

NORTHERN CAPE REGION

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INTRODUCTION

The main water treatment works in Sedibeng Water's Northern Cape Region consist of the Vaal Gamagara, Pelladrift, and Namakwa Water Supply Schemes. The Region's municipal customers are the Digkatlong, Tsantsabane, Gamagara and Joe Morolong Local Municipalities which are supplied from the Vaal Gamagara Water Supply Scheme, while the Nama Khoi and Khai Ma Local Municipalities are supplied from the Namakwa Water Supply Scheme and the Pelladrift Water Supply Scheme, respectively. Within the context of Regional Water Utility Establishment processes and as part of new business development, the Region has been carrying out investigations in terms of expanding its services to all the municipalities in the Northern Cape Province.

PRIMARY OBJECTIVE

The primary objective of the Northern Cape Region is to supply bulk potable water, maintain the extensive pipeline network in its operational area and ensure that the water supplied meets SANS: 241 standards. The Region also operates a quality

control laboratory, which is located at the Vaal Gamagara offices of Sedibeng Water and provides services to internal and external customers in the Region. Various programmes were implemented to assist some of the municipalities in the area to attain Blue and Green Drop status.

WATER SOURCES

Vaal Gamagara Water Supply Scheme

Raw water is abstracted from the Vaal River and augmented with ground water from the dewatering operations at Kolomela (Beeshoek) and the Sishen Mines. The raw water from the Vaal River is treated at the Vaal Gamagara Water Treatment Plant near Delpportshoop, and distributed through a bulk pipeline to Black Rock, which is situated 340km from the water treatment plant.

The Vaal Gamagara Water Supply Scheme is currently operating beyond its design capacity of 20 million kℓ/annum. However, the upgrading of the scheme is underway. Construction commenced in November 2016 with the 86km pipeline section between Roscoe (Olifantshoek cross on the N14)

to Black Rock. This section is the major constraint in the system due to its age and size, hence construction commenced at this point.

Pelladrift Water Supply Scheme

Raw water is sourced from the Orange River and treated at the treatment works located on the banks of the river. This plant has been upgraded to double its capacity from 12Mℓ/day to 25Mℓ/day in order to accommodate the water demands of the new Gamsberg Mine. An additional pipeline (parallel to the existing line) was constructed during 2017/2018 and commissioned during the 2018/2019 financial year to supply water directly to the Gamsberg Mine.

Namakwa Water Supply Scheme

Water is abstracted from the Orange River about 110km north of Springbok in the Namakwa District Municipality. The scheme has reached the end of its operational lifespan and a project to refurbish the infrastructure is being implemented. Construction work commenced in September 2013 and progress to date stands at 64%. The scheme met the expected consumer demand during the 2018/19 financial year.

AREAS OF SUPPLY

Potable water in the Region is supplied to the following areas:

• **Pelladrift Scheme**

- Poffader;

- Pella;
- Aggeneys township;
- Gamsberg Mine; and
- Black Mountain Mine within the Khâi-Ma Local Municipality.

• **Namakwa Scheme**

- Nama Khoi Local Municipality;
- De Beers Mine; and
- Small industries within the jurisdiction of the above mentioned municipality.

• **Vaal Gamagara Scheme**

- Dikgatlong Local Municipality;
- Tsantsabane Local Municipality;
- Gamagara Local Municipality;
- Joe Morolong Local Municipality;
- Industries;
- Government institutions; and
- Farmer and mines in the operational area.

PRODUCTION VOLUMES

The Region’s water supply schemes performed according to the targets set for the 2018/2019 financial year. Performance levels with regards to raw water purchases and volumes produced during the review period, are indicated in Tables 1 and 2. As indicated in Tables 1 and 2, the three schemes in the Northern Cape Region produced a total of 30.81 million kℓ of water during the 2018/2019 financial year, while total water sales amounted to 27.4 million kℓ.

Table 1: Raw Water Purchases

Year	Vaal Gamagara Volume (kℓ)	Namakwa Volume (kℓ)	Pelladrift Volume (kℓ)	Total Volume (kℓ)
2018/2019	20,053,532	3,846,658	6,907,251	30,807,441
2017/2018	20,100,344	4,011,816	5,046,054	29,158,214

The total raw water purchases of the Region have increased by 5.66% from the previous financial year to the 2018/2019 financial year, due to the increased volumes of supply to the Gamsberg Mine in the

Pelladrift area. Volumes from the Vaal Gamagara and Namakwa Schemes declined when compared to the previous financial year.

Table 2: Volume of Water Produced (Sold)

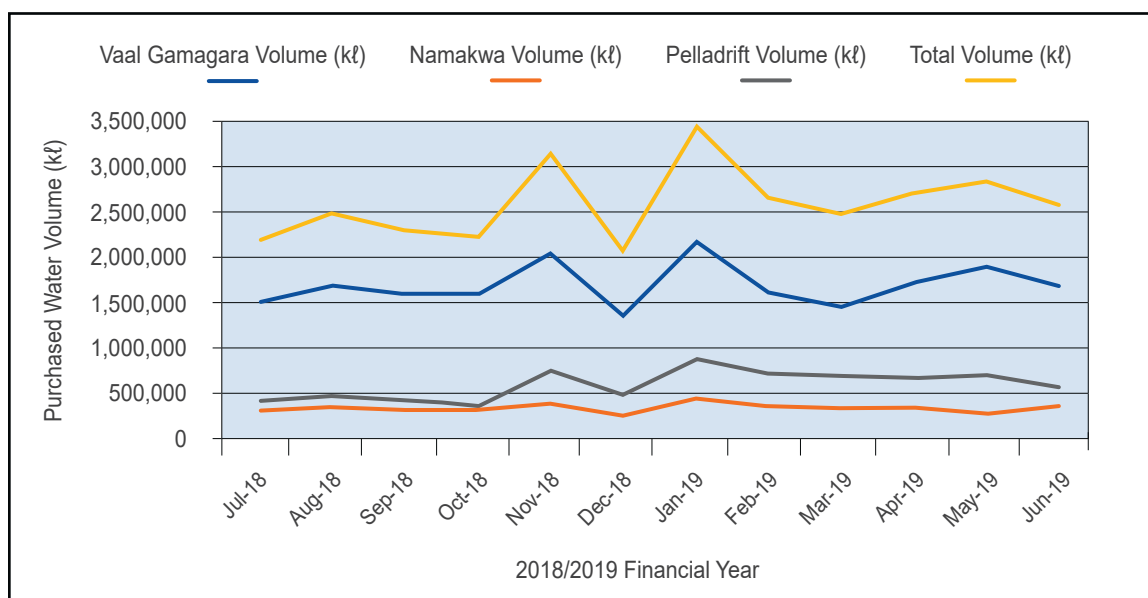
Year	Vaal Gamagara Volume (kℓ)	Namakwa Volume (kℓ)	Pelladrift Volume (kℓ)	Total Volume (kℓ)
2018/2019	18,423,734	2,565,896	6,409,858	27,399,488
2017/2018	18,874,450	3,311,554	5,229,279	27,485,283

The volume of water produced (sold) by the Region has decreased by 0.31% from the previous financial year to the 2018/2019 financial year, due to infrastructure capacity shortcomings and frequent

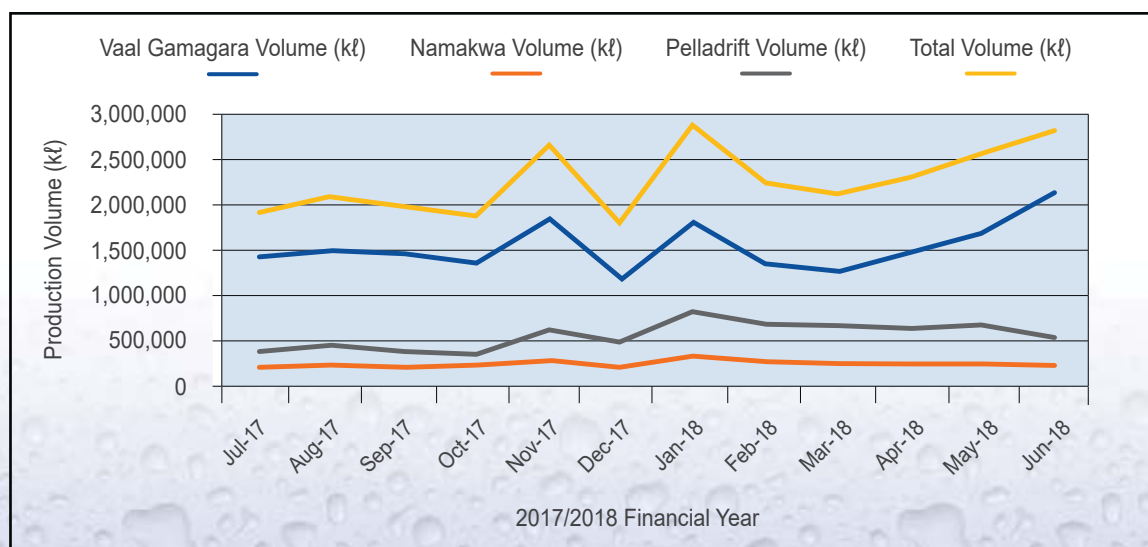
breakdowns experienced during the high demand season.

Month-by-month trends in water purchases and production are depicted in Graphs 1-2.

Graph 1: Monthly Trends in Bulk Water Purchased



Graph 2: Monthly Trends in Potable Water Production



INFRASTRUCTURE MAINTENANCE AND REFURBISHMENT

Planned maintenance programmes were carried out on an on-going basis according to a planned

maintenance schedule, including daily, weekly, monthly and annual inspections. Expenditure on maintenance and refurbishment during the 2018/2019 financial year is reflected in Table 3:

Table 3: Expenditure on Maintenance and Refurbishment

Year	Maintenance/ Refurbishment	Expenditure (R)	Increase in Expenditure (R)	Variance (%)
2018/2019	Maintenance	9,329,985	730,377	8.49%
2017/2018	Maintenance	8,599,608	2,558,287	22.93%

During the financial year under review, maintenance was primarily aimed at critical plant machinery to keep the schemes operating due to resource challenges. Maintenance expenditure increased by 8.49% compared to the 2017/2018 financial year.

Namakwa Scheme

The Namakwa Scheme is currently being renewed as it reached the end of its operational lifespan. The scheme has been experiencing frequent breakdowns due to aged pipeline infrastructure. A refurbishment project was initiated in 2013 and by the end of 2018/2019 financial year, this upgrading project is 64% completed. The reliability of the scheme has improved significantly.

Pelladrift Scheme

During the 2018/2019 financial year, Phase 1 of the upgrading of the Pelladrift Scheme has been completed and commissioned. The scheme now has increased capacity to meet the demand of the new Gamsberg Mine that is situated at Aggeneys close to the Black Mountain Mine. The scheme now makes use of high efficient pumps to limit electricity consumption while supplying increased volumes.

Planned Maintenance:

Planned maintenance at the scheme is carried out as per the annual Maintenance Plan. The following maintenance work was done during the 2018/2019 financial year:

- Servicing of overhead lifting equipment;
- Repairing of transformers at the residential area and pump stations;
- Cleaning of reservoirs and balancing reservoir in Pelladrift;
- Repairing of service pump at Henkries High Lift Pump Station;
- Performing of vibration analysis and oil sampling at the pumps;
- Servicing of pumps and motors at Henkries River Pump Station;
- Cleaning of sewer pipelines and septic tanks at Henkries residential area;
- Cleaning of water chambers in Springbok; and
- Servicing of pressure reducing valve in Steinkopf.

Unplanned Maintenance:

- Repairing of leaks at Aggeneys pipeline;
- Replacing manhole covers along the pipeline in Concordia;
- Repairing of burst pipes and leaks in Henkries;
- Replacing of electric cables and relays in Okiep Pump Station;
- Replacing of batteries and electronic circuit of radio receiver station at Kumsu;
- Replaced isolation valves at Okiep Pump Station;
- Repairing of burst pipes in Bersig and Okiep; and
- Changing of faulty meters along the pipeline.

Vaal Gamagara Scheme

The refurbishment and upgrading of Phase 1 of the Vaal Gamagara Supply Scheme commenced in October 2016, starting with the Roscoe to Black Rock

pipeline section (80km). Construction is on-going and the pipeline is being replaced and upgraded. Phase 2 of the project is at the planning and design stage.

Planned Maintenance:

- Manufacturing of water pipeline reducers and flanges for air valves on the SWEF line;
- Servicing of pumps and valves at Trewill Pump Station;
- Replacing of Pump No. 1 at Glossom Pump Station;
- Doing maintenance on the motors at High Lift Kneukel and Trewill Pump Stations;
- Installing of soft starter for Pump No. 3 at Sishen Pump Station;
- Connecting of Bio-filter 2 at Vaal Gamagara Wastewater Plant;
- Repairing of needle valve at Kathu;
- Servicing of overhead crane at Kneukel, Trewill and Beeshoek Pump Stations;
- Inspecting of cathodic protection at Postmansburg, Lime Acres and Groenwater; and
- Installing of plunger valve at Trewill Pump Station.

Unplanned Maintenance:

- Repairing of communication failure at Glossom reservoir;
- Repairing of leaks on Roscoe line;
- Repairing of communication failure at Clifton;

- Repairing of submersible pump at Vaal Gamagara Plant;
- Resetting of PLC and pumps at Trewill Pump Station;
- Repairing of leak at Sariel's Farm and Roscoe;
- Repairing of power and communication failure at Beeshoek Pump Station;
- Attending to communication failure at Koopmansfontein;
- Repairing of leak at PRV 116 at Kathu;
- Replacing of faulty plunger valve at Kneukel Pump Station;
- Repairing of leak at Silver Stream; and
- Repairing of leak at Kneukel Pump Station.

POTABLE WATER QUALITY

Pelladrift Scheme

Tables 4.1 and 4.2 depict the overall water quality results for the Pelladrift distribution network during the last quarter of the 2018/2019 financial year. The Pelladrift Water Treatment Works did not comply with final turbidity as per SANS 241:2015, due to the unavailability of a filtration system. A clarifier is used to settle the flocs formed during the flocculation process. The balancing reservoir also serves to settle turbid particles. It is planned that a filtration system will be incorporated in the next phase of expansion at the treatment works.

Table 4.1: Water Quality Results – Pelladrift (Final Water)

Pelladrift Water Supply Scheme	Compliance Levels (%) – SANS 241:2015		
	NTU <1	NTU 1-5	NTU >5
Final water	0%	99.38%	0.6%

At the Pelladrift Water Treatment Works, chemical determinands are monitored at the Pelladrift operational laboratory, while microbiological

determinands are monitored at the Henkries operational laboratory, which is equipped to perform such analysis.

Table 4.2: Water Quality Results (Pelladrift Supply Systems)

Supply Systems for Pelladrift	Compliance Levels (%) – SANS 241:2015			
	Physical Organoleptic: (95%)	Chemical Health: (95%)	Operational Limits: (95%)	Microbiological Health: (97%)
Pella Off-take	100	100	99.38	100
Poffader Off-take	100	100	99.38	100
Swartkoppies Off-take	100	100	99.38	93%
Horseshoe Reservoir	100	100	99.38	93%

In terms of the supply systems, the turbidity tested between 1 and 5 NTU for all the compliance samples taken during the 2018/2019 financial year. Out of 30 samples that were taken (including resampling), two microbiological failures at the Horseshoe Reservoir and Swartkoppies off-take, were recorded.

Namakwa Scheme

Tables 5.1 and 5.2 indicate the overall water quality results for the Henkries distribution network during the 2018/2019 financial year. Sedibeng Water’s water quality target for the system is set at a compliance rate of 97%. Concerning the test results

for Physical and Organoleptic determinands, pH complied 100% with set requirements, while turbidity achieved a compliance rate of 96%, which complies with the water quality standards. Test results for *E. coli* complied 100% with the requirements of the SANS 241:2015 standard.

The water supply system has a chlorine booster station at the Okiep Pump Station to boost the dosage of chlorine to the areas of NababEEP, Concordia and Carolusberg, which used to experience residual chlorine depletion in the past. All take-off points complied with minimum residual chlorine levels throughout the year under review.

Table 5.1 Quality Results – Henkries (Final Water)

Henkries Purification Plant	Compliance Levels (%) – SANS 241:2015			
	Physical Organoleptic: (95%)	Chemical Health: (95%)	Operational Limits: (95%)	Microbiological Health: (97%)
Final Water	100	100	94%	100

Failures recorded were due to the free chlorine levels being above the required limit of 5mg/l.

Table 5.2: Water Quality Results (Namakwa Supply Systems)

Namakwa Supply Systems	Compliance Levels (%) – SANS 241:2015			
	Physical Organoleptic: (95%)	Chemical Health: (95%)	Operational Limits: (95%)	Microbiological Health: (97%)
Carolusburg	100	100	100	100
Springbok	100	100	100	100
Bulletrap	100	100	100	96
Steinkopf	100	100	100	96
Okiep	100	100	100	100
NababEEP	99	100	100	100
Concordia	100	100	100	100

Vaal Gamagara Scheme

Tables 6.1 and 6.2 indicate the water quality results of the Vaal Gamagara distribution network for the 2018/2019 financial year. Water quality complied with the set SANS 241:2015 standards. Sedibeng Water’s water quality target for this system is a compliance rate of 99%. Concerning the test results of the Physical and Organoleptic determinands, pH complied 99.9% with set requirements. Likewise, turbidity achieved a compliance rate of 99.9%

(which complies with the water quality standards). The plant optimisation measures implemented were effective as confirmed by operational monitoring. Chlorine gas is dosed at various points along the pipeline route to ensure microbiological compliance and improve the quality of ground water. The average residual chlorine attained was 2.4 mg/l, and as a result the Microbiological Safety Requirements for *E.coli* and the Operational Water Quality Total Coliforms achieved a 99.9% compliance rate as per the requirements of the SANS 241:2015 standard.

Table 6.1: Water Quality Results – Vaal Gamagara (Final Water)

Vaal Gamagara Purification Plant	Compliance Levels (%) – SANS 241:2015			
	Physical Organoleptic: (95%)	Chemical Health: (95%)	Operational Limits: (95%)	Microbiological Health: (97%)
Final Water	100	100	99.5	100

Table 6.2: Water Quality Results (Vaal Gamagara Supply Systems)

Supply Systems for Vaal Gamagara	Compliance Levels (%) – SANS 241:2015			
	Physical Organoleptic: (95%)	Chemical Health: (95%)	Operational Limits: (95%)	Microbiological Health: (97%)
Dikgatlong	99.9	99.9	99.9	99.9
Olifantshoek	99.9	99.9	99.3	99.9
Kathu	99.9	99.9	99.9	99.9
Hotazel	99.9	99.9	99.3	99.9
Postmasburg	99.9	99.9	99.9	99.9

CONCLUSION

During the 2018/2019 financial year, the Northern Cape Region excelled at providing a reliable supply of potable water of high quality to designated

communities and clients in the Northern Cape Province.