GEOLOGICAL SURVEY

Elliston Town Water Supply
Report on Drilling and Pump Testing

by

A.F. WILLIAMS

Department of Mines
South Australia —

RB 73/158

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
ENGINEERING DIVISION

ELLISTON TOWN WATER SUPPLY
REPORT ON DRILLING AND PUMP TESTING

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A.F. WILLIAMS
GEOLOGIST
HYDROGEOLOGY SECTION

Rept.Bk.No. 73/158
G.S. No. 5163
Hyd. No. 2556
D.M. No. 1015/69

27th June, 1973

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REPORT ON DRILLING AND PUMP TESTING

INTRODUCTION

At the request of the Engineering and Water Supply Department, a bore hole was drilled and pump tested by the Drilling Branch of the Mines Department to provide an alternate source for the town water supply (see Fig. 1). This bore is some 0.8 km (½m) from the main producing bore. Mr. W.H. Deer, Resident Engineer for the above Department at Port Lincoln indicated that a supply of about 6 litres per second (4 500 gallons per hour) should be sufficient for an auxiliary source.

RESULTS

This bore intersected some 84m of calcarenite (see log appendix 1) which was generally poorly cemented but some harder bands were found at depth. The whole of the sequence penetrated is considered part of the Bridgewater Formation. The bore was subsequently pump tested with a line shaft pump. An airline and pressure gauge arrangement was used to record the pressure decrease in the hole during the test (each 1 kilopascal pressure decrease corresponded to a decrease of 0.1 metre of drawdown). The results are displayed on Table 1. The maximum drop of pressure recorded during the test was 14 kilopascals (2 lbs/sq.in) which corresponded to 1.4 metres of drawdown. The bore hole developed slightly during the test and at the completion, the pressure had recovered by

7 kilopascals equivalent to a final drawdown of 0.7 metres.

The bore fully recovered in 20 minutes (see Table I). Pumping rate averaged about 11.3 litres per second. Salinity results (about 900 mg/l - see appendix II) indicated that the water is suitable for human consumption.

CONCLUSIONS

This bore should provide an adequate auxiliary source for the Elliston town water supply. The bore can be safely pumped at about 11 litres per second. No problems are anticipated since the supply required is of the order of 6 litres per second.

AFW:jl
27th June, 1973

A.F. WILLIAMS
GEOLOGIST
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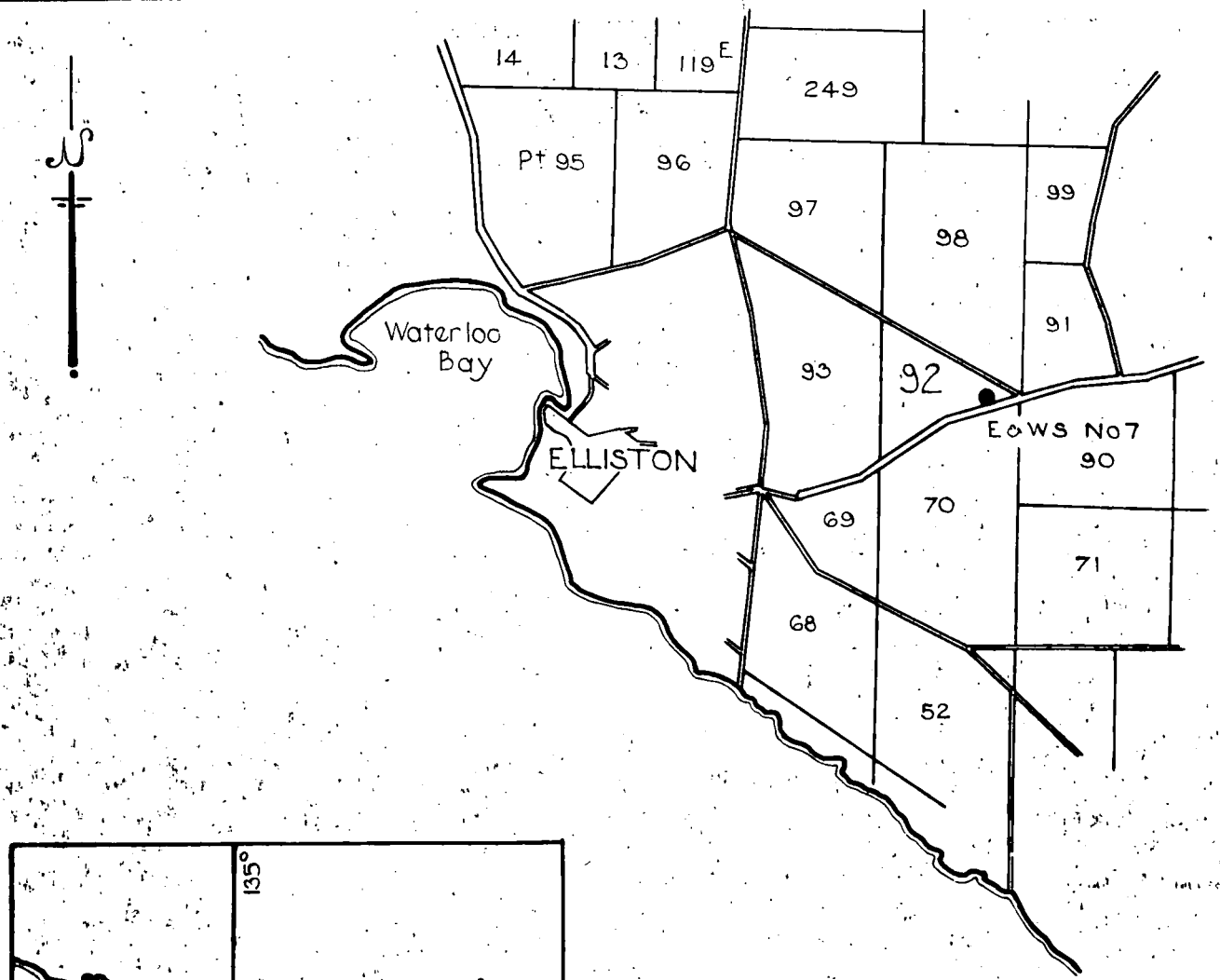
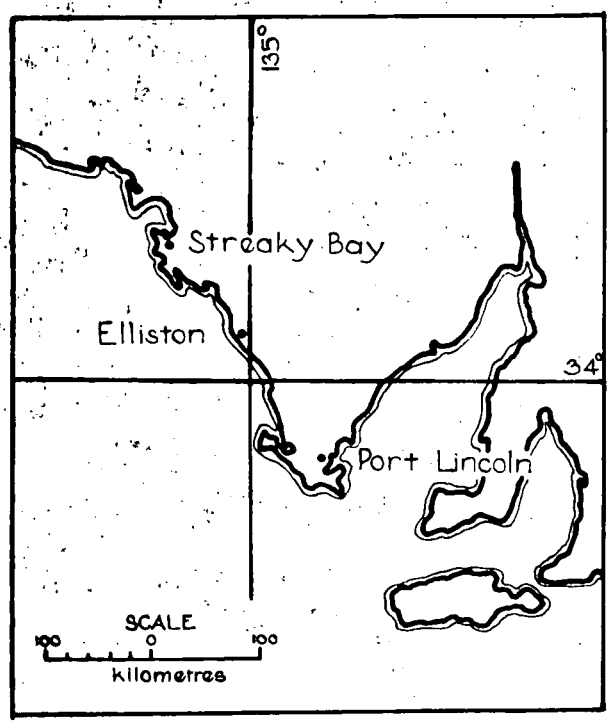
Table I - showing time, pressure readings and pump rates.

Time (minutes after start)	Pressure reading (kilopascals)	Pumping rate litres per second	
0	179	-	
30	176	10.9	
60	172	11.0	
9090	169	11.1	
120	165	11.2	
150	165	"	
180	165	"	
720	165	11.2	
1350	165	11.2	
1980	165	11.4	
2370	169	11.1	
2460	171	11.1	
2700	171	11.2	
1790	171	11.3	
Pump stopped at 2790 minutes after start Bore then allowed to recover			
2880	172		
2890	191	Release of water from pump column?	
2900	179	- Recovery complete	

Note (i) 1 kilopascal = 0.145 pounds per square inch.

(ii) Average pump rate 11.3 litres per second.





SCALE

METRES 1000 0 1000 2000 METRES

FEET 5000 0 5000 FEET

FIG. 1

	DEPARTMENT OF MINES — SOUTH AUSTRALIA	Scale: 1:63 360
Compiled: A.F.W.	LOCALITY PLAN ELLISTON TOWN WATER SUPPLY AUXILIARY BORE	Date: 27 June 1973
Drn. R.B. | Ckd.		Drg. No. S10361 D1.6

300—6.72 C5552

DEPARTMENT OF MINES — SOUTH AUSTRALIA

BORE LOG · HYDROGEOLOGY

Purpose of Bore: ELLISTON TOWN WATER SUPPLY
State No. 680009203
Hundred: WARD
Section: 92
Bore Serial No. 32/73
Owner: E. & W.S.
Address: VICTORIA SQ. ADELAIDE
Project No. BORE 6
Driller: A. STURAK
Docket No. 1015/69
Commenced: 19.3.73
Completed: 30.3.73
R.L. Collar (M.S.L.)
Depth: 84 m
Drill type: CABLE TOOL
Circulation
R.L. Surface
Co-ords E
Logged by: A.F.WILLIAMS
Date: 8.5.73
Casing: see log
A.M.G. Zone
N

WATERS CUT	DEPTH (m)	WATER LEVEL (m)	SUPPLY-l/sec	HOW TESTED	TOTAL SALTS mg/l	ANALYSIS No.
	59	55.15	5	Pump tested	886	W1692/73

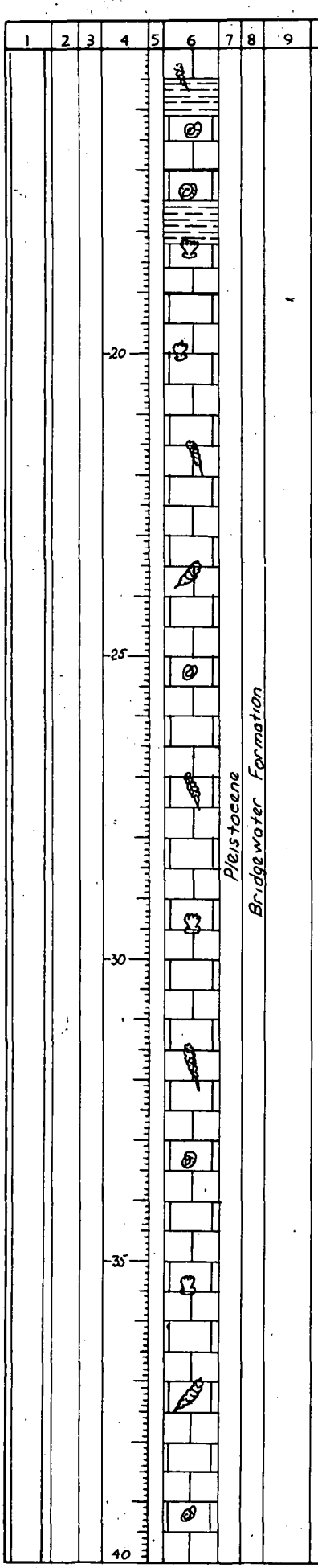
REMARKS

1 CASING	2 WATERS CUT	3 WATER LEVEL	4 DEPTH (m)	5 CORE	6 GRAPHIC LOG	7 AGE	8 UNIT	9 PENETRATION RATE
* 80.54m of 6" Casing			5, 10, 15			Pleistocene	Bridgewater formation	

DESCRIPTION

0 - .84 m Calcarenite 95% carbonate, 5% quartz fine to medium grained, subangular to well rounded, possibly some oolitic grains, pink, grey, white and yellow. Poorly cemented. Possible shell fragments

11-15 m 5% clay.

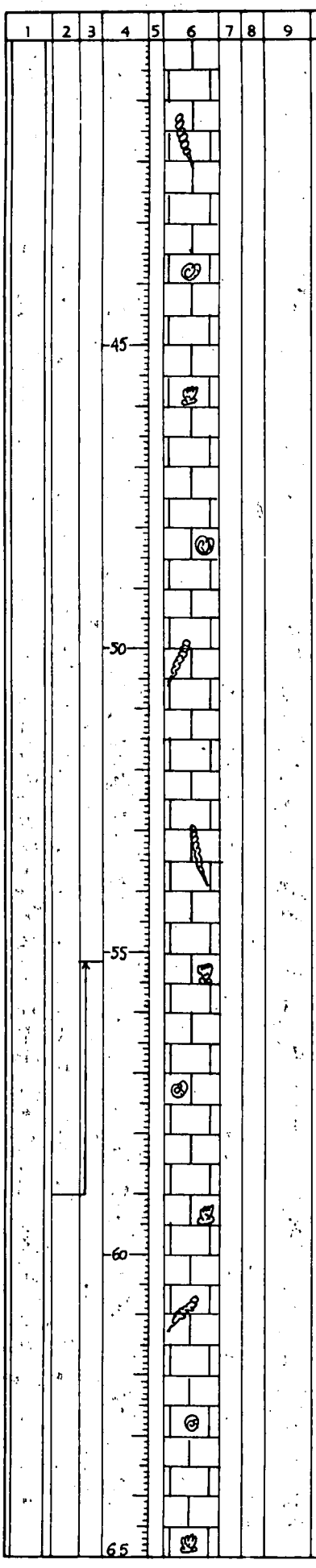


15-17 m as above 10-15% clay.

17-19 m as above 5-10% quartz, less clay. Some carbonate cement.

19-25 m as above but some harder material at 19-21 m.

25-41 m as above but becoming more yellowish.

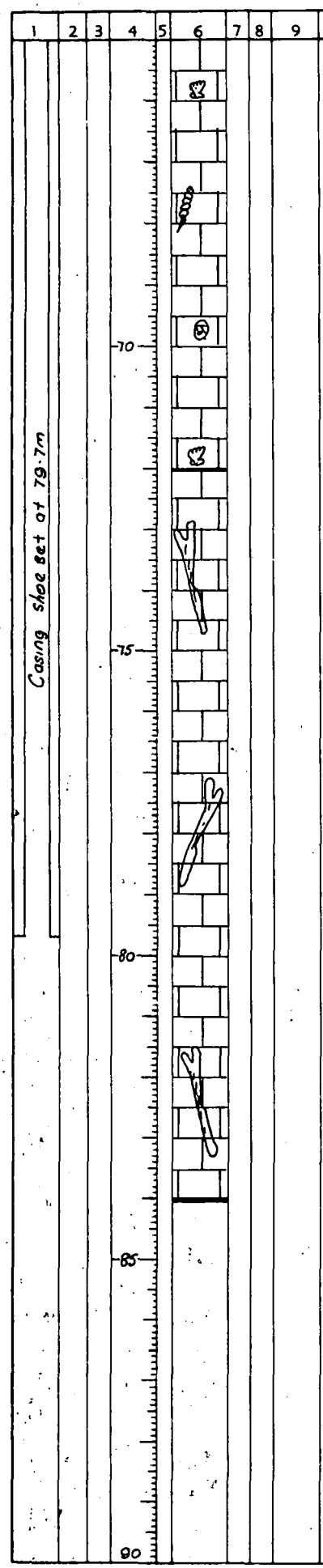


41-43 m slightly more clayey and becoming pinkish.

43-45 m Harder reasonably well cemented bands.

45-55 m as for 43-45 m.

55-72 m as for 43-45 m - brownish yellow, predominantly medium grained.



72-84 m as for 55-72 m - some bryozoal fragments? Well cemented and poorly cemented material.

75-79 m - predominantly poorly cemented.

79-82 m as above some hard well cemented fragments.

82-84 m - as for 79-82 m. Some hard recrystallized material.

84 - end of hole.

amdel

WATER ANALYSIS REPORT

SAMPLE NO. W1692/73 JOB NO. 4328/73

CHEMICAL COMPOSITION

		Milligrams per litre mg/l	Milliequivalents per litre me/l
Cations			
Calcium	(Ca)	69	3.4
Magnesium	(Mg)	45	3.7
Sodium	(Na)	200	8.7
Potassium	(K)	7	0.2
Iron	(Fe)		
Anions			
Carbonate	(CO_3)		
Bicarbonate	(HCO_3)	305	5.0
Sulphate	(SO_4)	50	1.0
Chloride	(Cl)	358	10.1
Fluoride	(F)		
Nitrate	(NO_3)	7	0.1
Phosphate	(PO_4)		

TOTALS and BALANCE

Cations me/l	Anion me/l
16.0	16.2

diff Δ 0.2 sum Σ 32.2 % $(\frac{\Delta \times 100}{\Sigma})$ 0.62

DERIVED AND OTHER DATA

Conductivity (E.C.) μS/cm at 25°C 1705

	Milligrams per litre mg/l	Units
Total Dissolved Solids:		
a. Based on E.C.		
b. Calculated (HCO_3=CO_3)	886	
c. Residue on evaporation at 180°C		
Total Hardness as $CaCO_3$	355	
Carbonate Hardness as $CaCO_3$	250	
Non-carbonate Hardness as $CaCO_3$	105	
Total Alkalinity as $CaCO_3$	250	
Free Carbon Dioxide (CO_2)		
Suspended Solids		
Silica (SiO_2)		
Boron (B)		
		Units
Reaction–pH		
Turbidity (Jackson)		
Colour (Hazen)		
~~Sodium Absorption Ratio~~ Sodium to total cation ratio	54.4	

Name E.& W.S. Hundred Ward Supply 4,000

Section 680009203 Depth Hole 84.00

Address Ellistontown Hole No. 6 Date Collected 28.3.73

Water Supply Water Cut 59.00 Sample Collected by A Sturak

Water Level 55.15 Date Received

REMARKS:

for Director

WATER ANALYSIS REPORT

SAMPLE NO. 1265/73 JOB NO. 4483/73

CHEMICAL COMPOSITION		Milligrams per litre mg/l	Milliequivalents per litre me/l
Cations			
Calcium	(Ca)	57	2.8
Magnesium	(Mg)	49	4.0
Sodium	(Na)	218	9.5
Potassium	(K)	8	0.2
Iron	(Fe)		
Anions			
Carbonate	(CO_3)		
Bicarbonate	(HCO_3)	310	5.1
Sulphate	(SO_4)	50	1.0
Chloride	(Cl)	365	10.3
Fluoride	(F)		
Nitrate	(NO_3)	8	0.1
Phosphate	(PO_4)	0.08	-

TOTALS and BALANCE

Cations me/l	Anion me/l
16.5	16.5

diff Δ 0 sum Σ 33.0 % $(\frac{\Delta \times 100}{\Sigma})$ -

DERIVED AND OTHER DATA	Milligrams per litre mg/l
Conductivity (E.C.) μS/cm at 25°C 1545	
Total Dissolved Solids:	
a. Based on E.C.	
b. Calculated (HCO_3=CO_3)	908
c. Residue on evaporation at 180°C	
Total Hardness as $CaCO_3$	345
Carbonate Hardness as $CaCO_3$	255
Non-carbonate Hardness as $CaCO_3$	90
Total Alkalinity as $CaCO_3$	255
Free Carbon Dioxide (CO_2)	
Suspended Solids	
Silica (SiO_2)	
Boron (B)	
	Units
Reaction—pH	
Turbidity (Jackson)	
Colour (Hazen)	
Sodium Absorption Ratio	
Sodium to total cation ratio (equiva)	57.6

Name Elliston Town Supply Hundred Ward Supply 8960 gph

Section 92 Depth Hole

Address Hole No. 7 Date Collected 11.4.73

Water Cut Sample Collected by R. Tait

Water Level Date Received

REMARKS:

for Director