DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

GEOLOGICAL SURVEY

QUORN TOWN WATER SUPPLY
WELL 3 AND SCOUT HOLE 1

by

X.P. SIBENALER
GEOLOGIST II

ENGINEERING DIVISION

Rept.Bk.No. 79/11
D.M. No. 387/68, 476/77
G.S. No. 6130
ENG. No. 77/CB-12

CONTENTS

FIGURES

BIBLIOGRAPHY INDEX

1 — ACCESSION NUMBER: | TYPE OF WORK: 1 | SECURITY: 1 | FILE NO.: 79/11 | PUBLIC. CODE: 1 | SERIAL OR VOLUME NO.: | PAGES: 8 | ILLUSTS MAPS & PLANS: Y | YEAR: 1979 | POINT LOCATION: LATITUDE OR EAST | LONGITUDE OR NORTH | ZONE

2 — TITLE: QUORN TOWN WATER SUPPLY WELL 3 AND SCOUT HOLE 1 (3 FIGS)

2 1 — TITLE:

3 — ORGAN. OR COMPANY: | AUTHORS: SIBENALER, X. P.

3 1 — AUTHORS: 6533-3

4 — MAP REFERENCES:

ACCESSION NUMBER REPEATED ON EVERY CARD

5 — LOCALITIES:

QUORN

FLINDERS RANGES

PICHI RICHI

HUNDRED | SECTIONS: 62 42 | HUNDRED | SECTIONS | LICENCE AREA

5 1

6 — KEYWORDS:

MAJOR KEYWORD: HYDROGEOLOGY

WATER SUPPLY

AQUIFER - HARDROCK

WATER ANALYSES

WELL DISCHARGE TEST

~~D~~ ROTARY - ~~HAMMER~~ DRILLING

DRILLING ~~CUTTINGS~~ 1769

GROUND WATER

WELL LOSS

GEOL. LOG

ADELAIDEAN

6 1

POUND QTZITE

A.B.C. RANGE QTZITE

INDEXED BY . . . . . . DATE . . . . . . CHECKED . . . [signature] . . . DATE 19-2-79

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

Rept.Bk.No. 79/11
D.M. No. 387/68, 476/77
G.S. No. 6130
ENG. No. 77/CB-12

QUORN TOWN WATER SUPPLY
WELL 3 AND SCOUT HOLE 1

ABSTRACT

One standby production well and one exploratory hole were successfully drilled in March/April 1978.

The long term yield of the production well has been estimated at 600 kl/day, with salinity marginally increasing from 1914 to 1985 mg/l during the 48 hr. discharge test. As this well taps the same aquifer as the two existing production wells it is considered essential that water level measurements and salinity tests be regularly carried out on all wells after the new well is brought into commission.

The exploratory hole has opened up the possibility of another production well field, 5 km south west of Quorn which deserves further evaluation.

INTRODUCTION

A request from the E. & W.S. Dept. was received in July 1977 for this Department to investigate the possibility of drilling a standby production well as near as possible to the existing supply system.

Quorn town water supply is presently being obtained from 2 wells located within 5 km N.W. of the township, and from the Quorn Reservoir (Fig. 1). In October 1974, the reservoir was temporarily taken out of service due to unacceptable bacteriological quality. During summer 1977/78 the supply reached a critical stage when the two wells were pumped to their full capacity (Well 1 ∿ 600 kl/day, Well 2 - 300 kl/day). Although a chlorination scheme has now been implemented, records show that the reservoir is not reliable, and the town supply is essentially dependent on the two existing wells.

A standby well is therefore required, especially with the anticipated increase in the number of services in Quorn.

As part of its programme of general groundwater investigation in the State, the Dept. of Mines & Energy additionally undertook to drill an exploration well to locate an alternative groundwater supply.

Rotary hammer drilling was specified for the 2 holes and drilling operations were carried out between 28/3/78 and 3/4/78. A 48 hr. well discharge test was also carried out on the standby production well (herewith referred to as T.W.S. 3) between 19/7/78 and 21/7/78.

HYDROGEOLOGY

Sturtian feldspathic sandstone and Cambrian quartzite are generally regarded as the better aquifers near Quorn, especially where these rocks are extensively jointed and an adequate source of recharge is present. Previous field investigations in the area (Hillwood 1965, Gibson 1968) have shown that these rocks are generally undisturbed with not much evidence of jointing and fracturing. Yields of between 50-150 kl/day (500-1 500 g.p.h.) and salinities between 1 000-2 000 mg/l TDS are generally obtained from bores drilled in the sandstone. Town water supply Bore 1 however has a yield of over 300 kl/day - it is thought that this larger supply is related to the nearby major fault. Similarly T.W.S. Well 2 was sited near the junction of a major N-S fault and Ingaree Creek. A supply of about 500 kl/day and salinity 1 500 mg/l TDS was obtained.

A recent water well survey in the area (Clarke 1978) confirmed that better quality groundwater generally occurs north of Quorn in consolidated sediments, whereas water obtained from areas underlain by alluvial sands, gravels and clays tends to be more saline.

T.W.S. Well 3 was therefore sited approximately 1 km south of well 2, near the major fault zone and Stony Creek. An additional advantage is the proximity to the existing pipeline. The main disadvantage here is that all the town water supply wells will be tapping virtually the same source of supply. Because of low rainfall in the area (300 mm), recharge is limited and overpumping could occur.

Scout hole no. 1 was sited approximately 5 km S.W. of Quorn (Fig. 1) near a major fault in quartzite and a major tributary of Capowie Creek, in an area where groundwater data is scarce. Although this site is significantly distant from existing E.W.S. facilities, it could, if successful, open up an alternative production field which, if required, will allow spelling of the present system.

SUMMARY OF WELL DETAILS

Both wells were successfully drilled with the rotary-hammer drilling technique. Geological logs are included in appendix 1. Location of the wells is shown in Fig. 1.

A. T.W.S. No. 3

Depth: 69 m

Casing: 203 mm (8") from surface to 9 m. 178 mm open hole to 69 m.

Water cut: 45 m

Static water level: 42 m (before testing)

Water salinity: 1914 mg/l

Recommended maximum yield: 600 kl/day (5 500 g.p.h.)

Recommended pump depth: 67 m

Pumping water level: 57 m

Aquifer: unconfined quartzite

B. Scout hole No. 1

Depth: 51 m

Casing*: 203 mm to 13.4 m. 178 mm open hole to 51 m.

Water cut: 36 m

Static water level: 32 m

Water salinity: 1 745 mg/l

Yield**: airlifted at about 330 kl/day

Aquifer: semi confined quartzite.

WELL DISCHARGE TEST

A 48 hr. well discharge test consisting of a 5-stage step drawdown test followed by a constant discharge test of 41 hours was carried out on the town water supply well. The step drawdown test assesses the performance of a well at different rates and durations of pumping. This is done with the following equation:

$$s = (a + b \log t)\, Q + cQ^2$$

where s = drawdown (m) a,c = Well loss constant

Q = pumping rate (kl/hr) b = Aquifer loss constant

t = pumping time (mins)

The constant discharge test supplies information on aquifer characteristics and any hydrogeological boundaries which may be present.

Step drawdown Test

The drawdown equation $s = (0.185 + 0.075 \log t)\, Q + 0.009\, Q^2$ was derived for T.W.S. No. 3 (see Fig. 2).

Verification of equation:

(a) drawdown from extrapolation of test data at t = 10 000 min and Q = 19.1 kl/hr. is 13 m.

(b) drawdown calculated from equation at same t and Q is 12.5 m.

*Due to the strongly fractured nature of the quartzite aquifer, with common thin clay partings, the hole could be unstable. The well should therefore be fully cased (slotted 36-51 m) prior to changing its status from observation to production.
** This well was not discharge tested. However, in comparison with T.W.S. No. 3 which was also airlifted at about 300 kl/day, the scout hole yield is expect to be comparable to the tested well.

The equation can therefore be reliably used to determine the likely performance of the well for varying pumping rates. It must be stressed, however, that discharge boundary conditions, (due to limited extent of aquifer or varying permeability) may adversely affect the performance of the well at pumping periods greater than the test period.

Constant Discharge Test

The semi-log graph of the test has been plotted in Fig. 3 By extrapolating the test curve, corrected to allow for pre-main stage drawdowns, a long term pumping rate can be calculated:

$$Q_L = Q_T \frac{Sw}{S_{10^6}}$$

where Q_L = long term pumping rate

Q_T = test rate

Sw = available drawdown = 22 m

S_{10^6} = drawdown from extrapolated test data at 10^6 min (2 years).

$$Q_L = \frac{458 \times 22}{16.7} = 600 \text{ kl/day}$$

No apparent discharge boundaries were detected in the drawdown data. However the effect of a discharge boundary can be observed in the recovery data (at t/t_1 = 100 min.). Irregularities in drawdown measurements during the 4th stage (270 - 310 min.) may have masked the effect of this boundary in the drawdown data. As the aquifer is of limited extent, these boundary conditions (which lead to increasing rate of drawdown) are likely to be intersected if the well is pumped continuously for extensive periods. The long term performance of this well can therefore only be determined with a discharge test of extended duration. This can be effectively and economically accomplished by appropriately monitoring drawdowns in the well when it is initially brought into commission.

From the drawdown data, which was adjusted to allow for dewatering of the aquifer, a transmissivity value of T = 70 kl/day/m was calculated for that portion of the aquifer around T.W.S. No. 3. A comparable value of T = 90 kl/day/m was obtained from recovery data.

WATER QUALITY

Water samples from both wells were submitted to Amdel for full analysis. Additionally the town water supply well was sampled at regular 300 minute intervals during the main constant discharge test to monitor any variation in salinity during pumping. Analytical results have been included in Appendix 2.

The groundwater salinity in the standby well (1 900-2 065 mg/l) is slightly greater than the present groundwater supply. Of more significance is the small but steady increase in salinity with pumping. Regular monitoring of the water quality is therefore warranted. Groundwater quality from the scout hole is comparable to the present supply.

DISCUSSION

The standby production well, T.W.S. 3, was successfully completed, with yield and quality comparable to the existing two productive wells. As mentioned above, adequate monitoring of the well performance when initially brought into commission is recommended. Further advice on this aspect should be sought from this Department after the well has been equipped. Additionally, the three T.W.S. Wells will be essentially tapping the same groundwater body. In the low rainfall region, there is a danger that significant increase in withdrawals may lead to dewatering of the aquifer. Regular monitoring of water levels in all production wells is therefore strongly recommended.

In view of the small trend in increasing salinity during the discharge test, monitoring of the water quality from Well 3 is necessary.

Scout hole 1 has opened up the possibility of an alternative production well field which may be required if dewatering of the present field is occurring. The quality and yield from this hole is comparable to that available from the existing productive wells. Further exploratory drilling and well discharge testing in this area south west of Quorn is warranted to quantify the groundwater potential.

X.P. SIBENALER
GEOLOGIST II

REFERENCES

Bleys, C., 1969. QUORN TOWN WATER SUPPLY BOREHOLE NO. 2. S.A. Dept. of Mines, unpublished report 69/74.

Clark, D.K., 1978. Regional Water Well Survey of the Willochra Basin and Neighbouring Areas. S.A. Dept. of Mines and Energy, unpublished report 78/59.

Gibson, A.A., 1968. Report on groundwater prospects. Quorn Water Supply. S.A. Dept. of Mines, unpublished report 66/127.

Hillwood, E.R., 1965. Underground Water Survey, Quorn Water Supply. S.A. Dept. of Mines, unpublished report 61/148.

APPENDIX 1

GEOLOGICAL LOGS

MF32

PROJECT: Quorn Town Water Supply

DEPARTMENT OF MINES AND ENERGY—SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: T.W.S. 3

UNIT / STATE NO. 583006202

DM 387/68

LOCATION OR COORDS:

SEC. HD. El. Surface m El. Ref. Point m Datum

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	TOTAL DISSOLVED SOLIDS Analysis No:
	45	42	45 45	69 69	300 450	½ 48	airlift pump	2025	W— W3574/78

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia (mm)	CASING From (m)	CASING To (m)
0	6		Alluvial clay and Gravel	Alluvial brown clays and gravels			203	-0.3	8.4
6	69		Weakly weathered to fresh sandstone and quartzite	6-21 fine/medium grained quartzite and sandstone fragments, minor white clay (<2%) Common staining. 21-57 pinkish white very fine to medium grained moderately indurated sandstone 1-5% white clay, thin interbeds of strongly indurated medium grained quartzite. 57-69 strongly indurated quartzite, minor staining.	POUND QUARTZITE				

REMARKS:

*NOTE: 110 kl / day = 1000gals / hr.

Permit No. 2506

DRILL TYPE: Rotary-hammer

COMPLETED: 31/4/78

CIRCULATION: Air

LOGGED BY: XPS

SHEET 1 OF 1

DATE: 31/4/78

MF32

PROJECT: Quorn Town Water Supply

DEPARTMENT OF MINES AND ENERGY—SOUTH AUSTRALIA
ENGINEERING DIVISION

WATER WELL LOG

HOLE NO: Scout ~~Hole 1~~

UNIT / STATE NO.

LOCATION OR COORDS:

SEC. HD. El. Surface m

El. Ref. Point m Datum

DM 476/77

AQUIFER SUMMARY:	DEPTH TO WATER CUT (m)	DEPTH TO STANDING WATER (m)	INTERVAL TESTED From:	INTERVAL TESTED To:	SUPPLY kilolitres/day*	SUPPLY Test Length (hrs)	SUPPLY Method	TOTAL DISSOLVED SOLIDS milligrammes/litre	Analysis No:
	36	32	36	51	330	½	Airlift	1870	W— 2407/78

DEPTH (m) From	DEPTH (m) To	GRAPHIC LOG	ROCK / SEDIMENT NAME	GEOLOGICAL DESCRIPTION	FORMATION / AGE	DEPTH CORE SAMPLE	CASING Dia(mm)	CASING From(m)	CASING To(m)
0	12		Clay	Gritty brown clay, sandy, grit: up to 5% coarse quartzite fragments.					
12	15		Sand	Mainly medium grained ang. to rounded qtz. grains moderately stained.					
15	51		Fracture Quartzite	15-18 m Fine to medium grained cream and pinkish quartzite, 2% clay. 18-27 m 20-40% dark brown clay, fractured, stained pinkish quartzite. 27-51 m pinkish, fractured quartzite, up to 5% clay in fracture partings. Common staining of fragments.	?A.B.C. Quartzite				

REMARKS: *NOTE: 110 kl / day = 1000gals / hr.

Scout hole completed as observation well. Hole not straight

DRILL TYPE: Rotary-hammer

COMPLETED: 3/4/78

CIRCULATION: Air

LOGGED BY: XPS

SHEET 1 OF 1

DATE: 3/4/78

APPENDIX 2

WATER ANALYSES

T.W.S. WELL 3 (P.N. 2506)

Sampling Time (mins. after start of pumping)	Conductivity (s at 25°C)	Salinity	pH	Analysis No.
0	3400	1960	6.8	W3571/78
-	3330	1915	7.8	W3572/78
370	3410	1965	6.5	W3573/78
600	3510	2025	6.9	W3574/78
900	3410	1965	6.9	W3575/78
1200	3440	1985	6.8	W3576/78
1500	3480	2010	6.4	W3577/78
1800	3500	2020	6.6	W3578/78
2100	3530	2035	6.5	W3579/78
2400	3530	2035	6.6	W3580/78
2700	3530	2035	6.8	W3583/78
2880	3570	2065	6.4	W3584/78

WATER ANALYSIS REPORT

SAMPLE No. W2190/78 JOB No. 3941-78

CHEMICAL COMPOSITION

		MILLIGRAMS PER LITRE mg/ℓ	MILLEQUIVS. PER LITRE me/ℓ
CATIONS			
CALCIUM	(Ca)	116	5.8
MAGNESIUM	(Mg)	114	9.4
SODIUM	(Na)	429	18.7
POTASSIUM	(K)	17	0.4
IRON	(Fe)		
ANIONS			
HYDROXIDE	(OH)		
CARBONATE	(CO_3)		
BICARBONATE	(HCO_3)	467	7.7
SULPHATE	(SO_4)	155	3.2
CHLORIDE	(Cl)	851	24.0
FLUORIDE	(F)		
NITRATE	(NO_3)	1	-
PHOSPHATE	(PO_4)		

TOTALS AND BALANCE

CATIONS	(me/ℓ)	34.3	DIFF =	0.7
ANIONS	(me/ℓ)	34.9	SUM =	69.2

$\frac{\text{DIFF } 100}{\text{SUM}}$ = 1.0%

DERIVED AND OTHER DATA

CONDUCTIVITY (E.C.) MICRO-S/cm AT 25 DEG.C 3608

TOTAL DISSOLVED SOLIDS	MILLIGRAMS PER LITRE mg/ℓ
A. BASED ON E.C.	
B. CALCULATED (HCO_3=CO_3)	1914
C. RESIDUE ON EVAP. AT 180 DEG.C	
TOTAL HARDNESS AS $CaCO_3$	759
CARBONATE HARDNESS AS $CaCO_3$	383
NON-CARBONATE HARDNESS AS $CaCO_3$	376
TOTAL ALKALINITY AS $CaCO_3$	383
FREE CARBON DIOXIDE (CO_2)	
SUSPENDED SOLIDS	
SILICA (SiO_2)	
BORON (B)	

	UNITS
REACTION - pH	8.3
TURBIDITY (JACKSON)	
COLOUR (HAZEN)	

SODIUM TO TOTAL CATION RATIO(me/ℓ) 54.5%

NAME - E.&W.S. Dept.
ADDRESS CRYSTAL BROOK
DATE COLLECTED MARCH 1978
SAMPLE COLLECTED BY: R. FEBEY

FIELD TEMP. 15 °C
FIELD pH @ °C
FIELD COND. 2500 μ-S/cm

OBS. No. QUORN T.W.S. Well 3
HOLE No. P.N. 2506
D.M. No. 387/68

Sample collected at end of air lifting.

WATER ANALYSIS REPORT

SAMPLE No. W3585 | JOB No. 537-79

CHEMICAL COMPOSITION

		MILLIGRAMS PER LITRE mg/ℓ	MILLEQUIVS. PER LITRE me/ℓ
CATIONS			
CALCIUM	(Ca)	138	6.9
MAGNESIUM	(Mg)	111	9.1
SODIUM	(Na)	453	19.7
POTASSIUM	(K)	18	0.5
IRON	(Fe)		
ANIONS			
HYDROXIDE	(OH)		
CARBONATE	(CO_3)		
BICARBONATE	(HCO_3)	523	8.6
SULPHATE	(SO_4)	170	3.5
CHLORIDE	(Cl)	836	23.6
FLUORIDE	(F)		
NITRATE	(NO_3)	2	.0
PHOSPHATE	(PO_4)		

TOTALS AND BALANCE

CATIONS	(me/ℓ)	36.2	DIFF =	0.5
ANIONS	(me/ℓ)	35.7	SUM =	71.9

$\frac{\text{DIFF } 100}{\text{SUM}}$ = 0.6%

DERIVED AND OTHER DATA

CONDUCTIVITY (E.C.) MICRO-S/cm AT 25 DEG.C 3715

	MILLIGRAMS PER LITRE mg/ℓ
TOTAL DISSOLVED SOLIDS	
A. BASED ON E.C.	
B. CALCULATED (HCO_3=CO_3)	1985
C. RESIDUE ON EVAP. AT 180 DEG.C	
TOTAL HARDNESS AS $CaCO_3$	801
CARBONATE HARDNESS AS $CaCO_3$	428
NON-CARBONATE HARDNESS AS $CaCO_3$	373
TOTAL ALKALINITY AS $CaCO_3$	428
FREE CARBON DIOXIDE (CO_2)	
SUSPENDED SOLIDS	
SILICA (SiO_2)	
BORON (B)	

	UNITS
REACTION - pH	6.6
TURBIDITY (JACKSON)	
COLOUR (HAZEN)	

SODIUM TO TOTAL CATION RATIO(me/ℓ) 54.5%

NAME - E. & W.S. DEPT. NORTHERN REGION
ADDRESS
DATE COLLECTED 21/7/78
SAMPLE COLLECTED BY: C. PENHALL AT END OF WELL DISCHARGE TEST.

FIELD TEMP. °C
FIELD pH @ °C
FIELD COND. μ-S/cm

OBS. No.
HOLE No. P.N. 2506 - Quorn T.W.S. Well 3.
D.M. No. 387/68

WATER ANALYSIS REPORT

SAMPLE No. W2191/78 JOB No. 3941-78

CHEMICAL COMPOSITION

		MILLIGRAMS PER LITRE mg/ℓ	MILLEQUIVS. PER LITRE me/ℓ
CATIONS			
CALCIUM	(Ca)	74	3.7
MAGNESIUM	(Mg)		
SODIUM	(Na)	78	6.4
POTASSIUM	(K)	480	20.9
IRON	(Fe)	15	0.4
ANIONS			
HYDROXIDE	(OH)		
CARBONATE	(CO_3)	15	0.5
BICARBONATE	(HCO_3)	355	5.8
SULPHATE	(SO_4)	200	4.2
CHLORIDE	(Cl)	708	20.0
FLUORIDE	(F)		
NITRATE	(NO_3)	1	
PHOSPHATE	(PO_4)		

TOTALS AND BALANCE

CATIONS	(me/ℓ)	31.4	DIFF =	0.9
ANIONS	(me/ℓ)	30.5	SUM =	61.8

$\frac{\text{DIFF } 100}{\text{SUM}}$ = 1.5%

DERIVED AND OTHER DATA

CONDUCTIVITY (E.C.)
MICRO-S/cm AT 25 DEG.C 2975

	MILLIGRAMS PER LITRE mg/ℓ
TOTAL DISSOLVED SOLIDS	
A. BASED ON E.C.	
B. CALCULATED (HCO_3=CO_3)	1745
C. RESIDUE ON EVAP. AT 180 DEG.C	
TOTAL HARDNESS AS $CaCO_3$	506
CARBONATE HARDNESS AS $CaCO_3$	291
NON-CARBONATE HARDNESS AS $CaCO_3$	215
TOTAL ALKALINITY AS $CaCO_3$	316
FREE CARBON DIOXIDE (CO_2)	
SUSPENDED SOLIDS	
SILICA (SiO_2)	
BORON (B)	

	UNITS
REACTION - pH	8.5
TURBIDITY (JACKSON)	
COLOUR (HAZEN)	

SODIUM TO TOTAL CATION RATIO(me/ℓ) 66.6%

NAME -
ADDRESS
DATE COLLECTED 1/4/78
SAMPLE COLLECTED BY: R. FEBEY at end of air lifting.

FIELD TEMP. 27 °C
FIELD pH @ °C
FIELD COND. 2900 μ-S/cm

OBS. No.
HOLE No. Quorn Scout hole No. 1.
D.M. No. 476/77

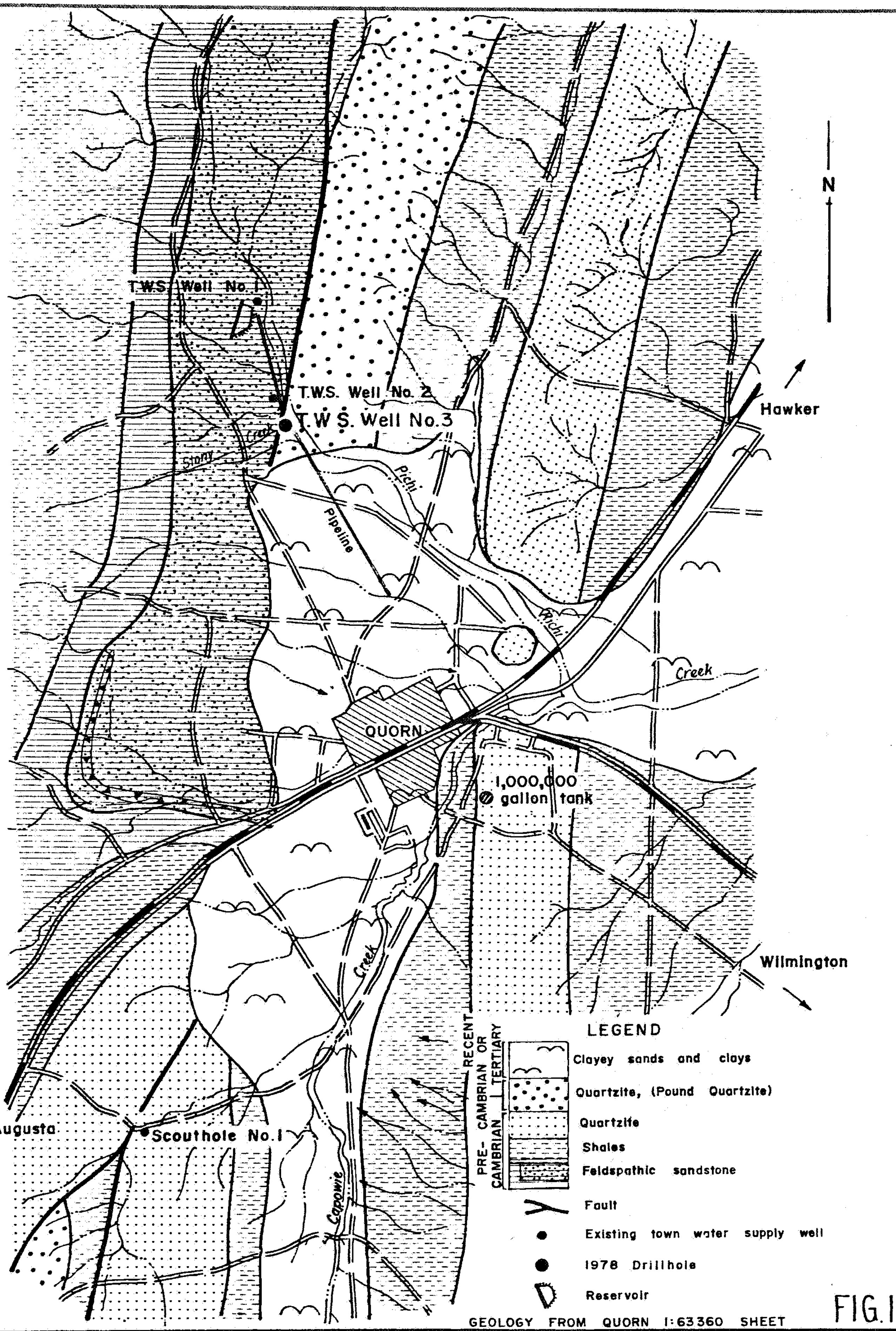
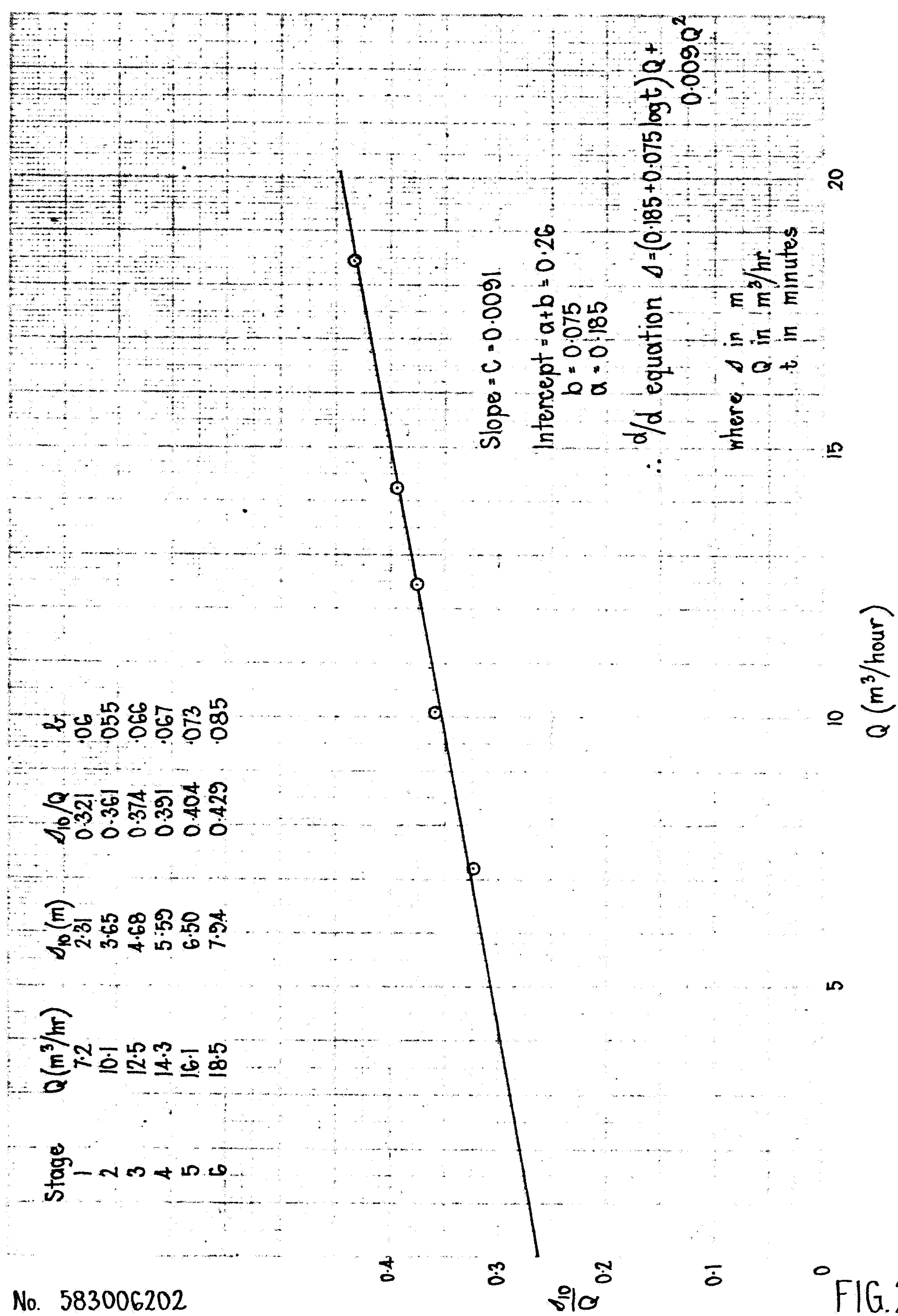


FIG.1

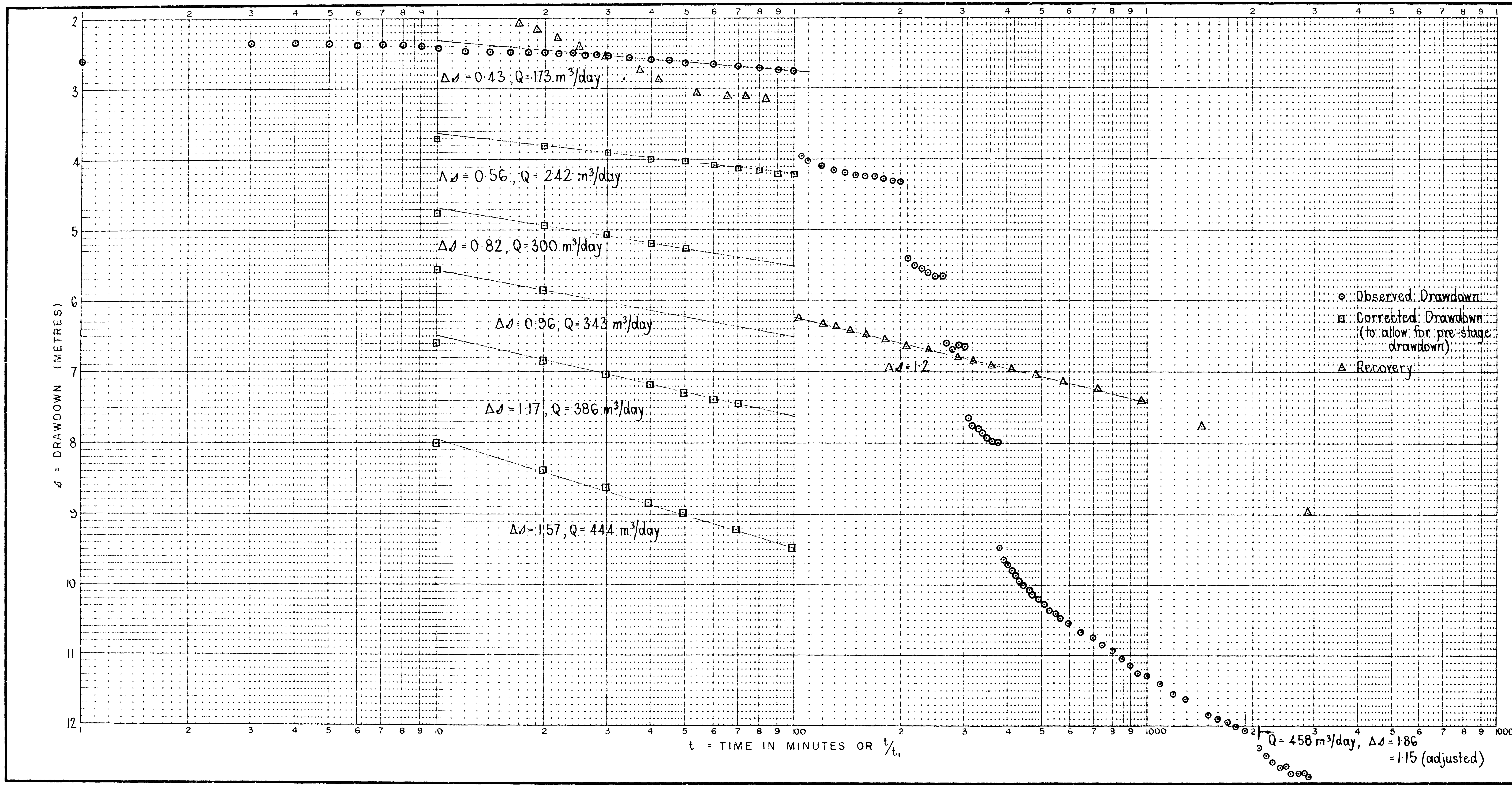
	DEPARTMENT OF MINES – SOUTH AUSTRALIA	SCALE 1:63360
COMPILED X. SIBENALER	QUORN TOWN WATER SUPPLY	DATE 15th SEPT. 1977
DRN TE | CKD R.H.	WELL LOCATIONS AND GEOLOGY	PLAN NUMBER S13816



Well No. 583006202

FIG. 2

	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE
COMPILED X.P.S.	QUORN TOWN WATER SUPPLY	DATE Dec 1978
DRN R.H. CKD	DERIVATION OF DRAWDOWN EQUATION	PLAN NUMBER S13817



P.F. No. 69—953 MH

BOREHOLE STATE/UNIT No. 583006202

REF. PT. .... (m) above ground

AQUIFER FROM 45 TO 69 (m)

HOLE DEPTH 69 (m)

TYPE OF PUMP Mono 8-10

LENGTH OF TEST 48 hrs.

DEPTH WATER LEVEL AT TEST START (ℓ_2) 42 (m)

DEPTH PUMP INTAKE (ℓ_1) 64 (m)

* AVAILABLE DRAWDOWN 22 (m)

EQUATIONS

$$T = \frac{0{\cdot}183 \times Q}{\Delta_s} \qquad S = \frac{2{\cdot}25 \times T t_o}{r^2}$$

In which

T = Transmissivity (m³/day/m) S = Storage Coefficient

Q = Pumping Rate (m³/day) t_o = Zero drawdown time (mins)

Δ_s = Drawdown per log cycle (m) r = Distance to Observation Bore (m)

1 day = $8{\cdot}64 \times 10^4$ secs.

DATA

Q	Δ_s	t_o	r
458	late (adjusted) 1·15	–	–

CALCULATIONS

Drawdown

T_{late} (adjusted, $s' = s - \frac{s^2}{2b}$) = 73 m³/day/m

Recovery

T (adjusted, Qav. = 411) = 90 m³/day/m.

* Available drawdown = $\ell_1 - \ell_2$

FIG. 3

COMPILED X. P. S.	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	D.M. 387/68
DRN R. H. CKD	QUORN TOWN WATER SUPPLY WELL No. 3	DATE Dec 1978
	PERMIT No. 2506 — WELL No. 583006202	PLAN NUMBER 78-937
	WELL DISCHARGE TEST	