

PACIFIC HYDROLOGY CONSULTANTS LTD.
CONSULTING GROUNDWATER GEOLOGISTS

204 - 1929 WEST BROADWAY
VANCOUVER, B.C. V6J 1Z3
TELEPHONE: (604) 738-9232

September 20, 1989

Ms. Trudy Vanderbyl
23981 - 68 Avenue
R.R. No. 8
LANGLEY B. C. V3A 6H4

Subject: Approval of Drilled Wells for Domestic Use on the Proposed Subdivision of Lots 1 and 4 of the E $\frac{1}{2}$ of the NE $\frac{1}{4}$ of Sec. 16, Twp. 11, Plan 12987, Except Part of Lot 4 Shown on Plan 23059, New Westminster District, Located at 6821 - 240 Street and 23981 - 68, Langley

Dear Ms. Vanderbyl:

Enclosed are the Private Well Certification documents dealing with the three wells on the property covered by the proposed subdivision. The records which you (T. Vanderbyl) have provided show the following:

Well	Date of Construction	Drilling Contractor	Well Depth	Nitrate (mg/L)	Bacterial Test
No. 1	June 1978	Nor-West	82.6 m (271 ft)	4.4	Satisfactory
No. 2	January 1986	Linder's	34.5 m (113 ft)	9.9	Second sample okay
No. 3	August 1989	Nor-West	94.2 m (309 ft)	0.0	Second sample okay

We understand that the situation is as follows:

1. You have applied to subdivide the subject property into two parcels.
2. In the proposed subdivision, Wells No. 1 and No. 2 will be on one lot; Well No. 3, which was constructed for this purpose, will be on the other lot.

Ms. Trudy Vanderbyl

Approval of Drilled Wells for Domestic Use on the Proposed
Subdivision of Lots 1 and 4 of the E $\frac{1}{2}$ of the NE $\frac{1}{4}$ of Sec. 16,
Twp. 11, Plan 12987, Except Part of Lot 4 Shown on Plan 23059,
New Westminster District, Located at 6821 - 240 Street and
23981 - 68 Avenue, Langley
September 20, 1989 - Page 2

3. Well No. 1 has always been used for domestic purposes for one residence with a line to the second residence for standby purposes.
4. In the past, Well No. 2 was used for domestic purposes at the other residence but this is no longer the case. Well No. 1 will continue to be used to supply domestic water for both houses as well as for watering livestock.
5. A pump test was carried out on Well No. 3 by E.D.S. Pumps & Plumbing Ltd. of Langley. The pump test data are included with the documents which you provided.
6. The Municipality of Langley requires that:
 - a. a pump test be carried out to establish the capacity of Well No. 3;
 - b. a chemical analysis be carried out on water from all three wells;
 - c. a test for coliform bacteria be carried out on the water from all three wells;
 - d. Private Well Certification forms be filled out for all of the wells within the subdivision.

We have examined the pumping test data for Well No. 3 and we find that the test was carried out correctly. The test shows that the capacity of Well No. 3 is much higher than the 2500 L/day required by the Township of Langley and, also, that it is capable of supplying water at more than 9 L/min for a four-hour period.

The chemical water analyses data sheets from Norwest Soil Research Inc. present problems which we did not discover until after you (T. Vanderbyl) had left our office. The results from Well No. 1 are certainly satisfactory. The certificates for Well No. 2 show that two analyses were carried out and that both are exactly the same except that the second has a little

Ms. Trudy Vanderbyl

Approval of Drilled Wells for Domestic Use on the Proposed
Subdivision of Lots 1 and 4 of the E $\frac{1}{2}$ of the NE $\frac{1}{4}$ of Sec. 16,
Twp. 11, Plan 12987, Except Part of Lot 4 Shown on Plan 23059,
New Westminster District, Located at 6821 - 240 Street and
23981 - 68 Avenue

September 20, 1989 - Page 3

less nitrate. Both samples show 0.40 mg/L of iron; this is quite high and, if it is dissolved iron, would likely cause staining. In any case, it is certainly not an health problem. We note that the coliform count is very high in the first sample and is very low in the second sample. However, we understand from a 'phone discussion with you (T. Vanderbyl) that the water is not staining the plumbing so the high iron in the analysis may be caused by a few rust particles in the water. We note that the analysis for the new well shows 0.80 mg/L of iron. We presume that most of this is due to iron adsorbed on clay particles; this is a fairly common condition in a new well. In our (Livingston, Vanderbyl) 'phone discussion of September 18, you (T. Vanderbyl) confirmed that the sample was taken shortly after completion of the well and that the water was still slightly cloudy.

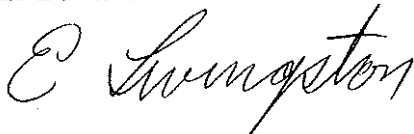
Further to our (Livingston, Vanderbyl) discussion on September 18 at Pacific Hydrology's Office, we believe that Well No. 2 may be polluted. This is indicated by high nitrate as well as a bad bacterial sample. We suspect that the shallower aquifer, in which Well No. 2 is completed, may be polluted. We recommend that the water from Well No. 2 not be used for domestic purposes; however, there is no reason why it should not be used for other purposes, including livestock watering.

We have written a letter to the Township of Langley explaining our opinion in regard to water quality; this letter should be submitted with the certification documents

We trust that all is in order. Please call if you require further assistance with this matter.

Yours truly,

PACIFIC HYDROLOGY CONSULTANTS LTD.



E. Livingston, P. Eng.

Enclosures



The Corporation of the Township of Langley

SCHEDULE "A"

PRIVATE WELL CERTIFICATION

PURSUANT TO SCHEDULE "A" of the Subdivision and Development Control Bylaw, which requires that each lot to be created and/or each existing lot forming part of the proposed development can be serviced with potable water in accordance with the requirements of the Bylaw for the development of:

LEGAL DESCRIPTION: Lots 1 and 4 of the E½ of the NE¼ of Sec. 16, Twp. 11, Plan 12987, Except part of Lot 4, shown on Plan 23059, New Westminster District.

PROJECT NO.: 89-28 (File No. 11-16-24)

I certify that a quantity of not less than 2,500 litres per day has been proven for each existing or proposed lot in the development.

I certify that each well within the subdivision has been tested and is capable of continuously providing water at a rate of 9 litres/min. for a four hour period.

I certify that water quality tests have been conducted and that the "B.C. Drinking Water Standards, 1982" can be met for each existing or proposed lot in the development.

E. Livingston, P. Eng. *E. Livingston*
Certified By (Name of Professional Engineer)

PACIFIC HYDROLOGY CONSULTANTS LTD.
Address
204 - 1929 West Broadway, VANCOUVER B. C. V6J 1Z3

PROFESSIONAL SEAL



See attachments as required pursuant to clause 2.2.18 of Schedule "A".



The Corporation of the Township of Langley

SCHEDULE "A"

WELL PUMP TEST - FIELD TEST

OWNER'S NAME: T. J. Hauwert WELL NO. 3
 APPLICATION NO.: 89-28 DATE: September 6, 1989
 LOCATION: 23981-68 Avenue, LANGLEY SHEET 1 OF 4
 TEST NO. 1

Drawdown Recovery

Rdg #	Time From Start (Min)	Depth To Water (M)	Draw Down (M)	Flow Measurement Data			Comments
				(MIN)	(L)	Lpm	
		24.38					Static water level.
1	0.1	24.44	0.06	0.1	4.63	46.3	Discharge water has reddish colour.
2	0.2	24.74	0.36	0.1	4.63	46.3	"
3	0.3	24.90	0.52	0.1	4.63	46.3	"
4	0.4	25.00	0.62	0.1	4.63	46.3	"
5	0.5	25.15	0.77	0.1	4.63	46.3	"
6	0.6	25.28	0.90	0.1	4.63	46.3	"
7	0.7	25.44	1.06	0.1	4.63	46.3	"
8	0.8	25.51	1.13	0.1	4.63	46.3	"
9	0.9	25.62	1.24	0.1	4.63	46.3	"
10	1.0	25.72	1.34	0.1	4.63	46.3	"
11	2.0	26.58	2.20	1.0	46.3	46.3	"
12	3.0	27.19	2.81	1.0	46.3	46.3	"
13	4.0	27.66	3.28	1.0	46.3	46.3	"
14	5.0	27.87	3.49	1.0	46.3	46.3	"
15	6.0	28.08	3.70	1.0	46.3	46.3	"
16	7.0	28.21	3.83	1.0	46.3	46.3	"
17	8.0	28.32	3.94	1.0	46.3	46.3	Water clearing.
18	9.0	28.42	4.04	1.0	46.3	46.3	"
19	10.0	28.49	4.11	1.0	46.3	46.3	"



The Corporation of the Township of Langley

SCHEDULE "A"

WELL PUMP TEST - FIELD TEST

OWNER'S NAME: T. J. Hauwert WELL NO. 3
 APPLICATION NO.: 89-28 DATE: September 6, 1989
 LOCATION: 23981 - 68th Avenue SHEET 2 OF 4
LANGLEY TEST NO. 1

Drawdown Recovery

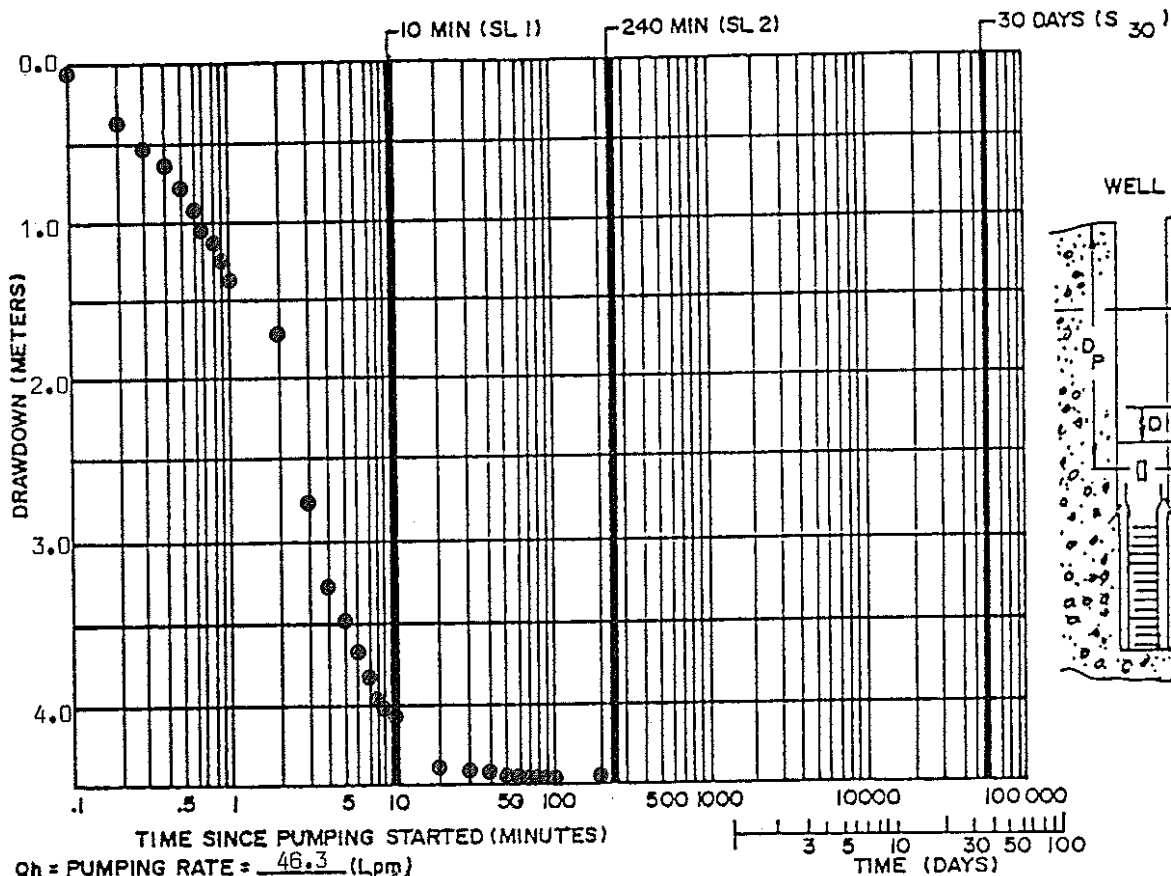
Rdg #	Time From Start	Depth To Water	Draw Down	Flow Measurement Data			Comments
				(MIN)	(L)	Lpm	
20	20	28.78	4.40	10	463	46.3	Discharge water clean and clear.
21	30	28.79	4.41	10	463	46.3	"
22	40	28.81	4.43	10	463	46.3	"
23	50	28.83	4.45	10	463	46.3	"
24	60	28.84	4.46	10	463	46.3	"
25	70	28.85	4.47	10	463	46.3	"
26	80	28.85	4.47	10	463	46.3	"
27	90	28.85	4.47	10	463	46.3	"
28	100	28.85	4.47	10	463	46.3	"
29	200	28.85	4.47	100	4630	46.3	"



The Corporation of the Township of Langley
SCHEDULE "A"

TIME-DRAWDOWN GRAPH FOR PUMP TEST

OWNER'S NAME: T. J. Hauwert WELL No. 3
 APPLICATION No: 88-29 DATE: September 6, 1989
 LOCATION: 23981-68 Ave LANGLEY, B. C. SHEET 3 OF 4
 DEPTH TO STATIC WATER LEVEL: 24.38 (m) TEST No. 1



$Q_h = \text{PUMPING RATE} = \frac{46.3}{7.1} \text{ (Lpm)}$
 $Sh_1 = \text{DRAWDOWN AT 10 MIN.} = 2.1 \text{ m.}$
 $Sh_2 = \text{DRAWDOWN AT 240 MIN.} = 4.47 \text{ m.}$
 CALCULATED DRAWDOWN VALUES: $SL_1 = \frac{Q_i}{Q_h} \times Sh_1 = 0.15 \text{ m}$
 $SL_2 = \frac{Q_i}{Q_h} \times Sh_2 = 0.16 \text{ m}$
 DRAWDOWN AT 30 DAYS (S_{30}) = 0.18 m

ESTIMATED MINIMUM ADJUSTMENT FOR SEASONAL DECLINE (D): USE FOLLOWING FIGURES IF OTHER LOCAL DATA OR HYDROGEOLOGIST'S OPINION IS NOT AVAILABLE.

TESTS RUN IN AUG., SEPT. & OCT.: 2 m
 TESTS RUN IN NOV., DEC., JAN., MAY, JUNE & JULY: 4 m
 TESTS RUN IN FEB., MAR. & APRIL: 6 m

SAFETY FACTOR = SF = 1m

DEPTH TO PROPOSED PUMP SUCTION (D_p) 88.39 m

CALCULATE MINIMUM AVAILABLE DRAWDOWN: $D_p - (D_{TW} + S_{30} + D + SF) =$

$$\underline{88.39} - (\underline{24.38} + \underline{0.18} + \underline{4} + \underline{1}) = \underline{58.83}$$

IF ANSWER TO ABOVE CALCULATION IS NEGATIVE, THEN EITHER THE PUMP HAS TO BE SET LOWER OR THE WELL IS NOT CAPABLE OF SUPPLYING WATER FOR A HOUSE.



The Corporation of the Township of Langley

SCHEDULE "A"

PUMP TEST SUMMARY

OWNER'S NAME: T. J. Hauwert WELL NO. 3
 APPLICATION NO.: 89-28 DATE: September 7, 1989
 LOCATION: 23981 - 68 Ave. and 6821 - 240 st. SHEET 4 OF 4
LANGLEY TEST NO. 1

WELL COMPLETION DATA		SCREEN DESIGN (mark one)		DESCRIPTION OF AQUIFER
Depth <u>92.66</u> (m)	<input type="checkbox"/> Open Hole	<input type="checkbox"/> Slotted Casing	<u>Sand</u>	
Diameter <u>150</u> (mm)	<input checked="" type="checkbox"/> Screen	<input type="checkbox"/> Gravel Pack		
Static Water Level <u>24.38</u> (m)	<input type="checkbox"/> Other _____			
	Screen interval <u>90.9</u> m to <u>94.2</u> m			
PUMP TEST				
Start: Date <u>06/09/89</u>	Time _____			
	<u>d/mo/yr</u>	<u>hr/min</u>		
Pump Type: <input checked="" type="checkbox"/> Electric submersible	<input type="checkbox"/> Jet	<input type="checkbox"/> Air Lift		
Other? Describe _____				
Test Pump Set at <u>88.39</u> m below ground				
Water level sounded by: <input checked="" type="checkbox"/> Electric tape	<input type="checkbox"/> Air bubbler	<input type="checkbox"/> Steel tape		
Other? Describe _____				
Flow measured by: <input type="checkbox"/> Container & watch	<input checked="" type="checkbox"/> Flow meter			
<input type="checkbox"/> Orifice & tube <input type="checkbox"/> Other? Describe _____				
TEST				
Constant rate of yield <u>46.3</u> Lpm	Test duration <u>3.3</u> hours			
Initial non-pumping level <u>24.38</u> m				
Drawdown in well at end of test <u>4.47</u> m				
Recommended pumping rate <u>50+</u> Lpm				
WATER SAMPLES TAKEN DURING TEST				
Chemical Analysis <input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No			
Bacterial Analysis <input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No			
Water Temperature <u>8</u> °C				
Any particular gas smells noted <u>No</u>				
Comments on clarity of water <u>Pumped clear after 20 minutes</u>				
Other _____				

NOR-WEST WATER WELL DRILLING LTD.

Well No. 3

WIN 59012

P.O. Box 3446
Langley 534-4108

23191 Fraser Highway, Langley
Evenings: Langley 534-4222

WELL LOG

OWNER MR. TED HAUWART
ADDRESS 23981 - 68th AVENUE
LANGLEY, B. C.
LOCATION SAME

AUGUST 12th, 1989

Date Begun AUGUST 4/89 Completed AUGUST 11/89
Yield 30 + Gallons per minute
Static Water Level 78 FT feet from surface
Pumping Water Level 295 feet from surface
Casing Used 304 FT OF 6 INCH
Bottom of Casing 301 FT feet from surface
Stick-up above ground 3 FT feet
Screen Used #15 & #20 SLOT STAINLESS STEEL SCREENS C/W 2 FT RISER PIPE
Top of Screen 298 FT feet from surface
Bottom of Screen 309 FT feet from surface
Sources of Water 30 + g.p.m. at 298 - 309 feet
Sources of Water _____ g.p.m. at _____ feet
Sources of Water _____ g.p.m. at _____ feet
Sources of Water _____ g.p.m. at _____ feet
Rig No. A/R #1
Driller C.V. WALSH & B. SIMPSON
RECOMMENDED PUMP SET AT 295 FT. RATE 30 G.P.M.

Depth	Material
0	
20	SAND AND GRAVEL
	DRY BROWN SAND
70	DRY BROWN SAND
	WET BROWN SAND, SILTY
115	WET GRAY SAND, SILTY
135	SILTY GRAY CLAY
	SILTY GRAY CLAY
224	SILTY GRAY SAND WITH LAYERS OF CLAY (WATER BEARING)
258	SILTY SAND (WATER BEARING) DIRTY
300	WATER BEARING SAND, CLEAN
309	DIRTY WATER BEARING SAND

NOR-WEST WATER WELL DRILLING LTD.

Well No. 1

WTN 39817

P.O. Box 3446
Langley 534-4108

23191 Fraser Highway, Langley
Evenings: Langley 534-4222

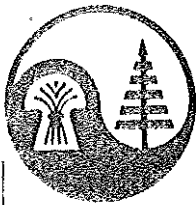
WELLS LOG

OWNER MR. TED HAWWERT
ADDRESS 6821 - 240th. ST.
LANGLEY, B. C.
LOCATION SAME

JUNE 10, 1978

Date Begun	<u>JUNE 2/78</u>	Completed	<u>JUNE 9/78</u>
Yield	<u>10 PLUS</u>	Gallons per minute	
Static Water Level	<u>74</u>	feet from surface	
Pumping Water Level	<u>200</u>	feet from surface	
Casing Used	<u>266'7"</u>		
Bottom of Casing	<u>264'7"</u>	feet from surface	
Stick-up above ground	<u>2'</u>	feet	
Screen Used	<u>#30 SLOT S.S. WITH 3' RISER</u>		
Top of Screen	<u>263'3"</u>	feet from surface	
Bottom of Screen	<u>271'</u>	feet from surface	
Sources of Water	<u>10 PLUS</u>	g.p.m. at	<u>266-271</u> feet
Sources of Water		g.p.m. at	
Sources of Water		g.p.m. at	
Sources of Water		g.p.m. at	
Rig No.	<u>A.R.</u>		
Driller	<u>D. WALSH, T. WALSH</u>		
RECOMMENDED PUMP SET AT <u>200</u> FT. RATE <u>10</u> G.P.M.			

Depth	Material
0	TOP SOIL
2	STICKY BROWN CLAY
5	LOOSE SAND & GRAVEL
23	COMPACT GRAVEL & SAND
30	LOOSE SAND & GRAVEL
70	W. B. BROWN SAND (RED)
140	W. B. SAND WITH CLAY
188	HARD STICKY GREY CLAY
214	W. B. SILTS WITH CLAY BALLS
240	W. B. SILTY SAND & CLAY BALLS
245	SILTY W. B. SAND & GRAVEL & CLAY
256	SILTY W. B. SAND & CLAY BALLS
264	W. B. SAND & GRAVEL
271	



NORWEST LABS

"Keeping B.C. Growing"

WATER ANALYSIS REPORT

W.O. NUMBER : 7104
LAB. NUMBER : 893960

SAMPLE SUBMITTED BY :

T. HAUWERT
23981 - 62ND AVENUE RR#8
LANGLEY, B.C. V3A 6H4

SAMPLE RECEIVED : 08-28-1989
ANALYSIS COMPLETED : 08-30-1989
SAMPLE RETAINED FOR 60 DAYS

SAMPLE IDENTIFICATION : WELL #1 23981-68TH AVE

ANALYTICAL RESULTS

GUIDELINES FOR DRINKING WATER

pH	8.09	pH values between 6.5 & 8.5 considered acceptable
Electrical Conductivity	0.18 ms/cm	Values above 1.0 ms/cm indicate increasing salt content
Total Dissolved Solids	150 mg/l	Objective level 500 mg/l; higher values indicate high salts
Total Suspended Solids	2 mg/l	Values above 250 mg/l indicate increasing levels of sediment
Ammonium-N	0.0 mg/l	Acceptable values below 0.5 mg/l; objective level below 0.01 mg/l
Potassium	3.0 mg/l	No acceptable level set; values normally in the 0.5 to 10 mg/l range
Calcium	27.0 mg/l	Below 200 mg/l acceptable; objective level below 75 mg/l
Magnesium	5.5 mg/l	Below 150 mg/l acceptable; objective level below 50 mg/l
Sodium	7.8 mg/l	Below 300 mg/l acceptable; over 20 mg/l high for low sodium diets
Iron	0.00 mg/l	Above 0.3 mg/l may cause staining & deposits; objective limit 0.05 mg
Copper	0.00 mg/l	Below 1.0 mg/l acceptable; objective limit below 0.01 mg/l
Zinc	0.00 mg/l	Below 5.0 mg/l acceptable; objective limit below 1.0 mg/l
Manganese	0.02 mg/l	Below 0.05 mg/l acceptable; objective limit below 0.01 mg/l
Phosphate-P	0.0 mg/l	No acceptable limit set; below 0.2 mg/l desirable
Sulphate-S	4.8 mg/l	Below 500 mg/l acceptable; objective limit below 250 mg/l
Nitrate-N	4.4 mg/l	Below 10 mg/l acceptable; high values may indicate contamination
Chloride	8.0 mg/l	Below 250 mg/l acceptable
Fluoride	0.13 mg/l	Values up to 1.2 mg/l desirable; under 1.5 mg/l acceptable
Boron	0.07 mg/l	Below 5.0 mg/l acceptable
Carbonate	0 mg/l	Presence indicates alkaline water
Bicarbonate	59 mg/l	Presence indicates mildly alkaline water
Hardness (CaCO ₃ equiv)	90 mg/l	Soft waters are less than 75 mg/l; hard waters above 150 mg/l
Total coliforms	0/100ml	Above 2/100 ml unacceptable
Fecal coliforms	0/100ml	Greater than 0/100ml unacceptable

Results quoted as zero indicate concentrations below the following detection limits:

Less than 0.01 mg/l Fe, Cu, Zn, Mn, B

Less than 0.05 mg/l Na, Ca, Mg, K, PO₄-P, NH₄-N, NO₃-N

Less than 0.10 mg/l Cl, F, SO₄-S; Less than 1 mg/l TDS, TSS, carbonate & bicarbonate

Norwest Labs



203 - 20771 Langley By-Pass
Langley, B.C. V3A 5E8
(604) 530-4344

Date: 89-3960

Work Order No.: 7104

Source of Sample:

Domestic Well Water from #1 - 23981 - 68th Avenue

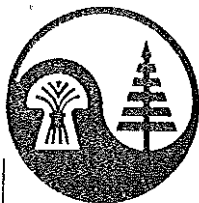
CERTIFICATION OF POTABILITY

Norwest Soil Research Inc. certifies that the above mentioned water sample number 89-3960 supplied by T. Hauwert meets the chemical and bacteriological requirements specified by the B.C. Drinking Water Standards, 1982.

Sincerely,

Dr. Thomas F. Guthrie, P.Ag.
Laboratory Manager

Note: All reports are the confidential property of our clients. Publication of statements, conclusions or extracts from or regarding our reports is not permitted without our written approval. Any liability attached thereto is limited to the fee charged.



NORWEST LABS

"Keeping B.C. Growing"

WATER ANALYSIS REPORT

W.O. NUMBER : 7104
LAB. NUMBER : 893762

SAMPLE SUBMITTED BY :

L. HAUWERT
23981 - 62ND AVENUE RR#8
LANSLEY, B.C. V3A 6H4

SAMPLE RECEIVED : 08-28-1989
ANALYSIS COMPLETED : 09-18-1989
SAMPLE RETAINED FOR 60 DAYS

SAMPLE IDENTIFICATION : NEW WELL 23950-68TH AVENUE

ANALYTICAL RESULTS

GUIDELINES FOR DRINKING WATER

pH	8.56	pH values between 6.5 & 8.5 considered acceptable
Electrical Conductivity	0.16 ms/cm	Values above 1.0 ms/cm indicate increasing salt content
Total Dissolved Solids	113 mg/l	Objective level 500 mg/l; higher values indicate high salts
Total Suspended Solids	23 mg/l	Values above 250 mg/l indicate increasing levels of sediment
Ammonium-N	0.0 mg/l	Acceptable values below 0.5 mg/l; objective level below 0.01 mg/l
Potassium	4.0 mg/l	No acceptable level set; values normally in the 0.5 to 10 mg/l range
Calcium	20.0 mg/l	Below 200 mg/l acceptable; objective level below 75 mg/l
Magnesium	5.9 mg/l	Below 150 mg/l acceptable; objective level below 50 mg/l
Sodium	7.3 mg/l	Below 300 mg/l acceptable; over 20 mg/l high for low sodium diets
Iron	0.80 mg/l	Above 0.3 mg/l may cause staining & deposits; objective limit 0.05 mg/l
Copper	0.00 mg/l	Below 1.0 mg/l acceptable; objective limit below 0.01 mg/l
Zinc	0.29 mg/l	Below 5.0 mg/l acceptable; objective limit below 1.0 mg/l
Manganese	0.02 mg/l	Below 0.05 mg/l acceptable; objective limit below 0.01 mg/l
Phosphate-P	0.0 mg/l	No acceptable limit set; below 0.2 mg/l desirable
Sulphate-S	5.5 mg/l	Below 500 mg/l acceptable; objective limit below 250 mg/l
Nitrate-N	0.0 mg/l	Below 10 mg/l acceptable; high values may indicate contamination
Chloride	5.6 mg/l	Below 250 mg/l acceptable
Fluoride	0.14 mg/l	Values up to 1.2 mg/l desirable; under 1.5 mg/l acceptable
Boron	0.07 mg/l	Below 5.0 mg/l acceptable
Carbonate	1 mg/l	Presence indicates alkaline water
Bicarbonate	72 mg/l	Presence indicates mildly alkaline water
Hardness (CaCO ₃ equiv)	74 mg/l	Soft waters are less than 75 mg/l; hard waters above 150 mg/l
Total coliforms	1/100ml	Above 2/100 ml unacceptable
Fecal coliforms	0/100ml	Greater than 0/100ml unacceptable

Note: Non coliforms are present at this time.

Results quoted as zero indicate concentrations below the following detection limits:

Less than 0.01 mg/l Fe, Cu, Zn, Mn, B

Less than 0.05 mg/l Na, Ca, Mg, K, PO₄-P, NH₄-N, NO₃-N

Less than 0.10 mg/l Cl, F, SO₄-S; Less than 1 mg/l TDS, TSS, carbonate & bicarbonate

Norwest Labs



203 - 20771 Langley By-Pass
Langley, B.C. V3A 5E8
(604) 530-4344

Date: 18 September 1989

Work Order No.: 7104

Source of Sample:

Domestic Well Water from New Well - 23950 - 68th Avenue

CERTIFICATION OF POTABILITY

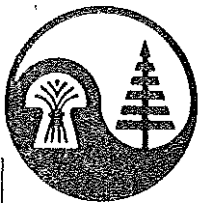
Norwest Soil Research Inc. certifies that the above mentioned water sample number 89-3962 supplied by T. Hauwert meets the chemical and bacteriological requirements specified by the B.C. Drinking Water Standards, 1982.

Sincerely,

A handwritten signature in cursive script that reads "Thomas F. Guthrie".

Dr. Thomas F. Guthrie, P.Ag.
Laboratory Manager

Note: All reports are the confidential property of our clients. Publication of statements, conclusions or extracts from or regarding our reports is not permitted without our written approval. Any liability attached thereto is limited to the fee charged.



NORWEST LABS

"Keeping B.C. Growing"

WATER ANALYSIS REPORT

W.D. NUMBER : 7104
LAB. NUMBER : 893961

SAMPLE SUBMITTED BY :

T. HAUWERT
23981 - 62ND AVENUE RR#8
LANGLEY, B.C. V3A 6H4

SAMPLE RECEIVED : 08-28-1989
ANALYSIS COMPLETED : 09-18-1989
SAMPLE RETAINED FOR 60 DAYS

SAMPLE IDENTIFICATION : WELL 2 6821 - 240TH STREET

ANALYTICAL RESULTS

GUIDELINES FOR DRINKING WATER

pH	7.18	pH values between 6.5 & 8.5 considered acceptable
Electrical Conductivity	0.20 ms/cm	Values above 1.0 ms/cm indicate increasing salt content
Total Dissolved Solids	230 mg/l	Objective level 500 mg/l; higher values indicate high salts
Total Suspended Solids	5 mg/l	Values above 250 mg/l indicate increasing levels of sediment
Ammonium-N	0.0 mg/l	Acceptable values below 0.5 mg/l; objective level below 0.01 mg/l
Potassium	2.0 mg/l	No acceptable level set; values normally in the 0.5 to 10 mg/l range
Calcium	21.0 mg/l	Below 200 mg/l acceptable; objective level below 75 mg/l
Magnesium	8.8 mg/l	Below 150 mg/l acceptable; objective level below 50 mg/l
Sodium	9.0 mg/l	Below 300 mg/l acceptable; over 20 mg/l high for low sodium diets
Iron	0.40 mg/l	Above 0.3 mg/l may cause staining & deposits; objective limit 0.05 mg/l
Copper	0.00 mg/l	Below 1.0 mg/l acceptable; objective limit below 0.01 mg/l
Zinc	0.01 mg/l	Below 5.0 mg/l acceptable; objective limit below 1.0 mg/l
Manganese	0.01 mg/l	Below 0.05 mg/l acceptable; objective limit below 0.01 mg/l
Phosphate-P	0.0 mg/l	No acceptable limit set; below 0.2 mg/l desirable
Sulphate-S	1.2 mg/l	Below 500 mg/l acceptable; objective limit below 250 mg/l
Nitrate-N	9.9 mg/l	Below 10 mg/l acceptable; high values may indicate contamination
Chloride	10.0 mg/l	Below 250 mg/l acceptable
Fluoride	0.12 mg/l	Values up to 1.2 mg/l desirable; under 1.5 mg/l acceptable
Boron	0.09 mg/l	Below 5.0 mg/l acceptable
Carbonate	0 mg/l	Presence indicates alkaline water
Bicarbonate	48 mg/l	Presence indicates mildly alkaline water
Hardness (CaCO ₃ equiv)	89 mg/l	Soft waters are less than 75 mg/l; hard waters above 150 mg/l
Total coliforms	0/100ml	Above 2/100 ml unacceptable
Fecal coliforms	0/100ml	Greater than 0/100ml unacceptable

Results quoted as zero indicate concentrations below the following detection limits:

Less than 0.01 mg/l Fe, Cu, Zn, Mn, B

Less than 0.05 mg/l Na, Ca, Mg, Y, PO₄-P, NH₄-N, NO₃-N

Less than 0.10 mg/l Cl, F, SO₄-S; Less than 1 mg/l TDS, TSS, carbonate & bicarbonate

Norwest Labs



203 - 20771 Langley By-Pass
Langley, B.C. V3A 5E8
(604) 530-4344

Date: 18 September 1989

Work Order No.: 7104

Source of Sample:

Domestic Well Water from Well #2- 6821 - 240th Street

CERTIFICATION OF POTABILITY

Norwest Soil Research Inc. certifies that the above mentioned water sample number 89-3961 supplied by T. Hauwert meets the chemical and bacteriological requirements specified by the B.C. Drinking Water Standards, 1982.

Sincerely,

Dr. Thomas F. Guthrie, P.Ag.
Laboratory Manager

Note: All reports are the confidential property of our clients. Publication of statements, conclusions or extracts from or regarding our reports is not permitted without our written approval. Any liability attached thereto is limited to the fee charged.

PACIFIC HYDROLOGY CONSULTANTS LTD.
CONSULTING GROUNDWATER GEOLOGISTS

204 - 1929 WEST BROADWAY
VANCOUVER, B.C. V6J 1Z3
TELEPHONE: (604) 738-9232

September 20, 1989

The Corporation of the Township of Langley
Planning Department
4914 - 221 Street
LANGLEY, B. C. V3A 3Z8

Attention: Chris F. Blondin, A.Sc.T.
Development Technologist, Land Development Division

Subject: Private Well Certification; Application No. 89-28;
Langley Township File No. 11-16-24

Dear Sirs:

The purpose of this letter, which is attached to the Private Well Certification for Subdivision Application No. 89-28, is to present additional information and explanation to support the Certificate.

We shall refer to the wells for this project as No.'s 1, 2 and 3, which are identified by the date of construction and name of the drilling contractor, as follows:

- Well No. 1, completed in June 1978, by Nor West Water Well Drilling Ltd.;
- Well No. 2, completed in January 1986, by Linder's Well Drilling Ltd.;
- Well No. 3, completed in August 1989, by Nor-West Water Well Drilling Ltd.

Wells No. 1 and No. 3 are completed in a deep aquifer below 76 m (250 ft) while Well No. 2 is completed in a shallow aquifer, the bottom of which is at about 39.6 m (130 ft). The two aquifers are separated by about 30 m (100 ft) of much less permeable material, including sediments described as "hard sticky grey clay" and "silty grey clay". There is a difference in static water level of several metres between the two aquifers. The lithologs and the difference in the static levels show that the two aquifers are not hydraulically connected.

We outline the groundwater conditions because the chemical analyses and one bacteria test indicate that the water in the upper aquifer may be polluted, perhaps by the livestock which are being raised on the property. Careful testing may show that this is not the case. However, in the meantime, we suggest that water from Well No. 2 not be used for domestic purposes. In fact, we understand that water from Well No. 2 is not now being used for domestic purposes nor will it be put to such use in future. The two existing houses are being supplied from Well No. 1 which has more than sufficient capacity. You will note that the chemical analysis for Well No. 3 shows that the iron content is 0.80 mg/L. We believe that this high iron is associated with fine mineral particles in the water and does not represent the true iron content of the water. We say this for the following reasons:

1. Ms. T. Vanderbyl, who was present when the water sample was taken, says that the sample was taken shortly after pumping started while the water was still slightly cloudy.
2. The analysis for water from Well No. 1, which is completed in the same aquifer, shows no iron and the water has not caused any staining of the plumbing after constant use since 1978.

In summary:

1. Each of the three wells is capable of supplying 2500 litres per day.
2. Each of the wells is capable of continuously providing water at the rate of 9 litres/minute for a four-hour period.
3. The water from Wells No. 1 and No. 3, as shown by chemical analyses from Norwest Labs (Norwest Soil Research Inc.) meets the "British Columbia Drinking Water Standards, 1982".
4. There is some indication that water from Well No. 2, which is not used for domestic purposes, may be polluted. However, since Well No. 2 is completed in a different aquifer than Wells No. 1 and No. 3, the poor quality water will not reach these Wells.

The Corporation of the Township of Langley
Private Well Certification; Application No. 89-28; Langley
Township File No. 11-16-24
September 20, 1989 - Page 3

Please call if you wish to discuss the contents of
this letter.

Yours truly,

PACIFIC HYDROLOGY CONSULTANTS LTD.

E. Livingston

E. Livingston, P. Eng.

