

INVESTIGATIONS

Geology & Ground Water Resources In Vicinity of Silverdale, Kitsap County, Washington

state of washington
department of ecology
daniel j. evans
governor
john a. biggs
director
olympia, washington
october, 1971

An investigation of the geology and ground-water resources along the Chico to Silverdale freeway. Testing was done to determine the quantity and quality of the ground water available in the area. Prepared by Paul A. Eddy, Office of Technical Services, Department of Ecology, Olympia, Washington, January 1971.

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Purpose and Scope of the Investigation

This study was initiated on August 10, 1970 in response to a letter received from the Chief Right of Way Agent, Department of Highways, requesting information about present and future ground-water availability and possible damages which could be incurred by construction of the Chico to Silverdale freeway.

The scope of this study was set to include several determinations which are:

1. Ascertain the availability of ground water to the present well site.
2. Determine the direction of ground-water flow.
3. Conduct a pump test in order to obtain specific information about the well behavior.
4. Determine possible damage to the well by nearby construction.

The study consisted of a general geologic reconnaissance of the area and a pump test of the well in question. Additional information was obtained from the files of the Department of Ecology.

Location and Topography of the Area

The well in question lies geographically near the center of Kitsap County and is within Township 25 North, Range 1 East, Section 17. The altitude of the well is approximately 160 feet above sea level and lies in a small draw directly east of the house approximately 100 feet and about 50 feet below the house in altitude. (Fig. 1)

Geology and Ground Water

Geology of this area consists of Vashon Drift which is of Quaternary age. The stratigraphic unit is till and consists of a mixture of compacted, frequently concrete-like mixture of cobbles and coarse gravel in a binder of silt and clay. Normally this unit is impervious, but in places yields small amounts of perched ground-water which is the case with the well in question. This type water source is generally close to the surface and easily polluted from surface sources. (Fig. 2)

Pump Test Data

The following table indicates the response of this well to pumping. The pump was $\frac{1}{2}$ horse power and yielded 3.5± gallons per minute. General well information is in Fig. 3.

August 8, 1970

Pumping Data Hour	Water Level below LSD*	Remarks
1:45 PM	21.40	Well just pumped
2:09	21.40	Pump test started
2:14	21.61	-0.21 Water level decline
2:19	21.77	-0.16
2:24	21.93	-0.16
2:29	22.11	-0.18
2:39	22.42	-0.31
2:49	22.74	-0.32
2:59	23.02	-0.28 Pump getting very hot
3:09	23.27	-0.25 Pump off total drawdown 1.87 feet

Recovery Data

3:14	23.22	+0.05
3:19	23.17	+0.05
3:24	23.15	+0.02
3:29	23.09	+0.06
3:35	23.04	+0.05
3:40	23.01	+0.03
3:50	22.96	+0.05
4:00	22.88	+0.08
4:14	22.80	+0.08 Total 1 hour Recovery

Conclusions

Assuming the intake in the well is one (1) foot above the bottom of the well and the pumping rate is from 3.4 to 3.5 gallons per minute this well will pump dry in approximately three (3) hours.

The specific capacity of the well is 1.88 gallons per foot of drawdown based on the conducted pump test.

The total recovery time would be about five (5) hours based on the conducted pump test. (Fig. 4)

Over the one (1) hour pump test the well yield was approximately 210 gallons per hour of water. Based on a need of 200 gallons per day per person in the household, this well will produce the amount required (800 gallons per day for a 4 member family) over a 24 hour period. However, this quantity cannot be produced on a continuous basis since at the end of three (3) hours of pumping the water level will have been lowered to the depth of the intake. At this point the well will have produced only about 630 gallons. The well will then require rest in order for recovery to occur before repumping the remaining quantity.

*Land Surface Datum

Based on the very low conductivity of the water as indicated by the low reading on the M-Scope the water appears to contain few minerals.

The sample tested by the County Health Office indicated that the (MPN) of bacteria of the coliform group count was zero (0) indicating that the water sample had no organic contamination. Visual observation showed the water to be clear and the taste of the water was good.

The general direction of ground-water flow appears to be from the NW to NNW which would indicate that construction might effect the well quality if large amounts of contaminated water reaches the aquifer.

It is recommended that the well be monitored during the construction when possible contamination might occur.

REFERENCES

Garling, M. E., Molenaar Dee and others, 1965, Water Resources and Geology of the Kitsap Peninsula and Certain Adjacent Islands: Washington Department of Conservation Water Supply Bulletin No. 18, pg. 32, and map.

Washington State Department of Health Bulletin ES No. 4, pg. 10.

APPENDIX I

FIGURES 1-4

PAGES 6-9

EXPLANATION

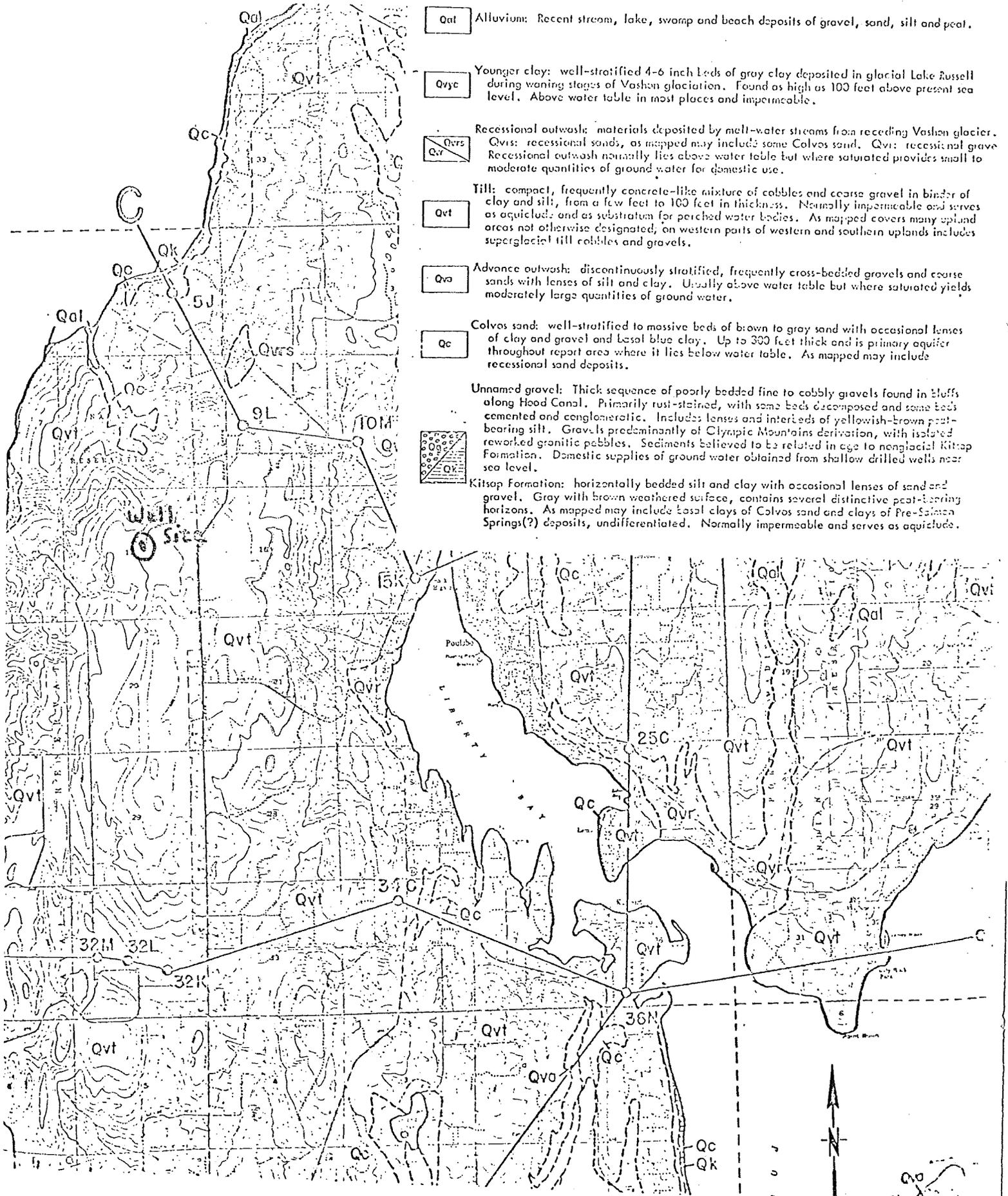


Figure 1

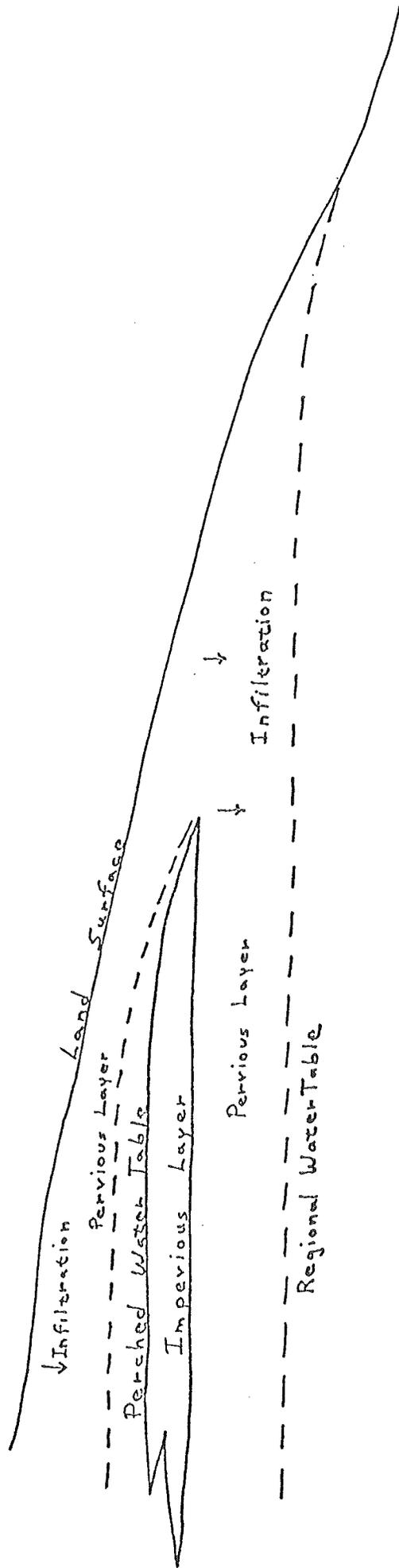


Figure 2

WELL SCHEDULE

Date August 5 19 70

Record by Paul A. Eddy

Source of data Observation

1. Location: State Washington County Kitsap

Map Poulsbo Well No. 25/1E-17 SW 1/4, SW 1/4, NE 1/4

2. Owner Verne Youngs Address _____

Tenant _____ Address _____

Driller _____ Address _____

3. Topography Sidehill

4. Elevation 180 ft. above Sea level

above
~~below~~

5. Type: Dug drilled, driven, bored, jetted _____ 19

6. Depth: ~~Rept.~~ Sounded _____ ft. Meas. 27.7 _____ ft.

7. Casing: Diam. 36 in., to _____ in., Type Concrete

Depth _____ ft., Finish _____

8. Chief Aquifer _____ From _____ ft. to _____ ft.

Others _____

9. Water level 21.40 ft. ~~rept.~~ August 5 19 70 above LSD

~~rept.~~
meas.

above
~~below~~

_____ which is 140 ft. above ~~below~~ Altitude surface

10. Pump: Type Dorward Jet Capacity _____ G.M.

Power: Kind 3450 RPM Horsepower 0.5

11. Yield: Flow _____ G.M., Pump 3.5 G.M., Meas., Rept., Est. 8-5-70

Drawdown 1.87 ft. after 1 hours pumping at 3.5 G.M.

12. User: Dom., Stock, PS., RR., Ind., Irr., Obs. _____

13. Quality _____ Temp. _____ °C

Taste, odor, color Good, none, colorless Sample Yes
No

14. Remarks: (Log, Analyses, etc.) Pump base by Myers

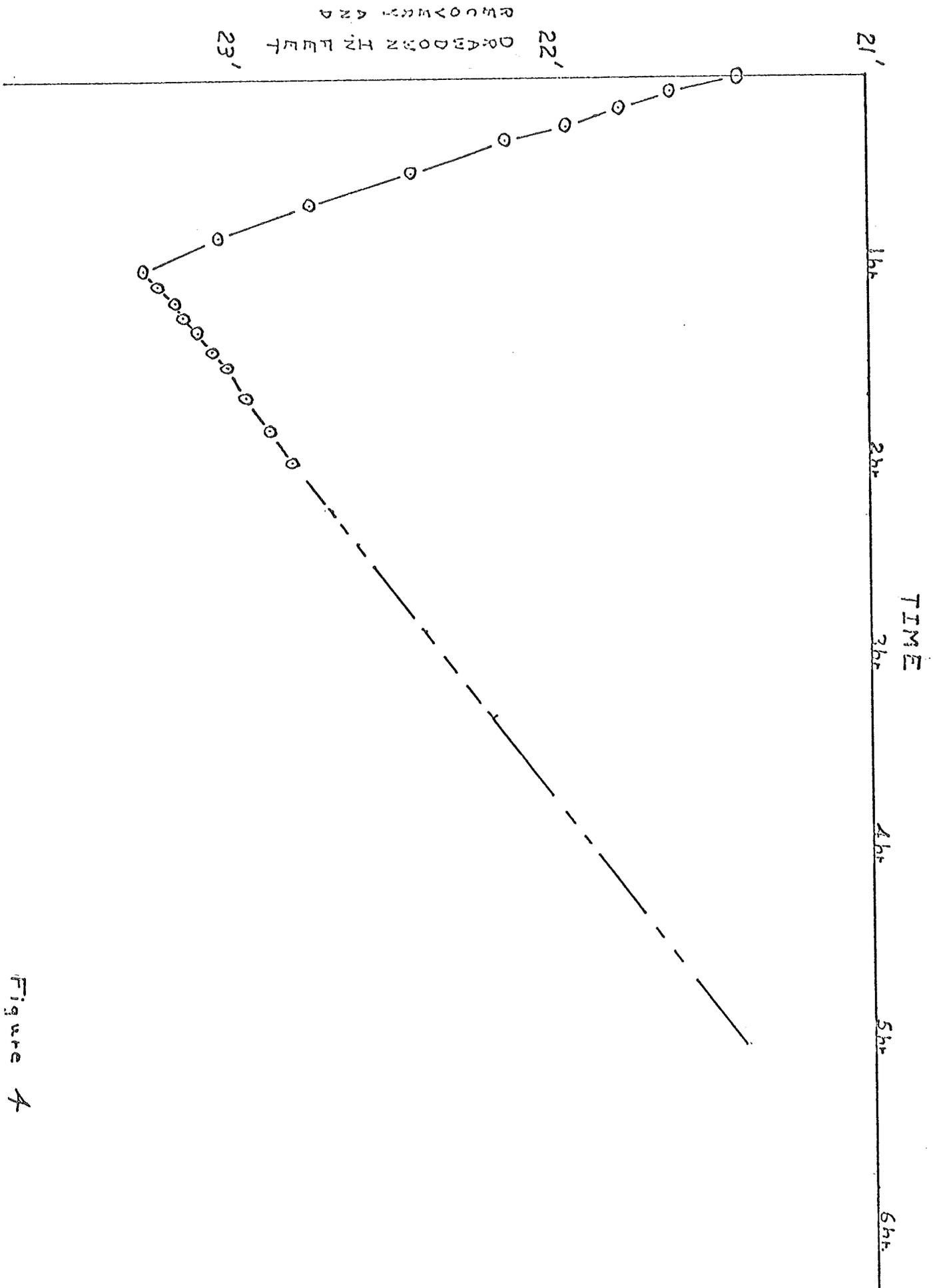


Figure 4

APPENDIX II

REQUEST LETTER

STATE OF WASHINGTON
DANIEL J. EVANS, GOVERNOR



WASHINGTON
STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS

G. H. ANDREWS, DIRECTOR
HIGHWAYS-LICENSES BUILDING
OLYMPIA

July 24, 1970

DISTRICT OFFICES

- NO. 1 SEATTLE 98108
8431 SO. CORSON AVE.
- NO. 2 WENATCHEE 98801
P. O. BOX 98
- NO. 3 OLYMPIA 98501
P. O. BOX 327
- NO. 4 VANCOUVER 98663
4200 MAIN STREET
- NO. 5 YAKIMA 98901
P. O. BOX 52
- NO. 6 SPOKANE 99205
N. 2714 MAYFAIR ST.

- COMMISSIONERS
- GEORGE D. ZAHN, CHAIRMAN
METHOW
 - ROBERT L. MIKALSON
CENTRALIA
 - HAROLD WALSH
EVERETT
 - BAKER FERGUSON
WALLA WALLA
 - JOHN N. RUPP
SEATTLE
 - LORENZ GOETZ, SECRETARY
OLYMPIA

RECEIVED
DEPARTMENT OF ECOLOGY
BELLVIEW 98004
10506 N.E. 4TH ST.

JUL 24 1970

A. M. 7 19 10 11 12 1 2 3 4 5 6 P. M.

H. M. Ahlquist, Director
Department of Ecology
Water Resources Division
Olympia, Washington 98501

Re: SR 3, Chico to Silverdale
CS 1804 R R/W 1854
Parcel No. 3-3063

Dear Sir:

We attach our map illustrating the above Parcel 3-3063 and approximate location of well thereon. During negotiations, the property owners raised the question of damages to such well because of highway construction that will be in a cut. The well appears to be over 200 feet from the right of way. Our agent agreed that there might be damages and put a protective clause in the voucher, also, stating that the well should be tested both before and after construction.

The appraiser mentions that the well is at the bottom of a ravine and the frame pump house measures 6' x 8'.

In order to provide a basis for such further negotiations, if necessary, we would like to ask your Department's assistance in making a test of this well as to volume and potability. You may have had an earlier request from District III applicable to this same parcel and its well which could have been submitted without the attached map.

Thank you for your help in this matter.

Very truly yours,

G. H. ANDREWS
Director of Highways

J. Arnold Cobley
By: J. ARNOLD COBLEY
Chief Right of Way Agent

GHA/cc
JAC/PAW

Attachment