



To: A.P. Kohut
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Groundwater Section
Hydrology Section

Date: September 12, 1986
Our File: 92 B/14

Re: Flowing Well on Mayne Island

On September 9th and 10th, 1986, I visited Mayne Island to inspect the above well (the Bennett well). In addition, the adjacent area along Fernhill Road from Georgina Point Road to Minty Drive was also surveyed to investigate any concerns of residents regarding the free flowing Bennett well on the groundwater conditions in the area (Figure 1). Well data obtained from Mr. Bennett, Mr. Smithson the driller, and from my measurements are summarized below:

Bennett Well

Date drilled: July, 1986
Depth: 200 feet
Diameter: 6-inch, cased with 6-inch diameter steel casing to 20 feet and open borehole below 20 feet
Lithology: shale, major water-bearing zone at 185 feet
Air lift test: 50 gpm
Static water level: above ground level
Flow: 3 USgpm
Casing stickup: 0.75 feet above ground level

The 6-inch casing was installed by drilling an oversized hole and slipping the casing into the hole; no surface seal was constructed. The well is fitted with a cover plate but the water is allowed to flow quite freely out between the plate and the casing (Photo 1). This is a common drilling completion practice in the area. Mr. W. Fudge, local resident, said that the flow was greater earlier in the summer just after it was drilled. Presently, the flow disappears into the ground immediately downslope; no seepage was detected at the ditch along Georgina Point Road about 50 feet downslope of the well. Some natural slope stability problems do occur along this road downslope which Highway personnel have been aware of for some years. The well is located about 100 feet from shore. Salt content of the flowing well water is quite low ($\text{NaCl} = 100 \text{ mg/L}$).

APK

Roughly two-thirds of the adjacent property owners were contacted. Except for the B.C. Tel dug well and the Engelhardt property which obtains water from Cullison Brook, residents obtain water from wells completed into the same bedrock shale aquifer as the Bennett well [this was inferred from the similarity of the water quality from the wells (see Table 1)]. There were no complaints about the Bennett well affecting the capacity and water level of the adjacent wells. Local water level data is scarce - nearly all the wells are sealed at the well head. Only the water level in the Higginbottom well could be measured and it was 10 feet lower from last year. However, this well is being pumped. Mrs. Drummond did notice that her well water turned silty after the Bennett well was drilled but she also said that it turns silty after heavy rains. The most widespread complaint in the area is bacterial pollution of the groundwater which has been attributed to septic systems. There is also a concern that the Miners Bay Trading Post well has been contaminated by gasoline from the Esso station uphill. That well has the poorest water quality: the water has a relatively high salt content ($\text{NaCl} = 350 \text{ mg/L}$) and iron content ($\text{Fe} = 2.5 \text{ mg/L}$), leaves a brown scum in bathtubs and smells of sewage. Contamination of this well may be due primarily to local septic systems.

The affect of the flowing Bennett well on the regional groundwater level, and on the capacity of the neighbouring wells (interference), though possible (Figure 2), does not appear under present conditions to be significant. Monitoring the water level in the upgradient wells would be necessary to confirm this. However, the Bennett well is located at the end of the groundwater flow system where the water flushes out to the sea. The flow of 3 USgpm is equivalent to a drawdown of a few feet at the well (depending on the aquifer transmissivity) and represents a very small amount of water drawn from the watershed. This flow likely induces an equally small degree of upconing of saltwater toward the well. This amount of flow would also not likely contribute significantly to slope instability along the shore downslope; this can be checked by the Highways personnel. It is likely that the flow from the well will increase in the winter months as the regional groundwater level rises in response to rainfall. Well interference and seawater intrusion may become problematic if the well is put into production at 50 gpm. A 3-day pumping test during the dry season would be necessary to assess the actual capacity taking into account these concerns.

A Kohut

September 12, 1986

It appears the well could be left as it is with no major problems but several alternatives are available for stopping the flow:

1. Extra casing can be added on as stickup. Five or more feet of casing may be necessary. This would require welding equipment and a pump to lower the water level in the well before welding.
2. The well can be sealed with a well cap. Water may, however, leak out along the outside of the 6-inch casing to saturate the ground around the well.
3. A liner can be grouted in place to just above the water producing zone to prevent leakage along the outside of the casing and then the well can be capped. This would require mobilizing a drilling rig and grouting equipment.

Mike Wei

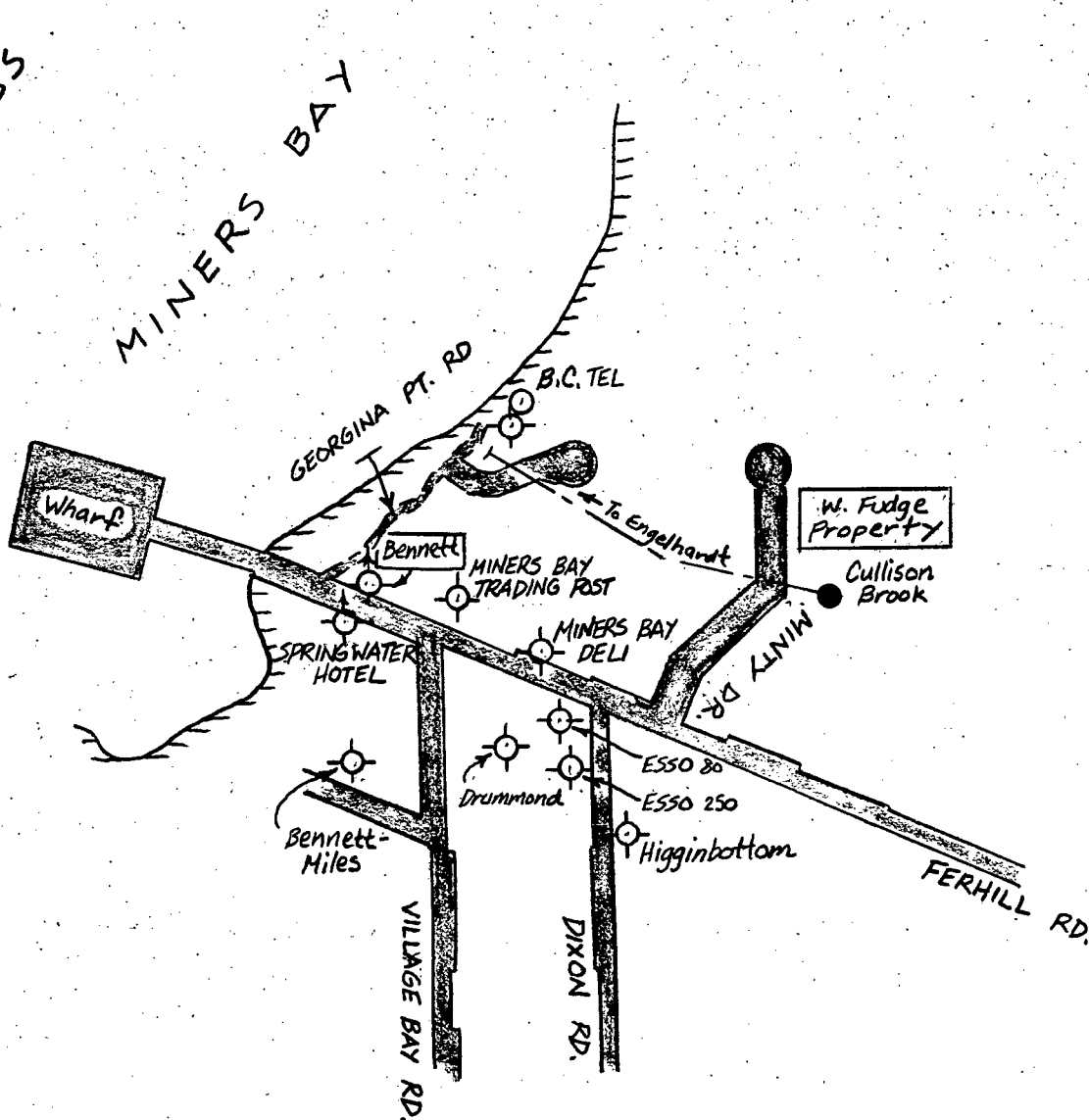
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MW/dma

WELL LOCATION - MINERS BAY FIELD SURVEY

Active Pass

MINERS BAY



LEGEND

- DUG WELL
- DRILLED WELL
- FLOWING WELL
- LICENSED INTAKE + PIPELINE



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SCALE: VERT. N/A

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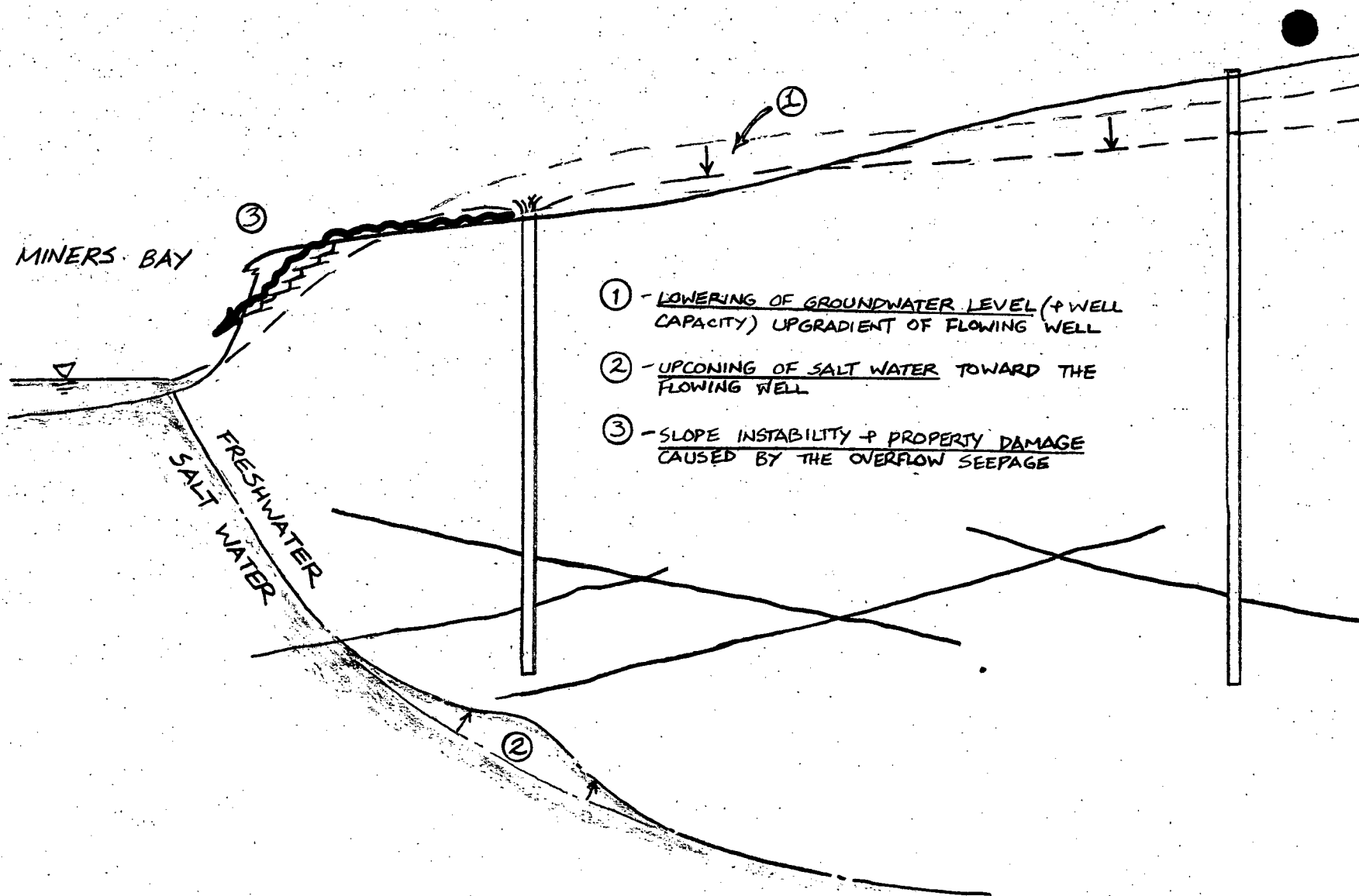
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DWG. No. FIGURE 1

POSSIBLE EFFECTS OF A FLOWING WELL AT MINERS BAY



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Picture 1. The Bennett well flowing at 30USgpm,
Miners Bay, Mayne Island.

WATER QUALITY - MINERS BAY FIELD SURVEY

WELL	T°C	Cond. (µS/cm)	pH	Ph. Alk. (mg/L)	M.O. Alk (mg/L)	Hardness (mg/L)	NaCl (mg/L)	Fe _T (mg/L)	Nitr-N (mg/L)	COMMENTS
BENNETT	12	590	9.5	—	205	51	100	<0.5	0	Rotten egg smell
MINERS BAY TRADING POST	19	1,000	7.0	—	239	51	≤ 350	2.5	N/T	Brown color, not used for drinking
MINERS BAY DELI	17	500	9.0	—	≤ 222	<17	<50	~0.5	N/T	Use chlorine
ESSO 250'	13½	480	9.5	—	222	<17	N/T	≤ 0.5	N/T	
SPRINGWATER HOTEL	14	410	7.3	—	188	≤ 34	<50	≤ 0.5	N/T	Use chlorine
DRUMMOND	16	460	9.0	—	222	<17	<50	~0.5	N/T	Silty, not used for drinking
B.C. TEL	16½	300	8.8	—	≤ 120	137	<50	3.7	0	Slight brown cast, not for drinking
BENNETT - MILES	17	350	6.3	—	≤ 100	≤ 137	N/T	~1.0	N/T	
HIGGINBOTTOM	15	470	9.5	—	< 240	<17	N/T	<0.5	N/T	



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DWG. No. TABLE 1

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