

## STEVE TSHWETE MUNICIPALITY

P.O. Box 14  
MIDDELBURG  
1050

CHEMICAL ANALYSIS

Our Ref: STE / 158 - 169 / B / 09 / 11

Date received: 13 September 2011  
Date reported: 23 September 2011  
Quantity Analyzed: 12  
Lab No :

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

B 162

| Analysis Results mg/l                   | Krugerdam Raw | SANS Standards -241 (2011) Domestic Water |
|-----------------------------------------|---------------|-------------------------------------------|
|                                         |               | Standard Limits                           |
| Total Dissolved Solids                  | 476           | ≤ 1 200                                   |
| Nitrate & Nitrite as N                  | 0.12          | ≤ 11                                      |
| Chlorides as Cl                         | 22            | ≤ 300                                     |
| Total Alkalinity as CaCO <sub>3</sub>   | 70            |                                           |
| Fluoride as F                           | 0.34          | ≤ 1.5                                     |
| Sulphate as SO <sub>4</sub>             | 284           | Acute Health ≤ 500 - Aesthetic ≤ 250      |
| Total Hardness as CaCO <sub>3</sub>     | 337           |                                           |
| Calcium Hardness as CaCO <sub>3</sub>   | 145           |                                           |
| Magnesium Hardness as CaCO <sub>3</sub> | 192           |                                           |
| Calcium as Ca                           | 58.2          |                                           |
| Magnesium as Mg                         | 46.7          |                                           |
| Sodium as Na                            | 31.3          | ≤ 200                                     |
| Potassium as K                          | 10.7          |                                           |
| Iron as Fe                              | 0.14          | Chronic Health ≤ 2.0 - Aesthetic ≤ 0.3    |
| Manganese as Mn                         | 0.16          | Chronic Health ≤ 0.5 - Aesthetic ≤ 0.1    |
| Conductivity at 25° C in mS/m           | 72.1          | ≤ 170                                     |
| pH-Value at 25° C                       | 8.05          | ≥ 5.0 to ≤ 9.7                            |
| pHs by 21° Celsius                      | 8.02          |                                           |
| Langelier Saturation Index              | +0.03         |                                           |
| Turbidity as N.T.U                      | 4.7           | Operational ≤ 1.0 - Aesthetic ≤ 5.0       |
| Free Residual Chlorine Cl <sub>2</sub>  | <0.1          | ≤ 5                                       |
| Total Residual Chlorine Cl <sub>2</sub> | <0.1          |                                           |
| Free & Saline Ammonia as N              | 0.33          | ≤ 1.5                                     |
| Aluminium as Al                         | <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

| QUALITY CONTROL CHECKS          |      |
|---------------------------------|------|
| Cation Balance                  | 8.40 |
| Anion Balance                   | 7.96 |
| % Difference                    | 2.7  |
| Measured TDS                    | 476  |
| Calculated TDS                  | 497  |
| Limits > 1.0 - <1.2             | 1.0  |
| Calcul TDS / E.C. (0.55 - 0.70) | 0.7  |



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

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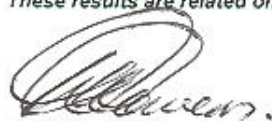
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Attention. Me. Zelda Louw

B 162

| Analysis Results mg/l          | Krugerdam Raw      | SANS Standards -241 (2011) Domestic Water |
|--------------------------------|--------------------|-------------------------------------------|
|                                |                    | Standard Limits                           |
| Selenium as Se                 | <0.01              | ≤0.01                                     |
| Vanadium as V                  | <0.01              | ≤0.20                                     |
| Dissolved Organic Carbon (DOC) | 8.60               |                                           |
| Phenolic Compounds             | <0.005             |                                           |
| Cyanide as CN                  | <0.01              | ≤10                                       |
| Cadmium as Cd                  | <0.003             | ≤0.003                                    |
| Cobalt as Co                   | <0.01              | ≤0.5                                      |
| Total Chromium as Cr           | <0.01              | ≤0.05                                     |
| Copper as Cu                   | <0.01              | ≤2.0                                      |
| Antimony as Sb                 | <0.005             | ≤0.02                                     |
| Nickel as Ni                   | <0.01              | ≤0.07                                     |
| Lead as Pb                     | <0.01              | ≤0.01                                     |
| Zinc as Zn                     | <0.01              | ≤5                                        |
| Arsenic as As                  | <0.01              | ≤0.01                                     |
| Mercury as Hg                  | <0.001             | ≤0.006                                    |
| Colour as Pt-Co*               | 15                 | ≤15                                       |
| Odour*                         | No offensive odour | Inoffensive                               |
| Taste*                         | Acceptable Taste   | Inoffensive                               |

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B 163


| Analysis Results mg/l                   | Krugerdam Final | SANS Standards -241 (2011) Domestic Water |
|-----------------------------------------|-----------------|-------------------------------------------|
|                                         |                 | Standard Limits                           |
| Total Dissolved Solids                  | 472             | ≤ 1 200                                   |
| Nitrate & Nitrite as N                  | 0.18            | ≤ 11                                      |
| Chlorides as Cl                         | 25              | ≤ 300                                     |
| Total Alkalinity as CaCO <sub>3</sub>   | 65              |                                           |
| Fluoride as F                           | 0.34            | ≤ 1.5                                     |
| Sulphate as SO <sub>4</sub>             | 286             | Acute Health ≤ 500 - Aesthetic ≤ 250      |
| Total Hardness as CaCO <sub>3</sub>     | 335             |                                           |
| Calcium Hardness as CaCO <sub>3</sub>   | 145             |                                           |
| Magnesium Hardness as CaCO <sub>3</sub> | 190             |                                           |
| Calcium as Ca                           | 58.1            |                                           |
| Magnesium as Mg                         | 46.1            |                                           |
| Sodium as Na                            | 29.3            | ≤ 200                                     |
| Potassium as K                          | 10.9            |                                           |
| Iron as Fe                              | <0.01           | Chronic Health ≤ 2.0 - Aesthetic ≤ 0.3    |
| Manganese as Mn                         | <0.01           | Chronic Health ≤ 0.5 - Aesthetic ≤ 0.1    |
| Conductivity at 25° C in mS/m           | 72.2            | ≤ 170                                     |
| pH-Value at 25° C                       | 7.59            | ≥ 5.0 to ≤ 9.7                            |
| pHs by 21° Celsius                      | 8.05            |                                           |
| Langelier Saturation Index              | -0.46           |                                           |
| Turbidity as N.T.U                      | 0.59            | Operational ≤ 1.0 - Aesthetic ≤ 5.0       |
| Free Residual Chlorine Cl <sub>2</sub>  | <0.1            | ≤ 5                                       |
| Total Residual Chlorine Cl <sub>2</sub> | 0.1             |                                           |
| Free & Saline Ammonia as N              | 0.24            | ≤ 1.5                                     |
| Aluminium as Al                         | <0.01           | ≤ 0.30                                    |

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| QUALITY CONTROL CHECKS          |      |
|---------------------------------|------|
| Cation Balance                  | 8.25 |
| Anion Balance                   | 7.99 |
| % Difference                    | 1.6  |
| Measured TDS                    | 472  |
| Calculated TDS                  | 496  |
| Limits > 1.0 - <1.2             | 1.0  |
| Calcul TDS / E.C. (0.55 - 0.70) | 0.7  |



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| Analysis Results mg/l          | Krugerdam Final    | SANS Standards - 241 (2011) Domestic Water |
|--------------------------------|--------------------|--------------------------------------------|
|                                |                    | Standard Limits                            |
| Selenium as Se                 | <0.01              | ≤0.01                                      |
| Vanadium as V                  | <0.01              | ≤0.20                                      |
| Dissolved Organic Carbon (DOC) | 7.66               |                                            |
| Phenolic Compounds             | <0.005             |                                            |
| Cyanide as CN                  | <0.01              | ≤10                                        |
| Cadmium as Cd                  | <0.003             | ≤0.003                                     |
| Cobalt as Co                   | <0.01              | ≤0.5                                       |
| Total Chromium as Cr           | <0.01              | ≤0.05                                      |
| Copper as Cu                   | <0.01              | ≤2.0                                       |
| Antimony as Sb                 | <0.005             | ≤0.02                                      |
| Nickel as Ni                   | <0.01              | ≤0.07                                      |
| Lead as Pb                     | <0.01              | ≤0.01                                      |
| Zinc as Zn                     | <0.01              | ≤5                                         |
| Arsenic as As                  | <0.01              | ≤0.01                                      |
| Mercury as Hg                  | <0.001             | ≤0.006                                     |
| Colour as Pt-Co*               | 5                  | ≤15                                        |
| Odour*                         | No offensive odour | Inoffensive                                |
| Taste*                         | Acceptable Taste   | Inoffensive                                |

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