

## **ISIHLOMELELO A**

### **Izishunqulelo ezisetyenzisweyo kwiSihlomelelo B**

|      |                                       |
|------|---------------------------------------|
| BHN  | Basic Human Needs                     |
| EIS  | Ecological Importance and Sensitivity |
| EWR  | Ecological Water Requirement          |
| IUA  | Integrated Unit of Analysis           |
| NMAR | Natural Mean Annual Runoff            |
| MCM  | Million Cubic Metres                  |
| PES  | Present Ecological Status             |
| REC  | Recommended Ecological Category       |
| TEC  | Target Ecological Category            |

### **AMANZI ANGAPHEZU KOMHLABA – IBAKALA LOMTHAMO WAMANZI EMILANJENI**

Iziphumo zoQingqo lwamaHlelo emisele yamanzi nohlelo lweendawo zokuphilisana kwiindawo zoboniselo ngamanzi u- F60 no-G30, apho amanani amahlelo eboniswe njenge-pesenteji ye- NMAR ngezo ndawo zithile zoboniselo ngamanzi (aguquguqukayo) ngokwemiqathango yesiqendu (16)(1).

## ISIHLOMELELO

**UTafile 1.1:** Uhlelo lwemisele yamanzi ngebakala lomthamo wamanzi alifunekayo emilanjani, oluquka i- EWR & BHN ngezikhundla zongxamiseko.

| Indawo yoboniselo | Umsele wamanzi (Isikhundla sendibanoNode/ i-EWR)                           | PES | EIS      | REC | NMAR (MCM) <sup>1</sup> | Umsele wendawo yokuphilisana <sup>3</sup> (MCM) | i-BHN yomsele <sup>4</sup> (MCM) | Lulonke uhlelo <sup>2</sup> (% NMAR) |
|-------------------|----------------------------------------------------------------------------|-----|----------|-----|-------------------------|-------------------------------------------------|----------------------------------|--------------------------------------|
| F60A              | Lower Brak River – <b>EWR 1</b>                                            | B   | Phakathi | B   | 0.07                    | 0.019                                           | 0.001                            | 28.59                                |
| F60B              | Klein Goerap River at the confluence with the Sout River – Node 1          | C   | Phakathi | B   | 0.07                    | 0.019                                           | 0.009                            | 43.28                                |
| F60C              | Sout River at the confluence with the Klein Goerap River – Node 2          | C   | Phakathi | C   | 0.255                   | 0.046                                           | 0.004                            | 39.36                                |
| F60D              | Lower Groot River – <b>EWR 3</b>                                           | C   | Phakathi | C   | 0.11                    | 0.020                                           | 0.008                            | 25.45                                |
| G30A              | Lower Papkuils River – <b>EWR 15</b>                                       | C/D | Phezulu  | C   | 1.378                   | 0.407                                           | 0.129                            | 43.2                                 |
| G30B              | Bergvallei River at the confluence with the Kruismans River – Node 3       | D/E | Phezulu  | C   | 16.353                  | 7.039                                           | 0.038                            | 39.19                                |
| G30C              | Upper Kruismans River at the confluence with the Bergvallei River – Node 4 | D   | Phezulu  | C   | 11.457                  | 4.510                                           | 0.004                            | 19.67                                |
| G30D              | Lower Kruimans River – <b>EWR 10</b>                                       | D   | Phezulu  | C   | 27.813                  | 11.279                                          | 0.004                            | 42.2                                 |
| G30D              | Lower Krom Antonies River – <b>EWR 11</b>                                  | C/D | Phezulu  | C   | 7.318                   | 2.730                                           | 0.001                            | 39.1                                 |
| G30E              | Lower Verlorenvlei River – <b>EWR 12</b>                                   | D   | Phezulu  | C   | 47.502                  | 17.617                                          | 0.021                            | 39.2                                 |
| G30F              | Lower Langvlei River – <b>EWR 8</b>                                        | E   | Phezulu  | D   | 8.955                   | 1.718                                           | 0.025                            | 19.5                                 |
| G30G              | Lower Jakkals River – <b>EWR 7</b>                                         | C/D | Phakathi | D   | 2.315                   | 0.685                                           | 0.131                            | 37.4                                 |
| G30H              | Lower Sandlaagte River – <b>EWR 6</b>                                      | C/D | Phantsi  | C   | 2.80                    | 0.330                                           | 0.059                            | 13.89                                |

1) NMAR ngamanzi obuncikane bemvula ngonyaka).

2) Owona umthamo ngokohlelo ubhekisa kwihlelo lomsele oyindawo yokuphilisana nangokwemfuno esisiseko yomntu (BHN).

3) Lo mthamo umele ubuncikane bexesha elide oko kungqiyame nge- NMAR. Ukuba i- NMAR iyaguquka, lo mthamo nawo uyaguquka .

4) Umele imfuno esisiseko yomntu Represents the Basic Human Needs (BHN).

## 1. AMANZI ANGAPHEZU KOMHLABA – IBAKALA LEKWALITI EFANELEKILEYO EMILANJENI

### Uqingqo lwamahlelo ngebakala leKwaliti efanele izikhundla ze- EWR

**UTafale 2.1:** Imfuno zeKwaliti yaManzi efanele uMlambo i- Papkuils (G30A)

| Izinongo zekwaliti                                                                                    | Umda                                         | Iimfuno zeKwaliti yaManzi (PES) | Iimfuno ezisisiseko zoMntu | Imfuno yoMsele: ikaliti yamanzi                                            |
|-------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------|----------------------------|----------------------------------------------------------------------------|
| Ikhemistri gabalala ngobukhulu bezinto w=eziphilayo (General chemistry – Major Ions) <sup>1,2,3</sup> | Sodium (mg/l)                                | N/A                             | <200                       | <200 <sup>4</sup>                                                          |
|                                                                                                       | Magnesium (mg/l)                             | N/A                             | <70                        | <70 <sup>4</sup>                                                           |
|                                                                                                       | Chloride (mg/l)                              | N/A                             | <200                       | <200 <sup>4</sup>                                                          |
|                                                                                                       | Calcium (mg/l)                               | N/A                             | <80                        | <80 <sup>4</sup>                                                           |
|                                                                                                       | Sulphate (mg/l)                              | N/A                             | <200                       | <200 <sup>4</sup>                                                          |
|                                                                                                       | Chloride (mg/l)                              | N/A                             | N/A                        | <0.35 <sup>4</sup>                                                         |
|                                                                                                       | Fluoride (mg/l)                              | N/A                             | < 1.5                      | <1.5 <sup>4</sup>                                                          |
|                                                                                                       | Manganese (µg/l)                             | N/A                             | <0.15                      | <0.15 <sup>4</sup>                                                         |
| Izondlo <sup>1,2,3</sup>                                                                              | Potassium (mg/l)                             | N/A                             | <50                        | <50 <sup>4</sup>                                                           |
|                                                                                                       | Phosphate (PO <sub>4</sub> )(mg/l)           | <0.2                            | N/A                        | <0.015 - 0.025                                                             |
| Ikwali yamanzi ebonakalayo                                                                            | Total Inorganic Nitrogen (mg/l) <sup>3</sup> | <0.5                            | <0.9                       | <0.7 – 1                                                                   |
|                                                                                                       | pH (pH units)                                | 7.6                             | 6 - 9                      | 5 <sup>th</sup> percentile 5.6 – 5.9/95 <sup>th</sup> percentile 8.8 – 9.2 |
|                                                                                                       | Electrical conductivity (mS/m)               | 129                             | <70                        | ≤129 <sup>5</sup>                                                          |
|                                                                                                       | Total Dissolve Solid (mg/l)                  | 868                             | <450                       | ≤868 <sup>5</sup>                                                          |
|                                                                                                       | Turbidity (NTU)                              | 3.8                             | 1 - 5                      | 1 – 5                                                                      |
| Izinto eziyityhefu nemixhube emininzi <sup>1</sup>                                                    | Dissolve Oxygen (mg/l)                       | 12.4                            |                            | 6 – 7                                                                      |
|                                                                                                       | Toxics (as listed in DWAF, 1996)             | ≤ TWQR                          | ≤ TWQR                     | ≤ TWQR                                                                     |
| IKwaliti yaManzi ngokofundo lwezinto eziphila kuwo                                                    | Faecal Coliforms (count per 100ml)           | -                               | -                          | -                                                                          |
|                                                                                                       | Total Coliforms (count per 100ml)            | -                               | <10                        | <10 <sup>4</sup>                                                           |

**UTafale 2.2:** Imfuno zeKwaliti yaManzi efanele uMlambo i-Kruismans (G30D)

| Izinongo zekwaliti                                                                                    | Umda                                         | Iimfuno zeKwaliti yaManzi (PES) | Iimfuno ezisisiseko zoMntu | Imfuno yoMsele: ikaliti yamanzi |
|-------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------|----------------------------|---------------------------------|
| Ikhemistri gabalala ngobukhulu bezinto w=eziphilayo (General chemistry – Major Ions) <sup>1,2,3</sup> | Sodium (mg/l)                                | N/A                             | <200                       | <200 <sup>4</sup>               |
|                                                                                                       | Magnesium (mg/l)                             | N/A                             | <70                        | <70 <sup>4</sup>                |
|                                                                                                       | Chloride (mg/l)                              | N/A                             | <200                       | <200 <sup>4</sup>               |
|                                                                                                       | Calcium (mg/l)                               | N/A                             | <80                        | <80 <sup>4</sup>                |
|                                                                                                       | Sulphate (mg/l)                              | N/A                             | <200                       | <200 <sup>4</sup>               |
|                                                                                                       | Chlorine (mg/l)                              | N/A                             | N/A                        | <0.35 <sup>4</sup>              |
|                                                                                                       | Fluoride (mg/l)                              | N/A                             | < 1.5                      | <1.5 <sup>4</sup>               |
|                                                                                                       | Manganese (µg/l)                             | N/A                             | <0.15                      | <0.15 <sup>4</sup>              |
| Izondlo <sup>1,2,3</sup>                                                                              | Potassium (mg/l)                             | N/A                             | <50                        | <50 <sup>4</sup>                |
|                                                                                                       | Phosphate (PO <sub>4</sub> )(mg/l)           | <0.2                            | N/A                        | <0.015 - 0.025                  |
|                                                                                                       | Total Inorganic Nitrogen (mg/l) <sup>3</sup> | <0.5                            | <0.9                       | <0.7 – 1                        |

| Izinongo zekwaliti                                 | Umda                               | Iimfuno zeKwaliti yaManzi (PES) | Iimfuno ezisisiseko zoMntu | Iimfuno yoMsele: ikaliti yamanzi                                           |
|----------------------------------------------------|------------------------------------|---------------------------------|----------------------------|----------------------------------------------------------------------------|
| Ikwality yamanzi ebonakalayo                       | pH (pH units)                      | 7.19 – 7.35                     | 6 - 9                      | 5 <sup>th</sup> percentile 5.6 – 5.9/95 <sup>th</sup> percentile 8.8 – 9.2 |
|                                                    | Electrical conductivity (mS/m)     | 650 - 990                       | <70                        | ≤650 (wet season) ≤990 (dry season) <sup>5</sup>                           |
|                                                    | Total Dissolve Solid (mg/l)        | 4400 - 6800                     | <450                       | ≤4400 (wet season) ≤6800 (dry season) <sup>5</sup>                         |
|                                                    | Turbidity (NTU)                    | 1.8 – 19.2                      | 1 - 5                      | 1 – 5                                                                      |
|                                                    | Dissolve Oxygen (mg/l)             | 13                              |                            | 6 – 7                                                                      |
| Izinto eziyityhefu nemixhube emininzi <sup>1</sup> | Toxics (as listed in DWAF, 1996)   | ≤ TWQR                          | ≤ TWQR                     | ≤ TWQR                                                                     |
| Ikwality yaManzi ngokofundo lwe zinto              | Faecal Coliforms (count per 100ml) | -                               | -                          | -                                                                          |
|                                                    | Total Coliforms (count per 100ml)  | -                               | <10                        | <10 <sup>4</sup>                                                           |

**UTafle 2.3:** Iimfuno zeKwaliti yaManzi efanele uMlambo i-Krom Antonies (G30D)

| Izinongo zekwaliti                                                                                  | Umda                               | Iimfuno zeKwaliti yaManzi (PES) | Iimfuno ezisisiseko zoMntu | Iimfuno yoMsele: ikaliti yamanzi                                           |
|-----------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------|----------------------------|----------------------------------------------------------------------------|
| Ikhemistri gabalala ngobukhulu bezinto eziphilayo (General chemistry – Major Ions) <sup>1,2,3</sup> | Sodium (mg/l)                      | N/A                             | <200                       | <200 <sup>4</sup>                                                          |
|                                                                                                     | Magnesium (mg/l)                   | N/A                             | <70                        | <70 <sup>4</sup>                                                           |
|                                                                                                     | Chloride (mg/l)                    | N/A                             | <200                       | <200 <sup>4</sup>                                                          |
|                                                                                                     | Calcium (mg/l)                     | N/A                             | <80                        | <80 <sup>4</sup>                                                           |
|                                                                                                     | Sulphate (mg/l)                    | N/A                             | <200                       | <200 <sup>4</sup>                                                          |
|                                                                                                     | Chlorine (mg/l)                    | N/A                             | N/A                        | <0.35 <sup>4</sup>                                                         |
|                                                                                                     | Fluoride (mg/l)                    | N/A                             | < 1.5                      | <1.5 <sup>4</sup>                                                          |
|                                                                                                     | Manganese (µg/l)                   | N/A                             | <0.15                      | <0.15 <sup>4</sup>                                                         |
|                                                                                                     | Potassium (mg/l)                   | N/A                             | <50                        | <50 <sup>4</sup>                                                           |
| Izondlo <sup>1,2,3</sup>                                                                            | Phosphate (PO <sub>4</sub> )(mg/l) | <0.2                            | N/A                        | <0.015 - 0.025                                                             |
|                                                                                                     | Total Inorganic Nitrogen           | <0.5                            | <0.9                       | <0.7 – 1                                                                   |
| Ikwality yamanzi ebonakalayo                                                                        | pH (pH units)                      | 7.65 – 7.78                     | 6 - 9                      | 5 <sup>th</sup> percentile 5.6 – 5.9/95 <sup>th</sup> percentile 8.8 – 9.2 |
|                                                                                                     | Electrical conductivity (mS/m)     | 29 - 157                        | <70                        | ≤29 (wet season) ≤157 (dry season) <sup>5</sup>                            |
|                                                                                                     | Total Dissolve Solid (mg/l)        | 202 - 1044                      | <450                       | ≤202 (wet season) ≤1044 (dry season) <sup>5</sup>                          |
|                                                                                                     | Turbidity (NTU)                    | 1.4 – 18.2                      | 1 - 5                      | 1 – 5                                                                      |
|                                                                                                     | Dissolve Oxygen (mg/l)             | 10.8                            |                            | 6 – 7                                                                      |
| Izinto eziyityhefu nemixhube emininzi <sup>1</sup>                                                  | Toxics (as listed in DWAF, 1996)   | ≤ TWQR                          | ≤ TWQR                     | ≤ TWQR                                                                     |

| Izinongo zekwaliti                                 | Umda                               | Iimfuno zeKwaliti yaManzi (PES) | Iimfuno ezisisiseko zoMntu | Iimfuno yoMsele: ikaliti yamanzi |
|----------------------------------------------------|------------------------------------|---------------------------------|----------------------------|----------------------------------|
| IKwaliti yaManzi ngokofundo lwezinto eziphila kuwo | Faecal Coliforms (count per 100ml) | -                               | -                          | -                                |
|                                                    | Total Coliforms (count per 100ml)  | -                               | <10                        | <10 <sup>4</sup>                 |

**UTafle:** Imfuno zeKwaliti yaManzi efanele uMlambo i-Verlorenvlei (G30E)

| Izinongo zekwaliti                                                                                    | Umda                                         | Iimfuno zeKwaliti yaManzi (PES) | Iimfuno ezisisiseko zoMntu | Iimfuno yoMsele: ikaliti yamanzi                                           |
|-------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------|----------------------------|----------------------------------------------------------------------------|
| Ikhemistri gabalala ngobukhulu bezinto w=eziphilayo (General chemistry – Major Ions) <sup>1,2,3</sup> | Sodium (mg/l)                                | N/A                             | <200                       | <200 <sup>4</sup>                                                          |
|                                                                                                       | Magnesium (mg/l)                             | N/A                             | <70                        | <70 <sup>4</sup>                                                           |
|                                                                                                       | Chloride (mg/l)                              | N/A                             | <200                       | <200 <sup>4</sup>                                                          |
|                                                                                                       | Calcium (mg/l)                               | N/A                             | <80                        | <80 <sup>4</sup>                                                           |
|                                                                                                       | Sulphate (mg/l)                              | N/A                             | <200                       | <200 <sup>4</sup>                                                          |
|                                                                                                       | Chlorine (mg/l)                              | N/A                             | N/A                        | <0.35 <sup>4</sup>                                                         |
|                                                                                                       | Fluoride (mg/l)                              | N/A                             | < 1.5                      | <1.5 <sup>4</sup>                                                          |
|                                                                                                       | Manganese (µg/l)                             | N/A                             | <0.15                      | <0.15 <sup>4</sup>                                                         |
|                                                                                                       | Potassium (mg/l)                             | N/A                             | <50                        | <50 <sup>4</sup>                                                           |
| Izondlo <sup>1,2,3</sup>                                                                              | Phosphate (PO <sub>4</sub> )(mg/l)           | <0.2                            | N/A                        | <0.015 - 0.025                                                             |
|                                                                                                       | Total Inorganic Nitrogen (mg/l) <sup>3</sup> | <0.5                            | <0.9                       | <0.7 - 1                                                                   |
| IKwaliti yamanzi ebonakalayo                                                                          | pH (pH units)                                | 7.62                            | 6 - 9                      | 5 <sup>th</sup> percentile 5.6 – 5.9/95 <sup>th</sup> percentile 8.8 – 9.2 |
|                                                                                                       | Electrical conductivity (mS/m)               | 194                             | <70                        | <194 <sup>5</sup>                                                          |
|                                                                                                       | Total Dissolve Solid (mg/l)                  | 1300                            | <450                       | <1300 <sup>5</sup>                                                         |
|                                                                                                       | Turbidity (NTU)                              | 4.4                             | 1 - 5                      | 1 - 5                                                                      |
|                                                                                                       | Dissolve Oxygen (mg/l)                       | 8.9                             |                            | 6 - 7                                                                      |
| Izinto eziyityhefu nemixhube emininzi <sup>1</sup>                                                    | Toxics (as listed in DWAF, 1996)             | ≤ TWQR                          | ≤ TWQR                     | ≤ TWQR                                                                     |
| IKwaliti yaManzi ngokofundo lwezinto eziphila kuwo                                                    | Faecal Coliforms (count per 100ml)           | -                               | -                          | -                                                                          |
|                                                                                                       | Total Coliforms (count per 100ml)            | -                               | <10                        | <10 <sup>4</sup>                                                           |

**UTafle 2.5:** Imfuno zeKwaliti yaManzi efanele uMlambo i-Langvlei (G30F)

| Izinongo zekwaliti                                                       | Umda             | Iimfuno zeKwaliti yaManzi (PES) | Iimfuno ezisisiseko zoMntu | Iimfuno yoMsele: ikaliti yamanzi |
|--------------------------------------------------------------------------|------------------|---------------------------------|----------------------------|----------------------------------|
| Ikhemistri gabalala ngobukhulu bezinto w=eziphilayo (General chemistry – | Sodium (mg/l)    | N/A                             | <200                       | <200 <sup>4</sup>                |
|                                                                          | Magnesium (mg/l) | N/A                             | <70                        | <70 <sup>4</sup>                 |
|                                                                          | Chloride (mg/l)  | N/A                             | <200                       | <200 <sup>4</sup>                |
|                                                                          | Calcium (mg/l)   | N/A                             | <80                        | <80 <sup>4</sup>                 |
|                                                                          | Sulphate (mg/l)  | N/A                             | <200                       | <200 <sup>4</sup>                |
|                                                                          | Chlorine (mg/l)  | N/A                             | N/A                        | <0.35 <sup>4</sup>               |

| Izinongo zekwaliti                                 | Umda                               | Iimfuno zeKwaliti yaManzi (PES) | Iimfuno ezisisiseko zoMntu | Iimfuno yoMsele: ikaliti yamanzi                                            |
|----------------------------------------------------|------------------------------------|---------------------------------|----------------------------|-----------------------------------------------------------------------------|
| Major Ions) <sup>1,2,3</sup>                       | Fluoride (mg/l)                    | N/A                             | < 1.5                      | <1.5 <sup>4</sup>                                                           |
|                                                    | Manganese (µg/l)                   | N/A                             | <0.15                      | <0.15 <sup>4</sup>                                                          |
|                                                    | Potassium (mg/l)                   | N/A                             | <50                        | <50 <sup>4</sup>                                                            |
| Izondlo <sup>1,2,3</sup>                           | Phosphate (PO <sub>4</sub> )(mg/l) | <0.2                            | N/A                        | <0.025 – 0.125                                                              |
|                                                    | Total Inorganic Nitrogen           | 1.98                            | <0.9                       | <1 - 4                                                                      |
| Ikwali yamanzi ebonakalayo                         | pH (pH units)                      | 6.9                             | 6 - 9                      | 5 <sup>th</sup> percentile 5.0 – 5.6/95 <sup>th</sup> percentile 9.2 – 10.0 |
|                                                    | Electrical conductivity (mS/m)     | 1214                            | <70                        | ≤1214 <sup>5</sup>                                                          |
|                                                    | Total Dissolve Solid (mg/l)        | 7998                            | <450                       | ≤7998 <sup>5</sup>                                                          |
|                                                    | Turbidity (NTU)                    | 37                              | 1 - 5                      | 1 – 5                                                                       |
|                                                    | Dissolve Oxygen (mg/l)             | 14                              |                            | 6 – 7                                                                       |
| Izinto eziyityhefu nemixhube emininzi <sup>1</sup> | Toxics (as listed in DWAF, 1996)   | ≤ TWQR                          | ≤ TWQR                     | ≤ TWQR                                                                      |
| Ikwali yaManzi ngokofundo lwezinto eziphila kuwo   | Faecal Coliforms (count per 100ml) | -                               | -                          | -                                                                           |
|                                                    | Total Coliforms (count per 100ml)  | -                               | <10                        | <10 <sup>4</sup>                                                            |

**UTafle 2.6:** Iimfuno zeKwaliti yaManzi afanele uMlambo i- Jakkals (**G30G**)

| Izinongo zekwaliti                                                                                    | Umda                                         | Iimfuno zeKwaliti yaManzi (PES) | Iimfuno ezisisiseko zoMntu | Iimfuno yoMsele: ikaliti yamanzi                                           |
|-------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------|----------------------------|----------------------------------------------------------------------------|
| Ikhemistri gabalala ngobukhulu bezinto w=eziphilayo (General chemistry – Major Ions) <sup>1,2,3</sup> | Sodium (mg/l)                                | N/A                             | <200                       | <200 <sup>4</sup>                                                          |
|                                                                                                       | Magnesium (mg/l)                             | N/A                             | <70                        | <70 <sup>4</sup>                                                           |
|                                                                                                       | Chloride (mg/l)                              | N/A                             | <200                       | <200 <sup>4</sup>                                                          |
|                                                                                                       | Calcium (mg/l)                               | N/A                             | <80                        | <80 <sup>4</sup>                                                           |
|                                                                                                       | Sulphate (mg/l)                              | N/A                             | <200                       | <200 <sup>4</sup>                                                          |
|                                                                                                       | Chlorine (mg/l)                              | N/A                             | N/A                        | <0.35 <sup>4</sup>                                                         |
|                                                                                                       | Fluoride (mg/l)                              | N/A                             | < 1.5                      | <1.5 <sup>4</sup>                                                          |
|                                                                                                       | Manganese (µg/l)                             | N/A                             | <0.15                      | <0.15 <sup>4</sup>                                                         |
|                                                                                                       | Potassium (mg/l)                             | N/A                             | <50                        | <50 <sup>4</sup>                                                           |
| Izondlo <sup>1,2,3</sup>                                                                              | Phosphate (PO <sub>4</sub> )(mg/l)           | <0.2                            | N/A                        | <0.015 - 0.025                                                             |
|                                                                                                       | Total Inorganic Nitrogen (mg/l) <sup>3</sup> | <0.5                            | <0.9                       | <0.7 - 1                                                                   |
| Ikwali yamanzi ebonakalayo                                                                            | pH (pH units)                                | 7.12 – 7.39                     | 6 - 9                      | 5 <sup>th</sup> percentile 5.6 – 5.9/95 <sup>th</sup> percentile 8.8 – 9.2 |
|                                                                                                       | Electrical conductivity (mS/m)               | 2200 - 10100                    | <70                        | ≤2200 (wet season) ≤10100 (dry season) <sup>5</sup>                        |
|                                                                                                       | Total Dissolve Solid (mg/l)                  | 14606 - 61200                   | <450                       | ≤14606 (wet season) ≤61200 (dry season) <sup>5</sup>                       |
|                                                                                                       | Turbidity (NTU)                              | 0.88 - 14                       | 1 - 5                      | 1 - 5                                                                      |
|                                                                                                       | Dissolve Oxygen (mg/l)                       | N/A                             |                            | 6 - 7                                                                      |

| Izinongo zekwaliti                                 | Umda                               | Iimfuno zeKwaliti yaManzi (PES) | Iimfuno ezisisiseko zoMntu | Iimfuno yoMsele: ikaliti yamanzi |
|----------------------------------------------------|------------------------------------|---------------------------------|----------------------------|----------------------------------|
| Izinto eziyityhefu nemixhube emininzi <sup>1</sup> | Toxics (as listed in DWAF, 1996)   | ≤ TWQR                          | ≤ TWQR                     | ≤ TWQR                           |
| IKwaliti yaManzi ngokofundo lwezinto eziphila kuwo | Faecal Coliforms (count per 100ml) | -                               | -                          | -                                |
|                                                    | Total Coliforms (count per 100ml)  | -                               | <10                        | <10 <sup>4</sup>                 |

**QAPHELA:** Apho umahluko kumaxabiso ekwaliti yamanzi afanele umsele wokuphilisana nomsele ofanele imfuno esisiseko yomntu wafunyanwayo, kulapho kanye kwakhethwa khona elona xabiso liqatha okanye likhusela ngamandla ngebakala lekwaliti yamanzi oMsele.

<sup>1</sup> **ref:** South African Water Quality Guidelines, Volume 1: Domestic Water Use, 2<sup>nd</sup> Ed. 1996. Department of Water Affairs and Forestry. Pretoria, South Africa.

<sup>2</sup> **ref:** South African Water Quality Guidelines, Volume 7: Aquatic Ecosystems, 2<sup>nd</sup> Ed. 1996. Department of Water Affairs and Forestry. Pretoria, South Africa.

<sup>3</sup> **ref:** South African National Standard 241:2011 Water Quality Standards

<sup>4</sup> **note:** Based on Basic Human Needs requirements. Water for domestic use should be treated to SANS 241: 2011 Water Quality Standards.

<sup>5</sup> **note:** The Reserve Requirement does not meet the Basic Human Needs requirements as it is a naturally high salinity system and would never meet the BHN requirements. Water for domestic use should be treated to SANS 241: 2011 Water Quality Standards

## 2. AMANZI ANGAPHEZU KOMHLABA - IBAKALA LEMIFULA

### 2.1 UMTHAMO

**UTafile 3.1.** Imida ngobume bomhlaba yemifula

| Imifula              | Quat | Udidi lomfula                    | Ummandla wentloko yomfula       | Ummandla wentloko yomfula       | Imida esemacaleni                                           |
|----------------------|------|----------------------------------|---------------------------------|---------------------------------|-------------------------------------------------------------|
| Umfula iVerlorenvlei | G30E | Ichibi lomfula                   | 32°25'55.82"S;<br>18°29'57.78"E | 32°18'58.34"S;<br>18°20'5.96"E  | 5 m contour above Mean Sea Level (MSL) ngakunxweme ngalunye |
| Umfula iWadrikt      | G30F | Umfula ovaliweyo ubukhulu becala | 32°12'49.87"S;<br>18°22'37.15"E | 32°12'15.54"S;<br>18°19'32.43"E | 5 m contour above Mean Sea Level (MSL) ngakunxweme ngalunye |
| Umfula iJakkals      | G30G | Umfula ovalwe okwexeshana        | 32°5'26.89"S;<br>18°20'1.32"E   | 32°5'5.39"S;<br>18°18'48.25"E   | 5 m contour above Mean Sea Level (MSL) ngakunxweme ngalunye |
| Umfula iSout (Noord) | F60D | Umfula ovaliweyo ubukhulu becala | 30°28'17.92"S<br>17°22'32.83"E  | 30°28'20.54"S<br>17°21'34.07"E  | 5 m contour above Mean Sea Level (MSL) ngakunxweme ngalunye |

**UTafile 3.2.** Iimfuno zamanzi afanele iindawo zokuphilisana kwiMifula.

| Indawo yoboniselo | Umsele wamanzi       | PES            | EIS                        | REC            | Umsele oyindawo yokuphilisana * (MCM) | Umsele oyindawo yokuphilisana (% NMAR) | i-MAR yendalo (MCM) | iMAR yango ku (MCM) |
|-------------------|----------------------|----------------|----------------------------|----------------|---------------------------------------|----------------------------------------|---------------------|---------------------|
| <b>G30E</b>       | Umfula iVerlorenvlei | D <sup>1</sup> | Ubalulekile                | B <sup>2</sup> | 27.505                                | 82.6                                   | 33.3                | 17.93               |
| <b>G30F</b>       | Umfula iWadrikt      | D              | Ubalulekile                | C              | 3.658                                 | 77                                     | 4.75                | 3.2                 |
| <b>G30G</b>       | Umfula iJakkals      | D              | Usezantsi ukuya ku-avareji | D              | 0.804                                 | 57                                     | 1.41                | 0.96                |
| <b>F60D</b>       | Umfula iSout (Noord) | E              | U-avareji                  | D              | . <sup>3</sup>                        | . <sup>3</sup>                         | 0.46                | 0.46                |

<sup>1</sup> ISimo saNgoku (2022) saqikelelwa ukuba singuBakala E ngenxa yembalela eyatsalayo, eyathi idibene notsalo lwamanzi yabangela umda nomandlalo wechibi wahlala uze kangangexesha elide (amanqanaba asezantsi kakhulu amanzi). Ngoqikelelo lokuba ichibi liza kubangcono emva kokuba amanqanaba amanzi ebuye anyuka kwakhona, uphononongo lomboniso wolinganiselo weminyaka eyi-101 waNgoku lwabonisa ukuba i-PES = iliBakala D.



<sup>2</sup> Umfula iVerlorenvlei wahllelwa “njengomfula obalulekileyo”. Esi sisikhundla i- Ramsar nommandla okhuselweyo onqwenelekayo kwiSicwangciso soKwahluka kwezinto zendalo sovavanyo i-National Biodiversity Assessment. Ngoko ke, ngokubhekiselele kuxwebhu lweengcebiso sokunika umyalelo nge-REC, imeko yomfula mayiphakanyiswe ibe kwinqanaba le- Best Attainable State (BAS). I-Best Attainable State yomfula ngu- B.

<sup>3</sup> Uvavanyo lomfula i-Sout lwaqhutywa kwiqonga lethala lofundonzulu ngamanzi elalinokungazithembi ngokubanakho ukuveza iziphumo. Siyandulula ukuba lo mfula mawuvuselelwe usuke ku- E uye kutsho ku- D. Njengokuba amafuthe amaninzi engabandakanyi ukuhamba kwamanzi, amanqanaba angoku okuhamba kwamanzi makagcinwe njengonqanaba elindululwayo luhamba kwamanzi.

## 2.2 IINQOBO ZOVAVANYO LWENDAWO YOKUPHILISANA

**UMda wengxaki esenokuvela (Thresholds of potential concern (iTPC)** uchazwa njengamaqondo okugqibela anokumetwa nangqamene nezalathisi ezithile ze-biota apho xa kuthe kwafikelelwa kuwo (okanye xa izibonelo ziqikelela ukuba loo maqondo kuza kufikelelwa kuwo) aza kuxhokonxa imfuno yesisombululo kubaphathi. Eneneni, ii- TPCs mazibonise imiqondiso exelayo ukuba ukho umcelingeni wokungalandelwa komthetho ngokubhekiselele kwiinqobo zovavanyo lwendawo yokuphilisana ezisekiweyo (i.e. hayi nje u-asibuyeli apho)'). Oku kuyabonisa ukuba izalathisi (okanye imisebenzi yohlolo)ezikhethwe njengenxalenye yenkqubo yohlolo yexesha elide zimele ukufaka amabakala a- biotic na-abiotic manqanaba lawo kumelwe ze avakalelwe xa ikho inguqu kwindlela amanzi angena ngawo emlanjeni. Ii-TPCs ezinxulunyaniswa nenqobo nganye yovavanyo lwendawo yokuphilisana nazo ziboniseiwe kooTafile 3.3 ukuya ku- 3.6.

**UTafile 3.3:** Iinqobo zovavanyo lwendawo zokuphilisana nee- TPCs ezinxulunyaniswa **neBakala B** kumfula womlambo iVerlorenvlei

| Ibakala-Abiotic/Biotic | Iinqobo zovavanyo lwendawoyokuphilisana                                                                                                                                                         | Umda wengxaki esenokuvela                                                                                                                                                                                                                                                                                       |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ikwality yamanzi       | Isimo sobukho beetyuwa nokufumaneka kweemo zobu- abiotic obahlukeneyo masingqamane ngqo nemeko yobhekiso; Isimo 5 (ukuvala, i-hypersaline yenqanaba elisezantsi lamanzi) masingabikho kwaphela. | <ul style="list-style-type: none"> <li>Ubukho beetyuwa kuMda A &gt; 45 (iminyaka emi 3)</li> <li>Ubukho beetyuwa B &gt; 3</li> <li>Ubukho beetyuwa C &gt; 1.5</li> </ul>                                                                                                                                        |
|                        | Ikwali yamanzi <b>angena emlanjeni</b> ayizichaphazeli kakubi iimeko zekwality yamanzi kulo mfula, ngakumbi ngokubhekiselele ekuchumeni okungekuko okwendalo kwezondlo nezinto ezinetyhefu      | <p>Ukungena kwamanzi emlanjeni:</p> <ul style="list-style-type: none"> <li>I-pH oyamanzi angenayo ibetha ngaphaya ko- 8.5 okanye ingaphantsi ko -5.5</li> <li>I-oksijini enyibilikisiweyo (Dissolved oxygen (DO) ingaphantsi ko -4 mg/l</li> <li>Ubukho bodaka buyaqhuba bubetha ngaphaya ko- 10 NTU</li> </ul> |

| Ibakala-Abiotic/Biotic       | Iingobo zovavanyo lwendawoyokuphilisana                                                                                                                                                                                                                         | Umda wengxaki esenokuvela                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              |                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>I-Dissolved Inorganic Nitrogen (DIN) persistently greater than 200 µg/l</li> <li>I-Dissolved Inorganic Nitrogen (DIN) iyaqhuba ibetha ngaphaya ko- 50 µg/l</li> <li>Ubukho bezinto ezinyehfu (e.g. ii-metals ezinzima nee-agrochemicals) bubetha ngaphaya komlinganiselo oxeliweyo kuxwebhu i-South African Water Quality guidelines (ngamanzi ahlaziyekileyo namanzi omxweme)</li> </ul>                                                                                                                                                                                                                                                                                                                                               |
|                              | <p>Ikwaliti yamanzi <b>omfula</b> ayinafuthe labungozi kwimpilo e-biotic, ngakumbi ngokubhekiselele ekuchumeni kwezondlo, nokuguquguquka kwe- diurnal ngepH (e.g. iyancipha ebusuku, yande emini), okanye abemuncu kuphuhle ne- hypoxia xa kubola i- algal.</p> | <p>Umfula:</p> <ul style="list-style-type: none"> <li>pH ingaphantsi ko- 6, okanye ihlala ingaphezu ko- 9</li> <li>I-DO ingaphantsi ko- 4 mg/l</li> <li>Ubukho bodaka buyaqhuba bubetha ngaphaya ko-20 NTU (e.g. isiphumo soko ludubulo oluqhubayo lwee- algal)</li> <li>I-DIN esisiphumo ibetha ngaphaya ko-100 µg/l (kummandla ovalekileyo oku bekuza kuxela ububa ukuchuma kubaxekile ngenxa yongenelelo lwezimbiwa oluqhubayo luchaphazela amanzi)</li> <li>-DIP esisiphumo ibetha ngaphaya ko-20 µg/l (kummandla ovalekileyo oku bekuza kuxela ububa ukuchuma kubaxekile ngenxa yongenelelo lwezimbiwa oluqhubayo luchaphazela amanzi)</li> <li>Ubukho bezinto ezinyehfu (e.g. ii-metals ezinzima nee-agrochemicals) bubetha ngaphaya komlinganiselo oxeliweyo</li> </ul> |
| Uguquguquko lofundo ngamanzi | Umfula mawungavunyelwa ukuba usebenze ngokwendalo kungakhange kubandakanywe ungenelelo lomntu                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Umlomo uvaleke ngesheyi</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| Ibakala-Abiotic/Biotic  | Iingqobo zovavanyo lwendawoyokuphilisana                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Umda wengxaki esenokuvela                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Alukho uqhagamshelwano phakathi koMda A, B no-C</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Uguquguquko lweentlenge | limeko zeempuphuma nezokophula mazigcine izimbo zosasazo lweentlenge nendawo yokuphilisama emanzini (iindawo zokuphila ezibonakalayo kulo mjelo) ukuze zingabethi ngaphaya kwee- TPCs ze-biota                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Njengezo zuguquguquko ngofundo ngamanzi phaya ngasentla</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Microalgae              | Imigqeku ye-Phytoplankton mayibonise imigqeku eyahlukayo ezine- biomass ephakathi okanye esezantsi (emetwe njengobukho be- chlorophyll-), nobukho obuncuphileyo bee- HABs. Imigqeku ye-Benthic microalgal mayibonise i-biomass ephakathi, nediator yokwahluka kwebenthic ephakathi (kwinqanaba elivalekileyo) ukuya phezulu (kwinqanaba elivulekileyo).                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>I-Phytoplankton biomass ingaphezu ko- 20 <math>\mu\text{g Chl-a l}^{-1}</math>.</li> <li>I- High-biomass HABs (<math>&gt; 60 \mu\text{g Chl-a l}^{-1}</math> yonganyelwe yitaxa enye, e.g., ii-cyanophytes) entlakohlaza/ ehlotyeni.</li> <li>I-benthic microalgal biomass yamazana inkulu kune- 100 mg <math>\text{Chl-a m}^{-2}</math>.</li> <li>Ukwahluka kwe-Benthic diatom (<i>H'</i>) kungaphantsi ko- 2.</li> </ul>                                                                                                          |
| Macrophytes             | Hlola usasazo lweendidi zemigqeku yezityalo i.e., ii- iingcongolo nemihlonyane, ii-macrophytes ezidityanisiweyo, imigxobhozo yeetyuwa ngethuba kusehla kuseniyuka amanqanaba amanzi. , salt marsh during water level fluctuations. Gcina iingcongolo nemihlonyane nendawo yokuphila exhasa i- biota ebandakanyekayo. Iingcongolo nemihlonyane ixhomekeke kumanzi atsitsa ngaphantsi komhlaba (Jonga ezaa ndlela zichaziweyo kwingxelo ye- EWR ngomfula iVerlorenvlei). Ukwanda phaya kumantla kungenxa yegalelo leentlenge nezondlo. Jongisisa imihlaba ene-asidi njengefuthe lexesha elide ekubeni ngcono kwemeko yee-macrophytes engaziwayo. Imicelimngeni ephambili iquka i- pH nobukho beetyuwa ngakumbi kumanzi angaphantsi komhlaba neentlenge. Ubukho bodaka emanzini kubalulekile kwii -macrophyte ezidityanisiweyo. | <ul style="list-style-type: none"> <li>Ingaphezu kwenguqu engu-20% kummandla owogqunywe ziindawo zokuphila ezahlukayo.</li> <li>Ummandla wokuvuleka kwamanzi ungaphantsi ko- 1.2 ha (kuMda A), 405 ha (kuMda B) ze ibengu-14.3 ha (kuMda C) ubangela ukuba ube lilifa lemihlaba ene-asidi.</li> <li>Ubukho beetyuwa kumanzi angaphantsi komhlaba angaphezu ko- 10 ukuya ku- 5 bunciphisa ukhulu lweengcongolo nemihlonyana.</li> <li>Ubukho beetyuwa kweentlenge <math>&gt; 75</math> akubangeli lukhulo lungako. Ukuntshula kwembewu kurhuqa ngaphantsi ko-15.</li> </ul> |

| Ibakala-Abiotic/Biotic | Iingobo zovavanyo lwendawoyokuphilisana                                                                                                                                                                                                                                                                                                                      | Umda wengxaki esenokuvela                                                                                                                                                                                                                                                                                                                                                        |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ezingenamathambo       | Umfula mawube nemigqeku eyahlukayo yezingenamathambo eziquka abameli bawo onke amaqela emisebenzi adweliswe kule ngxelo, ngakumbi iindidi zamanzi ahlaziyekileyo nabutyuwarha, oko kuquka ezingenamathambo ezinkulu.                                                                                                                                         | Ukwehla kubuninzi nokwahluka kwee-crustacea nemibungu yezinambuzane kwi- zooplankton (aamnqanaba angoku aza kuqikelelwa).                                                                                                                                                                                                                                                        |
| Iintlanzi              | Gcina le migqeku ilandelayo yeentlanzi emfuleni (oko kuxhomekeka kubuninzi): iindidi eziphila kulo mfula (20-30%), iindidi ezibandakanywa namanzi omfula (60-70%) aneendidi zamanzi ahlaziyekileyo zomthonyama (<1%). Zonke iindidi zomthonyama ezongameleyo ngokwamanani zimelwe zezincinci kangange 0+ kwisithuba seenyanga ezili 12 sokuvuleka koomandla. | <ul style="list-style-type: none"> <li>Inqanaba leendidi ezibandakanywa nomfula liwela ngaphantsi ko 50% wabo bubonke ubuninzi.</li> <li>Kukho iindidi zamanzi ahlaziyekileyo ezingezizo ezomthonyama kulo mfula.</li> <li>Ukungabikho kwezincinci kangange- 0+ kuzo naziphi na ke iindidi zeentlanzi ezongameleyo kwisithuba seenyanga ezili- 12 ummandla uvulekile.</li> </ul> |
| Iintaka                | Lo mfula mawubenemigqeku eyahlukayo ye- avifaunal eku abameli bazo zonke iintaka ezifanayo ezidweliswe kule ngxelo ngakumbi ezo zifudukayo neentakamanzi. Umfula mawuxhase amawaka eentaka ehlotyeni namakhulu ebusika                                                                                                                                       | <ul style="list-style-type: none"> <li>Ubuninzi obuncitshisiweyo beendidi ze - piscivores (&lt; 3; okanye &lt;100 yeenyaka).</li> <li>Amanani eentaka manzi awela ngaphantsi ko- 60okanye ii-waders ngaphantsi ko-100 iehlotyeni.</li> <li>Ewonke amanani eentaka-manzi awela ngaphantsi ko 2000 izihlandlo ezi- 3 ezilandelelanayo ehlotyeni .</li> </ul>                       |

**UTafile 3.4:** Iingobo zovavanyo lweendawo zokuphilisana nee- TPC ezingqamene **neBakala leeNdawo zokuPhilisana C** kumfula womlambo uWadrift

| Ibakala-Abiotic/Biotic | Iingobo zovavanyo lwendawoyokuphilisana                                                                                                                                                                                                                                            | Umda wengxaki esenokuvela                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ikwality yamanzi       | Isimo sobukho beetyuwa nokufumaneka kweemo zobu- abiotic obahlukeneyo masingqamane ngqo nemeko yobhekiso; Isimo 5 (ukuvalaka, i-hypersaline yenqanaba elisezantsi lamanzi) masingabikho kwaphela.                                                                                  | <ul style="list-style-type: none"> <li>• Ubukho beetyuwa kuyo nayiphi na indawo kulo mfula ibetha ngaphaya ko- 65</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                        | Ikwality yamanzi <b>omlambo</b> ayinafuthe labungozi kwiimeko zekwality yamanzi kulo mfula, ngakumbi ngokubhekiselele ekuchumeni kwezondlo, nezinto ezityhefu                                                                                                                      | <p>Amanzi angena emlanjeni:</p> <ul style="list-style-type: none"> <li>• pH ingaphantsi ko- 8.5, okanye ihlala ingaphezu ko- 5.5</li> <li>• I-DO ingaphantsi ko- 4 mg/l</li> <li>• Ubukho bodaka buyaqhuba bubetha ngaphaya ko-10 NTU</li> <li>• I-DIN isoloko ibetha ngaphaya ko-200 µg/l</li> <li>• I-DIN isoloko ibetha ngaphaya ko-50 µg/l</li> <li>• Ubukho bezinto ezinetyhefu (e.g. ii-metals ezinzima nee-agrochemicals) bubetha ngaphaya komlinganiselo oxeliweyo . Inqanaba elibanzi lokuthatyathwa kweesampulu kuza kudingeka ukuba liqhutywe khonukuze luqingqe inqanama leziyobisi ekuza kufuka zifakwe kwinkqubo yohlolo yexesha elide.</li> </ul> |
|                        | Ikwality yamanzi <b>omfula</b> ayinafute libi kwimpilo ye- biotic, ngakumbi ngokubhekiselele ekuchumeni kwezondlo noguquguquko lwe- diurnal ngokwe- pH (e.g. iyehla ebusuku, yande emini), okanye amanzi abemuncu kuphuhle nethuba lobukho be- hypoxia ngenxa yokubola kwe- algal. | <p>Umfula:</p> <ul style="list-style-type: none"> <li>• I-pH ibetha ngaphantsi ko- 6, okanye isoloko ingaphezulu ko- 9</li> <li>• I-DO ingaphantsi kwe- 4 mg/l</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Ibakala-Abiotic/Biotic       | Iingobo zovavanyo lwendawoyokuphilisana                                                                                                                                                                                                                                                                                                                | Umda wengxaki esenokuvela                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              |                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• Ubukho bodaka busoloko bubetha ngaphaya kwe -20 NTU (e.g. ngenxa yodubulo oluqhubayo lwee- algal)</li> <li>• I- DIN esisiphumo ibetha ngaphaya ko-100 <math>\mu\text{g}/\ell</math> (kwiimeko zokuvaleka oku bekuza kuthetha ukuba kukho ukuchuma okugqithisileyo ngenxa yokwenziwa kwezimbiwa)</li> <li>• I- DIP ibetha ngaphaya kwe- 20 <math>\mu\text{g}/\ell</math> ) ((kwiimeko zokuvaleka oku bekuza kuthetha ukuba kukho ukuchuma okugqithisileyo ngenxa yokwenziwa kwezimbiwa)</li> <li>• Ubukho bezinto ezinetyhefu (e.g. ii-metals ezinzima nee-agrochemicals) bubetha ngaphaya komlinganiselo oxeliweyo</li> </ul> |
| Uguquguquko lofundp ngamanzi | Umfula mawuvunyelwe ukuba usebenze ngokwendalo ngongenelelo lomntu ngamanqanaba aphantsi                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• Alukho uqhagamshelwano phakathi kweMida A no- B (amanqanaba emibhobo enqamlezileyo ezibhulorhweni abuphakama ngaphezulwana apha emhlabeni)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Uguquguquko lweentlenge      | Iimeko zeempuphuma nezokophula mazigcine izimbo zosasazo lweentlenge nendawo yokuphilisama emanzini (iindawo zokuphila ezibonakalayo kulo mjelo) ukuze zingabethi ngaphaya kwee- TPCs ze-biota                                                                                                                                                         | <ul style="list-style-type: none"> <li>• Njengoguquguquko lofundo ngamanzi apha ngasentla</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Microalgae                   | Imiggeku ye-Phytoplankton mayibonise imiggeku eyahlukayo ezine- biomass ephakathi okanye esezantsi (emetwe njengobukho be- chlorophyll-), nobukho obuncuphileyo bee-HABs. Imiggeku ye-Benthic microalgal mayibonise i-biomass ephakathi, nediator yokwahluka kwebenthic ephakathi (kwinqanaba elivalekileyo) ukuya phezulu (kwinqanaba elivulekileyo). | <ul style="list-style-type: none"> <li>• I-Phytoplankton biomass ingaphezu ko- 20 <math>\mu\text{g Chl-a l}^{-1}</math>.</li> <li>• Xhaphakileyo, futhi igxininisa kuphawu olunye (&gt;90% ubuninzi obuqhelekileyo) iphezulu i-biomass yee-HABs (&gt;60 <math>\mu\text{g Chl-a l}^{-1}</math>)</li> <li>• I-benthic microalgal biomass yamazana inkulu kune- 100 mg Chl-a <math>\text{m}^{-2}</math>.</li> <li>• Ukwahluka kwe-Benthic diatom (<math>H'</math>) kungaphantsi ko- 2.</li> </ul>                                                                                                                                                                         |

| Ibakala-Abiotic/Biotic                     | Iinqobo zovavanyo lwendawoyokuphilisana                                                                                                                                                                                                                                                                                                                                   | Umda wengxaki esenokuvela                                                                                                                                                                                                                                              |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Macrophytes                                | Gcina usasazo, ubungakanani nokwahluka kweendidi zemigqeku yezityalo, umgxobhozo weetyuwa nengcongolo nemihloniyane eshiyekileyo. Nangona nje imigxobhozo yeepepete phaya emantla ingazi kubuya, ukungena kwamanzi ahlaziyekileyo kona kuza kwandsa ukwahluka kwendawo yokuphila kunciphisa neendidi zasemhlabeni esele zithabathe indawo yendawo yokuphila elahlekileyo. | <ul style="list-style-type: none"> <li>Ingaphezu kwenguqu engu-20% kummandla owogqunywe ziindawo zokuphila ezahlukeyo</li> </ul>                                                                                                                                       |
| i-Zooplankton yezingenamathambo ze-benthic | Gcina imigqeku yangoku yezingenamathambo                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Inqanaba langoku liza kuqikelelwa</li> </ul>                                                                                                                                                                                    |
| iintlanzi                                  | Gcina imigqeku yangoku yeentlanzi.                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Azikho iintlanzi</li> <li>Kufumaneka iindidi zamanzi ahlaziyekileyo zeentlanzi ezingezozomthonyama kulo mfula.</li> </ul>                                                                                                       |
| Iintaka                                    | Lo mfula mawubenemigqeku eyahlukayo ye- avifaunal equka abameli bazo zonke iintaka ezifanayo ezidweliswe kule ngxelo ngakumbi ezo zifudukayo neentakamanzi. Umfula mawuxhase amawaka eentaka ehlotyeni namakhulu ebusika.                                                                                                                                                 | <ul style="list-style-type: none"> <li>Amanani eentakamanzi ehlela ngaphantsi ko- 600, amasomi ngaphantsi ko- 100 ehlotyeni, nee-terns zingaphantsi ko-250</li> <li>Amanani eendidi zeentaka ehlela ngaphantsi ko- 1000 izihlandlo ezi- 3 ezilandelelanayo.</li> </ul> |

**UTafle 3.5:** Elinqobo zovavanyo nee-TPCs ezingqamene neBakala D lomfula womlambo iJakkals

| Ibakala-Abiotic/Biotic | Iinqobo zovavanyo lwendawoyokuphilisana                                                                                                                                                                      | Umda wengxaki esenokuvela                                                                                                                                                        |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ikwality yamanzi       | Isimo sobukho beetyuwa nokufumaneka kweemo zobu- abiotic obahlukeneyo masingqamane ngqo nemeko yobhekiso; Isimo 1 (ukuvala, i-hypersaline yenqanaba elisezantsi lamanzi) masingabikho ngaphezulu kwesangoku. | <ul style="list-style-type: none"> <li>Ubukho beetyuwa kuyo nayiphi na indawo yomfula bubetha ngaphaya ko- 35</li> </ul>                                                         |
|                        | Ikwality yamanzi <b>omlambo</b> ayinafuthe labungozi kwiimeko zekwality yamanzi kulo mfula, ngakumbi ngokubhekiselele ekuchumeni kwezondlo, nezinto ezityhefu                                                | <p>Amanzi angena emlanjeni:</p> <ul style="list-style-type: none"> <li>I-pH ingaphantsi ko- 8.5, okanye ihlala ingaphezu ko- 5.5</li> <li>I-DO ingaphantsi ko- 4 mg/l</li> </ul> |



| Ibakala-Abiotic/Biotic | Iinqobo zovavanyo lwendawoyokuphilisana                                                                                                                                                                                                                                                   | Umda wengxaki esenokuvela                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        |                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>• Ubukho bodaka buyaqhuba bubetha ngaphaya ko-10 NTU</li> <li>• I-DIN isoloko ibetha ngaphaya ko-200 µg/l</li> <li>• I-DIN isoloko ibetha ngaphaya ko-50 µg/l</li> <li>• Ubukho bezinto ezinyehfu (e.g. ii-metals ezinzima nee-agrochemicals) bubetha ngaphaya komlinganiselo oxeliweyo . Inqanaba elibanzi lokuthatyathwa kweesampulu kuza kudingeka ukuba liqhutywe khonukuze luqingqe inqanama leziyobisi ekuza kufuka zifakwe kwinkqubo yohlolo yexesha elide.</li> </ul>                                                                                                                                                                                                                                                                                                              |
|                        | <p>Ikwaliti yamanzi <b>omfula</b> ayinafute libi kwimpilo ye- biotic, ngakumbi ngokubhekiselele ekuchumeni kwezondlo noguquguquko lwe- diurnal ngokwe- pH (e.g. iyehla ebusuku, yande emini), okanye amanzi abemuncu kuphuhle nethuba lobukho be- hypoxia ngenxa yokubola kwe- algal.</p> | <p>Umfula:</p> <ul style="list-style-type: none"> <li>• I-pH ibetha ngaphantsi ko- 6, okanye isoloko ingaphezulu ko- 9</li> <li>• I-DO ingaphantsi kwe- 4 mg/l</li> <li>• Ubukho bodaka busoloko bubetha ngaphaya kwe -20 NTU (e.g. ngenxa yodubulo oluqhubayo lwee- algal)</li> <li>• I- DIN esisiphumo ibetha ngaphaya ko-100 µg/l (kwiimeko zokuvaleka oku bekuza kuthetha ukuba kukho ukuchuma okugqithisileyo ngenxa yokwenziwa kwezimbiwa)</li> <li>• I- DIP ibetha ngaphaya kwe- 20 µg/l ) ((kwiimeko zokuvaleka oku bekuza kuthetha ukuba kukho ukuchuma okugqithisileyo ngenxa yokwenziwa kwezimbiwa)</li> <li>• Ubukho bezinto ezinyehfu (e.g. ii-metals ezinzima nee-agrochemicals) bubetha ngaphaya komlinganiselo oxeliweyo . Inqanaba elibanzi lokuthatyathwa kweesampulu kuza kudingeka ukuba liqhutywe</li> </ul> |

| Ibakala-Abiotic/Biotic       | Iinqobo zovavanyo lwendawoyokuphilisana                                                                                                                                                                                                                                                                                                                                 | Umda wengxaki esenokuvela                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              |                                                                                                                                                                                                                                                                                                                                                                         | khonukuze luqingqe inqanama leziyobisi ekuza kufuka zifakwe kwinkqubo yohlolo yexesha elide.                                                                                                                                                                                                                                                                                                                                                        |
| Uguquguquko lofundo ngamanzi | Umfula mawuvunyelwe ukuba usebenze ngokwendalo nakanjani na                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>&gt;11% ukwenzeka kwiSimo 1: ukuvaleka kwasemanzini / ngokwe-hypersaline, kubonakala ngokubaze kweMida B no-C.</li> <li>&gt;72% ukwenzeka kwiSimo 2: ukuvaleka kwasemanzini</li> <li>&lt;5% ukwenzeka kwiimeko zokuvuleka komlomo</li> <li>Ukuhlamba kwawo kakhulu akwezeki kangangeenyanga ezi-6</li> </ul>                                                                                                 |
| Uguquguquko lweentlenge      | limeko zeempuphuma nezokophula mazigcine izimbo zosasazo lweentlenge nendawo yokuphilisama emanzini (iindawo zokuphila ezibonakalayo kulo mjelo) ukuze zingabethi ngaphaya kwee- TPCs ze-biota                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Njengoguquguquko ngofundo ngamanzi apha ngasentla</li> </ul>                                                                                                                                                                                                                                                                                                                                                 |
| Microalgae                   | Imigqeku ye-Phytoplankton mayibonise imigqeku eyahlukayo ezine- biomass ephakathi okanye esezantsi (emetwe njengobukho be- chlorophyll-), nobukho obuncuphileyo bee- HABs. Imigqeku ye-Benthic microalgal mayibonise i-biomass ephakathi, nediatom yokwahluka kwebenthic ephakathi (kwinqanaba elivalekileyo) ukuya phezulu (kwinqanaba elivulekileyo).                 | <ul style="list-style-type: none"> <li>I-Phytoplankton biomass ingaphezulu ko- 20 <math>\mu\text{g Chl-a l}^{-1}</math>.</li> <li>Monospecific (&gt;90% ubuninzi obuqhelekileyo) iphezulu i-biomass yee-HABs (&gt;60 <math>\mu\text{g Chl-a l}^{-1}</math>)</li> <li>Subtidal benthic microalgal biomass ingaphezulu ko- 100 mg Chl-a <math>\text{m}^{-2}</math>.</li> <li>Ukwahluka kwe-diatom ye-Benthic (<i>H'</i>) ngaphantsi ko- 2.</li> </ul> |
| Macrophytes                  | Gcina usasazo, ubungakanani nokwahluka kweendidi zemigqeku yezityalo, umgxobhozo weetyuwa nengcongolo nemihlonjane eshiyekileyo. Nangona nje imigxobhozo yee-pete phaya emantla ingazi kubuya, ukungena kwamanzi ahlaziyekileyo kona kuza kwandsa ukwahluka kwendawo yokuphila kunciphisa neendidi zasemhlabeni esele zithabathe indawo yendawo yokuphila elahlekileyo. | <ul style="list-style-type: none"> <li>Ingaphezu kwenguqu engu-20% kummandla owogqunywe ziindawo zokuphila ezahlukayo</li> </ul>                                                                                                                                                                                                                                                                                                                    |

| Ibakala-Abiotic/Biotic                     | Iinqobo zovavanyo lwendawoyokuphilisana                                                                                                                                                                             | Umda wengxaki esenokuvela                                                                                                                                                                                                                                                                                          |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| i-Zooplankton yezingenamathambo ze-benthic | Gcina imigqeku yangoku yezingenamathambo                                                                                                                                                                            | <ul style="list-style-type: none"> <li>Inqanaba langoku liza kuqikelelwa</li> </ul>                                                                                                                                                                                                                                |
| iintlanzi                                  | Gcina imigqeku yangoku yeentlanzi.                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Ngaphantsi ko- 2 kwisi- 5 seendidi zeentlanzi siboniwe</li> <li>Kufumaneka iindidi zamanzi ahlaziyekileyo zeentlanzi ezingezizo ezomthonyama kulo mfula.</li> <li>Azikho ngo - 0+ ezincinci kwiindidi ezongameleyo zeentlanzi.</li> </ul>                                   |
| Iintaka                                    | Lo mfula mawubenemigqeku eyahlukayo ye- avifaunal equka abameli bazo zonke iintaka ezifanayo ezidweliswe kule ngxelo ngakumbi ezo zifudukayo neentakamanzi. Umfula mawuxhase amakhulu eentaka ehlotyeni nasebusika. | <ul style="list-style-type: none"> <li>Ubukho bee- piscivores bunciphile (&lt; 2 yeendidi; okanye &lt;10 yeentaka).</li> <li>Amanani eentakamanzi okanye amasomi ehlela ngaphantsi ko- 50 ehlotyeni.</li> <li>Ewonke amanani eentakamanzi ahlela ngaphantsi kwe- 200 izihlandlo ezi- 3 ezilandelelanayo</li> </ul> |

**UTafile 3.6:** Iinqobo zovavanyo nee- TPC ezingqamene neBakala D kumfula womlambo i- Sout

| Ibakala-Abiotic/Biotic | Iinqobo zovavanyo lwendawoyokuphilisana                                                                                                                                                                                                                                            | Umda wengxaki esenokuvela                                                                                                                                                                                                      |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ikwality yamanzi       | Ubukho beetyuwa obubaxekileyo mabuthintelwe                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Emantla: &gt;120 psu (bubaxekile ubukho beetyuwa)</li> <li>Embindini : &gt; 80 psu (bubaxekile ubukho beetyuwa)</li> <li>Emazantsi: &gt; 60 psu (bubaxekile ubukho beetyuwa)</li> </ul> |
|                        | Ikwality yamanzi <b>omfula</b> ayinafute libi kwimpilo ye- biotic, ngakumbi ngokubhekiselele ekuchumeni kwezondlo noguquguquko lwe- diurnal ngokwe- pH (e.g. iyehla ebusuku, yande emini), okanye amanzi abemuncu kuphuhle nethuba lobukho be- hypoxia ngenxa yokubola kwe- algal. | <ul style="list-style-type: none"> <li>DIN: Kuwo wonke umfula, average &gt;0.1 mg/l</li> <li>DIP: Kuwo wonke umfula, average &gt;0.01 mg/l</li> </ul>                                                                          |

| Ibakala-Abiotic/Biotic       | Iingobo zovavanyo lwendawoyokuphilisana                                                                                                                                                        | Umda wengxaki esenokuvela                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              |                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>DO: Kuwo wonke umfula, average <math>\geq 6</math> mg/l</li> <li>Ubukho bodaka busoloko bubetha ngaphaya kwe -10 NTU ngaphandle kwamaxa eempuphuma</li> <li>Ubukho bezinto ezinyehfu (e.g. ii-metals ezinzima nee-agrochemicals) bubetha ngaphaya komlinganiselo oxeliweyo . Inqanaba elibanzi lokuthatyathwa kweesampulu kuza kudingeka ukuba liqhutywe khonukuze luqingqe inqanama leziyobisi ekuza kufuka zifakwe kwinkqubo yohlolo yexesha elide.</li> </ul>                                                                                                                                                                                                                                                                                                                   |
| Uguquguquko lofundo ngamanzi | Umfula mawuvunyelwe ukuba usebeze ngendalo nakanjani na                                                                                                                                        | Uqhagamshelwano nemisele eyahlukeneyo yamanzi liphucukile, lwaza lwavuselela uqhagamshelwano nendawo yoboniselo ngokuthi kususwe/ okanye kuguqulwe udonga olunqamlezileyo kwintloko yomfula.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Uguquguquko lweentlenge      | Iimeko zeempuphuma nezokophula mazigcine izimbo zosasazo lweentlenge nendawo yokuphilisama emanzini (iindawo zokuphila ezibonakalayo kulo mjelo) ukuze zingabethi ngaphaya kwee- TPCs ze-biota | <ul style="list-style-type: none"> <li>Imeko yeempuphuma igcine izimbo zosasazo lweentlenge nendawo yokuphila emanzini (indawo yokuphila ngaphakathi emseleni).Ubukho beentlenge oburhoxisiweyo kumanzi angena emlanjeni abuphambuki ngaphezu ko- 20% yobudlelwane bolahlo longxalo lweentlenge bangoku (buza kuqikelelwato). Izimbo zokwenziwa kweentlenge nokhukuliso kulo mfula azahluki kangako kwezexesha langoku (<math>\pm 0.5</math> m) (ziza kuqikelelwa).</li> <li>Iinguqu kwizimbo zosasazo lobukhulu bokhozo lweentlenge ziyafana nezangoku. I-diametr yomandlalo osembinini uphambuka ngaphantsi kwemeko yesibini ukusuka kumanqanaba angoku (amanqanaba aza). Usasazo lweesanti/ lodaka embindini nasemantla aluguquki ngaphezu kwe- 20% ukusuka kwiSimo saNgoku kwi-avareji yeminyaka emihlanu.</li> </ul> |

| Ibakala-Abiotic/Biotic                     | Iingobo zovavanyo lwendawoyokuphilisana                                                                                                                                                                                                                                                                                                                                 | Umda wengxaki esenokuvela                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Microalgae                                 | Imiggeku ye-Phytoplankton mayibonise imiggeku eyahlukayo ezine- biomass ephakathi okanye esezantsi (emetwe njengobukho be- chlorophyll-), nobukho obuncuphileyo bee-HABs. Imiggeku ye-Benthic microalgal mayibonise i-biomass ephakathi, nediator yokwahluka kwebenthic ephakathi (kwinqanaba elivalekileyo) ukuya phezulu (kwinqanaba elivulekileyo).                  | Gcina usasazo lwamaqela awahlukileyo e -phytoplankton ne-biomass esezantsi phaya kumazantsi ( $< 10 \mu\text{g l}^{-1}$ (inqanaba langoku liza kuqikelelwa).                                                                                                                                                                                                                                                                                                                                                             |
| Macrophytes                                | Gcina usasazo, ubungakanani nokwahluka kweendidi zemiggeku yezityalo, umgxobhozo weetyuwa nengcongolo nemihloniyane eshiyekileyo. Nangona nje imigxobhozo yeepete phaya emantla ingazi kubuya, ukungena kwamanzi ahlaziyekileyo kona kuza kwandsa ukwahluka kwendawo yokuphila kunciphisa neendidi zasemhlabeni esele zithabathe indawo yendawo yokuphila elahlekileyo. | <ul style="list-style-type: none"> <li>Yi&gt;20 % inguqu kummandla owogqunywe ziindawo zokuphila ezahlukileyo ze- (oku yimpendulo yeenguqu zendalo ngenxa yeemeko zendalo zokuguquguquka komfula).</li> <li>Ubukho bekhola yeetyuwa abukho ngaphezulu ko- 50 phaya kumazantsi ukuze bunciphise uguquguquko lweetyuwa neetyuwa zomgxobhozo (<i>Sarcocornia pillansii</i>).</li> <li>Thintela uphazamiseko nokhulo lwazo kwiindawo zokuphila kumgxobhozo weetyuwa nakwithafa leempuphuma ngemisebenzi yeetyuwa.</li> </ul> |
| i-Zooplankton yezingenamathambo ze-benthic | Gcina imiggeku yezingenamathambo yangoku                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>I-Unincysted Brine shrimp mayibekho kulo mmandla kangange- <math>&lt; 75\%</math> yexesha.</li> <li>Inqanaba langoku liza kuqikelelwa</li> </ul>                                                                                                                                                                                                                                                                                                                                  |
| iintlanzi                                  | Azingeni ndawo. limeko eziphezulu zobukho beetyuwa                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Azingeni ndawo. limeko eziphezulu zobukho beetyuwa.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Iintaka                                    | Lo mfula mawubenemiggeku eyahlukayo ye- avifaunal equka abameli bazo zonke iintaka ezifanayo ezidweliswe kule ngxelo ngakumbi ezo zifudukayo neentakamanzi. Umfula mawuxhase amakhulu eentaka ehlotyeni nasebusika.                                                                                                                                                     | <ul style="list-style-type: none"> <li>Oko kuquka ii- flamingos, iindidi ezingaphezu zamasomi neentakamanzi ezitya iintlanzana zamanzi anetyuwa mazibekho - <math>&lt; 75\%</math> yexesha (kwisithuba sika- 40 – 150 sobukho beentlanzana zamanzi anetyuwa).</li> </ul>                                                                                                                                                                                                                                                 |

| Ibakala-Abiotic/Biotic | lingobo zovavanyo lwendawoyokuphilisana | Umda wengxaki esenokuvela                                                                                            |
|------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------|
|                        |                                         | <ul style="list-style-type: none"> <li>• Ukufa kweentaka nonobangela wooko ngumcimbi omele kungqinisiswa.</li> </ul> |

### 3. AMANZI ANGAPHEZU KOMHLABA - IBAKALA LOMTHAMO NGEMIWONYO

Izikhundla eziphakanyisiweyo ze-EWR zakhethwa neYunithi nganye yoMwonyo ngethuba lophando lwe-reconnaissance olwaqhutywa ngeyoKwindla 2022. Izikhundla ze- EWR zakhethwa kunye nezikhundla ze-EWR ukuze iiYunithi zomsele woMlambo ziqalise ngemfezeko.

**uTafale 4.1** uchonga imiwonyo yongxamiseko kwiindawo zoboniselo u- F60 no-G30 futhi ushwankathela i- PES, EIS, REC yemiwonyo echongiweyo.

**UTafale 4.1:** Itafale ebonisa iiphumo kwimiwonyo yongxamiseko

| i-Quat | Isikhundla se-EWR / Indibano | Umsele wamanzi             | Uququzelo ngobume bomhlaba |               | PES | EIS      | REC |
|--------|------------------------------|----------------------------|----------------------------|---------------|-----|----------|-----|
|        |                              |                            | Yobubanzi                  | Yobude        |     |          |     |
| F60A   | EWR 2                        | North West Fynbos umwonyo  | 30°57'15.89"S              | 17°46'43.61"E | A/B | Phezulu  | A/B |
| F60C   | EWR 4                        | Knersvlakte umwonyo        | 31° 7'12.48"S              | 17°54'33.50"E | B   | Phakathi | B   |
| F60E   | EWR 5                        | Sandveld umwonyo           | 31°24'10.86"S              | 17°59'24.11"E | C   | Phakathi | C   |
| G30F   | EWR 9                        | Wadrikt Wetland            | 32°12'52.21"S              | 18°22'31.50"E | F   | Phezulu  | D   |
| G30A   | EWR13                        | Isolated depression/ dunes | 32°22'39.14"S              | 18°19'48.28"E | C   | Phezulu  | C   |
| G30A   | EWR14                        | Rocherpan                  | 32°36'49.34"S              | 18°17'55.89"E | D   | Phezulu  | C   |
| G30A   | EWR16                        | Papkuilsvlei / Rietsvlei   | 32°38'1.26"S               | 18°29'56.29"E | C   | Phezulu  | C   |

### 4. AMANZI ANGAPHANTSI KOMHLABA – IBAKALA LOMTHAMO

#### 5.1 UMSELE WAMNGAPHANTSI KOMHLABA – IBAKALA LOMTHAMO WAMANZI

Ukuboniswa gca /ukwahlulwa komda wamanzi angaphantsi komhlaba phakathi kwindawo yoboniselo u- G30 kwalandela imeko yangoku yemida eyahlulwe ngezine (**uMzobo 2**) kuba emnye kule mida uthe kanti uquka/ufaka intlango eyodwa ezalana kakuhle nje nokuhamba kwamanzi angaphantsi komhlaba negalelo alenzayo kumanzi angaphezu komhlaba. Indawo yoboniselo ngamanzi u- G30D wahlulwa waba yi- GRU yasemantla nasemazantsi. Oku kwenziwa kungqiyanywe ngomahluko omkhulu kwimvula eyafunyanwayo esuka ngokucacileyo emantla isya emazantsi. Isiqephu sasemazantsi sendawo yoboniselo sifumana iimvula ezininzi xa usithelekisa nesiya sasemantla. Kwiimeko apho ummandla wasemazantsi

ojikelezwe ziintaba equka umandlalo wamawa eentlenge uwela ngempazamo imida esikiweyo necandiweyo, oko kubangelwa ngamanqanaba aphezulu ovuselelo. U-G30F naye wahlulwe wangu -GRU wasemantla nasemazantsi, nanjengoko le ndawo yoboniselo ngamanzi iquka iintlango ezimbini apho intlango ngaye inophawu lokungasasebenzi njengesiqhelo.

Xa sijonge indalo yomsele wamanzi angaphantsi komhlaba phakathi kwiindawo zoboniselo eziphantsi ko- F60, imida ekhoyo yeendawo zoboniselo (**uMzobo 3**) nayo yalandelwa njengoko zikwazi ukufaka umsele wamanzi ngamnye ongaphezu komhlaba nanjengokuba ii- RQOs ziza kube zikwelo nqanaba, ibe neyona mida yamanzi angaphantsi komhlaba ingaziwa, imida esikwe ngezine iza kudlala indima njengomahlulo owaneleyo. Kuba ke bekukho nee-akhwifa eziludidi lwe -karst kwimimandla yonxweme i-F60E`s, kuye kwazanywa ukuyahlula le ndawo yoboniselo. Kuba ke zingekho iinkcukacha ezinokubonisa ukuba kanye-kanye kukude kangakanani ukuya kumphezulu wonxweme apho ezi akhwifa zobu-karst zinabela khona, kwaye kwagqitywa kwelokuba ishiywe imida ze- GRU njengoko injalo de zibe iinkcukacha zifumaneka ngokwaneleyo. Imimandla ecandiweyo kwiindawo zoboniselo eziphantsi ko- G30 :



**uTafle 5.1:** Uhlelo lomsele wamanzi angaphantsi komhlaba

| <b>lindawana zobonisele ngamanzi ezisetyenzisiweyo ukuze kubalwe inqanaba lovuselelo</b> | <b>Umsele ongumlambo</b> | <b>Ummandla (km<sup>2</sup>)</b> | <b>i-MAP (mm)</b> | <b>Uvuselelo oluqikelelweyo lwawo ewonke manzingonyaka (%)</b> | <b>Uvuselelo olubaliweyo (Mm<sup>3</sup>)</b> | <b>Ewonke atsalelwe ukuhambisa iinkonzo ezidolophini (million m<sup>3</sup>)</b> | <b>Umsele (i-BHN + Springflow + igalelo kumanzi amancinci)</b> | <b>Ewonke amanzi atsalelwe unkcenkces helo (million m<sup>3</sup>)</b> | <b>Uxhathiso lwamanzi angaphantsi komhlaba (million m<sup>3</sup>)</b> |
|------------------------------------------------------------------------------------------|--------------------------|----------------------------------|-------------------|----------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------|
| G30A1                                                                                    | Papkuils                 | 131.1                            | 292               | 3.5%                                                           | 1.34                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| G30A2                                                                                    | Papkuils Lower           | 10.0                             | 292               | 3.5%                                                           | 0.10                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| G30A_amanzi angaphantsi komhlaba                                                         |                          | 604.3                            | 260               | 3.5%                                                           | 5.50                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| <b>Iyonke i-G30A_</b>                                                                    |                          |                                  |                   |                                                                | <b>6.94</b>                                   | <b>0</b>                                                                         | <b>0.252981875</b>                                             | <b>6.79956</b>                                                         | <b>-0.11070</b>                                                        |
| G30B1                                                                                    | Upper Kruismans          | 23.7                             | 505               | 23.0%                                                          | 2.75                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| G30B1                                                                                    | Upper Kruismans          | 92.4                             | 300               | 5.0%                                                           | 1.39                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| G30B2                                                                                    | Southkloof               | 17.8                             | 415               | 23.0%                                                          | 1.69                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| G30B2                                                                                    | Southkloof               | 194.5                            | 300               | 5.0%                                                           | 2.92                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| G30B3                                                                                    | Huis tributary           | 53.8                             | 505               | 23.0%                                                          | 6.25                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| G30B3                                                                                    | Huis tributary           | 288.5                            | 300               | 5.0%                                                           | 4.33                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| <b>Iyonke i-G30B_</b>                                                                    |                          |                                  |                   |                                                                | <b>19.32</b>                                  | <b>0.053676</b>                                                                  | <b>3.5056685</b>                                               | <b>2.1537</b>                                                          | <b>13.61017</b>                                                        |
| G30C1                                                                                    | Kleinvlei                | 64.3                             | 404               | 23.0%                                                          | 5.98                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| G30C2                                                                                    | Jansekraal               | 62.6                             | 404               | 23.0%                                                          | 5.81                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| G30C3                                                                                    | Bergvallei               | 218.2                            | 383               | 3.5%                                                           | 2.92                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| <b>Iyonke i-G30C_</b>                                                                    |                          |                                  |                   |                                                                | <b>14.72</b>                                  | <b>0.074207</b>                                                                  | <b>1.541531375</b>                                             | <b>6.33080</b>                                                         | <b>6.76926</b>                                                         |
| G30D1                                                                                    | KA upper                 | 64.8                             | 517               | 23.0%                                                          | 7.71                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| G30D1                                                                                    | KA lower                 | 55.1                             | 366               | 5.0%                                                           | 1.01                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| G30D2                                                                                    | Hol upper                | 51.7                             | 517               | 23.0%                                                          | 6.15                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| G30D2                                                                                    | Hol lower                | 102.6                            | 366               | 5.0%                                                           | 1.88                                          |                                                                                  |                                                                |                                                                        |                                                                        |
| G30D3                                                                                    | Matroosfontein           | 128.2                            | 347               | 3.5%                                                           | 1.56                                          |                                                                                  |                                                                |                                                                        |                                                                        |

| lindawana zoboniselo ngamanzi ezisetyenzisiweyo ukuze kubalwe inqanaba lovuselelo | Umsele ongumlambo | Ummandla (km <sup>2</sup> ) | i-MAP (mm) | Uvuselelo oluqikelelweyo lwawo ewonke manzingonyaka (%) | Uvuselelo olubaliweyo (Mm <sup>3</sup> ) | Ewonke atsalelwe ukuhambisa iinkonzo ezidolophini (million m <sup>3</sup> ) | Umsele (i-BHN + Springflow + igalelo kumanzi amancinci) | Ewonke amanzi atsalelwe unkencnces helo (million m <sup>3</sup> ) | Uxhathiso lwamanzi angaphantsi komhlaba (million m <sup>3</sup> ) |
|-----------------------------------------------------------------------------------|-------------------|-----------------------------|------------|---------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------|
| G30D4                                                                             | Verlorenvlei      | 151.8                       | 347        | 3.5%                                                    | 1.84                                     |                                                                             |                                                         |                                                                   |                                                                   |
| <b>lyonke i-G30D_</b>                                                             |                   |                             |            |                                                         | <b>20.14</b>                             | <b>0.03798867</b>                                                           | <b>3.286462</b>                                         | <b>10.53787</b>                                                   | <b>6.27765</b>                                                    |
| G30E1                                                                             | Kruisfontein      | 90.4                        | 286        | 3.5%                                                    | 0.91                                     |                                                                             |                                                         |                                                                   |                                                                   |
| G30E2                                                                             | Verlorenvlei      | 44.9                        | 286        | 3.5%                                                    | 0.45                                     |                                                                             |                                                         |                                                                   |                                                                   |
| G30E3                                                                             | Verlorenvlei      | 35.3                        | 286        | 3.5%                                                    | 0.35                                     |                                                                             |                                                         |                                                                   |                                                                   |
| G30E4                                                                             | Verlorenvlei      | 190.5                       | 286        | 5.0%                                                    | 2.72                                     |                                                                             |                                                         |                                                                   |                                                                   |
| <b>lyonke i-G30E_</b>                                                             |                   |                             |            |                                                         | <b>4.43</b>                              | <b>0.443172</b>                                                             | <b>0.791505375</b>                                      | <b>2.9434064</b>                                                  | <b>0.25440</b>                                                    |
| G30F1                                                                             | Langvlei          | 194.2                       | 352        | 3.5%                                                    | 2.39                                     |                                                                             |                                                         |                                                                   |                                                                   |
| G30F2                                                                             | Lambertshoek      | 98.9                        | 352        | 23.0%                                                   | 8.01                                     |                                                                             |                                                         |                                                                   |                                                                   |
| G30F3                                                                             |                   | 397.8                       | 236        | 3.5%                                                    | 3.29                                     |                                                                             |                                                         |                                                                   |                                                                   |
| G30F4                                                                             |                   | 30.2                        | 212        | 3.5%                                                    | 0.22                                     |                                                                             |                                                         |                                                                   |                                                                   |
| G30F_Groundwater North                                                            |                   | 20.2                        | 175        | 3.5%                                                    | 0.12                                     |                                                                             |                                                         |                                                                   |                                                                   |
| G30F_Groundwater South                                                            |                   | 59.1                        | 212        | 3.5%                                                    | 0.44                                     |                                                                             |                                                         |                                                                   |                                                                   |
| <b>lyonke i-G30F_</b>                                                             |                   |                             |            |                                                         | <b>14.47</b>                             | <b>0.98592</b>                                                              | <b>1.713247375</b>                                      | <b>18.43323</b>                                                   | <b>-5.10282</b>                                                   |
| G30G1                                                                             | Jakkals           | 134.4                       | 268        | xx                                                      | 11.15                                    |                                                                             |                                                         |                                                                   |                                                                   |
| G30G2                                                                             | Peddies           | 49.4                        | 268        | 23.0%                                                   | 3.05                                     |                                                                             |                                                         |                                                                   |                                                                   |
| G30G3                                                                             |                   | 317.5                       | 208        | 3.5%                                                    | 2.31                                     |                                                                             |                                                         |                                                                   |                                                                   |
| G30G4                                                                             |                   | 21.7                        | 138        | 3.5%                                                    | 0.10                                     |                                                                             |                                                         |                                                                   |                                                                   |
| G30G_Groundwater West                                                             |                   | 89.8                        | 138        | 3.5%                                                    | 0.43                                     |                                                                             |                                                         |                                                                   |                                                                   |
| G30G_Groundwater East                                                             |                   | 44.2                        | 208        | 3.5%                                                    | 0.32                                     |                                                                             |                                                         |                                                                   |                                                                   |
| <b>lyonke i-G30G_</b>                                                             |                   |                             |            |                                                         | <b>17.37</b>                             | <b>0.203213</b>                                                             | <b>0.670242125</b>                                      | <b>3.616832</b>                                                   | <b>12.87576</b>                                                   |

| <b>lindawana<br/>zoboniselo<br/>ngamanzi<br/>ezisetyenzisiweyo<br/>ukuze kubalwe<br/>inqanaba<br/>lovuselelo</b> | <b>Umsele<br/>ongumlambo</b> | <b>Ummandla<br/>(km<sup>2</sup>)</b> | <b>i-MAP<br/>(mm)</b> | <b>Uvuselelo<br/>oluqikelelweyo<br/>lwawo ewonke<br/>manzingonyaka<br/>(%)</b> | <b>Uvuselelo<br/>olubaliweyo<br/>(Mm<sup>3</sup>)</b> | <b>Ewonke<br/>atsalelwe<br/>ukuhambisa<br/>iinkonzo<br/>ezidolophini<br/>(million m<sup>3</sup>)</b> | <b>Umsele (i-<br/>BHN +<br/>Springflow<br/>+ igalelo<br/>kumanzi<br/>amancinci)</b> | <b>Ewonke<br/>amanzi<br/>atsalelwe<br/>unkcenkces<br/>helo (million<br/>m<sup>3</sup>)</b> | <b>Uxhathiso<br/>lwamanzi<br/>angaphantsi<br/>komhlaba<br/>(million m<sup>3</sup>)</b> |
|------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------|-----------------------|--------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| G30H1                                                                                                            |                              | 580.8                                | 204                   | 3.5%                                                                           | 4.15                                                  |                                                                                                      |                                                                                     |                                                                                            |                                                                                        |
| G30H_Groundwater                                                                                                 |                              | 495.4                                | 138                   | 3.5%                                                                           | 2.39                                                  |                                                                                                      |                                                                                     |                                                                                            |                                                                                        |
| <b>G30H_Total</b>                                                                                                |                              |                                      |                       |                                                                                | <b>6.53</b>                                           | <b>0</b>                                                                                             | <b>0.059102625</b>                                                                  | <b>2.31426</b>                                                                             | <b>4.16041</b>                                                                         |
| F60A                                                                                                             | Brak                         | 386                                  | 103                   | 3.5%                                                                           | <b>1.39</b>                                           | <b>0</b>                                                                                             | <b>0.0010585</b>                                                                    |                                                                                            | <b>1.39047</b>                                                                         |
| F60B                                                                                                             | Klein-Goerap                 | 320                                  | 129                   | 3.5%                                                                           | <b>1.44</b>                                           | <b>0.183146</b>                                                                                      | <b>0.008513625</b>                                                                  |                                                                                            | <b>1.25314</b>                                                                         |
| F60C                                                                                                             | Sout                         | 622                                  | 114                   | 3.5%                                                                           | <b>2.48</b>                                           | <b>0</b>                                                                                             | <b>0.00406975</b>                                                                   |                                                                                            | <b>2.47771</b>                                                                         |
| F60D                                                                                                             | Groot-Goerap                 | 481                                  | 120                   | 3.5%                                                                           | <b>2.02</b>                                           | <b>0</b>                                                                                             | <b>0</b>                                                                            |                                                                                            | <b>2.02020</b>                                                                         |
| F60E                                                                                                             |                              | 120                                  | 116                   | 3.5%                                                                           | <b>0.49</b>                                           | <b>0</b>                                                                                             | <b>0.000556625</b>                                                                  |                                                                                            | <b>0.48664</b>                                                                         |

## 5.2 UMSELE WAMANZI ANGAPHANTSI KOMHLABA– IBAKALA LEKWALITI YAMANZI

IBakala keKwaliti yamanzi angaphantsi komhlaba kumsele ohleliweyo nethempleti esebenzisa - 10% phezulu kumbindi womsele. Nceda uqaphele ukuba ikwaliti yamanzi angaphantsi komhlaba iguquka ngendalo kwindawo yoboniselo, futhi nangokwamaxesha omnyaka. Ikwaliti yamanzi angaphantsi komhlaba mayithobele uluhlu lwekwaliti yamanzi engqaliweyo njengoko kubonisiwe kuTafle 5.2. Ngamathuba okuqala oqingqo lwebakala lwekwaliti yamanzi angaphantsi komhlaba azolileyo ithelekiswa nexabiso lokusebenziseka leHlelo 1 (SANS 241:1 2011). Elona xabiso lisezantsi nelilelona lingaguqukiyo kwesi sibini liyakhethwa. Ngaloo mathuba kuye kwakhethwa ixabiso lokuzola, liye lonyuke ngo- 10 per cent. Xa iyonke ikwaliti yamanzi yeeyunithi zomsele iphakathi kakuhle nje kwimigangatho esekelwe ikwaliti yamanzi okusela.

**uTafle 5.2:** Ikhemistri gabalala

| Umda wekhemistri                               | Uluhlu lwekwaliti yamanzi engqaliweyo <sup>1</sup> |         |                 |                    |             |
|------------------------------------------------|----------------------------------------------------|---------|-----------------|--------------------|-------------|
|                                                | Units                                              | Class 0 | Class I         | Class II           | Class III   |
| pH (iiYunithi ze-pH)                           |                                                    | 6 - 9   | 5 - 6 & 9 - 9.5 | 4 - 5 & > 9.5 - 10 | < 4 or > 10 |
| Zizonke izinto ezinqinileyo ezinyibilikisiweyo | mg/l                                               | 0 - 450 | 450 - 1000      | 1000 - 2450        | > 2450      |
| Ukutsha umbane                                 | mS/m                                               | 0 - 70  | 70 - 150        | 150 - 300          | > 370       |
| Calcium njenge- Ca                             | mg/l                                               | 0 - 80  | 80 - 150        | 150 - 300          | > 300       |
| Magnesium as Mg                                | mg/l                                               | 0 - 30  | 30 - 70         | 70 - 100           | > 100       |
| Sodium as Na                                   | mg/l                                               | 0 - 100 | 100 - 200       | 200 - 400          | > 400       |
| Chloride as Cl                                 | mg/l                                               | 0 - 100 | 100 - 200       | 200 - 600          | > 600       |
| Sulphate as SO <sub>4</sub>                    | mg/l                                               | 0 - 200 | 200 - 400       | 400 - 600          | > 600       |
| Nitrate as NO <sub>x</sub> - N                 | mg/l                                               | 0 - 6   | 6 - 10          | 10 - 20            | > 20        |
| Flouride as F                                  | mg/l                                               | 0 - 1   | 1 - 1.5         | 1.5 - 3.5          | > 3.5       |
| Faecal coliforms                               | counts/100ml                                       | 0       | 0 - 1           | 1 - 10             | > 10        |

1)Ref: South African Water Quality Guidelines, Volume 1: Domestic Water Use, 2<sup>nd</sup> Ed. 1996.  
Department of Water Affairs, Pretoria, South Africa.

### QAPHELA:

**Class 0:** Amanzi ahlelwa njengalawo anqwenelekayo okusela nakufaneleyo ukusetyenziswa unaphakade. Amaxabiso ahlala engalawo axelwe kwimigangatho yekwaliti yamanzi esekiweyo, njenge- South African Water Quality Guideline for Domestic Use.

**Class I:** Amanzi asakufanele ukusetyenziswa unaphakade; kodwa ke, zikho iziphene ezithile zezempilo ezinokuvula nanxa ingavamanga nje loo nto. La ngamanzi asenokuba nalo nexabiso lokunyanga.

**Class II:** Amanzi avumeleke ukuba angasetyenziswa okwethutyana okanye ngaloo maxesha kaXakeka. Ifuthe kwezempilo lingafumaneka amaxesha amaninzi xa uwathelekisa nalawo weHlelo 1, ngakumbi kwabo sele bewasebenzise ixesha elide loo manzi. Ngoko ke la manzi makangasetyenziswa unaphakade. Eli hlelo lelona lingacaci ncam ngokwemigangatho esekiweyo ngokubhekiselele kwelona xesha la manzi akulungeleyo ukusetyenziswa. Imigangatho ithi nje angasetyenziswa ixesha elifutshane, ibe ingacacisi ncam ukuba u-'elifutshane' uthetha ukuthini kanye-kanye.

**Class III:** Amanzi eHlelo III aza kubangela ifuthe elibi kakhulu kwezempilo, ngakumbi ebantwaneni nabantu asele bekhulile. Siyacebisa ukuba la manzi angasetyenziselwa ukusela konke..

UTafle 5.3. IBakala lokuqala lekwali yamanzi angaphantsi komhlaba

| Indawo yoboniselo ngezine |                                             | Ca (mg/L) | Cl (mg/L) | EC (mS/m) | F (mg/L) | Mg (mg/L) | No3 + No2 (mg/L) | Na (mg/L) | SO4 (mg/L) | TAL      | pH       |
|---------------------------|---------------------------------------------|-----------|-----------|-----------|----------|-----------|------------------|-----------|------------|----------|----------|
| F60A                      | Inombolo yezikhundla zokuthabatha iisampulu | 10        | 10        | 10        | 10       | 10        | 10               | 10        | 10         | 10       | 10       |
|                           | Phakathi                                    | 121.25    | 3386      | 1058.5    | 0.64     | 210.5     | 0.3125           | 1848.6    | 514.95     | 152.1    | 7.595    |
|                           | Average                                     | 135.08    | 3405.97   | 980.8     | 0.924    | 218.11    | 0.7714           | 1896.43   | 466.39     | 153.24   | 7.519    |
|                           | 95 percentile                               | 315.03    | 8000.025  | 2088.25   | 2.3515   | 537.91    | 2.66535          | 4385.295  | 1067.57    | 229.75   | 8.2755   |
|                           | 5 percentile                                | 15.8      | 314.345   | 112.75    | 0.2      | 27.18     | 0.02             | 159.39    | 22.575     | 57.2     | 6.445    |
|                           | Uhlelo lwamanzi angaphantsi komhlaba        | 133.375   | 3724.6    | 1164.35   | 0.704    | 231.55    | 0.34375          | 2033.46   | 566.445    | 167.31   | 8.2709   |
| F60B                      | Inombolo yezikhundla zokuthabatha iisampulu | 71        | 71        | 71        | 71       | 71        | 64               | 64        | 71         | 71       | 71       |
|                           | Phakathi                                    | 152.2     | 2005.3    | 656       | 1.415    | 187.1     | 1.535            | 1034.443  | 394        | 174.6    | 7.77     |
|                           | Average                                     | 200.1151  | 2484.776  | 792.9345  | 1.47331  | 237.066   | 5.507414         | 1304.9    | 460.5053   | 166.7894 | 7.633296 |
|                           | 95 percentile                               | 507.85    | 4896.65   | 1415      | 2.5475   | 551       | 25.2245          | 1926.473  | 911.925    | 285.55   | 8.39     |
|                           | 5 percentile                                | 50.45     | 445       | 146       | 0.53     | 54.5      | 0.02             | 698.06    | 60         | 52.4     | 6.975    |
|                           | Uhlelo lwamanzi angaphantsi komhlaba        | 167.42    | 2205.83   | 721.6     | 1.5565   | 205.81    | 1.6885           | 1137.887  | 433.4      | 192.06   | 8.396625 |
| F60C                      | Inombolo yezikhundla zokuthabatha iisampulu | 32        | 32        | 32        | 32       | 32        | 32               | 32        | 32         | 32       | 32       |
|                           | Phakathi                                    | 142.3     | 2462.85   | 765       | 1.075    | 195.45    | 0.16             | 1280.5    | 361.9      | 103.4    | 7.175    |
|                           | Average                                     | 184.0891  | 2705.688  | 838.1688  | 1.22375  | 220.4469  | 3.301219         | 1344.302  | 404.7125   | 101.1922 | 7.2025   |

| Indawo yoboniselwe ngezine |                                             | Ca (mg/L) | Cl (mg/L) | EC (mS/m) | F (mg/L) | Mg (mg/L) | No3 + No2 (mg/L) | Na (mg/L) | SO4 (mg/L) | TAL     | pH       |
|----------------------------|---------------------------------------------|-----------|-----------|-----------|----------|-----------|------------------|-----------|------------|---------|----------|
|                            | 95 percentile                               | 385.545   | 5112.41   | 1543.6    | 2.3345   | 435.815   | 13.707           | 2453.865  | 670.39     | 202.935 | 7.8325   |
|                            | 5 percentile                                | 48.385    | 635.55    | 223.76    | 0.37775  | 53.96     | 0.02             | 336.215   | 109.305    | 11.15   | 6.5685   |
|                            | Uhlelo lwamanzi angaphantsi komhlaba        | 156.53    | 2709.135  | 841.5     | 1.1825   | 214.995   | 0.176            | 1408.55   | 398.09     | 113.74  | 7.92275  |
|                            |                                             |           |           |           |          |           |                  |           |            |         |          |
| F60D                       | Inombolo yezikhundla zokuthabatha iisampulu | 5         | 5         | 5         | 5        | 5         | 5                | 5         | 5          | 5       | 5        |
|                            | Phakathi                                    | 288.7     | 4249.6    | 1255      | 2        | 270.7     | 0.59             | 2136.5    | 592.2      | 180.4   | 7.83     |
|                            | Average                                     | 254.56    | 3955.46   | 1189.6    | 1.99     | 284.48    | 3.9268           | 2079.22   | 606.46     | 161.6   | 7.804    |
|                            | 95 percentile                               | 372.24    | 4786.36   | 1432      | 2.528    | 429.14    | 12.9508          | 2609.34   | 763.1      | 204.5   | 8.042    |
|                            | 5 percentile                                | 116.84    | 2664.02   | 808       | 1.576    | 161.86    | 0.02             | 1454.82   | 407.3      | 97.66   | 7.556    |
|                            | Uhlelo lwamanzi angaphantsi komhlaba        | 317.57    | 4674.56   | 1380.5    | 2.2      | 297.77    | 0.649            | 2350.15   | 651.42     | 198.44  | 8.5844   |
|                            |                                             |           |           |           |          |           |                  |           |            |         |          |
| F60E                       | Inombolo yezikhundla zokuthabatha iisampulu | 13        | 13        | 13        | 5        | 13        | 13               | 13        | 13         | 5       | 13       |
|                            | Phakathi                                    | 461       | 8812.8    | 2565      | 3.08     | 620       | 1.13             | 4289.9    | 1264.4     | 112.5   | 7.5      |
|                            | Average                                     | 486.6308  | 9206.658  | 2595.846  | 2.736    | 724.1154  | 2.535077         | 4568.458  | 1340.038   | 123.2   | 7.685385 |
|                            | 95 percentile                               | 1047.8    | 17630.12  | 4686      | 3.638    | 1546.6    | 9.9626           | 8138.7    | 2409.52    | 190.78  | 8.74     |
|                            | 5 percentile                                | 40.8      | 2537.42   | 802.58    | 1.272    | 82.4      | 0.012            | 1328.22   | 333.98     | 50.2    | 7.02     |
|                            | Uhlelo lwamanzi angaphantsi komhlaba        | 507.1     | 9694.08   | 2821.5    | 3.388    | 682       | 1.243            | 4718.89   | 1390.84    | 123.75  | 8.453923 |

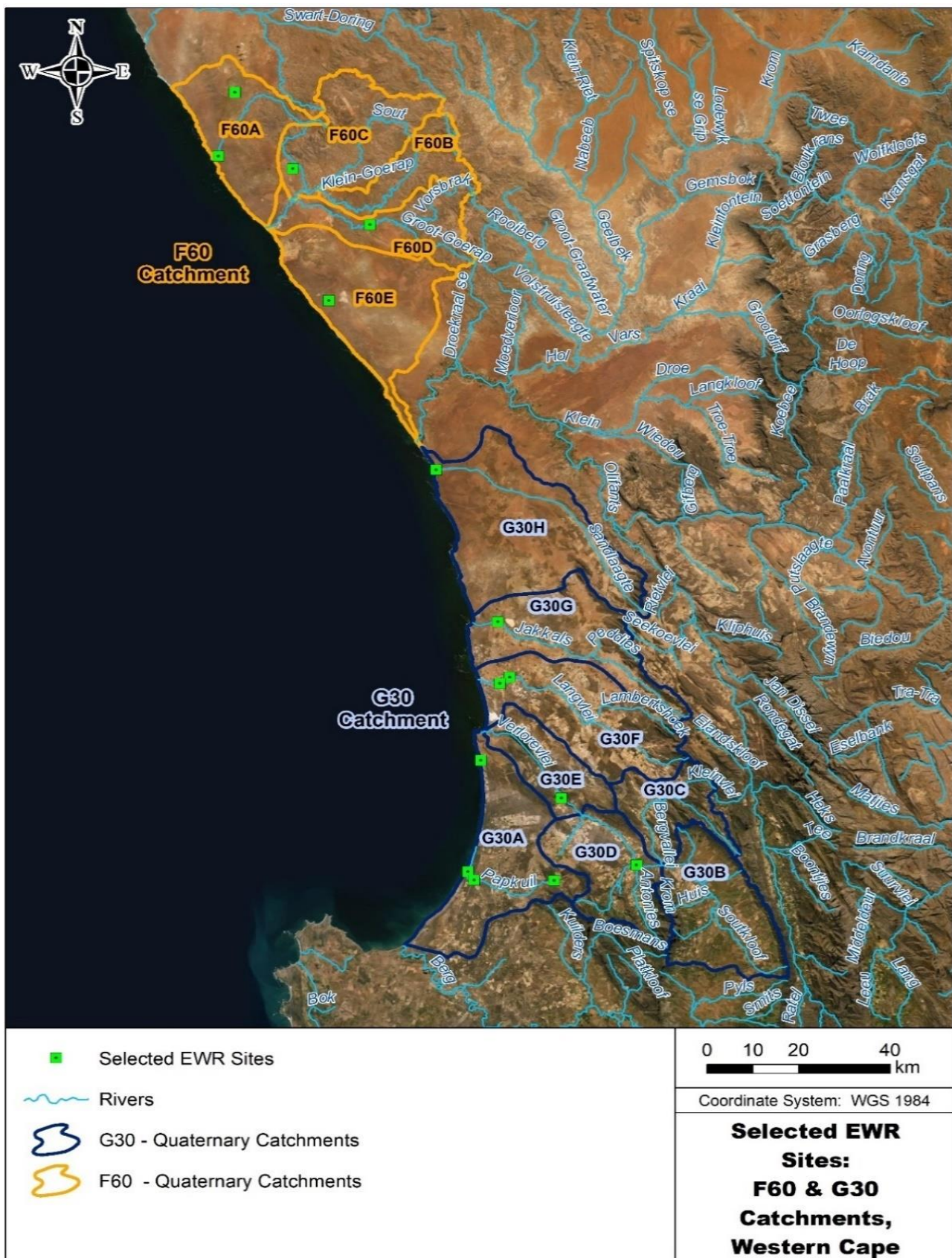
| Indawo yoboniselwe ngezine |                                             | Ca (mg/L) | Cl (mg/L) | EC (mS/m) | F (mg/L) | Mg (mg/L) | No3 + No2 (mg/L) | Na (mg/L) | SO4 (mg/L) | TAL      | pH       |
|----------------------------|---------------------------------------------|-----------|-----------|-----------|----------|-----------|------------------|-----------|------------|----------|----------|
| G30A                       | Inombolo yezikhundla zokuthabatha iisampulu | 46        | 46        | 46        | 46       | 46        | 46               | 46        | 46         | 46       | 46       |
|                            | Phakathi                                    | 38.9      | 928.6     | 325.5     | 0.41     | 79.55     | 0.09             | 510.55    | 105        | 59.55    | 6.705    |
|                            | Average                                     | 66.80552  | 1329.66   | 429.7391  | 0.698424 | 112.3196  | 5.865696         | 718.1763  | 215.989    | 83.26383 | 6.678076 |
|                            | 95 percentile                               | 186.325   | 3593.05   | 1119.075  | 1.685    | 288.35    | 5.2575           | 1981.125  | 794.6      | 269.8    | 7.5975   |
|                            | 5 percentile                                | 7.825     | 201.519   | 86.45     | 0.106    | 13.7735   | 0.02             | 118.3     | 17.075     | 2        | 4.825    |
|                            | Uhlelo lwamanzi angaphantsi komhlaba        | 42.79     | 1021.46   | 358.05    | 0.451    | 87.505    | 0.099            | 561.605   | 115.5      | 65.505   | 7.345884 |
| G30A                       | Inombolo yezikhundla zokuthabatha iisampulu | 71        | 71        | 71        | 71       | 71        | 71               | 71        | 71         | 71       | 71       |
|                            | Phakathi                                    | 26.5      | 460.4     | 191       | 0.29     | 37.6      | 1.617            | 273.4     | 41.6       | 73.4     | 7.49     |
|                            | Average                                     | 40.59099  | 717.4127  | 259.1075  | 0.371592 | 62.67571  | 5.757516         | 380.602   | 82.58715   | 89.5521  | 7.377781 |
|                            | 95 percentile                               | 154.65    | 2602.6    | 817       | 0.895    | 237.55    | 20.1255          | 1279.85   | 253.45     | 204.35   | 7.915    |
|                            | 5 percentile                                | 3.949167  | 25.77848  | 22.2      | 0.115    | 3.856292  | 0.02             | 16.11025  | 5.85       | 10.5746  | 6.66     |
|                            | Uhlelo lwamanzi angaphantsi komhlaba        | 29.15     | 506.44    | 210.1     | 0.319    | 41.36     | 1.7787           | 300.74    | 45.76      | 80.74    | 8.115559 |
| G30C                       | Inombolo yezikhundla zokuthabatha iisampulu | 23        | 23        | 23        | 23       | 23        | 23               | 23        | 23         | 23       | 23       |
|                            | Phakathi                                    | 5.6       | 102.6     | 45.6      | 0.1045   | 9.6       | 2.898            | 52.5      | 10.3       | 5.8      | 6.24     |
|                            | Average                                     | 7.493304  | 126.4481  | 51.1913   | 0.118891 | 11.67498  | 3.403674         | 65.37291  | 15.65283   | 13.14391 | 6.124261 |



| Indawo yoboniselwe ngezine |                                             | Ca (mg/L) | Cl (mg/L) | EC (mS/m) | F (mg/L) | Mg (mg/L) | No3 + No2 (mg/L) | Na (mg/L) | SO4 (mg/L) | TAL      | pH       |
|----------------------------|---------------------------------------------|-----------|-----------|-----------|----------|-----------|------------------|-----------|------------|----------|----------|
|                            | 95 percentile                               | 23.81     | 284.05    | 107.01    | 0.249    | 25.61     | 8.40435          | 145.83    | 31.95      | 52.89    | 7.439    |
|                            | 5 percentile                                | 1.51      | 32.22     | 17.8      | 0.05     | 3         | 0.3131           | 16.99     | 2          | 0        | 4.904    |
|                            | Uhlelo lwamanzi angaphantsi komhlaba        | 6.16      | 112.86    | 50.16     | 0.11495  | 10.56     | 3.1878           | 57.75     | 11.33      | 6.38     | 6.736687 |
|                            |                                             |           |           |           |          |           |                  |           |            |          |          |
| G30E                       | Inombolo yezikhundla zokuthabatha iisampulu | 54        | 54        | 54        | 54       | 54        | 54               | 54        | 54         | 54       | 54       |
|                            | Phakathi                                    | 30.11667  | 327.375   | 131.225   | 0.28     | 24.55     | 3.0675           | 179.9172  | 45.15      | 47.9     | 7.25     |
|                            | Average                                     | 88.55904  | 2385.89   | 588.3099  | 0.318939 | 168.7501  | 5.32966          | 1283.713  | 316.2033   | 89.15064 | 7.031156 |
|                            | 95 percentile                               | 395.7825  | 14167.74  | 3614.135  | 0.85875  | 1026.97   | 16.31963         | 7557.27   | 1947.528   | 277.875  | 8.284    |
|                            | 5 percentile                                | 5.7135    | 53.66765  | 30.915    | 0.063325 | 5.565     | 0.05325          | 32.225    | 4.655      | 2        | 4.361    |
|                            | Uhlelo lwamanzi angaphantsi komhlaba        | 33.12833  | 360.1125  | 144.3475  | 0.308    | 27.005    | 3.37425          | 197.9089  | 49.665     | 52.69    | 7.734272 |
|                            |                                             |           |           |           |          |           |                  |           |            |          |          |
| G30G                       | Inombolo yezikhundla zokuthabatha iisampulu | 5         | 5         | 5         | 5        | 5         | 5                | 5         | 5          | 5        | 5        |
|                            | Phakathi                                    | 32.0305   | 512.9     | 183       | 0.2255   | 40.417    | 0.8905           | 251.5     | 69.736     | 35.209   | 6.2125   |
|                            | Average                                     | 33.4133   | 730.7937  | 258.9     | 0.3231   | 59.5455   | 3.4445           | 387.1535  | 90.5404    | 56.2873  | 6.5516   |
|                            | 95 percentile                               | 57.1609   | 1359.691  | 444.6     | 0.778    | 107.8285  | 11.5959          | 704.3425  | 140.8546   | 134.2851 | 7.5442   |
|                            | 5 percentile                                | 11.78     | 284.6361  | 110.1     | 0.1      | 26.04     | 0.126            | 139.8467  | 48.664     | 17.48    | 6.008    |
|                            | Uhlelo lwamanzi angaphantsi komhlaba        | 35.23355  | 564.19    | 201.3     | 0.24805  | 44.4587   | 0.97955          | 276.65    | 76.7096    | 38.7299  | 7.20676  |

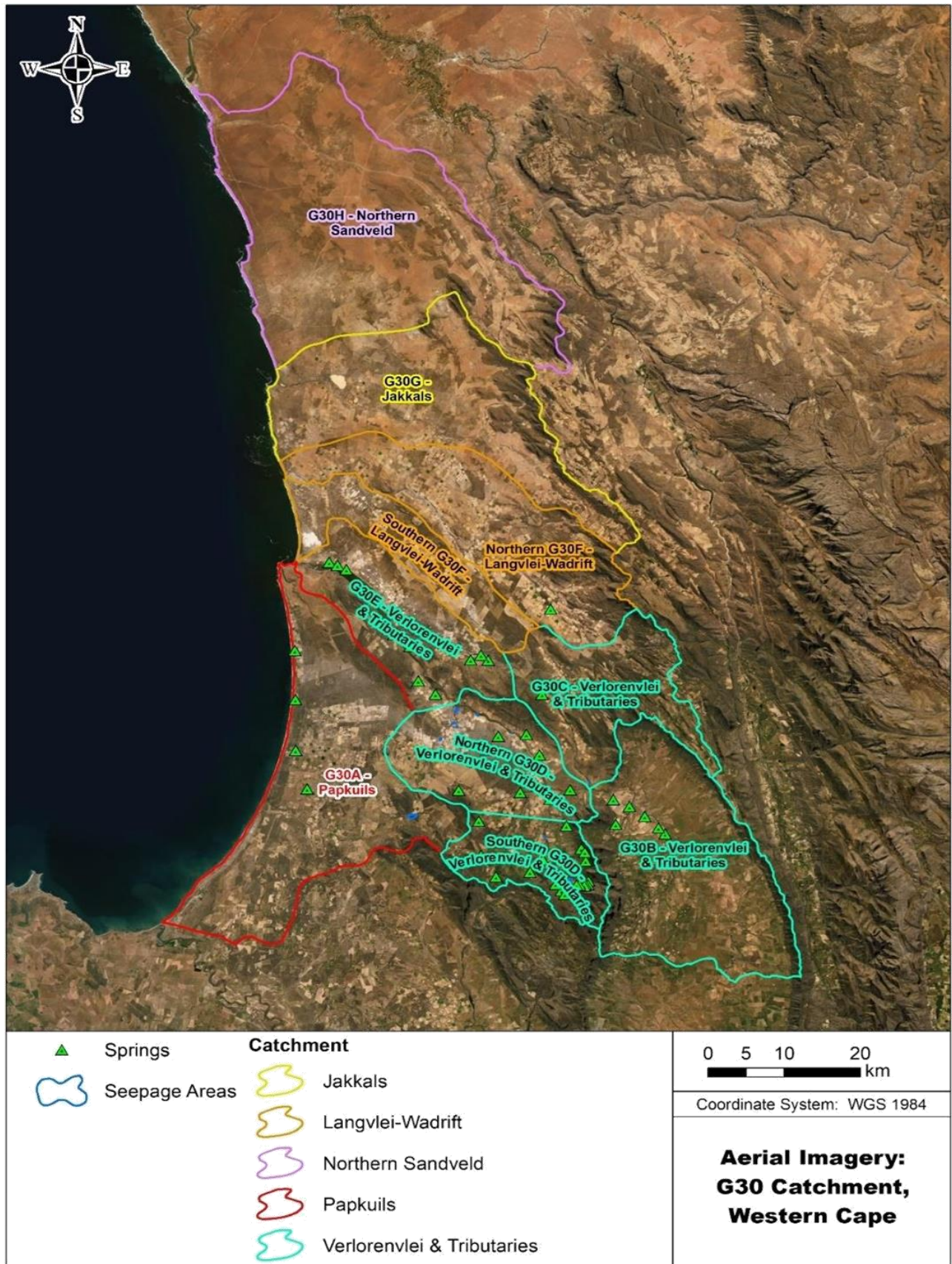
| Indawo yoboniselwe ngezine |                                             | Ca (mg/L) | Cl (mg/L) | EC (mS/m) | F (mg/L) | Mg (mg/L) | No3 + No2 (mg/L) | Na (mg/L) | SO4 (mg/L) | TAL      | pH       |
|----------------------------|---------------------------------------------|-----------|-----------|-----------|----------|-----------|------------------|-----------|------------|----------|----------|
| G30H                       | Inombolo yezikhundla zokuthabatha iisampulu | 36        | 36        | 36        | 36       | 36        | 36               | 36        | 36         | 36       | 36       |
|                            | Phakathi                                    | 42.6      | 853.35    | 268.5     | 0.265    | 66.15     | 2.199            | 424.7     | 95.65      | 44.65    | 7.135    |
|                            | Average                                     | 64.71111  | 1187.418  | 362.7333  | 0.368833 | 98.79306  | 2.543806         | 580.0542  | 140.0961   | 48.27183 | 6.874111 |
|                            | 95 percentile                               | 203.575   | 3309.05   | 1013.55   | 0.8      | 306.875   | 6.615            | 1628.675  | 367.85     | 114.85   | 7.78     |
|                            | 5 percentile                                | 9.15      | 203.7     | 64.3      | 0.095    | 17.35     | 0.0515           | 128.25    | 24.925     | 2        | 4.09     |
|                            | Uhlelo lwamanzi angaphantsi komhlaba        | 46.86     | 938.685   | 295.35    | 0.2915   | 72.765    | 2.4189           | 467.17    | 105.215    | 49.115   | 7.561522 |
| Northern G30D              | Inombolo yezikhundla zokuthabatha iisampulu | 18        | 18        | 18        | 18       | 18        | 18               | 18        | 18         | 18       | 18       |
|                            | Phakathi                                    | 12.75     | 141.8     | 65.625    | 0.125    | 13.925    | 1.3535           | 78.65     | 21.4       | 19.7     | 6.83     |
|                            | Average                                     | 13.45342  | 170.1839  | 71.14167  | 0.203167 | 14.91925  | 2.985611         | 91.82153  | 22.25411   | 34.35392 | 6.858528 |
|                            | 95 percentile                               | 34.295    | 329.31    | 129.585   | 0.4985   | 31.14     | 8.0653           | 174.11    | 46.1011    | 107.755  | 7.6645   |
|                            | 5 percentile                                | 4.615     | 81.855    | 38.88     | 0.05     | 4.27      | 0.02             | 44.64     | 2          | 7.185    | 6.241    |
|                            | Uhlelo lwamanzi angaphantsi komhlaba        | 14.025    | 155.98    | 72.1875   | 0.1375   | 15.3175   | 1.48885          | 86.515    | 23.54      | 21.67    | 7.544381 |
| Southern G30D              | Inombolo yezikhundla zokuthabatha iisampulu | 42        | 42        | 42        | 42       | 42        | 42               | 42        | 42         | 42       | 42       |
|                            | Phakathi                                    | 42.7      | 181.6     | 83.75     | 0.19     | 18.35     | 0.043            | 94.05     | 36.45      | 79.1     | 7.655    |
|                            | Average                                     | 58.15952  | 322.6998  | 130.0214  | 0.18881  | 31.87619  | 1.21831          | 143.7095  | 59.50143   | 86.12857 | 7.553095 |

| Indawo yoboniselwe ngezine |                                             | Ca (mg/L) | Cl (mg/L) | EC (mS/m) | F (mg/L) | Mg (mg/L) | No3 + No2 (mg/L) | Na (mg/L) | SO4 (mg/L) | TAL      | pH       |
|----------------------------|---------------------------------------------|-----------|-----------|-----------|----------|-----------|------------------|-----------|------------|----------|----------|
|                            | 95 percentile                               | 152.735   | 1027.355  | 333.3     | 0.4085   | 94.49     | 5.87915          | 459.58    | 231.98     | 189.52   | 8.355    |
|                            | 5 percentile                                | 4.345     | 48.93     | 33.145    | 0.05     | 5.15      | 0.02             | 31.405    | 8.403      | 2.1      | 6.6      |
|                            | Uhlelo lwamanzi angaphantsi komhlaba        | 46.97     | 199.76    | 92.125    | 0.209    | 20.185    | 0.0473           | 103.455   | 40.095     | 87.01    | 8.308405 |
|                            |                                             |           |           |           |          |           |                  |           |            |          |          |
| Northern G30F              | Inombolo yezikhundla zokuthabatha iisampulu | 56        | 56        | 56        | 56       | 56        | 56               | 56        | 56         | 56       | 56       |
|                            | Phakathi                                    | 9.27925   | 223.45    | 85.825    | 0.12     | 18.65     | 2.2695           | 113.8     | 12.65      | 6.8      | 5.99     |
|                            | Average                                     | 27.05899  | 602.7451  | 191.9863  | 0.140286 | 57.26182  | 3.307402         | 282.4382  | 52.72972   | 14.45998 | 5.967598 |
|                            | 95 percentile                               | 80.47775  | 3112.516  | 911.1     | 0.269625 | 247.9615  | 10.24425         | 1470.474  | 244.3508   | 54.42938 | 7.1725   |
|                            | 5 percentile                                | 2.13125   | 55.95     | 23.75     | 0.05     | 4.425     | 0.055            | 32.05     | 2          | 2        | 4.6475   |
|                            | Uhlelo lwamanzi angaphantsi komhlaba        | 10.20718  | 245.795   | 94.4075   | 0.132    | 20.515    | 2.49645          | 125.18    | 13.915     | 7.48     | 6.564358 |
|                            |                                             |           |           |           |          |           |                  |           |            |          |          |
| Southern G30F              | Inombolo yezikhundla zokuthabatha iisampulu | 46        | 46        | 46        | 46       | 46        | 46               | 46        | 46         | 46       | 46       |
|                            | Phakathi                                    | 8.6445    | 183.7023  | 62.45     | 0.135    | 13.65     | 1.838            | 98.675    | 21.218     | 13.1     | 6.575    |
|                            | Average                                     | 30.21916  | 444.8984  | 144.0739  | 0.218978 | 31.81539  | 2.471087         | 240.6488  | 64.96715   | 35.54945 | 6.50562  |
|                            | 95 percentile                               | 146.275   | 1464.35   | 514.3     | 0.485    | 95.8      | 5.6125           | 768.1     | 232.925    | 134.075  | 7.69     |
|                            | 5 percentile                                | 3.875     | 84.55     | 34.775    | 0.05     | 5.825     | 0.025            | 44.95     | 5.975      | 2.55     | 5        |
|                            | Uhlelo lwamanzi angaphantsi komhlaba        | 9.50895   | 202.0725  | 68.695    | 0.1485   | 15.015    | 2.0218           | 108.5425  | 23.3398    | 14.41    | 7.156182 |

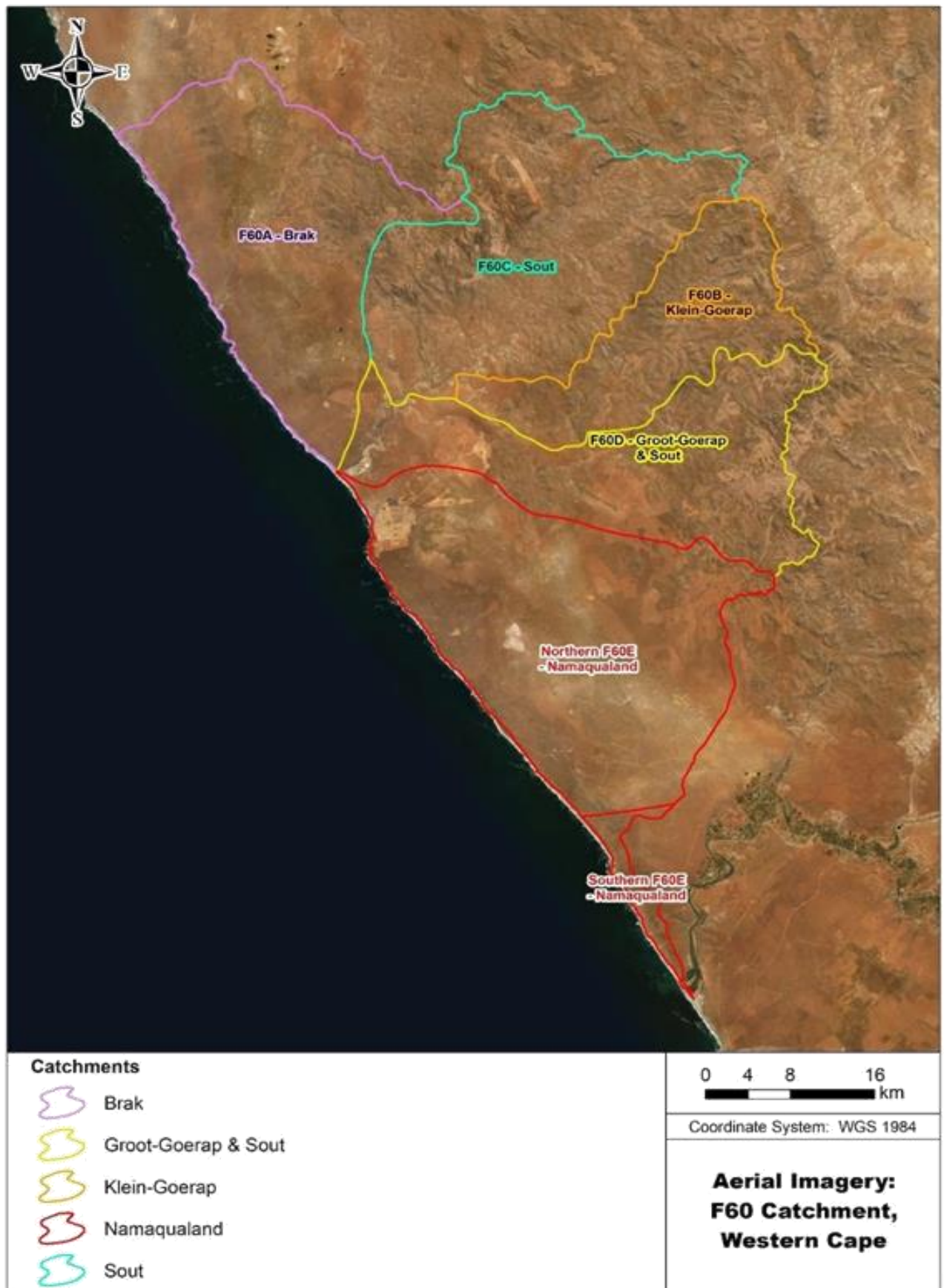


**Umzobo 1:** Imephu yeengingqi kwiindawo zoboniselo ngamanzi u- F60 no-G30 ibonisa izikhundla ze- EWR neeNdawo zoBoniselo ngamanzi ezidweliswe ngezine.





**Umzobo 2:** Imephu yomdibaniso yee- GRUs ezicandiweyo kwindawo yoboniselo ngamanzi i- G30



**Umzobo 3:** Imephu yomdibaniso yee- GRUs ezicandiweyo kwindawo yoboniselo ngamanzi u- F60