

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

P.O. Box 17  
BELFAST, 1100

**CHEMICAL ANALYSIS : WATER SAMPLES** Our Ref: EMA / 157 - 162 / C /05/15

Date received: 14 May 2019

BELFAST

Att : M. Joubert

Date reported: 20 May 2019

Quantity Analyzed: 6

Lab No:

C 157

Analysis Results mg/l	LPM METHOD	NBF 2/5/19 Belfast Waterworks Inlet	SANS Standards -241 (2011) Domestic Water
			Standard Limits
Total Dissolved Solids	LPM 2	158	≤ 1 200
Suspended Solids	LPM 1	4.8	
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	34.3	≤ 300
Total Alkalinity as CaCO <sub>3</sub>	LPM 11/81	79	
Fluoride as F	LPM 76	0.20	≤ 1.5
Sulphate as SO <sub>4</sub>	LPM 76	13.4	Acute Health ≤ 500 - Aesthetic ≤ 250
Total Hardness as CaCO <sub>3</sub>	LPM 85	72	
Calcium Hardness as CaCO <sub>3</sub>	LPM 85	31	
Magnesium Hardness as CaCO <sub>3</sub>	LPM 85	41	
Calcium as Ca	LPM 15	12.6	
Magnesium as Mg	LPM 15	9.89	
Sodium as Na	LPM 15	24.1	≤ 200
Potassium as K	LPM 15	4.54	
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	25.1	≤ 170
pH-Value at 25° C (pH Units)	LPM 51/82	7.80	≥ 5.0 to ≤ 9.7
pHs by 21° Celsius	LPM 85	8.33	
Langelier Saturation Index	LPM 85	-0.53	
Turbidity as N.T.U.	LPM 23/82	3.78	Operational ≤ 1.0 - Aesthetic ≤ 5.0
Free Residual Chlorine Cl <sub>2</sub> *	LPM 84	-	
Aluminium as Al	LPM 15/67	0.01	≤ 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

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**QUALITY CONTROL CHECKS**

Cation Balance	2.61
Anion Balance	2.84
% Difference	-4.2
Measured TDS	158
Calculated TDS	147
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.6

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

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

Our Ref: EMA / 157 - 162 / C /05/15

Date received: 14 May 2019

BELFAST

Att : M. Joubert

Date reported: 20 May 2019

Quantity Analyzed: 6

Lab No:

C 158

Analysis Results mg/l	LPM METHOD	NBF 4/5/19 Belfast Waterworks Final Treated	SANS Standards -241 (2011) Domestic Water
			Standard Limits
Total Dissolved Solids	LPM 2	152	≤ 1 200
Suspended Solids	LPM 1	<0.4	
Nitrate & Nitrite as N	LPM 76	0.10	
Nitrate NO <sub>3</sub> as N	LPM 76	0.10	≤ 11
Nitrite NO <sub>2</sub> as N	LPM 76	<0.1	≤ 0.9
Chlorides as Cl	LPM 76	38.0	≤ 300
Total Alkalinity as CaCO <sub>3</sub>	LPM 11/81	77	
Fluoride as F	LPM 76	<0.20	≤ 1.5
Sulphate as SO <sub>4</sub>	LPM 76	13.2	Acute Health ≤ 500 - Aesthetic ≤ 250
Total Hardness as CaCO <sub>3</sub>	LPM 85	73	
Calcium Hardness as CaCO <sub>3</sub>	LPM 85	31	
Magnesium Hardness as CaCO <sub>3</sub>	LPM 85	41	
Calcium as Ca	LPM 15	12.6	
Magnesium as Mg	LPM 15	10.0	
Sodium as Na	LPM 15	24.6	≤ 200
Potassium as K	LPM 15	4.67	
Iron as Fe	LPM 15/67	0.08	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	25.5	≤ 170
pH-Value at 25° C (pH Units)	LPM 51/82	8.00	≥ 5.0 to ≤ 9.7
pHs by 21° Celsius	LPM 85	8.34	
Langelier Saturation Index	LPM 85	-0.34	
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	0.90	
Aluminium as Al	LPM 15/67	0.09	≤ 0.30

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**QUALITY CONTROL CHECKS**

Cation Balance	2.66
Anion Balance	2.89
% Difference	-4.2
Measured TDS	152
Calculated TDS	151
Limits > 1.0 - <1.2	1.0
Calcul TDS / E.C. (0.55 - 0.70)	0.6

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

**NKANGALA DISTRICT**  
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P.O. Box 17  
BELFAST, 1100

**CHEMICAL ANALYSIS : WATER SAMPLES** Our Ref: EMA / 157 - 162 / C /05/15

Date received: 14 May 2019

**WATERVAL BOVEN**

Att : M. Joubert

Date reported: 20 May 2019

Quantity Analyzed: 6

Lab No:

**C 160**

Analysis Results mg/l	LPM METHOD	NWB 2/5/19 Waterworks Inlet	SANS Standards -241 (2011) Domestic Water
			Standard Limits
Total Dissolved Solids	LPM 2	118	≤ 1 200
Suspended Solids	LPM 1	<0.4	
Nitrate & Nitrite as N	LPM 76	0.80	
Nitrate NO <sub>3</sub> as N	LPM 76	0.80	≤ 11
Nitrite NO <sub>2</sub> as N	LPM 76	<0.1	≤ 0.9
Chlorides as Cl	LPM 76	8.16	≤ 300
Total Alkalinity as CaCO <sub>3</sub>	LPM 11/81	84	
Fluoride as F	LPM 76	<0.20	≤ 1.5
Sulphate as SO <sub>4</sub>	LPM 76	6.93	Acute Health ≤ 500 - Aesthetic ≤ 250
Total Hardness as CaCO <sub>3</sub>	LPM 85	71	
Calcium Hardness as CaCO <sub>3</sub>	LPM 85	29	
Magnesium Hardness as CaCO <sub>3</sub>	LPM 85	42	
Calcium as Ca	LPM 15	11.6	
Magnesium as Mg	LPM 15	10.22	
Sodium as Na	LPM 15	10.19	≤ 200
Potassium as K	LPM 15	1.16	
Iron as Fe	LPM 15/67	0.61	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	15.9	≤ 170
pH-Value at 25° C (pH Units)	LPM 51/82	7.93	≥ 5.0 to ≤ 9.7
pHs by 21° Celsius	LPM 85	8.31	
Langelier Saturation Index	LPM 85	-0.38	
Turbidity as N.T.U.	LPM 23/82	3.50	Operational ≤ 1.0 - Aesthetic ≤ 5.0
Free Residual Chlorine Cl <sub>2</sub> *	LPM 84	-	
Aluminium as Al	LPM 15/67	0.07	≤ 0.30

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**QUALITY CONTROL CHECKS**

Cation Balance	1.92
Anion Balance	2.11
% Difference	-4.7
Measured TDS	118
Calculated TDS	104
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.7

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

**NKANGALA DISTRICT**  
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P.O. Box 17  
BELFAST, 1100

**CHEMICAL ANALYSIS : WATER SAMPLES**

Our Ref: EMA / 157 - 162 / C /05/15

Date received: 14 May 2019

WATERVAL BOVEN

Att : M. Joubert

Date reported: 20 May 2019

Quantity Analyzed: 6

Lab No:

C 161

Analysis Results mg/l	LPM METHOD	NWB 4/5/19 Waterworks Outlet Final	SANS Standards -241 (2011) Domestic Water
			Standard Limits
Total Dissolved Solids	LPM 2	114	≤ 1 200
Suspended Solids	LPM 1	2.4	
Nitrate & Nitrite as N	LPM 76	0.48	
Nitrate NO <sub>3</sub> as N	LPM 76	0.48	≤ 11
Nitrite NO <sub>2</sub> as N	LPM 76	<0.1	≤ 0.9
Chlorides as Cl	LPM 76	14.2	≤ 300
Total Alkalinity as CaCO <sub>3</sub>	LPM 11/81	79	
Fluoride as F	LPM 76	<0.20	≤ 1.5
Sulphate as SO <sub>4</sub>	LPM 76	6.50	Acute Health ≤ 500 - Aesthetic ≤ 250
Total Hardness as CaCO <sub>3</sub>	LPM 85	72	
Calcium Hardness as CaCO <sub>3</sub>	LPM 85	30	
Magnesium Hardness as CaCO <sub>3</sub>	LPM 85	42	
Calcium as Ca	LPM 15	11.9	
Magnesium as Mg	LPM 15	10.2	
Sodium as Na	LPM 15	10.8	≤ 200
Potassium as K	LPM 15	2.11	
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	17.1	≤ 170
pH-Value at 25° C (pH Units)	LPM 51/82	7.77	≥ 5.0 to ≤ 9.7
pHs by 21° Celsius	LPM 85	8.33	
Langelier Saturation Index	LPM 85	-0.56	
Turbidity as N.T.U.	LPM 23/82	0.93	Operational ≤ 1.0 - Aesthetic ≤ 5.0
Free Residual Chlorine Cl <sub>2</sub> *	LPM 84	1.20	
Aluminium as Al	LPM 15/67	0.04	≤ 0.30

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**QUALITY CONTROL CHECKS**

Cation Balance	1.97
Anion Balance	2.15
% Difference	-4.4
Measured TDS	114
Calculated TDS	106
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.6

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

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

**Certificate of Waste Water and Effluent Analysis - Sewage Purification Works**

Our Ref: NDM / 157 - 162 / C /05/19			
Lab No:		C 159	
ANALYSIS RESULTS mg/l	TEST METHOD	<i>Belfast Sewer Final Treated</i>	<b>General Standards</b> <b>Gazette No: 36820</b>
		<i>NBF9/5/19</i>	
DATE RECEIVED :		<i>14-May-19</i>	
DATE REPORTED :		<i>20-May-19</i>	
<i>Total Dissolved Solids</i>	LPM 2	<b>318</b>	
<i>Suspended Solids</i>	LPM 1	<b>18.8</b>	<b>25</b>
<i>Settleable Solids ml/l</i>	LPM 3	<b>&lt;0.20</b>	
<i>Conductivity at 25°C (mS/m)</i>	LPM 51/82	<b>71.6</b>	<b>Intake + 70-150</b>
<i>4 Hours Oxygen Absorbed</i>	LPM 25	<b>12.0</b>	
<i>Chemical Oxygen Demand</i>	LPM 6/83	<b>119</b>	<b>&lt; 75</b>
<i>Free and Saline Ammonia as N</i>	LPM 76	<b>30.2</b>	<b>&lt; 6</b>
<i>Nitrate - NO<sub>3</sub> as N</i>	LPM 76	<b>0.12</b>	<b>&lt; 15</b>
<i>Nitrite - NO<sub>2</sub> as N</i>	LPM 76	<b>&lt;0.1</b>	
<i>Ortho - Phosphate PO<sub>4</sub> as P</i>	LPM 76	<b>3.32</b>	<b>&lt; 10</b>
<i>Chlorides as Cl</i>	LPM 76	<b>59.4</b>	
<i>Total Alkalinity as CaCO<sub>3</sub></i>	LPM 11/81	<b>241</b>	
<i>pH - Value at 25°C (pH Units)</i>	LPM 51/81	<b>7.63</b>	<b>5.5 - 9.5</b>
<i>Sodium as Na</i>	LPM 15	<b>57.8</b>	
<i>Potassium as K</i>	LPM 15	<b>11.6</b>	
<i>Sulphate as SO<sub>4</sub></i>	LPM 76	<b>38.1</b>	
<i>Residual Chlorine as Cl<sub>2</sub> *</i>	LPM 84	<b>&lt;0.1</b>	<b>0.25</b>
<i>Faecal Coliform / 100ml (CFU)</i>	MLPM 4A	<b>&gt;1000</b>	<b>1000/100ml</b>

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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**



**NKANGALA DISTRICT MUNICIPALITY  
EMAKHAZENI LOCAL MUNICIPALITY**

**Certificate of Waste Water and Effluent Analysis - Sewage Purification Works**

Our Ref: NDM / 157 - 162 / C /05/19			
Lab No:	C 162		
ANALYSIS RESULTS mg/l	TEST METHOD	<i>Sewer Final</i>	General Standards Gazette No: 36820
		<i>NWB 6/5/19</i>	
DATE RECEIVED :		<i>14-May-19</i>	
DATE REPORTED :		<i>20-May-19</i>	
<i>Total Dissolved Solids</i>	LPM 2	186	
<i>Suspended Solids</i>	LPM 1	8.0	25
<i>Settleable Solids ml/l</i>	LPM 3	<0.20	
<i>Conductivity at 25°C (mS/m)</i>	LPM 51/82	32.4	Intake + 70-150
<i>4 Hours Oxygen Absorbed</i>	LPM 25	3.5	
<i>Chemical Oxygen Demand</i>	LPM 6/83	22	< 75
<i>Free and Saline Ammonia as N</i>	LPM 76	0.25	< 6
<i>Nitrate - NO<sub>3</sub> as N</i>	LPM 76	3.08	< 15
<i>Nitrite - NO<sub>2</sub> as N</i>	LPM 76	0.20	
<i>Ortho - Phosphate PO<sub>4</sub> as P</i>	LPM 76	0.21	< 10
<i>Chlorides as Cl</i>	LPM 76	20.6	
<i>Total Alkalinity as CaCO<sub>3</sub></i>	LPM 11/81	97	
<i>pH - Value at 25°C (pH Units)</i>	LPM 51/81	7.55	5.5 - 9.5
<i>Sodium as Na</i>	LPM 15	19.5	
<i>Potassium as K</i>	LPM 15	2.91	
<i>Sulphate as SO<sub>4</sub></i>	LPM 76	23.0	
<i>Residual Chlorine as Cl<sub>2</sub> *</i>	LPM 84	<0.1	0.25
<i>Faecal Coliform / 100ml (CFU)</i>	MLPM 4A	>1000	1000/100ml

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

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