STUDY ON THE GROUNDWATER POTENTIAL EVALUATION AND MANAGEMENT PLAN FOR THE SOUTHEAST KALAHARI (STAMPRIET) ARTESIAN BASIN IN THE REPUBLIC OF NAMIBIA

Japan International Cooperation Agency

Pacific Consultants International

BOREHOLE FINAL REPORT

Borehole

J6-A (WW 39850)

Cobra R 349

METZGER PM DRILLING
P.O.Box 11733
Windhoek
Namibia

Windhoek

October 2000

Contents per Chapter

1. Geological Borehole Log

GEOLOGICAL BOREHOLE LOG

Farm Cobra **WW 39850**
Jica Reference: J 6 A **S 24. 80059°**
Date completed: 10 July 2000 **E 19. 33520°**
(final casing installed) **Collar elev.: 1104 mamsl**

Depth below surface (m)	Section (m)	Lithology	Stratigraphy
0 - 4	4	Very coarse grained subsurface **sand**. Unsorted.	
4 - 26	22	Calcareous **sandstone** with pebbles and granules, light pinkish to white.	
26 - 104	78	Calcareous **sandstone**, moderate brown, drill-cuttings severely ground. Between 48 and 52 m a gravelly horizon was intersected.	
104 - 111	7	Light brown medium to coarse grained **sandstone**, calcite cemented.	
111 - 121	10	Calcareous **sandstone**, moderate brown, drill-cuttings severely ground.	**KALAHARI**
121 - 141	20	Calcareous **sandstone**, medium grained quartz grains. Dispersed quartz granules ∅ 2 mm, sub angular, sandstone purple to dark grey.	
141 - 153	12	As above, with colour change to moderate orange brown.	
153 - 158	5	As above, with intercalated bands of moderate red brown **sandstone**, medium to coarse grained, with quartz granules ϕ 2 – 3 mm displaying FeO-staining between 156 and 158 m.	
158 - 168	10	Prominent **sandstone** to 164 m, fining to a shale at 168 m, colour dark yellowish brown.	
168 - 177	9	Moderate brown clayey shale. At 177 m moderate brown very fine **sandstone/siltstone**.	**RIETMOND**
177 - 186	9	Very pale orange medium to coarse grained **sandstone**, moderately sorted and sub-rounded quartz grains. Sandstone friable, porous and slightly calcareous. A few chips of moderate brown siltstone in sample. Intercalated thin dark yellowish orange shale.	
186 - 199	13	Greyish pink to moderate pink medium to coarse-grained micaceous feldspathic **sandstone**. Muscovite and biotite recorded. The sandstone is friable and porous. From 197 m sandstone becomes well foliated with an increase of biotite.	**AUOB A 5**
199 - 209	10	Medium to coarse-grained feldspathic **sandstone**, friable and porous and slightly micaceous (mainly muscovite.) Dark yellowish orange. Clayey possibly due to intercalated shales.	
209 - 222	13	Greyish red to very dusky red **shale**. Intercalated medium to coarse-grained feldspathic sandstone.	**AUOB A 4**

		Muscovite and biotite present. Colour of sandstone brownish grey to grayish red. Shale increases with depth, sandstone decreases with depth. From 219 to 222 m the colour of the shale changes to blackish red.	
222 - 232	10	Light grey to medium dark grey fine to medium grained slightly calcareous micaceous **sandstone** with intercalated well-laminated dark grey shale and siltstone. Flakes of strong brown clay present. With depth sandstone changes to medium to coarse grained.	**AUOB A 3**
232 - 236	4	Predominantly well-laminated **shale** with subordinate intercalated micaceous sandstone layers. Flakes of strong brown clay present.	**AUOB A 2**
236 - 264	28	Medium gray medium to coarse grained calcareous **sandstone**. Very porous with pure white calcite nodules ∅ 2 – 3 mm. **Aquifer.**	**AUOB A 1**
264 – 273 EOH	9	As above with intercalated **shale/siltstone** layers. Formation more micaceous (biotite). Colour darker grey. Sandstone slightly calcareous.	**MUKOROB**

General remarks:

1. Drilling method mud rotary results in severe grinding of samples during up-hole transport. Samples thus often collected as a "clayey" mass and careful washing is necessary to interpret geology.
2. Only the A1 horizon was screened as the upper Auob Sandstones are believed to host saline groundwater, while the A1-horizon was indicated to be a fresh water aquifer.

This borehole was logged by A. Wierenga.

2. Penetration Record

Penetration Record J 6 A	
Depth (m)	Pen. Rate (min/m)
1	
5	
10	6.8
	2.9
	2.4
	3.15
	5.8
	6.2
	5.05
	6.25
	6.75
	6.36
20	7.7
	6.65
	6.6
	6.8
	7.25
	5.4
	4.95
	5.45
	5.05
	5.6
30	5.75
	5.7
	5.1
	7.8
	6.8
	8.85
	6.8
	6.85
	5.55
	2.95
40	6.45
	7.45
	8.45
	9.35
	6
	8.2
	6.8
	7.95
	5.65
	6.6
50	6
	9.4
	11.6
	33.65
	13.8

	21.45
	15.95
	16
	13.7
	8.55
60	9.1
	10.55
	10.1
	10.9
	8.3
	17.1
	11.32
	11.15
	11.55
	10.15
70	11.25
	12.1
	12.55
	11.5
	9.3
	10.7
	11.5
	10.75
	9.75
	8.25
80	8.9
	11.3
	10.75
	12.3
	10.95
	9.95
	10.7
	11.55
	13.75
	13.95
90	14.7
	13.15
	13.3
	10.1
	10.55
	9.6
	9.5
	9.75
	11.85
	11.65
100	10.25
	11.5
	11.25
	9.8
	12.3
	12.65
	10.1
	7.4
	5.75
	4.6
110	5.7

	7.45
	7.65
	7.2
	10.6
	7.35
	6.5
	8.25
	6.75
	6.55
120	6.75
	5.8
	3.2
	4.35
	4.6
	2.3
	2.2
	2
	1.85
	1.9
130	1.2
	2.5
	2.25
	2.75
	8.85
	8.85
	8.35
	7.4
	3.15
	13.5
140	2.5
	2.85
	3.3
	3
	2.35
	3.2
	4.65
	2.6
	2.95
	2.65
150	2
	2
	4.1
	5.15
	3.7
	3.15
	3.35
	6
	3.45
	12.3
160	11.85
	10.4
	26.3
	8.8
	4
	3.3
	2.4

	5.65
	13.45
	6.7
170	4.85
	6.3
	4.9
	4.72
	10.1
	5.2
	7.5
	9.15
	6.4
180	5.6
	5.1
	4.6
	4.7
	4.25
	4.85
	6.75
	7.3
	8
	8
190	7.45
	9
	7.2
	6.85
	7.45
	7.4
	7.95
	7.35
	39.7
	11.55
200	7.75
	7.9
	6.15
	7.95
	8.5
	7
	8.3
	8.25
	10.15
	6.4
210	6.3
	6.15
	10.7
	10.2
	9.1
	11.1
	9.05
	10.3
	8.05
	7.85
220	7.9
	7.7
	7.8

	8
	11.05
	9.1
	9.5
	9.3
	11.4
	12.15
230	13.1
	12.3
	10.8
	7.85
	5.5
	6.35
	10.55
	9.55
	5.75
240	5.35
	5.8
	5.1
	5.85
	6.4
	7.3
	6.65
	7.35
	7.25
	8.3
250	8.8
	10.2
	10.4
	8.4
	10.75
	10.45
	11
	11.05
	22.35
	28.25
260	26.4
	9.1
	9.7
	11.75
	10.5
	11.25
	11.9
	11.4
	10.4
	10.05
270	10.1
	10.3
	10.4
273	10.2

j6apen

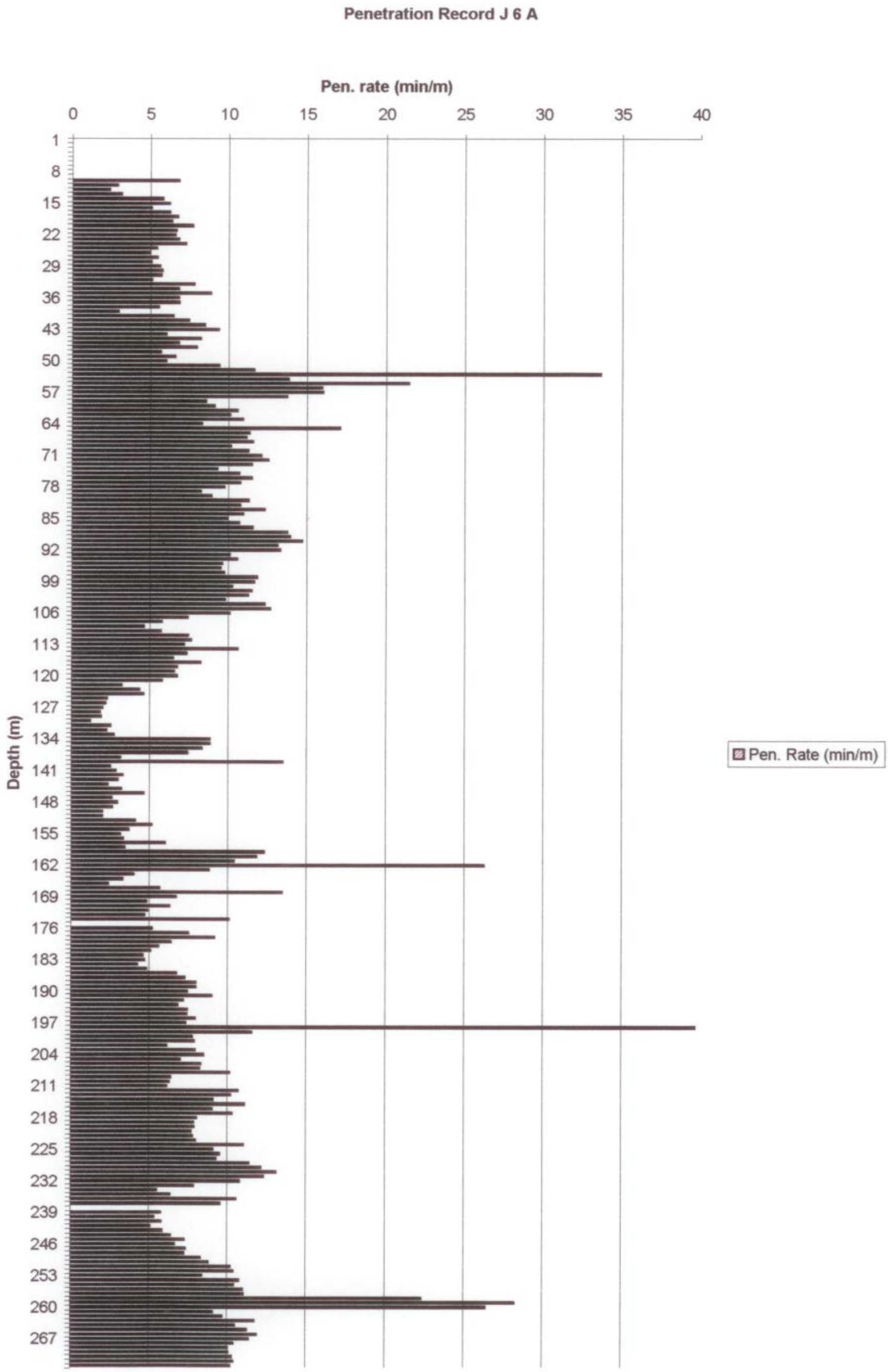


Chart1

3. Mud Rotary Drilling Log

THE STUDY ON THE GROUNDWATER POTENTIAL EVALUATION AND MANAGEMENT PLAN IN THE SOUTHEAST KALAHARI (STAMPRIET) ARTESIAN BASIN

MUD ROTARY DRILLING LOG

JICA REFERENCE: J 6 A LOCALITY: Cobra R 349 WW 39850 DATE: 228/06/00 to 5/07/00

TIME	DEPTH mbgl	MARSH FUNNEL TEST 1000 ml (sec)	MARSH FUNNEL TEST 500 ml (sec)	E. C. mS/cm	DENSITY	pH	TEMPERATURE ° C	COMMENT
14:00 28/6/00	26	35	22	1.571		8	20.6	
	26	28	16	1.03		9	15.7	Water used for mixing
10:00 29/06	54	38	25	1,67		9	18.6	
13:45	72	33	25	1.84		9	28.6	
	29	21	19	1.05		9	14.6	Water used for mixing
20:00	103	37	20	2.12		9	29.9	
23:50	138	38	21	2.55		10	26.0	
12:30 30/06	146	38	21	2.33		9	24.4	Start drilling for the day
		31	25	1.07		8	9.1	Water used for mixing
15:27	168	36	22	2.68		9	26.6	Before logging
		28	19	1.08		8	14.0	Water used for mixing
19:30 4/07	190	42	25	3.29		12	21.5	Drilling 9 7/8 "
12:15 5/07	210	37	21	6.89		10	21.2	

20:15	237	32	19	6.34		12	26.1	Before logging
		28	18	1.2		9	16.1	Water used for mixing
08:00 9/7/00	273	36	22	6.3		10	16.5	Before logging
		29	18	1.08		8	14.3	Water used for mixing.

4. Geophysical Log and Casing Design

5. Borehole Development Data

THE STUDY ON THE GROUNDWATER POTENTIAL EVALUATION AND MANAGEMENT PLAN IN THE SOUTHEAST KALAHARI (STAMPRIET) ARTESIAN BASIN

BOREHOLE DEVELOPMENT DATA

JICA REFERENCE: J 6 A LOCALITY: Cobra R 349 WW 39850 DATE: 12/07/2000 (starting)

TIME (actual)	P.I.D. (mbsu)	½ 90° V-Notch (mm)	Yield (m^3/h)	E.C. (mS/m)	Water Level (mbsu)	Remarks
12:00	240	15			74.90	Date 12/07/00
13:00		25			76.27	
13:00		20			80.20	
15:00		10	0.036		80.70	
16:00		10			84.3	
17:00		10			88.31	
18:00		10			91.15	
19:00		10	0.036		97.58	
20:00						Airlift through night.
05:00						Date 13/07/00: Compressor stopped.
07:00	246	10	0.036		104.83	
08:00		10	0.036		105.78	
09:00		10			105.6	
10:00		10			105.37	
11:00		10			105.80	
12:00		10	0.036		104.98	
14:00	252	40	0.72		109>46	
15:00		35	0.55		109.32	
16:00		35			109.92	
17:00		32			109.96	

TIME (actual)	P.I.D. (mbsu)	½ 90° V-Notch (mm)	Yield (m^3/h)	E.C. (mS/m)	Water Level (mbsu)	Remarks
18:00		35			109.96	Water still very dirty.
19:00	252	35	0.55		109.92	Pump through the night.
07:00		30	0.36		108.8	Date 14/07/00.
08:00	258					Install additional pipe.
09:00		40	0.72		110.79	
10:00		28			110.53	
11:00		15	0.2		106.18	
12:00		15			106.22	
13:00		15	0.2		108.55	
14:00		30	0.36		109.42	
15:00		30			108.40	
16:00		30			109.39	
17:00		30	0.36		109.06	
18:00		28	0.3		109.22	
19:00	258	28			109.20	
20:00						Blow through the night.
07:00	258	28	0.3		109.18	Date 15/07/00.
08:00	264	18	0.4			Added one pipe.
09:00		18			106.30	
10:00		20	0.044		106.45	
11:00		28			106.77	
12:00		28			107.26	
13:00		25	0.25		108.63	
14:00		25			108.30	
15:00		25			107.70	
16:00	264	25	0.25		106.98	

TIME (actual)	P.I.D. (mbsu)	½ 90° V-Notch (mm)	Yield (m^3/h)	E.C. (mS/m)	Water Level (mbsu)	Remarks
17:00		25	0.25		105.20	
18:00		28			106.15	
19:00	264	28	0.3		107.88	Pump through the night.
07:00					108.39	Stop development by airlift.

Remarks:

1. Deep water level combined with low yield necessitates long development times.
2. Borehole also developed by means of pumping with electrical submersible pump on 30/07/2000. See Table below:

TIME (actual)	Pump time (min)	Water Level (mbsu)	Yield (m^3/h)	E.C. (mS/m)	Remarks
14:00	0	105.57			Pump installed at 148 mbgl
14:01	0				Start developing.
	1	114.90			
	2	117.61			
	3	121.10			
	4	119.13			
	5	117.74			
	6	116.24			
	7	115.57			
	8	114.98	1.95		
	9	114.52			
14:11	10	114.28			
	12	113.93			

TIME (actual)	Pump time (min)	Water Level (mbsu)	Yield (m^3/h)	E.C. (mS/m)	Remarks
	14	113.82	2.39		
	16	113.80			
	18	113.75			
	20	113.72	2.33		
	23	113.69			
	26	113.74			
14:31	30	113.76			
	31	115.41			
	32	117.23	4.6		
	33	118.69			
	34	119.28			
	35	119.49	4.029		
	36	119.60			
	37	119.69			
	38	119.80			
	39	119.88			
	40	119.98			
	42	120.11		212	pH 10.55; T 28.5°C
	44	120.22			
	46	120.30			
	48	120.37			
	50	120.42			
	53	120.51	3.938		
	56	120.59		202	pH 10.0; T 29.4°C
	60	120.64			
	65	120.72		196	
15:12	70	120.78			

TIME (actual)	Pump time (min)	Water Level (mbsu)	Yield (m^3/h)	E.C. (mS/m)	Remarks
	71	121.32			
	72	121.76			
	73	122.60	6.0		
	74	123.85			
	75	125.05			
	76	125.97			
	77	126.79			
	78	127.43			
	79	128.02			
	80	128.50		193	
	82	129.79			
	84	130.29	5.7		
	86	130.52			
	88	130.90			
	90	131.09			
	93	131.35	5.63		
	96	131.58		191	pH 9.02; T 29.5°C
	100	131.77			
	105	131.90			
15:50	106	132.7			
	107	133.92	7.272		
	108	134.90			
	109	135.99			
	110	136.58			
	111	136.98			
	112	137.35			
	113	137.63			

TIME (actual)	Pump time (min)	Water Level (mbsu)	Yield (m^3/h)	E.C. (mS/m)	Remarks
	114	137.90			
	115	138.17	7.243		
	117	138.42			
	119	138.66			
	121	138.89			
	123	139.16	7.243		
	125	139.25		192	pH 9.12; T 29.4°C
	128	139.37			
	131	139.45			
	135	139.53	7.024		
	140	139.66			
	145	139.85			
	150	139.99		190	pH 8.78; T 29.4°C
	155	140.02			
	160	139.99	7.003		
16:49	165	140.08			Stop development.
	1	136.30			Start recording recovery.
	2	132.70			
	3	129.44			
	4	126.67			
	5	124.32			
	6	122.21			
	7	120.38			
	8	118.91			
	9	117.72			
	10	116.54			
	12	114.41			

TIME (actual)	Pump time (min)	Water Level (mbsu)	Yield (m^3/h)	E.C. (mS/m)	Remarks
	14	112.81			
	16	111.66			
	18	110.61			
	20	109.94			
	23	109.04			
	26	108.37			
	30	107.75			
	35	107.15			
	40	106.78			
	45	106.52			
	50	106.28			
	55	106.06			
17:49	60	105.92			Stop measurements for the day and test.

6. Evaluation of Pumping Test

1. PUMPING TEST ANALYSIS

J6-A (WW39850) - Pumping well

J6-K (WW39849) - Observation well

J6-N (WW39851) - Observation well

Farm Borehole - Observation well

1.1. Well Efficiency (Step Drawdown Test) (Annex 1)

Well Efficiency was analysed by making use of the Jacob method for draw down data. Aquifer parameters used for the calculation of well efficiency were obtained from the evaluation results of the constant discharge test, which is discussed in **Section 1.2** below.

The well efficiencies at the range of pumping rates used during the step drawdown test are summarised in **Table 1** below.

Table 1: J6-A; borehole efficiency at various pumping rates

Borehole number	Step	Abstraction Rate [m^3/h]	Draw Down* [m]	Borehole Efficiency [%]
J6-A	1	2.0	7.97	61.0
	2	3.1	12.5	60.0
	3	4.2	16.5	59.0
	4	5.1	21.1	58.2
	5	6.2	26.6	57.3

* at cut-off time t, after which well bore storage has no affect on the well performance

Data on the linear and non-linear well losses and skin factors as well as the efficient well radius are presented in **Annex 1.**

1.2. Constant Discharge Test Analysis (Annex 2 - 5)

An abstraction rate of 4 m^3/h was applied for the constant discharge test. The constant discharge draw down curve of abstraction borehole **J6-A** indicates confined conditions. For confined aquifers, the Theis analysis method with draw down and recovery data was used to calculate the hydraulic conductivity of the aquifer **(Annex 2 & 3**).

The aquifer storativity was estimated due to the fact that the observation boreholes **J6-K, J6-N** and the farm borehole are located in other aquifers and not in the pumped Auob sandstone aquifer. During the duration of the constant discharge test, a rise in the water level of observation borehole **J6-N** is observed, while the water level of **J6-K** was stable throughout the test. The farm borehole was pumped during the test and cannot be evaluated (**Annex 5**).

The results of the constant discharge analysis are summarised in **Table 2** below.

Table 2: Aquifer Parameters calculated for J6-A; Auob sandstone

Borehole number	Analysis Method	T [m^2/day]	s [m]	k_f [cm/sec]	S [-]	Simulation model	Comments
J6-A	Theis-draw down	8.44	30	3.3×10^{-4}	*3×10^{-9}	Theis	*Storativity estimated - Observation boreholes not located in the tested aquifer
	Theis - recovery	8.60	30	3.3×10^{-4}	*3×10^{-9}		

The Theis model for confined aquifer conditions was used to simulate and verify the actual data and analysis approach of the constant discharge test. No leaky conditions could be evaluated for **J6-A**. Simulation parameters summarised in **Table 2** were used in simulation of the actual pumping test data (See **Annex 4** for simulation results).

Annex 5 compares the draw down results of the pumping borehole **J6-A** and observation boreholes **J6-K** and **J6-N**. It is obvious that pumping from the Auob sandstone aquifer did not have any influence on the Kalahari and Nossob aquifers.

The radius of influence (R) was estimated after SICHARDT (1928) using the equation:

$R = 3000 \times s \times K_f^{1/2}$

$R = 3000 \times 23.9 \times 1.82 \times 10^{-3} = \underline{131\ m}$

where

R = Radius of influence

s = Draw down in abstraction borehole at end of pumping

K_f = Permeability of the aquifer

The equation is approximately correct for unconfined aquifers. In case of a confined aquifer the radius of influence most probably larger and the 131 m are considered to be the minimum value.

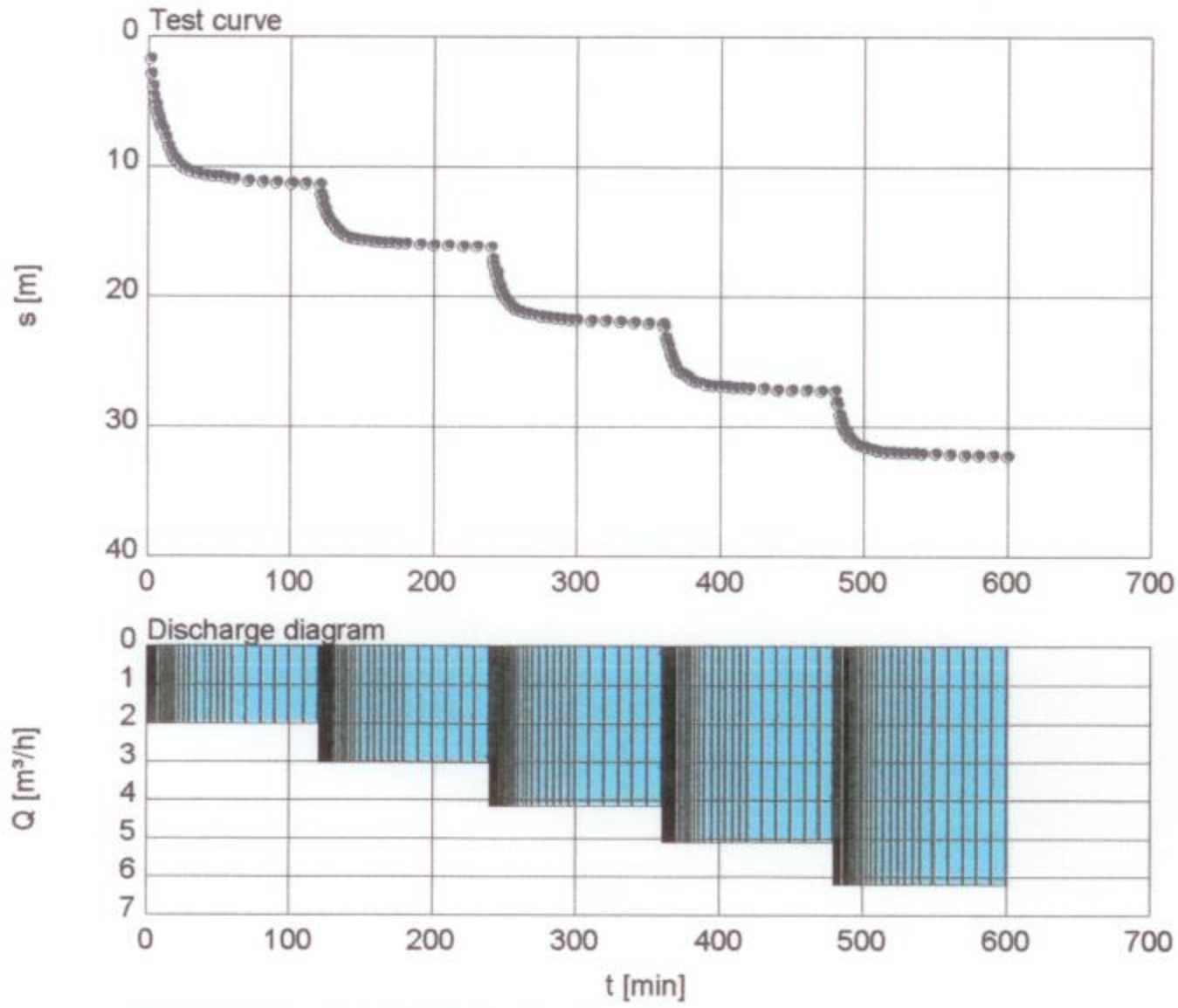
A proper evaluation of R (and storativity S) will only be possible once reliable data from observation wells, penetrating the same aquifer as the pumped well, are available.

Groundwater Study in the Stampriet Artesian Basin

Evaluation of Test Pumping Data

Step test analysis

Pumped well J6_A



Borehole, well & aquifer

Drilled:	
Latitude:	
Longitude:	
Elevation:	300 [m]
Depth:	273 [m]
Stick up:	0.90 [m]
Bh. radius:	0.1255 [m]
Casing radius:	0.084 [m]
RWL:	103.95 [m]
max.drawdown:	32.25 [m]
Aq.type:	confined
Aq.thickness:	30.00 [m]
Stratigraphy:	Auob Sandstone
Lithology:	

Test running

Start:31/07/2000 07:06:00	
Dis.dur.:	600 [min]
Av.dis.:	4.11 [m³/h]
Max.dis.:	6.2 [m³/h]
Min.dis.:	2 [m³/h]
Total dis.:	41.1 [m³]
Crew:	Metzger_PM
Supervisor:	PCI

Results

Well performance:

s: $(B1+B2)*Q+C*Q^2$

Linear aquifer loss B1:	2.41
Linear well loss B2:	1.42
Non-linear well loss C:	0.06

	Q [m³/h]	s [m]	Eff [%]
Step 1:	2.00	7.97	61.0
Step 2:	3.06	12.5	60.0
Step 3:	4.19	16.5	59.0
Step 4:	5.11	21.1	58.2
Step 5:	6.20	26.6	57.3

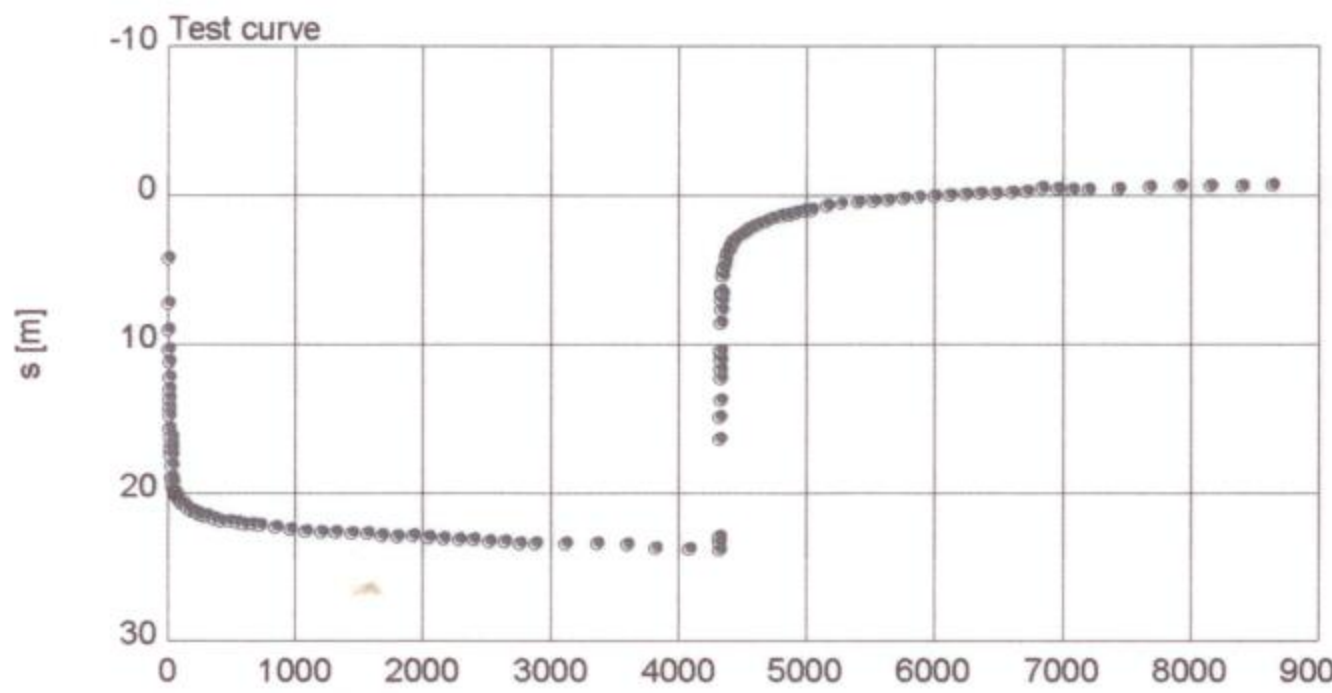
Linear skin factor:	3.15 [-]
Non-linear skin factor:	3.28 [d/m³]
Effective well radius:	2.3E-3 [m]

Groundwater Study in the Stampriet Artesian Basin

Evaluation of Test Pumping Data

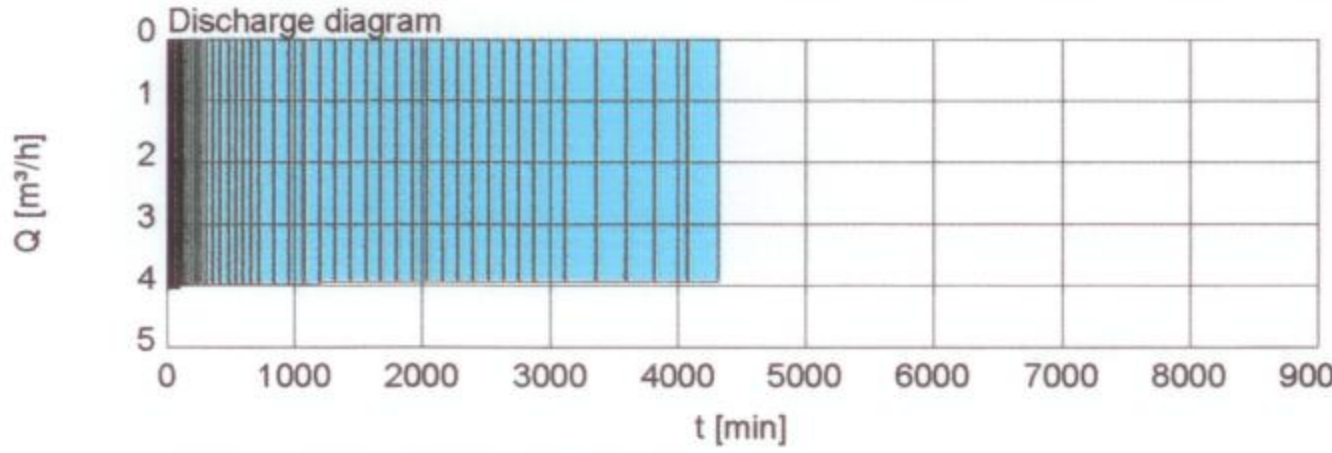
Test pumping analysis

Pumped well J6_A



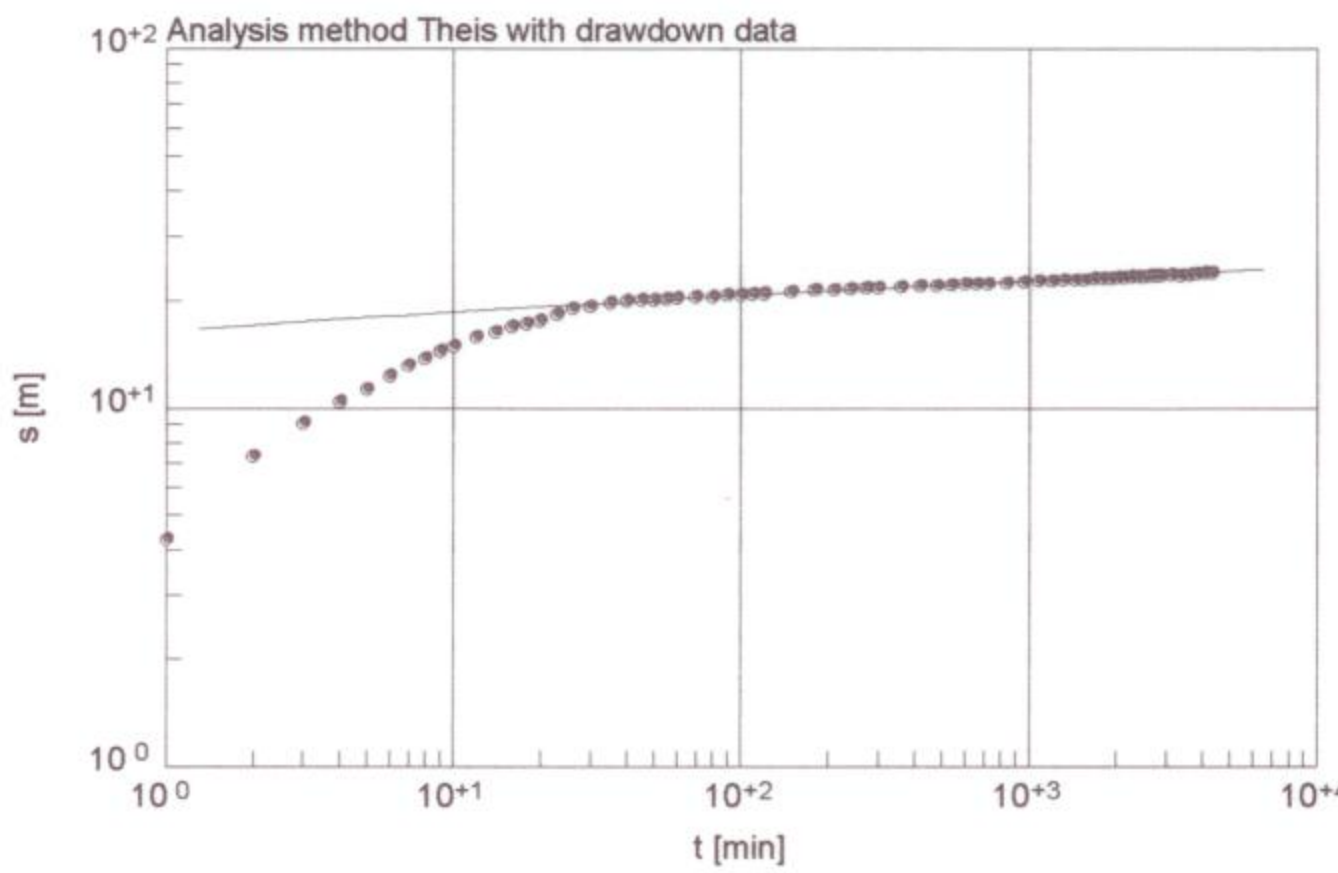
Borehole, well & aquifer

Drilled:	
Latitude:	
Longitude:	
Elevation:	300 [m]
Depth:	273 [m]
Stick up:	0.90 [m]
Bh. radius:	0.1255 [m]
Casing radius:	0.084 [m]
RWL:	105.31 [m]
max.drawdown:	23.88 [m]
Aq.type:	confined
Aq.thickness:	30.00 [m]
Stratigraphy:	Auob Sandstone
Lithology:	



Test running

Start:01/08/2000 08:00:00	
Dis.dur.:	4320 [min]
Av.dis.:	3.97 [m³/h]
Max.dis.:	4.11 [m³/h]
Min.dis.:	3.95 [m³/h]
Total dis.:	285 [m³]
Crew:	Metzger_PM
Supervisor:	PCI



Results

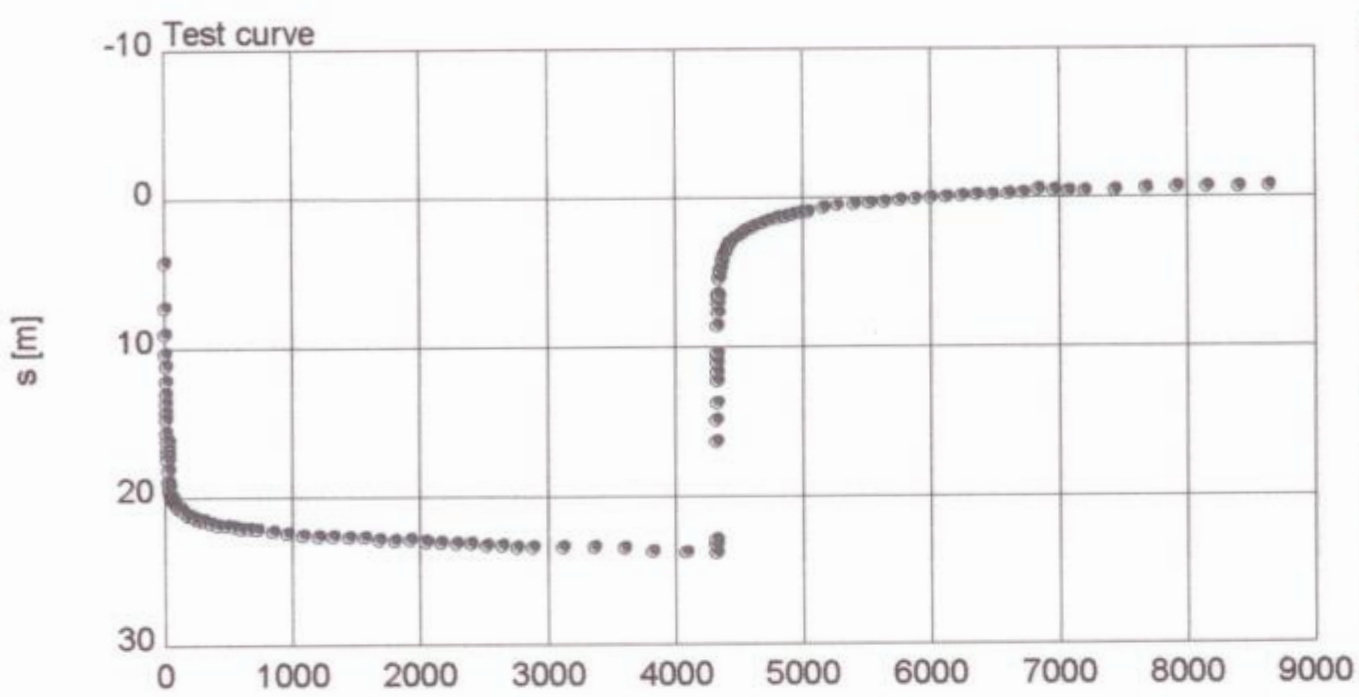
Match parameter:	
Q:	3.97 [m³/h]
t:	1.18E3 [min]
s:	22.4 [m]
1/u:	1.83E11 [-]
W(u):	25 [-]
Aquifer parameter:	
T:	8.44 [m²/d]
k:	0.281 [m/d]

Groundwater Study in the Stampriet Artesian Basin

Evaluation of Test Pumping Data

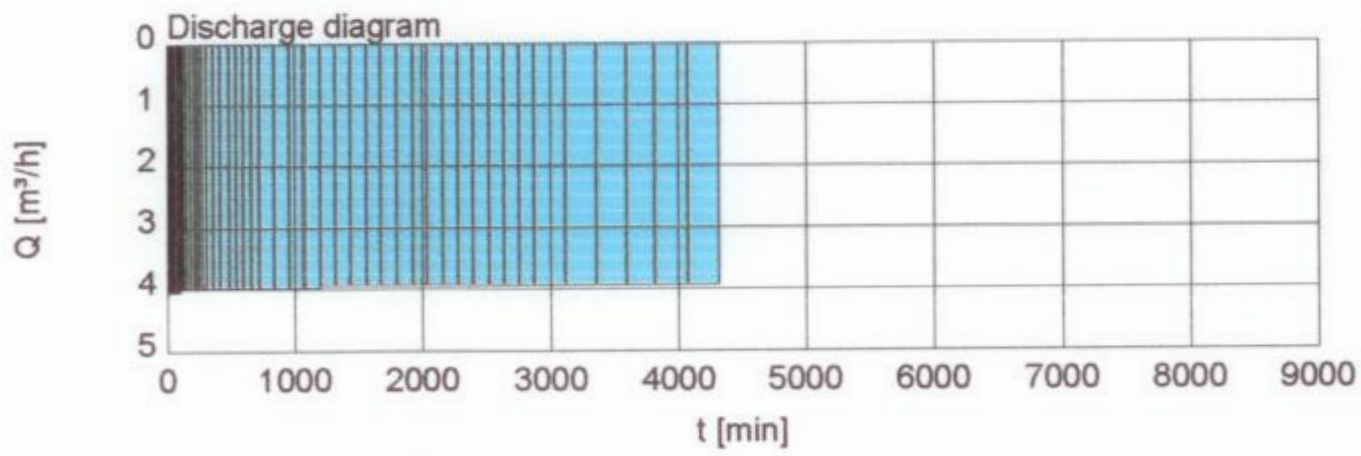
Test pumping analysis

Pumped well J6_A



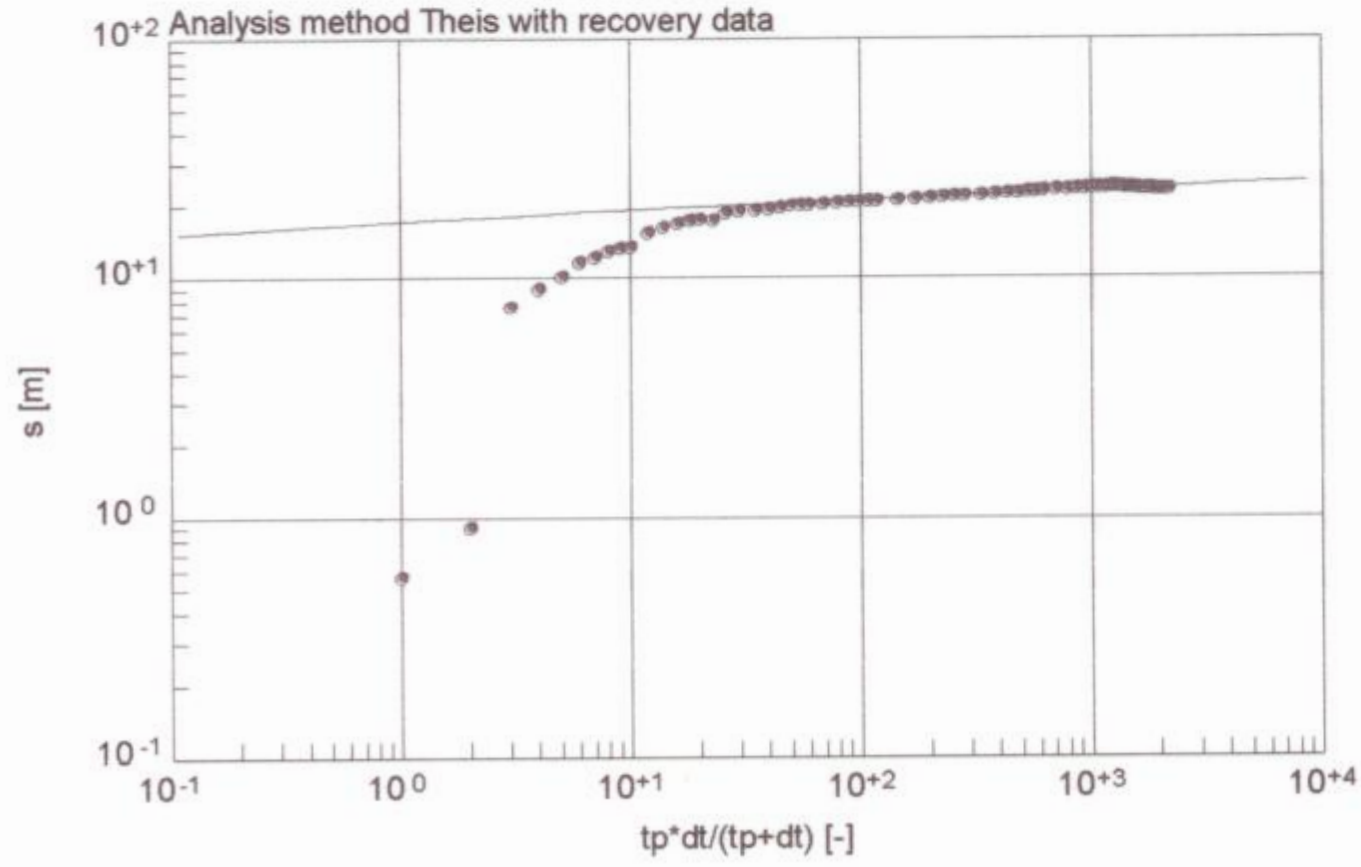
Borehole, well & aquifer

Drilled:	
Latitude:	
Longitude:	
Elevation:	300 [m]
Depth:	273 [m]
Stick up:	0.90 [m]
Bh. radius:	0.1255 [m]
Casing radius:	0.084 [m]
RWL:	105.31 [m]
max.drawdown:	23.88 [m]
Aq.type:	confined
Aq.thickness:	30.00 [m]
Stratigraphy:	Auob Sandstone
Lithology:	



Test running

Start:01/08/2000 08:00:00	
Dis.dur.:	4320 [min]
Av.dis.:	3.97 [m³/h]
Max.dis.:	4.11 [m³/h]
Min.dis.:	3.95 [m³/h]
Total dis.:	285 [m³]
Crew:	Metzger_PM
Supervisor:	PCI



Results

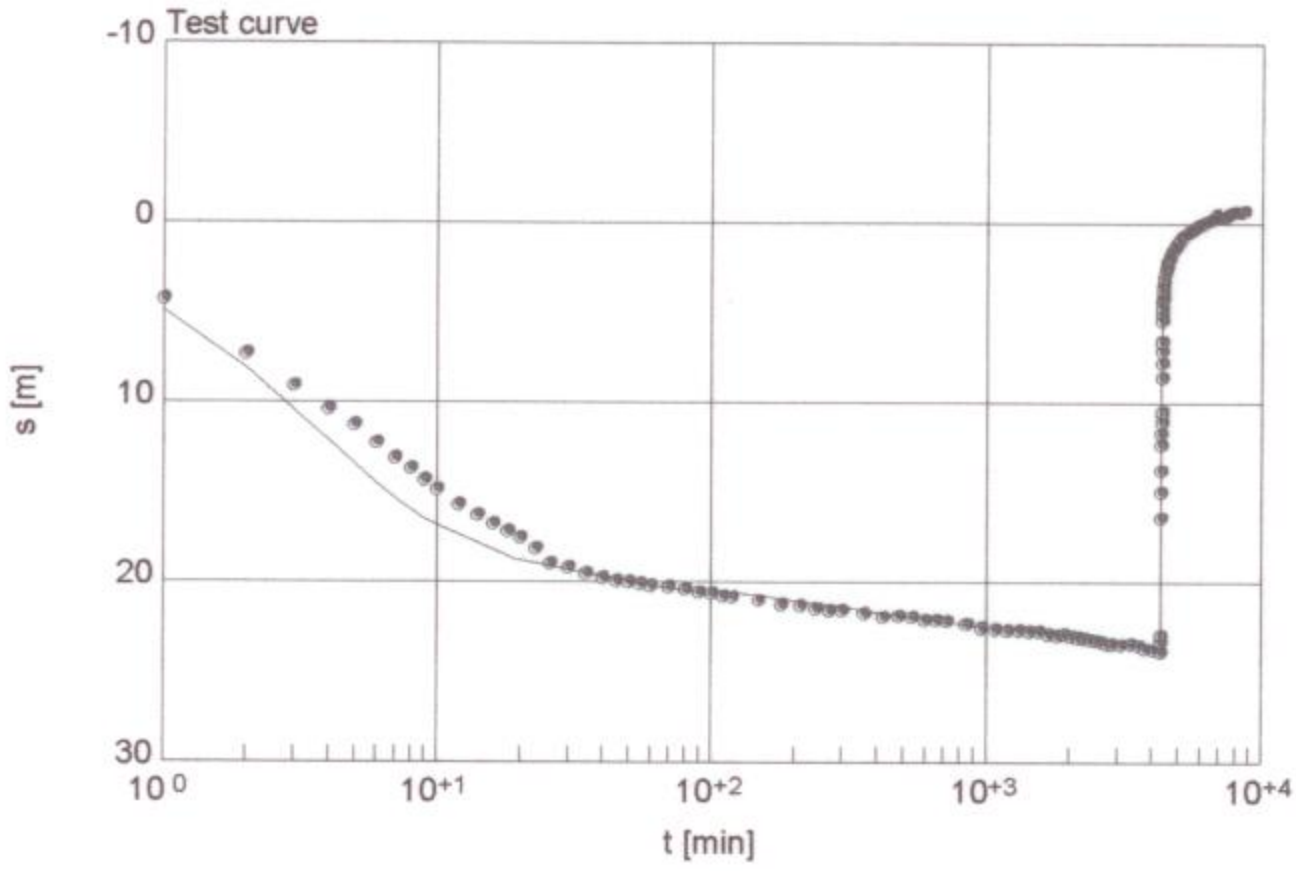
Match parameter:	
Q:	3.97 [m³/h]
t:	36 [min]
s:	20.1 [m]
1/u:	1.67E10 [-]
W(u):	22.8 [-]
Aquifer parameter:	
T:	8.6 [m²/d]
k:	0.287 [m/d]
S+sf:	3.3E-9 [-]

Groundwater Study in the Stampriet Artesian Basin

Evaluation of Test Pumping Data

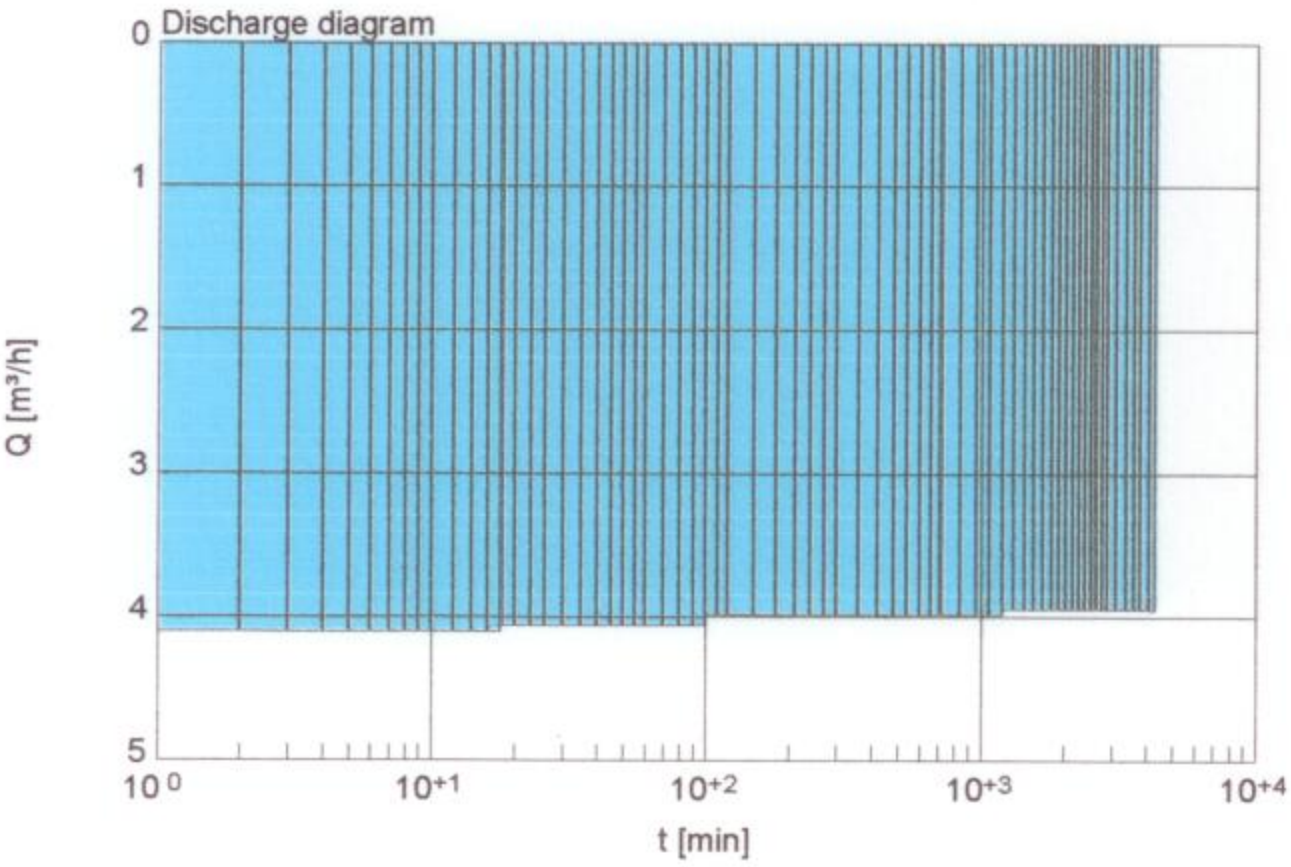
Test pumping diagnosis

Pumped well J6_A



Remarks

Simulation of the actual recorded draw down during the constant discharge test applying the Theis model for confined aquifers.



Discharge info

Dis.dur.: 4320 [min]
tcorr: 4317 [min]

Av.dis.: 3.97 [m³/h]
max.dis.: 4.11 [m³/h]
min.dis.: 3.95 [m³/h]
Qn: 3.96 [m³/h]

Dis.sum: 285 [m³]

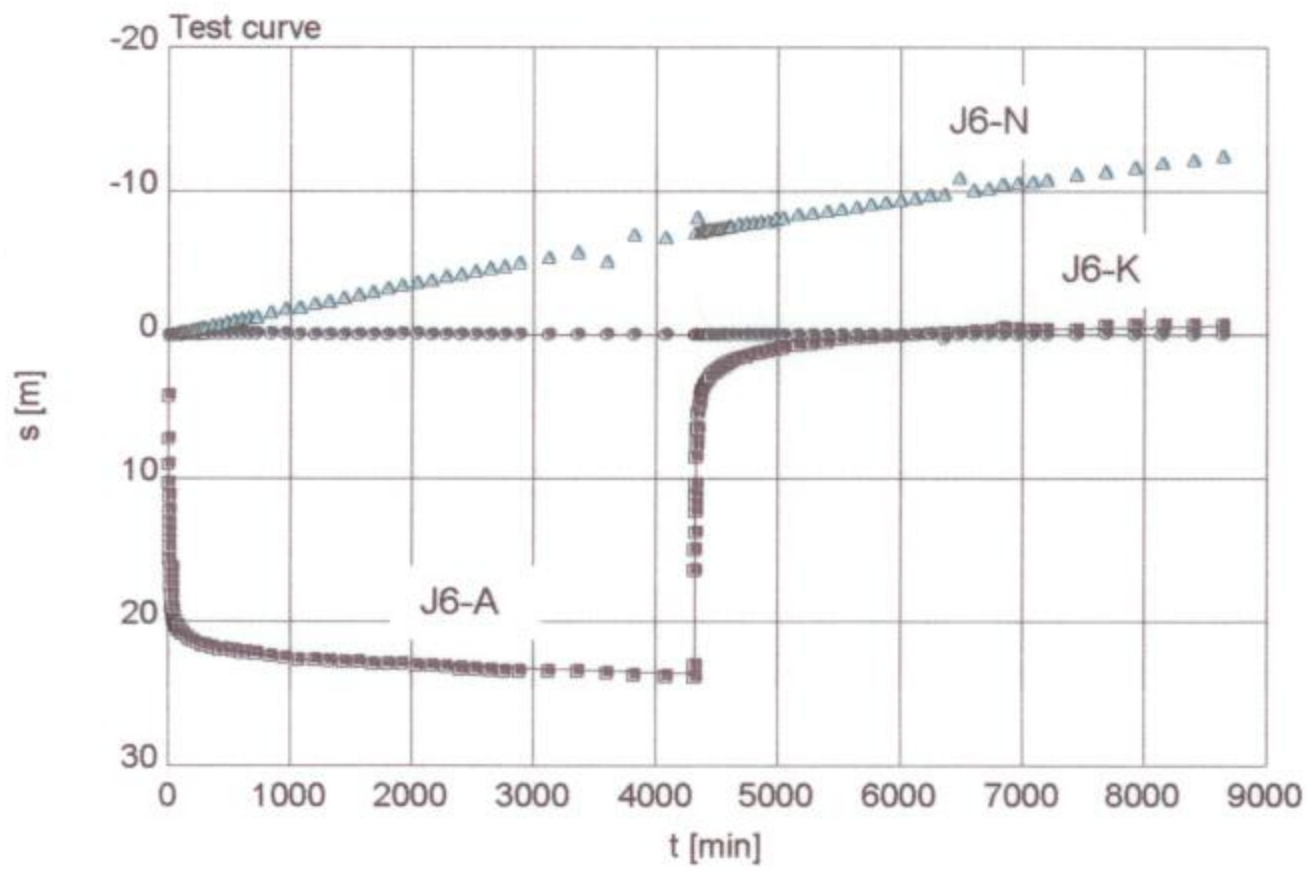
Date 15/08/00	prepared by BIWAC	Annex 4

Groundwater Study in the Stampriet Artesian Basin

Evaluation of Test Pumping Data

Test pumping diagnosis

Pumped well J6_A



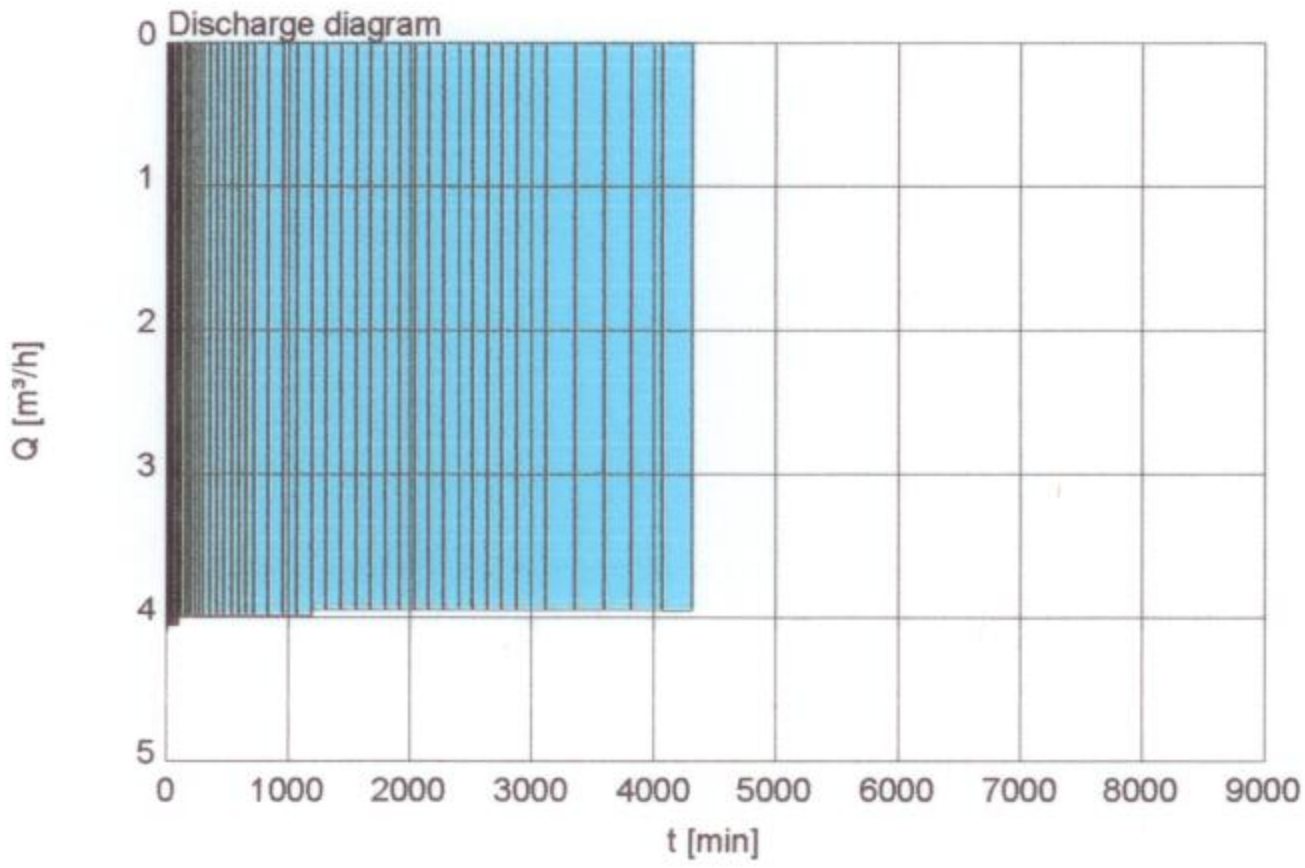
Remarks

Merged draw down data from observation borehole J6_K and J6_N.

The farm borehole was pumped during the test.

The observation boreholes don't penetrate the same aquifer.

The WL of J6_K is stable while the WL of J6_N rises during the test.
No storativity can be evaluated.



Discharge info

Dis.dur.:	4320 [min]
tcorr:	4317 [min]
Av.dis.:	3.97 [m³/h]
max.dis.:	4.11 [m³/h]
min.dis.:	3.95 [m³/h]
Qn:	3.96 [m³/h]
Dis.sum:	285 [m³]

Distance of observation boreholes: J6-K = 63.5 m; J6-N = 58.5 m

Date 15/08/00	prepared by BIWAC	Annex 5

7. Water Level Recorder Installation

THE STUDY ON THE GROUNDWATER POTENTIAL EVALUATION AND MANAGEMENT PLAN IN THE SOUTHEAST KALAHARI (STAMPRIET) ARTESIAN BASIN

INSTALLATION OF SEBA FLOATERS

JICA REFERENCE: J 6 A LOCALITY: Cobra R 349

WW 39850

1. **Serial Number of floater**: 4499
2. **Date installed**: 20/09/00
3. **Rest Water Level when installed**: 104.25 mbsu
4. **Distance from stick-up to logger**: 100 m
5. **Distance from logger to water level**: 4.25 m
6. **Cut off**: 100 m (0.91 + 99.11)