GROUNDWATER RESOURCE INFORMATION PROJECT
EASTERN CAPE PROVINCE

GROUNDWATER INFORMATION SOURCE REFERENCE SHEET

SOURCE REF NR:	AG038	Own Archive	X	Copy attached	X
		Sourced		Copy at source	

A: SOURCE DESCRIPTION

District Municipality:	Amatole		Chris Hani	X	O.R Tambo	
	Ukhahlamba		Cacadu		Alfred Nzo	
Local Municipality:	Tsolwana					
Institution where Information is held:	AGES EC CC					
Branch of Institution:	EAST LONDON					
Contact details: Contact person:	JAN MYBURGH					
Contact Tel:	043 7262070					
Contact Email:	easterncape@ages-group.com					

B: TYPE OF INFORMATION

Information format:	Hard copy	X	Data Summary		Electronic Report	
	Specify Other: -					
Report / Info Title:	Pump testing evaluation of existing boreholes at Hofmeyr - Eastern Cape Province					
Report Nr:	EC/01/22/HG		Date:	August 2001		
Author Details:	J.A MYBURGH					
Author's Qualification:	Hydrogeologist	X	Govt Dept		Project Manager	
	Engineer		Technician		Other	
	Specify Other:					
Captured by:	A VILJOEN	Date:	19/2/2004	Signed:		

C: GEOHYDROLOGICAL CATEGORIZATION

Project Type	Source development	X	Feasibility Study		Sanitation Study	
	Specify Other:					

Reference Co-ordinate:	Latitude	Longitude
	S 31° 38' 00"	E 25° 48' 00"

	Yes	No	Complete	Incomplete
Lithological & Construction Logs		X		
Hydrocensus Data	X			X
Pump Testing Data	X		X	
Chemical Water Analysis Data	X		X	
Geohydrological Data	X			X
Spring Data		X		
Remote Sensing Data		X		
Map Data	X			X

Comments:

Reviewed by: F. de Jager Date: 4/3/04 Signed:

SOUTHERN AFRICA GEOCONSULTANTS (PTY) LTD

Project report:

EC/01/22/HG

GeoCon

Hydrogeological investigation

Pump Testing Evaluation of existing boreholes at HOFMEYR – Eastern Cape Province

August 2001

Project team:
J.A.Myburgh,
F.N. de Jager,

Project report: EC/01/22/HG

Hydrogeological investigation

Pump Testing Evaluation of existing boreholes HOFMEYR – Eastern Cape Province

August 2001

Conducted on behalf of:
V3 CONSULTING ENGINEERS
P.O.Box
Tecoma
PORT ELIZABETH

Mr. C. Louw
Tel. No.: (041) 391 8811
Fax. No.: (041) 364 3798

Compiled by:

J.A.Myburgh (BSc Hons)
Consulting Hydrogeologist – Pr.Sci.Nat.

Northern Province	Gauteng Province	Eastern Cape Province
120 Marshall Street	66 Paradissi Street, Highveld X8	8 Sansom Street, Vincent
P.O. Box 2526	Postnet, Suite 12, Private Bag	Postnet 203, Private Bag X9063
PIETERSBURG	X108	EAST LONDON
0700	CENTURION	5200
Tel. No.:+27 - 15 - 291 1577	0046	Tel. No.:+27 - 43 - 726 2070
Fax. No.:+27 - 15 - 291 1702	Tel. No.:+27 - 12 – 665 3100	Fax. No.:+27 - 43 - 726 9232
e-mail:pietersburg@geocon.co.za	Fax. No.:+27 - 12 – 665 2176	e-mail:eastlondon@geocon.co.za
	e-mail:centurion@geocon.co.za	

Directors: SJ Pretorius, JA Myburgh, F Calitz, JJP Vivier

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1. INTRODUCTION

1.1 Terms of reference

Southern Africa GeoConsultants (PTY) Ltd – hereafter referred to as GeoCon - was appointed by V3 Consulting Engineers to carry out pump testing of existing boreholes at the town Hofmeyr in the former Stormberg district of the Eastern Cape Province.

This report gives results and recommendations resulting from the execution of potential determinative pump tests at four existing boreholes all of which is located within the boundaries of the study area.

1.2 Scope of investigation

GeoCon was appointed to only carry out the requested pump tests – with special reference made in the letter of appointment that " no elaborate test report will be required", and that "only essential information will suffice". It was however the opinion of Geocon to carry out the project in a responsible and professional manner within the bidget framework – implicating the following inputs:

- Liaison with municipal offices and personnel
- Evaluation of three electrical driven mono pumps and one windmill
- Site evaluation - groundwater potential assessment
- Coordination and supervision of pump testing program
- Analyses of pump testing data
- Assessment of groundwater quality
- Reporting with utilization recommendations

1.3 Location of study area

The town Hofmeyr is located approximately 65 kilometers to the north of Cradock. The boreholes concerned are situated about 700 m outside the town next to the R401 gravel road that connects Hofmeyr with Tarkastad. (Figure 1).

1.4 Information sources

All information pertaining to the boreholes was obtained from on-site observations and reports from local municipality representative - Mr. Pat Downing.

- Geological information was obtained from the 1:250 000 scale geological map: (3124) Middelburg.
- Topographical information was obtained from the 1:50 000 scale topographical map: 3125DB Hofmeyr.
- Rainfall and water level data of the monitoring borehole HR5 for the last year was obtained from Mr. Downing.

FIGURE 1: GEOLOGICAL MAP

HOFMEYR GROUNDWATER INVESTIGATION

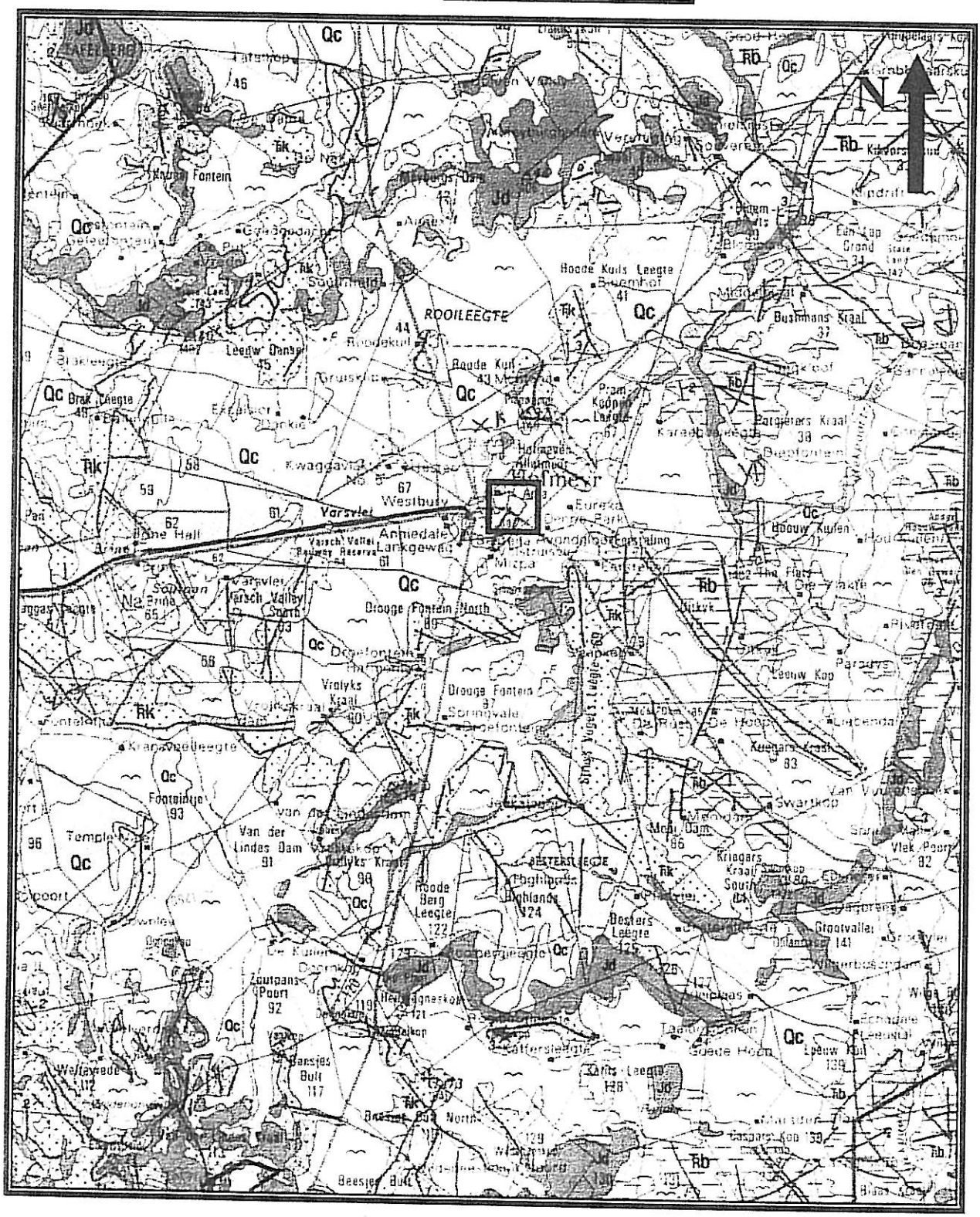
Scanned image – not to scale

Legend

- Dolerite Dyke
- Alluvium
- Qc Calcrete
- Jd Dolerite
- Tk Katberg Formation
- Project Area

Eastern Cape Province
8 Sansom Street, Vincent
Postnet 203, Private Bag X9063
EAST LONDON
5200
Tel. No.:+27 - 43 - 726 2070
Fax. No.:+27 - 43 - 726 9232
e-mail:eastlondon@geocon.co.za

GeoCon



2. METHODOLOGY

2.1 Hydrogeological survey

A field inspection was carried out during which the local geological and hydrogeological conditions were evaluated. This information was required for aquifer definition, pump testing data analyses, recharge potential as well as water quality assessments and long-term sustainability determination.

2.2 Evaluation of existing equipment

This was carried out by the appointed pump testing contractor by measuring flow readings at different pressure settings while recording pump revolutions. This information was seen as sufficient to asses the condition of existing equipment as well as the yields available from the pumping equipment.

2.3 Pump testing

Pump testing was carried out under the co-ordination and guidance of the hydrogeological consultant. It was the aim of the pump testing exercise to determine the potential at each borehole and tests were adapted according to the yields observed. This resulted in some boreholes being pumped for longer periods than others. The aim at all times was to obtain maximum information regarding the local aquifer within the allowed budget and scope of the appointment.

The appointed pump-testing contractor executed pump testing under the supervision and guidance of the hydrogeological consultant at the existing boreholes. Pump testing was done using a positive displacement mono-type pump being driven by an engine equipped with a gearbox to be able to pump at different rates. Because the boreholes are in use, they were allowed to recover sufficiently before pump testing of the holes commenced.

Initial testing procedures involved calibration testing where no information or inaccurate information regarding the yield of a borehole exists. This was typically followed by a step drawdown test during which the water level response to different abstraction rates was measured. Results from this test were used to determine a safe and adequate rate at which to perform the constant rate drawdown test. The constant rate drawdown test was commenced once the water level has recovered sufficiently.

The water level response to the constant rate drawdown test, as well as the recovery after the test, was used to assess the hydraulic parameters of the aquifer. These results help to determine the safe long-term abstraction rates at each of the tested boreholes.

It must be noted that at least one of the existing boreholes had to remain pumping to maintain the water supply to the town throughout the entire pump testing phase.

Monitoring of boreholes nearest to the pumping borehole, was carried out where seen as feasible.

2.4 Chemical Water Analyses

A water sample was taken at the boreholes at the end of the pumping cycle of the last test carried out. Water was analyzed as far as its physical, chemical and microbiological quality is concerned where required.

Results were evaluated using the document:

Quality of Domestic Water Supplies; Volume 1;Assessment Guide; Second Edition 1998; Water Research Commission No. TT101/98.

The Water Quality Assessment Guide defines the following classes:

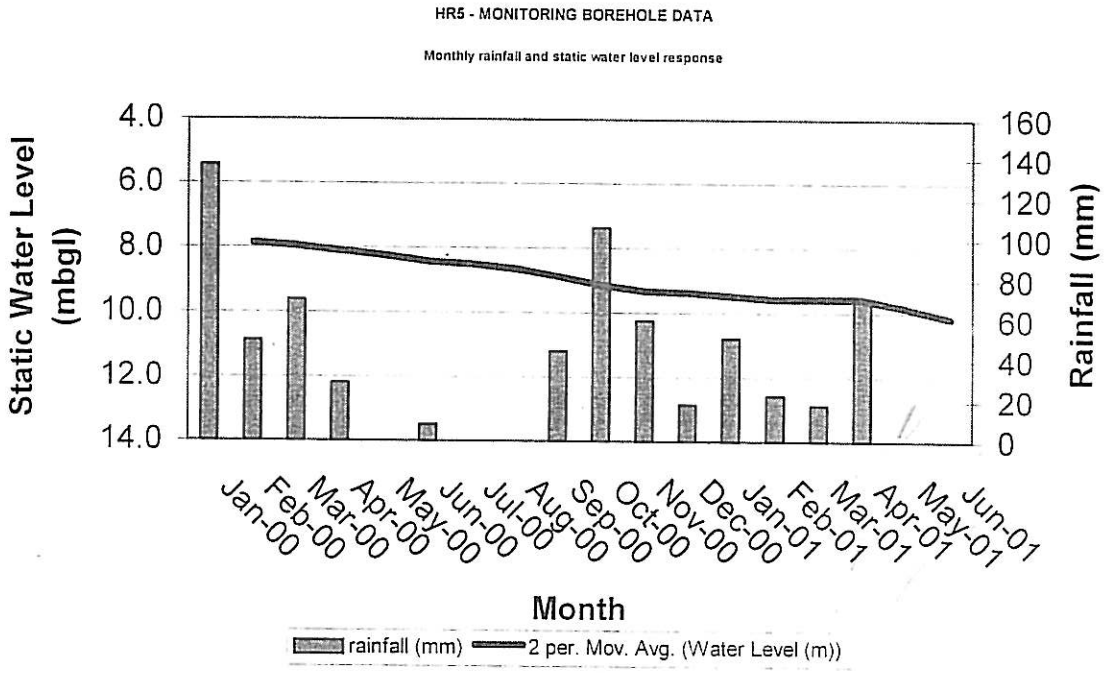
Class 0	**Ideal water quality**	Suitable for lifetime use
Class 1	**Good water quality**	Suitable for use, rare instances of negative effects.
Class 2	**Marginal water quality**	Conditionally acceptable. Negative effects may occur in some sensitive groups.
Class 3	**Poor water quality**	Unsuitable for use without treatment. Chronic effects may occur.
Class 4	**Dangerous water quality**	Totally unsuitable for use. Acute effects may occur.

3. RESULTS

3.1 Hydrogeological Setting

According to the geological map the study area is covered by alluvium and underlain by sandstone and mudstone of the Katberg formation of the Tarkastad subgroup that forms part of the Beaufort Group belonging to the Karoo sequence of rocks (Figure 1). The Karoo sequence of rocks typically occurs as a horizontally orientated layered sequence. This sequence had been intruded by Dolerite in the form of sheets and dykes during the late Karoo volcanism. Most boreholes in the project area have been drilled associated with such dolerite dyke intrusions.

Data obtained from the monitoring borehole HR5 indicates that the static groundwater level is continuing to drop regardless of the rainfall in the area. This may be an indication that the local aquifer is being mismanaged. The graph of the rainfall and static water level at HR5 is shown below:



This data is however seen as insufficient to evaluate long term trends and it will be recommended that a more comprehensive monitoring program with data evaluation be implemented.

Four geophysical profiles comprising geomagnetic profiling - were executed in the direct vicinity of the four boreholes concerned. The aim of the geophysical survey was to delineate any geological structures that may influence the characteristics of the local aquifer. Results from the survey in combination with geological mapping indicated the presence of a dolerite dyke that separates boreholes HR1 and HR3 from boreholes HR2 and HR4. This dolerite dyke most probably divides the aquifer into compartments – affecting groundwater flow and recharge. The position of the dolerite dykes concerned are indicated in Figure 2. Geophysical profiles are indicated in Figure 3, and geomagnetic survey data is attached in Appendix D for reference. The prominent magnetic anomaly caused by the dolerite intrusion present is clearly seen in profile 1 for instance.

FIGURE 2: LOCALITY MAP

HOFMEYR GROUNDWATER INVESTIGATION

Scanned image – not to scale

Legend

- Borehole and Number
- Monitoring borehole HR5
- Dolerite Dyke
- Other Boreholes

Eastern Cape Province
8 Sansom Street, Vincent
Postnet 203, Private Bag X9063
EAST LONDON
5200
Tel. No.:+27 - 43 - 726 2070
Fax. No.:+27 - 43 - 726 9232
e-mail:eastlondon@geocon.co.za

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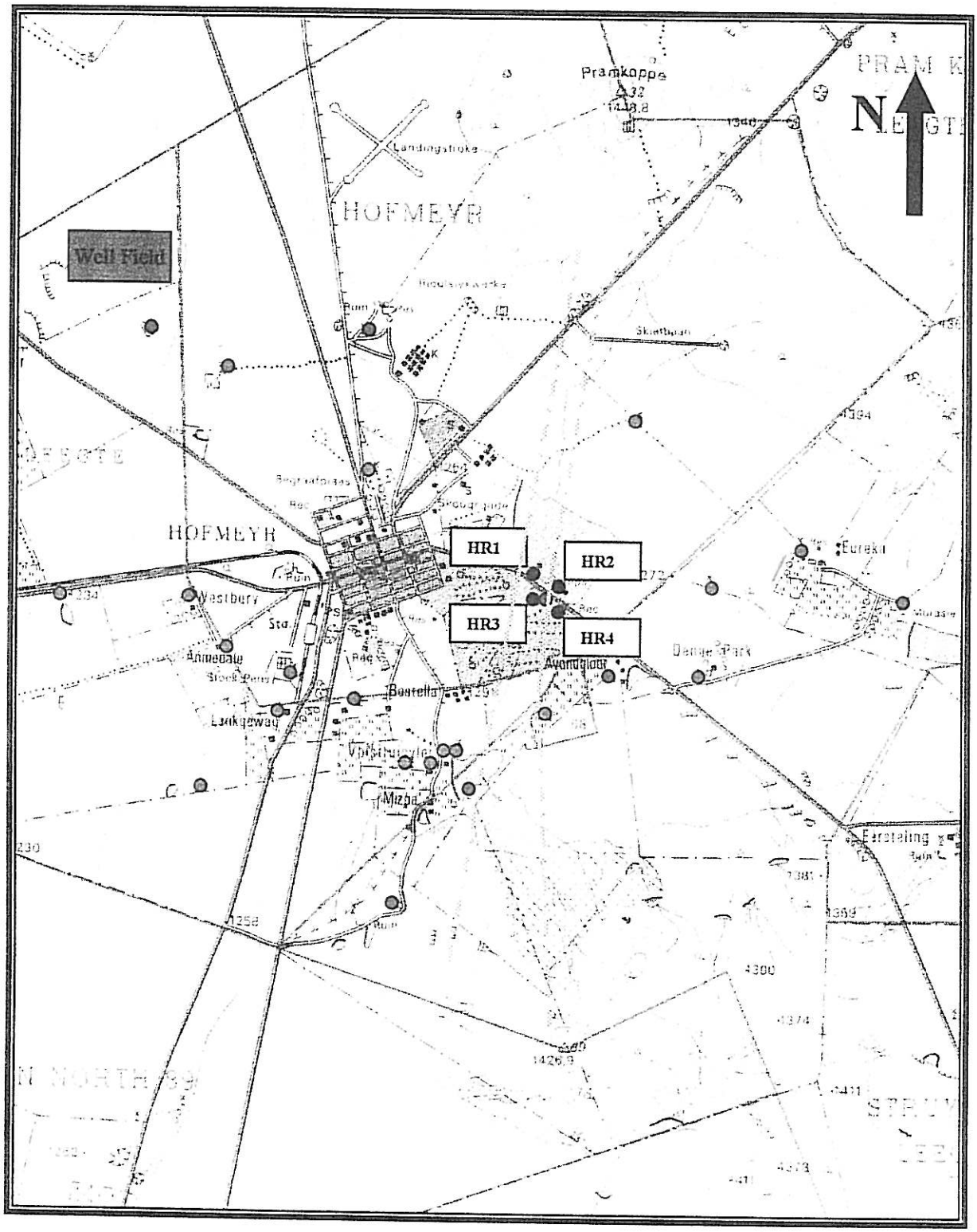


FIGURE 3: GEOPHYSICAL MAP

HOFMEYR GROUNDWATER INVESTIGATION

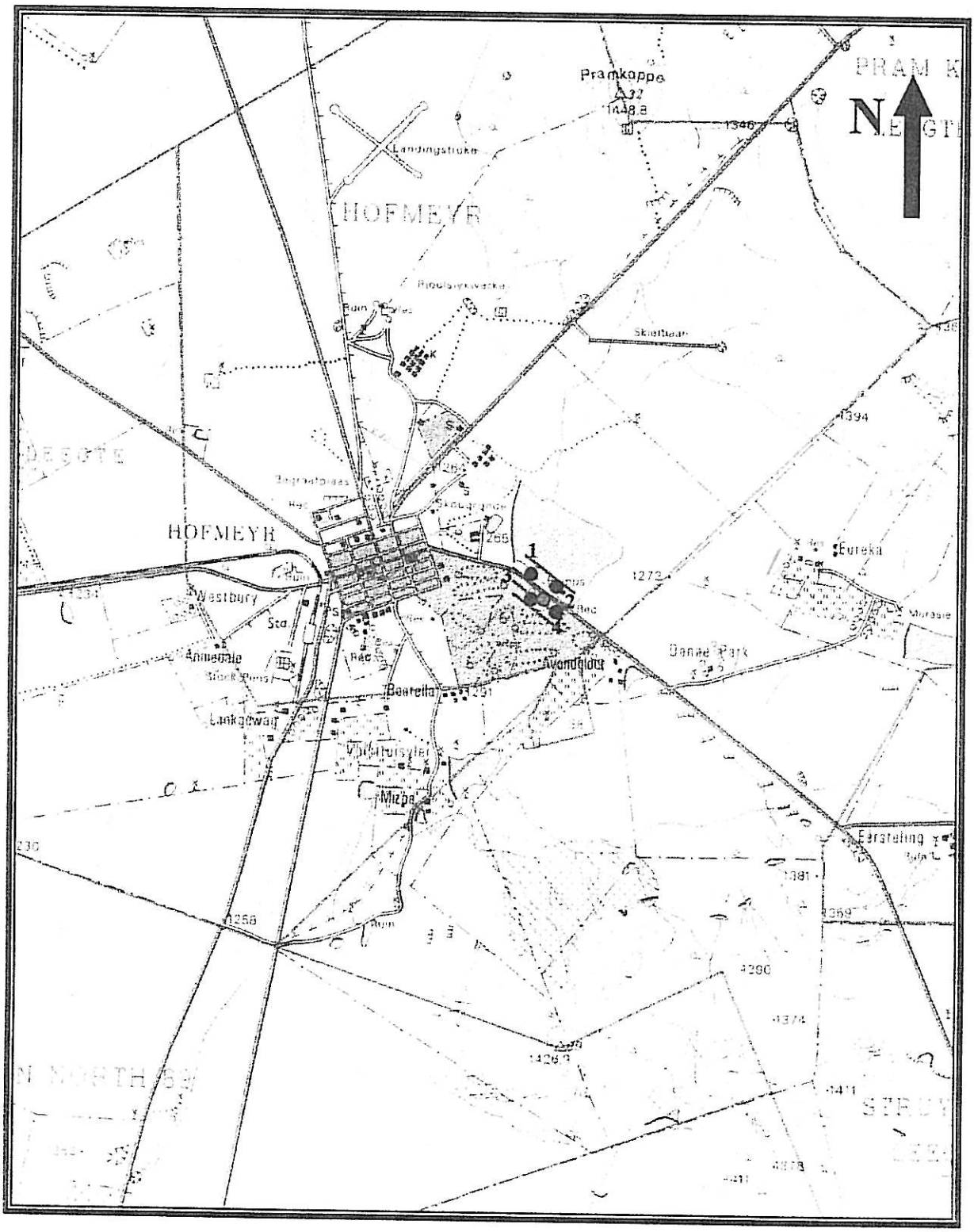
Scanned image – not to scale

Legend

- Existing Borehole
- Monitoring borehole HR5
- 1 Geophysical profile

Eastern Cape Province
8 Sansom Street, Vincent
Postnet 203, Private Bag X9063
EAST LONDON
5200
Tel. No.:+27 - 43 - 726 2070
Fax. No.:+27 - 43 - 726 9232
e-mail:easterncape@geocon.co.za

GeoCon



3.2 Liaison

The first site visit was made on the 28th of June and procedures to be followed were discussed with the representative from the local municipality - Pat Downing. Existing boreholes that had to be tested were indicated and site verification and geological mapping was done. Liaison documentation is attached in Appendix A for reference.

3.3 Borehole census

Not forming part of the scope of this appointment – no formal borehole census was carried out outside of the target area. Several other boreholes were however noted in the area and these are indicated in Figure 2. The approximate location of the alternative abstraction zone – marked as "Well Field" in figure 2, is also indicated.

It will be strongly recommended that a regional borehole census be carried out to determine regional abstraction trends and volumes which will most definitely effect the municipal abstraction.

3.4 Existing equipment

Of the four boreholes concerned, HR1, HR2 and HR3 was equipped with electrical driven mono pumps, while HR4 was equipped with a windmill in disrepair. The pumphouses in which boreholes HR1 and HR2 is located is build out of brick and in a poor condition whilst borehole HR3 is located in a temporary sink pumphouse that is in a moderate to poor condition. Existing pump houses were destroyed as new pump houses are to be built as part of this project. The windmill (borehole nr. HR4) was non-operational and in poor condition at the time of the testing program. The monitoring borehole HR5 is in a good condition and is located inside a small metal house that is in a good condition.

3.5 Pump Testing

Pump testing at the boreholes involved calibration testing, step drawdown, constant rate drawdown and recovery testing.

Some boreholes were used as observation boreholes during the pump testing process.

- **Borehole number HR1** was found to be 48.30m deep with the static water level being at 10.88m. The test pump was installed at 41m – leaving 30.12m of drawdown available for pump testing purposes. Following calibration and step drawdown testing, the maximum yield at pump inlet was observed to be 10.04 l/s. A constant rate test was performed at 9.0 l/s for 48 hours. A drawdown of 12.25m was noted at the end of 48 hours – constituting 41% of the available drawdown. Water level recovery was 90% within 10 hours after pumping ceased. Borehole HR2 was being pumped throughout this test to maintain the water supply to the town at approximately 1.5 l/s. Borehole HR5 was monitored during the test and a drawdown of 0.32m was noted at the end of the 48 hr test.
- ***It must be noted that an armed robbery took place during the recovery test period at this borehole. The contractor's site personnel were assaulted and their tent and some equipment set alight. All data recorded during this test was lost in the fire and evaluations and recommendations were made based on data recorded by the hydrogeologist throughout the testing procedure. The decision was made that this information is sufficient and that a re-test will not be required. Severe injuries incurred by the site personnel as well as the loss of equipment further made immediate re-testing impossible and water supply to the town had to be re-activated as soon as possible.***

- **Borehole number HR2** was found to be 49.07m deep with the static water level being at 10.33m. The test pump was installed at 45m – leaving 34.67m of drawdown available for pump testing purposes. Following calibration and step drawdown testing, a constant rate test was performed at 4.7 l/s for 48 hours. A drawdown of 10.24m was noted at the end of 48 hours – constituting 30% of the available drawdown. Water level recovery was 91% within 10 minutes after pumping ceased. Borehole HR1 was being pumped throughout this test to maintain the water supply to the town at approximately 2.5 l/s. Borehole HR5 was monitored during the test and a drawdown of 1.30m was noted at the end of the 48 hr test.

- **Borehole number HR3** was found to be 70.81m deep with the static water level being at 10.54m. The test pump was installed at 60m – leaving 49.46m of drawdown available for pump testing purposes. Following calibration and step drawdown testing, the maximum yield at pump inlet was observed to be 3.08 l/s. A constant rate test was performed at 2.13 l/s for 48 hours. A drawdown of 4.45m was noted at the end of 48 hours – constituting 9% of the available drawdown. Water level recovery was 93% within 1 hour after pumping ceased. Borehole HR1 was being pumped throughout this test to maintain the water supply to the town at approximately 2.5 l/s. Borehole HR5 was monitored during the test and a drawdown of 0.28m was noted at the end of the 48 hr test. Borehole HR4 was monitored during the test and a drawdown of 0.20m was noted at the end of the 48 hr test.

- **Borehole number HR4** was found to be 30.60m deep with the static water level being at 10.46m. The test pump was installed at 27m – leaving 16.54m of drawdown available for pump testing purposes. Following calibration and step drawdown testing, the maximum yield at pump inlet was observed to be 2.39 l/s. A constant rate test was performed at 1.8 l/s for 24 hours. A drawdown of 3.61m was noted at the end of 24 hours – constituting 22% of the available drawdown. Water level recovery was 95% within 7 minutes after pumping ceased. Borehole HR1 was being pumped throughout this test to maintain the water supply to the town at approximately 2.5 l/s.

Pump-testing data is given in Appendix B for reference.

3.6 Water Chemistry

Water samples taken were analyzed in terms of its microbiological and physical quality with the following results:

Borehole Nr.	DRINKING QUALITY		FOOD PREPARATION	BATHING	LAUNDRY
	Health	*Aesthetic*			
HR1	2	2	3	3	3
HR2	2	2	3	3	3
HR3	Not	analysed	---	Future	Monitoring
HR4	2	2	3	3	3

Results were evaluated using the document:

Quality of Domestic Water Supplies; Volume 1;Assessment Guide; Second Edition 1998; Water Research Commission No. TT101/98.

Borehole HR1 has water of marginal drinking quality due to the following:

- *Slight bacteriological contamination*
- *High turbidity*
- *Water being hard to very hard*

Lathering of soap can be impaired with scaling of appliances most likely to occur. Chronic effects are possible in sensitive users due to hard water. Turbidity and bacteriological contamination will have to be addressed via appropriate water treatment.

Borehole HR2 has water of marginal drinking quality due to the following:

- *Elevated turbidity*
- *Water being very hard*

Lathering of soap can be impaired with scaling of appliances most likely to occur. Chronic effects are possible in sensitive users due to hard water.

Borehole HR4 has water of marginal drinking quality due to the following:

- *Water being very hard*

Lathering of soap can be impaired with scaling of appliances most likely to occur. Chronic effects are possible in sensitive users due to hard water.

Water analyses results is given in Appendix C for reference.

Sampling of borehole HR3 was not seen as necessary due to its proximity to the other boreholes and sufficient data being available for each of the two groundwater compartments present. Sampling of this borehole will however be recommended during the monitoring program.

4. SUMMARY & RECOMMENDATIONS

- Groundwater potential in the target area is high. and is associated with the fracturing – induced by the dolerite intrusions present.
- Compartmentalization is possibly caused by the dolerite intrusions present but the dykes are not seen as aquicludes due to the high grade of weathering at shallow depths and shallow groundwater levels. This was confirmed by monitoring both compartments during the pumping process.
- Indication is that the main water strikes at the boreholes were within the first 20 to 30m from surface. This implicates that water level fluctuations during dry seasons could have an impact on the yield potential at the boreholes concerned.
- There is concern that the boreholes in this well field are located to close to eachother and it will therefore be recommended that no more than one borehole from each compartment is utilized at any time.
- Water quality has to be evaluated in the light of the water having been used for many years already. There is no major concern in terms of the water quality with appropriate treatment to be considered where necessary.

The following recommendations are given:

- **Borehole HR1** is recommended for usage as main production borehole. The existing equipment in this borehole can be used only if upgrading can result in an abstraction rate not exceeding 4.8 l/s being possible. A pump installation depth of 45m is suitable. It is recommended that this borehole be pumped on a 24 hour cycle for one(1) month during which proper water level monitoring at all monitoring points take place. Evaluation of this data will indicate whether the cycle has to be changed to less than 24hrs. Construction of new pumping houses must address the possibility of contamination from polluted surface water – as noted from chemical water analyses.

- **Borehole HR2** is recommended as the second production borehole with the existing equipment installed in the borehole being suitable – but in need of refurbishment. A pump installation depth of 45m is suitable An abstraction rate of 2.0 l/s must not be exceeded. This borehole is recommended for abstraction on a limited duty cycle of 8/24 hours. Construction of new pumping houses must address the possibility of contamination from polluted surface water – as noted from chemical water analyses.

- **Borehole nr HR3** is recommended for usage only as monitoring point and emergency/standby borehole in the instance where HR1 is not operational. The current equipment is suitable if refurbished, with an abstraction rate of 2.0 l/s, over a duty cycle of 8 hours, not to be exceeded. A pump installation depth of 60m is suitable.

- **Borehole HR4** is not recommended for equipping and must be used as monitoring borehole together with the Water Affairs borehole. It must be capped and protected for this purpose.

- Only Borehole HR3 will need conduit pipe installed together with the current equipment for monitoring purposes. This borehole together with the Water Affairs borehole as well as HR4 will be sufficient to monitor the different groundwater compartments present.

- It must be stressed that it was not the scope of this investigation to carry out a regional hydrogeological study and that only the four boreholes concerned had to be evaluated. It is of extreme importance that such an investigation be carried out as soon as possible for long term planning purposes and sustainability of the groundwater sources.

- The implementation of an initail weekly monitoring scheme – to be developed into a monthly program – is of utmost importance to monitor the reaction of the aquifer to the recommendations made. This data will have to include water levels, rainfall data as well as abstraction volumes and will have to be reviewed in 6 months time and changes made where necessary.

- A comprehensive water quality analyses – incorporating all boreholes used for municipal water supply, must be carried out before appropriate treatment options are considered.

APPENDIX A

LIAISON DOCUMENTATION

LIAISON - LOCAL AUTHORITIES

S. A. GeoConsultants (Pty) Ltd
P / Bag X9063, Postnet 203
East London
Tel: 043 - 726 2070

GEOCON

Date:	28 June 2001
District:	
Community:	Hofmeyr
Project:	Hofmeyr Groundwater investigation

Objectives - GeoCon:	Borehole survey. First site visit
Objectives - Community:	

Authorities:

Name:	Position:	Signature:	Date:	Remarks:
P Downey	Municipality		28/6/2001	
F.N. de Jager	GEOCON		28/6/2001	

APPENDIX B

PUMP TESTING DATA

CALIBRATION TEST AND RECOVERY

BOREHOLE NO.:	HR1	PROJECT:	Hofmeyer
ALTERNATIVE NO.:		SITE NAME:	Hofmeyer Town
ALTERNATIVE NO.:		CLIENT:	

BOREHOLE DEPTH (mbdl):	48.30	CASING DEPTH (mbdl):	3.68	PUMP TYPE USED:	BP22
DEPTH OF PUMP (mbdl):	45.00	CASING HEIGHT (magl):	0.00	OPERATOR:	Isaac / Joseph
PUMP INLET DIAMETER (mm):	110	CASING ID (mm):	200	CONTRACTOR:	AB Pumps
STATIC WATER LEVEL (mbdl):	10.88	DATUM LEVEL (magl):	0.68	SUPERVISOR:	M Oliver

DISCHARGE RATE 1

DATE: 31/07/2001 TIME: 18H30

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1	0.17		1	
2	0.19		2	
3	0.19	0.74	3	
5	0.19		5	
7	0.19	0.86	7	
10	0.23	1	10	
15	0.24	1	15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

TYPE OF RESERVOIR:
BRICK

RESERVOIR SIZE:
APPROX. 270 KL

RESERVOIR CONITION:
FAIR

STAND HEIGHT (m):
3M

DISCHARGE RATE 2

DATE: 31/07/2001 TIME: 18H45

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1	0.54		1	
2	0.56	2.15	2	
3	0.57		3	
5	0.58		5	
7	0.58	2.15	7	
10	0.59		10	
15	0.59		15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

TYPE OF ENCLOSURE:
NO

MATERIAL OF ENCLOSURE:

CONDITION OF ENCLOSURE:

WATER METER MANUFACTURER:

WATER METER READING:

DISCHARGE RATE 3

DATE: 31/07/2001 TIME: 19H00

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1	1.23		1	
2	1.35	4.16	2	
3	1.38	4.09	3	
5	1.40		5	
7	1.42		7	
10	1.43	4.11	10	
15	1.44		15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

PRESSURE GAUGE MANUFACTURER:
NO

GAUGE READING (KpA):

MONITORING FACILITY:

MAINTAINED:

DISCHARGE RATE 4

DATE: 31/07/2001 TIME: 19H15

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1	2.26		1	
2	2.50	7.65	2	
3	3.02		3	
5	3.75	7.7	5	
7	3.89		7	
10	3.93		10	
15	4.01		15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

PUMP TYPE:
SD

PUMP MANUFACTURER:
MONO

PUMP SERIAL No:
GW 1301

PUMP PULLEY DIAMETER (mm):
350mm

PUMP INTAKE DEPTH (m):
41m

PUMP RPM:

PUMP CONDITION:
FAIR

DISCHARGE RATE 5

DATE: TIME:

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1	
2			2	
3			3	
5			5	
7			7	
10			10	
15			15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

TYPE OF POWER:
ELECTRIC

ENGINE MANUACTURER:
SIEMENS

ENGINE MODEL:
1LA31664Y40

ENGINE SERIAL No:
9536058

ENGINE PULLEY DIAMETER (mm):
200mm

POWER RATING (kW):
15 KW

ENGINE CONDITION:
WORKING

DISCHARGE RATE 6

DATE: TIME:

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1	0.46
2			2	0.20
3			3	
5			5	
7			7	
10			10	
15			15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	
			180	
			210	
			240	
			300	
			420	
			480	
			540	
			600	
			660	

EXISTING EQUIPMENT DETAIL:

TYPE OF RISER:
STEEL

CLASS OF RISER:

DIAMETER OF RISER (mm):
100mm

CONDITION OF RISER:
POOR

SHAFT DIAMETER (mm):
20mm

ELEMENT DIAMETER (mm):
90mm

ELEMENT STROKE (mm):

COMMENTS:

Top Rod - Need replacing

Bearing assembly on pumphead need servicing

Columns - rods poor condition

Electrical motor need servicing, Valve and non-return valve needs replacing on rising main

DID THE BOREHOLE PRODUCE ANY SILT / SAND / GRAVEL ?

STEPPED DISCHARGE TEST AND RECOVERY

BOREHOLE NO.:	HR1 2125CB00004	PROJECT:	Hofmeyer
ALTERNATIVE NO.:	0	SITE NAME:	Hofmeyer Town
ALTERNATIVE NO.:	0	CLIENT:	0

BOREHOLE DEPTH (mbdl):	48.30	CASING DEPTH (mbdl):	3.68	PUMP TYPE USED:	BP22
DEPTH OF PUMP (mbdl):	45.00	CASING HEIGHT (magl):	0.00	OPERATOR:	Isaac / Joseph
PUMP INLET DIAMETER (mm):	110	CASING ID (mm):	200	CONTRACTOR:	AB Pumps
STATIC WATER LEVEL (mbdl):	10.88	DATUM LEVEL (magl):	0.68		

DISCHARGE RATE 1

DATE: 01/08/2001
TIME: 08H50

Time (min)	Drawdown (m)	Yield (l/s)
1	0.81	2.750
2	0.48	2.090
3	0.42	2.120
5	0.52	
7	0.47	2.120
10	0.50	
15	0.51	2.120
20	0.51	2.120
30	0.51	
40	0.51	
50	0.51	2.130
60	0.52	
70		
80		
90		
100		
110		
120		

Average yield: 2.20714286

Recovery 1

Time (min)	Recovery (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	
(l/s)	

DISCHARGE RATE 2

DATE: 01/08/2001
TIME: 09H50

Time (min)	Drawdown (m)	Yield (l/s)
1	0.92	3.460
2	1.22	4.090
3	1.27	
5	1.29	
7	1.30	4.280
10	1.31	
15	1.32	4.220
20	1.34	
30	1.34	4.240
40	1.35	
50	1.36	
60	1.37	4.250
70		
80		
90		
100		
110		
120		

Average yield: 4.09

Recovery 2

Time (min)	Recovery (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	

DISCHARGE RATE 3

DATE: 01/08/2001
TIME: 10H50

Time (min)	Drawdown (m)	Yield (l/s)
1	1.68	
2	1.90	
3	1.95	5.520
4	2.10	
7	2.12	5.650
10	2.26	
15	2.48	6.190
20	2.51	
30	2.52	6.250
40	2.54	
50	2.56	
60	2.58	
70		
80		
90		
100		
110		
120		

Average yield: 5.9025

Recovery 3

Time (min)	Recovery (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	

DISCHARGE RATE 4

DATE: 01/08/2001
TIME: 11H50

Time (min)	Drawdown (m)	Yield (l/s)
1	3.05	
2	4.34	
3	4.46	
5	4.60	8.50
7	4.68	
10	4.81	8.41
15	4.94	
20	4.98	
30	5.01	
40	5.05	8.48
50	5.07	
60	5.09	
70		
80		
90		
100		
110		
120		

Average yield: 8.46333333

Recovery 4

Time (min)	Recovery (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	

DISCHARGE RATE 5

DATE: 01/08/2001
TIME:

Time (min)	Drawdown (m)	(l/s)
1		
2		
3		
5		
7		
10		
15		
20		
30		
40		
50		
60		
70		
80		
90		
100		
110		
120		

Recovery 5

Time (min)	Recovery (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	
240	
300	
360	
420	
480	
540	
600	
660	
720	
780	

DISCHARGE RATE 6

DATE: 01/08/2001
TIME:

Time (min)	Drawdown (m)	Yield (l/s)
1		
2		
3		
5		
7		
10		
15		
20		
30		
40		
50		
60		
70		
80		
90		
100		
110		
120		
150		
180		
210		
240		
300		
360		
420		
480		

Average yield:

Recovery

Time (min)	Recovery (m)
1	0.71
2	0.33
3	0.29
5	0.25
7	0.22
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	
240	
300	
360	
420	
480	
540	
600	
660	
720	

COMMENTS:

CONSTANT DISCHARGE TEST AND RECOVERY

BOREHOLE NO. :	HR1	PROJECT:	Hofmeyer	CLIENT:	0
ALTERNATIVE NO. :	0	SITE NAME:	Hofmeyer Town		
DEPTH OF PUMP (mbdl):	45.00	PUMP TYPE USED:	BP22	OPERATOR:	Isaac / Joseph
INLET DIAMETER (mm):	110	EXISTING EQUIPMENT:	PD	CONTRACTOR:	AB Pumps

TEST STARTED	DATE:	05/08/2001	TEST COMPLETED	DATE:	06/08/2001	TOTAL TIME - PUMPED (min):	2880	TOTAL TEST TIME (min):	2880
	TIME:	08h30		TIME:	08H30	TOTAL TIME-RECOVERY(min):	1800	AVERAGE YIELD (l/s):	8.98

DISCHARGE BOREHOLE		OBSERVATION BOREHOLE 1		OBSERVATION BOREHOLE 2		OBSERVATION BOREHOLE 3	
CASING HEIGHT (magl):	0.00	No. :		No. :		No. :	
CASING DEPTH (mbdl):	3.68	DATUM LEVEL (magl):		DATUM LEVEL (magl):		DATUM LEVEL (magl):	
CASING ID (mm):	200	CASING DEPTH (mbdl):		CASING DEPTH (mbdl):		CASING DEPTH (mbdl):	
BOREHOLE DEPTH (mbdl):	48.3	BOREHOLE DEPTH :		BOREHOLE DEPTH :		BOREHOLE DEPTH :	
WATER LEVEL (mbdl):	10.8	WATER LEVEL:		WATER LEVEL:		WATER LEVEL:	
DATUM LEVEL (magl):	41	DISTANCE (m):		DISTANCE (m):		DISTANCE (m):	

Time (min)	Drawdown (m)	Yield (l/s)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)
1	0.91		4.04	1			1			1		
2	1.15	8.65	1.95	2			2			2		
3	1.96		1.91	3			3			3		
5	1.99		1.89	5			5			5		
7	2.09	9.02	1.88	7			7			7		
10	2.15		1.86	10			10			10		
15	2.21		1.82	15			15			15		
20	2.36	9.01	1.78	20			20			20		
30	2.69		1.76	30			30			30		
40	2.99		1.69	40			40			40		
60	3.20	9.00	1.67	60			60			60		
90	3.53		1.65	90			90			90		
120	3.69	9.01	1.62	120			120			120		
150	4.75		1.60	150			150			150		
180	4.92		1.59	180			180			180		
210	5.30	9.00	1.58	210			210			210		
240	5.45		1.57	240			240			240		
300	5.62		1.56	300			300			300		
360	5.66	9.02	1.55	360			360			360		
420	6.56		1.54	420			420			420		
480	6.99		1.53	480			480			480		
540	7.86	9.02	1.52	540			540			540		
600	8.50		1.51	600			600			600		
720	9.70		1.50	720			720			720		
840	10.65	9.01	0.45	840			840			840		
960	10.70		0.46	960			960			960		
1080	10.74		0.47	1080			1080			1080		
1200	10.88	9.02	0.46	1200			1200			1200		
1320	10.86		0.42	1320			1320			1320		
1440	10.95		0.40	1440			1440			1440		
1800	11.75	9.01	0.38	1800			1800			1800		
2280	11.96			2280			2280			2280		
2880	12.25	9.00		2880			2880			2880		
3240												
3600												
3960												
4320												

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DISCHARGE BOREHOLE				OBSERVATION BOREHOLE 1			OBSERVATION BOREHOLE 2			OBSERVATION BOREHOLE 3		
Time (min)	Drawdown (m)	Yield (l/s)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)
1500				1500			1500			1500		
1560				1560			1560			1560		
1620				1620			1620			1620		
1680				1680			1680			1680		
1740				1740			1740			1740		
1800				1800			1800			1800		
1860				1860			1860			1860		
1920				1920			1920			1920		
1980				1980			1980			1980		
2040				2040			2040			2040		
2100				2100			2100			2100		
2160				2160			2160			2160		
2220				2220			2220			2220		
2280				2280			2280			2280		
2340				2340			2340			2340		
2400				2400			2400			2400		
2460				2460			2460			2460		
2520				2520			2520			2520		
2580				2580			2580			2580		
2640				2640			2640			2640		
2700				2700			2700			2700		
2760				2760			2760			2760		
2820				2820			2820			2820		
2880				2880			2880			2880		

DESCRIPTION:	QUANTITY:	UNIT:
ESTABLISHMENT		Sum
INTER HOLE MOVE > 10 km		Km.
FROM: SITE NAME:		
BOREHOLE No:		
INTER HOLE MOVE < 10 km:		No.
REMOVAL AND RE-ERECTION OF PUMP HOUSE:		No.
REMOVAL OF EXISTING EQUIPMENT:		No.
RE-INSTALLATION OF EXISTING EQUIPMENT:		No.
WORK TIME RATE (REPAIRS):		Hour
STANDING TIME:		Hour
LATITUDE: LONGITUDE:		

SUMMARY

DESCRIPTION:	QUANTITY:	UNIT
STRAIGHTNESS TEST:		No
VERTICALITY TEST:		No
CASING DETECTION:		No
STEEL BOREHOLE COVER:		No
BOREHOLE MARKING:		No
SITE CLEANING / FINISHING:		No
REPORTING & DATA RECORDING:		No
SLUG TEST:		No
LAYFLAT (m):		m
BOREHOLE DEPTH AFTER TEST:		m
BOREHOLE WATERLEVEL AFTER TEST:		m

TEST DESCRIPTION	STEP	1	2	3	4	5	6	TOTAL: (min)	(hrs)	RECOVERY: (m)	(min)
CALIBRATION TEST:											
TEST DURATION (Minutes)		15	15	15	15			60	1.00	0.20	2
TEST YIELD (l/s)		0.90	2.15	4.12	7.68			MAXIMUM (l/s)	7.7		
DRAWDOWN (m)		0.24	0.59	1.44	4.01			MAXIMUM (m)	4.0		
MULTI-RATE / STEP DRAWDOWN:											
TEST DURATION (Minutes)		60	60	60	60			240	4.00	0.22	7
TEST YIELD (l/s)		2.21	4.09	5.90	8.46			MAXIMUM (l/s)	8.5		
DRAWDOWN (m)		0.0	1.37	2.58	5.09			MAXIMUM (m)	5.1		

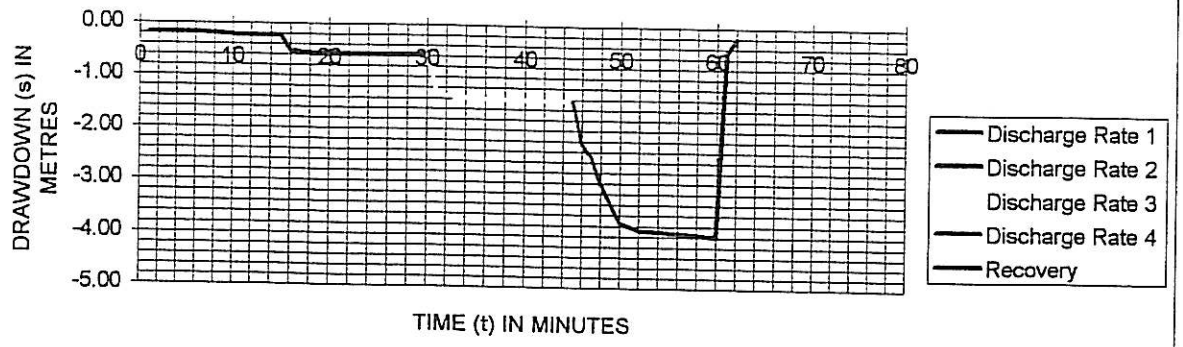
RECOVERY TEST		
TIME TOTAL (hrs):		30.15
Cal	Steps	CD	Total
2	7	1800	1809
DRAWDOWN TOTALS (CD):		
AVAILABLE	UTILISED	%
34.1	12.25	35.90

CONSTANT DISCHARGE TEST	TEST DURATION (min)	(hrs)	TEST YIELD (l/s)	DRAWDOWN (m)	RECOVERY: (m)	%	(min)	(hrs)
	2880	48.00	8.98	12.25	0.38	96.90	1800	30.00
OBSERVATION BOREHOLES:	No.	720	1440	2880	>2880 (min)		TOTAL:	

BOREHOLE NUMBER: HR1

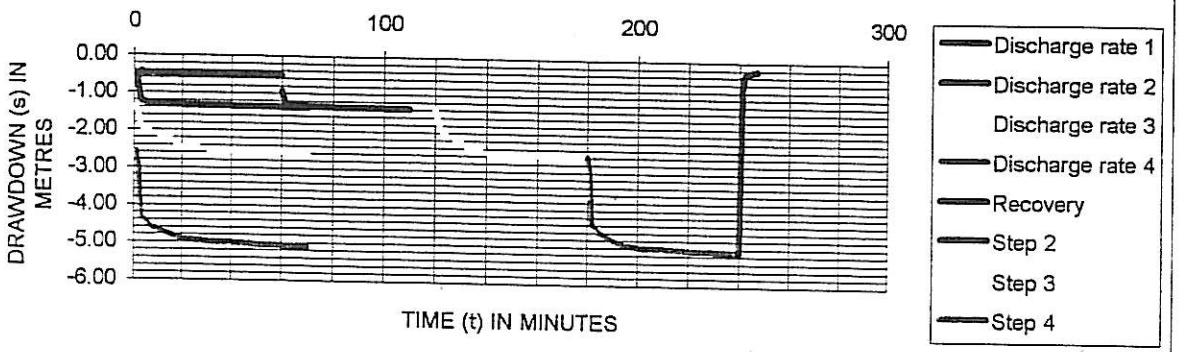
CALIBRATION TEST AND RECOVERY

Discharge 1:	0.90	Discharge 2:	2.15	Discharge 3:	4.12	Discharge 4:	7.68	Discharge 5:		Discharge 6:	
										Drawdown 1:	0.24
										Drawdown 2:	0.59
										Drawdown 3:	1.44
										Drawdown 4:	4.01
										Drawdown 5:	0.00
										Drawdown 6:	0.00
										Duration 1:	15
										Duration 2:	15
										Duration 3:	15
										Duration 4:	15
										Duration 5:	
										Duration 6:	
										Recovery (m):	0.20
										Recovery (min):	2

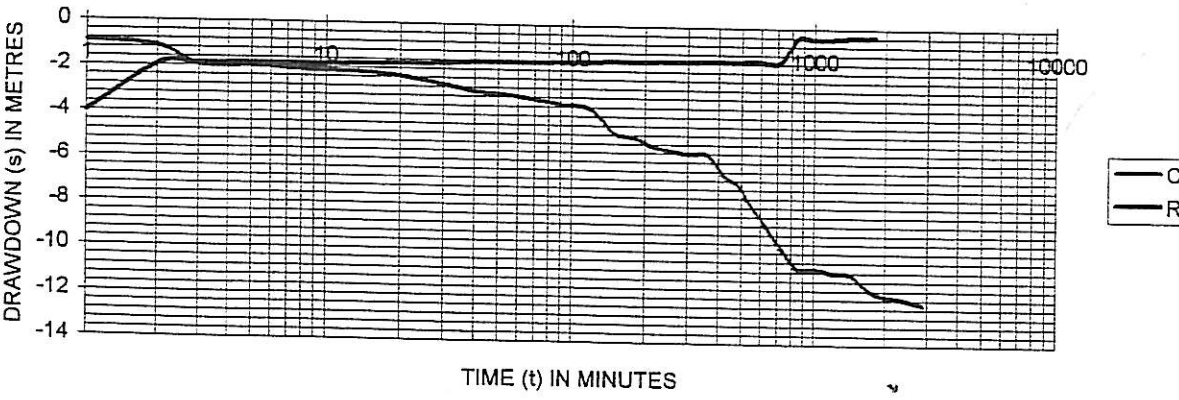


STEPPED DISCHARGE TEST AND RECOVERY

Discharge 1:	2.20714	Discharge 2:	4.09	Discharge 3:	5.9025	Discharge 4:	8.46333	Discharge 5:		Discharge 6:	
										Drawdown 1:	0.00
										Drawdown 2:	1.37
										Drawdown 3:	2.58
										Drawdown 4:	5.09
										Drawdown 5:	0.00
										Drawdown 6:	
										Duration 1:	60
										Duration 2:	60
										Duration 3:	60
										Duration 4:	60
										Duration 5:	
										Duration 6:	
										Recovery (m):	0.22
										Recovery (min):	7



CONSTANT DISCHARGE TEST AND RECOVERY



TEST INFORMATION

Date tested	01/08/2001	Water level (mbgl)	10.88	Depth of pump (mbgl)		45
CD duration	2880	CD discharge rate	8.980833333	CD drawdown		12.25
Available drawdown (m)	34.12	% Recovery after CD	97	% after	1800	min

CALIBRATION TEST AND RECOVERY

BOREHOLE NO. :	HR2	PROJECT:	Hofmeyer
ALTERNATIVE NO. :		SITE NAME:	Hofmeyer Town
ALTERNATIVE NO. :		CLIENT:	

BOREHOLE DEPTH (mbdl):	49.07	CASING DEPTH (mbdl):	8.84	PUMP TYPE USED:	BP 22
DEPTH OF PUMP (mbdl):	45.00	CASING HEIGHT (magl):	0.00	OPERATOR:	Simon
PUMP INLET DIAMETER (mm):	110.00	CASING ID (mm):	200.00	CONTRACTOR:	AB Pumps
STATIC WATER LEVEL (mbdl):	10.33	DATUM LEVEL (magl):	0.44	SUPERVISOR:	M Oliver

DISCHARGE RATE 1

DATE: 27/07/2001 TIME: 19H50

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1	0.62		1	
2	0.78		2	
3	0.78	1.08	3	
5	0.88		5	
7	0.88	1.09	7	
10	0.89		10	
15	0.89	1.09	15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

TYPE OF RESERVOIR: Concrete

RESERVOIR SIZE: E175

RESERVOIR CONITION: Fair

STAND HEIGHT (m): Approx. 4m

DISCHARGE RATE 2

DATE: 27/07/2001 TIME: 20H10

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1	2.27		1	
2	2.14		2	
3	2.14	2.22	3	
5	2.18	2.2	5	
7	2.19	2.22	7	
10	2.22		10	
15	2.24	2.22	15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

TYPE OF ENCLOSURE: None

MATERIAL OF ENCLOSURE:

CONDITION OF ENCLOSURE:

WATER METER MANUFACTURER:

WATER METER READING:

DISCHARGE RATE 3

DATE: 27/07/2001 TIME: 20H25

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1	3.19		1	
2	3.98	3.99	2	
3	4.34	4.05	3	
5	4.73		5	
7	4.87	4.06	7	
10	4.91		10	
15	5.07	4.05	15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

PRESSURE GAUGE MANUFACTURER:

GAUGE READING (KpA):

MONITORING FACILITY:

MAINTAINED:

DISCHARGE RATE 4

DATE: 27/07/2001 TIME: 20H50

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
	6.43		1	
2	7.46		2	
	8.95	6.33	3	
	11.94		5	
7	14.81	7.08	7	
10	17.41		10	
15	20.53	7.09	15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

PUMP TYPE: Iono pump

PUMP MANUFACTURER: Mono

PUMP SERIAL No: GW1301

PUMP PULLEY DIAMETER (mm): 441mm

PUMP INTAKE DEPTH (m): 38m

PUMP RPM:

PUMP CONDITION: Good

DISCHARGE RATE 5

DATE: 27/07/2001 TIME:

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1	
2			2	
3			3	
5			5	
7			7	
10			10	
15			15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

TYPE OF POWER: Electric

ENGINE MANUACTURER: 13mm

ENGINE MODEL: 15KW

ENGINE SERIAL No:

ENGINE PULLEY DIAMETER (mm): 134mm

POWER RATING (kW): 15KW

ENGINE CONDITION: Good

DISCHARGE RATE 6

DATE: TIME:

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1	15.21
2			2	7.17
3			3	3.03
5			5	1.05
7			7	0.59
10			10	0.36
15			15	0.22
			20	0.17
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	
			180	
			210	
			240	
			300	
			420	
			480	
			540	
			600	
			660	

EXISTING EQUIPMENT DETAIL:

TYPE OF RISER: Steel

CLASS OF RISER:

DIAMETER OF RISER (mm): 100mm

CONDITION OF RISER: Fair

SHAFT DIAMETER (mm): 120

ELEMENT DIAMETER (mm):

ELEMENT STROKE (mm):

COMMENTS:

Pump room demolish, Electric wiring and motor head servicing and repairs

Column and rods need to be replaced

Pump lead bearing assembly and top rod to be replaced (pump incorrect installed)

Replace gland packing and seals

Valve and non-return valve to be replaced

STEPPED DISCHARGE TEST AND RECOVERY

BOREHOLE NO. :	HR2 3125TR00603	PROJECT:	Hofmeyer
ALTERNATIVE NO :	0	SITE NAME:	Hofmeyer Town
ALTERNATIVE NO. :	0	CLIENT:	0

BOREHOLE DEPTH (mbdt):	49.07	CASING DEPTH (mbdt):	8.84	PUMP TYPE USED:	BP 22
DEPTH OF PUMP (mbdt):	45.00	CASING HEIGHT (magl):	0.00	OPERATOR:	Simon
PUMP INLET DIAMETER (mm):	110.000	CASING ID (mm):	200.000	CONTRACTOR:	AB Pumps
STATIC WATER LEVEL (mbdt):	10.33	DATUM LEVEL (magl):	0.44		

DISCHARGE RATE 1

DATE: 27/07/2001
TIME: 21H15

Time (min)	Drawdown (m)	Yield (l/s)
1	0.56	
2	0.71	
3	0.78	
5	0.84	0.980
7	0.84	
10	0.84	0.970
15	0.84	
20	0.84	
30	0.84	0.970
40	0.84	
50	0.84	
60	0.84	0.970
70		
80		
90		
100		
110		
120		

Average yield: 0.9725

Time (min)	Recovery 1 (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	
(l/s)	

DISCHARGE RATE 2

DATE: 27/07/2001
TIME: 22H15

Time (min)	Drawdown (m)	Yield (l/s)
1	1.47	
2	1.73	
3	1.76	
5	1.85	2.100
7	1.86	
10	1.92	2.110
15	1.96	
20	2.03	2.120
30	2.05	
40	2.05	2.100
50	2.05	
60	2.05	2.110
70		
80		
90		
100		
110		
120		

Average yield: 2.108

Time (min)	Recovery 2 (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	

DISCHARGE RATE 3

DATE: 27/07/2001
TIME: 23H15

Time (min)	Drawdown (m)	Yield (l/s)
1	2.97	
2	3.36	
3	3.37	
5	4.59	4.340
7	4.23	3.150
10	3.61	3.140
15	3.40	3.100
20	3.40	
30	3.42	3.090
40	3.47	
50	3.50	
60	3.52	3.100
70		
80		
90		
100		
110		
120		

Average yield: 3.32

Time (min)	Recovery 3 (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	

DISCHARGE RATE 4

DATE: 27/07/2001
TIME: 00H15

Time (min)	Drawdown (m)	Yield (l/s)
1	4.07	
2	4.87	4.44
3	5.45	5.46
5	6.95	5.96
7	7.94	
10	9.09	5.95
15	10.22	
20	10.84	5.94
30	11.72	
40	12.57	
50	12.88	5.95
60	13.18	
70		
80		
90		
100		
110		
120		

Average yield: 5.61666667

Time (min)	Recovery 4 (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	

DISCHARGE RATE 5

DATE: 27/07/2001
TIME:

Time (min)	Drawdown (m)	Yield (l/s)
1		
2		
3		
5		
7		
10		
15		
20		
30		
40		
50		
60		
70		
80		
90		
100		
110		
120		

Time (min)	Recovery 5 (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	
240	
300	
360	
420	
480	
540	
600	
660	
720	
780	

DISCHARGE RATE 6

DATE: 27/07/2001
TIME:

Time (min)	Drawdown (m)	Yield (l/s)
1		
2		
3		
5		
7		
10		
15		
20		
30		
40		
50		
60		
70		
80		
90		
100		
110		
120		
150		
180		
210		
240		
300		
360		
420		
480		

Average yield:

Time (min)	Recovery (m)
1	7.93
2	3.43
3	1.79
5	0.77
7	0.63
10	0.48
15	0.40
20	0.31
30	0.18
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	
240	
300	
360	
420	
480	
540	
600	
660	
720	

COMMENTS:

CONSTANT DISCHARGE TEST AND RECOVERY

BOREHOLE NO. :	HR2	PROJECT:	Hofmeyer	CLIENT:	0
ALTERNATIVE NO. :	0	SITE NAME:	Hofmeyer Town		
DEPTH OF PUMP (mbdl):	45.00	PUMP TYPE USED:	BP 22	OPERATOR:	Simon
INLET DIAMETER (mm):	110	EXISTING EQUIPMENT:	Mono pump	CONTRACTOR:	AB Pumps

TEST STARTED	DATE:	28/07/2001	TEST COMPLETED	DATE:	29/09/2001	TOTAL TIME - PUMPED (min):	2880	TOTAL TEST TIME (min):	2280
	TIME:	11H30		TIME:	11H30	TOTAL TIME-RECOVERY(min):	1260	AVERAGE YIELD (l/s):	4 72

DISCHARGE BOREHOLE		OBSERVATION BOREHOLE 1		OBSERVATION BOREHOLE 2		OBSERVATION BOREHOLE 3	
CASING HEIGHT (magl):	0.00	No. :	DWAF	No. :		No. :	
CASING DEPTH (mbdl):	8.84	DATUM LEVEL (magl):		DATUM LEVEL (magl):		DATUM LEVEL (magl):	
CASING ID (mm):	200.00	CASING DEPTH (mbdl):		CASING DEPTH (mbdl):		CASING DEPTH (mbdl):	
BOREHOLE DEPTH (mbdl):	49.07	BOREHOLE DEPTH :		BOREHOLE DEPTH :		BOREHOLE DEPTH :	
WATER LEVEL (mbdl):	10.33	WATER LEVEL :	10.12	WATER LEVEL :		WATER LEVEL :	
DATUM LEVEL (magl):	0.44	DISTANCE (m):	50	DISTANCE (m):		DISTANCE (m):	

Time		Yield	Recovery	Time	Drawdown	Recovery	Time	Drawdown	Recovery	Time	Drawdown	Recovery
(min)	(m)	(l/s)	(m)	(min)	(m)	(m)	(min)	(m)	(m)	(min)	(m)	(m)
1	4.25		6.43	1			1			1		
2	4.77		3.06	2			2			2		
3	5.49		1.82	3			3			3		
5	6.35		1.18	5			5			5		
7	6.76	4.75	1.01	7			7			7		
10	7 13		0.90	10			10			10		
15	7.43		0.79	15			15			15		
20	7.70		0.75	20			20			20		
30	8.17	4.75	0.67	30			30			30		
40	8.41		0.64	40			40			40		
60	8.64		0.62	60			60			60		
90	8.87	4.74	0.58	90			90			90		
120	9.02		0.54	120			120			120		
150	9.04		0.52	150			150			150		
180	9.06		0.50	180			180			180		
210	9.10	4.75	0.48	210			210			210		
240	9.15		0.47	240			240			240		
300	9.26	4.69	0.45	300			300			300		
360	9.30		0.44	360			360			360		
420	9.46	4.69	0.43	420			420			420		
480	9.50		0.43	480			480			480		
540	9.54	4.70	0.42	540			540			540		
600	9.58		0.41	600			600			600		
660	9.62	4.70	0.40	660			720			720		
720	9.64		0.39	720	-1.15		840			840		
780	9.67	4.75	0.39	780			960			960		
840	9.74		0.38	840			1080			1080		
900	9.78	4.75	0.37	900			1200			1200		
960	9.82		0.36	960			1320			1320		
1020	9.90	4.74	0.35	1020			1440			1440		
1080	9.94		0.35	1080			1800			1800		
1140	9.98	4.73	0.34	1140			2280			2280		
1200	9.99	4.69	0.33	1200			2880			2880		
1260	10.02	4.69	0.33	1260								
1320	10 05			1320								
1380	10.05	4.69		1380								
1440	10.10	4.75		1440	1 19							

DISCHARGE BOREHOLE				OBSERVATION BOREHOLE 1			OBSERVATION BOREHOLE 2			OBSERVATION BOREHOLE 3		
Time (min)	Drawdown (m)	Yield (l/s)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)
1500	10.12	4.75		1500			1500			1500		
1560	10.14	4.75		1560			1560			1560		
1620	10.14	4.75		1620			1620			1620		
1680	10.14	4.90		1680			1680			1680		
1740	10.15			1740			1740			1740		
1800	10.15	4.85		1800			1800			1800		
1860	10.16			1860			1860			1860		
1920	10.16	4.86		1920			1920			1920		
1980	10.17			1980			1980			1980		
2040	10.17	4.84		2040			2040			2040		
2100	10.18	4.82		2100			2100			2100		
2160	10.18			2160	1.29		2160			2160		
2220	10.19	4.83		2220			2220			2220		
2280	10.19			2280			2280			2280		
2340	10.20	4.84		2340			2340			2340		
2400	10.20			2400			2400			2400		
2460	10.21	4.83		2460			2460			2460		
2520	10.21			2520			2520			2520		
2580	10.22	4.84		2580			2580			2580		
2640	10.22	4.85		2640			2640			2640		
2700	10.23			2700			2700			2700		
2760	10.23	4.84		2760			2760			2760		
2820	10.24			2820			2820			2820		
2880	10.24			2880	1.30		2880			2880		

DESCRIPTION:	QUANTITY:	UNIT:
ESTABLISHMENT		Sum
INTER HOLE MOVE > 10 km		Km.
FROM: SITE NAME:		
BOREHOLE No:		
INTER HOLE MOVE < 10 km:		No.
REMOVAL AND RE-ERECTION OF PUMP HOUSE:		No.
REMOVAL OF EXISTING EQUIPMENT:		No.
RE-INSTALLATION OF EXISTING EQUIPMENT:		No.
WORK TIME RATE (REPAIRS):		Hour
STANDING TIME:		Hour
LATITUDE: LONGITUDE:		

SUMMARY

DESCRIPTION:	QUANTITY:	UNIT
STRAIGHTNESS TEST:		No.
VERTICALITY TEST:		No.
CASING DETECTION:		No.
STEEL BOREHOLE COVER:		No.
BOREHOLE MARKING:		No.
SITE CLEANING / FINISHING:		No.
REPORTING & DATA RECORDING:		No.
SLUG TEST:		No.
LAYFLAT (m):	450	m
BOREHOLE DEPTH AFTER TEST:		m
BOREHOLE WATERLEVEL AFTER TEST:		m

TEST DESCRIPTION	STEP	1	2	3	4	5	6	TOTAL: (min)	TOTAL: (hrs)	RECOVERY: (m)	RECOVERY: (min)
CALIBRATION TEST:											
TEST DURATION (Minutes)		15	15	15	15			60	1.00	0.17	20
TEST YIELD (l/s)		1.09	2.22	4.04	6.83			MAXIMUM (l/s)	6.8		
DRAWDOWN (m)		0.89	2.27	5.07	20.53			MAXIMUM (m)	20.5		
MULTI-RATE / STEP DRAWDOWN:											
TEST DURATION (Minutes)		60	60	60	60			240	4.00	0.18	30
TEST YIELD (l/s)		0.97	2.11	3.32	5.62			MAXIMUM (l/s)	5.6		
DRAWDOWN (m)		0.84	2.05	4.59	13.18			MAXIMUM (m)	13.2		

RECOVERY TEST			
TIME TOTAL (hrs):			21.83
Cal	Steps	CD	Total
20	30	1260	1310
DRAWDOWN TOTALS (CD):			
AVAILABLE	UTIL-ISED		%
34.7	10.24		29.54

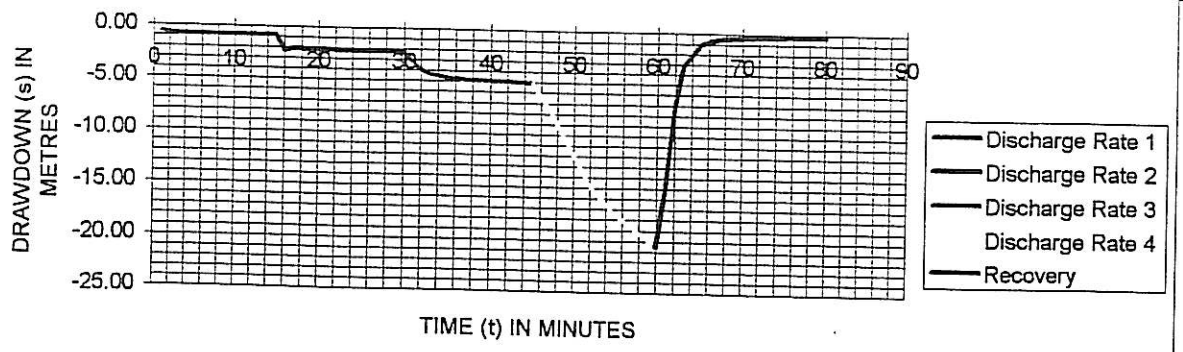
CONSTANT DISCHARGE TEST	TEST DURATION (min)	TEST DURATION (hrs)	TEST YIELD (l/s)	DRAWDOWN (m)	RECOVERY: (m)	RECOVERY: %	RECOVERY: (min)	RECOVERY: (hrs)
	2880	48.00	4.72	10.24	0.33	96.78	1260	21.00

OBSERVATION BOREHOLES:	No. of boreholes	720 (min)	1440 (min)	2880 (min)	>2880 (min) nr.	>2880 (min) Time	TOTAL: (min)	TOTAL: (hrs)
	1			1			2880	48.00

BOREHOLE NUMBER: HR2

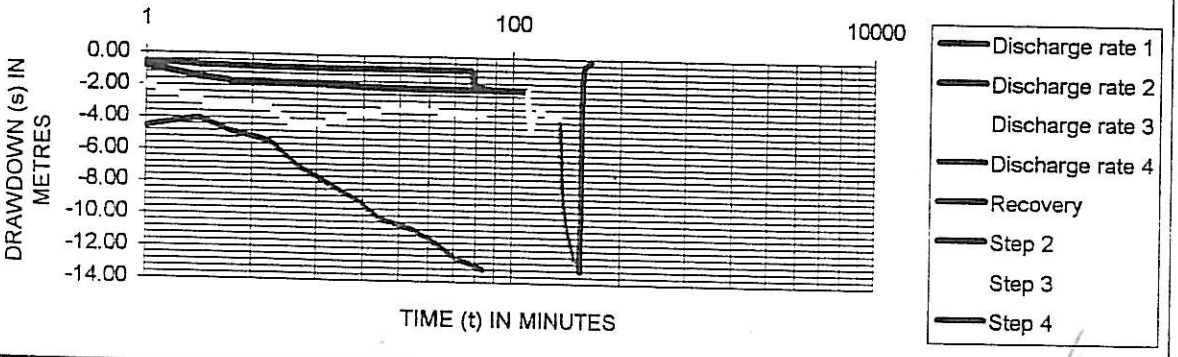
CALIBRATION TEST AND RECOVERY

Discharge 1:	1.09	Discharge 2:	2.22	Discharge 3:	4.04	Discharge 4:	6.83	Discharge 5:		Discharge 6:	
										Drawdown 1:	0.89
										Drawdown 2:	2.27
										Drawdown 3:	5.07
										Drawdown 4:	20.53
										Drawdown 5:	0.00
										Drawdown 6:	0.00
										Duration 1:	15
										Duration 2:	15
										Duration 3:	15
										Duration 4:	15
										Duration 5:	
										Duration 6:	
										Recovery (m):	0.17
										Recovery (min):	20

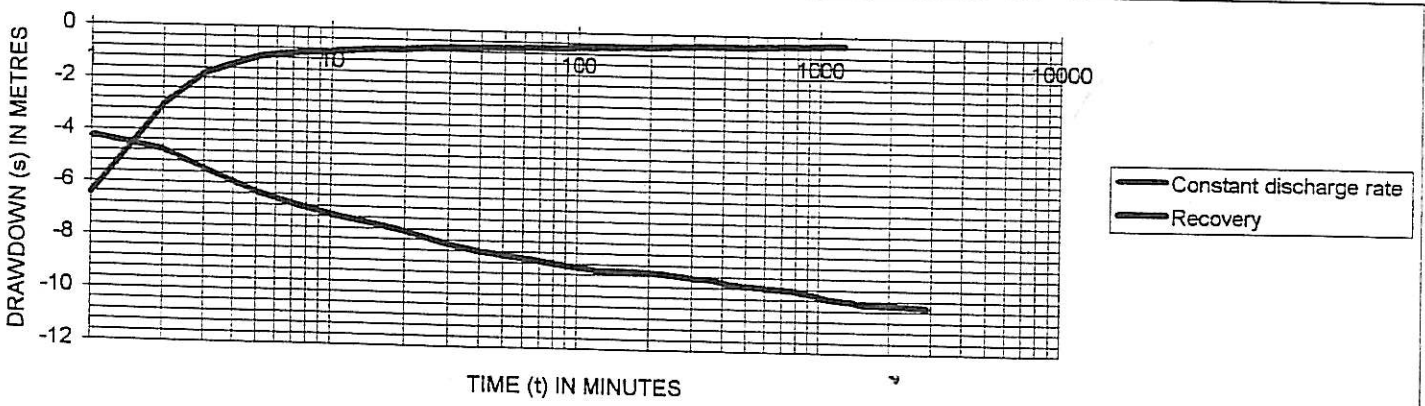


STEPPED DISCHARGE TEST AND RECOVERY

Discharge 1:	0.9725	Discharge 2:	2.108	Discharge 3:	3.32	Discharge 4:	5.61667	Discharge 5:		Discharge 6:	
										Drawdown 1:	0.84
										Drawdown 2:	2.05
										Drawdown 3:	4.59
										Drawdown 4:	13.18
										Drawdown 5:	0.00
										Drawdown 6:	
										Duration 1:	60
										Duration 2:	60
										Duration 3:	60
										Duration 4:	60
										Duration 5:	
										Duration 6:	
										Recovery (m):	0.18
										Recovery (min):	30



CONSTANT DISCHARGE TEST AND RECOVERY



TEST INFORMATION

Date tested	28/07/2001	Water level (mbgl)	10.33	Depth of pump (mbgl)	45
CD duration	2880	CD discharge rate	4.72	CD drawdown	10.24
Available drawdown (m)	34.67	% Recovery after CD	97	% after 1260	min

CALIBRATION TEST AND RECOVERY

BOREHOLE NO. :	HR3			PROJECT:	Hofmeyer
ALTERNATIVE NO. :				SITE NAME:	Hofmeyer Town
ALTERNATIVE NO. :				CLIENT:	S. A. Geocon
BOREHOLE DEPTH (mbdl):	70.81	CASING DEPTH (mbdl):	2.52	PUMP TYPE USED:	BP22
DEPTH OF PUMP (mbdl):	60.00	CASING HEIGHT (magl):	0.10	OPERATOR:	Isaac
PUMP INLET DIAMETER (mm):	110.00	CASING ID (mm):	210.00	CONTRACTOR:	AB Pumps
STATIC WATER LEVEL (mbdl):	10.54	DATUM LEVEL (magl):	0.29	SUPERVISOR:	M. Oliver

DISCHARGE RATE 1

DATE: 19/07/2001 TIME: 16H00

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
	0.86		1	
2	1.09	1.03	2	
	1.30	1.04	3	
	1.38	1.05	5	
7	1.44	1.04	7	
0	1.49	1.03	10	
5	1.51	1.04	15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

TYPE OF RESERVOIR:
RICK

RESERVOIR SIZE:
Approx. 300 kl

ESERVOIR CONITION:
ood / Fair

STAND HEIGHT (m):
3m

DISCHARGE RATE 2

DATE: 19/07/2001 TIME: 16H15

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1	1.54		1	
2	1.66	1.12	2	
3	1.76	1.91	3	
5	2.70	1.91	5	
7	2.96		7	
10	3.14	1.93	10	
15	3.30		15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

TYPE OF ENCLOSURE:
Sink

MATERIAL OF ENCLOSURE:
Sink

CONDITION OF ENCLOSURE:
Poor

WATER METER MANUFACTURER:

WATER METER READING:

DISCHARGE RATE 3

DATE: 19/07/2001 TIME: 16H30

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1	4.14	2.93	1	
2	4.45		2	
3	4.94	3.74	3	
5	6.93	3.84	5	
7	8.06		7	
10	11.47		10	
15	16.44		15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

PRESSURE GAUGE MANUFACTURER:

GAUGE READING (KpA):

MONITORING FACILITY:

MAINTAINED:

DISCHARGE RATE 4

DATE: 19/07/2001 TIME: 16H45

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
	20.11		1	
2	22.45		2	
	27.89	6.38	3	
	45.15	6.4	5	
7	47.84		7	
0	50.84	6.4	10	
5			15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

PUMP TYPE:
ono PD

PUMP MANUFACTURER:
Mono

JMP SERIAL No:
66620

PUMP PULLEY DIAMETER (mm):
280

JMP INTAKE DEPTH (m):
18 5

JMP RPM:
1440

PUMP CONDITION:
ir

DISCHARGE RATE 5

DATE: 19/07/2001 TIME: 16H55

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1	
2			2	
3			3	
5			5	
7			7	
10			10	
15			15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

TYPE OF POWER:
Electric

ENGINE MANUACTURER:
Gec

ENGINE MODEL:
7.5 HP

ENGINE SERIAL No:
SM34985/9

ENGINE PULLEY DIAMETER (mm):
190

POWER RATING (kW):
7 5 HP

ENGINE CONDITION:
Good

DISCHARGE RATE 6

DATE: TIME:

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1	40.38
2			2	36.36
3			3	29.14
5			5	22.54
7			7	16.76
10			10	4.84
15			15	0.93
			20	0.22
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	
			180	
			210	
			240	
			300	
			420	
			480	
			540	
			600	
			660	

EXISTING EQUIPMENT DETAIL:

TYPE OF RISER:
Steel

CLASS OF RISER:

DIAMETER OF RISER (mm):
50mm

CONDITION OF RISER:
Poor

SHAFT DIAMETER (mm):
16mm

ELEMENT DIAMETER (mm):

ELEMENT STROKE (mm):

OMMENTS:

Water level befor installing pipes = 10,26m

DID THE BOREHOLE PRODUCE ANY SILT / SAND / GRAVEL ?

STEPPED DISCHARGE TEST AND RECOVERY

BOREHOLE NO :	HR3 3125DR 0600 1	PROJECT:	Hofmeyer
ALTERNATIVE NO :	0	SITE NAME:	Hofmeyer Town
ALTERNATIVE NO :	0	CLIENT:	S. A. Geocon

BOREHOLE DEPTH (mbdl):	70.81	CASING DEPTH (mbdl):	2.52	PUMP TYPE USED:	BP22
DEPTH OF PUMP (mbdl):	60.00	CASING HEIGHT (magl):	0.10	OPERATOR:	Isaac
PUMP INLET DIAMETER (mm):	110.000	CASING ID (mm):	210.000	CONTRACTOR:	AB Pumps
STATIC WATER LEVEL (mbdl):	10.54	DATUM LEVEL (magl):	0.29		

DISCHARGE RATE 1

DATE: 19/07/2001
TIME: 17H40

Time (min)	Drawdown (m)	Yield (l/s)
1	0.64	
2	0.94	
3	1.04	0.820
5	1.06	0.880
7	1.22	0.970
10	1.36	1.000
15	1.40	1.010
20	1.42	1.000
30	1.44	1.000
40	1.45	
50	1.46	1.010
60	1.47	1.010
70		
80		
90		
100		
110		
120		

Average yield: 0.96666667

Recovery 1

Time (min)	Recovery (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	

(l/s)

DISCHARGE RATE 2

DATE: 19/07/2001
TIME: 18H40

Time (min)	Drawdown (m)	Yield (l/s)
1	1.92	
2	1.96	1.640
3	1.99	2.180
5	2.07	
7	1.97	2.110
10	1.82	2.020
15	2.04	
20	3.20	2.010
30	3.22	2.000
40	3.24	
50	3.25	2.000
60	3.26	2.010
70		
80		
90		
100		
110		
120		

Average yield: 1.99625

Recovery 2

Time (min)	Recovery (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	

DISCHARGE RATE 3

DATE: 19/07/2001
TIME: 19H40

Time (min)	Drawdown (m)	Yield (l/s)
1	3.82	
2	4.10	2.840
3	4.50	2.950
4	5.64	
7	6.28	3.070
10	6.98	
15	7.70	3.060
20	8.51	
30	10.50	3.040
40	11.55	3.050
50	12.28	
60	12.79	3.060
70		
80		
90		
100		
110		
120		

Average yield: 3.01

Recovery 3

Time (min)	Recovery (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	

DISCHARGE RATE 4

DATE: 19/07/2001
TIME:

Time (min)	Drawdown (m)	Yield (l/s)
1		
2		
3		
5		
7		
10		
15		
20		
30		
40		
50		
60		
70		
80		
90		
100		
110		
120		

Average yield: #DIV/0!

Recovery 4

Time (min)	Recovery (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	

DISCHARGE RATE 5

DATE: 19/07/2001
TIME:

Time (min)	Drawdown (m)	Yield (l/s)
1		
2		
3		
5		
7		
10		
15		
20		
30		
40		
50		
60		
70		
80		
90		
100		
110		
120		

Recovery 5

Time (min)	Recovery (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	
240	
300	
360	
420	
480	
540	
600	
660	
720	
780	

DISCHARGE RATE 6

DATE: 19/07/2001
TIME:

Time (min)	Drawdown (m)	Yield (l/s)
1		
2		
3		
5		
7		
10		
15		
20		
30		
40		
50		
60		
70		
80		
90		
100		
110		
120		
150		
180		
210		
240		
300		
360		
420		
480		

Average yield:

Recovery

Time (min)	Recovery (m)
1	9.15
2	7.37
3	5.97
5	2.53
7	0.75
10	0.23
15	0.15
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	
240	
300	
360	
420	
480	
540	
600	
660	
720	

COMMENTS:

CONSTANT DISCHARGE TEST AND RECOVERY

BOREHOLE NO. :	HR3	PROJECT:	Hofmeyer	CLIENT:	S. A. Geocon
ALTERNATIVE NO. :	0	SITE NAME:	Hofmeyer Town		
DEPTH OF PUMP (mbdl):	60.00	PUMP TYPE USED:	BP22	OPERATOR:	Isaac
INLET DIAMETER (mm):	110	EXISTING EQUIPMENT:	Mono PD	CONTRACTOR:	AB Pumps
TEST STARTED DATE:	20/07/2001	TEST COMPLETED DATE:		TOTAL TIME - PUMPED (min):	
TEST STARTED TIME:	12H10	TEST COMPLETED TIME:		TOTAL TIME-RECOVERY(min):	
				TOTAL TEST TIME (min):	
				AVERAGE YIELD (l/s):	2.13

DISCHARGE BOREHOLE	
CASING HEIGHT (magl):	0.10
CASING DEPTH (mbdl):	2.52
CASING ID (mm):	210.00
BOREHOLE DEPTH (mbdl):	70.81
WATER LEVEL (mbdl):	10.54
DATUM LEVEL (magl):	0.29

OBSERVATION BOREHOLE 1	
No. :	DWAF Observation
DATUM LEVEL (magl):	0.29
CASING DEPTH (mbdl):	
BOREHOLE DEPTH :	
WATER LEVEL:	1.5
DISTANCE (m):	50

OBSERVATION BOREHOLE 2	
No. :	Windmill
DATUM LEVEL (magl):	0.66
CASING DEPTH (mbdl):	3
BOREHOLE DEPTH :	30.6
WATER LEVEL:	10.46
DISTANCE (m):	110

OBSERVATION BOREHOLE 3	
No. :	
DATUM LEVEL (magl):	
CASING DEPTH (mbdl):	
BOREHOLE DEPTH :	
WATER LEVEL:	
DISTANCE (m):	

Time (min)	Drawdown (m)	Yield (l/s)	Recovery (m)
1	1.78		3.80
:	2.51	2.10	2.09
3	2.81		1.22
5	3.03	2.22	0.52
	3.50		0.42
10	3.61	2.10	0.37
15	3.80	2.10	0.34
20	3.83	2.10	0.33
30	3.86		0.31
40	3.86		0.30
60	3.90	2.08	0.29
90	3.93		0.29
120	3.96	2.13	
150	3.98		
180	3.98	2.15	
210	3.99		
240	3.99		
300	4.01	2.14	
360	4.03	2.10	
420	4.05	2.11	
480	4.08	2.12	
540	4.13	2.13	
600	4.14	2.11	
720	4.16	2.14	
840	4.18	2.12	
960	4.20	2.13	
1080	4.22	2.14	
1200	4.24	2.13	
1260	4.27	2.12	
1320	4.29	2.13	
1380	4.31	2.13	
1440	4.33	2.14	
2880	4.35	2.12	
1260	4.36	2.12	
1320	4.36	2.13	
1380	4.37	2.14	
1440	4.37	2.12	

Time (min)	Drawdown (m)	Recovery (m)
1		
2		
3		
5		
7		
10		
15		
20	0.00	
30		
40		
60	0.00	
90		
120	0.00	
150		
180	0.00	
210		
240	0.00	
300	0.00	
360	0.00	
420		
480		
540	0.00	
600		
720	0.00	
840	0.00	
960		
1080		
1200	0.19	
1260	0.19	
1320	0.20	
1380	0.20	
1440	0.21	
2880		

Time (min)	Drawdown (m)	Recovery (m)
1		
2		
3		
5		
7		
10		
15		
20	0.00	
30		
40		
60	0.00	
90		
120	0.00	
150		
180	0.00	
210		
240	0.00	
300	0.00	
360	0.00	
420		
480		
540	0.00	
600		
720	0.00	
840	0.00	
960		
1080		
1200	0.14	
1260	0.14	
1320	0.15	
1380	0.15	
1440	0.15	
2880		

Time (min)	Drawdown (m)	Recovery (m)
1		
2		
3		
5		
7		
10		
15		
20		
30		
40		
60		
90		
120		
150		
180		
210		
240		
300		
360		
420		
480		
540		
600		
720		
840		
960		
1080		
1200		
1320		
1440		
1800		
2280		
2880		

DISCHARGE BOREHOLE				OBSERVATION BOREHOLE 1			OBSERVATION BOREHOLE 2			OBSERVATION BOREHOLE 3		
Time (min)	Drawdown (m)	Yield (l/s)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)
1500	4.37	2.13		1500	0.21		1500	0.16		1500		
1560	4.38	2.13		1560	0.21		1560	0.16		1560		
1620	4.38	2.12		1620	0.22		1620	0.16		1620		
1680	4.39	2.11		1680	0.22		1680	0.16		1680		
1740	4.39	2.12		1740	0.22		1740	0.16		1740		
1800	4.39	2.12		1800	0.22		1800	0.17		1800		
1860	4.40	2.13		1860	0.23		1860	0.17		1860		
1920	4.40	2.14		1920	0.23		1920	0.17		1920		
1980	4.40	2.14		1980	0.23		1980	0.17		1980		
2040	4.41	2.13		2040	0.24		2040	0.17		2040		
2100	4.41	2.13		2100	0.24		2100	0.18		2100		
2160	4.41	2.12		2160	0.24		2160	0.18		2160		
2220	4.42	2.13		2220	0.25		2220	0.18		2220		
2280	4.42	2.14		2280	0.25		2280	0.18		2280		
2340	4.42	2.14		2340	0.25		2340	0.18		2340		
2400	4.43	2.15		2400	0.25		2400	0.18		2400		
2460	4.43	2.15		2460	0.26		2460	0.19		2460		
2520	4.43	2.14		2520	0.26		2520	0.19		2520		
2580	4.44	2.14		2580	0.26		2580	0.19		2580		
2640	4.44	2.16		2640	0.27		2640	0.19		2640		
2700	4.44	2.15		2700	0.27		2700	0.19		2700		
2760	4.45	2.15		2760	0.27		2760	0.20		2760		
2820	4.45	2.15		2820	0.27		2820	0.20		2820		
2880	4.45	2.14		2880	0.28		2880	0.20		2880		

DESCRIPTION:	QUANTITY:	UNIT:
ESTABLISHMENT		Sum
NTER HOLE MOVE > 10 km		Km.
FROM: SITE NAME:		
BOREHOLE No:		
NTER HOLE MOVE < 10 km:		No.
REMOVAL AND RE-ERECTION OF PUMP HOUSE:		No.
REMOVAL OF EXISTING EQUIPMENT:		No.
RE-INSTALLATION OF EXISTING EQUIPMENT:		No.
WORK TIME RATE (REPAIRS):		Hour
STANDING TIME:		Hour
ATITUDE: LONGITUDE:		

SUMMARY

DESCRIPTION:	QUANTITY:	UNIT
STRAIGHTNESS TEST:		No.
VERTICALITY TEST:		No.
CASING DETECTION:		No.
STEEL BOREHOLE COVER:		No.
BOREHOLE MARKING:		No.
SITE CLEANING / FINISHING:		No.
REPORTING & DATA RECORDING:		No.
SLUG TEST:		No.
LAYFLAT (m):		m
BOREHOLE DEPTH AFTER TEST:		m
BOREHOLE WATERLEVEL AFTER TEST:		m

TEST DESCRIPTION	STEP	1	2	3	4	5	6	TOTAL: (min)	TOTAL: (hrs)	RECOVERY: (m)	RECOVERY: (min)
CALIBRATION TEST:											
TEST DURATION (Minutes)		15	15	15	10			55	0.92	0.22	20
TEST YIELD (l/s)		1.04	1.72	3.50	6.39			MAXIMUM (l/s)	6.4		
DRAWDOWN (m)		1.51	3.30	16.44	50.84			MAXIMUM (m)	50.8		
MULTI-RATE / STEP DRAWDOWN:											
TEST DURATION (Minutes)		60	60	60				180	3.00	0.15	15
TEST YIELD (l/s)		0.97	2.00	3.01				MAXIMUM (l/s)	3.0		
DRAWDOWN (m)		1.5	3.26	12.79				MAXIMUM (m)	12.8		

RECOVERY TEST			
TIME TOTAL (hrs):			0.58
Cal	Steps	CD	Total
20	15	0	35
DRAWDOWN TOTALS (CD):			
AVAILABLE	UTILISED		%
49.5	4.45		9.00

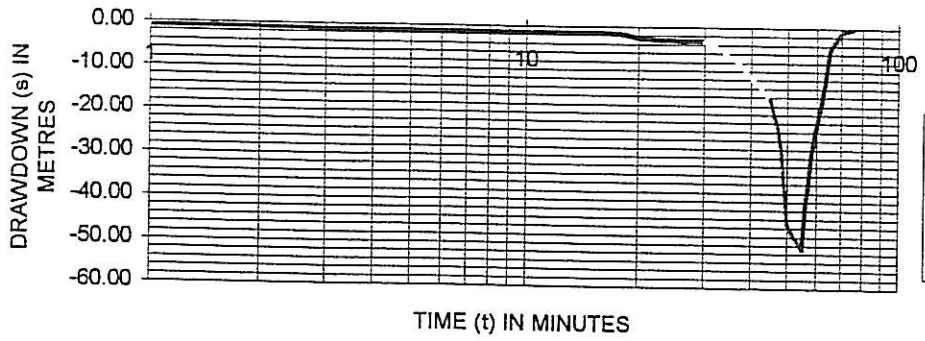
CONSTANT DISCHARGE TEST	TEST DURATION (min)	TEST DURATION (hrs)	TEST YIELD (l/s)	DRAWDOWN (m)	RECOVERY: (m)	RECOVERY: %	RECOVERY: (min)	RECOVERY: (hrs)
	0	0.00	2.13	4.45	0.29	93.48	0	0.00

OBSERVATION BOREHOLES:	No. of boreholes	720 (min)	1440 (min)	2880 (min)	>2880 (min) nr.	>2880 (min) Time	TOTAL: (min)	TOTAL: (hrs)
							0	0.00

BOREHOLE NUMBER: HR3

CALIBRATION TEST AND RECOVERY

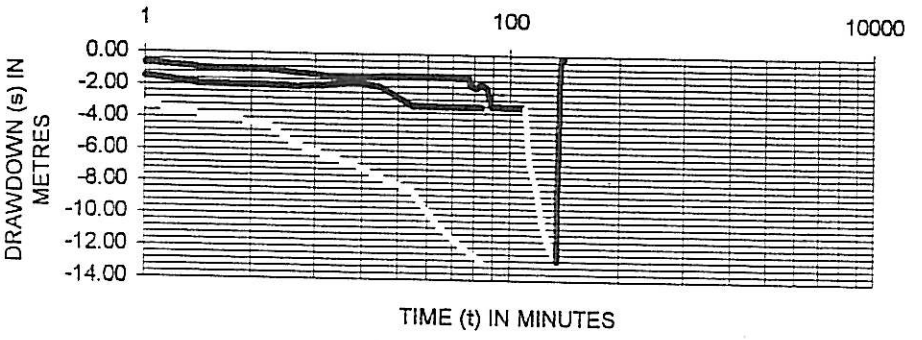
Discharge 1:	1.04	Discharge 2:	1.72	Discharge 3:	3.50	Discharge 4:	6.39	Discharge 5:		Discharge 6:	



Drawdown 1:	1.51
Drawdown 2:	3.30
Drawdown 3:	16.44
Drawdown 4:	50.84
Drawdown 5:	0.00
Drawdown 6:	0.00
Duration 1:	15
Duration 2:	15
Duration 3:	15
Duration 4:	10
Duration 5:	
Duration 6:	
Recovery (m):	0.22
Recovery (min):	20

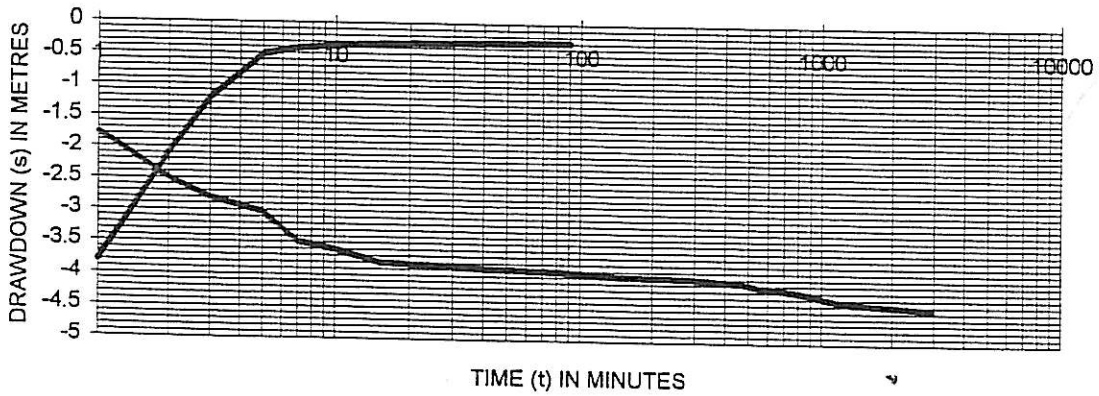
STEPPED DISCHARGE TEST AND RECOVERY

Discharge 1:	0.96667	Discharge 2:	1.99625	Discharge 3:	3.01	Discharge 4:		Discharge 5:		Discharge 6:	



Drawdown 1:	1.47
Drawdown 2:	3.26
Drawdown 3:	12.79
Drawdown 4:	0.00
Drawdown 5:	0.00
Drawdown 6:	
Duration 1:	60
Duration 2:	60
Duration 3:	60
Duration 4:	
Duration 5:	
Duration 6:	
Recovery (m):	0.15
Recovery (min):	15

CONSTANT DISCHARGE TEST AND RECOVERY



TEST INFORMATION

Date tested	20/07/2001	Water level (mbgl)	10.54	Depth of pump (mbgl)		60
CD duration	0	CD discharge rate	2.13	CD drawdown		4.45
Available drawdown (m)	49.46	% Recovery after CD	93	% after	0	min

CALIBRATION TEST AND RECOVERY

BOREHOLE NO. :	HR4	PROJECT:	Hofmeyer
ALTERNATIVE NO. :		SITE NAME:	Hofmeyer Town
ALTERNATIVE NO. :		CLIENT:	Hofmeyer Town

BOREHOLE DEPTH (mbdl):	30.60	CASING DEPTH (mbdl):	3.00	PUMP TYPE USED:	BP 22
DEPTH OF PUMP (mbdl):	27.00	CASING HEIGHT (magl):	0.44	OPERATOR:	JOSEPH / ISAAC
PUMP INLET DIAMETER (mm):	0.11	CASING ID (mm):	1.65	CONTRACTOR:	AB PUMPS
STATIC WATER LEVEL (mbdl):	10.46	DATUM LEVEL (magl):	0.66	SUPERVISOR:	W Oliver

DISCHARGE RATE 1

DATE: 24/07/2001 TIME: 11H00

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1	0.99		1	
2	1.16	0.38	2	
3	1.21	0.91	3	
5	1.24	0.92	5	
7	1.26		7	
10	1.28	0.93	10	
15	1.32		15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

TYPE OF RESERVOIR:

RESERVOIR SIZE:

RESERVOIR CONITION:

STAND HEIGHT (m):

DISCHARGE RATE 2

DATE: 24/07/2001 TIME: 11H30

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1	2.60	1.94	1	
2	3.01	1.91	2	
3	3.15		3	
5	3.43	1.88	5	
7	3.70		7	
10	3.93	1.88	10	
15	4.20		15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

TYPE OF ENCLOSURE:

MATERIAL OF ENCLOSURE:

CONDITION OF ENCLOSURE:

WATER METER MANUFACTURER:

WATER METER READING:

DISCHARGE RATE 3

DATE: 24/07/2001 TIME: 11H45

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1	4.55		1	
2		3.49	2	
3		3.49	3	
5			5	
7	12.18	3.49	7	
10	12.28		10	
15	15.20		15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

PRESSURE GAUGE MANUFACTURER:

GAUGE READING (KpA):

MONITORING FACILITY:

MAINTAINED:

DISCHARGE RATE 4

DATE: 24/07/2001 TIME:

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1	
2			2	
3			3	
5			5	
7			7	
10			10	
15			15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

PUMP TYPE:
NO

PUMP MANUFACTURER:

PUMP SERIAL No:

PUMP PULLEY DIAMETER (mm):

PUMP INTAKE DEPTH (m):

PUMP RPM:

PUMP CONDITION:

DISCHARGE RATE 5

DATE: 24/07/2001 TIME:

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1	
2			2	
3			3	
5			5	
7			7	
10			10	
15			15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	

EXISTING EQUIPMENT DETAIL:

TYPE OF POWER:
BROKEN

ENGINE MANUACTURER:

ENGINE MODEL:

ENGINE SERIAL No:

ENGINE PULLEY DIAMETER (mm):

POWER RATING (kW):

ENGINE CONDITION:

DISCHARGE RATE 6

DATE: TIME:

Time (min)	Drawdown (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1	7.54
2			2	4.15
3			3	0.92
5			5	0.26
7			7	0.18
10			10	
15			15	
			20	
			30	
			40	
			50	
			60	
			70	
			80	
			90	
			100	
			110	
			120	
			150	
			180	
			210	
			240	
			300	
			420	
			480	
			540	
			600	
			660	

EXISTING EQUIPMENT DETAIL:

TYPE OF RISER:
NO

CLASS OF RISER:

DIAMETER OF RISER (mm):

CONDITION OF RISER:

SHAFT DIAMETER (mm):

ELEMENT DIAMETER (mm):

ELEMENT STROKE (mm):

COMMENTS:

WATER LEVEL BEFOR PIPES 10.20 M

DID THE BOREHOLE PRODUCE ANY SILT / SAND / GRAVEL ?

STEPPED DISCHARGE TEST AND RECOVERY

BOREHOLE NO. :	HR4 3125 0002	PROJECT:	Hofmeyer
ALTERNATIVE NO. :	0	SITE NAME:	Hofmeyer Town
ALTERNATIVE NO. :	0	CLIENT:	Hofmeyer Town

BOREHOLE DEPTH (mbdl):	30.60	CASING DEPTH (mbdl):	3.00	PUMP TYPE USED:	BP 22
DEPTH OF PUMP (mbdl):	27.00	CASING HEIGHT (magl):	0.44	OPERATOR:	JOSEPH / ISAAC
PUMP INLET DIAMETER (mm):	0.110	CASING ID (mm):	1.650	CONTRACTOR:	AB PUMPS
STATIC WATER LEVEL (mbdl):	10.46	DATUM LEVEL (magl):	0.66		

DISCHARGE RATE 1

DATE: 24/07/2001
TIME: 12H30

Time (min)	Drawdown (m)	Yield (l/s)
1	0.67	
2	0.83	
3	0.90	0.720
5	0.90	0.750
7	0.89	0.740
10	0.86	0.680
15	0.71	0.640
20	0.63	0.550
30	0.63	0.540
40	0.64	0.530
50	0.65	0.540
60	0.66	
70		
80		
90		
100		
110		
120		

Average yield: 0.63222222

Recovery 1

Time (min)	Recovery 1 (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	
(l/s)	

DISCHARGE RATE 2

DATE: 24/07/2001
TIME: 01H30

Time (min)	Drawdown (m)	Yield (l/s)
1	1.02	
2	1.21	0.810
3	1.30	0.960
5	1.36	1.030
7	1.39	1.050
10	1.41	
15	1.42	1.050
20	1.43	
30	1.44	
40	1.45	1.060
50	1.46	
60	1.41	
70		
80		
90		
100		
110		
120		

Average yield: 0.99333333

Recovery 2

Time (min)	Recovery 2 (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	

DISCHARGE RATE 3

DATE: 24/07/2001
TIME:

Time (min)	Drawdown (m)	Yield (l/s)
1	2.96	2.160
2	3.45	2.080
3	3.86	2.050
4	4.24	2.010
7	4.40	
10	4.52	2.020
15	4.85	
20	4.91	2.030
30	5.05	
40	5.24	2.040
50	5.27	
60	5.32	2.050
70		
80		
90		
100		
110		
120		

Average yield: 2.055

Recovery 3

Time (min)	Recovery 3 (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	

DISCHARGE RATE 4

DATE: 24/07/2001
TIME:

Time (min)	Drawdown (m)	Yield (l/s)
1		
2		
3		
5		
7		
10		
15		
20		
30		
40		
50		
60		
70		
80		
90		
100		
110		
120		

Average yield: #DIV/0!

Recovery 4

Time (min)	Recovery 4 (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	

DISCHARGE RATE 5

DATE: 24/07/2001
TIME:

Time (min)	Drawdown (m)	Yield (l/s)
1		
2		
3		
5		
7		
10		
15		
20		
30		
40		
50		
60		
70		
80		
90		
100		
110		
120		

Recovery 5

Time (min)	Recovery 5 (m)
1	
2	
3	
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	
240	
300	
360	
420	
480	
540	
600	
660	
720	
780	

DISCHARGE RATE 6

DATE: 24/07/2001
TIME:

Time (min)	Drawdown (m)	Yield (l/s)
1		
2		
3		
5		
7		
10		
15		
20		
30		
40		
50		
60		
70		
80		
90		
100		
110		
120		
150		
180		
210		
240		
300		
360		
420		
480		

Average yield:

Recovery

Time (min)	Recovery (m)
1	4 60
2	1.40
3	0 22
5	
7	
10	
15	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
150	
180	
210	
240	
300	
360	
420	
480	
540	
600	
660	
720	

COMMENTS:

CONSTANT DISCHARGE TEST AND RECOVERY

BOREHOLE NO. :	HR4	PROJECT:	Hofmeyer	CLIENT:	Hofmeyer Town
ALTERNATIVE NO. :	0	SITE NAME:	Hofmeyer Town		
DEPTH OF PUMP (mbdl):	27.00	PUMP TYPE USED:	BP 22	OPERATOR:	JOSEPH / ISAAC
INLET DIAMETER (mm):	0.11	EXISTING EQUIPMENT:	NO	CONTRACTOR:	AB PUMPS

TEST STARTED	DATE:	24/07/2001	TEST COMPLETED	DATE:	25/07/2001	TOTAL TIME - PUMPED (min):	1440	TOTAL TEST TIME (min):	1440
	TIME:	05H10		TIME:	05H17	TOTAL TIME-RECOVERY(min):	7	AVERAGE YIELD (l/s):	1.78

DISCHARGE BOREHOLE				OBSERVATION BOREHOLE 1			OBSERVATION BOREHOLE 2			OBSERVATION BOREHOLE 3		
CASING HEIGHT (magl):			0.44	No. :			No. :			No. :		
CASING DEPTH (mbdl):			3.00	DATUM LEVEL (magl):			DATUM LEVEL (magl):			DATUM LEVEL (magl):		
CASING ID (mm):			1.65	CASING DEPTH (mbdl):			CASING DEPTH (mbdl):			CASING DEPTH (mbdl):		
BOREHOLE DEPTH (mbdl):			30.60	BOREHOLE DEPTH :			BOREHOLE DEPTH :			BOREHOLE DEPTH :		
WATER LEVEL (mbdl):			10.46	WATER LEVEL:			WATER LEVEL:			WATER LEVEL:		
DATUM LEVEL (magl):			0.66	DISTANCE (m):			DISTANCE (m):			DISTANCE (m):		
Time (min)	Drawdown (m)	Yield (l/s)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)
1	0.94	1.49	0.95	1			1			1		
2	1.89	1.75	0.34	2			2			2		
3	2.09	1.51	0.26	3			3			3		
5	2.29		0.22	5			5			5		
7	2.69	1.82	0.18	7			7			7		
10	2.83	1.83		10			10			10		
15	2.87			15			15			15		
20	2.90			20			20			20		
30	2.92	1.81		30			30			30		
40	2.94			40			40			40		
60	2.96	1.81		60			60			60		
90	2.97	1.79		90			90			90		
120	2.98	1.80		120			120			120		
150	2.99	1.80		150			150			150		
180	3.02	1.83		180			180			180		
210	3.04			210			210			210		
240	3.06			240			240			240		
300	3.08	1.82		300			300			300		
360	3.10	1.80		360			360			360		
420	3.12			420			420			420		
480	3.14	1.83		480			480			480		
540	3.17			540			540			540		
600	3.19	1.82		600			600			600		
660	3.22	1.81		720			720			720		
720	3.25	1.80		840			840			840		
780	3.28	1.83		960			960			960		
840	3.31	1.81		1080			1080			1080		
900	3.36	1.80		1200			1200			1200		
960	3.38	1.83		1320			1320			1320		
1020	3.40	1.84		1440			1440			1440		
1080	3.43	1.82		1800			1800			1800		
1140	3.46			2280			2280			2280		
1200	3.49			2880			2880			2880		
1260	3.52											
1320	3.55											
1380	3.57											
1440	3.61											

DISCHARGE BOREHOLE				OBSERVATION BOREHOLE 1			OBSERVATION BOREHOLE 2			OBSERVATION BOREHOLE 3		
Time (min)	Drawdown (m)	Yield (l/s)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)	Time (min)	Drawdown (m)	Recovery (m)
1500				1500			1500			1500		
1560				1560			1560			1560		
1620				1620			1620			1620		
1680				1680			1680			1680		
1740				1740			1740			1740		
1800				1800			1800			1800		
1860				1860			1860			1860		
1920				1920			1920			1920		
1980				1980			1980			1980		
2040				2040			2040			2040		
2100				2100			2100			2100		
2160				2160			2160			2160		
2220				2220			2220			2220		
2280				2280			2280			2280		
2340				2340			2340			2340		
2400				2400			2400			2400		
2460				2460			2460			2460		
2520				2520			2520			2520		
2580				2580			2580			2580		
2640				2640			2640			2640		
2700				2700			2700			2700		
2760				2760			2760			2760		
2820				2820			2820			2820		
2880				2880			2880			2880		

DESCRIPTION:	QUANTITY:	UNIT:
ESTABLISHMENT		Sum
NTER HOLE MOVE > 10 km		Km.
FROM: SITE NAME:		
BOREHOLE No:		
NTER HOLE MOVE < 10 km:		No.
REMOVAL AND RE-ERECTION OF PUMP HOUSE:		No.
REMOVAL OF EXISTING EQUIPMENT:		No.
RE-INSTALLATION OF EXISTING EQUIPMENT:		No.
WORK TIME RATE (REPAIRS):		Hour
STANDING TIME:		Hour
LATITUDE: LONGITUDE:		

SUMMARY

DESCRIPTION:	QUANTITY:	UNIT
STRAIGHTNESS TEST:		No.
VERTICALITY TEST:		No.
CASING DETECTION:		No.
STEEL BOREHOLE COVER:		No.
BOREHOLE MARKING:		No.
SITE CLEANING / FINISHING:		No.
REPORTING & DATA RECORDING:		No.
SLUG TEST:		No.
LAYFLAT (m):		m
BOREHOLE DEPTH AFTER TEST:		m
BOREHOLE WATERLEVEL AFTER TEST:		m

TEST DESCRIPTION	STEP	1	2	3	4	5	6	TOTAL: (min)	TOTAL: (hrs)	RECOVERY: (m)	RECOVERY: (min)
CALIBRATION TEST:											
TEST DURATION (Minutes)		15	15	15				45	0.75	0.18	7
TEST YIELD (l/s)		0.79	1.90	3.49				MAXIMUM (l/s)	3.5		
DRAWDOWN (m)		1.32	4.20	15.20				MAXIMUM (m)	15.2		
MULTI-RATE / STEP DRAWDOWN:											
TEST DURATION (Minutes)		60	60	60				180	3.00	0.22	3
TEST YIELD (l/s)		0.63	0.99	2.06				MAXIMUM (l/s)	2.1		
DRAWDOWN (m)		0.9	1.46	5.32				MAXIMUM (m)	5.3		

RECOVERY TEST			
TIME TOTAL (hrs):			0.28
Cal	Steps	CD	Total
7	3	7	17
DRAWDOWN TOTALS (CD):			
AVAILABLE	UTIL-ISED	%	
16.5	3.61	21.93	

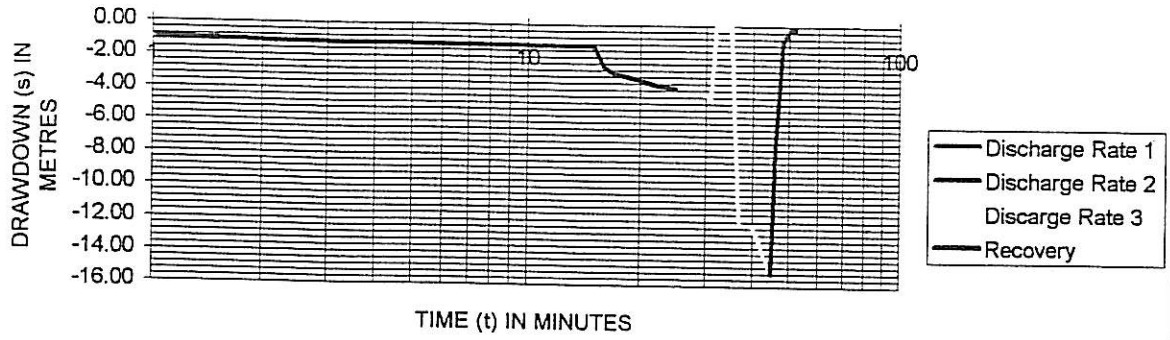
CONSTANT DISCHARGE TEST	TEST DURATION (min)	TEST DURATION (hrs)	TEST YIELD (l/s)	DRAWDOWN (m)	RECOVERY: (m)	RECOVERY: %	RECOVERY: (min)	RECOVERY: (hrs)
	1440	24.00	1.78	3.61	0.18	95.01	-	0.12

OBSERVATION BOREHOLES:	No. of boreholes	720 (min)	1440 (min)	2880 (min)	>2880 (min) nr.	>2880 (min) Time	TOTAL: (min)	TOTAL: (hrs)
							0	0.00

BOREHOLE NUMBER: HR4

CALIBRATION TEST AND RECOVERY

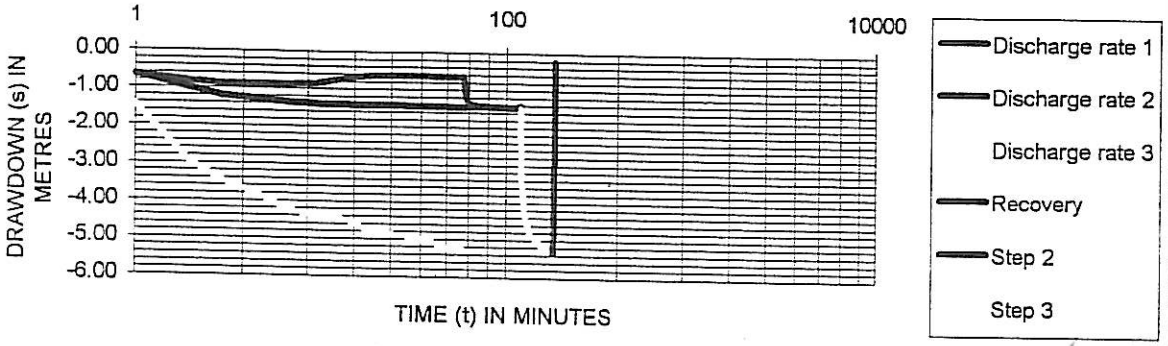
Discharge 1:	0.79	Discharge 2:	1.90	Discharge 3:	3.49	Discharge 4:		Discharge 5:		Discharge 6:	



Drawdown 1:	1.32
Drawdown 2:	4.20
Drawdown 3:	15.20
Drawdown 4:	0.00
Drawdown 5:	0.00
Drawdown 6:	0.00
Duration 1:	15
Duration 2:	15
Duration 3:	15
Duration 4:	
Duration 5:	
Duration 6:	
Recovery (m):	0.18
Recovery (min):	7

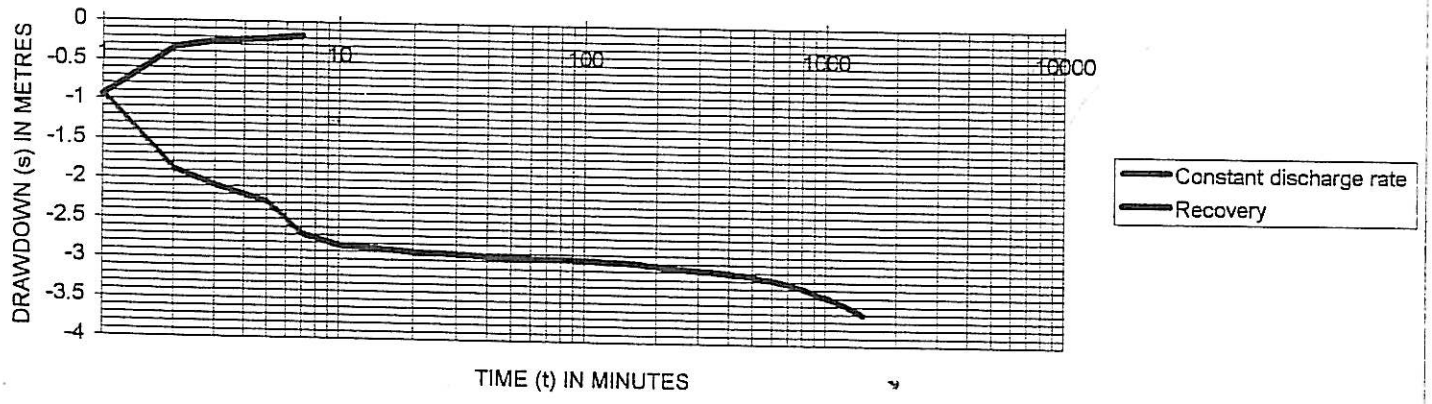
STEPPED DISCHARGE TEST AND RECOVERY

Discharge 1:	0.63222	Discharge 2:	0.99333	Discharge 3:	2.055	Discharge 4:		Discharge 5:		Discharge 6:	



Drawdown 1:	0.90
Drawdown 2:	1.46
Drawdown 3:	5.32
Drawdown 4:	0.00
Drawdown 5:	0.00
Drawdown 6:	
Duration 1:	60
Duration 2:	60
Duration 3:	60
Duration 4:	
Duration 5:	
Duration 6:	
Recovery (m):	0.22
Recovery (min):	3

CONSTANT DISCHARGE TEST AND RECOVERY



TEST INFORMATION

Date tested	24/07/2001	Water level (mbgl)	10.46	Depth of pump (mbgl)			27
CD duration	1440	CD discharge rate	1.78	CD drawdown			3.61
Available drawdown (m)	16.54	% Recovery after CD	95	%	after	7	min

APPENDIX C

CHEMICAL WATER ANALYSES

Hofmeyr

Borehole Id	HR1
Date Sampled	01-Aug-01
Drinking water class	2
Sample Number	GC059

					Class
Micro-biological properties	Viable organisms				
	Faecal coliforms			0.00	0
	Total coliforms			15.00	2
Physical Properties	Electrical Conductivity	*EC*	mS / m	110.60	1
	Total Desolved Salts	*TDS*	mg / l		
	pH Value	*pH*		7.06	0
	Turbidity		NTU	3.00	2
Chemical properties	Arsenic	*As*	mg / l		
	Cadmium	*Cd*	mg / l		
	Calcium	*Ca*	mg / l	65.00	0
	Chloride	*Cl*	mg / l	94.00	0
	Copper	*Cu*	mg / l		
	Floride	*F*	mg / l	0.25	0
	Iron	*Fe*	mg / l	0.14	0
	Total Hardness	$CaCO_3$	mg / l	351.70	2
	Magnesium	*Mg*	mg / l	46.00	0
	Manganese	*Mn*	mg / l		
	Nitrate	*N*	mg / l	1.30	0
	Nitrate	NO_3	mg / l		
	Potassium	*K*	mg / l	4.10	0
	Sodium	*Na*	mg / l	70.00	0
	Sulphate	SO_4	mg / l	78.00	0
	Zinc	*Zn*	mg / l		
Chemical properties (not required for the clasification of domestic drinking water supply)	Ammonia	NH_4	mg / l	0.09	
	P - Alkalinity	$CaCO_3$	mg / l	269.00	
	M - Alkalinity	*CaCO3*	mg / l	189.40	
	Calcium Hardness	*CaCO3*	mg / l	162.30	
	Magnesium Hardness	*CaCO3*	mg / l		
	Carbonate	*CaCO3*	mg / l		
	Bicarbonate	HCO_3	mg / l		
	Silica	*Si*	mg / l		
	Phosphor	PO_4 *as P*	mg / l		

Hofmeyr

Borehole Id	HR2
Date Sampled	01-Aug-01
Drinking water class	2
Sample Number	GC060

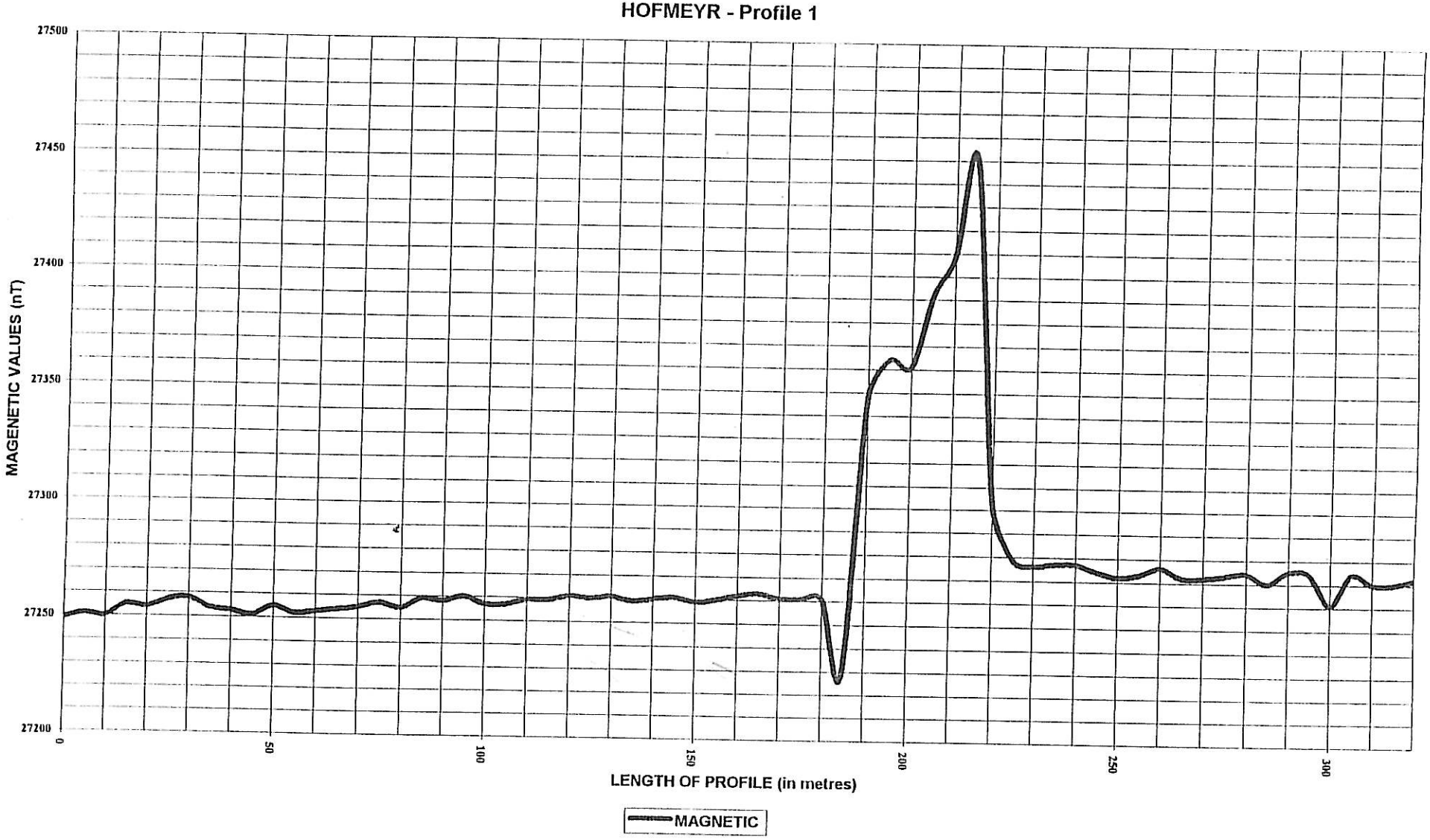
					Class
Micro-biological properties	Viable organisms				
	Faecal coliforms			0.00	0
	Total coliforms			0.00	0
Physical Properties	Electrical Conductivity	EC	mS / m	132.70	1
	Total Desolved Salts	TDS	mg / l		
	pH Value	pH		7.33	0
	Turbidity		NTU	6.10	2
Chemical properties	Arsenic	As	mg / l		
	Cadmium	Cd	mg / l		
	Calcium	Ca	mg / l	73.00	0
	Chloride	Cl	mg / l	134.00	1
	Copper	Cu	mg / l		
	Floride	F	mg / l	0.10	0
	Iron	Fe	mg / l	0.41	0
	Total Hardness	$CaCO_3$	mg / l	417.00	2
	Magnesium	Mg	mg / l	57.00	0
	Manganese	Mn	mg / l		
	Nitrate	N	mg / l	2.00	0
	Nitrate	NO_3	mg / l		
	Potassium	K	mg / l	4.30	0
	Sodium	Na	mg / l	98.00	0
	Sulphate	SO_4	mg / l	98.00	0
	Zinc	Zn	mg / l		
Chemical properties (not required for the clasification of domestic drinking water supply)	Ammonia	NH_4	mg / l	0.09	
	P - Alkalinity	$CaCO_3$	mg / l	280.00	
	M - Alkalinity	CaCO3	mg / l	234.70	
	Calcium Hardness	CaCO3	mg / l	182.30	
	Magnesium Hardness	CaCO3	mg / l		
	Carbonate	CaCO3	mg / l		
	Bicarbonate	HCO_3	mg / l		
	Silica	Si	mg / l		
	Phosphor	PO_4 as P	mg / l		

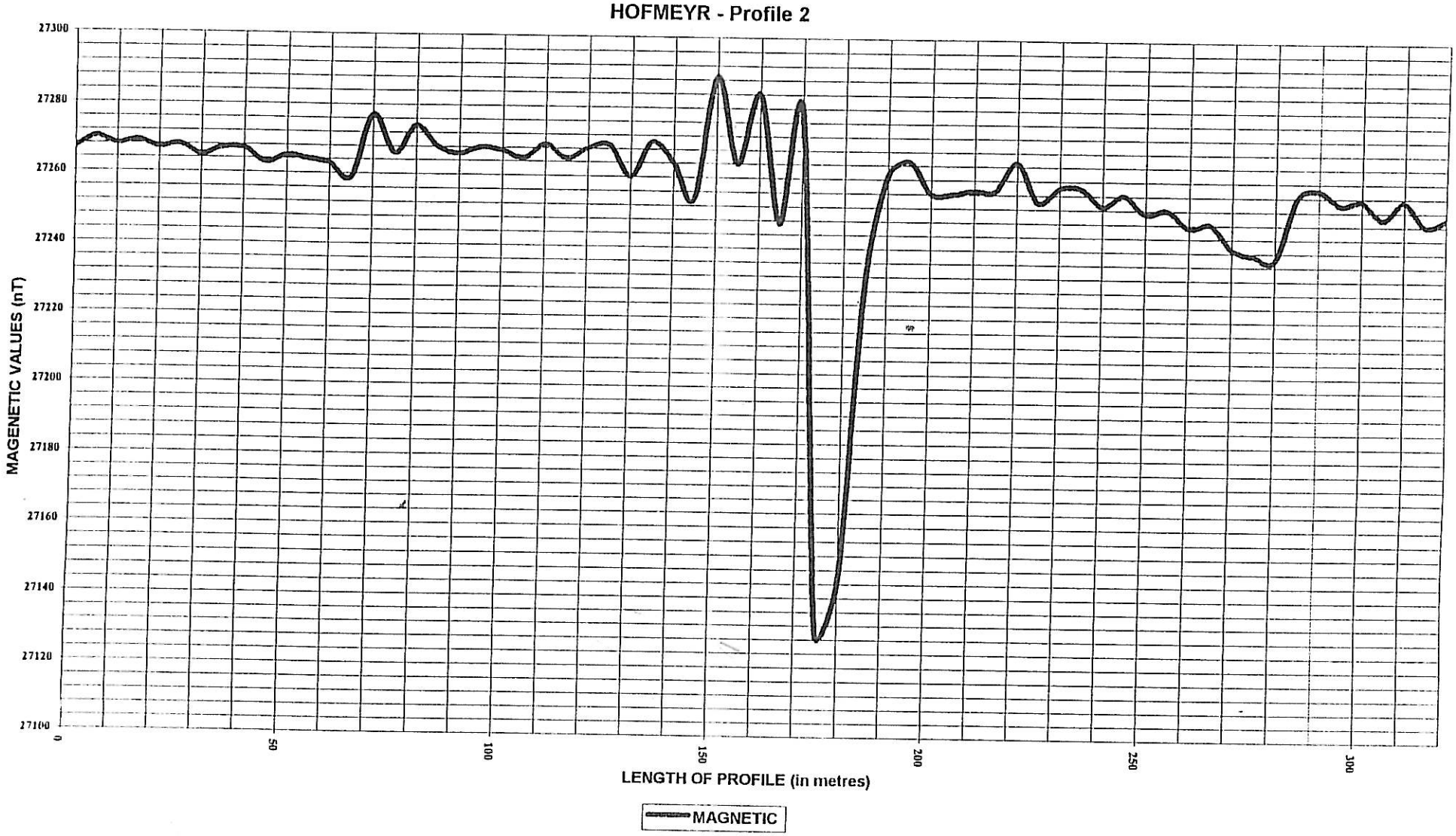
Borehole Id	HR4
Date Sampled	25-Jul-01
Drinking water class	2
Sample Number	GC062

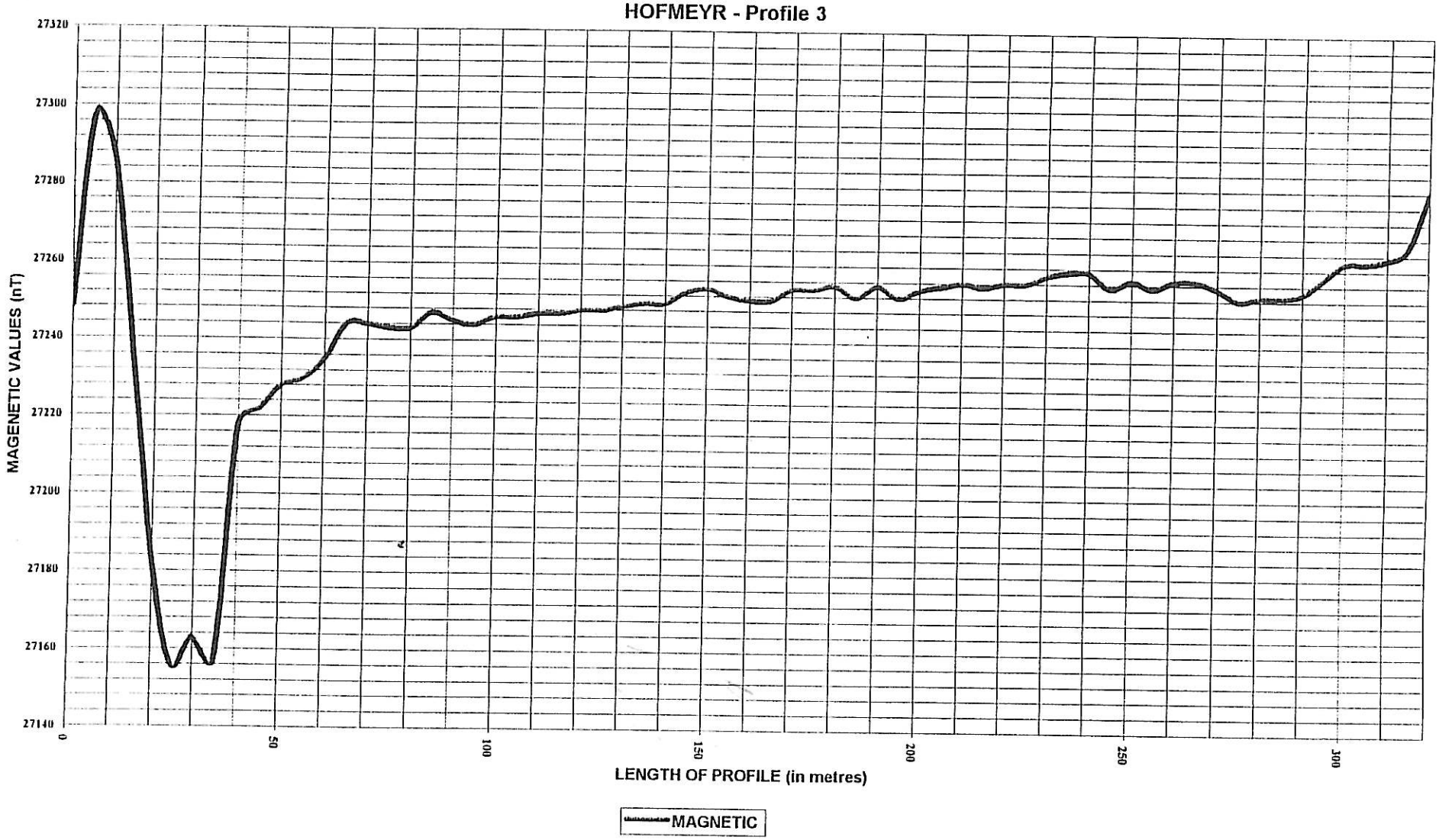
					Class
Micro-biological properties	Viable organisms				
	Faecal coliforms			0.00	0
	Total coliforms			5.00	1
Physical Properties	Electrical Conductivity	*EC*	mS / m	121.30	1
	Total Desolved Salts	*TDS*	mg / l		
	pH Value	*pH*		6.90	0
	Turbidity		NTU	0.90	1
Chemical properties	Arsenic	*As*	mg / l		
	Cadmium	*Cd*	mg / l		
	Calcium	*Ca*	mg / l	75.00	0
	Chloride	*Cl*	mg / l	128.00	1
	Copper	*Cu*	mg / l		
	Floride	*F*	mg / l	0.10	0
	Iron	*Fe*	mg / l	0.01	0
	Total Hardness	$CaCO_3$	mg / l	401.40	2
	Magnesium	*Mg*	mg / l	52.00	0
	Manganese	*Mn*	mg / l		
	Nitrate	*N*	mg / l	2.10	0
	Nitrate	NO_3	mg / l		
	Potassium	*K*	mg / l	3.70	0
	Sodium	*Na*	mg / l	85.00	0
	Sulphate	SO_4	mg / l	99.00	0
	Zinc	*Zn*	mg / l		
Chemical properties (not required for the clasification of domestic drinking water supply)	Ammonia	NH_4	mg / l	0.09	
	P - Alkalinity	$CaCO_3$	mg / l	275.00	
	M - Alkalinity	*CaCO3*	mg / l	214.10	
	Calcium Hardness	*CaCO3*	mg / l	187.30	
	Magnesium Hardness	*CaCO3*	mg / l		
	Carbonate	*CaCO3*	mg / l		
	Bicarbonate	HCO_3	mg / l		
	Silica	*Si*	mg / l		
	Phosphor	PO_4 as *P*	mg / l		

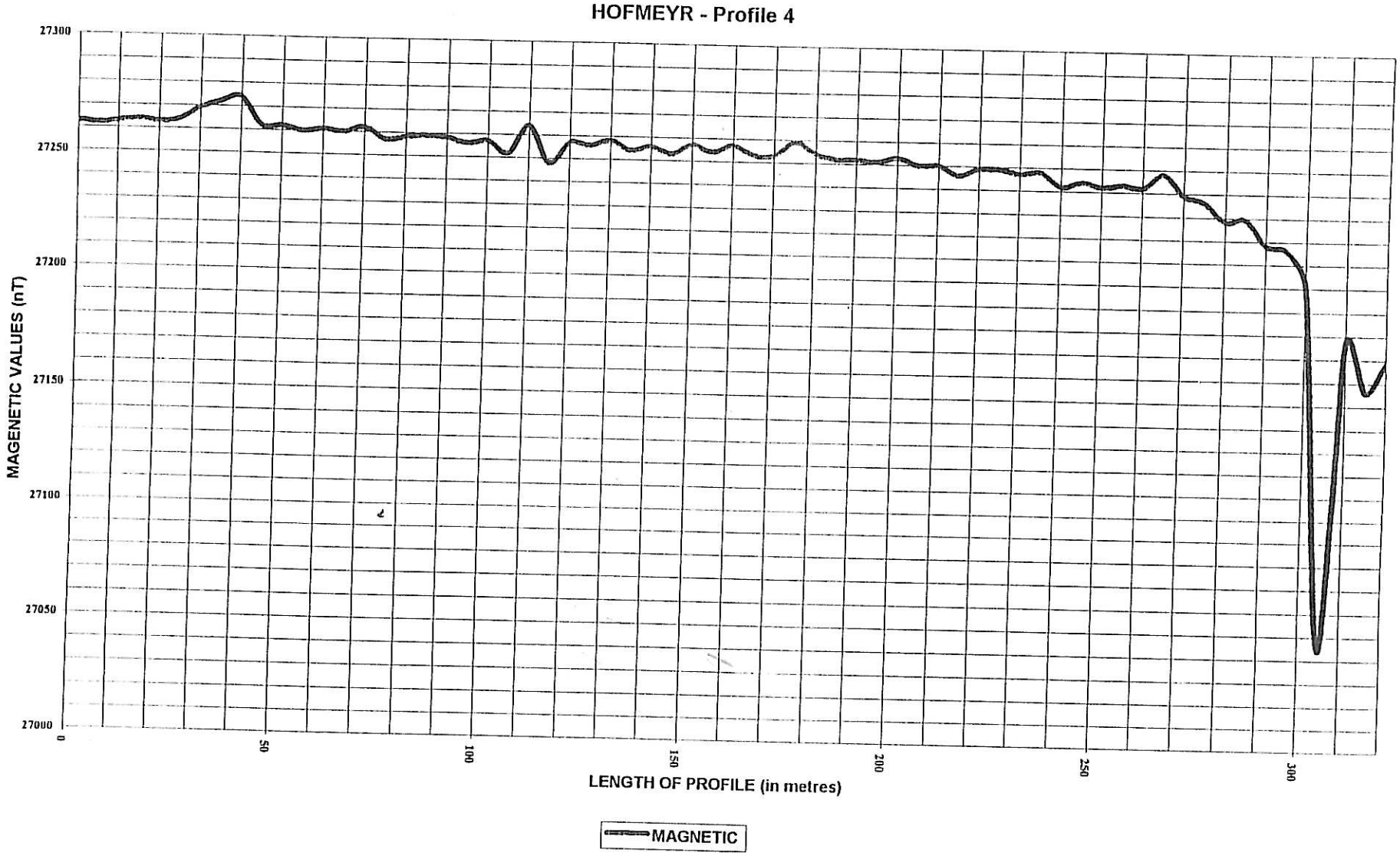
APPENDIX D

GEOPHYSICAL DATA


HOFMEYR - Profile 1
MAGENETIC VALUES (nT)
27500
27450
27400
27350
27300
27250
27200
0
50
100
150
200
250
300
LENGTH OF PROFILE (in metres)
MAGNETIC


HOFMEYR - Profile 2
MAGENETIC VALUES (nT)
27300
27280
27260
27240
27220
27200
27180
27160
27140
27120
27100
0
50
100
150
200
250
300
LENGTH OF PROFILE (in metres)
MAGNETIC


HOFMEYR - Profile 3
MAGENETIC VALUES (nT)
27320
27300
27280
27260
27240
27220
27200
27180
27160
27140
0
50
100
150
200
250
300
LENGTH OF PROFILE (in metres)
MAGNETIC


HOFMEYR - Profile 4
MAGENETIC VALUES (nT)
27300
27250
27200
27150
27100
27050
27000
0
50
100
150
200
250
300
LENGTH OF PROFILE (in metres)
MAGNETIC