

**NKANGALA DISTRICT**  
**EMAKHAZENI MUNICIPALITY**

P.O. Box 17  
BELFAST, 1100

**CHEMICAL ANALYSIS : WATER SAMPLES** Our Ref: EMA / 401 - 403 / D /05/15

Date received: 23 May 2019

BELFAST

Att : M. Joubert

Date reported: 30 May 2019

Quantity Analyzed: 3

Lab No:

D 401

Analysis Results mg/l	LPM METHOD	NDS 2/5/19 Dullstroom Waterworks Inlet	SANS Standards -241 (2011) Domestic Water
			Standard Limits
Total Dissolved Solids	LPM 2	48	≤ 1 200
Suspended Solids	LPM 1	<0.4	
Nitrate & Nitrite as N	LPM 76	<0.1	
Nitrate NO <sub>3</sub> as N	LPM 76	<0.1	≤ 11
Nitrite NO <sub>2</sub> as N	LPM 76	<0.1	≤ 0.9
Chlorides as Cl	LPM 76	6.55	≤ 300
Total Alkalinity as CaCO <sub>3</sub>	LPM 11/81	24	
Fluoride as F	LPM 76	<0.20	≤ 1.5
Sulphate as SO <sub>4</sub>	LPM 76	3.97	Acute Health ≤ 500 - Aesthetic ≤ 250
Total Hardness as CaCO <sub>3</sub>	LPM 85	13	
Calcium Hardness as CaCO <sub>3</sub>	LPM 85	7	
Magnesium Hardness as CaCO <sub>3</sub>	LPM 85	6	
Calcium as Ca	LPM 15	2.63	
Magnesium as Mg	LPM 15	1.49	
Sodium as Na	LPM 15	11.7	≤ 200
Potassium as K	LPM 15	0.93	
Iron as Fe	LPM 15/67	0.39	Chronic Health ≤ 2.0 - Aesthetic ≤ 0.3
Manganese as Mn	LPM 15/67	<0.01	Chronic Health ≤ 0.5 - Aesthetic ≤ 0.1
Conductivity at 25° C (mS/m)	LPM 51/82	5.14	≤ 170
pH-Value at 25° C (pH Units)	LPM 51/82	7.44	≥ 5.0 to ≤ 9.7
pHs by 21° Celsius	LPM 85	9.45	
Langelier Saturation Index	LPM 85	-2.01	
Turbidity as N.T.U.	LPM 23/82	1.10	Operational ≤ 1.0 - Aesthetic ≤ 5.0
Free Residual Chlorine Cl <sub>2</sub> *	LPM 84	-	
Aluminium as Al	LPM 15/67	0.05	≤ 0.30

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

These results must be read in conjunction with the Uncertainty of Measurement 'list as provided by Regen Waters Laboratory

**QUALITY CONTROL CHECKS**

Cation Balance	0.81
Anion Balance	0.75
% Difference	3.8
Measured TDS	48
Calculated TDS	42
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.8

**••••• NKANGALA DISTRICT •••••**  
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**CHEMICAL ANALYSIS : WATER SAMPLES**

Our Ref: EMA / 401 - 403 / D /05/15

Date received: 23 May 2019

BELFAST

Att : M. Joubert

Date reported: 30 May 2019

Quantity Analyzed: 3

Lab No:

D 402

Analysis Results mg/l	LPM METHOD	NDS 4/5/19 Dullstroom Waterworks Final Treated	SANS Standards -241 (2011) Domestic Water
			Standard Limits
Total Dissolved Solids	LPM 2	48	≤ 1 200
Suspended Solids	LPM 1	<0.4	
Nitrate & Nitrite as N	LPM 76	<0.1	
Nitrate NO <sub>3</sub> as N	LPM 76	<0.1	≤ 11
Nitrite NO <sub>2</sub> as N	LPM 76	<0.1	≤ 0.9
Chlorides as Cl	LPM 76	10.4	≤ 300
Total Alkalinity as CaCO <sub>3</sub>	LPM 11/81	25	
Fluoride as F	LPM 76	<0.20	≤ 1.5
Sulphate as SO <sub>4</sub>	LPM 76	2.19	Acute Health ≤ 500 - Aesthetic ≤ 250
Total Hardness as CaCO <sub>3</sub>	LPM 85	27	
Calcium Hardness as CaCO <sub>3</sub>	LPM 85	17	
Magnesium Hardness as CaCO <sub>3</sub>	LPM 85	10	
Calcium as Ca	LPM 15	6.77	
Magnesium as Mg	LPM 15	2.48	
Sodium as Na	LPM 15	5.29	≤ 200
Potassium as K	LPM 15	1.06	
Iron as Fe	LPM 15/67	0.03	Chronic Health ≤ 2.0 - Aesthetic ≤ 0.3
Manganese as Mn	LPM 15/67	<0.01	Chronic Health ≤ 0.5 - Aesthetic ≤ 0.1
Conductivity at 25° C (mS/m)	LPM 51/82	7.60	≤ 170
pH-Value at 25° C (pH Units)	LPM 51/82	7.21	≥ 5.0 to ≤ 9.7
pHs by 21° Celsius	LPM 85	9.04	
Langelier Saturation Index	LPM 85	-1.83	
Turbidity as N.T.U.	LPM 23/82	0.91	Operational ≤ 1.0 - Aesthetic ≤ 5.0
Free Residual Chlorine Cl <sub>2</sub> *	LPM 84	2.30	
Aluminium as Al	LPM 15/67	0.15	≤ 0.30

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Measurement 'list as provided by Regen Waters Laboratory

**QUALITY CONTROL CHECKS**

Cation Balance	0.82
Anion Balance	0.84
% Difference	-1.3
Measured TDS	48
Calculated TDS	43
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.6

P.L.G. UYS / A.KOHRIS  
Technical Signatory

**NKANGALA DISTRICT MUNICIPALITY**  
**EMAKHAZENI LOCAL MUNICIPALITY**

Certificate of Waste Water and Effluent Analysis - Sewage Purification Works

Our Ref: NDM / 401 - 403 / D /05/19			
Lab No:	D 403		
ANALYSIS RESULTS mg/l	TEST METHOD	<i>Dullstroom Sewer Final Treated</i>	General Standards Gazette No: 36820
		<i>DS9/5/19</i>	
DATE RECEIVED :		23-May-19	
DATE REPORTED :		30-May-19	
<b>Total Dissolved Solids</b>	LPM 2	<b>178</b>	
<b>Suspended Solids</b>	LPM 1	<b>36.8</b>	25
<b>Settleable Solids ml/l</b>	LPM 3	<b>&lt;0.20</b>	
<b>Conductivity at 25°C (mS/m)</b>	LPM 51/82	<b>39.0</b>	Intake + 70-150
<b>4 Hours Oxygen Absorbed</b>	LPM 25	<b>12.9</b>	
<b>Chemical Oxygen Demand</b>	LPM 6/83	<b>105</b>	< 75
<b>Free and Saline Ammonia as N</b>	LPM 76	<b>17.5</b>	< 6
<b>Nitrate - NO<sub>3</sub> as N</b>	LPM 76	<b>&lt;0.1</b>	< 15
<b>Nitrite - NO<sub>2</sub> as N</b>	LPM 76	<b>&lt;0.1</b>	
<b>Ortho - Phosphate PO<sub>4</sub> as P</b>	LPM 76	<b>1.28</b>	< 10
<b>Chlorides as Cl</b>	LPM 76	<b>32.4</b>	
<b>Total Alkalinity as CaCO<sub>3</sub></b>	LPM 11/81	<b>113</b>	
<b>pH - Value at 25°C (pH Units)</b>	LPM 51/81	<b>7.25</b>	5.5 - 9.5
<b>Sodium as Na</b>	LPM 15	<b>61.6</b>	
<b>Potassium as K</b>	LPM 15	<b>6.85</b>	
<b>Sulphate as SO<sub>4</sub></b>	LPM 76	<b>23.8</b>	
<b>Residual Chlorine as Cl<sub>2</sub> *</b>	LPM 84	<b>&lt;0.1</b>	0.25
<b>Faecal Coliform / 100ml (CFU)</b>	MLPM 4A	<b>30</b>	1000/100ml

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VALUES HIGHLIGHTED IN GREY ARE NOT WITHIN THE (GAZETTE 20526) GENERAL LIMITS AS SPECIFIED

**P.L.G. UYS / A.KOHR**  
Technical Signatory