

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
AMENDED

REPORT OF EXAMINATION

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

Ground Water (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE July 13, 1990	APPLICATION NUMBER G2-27816	PERMIT NUMBER	CERTIFICATE NUMBER
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NAME
Public Utility District #1 of Jefferson County

ADDRESS (STREET) Post Office Box 929	(CITY) Port Hadlock	(STATE) Washington	(ZIP CODE) 98339-0929
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PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #1 Bywater Bay

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 150	MAXIMUM ACRE-FEET PER YEAR 136
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QUANTITY, TYPE OF USE, PERIOD OF USE
136 acre-feet per year Multiple domestic supply Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
1550 feet west and 475 feet south of the center of Section 34.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$	SECTION 34	TOWNSHIP N. 28	RANGE, (E. OR W.) W.M. 1E	W.R.I.A. 17	COUNTY Jefferson
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RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
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LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Section 26, T. 28 N., R. 1 E.W.M., Except northwest quarter of the northwest quarter
Section 33, T. 28 N., R. 1 E.W.M.
Section 34, T. 28 N., R. 1 E.W.M.
Section 35, T. 28 N., R. 1 E.W.M.
Section 2, T. 27 N., R. 1 E.W.M.
Section 3, T. 27 N., R. 1 E.W.M.

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DESCRIPTION OF PROPOSED WORKS

An 8' x 299' well

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	August 1, 1993	August 1, 1996

REPORT

This amended Report of Examination is issued pursuant to Pollution Control Hearing Board Stipulation and Order of Full Dismissal No. 92-170.

BACKGROUND:

On July 13, 1990 Robert Leach, on behalf of the Public Utilities District #1 of Jefferson County, applied for a permit under the provisions of Chapters 90.44 and 90.03 Revised Code of Washington (RCW) to appropriate public ground water from a well. A rate of 175 gallons per minute was requested. The water is intended for community domestic supply of 270 homes. The application number is G2-27816.

At the applicants request, a preliminary permit to test the well was issued on February 11, 1991. An aquifer test was conducted by the environmental consulting firm Robinson and Noble, Inc. in March 1992.

A legal notice of the proposed appropriation was published on September 19, and 26, 1990, in the *Port Townsend/Jefferson County Leader*. No objections were received as a result of the public notice.

In August 1992 the Shine Community Action Committee filed an appeal with the Pollution Control Hearing Board contesting the issuance of a permit (PCHB 92-170). The parties have agreed to settle in accordance with the terms and provisions of the Settlement Agreement in 92-170, and the following amended report of examination.

INVESTIGATIONS:

In consideration of this application, I conducted a field investigation of the site on February 26, 1992. The applicant was not present on the site. Other investigations included a review of neighboring well logs, water right certificates and information submitted by the applicant. For additional information I contacted Bob Leach, manager for the Jefferson County Public Utilities District #1, and Greg Roats of Roats Engineering.

The project site is located in eastern Jefferson County, west of the Hood Canal Floating Bridge. Port Ludlow, five miles north, is the nearest community. The well is located approximately 2,000 feet from Squamish Harbor at an elevation of approximately 214 feet above mean sea level. The surrounding area is predominantly rural. This well will be inter-tied with an additional well, and serve existing and proposed regional development.

This well, identified as Bywater Bay well #1, is to be pumped in conjunction with a second well (well #2), which has been applied for under ground water application G2-27817. This water system will be owned and operated by Jefferson County Public Utility District (PUD) #1. System design was done by Roats Engineering.

The distribution system for well #1 consists of a 20 horsepower submersible pump, capable of producing 175 gallons per minute. Water from both wells will fill a 85,000 gallon storage tank, and will be distributed via 67,500 feet of main line.

Well Construction

Well #1 was constructed with 8-inch diameter casing to a total depth of 295 feet. It is effectively screened from 273 to 290 feet below ground surface. The well is completed in medium to coarse sand and gravel. The static water level is 163.5 feet or 52.5 feet above mean sea level, (MSL).

The well is enclosed in a pump-house which has a floor elevation of 214 feet mean sea level. The pump is set near sea level.

Aquifer Test

On March 5, 1992 a 24-hour constant rate test was performed by Robinson and Noble, Inc. During the pumping and recovery portions of the test, water levels were measured in well #1 and two additional domestic wells located at radial distances of 1,490 feet west (Hendrickson well), and 1,870 feet south (Hill well) of well #1. The Hendrickson well is situated at an elevation of about 208 feet above MSL and was constructed using 6-inch casing to a total depth of 200 feet. It is screened between 195 and 200 feet BGS. Well construction detail for the Hill well are unknown, but it is situated at an elevation of about 52 feet MSL and is suspected to be approximately 80 feet deep.

From the consultant's completion report the following is reported:

- Two pumping tests were conducted on well #1; The first at 118 gpm for 24-hours and a second test at 160 gpm for 50 minutes. The results indicate that the well can safely be used at a rate of 150 gpm.
- Well #1 produces water from a stratified sand and gravel aquifer that is located approximately between + 13 feet and -85 feet mean sea level. Observation wells monitored during the test may be located in an upper aquifer unit that is separate from the one supplying the production well. However, the lower unit receives leakage recharge from the upper unit.
- Aquifer transmissivity is estimated to be 2,000 gpd/ft. The aquifer is confined.
- Static water levels in well #1 drew down from a pre-test static of 163.6 feet to 207.4 feet BGS, after 24 hours of pumping.
- No tidal effects were observed in well #1, but the water level does respond to barometric changes.
- Water levels in the Hendrickson well declined approximately 0.3 feet during the pump test of well #1. The Hill well showed no measurable response to the pumping of well #1.
- The test did not show any evidence of salt water intrusion.

The consultant recommends static and pumping water levels and production data be recorded on a monthly basis. This will be required as a provision of the permit. Also the pump rate will be reduced to 150 gpm, as recommended.

Impact Assessment

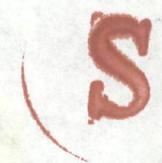
Department of Ecology hydrogeologist, Kirk Sinclair, reviewed the consultant's completion report. He assessed the two primary issues of concern associated with permitting Bywater Bay well #1:

- Will use of this well at 150 gpm cause sea water intrusion ?
- Will use of the well result in impairment of nearby wells ?

In response to the first question, Sinclair evaluated the water quality information included in the report as well as the drawdown and recovery plots prepared from the aquifer test data. Chloride concentrations in water from well #1 are low (6 mg/L) and indicate no intrusion problem. The water level in the well rose to within a foot of the pre-pumpage static water level after 24 hours of recovery. Jefferson County with its abundance of coastline and unique geology appears to be at particular risk for sea water intrusion conditions. Because it is unclear how the aquifer will respond to pumpage in the long term, Sinclair agrees that ongoing water level and water quality monitoring occur, as provisioned.

In order to assess potential drawdown in wells spaced at various distances from the production well, Sinclair used Jacob's (1946) modification of the Theis (1935) non-equilibrium formula.

Assuming well #1 is pumped continuously for 365 days, the maximum estimated drawdown in wells 1,000, 1,500 and 2,500 feet away, completed in the same aquifer, would be as follows.



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Assumed Storage Coefficient	<u>Maximum Predicted Drawdown</u>		
	1000 feet	1500 feet	2,500 feet
s = 0.01	14.1 ft	10.5 ft	5.98 ft
s = 0.001	24.3 ft	20.7 ft	16.18 ft
s = 0.0001	34.5 ft	30.9 ft	26.38 ft

The limiting assumptions of this equation allow for a "worst case" assessment. These drawdown estimates are therefore high since they are based on the assumption that the aquifer receives no recharge during the 365 day pumping period and that the potentiometric surface is initially horizontal. Neither of these assumptions are true. In addition, the method does not account for the reduction in drawdown that occurs as a function of water leakage from overlying water bearing units. In reality the drawdown caused by well #1 pumpage will be substantially less than predicted by this method.

There are approximately 13 wells that may be located within 1,500 feet of the production well. These wells have available drawdown levels ranging from 18 to 140 feet, with the majority averaging at least 40 feet. Given the "worst case" impact assessment scenario assumed by the Theis equation, water levels could drop from 10.5 to 30.9 feet, effectively rendering them unusable.

Under 90.44.130 RCW, the Department of Ecology is responsible for limiting ground water withdrawals to the extent that senior rights and the safe sustaining yield of the aquifer are protected. Because this degree of negative impact would be unacceptable, I recommend that water levels be monitored and data submitted to the Department of Ecology for analysis. Any significant decline in area water levels that can be accredited to the Bywater Bay well #1, will result in a reduction of the authorized withdrawal and pump rates.

DISCUSSION:

Department of Ecology records indicate that over 21 wells have been constructed within a half mile radius of the subject well. Based on actual monitoring at the observation wells, drawdown at these locations should be insignificant. However, the theoretical impact assessment performed by Ecology staff indicates some level of well interference could potentially occur given the particular conditions assumed by the Jacob's model.

Monitoring of water levels in the production well and neighboring wells will give both the Jefferson County P.U.D. and Ecology an opportunity to assess actual impact.

Two ground water certificates have been issued approximately one half mile southwest of the Bywater Bay well #1. One supplies Sound View Villa Club and authorizes a withdrawal rate of 20 gallons per minute, 9 acre-feet per year. The second authorizes 10 gpm and 1 acre-foot for single domestic supply.

Based on well spacing in the area, and aquifer test data, including the monitoring of observation wells, it does not appear that the subject well will adversely impact existing rights. Additionally, these wells are being developed to provide water to rural residents who have been utilizing private wells, many with water quality and availability problems.

However, the applicant is reminded of the responsibility towards other right holders in the area, and advised that regulation of the withdrawal and pumping rate may be required if existing rights are injuriously affected. Metering of static water levels, water usage and pumping rates will be required as provisions of this permit. In order for this aquifer to provide a sustainable supply, pumping must be managed so that there is no ongoing, progressive decline of static water levels from year to year.

Water Requirements

The water requirements for a multiple domestic system of this nature should not exceed an average daily use of 450 gallons per day or 0.5 acre-feet per year per residence. The Bywater Bay #1 well will serve 270 connections. Water needs amount to 121,500 gallons per day, or 136 acre-feet per year. The total number of homes served by the two wells will be 324. Ground water permits G2-27816 and G2-27817, when combined, allocate 162 acre-feet per year.

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CONCLUSION:

In accordance with Chapters 90.03 and 90.44 RCW, I find there is water available for appropriation from the source in question, the appropriation as recommended is a beneficial use and should not impair existing rights or be detrimental to public welfare.

RECOMMENDATIONS:

I recommend approval of this application and issuance of a permit to allow appropriation of 150 gallons per minute, 136 acre-feet per year from this well for multiple domestic supply of 270 homes. The period of use shall be year round as needed.

PROVISIONS:

The terms of the Stipulation and Order of Dismissal in PCHB #92-170, are hereby incorporated, by reference, into this report. The permit shall be subject to existing rights, the terms of the stipulation, and to the following provisions.

"Prior to issuance of a final water right certificate, data shall be submitted covering three years' production from well #1, including pumpage, water levels, and water quality, as described below:

- An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly.
- Installation and maintenance of an access port as described in WAC 173-160-355 is required. An air line and gauge may be installed in addition to the access port. Pumping and non-pumping water levels shall be measured and recorded using a consistent methodology, in accordance with accepted industry standards. Such measurements shall be made at least monthly. The length of the pumping period or recovery period prior to each measurement shall be constant, and shall be included in the record.
- A summary of the previous year's monthly water level data, monthly totals of water pumped from this well, and water quality data shall be submitted to Ecology's Water Resources Program, Southwest Regional Office, annually during the month of February, or more frequently if requested by Ecology."
- Chloride samples shall be gathered from Well #1, on a quarterly basis (June, September, December, and March) and submitted to a laboratory accredited by the Department of Ecology and the results shall be submitted to the Department of Ecology, Southwest Regional Office. If the chloride concentration exceeds 50 mg/L, the withdrawal rate shall be reduced or the pump setting raised to reduce the chloride level to below 50 mg/l.
- In addition, the monitoring requirements for the additional wells as set forth in the settlement agreement shall be performed.

Monitoring, as outlined above, shall be performed until the final Water Rights Certificate is issued.

Prior to operation of Bywater Bay well #1, the P.U.D. will perform an eight week baseline data study on the wells designated by the Settlement Agreement. The testing will include weekly static level testing, and chloride tests as provided for in the settlement agreement, during the test period.

The applicant is advised that notice of proof of appropriation of water (under which the final certificate of water rights is issued) should not be filed until the permanent diversion facilities have been installed, and the system has been in use for a period of 3 years. This includes installation of a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served. The applicant is advised that the annual quantity will reflect that amount the system, as built, is capable of delivering.

Prior to certification, the permittee shall submit a completion report, to the Department of Ecology. The report shall demonstrate the actual sustainable production of the Bywater Bay well #1 and address production of the #2 back-up well. The report shall assess actual and potential impacts to senior water rights in the service area. Quantities authorized under this permit may be reduced on the final water right certificate, to reflect a sustainable yield and protection of senior rights.

Report Continued

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, Mail Stop LD-11, Building 3, Olympia, Washington 98504, prior to any new construction or alterations of a public water supply system.

This permit is subject to the implementation of the minimum requirements established in the Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology and Conservation Programs, July 1990 (attached), and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this permit, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the State in the best public interest. Favorable consideration of this application has been based on sufficient waters available, at least during portions of the year. However, it is pointed out to the applicant that this use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

REPORTED BY: J Van Halle Date: July 26, 1993

The statutory permit fee for this application is \$20.00.