

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Date reported: 6 December 2010

Quantity Analyzed: 15

Lab No :

E124

Attention: Mr. R. Boucher

Attention: Me. Z. Louw

Analysis Results mg/l	Nasareth Reservoir	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	778	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	0.11	< 10	> 10 - 20
Chlorides as Cl	28	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	92		
Fluoride as F	0.40	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	434	< 400	> 400 - 600
Total Hardness as CaCO ₃	451		
Calcium Hardness as CaCO ₃	181		
Magnesium Hardness as CaCO ₃	270		
Calcium as Ca	72.4	< 150	> 150 - 300
Magnesium as Mg	65.5	< 70	> 70 - 100
Sodium as Na	33.9	< 200	> 200 - 400
Potassium as K	10.5	< 50	> 50 - 100
Iron as Fe	<0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	0.01	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	102.0	< 150	> 150 - 370
pH-Value at 25 ° C	8.03	5.0 - 9.5	> 4.0 - 10.0
pHs by 21°Celsius	7.34		
Langelier Saturation Index	+0.69		
Turbidity as N.T.U	1.10	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	0.1		
Total Residual Chlorine Cl ₂	0.3		
Colour as Pt-Co	5	<20	>20 - 50
Aluminium as Al	<0.01	< 0.30	> 0.30 - 0.50

All heavy metal analyses have been performed on filtered samples

Tests marked with an asterisk * are not SANAS accredited

These results are related only to the items tested

QUALITY CONTROL CHECKS	
Cation Balance	10.75
Anion Balance	11.69
% Difference	-4.2
Measured TDS	778
Calculated TDS	701
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.7

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Attention: Mr. R. Boucher

Date reported: 6 December 2010

Attention: Me. Z. Louw

Quantity Analyzed: 15

Lab No :

E125

Analysis Results mg/l	Graspan Reservoir	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	714	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	0.19	< 10	> 10 - 20
Chlorides as Cl	27	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	90		
Fluoride as F	0.39	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	409	< 400	> 400 - 600
Total Hardness as CaCO ₃	447		
Calcium Hardness as CaCO ₃	181		
Magnesium Hardness as CaCO ₃	266		
Calcium as Ca	72.6	< 150	> 150 - 300
Magnesium as Mg	64.7	< 70	> 70 - 100
Sodium as Na	34.2	< 200	> 200 - 400
Potassium as K	11.5	< 50	> 50 - 100
Iron as Fe	<0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	<0.01	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	96.8	< 150	> 150 - 370
pH-Value at 25° C	7.92	5.0 - 9.5	> 4.0 - 10.0
pHs by 21°Celsius	7.35		
Langelier Saturation Index	+0.57		
Turbidity as N.T.U	0.44	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	<0.1		
Total Residual Chlorine Cl ₂	0.1		
Colour as Pt-Co	5	<20	>20 - 50
Aluminium as Al	<0.01	< 0.30	> 0.30 - 0.50

All heavy metal analyses have been performed on filtered samples

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QUALITY CONTROL CHECKS	
Cation Balance	10.73
Anion Balance	11.11
% Difference	-1.7
Measured TDS	714
Calculated TDS	675
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.7

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Attention: Me. Z. Louw

Quantity Analyzed: 15

Lab No :

E126

Analysis Results mg/l	Doornkop 1	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	80	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	1.2	< 10	> 10 - 20
Chlorides as Cl	4.0	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	56		
Fluoride as F	<0.20	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	5.4	< 400	> 400 - 600
Total Hardness as CaCO ₃	47		
Calcium Hardness as CaCO ₃	24		
Magnesium Hardness as CaCO ₃	23		
Calcium as Ca	9.63	< 150	> 150 - 300
Magnesium as Mg	5.54	< 70	> 70 - 100
Sodium as Na	8.10	< 200	> 200 - 400
Potassium as K	0.87	< 50	> 50 - 100
Iron as Fe	<0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	<0.01	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	12.2	< 150	> 150 - 370
pH-Value at 25 ° C	79.0	5.0 - 9.5	> 4.0 - 10.0
Turbidity as N.T.U	0.26	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	<0.1		
Total Residual Chlorine Cl ₂	<0.1		
Colour as Pt-Co	5	<20	>20 - 50
Free & Saline Ammonia as N	<0.20		
Aluminium as Al	0.03	< 0.30	> 0.30 - 0.50

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QUALITY CONTROL CHECKS	
Cation Balance	1.31
Anion Balance	1.43
% Difference	-4.2
Measured TDS	80
Calculated TDS	73
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.6

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Attention: Mr. R. Bouwer

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Attention. Me. Zelda Louw

Quantity Analyzed: 15

Lab No :

E126

Analysis Results mg/l	Doornkop (1)	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Selenium as Se	<0.01	<0.02	>0.02 - 0.05
Vanadium as V	<0.01	<0.20	>0.2 - 0.5
Total Organic Carbon (TOC)	2.6		
Phenolic Compounds	<0.005	<0.01	>0.01 - 0.07
Cyanide as CN	<0.01	<0.05	>0.05 - 0.07
Cadmium as Cd	<0.003	<0.005	>0.005 - 0.01
Cobalt as Co	<0.01	<0.50	>0.50 - 1.0
Total Chromium as Cr	<0.01	<0.10	>0.10 - 0.50
Copper as Cu	<0.01	<1.0	>1.0 - 2.0
Antimony as Sb	<0.005	<0.01	>0.01 - 0.05
Nickel as Ni	<0.01	<0.15	>0.15 - 0.35
Lead as Pb	<0.01	<0.02	>0.02 - 0.05
Zinc as Zn	0.02	<5.0	>5.0 - 10.0
Arsenic as As	<0.01	<0.01	>0.01 - 0.05
Mercury as Hg	<0.001	<0.001	>0.001 - 0.005
Colour as Pt-Co*	5	<20	>20 - 50
Odour*	No offensive odour		
Taste*	Acceptable Taste		

All heavy metal analyses have been performed on filtered samples

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These results are related only to the items tested

P.L.G. UYS (M.D.)

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Attention: Me. Z. Louw

Quantity Analyzed: 15

Lab No :

E127

Analysis Results mg/l	Doornkop 2	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	70	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	3.9	< 10	> 10 - 20
Chlorides as Cl	10	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	26		
Fluoride as F	<0.20	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	<1.0	< 400	> 400 - 600
Total Hardness as CaCO ₃	32		
Calcium Hardness as CaCO ₃	18		
Magnesium Hardness as CaCO ₃	14		
Calcium as Ca	7.02	< 150	> 150 - 300
Magnesium as Mg	3.48	< 70	> 70 - 100
Sodium as Na	8.10	< 200	> 200 - 400
Potassium as K	0.57	< 50	> 50 - 100
Iron as Fe	<0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	<0.01	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	10.7	< 150	> 150 - 370
pH-Value at 25 ° C	7.0	5.0 - 9.5	> 4.0 - 10.0
Turbidity as N.T.U	0.35	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	0.5		
Total Residual Chlorine Cl ₂	0.5		
Colour as Pt-Co	5	<20	>20 - 50
Free & Saline Ammonia as N	<0.20		
Aluminium as Al	<0.01	< 0.30	> 0.30 - 0.50

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QUALITY CONTROL CHECKS	
Cation Balance	1.00
Anion Balance	1.08
% Difference	-3.7
Measured TDS	70
Calculated TDS	62
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.6

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Lab No :

Attention: Mr. R. Bouwer
Attention. Me. Zelda Louw

E127

Analysis Results mg/l	Doornkop 2	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Selenium as Se	<0.01	<0.02	>0.02 - 0.05
Vanadium as V	<0.01	<0.20	>0.2 - 0.5
Total Organic Carbon (TOC)	<1.0		
Phenolic Compounds	<0.005	<0.01	>0.01 - 0.07
Cyanide as CN	<0.01	<0.05	>0.05 - 0.07
Cadmium as Cd	<0.003	<0.005	>0.005 - 0.01
Cobalt as Co	<0.01	<0.50	>0.50 - 1.0
Total Chromium as Cr	<0.01	<0.10	>0.10 - 0.50
Copper as Cu	<0.01	<1.0	>1.0 - 2.0
Antimony as Sb	<0.005	<0.01	>0.01 - 0.05
Nickel as Ni	<0.01	<0.15	>0.15 - 0.35
Lead as Pb	<0.01	<0.02	>0.02 - 0.05
Zinc as Zn	0.29	<5.0	>5.0 - 10.0
Arsenic as As	<0.01	<0.01	>0.01 - 0.05
Mercury as Hg	<0.001	<0.001	>0.001 - 0.005
Colour as Pt-Co*	5	<20	>20 - 50
Odour*	No offensive odour		
Taste*	Acceptable Taste		

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Attention: Me. Z. Louw

Quantity Analyzed: 15

Lab No :

E128

Analysis Results mg/l	Hendrina Potable WTP Raw	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	128	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	0.34	< 10	> 10 - 20
Chlorides as Cl	13	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	58		
Fluoride as F	0.23	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	27.3	< 400	> 400 - 600
Total Hardness as CaCO ₃	67		
Calcium Hardness as CaCO ₃	32		
Magnesium Hardness as CaCO ₃	35		
Calcium as Ca	13.0	< 150	> 150 - 300
Magnesium as Mg	8.56	< 70	> 70 - 100
Sodium as Na	12.9	< 200	> 200 - 400
Potassium as K	2.81	< 50	> 50 - 100
Iron as Fe	0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	<0.01	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	20.1	< 150	> 150 - 370
pH-Value at 25 ° C	7.6	5.0 - 9.5	> 4.0 - 10.0
Turbidity as N.T.U	5.0	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	<0.1		
Total Residual Chlorine Cl ₂	<0.1		
Free & Saline Ammonia as N	<0.20		
Aluminium as Al	0.04	< 0.30	> 0.30 - 0.50

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QUALITY CONTROL CHECKS	
Cation Balance	1.99
Anion Balance	2.13
% Difference	-3.4
Measured TDS	128
Calculated TDS	115
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.6

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Attention: Mr. R. Bouwer

Date reported: 6 December 2010

Attention. Me. Zelda Louw

Quantity Analyzed: 15

Lab No :

E128

Analysis Results mg/l	Hendrina Potable WTP Raw	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Selenium as Se	<0.01	<0.02	>0.02 - 0.05
Vanadium as V	<0.01	<0.20	>0.2 - 0.5
Total Organic Carbon (TOC)	6.4		
Phenolic Compounds	<0.005	<0.01	>0.01 - 0.07
Cyanide as CN	<0.01	<0.05	>0.05 - 0.07
Cadmium as Cd	<0.003	<0.005	>0.005 - 0.01
Cobalt as Co	<0.01	<0.50	>0.50 - 1.0
Total Chromium as Cr	<0.01	<0.10	>0.10 - 0.50
Copper as Cu	<0.01	<1.0	>1.0 - 2.0
Antimony as Sb	<0.005	<0.01	>0.01 - 0.05
Nickel as Ni	0.02	<0.15	>0.15 - 0.35
Lead as Pb	<0.01	<0.02	>0.02 - 0.05
Zinc as Zn	0.01	<5.0	>5.0 - 10.0
Arsenic as As	<0.01	<0.01	>0.01 - 0.05
Mercury as Hg	<0.001	<0.001	>0.001 - 0.005
Colour as Pt-Co*	5	<20	>20 - 50
Odour*	No offensive odour		
Taste*	Acceptable Taste		

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Attention: Me. Z. Louw

Quantity Analyzed: 15

Lab No :

E129

Analysis Results mg/l	Hendrina Potable WTP Final (A)	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	130	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	0.30	< 10	> 10 - 20
Chlorides as Cl	17	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	58		
Fluoride as F	0.21	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	26.2	< 400	> 400 - 600
Total Hardness as CaCO ₃	73		
Calcium Hardness as CaCO ₃	39		
Magnesium Hardness as CaCO ₃	34		
Calcium as Ca	15.6	< 150	> 150 - 300
Magnesium as Mg	8.22	< 70	> 70 - 100
Sodium as Na	12.5	< 200	> 200 - 400
Potassium as K	2.74	< 50	> 50 - 100
Iron as Fe	<0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	<0.01	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	21.5	< 150	> 150 - 370
pH-Value at 25 ° C	8.5	5.0 - 9.5	> 4.0 - 10.0
Turbidity as N.T.U	0.3	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	<0.1		
Total Residual Chlorine Cl ₂	0.1		
Free & Saline Ammonia as N	<0.20		
Aluminium as Al	<0.01	< 0.30	> 0.30 - 0.50

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QUALITY CONTROL CHECKS	
Cation Balance	2.07
Anion Balance	2.22
% Difference	-3.5
Measured TDS	130
Calculated TDS	119
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.6

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E129

Analysis Results mg/l	Hendrina Potable WTP Final (A)	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Selenium as Se	<0.01	<0.02	>0.02 - 0.05
Vanadium as V	<0.01	<0.20	>0.2 - 0.5
Total Organic Carbon (TOC)	6.6		
Phenolic Compounds	<0.005	<0.01	>0.01 - 0.07
Cyanide as CN	<0.01	<0.05	>0.05 - 0.07
Cadmium as Cd	<0.003	<0.005	>0.005 - 0.01
Cobalt as Co	<0.01	<0.50	>0.50 - 1.0
Total Chromium as Cr	<0.01	<0.10	>0.10 - 0.50
Copper as Cu	<0.01	<1.0	>1.0 - 2.0
Antimony as Sb	<0.005	<0.01	>0.01 - 0.05
Nickel as Ni	<0.01	<0.15	>0.15 - 0.35
Lead as Pb	<0.01	<0.02	>0.02 - 0.05
Zinc as Zn	0.01	<5.0	>5.0 - 10.0
Arsenic as As	<0.01	<0.01	>0.01 - 0.05
Mercury as Hg	<0.001	<0.001	>0.001 - 0.005
Colour as Pt-Co*	5	<20	>20 - 50
Odour*	No offensive odour		
Taste*	Acceptable Taste		

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Attention: Me. Z. Louw

Quantity Analyzed: 15

Lab No :

E130

Analysis Results mg/l	Hendrina Potable WTP Final (B)	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	140	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	0.31	< 10	> 10 - 20
Chlorides as Cl	18	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	58		
Fluoride as F	0.20	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	27.3	< 400	> 400 - 600
Total Hardness as CaCO ₃	73		
Calcium Hardness as CaCO ₃	39		
Magnesium Hardness as CaCO ₃	34		
Calcium as Ca	15.7	< 150	> 150 - 300
Magnesium as Mg	8.20	< 70	> 70 - 100
Sodium as Na	12.7	< 200	> 200 - 400
Potassium as K	2.74	< 50	> 50 - 100
Iron as Fe	<0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	<0.01	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	21.5	< 150	> 150 - 370
pH-Value at 25 ° C	8.6	5.0 - 9.5	> 4.0 - 10.0
Turbidity as N.T.U	0.2	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	<0.1		
Total Residual Chlorine Cl ₂	0.2		
Free & Saline Ammonia as N	<0.20		
Aluminium as Al	<0.01	< 0.30	> 0.30 - 0.50

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QUALITY CONTROL CHECKS	
Cation Balance	2.08
Anion Balance	2.27
% Difference	-4.3
Measured TDS	140
Calculated TDS	122
Limits > 1.0 - <1.2	1.2
Calcul TDS / E.C. (0.55 - 0.70)	0.6

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Quantity Analyzed: 15

Lab No :

E130

Analysis Results mg/l	Hendrina Potable WTP Final (B)	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Selenium as Se	<0.01	<0.02	>0.02 - 0.05
Vanadium as V	<0.01	<0.20	>0.2 - 0.5
Total Organic Carbon (TOC)	4.5		
Phenolic Compounds	<0.005	<0.01	>0.01 - 0.07
Cyanide as CN	<0.01	<0.05	>0.05 - 0.07
Cadmium as Cd	<0.003	<0.005	>0.005 - 0.01
Cobalt as Co	<0.01	<0.50	>0.50 - 1.0
Total Chromium as Cr	<0.01	<0.10	>0.10 - 0.50
Copper as Cu	<0.01	<1.0	>1.0 - 2.0
Antimony as Sb	<0.005	<0.01	>0.01 - 0.05
Nickel as Ni	<0.01	<0.15	>0.15 - 0.35
Lead as Pb	<0.01	<0.02	>0.02 - 0.05
Zinc as Zn	0.01	<5.0	>5.0 - 10.0
Arsenic as As	<0.01	<0.01	>0.01 - 0.05
Mercury as Hg	<0.001	<0.001	>0.001 - 0.005
Colour as Pt-Co*	5	<20	>20 - 50
Odour*	No offensive odour		
Taste*	Acceptable Taste		

All heavy metal analyses have been performed on filtered samples

*Tests marked with an asterisk * are not SANAS accredited*

These results are related only to the items tested

P.L.G. UYS (M.D.)

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Attention: Mr. R. Bouwer

Date reported: 6 December 2010

Attention: Me. Z. Louw

Quantity Analyzed: 15

Lab No :

E131

Analysis Results mg/l	Presidents Rus Raw	SANS Standards -241 (2005)	
		Class I (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	520	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	<0.1	< 10	> 10 - 20
Chlorides as Cl	27	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	116		
Fluoride as F	0.50	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	241	< 400	> 400 - 600
Total Hardness as CaCO ₃	297		
Calcium Hardness as CaCO ₃	136		
Magnesium Hardness as CaCO ₃	161		
Calcium as Ca	54.4	< 150	> 150 - 300
Magnesium as Mg	39.20	< 70	> 70 - 100
Sodium as Na	36.5	< 200	> 200 - 400
Potassium as K	2.79	< 50	> 50 - 100
Iron as Fe	<0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	<0.01	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	72.4	< 150	> 150 - 370
pH-Value at 25 ° C	7.5	5.0 - 9.5	> 4.0 - 10.0
Turbidity as N.T.U	1.7	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	<0.1		
Total Residual Chlorine Cl ₂	<0.1		
Free & Saline Ammonia as N	0.28		
Aluminium as Al	<0.01	< 0.30	> 0.30 - 0.50

All heavy metal analyses have been performed on filtered samples

Tests marked with an asterisk * are not SANAS accredited

These results are related only to the items tested

QUALITY CONTROL CHECKS	
Cation Balance	7.60
Anion Balance	8.13
% Difference	-3.3
Measured TDS	520
Calculated TDS	472
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.7

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Attention: Mr. R. Bouwer

Date reported: 6 December 2010

Attention: Me. Zelda Louw

Quantity Analyzed: 15

Lab No :

E131

Analysis Results mg/l	Presidents Rus Raw	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Selenium as Se	<0.01	<0.02	>0.02 - 0.05
Vanadium as V	<0.01	<0.20	>0.2 - 0.5
Total Organic Carbon (TOC)	4.2		
Phenolic Compounds	<0.005	<0.01	>0.01 - 0.07
Cyanide as CN	<0.01	<0.05	>0.05 - 0.07
Cadmium as Cd	<0.003	<0.005	>0.005 - 0.01
Cobalt as Co	<0.01	<0.50	>0.50 - 1.0
Total Chromium as Cr	<0.01	<0.10	>0.10 - 0.50
Copper as Cu	<0.01	<1.0	>1.0 - 2.0
Antimony as Sb	<0.005	<0.01	>0.01 - 0.05
Nickel as Ni	0.01	<0.15	>0.15 - 0.35
Lead as Pb	<0.01	<0.02	>0.02 - 0.05
Zinc as Zn	<0.01	<5.0	>5.0 - 10.0
Arsenic as As	<0.01	<0.01	>0.01 - 0.05
Mercury as Hg	<0.001	<0.001	>0.001 - 0.005
Colour as Pt-Co*	10	<20	>20 - 50
Odour*	No offensive odour		
Taste*	Acceptable Taste		

All heavy metal analyses have been performed on filtered samples

Tests marked with an asterisk * are not SANAS accredited

These results are related only to the items tested

P.L.G. UYS (M.D.)

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Attention: Mr. R. Bouwer

Date reported: 6 December 2010

Attention: Me. Z. Louw

Quantity Analyzed: 15

Lab No :

E132

Analysis Results mg/l	Presidents Rus Final	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	526	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	<0.1	< 10	> 10 - 20
Chlorides as Cl	32	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	107		
Fluoride as F	0.46	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	241	< 400	> 400 - 600
Total Hardness as CaCO ₃	304		
Calcium Hardness as CaCO ₃	142		
Magnesium Hardness as CaCO ₃	162		
Calcium as Ca	56.7	< 150	> 150 - 300
Magnesium as Mg	39.3	< 70	> 70 - 100
Sodium as Na	36.2	< 200	> 200 - 400
Potassium as K	3.68	< 50	> 50 - 100
Iron as Fe	<0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	0.04	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	73.8	< 150	> 150 - 370
pH-Value at 25 ° C	7.94	5.0 - 9.5	> 4.0 - 10.0
Turbidity as N.T.U	0.48	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	<0.1		
Total Residual Chlorine Cl ₂	0.1		
Free & Saline Ammonia as N	<0.20		
Aluminium as Al	<0.01	< 0.30	> 0.30 - 0.50

All heavy metal analyses have been performed on filtered samples

Tests marked with an asterisk * are not SANAS accredited

These results are related only to the items tested

QUALITY CONTROL CHECKS	
Cation Balance	7.73
Anion Balance	8.08
% Difference	-2.2
Measured TDS	526
Calculated TDS	475
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.6

P.L.G. UYS (M.D.)

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Attention: Mr. R. Bouwer

Date reported: 6 December 2010

Attention: Me. Zelda Louw

Quantity Analyzed: 15

Lab No :

E132

Analysis Results mg/l	Presidents Rus Final	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Selenium as Se	<0.01	<0.02	>0.02 - 0.05
Vanadium as V	<0.01	<0.20	>0.2 - 0.5
Total Organic Carbon (TOC)	2.1		
Phenolic Compounds	<0.005	<0.01	>0.01 - 0.07
Cyanide as CN	<0.01	<0.05	>0.05 - 0.07
Cadmium as Cd	<0.003	<0.005	>0.005 - 0.01
Cobalt as Co	<0.01	<0.50	>0.50 - 1.0
Total Chromium as Cr	<0.01	<0.10	>0.10 - 0.50
Copper as Cu	<0.01	<1.0	>1.0 - 2.0
Antimony as Sb	<0.005	<0.01	>0.01 - 0.05
Nickel as Ni	0.01	<0.15	>0.15 - 0.35
Lead as Pb	<0.01	<0.02	>0.02 - 0.05
Zinc as Zn	0.02	<5.0	>5.0 - 10.0
Arsenic as As	<0.01	<0.01	>0.01 - 0.05
Mercury as Hg	<0.001	<0.001	>0.001 - 0.005
Colour as Pt-Co*	5	<20	>20 - 50
Odour*	No offensive odour		
Taste*	Acceptable Taste		

All heavy metal analyses have been performed on filtered samples

*Tests marked with an asterisk * are not SANAS accredited*

These results are related only to the items tested

P.L.G. UYS (M.D.)

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Attention: Mr. R. Bouwer

Date reported: 6 December 2010

Attention: Me. Z. Louw

Quantity Analyzed: 15

Lab No :

E133

Analysis Results mg/l	Vaalbank WTP Raw	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	794	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	<0.1	< 10	> 10 - 20
Chlorides as Cl	23	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	101		
Fluoride as F	0.42	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	425	< 400	> 400 - 600
Total Hardness as CaCO ₃	483		
Calcium Hardness as CaCO ₃	190		
Magnesium Hardness as CaCO ₃	293		
Calcium as Ca	76.2	< 150	> 150 - 300
Magnesium as Mg	71.1	< 70	> 70 - 100
Sodium as Na	36.9	< 200	> 200 - 400
Potassium as K	10.8	< 50	> 50 - 100
Iron as Fe	<0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	<0.01	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	104	< 150	> 150 - 370
pH-Value at 25 ° C	8.20	5.0 - 9.5	> 4.0 - 10.0
Turbidity as N.T.U	0.57	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	<0.1		
Total Residual Chlorine Cl ₂	<0.1		
Free & Saline Ammonia as N	<0.20		
Aluminium as Al	<0.01	< 0.30	> 0.30 - 0.50

All heavy metal analyses have been performed on filtered samples

Tests marked with an asterisk * are not SANAS accredited

These results are related only to the items tested

QUALITY CONTROL CHECKS	
Cation Balance	11.53
Anion Balance	11.54
% Difference	0.0
Measured TDS	794
Calculated TDS	705
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.7

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Attention: Mr. R. Boucher

Date reported: 6 December 2010

Attention. Me. Zelda Louw

Quantity Analyzed: 15

Lab No :

E133

Analysis Results mg/l	Vaalbank WTP Raw	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Selenium as Se	<0.01	<0.02	>0.02 - 0.05
Vanadium as V	<0.01	<0.20	>0.2 - 0.5
Total Organic Carbon (TOC)	2.3		
Phenolic Compounds	<0.005	<0.01	>0.01 - 0.07
Cyanide as CN	<0.01	<0.05	>0.05 - 0.07
Cadmium as Cd	<0.003	<0.005	>0.005 - 0.01
Cobalt as Co	<0.01	<0.50	>0.50 - 1.0
Total Chromium as Cr	<0.01	<0.10	>0.10 - 0.50
Copper as Cu	<0.01	<1.0	>1.0 - 2.0
Antimony as Sb	<0.005	<0.01	>0.01 - 0.05
Nickel as Ni	0.01	<0.15	>0.15 - 0.35
Lead as Pb	<0.01	<0.02	>0.02 - 0.05
Zinc as Zn	0.02	<5.0	>5.0 - 10.0
Arsenic as As	<0.01	<0.01	>0.01 - 0.05
Mercury as Hg	<0.001	<0.001	>0.001 - 0.005
Colour as Pt-Co*	10	<20	>20 - 50
Odour*	No offensive odour		
Taste*	Acceptable Taste		

All heavy metal analyses have been performed on filtered samples

Tests marked with an asterisk * are not SANAS accredited

These results are related only to the items tested

P.L.G. UYS (M.D.)

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Attention: Mr. R. Bouwer

Date reported: 6 December 2010

Attention: Me. Z. Louw

Quantity Analyzed: 15

Lab No :

E134

Analysis Results mg/l	Vaalbank WTP Final	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	766	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	<0.1	< 10	> 10 - 20
Chlorides as Cl	27	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	95		
Fluoride as F	0.38	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	408	< 400	> 400 - 600
Total Hardness as CaCO ₃	474		
Calcium Hardness as CaCO ₃	191		
Magnesium Hardness as CaCO ₃	283		
Calcium as Ca	76.3	< 150	> 150 - 300
Magnesium as Mg	68.8	< 70	> 70 - 100
Sodium as Na	36.0	< 200	> 200 - 400
Potassium as K	11.2	< 50	> 50 - 100
Iron as Fe	<0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	0.02	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	101	< 150	> 150 - 370
pH-Value at 25 ° C	8.02	5.0 - 9.5	> 4.0 - 10.0
Turbidity as N.T.U	1.70	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	<0.1		
Total Residual Chlorine Cl ₂	0.2		
Free & Saline Ammonia as N	<0.20		
Aluminium as Al	<0.01	< 0.30	> 0.30 - 0.50

All heavy metal analyses have been performed on filtered samples

Tests marked with an asterisk * are not SANAS accredited

These results are related only to the items tested

QUALITY CONTROL CHECKS	
Cation Balance	11.32
Anion Balance	11.18
% Difference	0.7
Measured TDS	766
Calculated TDS	686
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.7

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Attention: Mr. R. Boucher

Date reported: 6 December 2010

Attention: Me. Zelda Louw

Quantity Analyzed: 15

Lab No :

E134

Analysis Results mg/l	Vaalbank WTP Final	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Selenium as Se	<0.01	<0.02	>0.02 - 0.05
Vanadium as V	<0.01	<0.20	>0.2 - 0.5
Total Organic Carbon (TOC)	6.9		
Phenolic Compounds	<0.005	<0.01	>0.01 - 0.07
Cyanide as CN	<0.01	<0.05	>0.05 - 0.07
Cadmium as Cd	<0.003	<0.005	>0.005 - 0.01
Cobalt as Co	<0.01	<0.50	>0.50 - 1.0
Total Chromium as Cr	<0.01	<0.10	>0.10 - 0.50
Copper as Cu	<0.01	<1.0	>1.0 - 2.0
Antimony as Sb	<0.005	<0.01	>0.01 - 0.05
Nickel as Ni	0.01	<0.15	>0.15 - 0.35
Lead as Pb	<0.01	<0.02	>0.02 - 0.05
Zinc as Zn	0.01	<5.0	>5.0 - 10.0
Arsenic as As	<0.01	<0.01	>0.01 - 0.05
Mercury as Hg	<0.001	<0.001	>0.001 - 0.005
Colour as Pt-Co*	5	<20	>20 - 50
Odour*	No offensive odour		
Taste*	Acceptable Taste		

All heavy metal analyses have been performed on filtered samples

*Tests marked with an asterisk * are not SANAS accredited*

These results are related only to the items tested

P.L.G. UYS (M.D.)

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Attention: Mr. R. Bouwer

Date reported: 6 December 2010

Attention: Me. Z. Louw

Quantity Analyzed: 15

Lab No :

E135

Analysis Results mg/l	Krugerdam Raw	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	558	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	0.22	< 10	> 10 - 20
Chlorides as Cl	19	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	84		
Fluoride as F	0.33	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	304	< 400	> 400 - 600
Total Hardness as CaCO ₃	338		
Calcium Hardness as CaCO ₃	140		
Magnesium Hardness as CaCO ₃	198		
Calcium as Ca	56.1	< 150	> 150 - 300
Magnesium as Mg	48.2	< 70	> 70 - 100
Sodium as Na	27.1	< 200	> 200 - 400
Potassium as K	9.49	< 50	> 50 - 100
Iron as Fe	<0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	0.01	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	782	< 150	> 150 - 370
pH-Value at 25 ° C	7.79	5.0 - 9.5	> 4.0 - 10.0
Turbidity as N.T.U	5.00	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	0.1		
Total Residual Chlorine Cl ₂	<0.1		
Free & Saline Ammonia as N	<0.20		
Aluminium as Al	<0.01	< 0.30	> 0.30 - 0.50

All heavy metal analyses have been performed on filtered samples

Tests marked with an asterisk * are not SANAS accredited

These results are related only to the items tested

QUALITY CONTROL CHECKS	
Cation Balance	8.19
Anion Balance	8.58
% Difference	-2.3
Measured TDS	558
Calculated TDS	516
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.1

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Attention: Mr. R. Bouwer

Date reported: 6 December 2010

Attention. Me. Zelda Louw

Quantity Analyzed: 15

Lab No :

E135

Analysis Results mg/l	Krugerdam Raw	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Selenium as Se	<0.01	<0.02	>0.02 - 0.05
Vanadium as V	<0.01	<0.20	>0.2 - 0.5
Total Organic Carbon (TOC)	5.7		
Phenolic Compounds	<0.005	<0.01	>0.01 - 0.07
Cyanide as CN	<0.01	<0.05	>0.05 - 0.07
Cadmium as Cd	<0.003	<0.005	>0.005 - 0.01
Cobalt as Co	<0.01	<0.50	>0.50 - 1.0
Total Chromium as Cr	<0.01	<0.10	>0.10 - 0.50
Copper as Cu	<0.01	<1.0	>1.0 - 2.0
Antimony as Sb	<0.005	<0.01	>0.01 - 0.05
Nickel as Ni	0.01	<0.15	>0.15 - 0.35
Lead as Pb	<0.01	<0.02	>0.02 - 0.05
Zinc as Zn	<0.01	<5.0	>5.0 - 10.0
Arsenic as As	<0.01	<0.01	>0.01 - 0.05
Mercury as Hg	<0.001	<0.001	>0.001 - 0.005
Colour as Pt-Co*	5	<20	>20 - 50
Odour*	No offensive odour		
Taste*	Acceptable Taste		

All heavy metal analyses have been performed on filtered samples

*Tests marked with an asterisk * are not SANAS accredited*

These results are related only to the items tested

P.L.G. UYS (M.D.)

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Attention: Mr. R. Bouwer

Date reported: 6 December 2010

Attention: Me. Z. Louw

Quantity Analyzed: 15

Lab No :

E136

Analysis Results mg/l	Krugerdam Final	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	560	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	0.18	< 10	> 10 - 20
Chlorides as Cl	23	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	82		
Fluoride as F	0.29	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	305	< 400	> 400 - 600
Total Hardness as CaCO ₃	341		
Calcium Hardness as CaCO ₃	143		
Magnesium Hardness as CaCO ₃	198		
Calcium as Ca	57.3	< 150	> 150 - 300
Magnesium as Mg	48.1	< 70	> 70 - 100
Sodium as Na	26.9	< 200	> 200 - 400
Potassium as K	9.45	< 50	> 50 - 100
Iron as Fe	<0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	0.01	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	79.0	< 150	> 150 - 370
pH-Value at 25 ° C	7.82	5.0 - 9.5	> 4.0 - 10.0
Turbidity as N.T.U	0.62	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	<0.1		
Total Residual Chlorine Cl ₂	0.2		
Free & Saline Ammonia as N	<0.20		
Aluminium as Al	<0.01	< 0.30	> 0.30 - 0.50

All heavy metal analyses have been performed on filtered samples

Tests marked with an asterisk * are not SANAS accredited

These results are related only to the items tested

QUALITY CONTROL CHECKS	
Cation Balance	8.23
Anion Balance	8.67
% Difference	-2.6
Measured TDS	560
Calculated TDS	521
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.7

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Attention: Mr. R. Boucher

Date reported: 6 December 2010

Attention. Me. Zelda Louw

Quantity Analyzed: 15

Lab No :

E136

Analysis Results mg/l	Krugerdam Final	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Selenium as Se	<0.01	<0.02	>0.02 - 0.05
Vanadium as V	<0.01	<0.20	>0.2 - 0.5
Total Organic Carbon (TOC)	5.2		
Phenolic Compounds	<0.005	<0.01	>0.01 - 0.07
Cyanide as CN	<0.01	<0.05	>0.05 - 0.07
Cadmium as Cd	<0.003	<0.005	>0.005 - 0.01
Cobalt as Co	<0.01	<0.50	>0.50 - 1.0
Total Chromium as Cr	<0.01	<0.10	>0.10 - 0.50
Copper as Cu	0.05	<1.0	>1.0 - 2.0
Antimony as Sb	<0.005	<0.01	>0.01 - 0.05
Nickel as Ni	0.01	<0.15	>0.15 - 0.35
Lead as Pb	<0.01	<0.02	>0.02 - 0.05
Zinc as Zn	0.01	<5.0	>5.0 - 10.0
Arsenic as As	<0.01	<0.01	>0.01 - 0.05
Mercury as Hg	<0.001	<0.001	>0.001 - 0.005
Colour as Pt-Co*	5	<20	>20 - 50
Odour*	No offensive odour		
Taste*	Acceptable Taste		

All heavy metal analyses have been performed on filtered samples

Tests marked with an asterisk * are not SANAS accredited

These results are related only to the items tested

P.L.G. UYS (M.D.)

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Attention: Mr. R. Bouwer

Date reported: 6 December 2010

Attention: Me. Z. Louw

Quantity Analyzed: 15

Lab No :

E137

Analysis Results mg/l	Mafube Village Final	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	142	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	1.10	< 10	> 10 - 20
Chlorides as Cl	15	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	92		
Fluoride as F	0.54	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	2.8	< 400	> 400 - 600
Total Hardness as CaCO ₃	56		
Calcium Hardness as CaCO ₃	38		
Magnesium Hardness as CaCO ₃	17		
Calcium as Ca	15.4	< 150	> 150 - 300
Magnesium as Mg	4.23	< 70	> 70 - 100
Sodium as Na	23.7	< 200	> 200 - 400
Potassium as K	2.25	< 50	> 50 - 100
Iron as Fe	<0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	<0.01	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	22.1	< 150	> 150 - 370
pH-Value at 25 ° C	7.42	5.0 - 9.5	> 4.0 - 10.0
Turbidity as N.T.U	0.36	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	0.4		
Total Residual Chlorine Cl ₂	6.0		
Free & Saline Ammonia as N	<0.20		
Aluminium as Al	<0.01	< 0.30	> 0.30 - 0.50

All heavy metal analyses have been performed on filtered samples

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QUALITY CONTROL CHECKS	
Cation Balance	2.21
Anion Balance	2.43
% Difference	-4.8
Measured TDS	142
Calculated TDS	125
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.6

P.L.G. UYS (M.D.)

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010
Date reported: 6 December 2010
Quantity Analyzed: 15
Lab No :

Attention: Mr. R. Bouwer
Attention. Me. Zelda Louw

E137

Analysis Results mg/l	Mafube Village Final	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Selenium as Se	<0.01	<0.02	>0.02 - 0.05
Vanadium as V	<0.01	<0.20	>0.2 - 0.5
Total Organic Carbon (TOC)	2.1		
Phenolic Compounds	<0.005	<0.01	>0.01 - 0.07
Cyanide as CN	<0.01	<0.05	>0.05 - 0.07
Cadmium as Cd	<0.003	<0.005	>0.005 - 0.01
Cobalt as Co	<0.01	<0.50	>0.50 - 1.0
Total Chromium as Cr	<0.01	<0.10	>0.10 - 0.50
Copper as Cu	<0.01	<1.0	>1.0 - 2.0
Antimony as Sb	<0.005	<0.01	>0.01 - 0.05
Nickel as Ni	<0.01	<0.15	>0.15 - 0.35
Lead as Pb	<0.01	<0.02	>0.02 - 0.05
Zinc as Zn	0.16	<5.0	>5.0 - 10.0
Arsenic as As	<0.01	<0.01	>0.01 - 0.05
Mercury as Hg	<0.001	<0.001	>0.001 - 0.005
Colour as Pt-Co*	5	<20	>20 - 50
Odour*	No offensive odour		
Taste*	Acceptable Taste		

All heavy metal analyses have been performed on filtered samples
Tests marked with an asterisk * are not SANAS accredited
These results are related only to the items tested

P.L.G. UYS (M.D.)

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010

Attention: Mr. R. Bouwer

Date reported: 6 December 2010

Attention: Me. Z. Louw

Quantity Analyzed: 15

Lab No :

E138

Analysis Results mg/l	Bankfontein	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Total Dissolved Solids	154	< 1 000	> 1 000 - 2 400
Nitrate & Nitrite as N	<0.1	< 10	> 10 - 20
Chlorides as Cl	5.0	< 200	> 200 - 600
Total Alkalinity as CaCO ₃	122		
Fluoride as F	1.74	< 1.0	> 1.0 - 1.5
Sulphate as SO ₄	5.2	< 400	> 400 - 600
Total Hardness as CaCO ₃	76		
Calcium Hardness as CaCO ₃	52		
Magnesium Hardness as CaCO ₃	24		
Calcium as Ca	20.7	< 150	> 150 - 300
Magnesium as Mg	5.79	< 70	> 70 - 100
Sodium as Na	24.7	< 200	> 200 - 400
Potassium as K	0.68	< 50	> 50 - 100
Iron as Fe	<0.01	< 0.20	> 0.20 - 2.0
Manganese as Mn	<0.01	< 0.10	> 0.10 - 1.0
Conductivity at 25° C in mS/m	24.6	< 150	> 150 - 370
pH-Value at 25 ° C	8.03	5.0 - 9.5	> 4.0 - 10.0
Turbidity as N.T.U	0.39	< 1	> 1 - 5
Free Residual Chlorine Cl ₂	<0.1		
Total Residual Chlorine Cl ₂	<0.1		
Free & Saline Ammonia as N	<0.20		
Aluminium as Al	<0.01	< 0.30	> 0.30 - 0.50

All heavy metal analyses have been performed on filtered samples

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These results are related only to the items tested

QUALITY CONTROL CHECKS	
Cation Balance	2.60
Anion Balance	2.78
% Difference	-3.3
Measured TDS	154
Calculated TDS	138
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.6

STEVE TSHWETE MUNICIPALITY

P.O. Box 14
MIDDELBURG
1050

CHEMICAL ANALYSIS

Our Ref: STE / 124 - 138/ E /11/10

Date received: 16 November 2010
Date reported: 6 December 2010
Quantity Analyzed: 15
Lab No :

Attention: Mr. R. Boucher
Attention. Me. Zelda Louw

E138

Analysis Results mg/l	Bankfontein	SANS Standards -241 (2005)	
		Class 1 (recommended operational limit)	Class 2 (max allowable for limited duration)
Selenium as Se	<0.01	<0.02	>0.02 - 0.05
Vanadium as V	<0.01	<0.20	>0.2 - 0.5
Total Organic Carbon (TOC)	2.3		
Phenolic Compounds	<0.005	<0.01	>0.01 - 0.07
Cyanide as CN	<0.01	<0.05	>0.05 - 0.07
Cadmium as Cd	<0.003	<0.005	>0.005 - 0.01
Cobalt as Co	<0.01	<0.50	>0.50 - 1.0
Total Chromium as Cr	<0.01	<0.10	>0.10 - 0.50
Copper as Cu	0.05	<1.0	>1.0 - 2.0
Antimony as Sb	<0.005	<0.01	>0.01 - 0.05
Nickel as Ni	<0.01	<0.15	>0.15 - 0.35
Lead as Pb	<0.01	<0.02	>0.02 - 0.05
Zinc as Zn	0.08	<5.0	>5.0 - 10.0
Arsenic as As	<0.01	<0.01	>0.01 - 0.05
Mercury as Hg	<0.001	<0.001	>0.001 - 0.005
Colour as Pt-Co*	5	<20	>20 - 50
Odour*	No offensive odour		
Taste*	Acceptable Taste		

All heavy metal analyses have been performed on filtered samples
Tests marked with an asterisk * are not SANAS accredited
These results are related only to the items tested

P.L.G. UYS (M.D.)

STEVE TSHWETE TOWN COUNCIL

CHEMICAL ANALYSIS : TRIHALOMETHANES

Date Received : 16 November 2010

Analysis Results - µg/l [ppb]	Doornkop 1	Doornkop 2	Hendrina Potable WTP Raw
Bromoform	< 5	< 5	< 5
Chloroform	< 5	< 5	< 5
Bromodichloromethane	< 10	< 10	< 10
Dibromochloromethane	< 2	< 2	< 2
Trichloroethylene (TCE)	< 5	< 5	< 5

Analysis Results - µg/l [ppb]	Hendrina Potable WRP - Final (A)	Hendrina WTP Final (B)
Bromoform	< 5	< 5
Chloroform	49	49
Bromodichloromethane	14	13
Dibromochloromethane	6.0	< 2
Trichloroethylene (TCE)	< 5	< 5

ppb - parts per billion

STANDARDS 241 (2006)	
Class 1 (acceptable)	< 200 µg/l
Class 2 (max. allowable)	200 - 300 µg/l

P.L.G. UYS (M.D.)

STEVE TSHWETE TOWN COUNCIL

CHEMICAL ANALYSIS : TRIHALOMETHANES

Date Received : 16 November 2010

Analysis Results - µg/l [ppb]	President Rus Raw	President Rus Final	Vaalbank WTP Raw
Bromoform	< 5	< 5	< 5
Chloroform	< 5	46	< 5
Bromodichloromethane	< 10	19	< 10
Dibromochloromethane	< 2	20	< 2
Trichloroethylene (TCE)	< 5	< 5	< 5

Analysis Results - µg/l [ppb]	Vaalbank WTP Final	Krugerdam Raw	Krugerdam Final
Bromoform	< 5	< 5	< 5
Chloroform	42	< 5	35
Bromodichloromethane	32	< 10	25
Dibromochloromethane	14	< 2	11
Trichloroethylene (TCE)	< 5	< 5	< 5.0

ppb - parts per billion

STANDARDS 241 (2006)	
Class 1 (acceptable)	< 200 µg/l
Class 2 (max. allowable)	200 - 300 µg/l

P.L.G. UYS (M.D.)

STEVE TSHWETE TOWN COUNCIL

CHEMICAL ANALYSIS : TRIHALOMETHANES

Date Received : 16 November 2010

Analysis Results - µg/l [ppb]	Mafube Village	Bankfontein
Bromoform	< 5	< 5
Chloroform	< 5	< 5
Bromodichloromethane	< 10	< 10
Dibromochloromethane	< 2	< 2
Trichloroethylene (TCE)	< 5	< 5

ppb - parts per billion

STANDARDS 241 (2006)	
Class 1 (acceptable)	< 200 µg/l
Class 2 (max. allowable)	200 - 300 µg/l

P.L.G. UYS (M.D.)