

GROUNDWATER DEVELOPMENT
KATIT INDIAN RESERVE
OWEEKENO VILLAGE, RIVERS INLET

for

DEPARTMENT OF INDIAN AFFAIRS
AND NORTHERN DEVELOPMENT

by

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November 1978
77-031

Project No. 972/100

1.0 INTRODUCTION

A new production well was constructed at Oweekeno Village on Rivers Inlet, British Columbia, during October 1978. The well can deliver groundwater at rates of up to 100 USgpm and the water quality is excellent for domestic purposes.

2.0 WELL CONSTRUCTION

The 6-inch diameter well was drilled and cased to a total depth of 91 feet using an air rotary drilling rig equipped with a casing hammer. Clean water-bearing sands and gravels were penetrated in the hole below a depth of 47 feet. An 8-inch diameter surface casing was installed to a depth of 12 feet and the annular space between 8-inch and 6-inch casings was cemented to protect the well against surface seepage.

A stainless steel well screen with a slot opening of 0.040 inch was set between depths of 85.5 feet and 89.5 feet and was exposed in some of the best gravel in the aquifer. The well was then developed by blowing and surging with compressed air from the drilling rig.

3.0 WELL TESTING

A pumping test was carried out on the completed well for a total of 25 hours using a submersible pump and a portable generator. The discharge rate during the test was 38 USgpm which was the maximum capacity of the pump.

The well reached near stabilization at a pumping level of 47.75 feet after only a few minutes of pumping from the static water level of 45.73 feet. The pumping level then fluctuated between 46.70 feet and 47.90 feet in response to tidal influence for the remainder of the test. Well recovery was almost instantaneous to near the static water level when pumping ended.

3.0 WELL TESTING, cont'd.

Based upon a drawdown of two feet and a discharge rate of 38 USgpm the specific capacity of the well is calculated to be 19 USgpm per foot of drawdown. A highly permeable section of water-bearing material in the vicinity of the well is indicated although rapid stabilization of the pumping level does not allow a useful calculation of the transmissivity to be made. However, the transmissivity should be in the range of 40,000 USgpd per foot based upon the observed specific capacity.

4.0 WELL YIELD

The total available drawdown in the well at the time of testing was 42 feet. The calculated yield for the well is therefore in the range of 800 USgpm using the specific capacity of 19 USgpm per foot of drawdown. However, the well screen as installed is capable of admitting only 100 USgpm at an entrance velocity of 0.1 feet per second as recommended by the manufacturer.

Our previous estimate of requirements for the village was 40 USgpm which provided some measure of safety over probable usage at present. A well rating of 100 USgpm will therefore provide for current domestic needs and fire protection as well as future growth of the village.

Please note that all water level measurements have been taken from the top of the finished well casing which is 2.8 feet above ground level.

Seasonal water level fluctuations are not expected to be significant and do not affect the rating of this well.

5.0 INORGANIC CHEMICAL QUALITY

When the site was first investigated there was some apprehension that the water quality of a

5.0 INORGANIC CHEMICAL QUALITY, cont'd.

new well might reflect the brackish problems of the existing dug well at the village. The conductivity of the water was therefore tested periodically during drilling and testing of the new well and these tests showed that a very low dissolved ion content was present.

A water sample was collected near the end of the pumping test and was submitted to a commercial laboratory for analysis. The results of the analysis included with this report show that the water meets the Canadian Drinking Water Standards for all parameters tested and is of excellent quality for domestic use.

The tidal influence noted during the pumping test is not an indication of salt water contamination at the new well site.

6.0 CONCLUSIONS AND RECOMMENDATIONS

- 6.1 The subject well was completed in a sand and gravel aquifer to a depth of 89.5 feet.
- 6.2 The capacity of the well is limited by the open area of the well screen to 100 USgpm and should not be pumped in excess of this rate.
- 6.3 A submersible pump is recommended for permanent installation in the new well. The pumping level at 100 USgpm is expected to be 51 feet below the top of the finished casing and the pump should be capable of delivering 100 USgpm against 51 feet of head plus the additional head required to reach the storage tank. The pump may be set as low as 84 feet below ground level.
- 6.4 A pump house, if constructed, should be provided with a removable section at least two feet square and positioned directly over the well head. This will permit access for removal of the pump for servicing and maintenance.

6.0 CONCLUSIONS AND RECOMMENDATIONS, cont'd.

6.5 Adequate check valves must be installed in the discharge line of the pump to prevent any backwashing of the well screen. Any action which would disturb the developed aquifer packed around the screen will very likely cause the well to pump sand.

6.6 When installing a pump or working around the well great care must be taken to prevent any foreign material from getting into the well. Many wells have been rendered useless through innocent carelessness as well as deliberate junking.

DEPTH, FT.

0
—
10
—
20
—
30
—
40
—
50
—
60
—
70
—
80
—
90

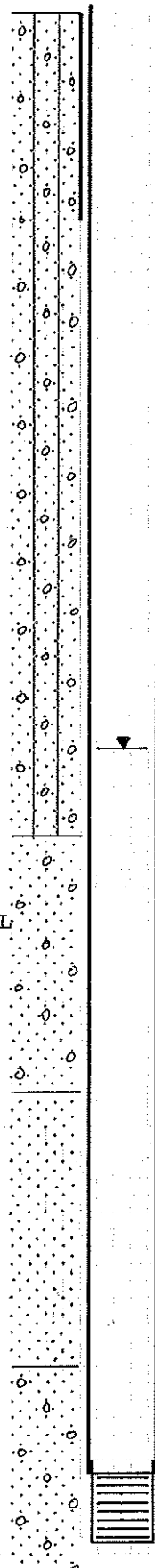
Brown silty
GRAVEL and
boulders

Coarse GRAVEL
gray

Brown coarse
SAND

Gray medium
SAND and
fine GRAVEL

Brown medium
SAND



Surface casing 8 inch I.D. steel.
Annular space cemented between casings.

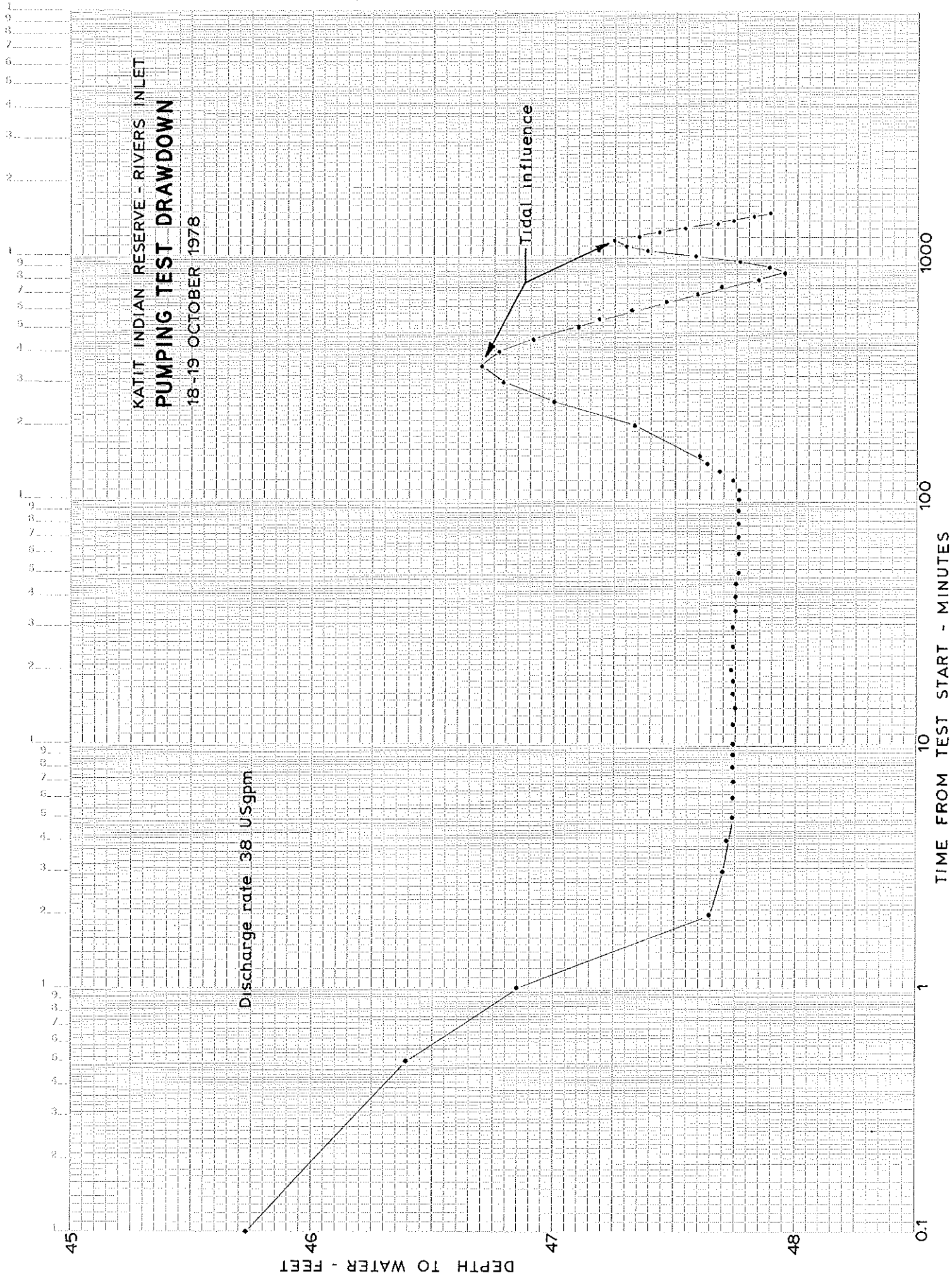
Well casing 6 inch I.D. steel.

Static water level 42.9 feet (18-10-78)

Stainless steel well screen, 0.040 inch
slot size. Bottom of screen at 89.3 feet
and top of lead packer at 84.5 feet depth.

KATIT INDIAN RESERVE - RIVERS INLET PRODUCTION WELL LOG

BROWN, ERDMAN & ASSOCIATES LTD.
25-10-78 HWR 77-031





BROWN, ERDMAN & ASSOCIATES LTD.
1401 BEWICKE AVENUE, NORTH VANCOUVER, BRITISH COLUMBIA

PAGE 1

WELL OWNER KATIT INDIAN RESERVE
LOCATION OWIKENO LAKE

WELL NO. 2
JOB NO. 77-031

DRAWDOWN
RECOVERY

DATE	TIME	ELAPSED TIME MINUTES	DTW	Q <u>US</u> GPM	REMARKS
18-10-78	10:30	0	45.73		MEASURE POINT 2.8' AGL.
		0.5	46.39		
		1	46.85	38	
		2	47.64		
		3	47.70		
		4	47.72		
	10:35	5	47.74	38	
		6	47.74		
		7	47.74		
		8	47.74		
		9	47.74		
	10:40	10	47.74	38	
		12	47.74		
		14	47.75		
		16	47.74		
		18	47.74		
	10:50	20	47.73		
	10:55	25	47.74		
	11:00	30	47.74		6.5°C
	11:05	35	47.75		EC = 60 Ω mho
	11:10	40	47.75		
	11:15	45	47.75		
	11:20	50	47.76	38	
	11:30	60	47.76		
	11:40	70	47.76		
	11:50	80	47.76		
	12:00	90	47.76		
	12:10	100	47.76		
	12:20	110	47.76		
	12:30	120	47.74		
	12:40	130	47.68		
	12:50	140	47.63	38	

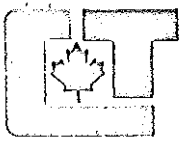


WELL OWNER KATIT INDIAN RESERVE
 LOCATION _____

WELL NO. 2
 JOB NO. 77-031

DRAWDOWN
 RECOVERY

DATE	TIME	ELAPSED TIME MINUTES	DTW	Q <u>US</u> GPM	REMARKS
18-10-78	13:00	150	47.60	38	
	13:50	200	47.33		EC = 61 Ω mho River = 12°C
	14:40	250	47.00		
	15:30	300	46.79		
	16:20	350	46.70		
	17:10	400	46.77		
	18:00	450	46.91		
	19:00	510	47.10		
	19:40	550	47.18		
	20:30	600	47.32		
	21:20	650	47.46		
	22:10	700	47.59		
	23:00	750	47.69		
	23:50	800	47.84		
19-10-78	00:40	850	47.95	38	
	01:30	900	47.88		
	02:20	950	47.76		
	03:10	1000	47.58		
	04:00	1050	47.38		
	04:50	1100	47.30		
	05:40	1150	47.25		
	06:30	1200	47.35		
	07:20	1250	47.43		
	08:10	1300	47.54	38	EC = 63 Ω mho
	09:10	1360	47.67		
	09:50	1400	47.73		
	10:40	1450	47.82		
	11:30	1500	47.89		EC = 63 Ω mho 6.5°C
		END PUMPING			



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Report On Analysis of Water Samples File No. 7813C
Reported to Brown, Erdman & Associates Report No. _____
1401 Bewicke Ave. Date Nov. 3, 1978
North Vancouver, B. C.
Attention: Mr. H. Reid

We have tested the sample of water submitted by you on Oct. 22, 1978 and report as follows:

SAMPLE IDENTIFICATION:

The sample was submitted in a plastic bottle labelled:

KATIT I.R.
77-031
RIVER INLET BC
19 October 1978

METHOD OF TESTING:

The analyses were carried out in accordance with procedures described in "Standard Methods for the Examination of Water and Wastewater (14 Edition)" published by the American Public Health Association, 1975.

RESULTS OF TESTING:

(see following page)

RESULTS OF TESTING:

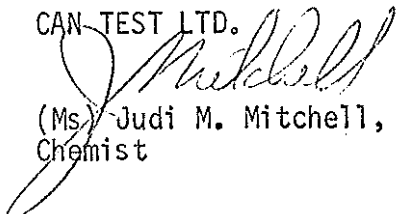
<u>TEST</u>	<u>RESULT</u>
<u>Physical Tests</u>	
pH	7.20
Conductance (umhos/cm)	53.2
Color (CU)	L 5.
Turbidity (JTU)	0.20
Total Dissolved Solids (mg/L)	48.
Total Suspended Solids (mg/L)	0.75
<u>Dissolved Anions (mg/L)</u>	
Alkalinity	
Bicarbonate HCO ₃	31.4
Carbonate CO ₃	NIL
Chloride Cl ⁻	1.0
Sulfate SO ₄	3.7
Nitrates & Nitrites N	0.069
Phosphate PO ₄	L 0.003
Fluoride F	0.06
<u>Dissolved Cations (mg/L)</u>	
Total Hardness CaCO ₃	19.9
Calcium Ca	6.71
Magnesium Mg	0.75
Sodium Na	2.32
Potassium K	0.95
Iron Fe	L 0.030
Manganese Mn	L 0.003
Cadmium Cd	0.002
Copper Cu	0.001
Lead Pb	0.005
Zinc Zn	0.025
<u>Others (mg/L)</u>	
Total Iron Fe	L 0.030
Total Manganese Mn	L 0.003

L = less than, mg/L = milligrams per liter (or parts per million for drinking water).

REMARKS:

The water represented by the sample submitted can be characterized as a soft water, low in dissolved mineralization. For the parameters tested the sample met the limits set by the "Canadian Drinking Water Standards and Objectives, 1968".

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(Ms.) Judi M. Mitchell, B.Sc.
Chemist

/mp