STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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

PRIORITY DATE	APPLICATION NO.	PERMIT NO.	CERTIFICATE NO.
October 14, 2008	G1-28598		

NAME

Matthew & Laura Zybas

ADDRESS/STREET	CITY/STATE	ZIP CODE
435 Beach Haven Road	Eastsound, WA	98245

PUBLIC WATERS TO BE APPROPRIATED

SOURCE

Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND (cfs)	MAXIMUM GALLONS PER MINUTE (gpm)	MAXIMUM ACRE FEET PER YEAR (ac-ft/yr)
	20	3.3

TYPE OF USE, PERIOD OF USE, QUANTITIES

Domestic supply, year round, 0.3 acre feet per year
Irrigation, during irrigation season, 3.0 acre feet per year

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL

Well is located 127 feet south and 2016 feet west of the NE corner of Section 21, Township 37 North, Range 2 West, W. M. in San Juan County, Washington. Lat: 48.9527, Long: -122.68876

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP	RANGE	WRIA	COUNTY
NW 1/4 NE 1/4	21	37N	2W	2	San Juan
PARCEL NUMBER					
272112002					

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

West 495 feet of the East 990 feet of the Northwest Quarter of the Northeast Quarter of Section 21, Township 37 North, Range 2 West, W.M., in San Juan County, Washington;

EXCEPT South 757 feet thereof, and

EXCEPT North 15 feet thereof conveyed to San Juan County for roads.

Attachment 1 shows the location of the authorized place of use and point of withdrawal

DESCRIPTION OF PROPOSED WORKS

The Zybas water system consists of a well which provides water to a single domestic home and irrigation for approximately 2 acres of land located near the northwestern corner of Orcas Island near West Beach.

DEVELOPMENT SCHEDULE		
BEGIN PROJECT BY THIS DATE	COMPLETE PROJECT BY THIS DATE	WATER PUT TO FULL USE BY THIS DATE
Already started	December 31, 2019	December 31, 2024

PROVISIONS

- An approved measuring device shall be installed and maintained in the well identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173.

    - Water use data shall be recorded annually. Data shall be maintained by the property owner and promptly submitted to Ecology upon request. Recording and retention of data by the water right holder are required to inform the water users about how much water is used, when the water is used and to assist users in efficient water management.

    - 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".

    - 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.

- All water wells constructed within the State shall meet the minimum standards for well construction and maintenance as provided under WAC 18.104, Washington Water Well Construction Act of 1971, and WAC 173-160, Minimum Standards for Construction and Maintenance of Wells.

- In accordance with WAC 173-160-205, wells shall not be located within certain minimum distances of potential sources of contamination. These minimum distances shall comply with local health regulations, as appropriate. In general, wells shall be located at least 100 feet from a sewer, septic tank, privy, or other source of contamination. Wells shall not be located within 1,000 feet of a solid waste landfill.

- Installation and maintenance of an access port as described in WAC 173-160-291 is required. An air line and gauge may be installed in addition to the access port.

- In order to protect the resource, static water level (SWL) shall be measured at least once a year. Measurements shall be taken after the pump has been shut off a reasonable time to allow water level to return to normal. Ecology's Water Resources section at the Northwest Regional Office (NWRO) shall be notified if a below normal seasonal drop is measured in SWL; otherwise this data shall be maintained and be made available to Ecology upon request. (See enclosed form.)

- A certificate of water right will issue for only that quantity of water that has been withdrawn and applied to actual beneficial use. Such quantity applied to actual beneficial use shall not exceed the quantity specified in this report of exam and will be calculated based on the best information available to Ecology, including metering data and/or water duty analysis.

- A certificate of water right will not be issued until a final investigation is made.

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 concur with the investigator that water is available from the source in question, the purpose of use is beneficial, there will be no impairment of existing rights, and there will be no detriment to the public interest.

Therefore, I ORDER approval of Application No. G1-28598, subject to existing rights and the provisions listed above.

You have a right to appeal this ORDER. To appeal this you must:

- File your appeal with the Pollution Control Hearings Board within 30 days of the "date of receipt" of this document. Filing means actual receipt by the Board during regular office hours.
- Serve your appeal on the Department of Ecology within 30 days of the "date of receipt" of this document. Service may be accomplished by any of the procedures identified in WAC 371-08-305(10). "Date of receipt" is defined at RCW 43.21B.001(2).

Be sure to do the following:

- Include a copy of this document that you are appealing with your Notice of Appeal.
- Serve and file your appeal in paper form; electronic copies are not accepted.

1. To file your appeal with the Pollution Control Hearings Board

Mail appeal to:

The Pollution Control Hearings Board
PO Box 40903
Olympia, WA 98504-0903

OR

Deliver your appeal in person to:

The Pollution Control Hearings Board
4224 – 6th Ave SE Rowe Six, Bldg 2
Lacey, WA 98503

2. To serve your appeal on the Department of Ecology

Mail appeal to:

The Department of Ecology
Appeals Coordinator
P.O. Box 47608
Olympia, WA 98504-7608

OR

Deliver your appeal in person to:

The Department of Ecology
Appeals Coordinator
300 Desmond Dr SE
Lacey, WA 98503

3. And 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://www1.leg.wa.gov/CodeReviser .

Signed at Bellevue, Washington, this 10th day of June, 2010.

Jacqueline Klug
Section Manager
Northwest Regional Office
Water Resources Program

INVESTIGATOR'S REPORT

BACKGROUND

Description and Purpose of the Project

The Zybas water system consists of a well which delivers water to a home and will provide irrigation for 2 acres of a diversity of crops, including ½ acre of blueberries, 1 acre of raspberries, and a ½ acre vegetable garden. All crops will be micro-irrigated via trickle/drip tape. The well has an in-well pressure system and pumps 20 gallons per minute through poly lines to the orchards and house.

Legal Requirements for Application Processing

Chapters 90.03 and 90.44 RCW authorize the appropriation of public water for beneficial use and describe the process for obtaining water rights. Laws governing the water right permitting process are contained in RCW 90.03.250 through 90.03.340 and RCW 90.44.060.

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

- **Public Notice**
  Public notice of the application was published in *The Islands' Sounder* on May 13 and May 20, 2009. There were no written protests during the statutory 30-day protest period.

- **State Environmental Policy Act (SEPA)**
  The subject water right application is categorically exempt under SEPA WAC 197-11-305 and WAC 197-11-800(4) because the instantaneous quantity is less than the 2,250 gallons per minute threshold.

INVESTIGATION

In considering this application, my investigation included, but was not limited to, research and/or review of:

- Brandon, M. T., Cowan, D.S., and Vance, J.A. 1988, The Late Cretaceous San Juan Thrust System, San Juan Islands, Washington, The Geological Society of America Special Paper 221, 81 pages.

- James, L.G., Erpenbeck, J.M., Bassett, D.L., Middleton, J.E. 1982 Irrigation Requirements for Washington-Estimates and Methodology. Research Bulletin EB 1513 College of Agriculture & Home Economics Washington State University, 37 Pages.

- Orr, L.A., Bauer, H.H. and Wayenberg, J.A. 2002, Estimates of Ground-Water Recharge from Precipitation to Glacial-Deposit and Bedrock Aquifers on Lopez, San Juan, Orcas, and Shaw Islands, San Juan County, Washington, U.S. Geological Survey Water-Resources Investigations Report 02-4114, 114 pages.

- Rose, John, 2010, Hydrogeologic Report for Application G1-28598, Department of Ecology

- Russell, R.H. ed., 1975, Geology and Water Resources of the San Juan Islands, San Juan County, Washington, Washington Department of Ecology Water Supply Bulletin No 46, 171 pages.

- Whiteman, K.J., Molenaar, D., Bortleson, G.C., and Jacoby, J.M., 1983, Occurrence, Quality, and Use of Ground Water in Orcas, San Juan, Lopez, and Shaw Islands, San Juan County, Washington, U.S. Geological Survey Water-Resources Investigations Report 83-4019, 12 sheets.

- USGS Eastsound, Wash. 7.5 minute topographic map

- Pump test data and chloride data

- Water well reports for Orcas Island

- Notes, photos and GPS data from my site visit on April 1, 2010

- Records of existing water rights in the vicinity

Geographic Setting of the Place of Use and Point of Withdrawal

The Zybas property is located in the San Juan Islands on the northwestern end of Orcas Island near West Beach. The property is located approximately ½ mile ENE of West Beach itself and west of Lookout Mountain. The area in the vicinity of the applicant's property is on the northern edge of a hilly and mountainous area extending to the southwest and a gently sloping area lying to the northeast. The northern part of the applicant's property lies within 1,500 feet of President Channel. The most prominent features in the area are Turtleback Mountain to the southwest with an elevation of 1,519 feet and Lookout Mountain to the east with an elevation of 690 feet. (See Topographic Map Fig. 1)

Figure 1

Topographic Map of the Vicinity of Zybas Water Right G1-28598

Simplified Geology of the San Juan Islands (This section was taken from the Hydrogeologic Report for this application by John Rose)

The geology of the San Juan Islands is very complex. It consists of a series of allochthonous terranes mostly of island arc and shallow marine origin of early Paleozoic to late Cretaceous age which were accreted onto the North American continent prior to subsequent compressional faulting. During the late Cretaceous, imbricate thrust faulting created a series of sub-parallel nappes which generally divide each of the five identified terranes. This faulting also resulted in pervasive high-pressure metamorphism and the creation of intermittent tectonic zones

along the fault contacts. These units were then tilted to the southeast, probably during the Tertiary period. Subsequent advance and retreat of continental glaciers of the Vashon Stade during the Fraser Glaciation approximately 10,000 years ago deposited sequences of intermixed clay, silt, sand and gravel in low lying areas. (Russell 1975) (Brandon et al.1988)

Of particular note are the Turtleback and Wrangellia Terranes which are the major rock complexes in the vicinity of the Zybas well. The Paleozoic Turtleback Terrane consists of formations of coarse grained metamorphosed gabbros and quartz diorites often intersected with younger finer grained dikes of varying igneous compositions. The much younger late Cretaceous Wrangellia Terrane is represented by the Haslam and Extension formations of the Nanaimo Group, consisting of mudstone-sandstone turbidites and conglomerate-sandstone submarine channel fills respectively. The Nanaimo Group is the detrital unit overlapped by the thrust system. (Brandon et al.1988)

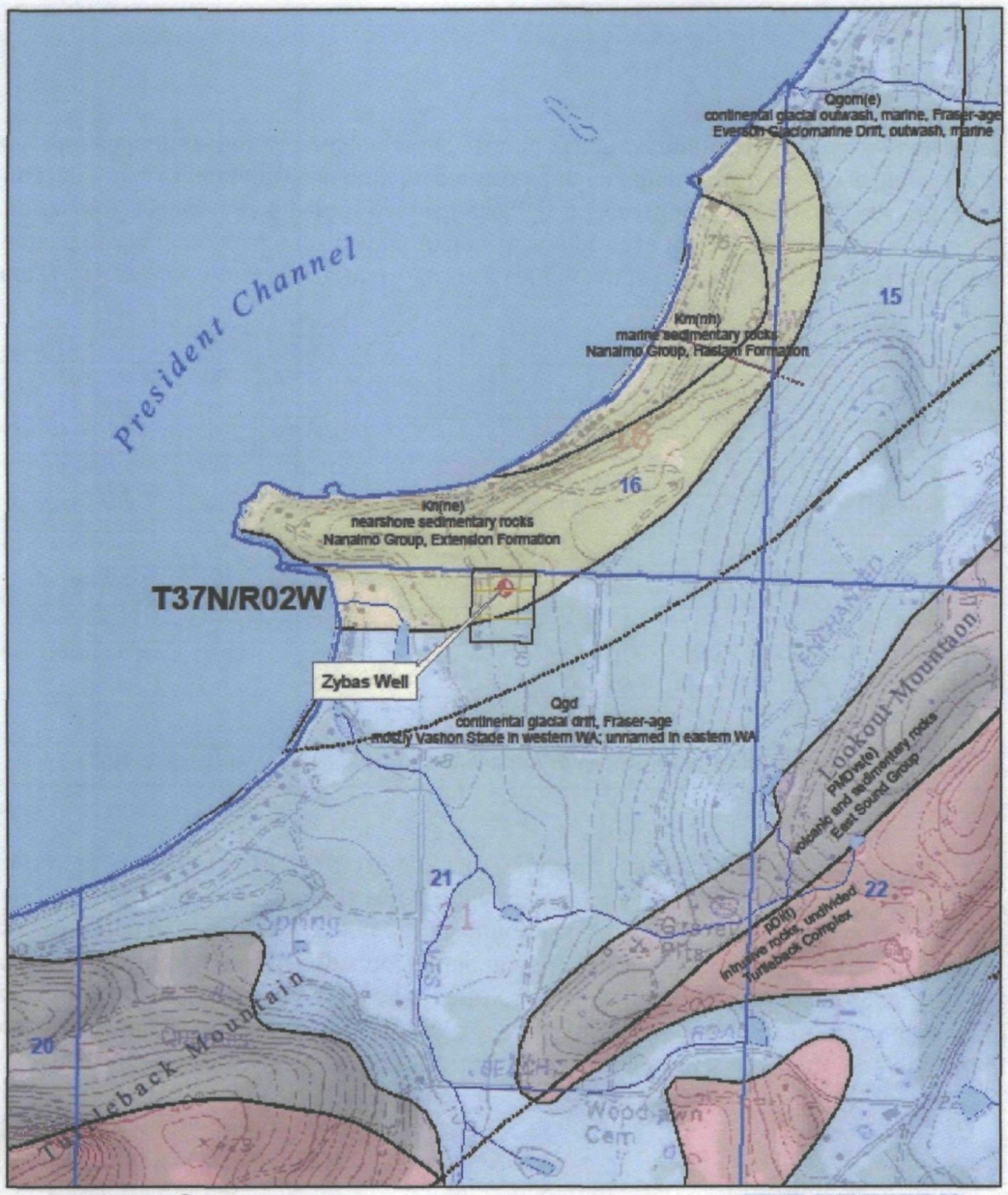
Hydrogeology of the West Sound Area, San Juan County, Washington (This section was taken from the Hydrogeologic Report for this application by John Rose)

The geology within a mile radius of the Zybas well is varied, consisting of thin discontinuous slabs of folded Nanaimo group marine and near shore sedimentary rocks along the coast. Further inland the Nanaimo Group is overlain by the older Turtleback Terrane consisting of slabs of volcanic and sedimentary rocks of the East Sound Group and the igneous rocks of the Turtleback Complex. Separating the Turtleback and Nanaimo Groups and more or less parallel to the coast line is the gently dipping Harro Thrust Fault which is concealed by a ½ mile wide ribbon of glacial drift. This well-defined major fault dips to the southeast. The fault is a little more than 700 ft from the Zybas well and probably constitutes a major hydrogeologic divide since it separates low permeable crystalline rocks to the south east from the higher permeable Nanaimo sedimentary rocks where the Zybas well is. (See Geologic Map, Fig. 2)

The drilled well was completed on May 26, 2005, and the pump test was done on April 15, 2009. The well is drilled in bedrock to a depth of 79 ft. The well log indicates thick layers of clayey silt interspersed with thin layers of silt. The well was completed in 13 feet of sand and gravel. This is consistent with where the GPS surveyed position plotted on the geologic map indicating the well penetrates the Extension formation of conglomerate and sandstone.

Aquifer Recharge

Russell reports the source of groundwater in the San Juans is exclusively from precipitation. Precipitation in the area is between 34-36 inches per year and annual recharge occurs mostly during the wintertime, from September to April when precipitation is highest and evapotranspiration and artificial discharge is lowest. (Orr et al. 2002) (Russell 1975) The historical mean annual water budget at Olga Station provided by Russell indicates July has the highest amount of potential evapotranspiration and the lowest level of precipitation. This is coupled with high levels of artificial ground water discharge through pumping of wells during the summer. Since the Zybas well lies down slope of both Lookout and Turtleback Mountains, it can be inferred that runoff from these two topographic high features contribute a significant amount of recharge to the area.



Geologic Map of the Vicinity of Zybas Water Right G1-28598

Figure 2

Site Visit

On April 1, 2010, John Rose and I met with the applicant who gave us a tour of her property. It is located approximately 7 miles (by road) north of the Orcas Island ferry landing on the east side of Crow Valley Road. The street address is 435 Beach Haven Road. We observed the well and ½ acre of blueberries which are currently being micro-irrigated. We measured the water level in the well at 41.49 feet below top of casing. A Sensus 5/8 inch SRII water meter connected to the main line running off the well read 81,270 gallons.

The Well and Pump Test

The drilled well (Ecology ID # AHH 581) is 6 inches in diameter and cased to 74 feet below surface. A Johnson telescoping screen was emplaced from 74 to 79 feet with no gravel or filter pack. The well uses a 1 HP Berkley 20 gpm pump with a Goulds BF-15 pressure controller to supply water to the house and irrigation system.

(The following paragraph and table were taken from the Hydrogeologic Report for this application by John Rose) A constant rate pump test was conducted on the well on April 15, 2009, by Coldspring Resource Management Inc. Static water level was initially measured at 41.5 ft. This test was run at 20 gallons per minute for approximately 13 ½ hours. Dynamic water level reached a depth of 67 ft and recovery of water level to 41.92 ft took 125 minutes.

There was 86% recovery within 10 minutes of the pump being shut off indicating good recharge to the well. Specific capacity is calculated to be 0.78 gallons/minute per foot of drawdown. Pump suction is set at 75 ft depth, so specific capacity is more than enough to meet the Zybas' need of 20 gpm. The results from the pump test are summarized in Table 1.

Table 1. Pump Test data	
Date	April 15, 2009
Duration (hours)	13 hours 24 min.
Static Water Level	41.5 ft.
Maximum Drawdown	67 ft.
Recovery Level	41.92 ft.
Recovery Time	2 hours 5 min.
Total gallons pumped	16,022 gallons
Yield	28,800 gpd
Specific capacity	0.78 gal/min./ft

Potential for Seawater Intrusion

The well is a less than ¼ mile from President Channel with an elevation of 94 feet above National Geodetic Vertical Datum 1988 (NGVD88) based on GPS data gathered on April 1, 2010, and correlated with the USGS topo map. The bottom of the screened interval of the well is at 79 feet depth, which is roughly 15 feet above Mean Sea Level (+/-4 feet error based on difference between NGVD 88 and NAVD 29 vertical control of USGS topo map). A chloride test done during the site visit with a field HACH kit indicated 30 mg/L Cl. The 2007 San Juan County Seawater Intrusion Risk Map indicates only one well in the vicinity of the application that has chloride levels above 100mg/L chloride levels. Based on this data, and the low pumping rate of the well, the potential for seawater intrusion is remote.

Other Water Rights in the Vicinity

The Department of Ecology Water Right Tracking System (WRTS) database was queried to determine the number of existing water rights within one-half mile of the Zybas well. An arbitrarily, yet conservatively chosen area of one-half mile is used to define "close proximity". This value is justified experimentally based on current and historical pump test data that show negligible drawdown, and therefore unlikely impairment to wells or surface water diversions, induced by groundwater withdrawal at a distance of 1000 feet in most cases. Five ground water rights and two surface water rights were found to be located within ½ mile radius from the Zybas well. The nearest well is over 300 feet away. The existing water rights are summarized in Table 2 below.

Table 2. Existing Water Rights in the vicinity of Water Right Application G1-28598

			Instantaneous Quantity					
Water Right Number	Status	Priority date	CFS	Gpm	Acre ft/y	Irrigated acres	Purpose	Water Right Holder
S1-00455CWRIS	Cert	06/14/1968	0.13		8	7	IR,ST	Cadden, Dora M.
S1-*05774CWRIS	Cert	12/30/1942	0.03			3	IR	Wright, C. R.
G1-20990CWRIS	Cert	10/23/1973		15	1		DM	Fischer, W.M.
G1-00553CWRIS	Cert	08/17/1971		20	7.5		DM	Murray, Robert H.
G1-23679CWRIS	Cert	0915/1980		10	0.5		DS	Smiley, E. K.
G1-*07113CWRIS	Cert	04/15/1964		10	3		DS, IR	Hall, F. B.
G1-*14269ABCWRIS	Cert	03/26/1957		18	5	5	DM,IR	W. Beach Water Assoc.

There are 12 ground water claims and 1 surface water claim within the ½ mile radius. A water right claim is a statement of the beneficial use of water that occurred prior to the adoption of the water right codes and is not authorized by a state-issued permit or certificate. The Department of Ecology cannot verify the validity of these claims, as water right claims can only be confirmed in an adjudication by a Washington State Superior Court. Many of the claims represent use under the ground water exemption (RCW 90.44.050) for single domestic use.

FINDINGS

Under state law the following four criteria must be met for an application to be approved:

- Water must be available
- There must be no impairment of existing rights
- The water use must be beneficial
- The water use must not be detrimental to the public interest

Water Availability

There are no regulatory closures or restrictions affecting groundwater availability on Orcas Island, therefore I find water is legally available for this appropriation. The well was tested at 20 gpm without excessive drawdown, therefore this instantaneous quantity is physically available for appropriation.

The annual quantity of water available for appropriation is 0.3 acre-feet per year for domestic supply, and 3.0 acre-feet per year for irrigation. These quantities have been calculated in the Hydrogeologic Report for this application by John Rose as follows:

The Crop Irrigation Requirement (CIR) data were used for each type of crop from the State of Washington Irrigation Guides (WAIG) for both 1985 and 1992. The CIR used was based on the Olga rain gauge on Orcas Island. This gave inches of irrigation water needed above average rainfall observed for this location. 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 the Ecology Water Resources Guidance 1210. For drip systems used on the Zybas property, estimates for average efficiency are assigned 88%. Mrs. Zybas indicated she intends to irrigate ½ acre of blueberries, 1 acre of raspberries, and ½ acre of vegetables. Adjusting the Crop Irrigation Requirement (CIR) by the efficiency of the irrigation system, the Total Irrigation Requirement (TIR) for the 2 acres would be approximately 3.0 acre-feet per year. The formula used to account for this is:

$$TIR = \#\ acres \times CIR / CONV / EFF\%$$

Where:

TIR = total irrigation requirement in acre-feet per year

 # acres = area irrigated in acres

CIR = crop irrigation requirement needed above precipitation

CONV = conversion factor to change units (12 inches to feet)

EFF% = application efficiency of irrigation system

There is no CIR data available for blueberries in the WAIG. Therefore the irrigation requirement for raspberries was used from the 1992 WAIG since this has the highest CIR. For determining CIR for the ½ acre of vegetables, the CIR for tomatoes was used since it has the highest value for that category of crop.

1 ½ acres of mixed blueberries/raspberries require 2.6 acre-feet per year.
½ acres of vegetables require 0.4 acre-feet per year.
Total irrigation requirement for all crops: 2.6 + 0.4 = 3.0 acre-feet per year.
Single home domestic use of 0.3 acre-feet per year, plus 3.0 acre-feet per year for crops = 3.3 acre-feet per year total annual quantity for the Zybas property.

Impairment Considerations

The nearest well is approximately 315 ft to the north of the Zybas well. It is listed as water right G1-20990C issued to Mr. W.M. Fischer. Unfortunately, a well log cannot be located for the Fischer well, so it is impossible to accurately determine what effect, if any, the Zybas well might have on this water right. However, both wells have low pumping rates and the Fischer well is not directly down gradient of the Zybas well, so it is reasonable to assume that whatever impact there might be on the Fischer well will be minimal if any. Especially since the Zybas well is completed in bedrock. Bedrock aquifer systems are not laterally continuous but consist of irregular fractures and physical barriers limiting hydraulic conditions. All other wells are over 750 ft away from the Zybas well and there should be no impairment from the Zybas well.

Beneficial Use

Domestic supply and irrigation are considered to be beneficial under RCW 90.54.020(1).

Public Interest Considerations

No potential for detriment to the public interest could be identified during the investigation of this application.

RECOMMENDATIONS

Based on the above investigation and findings, I recommend the request for a groundwater permit be approved in the quantities and within the limitations listed below and subject to the provisions 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
- 3.3 acre-feet per year total for domestic supply and irrigation
  - 0.3 acre-feet per year for domestic supply
  - 3.0 acre-feet per year for irrigation

Point of Withdrawal

NW¼ NE¼, Section 21, Township 37 North, Range 2 West, W.M.

Place of Use

As described on page 1 under LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED.

Based on the above investigation and findings, I recommend the request for a groundwater permit be approved in the quantities and within the limitations listed below and subject to the provisions on page 2.

CONCLUSIONS

In accordance with chapters 90.03 and 90.44 RCW, I conclude there is water available from the source in question, the purpose of use is beneficial, there will be no impairment of existing rights, and there will be no detriment to the public interest.

Report by: _____ 6/15, 2010
Jerry L. Liszak, LG, LHG — Date
Water Resources Program

Licensed Geologist/Hydrogeologist No. 834

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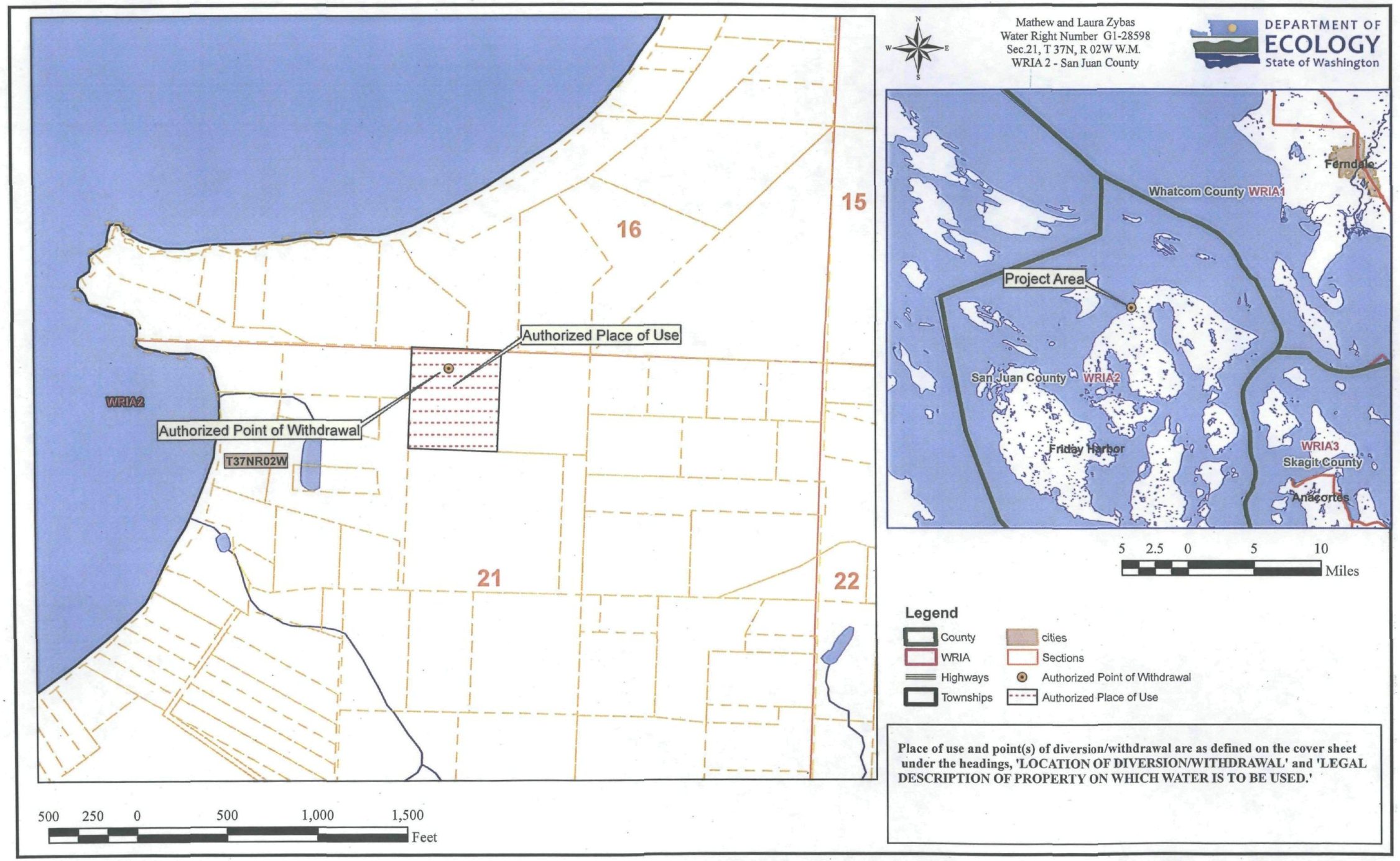

Attachment 1