



J.C. Foweraker, Head
Groundwater Section
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Date: Sept. 13, 1982
File: 82 L/16

Re: Illecillewaet River - Revelstoke

The purpose of this memorandum is to summarize the results of water level monitoring carried out at Revelstoke since December 1981. Water levels were monitored in three observation wells, a private well, at two sites on the Illecillewaet River and at the pond behind the No. 2 Creek culvert. The locations of the monitoring sites are shown in Figure 1. Available water level data is shown in Figure 2. Background information on the establishment of the monitoring sites is contained in two previous reports of March 1, 1982, and October 23, 1981. The groundwater situation at Revelstoke can be summarized as follows:

- (a) Groundwater occurs under water table conditions in shallow sand and gravel deposits which underlie the area where basement flooding has occurred. Water levels in the established observation wells ranged from 6 to 10 feet below ground.
- (b) There is good hydraulic continuity between the Illecillewaet River and the shallow groundwater regime adjacent to the river.
- (c) Groundwater levels adjacent to the river are influenced by river stage with the transient effects diminishing away from the river.
- (d) The natural groundwater gradient in the floodplain slopes towards the river with groundwater movement towards the river.

The monitoring data shown in Figure 2 shows the following events:

- 1. During freezing weather in early January 1982 the Illecillewaet River rose dramatically about 5 feet opposite the No. 2 Creek culvert while a three foot rise in river ice level occurred at the Fourth Street bridge crossing. This rise in river level must be due to river icing conditions downstream of the Fourth Street bridge causing a restriction in channel flow and backup of water levels upstream.

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Water levels in Observation Well No. 3 and in Mr. Duchman's well, adjacent to the river each rose about three feet at this same time.

2. By mid-January, the Illecillewaet River began to recede being ice-free about mid-March. Groundwater levels also dropped during this period except in Observation Well No. 1 furthest from the river.
3. Snowmelt and infiltration of surface runoff in March contributed to groundwater recharge and groundwater levels rose until mid-April. During this time the No. 2 Creek culvert was blocked and water levels in the pond behind the dyke were also rising. The river during this time was relatively low and static.
4. After the No. 2 Creek culvert was cleared on April 14, 1982, groundwater levels dropped until May when rising river levels again began to influence the groundwater regime. Well No. 3 closest to the river began to respond to the river in mid-May, Well No. 2 in early June and Well No. 1 in late June.

Two factors appear responsible for causing high water table conditions during the winter months at Revelstoke namely:

1. Freezing conditions and ice-buildup on the Illecillewaet River.
2. Periodic blockage of the culvert at No. 2 Creek.

Recommendations

River hydraulic studies would have to be undertaken to ascertain what measures would be appropriate for preventing icing conditions that may lead to river backup upstream.

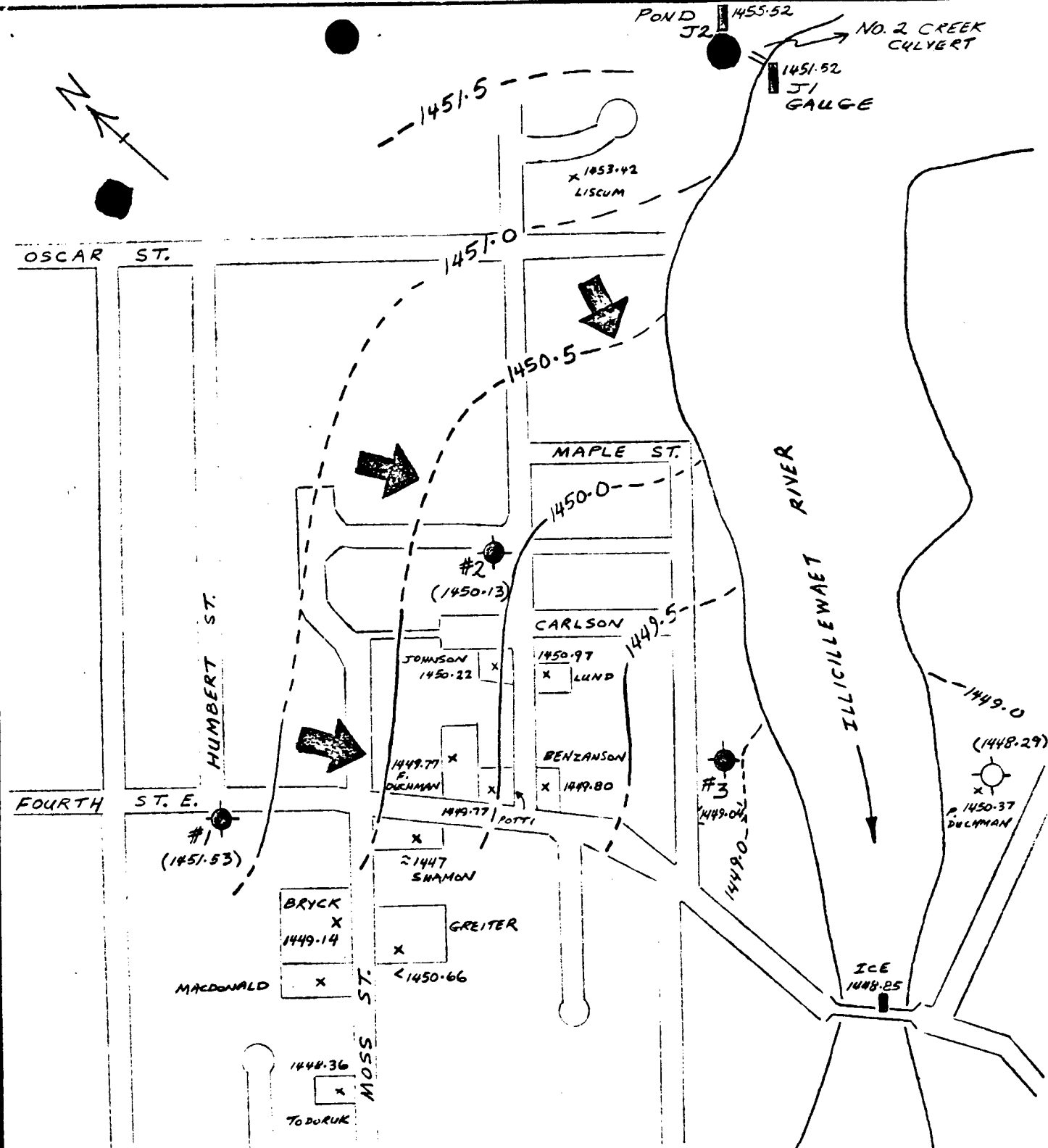
As there could be considerable difficulty in keeping the culvert at No. 2 Creek open throughout the year, particularly during the winter months, consideration should be given to replacing the culvert with an open channel. A level survey should be carried out to determine if the culvert has moved since its installation.

Monitoring of groundwater levels at Revelstoke should be continued for another year so that up-to-date information will be readily available on the water table situation if required. Monitoring of river levels could be discontinued during this period.



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APK/dma



LEGEND

- OBSERVATION WELL (WATER LEVEL ELEVATION) FT.
- BASEMENT FLOOR ELEVATION IN FEET
- 1450-WATER TABLE CONTOUR (ELEV. IN FEET)
- INFERRED CONTOUR
- INFERRED DIRECTION OF GROUNDWATER FLOW



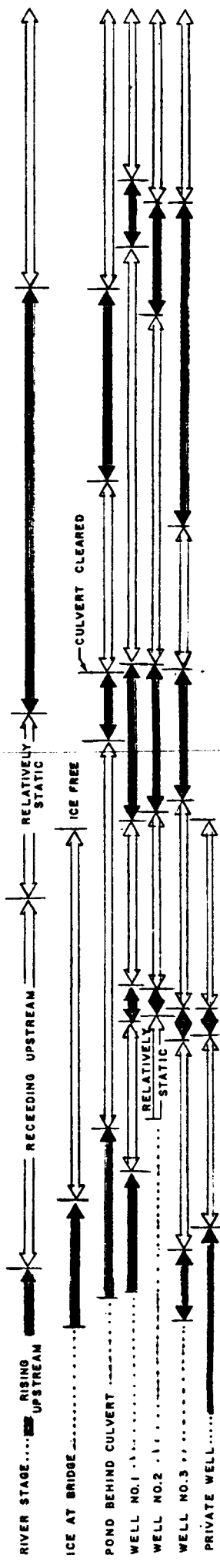
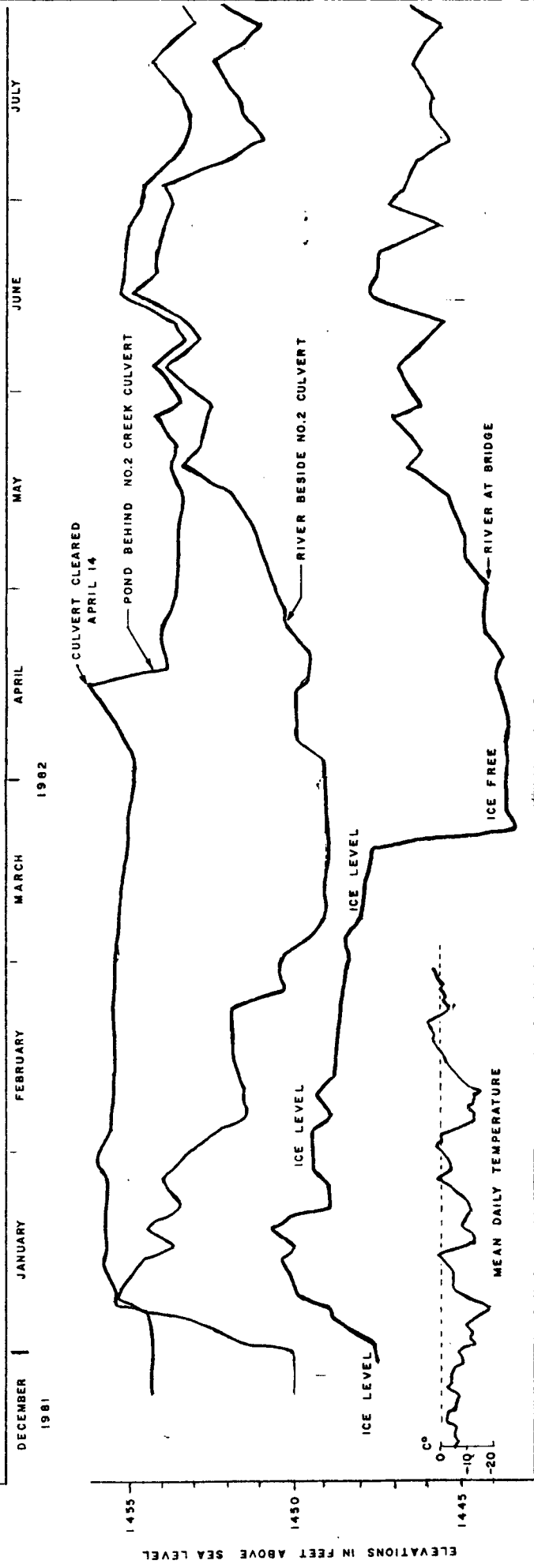
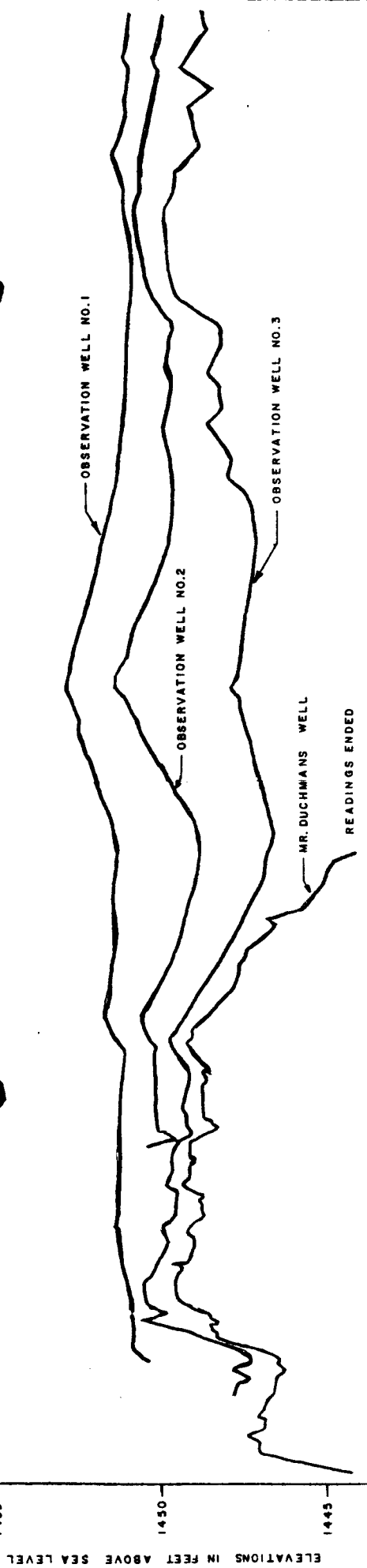
Province of British Columbia
 Ministry of Environment
 INVENTORY AND ENGINEERING BRANCH

TO ACCOMPANY REPORT ON
 REVELSTOKE BASEMENT FLOODING
 (WATER LEVELS FEB. 4, 1982.)

SCALE: VERT.
 HOR. 1" = 400'

DATE
 FEB. 1982

FILE No 82 L 16 DWG No APK ENGINEER
 FIGURE 1.



LEGEND

- ↑ RISING TREND
- ⇐ RECEDING TREND (OR STATIC)

FIGURE 2