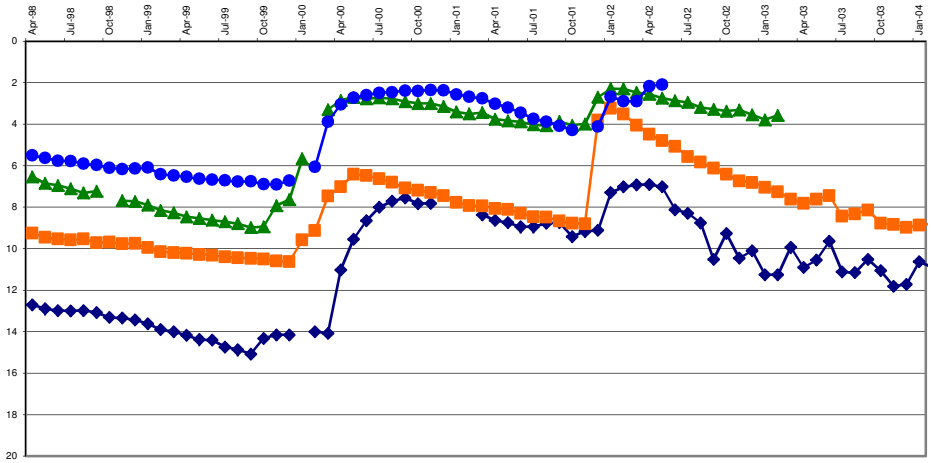
`LIMPOPO REGION

DIRECTORATE
WATER REGULATION AND USE

STATUS REPORT ON
GROUNDWATER LEVELS & TRENDS
1 NOVEMBER 2011 – 1 NOVEMBER 2012



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DECEMBER 2012

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SUMMARY

The rainy season has just started and no significant recharge of groundwater is notable thus far. Groundwater levels continue to decline slowly. And the majority of the monitoring stations indicate lower groundwater levels than the same time last year. Long-term data indicate that despite some years of a general declining trend, the current situation is still healthy. Some local areas seriously impacted by abstraction exist and warrant close monitoring. Aquifer management is again stressed as vitally important for sustainable use. Service providers as well as other abstractors should be well informed and capacitated to manage the resources.

1. BACKGROUND

Short and long-term groundwater level trends and rainfall distribution over the Limpopo Province is discussed in the report and an example of pumping effects is included.

The distribution of Limpopo's groundwater level monitoring stations from which water level data was obtained is depicted by (MAP 1)

Groundwater level data was collected during November 2012. All water level values used are that on the 1st of each month in question and taken at 12H00 in the case of logger data. Where logger data is not available the hand measurement taken during the site visit is used.

181 Of the 188 stations visited have water level data available for the past quarter and 176 for the whole year.

2. GROUNDWATER LEVELS

2.1 GROUNDWATER LEVEL TRENDS; AUGUST TO NOVEMBER 2012 (MAP 2)

Water levels for November were measured on the 1st of November and although some good rains were recorded during October, recharge is mostly not evident yet after the past dry season. On MAP 2 it is clear that the majority of groundwater levels are still lower than that measured on 1 August.

181 Of the stations visited have data for both dates, of these; 127 (70.2%) indicate a decline in groundwater level with the average being -0.36m. 54 Stations (29.8%)recorded a rise in groundwater level with an average rise of0.4m.

2.2 GROUNDWATER LEVEL BEHAVIOUR; NOVEMBER 2011 TO NOVEMBER 2012 (MAPS 3 & 4)

MAP 3 indicates that the majority of groundwater levels in the Limpopo are currently lower than that of the corresponding time last year. Most of the higher water levels occur along the southern part of the Olifants River drainage, the upper Lephalale and Mokolo River drainages (Waterberg area) and in the Njelele drainage area. A few indicated along the middle Sand River are affected by irrigation abstraction and are not considered true reflections of the water levels. The areas are indicated by the polygons on MAP 4.

176 Stations have data for the whole year. 151 (85.8%) of these have lower groundwater levels with an average decline of -0.99m, while the 20 stations (11.4%) considered giving a true reflection of the trend rose by an average of only 0.2m. The water level at 5 other stations either reflect pumping levels or recorded extreme rises due to local flooding of adjacent water courses.

3. RAINFALL (MAPS 4 & 5, GRAPH 1)

The total rainfall recorded over the past year is also depicted on Map 4. The correlation between higher rainfall areas and higher groundwater levels as discussed above is clearly illustrated in the Olifants, Lephalale, and Mokolo and Njelele drainages. While higher rainfall was not received in the middle and lower Njelele areas, recharge took place from the run-off of the Soutpansberg Mountains to the south.

The percentage of normal rainfall the past few months is presented on MAP 5 compiled by the South African Weather Services. Most of Limpopo had a good early rain season.

The rainy season has just started and indication from Graph 1 is that the early part, September to October, was good one compared to the previous two years. The trend the last few years were however of a dry late season and it can only be hoped that this trend does not continue.

4. CURRENT GROUNDWATER LEVEL TRENDS; SOME EXAMPLES

4.1. GROUNDWATER LEVEL TRENDS AT SOME STATIONS IN THE A4 DRAINAGE (Mokolo River): (GRAPH 2)

This is mostly a low impacted groundwater area and groundwater levels, in opposite to the rest of the Province; indicate a stable situation to even slightly rising trends.

4.2 GROUNDWATER LEVEL TRENDS AT SOME STATIONS IN THE A5 DRAINAGE (Lephalale River): (GRAPH 3)

Groundwater levels follow the same trend as displayed over the majority of the Province namely a slow declining trend over some years now.

4.3 GROUNDWATER LEVEL TRENDS AT SOME STATIONS IN THE A9 DRAINAGE (Levhuvhu & Mutale Rivers): (GRAPH 4)

Trends in this drainage are the same slow decline as for the A5 discussed above.

4.4 GROUNDWATER LEVEL TRENDS AT SOME STATIONS IN THE B8 DRAINAGE (Letaba River) : (GRAPHS 5 & 6)

Stations presented for the southern part of the Letaba drainage are located from the upper mountain catchment (Haenertsburg) to the lowveld prior to entering the Kruger Park (Mbaula). Groundwater levels are mostly stable to even a slight rise (GRAPH 5)

Groundwater levels in the northern part of this drainage, drained by the Klein and Middle Letaba Rivers, display the same declining trend as the rest of the Province over some years (GRAPH 6)

4.5 40 YEAR GROUNDWATER LEVEL TRENDS AT SOME STATIONS IN THE A7 DRAINAGE AROUND POLOKEANE (Sand River): (GRAPH 7)

Groundwater level trends indicated on Graph 7 vary from stable to a slow declining trend over the past 10 years. This is representative of the general situation over most of the Limpopo as already indicated above. Historic data indicates the same trend over the first part of the graph from 1972 1980. The middle part, 1981 to 1995 illustrates levels over a prolonged period of drought when record lows were recorded in many areas. The graph serves to illustrate that despite the general decline in groundwater levels over some years now, the current situation is still good.

5. IMPACTS OF ABSTRACTION ON GROUNDWATER LEVELS (GRAPH 8)

The trend at station A7 BEAULE is used to illustrate the effect of abstraction that can be clearly seen on Graph 8.The natural slow decline in notable until May 2011 after which a nearby borehole was equipped and abstraction for community water started. Large fluctuations in water level due to cycles of pumping and recovery are clear. There is also however a drastic increase in the longer term rate of decline in the water level which has dropped by 6.6m since abstraction commenced.

6. IMPORTANCE OF GROUNDWATER MANAGEMENT

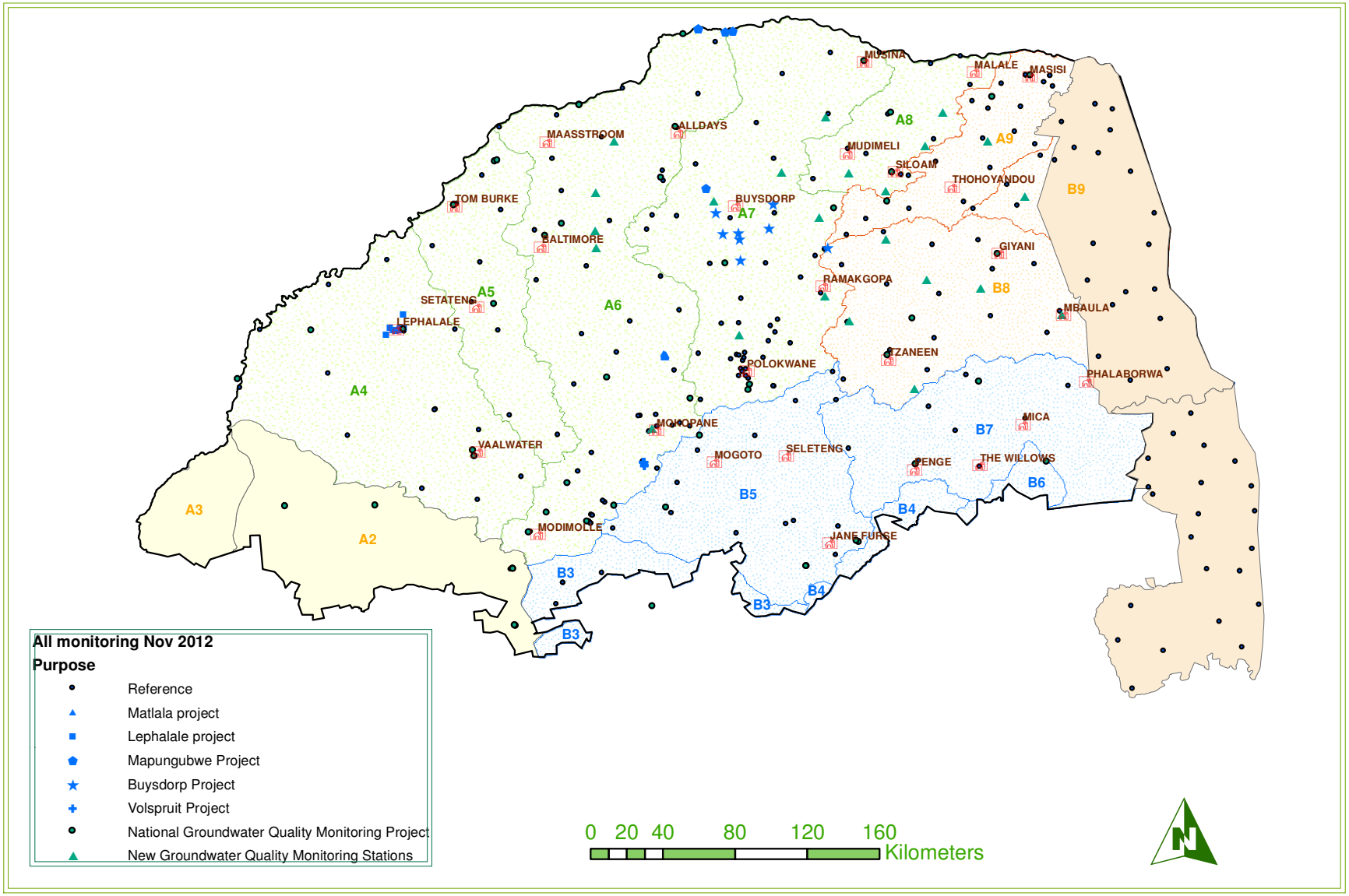
Although current groundwater levels, where historic data is available, are still well above the worst recorded and still indicate a generally healthy situation, sound resource management is still of critical importance. The effect as illustrated by Graph 8 leaves no doubt that poor or non-management of an aquifer will lead to local aquifer failure despite the good overall situation.

7. ACKNOWLEDGEMENTS

7.1. info@weathersa.co.zahttp://www.weathersa.co.za/

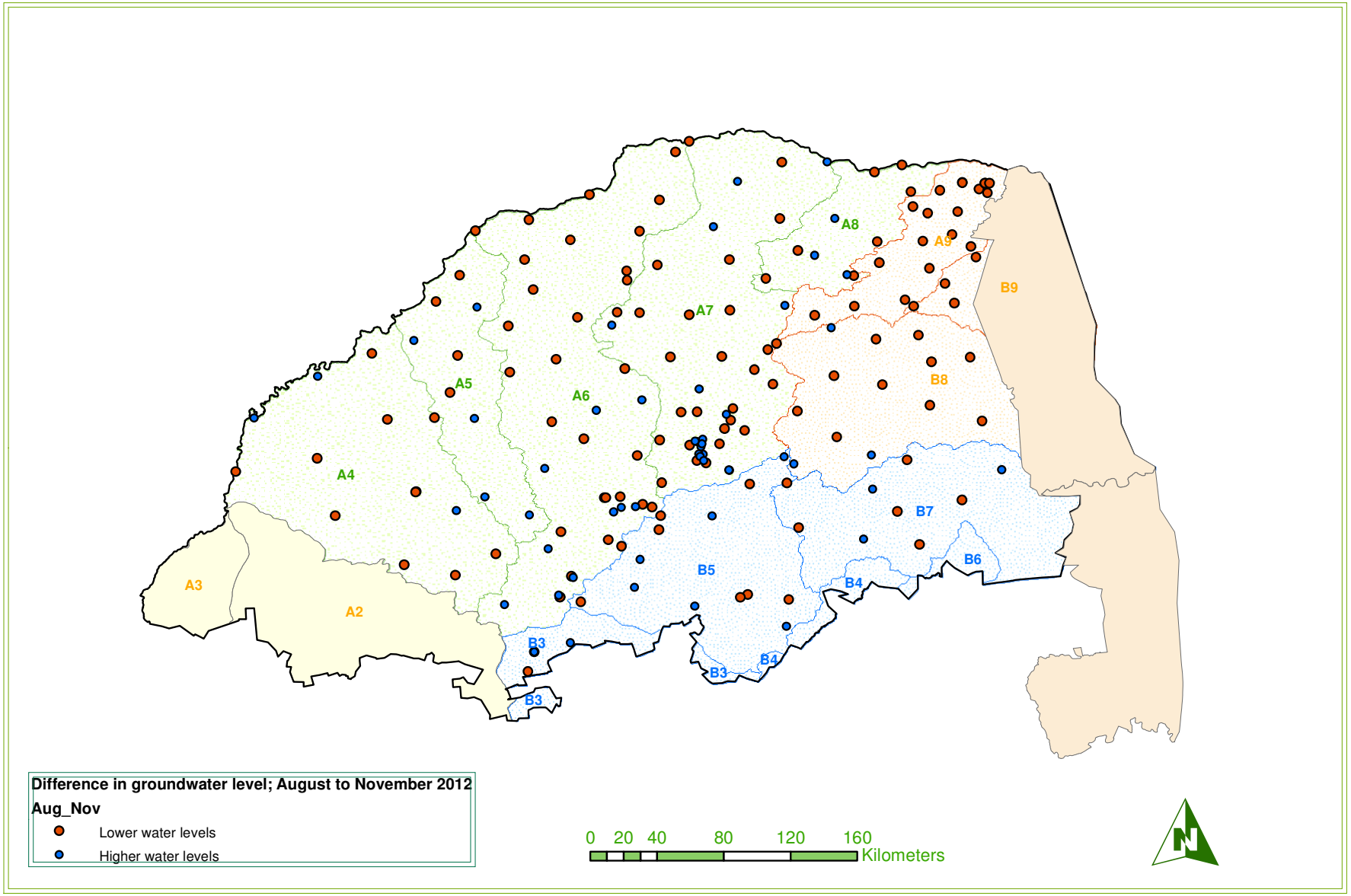
(Rainfall data for Limpopo Province as well as map 5)

Water Resource Information Management Limpopo
Distribution of groundwater monitoring stations



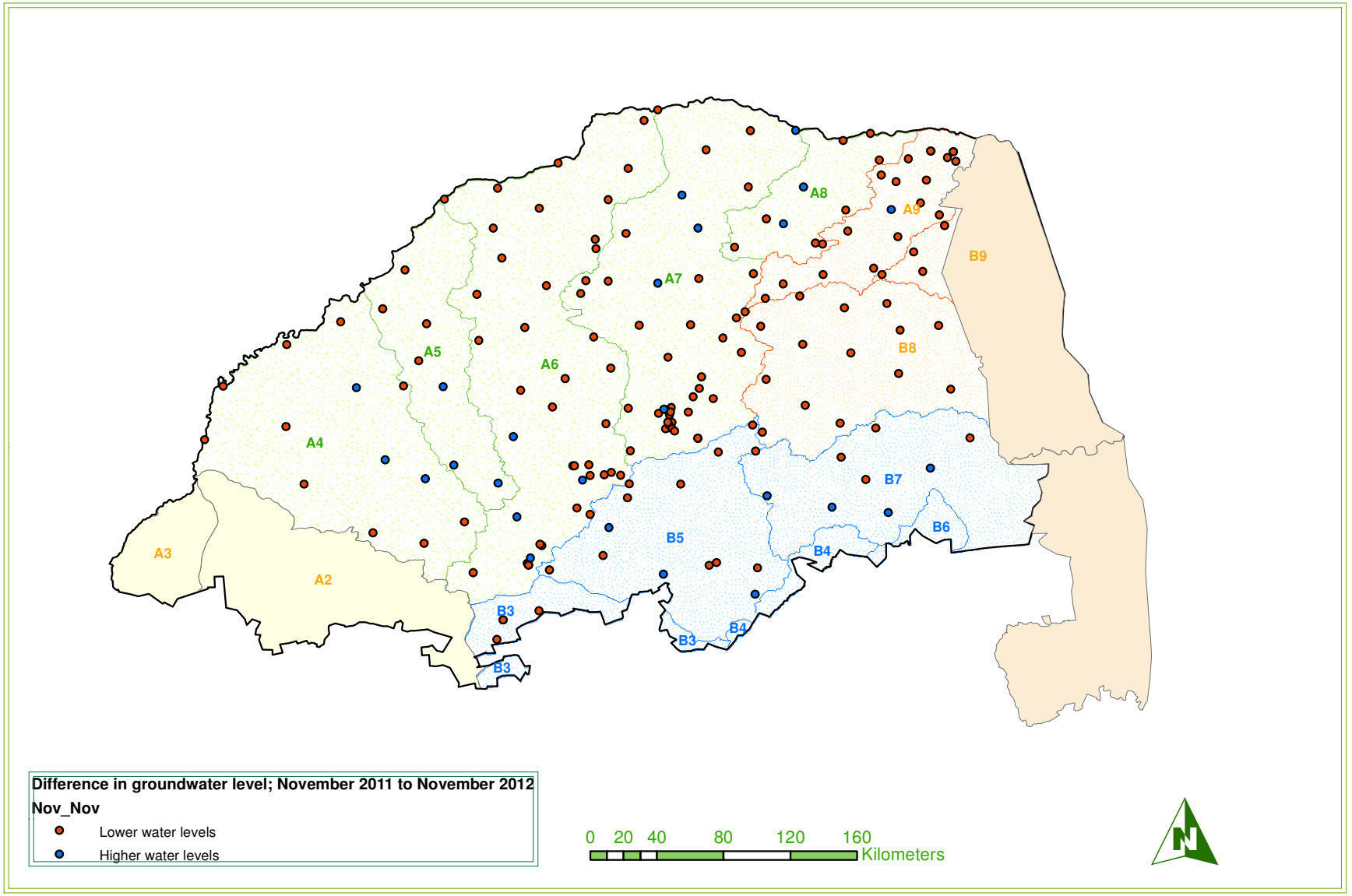
MAP 1

Groundwater level trend: August to November 2012



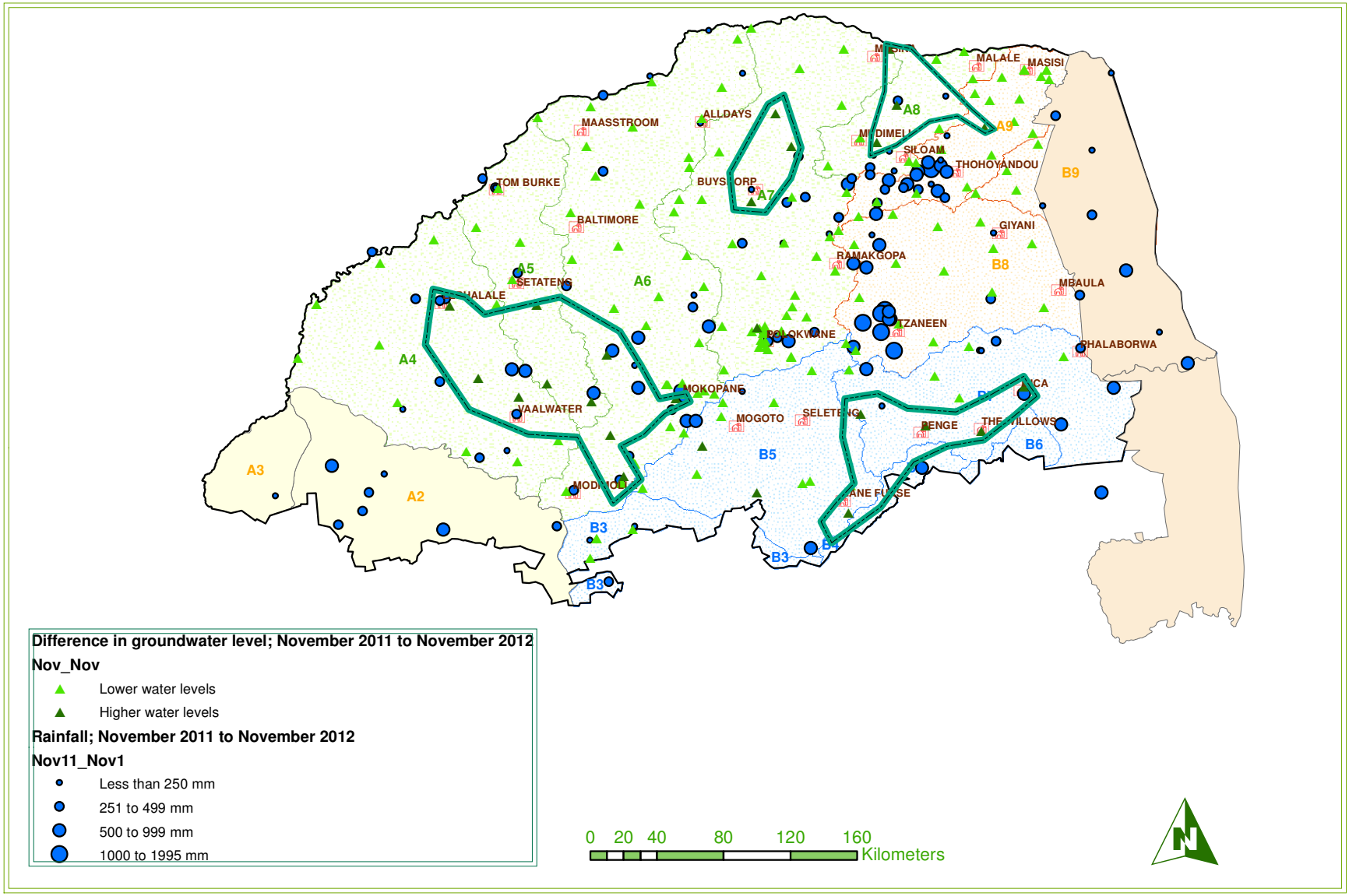
MAP 2

Groundwater level trend: November 2011 to November 2012



MAP 3

Groundwater level trend and total rainfall received: November 2011 to November 2012



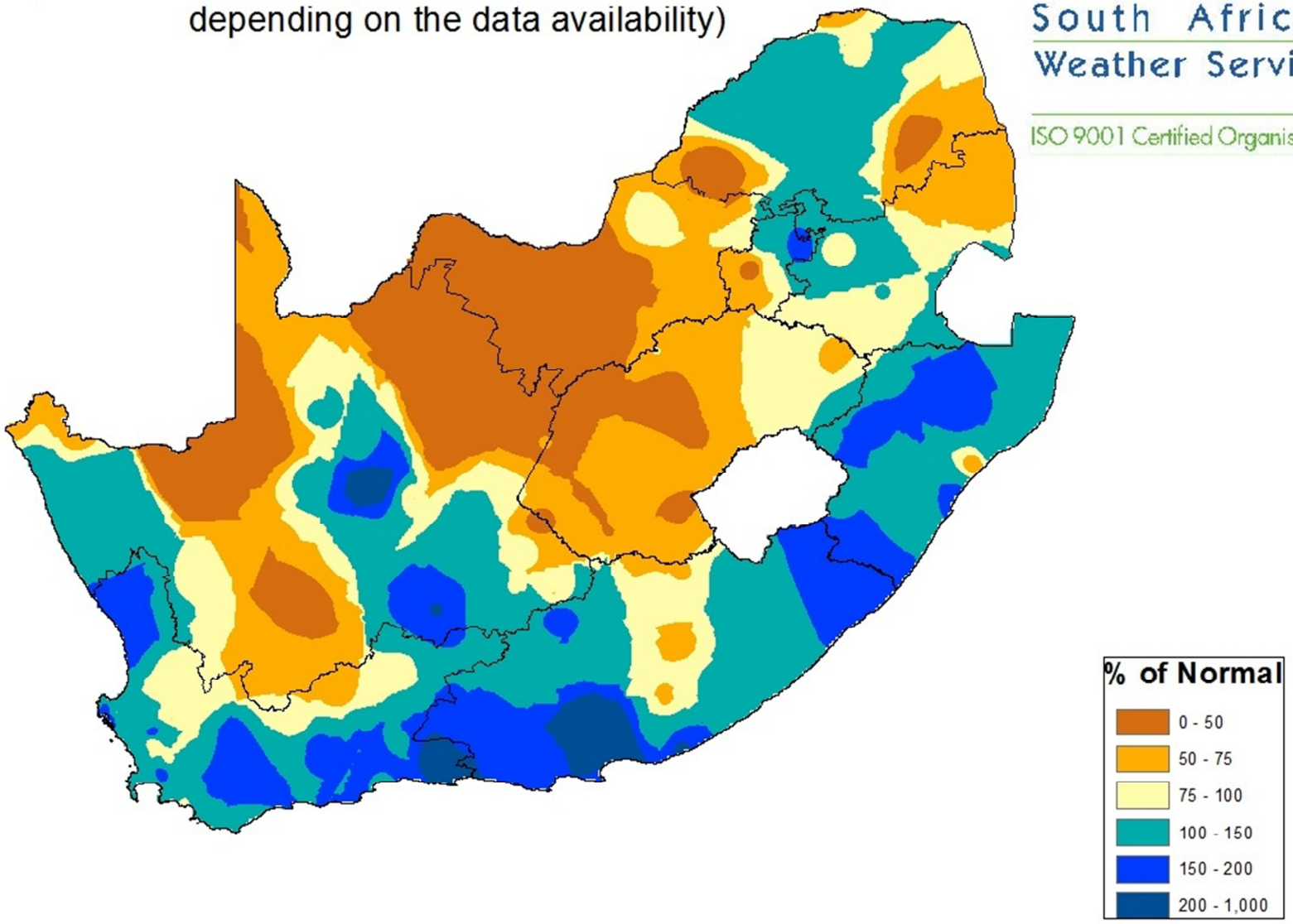
Map 4

Percentage of normal rainfall for season July 2012 - November 2012

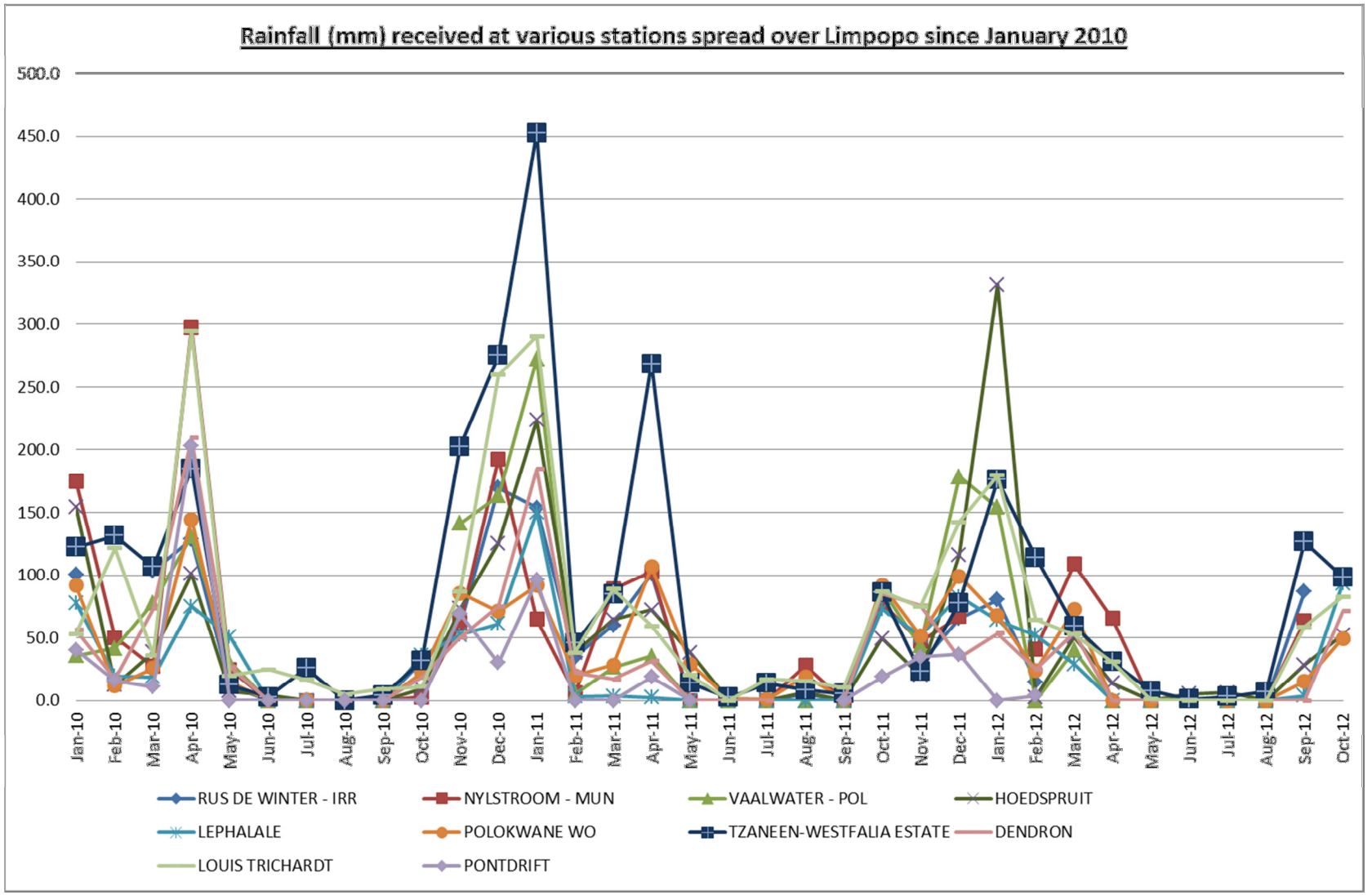
(Based on preliminary data,The number of stations vary depending on the data availability)

South African Weather Service

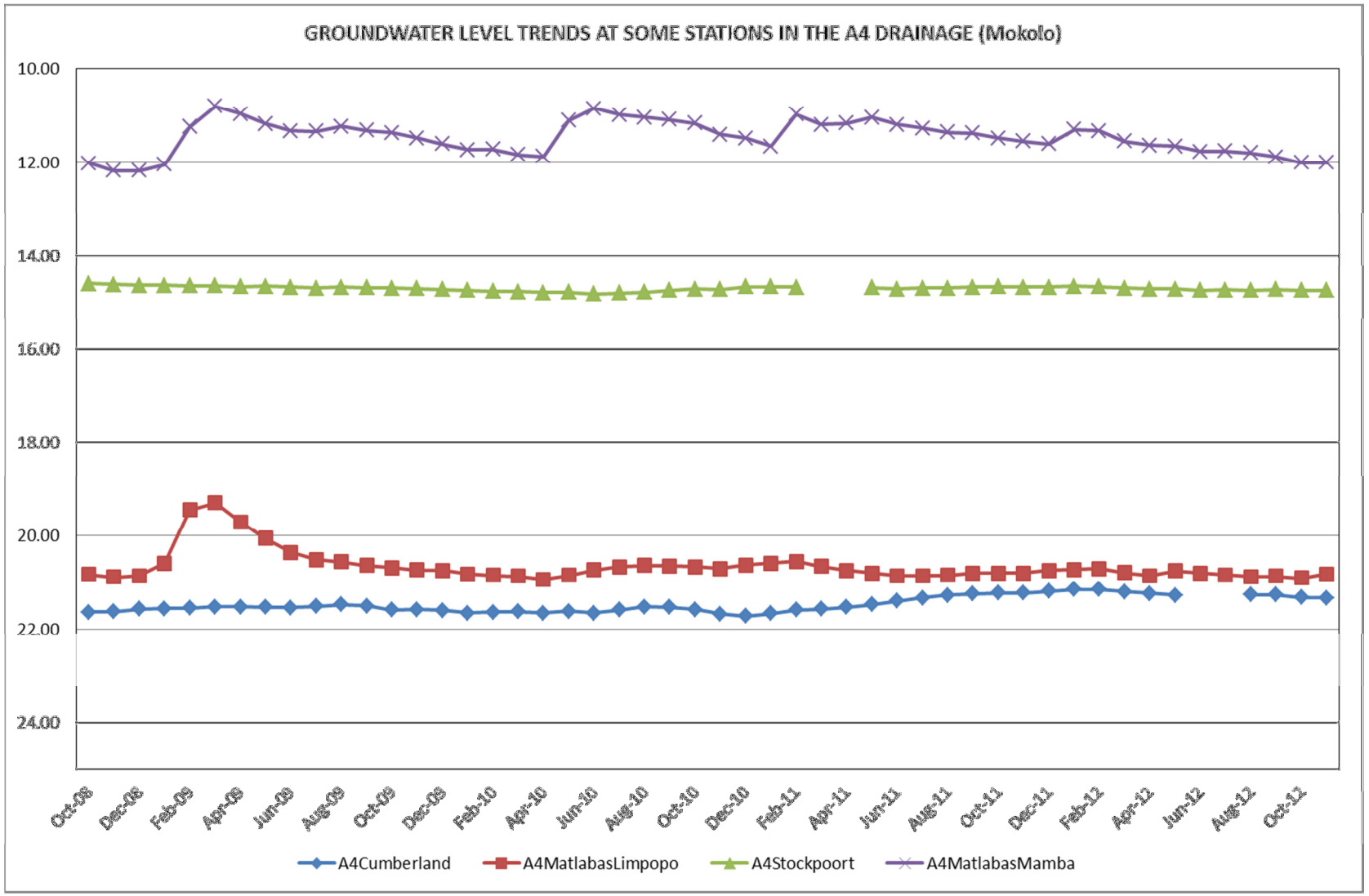
ISO 9001 Certified Organisation



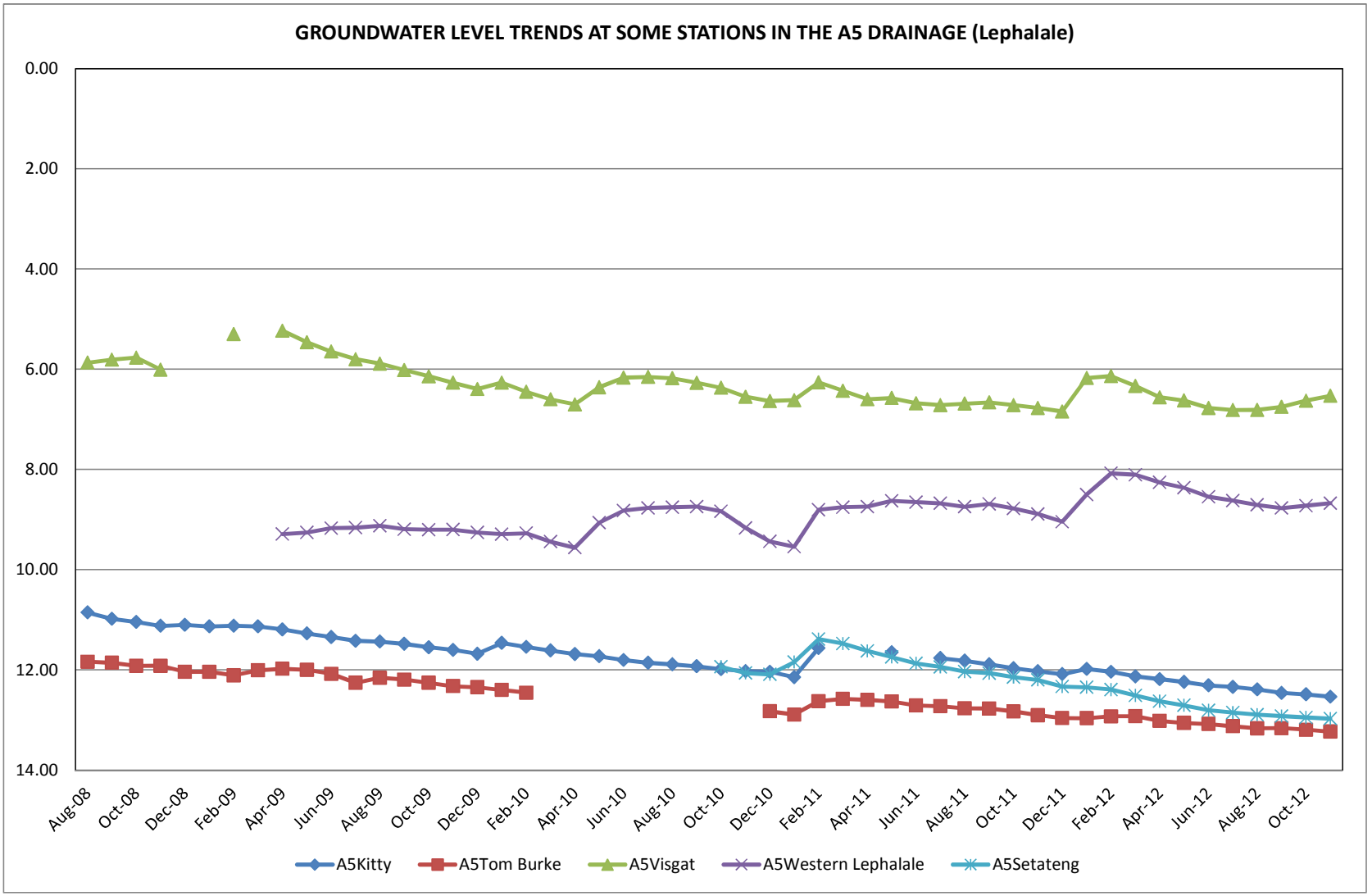
MAP 5


Rainfall (mm) received at various stations spread over Limpopo since January 2010
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Jan-10
Feb-10
Mar-10
Apr-10
May-10
Jun-10
Jul-10
Aug-10
Sep-10
Oct-10
Nov-10
Dec-10
Jan-11
Feb-11
Mar-11
Apr-11
May-11
Jun-11
Jul-11
Aug-11
Sep-11
Oct-11
Nov-11
Dec-11
Jan-12
Feb-12
Mar-12
Apr-12
May-12
Jun-12
Jul-12
Aug-12
Sep-12
Oct-12
RUS DE WINTER - IRR
NYLSTROOM - MUN
VAALWATER - POL
HOEDSPRUIT
LEPHALALE
POLOKWANE WO
TZANEEN-WESTFALIA ESTATE
DENDRON
LOUIS TRICHARDT
PONTDRIFT

GRAPH 1

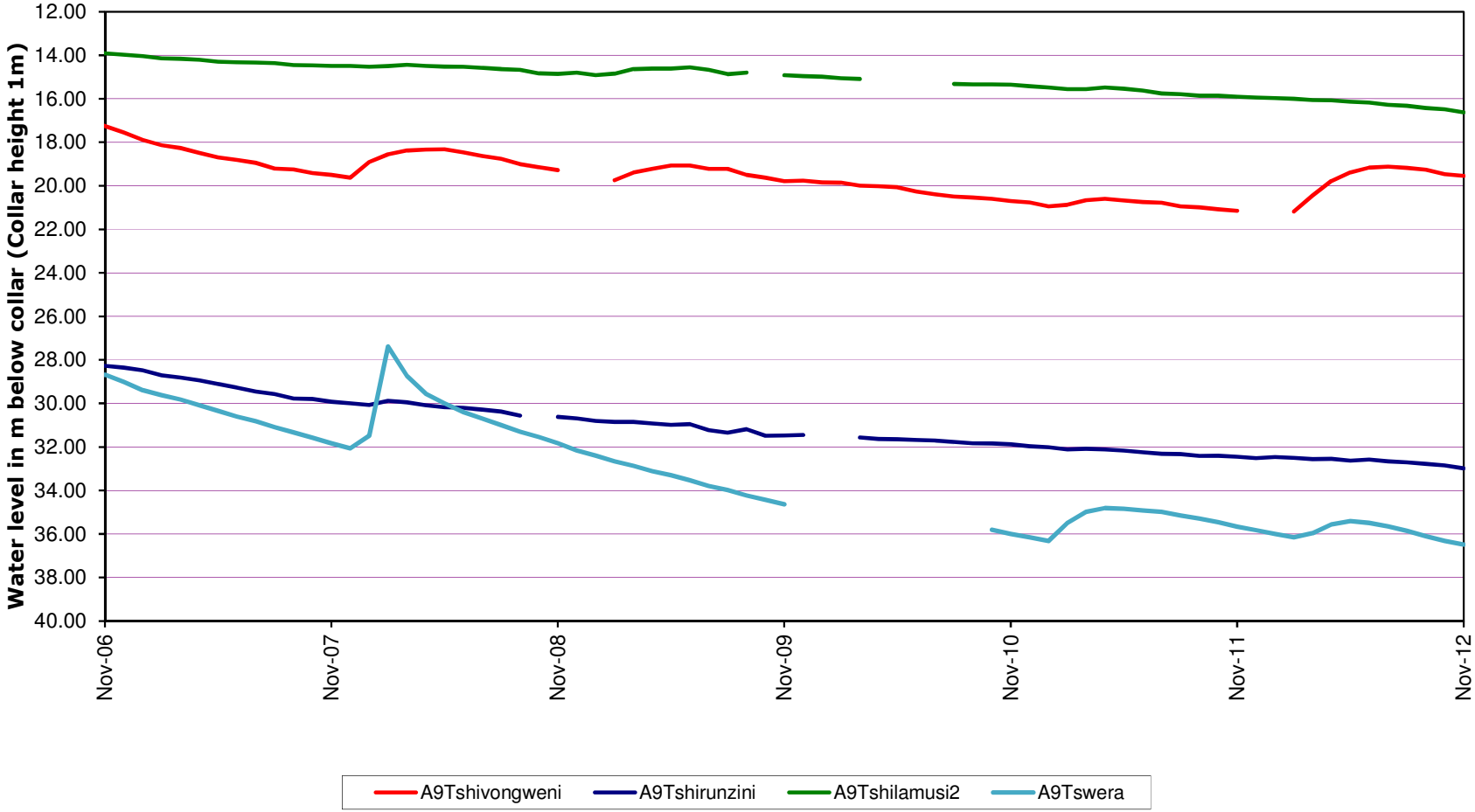

GROUNDWATER LEVEL TRENDS AT SOME STATIONS IN THE A4 DRAINAGE (Mokolo)
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
A4Cumberland
A4MatlabasLimpopo
A4Stockpoort
A4MatlabasMamba

GRAPH 2


GROUNDWATER LEVEL TRENDS AT SOME STATIONS IN THE A5 DRAINAGE (Lephalale)
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
Aug-08
Oct-08
Dec-08
Feb-09
Apr-09
Jun-09
Aug-09
Oct-09
Dec-09
Feb-10
Apr-10
Jun-10
Aug-10
Oct-10
Dec-10
Feb-11
Apr-11
Jun-11
Aug-11
Oct-11
Dec-11
Feb-12
Apr-12
Jun-12
Aug-12
Oct-12
A5Kitty
A5Tom Burke
A5Visgat
A5Western Lephalale
A5Setateng

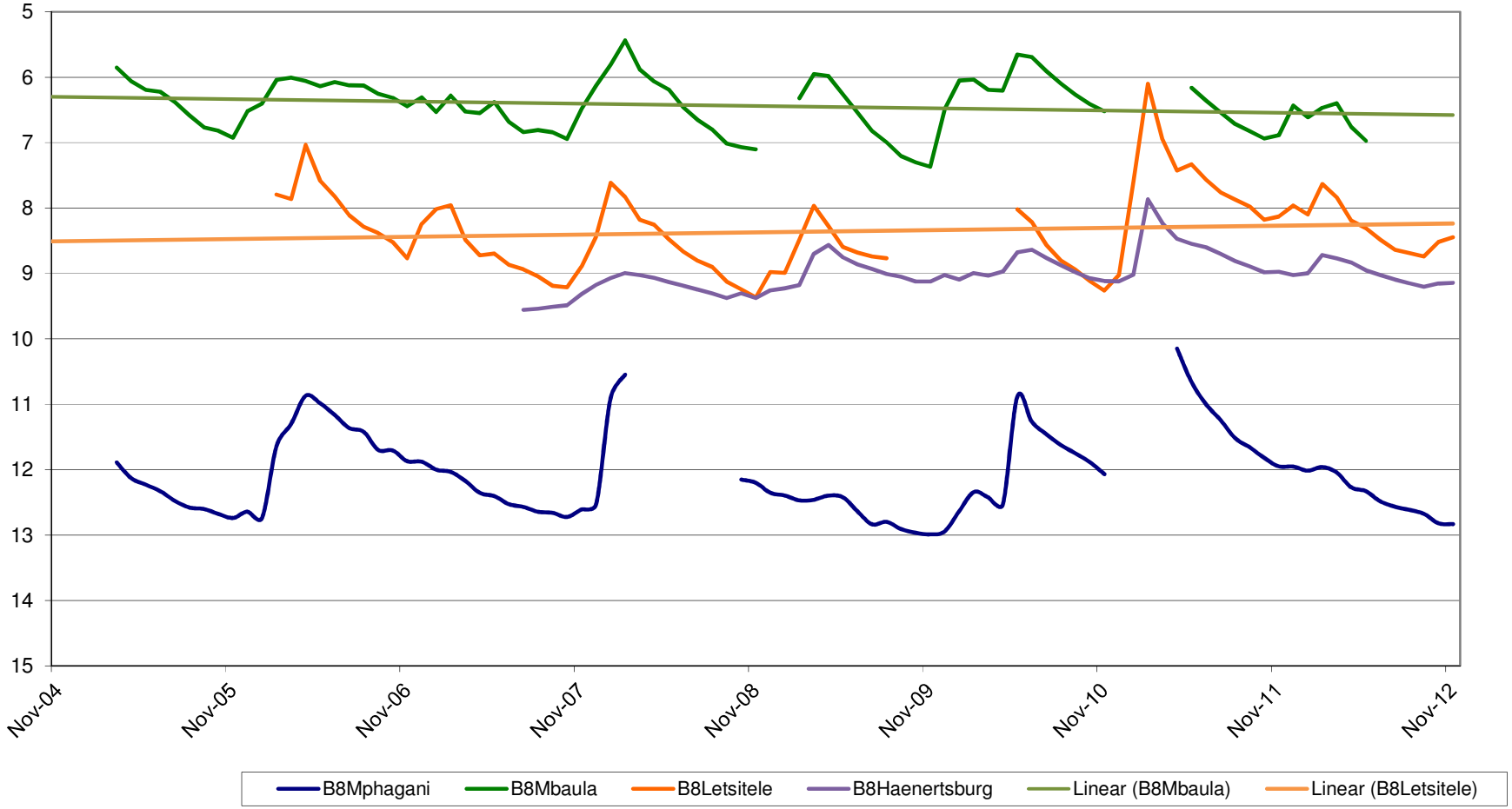
GRAPH 3

GROUNDWATER LEVEL TRENDS AT SOME STATIONS IN THE A9 DRAINAGE (Levhuvhu & Mutale)

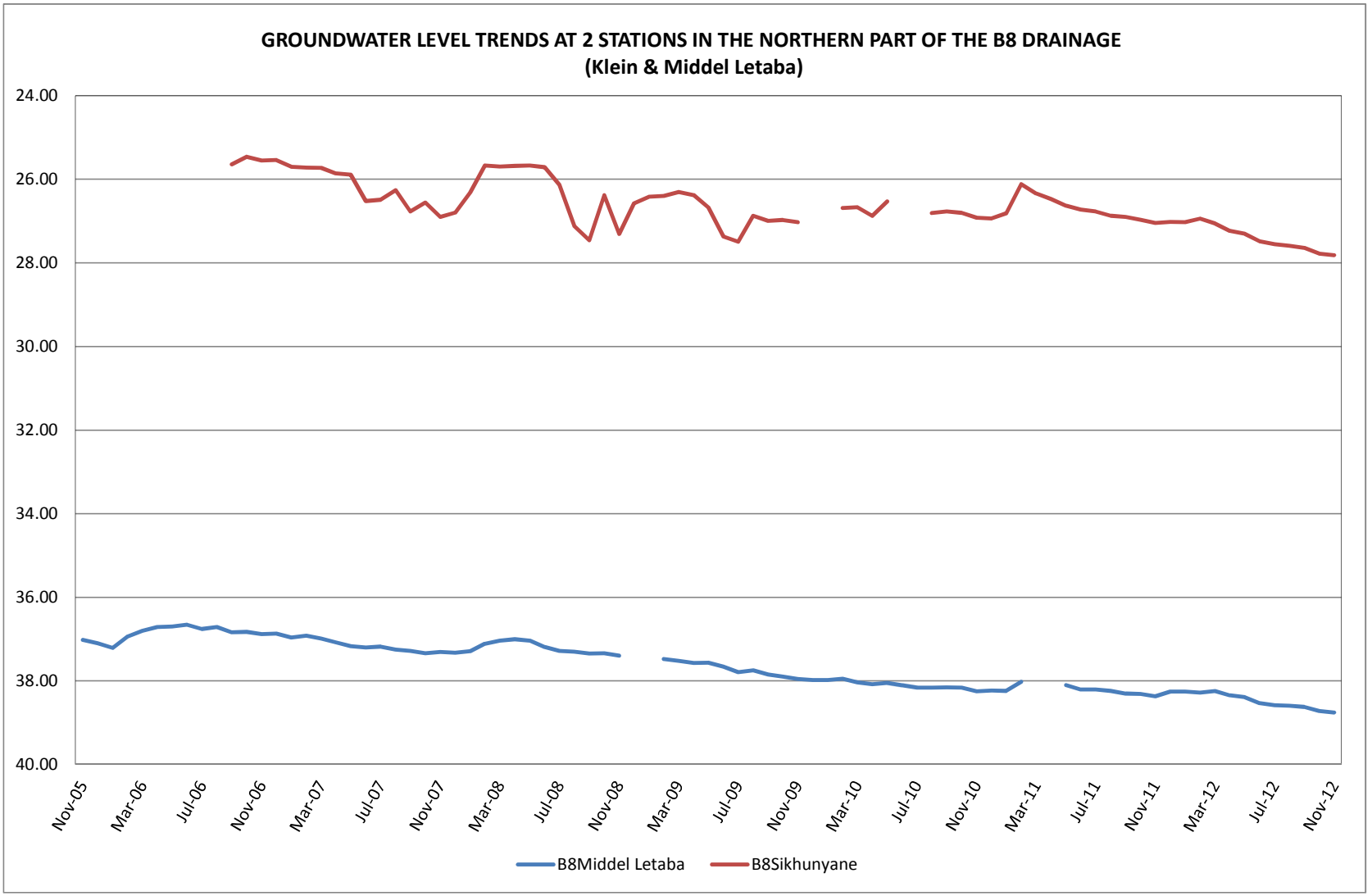


GRAPH 4

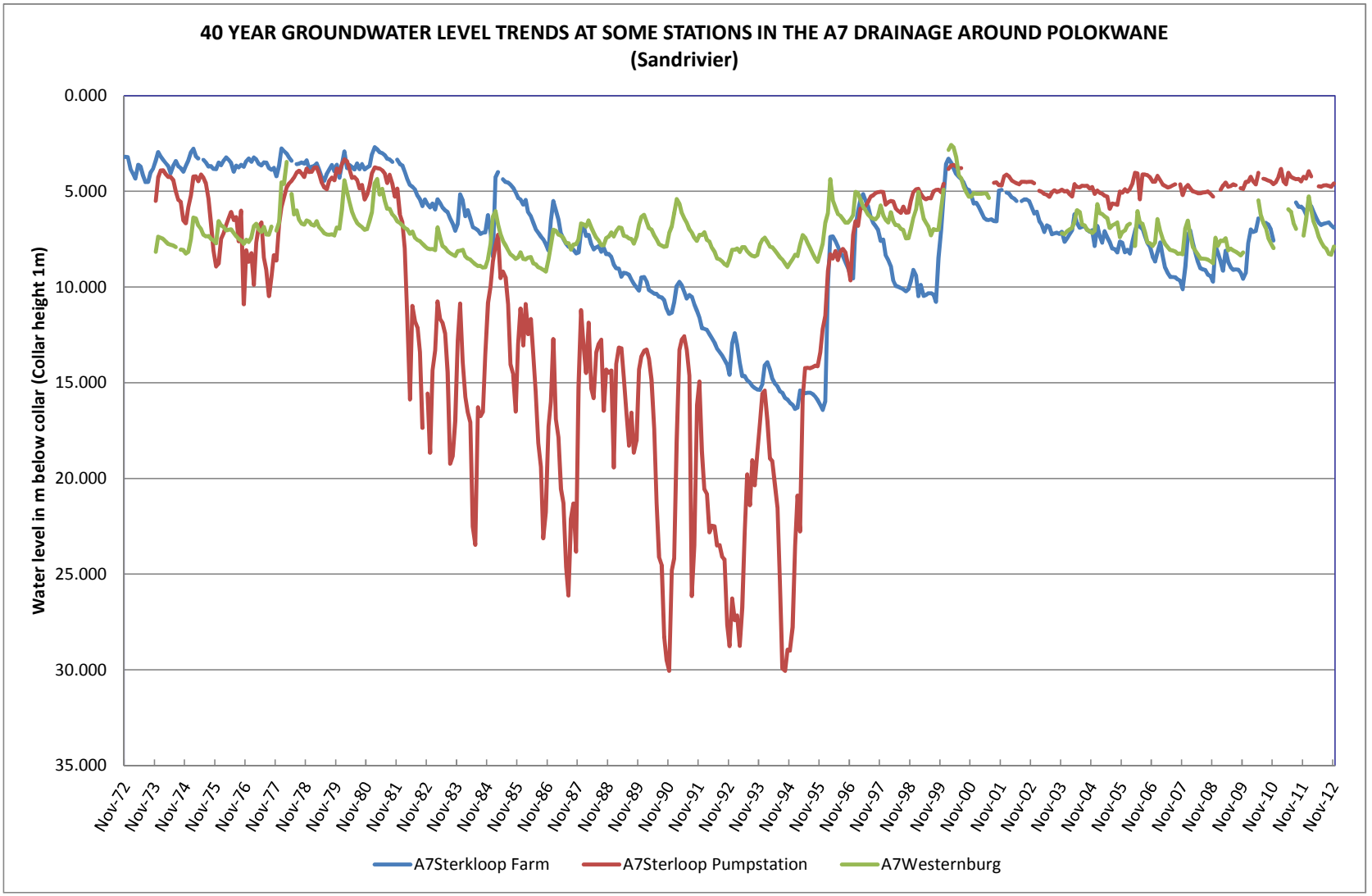
GROUNDWATER LEVEL TRENDS AT SOME STATIONS IN THE SOUTHERN PART OF THE B8 DRAINAGE (Letaba)



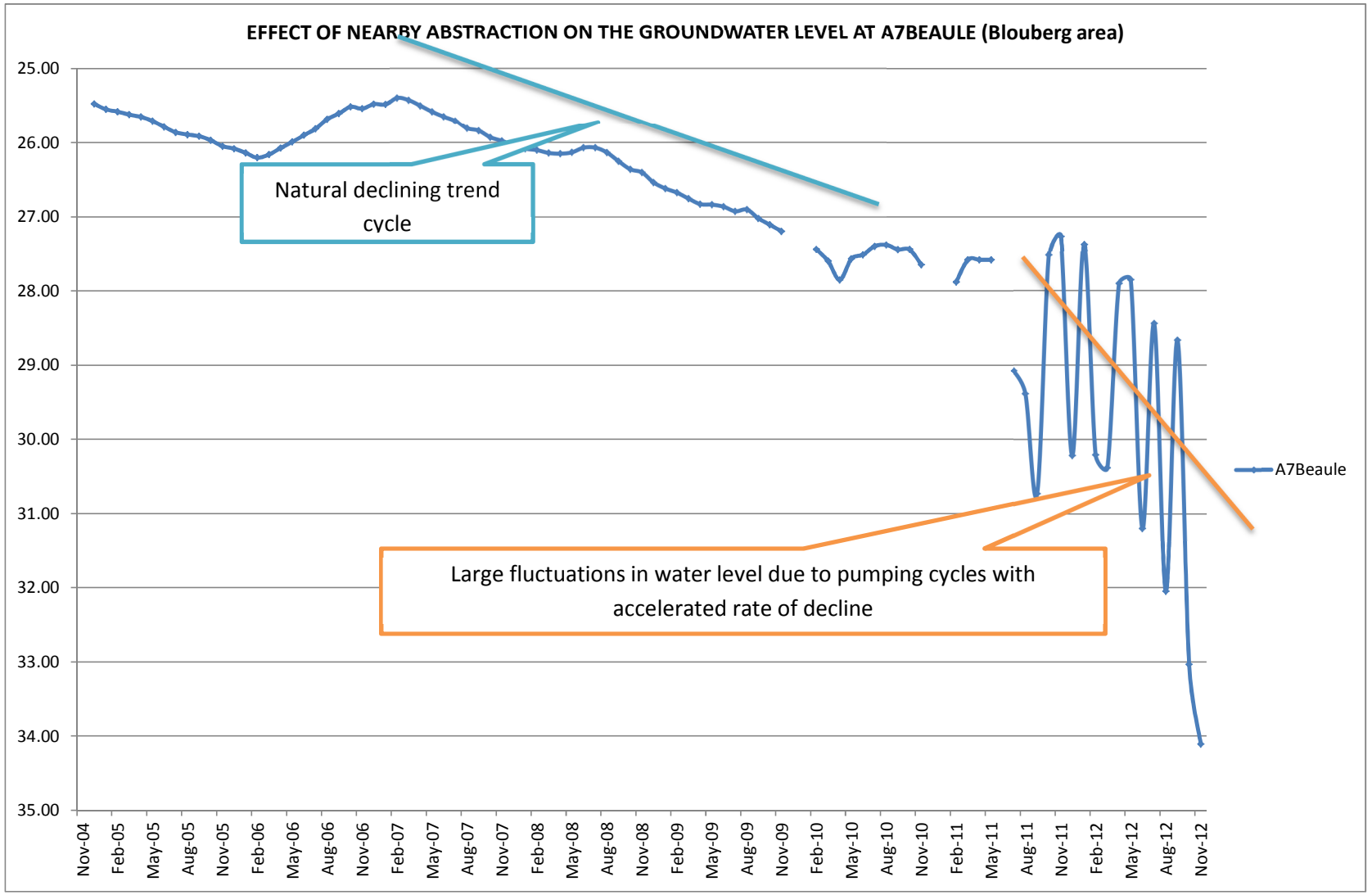
GRAPH 5


GROUNDWATER LEVEL TRENDS AT 2 STATIONS IN THE NORTHERN PART OF THE B8 DRAINAGE
(Klein & Middel Letaba)
24.00
26.00
28.00
30.00
32.00
34.00
36.00
38.00
40.00
Nov-05
Mar-06
Jul-06
Nov-06
Mar-07
Jul-07
Nov-07
Mar-08
Jul-08
Nov-08
Mar-09
Jul-09
Nov-09
Mar-10
Jul-10
Nov-10
Mar-11
Jul-11
Nov-11
Mar-12
Jul-12
Nov-12
B8Middel Letaba
B8Sikhunyane

GRAPH 6


40 YEAR GROUNDWATER LEVEL TRENDS AT SOME STATIONS IN THE A7 DRAINAGE AROUND POLOKWANE
(Sandrivier)
Water level in m below collar (Collar height 1m)
0.000
5.000
10.000
15.000
20.000
25.000
30.000
35.000
Nov-72
Nov-73
Nov-74
Nov-75
Nov-76
Nov-77
Nov-78
Nov-79
Nov-80
Nov-81
Nov-82
Nov-83
Nov-84
Nov-85
Nov-86
Nov-87
Nov-88
Nov-89
Nov-90
Nov-91
Nov-92
Nov-93
Nov-94
Nov-95
Nov-96
Nov-97
Nov-98
Nov-99
Nov-00
Nov-01
Nov-02
Nov-03
Nov-04
Nov-05
Nov-06
Nov-07
Nov-08
Nov-09
Nov-10
Nov-11
Nov-12
A7Sterkloop Farm
A7Sterloop Pumpstation
A7Westernburg

GRAPH 7


EFFECT OF NEARBY ABSTRACTION ON THE GROUNDWATER LEVEL AT A7BEAULE (Blouberg area)
Natural declining trend cycle
Large fluctuations in water level due to pumping cycles with accelerated rate of decline
A7Beaule
25.00
26.00
27.00
28.00
29.00
30.00
31.00
32.00
33.00
34.00
35.00
Nov-04
Feb-05
May-05
Aug-05
Nov-05
Feb-06
May-06
Aug-06
Nov-06
Feb-07
May-07
Aug-07
Nov-07
Feb-08
May-08
Aug-08
Nov-08
Feb-09
May-09
Aug-09
Nov-09
Feb-10
May-10
Aug-10
Nov-10
Feb-11
May-11
Aug-11
Nov-11
Feb-12
May-12
Aug-12
Nov-12

GRAPH 8