

CERTIFICATION OF WATER QUANTITY AND QUALITY FOR THE NORTH LOT  
OF A RURAL SUBDIVISION

AT 33199 RICHARDS AVENUE IN THE DISTRICT OF MISSION

(District of Mission Subdivision Application S92-027 and File PRF 15-40)

Prepared for

Mr. R.H. HILLIER  
33199 Richards Avenue  
MISSION, B.C. V2V 5X4

Prepared by

PACIFIC HYDROLOGY CONSULTANTS LTD.  
204 - 1929 West Broadway  
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August 12, 1992

**PACIFIC HYDROLOGY CONSULTANTS LTD.**  
CONSULTING GROUNDWATER GEOLOGISTS

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August 12, 1992

Mr. R.H. Hillier  
33199 Richards Avenue,  
MISSION, B.C. V2V 5X4

Subject: **Certification of Water Quantity and Quality for the North Lot of a Rural Subdivision at 33199 Richards Avenue in the District of Mission**  
District of Mission Subdivision Application S92-027 and File PRF 15-40

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Dear Sir:

This letter-report is further to: several telephone discussions between Mr. Rolly Hillier and Mr. Ed Livingston, P. Eng. of Pacific Hydrology Consultants Ltd., and to an onsite discussion between Mrs. Hillier and Ed Livingston during a site investigation on July 31, 1992, about groundwater conditions in the subject area, and, in particular, as they affect the shallow dug well proposed as a water supply for the North Lot to be created by the subdivision of a parcel of land at 33199 Richards Avenue in the District of Mission.

## 1.0 INTRODUCTION

The purpose of this letter is to present information which confirms that the dug well constructed at the site of spring discharge on the North Lot of the proposed subdivision of Lot 11, Section 4, Township 18, Plan 35599, New Westminster District, will "...provide a quantity of water not less than 2500 litres per day per parcel and provide a sustained yield of 9 litres per minute for a minimum of four hours", as required under

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District of Mission Bylaw No. 2203-1990. This letter also discusses the quality of groundwater yielded by the Well and provides the required hydrogeologic impact assessment with respect to:

- (i) Impact of the existing well on neighbour wells both within and adjacent to the proposed subdivision, and
- (ii) Long term impact of the well on the source aquifer.

The topographic setting of the proposed Hillier Subdivision is shown on Figure 1 in Appendix A and the local topography, subdivision layout and well location are shown on Figure 2, a draft plan prepared by J.M.C. Wade and Associates; as shown on Figure 2, access to the North Lot is by a panhandle off Richards Avenue. We understand that the proposed disposal field for the new Lot will be located more than 30 m (100 ft) south of the Well.

The subject Hillier Well is 2.4 m (7.8 ft) deep below ground level; the top of the 0.91 m (3 ft) diameter concrete casing projects approximately 0.5 m (1.6 ft) above ground. The well is constructed with three concrete casings; the bottom casing is perforated and is surrounded by drain rock. After installing the casings and drain rock in the hole dug by an excavator, the upper part of the hole was backfilled with excavated soil.

There are no drilled or dug wells in close proximity to the subject well. The closest well is a shallow dug well located at a similar elevation on the north lot created by the Knapp Subdivision of Lot 13 to the east.

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## 2.0 HYDROGEOLOGY

The proposed Hillier Subdivision is located on the north side of Richards Avenue, on the lower slope of an unnamed mountain which forms the east side of the Steelhead Valley. According to Geological Survey of Canada Map 1485A, **Surficial Geology Mission, British Columbia**, the surficial cover in the area of the proposed Subdivision is "Lodgment and minor flow till: Sf, sandy till and substratified drift 2 to 10 m thick". The conditions encountered in the excavation for the dug well, and also digging carried out lower on the slope, represent conditions that agree with G.S.C. Map 1485A.

The subject Well is located in an obvious area of groundwater discharge, as shown by the type of local vegetation and by the near-surface static water level of the Well. A small perennial stream flows a short distance northwest of the well casing. The stream probably originates as a spring further up the slope.

## 3.0 WELL CAPACITY

To assess whether the capacity of the subject Well on the North Lot of the proposed Hillier Subdivision satisfies District of Mission Bylaw 2203-1990, the Well was pump tested by the Owner, according to instructions by Pacific Hydrology and under Pacific Hydrology's supervision, using an existing syphon. The flow rate during the test was determined by timing the filling of a container of known volume.

The subject Well was tested using a constant-rate procedure. The testing, which started at 15:25 on June 18, was carried out with the syphon discharging initially at a rate of 14.7 litres per minute (3.2 igpm); the

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rate was adjusted several times and, finally, at 1415 minutes, to a rate of 30.7 L/min (6.76 igpm) to the end of the test at 1535 minutes (25.6 hrs). At the final rate, at the end of 1535 minutes of syphoning, the total drawdown in the Well was 1.22 m (4.00 ft) and approximately constant as shown on Figure 3 (Page B - 3). The recovery of the water level was observed for 90 minutes after pumping was terminated, by which time the water level had fully recovered, as shown on the plot of the recovery data (Figure 4, Page B - 4). This rapid response confirms that recharge conditions are satisfactory.

The long-term capacity of the subject Well is at least as high as the final syphon rate of 30.7 L/min (6.76 igpm). Capacity testing of the dug well on the North Lot of the proposed Hillier Subdivision, therefore, has clearly shown that the capacity of the Well is higher than the minimum quantity requirement specified in District of Mission Bylaw 2203-1990. Because the Well is located in a groundwater discharge zone, it is expected that there will be little seasonal reduction in well capacity, even in very dry summers.

#### **4.0 GROUNDWATER QUALITY**

Appendix C contains a certificate of analysis from Canadian Lysozyme Inc. (C.L.I.) dated June 19, 1992 and identified as Certificate Number 2587. The results presented by C.L.I. show that the water from the subject Hillier Well satisfies B.C. Ministry of Health's Drinking Water Standards for all parameters checked, including bacteriological.

The groundwater represented by the C.L.I. analysis is an extremely soft calcium/bicarbonate type water with very low dissolved mineralization. The water is of generally excellent quality for domestic consumption.

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## **5.0 HYDROGEOLOGIC IMPACT ASSESSMENT**

Because of its position in the groundwater flow system, and in consideration of the distance to other wells, use of the subject Well on the North Lot of the Hillier Subdivision is unlikely to have any impact on existing drilled and/or dug wells, or on the source aquifers in the area, either in the short or long term.

## **6.0 SUMMARY AND CONCLUSIONS**

1. The proposed Hillier rural Subdivision, at 33199 Richards Avenue in the District of Mission, is located in a groundwater discharge zone near the base of the south-facing slope of an unnamed mountain which forms the east side of the Steelhead Valley.
2. Capacity testing confirms that the recently constructed dug well, which is to be used as the source of domestic water for the North Lot of the proposed Hillier Subdivision of Lot 11, Section 4, Township 18, Plan 35599, New Westminster District, can clearly "...provide a quantity of water not less than 2500 litres per day per parcel and provide a sustained yield of 9 litres per minute for a minimum of four hours", as required by District of Mission Bylaw No. 2203-1990.
3. A chemical analysis carried out by Canadian Lysozyme Inc. shows that the groundwater from the subject Well on the North Lot of the proposed Hillier Subdivision meets B.C. Ministry of Health's drinking water quality standards for all parameters checked, including bacteriological, and is of generally good quality for domestic consumption.
4. Under the prevailing circumstances, the new dug well on the North Lot of the proposed Hillier Subdivision will not have any negative impacts on other existing drilled and/or dug wells in the area or on the source aquifers.

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We trust that this letter will satisfy District of Mission regarding the required certification of water quantity and quality from the new dug well on the North Lot of the proposed Subdivision at 33199 Richards Avenue. Please call if we can be of further assistance with this matter.

Yours truly,

PACIFIC HYDROLOGY CONSULTANTS LTD.

*E. Livingston*

E. Livingston, P. Eng.



Attachments

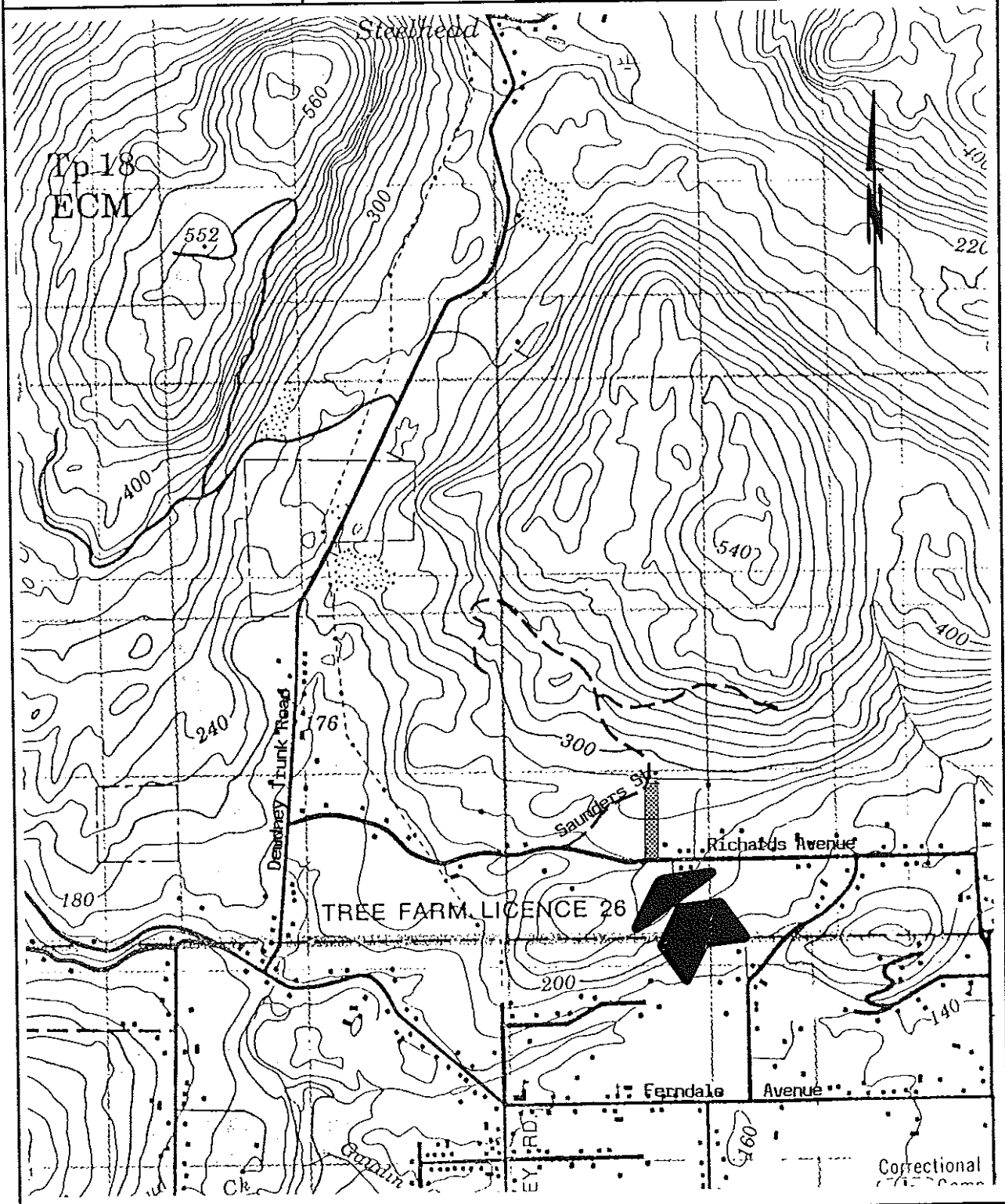
**APPENDIX A**

**AREA AND SITE LOCATION MAPS**



FIGURE 1

AREA LOCATION MAP - PROPOSED HILLIER  
SUBDIVISION ON RICHARDS AVENUE, MISSION



Notes:


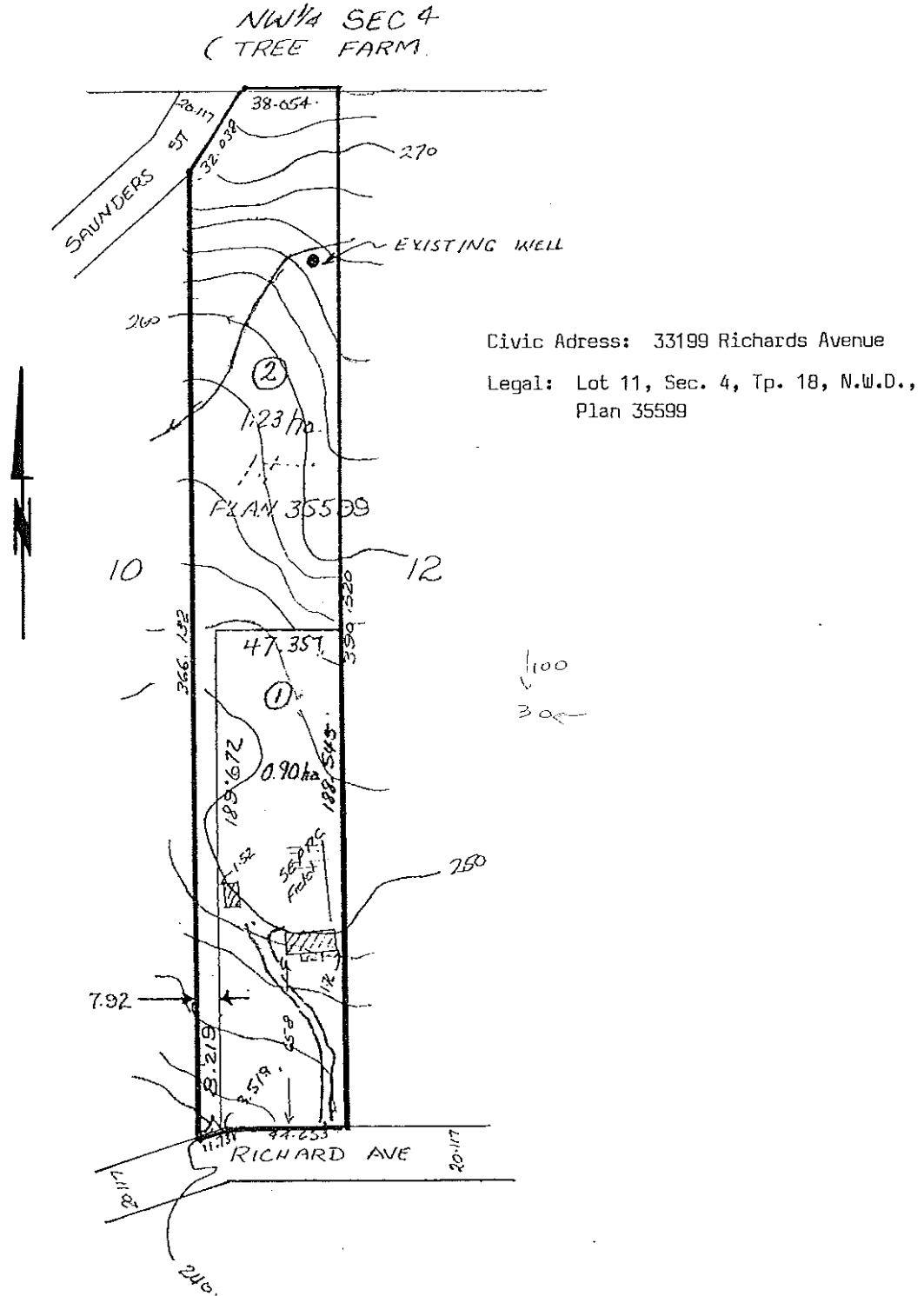
1. The base map is 1:50,000 scale topographic map N.T.S. 92G/1, Mission, enlarged to a scale of approximately 1:29,000; contour interval is 20 metres.
2.  indicates location of proposed Hillier Subdivision on Richards Avenue.

FIGURE 2

DRAFT PLAN OF PROPOSED HILLIER SUBDIVISION  
ON RICHARDS AVENUE IN DISTRICT OF MISSION



Notes:

1. The base map is a 1:2,500 scale plan by J.M.C. Wade & Associates (File M-2753) dated April 6, 1992; contour interval is two metres.
2. ● indicates location of subject shallow well, on North Lot to be created.

**APPENDIX B**

**PUMPING TEST DATA AND PLOTS**

PUMP TEST - DRAWDOWN

Project: R. HILLIER

Well: on North Lot 2

Location: 33199 Richards Avenue  
Mission, B.C.

Datum: Top of concrete casing at approx.  
0.5 m (1.6 ft) agl

Static Water Level: 2.63 ft

Well Details: 9.4 ft deep; 3 ft diameter

TIME	ELAPSED TIME t(min)	DISTANCE TO WATER (ft)	DRAWDOWN (ft)	TIME TO FILL 22 LITRES (sec)	PUMPING RATE (L/min)	REMARKS
06/18/92						
15:25		2.63				Static water level; start syphon.
16:25	60	5.08	2.45	20	66.0	Adjusted rate to 14.7 L/min.
17:25	120	2.83	0.20	50	26.4	Adjusted rate.
18:25	180	2.88	0.25	48	27.5	Adjusted rate.
20:25	300	2.85	0.22	40	33.0	Adjusted rate.
21:25	360	2.94	0.31	36	36.7	
23:25	480	3.10	0.47	36	36.7	
06/19/92						
05:00	815	3.17	0.54	36	36.7	
05:01	816	3.17	0.54	20	66.0	Adjusted rate.
05:30	845	4.48	1.85	20	66.0	
06:00	875	5.63	3.00	20	66.0	
06:15	890	6.17	3.54	36	36.7	Adjusted rate.
06:30	905	6.17	3.54	36	36.7	
08:30	1025	6.25	3.62	36	36.7	
09:00	1055	6.25	3.62	36	36.7	
11:00	1175	6.42	3.79	38	34.7	Adjusted rate.
12:00	1235	6.38	3.75	38	36.7	
13:00	1295	6.38	3.75	38	36.7	
15:00	1415	6.67	4.04	43	30.7	Adjusted rate.
17:00	1535	6.63	4.00	43	30.7	Stop syphon.

PUMP TEST - RECOVERY DATA

Project: R. HILLIER

Well: on North Lot 2

Location: 33199 Richards Avenue  
Mission, B.C.

Datum: Top of concrete casing at approx.  
0.5 m (1.6 ft) agl

Static Water Level: 2.63 ft

Final Drawdown: 4.00 ft

TIME	ELAPSED TIME SINCE PUMPING STARTED t(min)	ELAPSED TIME SINCE PUMPING STOPPED t'(min)	RATIO (t/t')	DISTANCE TO WATER (ft)	RESIDUAL DRAWDOWN (ft)	REMARKS
06/19/92						
17:00	1,535	0		6.63	4.00	Stop pump.
17:15	1,550	15	103.3	5.79	3.16	
18:00	1,595	60	26.6	3.94	1.31	
18:30	1,625	90	18.1	2.63	0.00	

FIGURE 3. DRAWDOWN IN HILLIER WELL

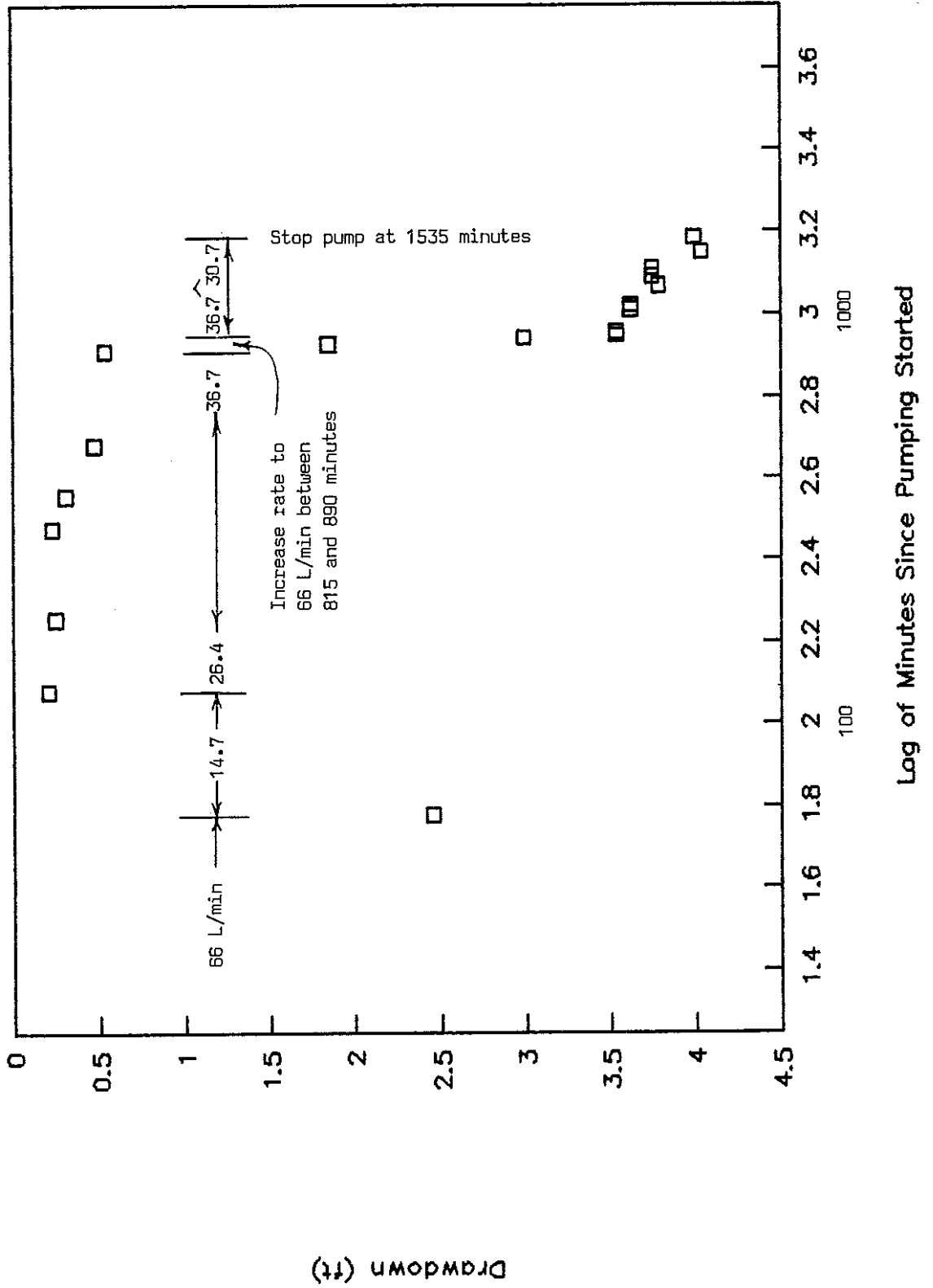
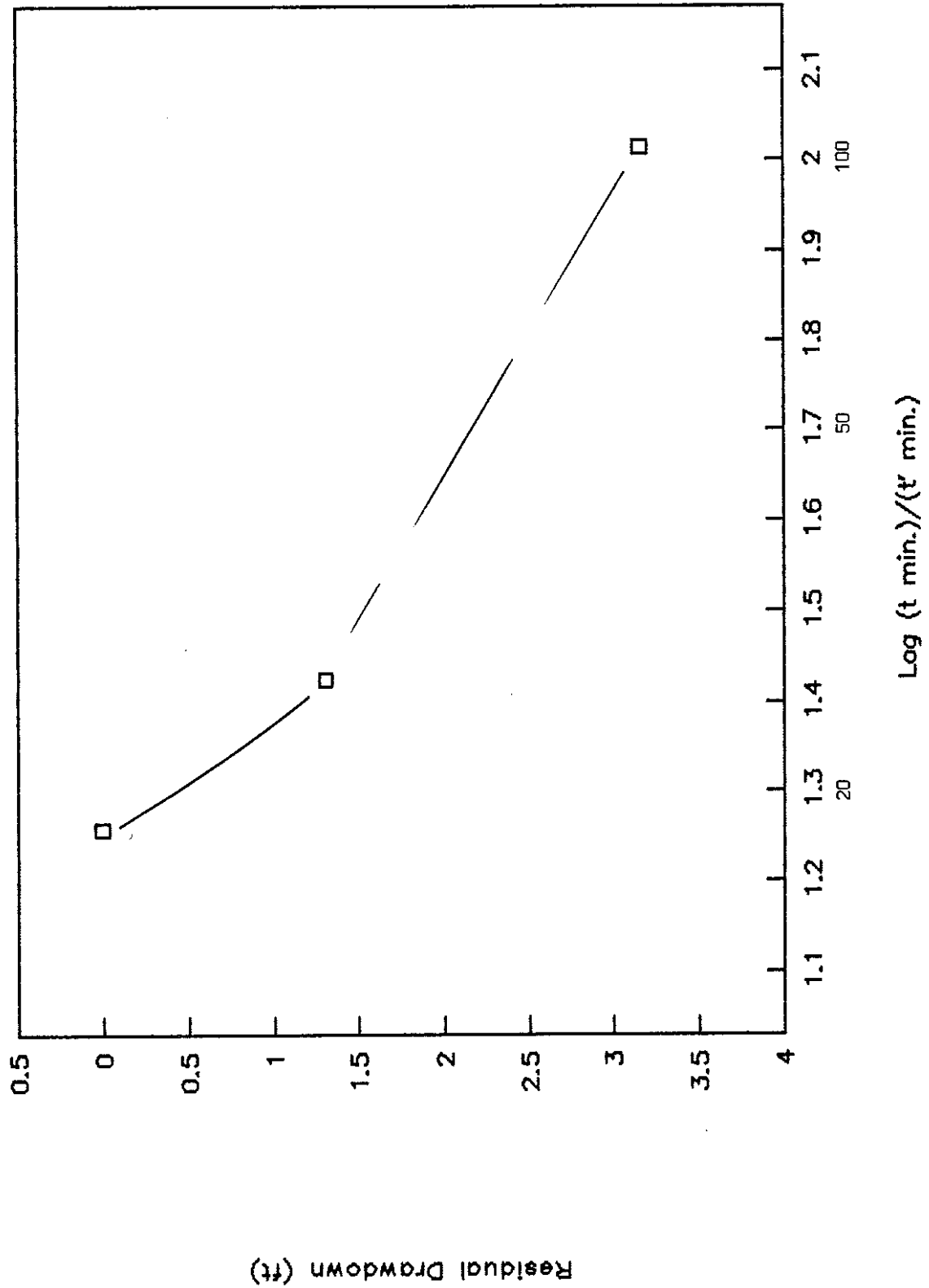


FIGURE 4. RECOVERY IN HILLIER WELL





CANADIAN LYSOZYME INC.

31212 Peardonville Road  
Abbotsford, B.C. V2S 5W6

CERTIFICATE OF ANALYSIS

CUSTOMER: Rolly Hillier  
33199 Richards Avenue  
R.R. 5 Mission, B.C. V2V 5X4

CERTIFICATE NO.: 2587  
DATE SUBMITTED: June 19, 1992  
INVOICE NO.: \_\_\_\_\_

We hereby certify that the sample(s) submitted have been tested, and the results are as follows:

Sample Identification:

Water - Received in glass jar  
Lot 11, Sec. 4, TP18  
NWD Plan 35599

Total Coliform (MPN)	<u>1.1</u> Coliform/100 mls
Fecal Coliform (MPN)	<u>1.1</u> Coliform/100 mls
pH	<u>7.04</u>
Total Alkalinity (as CaCO <sub>3</sub> )	<u>12.6</u> mg/l
Total Hardness (as CaCO <sub>3</sub> )	<u>9.8</u> mg/l
Filterable Solids	<u>24.0</u> mg/l

Anions

Chloride	<u>1.00</u> mg/l
Sulfate	<u>&lt;1.0</u> mg/l
Nitrate	<u>0.86</u> mg/l
Fluoride	<u>&lt;0.05</u> mg/l
Nitrite	<u>&lt;0.05</u> mg/l

DATED: July 10, 1992

QUALITY CONTROL: *[Signature]*

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WARRANTY AND LIMITS OF LIABILITY - Our warranty is limited to the accuracy of analyses as received. We assume no responsibility for the purposes for which the client uses the test results, nor liability for any other warranties, express or implied, including warranties of fitness for particular purpose or for merchantability made by the client. These terms and conditions shall supersede any conflicting terms and conditions stated on any purchase order, or other order of work submitted by the client.





# CANADIAN LYSOZYME INC.

31212 Peardonville Road  
Abbotsford, B.C. V2S 5W6

Customer: Rolly Hillier  
33199 Richards Avenue  
R.R. 5 Mission, B.C. V2V 5X4

Date: July 10, 1992  
Certificate: 2587  
Page: \_\_\_\_\_

We hereby certify that we have tested the samples submitted and report as follows:

<u>SAMPLE IDENTIFICATION</u>	<u>DETECTION LIMIT</u>	<u>RESULTS</u>
Aluminum	Al 0.15 ppm	<0.15 ppm
Antimony	Sb 0.15	<0.15
Arsenic	As 0.30	<0.30
Barium	Ba 0.001	<0.001
Beryllium	Be 0.003	<0.003
Bismuth	Bi 0.5	<0.5
Boron	B 0.01	<0.01
Cadmium	Cd 0.025	<0.025
Calcium	Ca 0.01	3.15
Chromium	Cr 0.03	<0.03
Cobalt	Co 0.02	<0.02
Copper	Cu 0.015	<0.015
Iron	Fe 0.030	<0.030
Lead	Pb 0.08	<0.08
Magnesium	Mg 0.001	0.48
Manganese	Mn 0.003	<0.003
Molybdenum	Mo 0.04	<0.04
Nickel	Ni 0.025	<0.025
Phosphorus	PO <sub>4</sub> 0.4	<0.4
Potassium	K 0.01	0.17
Silicon	SiO <sub>2</sub> 0.08	9.50
Silver	Ag 0.03	<0.03
Sodium	Na 0.1	1.92
Strontium	Sr 0.001	<0.001
Tin	Sn 0.03	<0.03
Titanium	Ti 0.006	<0.006
Vanadium	V 0.01	<0.01
Zinc	Zn 0.015	<0.015

< = less than

ppm = parts per million