



To: Dr. J.C. Foweraker, Head  
Groundwater Section  
Water Management Branch

Date: March 25, 1987

Our File: 92 H/4

Re: Impact of Proposed Subdivision at 45035 Keith Wilson Road  
on Chilliwack Municipal Wells

As requested by Mr. L. Hogg, Chief Public Health Inspector of the Upper Fraser Valley Health Unit, a review has been completed of available groundwater information in the above area. Mr. Hogg is concerned that wastewater disposal into the ground from the proposed 20 lot development on Keith Wilson Road may adversely affect the quality of groundwater approximately 600 m down gradient in two community production wells used by the District of Chilliwack (Figure 1). E. Livingston (Pacific Hydrology Consultants Ltd.) has reported (1986) that "under the prevailing circumstances, the addition of an additional 20 homes nearby is also unlikely to cause a problem, or even result in any perceptible increase in the concentration of nitrate in groundwater from the Chilliwack wells."

The development site is underlain by permeable sand and gravel deposits which comprise the high capacity, water table aquifer in which the municipal wells are completed. The permeability of the aquifer has been estimated to be in the range 1 to 10 cm per second (Livingston, 1986), and the transmissivity in the vicinity of the municipal wells has been estimated to be in the range 200,000 to 1,000,000 USgpd/ft. width of aquifer (Livingston, 1973). Non-pumping water levels in the municipal wells were reported to be 27 feet below ground when the wells were drilled. Screened intake intervals in the municipal wells are from 60 to 98 feet below ground. Wells completed to depths up to 78 feet for the Fraser Valley Arena, situated next to the development property are also reported to be completed in sand and gravel with non-pumping water levels reported to be 10 to 20 feet below ground.

As the aquifer underlying the region is relatively shallow, highly permeable and not confined by any thick section of low permeability deposits, the aquifer is readily susceptible to pollution from any significant waste discharges on or into the ground. The ability of the deposits underlying the area to assimilate waste discharges without any adverse groundwater quality effects depends upon a number factors including for example:

1. Quantity and nature of the contaminants being discharged.
2. Method of waste disposal.
3. Depth to water table.
4. Lithology and permeability of the soil materials.
5. Natural rates of groundwater movement.

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A relatively small accidental spill from an oil or gasoline tank for example in close proximity (1,000 feet) to the municipal wells might conceivably impair groundwater quality making it unpotable with hydrocarbons at barely detectable concentrations (e.g., 0.01 mg/L) within a relatively short time (weeks). Relatively small discharges of normal septic effluent such as that proposed by the development, however, would not in itself be expected to have a major quality effect upon the aquifer at distances of 600 metres from the points of discharge within a short time (years). Nevertheless, inappropriate use of septic disposal systems for disposal of common household chemicals such as paint thinners, grease removers, septic tank cleaners etc., could result in quantities of synthetic organic compounds entering the groundwater regime. These compounds can impair groundwater quality at concentrations of a few parts per billion. The transport and fate of organic contaminants in the subsurface environment is a relatively new topical area of concern, thus the published literature is sparse (Canter and Knox, 1985). The potential problems from septic fields may be compounded further with increased density of development.

In summary, the proposed development of 20 residential septic disposal fields would not in itself pose a significant threat to groundwater quality in the municipal wells situated down gradient. Due to the susceptibility of the aquifer to pollution there is a need, however, to protect this valuable resource from pollution hazards such as accidental chemical spills, leakage of fuel storage tanks and inappropriate waste discharges. The need for adequate aquifer protection in the vicinity of the Chilliwack wells has been recommended previously. In 1973, E. Livingston recommended "this excellent and rather shallow aquifer must be protected from pollution. Dumping of garbage or other wastes in the nearby gravel pit or in the area between the well and the Vedder River must be protected by proper zoning or other planning provisions."

As the District of Chilliwack is a major user of the aquifer, consideration should be given by the District to develop an aquifer protection plan which would help safeguard the quality of the resource for future use. Elements of this plan, for example, might include:

1. Establishing a buffer zone around the municipal wells limiting activities which may pose a potential pollution hazard.
2. Limiting the density of septic systems in the vicinity of the wells and regions upslope.

3. Monitoring the quality of groundwater in the municipal wells on an annual or semi-annual basis.
4. Establishing additional wells specifically for quality monitoring purposes.
5. Controlling land use activities upslope of the wells to reduce potential pollution hazards.

The District should also consider retaining the services of a groundwater consultant to assist them in preparing the plan.

With regard to the proposed development, sufficient geotechnical information should be provided to verify that the soil conditions, infiltration capacity and depth to the water table are satisfactory for successful operation of the proposed disposal facilities. A field inventory of all existing wells within 1,000 feet of the proposed development is also recommended to determine if any neighbouring properties are using groundwater.

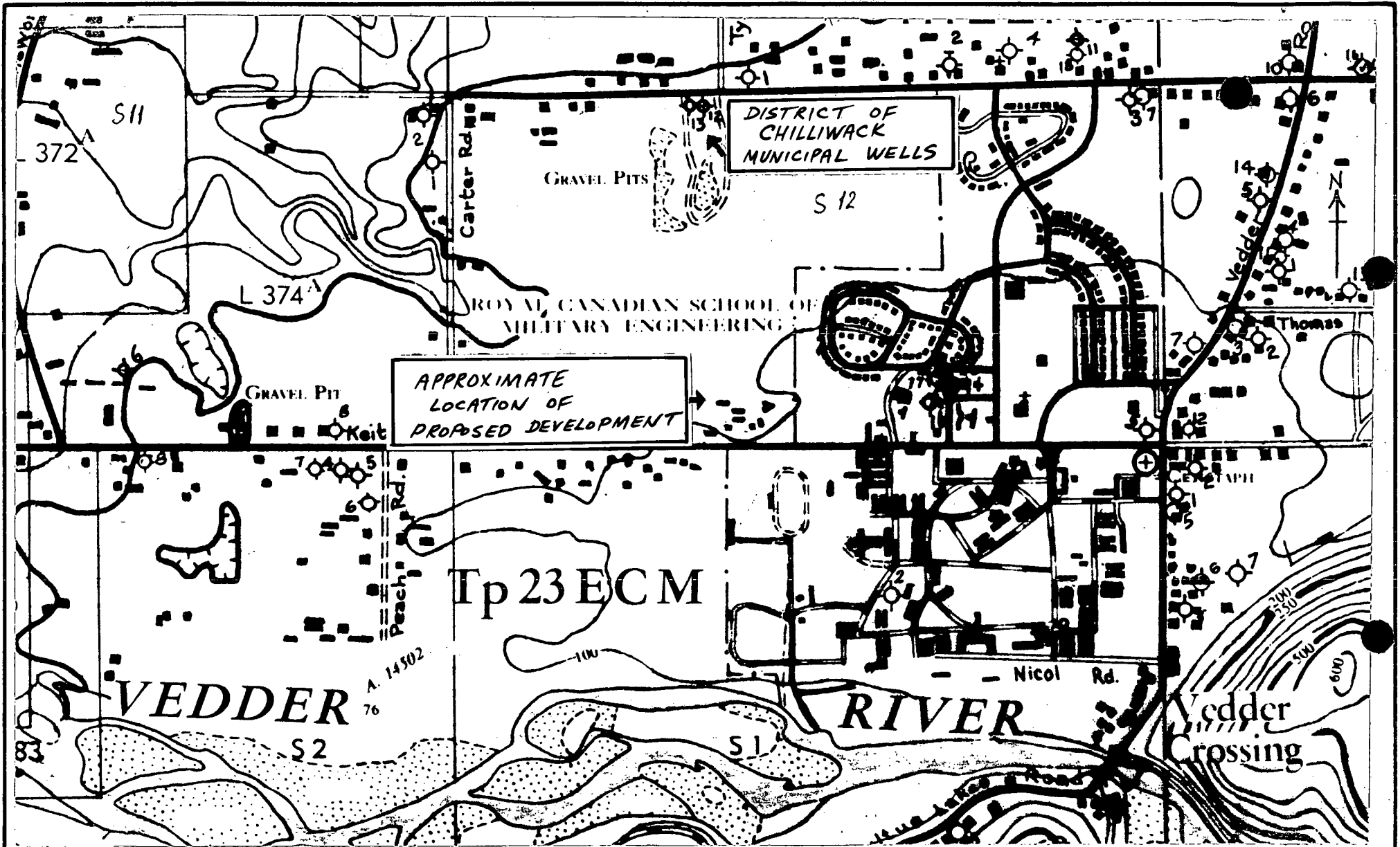


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#### References

- Canter, L.W. and R.C. Knox. 1985. Septic Tank System Effects on Ground Water Quality. Lewis Publishers, Inc., Chelsea, Michigan.
- Livingston, E. 1973. Letter report to Elk Creek Waterworks Company Ltd., June 22. E. Livingston, Vancouver.
- , 1986. Impact of a proposed subdivision at 45035 Keith-Wilson Road on the Chilliwack Municipal Wells. Letter report to Nyda Realty Inc., December 23. Pacific Hydrology Consultants Ltd., Vancouver.



Province of British Columbia  
 Ministry of Environment  
 WATER MANAGEMENT BRANCH

TO ACCOMPANY REPORT ON  
**IMPACT OF A PROPOSED SUBDIVISION  
 AT 45035 KEITH WILSON ROAD  
 ON CHILLIWACK MUNICIPAL WELLS**

SCALE: VERT. \_\_\_\_\_  
 HOR. 1" = 1000'

DATE  
 MARCH 1987

FILE No. \_\_\_\_\_ DWG. No. **APK** ENGINEER

FILE No. \_\_\_\_\_ DWG. No. **FIGURE 1**

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