92L-11-18

COMPILATION REPORT

GROUNDWATER DEVELOPMENT

Port McNeill, B.C.

RAYONIER CANADA (B.C.) LTD.

July, 1964

W.L. Brown, P.Eng.

R.D. Erdman, Geologist

INTRODUCTION

The preliminary survey of the Port Hoiolii area was conducted by members of this office in July, 1962, when a general interpretation of the geology of the area was made. Our findings at that time are recorded in the report entitled "Groundwater Supply, Port Hoiolii, B.C." dated July 20th, 1962.

A resistivity survey was conducted in August, 1963, when the hydrogeologic interpretation previously made was confirmed. A later resistivity survey was made in May, 1964, in an effort to delineate the sand and gravel filled channel previously detected, to ascertain if it was possible to drill closer to the townsite and therefore save on pipeline costs.

A suitable location was chosen near the intersection of the Mine Haulage Road and the road that runs into Port Hoiolii east of the East Road. This location was cleared and drilling started by Western Water Wells Ltd. of Vancouver on June 11th, 1964. A final pump test was concluded on July 6th with a sustained yield of 125 U.S. gpm.

The total cost of this well is approximately $6,000, which is approximately $1,000 below our estimate of $7,000.

Product in pump set Oct 19 1964
@ 100 feet. pumping level @ 110 imp gpm.
90 feet.
Water level maintained for 3½ hr while
filling tank.

90 AR/KB

DRILLING

As can be seen on the attached log, the well encountered clay sands and gravels from the surface to 65 feet. Clean water-bearing sands and gravels with minor tight stringers were then encountered from 65 feet to the bottom of the well at 110 feet. When the water-bearing material was encountered at 65 feet the water rose to 41.8 feet below the surface. This shows that the material from surface to 65 feet is impervious in the area of the well. This impervious zone will protect the well from contamination by surface waters in the vicinity of the well.

TESTING

After 47 feet of water-bearing material was penetrated it was decided to test the zone between depths of 100 to 110 feet. Therefore a test screen was set, and on the 23rd of June a short pump test was performed. This pump test indicated that the sands and gravels had a transmissibility of 7,200 U.S. gpd/ft. While this transmissibility is rather low for sands and gravels, it was sufficient to allow a fully-developed well to meet the minimum requirements of the formula of 200 U.S. gpm.

It was therefore decided to set a production screen from 100 to 110 feet, and convert the test well to a production well. The attached sieve analyses indicate that a 3-slot slot screen was needed for this section. A 20/1,000 inch slot screen was needed from 100 to 105 feet, and a 30/1,000 inch slot screen was used from 105 to 110 feet.

Some difficulty was encountered in setting the screen because the sandy material at the bottom of the hole heaved up into the casing whenever the water level was allowed to drop below its stable level of 41.8 feet below ground surface. However, on July 4th the screen was finally set at 110 feet and exposed and development started. Development work was done with surge blocks run by the pounding action of the drilling machine until less than six inches of sand was coming through the screen for one-half hour of surging.

set 19" O.W.h. 42 feet below top of casing RBE

The test pump was then set in the well and the final production pump tests performed. The well was pumped at 125 U.S. gpm from a depth of 99.75 feet below casing top for a period of two hours. This rate of yield is approximately 2.7 gallons per foot of drawdown. This specific capacity of 2.7 gallons per foot is approximately one-half of what the estimated specific capacity should be with a transmissibility of 7,300 U.S. gpd per foot. We therefore believed that further development would bring the production of the well up to 250 U.S. gpm.

Discussions were held with Mr. Helgren on July 8th, concerning the well and the need for further development, and the decision was made to leave the well as it was because the yield of 125 U.S. gpm was sufficient to meet the demands of the tentative.

PRODUCTION CAPACITY

Based upon available data, we believe that the well can safely yield 125 U.S. gpm from a pumping level of approximately 88 feet. If the pump suction is set at 98 feet below ground (this will be two feet above the top of the screen) the well will have a safety factor of ten feet. This safety factor would cover a seasonal fluctuation of approximately five feet and would have five feet of water covering the bowls of the pump during normal operation. The rating of 125 U.S. gpm is slightly higher than what our normal rating would be. However, in this case the water level stabilized extremely rapidly during the pump test. This indicates that there is a large amount of water in the area of the well and that this water has unencumbered access to the well.

WATER QUALITY

The chemical analysis attached to this report was conducted by Grant Eldridge. This analysis shows that the water has an excellent quality and is fit for all but most special uses.

RECOMMENDATIONS and CONCLUSIONS

1. An 8-inch diameter production well has been successfully completed for a cost of approximately $6,000.

2. This well will yield 100 Imp. gpm from a pumping level of approximately 88 feet. 110 Imp gpm production pump 90 w.l.

3. The rate of 100 Imp. gpm should not be exceeded except during an emergency.

4. The following records should be maintained by operating personnel. The readings should be taken once a week.
   (a) static (non pumping level) -- taken at least one hour after the pump has been operating;
   (b) pumping level -- taken at least one hour after the pump has been operating continuously.

5. A sounding port with a cap should be placed in the well casing so that these readings can be easily obtained.

6. Robinson, Roberts & Brown Ltd. should be asked to review the first year's records. We should be notified if any marked water level changes are observed.

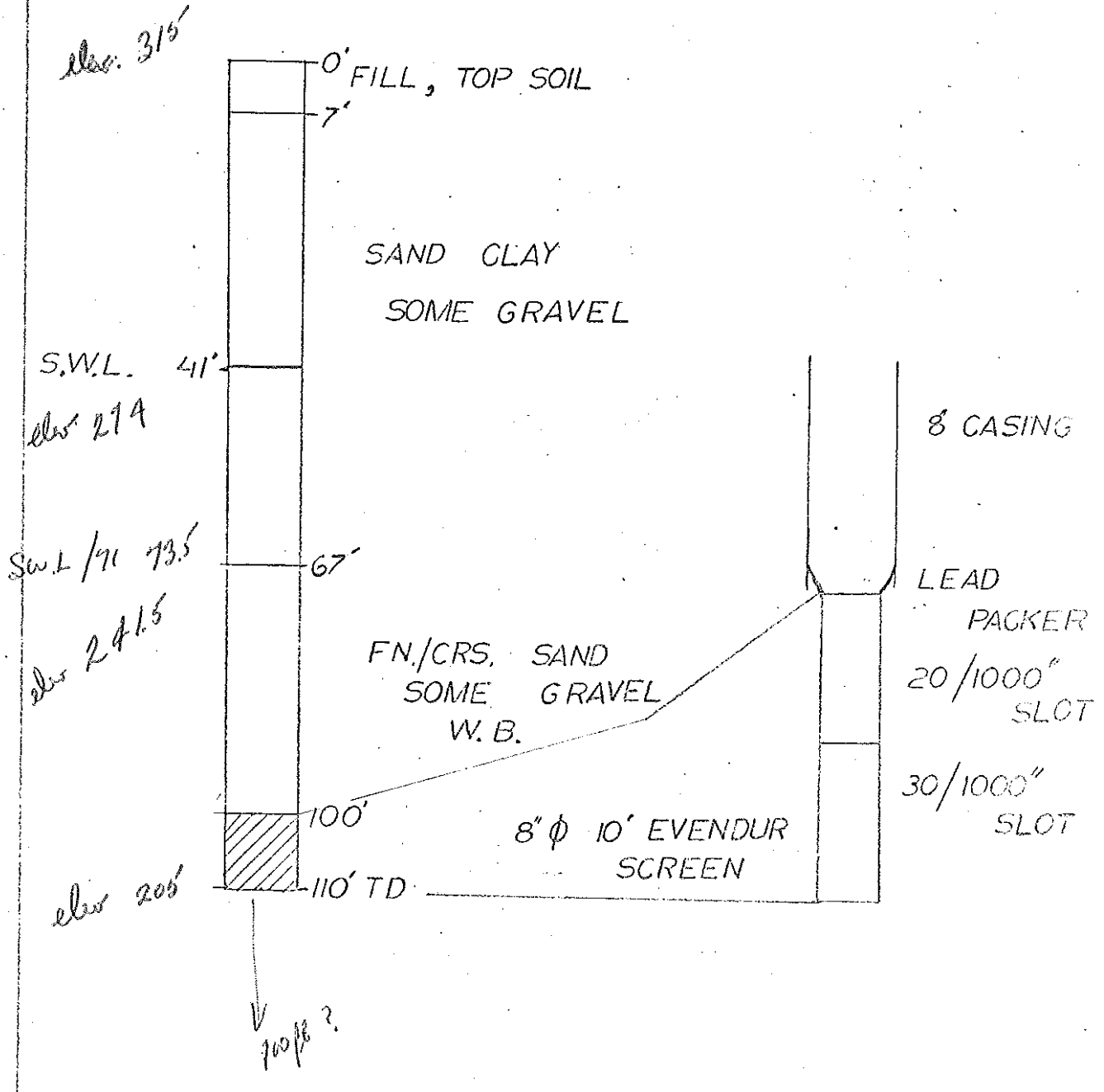
7. To protect the well from possible pollution:
   (a) The public should not be allowed closer than approximately 25 feet to the well;
   (b) No septic tank, drain field, or sewer should be constructed within 100 feet of the well;
   (c) no cemetery or garbage dump should be located within 1000 feet of the well.

Sounded bottom of hole clean

8. The pump house should either be removable or should be constructed with a 4-foot square door in the roof; one wall two feet from the well, and a removable panel or window in the wall closest to the well. This consideration will allow removal of the pump and repairs to the well if necessary.

9. Extreme care must be taken to protect the well during pump house construction and pump installation. If foreign matter or debris does fall accidentally into the well, make sure that it is not ignored and that we are notified.

PORT McNEILL
PRODUCTION WELL NO. 1



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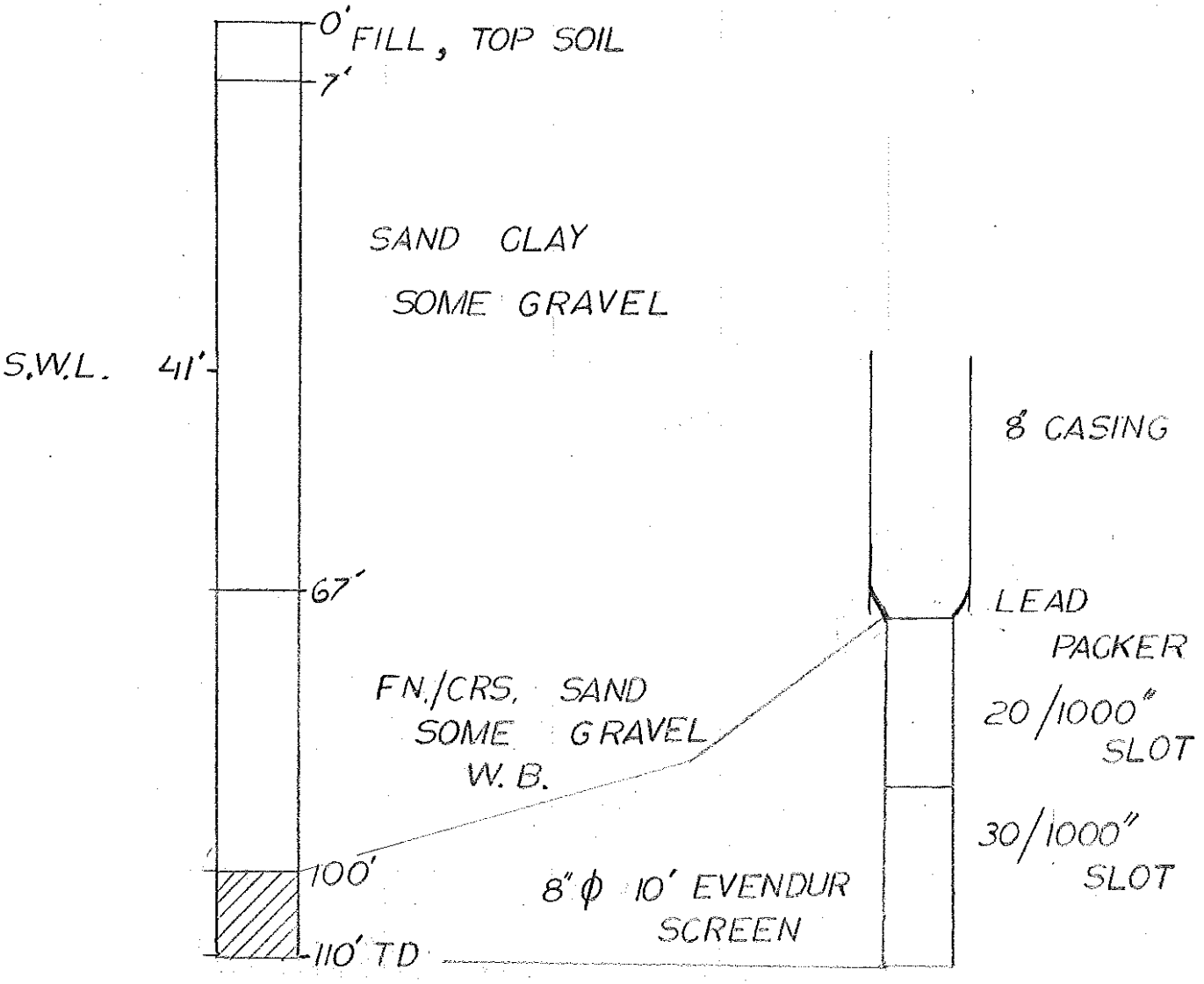
	JULY 1964 RBE

WIN 18764

PORT McNEILL
PRODUCTION WELL NO. 1



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JULY 1964 RBE

COAST ELDRIDGE
ENGINEERS & CHEMISTS LTD.

125 EAST 4TH AVE., VANCOUVER 10, B.C. TELEPHONE: 876-4111

REPORT OF:	Chemical Analysis	FILE No.	C.3-R.2-64 12308
AT	Vancouver Laboratory	DATE	July 2, 1964
PROJECT:	Water Samples	REPORT No.	
REPORTED TO:	Robinson Roberts & Brown Ltd. 4421 Patterdale North Vancouver, B. C.	ORDER No.	

We have analyzed the water sampl submitted to us on June 24, 1964 and report as hereunder:

SAMPLE IDENTIFICATION

Gallon Jug - Port McNeill #1 - June 23, 1964

RESULTS

p H	8.2
Colour (Pt-Co Scale)	ND
Turbidity (SiO_2 Scale)	ND
Suspended Matter	Trace
Alkalinity:	
Carbonate	Nil
Bicarbonate	114 p.p.m.
Total Hardness (Soap Method)	88.8 "
Chlorides	9.0 "
Sulphates	3.5 "
Total Dissolved Solids	176 "
Volatile Solids	59 "
Fixed Solids	117 "
Calcium	23.8 "
Magnesium	8.32 "
Sodium	5.7 "
Potassium	1.7 "
Manganese	Nil
Total Iron	Trace
Dissolved Iron	Trace
Total Aluminum	0.10 p.p.m.
Dissolved Aluminum	0.08 "
Dissolved Silicon	5.0 "
Aluminoid Nitrogen	Trace
Nitrate Nitrogen	2.5 p.p.m.
Surfactants	ND

p.p.m. - parts per million.

COAST ELDRIDGE

J. G. Smith, Chief Chemist