

REPORT ON POTABLE WATER QUALITY OF RDP SCHEMES WITHIN UMGUNGUNDLOVU DISTRICT MUNICIPALITY



January 2015

Potable Water Quality Report January 2015

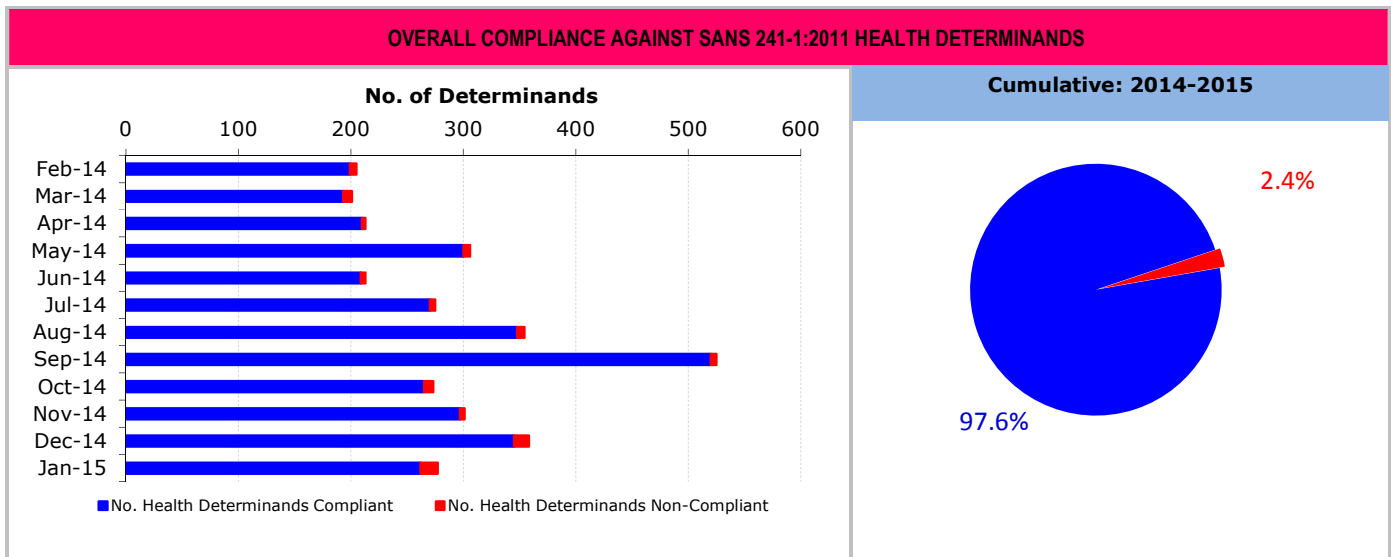
A total of 89 sites were visited of which 76 sites were sampled and analyzed in January. The collected potable water samples were analyzed for key water quality indicators, and assessed against SANS 241-1:2011 drinking water standards; the results are presented below:

NOTES

Water quality assessment: The assessment of the quality of drinking water is based on standard limits of the SANS 241-1:2011 specifications. The health-related standards are based on the consumption of 2L of water per day by a person of a mass of 60kg over a period of 70 years.

% Compliance: is calculated based on the results failing to comply with the standard limits of SANS 241-1:2011. Compliance is further categorized as Operational Compliance, Aesthetic Compliance and Health (Acute & Chronic) Compliance

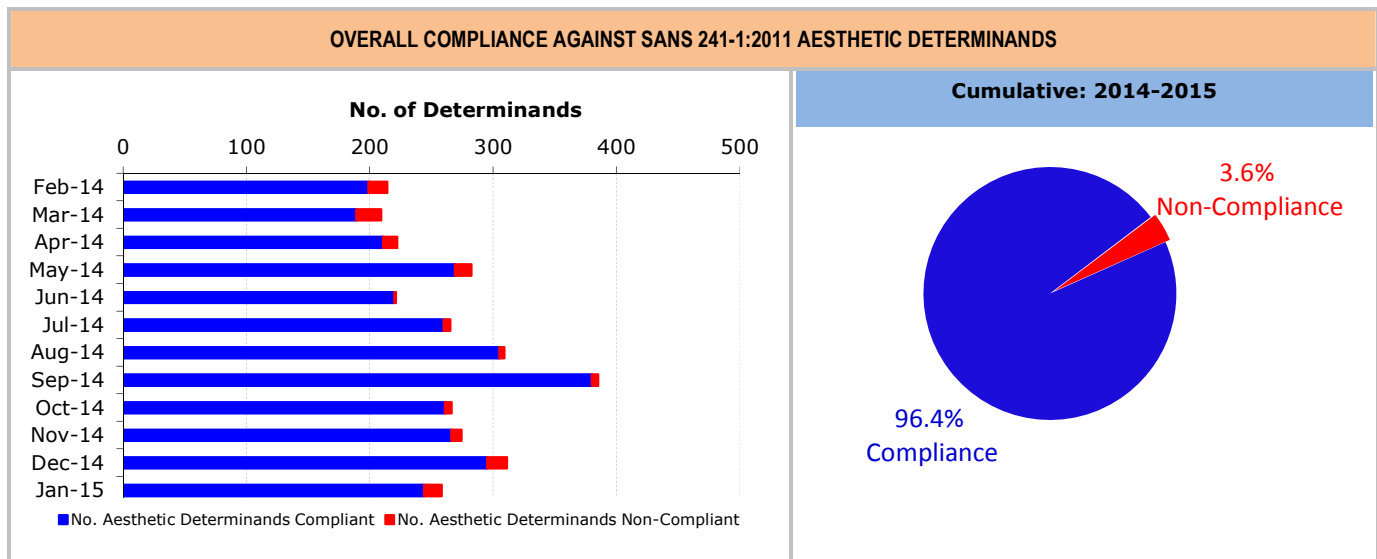
WATER QUALITY RESULTS & INTERPRETATIONS



The overall potable water compliance against SANS 241-1:2011 health determinands for the period February 2014 up to January 2015 is 97.6% with 2.4% failing the standard limits.

E. coli concentration in **Efaye Reservoir** (1 per 100mL), **Mount Elias Reservoir** (5 per 100mL), **Nguga Final** (>201 per 100mL), **Nguga Reticulation** (43 & 8 per 100mL), **Manyavu Reticulation** (11 per 100mL), **Lions River Final & Reticulation** (1 per 100mL), **Mpofana Reservoir 1** (3 per 100mL), **Makhuzeni Final** (145 per 100mL), **Makhuzeni Standpipe** (95 per 100mL), **Dalton Taxi Rank Tap** (66 per 100mL), **Nzinga Reticulation** (>201 per

100mL) and **Nzinga Final** (18 & 165 per 100mL) exceeded the health standard limit of 0 counts per 100 mL. This is mainly due to inadequate chlorine levels in water resulting in poor disinfection. Continuous consumption of contaminated water may lead to gastro-intestinal related diseases such as gastroenteritis.



The overall potable water compliance against SANS 241-1:2011 aesthetic determinands for the period February 2014 up to January 2015 is 96.4% with 3.6% failing the standard limits.

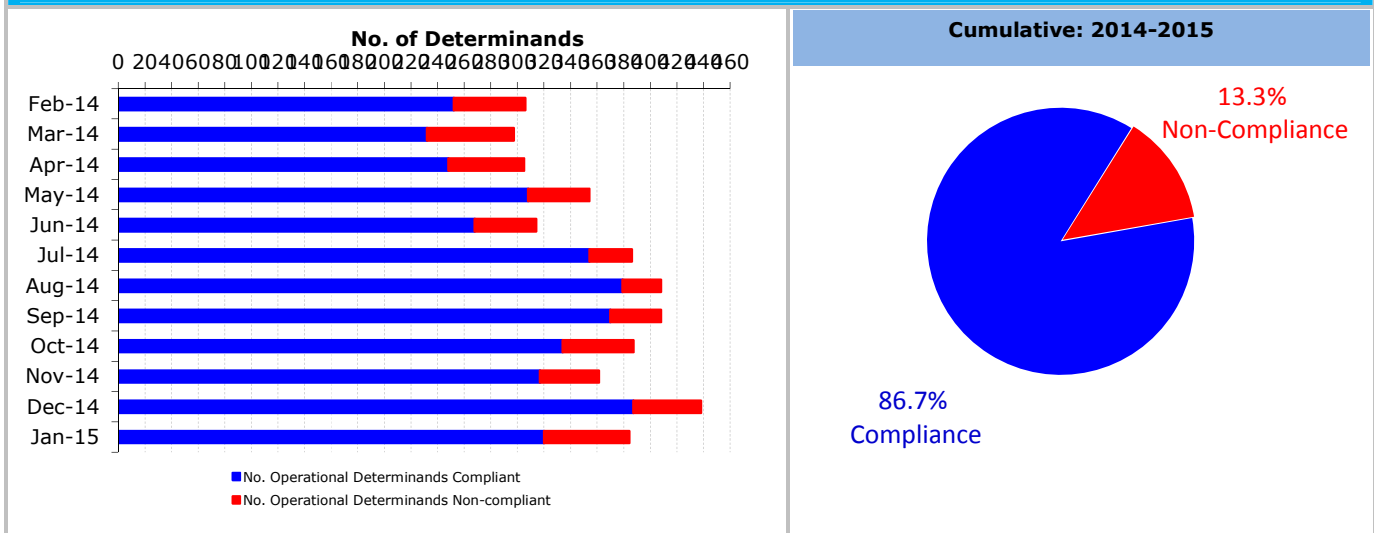
Turbidity concentration in **Nguga Final** (30.5 & 26.6 NTU), **Nguga Reticulation** (40.5, 6.1 & 5.2 NTU), **Makhuzeni Final** (53.9 NTU), **Makhuzeni Standpipe** (29.9 NTU), **Nzinga Reticulation** (17.5 & 21.6 NTU), **Nzinga Final** (58.5 & 9.3 NTU) and **Mpangisa Final** (5.1 NTU) exceeded the aesthetic standard limit of 5 NTU. The presence of turbidity in water results in a cloudy or muddy appearance; this may reduce disinfection effectiveness and contribute to taste and colour of the water.

Colour concentration in **Mount Elias Reservoir** (15.1 °H) exceeded the aesthetic standard limit of 15 °H. Staining of clothes and appliances may occur. No direct health effects are known unless the colour comes from a known toxicant.

Iron concentration in **Makhuzeni Final** (1.12 mg Fe/L) exceeded the aesthetic standard limit of 0.3 mg Fe/L. Staining of clothes and appliances will occur. Increasing taste and colour problems will also occur with iron concentrations >0.3 mg Fe/L.

All other results were compliant with the aesthetic standard limits.

OVERALL COMPLIANCE AGAINST SANS 241-1:2011 OPERATIONAL DETERMINANDS



The overall potable water compliance against SANS 241-1:2011 operational determinands for the period February 2014 up to January 2015 is 86.7% with 13.3% failing the standard limits.

Turbidity concentration in **Applesbosch Final** (1.6 NTU), **Applesbosch Reticulation**(1.6 NTU), **Efaye Res** (2.2 NTU), **Mount Elias Res** (4.5 & 1.6 NTU), **Nguga Final** (30.5, 4.5 & 26.6 NTU), **Nguga Reticulation** (40.4, 6.1 & 5.2 NTU), **Impendle Town Reservoir** (1.7 NTU), **Plumbers Workshop** (1.1 NTU), **Manyavu Reticulaton** (2.6 NTU), **Ledgetton Reticulation** (1.5 NTU), **Emakholweni Standpipe 1**(1.6 NTU), **Mpofana Reservoir 3** (1.3 NTU), **Mpofana Final** (1.1 NTU), **Mpofana Civic Municipality** (1.9 NTU), **Makheni Final** (5.0 & 1.3 NTU), **Makhuzeni Final** (53.9 NTU), **Makhuzeni Standpipe** (29.9 NTU), **Nzinga Reticulation 1** (17.5 & 21.6 NTU), **Nzinga Final** (58.5, 2.6 & 9.3 NTU), **Mpangisa Final** (5.1 & 4.1 NTU), **Mpangisa Reticulation** (5.0 & 1.7 NTU), **Richmond Reservoir** (1.1 NTU), **Rosetta Reservoir 1** (2.3 NTU) and **Rosetta Final** (2.9 NTU) exceeded the operational limit of 1NTU.

The presence of turbidity in water results in a cloudy or muddy appearance; this January may disinfection effectiveness and contributes to taste and colour of the water.

Aluminium concentration in **Nguga Final** (1416 & 367 µg Al/L), **Nguga Reticulation** (1155 & 438 µg Al/L), **Makheni Final** (1188 & 463 µg Al/L), **Makhuzeni Final** (1251 µg Al/L), **Makhuzeni Standpipe** (1514 µg Al/L), **Nzinga Reticulation** (1104 & 1308 µg Al/L), **Nzinga PP Final** (4937, 474 & 494 µg Al/L), **Rosetta Reservoir 1** (457 & 554 µg Al/L) and **Rosetta Final** (461 µg Al/L) exceeded the operational standard limit of 300 µg Al/L.

The main effects of aluminium in domestic water are aesthetic, relating to discolouration in the presence of iron and manganese. Prolonged exposure to aluminium has been implicated in chronic neurological disorders such as Alzheimer’s disease. It is, however, not clear whether the presence of aluminium causes such conditions or is an indicator of other factors. Therefore, the link between aluminium in water and the adverse effects on human health remains to be conclusively identified.

Heterotrophic plate counts in **Efaye Reservoir** (>1000 per mL **twice**), **Mount Elias Reservoir** (>1000 per mL **twice**), **Nguga Final** (>1000 per mL), **Lions River Final & Reticulation** (>1000 per mL), **Makheni Final** (>1000 per mL), **Makhuzeni Final** (>1000 per mL), **Makhuzeni Standpipe** (>1000 per mL) and **Nzinga Final** (>1000 per mL) exceeded the operational standard limit of 1000 per mL. This indicates inadequate disinfection of the water due to inadequate chlorine contacts times or chlorine levels

The **Coliform** concentration in **Makhuzeni Standpipe** (>201 per 100mL) exceeded the operational standard limit of 10 per 100mL. This indicates inadequate disinfection of the water due to inadequate chlorine contacts times or chlorine levels.

The **Coliphage** concentration in **Makhuzeni Standpipe** (14 per 10mL) exceeded the operational standard limit of 0 per 10mL. This indicates inadequate disinfection of the water due to inadequate chlorine contacts times or chlorine levels and that there is a slight possibility of faecal contamination

All other results were compliant with the operational standard limits.

ADDITIONAL OPERATIONAL ALERT INDICATORS

The **Free Chlorine** levels in **Applesbosch Final & Appelsbosch Reticulation** (7 & 21/1), **Efaye & Mount Elias Res** (8 & 22/1), **Endaleni Reservoir 1 & Standpipe** (13 & 27/1), **Ezimwini Standpipe** (6/1), **Nguga Final** (15 & 29/1), **Nguga Reticulation** (2, 15 & 29/1), **Gomane Reservoir, Plumber's Workshop** (6 & 20/1), **Hopewell Hall** (6 & 20/1), **Ndlovu Store House Reticulation** (6 & 20/1), **Manyavu Reticulation** (7 & 21/1), **KwaNtanzi Final** (8 & 22/1), **Lions River Final** (16 & 30/1), **Lions River Reticulation** (16 & 30/1), **Emakholweni Standpipe 1 & Tap** (6 & 20/1), **Masihambisane Final** (8 & 22/1), **Masihambisane Reticulation** (8 & 22/1), **eMbuthweni Reticulation 1 & 2** (12, 26/1), **Mpofana Res 1 - 3** (5/1), **Mpofana Final** (5 & 19/1), **Bruntville Community Hall & Mpofana Municipality Civic Hall** (5/1), **Maguzu Clinic** (14, 28/1), **Makheni Final** (8 & 22/1), **Makhuzeni Final & Standpipe** (15/1), **Mpolweni Hall** (9/1), **Mshwathi Municipal Offices, New Hanover welfare tap & Dalton Rank Tap** (9 & 23/1), **Cool Air Community Hall** (9 & 23/1), **Nzinga Reticulation** (29/1), **Nzinga Final** (15 & 29/1), **Mpangisa Final** (12/1), **Mpangisa Reticulation** (12 & 26/1), **Richmond Reservoir** (13 & 27/1) **Richmond Final** (13 & 27/1), **Rosetta Reservoir & Final** (5/1), **Mtulwa Final** (8/1), **Howick BP Garage, Green Acres Spar, Mpophomeni Hall & Hilton Reticulation** (16 & 30/1) and **Mtulwa Reticulation** (08/1) is below the recommended limit of 0.5 mg/L. **Low residual chlorine** is mainly associated with inefficient/inadequate dosing systems or long retention times of treated water in reservoirs.

Table 1: MONTHLY SUMMARY OF FINAL WATER COMPLIANCE FOR INDIVIDUAL SITES

SITE NAMES	Operational Limits			Aesthetic Limits			Health Limits (Acute & Chronic)		
	No of analyses done	% Compliance	Non-Compliant Analyses	No of analyses done	% Compliance	Non-Compliant Analyses	No of analyses done	% Compliance	Non-Compliant Analyses
uMSHWATHI LM									
Applesbosch WW Final	8	87.5%	Turbidity	4	100%	-	4	100%	-
Applesbosch Reticulation 1	8	87.5%	Turbidity	4	100%	-	4	100%	-
Efaye Reservoir	5	40%	2Plate counts, Turbidity	5	100%	-	4	75%	<i>E. coli</i>
Mount Elias Reservoir	6	33.3%	2Plate counts, 2Turbidities	6	83.3%	Colour	4	75%	<i>E. coli</i>
Ekhamanzi Standpipe	Sampled	Quarterly							
Kwantanzi WW Final	6	100%	-	4	100%	-	4	100%	-
Kwantanzi Reticulation 1	6	100%	-	4	100%	-	4	100%	-
Masihambisane WW Final	6	100%	-	4	100%	-	4	100%	-
Masihambisane Reticulation 1	6	100%	-	4	100%	-	4	100%	-
Makheni WW Final	8	37.5%	2Aluminiums, Plate Count, 2Turbidities	6	100%	-	4	100%	-
Mtulwa WW Final	8	100%	-	6	100%	-	6	100%	-
Mtulwa Reticulation 1	6	100%	-	4	100%	-	4	100%	-
Bhamshela Standpipe Res	Sampled	Quarterly							
Ozwathini Reservoir Outlet Bhamshela Standpipe	Sampled	Quarterly							
MKHAMBATHINI LM									
Mpangisa Final	8	75%	2Turbidities	4	75%	Turbidity	4	100%	-
Mpangisa Reticulation 1	8	75%	2Turbidities	4	100%	-	4	100%	-

SITE NAMES	Operational Limits			Aesthetic Limits			Health Limits (Acute & Chronic)		
	No of analyses done	% Compliance	Non-Compliant Analyses	No of analyses done	% Compliance	Non-Compliant Analyses	No of analyses done	% Compliance	Non-Compliant Analyses
RICHMOND LM									
Endaleni PP Reservoir 1	8	100%	-	4	100%	-	4	100%	-
Endaleni Standpipe 3	8	100%	-	4	100%	-	4	100%	-
Inhlazuka Spring	Sampled	Quarterly							
eMbuthweni WW Final	8	100%	-	4	100%	-	4	100%	-
eMbuthweni Reticulation 1	8	100%	-	4	100%	-	4	100%	-
eMbuthweni Reticulation 2	8	100%	-	4	100%	-	4	100%	-
Richmond Reservoir 1	10	90%	Turbidity	17	100%	-	29	100%	-
Richmond Final	8	100%	-	4	100%	-	4	100%	-
Smozomeni Spring 1 Main Reservoir	Sampled	Annually							
Smozomeni Spring 2 Main Reservoir	Sampled	Annually							
uMNGENI LM									
Lutchman's Farm B/H 1 Handpump	Sampled	Quarterly							
Ledgeton WW Final	6	100%	-	5	100%	-	4	100%	-
Ledgeton Reticulation 1	6	83.3%	Turbidity	4	100%	-	4	100%	-
Lions River WW Final	6	83.3%	Plate Count	4	100%	-	4	75%	<i>E. coli</i>
Lions River Reticulation 1	6	83.3%	Plate Count	4	100%	-	4	75%	<i>E. coli</i>
Fort Nottingham Bulk Res	Sampled	Quarterly							
Senzani Village B/H Handpump	Sampled	Annually							

SITE NAMES	Operational Limits			Aesthetic Limits			Health Limits (Acute & Chronic)		
	No of analyses done	% Compliance	Non-Compliant Analyses	No of analyses done	% Compliance	Non-Compliant Analyses	No of analyses done	% Compliance	Non-Compliant Analyses
MPOFANA LM									
Mpofana Reservoir 1	3	100%	-	2	100%	-	2	50%	<i>E. coli</i>
Mpofana Reservoir 2	3	100%	-	2	100%	-	2	100%	-
Mpofana Reservoir 3	3	66.7%	Turbidity	2	100%	-	2	100%	-
Mpofana Reservoir 4	3	100%	-	2	100%	-	2	100%	-
Mpofana WW Final	8	87.5%	Turbidity	4	100%	-	4	100%	-
Bruntville Community Hall	3	100%	-	2	100%	-	2	100%	-
Mpofana MuniCivic Building	3	66.7%	Turbidity	2	100%	-	2	100%	-
Rosetta Reservoir 1	8	62.5%	2Aluminiums, Turbidity	4	100%	-	4	100%	-
Rosetta WW Final	8	75%	Aluminium, Turbidity	4	100%	-	4	100%	-
Upper Rockly Drift B/H Main Jojo Tank 1	2	100%	-	2	100%	-	1	100%	-
IMPENDLE LM									
Nguga Final	12	50%	2Aluminiums, Plate Count, 3Turbidities	6	66.7%	2Turbidities	6	83.3%	<i>E. coli</i>
Nguga Reticulation 1	12	58.3%	2Aluminiums, 3Turbidities	6	50%	3Turbidities	6	66.7%	2 <i>E. coli</i>
Gomane Reservoir A	3	100%	-	2	100%	-	2	100%	-
Gomane Reservoir B	3	100%	-	2	100%	-	3	100%	-
Gomane Reservoir A Retic.	3	100%	-	2	100%	-	2	100%	-
Impendle Town Reservoir	3	66.7%	Turbidity	2	100%	-	2	100%	-
Impendle Town Reticulation	3	100%	-	2	100%	-	2	100%	-

SITE NAMES	Operational Limits			Aesthetic Limits			Health Limits (Acute & Chronic)		
	No of analyses done	% Compliance	Non-Compliant Analyses	No of analyses done	% Compliance	Non-Compliant Analyses	No of analyses done	% Compliance	Non-Compliant Analyses
Makhuzeni WW Final	4	25%	Aluminium, Plate Count, Turbidity	2	50%	Turbidity	2	50%	<i>E. coli</i>
Makhuzeni Standpipe	6	16.7%	Aluminium, Coliform, Coliphage, Plate Count, Turbidity	13	84.6%	Iron, Turbidity	26	96.2%	<i>E. coli</i>
Nzinga Reticulation 1	9	55.6%	2Aluminiums, 2Turbidities	6	66.7%	2Turbidities	6	83.3%	<i>E. coli</i>
Nzinga PP Outlet Final	12	41.7%	3Aluminiums, Plate Count, 3Turbidities Turbidity	6	66.7%	2Turbidities	6	66.7%	2 <i>E. coli</i>
UMGENI BULK									
Ezimwini Standpipe	3	100%	-	2	100%	-	2	100%	-
Njabulo Clinic Reticulation	Sampled	Quarterly							
Plumber's workshop	6	83.3%	Turbidity	4	100%	-	4	100%	-
Hopewell Hall Tap	6	100%	-	4	100%	-	4	100%	-
Ndlovu Store-House No. 840528	6	100%	-	4	100%	-	4	100%	-
Manyavu Reticulation	6	83.3%	Turbidity	4	100%	-	4	75%	<i>E. coli</i>
Emakholweni Standpipe 1	6	83.3%	Turbidity	4	100%	-	4	100%	-
Emakholweni Tap	6	100%	-	4	100%	-	4	100%	-
Maguzu Clinic Tap	6	100%	-	4	100%	-	4	100%	-

Table 1: MONTHLY SUMMARY OF FINAL WATER COMPLIANCE FOR INDIVIDUAL SITES - continued

SITE NAMES	Operational Limits			Aesthetic Limits			Health Limits (Acute & Chronic)		
	No of analyses done	% Compliance	Non-Compliant Analyses	No of analyses done	% Compliance	Non-Compliant Analyses	No of analyses done	% Compliance	Non-Compliant Analyses
Mpolweni Hall	3	100%	-	2	100%	-	2	100%	-
Mshwathi Municipal Offices	6	100%	-	4	100%	-	4	100%	-
New Hanover Welfare Tap	6	100%	-	4	100%	-	4	100%	-
Howick BP Garage	6	100%	-	4	100%	-	4	100%	-
Green Acres Spar	6	100%	-	4	100%	-	4	100%	-
Mpophomeni Hall	6	100%	-	4	100%	-	4	100%	-
Hilton Reticulation	6	100%	-	4	100%	-	4	100%	-
Vumuthando Primary School	Sampled	Quarterly							
Swayimane Community Hall	3	100%	-	2	100%	-	2	100%	-
Phakathi Store	Sampled	Quarterly							
Dalton Taxi Rank	6	100%	-	4	100%	-	4	75%	<i>E. coli</i>
Cool Air Community Hall	6	100%	-	4	100%	-	4	100%	-

Table 2: SANS 241-1:2011 DRINKING WATER STANDARD LIMITS

Determinands	Risk	Units	Standard Limits
Nitrite	Acute Health – 1	mg/L	≤0.9
Nitrate	Acute Health – 1	mg/L	≤11
Sulphate SO ₄ ⁼	Acute Health – 1	mg/L	≤500
Cyanide (recoverable) as CN ⁻	Acute Health – 1	µg/L	≤70
<i>E. coli</i>	Acute Health – 1	count/100 mL	Not detected
Cytopathogenic Viruses	Acute Health – 2	count/10 L	Not detected
Protozoan Parasites: Giardia/Cryptosporidium	Acute Health - 2	count/10 L	Not detected
Monochloramine	Chronic Health	mg/L	≤3
Fluoride F ⁻	Chronic Health	mg/L	≤1.5
Arsenic as As	Chronic Health	µg/L	≤10
Manganese as Mn	Chronic Health	µg/L	≤500
Antimony as Sb	Chronic Health	µg/L	≤20
Cadmium as Cd	Chronic Health	µg/L	≤3
Total Chromium as Cr	Chronic Health	µg/L	≤50
Cobalt as Co	Chronic Health	µg/L	≤500
Copper as Cu	Chronic Health	µg/L	≤2000
Lead as Pb	Chronic Health	µg/L	≤10
Mercury as Hg	Chronic Health	µg/L	≤6
Nickel as Ni	Chronic Health	µg/L	≤70
Selenium as Se	Chronic Health	µg/L	≤10
Uranium	Chronic Health	µg/L	≤15
Vanadium as V	Chronic Health	µg/L	≤200
Iron as Fe	Chronic Health	µg/L	≤2000
Total organic carbon as C	Chronic Health	mg/L	≤10
Bromoform (CHBr ₃)	Chronic Health	mg/L	≤0.1
Bromodichloromethane (CHCl ₂ Br)	Chronic Health	mg/L	≤0.06
Dibromochloromethane (CHClBr ₂)	Chronic Health	mg/L	≤0.1
Choloroform (CHCl ₃)	Chronic Health	mg/L	≤0.3
Microcystin	Chronic Health	µg/L	≤1
Free Chlorine	Chronic Health	mg/L	≤5
Turbidity	Aesthetic	NTU	≤5
Taste or Odor	Aesthetic	-	Inoffensive
Colour	Aesthetic	mg Pt-Co	≤15
Conductivity at 25 degrees	Aesthetic	mS/m	≤170
Ammonia as N	Aesthetic	mg/L	≤1.5
Chloride Cl ⁻	Aesthetic	mg/L	≤300
Sodium as Na	Aesthetic	mg/L	≤200
Sulphate SO ₄ ⁼	Aesthetic	mg/L	≤250
Zinc as Zn	Aesthetic	mg/L	≤5
Manganese as Mn	Aesthetic	µg/L	≤100
Iron as Fe	Aesthetic	µg/L	≤300
Total dissolved solids	Aesthetic	mg/L	≤1200
Phenols	Aesthetic	µg/L	≤10
pH value at 25 degrees	Operational	pH units	≥5 to ≤ 9.7
Turbidity	Operational	NTU	≤1
Aluminium as Al	Operational	µg/L	≤300
Coliphages	Operational	count/10 mL	Not detected
Total coliforms	Operational	count/100 mL	≤10
Heterotrophic Plate Count	Operational	per mL	≤1000