



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

DRAFT REPORT OF EXAMINATION
To Appropriate Public Waters of the State of Washington

APPLICATION DATE	APPLICATION NO.
March 11, 2009	G1-28613

NAME		
Mr. Jerry Jaderholm		
ADDRESS/STREET	CITY/STATE	ZIP CODE
P.O. Box 392	Coupeville, WA	98239

PUBLIC WATERS TO BE APPROPRIATED

SOURCE		
Well		
TRIBUTARY OF (IF SURFACE WATERS)		
MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	20	10.0

QUANTITY, TYPE OF USE, PERIOD OF USE
0.3 acre-feet, year-round for domestic use. 9.70 acre-feet for irrigation of 7 acres from March 31 to November 13 (227 days).

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
Approx. 1850 feet north and 200 feet east from the SW corner of Section 1, T. 31 N., R. 01 E.W.M.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP	RANGE	WRIA	COUNTY
NW¼ SW¼	1	31 N.	01 E.W.M.	6	Island
PARCEL NUMBER	LATITUDE	LONGITUDE	DATUM		
R13101-210-0400	N 48.201664	W -122.636688			

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED
[Attachment 1 shows location of the authorized place of use and point(s) of diversion or withdrawal.]

See Attachment 1 for map See Attachment 2 for full legal description.
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DESCRIPTION OF PROPOSED WORKS

6-inch well drilled to 251 feet screened from 246 to 251 feet below ground. A system of PVC piping distributes water to 1 residence and a drip-irrigation system serving 7 acres.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE	COMPLETE PROJECT BY THIS DATE	WATER PUT TO FULL USE BY THIS DATE
Begun	2023	2025

PROVISIONS

This authorization is subject to the following provisions:

Meter Installation

An approved measuring device shall be installed and maintained for each of the sources authorized by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173. <http://www.ecy.wa.gov/programs/wr/measuring/measuringhome.html>

WAC 173-173 describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition Ecology for modifications to some of the requirements. Installation, operation and maintenance requirements are enclosed as a document entitled "Water Measurement Device Installation and Operation Requirements".

Record, Report upon Request by Ecology

Water use data shall be recorded monthly and maintained by the property owner for a minimum of five years, and shall be promptly submitted to the Department of Ecology upon request.

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the records of water use that are kept to meet the above conditions, and to inspect at reasonable times any measuring device used to meet the above conditions.

Proof of Appropriation

The water right holder shall file the notice of Proof of Appropriation of water (under which the certificate of water right is issued) when the permanent distribution system has been constructed and the quantity of water required by the project has been put to full beneficial use. The certificate will reflect the extent of the project perfected within the limitations of the water right. Elements of a proof inspection may include, as appropriate, the source(s), system instantaneous capacity, beneficial use(s), annual quantity, place of use, and satisfaction of provisions.

FINDINGS OF FACT AND ORDER

Upon reviewing the investigator's report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find the appropriation of water as recommended will not be detrimental to existing rights or to the public interest.

Therefore, I ORDER the approval of Application No. G1-28613 subject to existing rights and the provisions specified above.

You have a right to appeal this action to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this document. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal, you must do the following within 30 days of the date of receipt of this document:

- File your appeal and a copy of this document with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this document on Ecology in paper form - by mail or in person. (See addresses below.) Email is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	Department of Ecology Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel Road SW Suite 301 Tumwater, WA 98501	Pollution Control Hearings Board PO Box 40903 Olympia, WA 98504-0903

Please also send a copy of your appeal to:

Jacqueline Klug
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue WA 98008

For additional information visit the Environmental Hearings Office Website: <http://www.eho.wa.gov> . To find laws and agency rules visit the Washington State Legislature Website: <http://www.l.wa.gov/CodeReviser> .

Signed at Bellevue, Washington, this _____ day of _____, 2011.

Jacqueline Klug, Section Manager
Water Resources Program
Northwest Regional Office

BACKGROUND

Project Description

Mr. Jaderholm owns 8.18 acres along Highway 20 approximately 2 miles southeast of Coupeville (Figure 1). The property is used for farming and is supplied by a single well operated under the water right exemption. Mr. Jaderholm has requested to expand his water use with an appropriation of 20 gallons per minute (gpm) to supply one domestic connection and the seasonal irrigation of 7 acres.

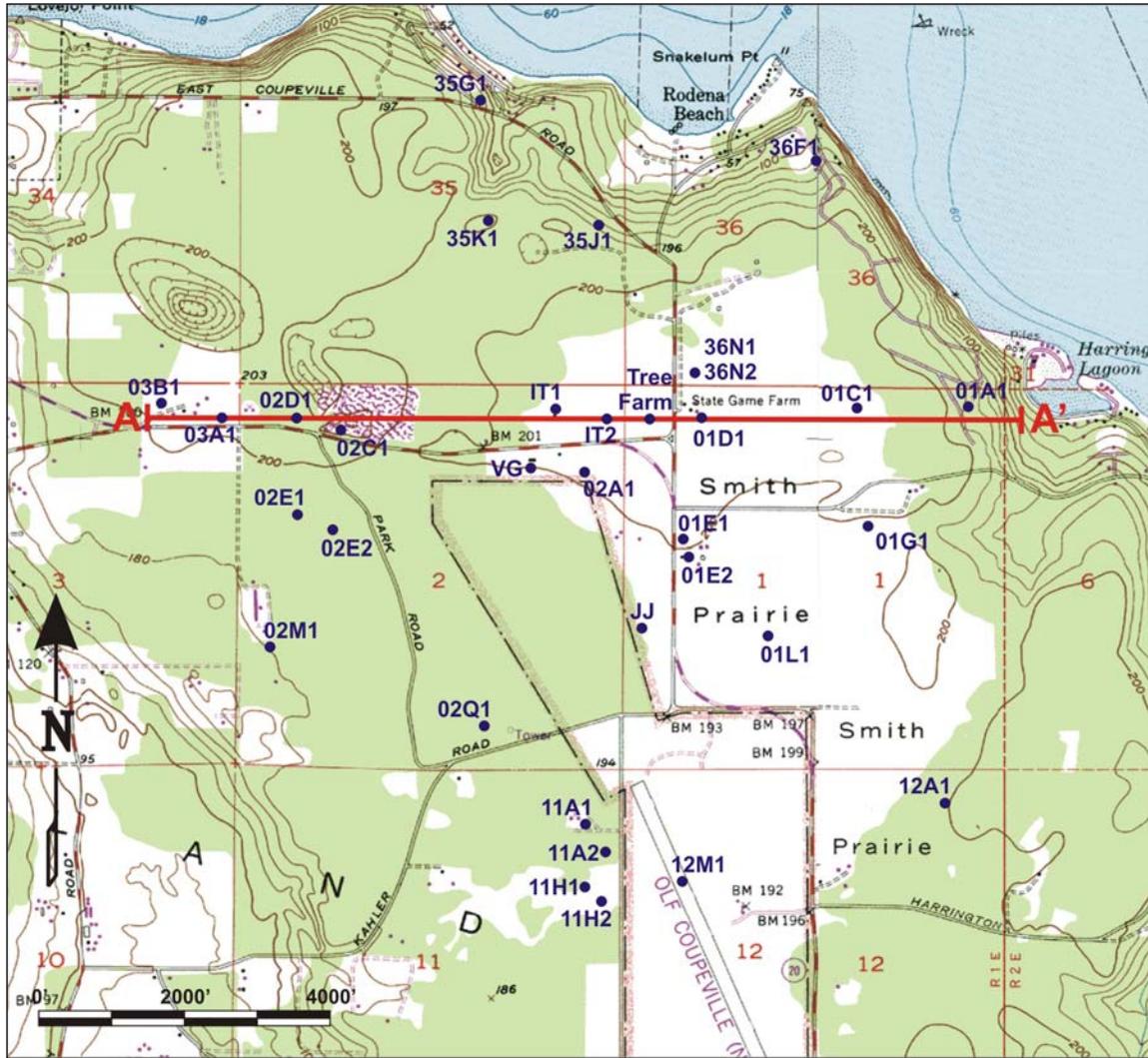


Figure 1: Vicinity, cross section and well location map. Applicant's well is labeled "JJ."

Table 1: Summary of Application No. G1-28613

<i>Attributes</i>	<i>Proposed</i>
Applicant	Mr. Jerry Jaderholm
Date of Application	3/11/2009
Instantaneous Quantity	20 gpm
Annual Quantity	10.0 acre-feet
Source	Groundwater
Point of Diversion/Withdrawal	Well
Purpose of Use	Domestic/Irrigation
Period of Use	Continuous/Seasonal
Place of Use	See Attachment 1 for map and Attachment 2 for full legal description.

Legal Requirements for Application Processing

The following requirements must be met prior to processing a water right application:

- **Public Notice**
Public Notice was published in *The Whidbey Examiner* on August 18 and 25, 2010. No protests were filed with Ecology.
- **State Environmental Policy Act (SEPA)**
Exempt under SEPA WAC 197-11-305 and WAC 197-11-800(4) because the instantaneous quantity is less than the one cubic foot per second threshold.

INVESTIGATION

Site Visit & Background

A site visit was conducted on January 13, 2011 by Robinson Noble Senior Hydrogeologist Doug Dow, LHG. Mr. Jaderholm was not present, but we were able to inspect all of the pertinent portions of the water system currently in place. As the well is in use now under the water right exemption and this application is primarily intended to expand the scope of the irrigation use, the system is substantially complete. A single, 6-inch water well is in place on the western half of the property. The well is completed at 251 feet below land surface. Distribution lines appear to be in place to serve the residence and existing raspberry plantings.

Supplemental information provided to Ecology by Mr. Jaderholm included test pumping results. B&W Pump Company conducted an 8-hour “drawdown test” using the currently installed pump equipment on October 5th 2010. The test was run at 30 gpm and resulted in 34.25 feet of drawdown at the conclusion of pumping. Water levels recovered to their pre-test levels within 60 minutes.

Existing Water Rights

Mr. Jaderholm holds no other water rights in the vicinity of this property. Five groundwater certificates have been authorized within the same section for various domestic and irrigation needs. Twenty-five more certificates and permits exist in the surrounding sections. Together these 30 certificates account for a total annual allocation of 1,188.3 acre-feet. A total of 54 claims are also recorded in section 1 and its eight surrounding sections. As these are unadjudicated, the allocations they may represent cannot be determined.

Hydrologic/Hydrogeologic Evaluation

The hydrogeologic setting in the Smith Prairie area of central Whidbey Island is described in Water Supply Bulletin No. 25 as a remnant of a glacial outwash terrace formed during the recession of Vashon ice (Anderson, 1968). No drainage network has developed on the prairie surface, and there are no lakes. It covers about eight square miles and lies between 180 and 200 feet above sea level. The USGS report, *Estimating Ground-Water Recharge from Precipitation on Whidbey and Camano Islands, for Water Years 1998 and 1999*, (Sumioka and Bauer, 2003) states that the Smith Prairie area receives an average precipitation of less than 23 inches per year. They estimate that the central part of the prairie receives 8 to 12 inches of annual recharge with 4 to 8 inches of recharge in the surrounding margins. The *Island County Water Resource Management Plan* adopted in 2005 considers Smith Prairie to be a Critical Aquifer Recharge Area. The EPA designated Whidbey Island’s aquifers as “Sole Source Aquifers” in 1982 (Island County, 2005).

The Mile Post 19 Farm well is located in sub-basin 13, as described in the County’s management plan (Figure 2). However, the Smith Prairie area also includes parts of sub-basins 14, 29, and 30. The sub-basin designation was determined from estimated ground water divides as derived from modeled aquifer water level elevations. Since the central portion of Smith Prairie receives recharge at a rate of up to 50 percent of estimated annual precipitation, ground water will tend to mound up in this area and flow away from the high point in all directions. This general pattern is reflected in the management plan modeled water levels. The management plan also assumes that groundwater withdrawals within a sub-basin would have “little, if any effect” on wells in the adjacent sub-basins (Island County, 2005). However, as presented in the management plan, the “mound” of water is centered on the intersection of three of the four sub-basins. Therefore, a withdrawal affecting water levels at the center of the mound will lower the top of the mound, and therefore, the effects will propagate across the sub-basin boundaries. While in this case the scale of the withdrawal requested by Mr. Jaderholm is too small to have a meaningful effect on overall water levels in the aquifer system, it is probably untrue to suggest that, regionally, the sub-basins do not have effects on each other.

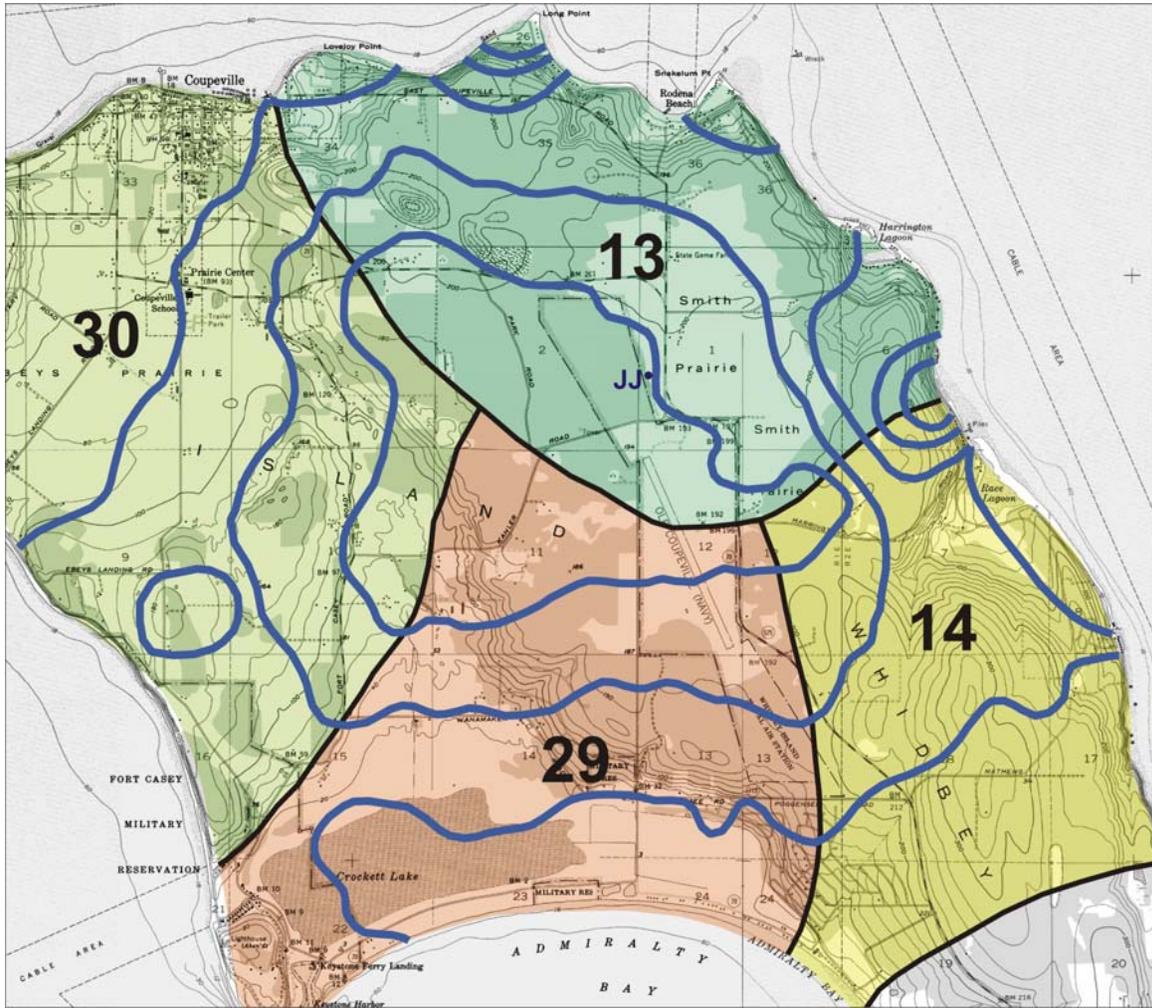


Figure 2: Island County-designated sub-basins in the area of Smith Prairie. (Figure re-drawn from Island County, 2005.) Blue lines are County-modeled “Generalized ground water contours” (unlabeled in the original). Applicant's well is labeled "JJ."

Well logs were obtained from the Department of Ecology’s data base and the Island County Hydrogeologic Database to create the hydrogeologic cross sections shown on Figure 3. Island County aquifers and aquitards are described in the USGS report, *Ground-water Resources and Simulation of Flow in Aquifers Containing Freshwater and Seawater* (Sapik and others, 1988). Five aquifers were identified and designated A through E for oldest to youngest (deep to shallow) respectively. Aquifers A, B, and C are located below sea level and aquifers D and E above sea level.

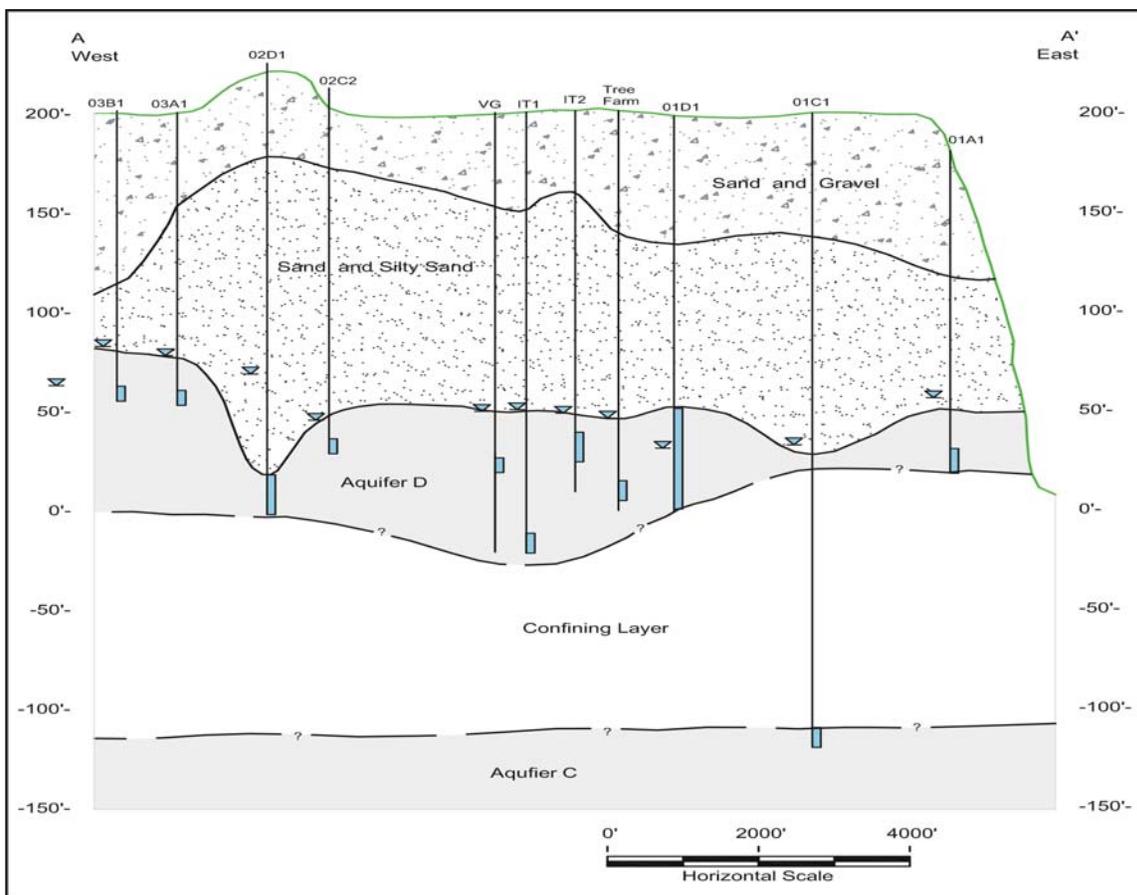


Figure 3: Hydrogeologic cross section A - A' (see Figure 1 for location).

The general geology of the area, as determined from the well logs and shown on the cross section, is characterized by a section of gravel and sand that may locally be over 100 feet in thickness. Within this zone, well logs

occasionally indicate layer(s) of “hardpan” which possibly indicates glacial till deposits. Below the gravel and sand is a thick sand layer that can be over 100 feet thick and contains silty sand and clay layers. This layer provides partial confinement to the underlying aquifer D. Aquifer D is locally ten to over 30 feet thick and is predominately sand with minor gravel layers. It has been tested to provide between ten and 300 gallons per minute (gpm) to wells completed in the Smith Prairie. Aquifer E does not appear to be present in the area and the majority of sediments above aquifer D are unsaturated.

In sub-basin 13, the general groundwater flow direction ranges from northward to eastward. This same direction is also implied by the County management plan modeled water level patterns (Figure 2). The aquifer water levels show that the aquifer C gradient is similar to that in aquifer D. For this sub-basin, both aquifers ultimately discharge to Saratoga Passage.

A blue-gray clay aquitard separates aquifer D from aquifer C. It is found from just above sea level to more than 100 feet below sea level. Aquifer C typically composed of and is composed of sand and gravel, is influenced by tidal changes, and can be subject to sea water intrusion. Wells completed in aquifer C have also been tested at rates up to and exceeding 300 gpm.

The Mile Post 19 Farm well log shows that it penetrated a layer of sand, likely aquifer D, between 146 and 162 feet below ground surface. Layers of clay found from 162 to 222 feet provide separation between aquifer D and aquifer C in this well.

Water Availability

There are no regulatory closures or restrictions affecting water availability on Whidbey Island, therefore I find water is legally available for this appropriation. The instantaneous quantity of 20 gpm is physically available for appropriation (see discussion below in Impairment Considerations).

The annual quantity of water for appropriation was calculated using Crop Irrigation Requirement (CIR) data from the State of Washington Irrigation Guide (WAIG) 1985 and 1992. The WAIG lists a CIR of 19.05 inches of water for raspberries grown at Coupeville (WAIG, Appendix A, p 70). However the CIR formula does not take into account the loss in conveyance from seepage, evaporation and surface runoff. Consequently, irrigation efficiency percentages were used from Ecology Water Resources Guidance 1210. Drip irrigation systems, such as the one planned for this property, are assumed to have an average efficiency of 88%. Adjusting the CIR by the efficiency, the Total Irrigation Requirement (TIR) for the 7 acres of crops was calculated, as shown below:

$$\text{TIR} = \text{acres} \times \text{CIR} / \text{EFF}\%$$

Where:

TIR = total irrigation requirement (acre-feet per year)

Acres = irrigated crop area (acres)

CIR = crop irrigation requirement (feet of water)

EFF% = irrigation system application efficiency

There is no specific CIR data available for plum trees in the WAIG. These crops are considered fruits; therefore the CIR for apple trees was used in the calculations. (The WAIG differentiates between apple orchards with and without groundcover. Groundcover was assumed.)

The CIR for raspberries is 1.59 feet (19.05 inches). The CIR for apples with cover is 1.48 feet (17.75 inches)

So, the TIR for 6 acres of raspberries and 1 acre of plum trees, all watered using a drip-irrigation system, is:

$$\begin{aligned} \text{TIR} &= (6 \text{ acres of raspberries} \times \text{CIR of } 1.59 / 88\% \text{ efficiency}) \\ &+ (1 \text{ acres of plums} \times \text{CIR of } 1.48 / 88\% \text{ efficiency}) \end{aligned}$$

$$(6 \times 1.59 / 0.88) = 8.40 \text{ acre-feet}$$

$$(1 \times 1.48 / 0.88) = 1.3 \text{ acre-feet}$$

$$\text{TIR} = 9.70 \text{ acre-feet}$$

The annual withdrawal to supply the on-site domestic use is set at 0.3 acre-feet per year based on a daily consumptive use of approximately 269 gallons. This is considered a typical daily use for Island County.

Impairment Considerations

As noted above, the Milepost 19 Farm well is located in the south-central portion of sub-basin 13 (Figure 2). The sub-basin is roughly 6.5 square miles in area and drains “radially” from a high point in the center of the island north and east towards Penn Cove and Saratoga Passage. No notable surface water features are present on the upland of the sub-basin. Given the low elevation of the water levels in aquifer D, and the general absence of saturated sediments above it, it is probable that most spring outfalls from aquifer D occur at or near beach-level

along Penn Cove or Saratoga Passage. Seeps may occur higher on the coastal bluffs, but are likely seasonal in nature, with recharge source areas that are close to the bluff edges.

The USGS identified three zones of recharge values of between 2 and 12 inches within the groundwater sub-basin. Using the median values for each of the three ranges reported, we calculated a weighted value for the sub-basin of 7 inches of recharge. Over the full area of the sub-basin, this amounts to over 169,000 acre-feet per year of water entering the shallow aquifer system (aquifer D).

To attempt to assess the current demand on the aquifer systems, we used Ecology's WRATS database to determine the number of claims and water right permits and certificate located in sub-basin 13. We then used the Ecology water well log database to count the number of recorded water wells in the same area. Recognizing that neither database is necessarily a complete record for the possible water users in the area, we counted 54 claims, 30 permits/certificates, and 153 well logs. Using this as a starting point, we calculated the following:

- 1) All of the claims (54) plus the well logs (153) minus the permits/certificates (30) totals 177 withdrawals. Some of the claims may be double counted because they have a recorded well log, but this may be offset by unpermitted wells or water users.
- 2) To be conservative and over-estimate the possible water use from the system, we assigned a total of 5,000 gallons of use per day for each of the 177 withdrawals. This totals 885,000 gallons per day, which is 991.4 acre-feet per year (afy).
- 3) The 30 permits and certificates total up to 1,188 afy (assuming all of the rights are in full use each year, which is not likely).
- 4) The combined total withdrawals are 2,179.4 afy.

It is generally well understood that a large proportion of the recharge in a given system is not available for use due to timing, storage, or discharge pathways that cannot easily be tapped. Further, in an island setting such as this, excess withdrawals can lead to impacts such as saltwater intrusion. However, even assuming that only a small portion of the overall recharge is available for capture and use, the total calculated withdrawals in the sub-basin is still a small percentage of the available recharge (less than 2%).

Using the above to provide a sense of scale, we conclude that water is available for the proposed withdrawal. Further it does not appear likely that this use will impair other uses in the sub-basin both because of the small amount requested for allocation and the generally large distances from neighboring withdrawals (the nearest well in the Ecology records is approximately 1,200 feet northeast; see Figure 1).

Given the location of the proposed withdrawal is about 1.5 miles inland from the coast, saltwater intrusion at this location is not a concern. As noted above, water appears to be available and the requested annual allocation is small, therefore, the withdrawal is unlikely to increase the risk of saltwater intrusion for users nearer to the coast.

Public Interest Considerations

The proposed use is considered beneficial. No impacts or public interest considerations were identified as a part of this examination.

Consideration of Protests and Comments

No comments or protests were received.

CONCLUSIONS

- Water is available for appropriation.
- This requested allocation is for a beneficial use, and will not impair existing rights or be detrimental to the public welfare.
- No impacts to surface water were identified.
- No increase in the likelihood of saltwater intrusion is expected.

RECOMMENDATIONS

Based on the above investigation and conclusions, I recommend that the Application No. G1-28613 be authorized, in the amounts and within the limitations listed below and subject to the provisions beginning on Page 2.

Purpose of Use and Authorized Quantities

The amount of water recommended is a maximum limit and the water user may only use that amount of water within the specified limit that is reasonable and beneficial.

- 20 gallons per minute
- 10.0 acre-feet per year

Point of Withdrawal

NW¼, SW¼, Section 1, Township 31 North, Range 01 East W.M.

Place of Use

As described on Attachment 2 of this Report of Examination.

Report by: _____
Burt G. Clothier, LGH, RG, CPG
Robinson Noble, Inc.

Date

Licensed Hydrogeologist 140

Reviewed by: _____
Jerry L. Lizak, LG, LHG
Ecology Water Resources Program

Date

Licensed Geologist/Hydrogeologist 834

References and Selected Sources:

Island County, 2005, *Island County Water Resource Management Plan – 2514 Watershed Planning*: Adopted by the Board of Island County Commissioners, June 20, 2005, 40 p., 12 appendices.

Sumioka, S.S. and H.H. Bauer, 2003, *Estimating Ground-Water Recharge from Precipitation on Whidbey and Camano Islands, Island County Washington, for Water Years 1998 and 1999*: U.S. Geological Survey Water Resources Investigations Report 03–4101, 33 p., 2 appendices.

United States Department of Agriculture, 1997, *Irrigation Guide, Part 652*: Natural Resources Conservation Service, National Engineering Handbook 820 p. 2 appendices.
Accessed at: http://www.wa.nrcs.usda.gov/technical/ENG/irrigation_guide/index.html on March 7, 2011.

Sapik D.B., G.C. Bortleson, B.W. Drost, M.A. Jones and E.A. Prych, 1988, *Ground-water Resources and Simulation of Flow in Aquifers Containing Freshwater and Seawater, Island County Washington*: U.S. Geological Survey Water Resources Investigations Report 87–4182, 67 p., 4 plates.

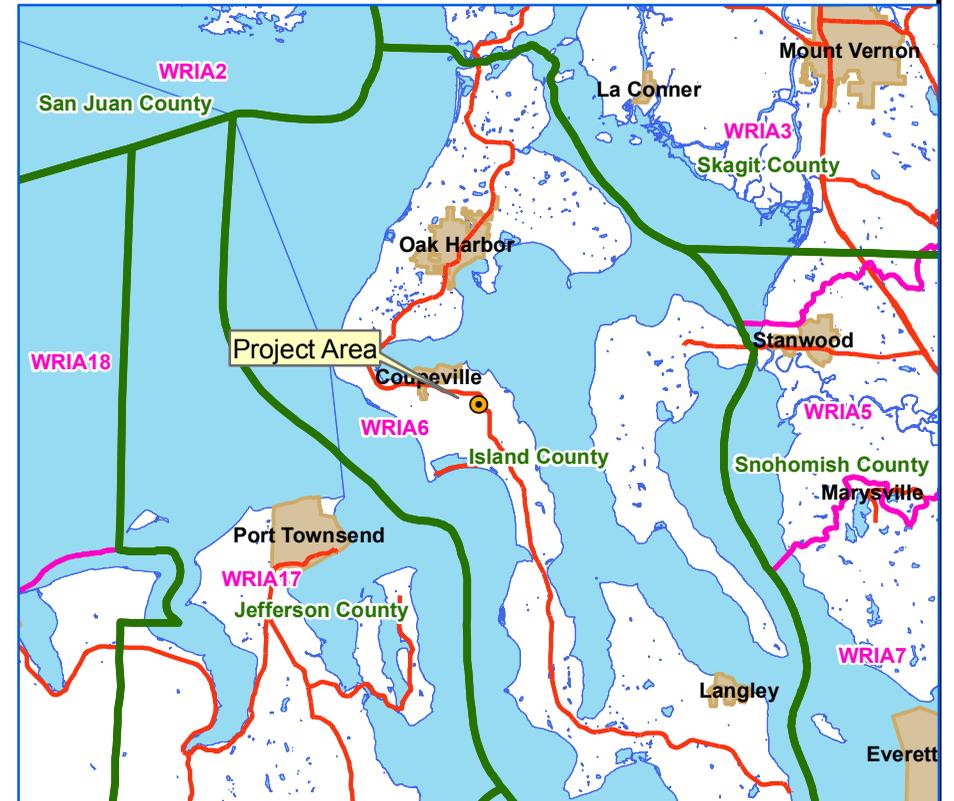
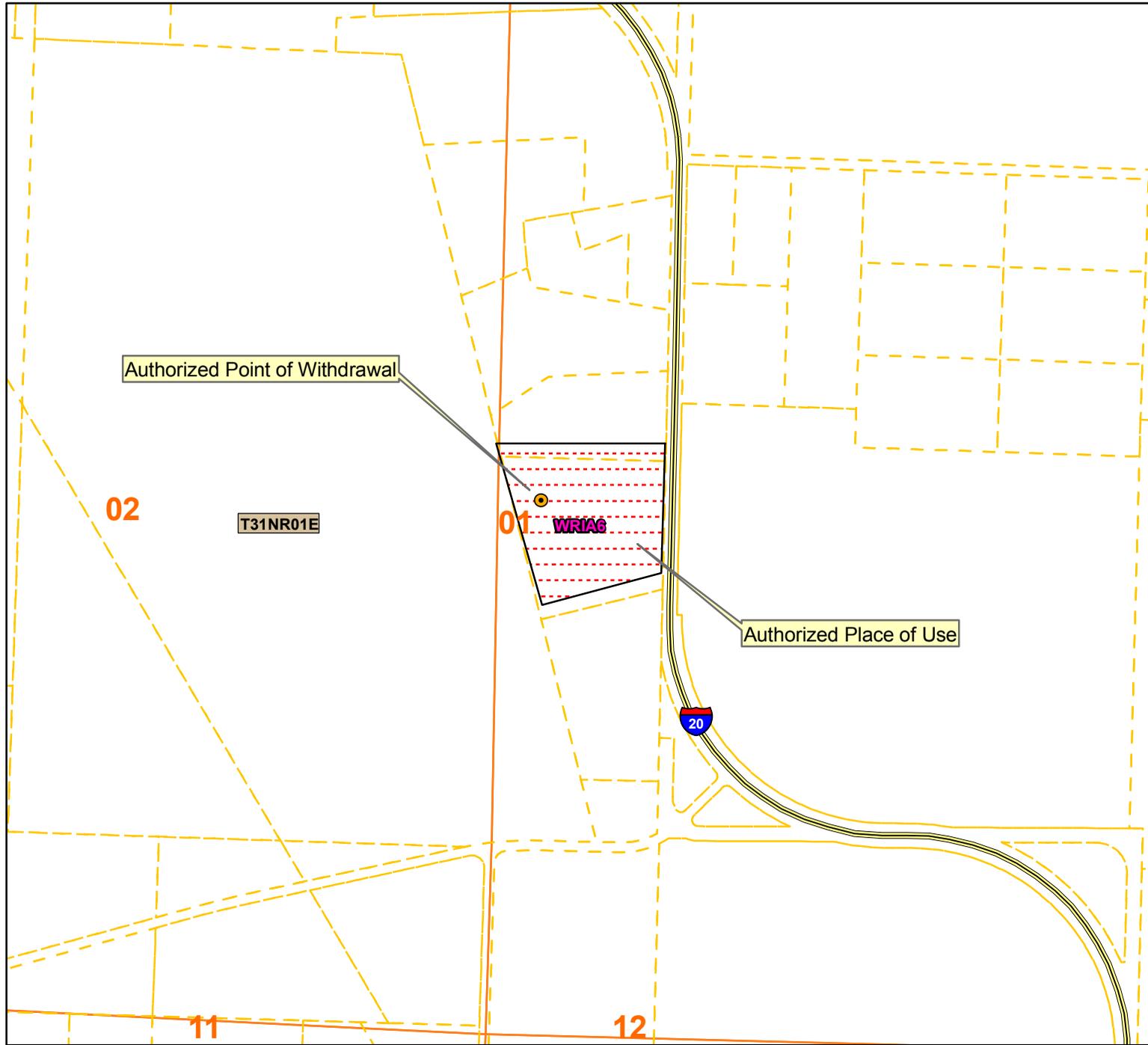
Easterbrook, D.J., 1968, *Pleistocene stratigraphy of Island County*: State of Washington Department of Natural Resources Water Supply Bulletin 25, Part I, 35 p.

Anderson, H.W., 1968, *Ground-water resources of Island County*: State of Washington Department of Natural Resources Water Supply Bulletin 25, Part II, 318 p.

If you need this publication in an alternate format, please call Water Resources Program at 360 407-6600. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.



Jaderholm, Jerry
 Water Right Number G1-28613
 Sec.01, T 31N, R 01E W.M.
 WRIA 6 - Island County



Legend

- County
- WRIA
- Highways
- Townships
- cities
- Sections
- Authorized Point of Withdrawal
- Authorized Place of Use

Place of use and point(s) of diversion/withdrawal are as defined on the cover sheet under the headings, 'LOCATION OF DIVERSION/WITHDRAWAL' and 'LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED.'

Attachment 2

Legal Description for Jaderholm

That portion of the Jonh Kineth Donation Land Claim, in Section 1, Township 31 North, Range 1 East of Willamette Meridian, described as follows:

Commencing at the Southeast corner of Section 2, Township 31 North, Range 1 East of the Willamette Merridian; thence North $43^{\circ}07'20''$ East 1016.24 feet; (1016.64 feet rec.) to the Southeast corner of said Kineth Donation Claim; thence North $8^{\circ}21'10''$ West 295.85 feet; thence West 282.53 feet (275.84 feet rec.), more or less, to the East line of the U.S. Navy Tract; thence North $15^{\circ}47'09''$ West (North $15^{\circ}58'10''$ West rec.), 683.59 feet; thence East 686.71 feet (681.30 feet rec.), more or less, to the West line of SR20; thence Southerly along said West line 522.40 feet, more or less, to a point which bears North $74^{\circ}51'01''$ East from the true point of beginning; thence South $74^{\circ}51'01''$ West 518.15 feet, more or less, to the true point of beginning.

Situate in the County of Island, State of Washington.