Theewaterskloof Local Municipality	10	36.8	31.2
Witzenberg Local Municipality	5	25.3	26.2
Average		**34.1**	**34.8**
Maximum		**89.5**	**89.6**
Minimum		**17.6**	**16.4**

Table 86: List of Low Risk supply systems in Western Cape Province

Western Cape: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Beaufort West Local Municipality	Beaufort West	15.7
	Merweville	29.1
	Murraysburg BWM	39.4
	Nelspoort	28.5
Bergrivier Local Municipality	Aurora	16.0
	Eendekuil	15.6
	Piketberg	32.0
	Poterville	22.9
	Redelinghuys	14.3
	Velddrif	49.9
Bitou Local Municipality	Kurland	17.7
	Nature`s Valley	13.7
	Plettenberg Bay	19.6

Western Cape: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Breede Valley Local Municipality	Bokrivier (Touwsrivier)	41.0
	De Doorns	46.9
	De Koppen (Fairyglen)	31.1
	Worcester / Rawsonville	45.2
Cape Agulhas Local Municipality	Aniston / Waenhuskrans	25.9
	Bredasdorp	34.2
	L` Agulhas	19.7
	Napier	25.9
	Spanjaardskloof	21.5
	Struisbaai	32.6
	Suiderstrand	17.8
Cederberg Local Municipality	Citrusdal	17.6
	Clanwilliam	35.8
	Elands Bay	35.4
	Graafwater	20.9
	Lambert`s Bay	17.6
City of Cape Town Metropolitan Municipality	Cape Town	25.7
Drakenstein Local Municipality	Bainskloof (Bainskloof WTW)	15.5
	Drakenstein (Paarl Mountain WTW & Cape Town Bulk)	33.6
George Local Municipality	George Water Works	41.1
	Haarlem Water Works	31.6
	Uniondale Water Treatment Works	27.6
	Wilderness Water Works	25.9
Hessequa Local Municipality	Albertinia	28.9
	Garcia	35.3
	Gouritsmond	17.7
	Heidelberg	37.4
	Jongensfontein	34.4
	Melkhoutfontein	32.6
	Riversdale	35.7
	Slangrivier	45.5
	Witsand	37.9
Knysna Local Municipality	Buffalo Bay	20.9
	Karatara	22.3
	Knysna WTW and Desal Plant	21.9
	Rheenendal	15.6
	Sedgefield WTW, Desal Plant, Emergency Bore Holes	24.4
Laingsburg Local Municipality	Laingsburg	48.7
Langeberg Municipality	Ashton	19.2
	Bonnievale	19.7
	McGregor	21.4
	Montagu	34.8
	Robertson	26.8
Matzikama Local Municipality	Bitterfontein DMA	32.4
	Ebenhaezer	25.8

Western Cape: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
	Klawer	23.0
	Koekenaap	25.1
	Lutzville	35.0
	Lutzville West	27.8
	Vredendal	34.0
Mossel Bay Local Municipality	Friemersheim WSS	17.3
	Hebertsdale WSS	30.0
	Lodewykstenk WSS	44.5
	Mosselbaai / Grootbrak / Kleinbrak WSS	28.4
	Ruiterbos WSS	30.0
Oudtshoorn Local Municipality	De Rust	47.3
	Dysselsdorp	34.5
Overstrand Local Municipality	Baardskeerdersbos Supply System	12.8
	Buffeljags Bay Supply System	16.2
	Buffelsrivier Supply System	16.7
	Greater Gansbaai Supply System	17.0
	Greater Hermanus Supply System	20.7
	Kleinmond Supply System	16.2
	Pearly Beach Supply System	13.8
	Stanford Supply System	17.8
Prince Albert Local Municipality	Klaarstroom	42.4
	Leeugamka	43.3
	Prince Albert	48.1
Saldanha Bay Local Municipality	Saldanda Bay Supply Systems	27.2
Stellenbosch Local Municipality	Blackheath (City of Cape Town)	23.5
	Faure System (City of Cape Town)	22.5
	Franschhoek	26.3
	Stellenbosch CBD	39.9
	Wemmershoek (City of Cape Town)	35.2
Swartland Local Municipality	Malmesbury Supply System	30.0
	Moorreesburg Supply System	23.0
Swellendam Local Municipality	Barrydale	29.8
	Buffelsjagrivier	35.3
	Suurbraak	21.1
	Swellendam	35.3
Theewaterskloof Local Municipality	Bereaville	25.7
	Botrivier	16.1
	Caledon	44.1
	Genadendal-WTW	44.0
	Grabouw WTW	42.7
	Greyton	29.2
	Riviersonderend WTW	21.1
	Tesselaarsdal WTW	21.7
	Villiersdorp WTW	29.3
	Voorstekraal	38.5

Western Cape: Low Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Witzenberg Local Municipality	Ceres Water Treatment Works	24.8
	Op die Berg Water Treatment Works	22.7
	Prince Alfred Hamlet Water Treatment Works	25.0
	Tulbagh Water Treatment Works	30.4
	Wolseley Water Treatment Works	28.2

Table 87: List of Critical Risk supply systems in Western Cape Province

Western Cape: Critical Risk Supply Systems		
WSA	**Supply System**	**%BDRR**
Kannaland Local Municipality	Ladismith	97.4
Kannaland Local Municipality	Van Wyksdorp WTW	97.2
Knysna Local Municipality	Belvidere	99.5
Knysna Local Municipality	Brenton-On-Sea	99.7
Knysna Local Municipality	Brenton-On-Lake	100.0
Kannaland Local Municipality	Ladismith	97.4

Table 88: List of top 10 performing systems in Western Cape Province

Western Cape: Top 10 Performing Supply Systems		
WSA	**Supply System**	**%BDRR**
Beaufort West Local Municipality	Beaufort West	15.7
Bergrivier Local Municipality	Aurora	16.0
Bergrivier Local Municipality	Eendekuil	15.6
Bergrivier Local Municipality	Redelinghuys	14.3
Bitou Local Municipality	Nature`s Valley	13.7
Drakenstein Local Municipality	Bainskloof (Bainskloof WTW)	15.5
Knysna Local Municipality	Rheenendal	15.6
Overstrand Local Municipality	Baardskeerdersbos Supply System	12.8
Overstrand Local Municipality	Buffeljags Bay Supply System	16.2
Overstrand Local Municipality	Kleinmond Supply System	16.2
Overstrand Local Municipality	Pearly Beach Supply System	13.8
Theewaterskloof Local Municipality	Botrivier	16.1

Beaufort West Local Municipality

Municipal BDRR Score: 17.6%

Assessment Areas	Beaufort West	Merweville	Murraysburg	Nelspoort
BULK / WSP				
A: Total Design Capacity (Ml/d)	22.1	2	0.6	0.5
B: % Operational Capacity in terms of design	12.4%	17%	45%	74%
C1a: % Microbiological Compliance	99.5%	95.2%	89.5%	91.3%
C1b: % Microbiological Monitoring Compliance	92.7%	70.8%	70.8%	87.5%
C2a: % Chemical Compliance	99.4%	100%	99.4%	98%
C2b: % Chemical Monitoring Compliance	82%	8.8%	8.8%	8.8%
D: % Technical Skills	75%	18.8%	37.5%	18.8%
E: % Water Safety Plan Status	19.1%	0%	0%	0%
%BDRR/BDRR max	15.7%	29.1%	39.4%	28.6%

WSA Overview

All the Water Supply Systems at this WSA (Beaufort West WSS, Merweville WSS, Murraysburg, WSS and Nelspoort WSS) falls in the low-risk category.

Criteria A – The design capacity information for all the Water Supply Systems was provided. This is an indication of the presence of flow management and of Treatment Works Classification.

Criteria B – All the Water Supply Systems are operating within their design capacity which makes them compliant.

Criteria C – The Beaufort West WSS indicated excellent Microbiological compliance, Microbiological Monitoring compliance, Chemical compliance, and Chemical Monitoring compliance. The Merweville WSS, Murraysburg, WSS and Nelspoort WSS achieved excellent compliance for Chemical compliance and adequate results for Microbiological compliance and non-compliance for Microbiological Monitoring compliance and Chemical Monitoring compliance which presents a serious health risk to the consumers as quality of water cannot be guaranteed for consumption.

Criteria D – The Beaufort West WSS indicated adequate score for compliance of 75% and Merweville WSS, Murraysburg, WSS and Nelspoort WSS indicated non-compliance with technical skills which indicates insufficient presence of the relevant process control staff and maintenance teams.

Criteria E – The Beaufort West WSS indicated low compliance and Merweville WSS, Murraysburg, WSS and Nelspoort WSS indicated the absence and lack of implementation of a Water Safety Plan and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Bergrivier Local Municipality

Municipal BDRR Score: 30%

Assessment Areas	Aurora	Eendekuil	Piketberg	Poterville
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.2	0.2	3.15	2.27
B: % Operational Capacity in terms of design	55%	90.5%	63.5%	57.27%
C1a: % Microbiological Compliance	100%	98.7%	95.8%	99%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	100%
C2a: % Chemical Compliance	96.4%	97%	92.9%	98.1%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%	97.1%	97.1%
D: % Technical Skills	8.3%	16.7%	16.7%	8.3%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	16.1%	15.6%	32%	22.9%

Assessment Areas	Redelinghuys	Velddrif
BULK / WSP		
A: Total Design Capacity (Ml/d)	0.26	N/I
B: % Operational Capacity in terms of design	53.85%	N/I
C1a: % Microbiological Compliance	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%
C2a: % Chemical Compliance	99.3%	99.4%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%
D: % Technical Skills	16.7%	8.3%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	14.3%	49.9%

WSA Overview

All the Water Supply Systems at this WSA (Aurora WSS, Eendekuil WSS, Piketberg WSS, Poterville WSS, Redelinghuys WSS and Velddrif WSS) falls in the low-risk category.

Criteria A – The design capacity information for all the Water Supply Systems was provided except for Velddrif WSS. The absence of design capacity information is an indication of the lack of flow management and absence of Treatment Works Classification.

Criteria B – The Aurora WSS, Piketberg WSS, Poterville WSS and Redelinghuys WSS are operating within their design capacities. The Eendekuil WSS is operating above its design capacity and there is no operational capacity information provided for the Velddrif WSS which makes both WSS non-compliant, and this must be addressed by the WSA.

Criteria C – All the Water Supply Systems achieved excellent compliance for Microbiological compliance (>98%), except for Piketberg WSS. All the Water Supply Systems have achieved excellent compliance for Microbiological Monitoring compliance (>80%) and Chemical Monitoring compliance (>80%). The Poterville WSS, Redelinghuys WSS and Velddrif WSS achieved excellent compliance for Chemical compliance (>98%) and Aurora WSS, Eendekuil WSS, and Piketberg WSS indicated adequate compliance for Chemical compliance The average Water Quality Monitoring results for the Water Supply Systems at this WSA revealed excellent performance and compliance.

Criteria D – All the Water Supply Systems indicated insufficient presence of the relevant process control staff and maintenance teams which makes them non-compliant.

Criteria E – All the Water Supply Systems indicated the absence of an implementation of a Water Safety Plan and development of risk-based water quality monitoring programmes as outlined in SANS 24.

The Regulator encourages the WSA to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Bitou Local Municipality

Municipal BDRR Score: 19.4%

Assessment Areas	Kurland	Nature's Valley	Plettenberg Bay
BULK / WSP			
A: Total Design Capacity (Ml/d)	0.65	1	27
B: % Operational Capacity in terms of design	86.1%	15.9%	48.5%
C1a: % Microbiological Compliance	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%
C2a: % Chemical Compliance	100%	100%	100%
C2b: % Chemical Monitoring Compliance	14.7%	14.7%	14.7%
D: % Technical Skills	81.3%	81.3%	85%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	17.7%	13.7%	19.6%

WSA Overview

All the Water Supply Systems (Kurland WSS, Nature's Valley WSS and Plettenberg Bay) in this WSA falls in the low-risk category.

Criteria A – design capacity information for all the Water Supply Services was provided. This is an indication of the presence of flow management and of Treatment Works Classification.

Criteria B – All the Water Supply Systems are operating within their design capacity which makes them compliant.

Criteria C – The three Water Supply Systems (Kurland WSS, Nature`s Valley WSS and Plettenberg Bay WSS) indicated excellent compliance for Microbiological compliance (>98%), Microbiological Monitoring compliance (>80%) and Chemical compliance (>98%). None of the Water Supply Systems achieved compliance for and Chemical Monitoring compliance which presents a serious health risk to the consumers as quality of water cannot be guaranteed for consumption.

Criteria D – All the Water Supply Systems achieved adequate compliance with technical skills. Which is an indication of sufficient relevant process control staff and maintenance teams.

Criteria E – There is no indicated presence and implementation of a Water Safety Plan and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015 for the three Water Supply Systems.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Breede Valley Local Municipality

Municipal BDRR Score: 43.2%

Assessment Areas	Bokrivier (Touwsrivier)	De Doorns	De Koppen (Fairyglen)	Worcester / Rawsonville
BULK / WSP				
A: Total Design Capacity (Ml/d)	1.5	2	10	60
B: % Operational Capacity in terms of design	93.3%	225%	10%	58.3%
C1a: % Microbiological Compliance	100%	97%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	91%
C2a: % Chemical Compliance	91.5%	94.2%	92.2%	95.7%
C2b: % Chemical Monitoring Compliance	14.7%	14.7%	14.7%	14.7%
D: % Technical Skills	45.8%	45.8%	64.6%	45.8%
E: % Water Safety Plan Status	90.9%	90.9%	90.9%	81.8%
%BDRR/BDRR max	41%	47%	31.1%	45.2%

WSA Overview

All the Water Supply System for this WSA (Bokrivier (Touwsrivier) WSS, De Doorns WSS, De Koppen (Fairyglen) WSS and Worcester/Rawsonville WSS falls in the low-risk category.

Criteria A – design capacity information for all the Water Supply Systems has been provided. This is an indication of flow management and the presence of Treatment Works Classification.

Criteria B – The De Koppen (Fairyglen) WSS and Worcester/Rawsonville WSS are operating within their design capacity and Bokrivier (Touwsrivier) WSS and De Doorns WSS are operating above their design capacity which makes them non-compliant, and this must be addressed by the WSA.

Criteria C – The Bokrivier (Touwsrivier) WSS, De Koppen (Fairyglen) WSS and Worcester/Rawsonville WSS indicated excellent compliance for Microbiological compliance (>98%), and De Doorns WSS achieved adequate compliance of 97%. All the WSS achieved excellent compliance for Microbiological Monitoring compliance (>80%). Adequate compliance was achieved by all the Water Supply Systems for Chemical compliance whereas they all achieved non-compliance for Chemical Monitoring compliance which may present a serious health risk to the consumers as quality of water cannot be guaranteed for consumption.

Criteria D – All the Water Supply Systems achieved non-compliance for the presence of technical skills. This is an indication of insufficient relevant process control staff and maintenance teams.

Criteria E – The Bokrivier (Touwsrivier) WSS, De Doorns WSS, De Koppen (Fairyglen) WSS achieved excellent compliance which indicated the presence and implementation of a Water Safety Plan and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.The Worcester/Rawsonville WSS achieved and adequate compliance with 81.8%.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Cape Agulhas Local Municipality

Municipal BDRR Score: 35.2%

Assessment Areas	Aniston / Waenhuskrans	Bredasdorp	Elim Fountain Water	Klipdale
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.55	8	N/I	N/I
B: % Operational Capacity in terms of design	0%	0%	N/I	N/I
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	50%
C2a: % Chemical Compliance	99.2%	100%	96.5%	97.2%
C2b: % Chemical Monitoring Compliance	17.7%	17.7%	17.7%	2.9%
D: % Technical Skills	75%	37.5%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	25.9%	34.2%	54.9%	54.2%

Assessment Areas	L`Agulhas	Napier	Protem	Spanjaardskloof
BULK / WSP				
A: Total Design Capacity (Ml/d)	1.2	1	N/I	0.15
B: % Operational Capacity in terms of design	100%	0%	N/I	0%
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%	50%	100%
C2a: % Chemical Compliance	98.8%	98.1%	100%	99.1%
C2b: % Chemical Monitoring Compliance	17.7%	17.7%	2.9%	20.6%
D: % Technical Skills	37.5%	75%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	19.75	25.9%	52.5%	21.6%

Assessment Areas	Struisbaai	Suiderstrand
BULK / WSP		
A: Total Design Capacity (Ml/d)	4.15	0.15
B: % Operational Capacity in terms of design	0%	0%
C1a: % Microbiological Compliance	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%
C2a: % Chemical Compliance	100%	98.8%
C2b: % Chemical Monitoring Compliance	17.7%	20.6%
D: % Technical Skills	75%	75%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	32.6%	17.8%

WSA Overview

The Napier WSS, Spanjaardskloof WSS, Struisbaai WSS and Suiderstrand WSS falls in the low-risk category and the Protem WSS falls in the Medium-Risk category.

Criteria A – design capacity information for all the Water Supply Systems was provided except for the Protem WSS, this is an indication of the absence of flow management and of Treatment Works Classification.

Criteria B – The information on operational capacity for all the Water Supply Systems was not provided, this is an indication of non-compliance and must be addressed by the WSA.

Criteria C – All the Water Supply Systems achieved excellent compliance for Microbiological Compliance (>98%) and Chemical compliance (>98%). The Napier WSS, Spanjaardskloof WSS, Struisbaai WSS and Suiderstrand WSS achieved excellent compliance for Microbiological Monitoring compliance (>80%) and Protem WSS was indicated to be non-compliant. All the Water Supply Systems indicated non-compliance with Chemical Monitoring compliance which indicates a high-risk for the end consumers.

Criteria D – The Napier WSS, Struisbaai WSS and Suiderstrand WSS achieved adequate compliance of 75% and Protem WSS and Spanjaardskloof WSS indicated non-compliance for technical skills which indicates inadequate presence or absence of relevant process controllers, supervisors and maintenance teams.

Criteria E – All the Water Supply Systems achieved non-compliance as they indicated the absence of the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Cederberg Local Municipality

Municipal BDRR Score: 27.9%

Assessment Areas	Algeria	Citrusdal	Clanwilliam	Elands Bay
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	8.3	6.9	1
B: % Operational Capacity in terms of design	N/I	34.9%	42%	50%
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	54.2%	91.7%	100%	100%
C2a: % Chemical Compliance	98%	100%	87.8%	91.8%
C2b: % Chemical Monitoring Compliance	5.8%	5.9%	5.9%	5.9%
D: % Technical Skills	25%	43.8%	25%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	53.4%	17.7%	35.8%	35.4%

Assessment Areas	Graafwater	Lambert`s Bay	Leipoldtville	Paleisheuwel
BULK / WSP				
A: Total Design Capacity (Ml/d)	7.5	5.2	0.5	N/I
B: % Operational Capacity in terms of design	8%	34.6%	2680%	N/I
C1a: % Microbiological Compliance	100%	100%	87.5%	93.3%
C1b: % Microbiological Monitoring Compliance	100%	91.7%	91.7%	50%
C2a: % Chemical Compliance	95.9%	99.7%	72%	95.5%
C2b: % Chemical Monitoring Compliance	8.8%	5.9%	5.9%	5.9%
D: % Technical Skills	43.8%	43.8%	25%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	20.9%	17.7%	53.9%	74.4%

Assessment Areas	Wuppertal
BULK / WSP	
A: Total Design Capacity (Ml/d)	N/I
B: % Operational Capacity in terms of design	N/I
C1a: % Microbiological Compliance	3.3%
C1b: % Microbiological Monitoring Compliance	100%
C2a: % Chemical Compliance	85.7%
C2b: % Chemical Monitoring Compliance	5.9%
D: % Technical Skills	25%
E: % Water Safety Plan Status	0%
%BDRR/BDRR max	72.3%

WSA Overview

The Citrusdal WSS, Clanwilliam WSS, Elands Bay WSS, Graafwater WSS and Lambert`s Bay WSS falls in the low-risk category followed by Algeria WSS and Leipoldtville WSS which fall in the medium-risk category followed by Paleisheuwel WSS and Wuppertal WSS which falls in the high-risk category.

Criteria A – The information of the Design Capacity for the Algeria WSS, Paleisheuwel WSS and Wuppertal WSS was not provided.

Criteria B – The Lambert`s Bay WSS, Citrusdal WSS, Clanwilliam WSS, Elands Bay WSS and Graafwater WSS are operating within their design capacity. The Leipoldtville WSS is operating above its design capacity and no operational capacity information was provided for the Algeria WSS, Paleisheuwel WSS and Wuppertal WSS. This is an indication of the absence of flow management and of Treatment Works Classification.

Criteria C – The Algeria WSS, Lambert`s Bay WSS, Citrusdal WSS, Clanwilliam WSS, Elands Bay WSS and Graafwater WSS achieved excellent compliance for Microbiological Compliance (>98%). The Clanwilliam WSS, Elands Bay WSS, Graafwater WSS and Wuppertal WSS achieved excellent compliance for Microbiological Monitoring compliance (>80%). The Algeria WSS, Citrusdal WSS and Lambert`s Bay WSS achieved excellent compliance for Chemical compliance (>98%). None of the WSS has achieved compliance for Chemical Monitoring compliance, this is an indication of non-compliance and must be addressed by the WSA.

Criteria D – None of the WSS has achieved excellent compliance for technical skills which is an indication of inadequate presence of relevant process controllers, supervisors and maintenance teams.

Criteria E – There is no Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015 presented for all the Water Supply Systems at this WSA.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

City of Cape Town Metropolitan Municipality

Municipal BDRR Score: 25.7%

Assessment Areas	Cape Town
BULK / WSP	
A: Total Design Capacity (Ml/d)	1685.2
B: % Operational Capacity in terms of design	41.5%
C1a: % Microbiological Compliance	99.6%
C1b: % Microbiological Monitoring Compliance	100%
C2a: % Chemical Compliance	99.3%
C2b: % Chemical Monitoring Compliance	94.1%
D: % Technical Skills	87.3%
E: % Water Safety Plan Status	90.4%
%BDRR/BDRR max	25.7%

WSA Overview

The Cape Town WSS falls in the low-risk category.

Criteria A – design capacity for the Cape Town WSS is 1685.2 Ml/day.

Criteria B – The Cape Town WSS indicated the operational capacity is 41.5% in terms of design. This indicates sufficient capacity to meet current demand.

Criteria C – The Cape Town WSS achieved excellent compliance (>98%) for Microbiological compliance, Microbiological Monitoring compliance (>80%), Chemical compliance (>98%) and Chemical Monitoring compliance (>80%). The WSA is commended for excellent water quality compliance and sufficient sample sites to verify the quality of water at all points in the network.

Criteria D – The Cape Town WSS achieved adequate compliance (87.3%) for technical skills which is an indication of the presence of relevant process controllers, supervisors and maintenance teams. The WSA must ensure there are sufficient process control and maintenance personnel to maintain the integrity of the water supply network.

Criteria E – There is excellent compliance (90.4%) for Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015. The WSA must ensure there is sufficient budget and resources to implement mitigating measures to reduce overall risk associated with water services provision.

Drakenstein Local Municipality

Municipal BDRR Score: 33.6%

Assessment Areas	Bainskloof (Bainskloof WTW)	Drakenstein (Paarl Mountain WTW & Cape Town Bulk)
BULK / WSP		City of Cape Town MM
A: Total Design Capacity (Ml/d)	0.4	275.5
B: % Operational Capacity in terms of design	1.8%	57.5%
C1a: % Microbiological Compliance	97.9%	99.8%
C1b: % Microbiological Monitoring Compliance	100%	0%
C2a: % Chemical Compliance	96.3%	95.9%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%
D: % Technical Skills	8.3%	39.3%
E: % Water Safety Plan Status	72.7%	62.5%
%BDRR/BDRR max	15.5%	33.6%

WSA Overview

The Bainskloof WSS and Drakenstein WSS falls in the low-risk category.

Criteria A – The design capacities for both Water Treatment Works were provided.

Criteria B – Both the Water Treatment Works are operating within their design capacity, and this is an indication of the presence of flow management and of Treatment Works Classification.

Criteria C – The Bainskloof WSS achieved excellent compliance (>98%) for Microbiological compliance, Microbiological Monitoring compliance (>80%), Chemical Monitoring compliance (>98%) and adequate compliance for Chemical compliance (96.3%). The Drakenstein WSS achieved excellent compliance for Microbiological compliance (>98%), adequate compliance for Chemical compliance and Chemical Monitoring compliance and non-compliance for Microbiological Monitoring compliance and this must be addressed by the WSA.

Criteria D – Both of the WSS achieved non-compliance for technical skills, which is an indication of inadequate presence of relevant process controllers, supervisors and maintenance teams.

Criteria E – Both the WSS achieved adequate compliance for Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

George Local Municipality

Municipal BDRR Score: 40.1%

Assessment Areas	George Water Works	Haarlem Water Works	Uniondale Water Treatment Works	Wilderness Water Works
BULK / WSP				
A: Total Design Capacity (Ml/d)	46	1	1.5	1.50
B: % Operational Capacity in terms of design	73.3%	0%	0%	0%
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	97.2%	100%	100%	100%
C2a: % Chemical Compliance	96.4%	96.2%	99.6%	98.5%
C2b: % Chemical Monitoring Compliance	14.7%	14.7%	14.7%	14.7%
D: % Technical Skills	37.5%	56.3%	37.5%	75%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	41.1%	31.6%	27.6%	25.9%

WSA Overview

The George WSS, Haarlem WSS, Uniondale WSS and Wilderness WSS falls in the low-risk category.

Criteria A – The design capacities for the four Water Treatment Works were provided.

Criteria B – The George WSS is operating within its design capacity. The Haarlem WSS, Uniondale WSS and Wilderness WSS indicates no presence of operational flow management.

Criteria C – All the WSS achieved excellent compliance (>98%) for Microbiological compliance and Microbiological Monitoring compliance (>80%). The Uniondale WSS and Wilderness WSS achieved excellent compliance for Chemical compliance (>98%). George WSS and Haarlem WSS achieved excellent compliance. None of the Water Treatment Works achieved compliance for Chemical Monitoring compliance.

Criteria D – None of the four WSS achieved excellent compliance (100%) for technical skills, which is an indication of inadequate presence of relevant process controllers, supervisors and maintenance teams.

Criteria E – The Kriel/Ganala WSS achieved excellent compliance, Kendal WSS indicated no presence and Rietspruit WSS and Witbank WSS indicated low compliance for Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Hessequa Local Municipality

Municipal BDRR Score: 39.9%

Assessment Areas	Albertinia	Garcia	Gouritsmond	Heidelberg
BULK / WSP				Overberg Water
A: Total Design Capacity (Ml/d)	2	0.18	0.15	10
B: % Operational Capacity in terms of design	0%	0%	0%	0%
C1a: % Microbiological Compliance	100%	91.7%	100%	98.5%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	71.3%
C2a: % Chemical Compliance	90.3%	85.1%	99.2%	91.4%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%	97.1%	47.7%
D: % Technical Skills	75%	37.5%	37.5%	25%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	28.9%	35.3%	17.7%	37.4%

Assessment Areas	Jongensfontein	Melkhoutfontein	Riversdale	Slangrivier
BULK / WSP				Overberg Water
A: Total Design Capacity (Ml/d)	0.35	1	4	5
B: % Operational Capacity in terms of design	0%	0%	0%	0%
C1a: % Microbiological Compliance	73.1%	96.2%	100%	93.7%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	71.3%
C2a: % Chemical Compliance	88.5%	85.6%	87.5%	92.6%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%	97.1%	47.7%
D: % Technical Skills	56.3%	56.3%	65.6%	75.1%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	34.4%	32.6%	35.7%	45.5%

Assessment Areas	Still Bay	Vermaaklikheid	Witsand
BULK / WSP			Overberg Water
A: Total Design Capacity (Ml/d)	2	N/I	5
B: % Operational Capacity in terms of design	0%	N/I	0%
C1a: % Microbiological Compliance	77.8%	92.3%	97.7%
C1b: % Microbiological Monitoring Compliance	100%	100%	71.3%
C2a: % Chemical Compliance	73.5%	78.1%	91.9%
C2b: % Chemical Monitoring Compliance	11.8%	97.1%	47.7%
D: % Technical Skills	37.5%	0%	75%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	57.9%	61.6%	37.9%

WSA Overview

The Albertinia WSS, Garcia WSS, Gouritsmond WSS, Heidelberg WSS, Jongensfontein WSS, Melkhoutfontein WSS, Riversdale WSS, Slangrivier WSS and Witsand WSS falls in the low-risk category and Still Bay WSS and Vermaaklikheid WSS falls in the medium-risk category.

Criteria A – The design capacities for all the Water Treatment Works were provided except for Vermaaklikheid WSS which did not provided information.

Criteria B – There is no operational flow information provided for all the Water Treatment Works, which indicates the absence of operational flow management.

Criteria C – The Albertinia WSS, Gouritsmond WSS, Heidelberg WSS and Riversdale WSS achieved excellent Microbiological compliance. The Albertinia WSS, Garcia WSS, Gouritsmond WSS, Jongensfontein WSS, Melkhoutfontein WSS, Riversdale WSS, Still Bay WSS and Vermaaklikheid WSS achieved excellent Microbiological Monitoring compliance. Only Gouritsmond WSS achieved excellent Chemical compliance. All the Water Treatment Works achieved excellent Chemical Monitoring compliance except Heidelberg WSS, Slangrivier WSS, Still Bay WSS and Witsand WSS.

Criteria D – None of the Water Treatment Works achieved excellent compliance for technical skills, which is an indication of inadequate presence of relevant process controllers, supervisors and maintenance teams.

Criteria E – All the WSS indicated no presence of Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Kannaland Local Municipality

Municipal BDRR Score: 89.5%

Assessment Areas	Calitzdorp	Ladismith	Van Wyksdorp	Zoar Town
BULK / WSP				
A: Total Design Capacity (Ml/d)	2.16	3.6	0.56	1.4
B: % Operational Capacity in terms of design	0%	0%	0%	100%
C1a: % Microbiological Compliance	83.3%	85.7%	66.7%	50%
C1b: % Microbiological Monitoring Compliance	50%	19.4%	25%	8.3%
C2a: % Chemical Compliance	83.3%	85.7%	50%	0%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	0%
D: % Technical Skills	0%	0%	0%	0%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	74.6%	97.4%	97.2%	89.2%

WSA Overview

The Calitzdorp WSS and Zoar Town WSS falls in the high-risk category and the Ladismith WSS and Van Wyksdorp WSS falls in the critical-risk category.

Criteria A – The design capacities for all the Water Supply Systems were provided.

Criteria B – The Zoar Town WSS is operating above their design capacities as it operates above 90%, and there is no operating capacity information provided for Calitzdorp WSS, Ladismith WSS and Van Wyksdorp WSS which indicates absence of operational flow management. The WSA must ensure daily flow is measured and planned upgrades are implemented to ensure sufficient supply to meet current and future demand.

Criteria C – All the Water Supply Systems achieved non-compliance for Microbiological compliance, Microbiological Monitoring compliance, Chemical compliance and Chemical Monitoring compliance which indicates a high-risk for the end consumers with regards to safety of drinking water.

Criteria D – All the Water Supply Systems indicated the absence of relevant process controllers, supervisors and maintenance teams. This presents a serious risk due to lack of technical skills to operate and maintain treatment plants and network.

Criteria E – All the Water Supply Systems indicated the absence of Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Knysna Local Municipality

Municipal BDRR Score: 29.8%

Assessment Areas	Belvidere	Brenton-On-Sea	Brenton-On-Lake	Buffalo Bay
BULK / WSP				
A: Total Design Capacity (Ml/d)	N/I	N/I	N/I	0.3
B: % Operational Capacity in terms of design	N/I	N/I	N/I	66.7%
C1a: % Microbiological Compliance	0%	0%	0%	100%
C1b: % Microbiological Monitoring Compliance	0%	0%	0%	54.2%
C2a: % Chemical Compliance	0%	0%	0%	94.5%
C2b: % Chemical Monitoring Compliance	0%	0%	0%	97.1%
D: % Technical Skills	16.7%	8.3%	0%	45.8%
E: % Water Safety Plan Status	0%	0%	0%	81.8%
%BDRR/BDRR max	99.5%	99.7%	100%	20.9%

Assessment Areas	Karatara	Knysna WSS and Desal Plant	Rheenendal	Sedgefield WSS, Desal Plant, Emergency Bore Holes
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.65	22	1	2.5
B: % Operational Capacity in terms of design	77.2%	49.1%	3.6%	60%
C1a: % Microbiological Compliance	100%	99.1%	100%	100%
C1b: % Microbiological Monitoring Compliance	54.2%	96.9%	54.2%	100%
C2a: % Chemical Compliance	99.4%	94.8%	96%	97.7%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%	97.1%	97.1%
D: % Technical Skills	27.1%	83.3%	27.1%	36.5%
E: % Water Safety Plan Status	90.9%	100%	90.9%	81.8%
%BDRR/BDRR max	22.4%	21.9%	15.6%	24.4%

WSA Overview

The Buffalo Bay, Karatara, Knysna, Rheenendal and Sedgefield WSS falls in the low-risk category and the Belvidere, Brenton-On-Sea and Brenton-On-Lake supply systems falls in the critical-risk category.

Criteria A – The design capacities for all the Water Treatment Works except Belvidere WSS, Brenton -On-Sea WSS and Brenton-On-Lake WSS were provided.

Criteria B – The Buffalo Bay, Karatara, Knysna WSS, Rheenendal and Sedgefield WSS are operating within their design capacities. No operational flow information was provided for Belvidere, Brenton -On-Sea and Brenton-On-Lake systems.

Criteria C – Four supply systems namely Buffalo Bay , Karatara, Knysna, Rheenendal and Sedgefield have achieved excellent compliance (>98%) for Microbiological compliance and Chemical Monitoring compliance (>80%). The Sedgefield WSS achieved excellent compliance for Microbiological Monitoring compliance and Karatara system achieved excellent compliance for Chemical compliance. No water quality monitoring was indicated for Belvidere, Brenton-On-Sea and Brenton-On-Lake which indicates a high-risk for the end consumers as water quality in these systems cannot be verified.

Criteria D – None of the supply systems achieved excellent compliance for technical skills which is an indication of inadequate presence of relevant process controllers, supervisors and maintenance teams.

Criteria E – The Karatara, Knysna and Rheenendal achieved excellent compliance, Buffalo Bay and Sedgefield achieved adequate compliance and the Belvidere, Brenton-On-Sea and Brenton-On-Lake indicated the absence of Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Laingsburg Local Municipality

Municipal BDRR Score: 50.6%

Assessment Areas	Laingsburg	Matjiesfontein
BULK / WSP		
A: Total Design Capacity (Ml/d)	5	0.5
B: % Operational Capacity in terms of design	0%	0%
C1a: % Microbiological Compliance	100%	60%
C1b: % Microbiological Monitoring Compliance	37.5%	41.7%
C2a: % Chemical Compliance	90.5%	95%
C2b: % Chemical Monitoring Compliance	35.3%	35.3%
D: % Technical Skills	0%	0%
E: % Water Safety Plan Status	0%	0%
%BDRR/BDRR max	48.7%	69%

WSA Overview

The Laingsburg WSS falls in the low-risk category and the Matjiesfontein WSS falls in the medium-risk category.

Criteria A – The design capacities for both the Water Supply Systems were provided.

Criteria B – The is no operational flows provided for Laingsburg WSS and Matjiesfontein WSS, this indicates the absence of flow management.

Criteria C – Only the Laingsburg WSS achieved excellent compliance (>98%) for Microbiological compliance. Non-compliance was achieved for the Microbiological Monitoring compliance, Chemical compliance and Chemical Monitoring compliance, indicating a high-risk for the end consumers.

Criteria D – Both the Water Supply Systems are non-compliant with technical skills, which is an indication of inadequate presence of relevant process controllers, supervisors and maintenance teams.

Criteria E – Both the Water Supply Systems indicated the absence of Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Langeberg Local Municipality

Municipal BDRR Score: 22.2%

Assessment Areas	Ashton	Bonnievale	McGregor	Montagu
BULK / WSP				
A: Total Design Capacity (Ml/d)	20	20	2	5
B: % Operational Capacity in terms of design	30.5%	25%	55%	0%
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	94.4%	100%	100%	75%
C2a: % Chemical Compliance	98%	97.7%	95.3%	99.2%
C2b: % Chemical Monitoring Compliance	88.2%	91.2%	91.2%	91.2%
D: % Technical Skills	37.5%	18.8%	18.8%	18.8%
E: % Water Safety Plan Status	18.2%	9.1%	9.1%	9.1%
%BDRR/BDRR max	19.2%	19.7%	21.4%	34.8%

Assessment Areas	Robertson
BULK / WSP	
A: Total Design Capacity (Ml/d)	10.8
B: % Operational Capacity in terms of design	63%
C1a: % Microbiological Compliance	100%
C1b: % Microbiological Monitoring Compliance	91.7%
C2a: % Chemical Compliance	96.7%
C2b: % Chemical Monitoring Compliance	91.2%
D: % Technical Skills	18.8%
E: % Water Safety Plan Status	9.1%
%BDRR/BDRR max	26.8%

WSA Overview

The Ashton WSS, Bonnievale WSS, McGregor WSS, Montagu WSS and Robertson WSS falls in the low-risk category.

Criteria A – The design capacities for all the Water Supply Systems were provided.

Criteria B – The Ashton WSS, Bonnievale WSS, McGregor WSS and Robertson WSS are operating within their design capacity and Montagu WSS indicated the absence of operational flow management.

Criteria C – All the Water Treatment Works achieved excellent compliance (>98%) for Microbiological compliance and Chemical Monitoring compliance (>80%). The Bonnievale WSS and McGregor WSS achieved excellent Microbiological Monitoring compliance and the rest of the WSS achieved adequate compliance. The Ashton WSS, Bonnievale WSS and Montagu WSS achieved excellent Chemical compliance while the other WSS achieved adequate compliance.

Criteria D – All the Water Supply Systems are non-compliant with technical skills, which is an indication of inadequate presence of relevant process controllers, supervisors and maintenance teams.

Criteria E – All the Water Supply Systems achieved non-compliance of Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.

- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Matzikama Local Municipality

Municipal BDRR Score: 32.1%

Assessment Areas	Bitterfontein DMA	Ebenhaezer	Klawer	Kliprand
BULK / WSP				
A: Total Design Capacity (Ml/d)	2	2	2	N/I
B: % Operational Capacity in terms of design	14.9%	57.6%	54.2%	N/I
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	70.8%	91.7%	83.3%	37.5%
C2a: % Chemical Compliance	94.9%	96.6%	97.6%	99.1%
C2b: % Chemical Monitoring Compliance	29.4%	29.4%	29.4%	29.4%
D: % Technical Skills	16.7%	8.3%	16.7%	8.3%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	32.4%	25.8%	23%	53.2%

Assessment Areas	Koekenaap	Lutzville	Lutzville West	Vredendal
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.5	2	0.5	5
B: % Operational Capacity in terms of design	65.2%	63.1%	28.2%	103.2%
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	45.8%	83.3%	41.7%	83.3%
C2a: % Chemical Compliance	96.1%	94.5%	95.2%	96.9%
C2b: % Chemical Monitoring Compliance	29.4%	29.4%	29.4%	29.4%
D: % Technical Skills	8.3%	16.7%	16.7%	16.7%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	25.1%	35%	27.8%	34%

WSA Overview

The Bitterfontein DMA WSS, Ebenhaezer WSS, Klawer WSS, Koekenaap WSS, Lutzville WSS, Lutzville West WSS and Vredendal WSS falls in the low-risk category and Kliprand WSS falls in the medium-risk category.

Criteria A – design capacity information for all the Water Treatment Works was provided except for Kliprand WSS.

Criteria B – The Bitterfontein DMA WSS, Ebenhaezer WSS, Klawer WSS, Koekenaap WSS, Lutzville WSS, Lutzville West WSS are operating within their design capacity. The Vredendal WSS is operating above its design capacity and no flow measurement information was provided for Kliprand WSS. This is an indication of non-compliance and must be addressed by the WSA.

Criteria C1 – All the WSS have achieved excellent Microbiological compliance (>98%). None of the WSS achieved compliance with Microbiological Monitoring compliance and Chemical Monitoring compliance. Only the Kliprand WSS achieved excellent compliance with Chemical compliance and the rest of the WSS achieved adequate compliance which indicates a high-risk for the end consumers.

Criteria D – None of the WSS achieved excellent compliance (>90%) with technical skills which is an indication of inadequate presence of relevant process controllers, supervisors and maintenance teams.

Criteria E – All the WSS indicated the absence of the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Verification of design capacity for the Water Supply Systems that have not provided the design capacity.
- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Mossel Bay Local Municipality

Municipal BDRR Score: 28.4%

Assessment Areas	Friemersheim	Hebertsdale	Lodewykstenk	Mosselbaai / Grootbrak / Kleinbrak
BULK / WSP				
A: Total Design Capacity (Ml/d)	1	2	0.2	55
B: % Operational Capacity in terms of design	48%	9%	105%	44.7%
C1a: % Microbiological Compliance	100%	100%	95.8%	98.3%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	100%
C2a: % Chemical Compliance	97.4%	92.7%	85.5%	96.8%
C2b: % Chemical Monitoring Compliance	20.6%	2.9%	20.6%	20.6%
D: % Technical Skills	100%	100%	100%	100%
E: % Water Safety Plan Status	72.7%	72.7%	90.9%	72.7%
%BDRR/BDRR max	17.3%	30.1%	44.5%	28.5%

Assessment Areas	Ruiterbos
BULK / WSP	
A: Total Design Capacity (Ml/d)	0.5
B: % Operational Capacity in terms of design	18%
C1a: % Microbiological Compliance	100%
C1b: % Microbiological Monitoring Compliance	100%
C2a: % Chemical Compliance	94.9%
C2b: % Chemical Monitoring Compliance	20.6%
D: % Technical Skills	62.5%
E: % Water Safety Plan Status	72.7%
%BDRR/BDRR max	30%

WSA Overview

All the Water Supply Systems (Friemersheim WSS, Hebertsdale WSS, Lodewykstenk WSS, Mosselbaai/Grootbrak/ Kleinbrak WSS and Ruiterbos WSS) falls in the low-risk category.

Criteria A – The design capacities for all the Water Supply Systems were provided.

Criteria B – The Friemersheim WSS, Hebertsdale WSS, Mosselbaai/Grootbrak/ Kleinbrak WSS and Ruiterbos WSS are operating within their design capacity and Lodewykstenk WSS is indicated to operate above its design capacity and this much be addressed by the WSA.

Criteria C – The Friemersheim WSS, Hebertsdale WSS, Mosselbaai/Grootbrak/ Kleinbrak WSS and Ruiterbos WSS achieved excellent compliance (>98%) and Lodewykstenk WSS indicated adequate compliance for Microbiological compliance. All the Water Supply Systems achieved excellent Microbiological Monitoring compliance (>80%). Adequate compliance was achieved by all the Water Supply Systems for Chemical compliance. Non-compliance was indicated by all the Water Supply Systems for Chemical Monitoring compliance. This is an indication of non-compliance and must be addressed by the WSA.

Criteria D – All the Water Supply Systems (Friemersheim WSS, Hebertsdale WSS, Lodewykstenk WSS and Mosselbaai/Grootbrak/ Kleinbrak WSS) achieved excellent compliance while Ruiterbos WSS achieved adequate compliance for technical skills, which is an indication of adequate presence of relevant process controllers, supervisors and maintenance teams.

Criteria E – The Lodewykstenk WSS achieved excellent compliance (>90%), while the Friemersheim WSS, Hebertsdale WSS, Mosselbaai/Grootbrak/ Kleinbrak WSS and Ruiterbos WSS achieved adequate compliance (72.7%) for Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Oudtshoorn Local Municipality

Municipal BDRR Score: 48.9%

Assessment Areas	De Rust	Dysselsdorp	Oudtshoorn
BULK / WSP			
A: Total Design Capacity (Ml/d)	1	9	30
B: % Operational Capacity in terms of design	45%	32.1%	56.7%
C1a: % Microbiological Compliance	66.7%	99.1%	93.2%
C1b: % Microbiological Monitoring Compliance	100%	100%	84.6%
C2a: % Chemical Compliance	92.6%	94%	79.7%
C2b: % Chemical Monitoring Compliance	11.8%	11.8%	11.8%
D: % Technical Skills	8.3%	55.2%	8.3%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	47.3%	34.5%	53.3%

WSA Overview

The De Rust WSS and Dysselsdorp WSS falls in the low-risk category and Oudtshoorn WSS falls in the medium-risk category.

Criteria A – The design capacities for all the Water Supply Systems were provided.

Criteria B – All the Water Supply Systems are operating within their design capacities.

Criteria C – The Dysselsdorp WSS achieved excellent compliance for Microbiological compliance (>98%) and Microbiological Monitoring compliance (>80%). The De Rust WSS achieved excellent compliance (>98%) for Microbiological Monitoring compliance (>80%). All the Water Supply Systems achieved adequate Chemical compliance and non-compliance for Chemical Monitoring compliance (<80%) which indicates a high-risk for the end consumers.

Criteria D – All the Water Supply Systems achieved non-compliance for technical skills which indicates inadequate presence of relevant process controllers, supervisors and maintenance teams.

Criteria E – All the Water Treatment Works and Water Supply Systems indicated no presence of the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Overstrand Local Municipality

Municipal BDRR Score: 19.1%

Assessment Areas	Baardskeerdersbos Supply System	Buffeljags Bay Supply System	Buffelsrivier Supply System	Greater Gansbaai Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.19	0.08	5.5	8.1
B: % Operational Capacity in terms of design	21.6%	12.8%	36%	43.8%
C1a: % Microbiological Compliance	100%	98.5%	100%	99.6%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	100%
C2a: % Chemical Compliance	99.5%	92.3%	97.7%	98.9%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%	97.1%	97.1%
D: % Technical Skills	54.2%	91.7%	91.7%	91.7%
E: % Water Safety Plan Status	81.8%	81.8%	81.8%	81.8%
%BDRR/BDRR max	12.8%	16.2%	16.7%	17%

Assessment Areas	Greater Hermanus Supply System	Kleinmond Supply System	Pearly Beach Supply System	Stanford Supply System
BULK / WSP				
A: Total Design Capacity (Ml/d)	38	5.8	1.44	1
B: % Operational Capacity in terms of design	27%	39%	27.1%	86%
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	100%
C2a: % Chemical Compliance	99.3%	99.1%	99.3%	99.6%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%	97.1%	97.1%
D: % Technical Skills	66.7%	91.7%	91.7%	91.7%
E: % Water Safety Plan Status	81.8%	81.8%	81.8%	81.8%
%BDRR/BDRR max	20.7%	16.2%	13.9%	17.8%

WSA Overview

All the Water Supply Systems (Baardskeerdersbos WSS, Buffeljags Bay WSS, Buffelsrivier WSS, Greater Gansbaai WSS, Greater Hermanus WSS, Kleinmond WSS, Pearly Beach WSS and Stanford Supply System) falls in the low-risk category.

Criteria A – The design capacities for all the Water Supply Systems were provided.

Criteria B – All the Water Supply Systems are operating within their design capacities.

Criteria C – All the Water Supply Systems achieved excellent compliance for Microbiological compliance (>98%), Microbiological Monitoring compliance (>80%), Chemical compliance (>98%), and Chemical Monitoring compliance (>80%), except Buffeljags Bay WSS which achieved adequate Chemical compliance of 92.3%.

Criteria D – All the Water Supply Systems achieved excellent compliance (>90%) with technical skills which is an indication of relevant process controllers, supervisors and maintenance teams. However, Baardskeerdersbos WSS and Greater Gansbaai WSS have insufficient technical skills and this presents a risk with regards to operations and maintenance of these WSS.

Criteria E – All the Water Supply Systems achieved adequate compliance of 81.8% for Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Prince Albert Local Municipality

Municipal BDRR Score: 46.4%

Assessment Areas	Klaarstroom	Leeugamka	Prince Albert
BULK / WSP			
A: Total Design Capacity (Ml/d)	0.5	0.5	2
B: % Operational Capacity in terms of design	0%	0%	0%
C1a: % Microbiological Compliance	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	75%	75%	75%
C2a: % Chemical Compliance	90.3%	93.9%	88.2%
C2b: % Chemical Monitoring Compliance	11.8%	17.7%	11.8%
D: % Technical Skills	37.5%	18.8%	37.5%
E: % Water Safety Plan Status	0%	0%	0%
%BDRR/BDRR max	42.4%	43.3%	48.1%

WSA Overview

All the Water Supply Systems (Klaarstroom WSS, Leeugamka WSS and Prince Albert WSS) falls in the low-risk category.

Criteria A – The design capacities for all the Water Supply Systems were provided.

Criteria B – There is no information provided for the operational flows for all the Water Supply Systems which is an indication of non-compliance and must be addressed by the WSA.

Criteria C – All the Water Supply Systems (Klaarstroom WSS, Leeugamka WSS and Prince Albert WSS) achieved excellent compliance for Microbiological compliance (>98%), adequate Microbiological Monitoring compliance and Chemical compliance and achieved non-compliance for Chemical Monitoring compliance, which indicates a high-risk for the end consumers.

Criteria D – None of the WSS achieved excellent compliance (>90%) with technical skills which indicates an absence of relevant process controllers, supervisors and maintenance teams.

Criteria E – All the WSS indicated non-compliance of the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Saldanha Bay Local Municipality

Municipal BDRR Score: 27.2%

Assessment Areas	Saldanha Bay Supply Systems
BULK / WSP	West Coast DM Bulk
A: Total Design Capacity (Ml/d)	72
B: % Operational Capacity in terms of design	47.9%
C1a: % Microbiological Compliance	96.7%
C1b: % Microbiological Monitoring Compliance	76.3%
C2a: % Chemical Compliance	98.7%
C2b: % Chemical Monitoring Compliance	68.8%
D: % Technical Skills	62.5%
E: % Water Safety Plan Status	36.4%
%BDRR/BDRR max	27.2%

WSA Overview

The Saldanha Bay WSS falls in the low-risk category.

Criteria A – design capacity information for the Saldanha Bay WSS has been provided.

Criteria B – The Saldanha Bay WSS is operating within their design capacity.

Criteria C – The Saldanha Bay WSS achieved excellent Chemical compliance. However Microbiological compliance is poor, and there are insufficient microbiological and chemical monitoring points as per the poor performance for these indicators. The WSA must ensure there is sufficient number of samples as per SANS 241: 2015 to verify the safety of water at all points in the network.

Criteria D – The Water Supply Systems achieved non-compliance for technical skills which is an indication of lack of relevant process controllers, supervisors and maintenance teams.

Criteria E – The Saldanha Bay WSS achieved non-compliance for the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Stellenbosch Local Municipality

Municipal BDRR Score: 26.1%

Assessment Areas	Blackheath (City of Cape Town)	Faure System (City of Cape Town)	Franschhoek	Stellenbosch CBD
BULK / WSP	City of Cape Town Metropolitan Municipality	City of Cape Town Metropolitan Municipality		
A: Total Design Capacity (Ml/d)	430	500	2	49
B: % Operational Capacity in terms of design	39.1%	36%	29.8%	54.7%
C1a: % Microbiological Compliance	100%	100%	91.3%	92.2%
C1b: % Microbiological Monitoring Compliance	0%	0%	100%	100%
C2a: % Chemical Compliance	97.2%	97.6%	96.4%	94.8%
C2b: % Chemical Monitoring Compliance	91.2%	91.2%	91.2%	91.2%
D: % Technical Skills	46.9%	75%	37.5%	37.5%
E: % Water Safety Plan Status	9.1%	9.1%	0%	0%
%BDRR/BDRR max	23.5%	22.5%	26.3%	39.9%

Assessment Areas	Wemmershoek (City of Cape Town)
BULK / WSP	City of Cape Town Metropolitan Municipality
A: Total Design Capacity (Ml/d)	250
B: % Operational Capacity in terms of design	61.2%
C1a: % Microbiological Compliance	97.5%
C1b: % Microbiological Monitoring Compliance	0%
C2a: % Chemical Compliance	96.7%
C2b: % Chemical Monitoring Compliance	94.1%
D: % Technical Skills	65.6%
E: % Water Safety Plan Status	9.1%
%BDRR/BDRR max	35.2%

WSA Overview

All the Water Treatment Works (Blackheath WSS, Faure System WSS, Franschhoek WSS, Stellenbosch CBD WSS and Wemmershoek WSS) falls in the low-risk category.

Criteria A – The design capacity information for all the WSS has been provided.

Criteria B – All the WSS (Blackheath WSS, Faure System WSS, Franschhoek WSS, Stellenbosch CBD WSS and Wemmershoek WSS) are operating within their design capacity.

Criteria C – The Blackheath WSS and Faure System WSS achieved excellent compliance (>98%) for Microbiological compliance and the rest of the WSS achieved adequate compliance. The Franschhoek WSS and Stellenbosch CBD WSS achieved excellent compliance and the rest of the WSS indicated the absence of Microbiological Monitoring compliance. All the WSS (Blackheath WSS, Faure System WSS, Franschhoek WSS, Stellenbosch CBD WSS and Wemmershoek WSS) achieved adequate compliance for Chemical compliance and Chemical Monitoring compliance.

Criteria D – All the WSS achieved non-compliance, except Faure System WSS which achieved adequate compliance with technical skills which is an indication of lack of relevant process controllers, supervisors and maintenance teams.

Criteria E – The Blackheath WSS and Faure System WSS achieved non-compliance and Franschhoek WSS and Stellenbosch CBD WSS indicated the absence of Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Swartland Local Municipality

Municipal BDRR Score: 25%

Assessment Areas	Malmesbury Supply System	Moorreesburg Supply System
BULK / WSP	West Coast DM Bulk	West Coast DM Bulk
A: Total Design Capacity (Ml/d)	29.1	72
B: % Operational Capacity in terms of design	50.6%	47.9%
C1a: % Microbiological Compliance	98.7%	97.5%
C1b: % Microbiological Monitoring Compliance	72.1%	76.3%
C2a: % Chemical Compliance	98.6%	98.3%
C2b: % Chemical Monitoring Compliance	92.4%	55.9%
D: % Technical Skills	53.1%	62.5%
E: % Water Safety Plan Status	18.2%	18.2%
%BDRR/BDRR max	30.%	23%

WSA Overview

The Malmesbury WSS and the Moorreesburg WSS falls in the low-risk category.

Criteria A – The information of the design capacities for both the Malmesbury WSS and the Moorreesburg WSS has been provided.

Criteria B – Both the Malmesbury WSS and the Moorreesburg WSS are operating within their design capacity.

Criteria C – The Malmesbury WSS achieved excellent Microbiological compliance, Chemical compliance and Chemical Monitoring compliance. The Moorreesburg WSS achieved excellent Microbiological compliance and Chemical compliance. There is insufficient microbiological monitoring taking place in both system sand insufficient chemical monitoring in the Moorreesburg WSS. The WSA must ensure there are sufficient sampling points as per SANS 241: 2015 to verify the quality of water at all points in the network.

Criteria D – Both the Malmesbury WSS and the Moorreesburg WSS indicated non-compliance with technical skills which is an indication of lack of relevant process controllers, supervisors and maintenance teams.

Criteria E – Both the Water Supply Systems achieved non-compliance for the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Swellendam Local Municipality

Municipal BDRR Score: 33.1%

Assessment Areas	Barrydale	Buffelsjagrivier	Suurbraak	Swellendam
BULK / WSP				
A: Total Design Capacity (Ml/d)	2	0.5	0.5	5
B: % Operational Capacity in terms of design	0%	0%	0%	0%
C1a: % Microbiological Compliance	100%	92.3%	98.4%	98.7%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	100%
C2a: % Chemical Compliance	91.6%	88.8%	76.7%	89.7%
C2b: % Chemical Monitoring Compliance	97.1%	97.1%	97.1%	97.1%
D: % Technical Skills	56.3%	37.5%	75%	75%
E: % Water Safety Plan Status	0%	0%	0%	0%
%BDRR/BDRR max	29.8%	35.3%	21.1%	35.4%

WSA Overview

All the Water Treatment Works (Barrydale WSS, Buffelsjagrivier WSS, Suurbraak WSS and Swellendam WSST) falls in low-risk category.

Criteria A – The design capacities for all the WSS were provided.

Criteria B – There was no information provided for the operational capacity for all the WSS, which is an indication of non-compliance and must be addressed by the WSA.

Criteria C – The Barrydale WSS, Suurbraak WSS and Swellendam WSS achieved excellent water quality compliance for Microbiological and chemical quality (>98%) and monitoring compliance (>80%). The Buffelsjagrivier WSS has sufficient microbiological and chemical monitoring compliance: however the actual water quality is poor and this presents a serious health risk to consumers. The WSA must address these failures to ensure delivery of safe drinking water at all times.

Criteria D – None of the WSS achieved excellent compliance (>90%) with technical skills which is an indication of lack of relevant process controllers, supervisors and maintenance teams.

Criteria E – All the WSS indicated the absence of the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Theewaterkloof Local Municipality

Municipal BDRR Score: 36.8%

Assessment Areas	Bereaville	Botrivier	Caledon	Genadendal
BULK / WSP				
A: Total Design Capacity (Ml/d)	0.35	1.6	2.7	1.1
B: % Operational Capacity in terms of design	0%	50%	0%	254.6%
C1a: % Microbiological Compliance	100%	100%	97.4%	92.3%
C1b: % Microbiological Monitoring Compliance	100%	100%	75%	100%
C2a: % Chemical Compliance	91.6%	98.1%	93.8%	86.2%
C2b: % Chemical Monitoring Compliance	82.4%	82.4%	82.4%	82.4%
D: % Technical Skills	45.8%	45.8%	8.3%	45.8%
E: % Water Safety Plan Status	100%	90.9%	10.1%	90.9%
%BDRR/BDRR max	25.7%	16.1%	44.2%	44%

Assessment Areas	Grabouw	Greyton	Riviersonderend	Tesselaarsdal
BULK / WSP				
A: Total Design Capacity (Ml/d)	15	1.8	2.4	0.5
B: % Operational Capacity in terms of design	0%	27.8%	41.7%	20%
C1a: % Microbiological Compliance	100%	94.7%	100%	95.8%
C1b: % Microbiological Monitoring Compliance	53.5%	100%	100%	100%
C2a: % Chemical Compliance	85.6%	75.9%	94.9%	98.9%
C2b: % Chemical Monitoring Compliance	82.4%	82.4%	82.4%	29.4%
D: % Technical Skills	53.3%	45.8%	62.5%	45.8%
E: % Water Safety Plan Status	0%	90.9%	100%	90.9%
%BDRR/BDRR max	42.7%	29.3%	21.1%	21.7%

Assessment Areas	Villiersdorp WSS	Voorstekraal
BULK / WSP		
A: Total Design Capacity (Ml/d)	2.9	0.35
B: % Operational Capacity in terms of design	51.7%	28.6%
C1a: % Microbiological Compliance	100%	100%
C1b: % Microbiological Monitoring Compliance	66.7%	50%
C2a: % Chemical Compliance	88.1%	88.7%
C2b: % Chemical Monitoring Compliance	82.4%	29.4%
D: % Technical Skills	45.8%	45.8%
E: % Water Safety Plan Status	90.9%	100%
%BDRR/BDRR max	29.3%	38.5%

WSA Overview

All the Water Treatment Works (Bereaville WSS, Botrivier WSS, Caledon WSS, Genadendal WSS, Grabouw WSS, Greyton WSS, Riviersonderend WSS, Tesselaarsdal WSS, Villiersdorp WSS and Voorstekraal WSS falls in low-risk category.

Criteria A – The design capacities for all the Water Treatment Works were provided.

Criteria B – The Botrivier WSS, Greyton WSS, Riviersonderend WSS, Tesselaarsdal WSS, Villiersdorp WSS and Voorstekraal WSS are operating within their design capacity. The Genadendal WSS is operating above its design capacity and there was no operational flow information provided for Bereaville WSS, Caledon WSS and Grabouw WSS which is an indication of non-compliance and must be addressed by the WSA.

Criteria C – The Bereaville WSS, Botrivier WSS, Grabouw WSS, Riviersonderend WSS, Villiersdorp WSS and Voorstekraal WSS achieved excellent Microbiological compliance (>98%); The Bereaville WSS, Botrivier WSS, Genadendal WSS, Greyton WSS, Riviersonderend WSS and Tesselaarsdal WSS achieved excellent Microbiological Monitoring compliance (>80%). The Botrivier WSS and Tesselaarsdal WSS achieved excellent Chemical compliance (<98%) and Bereaville WSS, Botrivier WSS, Grabouw WSS, Greyton WSS, Riviersonderend WSS and Villiersdorp WSS achieved excellent Chemical Monitoring compliance (>80%). The WSA must address microbiological and chemical failures at all systems with <98% for water quality to ensure the delivery of safe water to these communities.

Criteria D – All the WSS achieved non-compliance for technical skills which is an indication of lack of relevant process controllers, supervisors and maintenance teams.

Criteria E – The Bereaville WSS, Botrivier WSS, Caledon WSS, Genadendal WSS Greyton WSS, Riviersonderend WSS, Tesselaarsdal WSS, Villiersdorp WSS and Voorstekraal WSS achieved excellent compliance for Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ A and B: Installation of calibrated inflow meters to verify operational capacity.
- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.

Witzenberg Local Municipality

Municipal BDRR Score: 25.3%

Assessment Areas	Ceres Water Treatment Works	Op die Berg Water Treatment Works	Prince Alfred Hamlet Water Treatment Works	Tulbagh Water Treatment Works
BULK / WSP				
A: Total Design Capacity (Ml/d)	44.1	0.7	3.7	3.33
B: % Operational Capacity in terms of design	24.9%	57.1%	66.8%	69%
C1a: % Microbiological Compliance	100%	100%	100%	100%
C1b: % Microbiological Monitoring Compliance	100%	100%	100%	100%
C2a: % Chemical Compliance	95.4%	96.5%	97.2%	94%
C2b: % Chemical Monitoring Compliance	50%	50%	50%	50%
D: % Technical Skills	72.9%	54.2%	54.2%	54.2%
E: % Water Safety Plan Status	90.9%	90.9%	90.9%	90.9%
%BDRR/BDRR max	24.8%	22.7%	25%	30.4%

Assessment Areas	Wolseley Water Treatment Works
BULK / WSP	
A: Total Design Capacity (Ml/d)	3.5
B: % Operational Capacity in terms of design	71.4%
C1a: % Microbiological Compliance	98.3%
C1b: % Microbiological Monitoring Compliance	100%
C2a: % Chemical Compliance	95.9%
C2b: % Chemical Monitoring Compliance	50%
D: % Technical Skills	54.2%
E: % Water Safety Plan Status	90.9%
%BDRR/BDRR max	28.3%

WSA Overview

All the Water Treatment Works (Ceres WSS, Op die Berg WSS, Prince Alfred Hamlet WSS, Tulbagh WSS and Wolseley WSS) falls in the Low-Risk category.

Criteria A – The design capacities for all the WSS were provided.

Criteria B – All the WSS (Ceres WSS, Op die Berg WSS, Prince Alfred Hamlet WSS, Tulbagh WSS and Wolseley WSS) are operating within their design capacity.

Criteria C – All the WSS have achieved excellent Microbiological compliance (>98%) and Microbiological Monitoring compliance (>80%). However chemical water quality compliance is poor indicating potential health risk and there is insufficient number of chemical monitoring points to verify the quality of water at all points in the network.

Criteria D – The Op die Berg WSS, Prince Alfred Hamlet WSS, Tulbagh WSS and Wolseley WSS achieved a low compliance of 54.2% and Ceres WSS achieved an adequate compliance with technical skills which is an indication of the lack of relevant process controllers, supervisors and maintenance teams.

Criteria E – All the WSS achieved excellent compliance for the Water Safety Planning and development of risk-based water quality monitoring programmes as outlined in SANS 241:2015.

The Regulator encourages the WSA and WSP to urgently implement the following recommendations to ensure delivery of safe drinking water for all consumers:

- ✓ Ca: Implementation of corrective measures in the event of microbiological and chemical failures to always ensure delivery of safe drinking water.
- ✓ Cb: Implementation of monitoring programmes with sufficient samples based on population size as outlined in SANS 241:2015.
- ✓ D: Appointment of suitably qualified staff (supervisors, process controllers and maintenance teams) aligned to set criteria.
- ✓ E: Development of Water Safety Plan as per SANS 241:2015 and WHO guidelines including risk assessment of entire supply system, water quality evaluation based on full SANS 241:2015 analysis of raw and final water, development of risk-based monitoring programmes, and implementation of mitigating measures to address all medium and high risks.