

CEDARLANE WATER SYSTEM
SALTSPRING ISLAND
GROUNDWATER STUDY

Report

to

CAPITAL REGIONAL DISTRICT

FILE COPY

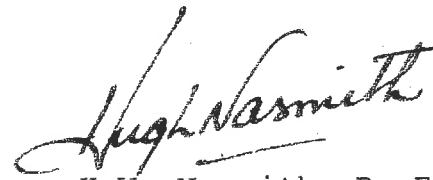
NOT TO BE REMOVED

FROM THURBER CONSULTANTS LTD.

VICTORIA OFFICE

Thurber Consultants Ltd.,
Victoria, B.C.

November 26, 1980
File: 17-210-21



H.W. Nasmith, P. Eng.,
Review Principal

B.I. Ingimundson, C.E.T.,
Project Manager

TABLE OF CONTENTS

	Page
1. INTRODUCTION	1
2. DATA COLLECTION	1
3. AREA AQUIFER CHARACTERISTICS	2
4. EXISTING WELL DATA EVALUATION	4
4.1 Well No. 1	4
4.2 Well No. 2	5
4.3 Well No. 3	6
4.4 Well No. 4	6
4.5 Well No. 5	7
4.6 Post Script	8
5. GROUNDWATER CHEMISTRY	8
6. CONCLUSIONS AND RECOMMENDATIONS	9

APPENDIX

1. INTRODUCTION

Thurber Consultants Ltd. were requested by the Capital Regional District to undertake the evaluation of existing water well information on 5 existing water wells at the Cedarlane Subdivision on Saltspring Island, B.C.. The well yield analysis study forms part of the overall water supply investigation for the Capital Regional District - Cedarlane Takeover Study.

The data evaluation and report preparation were under the direction of Mr. B.I. Ingimundson, C.E.T., with Mr. H.W. Nasmith, P. Eng. acting as Review Principal for the firm.

The terms of reference for the study were outlined in a letter from the Capital Regional District dated November 18, 1980. The study was to consist of an evaluation of existing data which was collected and reported by others. No field investigations or on-site discussions with residents were undertaken.

2. DATA COLLECTION

Information examined was supplied by the following:

- Capital Regional District, Victoria, B.C.
- Ministry of the Environment
Inventory and Engineering Branch
Groundwater Hydrology Section
Victoria, B.C.
- Ministry of the Environment
Water Rights Branch
Community Water Supply Section
Victoria, B.C.

The following reports and correspondence were studied during our investigations:

- "Report on Water Supply and Distribution System to Serve the Scotton Subdivision at Robinson and Mansell Roads, Saltspring Island, B.C." Associated Engineering Services Ltd. - December 1968
- "Addendum I, to Report on Water Supply and Distribution System to Serve the Scotton Subdivision at Robinson and Mansell Roads, Saltspring Island, B.C." Associated Engineering Services Ltd. - March 12, 1970
- Letter of February 9, 1973 to Cedarlane Water Systems Ltd., from Associated Engineering Services Ltd.
- Cedarlane - Scotton Takeover Study - Field Inspection Report
Capital Regional District, October 16, 1980
- "A Preliminary Geohydrological Study of Saltspring Island, B.C."
W.S. Hodge, March 1977
Groundwater Section, Ministry of the Environment

In addition to the above, well drilling and water chemistry information on the wells within the subdivision was obtained from the Ministry of the Environment. Stereo air photos were also examined to establish an appreciation for the terrain and watershed conditions.

All information collected referred to well yields and test pumping in gallons per minute (gpm). Since no reference was made to US or Imperial gallons we have assumed all testing information to be in US gallons per minute (USgpm).

3. AREA AQUIFER CHARACTERISTICS

Drilling information indicates the aquifer supplying the three wells (Nos. 1, 2 and 5) under study is composed of Upper Cretaceous (Nanaimo Group) marine

origin, sedimentary SANDSTONE. These sedimentary rocks are characterized by low porosity and permeability.

Geohydrology studies on Saltspring Island indicate the expected yield of most wells to be between 1 and 5 USgpm.

The recharge for the aquifer in the study area is expected to come from seasonal precipitation. The average annual precipitation on Saltspring Island is 33 inches (Halstead, 1967) and the estimated annual evapotranspiration is 16 inches (Chapman & Brown, 1966). Thus only 17 inches of precipitation remains for runoff and infiltration. As runoff is high, due to the topography on the island a minimal (probably less than 10%) infiltrates into the rock to recharge the aquifers.

A 100 day drought period is considered minimum in determining recharge annually on the Gulf Islands.

The Cedarlane wells receive their water from sandstone aquifers, which are close to the natural saline aquifers in the Ganges Harbour region. High concentrations of saltwater are known to exist just south of the subdivision. The Cedarlane well No. 4 yielded saltwater part way through its test pumping and was abandoned.

The majority of the water for the present subdivision supply is coming from Well No. 5. The drillers log indicates the source of supply for Well No. 5 is a bedrock fracture between 121 to 123 ft. The water supplying Well Nos. 1 and 2 appears to come from micro fractures and natural porosity of the sandstone. No drilling logs were located for Well Nos. 1 and 2, however the depth of 205 ft for both wells was mentioned in the existing reports.

4. EXISTING WELL DATA EVALUATION

4.1 Well No. 1

Well No. 1, 6 inches in diameter, was drilled to a reported depth of 205 ft in 1968. Although not reported, it is believed the well encountered less than 10 ft of clay or till overburden and then continued to its total depth of 205 ft in sandstone.

The driller, upon completion of drilling, undertook a brief bail test and rated the well at 4 USgpm. The owner subsequently undertook a 24 hour pump test in November 7 - 8, 1968 at a variable pumping rate and rated the well at 4 to 5 USgpm.

The well was re-tested twice in the winter of 1969 to 1970, first at a variable pumping rate for 95 hours and then a second test at a variable pumping rate for 18 to 24 hours. A limited amount of information is available regarding the tests and evidence exists to show that the well had not fully recovered prior to the start of the second test. The well was rated at 4.8 USgpm following these tests.

Our data analysis is based upon the information given in Table 3, Page 4 of the Associated Engineering Services Ltd. report (Addendum 1) dated March 12, 1970. A photocopy of this table is appended to this report.

The information cannot be accurately plotted on a time vs drawdown curve as the pumping rate varied during the test, while the pumping level was held at a constant 190 ft.

The pumping rate continued to decline through the entire test indicating that an equilibrium between pumping and recharge was not achieved.

Using the pumping data collected during the test we have arrived at a theoretical specific capacity of 0.03 USgpm per ft of drawdown. Allowing for a maximum pump setting of 190 ft from surface, we arrived at a maximum available drawdown of 180 ft from the static water level at the time of the test.

The pump tests were performed to procedures not used today and the testing was apparently done during the high recharge winter months. We would suggest, to arrive a theoretical safe yield, based upon the existing information, that the well be rated at 70% of its available drawdown. Therefore the calculated theoretical safe yield at this time would be 3.8 USgpm.

To confirm the actual safe yield a minimum 72 hour pump test should be run under controlled conditions during the low recharge period mid September to the end of October.

4.2 Well No. 2

Well No. 2, 6 inches in diameter, was drilled to a reported depth of 205 ft, probably at the same time as Well No. 1, in 1968. No log is available but it is believed the well is in the same low porosity sandstone formation.

The driller performed a bail test following completion of drilling and rated the well at 1.0 USgpm.

The owner subsequently undertook a pump test for 18 hours, in the winter of 1969-1970. The pumping rate was allowed to fall while the water level was held constant at 190 ft. The pumping rate did not stabilize during the entire length of the test. The analysis of data collected resulted in the well being rated at 2.0 USgpm.

Our data analysis is based upon the information given in Table 1, Page 2 of the Associated Engineering Services Ltd. report (Addendum 1), dated March 12, 1970. A photocopy of this table is appended to this report.

The information cannot be accurately plotted on a time vs drawdown curve, as the pumping rate varied during the test.

Using the pumping data collected, we have arrived at a theoretical specific capacity of 0.01 USgpm per ft of drawdown. Allowing for a maximum pump setting

of 190 ft from surface, we arrived at a maximum available drawdown of 175 ft from the static water level at the time of the test.

The pump tests were performed to procedures not used today and the testing apparently was done during the high recharge winter months. We would suggest, to arrive at a theoretical safe yield, based upon the existing information, that the well be rated at 70% of its available drawdown. Therefore the calculated theoretical safe yield at this time is 1.2 USgpm.

To confirm the actual safe yield a minimum 72 hour pump test should be run under controlled conditions during the low recharge period mid September to the end of October.

4.3 Well No. 3

Well No. 3, 6 inches in diameter, was drilled between 1968 and 1970. No drill log information was found pertaining to this well.

The well was to be tested at the same time as well Nos. 1 and 2, winter 1969 to 1970, however it was discovered that the hole had collapsed, thus the well was abandoned.

4.4 Well No. 4

Well No. 4, 6 inches in diameter, was drilled between 1968 and 1970. No drill log information was found pertaining to this well.

Test pumping of Well No. 4 was undertaken in the winter of 1969 to 1970. Partially through the test it was noticed the water was becoming salty. A chemical analysis established the following.

Calcium carbonate	42,500 ppm
Calcium	16,000 ppm
Magnesium	610 ppm
Sodium	31,000 ppm
Chlorides	77,760 ppm

The well was immediately abandoned. It is believed that the well either intercepted the natural saline aquifer, known to exist south of the subdivision, or the pumping of initially fresh water pulled the saline water into the well.

4.5 Well No. 5

Well No. 5, 8 inches in diameter, was drilled to a completed depth of 135 ft March 23 to 24, 1970. The drilling log indicated 7 ft of clay over sandstone. The driller noted that the major source of water came from a large fracture between 121 and 123 ft from surface.

The well was bail tested by the driller and rated at 20 USgpm.

The well was subsequently pump tested between October 4 - 7, 1971. The well was pumped at constant rate of 10 USgpm for a continuous period of 76 hours. The well was rated at that time at 7 USgpm.

A complete set of test pumping data was acquired from the Ministry of the Environment and our assessment of the well yield was based upon this information. A photocopy of the driller's well log and test pumping data is appended to this report.

We were able to draw a time vs drawdown curve for the pump test as the pumping rate remained constant. A copy of the curve is appended to this report.

The static water level was noted as 55 ft from surface at the commencement of the test. The water level continued to decline throughout the entire 78 hr pumping period. The curve indicates that, had pumping continued at 10 USgpm, the water level would have reached the fracture zone after 7500 minutes or a little over 5 days.

The Transmissivity of the aquifer around the well can be theoretically determined at 140 US gallons per day per foot of aquifer, from the drawdown curve. The

specific capacity based upon the pumping information was calculated as 0.075 USgpm per foot of drawdown.

Assuming the drilling information to be correct, the maximum pump setting should be 120 ft from surface. Therefore, the maximum available drawdown was computed as 65 ft from the static water level at the commencement of the test. The estimated minimum safe yield is therefore calculated at 4.8 USgpm.

4.6 Post Script

During our search for groundwater information at the Ministry of the Environment we discovered a limited information well log that stated a well to a depth of 300 ft was drilled in 1968 for Mr. Scotton, apparently in the vicinity of lots 5 or 6 in the southeast corner of the subdivision. The limited drilling information indicated the well was "nearly dry" and the driller estimated the yield at no greater than 1/4 USgpm.

5. Groundwater Chemistry

A water chemistry analysis was conducted on samples from wells numbers 1 and 5 and a nitrate/nitrite determination was done on water from Well No. 2. Recently a chemical analysis was done for the Capital Regional District on a sample taken from the water distribution system.

Below is a summary of the water chemistry analysis. Photocopies of the data sheets are appended to this report.

Groundwater Chemistry

Parameters	Limits (mg/l)	Well No. 1 11/21/68	Well No. 2 03/11/70	Well No. 5 10/22/71	Reservoir Oct 23/80
pH	6.5-8.3	7.45		6.9	7.2
TDS	1000	266			304
Alkalinity	30-500	195		210	193.3
Calcium	200	24.8		64	48

Groundwater Chemistry - continued

Parameters	Limits (mg/l)	Well No. 1 11/21/68	Well No. 2 03/11/70	Well No. 5 10/22/71	Reservoir Oct 23/80
Magnesium	150				9.6
Hardness	180	78.5		137	159
Manganese	0.05				0.31*
Iron	0.30	0.34*		0.4*	0.1
Sodium	300			28	45
Chloride	250	7.1		5	43.6
Fluoride	1.5				0.1
Sulphate	500			9	8.0
Nitrates	45	1	0.08	1	
Nitrites	2		0.01		
Turbidity	5	4		15*	
Potassium				0.5	
Nitrogen (No ₂ &No ₃)					0.4
Color	15 Units				1

*Exceeds recommended drinking water standards at the time of sampling

Manganese in water supplies is objectionable because at levels exceeding 0.15 mg/l it stains plumbing fixtures and laundry. With high iron concentrations its presence may lead to an accumulation of microbial growths in the distribution system forming coatings on metal pipes which may slough off as black precipitates.

6. CONCLUSIONS AND RECOMMENDATIONS

The data analyzed in this report was collected by others. The test procedures followed in the test pumping of Wells No. 1, 2, and 5 are not in accordance with generally accepted practices today. It would appear that the test pumping of Well No. 1 and 2 were done during the wet winter months when aquifer recharge is at its greatest.

It should also be noted that no information exists about pumping interference between the wells.

Based upon the information at hand, the following table with theoretical well yields resulted.

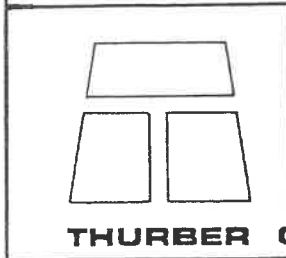
Well No.	Depth (ft)	Utility Yield (US gpm)	TCL Analysis (US gpm)
1	205	4.8	3.8
2	205	2.0	1.2
5	135	<u>7.0</u>	<u>4.8</u>
Cummulative Yield		13.8	9.8

To truly assess the sustained yield of the wells, controlled test pumping procedures should be undertaken for periods between 72 and 144 hours. The testing should be done during the seasonal low recharge period, mid September to late October. However, we believe the data examined provided reasonable-enough information to arrive at realistic minimum well yield estimates.

Should the demand for water exceed the estimated minimum well supply then we recommend a hydrogeological study be undertaken to attempt to locate and develop additional sources of potable well water.

As it would appear that the subdivision is very close to the Ganges Harbour Region saline aquifer, care should be taken in drilling future wells, so as not to draw saltwater into the existing freshwater aquifer.

Should the Capital Regional District take over maintenance of the wells, we recommend a water level monitoring program be established to develop a history of seasonal water level changes. We would be pleased to assist you in establishing the program.



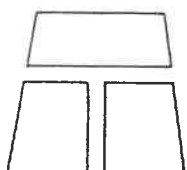
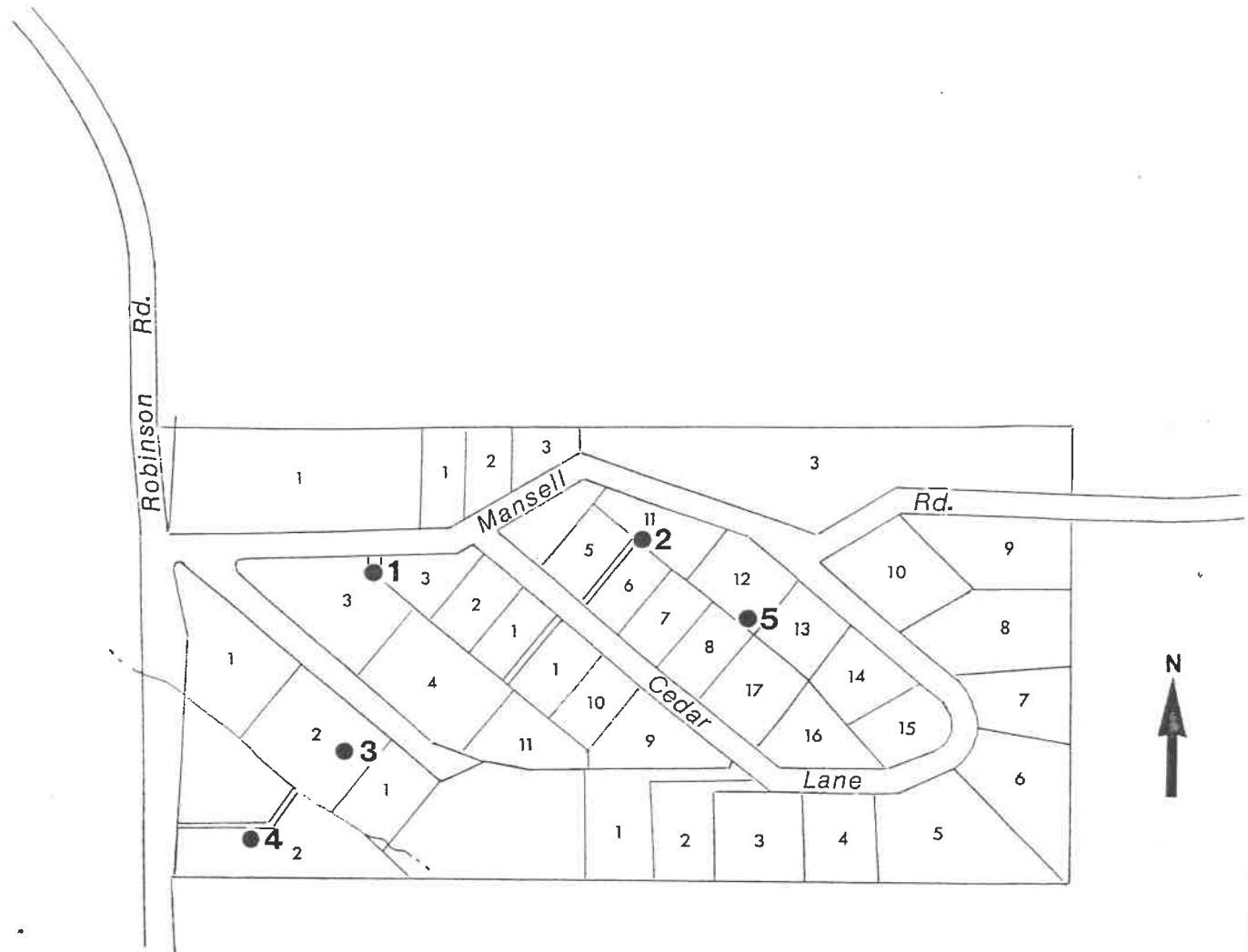
Capital Regional District

SITE LOCATION

Cedar Lane Groundwater Study - Saltspring Island

THURBER CONSULTANTS LTD., Geotechnical Engineers

DRAWN	D.S.
TRACED	
DATE	Dec. 1/80
APPROVED	<i>dii</i>
SCALE	1:250,000
DRAWING NO	17-210-21-1



THURBER CONSULTANTS LTD., Geotechnical Engineers

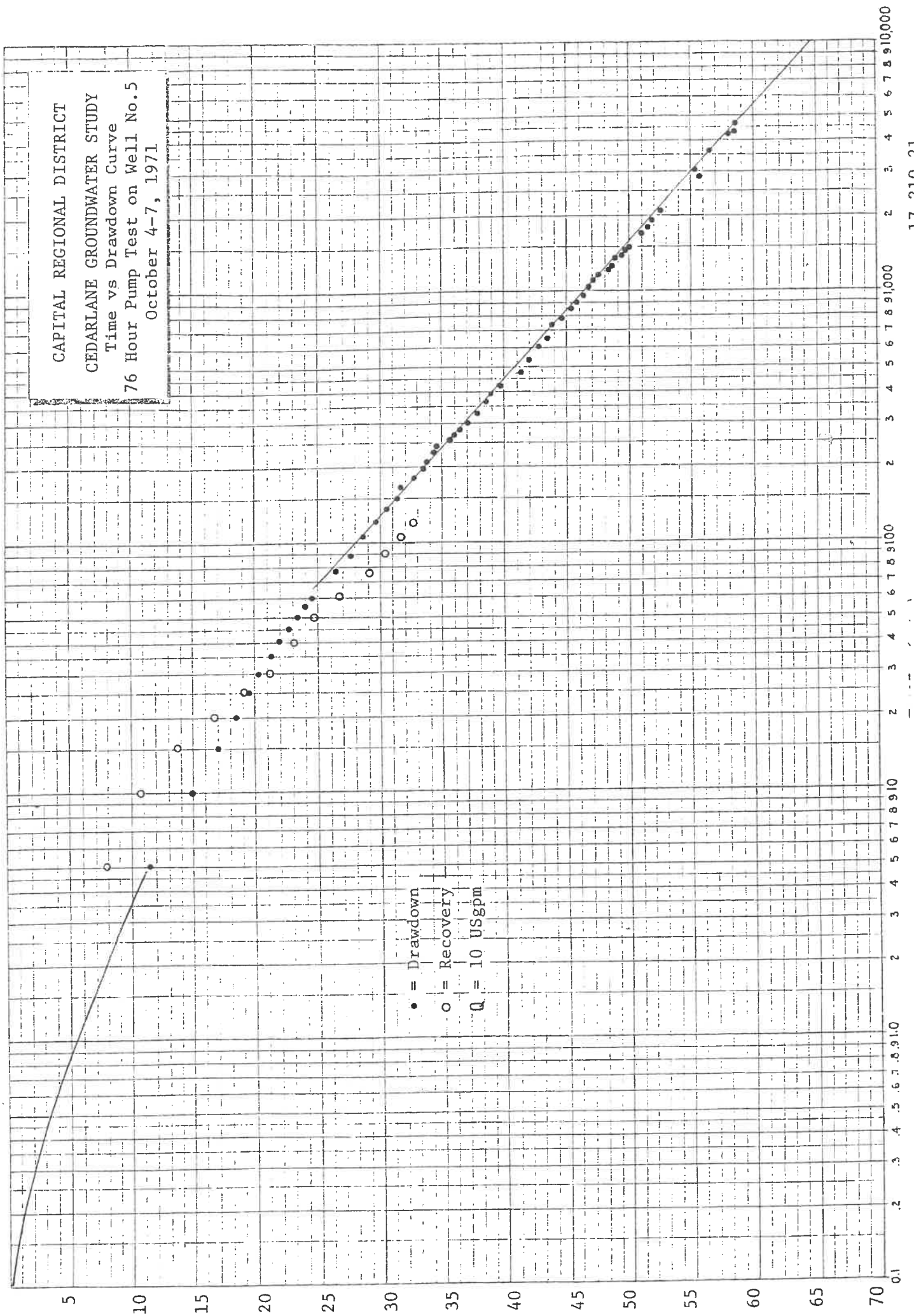
Capital Regional District

WELL LOCATIONS

Cedar Lane Groundwater Study - Saltspring Island

DRAWN	D.S.
TRACED	
DATE	Dec. 1/80
APPROVED	<i>Dii</i>
SCALE	n.t.s.
DRAWING NO	17-210-21-2

CAPITAL REGIONAL DISTRICT
CEDARLANE GROUNDWATER STUDY
Time vs Drawdown Curve
76 Hour Pump Test on Well No.5
October 4-7, 1971



KEN'S DRILLING LTD.

211 - 1409 WEST BROADWAY

VANCOUVER 9, B.C.

TELEPHONES: VANCOUVER 736-0022 - VICTORIA 477-4982

WELL LOG

OWNER SWITTON LUMBER LTD
ADDRESS Box 30 CANOE BC

INVOICE

8 FEET CASING @ 4.00 = \$33.00
135 FEET WELL HOLE @ 6.00 = \$810

TOTAL \$843.00

DATE BEGUN MAR 33
DATE COMPLETED MAR 24
YIELD APPROX 20 GALLONS PER MINUTE
PUMPING WATER LEVEL 130 FEET FROM SURFACE
CASING USED 8
BOTTOM OF CASING 7 1/2 FEET FROM SURFACE
STICK-UP ABOVE GROUND 6" FEET

DRILLER: Doug Smithson

DEPTH MATERIAL

CLAY AND SOFT SANDSTONE

A SMALL TRACE OF WATER

SANDSTONE WITH A LARGE FRACTURE BETWEEN 121 FT 123 FT WITH A GOOD STREAM OF WATER

A HARD SANDSTONE

PR Apr 6/71
Lum # 121

Table 3 Pumping Test Results
Well No. 1 Test 2 (1)

Time Hours (2)	Water Level (3)	Pump Rate GPM (4)	Period Hours (2)	Water Level (3)	Pump Rate GPM (4)
0			12		
1	190	5.5	13	190	5.0
2	190	5.4	14	190	5.0
3	190	5.3	15	190	4.7
4	189.5	5.3	16	185	5.1
5	190	5.3	17	190	4.9
6	190.5	5.1	18	190	4.9
7	192	5.2	19	190	4.9
8	190	5.2	20	190	4.8
9	192	5.1	21	190	4.8
10	191	5.1	22	189	4.8
11	190	5.0	23	189	4.8
12	190	5.0	24	190	4.8

1. Field pumping test carried out under the supervision of Butler Bros. Equipment Ltd., G. M. Haines.
2. Time is started after an initial 6-hour pumping period where drawdown level was stabilized. Water level at start of initial period was 27.5 feet.
3. Measured in feet from top of casing. Bottom of well 205 feet.
4. Measured Neptune water meter which was tested after the test by Butler Bros. Ltd. and proved accurate.

Table 1 Pumping Test Results
Well No. 2 (1)

Time Hours (2)	Water Level (3)	Pump Rate GPM (4)	Period Hours (2)	Water Level (3)	Pump Rate GPM (4)
0			12		
1	190	2.2	13	190	2.1
2	190	2.2	14	190	2.1
3	190	2.15	15	190	2.1
4	190	2.15	16	190	2.1
5	190	2.15	17	190	2.0
6	190	2.15	18	189	2.0
7	190	2.1	19	185	2.1
8	190	2.1	20	190	2.0
9	190	2.2	21	190	2.0
10	190	2.1	22	190	2.0
11	190	2.1	23	190	2.0
12	190	2.1	24	190	2.0

1. Field pumping test carried out under the supervision of Butler Bros. Equipment Ltd., G. M. Haines.
2. Time is started after an initial 6-hour pumping period where drawdown level was stabilized. Water level at start of initial period was 15 feet.
3. Measured in feet from top of casing. Bottom of well is 205 feet deep.
4. Measured with Neptune water meter. Meter was tested by Butler Bros. Ltd. after pumping tests and the meter proved accurate.

Time Start 9 AM.

Weather - Sunny periods - no r

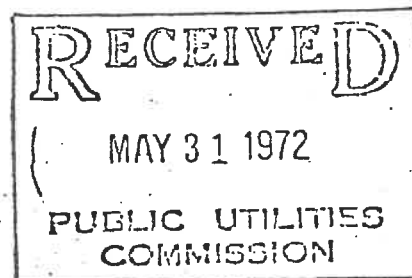
Time t	Water Depth	Meter Reading	Time	Water Depth	Meter Reading
Start 0	55' 0	23537	11:00 6:50	98 1/2 45.5	30162
0:05 5	66 1/2 11.5	23600	12:00 7:20	98 3/4 43.75	30766
0:10 10	70 15	23656	13:00 7:50	99 3/4 47.5	31366
0:15 15	72 17	23710	14:00 8:40	100 1/4 45.25	31960
0:20 20	73 1/2 18.5	23761	15:00 9:00	100 3/4 45.75	3256
0:25 25	74 1/2 19.5	23812	16:00 9:60	101 1/4 46.25	33161
0:30 30	75 1/4 20.25	23861	17:00 10:20	101 3/4 46.75	33761
0:35 35	76 1/4 21.25	23911	18:00 10:50	102 47	3436
0:40 40	77 22	23960	19:00 11:40	102 1/2 47.5	3495
0:45 45	77 3/4 22.75	24009	20:00 12:00	103 1/4 48.25	3556
0:50 50	78 1/2 23.5	24059	21:00 12:00	103 1/2 48.5	3616.
0:55 55	79 24	24109	22:00 13:20	103 3/4 48.75	3676
1:00 60	79 3/4 24.75	24159	23:00 13:50	104 1/2 49.5	3736
1:15 75	81 1/2 26.5	24309	24:00 14:40	104 3/4 49.75	3792
1:30 90	82 3/4 27.75	24459	25:00 15:00	105 50	3850
1:45 105	83 3/4 28.75	24510	26:00 15:20	105 1/2 50.25	3916
2:00 120	84 3/4 29.75	24762	27:00 16:20	105 3/4 50.75	3976
2:15 135	85 1/2 30.5	24912	28:00 16:50	106 51	4030
2:30 150	86 1/4 31.25	25061	29:00 17:40	106 1/4 51.25	4090
2:45 165	86 3/4 31.75	25212	30:00 18:50	106 1/4 51.25	4150
3:00 180	87 3/4 32.75	25362	31:00 19:10	106 1/2 51.5	4210
3:15 195	88 1/4 33.25	25512	32:00 19:20	106 3/4 51.75	427
3:30 210	88 3/4 33.75	25661	33:00 19:50	107 52	433
3:45 225	89 1/4 34.25	25811	34:00 20:10	107 1/4 52.25	439
4:00 240	89 3/4 34.75	25961	35:00 21:00	107 1/2 52.5	445
4:15 255	90 1/2 35.5	26111	36:00 21:10	107 1/2 52.5	451
4:30 270	91 36	26262	48:00 22:00	110 3/4 55.75	520
4:45 285	91 1/2 36.5	26412	49:00 22:10	110 1/4 55.25	520
5:00 300	92 37	26561	50:00 22:50	110 1/4 55.25	535
5:30 330	93 38	26862	60:00 23:00	111 1/2 56.5	595
6:00 360	93 3/4 38.75	27162	72:00 04:20	113 1/4 58.25	667
6:30 390	94 39	27461	73:00 04:30	113 58	675
7:00 420	94 3/4 39.75	27761	77:00 06:00	113 1/2 58.5	697
8:00 480	96 1/4 41.25	28361	78:00 06:50	113 1/2 58.5	703
9:00 540	97 42	28961	Pump off		
10:00 600	97 3/4 42.75	29562			

Time	Depth
imp off	113 $\frac{1}{2}$ 0
0:05 5	105 $\frac{1}{2}$ 8
0:10 10	102 $\frac{3}{4}$ 10.75
0:15 15	99 $\frac{3}{4}$ 13.75
0:20 20	96 $\frac{3}{4}$ 16.75
0:25 25	94 $\frac{1}{4}$ 19.25
0:30 30	92 $\frac{1}{2}$ 21
0:40 40	90 $\frac{1}{2}$ 23
0:50 50	88 $\frac{3}{4}$ 24.75
1:00 60	87 26.5
1:15 75	84 $\frac{1}{2}$ 29
1:30 90	83 $\frac{1}{4}$ 30.25
1:45 105	81 $\frac{3}{4}$ 31.75
2:00 120	81 32.5

Date Oct 7/71

Firm Bully Brothers ^{Inc}

Signed Mr. J. M. Harris



Certificate

SPECIALIZING IN:

BACTERIOLOGY
CHEMISTRY & BIOCHEMISTRY
CEREAL & TEXTILE CHEMISTRY
FEEDS, FERTILIZERS & PESTICIDES
FATS AND OILS
VITAMIN ANALYSIS
WATER ANALYSIS
SOIL TESTING
FOOD TECHNOLOGY
PLANT CONTROL
MILK & DAIRY PRODUCTS
CONSULTATION
RESEARCH

WOOD LABORATORY

SERVING AGRICULTURE AND INDUSTRY

555 HOMER STREET
VANCOUVER 3, B.C.

PHONE (604) 684-8732

ASSOCIATED WITH

AMERICAN DAIRY
SCIENCE ASS'N.
INTERNATIONAL ASS'N.
OF MILK & FOOD
SANITARIANS
VANCOUVER MERCHANTS
EXCHANGE
AMERICAN OIL
CHEMISTS' SOCIETY
CANADIAN INSTITUTE
OF FOOD TECHNOLC

CERTIFICATE No. 68-11-27

DATE November 28th., 1968.

Associated Engineering Services Ltd.,
620, View Street,
Victoria, B.C.

Attention: Mr. A.M.M. Crae.

Dear Sir:

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5
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We have examined the sample submitted by you on November 21st., 1968, and report as follows:

Identification of sample:

Scotton Subdivision, Saltspring Island, Well No. I.
Sample taken from Pump Discharge on Nov. 20th., 1968.

Lab. No. : 231

Ph Range	7.45		
Total Alkalinity (to M.O.)	195.0	mg/lit.	193
Total Hardness (EDTA)	78.0	"	159
Calcium (as Ca)	24.8	"	48
Total Iron	0.34	"	0.1
Chlorides	7.1	"	43.
Colour	5	Units	
Turbidity	4	ppm	
Nitrates (Spot test)	Negative		
Conductance	400	Micromohs,	

OCT 1
7.20

*

Respectfully submitted,

Wood Laboratory

cc: Dr. M.J. Stewart, Associated Eng. Services Ltd. Vancouver.

* Actual Dissolved Solids were found to be 266 mg/litre.

GREATER VICTORIA METROPOLITAN BOARD OF HEALTH

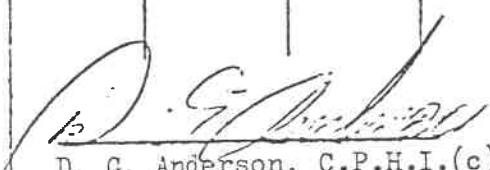
ENVIRONMENTAL SERVICES

BACTERIOLOGICAL REPORT ON WATER SAMPLES

REPORT TO: Associated Engineering Services
620 View Street
VICTORIA, B.C.

DATE: December 9, 1968

SPECIMEN	PLATE COUNT PER ML		COLIFORM TEST		
	20° C	35° C	0.1 ML	1 ML	10 ML
Well #1 - Scotton Subdivision	-	-	-	-	0/5


D. G. Anderson, C.P.H.I.(c)
Public Health Inspector

Certificate

WOOD LABORATORY LTD.

ANALYTICAL & CONSULTING CHEMISTS • BACTERIOLOGISTS & FOOD TECHNOLOGISTS

555 HOMER ST., VANCOUVER 3, B.C.

TELEPHONE (604) 684-8732

Associated Engineering Services Limited,
201 - 31 Bastion Square,
Victoria, B.C.

DATED: March 11th, 1970

CERTIFICATE No.: 70-3-23

Sample: Water

Marks: Scotton Subdivision, Salt Spring Island, Well #2,
~~sampled~~

Received On: March 11th, 1970

We hereby certify that we have tested the above described sample
of water and report as follows:

Nitrates (NO₃) 0.08 ppm

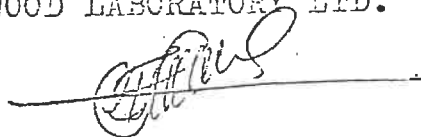
45 ppm cl.

Nitrites (NO₂) 0.01 ppm

< 2 ppm cl.

Respectfully submitted,

WOOD LABORATORY LTD.



B.B. Sharma, B.Sc.,
Chief Chemist

BBS/drw

GREATER VICTORIA METROPOLITAN BOARD OF HEALTH

BACTERIOLOGICAL REPORT ON WATER SAMPLES

MAY 31 1972

PUBLIC UTILITIES
COMMISSION

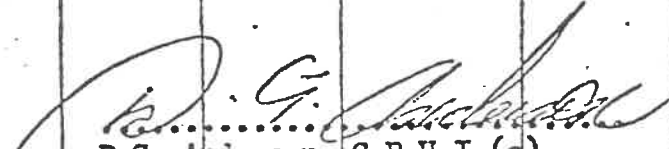
REPORT TO: W. R. Scotton,
Box 38,
Ganges, B. C.

DATE REPORTED:

October 20, 1971

DATE COLLECTED:

October 6, 1971

SPECIMEN	PLATE COUNT per ML		COLIFORM TEST		
	20° C	35° C	0.1 ML	1 ML	10 ML
<u>Cedarlane Water Systems Ltd.</u> Well No. 5	-	-	-	-	0/5
	 D.G. Anderson, C.P.H.I. (c), Public Health Inspector				
Mr. E. Cropp					

GVMEH:SAN.6
8/12/1969

GENERAL TESTING LABORATORIES DIVISION
SUPERINTENDENCE COMPANY (CANADA) LTD.

ANALYTICAL AND CONSULTING CHEMISTS

BULK CARGO SPECIALISTS - SURVEYORS - INSPECTORS - SAMPLERS - WEIGHERS

MEMBER,
AMERICAN SOCIETY FOR TESTING MATERIALS
THE AMERICAN OIL CHEMISTS' SOCIETY
CANADIAN TESTING ASSOCIATION

1001 EAST PENDER STREET
VANCOUVER 131, B.C.
CANADA

REGISTERED AND/OR
OFFICIAL CHEMISTS FOR:
VANCOUVER MERCHANTS EXCHANGE
NATIONAL INSTITUTE OF OILSEED PRODUCTS
THE AMERICAN OIL CHEMISTS' SOCIETY

OFFICIAL WEIGHMASTERS FOR:
VANCOUVER BOARD OF TRADE
VANCOUVER MERCHANTS EXCHANGE

October 22, 1971

BUTLER BROTHERS EQUIPMENT LTD.,
2046 Keating X Rd.,
Victoria, B.C.

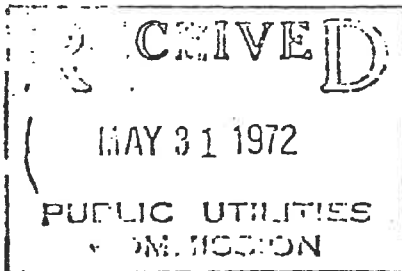
CERTIFICATE NO. 7110-0710

WE HAVE TESTED the herein described sample of water submitted
by you on October 7, 1971, and report as follows:

Description: Submitted Sample of Water
YOUR ORDER #L.P.O. V819

ANALYSIS:

Reaction	pH 6.9
Total Alkalinity (as CaCO ₃)	210 p.p.m.
Total Hardness (as CaCO ₃) ³	137 p.p.m.
Calcium (CaO)	64 p.p.m.
Total Iron (Fe)	0.4 p.p.m.
Chlorides (Cl)	5 p.p.m.
Colour	1 p.p.m.
Turbidity	15 p.p.m.
Nitrates.....	none (less than 1 p.p.m.)
Conductance	0.36 Millimhos per cm
Sulphate (SO ₄)	9 p.p.m.
Potassium (K)	0.5 p.p.m.
Sodium (Na)	28 p.p.m.



GENERAL TESTING LABORATORIES DIVISION
SUPERINTENDENCE COMPANY (CANADA) LTD.

per W.B. Sizer
W. B. Sizer - Chief Chemist

WBS/aw

Willis
Cunliffe
Tait

& Company Ltd.

Consulting Engineers

827 Fort Street, Victoria, B.C. V8W 1H8

Date: 23 October 1980

Job No.: 45-7785

Sampling Date: 15 October 1980

Sampling Agent: Client

Client: Capital Regional District
524 Yates Street
P.O. Drawer 1000
VICTORIA, B. C.
V8W 1K8

Attn: Mr. Allan Summers

This is to certify that the
water sample reported was
taken from the source described.

Agent's Signature

Analysis: performed according to "A Laboratory Manual for the Chemical
Analysis of Water, Wastewaters and Biological Tissues",
Chemistry Laboratory, Water Resources Service and/or "Standard
Methods/Water and Wastewater", American Public Health Association,
Fourteenth Edition.

Sample:


Cedar Lane
Water System

Total Dissolved Solids	mg/l	304
Conductivity	mg/l	510
pH		7.20
Total Alkalinity (as CaCO ₃)	mg/l	193.3
Calcium	mg/l	48.0
Magnesium	mg/l	9.6
Iron	mg/l	0.1
Manganese	mg/l	0.31*
Sodium	mg/l	45.0
Chloride	mg/l	43.6
Sulphate	mg/l	8.0
Fluoride	mg/l	10.1
Nitrogen (as NO ₂ + NO ₃)	mg/l	10.04
Total Coliform (membrane filter)	/100 ml.	L1
Hardness	mg/l	159

NOTES: * Exceeds B. C. Recommended Water Quality Standards.

L = Less Than

/cn


William F. Hyslop, Ph.D.
Chief Chemist
Environmental Services Division