

May 21st, 1971

NOTES ON GROUNDWATER INVESTIGATIONS

FOR SISKA FLAT INDIAN RESERVE #3

SOUTH OF LYTTON, B. C.

REFERENCE

Letter dated August 14th, 1970 to Mr. B. E. Marr, Chief Engineer, Water Investigations Branch, B. C. Water Resources Service from F. A. Clark, Regional Director, B. C.-Yukon Region, Department of Indian Affairs and Northern Development (File No. 0239013, 976/8-2-23 (TDE.1), 974/8-2-3-1).

GENERAL INFORMATION

The above letter requested Groundwater Division personnel to visit this reserve in order to give an opinion on the feasibility of drilling a well for a domestic water supply for approximately 20 people now living on the Siska Reserve.

The writer visited the Siska Reserve on the 1st and 2nd of October and discussed the water supply problem in general terms with Mr. Dixon who is a resident on the reserve. Mr. Dixon subsequently accompanied the writer on an extended field inspection of the area. The location of Mr. Dixon's house and the other three residents are shown on the attached aerial photographs.

The writer also discussed the problems in general terms by telephone with technical personnel in the Department of Indian Affairs following the field investigation. This report has been prepared from original field notes made at the time of the field inspection.

PRESENT WATER SYSTEM

The existing water system is supplied from Siska Creek (see photo). A temporary boulder dam is made each year out into Siska Creek and this is lined with plastic.

The water is diverted into a wooden stave pipeline and then by open ditch to a point on the opposite side of the highway just opposite Mr. Dixon's house. The water then flows through

a pipe under the highway and ends up close to Mr. Dixon's house. Other diversions from this open ditch on the opposite side of the highway from Dixon's house takes water to the other three houses. At the time of the inspection no water was being taken from the most distant connection to Monroe's house, so the members of this household, it is presumed, must be hauling water. During the winter months, the wood stave pipeline cannot operate and all residents rely on a small spring (see photo). I noticed that at the time of my visit the spring was barely flowing. Mr. Dixon said the flow increased during the winter months and was just enough for present needs. The flow during winter months, he said, $\frac{1}{2}$ filled a $1 \frac{3}{4}$ inch pipe. All water during winter months had to be hauled from this source.

The spring flow would appear to be issuing at the base of the shallow overburden where it overlies the bedrock. The spring is not accessible to a drilling rig, also I do think that in this situation of fairly impermeable overburden over fractured bedrock there would be much advantage in attempting to develop this spring source, ie. the yield would probably remain very limited.

The condition of the woodstave pipeline and especially the wooden scaffolding that supports much of the pipeline around the steep rock bluffs of Siska Creek are in bad repair. Much of the woodwork needs replacing. Slides destroy parts of the line at intervals and these have to be replaced.

SOME POSSIBLE SOLUTIONS TO THE WATER SUPPLY PROBLEM

Depending on economics, one of the following might be adopted:

1. Continue repair and replacement of the existing pipeline, and construct a suitable storage tank and pipeline from the existing spring to the 4 connections for winter use only.
2. Continue repair and replacement of existing pipeline and construct a small well for winter use only.
3. Depending on the result of preliminary well drilling a well might perhaps be constructed capable of supplying all 4 homes on a year round basis. This of course, would depend on the completion of a satisfactory pump test carried out at the dry time of the year when the water table is at its lowest.

4. Installation of a pipeline with a pumping system from a surface water intake on Siska Creek near the highway and diversion tunnel. A brief reconnaissance of this part of the Creek, showed steep rock bluffs which would make access and construction maintenance of any intake and pumping system costly.

RECOMMENDATIONS

In view of the foregoing alternatives, it might be useful to have some cost estimates of the following:

1. Repairs for say 10 years &/or replacement of existing pipeline, from the source on Siska Creek.
2. Tank and pipeline from present spring for winter use.

Cost estimates on the above would then give some means of comparison with the costs for construction of a test well.

The test well costs given in the next section do not include

1. cost of pump house
2. Cost of 3 phase power connection
3. cost of pump
4. cost of connections from well to houses

A test well cannot be guaranteed to be a success in advance and therefore the costs of drilling and casing the hole and any development and testing will be lost if the well is unsuccessful. Chances for successful completion of this well are only poor to very marginal.

The location suggested for a test well is downstream from the spring on a small fan (see photo). The site is accessible to a drilling truck and water is available from the diversion (during the summer) at the site.

The well might be expected to encounter groundwater from the overburden immediately overlying the bedrock or in the bedrock fractures below. Recharge would be from the valley side slopes. However, the permeability of the overburden and the bedrock and the amount of recharge available are the unknowns.

Static water level would be expected to be considerably above Fraser River level.

A well site located close to the terrace edge to obtain a source of recharge at or below the Fraser River itself, would entail additional drilling and be very costly. It would also mean at least two reductions in casing size starting out with 10-inch. Pumping costs would be high as static water level in the well would be at or near river level. The deep well alternative will not be considered further here.

COST ESTIMATES FOR A TEST WELL COMPLETED IN BEDROCK ABOVE FRASER RIVER LEVEL

1. Drill and case 6-inch hole at \$13.50 a ft. to a depth of 100 feet	<u>\$1350.00</u>
2. Drill and case 6-inch hole in rock at \$11.50 a ft. to a depth of 75 feet below the casing	<u>\$ 862.50</u>
3. Development, pumping test, etc., 36 hours at \$22.00 an hour	<u>\$ 792.00</u>
4. Mobilization and demobilization	<u>\$ 400.00</u>
TOTAL	<u>\$3404.50</u>

COST ESTIMATES FOR A TEST WELL COMPLETED IN OVERBURDEN ONLY

1. Drill and case 6-inch hole to a depth of 100 feet at \$13.50 a foot	<u>\$1350.00</u>
2. 4 feet of 6-inch well screen (Johnsons stainless steel, with fittings)	<u>\$ 234.00</u>
3. Setting screen, well development and pumping test at \$22.00 an hour for 48 hours	<u>\$1056.00</u>
4. Mobilization and demobilization	<u>\$ 400.00</u>
TOTAL	<u>\$3040.00</u>

CONCLUSIONS

The above suggestions and costs may be of some assistance to the Indian Affairs Department in coming to a decision for this system.

Chances for the successful completion of this well are only poor to very marginal.

The Groundwater Division of the Water Investigations Branch will be able to supply limited technical assistance, when staff are available, should a decision be made to proceed with well drilling.

Technical assistance would be as follows:

1. Recommendations on well and well screen design and sampling procedures.
2. Recommendations on when to stop drilling.
3. Recommendation on well development and procedures for pumping tests.
4. Analyses of results of pumping test.

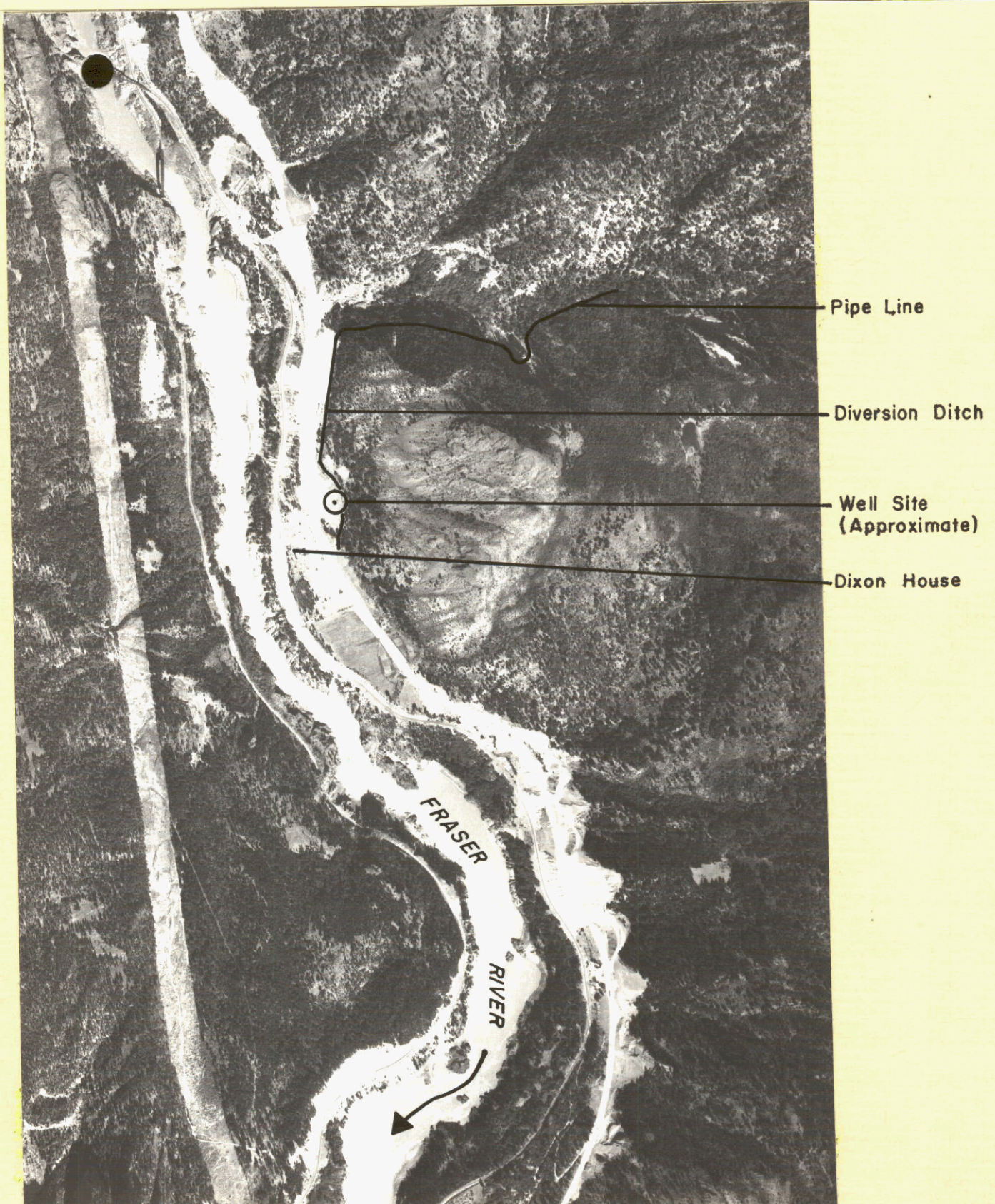
The Department of Indian Affairs would be expected to have a competent technician at the site to see that suitable samples are collected, to arrange for grain size analyses of samples, in the case where a screen design is required, and to supervise the pumping test and measurements.



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Groundwater Division

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BRITISH COLUMBIA
DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES
WATER RESOURCES SERVICE
WATER INVESTIGATIONS BRANCH
GROUNDWATER DIVISION



AERIAL PHOTOGRAPH TO ACCOMPANY "NOTES ON GROUNDWATER INVESTIGATIONS
FOR SISKIA FLATS INDIAN RESERVE #3 BY J.C. FOWERAKER
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