TECHNICAL REPORT NO: GH 3954

# A REGIONAL GROUNDWATER RESOURCE ASSESSMENT OF THE QUATERNARY CATCHMENT AREAS A61F AND A61G SITUATED IN THE POTGIETERSRUS / MAHWELERENG AREA AND THE PROPOSED MANAGEMENT THEREOF

by

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# EXECUTIVE SUMMARY

The study area, which consists of the Quaternary catchment areas A61F and A61G and includes towns of Potgietersrus and Mahwelereng, falls under the jurisdiction of the Greater Potgietersrus Local Authority. Groundwater has been extensively used for municipal, irrigation and mining purposes in the area. Due to an increase in the use of groundwater, which is already suffering from poor management and localised over-abstraction, the Division of Geohydrology was requested to re-assess the area's groundwater resources in order to establish the current status and potential of the aquifers and to compile an overall groundwater balance. Another important objective was to formulate a groundwater management plan for the area in which all the local stakeholders could contribute and participate.

The main groundwater users in the area include the Greater Potgietersrus Local Authority and the adjacent villages (3.29 x $10^6m^3/a$), Agriculture/Irrigators (7.19 x $10^6m^3/a$) and Potgietersrus Platinum Mine (2.29 x $10^6m^3/a$) totalling 12.77 x $10^6m^3/a$.

A borehole census was undertaken in the study area in collaboration with WSM Consultants (Pty) Ltd, from which, together with harvest and exploitation potential of the study area, a regional groundwater balance was compiled. The results indicated that based on the harvest potential there is still 10.08 x $10^6m^3/a$ of groundwater available but based on the exploitation potential a deficit of 0.72 x $10^6m^3/a$ already exists.

There is a total lack of aquifer management, which contributed to the current over-utilisation and localised over-abstraction of the resource. The alluvial aquifer along the Mogalakwena River has already been dewatered because of this. The dewatering was further enhanced by the lack of recharge. The Upper reaches of the Dorps River, which falls within the study area, has been declared a Subterranean Water Control area. Water use allocations were issued to the relevant farmers. Evaluations, however, have shown that these allocations exceed the harvest potential of this part of the catchment. Sub-catchment areas identified as over-utilised and under stress are A61F5 and A61G4 whereas A61F2, A61F3, A61F4 as well as A61G5 and A61G8 are moderately utilised.

Monitoring boreholes that were commissioned in the mid 1980's indicated a general lowering of water levels over the last 12 to 15 years with periods of recovery after above-average rainfall events. These recovery periods are, however, of short duration only. The current monitoring network is insufficient for the study area and needs to be extended.

Recommendations that have been proposed to conserve and manage the groundwater resources in the study area include:

- Investigate the use of storm water for artificial recharge purposes
- Establish a suitable network (improve the current distribution) of monitoring boreholes
- Produce a monthly groundwater level monitoring status report
- Develop and calibrate a conceptual groundwater flow model to predict a worst-case scenario
- Co-ordinate all new groundwater developments in the area

- Raise the level of groundwater awareness amongst the local population and groundwater users
- Establish a Water User's Association, which should include all the stakeholders in the area
- Determine the groundwater component of the reserve
- Register all water uses
- Consider the whole of the study for compulsory licensing

Groundwater is considered an important and valuable resource in the study area. The optimization of its use on a sustainable basis should become a very high priority to all the different stakeholders.

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# 1. INTRODUCTION

## 1.1. BACKGROUND INFORMATION

In terms of Water Services Act No 108 of 1997 Section 11(1) and 11(2) (a) the Potgietersrus Local Authority has a duty to all consumers or potential consumers in its area of jurisdiction to ensure efficient, affordable, economical and sustainable access to water services. However, this duty is subject to the availability of the resources. The groundwater resource had been and still is extensively utilised in the area for municipal, irrigation and mining purposes. The increasing use of groundwater coupled with poor management of this resource eventually led to localised over-abstraction and subsequently conflict between different users. The Division of Geohydrology of the Department of Water Affairs and Forestry was requested by its Director: Water Resource Management to re-assess the groundwater resources of the area in question, which consists of a number of quaternary catchment areas along the Mogalakwena River (Figure 1). The assessment was necessary in order to establish the current status and potential of the aquifers in the study area as well as the overall groundwater balance taking cognisance of the abstractions by the various users in the area. Stressed or fully developed sub-quaternary catchment areas should be identified. The approach followed in the assessment of the groundwater resources was to assess the relevant Quaternary Catchment areas (A61F and A61G) as a whole and not only the affected areas.

## 1.2 WATER DEMANDS AND CURRENT WATER USAGE

The water demand of the area is displayed in the table below:

*Table1: Greater Potgietersrus TLC Population and Water Needs Projections**

| Water User | 2000 | | 2005 | | 2010 | | 2015 | |
|---|---|---|---|---|---|---|---|---|
| | **Popula-tion** *($x10^3$)* | **Water needs** *($x10^6m^3/a$)* | **Popula-tion** *($x10^3$)* | **Water needs** *($x10^6m^3/a$)* | **Popula-tion** *($x10^3$)* | **Water needs** *($x10^6m^3/a$)* | **Popula-tion** *($x10^3$)* | **Water needs** *($x10^6m^3/a$)* |
| Potgietersrus | 12.6 | 3.30 | 14.2 | 3.74 | 16.1 | 4.13 | 18.2 | 4.58 |
| Mahwelereng | 45.9 | 2.30 | 51.9 | 2.97 | 58.7 | 3.77 | 66.5 | 4.79 |
| Madiba | 8.1 | 0.10 | 9.1 | 0.15 | 10.3 | 0.24 | 11.7 | 0.38 |
| Sekgakgapeng / Lekalakala | 34.9 | 0.41 | 39.5 | 0.64 | 44.7 | 0.97 | 50.6 | 1.48 |
| Squatters | 7.7 | 0.00 | 8.7 | 0.12 | 9.9 | 0.21 | 11.2 | 0.34 |
| **TOTAL** | 109.2 | 6.11 | 123.4 | 7.62 | 139.7 | 9.32 | 158.2 | 11.53 |

**Population projection has been escalated at 2.5%*
*Potgietersrus demand is based on an average of 250 l/c/d*
*Mahwelereng demand is based on average 100 l/c/d*
*Sekgakgapeng/Lekalakala & Madiba is based on 25 l/c/d*
*Mining demand is based on 11000$m^3$/d for both production and human needs*
*The future water demand for the mine to obtain full production for the next 15 years is 4.01 x$10^6m^3/a$.*

The current usage from the available water resources by the Greater Potgietersrus TLC and the Potgietersrus Platinum Mine are depicted in *Tables 2* and *3* respectively.

*Table2: Water usage in the Greater Potgietersrus TLC area*

| Water Source | User | Usage ($10^6 m^3/a$) |
|---|---|---|
| Doorndraai Dam ( Surface water) | Potgietersrus<br>Mahwelereng<br>Madiba | 2.92* |
| Planknek/Weenen well field | Potgietersrus | 3.71 |
| Uitloop Portion 39 | Potgietersrus | 0.18 |
| Rooisloot well field | Sekgakgapeng/Lekalakala | 0.29 |
| Mahwelereng (Dispersed and private boreholes) | Mahwelereng | 0.18 |
| Mahwelereng (Dispersed boreholes for Institutions) | Makopane College and Hospital | 0.12 |
| Madiba (Dispersed boreholes) | Madiba | 0.04 |
| **TOTAL USAGE (surface & groundwater)** | | **7.44** |

**Surface water*

*Table 3: Water usage by the Potgietersrus Platinum Mine*

| Water Source | User | Usage ($10^6 m^3/a$) |
|---|---|---|
| Blinkwater JV Well field | Potgietersrus Platinum Mine | 0.44 |
| Potgietersrus Effluent | | 0.93* |
| PPL Well field | | 0.73 |
| Commandodrift Well field | | 0.52 |
| Grassvalley Chrome Mine | | 0.54 |
| **TOTAL USAGE (surface & groundwater)** | | **3.16** |

**Surface water*

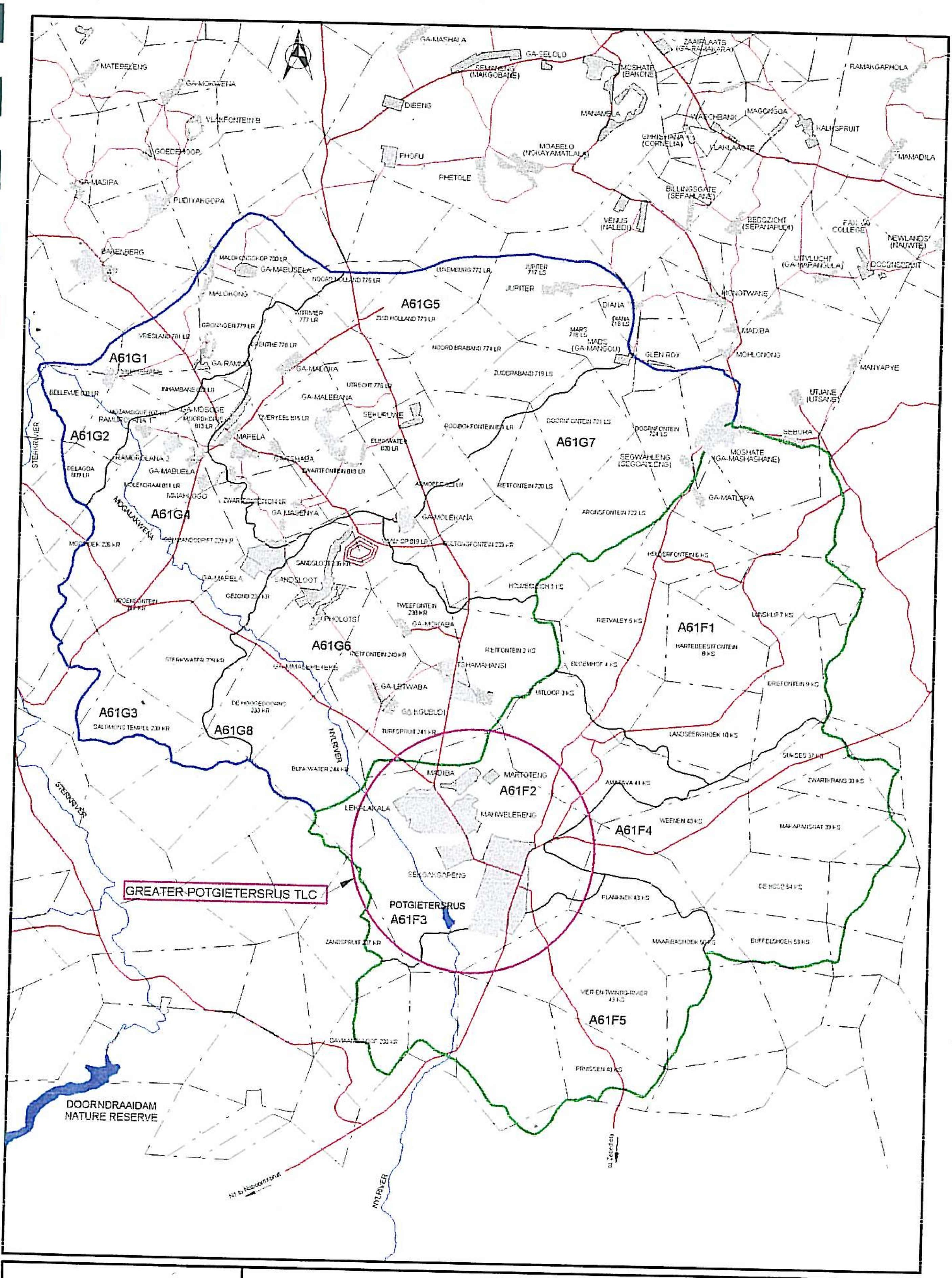
## 1.3 SCOPE

The main scope of the study is as follows: -

- Borehole census
- Determine existing abstractions per sub-quaternary catchment
- Evaluate existing well fields as well as existing monitoring network within the study area
- Calculate groundwater balance per sub-quaternary catchment
- Identification of stressed areas
- Develop a management plan
- Extension of existing monitoring network
- Launch groundwater awareness campaign amongst all groundwater users in the area
- Make recommendations for further work and enhancement of the management plan

## 1.4 LOCALITY

Greater Potgietersrus Transitional Local Council is situated midway between the towns of Pietersburg and Naboomspruit in the Northern Province. The study area is situated in the catchment area of the Mogalakwena River and consists of quaternary catchments A61G and A61F (Figure 1). The catchments include the farms Uitloop, Blinkwater, Planknek and Weenen, rural communities Madiba, Sekgakgapeng and Lekalakala, the towns of Potgietersrus and Mahwelereng and the Potgietersrus Platinum Mine (PPL).




# LOCALITY MAP

FIG. 1

## 1.5 DRAINAGE

The drainage of the two quaternary catchment areas A61F and A61G making up the study area is to a large extent controlled by the underlying geology and consists of a broad flat north-south trending valley roughly nine kilometres in length. The main drainage channel is the Mogalakwena River, which flows in a northwesternly direction with several seasonal tributaries draining the high lying areas in a southwesternly direction. These tributaries include the Dorps and Rooisloot Rivers, which drain the A61F catchment and the Pholotsi, Klein Sandsloot and Wit Rivers, which respectively drain the A61G catchment. The Mogalakwena River has a gradient of 5m per 10kms.

## 1.6 PREVIOUS INVESTIGATIONS

Projections made of the Potgietersrus Water Demand deeming numerous previous investigations indicated that water shortages can be expected in the medium to long term. The Division of Geohydrology of the Department of Water Affairs and Forestry in Pietersburg had been actively engaged over a number of years in assessing the groundwater potential in the vicinity of Potgietersrus with the view of recommending the augmentation of the TLC water supply from groundwater resources.

Graats (1960) investigated the possibility of a dam in the Mogalakwena River immediately upstream of its confluence with the Rooisloot River. The construction of the dam was not approved due to bacteriological contamination from the nearby settlement. Six boreholes were drilled during the process on the farm Blinkwater (244KR). It was found that alluvial material of 20m thickness containing substantial amounts of clay was present throughout the area. It was also speculated that the course of Mogalakwena River had shifted westwards and partially been filled up by material deposited by the Dorps and Rooisloot Rivers. A geophysical survey that was subsequently carried out led to the drilling of 14 boreholes around the proposed dam site. The drilling results indicated the bedrock to be overlain by alluvial deposits on the western side, which rapidly increased in thickness in excess of 20m towards the east.

In 1973 the alluvial deposits occurring on Blinkwater 244KR and adjacent farms were re-investigated by Kok and Venter (1978) of the Department of Water Affairs and Forestry (DWAF), which led to the drilling of 37 boreholes. Some of these boreholes were later equipped with automatic water level recorders. The hydrological results obtained on the farms Knapdaar 234KR, Rietfontein 240KR and Turfspruit 241KR are summarised in technical report GH 3012 (Kok & Venter, 1978). An isopach map of the alluvium was prepared from these results, which indicated the alluvium to be in access of 25m on farm Knapdaar 234KR.

Orpen (1979) in his interim report on the groundwater supply potential of the selected areas near Potgietersrus indicated that the groundwater resources in and around Potgietersrus are very limited and recommended that it be supplement from surface water sources to meet the long-term demand. However, he strongly emphasised that proper monitoring has to be done to acquire reliable data to support future assessment of the groundwater resource.

Lyness (1980) carried out extensive regional geohydrological investigation of the area around the town of Potgietersrus, which included a large portion of the Nile River catchment. This study eventually led to the establishment of the Dorps River well field on the farms Planknek and Weenen.

Taylor (1981) conducted an investigation to quantify the groundwater resources of the Upper Mogalakwena Valley to augment the Potgietersrus Water Supply. Primary aquifers, which were found to exist along the Dorps and Rooisloot River's respective confluences with the Mogalakwena River, consist of arenaceous and rudaceous alluvial material deposited by these two tributaries. An extensive geophysical survey conducted during the study indicated the alluvial aquifer to comprise saturated coarse-grained deposits overlaying 10m or more of well-weathered and fractured bedrock. This study was later extended by Orpen (1984) who investigated the installation and evaluation of boreholes in the Rooisloot area for the provision of water to the township of Mahwelereng. This led to the establishment of the so-called new Rooisloot well field.

Fayazi (1995) re-assessed the old and new Rooisloot well fields as well as the dolomitic aquifer on the farm Uitloop. The latter is extensively tapped for irrigation purposes on this farm. The objective was also to assess the feasibility of developing and/or utilising new or existing groundwater target areas to augment the existing diminishing water supply. He concluded that the primary aquifer in the vicinity of the old and new Rooisloot well fields was completely de-watered due to poor aquifer management and over abstraction and that the underlying weathered and fractured mafic aquifer was under severe stress. Potential target areas were identified down stream of these two well fields in the vicinity of the Pholotsi and Klein Sandsloot Rivers. Du Toit and Maswuma (1999) investigated the exploitable groundwater potential of this area, which included the drilling of about 43 exploration boreholes. High blow yields were obtained in fractured Bushveld Complex related granite dykes or sills intrusive in the weathered and fractured mafic rock aquifer. The PPL mine is currently using some of these exploration boreholes that in turn supply some of this water to the nearby villages.

## 2. GEOLOGY

The regional geology of the area comprises a variety of lithostratigraphical sequences (Figure 2), which spans a considerable length of the geological history of the study area.

### 2.1 PIETERSBURG GROUP

The Pietersburg Group, which is the oldest rocks in the study area (between 3300 and 3800 Ma), can broadly be divided into two parts. The lower part termed the Mothiba Formation and considered constituting the base of the Pietersburg Group, usually forms moderately high ridges in the study area. It consists mainly of serpentinite, pyroxenite, amphibolite, various types of green-schist, tuff, quartz porphyry, banded ironstone, phyllitic shale and carbonate schist. It represents a wide range of strongly metamorphosed volcanic and sedimentary rocks of which more than one cycle is properly developed. A sequence of coarse to fine clastic sedimentary rocks previously known as the Uitkyk Formation follows concordantly on the lower part.

## 2.2 HOUT RIVER GNEISS

The Hout River Gneiss, which is intrusive into the Pietersburg Group (Brandl, 1986), occupies the northeastern part of the study area. It largely underlies flat, undulating country and consists of a wide variety of granitoid rocks including leucocratic migmatite and gneiss, grey and pink hornblende-biotite gneiss, grey biotite gneiss and pegmatitic rocks (Brandl, 1986). Leucocratic migmatite and gneiss consist typically of dominant quartzo-feldspathic layers and thin parallel streaks, mainly of biotite (Brandl, 1986). Although the Hout River Gneiss is generally poorly exposed, reasonable exposures can be seen at a few locations in the study area.

## 2.3 UNNAMED GRANITE

This unnamed granite of Randian age, which forms a few low hills at Vaalkop, is a medium-grained, occasionally fine-grained, grey to pink rock of granodioritic composition (Brandl, 1986).

## 2.4 UTRECHT GRANITE

The Utrecht Granite, which is intrusive in the Hout River Gneiss, is located approximately 30 kilometres north of Potgietersrus. The intrusion forms a circular stock-like body covering an area of approximately 25 square kilometres. It comprises mainly a fine-grained pink biotite rock of granodioritic composition (Du Toit, 2001). No radiometric age is available for this pre-Bushveld Complex granite, but is regarded by Van Wyk (1977) to be of Vaalian age. Locally, garnets are present and enhance a weak foliation. Brandl (1998) found this to be an S-type granite, which means that it has been derived by the melting of a sedimentary precursor, which is most probably a metapelite. This could explain the relatively high $Al_2O_3$ content and the presence of garnet in the rock. Brandl (1998) also interpreted the Utrecht Granite as an anorogenic granite, which means that it was formed during a period of tectonic quiescence between orogenic periods and found that it is also not related to subduction processes. Inclusions (xenoliths) of gneiss, which are most probably related to the Hout River Gneiss, are abundant in the main exposure of the Utrecht Granite (Du Toit, 2001).

## 2.5 MASHASHANE SUITE

In the Mashashane Suite of intrusion, which occupies the central portion of the study area, two phases have been recognized namely the Lunsklip and Uitloop Granites (Brandl, 1986). The Lunsklip Granite varies from a pink coarse-grained, slightly porphyritic rock to real granite porphyry with a fine-grained matrix (De Villiers and Brandl, 1977). The Lunsklip Granite is characterised by rounded feldspar phenocrysts. The sphericity of these phenocrysts is probably due to magmatic corrosion or resorption (De Villiers and Brandl, 1977). The Uitloop Granite is mineralogically similar to the Lunsklip Granite but does not contain hornblende (Brandl, 1986). It is mainly reddish in colour and medium- to coarse-grained, with an adamellitic composition (Brandl, 1986). Both Uitloop and Lunsklip Granites are characterised by the presence of milky blue quartz, which is indicative of post-crystallisation stress (De Villiers and Brandl, 1977; Van Wyk, 1977; Brandl, 1986). Radiometric age determinations indicate an age of about 2 610 Ma for the Lunsklip Granite and about 2 550 for the Uitloop Granite (Burger and Coertze, 1977; Burger and Walraven, 1979b; Brandl, 1986).

## 2.6 TRANSVAAL SEQUENCE

The Transvaal Sequence includes the succession from the Wolkberg to the Pretoria Groups. The Wolkberg Group attains a maximum thickness of 300m in the study area and wedges out north of Potgietersrus. The succession was laid down in a protobasin on an uneven granitic floor with the result that the lower subdivisions, consisting of alternating volcanic, felspathic and conglomeratic rocks, are not persistent. The Black Reef Formation, which overlies the Wolkberg Group, consists mainly of greyish white medium-grained quartzite with occasional conglomerate beds. The Wolkberg Group and Black Reef Formation give rise to a prominent escarpment.

The Black Reef Formation, which has a minimum thickness of about 50m, is followed by the Chuniespoort Group, which also decreases in thickness north of Potgietersrus, where it overlies granites of the Basement complex. The Chuniespoort Group is subdivided into the Malmani Sub-Group represented by serpentinized dolomite, the Penge Formation comprising banded ironstone and shale followed by the Duitschland Formation comprising limestone, dolomite, chert, shale, quartzite, diamictite and hornfels.

The Pretoria Group, which consists of a number of subdivisions, comprises quartzite, shale, hornfels, marble and conglomerate with the quartzite forming the characteristic hills and ridges in the more southern and southeastern parts of the study area.

## 2.7 BUSHVELD COMPLEX

The rim of the Bushveld Complex trending north-south along the western boundary of the study area has been divided into a mafic portion termed the Rustenburg Layered Suite, a felsic portion represented by the Rashoop Granophyre and the Lebowa Granite Suites. The Rashoop Granophyre Suite is genetically related to the Rooiberg Group (not on Figure 2) and thus pre-dates the other units of the Complex.

### 2.7.1 Rustenburg Layered Suite

Four units have been recognised comprising the Rustenburg Layered Suite of which the Zoetveld Subsuite, Mapela Gabbro-Norite, and the Molendraai Magnetite-Gabbro are developed in the study area (Brandl, 1986). The Zoetveld Subsuite occurs as a satellite body, consisting of bronzitite with minor intercalated harzburgite (Van der Merwe, 1976, 1978; Brandl, 1986). Both lithologies exhibit a marked layering and are often serpentinized, especially near the base of the zone. The Mapela Gabbro-Norite consists of a 200 metre thick unit [regarded as the platinum bearing Platreef] and now thought to be part of the Rooipoort Norite-Anorthosite (Brandl, 1986) consisting of harzburgite followed by feldspathic and pegmatite pyroxenite, which in turn is overlain by norite, followed by gabbro, and anorthosite (Brandl, 1986). The succession is concluded with pyroxenite developed at the top, which also form several bands at the contact between the norite and gabbro (Brandl, 1986). The Molendraai Magnetite-Gabbro or upper zone is made up of alternating units of gabbro, anorthosite and ferrogabbro, the latter occurring mainly in the lower third of the zone (Brandl, 1986). The top of the succession is marked by the presence of olivine diorite.

### 2.7.2 Lebowa Granite Suite

The Lebowa Granite Suite overlying the Rustenburg Layered Suite, is represented by the Nebo Granite which is mainly a reddish, coarse-grained rock composed of orthoclase (perthitic), quartz, albite, hornblende and minor biotite (Brandl, 1986). The radiometric age of the Nebo Granite is given as 1 920 ± 40 Ma (Coertze *et al.*, 1978; Brandl, 1986).

### 2.7.3 Rashoop Granophyre Suite

The Rashoop Granophyre comprises the Waterval- and Stavoren Granophyre (not distinguished on Figure 2). The Waterval Granophyre occurs locally at the base of the granite and overlies leptite and basic rocks. The Stavoren Granophyre forms the roof phases of the granite in contact with quartzite of the Stavoren Fragment and with Rooiberg Lava in other parts of the area.

## 2.8 DIABASE INTRUSIONS

Diabase intrusions occur as dykes in almost all the formations in the study area. In the Swazian rocks and in the Hout River Gneiss they often give rise to ridges but in the sedimentary rocks they usually form negative topographic features. Most of the dykes strike northeasterly or northwesterly. Diabase sills are limited to the Nebo Granite and seem to have been emplaced partly along pre-existing fault zones. The diabase, which varies from aphanitic to coarse grained, is a greenish black rock of gabbroic composition and has ophitic texture.

## 2.9 QUATERNARY DEPOSITS

Deposits of Quaternary age occur along the banks of Mogalakwena River and some of its tributaries such as the Rooisloot River. These alluvial deposits, which range in thickness from 15m to 25m are poorly sorted and ranges from silt to pebbles. A 2m thick layer of rich black clay overlies the alluvium (WSM, 1999). The source of this clayey material is related to an increase in land-use activities upstream and along the banks of both the Rooisloot and Mogalakwena Rivers.

## 2.10 STRUCTURAL GEOLOGY

There are a number of northeast striking faults, some of which extend from the Bushveld Complex across the Transvaal Sequence into the Hout River Gneiss. The most prominent one is the Ysterberg fault, a tear fault, which may have been reactivated during different periods. It is believed that these faults may be important targets for potentially high yielding boreholes in the study area.

# 3. HYDROGEOLOGY

## 3.1 BOREHOLE CENSUS

Borehole information was obtained from WSM (Pty) Ltd (WSM, 1999) for quaternary catchments A61G and A61F1. The DWAF Regional Office conducted borehole surveys and collected information in the remainder of quaternary catchment A61F, which included a detail borehole census on the farms Uitloop 3KS and Amatava 41KS. A total of 144 boreholes were surveyed. All of the borehole census information is summarised in *APPENDIX A.*

## 3.2 GEOHYDROLOGICAL CHARACTERISTICS

The hydrogeology of the study area is described below in terms of its hydrogeological characteristics in order to derive a regional perspective of the area.

### 3.2.1 Aquifer description

Two types of aquifers occur in the study area namely primary and secondary aquifers:

#### 3.2.1.1 Primary aquifers

Groundwater occurs in Quaternary alluvial deposits of limited lateral extent and thickness along the Mogalakwena River and some of its tributaries. The internal primary porosity of these aquifers allows for the infiltration and abstraction of water. Accumulatively it only covers approximately 1% of the total study area. In general the primary aquifers consist of unconsolidated alluvial deposits comprising a clay layer overlying poorly to well sorted sand and gravel layers with an average saturated thickness of 10m. The total thickness of the alluvium varies from 10m up to 24m. The alluvial aquifers in the study area are mostly utilised in conjunction with the underlying weathered and fractured bedrock aquifers. Water levels respond quickly during recharge events i.e. when the river flows. Due to its limited lateral extent and saturated thickness these aquifers are also vulnerable to over-abstraction during periods of drought when there is little or no recharge.

#### 3.2.1.2 Secondary Aquifers

Consolidated hard rocks cover virtually all (99%) of the study area. The rock mass in the area was formed over a period of 3800 million years, which spans a considerable part of the South African geological history. Processes of tectonic deformation (folding, faulting) aided by weathering (mostly chemical weathering), dissolution (carbonate rocks) and unloading through erosion generated and/or enhanced fractures, interstices, and solution cavities in the hard rocks of the study area, which eventually contributed to the present groundwater environment prevailing in the different hard rock formations in the study area. Based on the processes described above the secondary aquifers occupying the study area can be sub-divided into the following categories:

- ***Fractured aquifers***: These aquifers are mostly derived from faulting and shearing and/or from other tectonic activities in the area. Aquifers included in this category are the fractured granite (of Bushveld Complex origin) dykes/sill intercepted in the mafic rocks of the Rustenburg Layered Suite (Bushveld Complex), the southwest/northwest striking faults and lineaments cutting through the Bushveld Complex, the Nebo Granite (Bushveld Complex), the quartzite formations of the Black Reef Formation and Pretoria Group as well as the Mashashane Suite comprising the Lunsklip and Uitloop Granites. The fractured granite dykes/sills, which occur sporadically and at varies depths, have only been intercepted in the mafic rocks. They vary in thickness from 2m to 15m with blow yields ranging from 2.5 l/s to 23 l/s. Despite the high blow yields these granite dykes/sills are, however, expected to possess only limited storage. The potential of the southwest/northwest striking faults and lineaments have not been investigated in detail but even if it is not significant they are regarded as important conduits for the transport of recharged groundwater from the high surrounding mountainous areas to the lower lying weathered and fractured aquifers. The groundwater potential of the Nebo Granite is generally poor but the occasional good supply (> 3 l/s) does occur. Generally only one out of every five boreholes drilled is successful. The storage capacity of this granite is also very low. The same can also be said of the Mashashane Suite. Depth of weathering in these rocks is generally insignificant with very low yield expectancies. Owing to its inaccessibility and limited and restricted occurrence the groundwater potential of the Black Reef quartzites is regarded insignificant whereas the water bearing properties of the quartzite and shale of the Pretoria Group are dependent on fracturing. The shale is in general far more favourable than the quartzites although the quartzites constitute good aquifers where fractured. Where the shales have been metamorphosed and converted to hornfels by the heat of the Bushveld Complex, its water bearing properties diminished. The hornfels are usually very hard rocks with few joints. The groundwater potential of the Pretoria Group is regarded to be low to moderate.

- ***Weathered aquifers***: These aquifers are derived from the destructive process whereby rocky materials on exposure to the atmospheric agents at or near the earth's surface disintegrate and decompose physically and chemically. They are mostly restricted to the igneous and metamorphic rocks occurring in the study area especially the mafic rocks (gabbro, norite, etc.) of the Rustenburg Layered Suite (Bushveld Complex) and the Hout River Gneiss. Rocks of the Rustenburg Layered Suite are characterised by a well-developed igneous layering. The various rock units have a fairly uniform composition and may be traced over appreciable distances. Its groundwater potential is generally good with water occurring in deeply (up to 55m in places) weathered and fractured basins occurring in these mafic rocks. More that 50% of the boreholes drilled in these weathered mafic rock basins had blow yields in excess of 3 l/s. The groundwater potential of the Hout River Gneiss is in general moderate to good with two thirds of all the successful boreholes yielding > 3 l/s. High yielding boreholes in the Hout River Gneiss appear to be related to pegmatite occurrences in the area. Water in the gneisses is also obtained in deep basins of weathering and transitional zones between weathered and solid gneiss. Deep weathering in excess of 40m is not uncommon in the gneiss. Groundwater also occurs in weathered and fractured shales of the Duitschland Formation, which is tapped by the Potgietersrus water supply boreholes on the farms Weenen and Planknek. The Mothiba Formation is also labelled a weathered aquifer with deep weathering of up to 48m occurring in places. However, a very low permeability, which is probably related to excessive clay produced through the weathering processes, renders its basins of weathering extremely poor aquifers. Water in the Mothiba Formation is exclusively obtained in fissures and fractures below the weathering zone and can therefore also be labelled a fractured aquifer.

- ***Karst aquifers***: These aquifers mainly occur in the Malmani Subgroup and Duitschland Formation both part of the Chuniespoort Group, which again is stratigraphically part of the Transvaal Sequence. The Malmani Subgroup comprises an alteration of chert-bearing and chert-free dolomite with the Duitschland Formation comprising dolomite, shale and limestone at the base with an increase of clastic material towards the top. Groundwater generally occurs along fault and shear zones associated with intense deformation resulting in the occurrence of fractures, joints and cavities subsequently enlarged by dissolution processes in the dolomites. Large abstractable quantities of groundwater can be stored in these dissolution channels and cavities. Borehole yields are generally moderate to high with an expected third of the boreholes yielding in excess of 3 l/s. Karst development is limited to the dolomitic formations of the Transvaal Sequence. Numerous seasonal and some perennial springs occur in these dolomitic formations, which contribute significantly, to the base flow component of the Dorps River. However, some springs occurring in the lower Dorps River catchment have been effected by the abstraction from boreholes on Planknek and Weenen.

In terms of lateral extent the fractured and weathered aquifers appear to be the most dominant in the study area.

## 3.3 HYDROGEOLOGICAL CLASSIFICATION OF THE AQUIFERS BASED ON THEIR BOREHOLE YIELD POTENTIAL

The aquifers have been subdivided and classified according to their borehole yield potential, which in turn is based on the geology, aquifer type, aquifer characteristics and available information. Hydrogeological units derived and delineated from this classification also differentiate between areas with high, moderate and low borehole yield potential.

### 3.3.1 High borehole yield potential (>5 l/s)

FRACTURED AND WEATHERED BASIN AQUIFERS

These includes the Hout River Gneiss, the fractured granite dykes/sills intrusive in the mafic rocks of the Bushveld Complex, southwest/northeast striking faults and lineaments in the Rustenburg Layered Suite and the weathered and fractured shales of the Duitschland Formation. If targeted correctly boreholes drilled in these aquifers could produce yields in access of 5 l/s.

### 3.2.1 Moderate yield potential (2 – 5 l/s)

FRACTURED AND WEATHERED AQUIFERS

Aquifers in this category include the weathered and fractured mafic rocks of the Rustenburg Layered Suite and the metamorphic rocks of the Mothiba Formation. If well fractured the shales and quartzites of the Pretoria Group could also fall under this category, which include faults and dykes occurring in them. Borehole yields ranging from 2 – 5 l/s can be expected from these aquifers.

KARST AQUIFERS

Besides for occurrences along the Upper reaches of the Dorps River and the Planknek/Weenen well field areas, karst aquifers are not that extensively or well developed in the study area. The dolomite occurrence northwest of the farm Uitloop has to a large extent been metamorphosed to marble and calc-silicate rocks and thus not as susceptible to dissolution by acidic water. The Planknek well field, from which water is abstracted for the town of Potgietersrus, is located in a karst environment. Borehole yields range from 3 – 5 l/s.

### 3.2.2 Low yield potential (<2 l/s)

FRACTURED AND WEATHERED AQUIFERS

Many of the minor aquifers fall in this category which include the Lebowa Granite, the Black Reef Formation and Mashashane Suite. Typical expected yields range from 0.1 l/s to 2 l/s.

PRIMARY AQUIFERS

The alluvial deposits along the Mogalakwena River had an average saturated thickness of 10m when the new Rooisloot well field was commissioned in 1986. This source, which has been over-utilised, by the local authority from 1986 to present and by the farmers further down stream, has proved to be an unreliable source of groundwater. On the farms Blinkwater and De Hoogedoorns the alluvium has virtually been dewatered due to over-utilisation practises and enhanced by the lack of recharge. The latter is probably related to extended droughts in the eighties and early nineties and extensive abstraction in the recharge areas, which resulted in limited or no lateral inflow. Another reason for the overall poor performance/unreliability of the alluvial aquifer is the presence of an upper clay layer (1-3m thick), which limits the vertical infiltration of surface water to the underlying unconsolidated material. Recharge of this aquifer is thus largely depended on the lateral inflow along the Rooisloot, Dorps and Mogalakwena Rivers. However, as already indicated above, heavy abstraction in the upper catchment areas of all three these rivers significantly influenced the amount of lateral inflow available to the alluvium aquifers.

## 4. HARVEST AND EXPLOITATION POTENTIAL

The assessment of the harvest and exploitation potential of whole area is based on the Groundwater Harvest Potential Map of the Republic South Africa by Seaward and Seymour (1996). Seaward and Seymour (1996) define the harvest potential as "The maximum volume of groundwater that may be abstracted per square km without depleting the resource". The above statement is valid if socio-economic factors were not an issue, i.e. the cost of abstracting all available groundwater. The Harvest Potential Map is based on two main parameters namely, (1) Groundwater Recharge and (2) Groundwater Storage.

Exploitation Potential on the other hand is the estimated volume of groundwater that can practically be abstracted per square km by drilling into structures where exploitable water can be obtained. Important factors to take into consideration is the underlying geology, the aquifer types, hydraulic parameters of the aquifer, the borehole yield potential of each hydrogeological regime as well as the frequency at which groundwater bearing structures occur.

### 4.1 HARVEST POTENTIAL

From the assessment of the Harvest Potential Map as well as all available information it was derived that the study area falls within the Harvest Potential Range of 10000 – 15000 $m^3/km^2$/annum. An average Harvest Potential of 12500$m^3/km^2$/annum was used throughout the study area.

## 4.2 EXPLOITATION POTENTIAL

To obtain a value for the exploitation potential of the study area, a factor was introduced, which was assumed to represent the volume of water that can practically be abstracted from the different aquifers in the study area. The factors for the different borehole yield potentials are:

| | |
|---|---|
| Low Yield Potential | 33% of Harvest Potential |
| Moderate Yield Potential including Karst areas | 66% of Harvest Potential |
| High Yield Potential as well as alluvial aquifers | 75% of Harvest Potential |

Table 4 below depicts the areas with different yield and associated exploitation potentials.

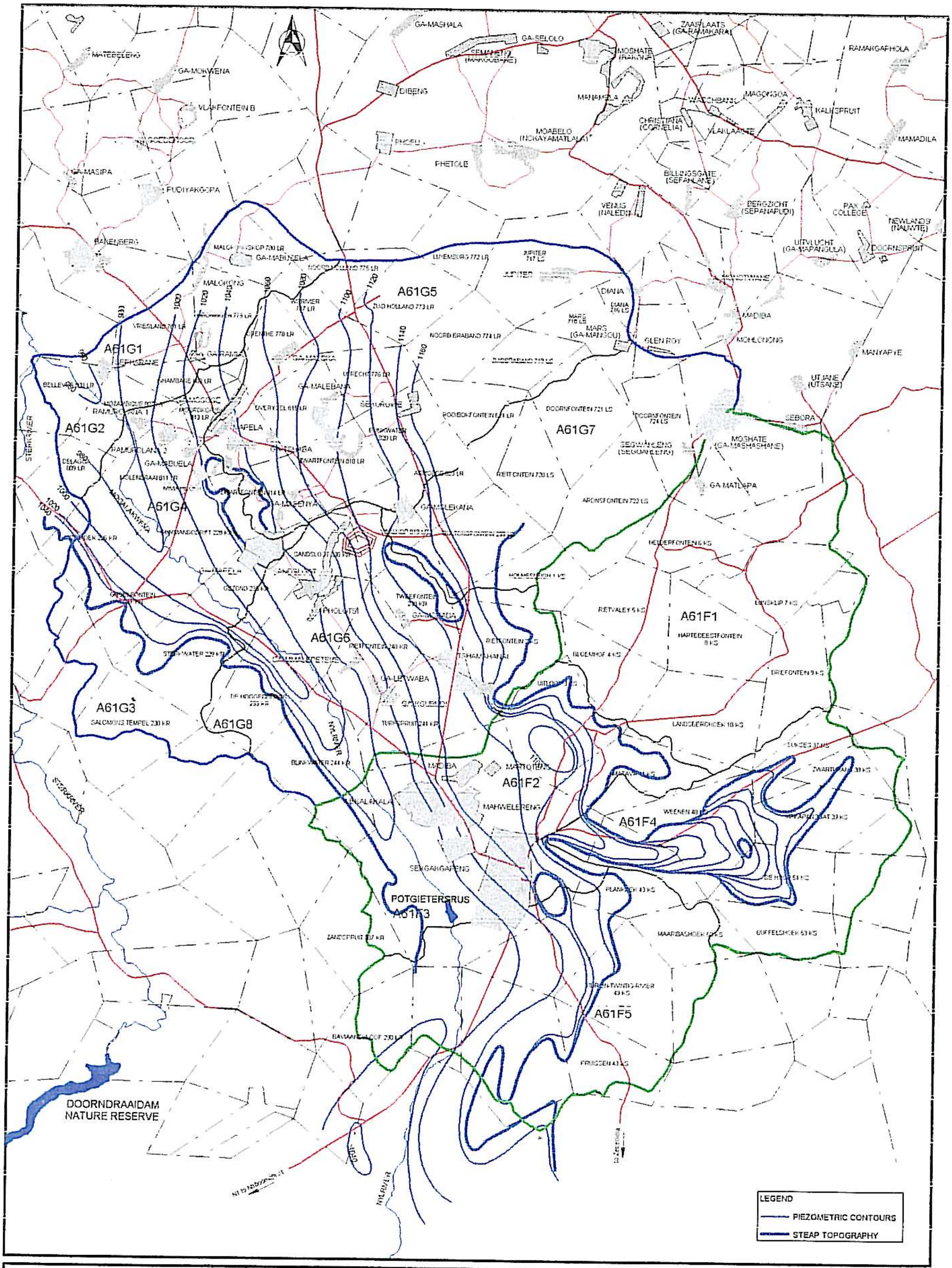
*Table 4: Harvest and Exploitation Potential per Quaternary catchment*

| Catchment no. | Total Area | Harvest Potential (HP) | High | | Moderate | | Low | | Exploitation Potential (EP) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Area | 75% of HP | Area | 66% of HP | Area | 33% of HP | |
| | $Km^2$ | $x10^6$ $m^3/a$ | $Km^2$ | $x10^6$ $m^3/a$ | $Km^2$ | $x10^6$ $m^3/a$ | $Km^2$ | $x10^6$ $m^3/a$ | $x10^6$ $m^3/a$ |
| A61F1 | 243 | 3.04 | 0 | 0 | 0 | 0 | 243 | 1.00 | 1.00 |
| A61F2 | 144 | 1.80 | 20 | 0.20 | 86 | 0.71 | 38 | 0.16 | 1.07 |
| A61F3 | 33 | 0.41 | 0 | 0 | 0 | 0 | 33 | 0.14 | 0.14 |
| A61F4 | 164 | 2.05 | 55 | 0.52 | 62 | 0.51 | 47 | 0.19 | 1.22 |
| A61F5 | 347 | 4.10 | 89 | 0.79 | 0 | 0 | 258 | 1.00 | 1.79 |
| A61G1 | 78 | 0.98 | 2 | 0.02 | 70 | 0.58 | 6 | 0.02 | 0.62 |
| A61G2 | 21 | 0.27 | 0 | 0 | 0 | 0 | 21 | 0.09 | 0.09 |
| A61G3 | 120 | 1.49 | 0 | 0 | 14 | 0.11 | 106 | 0.43 | 0.54 |
| A61G4 | 65 | 0.81 | 0 | 0 | 65 | 0.53 | 0 | 0 | 0.53 |
| A61G5 | 260 | 3.25 | 192 | 1.80 | 68 | 0.56 | 0 | 0 | 2.36 |
| A61G6 | 158 | 1.98 | 0 | 0 | 139 | 1.15 | 19 | 0.08 | 1.23 |
| A61G7 | 161 | 2.01 | 105 | 0.98 | 0 | 0 | 56 | 0.23 | 1.21 |
| A61G8 | 53 | 0.66 | 0 | 0 | 7 | 0.06 | 46 | 0.19 | 0.25 |
| **Totals** | **1847** | **22.85** | **463** | **4.31** | **511** | **4.21** | **873** | **3.53** | **12.05** |

# 5. GROUNDWATER LEVELS AND PIEZOMETRY

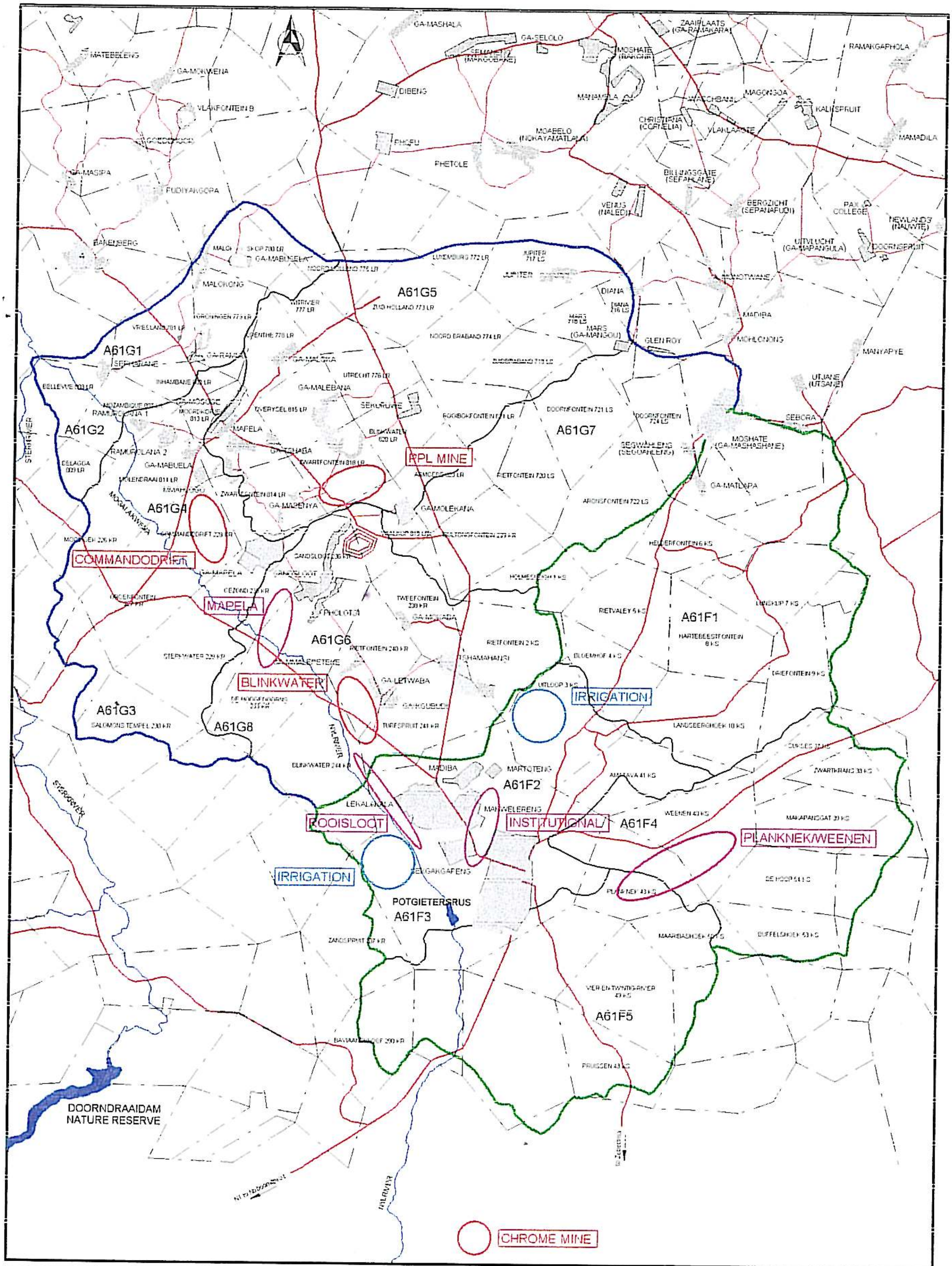
From the information obtained from the borehole census that was conducted during August and September 1999, a piezometric contour map was compiled to identify groundwater flow patterns and directions as well as areas of over-abstraction (Figure 3).

Groundwater flow is generally in a southwesternly direction towards the Mogalakwena River in the A61F2, A61F4, A61F5, A61G1, A61G4, A61G5, A61G6 and A61G7 catchment areas and in a northeasternly direction from the mountainous region of catchment areas A61F3, A61G2, A61G3 and A61G8. An extensive cone of depression is located on the farm Uitloop, which is related to over-abstraction practises for irrigation purposes. A groundwater divide also appears to exist south of Potgietersrus in the vicinity of the Mogalakwena River. The groundwater flow direction appears to have been reversed and the sub-surface flow is now backwards towards the Nyl River along this reach of the Mogalakwena River. The presence of this devide still needs to be confirmed however, but could be related to heavy groundwater abstraction for irrigation purposes further upstream along the Nyl River.




# PIEZOMETRIC CONTOURS

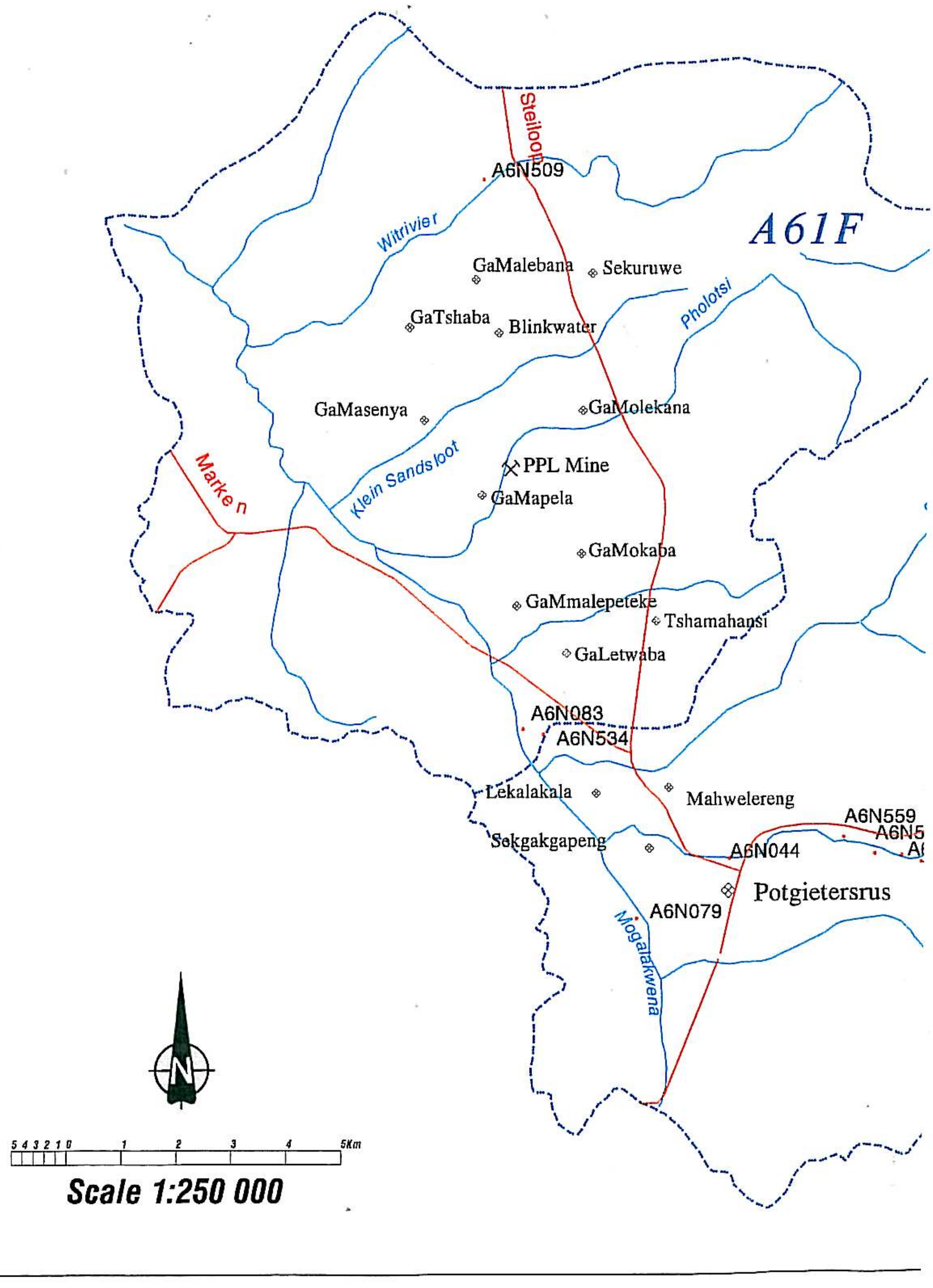
FIG. 3



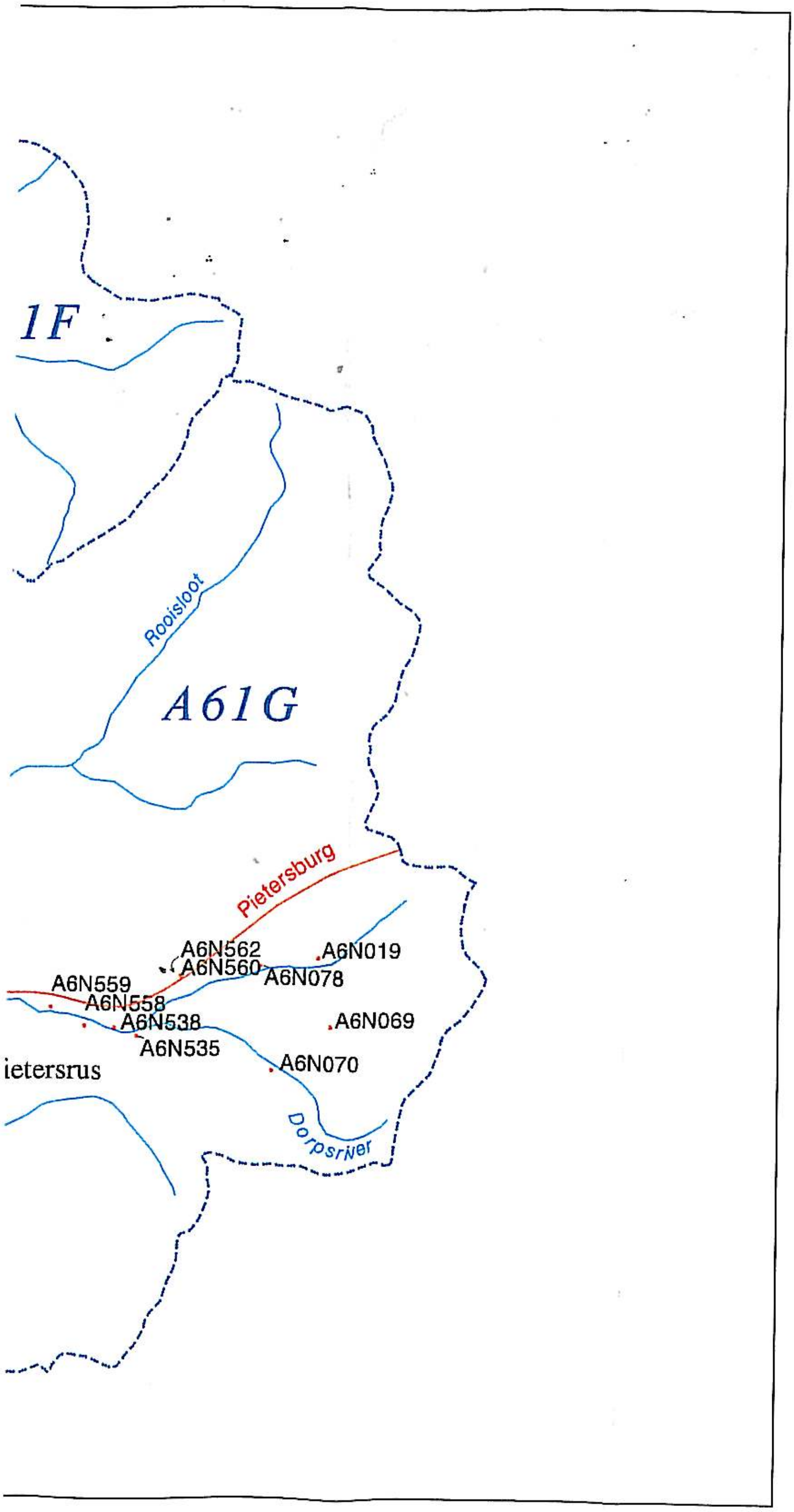

# WELLFIELDS LOCATION

FIG. 4

# Monitoring Netwo



twork




# FIGURE 5

- Roads
- Quaternary-Catchment
- Rivers
- A6N560 Water Level Recorder
- Towns

Date: 13/12/2001
Compiler: I.du Toit
Path: data/gwrespotgiet/pot.aml
Projection: Albers Equal Area
Spheriod: Clarke 1880
Source: DWAF - Geomatics

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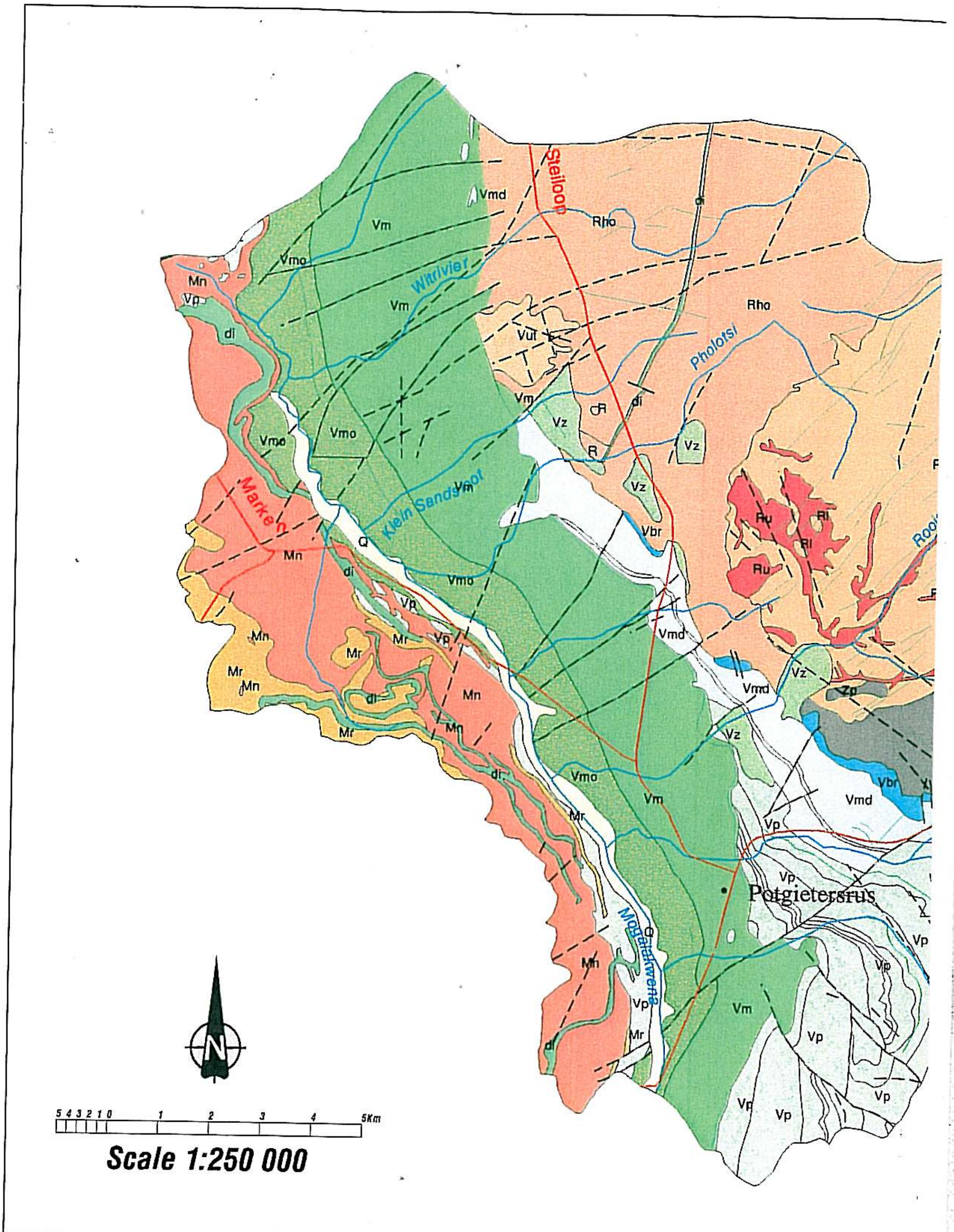
# GEOLOGY MAP


Steiloop
Witrivier
Pholotsi
Klein Sandsloot
Marken
Mogalakwena
Potgietersrus
Rho
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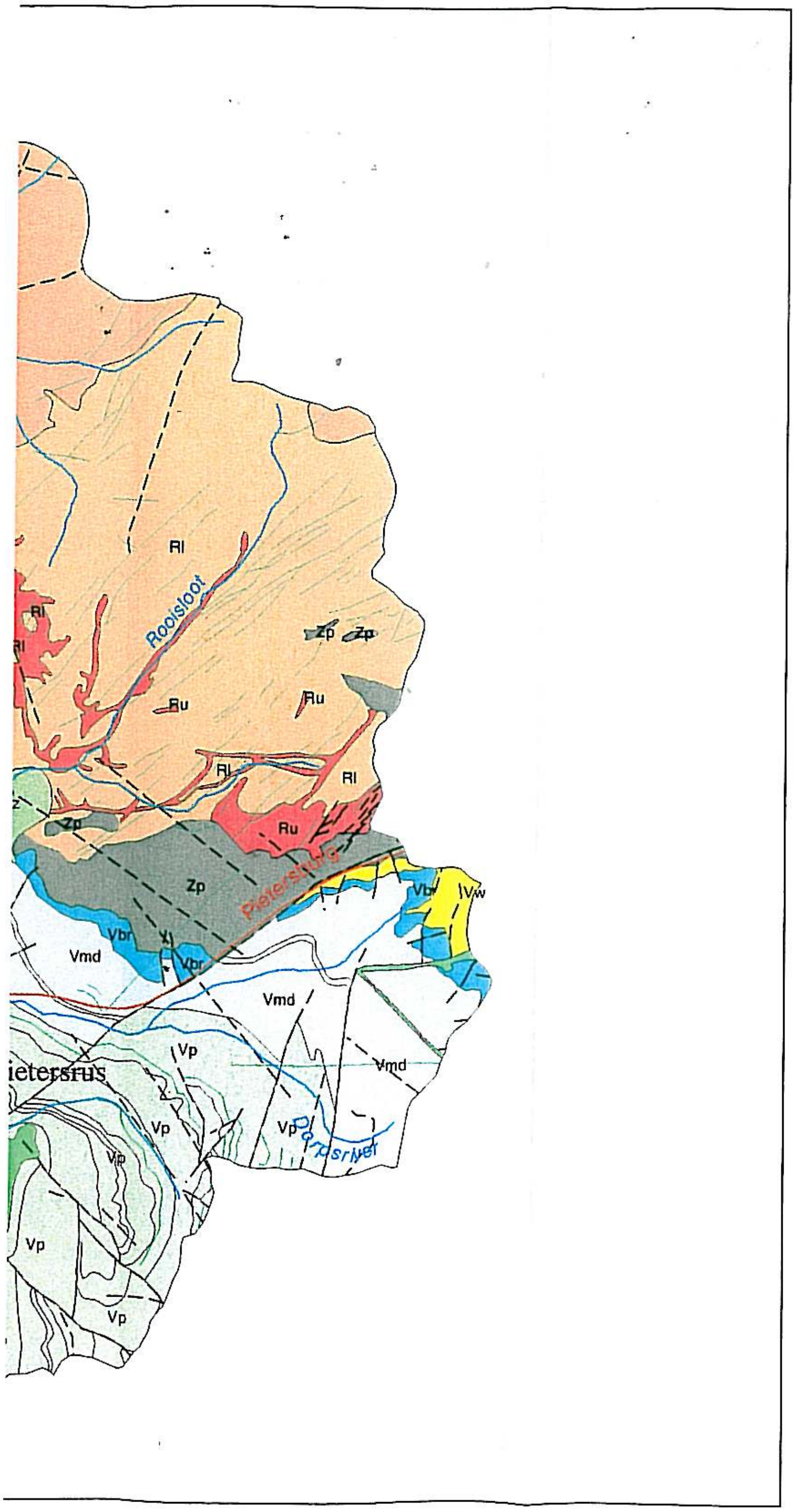
# FIGURE 2




| | |
|---|---|
| Q | Quaternary deposits (alluvium) |
| di | Diabase |
| Mr | Rashoop Granophyre (Bushveld Complex) |
| Mn | Lebowa Granite Suite (Bushveld Complex) |
| Vm, Vmo, Vz | Rustenburg Layered Suite (Bushveld Complex) |
| Vp | Pretoria Group (quartzite,shale,hornfels,marble) (Transvaal Sequence) |
| Vmd | Chuniespoort Group (dolomite,banded ironstone,shale,chert) (Transvaal Sequence) |
| Vbr | Black Reef Formation (quartzite) (Transvaal Sequence) |
| Vw | Wolkberg Group (quartzite, conglomerate) (Transvaal Sequence) |
| Ru | Uitloop Granite (Mashashane Suite) |
| Rl | Lunsklip Granite (Mashashane Suite) |
| Vut | Utrecht Granite |
| R | Unnamed Granite |
| Rho | Hout River Gneiss |
| Zp | Pietersburg Group (serpentinite,pyroxenite,schist amphibolite,tuff,banded ironstone) |
| | Faults |
| | Dykes |
| | Roads |
| | Rivers |

Date: 11/12/2001
Compiler: I.du Toit
Path: data/gwrespotgiet/pot.aml
Projection: Albers Equal Area
Spheriod: Clarke 1880
Source: DWAF - Geomatics

Department of Water Affairs & Forestry

DWAF erected a number of automatic water level recorders at various locations in the study area since 1969 and onwards (Figure 5). Most of these recorders show a steady decline of between 5m and 20m in the water level since the early 1980's up to the beginning of 1996 (Table 5). Due to excessive rainfall that occurred in the beginning of 1996 water levels rose between 2m and 30m followed again by a steady decline to just above the pre-1996 levels. Excessive rainfall between January and March 2000 again caused a substantial rise in the water levels of between 5m and 30m. It is clear from the recorder charts (*Appendix B*) that substantial recharge of the aquifers takes place during excessive rainfall events but during normal to sub-normal rainfall events the recharge is limited or insignificant. The latter conclusion could have been artificially created or the recharge could have been masked by the fact that the aquifers are not managed as they should i.e. during normal or sub-normal rainfall periods the abstraction from the aquifers are not decreased accordingly to match the smaller volumes of available water provided by recharge events hence the steady decline of the water levels. The aquifers also appear to loose the recharged water over a much shorter period of time than over the period 1980 to 1996.

*Table 5: Summary of important declining and rising periods of water levels in the study area*

| Recorder no | Location | Erection Date | Wl decline period | Decline in wl (m) | WL Rise Period | Rise in wl (m) | WL Decline period | Decline in wl (m) | WL Rise Period | Rise in wl (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| A6N 079 | Potgietersrus | 1980 | 1980 – 1996 | 8 | 1996 – 1997 | 8 | 1997 – 2000 | 5 | 2000 – current | 6 |
| A6N 044 | Potgietersrus | 1981 | 1985 – 1996 | 8 | 1996 – 1997 | 2 | 1997 – 2000 | 2 | 2000 – current | 5 |
| A6N 083 | Blinkwater | 1985 | 1985 – 1996 | 14 | 1996 – current | 4 | | | | |
| A6N 534 | Blinkwater | 1977 | 1981 – 1996 | 17 | 1996 – 1997 | 8 | 1997 – 2000 | 5 | 2000 – current | 6 |
| A6N 069 | De Hoop | 1977 | 1988 – 1996 | 5 | 1996 – 1997 | 30 | 1997 – 2000 | 25 | 2000 – current | 30 |
| A6N 070 | De Hoop | 1977 | 1981 – 1996 | 8 | 1996 – 1997 | 7 | 1997 – 2000 | 6 | 2000 – current | 8 |
| A6N 078 | Makapansgat | 1980 | 1981 – 1996 | 8 | 1996 – 1997 | 8 | 1997 – 2000 | 7 | 2000 – current | 8 |
| A6N 019 | Makapansgat | 1969 | 1975 – 1996 | 6 | 1996 – 1997 | 5 | 1997 – 2000 | 5 | 2000 – current | 6 |
| A6N 560 | Weenen | 1993 | none | 0 | 1996 – 1997 | 5 | 1997 – 2000 | 4 | 2000 – current | 4 |
| A6N 535 | Planknek | 1988 | 1988 – 1996 | 6 | 1996 – 1998 | 5 | 1998 – 2000 | 6 | 2000 – current | 8 |
| A6N 538 | Planknek | 1988 | 1988 – 1996 | 20 | 1996 – 1998 | 20 | 1998 – 2000 | 22 | 2000 – current | 28 |
| A6N 558 | Planknek | 1990 | 1992 – 1996 | 15 | 1996 – 1998 | 25 | 1998 – 2000 | 30 | 2000 – current | 25 |
| A6N 559 | Planknek | 1990 | 1990 - 1996 | 8 | 1996 – 1999 | 5 | 1999 – 2000 | 11 | 2000 – current | 10 |
| A6N 509 | Witrivier | 1979 | 1981 - 1984 | 16 | 1984 - 1985 | 8 | 1985 - 1987 | 11 | 1987 - 1988 | 17 |

The existing monitoring network in the study area consists of fourteen (14) water level monitoring recorders of which the charts are displayed in Appendix B including charts of a number of recorders located in the Nyl River valley outside the study area. It is also clear from Figure 5 that sub-catchments A61F3 to A61F5, A61G4, A61G5 and A61G8 have insufficient monitoring networks, which needs to be addressed. Despite having a reasonable monitoring system in the rest of the catchment areas, the data collected were not regularly evaluated nor were information disseminated to the different water users.

## 6. EXISTING GROUNDWATER USE

Groundwater is abstracted for various uses from a large number of boreholes spread over the two quaternary catchment areas. The largest users of groundwater are the PPL mine, Potgietersrus and surrounding TLC's and Uitloop irrigation farmers. The abstraction volumes are summarised in Table 6. These volumes are based on estimates, previous studies conducted in the study area as well as on information obtained from the borehole census. The total use from groundwater sources is estimated to be in the order of **12.77 x $10^6 m^3/a$.**

*Table 6: Existing groundwater use in the study area*

| Catchment no. | Domestic use | | | Industrial use | | | Total use |
|---|---|---|---|---|---|---|---|
| | **Rural x$10^6m^3/a$** | **Semi-Urban x$10^6m^3/a$** | **Towns x$10^6m^3/a$** | **Irrigation x$10^6m^3/a$** | **Stock x$10^6m^3/a$** | **Mining X$10^6m^3/a$** | **x$10^6m^3/a$** |
| A61F1 | 0.00 | 0.00 | 0.00 | 0.04 | 0.02 | 0.00 | **0.06** |
| A61F2 | 0.10 | 0.00 | 0.76 | 0.80 | 0.06 | 0.00 | **1.72** |
| A61F3 | 0.02 | 0.00 | 0.00 | 0.13 | 0.00 | 0.00 | **0.15** |
| A61F4 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | **1.00** |
| A61F5 | 0.00 | 0.00 | 0.00 | 4.82* | 0.05* | 0.00 | **4.87*** |
| A61G1 | 0.28 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | **0.29** |
| A61G2 | 0.01 | 0.00 | 0.00 | 0.02 | 0.01 | 0.00 | **0.04** |
| A61G3 | 0.01 | 0.00 | 0.00 | 0.17 | 0.02 | 0.00 | **0.2** |
| A61G4 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 1.05 | **1.07** |
| A61G5 | 0.37 | 0.00 | 0.00 | 1.00 | 0.02 | 1.00 | **2.39** |
| A61G6 | 0.31 | 0.00 | 0.00 | 0.01 | 0.01 | 0.13 | **0.46** |
| A61G7 | 0.13 | 0.00 | 0.00 | 0.1 | 0.05 | 0.00 | **0.28** |
| A61G8 | 0.02 | 0.00 | 0.00 | 0.1 | 0.01 | 0.11 | **0.24** |
| **Total use** | **1.26** | **0.00** | **1.76** | **7.19** | **0.27** | **2.29** | **12.77** |

**Uncertain*

## 7. GROUNDWATER BALANCE

A groundwater balance of the study area was compiled using the Harvest Potential Map of Seaward and Seymour (1996). The calculation of the harvest potential includes most of the natural water gains and losses incurred in a specific catchment area. By subtracting the estimated abstraction from the harvest potential the current water balance for each of the different sub-quaternary catchment areas was obtained and displayed in Table 7.

From Table 7 it can be concluded that if the harvest potential is used to calculate the groundwater balance then the groundwater still available for usage in the entire study area is in the order of **10.08 $10^6$ $m^3/a$** with deficits in sub-catchments A61F5 and A61G4. However, if one considers the volume of water that can practically be abstracted from the aquifer, i.e. the exploitation potential, then the situation changes dramatically. Due to extensive abstraction in sub-catchments A61F2, A61F3, A61F5, A61G4 and A61G5 totalling 10.2 x $10^6$ $m^3/a$ the total available exploitation potential for the whole study area is already exceeded by an estimated **0.72 x $10^6$ $m^3/a$.**

*Table 7: Groundwater balance for each sub-quaternary catchment*

| Catchment no. | Total Area Km$^2$ | Harvest Potential (HP) x10$^6$ m$^3$/a | Exploitation Potential (EP) x10$^6$ m$^3$/a | Total use x10$^6$m$^3$/a | Groundwater balance based on HP x10$^6$m$^3$/a | Groundwater balance based on EP x10$^6$m$^3$/a |
|---|---|---|---|---|---|---|
| A61F1 | 243 | 3.04 | 1.00 | 0.06 | 2.98 | 0.94 |
| A61F2 | 144 | 1.80 | 1.07 | 1.72 | 0.08 | -0.65 |
| A61F3 | 33 | 0.41 | 0.14 | 0.15 | 0.26 | -0.01 |
| A61F4 | 164 | 2.05 | 1.22 | 1.00 | 1.05 | 0.22 |
| A61F5 | 347 | 4.10 | 1.79 | 4.87 | -0.77 | -3.08 |
| A61G1 | 78 | 0.98 | 0.62 | 0.29 | 0.69 | 0.33 |
| A61G2 | 21 | 0.27 | 0.09 | 0.04 | 0.23 | 0.05 |
| A61G3 | 120 | 1.49 | 0.54 | 0.20 | 1.29 | 0.34 |
| A61G4 | 65 | 0.81 | 0.53 | 1.07 | -0.26 | -0.54 |
| A61G5 | 260 | 3.25 | 2.36 | 2.39 | 0.86 | -0.03 |
| A61G6 | 158 | 1.98 | 1.23 | 0.46 | 1.52 | 0.77 |
| A61G7 | 161 | 2.01 | 1.21 | 0.28 | 1.73 | 0.93 |
| A61G8 | 53 | 0.66 | 0.25 | 0.24 | 0.42 | 0.01 |
| **Totals for the whole study area** | **1847** | **22.85** | **12.05** | **12.77** | **10.08** | **-0.72** |

## 8. IDENTIFICATION OF STRESSED AREAS

From the groundwater balance described above sub-catchments under stress have been identified classified as follows:

If abstraction is >HP and >EP the classification is "Heavily utilised".
If abstraction is <HP and EP/A is <1.5 the classification is "Moderately utilised".
If abstraction is <HP and EP/A is >1.5 the classification is "Under-utilised"

*Table 8: Identification and classification of stressed sub-catchment areas*

| Catchment no | Abstraction versus Harvest Potential | Exploitation Potential/abstraction & relation to 1.5 factor | | Stress Classification |
|---|---|---|---|---|
| A61F1 | A < HP | 16.7 | > 1.5 | Under-utilised |
| A61F2 | A < HP | 0.6 | < 1.5 | Moderately utilised |
| A61F3 | A < HP | 0.9 | < 1.5 | Moderately utilised |
| A61F4 | A < HP | 1.2 | < 1.5 | Moderately utilised |
| A61F5 | A > HP | 0.4 | < 1.5 | Heavily utilised |
| A61G1 | A < HP | 2.1 | > 1.5 | Under-utilised |
| A61G2 | A < HP | 2.25 | < 1.5 | Under utilised |
| A61G3 | A < HP | 2.7 | > 1.5 | Under-utilised |
| A61G4 | A > HP | 0.5 | < 1.5 | Heavily utilised |
| A61G5 | A < HP | 1.0 | < 1.5 | Moderately utilised |
| A61G6 | A < HP | 2.7 | > 1.5 | Under-utilised |
| A61G7 | A < HP | 4.3 | > 1.5 | Under-utilised |
| A61G8 | A < HP | 1.0 | < 1.5 | Moderately utilised |

From Table 8 above it is clear that two sub-catchment areas namely A61F5 and A61G4 are considered to be under severe stress whilst five of the catchments are classified as being moderately utilised and therefore moderately stressed. These catchment areas require urgent management and monitoring of their groundwater resources. Areas classified as under-utilised would need to be monitored for further development.

# 9 EVALUATION OF THE EXISTING WELLFIELDS

The total groundwater abstraction from boreholes and well fields in the study area is in the order of **12.77 x $10^6m^3/a$** of which approximately **3.29 x $10^6m^3/a$** is used within the Greater Potgietersrus TLC and rural areas, **2.29 x $10^6m^3/a$** by the PPL mine and about **7.19 x $10^6m^3/a$** by agriculture (Table 6).

## 9.1 PLANKNEK / WEENEN WELLFIELDS

The groundwater balance (based on the Harvest Potential) calculated for the sub-quaternary catchment A61F4 shows that a volume of 1.05 x $10^6m^3/a$ can still be abstracted from the well field. The Planknek well field, which is situated along the Dorps River towards the lower part of the sub-quaternary catchment A61F4, shows a decline in the groundwater level since 1988, which continues even after February/March 2000 heavy rains (Table 5 and Water Level Recorder charts A6N535, A6N538, A6N558 and A6N559 of Appendix B). There is a rapid cone of depression at the outflow of the well field due to the large number of production boreholes concentrated in a small area. It is warned that continues over-abstraction of this well field could eventually result in the calcification and clogging-up of slotted casings and subsequently in the irrevocable reduction of yields of the production boreholes. The groundwater resources in this well field are fully developed and there is little point in any drilling for additional water except perhaps for the redistribution of the existing production boreholes. The latter would reduce the cone of depression at the outflow of the well field if the production boreholes could be spread over a bigger area. However, before any further drilling or development in this catchment area is considered, the sustainable abstraction and seasonal variations of the water levels must be re-evaluated for the period 1996 to present as well as the response of the aquifer to recharge events, especially after the above-normal rains received in the area since January 2000.

## 9.2 UITLOOP WELL FIELD (INCLUDING BORHOLE ON PORTION 39)

The owner of portion 39 of the farm Uitloop supplies about 0.18x$10^6m^3$ of water per annum to Potgietersrus town. This borehole, which is located upstream of Rooisloot well field but still in the same catchment area, abstracts water from the dolomite. An article 5(2) permit in terms of the old Water Act 54 of 1956, which was issued to the owner to supply this volume of water to Potgietersrus, is supposed to have expired in March 2001. If this abstraction has indeed been stopped as required by the permit the result would be a further deficit of about 0.18 x $10^6m^3/a$ to Potgietersrus municipality. Beside the production borehole on portion 39, considerable volumes of water (about 0.86 x $10^6m^3/a$) are also abstracted on Uitloop for irrigation purposes. Water levels on Uitloop farm 3KS (sub-quaternary catchment A61F2) have declined rapidly from 7m to 35m. As in the case of the Planknek/Weenen well field, this is due to the concentration of production boreholes for irrigation in a very small area. Farmers in this area are entirely depended on groundwater for all their needs.

## 9.3 ROOISLOOT WELLFIELD

The Rooisloot well field (Sub-catchment A61F3) was commissioned in 1985. It was initially recommended that 1.0 x $10^6 m^3/a$ could be safely abstracted from alluvial and underlying weathered mafic rock aquifers. The two aquifers had average saturated thicknesses of 10m and 15m respectively. Fayazi (1996), which re-evaluated the well field in 1996, found that the alluvial aquifer has been completely dewatered due to poor aquifer management practises, over-abstraction and lack of recharge. The abstraction during the period 1985 to 1996 was in excess of 1.5 x $10^6 m^3/a$. The water level declined over this period on average by about 14,5m. Initial water levels were recorded at 3m below surface (Water level Recorders A6N534 and A6N083). Poor maintenance of the well field eventually contributed to its collapse towards the end of the 1990's. Water balance calculations for the area, however, indicated that an amount of 0.26 x $10^6$ $m^3/a$ could still be safely abstracted from the A61F3 catchment. The water level recorders installed in the well field have shown that the recharge of the aquifer is directly dependent on rainfall. After the February/March 2000 above-normal rainfall events, the water level shows some indications of a recovery (Table 5).

# 10. IMPACT OF GROUNDWATER ABSTRACTION IN THE STUDY AREA

The expected or potential impacts that sustainable groundwater abstraction have or could have in the study area are summarised below:

## 10.1 IMPACT ON THE PLANT LIFE AND ECOLOGY.

The current water level along the Mogalakwena River plain and surrounding areas is in the order of 12m to 14 m below the surface. On the farm Blinkwater a number of "Annabome" occur, which were declared a national monument. The roots of these threes tap water from the shallow water levels (aquifers) for survival. Over-abstraction in the vicinity of these trees may in the medium to long term contribute to their extinction. It is recommended that a water level recorder is installed at this site to monitor the fluctuation of the water level and to ensure that it does not drop below 19m and thus beyond the reach of the roots.

## 10.2 IMPACT ON RURAL COMMUNITIES.

It is important that the impact on rural communities be addressed in this report as it can impact on the implementation of a management plan in the whole study area. The following villages are situated in the study area namely Ga- Malepeteke; Ga-Ledwaba; Ga-Kgubudi; Tshamahantsi; Ga-Magangoa; Ga-Moka and Mahwelereng. These communities are entirely depended on groundwater for their domestic supplies except for Mahwelereng village and Potgietersrus town. The latter two also receive bulk water from the Doorndraai dam. These communities mentioned above are all experiencing a lack of sustainable water supplies, which could be attributed to the following reasons:

- Over-usage or over-abstraction from the resource and thus exceeding the total annual recharge in the catchment.
- Abstraction from the large number of private boreholes in the Greater Potgietersrus TLC appears to have a considerable impact on the available water and therefore contributing to the depletion of the resource.
- Uncoordinated development of groundwater resources in the past by developers as well as total lack of groundwater management.

## 10.3 IMPACT ON MINING ACTIVITIES.

The PPL Mine provides employment to a large number of people from the Greater Potgietersrus TLC area. In order to reach full production the mine needs to increase the current supply of water from 7000 $m^3$/day to 11000 $m^3$/day. This will also lead to an increase in the number of employment in the area. A lack of sustainable water supply may result in the retrenchment of some employees. The current well fields that are supplying water to the mine can hardly meet the current demand of 7000$m^3$/day.

## 10.4 IMPACT ON THE POTGIETERSRUS TLC.

The Potgietersrus TLC is the primary supplier of water to the communities under their jurisdiction. The bulk water supply, which is supplemented by groundwater, can not meet the current demand. This has contributed considerably to the large number of private boreholes in the area especially the medium class households. The inconsistent supply of water has also contributed to the communities not paying their municipal accounts. They rather rely on private boreholes to satisfy their need, which is obviously stretching the aquifer to beyond its limits. The existing well fields, especially the ones along the Dorps and Rooisloot Rivers, cannot meet the current demand.

## 10.5 IMPACT ON AGRICULTURE / FARMING.

Organised agriculture such as on the farms Blinkwater and Uitloop are employing approximately 400 people. Numerous complaints lodged by various farmers indicated that they are experiencing a shortage of water for irrigation purposes (Appendix A). This has a severe influence on the value of their land. Investigations have indicated that water levels have dropped steadily since 1985 (Refer Chapter 6). The inconsistent availability of water for irrigation is forcing farmers to reduce production and subsequently their farm workers. Some farmers switched from irrigation to livestock farming.

# 11. CONCLUSIONS

One of the challenges of proper water management in the 21$^{st}$ century is to ensure that the society develops in a way that it can function successfully within the constrains of its available resources. It is to treat the development, use and protection of these resources as a common endeavour in the interest of all and in the spirit of a new patriotism rather than as a series of conflicts between different groups (*White Paper on a National Water Policy for South Africa, April 1997*). The following conclusions can be drawn:

- Despite the number of studies conducted in the area, no proper aquifer management plan has yet been initiated or put into action to ensure proper data collection and assessment.
- The groundwater resources in the study area are very limited because of, amongst other reasons, the relative low storativity of the ultra-mafic rock formation (Formanek, 1996). The groundwater that is available in the alluvium and in the various weathered and fractured aquifers therefore requires careful evaluation and monitoring on a continuous basis.
- There are some potential target-areas that could be investigated for groundwater development, which are located in a number of the sub-catchments namely A61G6, A61G8, A61G4 and A61F3, but with careful monitoring and assessment.

- The main aquifers are mostly structurally related and of a semi-confined-with-delayed-yield nature. They occur along narrow linear features, which draw water from low transmissivity zones.
- The alluvial aquifer, which is associated with the Mogalakwena River and some of its tributaries such as the Rooisloot River, has been over-exploited. Monitoring data has shown very little recharge of this aquifer over the past few years except after the heavy rains during February/March 2000.
- Well fields situated along the Dorps River valley (Planknek/Weenen) and on Uitloop farm i.e. the dolomite aquifer are also over-exploited. Water levels in the Planknek/Weenen well field (sub-catchment A61F4) have declined steadily since 1988. A cone of depression has developed at the outflow of the well field due to continuous abstraction from a concentration of production boreholes situated in small area. Recharge of this aquifer also appears to be very erratic. Besides a dramatic rise of water levels after heavy rainfall events at the end of 1995 and again in February/March 2000, the water levels show a continuo decline. The rise in water levels towards the end of 1995 was of short duration only. Water levels on Uitloop 3KS (also sub-catchment A61F4) have declined from 7m to 35m over the last 10 years. A cone of depression has developed on this farm due to the concentration of production boreholes in a very small area. Farmers in this area are entirely depended on groundwater for farming activities.
- Groundwater is respectively flowing in a southwesternly and northeasternly direction towards the Mogalakwena River. A groundwater devide has manifested itself south of Potgietersrus along the Mogalakwena River. It has not yet been confirmed if it is a natural phenomenon or if it is due to irrigation practices further to the south.
- Water levels in the Rooisloot Delta Aquifer (Sub-catchment A61F3) have declined steadily since 1985. Initial water levels were recorded at 3m below surface compare to the current level of 19m.
- Indications are that most of the groundwater resources in the study area are under moderate to severe stress especially sub-catchment areas A61F5 and A61G4. Sub-catchments A61F2 to 4 and A61G5 and 8 are under moderate stress whilst the rest of the sub-catchment areas making up the study area under under-utilised.

## 12 RECOMMENDATIONS

The following recommendations are proposed to conserve and manage the groundwater resources in the study area:

### 1. INVESTIGATE THE USE OF STORM WATER FOR ARTIFICIAL RECHARGE

An artificial recharge project should be investigated to stimulate and enhance infiltration of urban storm water in the Mahwelereng/Blinkwater area. Such a project should be based on extensive research and sound planning to ensure its success in terms of quantity and quality. A well designed storm water drainage system and a scientifically based water quality management strategy could accommodate all semi-urban and urban storm water runoff for recharge purposes. This could be achieved by integrating skills from the engineering and geohydrological fields as well as urban management. It is also recommended that a number of rock-fill weirs be constructed at selected points along the Dorps River to enhance recharge from occasional flood events.

2. ESTABLISH A PROPER MONITORING NETWORK

Twelve sites have been identified for drilling of shallow boreholes, which will be monitored for water level fluctuations on a monthly basis in addition to the existing network. These sites will be confirmed after a conceptual groundwater model has been developed for the area.

3. COMPILE A MONTHLY GROUNDWATER LEVEL MONITORING STATUS REPORT

A groundwater level monitoring status report should be produced on a monthly basis in order to regulate and monitor all abstractions and recharge in the area. These reports should also be utilised as an early warning system and to initiate remediatery actions in advanced. The monitoring information should also be used to refine the groundwater model and subsequently aquifer response predictions. Somebody must be identified, trained and given the responsibility to service and maintain the monitoring stations.

4. DEVELOP AND CALIBRATE A CONCEPTUAL GROUNDWATER FLOW MODEL FOR THE ENTIRE STUDY AREA

By definition, groundwater modelling is a tool that can help to manage an aquifer. It is useful in reconnaissance studies preceding field investigations, for interpretative studies following the field program but especially for predictive studies to estimate future aquifer behaviour. It is strongly recommended that all the existing well fields in the study area be modelled to simulate water level response to abstraction and recharge and predict a worst case scenario: long term sustainable yield.

5. CO-ORDINATE ALL NEW GROUNDWATER DEVELOPMENTS

The water balance has indicated that groundwater resources in the study area are under moderate to severe stress. In order to protect the resources all new groundwater developments must be co-ordinate through DWAF as well as the relevant (still to be established) Water User's Association(s).

6. A GROUNDWATER AWARENESS STRATEGY NEEDS TO BE SET UP FOR THE AREA

The need for information and education with respect to groundwater management spans the entire genre of persons depended on the resource. Meetings had already been held with the various stakeholders to bring the problems surrounding the groundwater resources in this area under their attention. Further actions are urgently required, as the competition with accompanied potential conflict for the limited available water is high in the area.

7. ESTABLISH A WATER USER'S ASSOCIATION (WUA)

Meetings had been held between DWAF and the different groundwater users (stakeholders) with the aim of promoting the establishment of a Water User's Association (WUA). These stakeholders include Potgietersrus TLC, PPL Mine, Uitloop Farmers, Blinkwater Farmers, and the councillors. A workshop should be held to work out a proper and acceptable management strategy and to encourage the establishment of a WUA. It is only through a WUA that a management strategy could be implemented and an investigation initiated to determine the impact of private boreholes on the resource. It is also only a WUA that could introduce measures to reduce private abstraction where a service provider is available. The WUA will also serve as a facilitator to encourage all groundwater users to register and license their usage.

## 8. DETERMINE GROUNDWATER COMPONENT OF THE RESERVE

The Chief Directorate: Scientific Services should be approached to do a preliminary reserve determination and to follow it up with a comprehensive determination at a later stage.

## 9. ALL WATER USERS MUST REGISTER THEIR USAGE

It is required by the National Water Act of 1998 that all existing groundwater use is registered with DWAF and new water users are licensed. Schedule 1 users (usage $<10m^3$/day) are not required to register but under the current circumstances with the stressed groundwater resources and the expected large impact of private boreholes on the resource, it is recommended that schedule 1 use is also registered.

## 10. COMPULSORY LICENSING

It is also recommended that the study area be considered for compulsory licensing.

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# APPENDICES

# APPENDIX A

## BOREHOLE CENSUS

# APPENDIX A

## BOREHOLE CENSUS

Date readings taken: 27 August 1999 to 02 September 1999

| BH No | Ref No | Co-Ordinates | | Depth | Est. Yield (l/s) | Type of Equipment | Location | W/L | Altitude | Piezometric |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Latitude | Longitude | | | | | | | |
| 19B | A2 | 24 59 21 | 28 59 21 | 80 | | | College | | 1220 | |
| 19C | A3 | 24 08 47 | 28 59 41 | 53 | 6.86 | submersible | " | | 1371 | |
| 19D | A4 | 24 08 49 | 28 59 32 | 49 | 4.53 | submersible | " | 18.5 | 1112 | 1093.5 |
| 19E | B5 | 24 08 50 | 28 59 33 | 62 | 2.77 | submersible | " | | 1178 | |
| 19F | C2 | 24 08 46 | 28 59 31 | 81 | 1.35 | | " | | 1155 | |
| 19G | C3 | 24 08 54 | 28 59 28 | 72 | 4.39 | submersible | " | 18.8 | 1218 | 1199.2 |
| 19H | C1 | 24 08 58 | 29 59 31 | 72 | dry | | | | | |
| 19I | B4 | 24 08 30 | 29 00 03 | 67 | 0.44 | | | | | |
| B43 | W328 | 24 01 37 | 28 55 38 | | | mono diesel | | | | |
| B44 | W327 | 24 26 54 | 28 59 10 | | | " " | Moshate | | 1179 | |
| B17B | | 24 09 27 | 28 58 54 | 57 | 3.11 | mono electric | Magistrate | | 1113 | |
| B17A | | 24 09 19 | 28 59 10 | 50 | 11.61 | " " | Magistrate | | 1191 | |
| 18A | | 24 09 12 | 28 59 23 | | | not equipped | Hospital | | 1168 | |
| 18B | | 24 09 11 | 28 59 24 | | | mono electric | " " | | 1110 | |
| 18C | | 24 09 10 | 28 39 15 | | | " " | " " | | 1390 | |
| 19A | A1 | 24 09 09 | 28 58 40 | 63 | | | " " | | | |
| B31 | | 24 10 55 | 28 58 57 | | | submersible | " " | | | |
| B29 | H03-1298 | 24 08 15 | 28 59 35 | 60 | 18.45 | orbit electric | | 15.2 | 1371 | 1354.8 |
| B30 | H03-1299 | 24 08 25 | 28 59 36 | 60 | 10 | " " | | 18.05 | 1209 | 1190.95 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| BH 70 | H03-1270 | 24 08 23 | 28 58 48 | | | mono electric | | 14.95 | 1066 | 1051.05 |
| B27 | | 24 08 14 | 28 59 06 | | | " " | | | | |
| B14 | H03-1723 | 24 08 13 | 28 57 20 | | | mono diesel | | 10.21 | 1052 | 1041.79 |
| | H03-1727 | 24 08 41 | 28 57 22 | | | " " | | | | |
| | H03-1535 | 24 08 43 | 28 57 34 | | | handpump | | | | |
| B10 | H03-1819 | 24 08 28 | 28 56 43 | 45 | 2.78 | mono electric | | 23.61 | | |
| B13 | H03-1076 | 24 08 44 | 28 56 28 | 48 | 15 | " " | | 11.82 | 1085 | 1073.18 |
| B4 | H03-2590 | 24 08 11 | 28 56 10 | 51 | 6 | " " | | | | |
| B3 | H03-2589 | 24 08 00 | 28 56 01 | 46 | 12 | " " | | | | |
| B2 | H03-2588 | 24 07 50 | 28 55 57 | 45 | 6 | orbit electric | | 22.4 | 1088 | 1065.6 |
| B5 | | 24 08 34 | 28 55 34 | 38 | 8 | | | | | |
| B6 | W330 | 24 08 48 | 28 56 13 | | | | | | | |
| B8 | H03-1816 | 24 09 23 | 28 56 46 | | | mono electric | | 6.05 | 974 | 967.95 |
| | | | | | | | | 5.15 | 986 | 980.85 |
| B9 | H03-1015 | 24 56 47 | 28 56 47 | | | mono electric | | 5.63 | 1032 | 1026.37 |
| B42 | H03-1815 | 24 09 24 | 28 57 23 | | | orbit electric | | 15.6 | 1167 | 1151.4 |
| N1 | | 24.17028 | 29.08729 | | | | Planknek | 34.06 | 1235..04 | 1200.98 |
| N11 | | 24.17200 | 29.08452 | | | | | 32.6 | 1228.61 | 1196.01 |

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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| WN1 | | 24.16398 | 29.10999 | | | | Weenen Ptn3 | 24.47 | 1270.8 | 1246.33 |
| WN20 | | 24.16451 | 29.10569 | | | | | | | |
| | | | | | | | | 39.87 | 1262.83 | 1222.96 |
| N5 | | 24.17021 | 29.07843 | | | | | | | |
| S1 | | | | | | | Planknek | 30.20 | | |
| S4 | | | | | | | " | 33.97 | | |
| W11 | | | | | | | " | 17.43 | | |
| | | | | | | | " | 23.55 | | |
| | | 24 10 22 | 29 05 48 | | | | " | 23.41 | | |
| W16 | | 24 10 03 | 29 03 47 | | | | " | 19.56 | | |
| W9 | | 24.16875 | 29.06762 | 77 | | | " | 22.84 | | |
| W15 | | 24.16732 | 29.05941 | 80 | | | Weenen | 28.1 | 1206 | 1177.9 |
| W17 | | 24.16881 | 29.06285 | 70 | | | Weenen | 20.1 | 1193 | 1172.9 |
| N2 | | 24.17030 | 29.08508 | 80 | | | Planknek | 23.3 | 1199 | 1175.7 |
| N3 | | 24.16957 | 29.08251 | 88 | | | " | 32.9 | 1230.84 | 1197.94 |
| N6 | | 24.17021 | 29.078443 | 94 | | | " | 32.6 | 1230 | 1197.4 |
| BH 70 | H03-1274 | | | 60 | 6.67 | | " | 34.9 | 1221 | 1186.1 |
| | | | | | | | Mahwelereng | 14.18 | | |
| N8 | | 24.16905 | 29.07991 | 65.7 | | | Planknek | 37.2 | 1225.41 | 1188.21 |

UITLOOP (3 KS)

Date readings taken: 07 & 08 September 1999

| Borehole Number | Co-ordinates | Altitude | Water level | Estimated yield (l/s) | TYPE OF EQUIPMENT |
|---|---|---|---|---|---|
| 1 ( Farm 41) | 24 06 45 29 03 55 | 1290 | 18.95 | 2 | Diesel Engine |
| 2 (Portion 3) | 24 06 25 29 03 05 | 1233 | 35 | 2 | |
| 3 " " | 24 06 25 29 03 14 | 1244 | 34.15 | 5 | |
| 4 " " | 24 06 28 29 03 17 | 1287 | 33.7 | 2 | |

| | | | | | |
|---|---|---|---|---|---|
| 5 " " | 24 06 28 29 03 15 | 1288 | 33.5 | 1.5 | |
| 6 (Bricks) | 24 06 32 29 01 28 | 1092 | 23.91 | 2 | |
| 7 " " | 24 06 32 29 01 25 | 1093 | 24.01 | 1 | |
| 8 " " | 24 06 40 29 01 14 | 1095 | 25.45 | not pumping | |
| 9 (Schoeman) | 24 06 20 29 01 13 | 1160 | 39.65 | 3.5 | |
| 10 " " | 24 06 29 29 01 10 | 1202 | collapsed | Dry | |
| 11 " " | 24 06 22 29 01 19 | 1220 | 39.95 | not pumping | |
| 12 " " | 24 06 17 29 01 32 | 1061 | 21.8 | | |
| 13 " " | 24 06 17 29 01 33 | 1062 | 39.62 | 2.5 | |
| 14 " " | 24 06 14 29 01 32 | 1129 | 41.62 | 3 | |
| 15 " " | 24 06 04 29 01 33 | 1166 | | 1.5 | |
| 16 " " | 24 06 04 29 01 34 | 1167 | | 2 | |
| 17Goelst Enterprise | 24 07 15 29 02 06 | 1110 | dry | dry | |
| 18 " " | 24 07 11 29 02 04 | 1115 | 28.31 | (3000gph ) | Submersible pump |
| 19 " " | 24 07 02 29 02 04 | 1193 | 27.95 | dry | |
| 20 " " | 24 07 09 29 01 58 | 1184 | 38.55 | dry | |
| 21 " " | 24 07 03 29 01 55 | 1159 | 45.5 | (2400gph ) | Submersible pump |
| 22 " " | 24 07 31 29 01 39 | 1207 | 23.3 | dry | |
| 23 " " | 24 07 32 29 01 40 | 1207 | 23.4 | dry | |
| 24 " " | 24 07 32 29 01 42 | 1206 | 25.6 | dry | |
| 25 Uitloop | 24 06 10 29 01 51 | 1132 | 39.5 | 2.5 | Submersible pump |
| 26 " " | 24 06 11 29 01 51 | 1113 | 35.9 | not equipped | |
| 27 " " | 24 06 16 29 01 52 | 1126 | 26.85 | not equipped | |

AMATAVA FARM (41 KS)

| Borehole No | Date taken | Co-ordinates | Altitude | Water level | Estimated yield (l/s) | TYPE OF EQUIPMENT |
|---|---|---|---|---|---|---|
| 1. | 08 September 1999 | 24 06 49 29 03 49 | 1185 | 26.2 | 1.5 | Submersible Pump |
| 2.(G31517) | 08 September 1999 | 24 07 43 29 04 01 | 1268 | 18.9 | 1.5 | Diesel engine |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3. | 08 September 1999 | 24 06 52 29 03 43 | 1089 | 27.5 | 2.5 | Submersible |

RBHN

# PPL GROUNDWATER EXPLORATION HYDROCENSUS (27//8/99)

| CATCHMENT No | FARM | VILLAGE | BH No | LAT | LONG | ELEVATION | SWL | PIEZO LEVEL | CURRENT ABSTRACTION | GROUNDWATER DEVELOPED | EQUIPMENT | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A61G1 | BELEVUE 808 LR | SEPHARANE | H03 2032 | 23 55 41 | 28 45 37 | | | | 2 | 2 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G1 | MOZAMBIQUE 807 LR | SEPHARANE | H03 2741 | 23 56 17.6 | 28 46 21.1 | | | | | | UNEQUIPPED | |
| A61G1 | MOZAMBIQUE 807 LR | SEPHARANE | H03 2742 | 23 56 24.3 | 28 46 28.2 | | | | 6.25 | 6.25 | ELECTRIC MONO | DOMESTIC SUPPLY to BAKENBERG |
| A61G1 | MOZAMBIQUE 807 LR | SEPHARANE | H03 2747 | 23 56 08.1 | 28 46 21.1 | | | | | | UNEQUIPPED | |
| A61G1 | MOZAMBIQUE 807 LR | SEPHARANE | H03 2748 | 23 56 19.4 | 28 46 31.7 | | | | 8.75 | 8.75 | ELECTRIC MONO | DOMESTIC SUPPLY to BAKENBERG |
| A61G1 | BELEVUE 808 LR | SEPHARANE | H03 2749 | 23 56 30.8 | 28 45 37 | | | | | | UNEQUIPPED | |
| A61G1 | GRONINGEN 779 LR | GA - RAMMU | H03 1068 | 23 54 30.4 | 28 49 52.2 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G1 | GRONINGEN 779 LR | GA - RAMMU | H03 1069 | 23 54 33.4 | 28 49 36.5 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G1 | GRONINGEN 779 LR | GA - RAMMU | H03 2061 | 23 53 58.2 | 28 49 20.4 | | | | 2 | 2 | DIESEL MONO | DOMESTIC USE |
| A61G1 | GRONINGEN 779 LR | GA - RAMMU | H03 2062 | 23 53 57.2 | 28 49 20.1 | | | | 0.3 | 0.3 | HANDPUMP | STOCK WATERING |
| A61G1 | GRONINGEN 779 LR | GA - RAMMU | H03 2065 | 23 54 37.6 | 28 49 20 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G1 | VRIESLAND 781 LR | GA - RAMMU | H03 2066 | 23 54 37.5 | 28 49 14.1 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G1 | VRIESLAND 781 LR | GA - RAMMU | H03 2068 | 23 54 08.3 | 28 49 29.4 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G1 | VRIESLAND 781 LR | MALOKONG | H03 1440 | 23 53 23.3 | 28 48 48.8 | | | | | | UNEQUIPPED | |
| A61G1 | MALOKONGSKOP 780 LR | MALOKONG | H03 1451 | 23 51 42.6 | 28 50 09.3 | | | | | | UNEQUIPPED | |
| A61G1 | MALOKONGSKOP 780 LR | MALOKONG | H03 2083 | 23 51 47.4 | 28 50 24.9 | | | | 2 | 2 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G1 | VRIESLAND 781 LR | MALOKONG | H03 2569 | 23 53 14.4 | 28 48 45.5 | 1033 | 30.9 | 1002.1 | | | UNEQUIPPED | |
| A61G1 | VRIESLAND 781 LR | MALOKONG | H03 2570 | 23 53 23.6 | 28 48 49.8 | 1032 | 23.9 | 1008.1 | | | UNEQUIPPED | |
| A61G1 | GRONINGEN 779 LR | MALOKONG | H03 2737 | 23 52 16.2 | 28 49 56.2 | | | | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G1 | GRONINGEN 779 LR | MALOKONG | H03 2738 | 23 52 15 | 28 49 55.7 | | | | | | UNEQUIPPED | SEALED OFF |
| A61G1 | GRONINGEN 779 LR | MALOKONG | H03 2739 | 23 52 20 | 28 49 55.5 | 1047 | 14.9 | 1032.1 | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G1 | MALOKONGSKOP 780 LR | MALOKONG | H03 2740 | 23 52 17 | 28 49 58 | 1048 | 15.8 | 1032.2 | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G2 | MOZAMBIQUE 807 LR | AGRICULTURE | 807LR 001 | 23 57 33.6 | 28 46 02.1 | | | | 2 | 2 | DIESEL MONO | |
| A61G2 | MOZAMBIQUE 807 LR | AGRICULTURE | 807LR 002 | 23 57 44.3 | 28 46 04.3 | | | | | | NOT EQUIPPED | |
| A61G3 | GROENFONTEIN 227 KR | AGRICULTURE | 227KR 001 | 24 02 31.4 | 28 46 44.1 | 1070 | 8.7 | 1061.3 | 2 | 2 | SUBMERSIBLE | |
| A61G3 | MOOIHOEK 226 KR | AGRICULTURE | 226KR 001 | 24 00 02 | 28 46 13 | | | | 2 | 2 | ELECTRIC MONO | HOUSEHOLD USE & STOCK WATERING |
| A61G3 | MOOIHOEK 226 KR | AGRICULTURE | 226KR 002 | 24 01 42.5 | 28 45 12.2 | 1135 | 29.2 | 1105.8 | 0.5 | 0.5 | SOLAR | STOCK & GAME WATERING |
| A61G3 | ROODEPOORT 222 KR | AGRICULTURE | 222KR 001 | 24 04 17 | 28 45 23 | 1222 | 15.7 | 1206.3 | | | NOT EQUIPPED | |
| A61G3 | STERKWATER 229KR | AGRICULTURE | 229KR 001 | 24 03 07 | 28 49 42 | | 11.08 | | NOT RECOMMENDED | NOT RECOMMENDED | NOT EQUIPPED | |
| A61G3 | STERKWATER 229KR | AGRICULTURE | 229KR 002 | 24 03 06 | 28 49 43 | | 12.95 | | | | NOT EQUIPPED | |
| A61G3 | STERKWATER 229KR | AGRICULTURE | 229KR 003 | 24 02 30 | 28 49 26 | | 20.08 | | | | NOT EQUIPPED | |
| A61G3 | STERKWATER 229KR | AGRICULTURE | 229KR 004 | 24 02 30.5 | 28 49 26 | | 20.08 | | | 1.50 | NOT EQUIPPED | |
| A61G3 | STERKWATER 229KR | AGRICULTURE | 229KR 005 | 24 02 27 | 28 49 33 | | | | 2.00 | 2.00 | SUBMERSIBLE | |
| A61G3 | STERKWATER 229KR | AGRICULTURE | 229KR 006 | 24 02 25 | 28 49 36 | | | | | | NOT EQUIPPED | |
| A61G3 | STERKWATER 229KR | AGRICULTURE | 229KR 007 | 24 02 19 | 28 49 43 | | 9.1 | | NOT RECOMMENDED | NOT RECOMMENDED | NOT EQUIPPED | |
| A61G3 | STERKWATER 229KR | AGRICULTURE | 229KR 008 | 24 02 52 | 28 50 08 | | 10.45 | | | | NOT EQUIPPED | |
| A61G3 | STERKWATER 229KR | AGRICULTURE | 229KR 009 | 24 02 46 | 28 50 13 | | | | 4.50 | 4.50 | SUBMERSIBLE | |
| A61G3 | STERKWATER 229KR | AGRICULTURE | 229KR 010 | 24 02 43 | 28 50 15 | | | | 2.00 | 2.00 | SUBMERSIBLE | |
| A61G3 | STERKWATER 229KR | AGRICULTURE | 229KR 011 | 24 02 40 | 28 50 18 | | 7.85 | | | | NOT EQUIPPED | |
| A61G3 | STERKWATER 229KR | AGRICULTURE | 229KR 012 | 24 02 36 | 28 49 49 | | | | 2.00 | 2.00 | SUBMERSIBLE | |
| A61G3 | STERKWATER 229KR | AGRICULTURE | 229KR 013 | 24 03 20 | 28 50 59 | | | | NOT RECOMMENDED | NOT RECOMMENDED | NOT EQUIPPED | |
| A61G3 | STERKWATER 229KR | AGRICULTURE | 229KR 014 | 24 03 23 | 28 50 47 | | | | 0.50 | 0.50 | WINDMILL | |
| A61G4 | GEZOND 235 KR | GA - MATLOU | H03 2276 | 24 01 35 | 28 51 11.6 | | | | DRY | DRY | UNEQUIPPED | |
| A61G4 | GEZOND 235 KR | GA - MATLOU | H03 2277 | 24 01 35.3 | 28 51 12.2 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G4 | GEZOND 235 KR | GA - MATLOU | H03 2280 | 24 01 25.6 | 28 51 08.7 | 1029 | 14.3 | 1014.7 | 2 | 2 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G4 | GEZOND 235 KR | GA - MATLOU | H03 2282 | 24 00 57.9 | 28 51 13 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G4 | GEZOND 235 KR | GA - MATLOU | H03 2283 | 24 01 35.3 | 28 52 05.5 | | | | 0:5 | 0.5 | WINDMILL | BLOCKED and ABANDONED |
| A61G4 | MOLENDRAAI 811 LR | GA - MABUELA | H03 2042 | 23 57 57.4 | 28 48 23.6 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G4 | MOLENDRAAI 811 LR | GA - MABUELA | H03 2043 | 23 58 04.5 | 28 48 51.2 | | 16.9 | | | | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | MMAHLOGO | H03 2045 | 23 57 56.4 | 28 49 22.1 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G4 | MOLENDRAAI 811 LR | GA - MABUELA | H03 2061 | 23 57 00.1 | 28 48 14.7 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G4 | MOLENDRAAI 811 LR | MMAHLOGO | H03 2579 | 23 58 04.1 | 28 48 50.3 | | | | DRY | DRY | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | MMAHLOGO | H03 2582 | 23 58 03.3 | 28 48 50.5 | | | | DRY | DRY | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | MMAHLOGO | HP 001 | 23 58 17.3 | 28 49 17.6 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G4 | MOLENDRAAI 811 LR | GA - MABUELA | HP 001 | 23 56 57.3 | 28 48 06.4 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G4 | MOLENDRAAI 811 LR | MMAHLOGO | HP 002 | 23 59 14.1 | 28 49 03 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G4 | SANDSLOOT 236 KR | MAPELA | H03 1593 | 24 01 40.4 | 28 53 30.5 | | | | 0.5 | 0.5 | WINDMILL | BLOCKED , DISMANTLED and ABANDONED |
| A61G4 | SANDSLOOT 236 KR | MAPELA | H03 1594 | 24 01 47.6 | 28 53 34.5 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G4 | KNAPDAAR 234 KR | MAPELA | H03 1600 | 24 02 09.5 | 28 53 20.2 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G4 | KNAPDAAR 234 KR | MAPELA | H03 1601 | 24 02 04.5 | 28 52 42.8 | | | | 2 | 2 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G4 | SANDSLOOT 236 KR | MAPELA | H03 2317 | 24 01 36 | 28 54 11.2 | | | | 0.5 | 0.5 | WINDMILL | |
| A61G5 | ARMOEDE 823 LR | Gillemberg Boerdery | 823LR 001 | 23 58 20.2 | 28 59 02.4 | | | | 2 | 2 | MONO & DIESEL | |
| A61G5 | ARMOEDE 823 LR | Gillemberg Boerdery | 823LR 002 | 23 56 56.1 | 28 57 47.8 | | | | 2 | 2 | MONO & DIESEL | |
| A61G5 | BLINKWATER 820 LR | SEKURUWE | H03 1244 | 23 56 19.3 | 28 57 21.6 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | BLINKWATER 820 LR | SEKURUWE | H03 1245 | 23 56 25.9 | 28 57 20 | | | | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G5 | BLINKWATER 820 LR | SEKURUWE | H03 1246 | 23 56 39.8 | 28 57 26.7 | | | | 2.95 | 2.95 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G5 | BLINKWATER 820 LR | MOHLOTLO | H03 2126 | 23 57 11.2 | 28 55 50.4 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | BLINKWATER 820 LR | MOHLOTLO | H03 2127 | 23 57 11.1 | 28 55 50.2 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | BLINKWATER 820 LR | MOHLOTLO | H03 2128 | 23 57 12.5 | 28 55 50 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | BLINKWATER 820 LR | MOHLOTLO | H03 2129 | 23 57 12.3 | 28 55 44 | | 24.1 | | | | UNEQUIPPED | |
| A61G5 | BLINKWATER 820 LR | MOHLOTLO | H03 2130 | 23 57 13.6 | 28 55 44.3 | | 25.9 | | | | UNEQUIPPED | |
| A61G5 | BLINKWATER 820 LR | MOHLOTLO | H03 2131 | 23 57 22.3 | 28 55 44.1 | | 22.3 | | | | UNEQUIPPED | |
| A61G5 | BLINKWATER 820 LR | SEKURUWE | H03 2153 | 23 56 16.4 | 28 57 20 | | | | 0.5 | 0.5 | WINDMILL | DOMESTIC SUPPLY |
| A61G5 | BLINKWATER 820 LR | SEKURUWE | H03 2157 | 23 56 30.3 | 28 56 19.3 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G5 | DIANA 716 LS | DIANA | H04-0379 | 23 52 37.8 | 29 04 52.8 | | | | 2 | 2 | MONO & DIESEL | GOOD COND. DOMESTIC USE |
| A61G5 | DOORNFONTEIN 724 LS | SEGOAHLENG | H04 0428 | 23 57 36 | 29 06 09 | 1420 | | | 2 | 2 | ELECTRIC MONO | FEEDS into RETICULATION 08/24 hrs |
| A61G5 | DOORNFONTEIN 724 LS | GA MATLAPA | H04 0431 | 23 50 52 | 29 07 10 | 1438 | | | 0.5 | 0.5 | WINDMILL | TO FILL UP RESERVOIR |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A61G5 | DOORNFONTEIN 724 LS | GA MATLAPA | H04 0444 | 23 59 11 | 29 06 38 | 1399 | | | 0.3 | 0.3 | HANDPUMP | IN USE |
| A61G5 | DOORNFONTEIN 724 LS | GA MATLAPA | 724LS001 | 23 59 19 | 29 06 39 | 1410 | 3.45 | 1406.55 | 2 | 2 | SUBMERSIBLE | TO IRRIGATE 0.5 ha PRIVATE GARDEN |
| A61G5 | DRENTHE 778 LR | GA - MALOKA | T3815 | 23 54 51.4 | 28 55 00 | | | | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY for GA - PUKA |
| A61G5 | DRENTHE 778 LR | GA - MALOKA | H03 2052 | 23 54 40.7 | 28 52 35.3 | | 12 | | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G5 | DRENTHE 778 LR | GA - MALOKA | H03 2054 | 23 54 44.5 | 28 52 55.5 | | 12 | | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G5 | WITRIVIER 777 LR | GA - MALOKA | H03 2055 | 23 54 28.1 | 28 53 25.1 | | 11 | | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G5 | WITRIVIER 777 LR | GA - MALOKA | H03 2056 | 23 54 25.1 | 28 53 28.1 | | 15.6 | | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G5 | WITRIVIER 777 LR | GA - MALOKA | H03 2057 | 23 54 08 | 28 53 42.3 | | | | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G5 | DRENTHE 778 LR | GA - MALOKA | T 3612 | 23 54 55.7 | 28 52 53.8 | | 20 | | 10 | 10 | ELECTRIC MONO | DOMESTIC SUPPLY for GA - PUKA |
| A61G5 | WITRIVIER 777 LR | GA - MALOKA | T 60541 | 23 54 20.3 | 28 53 31.3 | | | | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G5 | JUPITER 717 LS | JUPITER | H03-0381 | 23 52 18.9 | 29 02 06.3 | | | | 0.5 | 0.5 | WINDMILL | |
| A61G5 | JUPITER 717 LS | JUPITER | H03-0382 | 23 53 09.5 | 29 01 02.5 | | | | 5 | 5 | MONO & DIESEL | GOOD COND. DOMESTIC USE |
| A61G5 | JUPITER 717 LS | JUPITER | H03-0881 | 23 51 08.1 | 29 02 02.5 | | 24.6 | 1268.4 | 0.5 | 0.5 | WINDMILL | |
| A61G5 | LUXEMBURG 772 LR | Gillemberg Boerdery | 772LR 001 | 23 52 23.4 | 28 58 21.5 | | | | 2 | 2 | MONO & DIESEL | |
| A61G5 | MARS 718 LS | GA MANGOU | H04 0385 | 23 54 42 | 29 03 52 | 1340 | | | 0.3 | 0.3 | HANDPUMP | IN USE |
| A61G5 | MARS 718 LS | GA MANGOU | H04 0563 | 23 53 44 | 29 03 52 | 1339 | | | | | OPEN HOLE | |
| A61G5 | MARS 718 LS | GA MANGOU | H04 0564 | 23 54 24 | 29 04 22 | 1375 | 10.25 | 1364.75 | | | OPEN HOLE | SEALED OFF |
| A61G5 | MARS 718 LS | GA MANGOU | H04 1023 | 23 54 46 | 29 04 16 | 1346 | | | 2 | 2 | DIESEL MONO | TO FILL OP RESERVOIR 10/24 hrs 4 days a week |
| A61G5 | MOORDKOPJE 813 LR | GA - MOSOGE | H03 1461 | 23 57 00.7 | 28 50 30.1 | | | | | 0.2 | UNEQUIPPED | |
| A61G5 | MOORDKOPJE 813 LR | GA - MOSOGE | H03 1462 | 23 56 58.7 | 28 50 32.4 | | | | | 0.13 | UNEQUIPPED | |
| A61G5 | MOORDKOPJE 813 LR | GA - MOSOGE | H03 1463 | 23 57 24.1 | 28 50 00.6 | | 7.9 | | | 1 | UNEQUIPPED | |
| A61G5 | MOORDKOPJE 813 LR | GA - MOSOGE | H03 1464 | 23 57 24.5 | 28 50 08.1 | | | | 3.3 | 3.3 | UNEQUIPPED | |
| A61G5 | MOORDKOPJE 813 LR | GA - MOSOGE | H03 2047 | 23 56 42 | 28 49 55 | | | | 0.5 | 0.5 | WINDMILL | OUT OF ORDER |
| A61G5 | MOORDKOPJE 813 LR | GA - MOSOGE | H03 2049 | 23 56 35.5 | 28 50 48.4 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G5 | MOORDKOPJE 813 LR | GA - TSHABA | H03 2077 | 23 57 52.8 | 28 50 00 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | NOORD BRABAND 774 LR | Gillemberg Boerdery | 744LR 002 | 23 54 52.3 | 28 59 12.4 | | 21.6 | 1168.4 | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G5 | NOORD BRABAND 774 LR | Gillemberg Boerdery | 774LR 001 | 23 54 20.1 | 28 57 44.4 | | 10.4 | 1169.6 | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G5 | OVERYSEL 815 LR | GA - MALEBANA | H03 1459 | 23 56 04.5 | 28 53 39.7 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | OVERYSEL 815 LR | GA - MALEBANA | H03 2134 | 23 55 30 | 28 53 33.6 | | 23 | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | GA - MALEBANA | H03 2135 | 23 55 30.7 | 28 53 33.8 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | OVERYSEL 815 LR | GA - MALEBANA | H03 2136 | 23 55 32 | 28 53 35 | | 28.6 | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | GA - MALEBANA | H03 2137 | 23 55 33.1 | 28 53 35.6 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | OVERYSEL 815 LR | GA - MALEBANA | H03 2138 | 23 55 32.7 | 28 53 36.8 | | 29.98 | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | GA - MALEBANA | H03 2139 | 23 55 34 | 28 53 37.3 | | 30.98 | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | GA - MALEBANA | H03 2140 | 23 55 35 | 28 53 39.7 | | 30.8 | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | GA - MALEBANA | H03 2141 | 23 55 40.3 | 28 53 42.6 | | | | | 0.4 | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | OVERYSEL 815 LR | SEKHAOLELO | H03 2144 | 23 57 15.1 | 28 53 46.3 | | 21 | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | SEKHAOLELO | H03 2145 | 23 57 18 | 28 53 41.5 | | 27.5 | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | SEKHAOLELO | H03 2146 | 23 57 18.4 | 28 53 40.5 | | 27.6 | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | SEKHAOLELO | H03 2147 | 23 57 21.8 | 28 53 40 | | 23.1 | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | SEKHAOLELO | H03 2148 | 23 57 21.9 | 28 53 39.5 | | 23 | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | SEKHAOLELO | H03 2149 | 23 57 21.7 | 28 53 37.8 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | OVERYSEL 815 LR | SEKHAOLELO | H03 2150 | 23 57 23.6 | 28 53 35.2 | | 39.3 | | | 0.18 | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | SEKHAOLELO | H03 2151 | 23 57 25.7 | 28 53 33.2 | | | | | 3.8 | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | SEKHAOLELO | H03 2152 | 23 57 27.2 | 28 53 32 | | | | | 0.7 | UNEQUIPPED | |
| A61G5 | ROOIBOKFONTEIN 821 LR | Gillemberg Boerdery | 821LR 001 | 23 55 31.0 | 28 58 13.0 | | 38.6 | 1193.4 | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G5 | VAALKOP 819 LR | GA - PILA | H03 1597 | 23 59 19.1 | 28 54 26 | | | | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G5 | VAALKOP 819 LR | GA - PILA | H03 1598 | 23 59 22.4 | 28 54 23.8 | | | | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G5 | VAALKOP 819 LR | MOLEKANA | H03 2328 | 23 59 57.7 | 28 56 37.5 | | | | | | UNEQUIPPED | SEALED OFF |
| A61G5 | VAALKOP 819 LR | MOLEKANA | H03 2330 | 24 00 02.1 | 28 56 27.6 | | | | 2 | 2 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G5 | VAALKOP 819 LR | MOLEKANA | H03 2331 | 24 00 01 | 28 58 33 | 1131 | 5 | 1126 | | | UNEQUIPPED | |
| A61G5 | WITRIVIER 777 LR | Gillemberg Boerdery | 777LR 001 | 23 53 51.9 | 28 54 07.1 | | | | 5 | 5 | MONO & ELECTRICITY | IRRIGATION |
| A61G5 | WITRIVIER 777 LR | Gillemberg Boerdery | 777LR 002 | 23 53 56.8 | 28 54 02.6 | | | | 5 | 5 | MONO & ELECTRICITY | IRRIGATION |
| A61G5 | WITRIVIER 777 LR | Gillemberg Boerdery | 777LR 003 | 23 54 00 | 28 53 52.9 | | | | 5 | 5 | MONO & ELECTRICITY | IRRIGATION |
| A61G5 | WITRIVIER 777 LR | Gillemberg Boerdery | 777LR 004 | 23 54 09.7 | 28 53 57.4 | | | | 5 | 5 | MONO & ELECTRICITY | IRRIGATION |
| A61G5 | WITRIVIER 777 LR | Gillemberg Boerdery | 777LR 005 | 23 54 17.8 | 28 53 42.4 | | | | 5 | 5 | MONO & ELECTRICITY | IRRIGATION |
| A61G5 | WITRIVIER 777 LR | Gillemberg Boerdery | 777LR 006 | 23 54 19.4 | 28 53 40.6 | | | | 5 | 5 | MONO & ELECTRICITY | IRRIGATION |
| A61G5 | WITRIVIER 777 LR | Gillemberg Boerdery | 777LR 007 | 23 54 21.1 | 28 53 38.5 | | | | 5 | 5 | MONO & ELECTRICITY | IRRIGATION |
| A61G5 | WITRIVIER 777 LR | Gillemberg Boerdery | 777LR 008 | 23 54 25.9 | 28 53 36.4 | | | | 5 | 5 | MONO & ELECTRICITY | IRRIGATION |
| A61G5 | ZUID BRABAND 719 LS | Gillemberg Boerdery | 719LS 001 | 23 54 42.0 | 29 01 33.0 | | 22.9 | 1234.1 | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G5 | ZUID BRABAND 719 LS | Gillemberg Boerdery | 719LS 002 | 23 54 50.5 | 28 59 56.2 | | 9.9 | 1192.1 | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G5 | ZUID BRABAND 719 LS | Gillemberg Boerdery | 719LS 003 | 23 55 31.0 | 28 58 13.0 | | | | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G5 | ZUID BRABAND 719 LS | Gillemberg Boerdery | 719LS 004 | 23 54 47.2 | 28 59 47.2 | | 7.8 | 1192.2 | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G5 | ZUID HOLLAND 773 LR | Gillemberg Boerdery | 778LR 001 | 23 52 19.0 | 28 57 20.1 | | 16.4 | 1146.6 | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G5 | ZWARTFONTEIN 818 LR | SKIMMING | BH 001 | 23 59 35.1 | 28 52 56.1 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | MOORDKOPJE 813 LR | MAGOPE | H03 1073 | 23 58 21.1 | 28 50 03.4 | | | | | | UNEQUIPPED | SEALED OFF |
| A61G5 | ZWARTFONTEIN 814 LR | SKIMMING | H03 1075 | 23 58 51.6 | 28 51 56.5 | | | | | | UNEQUIPPED | SEALED OFF |
| A61G5 | ZWARTFONTEIN 814 LR | MAGOPE | H03 1465 | 23 58 26.2 | 28 50 58.6 | | 15.9 | | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G5 | ZWARTFONTEIN 814 LR | SKIMMING | H03 1476 | 23 58 47.7 | 28 51 58.5 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | MOORDKOPJE 813 LR | MAGOPE | H03 2069 | 23 58 08.8 | 28 50 40.3 | | | | 0.5 | 0.5 | WINDMILL | DOMESTIC SUPPLY |
| A61G5 | ZWARTFONTEIN 814 LR | MAGOPE | H03 2071 | 23 58 22 | 28 51 05.1 | | | | | | UNEQUIPPED | SEALED OFF |
| A61G5 | ZWARTFONTEIN 814 LR | SKIMMING | H03 2075 | 23 58 56.8 | 28 51 32 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | ZWARTFONTEIN 814 LR | SKIMMING | H03 2265 | 23 59 21 | 28 52 40.1 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G5 | ZWARTFONTEIN 814 LR | SKIMMING | H03 2266 | 23 59 22.8 | 28 52 41 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G5 | ZWARTFONTEIN 814 LR | SKIMMING | H03 2267 | 23 59 20.7 | 28 52 40.6 | | | | 0.3 | 0.3 | HANDPUMP | OUT OF ORDER |
| A61G5 | ZWARTFONTEIN 814 LR | SKIMMING | H03 2268 | 23 59 17.4 | 28 52 10.5 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY and IRRIGATION |
| A61G5 | ZWARTFONTEIN 814 LR | SKIMMING | H03 2269 | 23 59 15.7 | 28 52 13 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G5 | ZWARTFONTEIN 814 LR | SKIMMING | H03 2270 | 23 59 24.7 | 28 52 18.7 | | 17.3 | | | | UNEQUIPPED | |
| A61G5 | ZWARTFONTEIN 814 LR | GA - SEEMA | H03 2272 | 24 00 11.3 | 28 52 21.9 | 1046.1 | 8 | 1037.1 | 2 | 2 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2084 | 23 57 53.7 | 28 54 25.1 | | 22.5 | | 0.5 | 0.5 | WINDMILL | DOMESTIC SUPPLY |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2112 | 23 58 00 | 28 54 06 | | 20 | | | | UNEQUIPPED | |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2113 | 23 58 02.4 | 28 54 10 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2114 | 23 58 02.2 | 28 54 10.3 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2115 | 23 58 02.1 | 28 54 13.1 | | 15.98 | | | 1 | UNEQUIPPED | |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2116 | 23 58 02.2 | 28 54 13.2 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2117 | 23 58 02.3 | 28 54 14.3 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2118 | 23 58 01.5 | 28 54 18.3 | | 15.7 | | | | UNEQUIPPED. | |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2119 | 23 57 58.6 | 28 54 19.5 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2120 | 23 57 56 | 28 54 23.5 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2121 | 23 58 03 | 28 54 30.9 | | | | | | UNEQUIPPED | |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2123 | 23 57 52.4 | 28 54 27.3 | | 22.7 | | | 0.5 | UNEQUIPPED | |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2124 | 23 57 51 | 28 54 31.5 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2125 | 23 57 50.7 | 28 54 31.7 | | | | | 0.5 | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2166 | 23 57 38 | 28 54 04.8 | | | | 2 | 2 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G5 | ZWARTFONTEIN 818 LR | GA - PUKA | H03 2580 | 23 58 03 | 28 54 30.9 | | | | | | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45096 | 24 02 00.9 | 28 51 51.2 | | | | | | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45097 | | | | | | | 2 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45098 | 24 03 03.2 | 28 52 00.0 | | | | | 7 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45099 | 24 03 09.6 | 28 52 12.4 | | | | | 10 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45100 | 24 03 15.4 | 28 52 23.8 | | | | | 2 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45105 | 24 03 41.6 | 28 52 56.5 | | | | | 7.7 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45107 | | | | | | | 4.6 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45113 | | | | | | | 3 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45114 | | | | | | | 2 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45120 | | | | | | | 7 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45121 | | | | | | | 2 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45122 | | | | | | | 0.7 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45123 | | | | | | | 3 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45124 | | | | | | | 1.2 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45130 | | | | | | | 2.5 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45131 | 24 04 04.8 | 28 53 26.5 | | | | | 2 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45132 | 24 03 54.4 | 28 53 17.6 | | | | | 2 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | DWAF | G45518 | | | | | | | 2 | UNEQUIPPED | |
| A61G6 | KNAPDAAR 234 KR | PHOLOTSI | H03 1043 | 24 02 29.8 | 28 53 49.6 | | | | 4.1 | 4.1 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G6 | KNAPDAAR 234 KR | PHOLOTSI | H03 2288 | 24 02 28.7 | 28 53 49.6 | | | | 0.5 | 0.5 | WINDMILL | DOMESTIC SUPPLY |
| A61G6 | KNAPDAAR 234 KR | PHOLOTSI | H03 2293 | 24 02 50.6 | 28 53 49.6 | | | | | | DISMANTLED | |
| A61G6 | KNAPDAAR 234 KR | PHOLOTSI | H03 2294 | 24 03 01.5 | 28 53 18.3 | | | | 2 | 2 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G6 | KNAPDAAR 234 KR | PHOLOTSI | H03 2296 | 24 03 12.4 | 28 53 31.3 | | | | | | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 2 KS | TSHAMAHANSI | H03 0879 | 24 05 26.1 | 28 59 53.5 | | DRY | | | | UNEQUIPPED | ABANDONED |
| A61G6 | RIETFONTEIN 2 KS | TSHAMAHANSI | H03 2307 | 24 05 06.4 | 28 59 24.7 | 1164.98 | 27.26 | 1137.72 | 2 | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G6 | RIETFONTEIN 2 KS | TSHAMAHANSI | H03 2308 | 24 05 04.8 | 28 59 26.5 | 1160.02 | 27.1 | 1132.92 | 1 | 1 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G6 | RIETFONTEIN 2 KS | TSHAMAHANSI | H03 2784 | 24 05 00 | 28 59 55.6 | | | | | | NEW BOREHOLE | |
| A61G6 | RIETFONTEIN 2 KS | TSHAMAHANSI | H03 2786 | 24 03 44.8 | 28 59 45.9 | 1142 | 11.63 | 1130.37 | | 0.67 | NEW BOREHOLE | |
| A61G6 | RIETFONTEIN 2 KS | TSHAMAHANSI | H03 2787 | 24 03 37.6 | 28 59 58.2 | 1145 | 9.27 | 1135.73 | | 1.8 | NEW BOREHOLE | |
| A61G6 | RIETFONTEIN 240 KR | GA - KGUBUDI | H03 0961 | 24 05 30.9 | 28 56 19.1 | 1063 | 6.9 | 1056.1 | 2.85 | 2.85 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G6 | RIETFONTEIN 240 KR | MALEPETEKE | H03 1639 | 24 04 16.3 | 28 55 11.3 | 1052 | 20.11 | 1031.89 | 2 | 2 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 1687 | 24 04 53.3 | 28 54 10.7 | 1026 | 12.51 | 1013.49 | | | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 1688 | 24 04 55.1 | 28 54 14 | 1026.8 | 12.6 | 1014.2 | | 2 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 1689 | 24 04 58.4 | 28 54 15.6 | 1027 | 14.9 | 1012.1 | | 2 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 1690 | 24 05 02.7 | 28 54 12.9 | 1026.5 | 14.9 | 1011.6 | | 4.6 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 1691 | 24 05 07.1 | 28 54 22.1 | 1027 | 14.9 | 1012.1 | | 2.3 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | GA - LETWABA | H03 2227 | 24 04 02.6 | 28 55 38.6 | 1050.9 | 18.01 | 1041.09 | 0.89 | 0.89 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 2228 | 24 06 03.5 | 28 55 15.6 | 1035.05 | 19.1 | 1015.95 | | 8 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 2229 | 24 06 05 | 28 55 22.6 | 1037.8 | 20.4 | 1017.4 | | 0.9 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 2232 | 24 06 00.6 | 28 55 10.3 | 1034 | 17.4 | 1016.6 | | 0.8 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 2233 | 24 05 53.9 | 28 55 02.1 | 1029.9 | 15.9 | 1014 | | 2 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 2234 | 24 05 53.3 | 28 55 00.4 | 1029.2 | 15.05 | 1014.15 | | 2 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 2235 | 24 05 51.5 | 24 54 53.8 | 1028 | 14.4 | 1013.6 | | 2.8 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 2236 | 24 05 42.8 | 28 54 47.1 | 1028.3 | 14.3 | 1014 | | 3 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 2237 | 24 05 35.4 | 28 54 42.8 | 1028 | 14.65 | 1013.35 | | 2 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 2238 | 24 05 29.8 | 28 54 39.5 | 1028.7 | 15.7 | 1013 | | 3.8 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 2239 | 24 05 27.2 | 28 54 38.1 | | | | | 23 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 2240 | 24 05 21.1 | 28 54 30.1 | 1027.2 | 16.65 | 1010.55 | | 0.5 | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | GA - KGUBUDI | H03 2242 | 24 05 17.2 | 28 56 20.8 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G6 | RIETFONTEIN 240 KR | GA - KGUBUDI | H03 2243 | 24 05 05.7 | 28 56 38.5 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G6 | RIETFONTEIN 240 KR | GA - KGUBUDI | H03 2245 | 24 04 58.7 | 28 56 28.9 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G6 | RIETFONTEIN 240 KR | GA - KGUBUDI | H03 2246 | 24 05 42.1 | 28 56 29.1 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G6 | RIETFONTEIN 240 KR | MALEPETEKE | H03 2256 | 24 04 30 | 28 55 16 | | | | | | HANDPUMP | DOMESTIC SUPPLY |
| A61G6 | RIETFONTEIN 240 KR | MALEPETEKE | H03 2258 | 24 04 27 | 28 55 19 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 2576 | 24 08 04.6 | 28 57 09.6 | | | | | DRY | UNEQUIPPED | |
| A61G6 | RIETFONTEIN 240 KR | DWAF | H03 2577 | 24 08 04.8 | 28 57 16.8 | | | | 0.3 | 0.3 | UNEQUIPPED | |
| A61G6 | SANDSLOOT 236 KR | GA - LELAKA | H03 2274 | 24 00 37.4 | 28 52 03.4 | 1047 | 9.9 | 1037.1 | | 2 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G6 | TURFSPRUIT 241 KR | TSHAMAHANSI | H03 0182 | 24 04 41.6 | 28 58 33.5 | 1144.5 | 14.22 | 1130.28 | 1.3 | 2.5 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G6 | TURFSPRUIT 241 KR | TSHAMAHANSI | H03 0889 | 24 05 08 | 28 58 44.1 | 1133.98 | 13.76 | 1120.22 | 4.5 | 12 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G6 | TURFSPRUIT 241 KR | DWAF | H03 2230 | 24 06 10.3 | 28 55 33.7 | 1040.1 | 22.2 | 1017.9 | | 0.8 | UNEQUIPPED | |
| A61G6 | TURFSPRUIT 241 KR | DWAF | H03 2231 | 24 06 10 | 28 55 38 | 1041 | 22.2 | 1018.8 | | | UNEQUIPPED | |
| A61G6 | TURFSPRUIT 241 KR | DWAF | H03 2250 | 24 07 55.5 | 28 55 13.3 | 1142.5 | 21.45 | 1121.05 | | | UNEQUIPPED | |
| A61G6 | TURFSPRUIT 241 KR | DWAF | H03 2251 | 24 06 15.6 | 28 55 50.5 | 1142.7 | 22.35 | 1120.35 | | 2 | UNEQUIPPED | |
| A61G6 | TURFSPRUIT 241 KR | DWAF | H03 2252 | 24 06 16.6 | 28 55 51.5 | 1142.9 | 22.5 | 1120.4 | | | UNEQUIPPED | |
| A61G6 | TURFSPRUIT 241 KR | DWAF | H03 2253 | 24 06 18.2 | 28 55 58.1 | 1142.98 | 17.48 | 1125.48 | | 2 | UNEQUIPPED | |
| A61G6 | TURFSPRUIT 241 KR | DWAF | H03 2254 | 24 06 20.4 | 28 55 59.9 | 1143 | 14.9 | 1128.1 | | 2 | UNEQUIPPED | |
| A61G6 | TURFSPRUIT 241 KR | DWAF | H03 2255 | 24 06 22.6 | 28 56 03.4 | 1143.05 | 14.92 | 1128.13 | | 20 | UNEQUIPPED | |
| A61G6 | TURFSPRUIT 241 KR | DWAF | H03 2256 | 24 06 25.3 | 28 56 13.2 | 1143.6 | 17.5 | 1126.1 | | 6 | UNEQUIPPED | |
| A61G6 | TURFSPRUIT 241 KR | DWAF | H03 2257 | 24 06 29.9 | 28 56 16.8 | 1144 | 17.98 | 1126.02 | | 3 | UNEQUIPPED | |
| A61G6 | TURFSPRUIT 241 KR | TSHAMAHANSI | H03 2298 | 24 05 22.4 | 28 58 17.6 | 1109 | 10.7 | 1098.3 | 1.53 | 1.53 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G6 | RIETFONTEIN 2 KS | TSHAMAHANSI | H03 2310 | 24 04 49.6 | 28 59 28.3 | | | | | | UNEQUIPPED | BLOCKED and ABANDONED |
| A61G6 | RIETFONTEIN 2 KS | TSHAMAHANSI | H03 2312 | 24 05 24 | 28 59 26.5 | 1150 | 20.85 | 1129.15 | 3 | 5 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G6 | TURFSPRUIT 241 KR | TSHAMAHANSI | H03 2318 | 24 05 10.3 | 28 59 00 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G6 | TURFSPRUIT 241 KR | TSHAMAHANSI | H03 2321 | 24 05 10.6 | 28 58 18.5 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G6 | TURFSPRUIT 241 KR | GA - MAGONGWA | H03 2325 | 24 04 51.2 | 28 58 17.6 | 1119 | 9.14 | 1109.86 | 1.8 | 1.8 | ELECTRIC MONO | DOMESTIC SUPPLY |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A61G6 | TURFSPRUIT 241 KR | TSHAMAHANSI | H03 2525 | 24 05 15.9 | 28 58 30.6 | 1118.5 | 7 | 1111.5 | | | UNEQUIPPED | |
| A61G6 | TURFSPRUIT 241 KR | TSHAMAHANSI | H03 2782 | 24 05 24 | 28 59 00 | 1137.5 | 16.24 | 1121.28 | | 0.35 | NEW BOREHOLE | |
| A61G6 | TURFSPRUIT 241 KR | TSHAMAHANSI | H03 2783 | 24 05 32 | 28 59 30.8 | | | | | | NEW BOREHOLE | |
| A61G6 | TWEEFONTEIN 238 KR | GA - MOKABA | H03 1402 | 24 02 31.4 | 28 56 00 | | | | | 0.33 | UNEQUIPPED | |
| A61G6 | TWEEFONTEIN 238 KR | GA - MOKABA | H03 1695 | 24 03 22.4 | 28 56 44.1 | 1102 | 15.67 | 1086.33 | 0.8 | 0.6 l/sec | DIESEL MONO | DOMESTIC SUPPLY |
| A61G6 | TWEEFONTEIN 238 KR | GA - MOKABA | H03 1696 | 24 03 17.8 | 28 56 47.6 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G6 | TWEEFONTEIN 238 KR | GA - MOKABA | H03 1697 | 24 03 14.4 | 28 56 26.3 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G6 | TWEEFONTEIN 238 KR | GA - MOKABA | H03 1698 | 24 02 56 | 28 56 35.3 | 1121 | 21.53 | 1099.47 | 0.8 | 0.8 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G6 | TWEEFONTEIN 238 KR | GA - MOKABA | H03 1699 | 24 02 40 | 28 56 37.9 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G6 | TWEEFONTEIN 238 KR | GA - MOKABA | H03 1700 | 24 02 41.6 | 28 56 39.7 | 1129.9 | 22.04 | 1107.86 | 0.8 | 0.8 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G6 | TWEEFONTEIN 238 KR | GA - MOKABA | H03 1701 | 24 02 47 | 28 56 40 | | | | | | UNEQUIPPED | |
| A61G6 | TWEEFONTEIN 238 KR | MACHIKIRI | H03 1703 | 24 01 09.6 | 28 57 21.6 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G6 | TWEEFONTEIN 238 KR | MACHIKIRI | H03 1704 | 24 00 58.3 | 28 57 12.5 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G6 | TWEEFONTEIN 238 KR | MACHIKIRI | H03 1705 | 24 00 54.5 | 28 57 08.1 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G6 | TWEEFONTEIN 238 KR | MACHIKIRI | H03 1706 | 24 00 52.8 | 28 57 04.9 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G6 | TWEEFONTEIN 238 KR | MACHIKIRI | H03 1708 | 24 01 05.6 | 28 57 30.5 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G6 | TWEEFONTEIN 238 KR | MACHIKIRI | H03 1709 | 24 00 56.1 | 28 57 38 | | | | 0.5 | 0.5 | WINDMILL | DOMESTIC SUPPLY |
| A61G6 | TWEEFONTEIN 238 KR | MACHIKIRI | H03 1711 | 24 00 53.6 | 28 57 30.4 | 1178.44 | 13.84 | 1164.6 | 2 | 2 | DIESEL MONO | DOMESTIC SUPPLY |
| A61G6 | TWEEFONTEIN 238 KR | GA - MOKABA | H03 2262 | 24 02 31 | 28 56 29.4 | 1129.9 | 17.1 | 1112.8 | | | UNEQUIPPED | |
| A61G6 | TWEEFONTEIN 238 KR | GA - MOKABA | H03 2263 | 24 02 35.1 | 28 56 30.7 | 1129.9 | 22.2 | 1107.79 | | | UNEQUIPPED | |
| A61G6 | TWEEFONTEIN 238 KR | GA - MOKABA | H03 2264 | 24 02 29.8 | 28 56 20.4 | | | | | | UNEQUIPPED | ABANDONED |
| A61G6 | KNAPDAAR 234 KR | LELESO | H03 2290 | 24 01 59 | 28 55 07.2 | | | | | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A61G6 | KNAPDAAR 234 KR | LELESO | H03 2291 | 24 02 02.8 | 28 55 04.9 | | | | | 0.3 | HANDPUMP | |
| A61G6 | TWEEFONTEIN 238 KR | TSHAMAHANSI | H03 2297 | 24 03 50.4 | 28 58 22.3 | 1140.4 | 18.1 | 1122.3 | | | DISMANTLED | |
| A61G6 | RIETFONTEIN 2 KS | TSHAMAHANSI | H03 2304 | 24 03 49.6 | 28 58 33.5 | 1142 | 24.6 | 1117.4 | 1 | 1 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G6 | RIETFONTEIN 2 KS | TSHAMAHANSI | H03 2305 | 24 03 51.2 | 28 58 35.3 | 1142.05 | 25.77 | 1116.20 | 1 | 3.3 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A61G6 | RIETFONTEIN 2 KS | TSHAMAHANSI | H03 2785 | 24 03 48 | 28 59 35.3 | 1141.5 | 11.07 | 1130.43 | | 1.8 | NEW BOREHOLE | |
| A61G7 | DOORNFONTEIN 721 LS | Gillemberg Boerdery | 721LS 001 | 23 56 44.2 | 29 03 55.8 | | | | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G7 | DOORNFONTEIN 721 LS | Gillemberg Boerdery | 721LS 002 | 23 56 06.4 | 29 03 22.8 | | 17.4 | 1285.6 | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G7 | DOORNFONTEIN 721 LS | Gillemberg Boerdery | 721LS 003 | 23 55 55.1 | 29 02 59.2 | | 10.7 | 1291.3 | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G7 | DOORNFONTEIN 721 LS | Gillemberg Boerdery | 721LS 004 | 23 56 00.1 | 29 02 21.6 | | DRY | | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G7 | DOORNFONTEIN 721 LS | Gillemberg Boerdery | 721LS 005 | 23 55 09.6 | 29 02 04.7 | | | | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G7 | RIETFONTEIN 720 LS | Gillemberg Boerdery | 720LS 001 | 23 57 34.7 | 29 00 30.0 | | 18.6 | 1220.4 | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G7 | ARMOEDE 823 LR | Gillemberg Boerdery | 823LR 001 | 23 58 20.2 | 28 59 02.4 | | 12.2 | 1169.8 | 2 | 2 | MONO & DIESEL | CATTLE |
| A61G7 | DOORNFONTEIN 724 LS | SEGOAHLENG | H04 0428 | 23 57 36 | 29 06 09 | 1428 | | | 2 | 2 | ELECTRIC MONO | FEEDS into RETICULATION 08/24 hrs |
| A61G7 | MACHICHAANS 709 LS | BOETSE | H04 1027 | 23 58 13 | 29 06 59 | 1500 | 15.04 | 1484.96 | 0.3 | 0.3 | HANDPUMP | OUT OF USE |
| A61G7 | MACHICHAANS 709 LS | GASHA | H04 0433 | 23 57 59 | 29 07 22 | 1491 | | | 0.3 | 0.3 | HANDPUMP | OUT OF USE |
| A61G7 | MACHICHAANS 709 LS | MASHASHANE | H04 0420 | 23 55 50 | 29 08 07 | 1494 | 28.8 | 1465.2 | 1 | 1 | OLD MONO | OUT OF USE - DRILLED 1984 (T1295) = 6.25 l/sec |
| A61G7 | MACHICHAANS 709 LS | MASHASHANE | H04 0421 | 23 55 48 | 29 08 08 | 1494 | | | 1 | 1 | OLD DIESEL ENGINE | OUT OF USE |
| A61G7 | MACHICHAANS 709 LS | MASHASHANE | H04 0429 | 23 55 48 | 29 08 11 | 1488 | | | 2 | 2 | ELECTRIC MONO | IN USE - DRILLED 1988 = 2.00 l/sec |
| A61G7 | MACHICHAANS 709 LS | MASHASHANE | H04 0531 | 23 55 04 | 29 07 59 | 1480 | | | | | UNEQUIPPED | SEALED OFF WITH CEMENT BLOCK |
| A61G7 | GLEN ROY 713 LS | GLEN ROY | H04 0387 | 23 54 43 | 29 05 03 | 1397 | | | | | OPEN HOLE | FILLED WITH STONES |
| A61G8 | BLINKWATER 244 KR | AGRICULTURE | 244KR 001 | 24 05 35.7 | 28 54 12.0 | | | | 0.75 | 0.75 | SUBMERSIBLE | |
| A61G8 | BLINKWATER 244 KR | AGRICULTURE | 244KR 002 | 24 05 38.8 | 28 54 22.9 | | | | 1.50 | 1.50 | SUBMERSIBLE | |
| A61G8 | BLINKWATER 244 KR | AGRICULTURE | 244KR 003 | 24 06 40.1 | 28 54 13.4 | | | | 1.00 | 1.00 | SUBMERSIBLE | |
| A61G8 | BLINKWATER 244 KR | | 244KR 004 | 24 02 38.5 | 28 50 12.1 | | | | | | UNEQUIPPED | |
| A61G8 | BLINKWATER 244 KR | AGRICULTURE | 244KR 005 | 24 06 48.5 | 28 54 44.1 | | | | 1.00 | 1.00 | MONO & DIESEL | |
| A61G8 | BLINKWATER 244 KR | | 244KR 006 | 24 07 57.3 | 28 55 17.4 | | | | | 5.00 | UNEQUIPPED | |
| A61G8 | BLINKWATER 244 KR | | 244KR 007 | 24 02 26.1 | 28 49 32.6 | | | | | 2.00 | UNEQUIPPED | |
| A61G8 | BLINKWATER 244 KR | PPL | H29 0051 | 24 05' 46.4 | 28 54' 40.6" | | | | | | UNEQUIPPED | |
| A61G8 | BLINKWATER 244 KR | PPL | H29 0052 | 24 05' 36.8" | 28 54' 22.9" | | | | | | UNEQUIPPED | |
| A61G8 | BLINKWATER 244 KR | PPL | H29 0053 | 24 05' 40.0" | 28 54' 26.5" | | | | | 6 | UNEQUIPPED | |
| A61G8 | BLINKWATER 244 KR | PPL | H29 0054 | 24 05' 28.8" | 28 54' 30" | | | | 10 | 3.3 | UNEQUIPPED | |
| A61G8 | BLINKWATER 244 KR | PPL | H29 0055 | 24 05' 30.4" | 28 54' 28.2" | | | | | 3.75 | UNEQUIPPED | |
| A61G8 | BLINKWATER 244 KR | PPL | H29 0056 | 24 05' 14.4" | 28 54' 28.5" | | | | | | UNEQUIPPED | |
| A61G8 | BLINKWATER 244 KR | PPL | H29 0057 | 24 05' 11.2" | 28 54 21.2" | | | | | | UNEQUIPPED | |
| A61G8 | BLINKWATER 244 KR | PPL | H29 0064 | 24 05' 30.8" | 28 54' 35.3" | | SWL | | | 3.75 | UNEQUIPPED | |
| A61G8 | BLINKWATER 244 KR | PPL | H29 0065 | 24 06' 08.4" | 28 54' 38.8 | | | | | 9.89 | UNEQUIPPED | |
| A61G8 | BLINKWATER 244 KR | PPL | H29 0069 | 24 06' 22.4" | 28 54' 48.5" | | | | | 6 | UNEQUIPPED | |
| A61G8 | BLINKWATER 244 KR | PPL | H29 0070 | 24 04' 03.2" | 28 52' 35.2" | | | | | 6 | UNEQUIPPED | |
| A61G8 | BLINKWATER 244 KR | PPL | H29 0076 | 24 05' 00.0" | 28 53' 58.5" | | | | | | UNEQUIPPED | |
| A61G8 | DE HOOGEDOORNS 233 KR | AGRICULTURE | 233KR001 | 24 05 20 | 28 52 49 | | | | | | SUBMERSIBLE | |
| A61G8 | DEHOOGEDOORNS 233 KR | AGRICULTURE | 233KR002 | 24 03 44 | 28 51 48 | | 18.19 | | 1.00 | 1.00 | SUBMERSIBLE | |
| A61G8 | DEHOOGEDOORNS 233 KR | AGRICULTURE | 233KR003 | 24 03 44.5 | 28 51 46.5 | | 18.13 | | | | NOT EQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | AGRICULTURE | 233KR004 | 24 05 03 | 28 53 19 | | | | 2.00 | 2.00 | SUBMERSIBLE | |
| A61G8 | DEHOOGEDOORNS 233 KR | AGRICULTURE | 233KR005 | 24 03 38 | 28 51 56 | | | | 1.00 | 1.00 | SUBMERSIBLE | |
| A61G8 | DEHOOGEDOORNS 233 KR | AGRICULTURE | 233KR006 | 24 03 38.5 | 28 51 55.5 | | 12.7 | | | | NOT EQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | AGRICULTURE | 233KR007 | 24 03 38.5 | 28 51 56.5 | | 12.86 | | | | NOT EQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | AGRICULTURE | 233KR008 | 24 03 37 | 28 51 59 | | | | | | WEL | BOREHOLE IN WELL |
| A61G8 | DEHOOGEDOORNS 233 KR | AGRICULTURE | 233KR009 | 24 03 38.3 | 28 51 57 | | 12.98 | | NOT RECOMMENDED | NOT RECOMMENDED | NOT EQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | AGRICULTURE | 233KR010 | 24 03 50 | 28 52 09 | | 14.12 | | 1.50 | 1.50 | NOT EQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | AGRICULTURE | 233KR011 | 24 03 46 | 28 52 07 | | 12.5 | | NOT RECOMMENDED | NOT RECOMMENDED | NOT EQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | AGRICULTURE | 233KR012 | 24 03 35 | 28 51 44 | | | | 1.00 | 1.00 | SUBMERSIBLE | |
| A61G8 | DEHOOGEDOORNS 233 KR | AGRICULTURE | 233KR013 | 24 03 31 | 28 51 37 | | | | | | NOT EQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | AGRICULTURE | 233KR014 | 24 04 22 | 28 52 56 | | | | NOT RECOMMENDED | NOT RECOMMENDED | DIESEL MONO | STOCK WATERING |
| A61G8 | DEHOOGEDOORNS 233 KR | PPL | H29 0058 | 24 03' 51.2" | 28 52' 12.4" | 14/05/99 | | | | 3 | UNEQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | PPL | H29 0059 | 24 03' 33.6" | 28 52' 44.1" | 02/06/99 | | | | | UNEQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | PPL | H29 0060 | 24 04' 30.4" | 28 51' 15.9" | 12/06/99 | | | | | UNEQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | PPL | H29 0061 | 24 04' 20.8" | 28 51' 24.7" | 04/04/99 | | | | | UNEQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | PPL | H29 0062 | 24 04' 22.2" | 28 51' 22.9" | 10/06/99 | | | | | UNEQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | PPL | H29 0063a | 24 04' 28.8" | 28 51' 19.4" | 10/06/99 | | | | | UNEQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | PPL | H29 0063b | 24 04' 28.8" | 28 51' 19.4" | 11/06/99 | | | | | UNEQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | PPL | H29 0071 | 24 04' 52" | 28 53'35 | 21/06/99 | | | | | UNEQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | PPL | H29 0072 | 24 04'43" | 28 53'27" | 23/08/99 | | | | | UNEQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | PPL | H29 0073 | 24 04'29" | 28 53'12" | 25/08/99 | | | | | UNEQUIPPED | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A61G8 | DEHOOGEDOORNS 233 KR | PPL | H29 0074 | 24 04'23" | 28 53'06" | 27/08/99 | | | | | UNEQUIPPED | |
| A61G8 | DEHOOGEDOORNS 233 KR | PPL | H29 0075 | 24 03'30" | 28 52'00" | 29/08/99 | | | | | UNEQUIPPED | |
| A61J2 | DELAGOA 809 LR | | B09LR 001 | 23 58 13.6 | 28 45 56.1 | | | | 2 | 2 | DIESEL MONO | |
| A62B1 | MALOKONG 784 LR | MALOKONG 784 LR | H03 1637 | 23 50 44 | 28 48 34 | | 25.1 | | 6 | 6 | DIESEL MONO | DOMESTIC SUPPLY |
| A62B1 | MALOKONG 784 LR | MALOKONG 784 LR | H03 1641 | 23 50 27 | 28 48 07 | | 33.1 | | 3 | 3 | DIESEL MONO | DOMESTIC SUPPLY |
| A62B1 | VLIEGEKRAAL 783 LR | BAKENBERG | H03 1603 | 23 52 15.4 | 28 46 21.4 | | 12.45 | | 4.5 | 4.5 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A62B1 | VLIEGEKRAAL 783 LR | BAKENBERG | H03 1604 | 23 52 12.2 | 28 46 21.4 | | 12.45 | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A62B1 | VLIEGEKRAAL 783 LR | BAKENBERG | H03 1605 | 23 52 24.2 | 28 46 10.8 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A62B1 | VLIEGEKRAAL 783 LR | BAKENBERG | H03 1606 | 23 52 21.4 | 28 46 05.6 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A62B1 | VLIEGEKRAAL 783 LR | BAKENBERG | H03 1607 | 23 52 17.4 | 28 46 01.5 | | | | | | UNEQUIPPED | |
| A62B1 | VLIEGEKRAAL 783 LR | BAKENBERG | H03 1610 | 23 51 39.5 | 28 46 31.8 | | 17.89 | | 1.5 | 1.5 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A62B1 | VLIEGEKRAAL 783 LR | BAKENBERG | H03 1611 | 23 51 38.7 | 28 46 37.8 | | 19.7 | | 1.8 | 1.8 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A62B1 | VLIEGEKRAAL 783 LR | BAKENBERG | H03 1614 | 23 51 39.7 | 28 46 30.6 | | | | | | UNEQUIPPED | |
| A62B1 | VLIEGEKRAAL 783 LR | BAKENBERG | H03 1615a | 23 51 28.9 | 28 46 27.7 | | | | 0.3 | 0.3 | HANDPUMP | OUT OF ORDER |
| A62B1 | VLIEGEKRAAL 783 LR | BAKENBERG | H03 1615b | 23 51 29.9 | 28 46 27.7 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A62B1 | VLIEGEKRAAL 783 LR | BAKENBERG | H03 1616 | 23 51 41.7 | 28 46 18.6 | | 18.1 | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A62B1 | VLIEGEKRAAL 783 LR | BAKENBERG | H03 1617 | 23 51 40.3 | 28 46 20.6 | | 11 | | | | UNEQUIPPED | |
| A62B1 | HELLEM BRICKSTEEN 761 LR | BAKENBERG | H03 1626 | 23 51 39.5 | 28 46 18.2 | | | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A62B1 | HELLEM BRICKSTEEN 761 LR | BAKENBERG | H03 1627 | 23 51 32.2 | 28 45 42.5 | | | | | 2 | ELECTRIC MONO | DOMESTIC SUPPLY |
| A62B1 | VOGELSTRUISFONTEIN 765 LR | PUDIYAKGOPA | H03 1636 | 23 49 48 | 28 49 26 | | 9.65 | | 4.5 | 4.5 | DIESEL MONO | DOMESTIC SUPPLY |
| A62B2 | KLIPPLAATDRIFT 787 LR | KADITSHWENE | H03 1972 | 23 54 08 | 28 42 42 | | 6.3 | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A62B2 | KLIPPLAATDRIFT 787 LR | KADITSHWENE | H03 2018 | 23 54 12 | 28 42 03 | | 25.48 | | 0.3 | 0.3 | HANDPUMP | DOMESTIC SUPPLY |
| A62B2 | KLIPPLAATDRIFT 787 LR | KADITSHWENE | H03 2743 | 23 54 55.1 | 28 44 03.5 | | | | | | UNEQUIPPED | |
| A62B2 | KLIPPLAATDRIFT 787 LR | KADITSHWENE | H03 2744 | 23 54 51.9 | 28 44 00 | | | | | | UNEQUIPPED | |
| A62B2 | KLIPPLAATDRIFT 787 LR | KADITSHWENE | H03 2746 | 23 54 16.2 | 28 43 45.8 | | | | | | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | PPL | CD25 | 23 59 12 | 28 47 54 | | | | | | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | PPL | CD26 | 23 59 10 | 28 47 44 | | | | | | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | PPL | CD30 | 23 58 50 | 28 47 48 | | | | | | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | PPL | CD28 | 23 59 56 | 28 48 55 | | | | | | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | PPL | CD24 | 23 58 43 | 28 48 57 | | | | | | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | PPL | CD27 | 23 58 15 | 28 49 18 | | | | | | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | PPL | CD31 | 23 58 22 | 28 48 28 | | | | | | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | PPL | CD29 | 23 58 12 | 28 48 28 | | | | | | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | PPL | CD33 | 23 58 07 | 28 47 47 | | | | | | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | PPL | CD34 | 23 58 05 | 28 47 44 | | | | | | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | PPL | CD32 | 23 58 11 | 28 48 28 | | | | | | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | PPL | CD52 | 23 58 37 | 28 49 40 | | | | | | UNEQUIPPED | |
| A61G4 | MOLENDRAAI 811 LR | PPL | CD43 | 23 58 22 | 28 49 40 | | | | 10 | 10 | ELECTRIC MONO | |
| A61G4 | MOORDKOPJE 813 LR | PPL | CD44 | 23 58 24 | 28 49 45 | | | | | | UNEQUIPPED | |
| A61G4 | MOORDKOPJE 813 LR | PPL | CD46 | 23 58 11 | 28 49 51 | | | | 4.5 | 4.5 | ELECTRIC MONO | |
| A61G4 | MOORDKOPJE 813 LR | PPL | CD48 | 23 57 51 | 28 49 34 | | | | 5 | 5 | ELECTRIC MONO | |
| A61G4 | MOORDKOPJE 813 LR | PPL | CD53 | 23 57 42 | 28 49 58 | | | | 0 | 0 | ELECTRIC MONO | |
| A61G4 | MOORDKOPJE 813 LR | PPL | CD49 | 23 57 48 | 28 50 08 | | | | | | UNEQUIPPED | |
| A61G4 | MOORDKOPJE 813 LR | PPL | CD47 | 23 57 59 | 28 49 54 | | | | | | UNEQUIPPED | |
| A61G4 | COMMANDODRIFT 228 KR | PPL | CD50 | 23 58 51 | 28 49 31 | | | | | | UNEQUIPPED | |
| A61G4 | COMMANDODRIFT 228 KR | PPL | CD51 | 23 59 03 | 28 49 44 | | | | | | UNEQUIPPED | |
| A61G4 | COMMANDODRIFT 228 KR | PPL | CD42 | 23 59 10 | 28 49 02 | | | | 12 | 12 | ELECTRIC MONO | |
| A61G4 | COMMANDODRIFT 228 KR | PPL | CD10 | 23 59 22 | 28 48 53 | | | | 3.8 | 3.8 | ELECTRIC MONO | |
| A61G4 | COMMANDODRIFT 228 KR | PPL | CD11 | 23 59 43 | 28 48 46 | | | | 8 | 8 | ELECTRIC MONO | |
| A61G4 | COMMANDODRIFT 228 KR | PPL | CD41 | 24 00 00 | 28 48 41 | | | | | | UNEQUIPPED | |
| A61G4 | COMMANDODRIFT 228 KR | PPL | CD40 | 24 00 12 | 28 48 26 | | | | | | UNEQUIPPED | |
| A61G4 | COMMANDODRIFT 228 KR | PPL | CD4 | 24 00 59 | 28 49 02 | | | | | | UNEQUIPPED | |
| A61G4 | COMMANDODRIFT 228 KR | PPL | CD14 | 24 01 15 | 28 49 28 | | | | | | UNEQUIPPED | |
| A61G4 | COMMANDODRIFT 228 KR | PPL | CD13 | 24 01 13 | 28 49 46 | | | | | | UNEQUIPPED | |
| A61G4 | COMMANDODRIFT 228 KR | PPL | CD12 | 24 01 03 | 28 50 01 | | | | | | UNEQUIPPED | |
| A61G4 | COMMANDODRIFT 228 KR | PPL | CD37 | 24 00 53 | 28 50 35 | | | | | | UNEQUIPPED | |
| A61G4 | COMMANDODRIFT 228 KR | PPL | CD38 | 24 00 27 | 28 49 53 | | | | | | UNEQUIPPED | |
| A61G4 | COMMANDODRIFT 228 KR | PPL | CD15 | 24 00 08 | 28 48 24 | | | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | PPL | P50 | 23 56 00 | 28 52 35.3 | | | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | PPL | P49 | 23 56 19.2 | 28 52 45.9 | | | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | PPL | P48 | 23 56 25.6 | 28 52 50.3 | | | | 1.7 | 1.7 | ELECTRIC MONO | |
| A61G5 | OVERYSEL 815 LR | PPL | OY# | 23 56 30.4 | 28 52 53.8 | | | | 4.4 | 4.4 | ELECTRIC MONO | |
| A61G5 | OVERYSEL 815 LR | PPL | P23 | 23 57 14.4 | 28 53 20.5 | | | | 1.2 | 1.2 | ELECTRIC MONO | |
| A61G5 | OVERYSEL 815 LR | PPL | P24 | 23 56 36.0 | 28 52 56.0 | | | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | PPL | P27 | | | | | | 0 | 0 | ELECTRIC MONO | |
| A61G5 | ZWARTFONTEIN 814 LR | PPL | P22 | 23 58 14.4 | 28 54 10.6 | | | | 1.5 | 1.5 | ELECTRIC MONO | |
| A61G5 | ZWARTFONTEIN 814 LR | PPL | P31 | 23 58 22.4 | 28 55 05.3 | | | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | PPL | P21 | 23 58 24.0 | 28 55 54.7 | | | | 1 | 1 | ELECTRIC MONO | |
| A61G5 | ZWARTFONTEIN 814 LR | PPL | P7 | 23 58 28.0 | 28 54 31.8 | | | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | PPL | P40 | 23 58 36.8 | 28 53 52.9 | | | | 1 | 1 | ELECTRIC MONO | |
| A61G5 | ZWARTFONTEIN 814 LR | PPL | P46 | 23 59 00.0 | 28 54 00.0 | | | | 1.7 | 1.7 | ELECTRIC MONO | |
| A61G5 | ZWARTFONTEIN 814 LR | PPL | P39 | 23 59 04.8 | 28 54 10.6 | | | | | | UNEQUIPPED | |
| A61G5 | OVERYSEL 815 LR | PPL | P38 | | | | | | 7 | 7 | ELECTRIC MONO | |
| A61G5 | ZWARTFONTEIN 814 LR | PPL | P18 | 23 59 00.0 | 28 55 08.8 | | | | 3.3 | 3.3 | ELECTRIC MONO | |
| A61G5 | ZWARTFONTEIN 814 LR | PPL | P19 | 23 58 46.4 | 28 56 12.2 | | | | | | UNEQUIPPED | |
| A61G5 | VAALKOP 819 LR | PPL | P95 | | | | | | | | UNEQUIPPED | |
| A61G5 | VAALKOP 819 LR | PPL | P20 | | | | | | 3.8 | 3.8 | ELECTRIC MONO | |
| A61G8 | VAALKOP 819 LR | PPL | P0 | 23 59 28.8 | 28 54 52.0 | | | | | | UNEQUIPPED | |
| A61G8 | VAALKOP 819 LR | PPL | P37 | 23 59 40.0 | 28 54 52.9 | | | | 8.4 | 8.4 | ELECTRIC MONO | |
| A61G8 | VAALKOP 819 LR | PPL | P32 | 23 59 32.0 | 28 55 40.8 | | | | | | UNEQUIPPED | |
| A61G8 | VAALKOP 819 LR | PPL | P34 | 24 00 04.8 | 28 55 21.2 | | | | | | UNEQUIPPED | |
| A61G8 | SANDSLOOT 236 KR | PPL | P36 | | | | | | | | UNEQUIPPED | |
| A61G8 | SANDSLOOT 236 KR | PPL | P66 | | | | | | | | UNEQUIPPED | |
| A61G8 | SANDSLOOT 236 KR | PPL | P13 | 24 00 24.0 | 28 54 42.4 | | | | | | UNEQUIPPED | |
| A61G8 | SANDSLOOT 236 KR | PPL | P03 | 24 01 07.2 | 28 54 07.1 | | | | | | UNEQUIPPED | |

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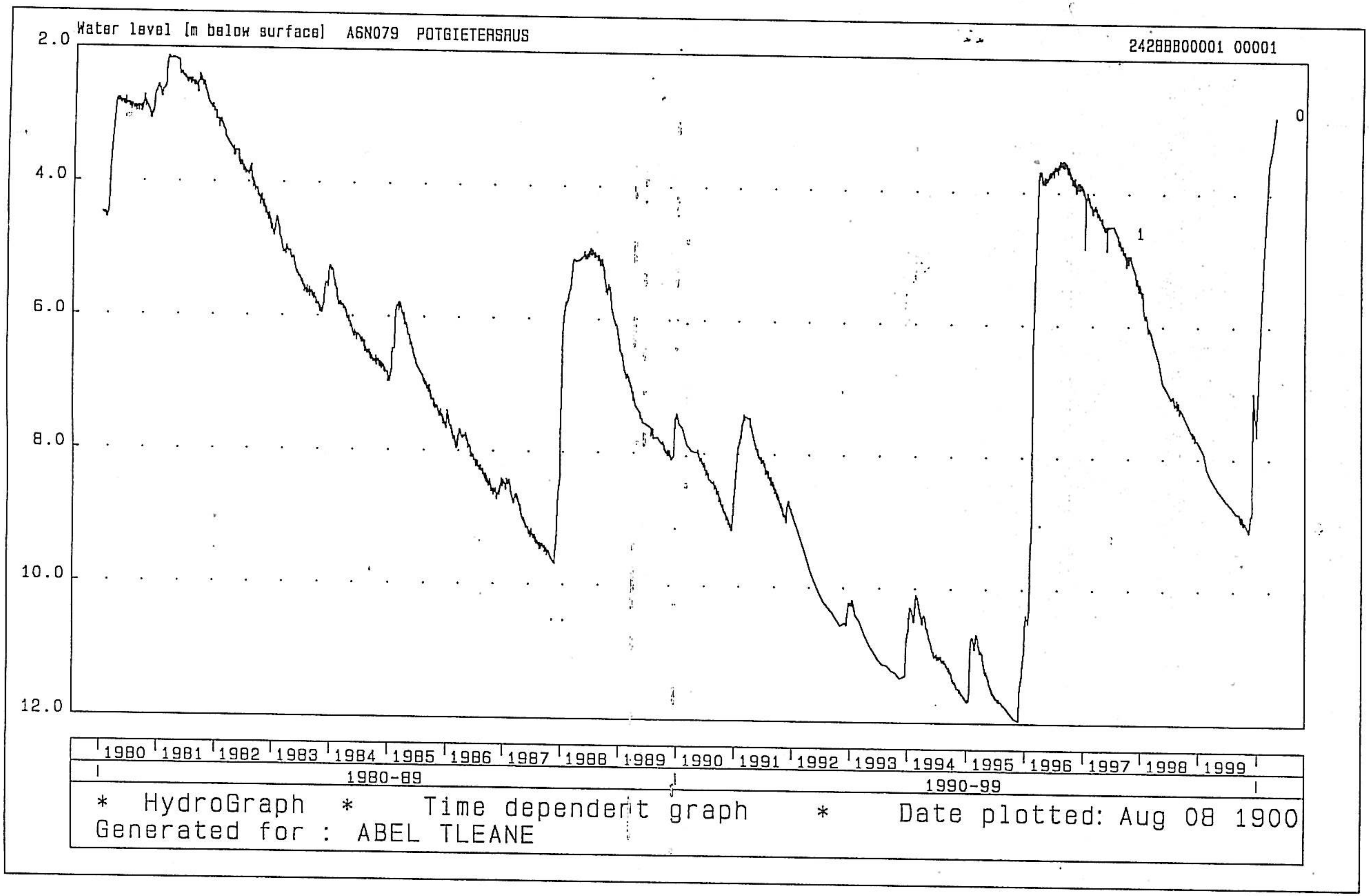
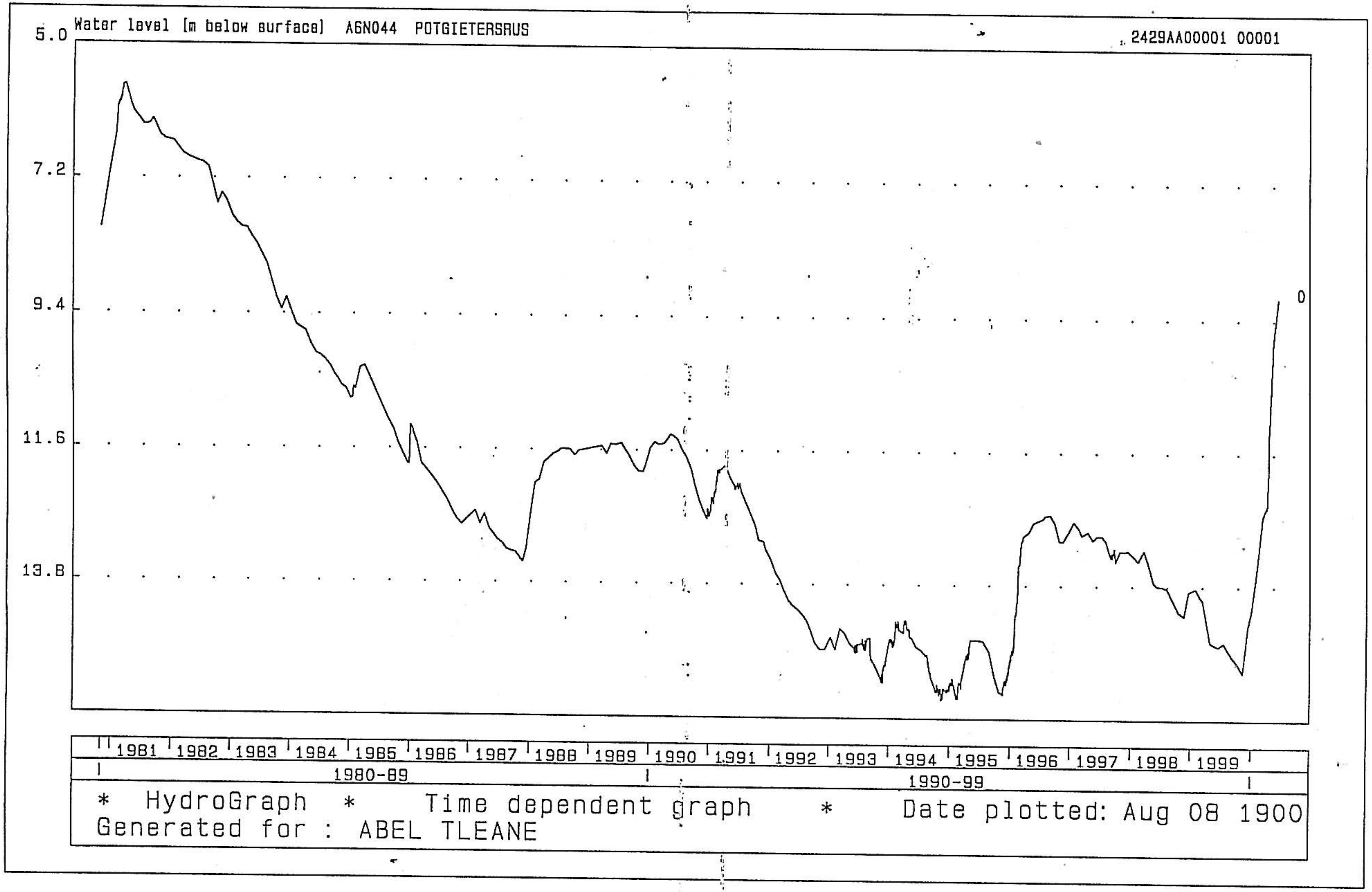
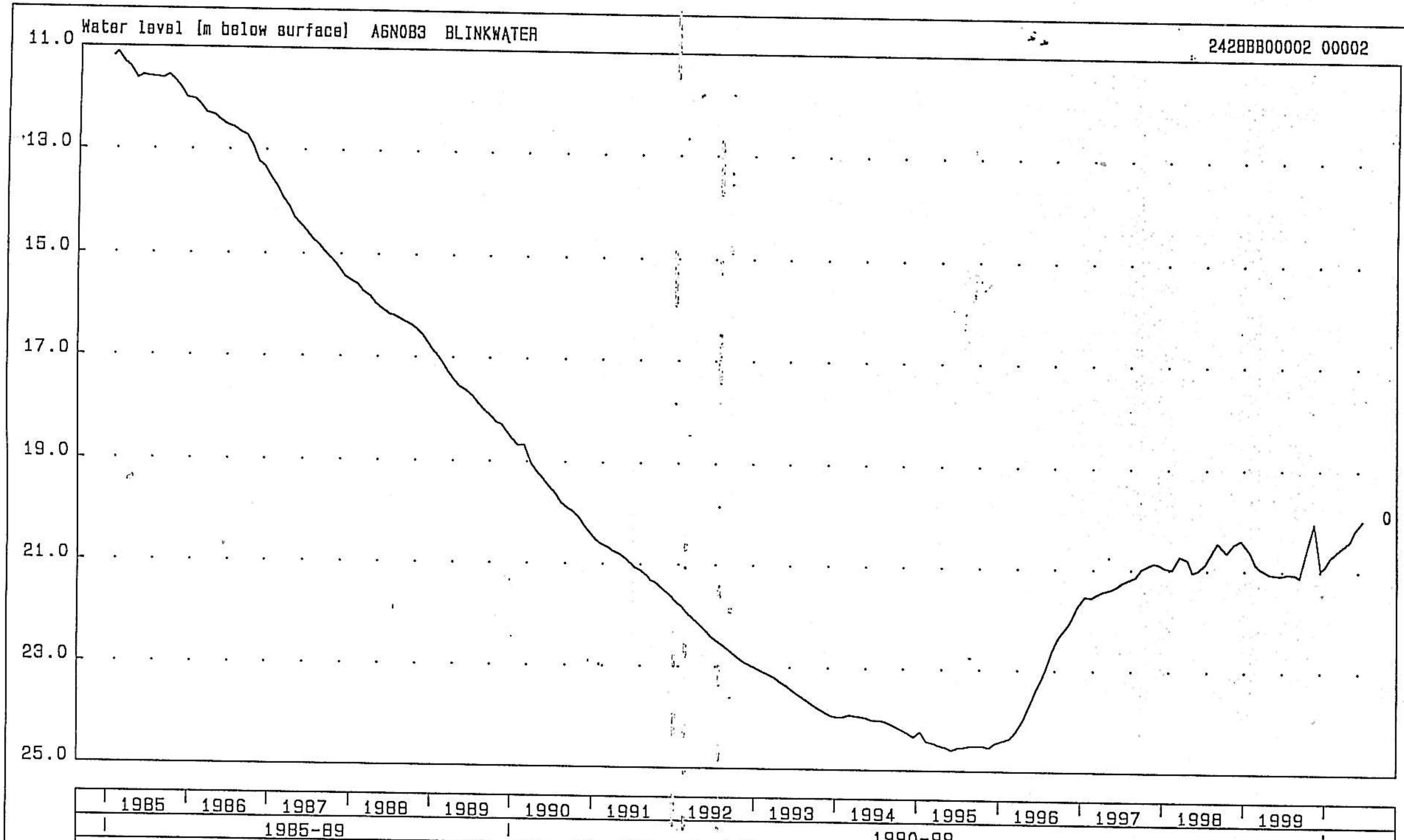
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A61GB | ZWARTFONTEIN 814 LR | PPL | P30 | | | | | | 1.5 | 1.5 | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B1 | | | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B2 | | | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B3 | | | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B4 | | | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B5 | | | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B6 | | | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B7 | 24 09 06.9 | 28 56 19.1 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B8 | 24 09 21.7 | 28 56 38.1 | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B9 | 24 09 20.8 | 28 56 55.1 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B10 | | | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B11 | 24 08 04.3 | 28 56 38.4 | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B12 | 24 08 04.8 | 28 56 39.5 | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B13 | | | | | | | | DIESEL MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B14 | 24 08 05.0 | 28 57 21.5 | | | | | | DIESEL MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B15 | 24 09 23.4 | 28 58 57.7 | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B16 | 24 09 25.5 | 28 59 01.7 | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B17 | 24 09 16.5 | 28 59 07.4 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B17a | 24 09 18.3 | 28 59 08.5 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B17b | 24 09 14.9 | 28 59 11.3 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B17c | 24 09 16.8 | 28 59 21.2 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B17d | 24 09 24.0 | 28 59 14.1 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B18a | 24 09 10.7 | 28 59 25.4 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B18b | 24 09 09.7 | 28 59 12.0 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B18c | | | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B19a | 24 08 57.2 | 28 59 25.0 | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B19b | 24 08 57.0 | 28 59 29.6 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B19c | 24 08 53.0 | 28 59 28.3 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B19d | 24 08 47.3 | 28 29 28.9 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B19e | 24 08 51.0 | 28 59 31.4 | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B19f | 24 08 49.2 | 28 59 25.8 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B19g | 24 08 49.3 | 28 59 31.4 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B19h | 24 08 57.0 | 28 59 21.2 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B19i | 24 08 55.3 | 28 59 18.0 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B20 | | | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B21 | | | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B22 | 24 07 41.3 | 28 59 27.2 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B23 | 24 07 48.0 | 28 59 20.5 | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B24 | 24 07 53.0 | 28 59 12.7 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B25 | 24 08 03.3 | 28 59 04.9 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B26 | 24 08 11.0 | 28 59 02.7 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B27 | 24 08 12.0 | 28 59 02.8 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B28 | | | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B29 | | | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B30 | 24 08 26.7 | 28 50 34.2 | | | | | | SUBMERSIBLE | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B31 | 24 08 36.3 | 28 50 17.3 | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B32 | | | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B33 | 24 07 43.3 | 28 59 35.3 | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B34 | | | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B35 | | | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B36 | | | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B37 | | | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B38 | | | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B39 | 24 08 00.7 | 28 50 04.2 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B40 | | | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B41 | | | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B42 | 24 09 24.3 | 28 57 21.9 | | | | | | ELECTRIC MONO | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B43 | 24 09 21.1 | 28 56 34.6 | | | | | | | |
| A61F2 | MACALACASKOP 243 KR | MAHWELERENG | B44 | 24 09 18.5 | 28 56 19.1 | | | | | | | |

# APPENDIX B

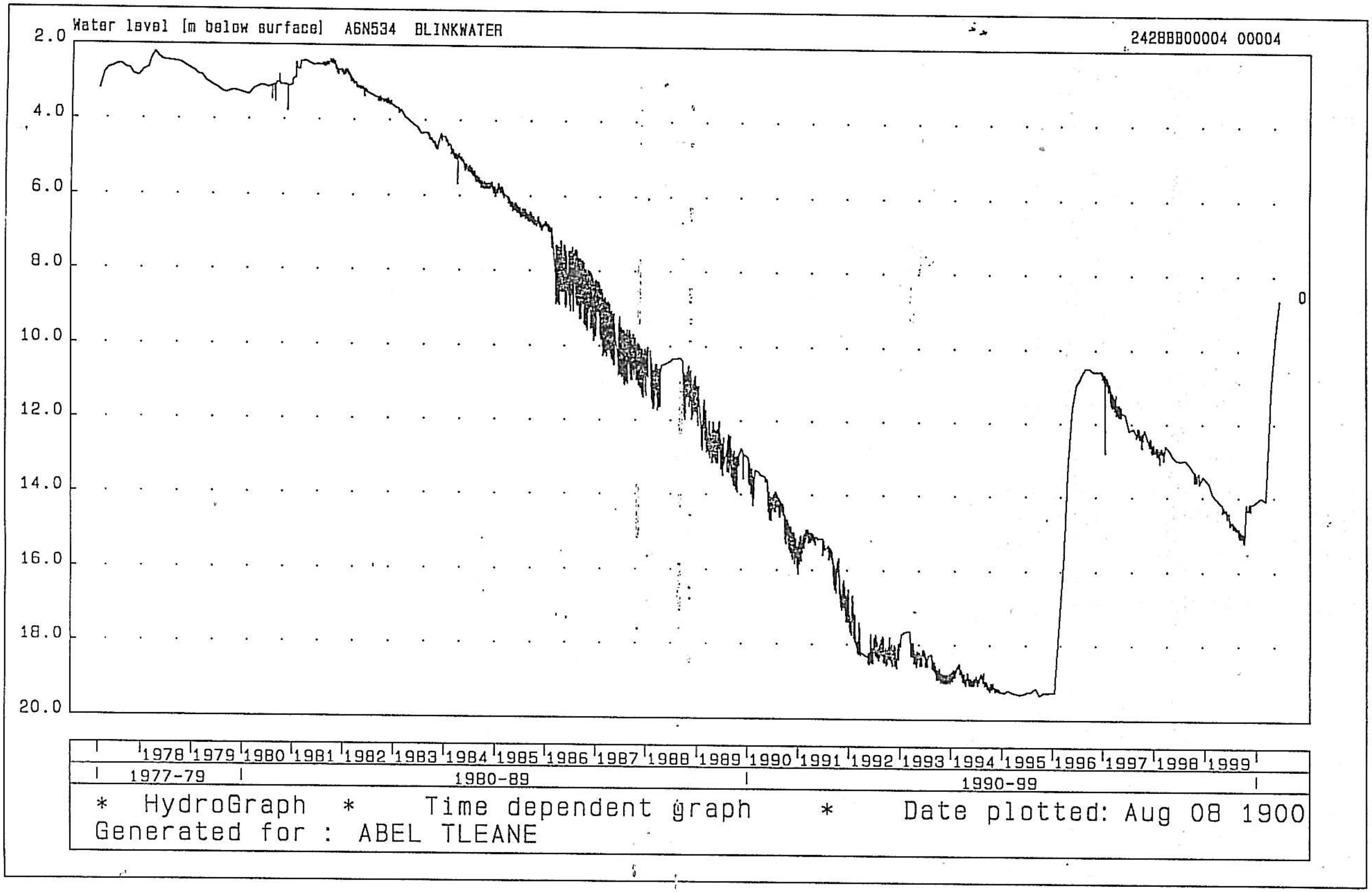
## WATER LEVEL RECORDER GRAPHS

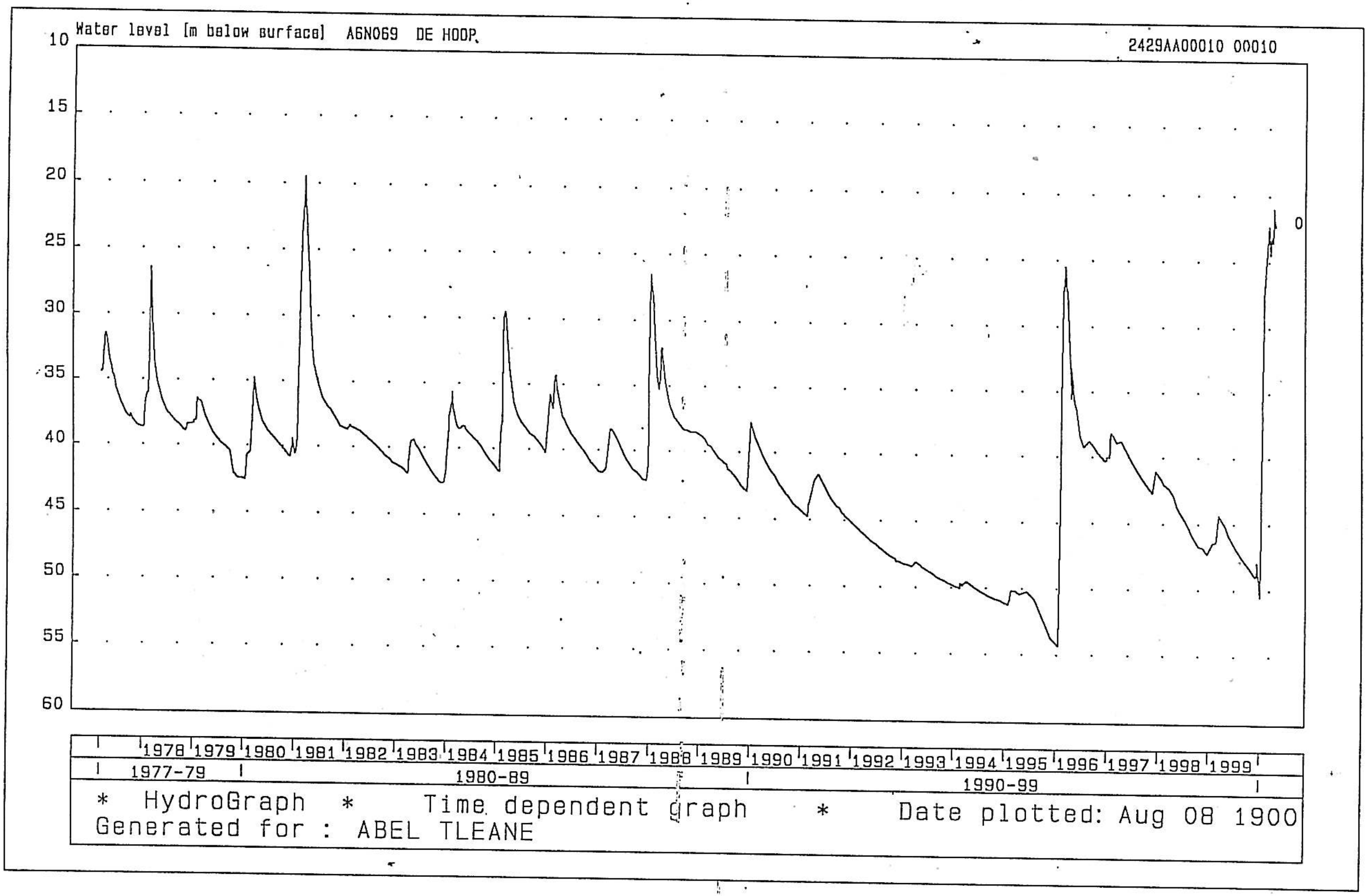

Water level [m below surface] A6N079 POTGIETERSRUS
242BBB00001 00001
2.0
4.0
6.0
8.0
10.0
12.0
0
1
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
1980-89
1990-99
* HydroGraph * Time dependent graph * Date plotted: Aug 08 1900
Generated for : ABEL TLEANE


Water level [m below surface]   A6N044   POTGIETERSRUS
2429AA00001 00001
5.0
7.2
9.4
11.6
13.8
0
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
1980-89
1990-99
*   HydroGraph   *   Time dependent graph   *   Date plotted: Aug 08 1900
Generated for : ABEL TLEANE

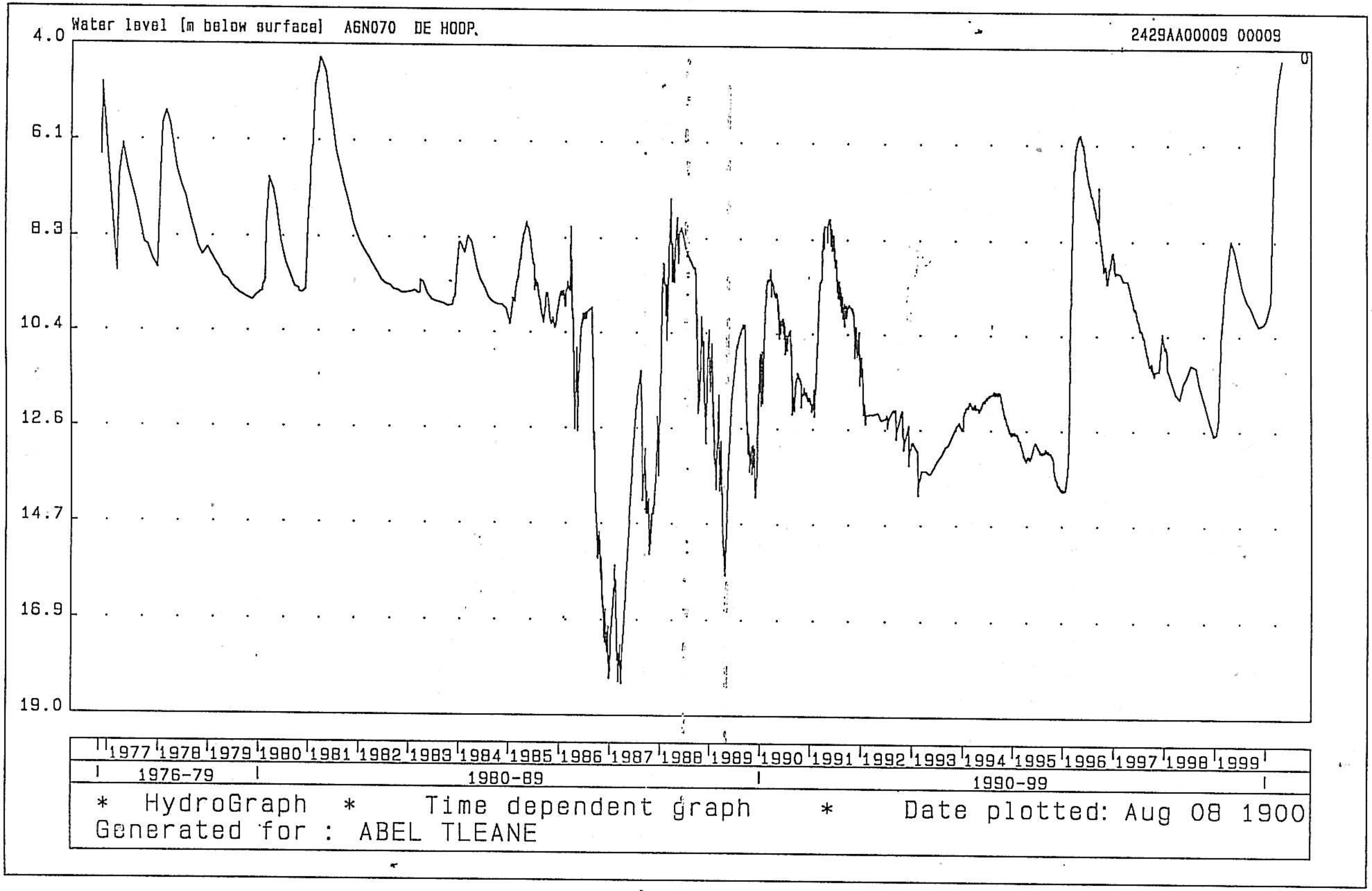


* HydroGraph * Time dependent graph * Date plotted: Aug 11 1900
Generated for : ABEL TLEANE

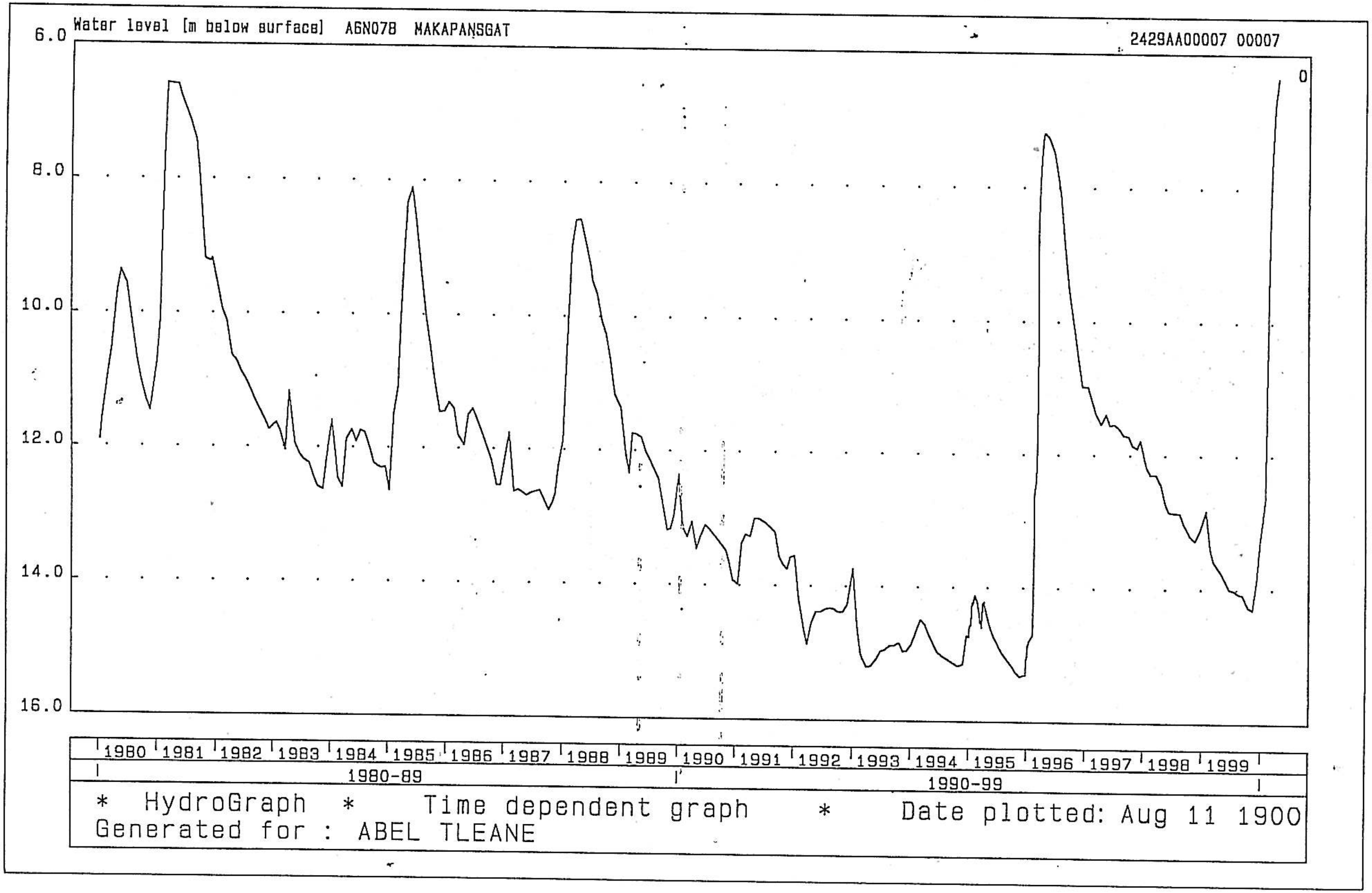

Water level [m below surface] A6N534 BLINKWATER
242BBB00004 00004
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
0
1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
1977-79
1980-89
1990-99
* HydroGraph * Time dependent graph * Date plotted: Aug 08 1900
Generated for : ABEL TLEANE

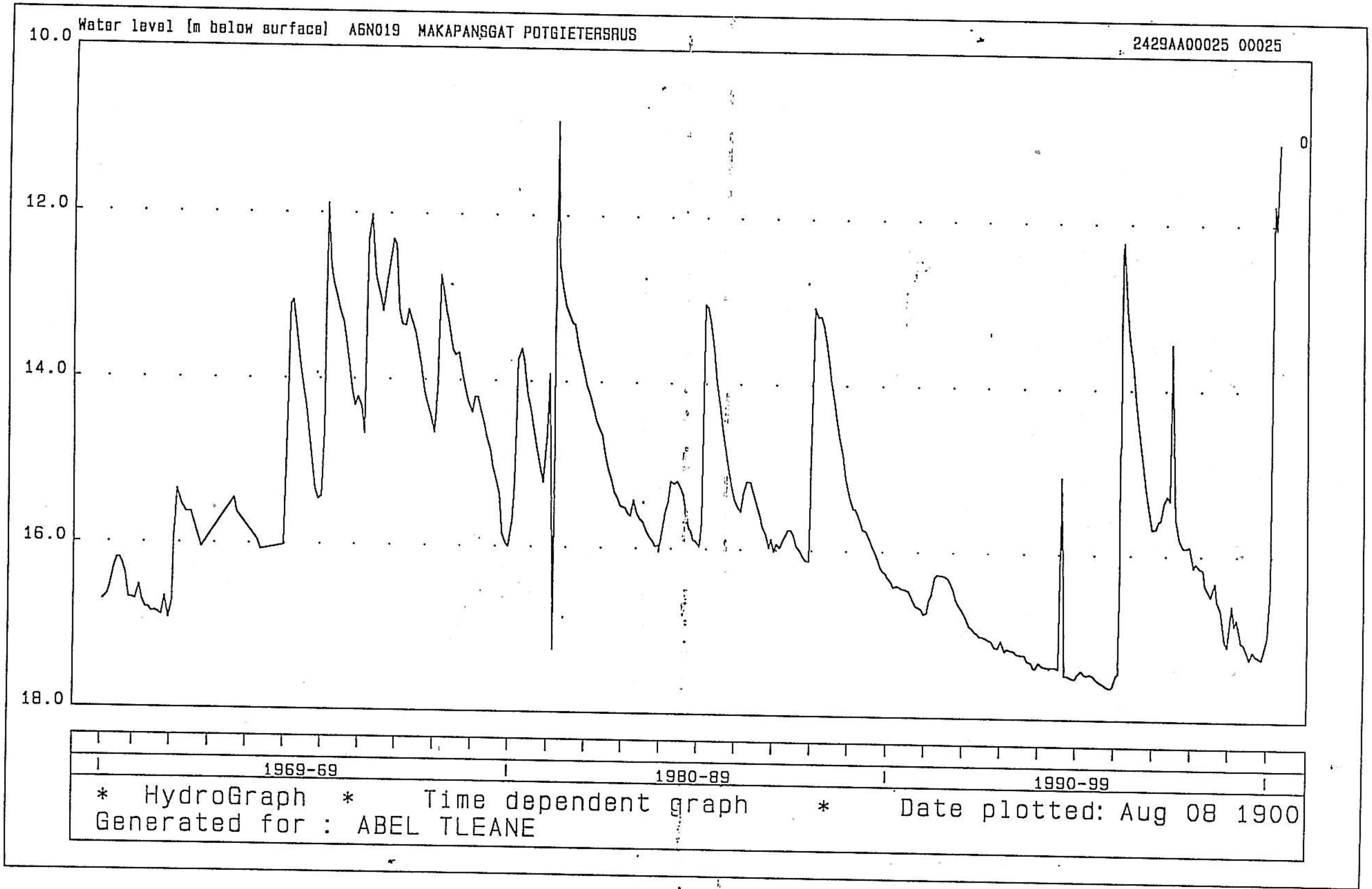


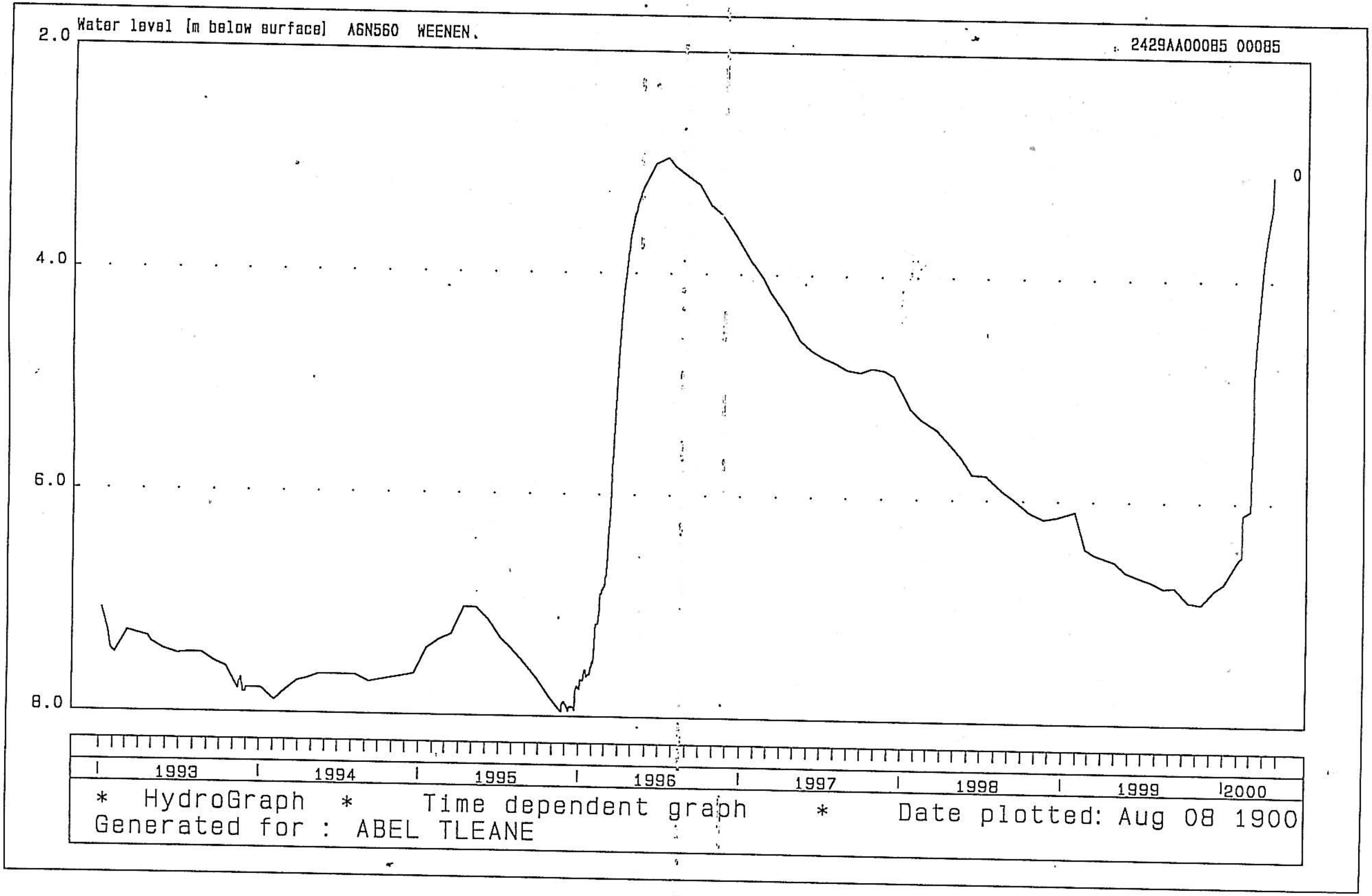
Water level [m below surface] A6N069 DE HOOP
2429AA00010 00010
10
15
20
25
30
35
40
45
50
55
60
0
1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
1977-79
1980-89
1990-99
* HydroGraph * Time dependent graph * Date plotted: Aug 08 1900
Generated for : ABEL TLEANE



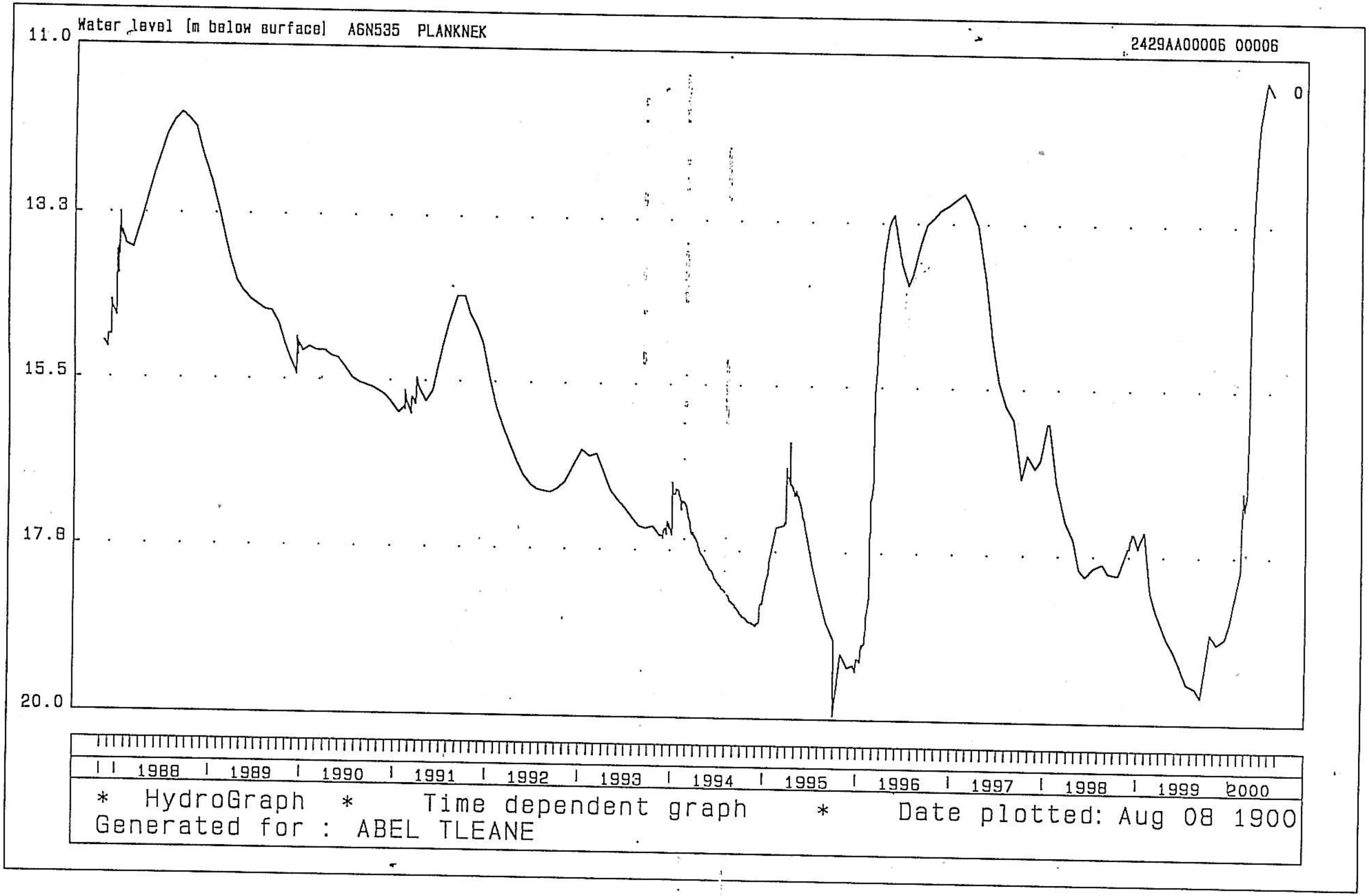
Water level [m below surface] A6N070 DE HOOP.
2429AA00009 00009
4.0
6.1
8.3
10.4
12.6
14.7
16.9
19.0
1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
1976-79
1980-89
1990-99
* HydroGraph * Time dependent graph * Date plotted: Aug 08 1900
Generated for : ABEL TLEANE

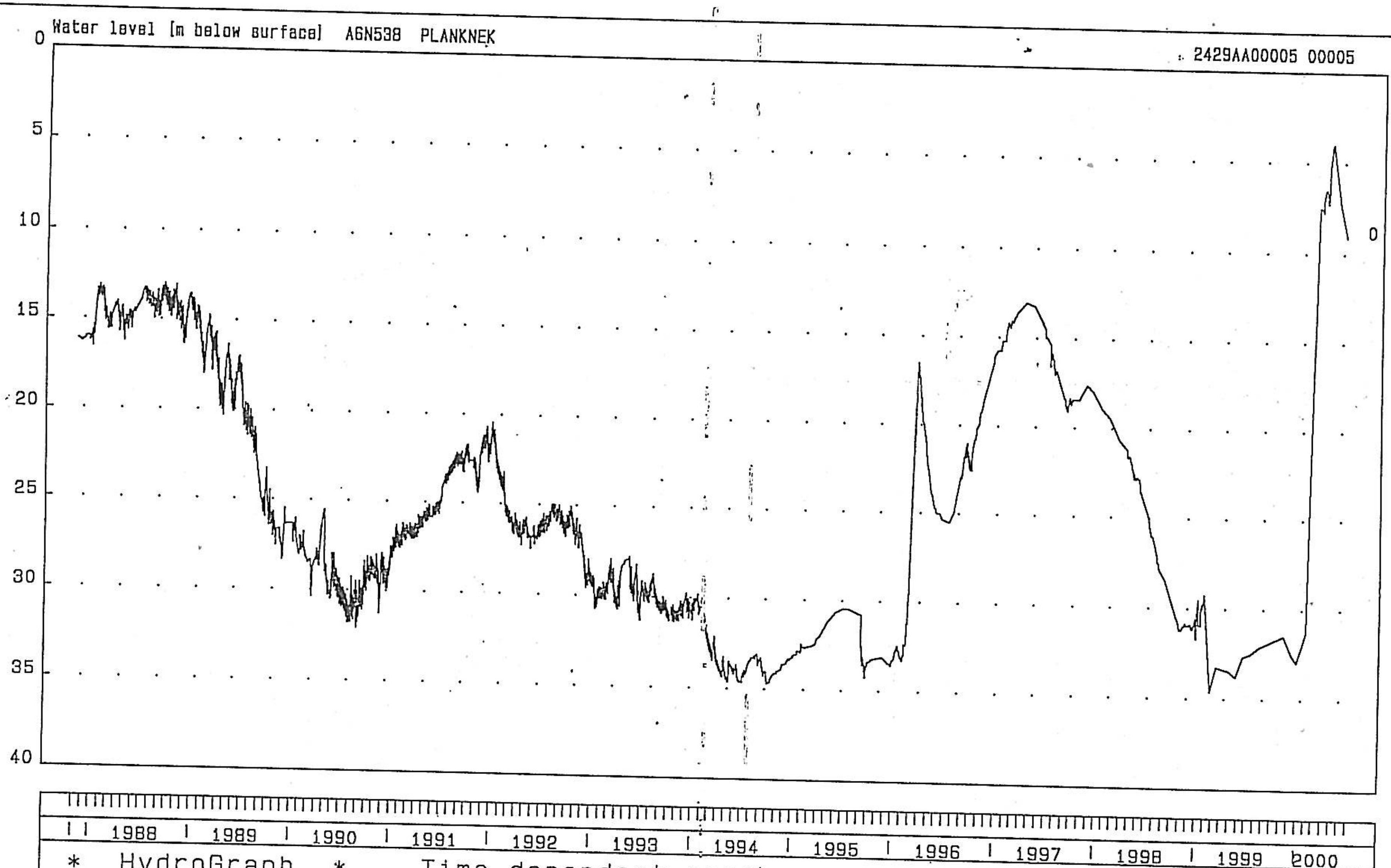

Water level [m below surface] A6N078 MAKAPANSGAT
2429AA00007 00007
6.0
8.0
10.0
12.0
14.0
16.0
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
1980-89
1990-99
* HydroGraph * Time dependent graph * Date plotted: Aug 11 1900
Generated for : ABEL TLEANE


Water level [m below surface] A6N019 MAKAPANSGAT POTGIETERSRUS
2429AA00025 00025
10.0
12.0
14.0
16.0
18.0
0
1969-69
1980-89
1990-99
* HydroGraph * Time dependent graph * Date plotted: Aug 08 1900
Generated for : ABEL TLEANE

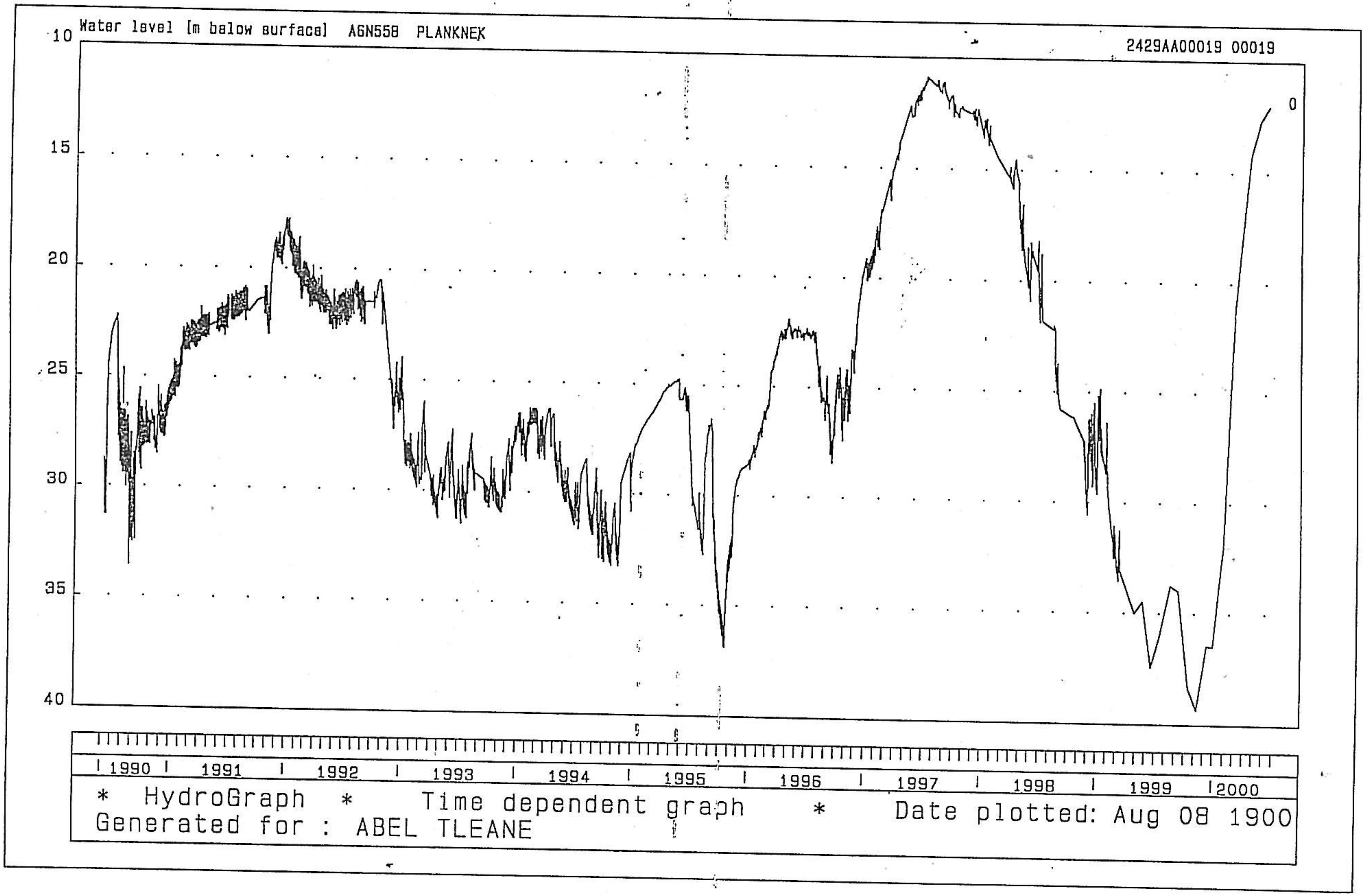


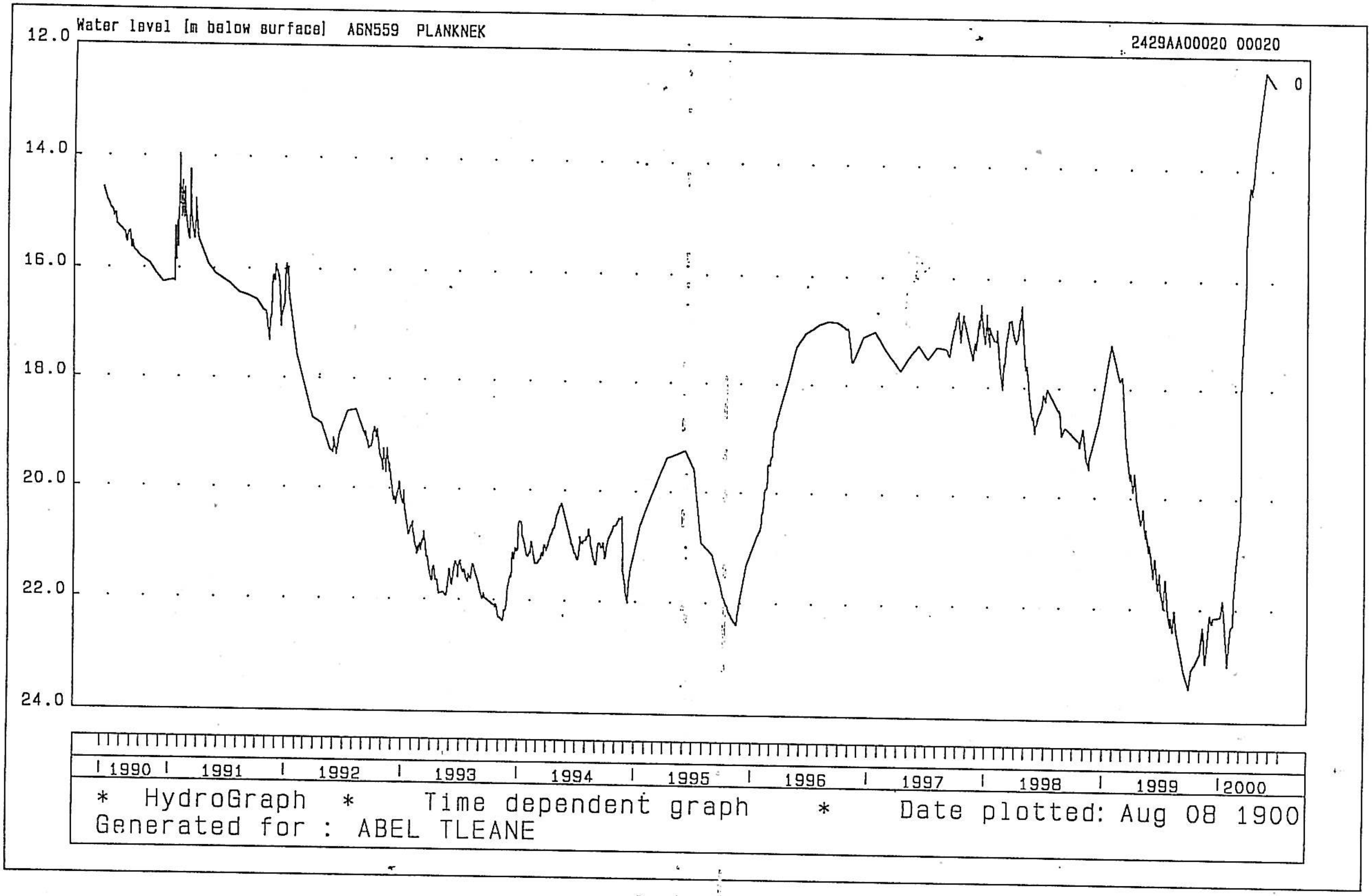
Water level [m below surface] A6N560 WEENEN.
2429AA00085 00085
2.0
4.0
6.0
8.0
0
1993
1994
1995
1996
1997
1998
1999
2000
* HydroGraph * Time dependent graph * Date plotted: Aug 08 1900
Generated for : ABEL TLEANE


Water level [m below surface] A6N535 PLANKNEK
2429AA00006 00006
11.0
13.3
15.5
17.8
20.0
0
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
* HydroGraph * Time dependent graph * Date plotted: Aug 08 1900
Generated for : ABEL TLEANE

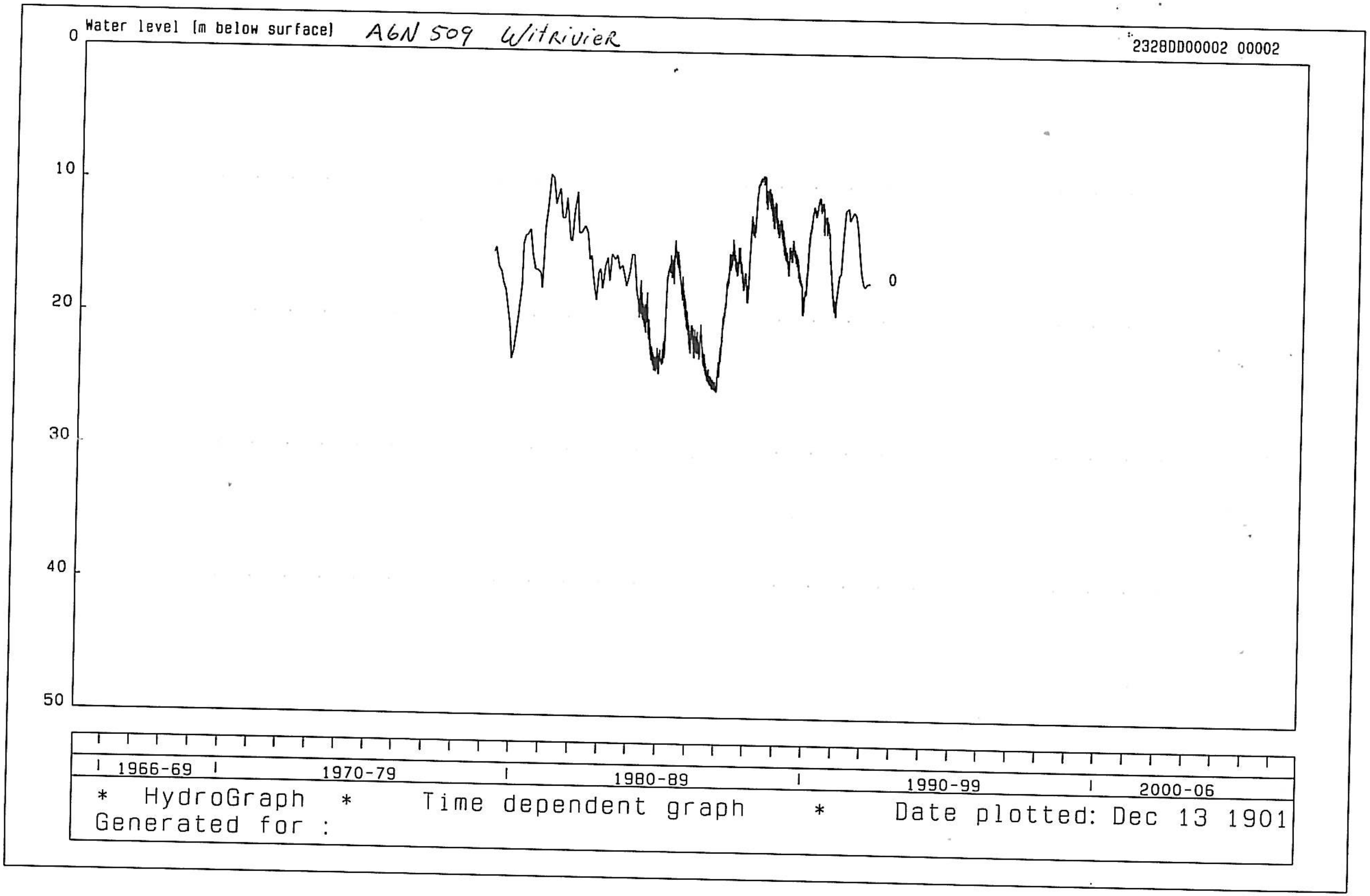



* HydroGraph * Time dependent graph * Date plotted: Aug 11 1900
Generated for : ABEL TLEANE


Water level [m below surface] A6N558 PLANKNEK
2429AA00019 00019
10
15
20
25
30
35
40
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
* HydroGraph * Time dependent graph * Date plotted: Aug 08 1900
Generated for : ABEL TLEANE



Water level [m below surface] A6N559 PLANKNEK
2429AA00020 00020
12.0
14.0
16.0
18.0
20.0
22.0
24.0
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
* HydroGraph * Time dependent graph * Date plotted: Aug 08 1900
Generated for : ABEL TLEANE



Water level (m below surface)
A6N 509 Witrivier
2328DD00002 00002
0
10
20
30
40
50
0
1966-69
1970-79
1980-89
1990-99
2000-06
* HydroGraph * Time dependent graph * Date plotted: Dec 13 1901
Generated for :