File NR G1-28540
WR Doc ID 4493099

DEPARTMENT OF ECOLOGY
State of Washington

State of Washington
REPORT OF EXAMINATION
FOR WATER RIGHT APPLICATION

PRIORITY DATE	WATER RIGHT NUMBER
3/27/2008	G1-28540

MAILING ADDRESS	SITE ADDRESS (IF DIFFERENT)
WASHINGTON WATER SERVICE CO PO BOX 336 GIG HARBOR WA 98335	WASHINGTON WATER SERVICE CO PO BOX 881 EASTSOUND WA 98245

Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
75	GPM	50

Purpose

	WITHDRAWAL OR DIVERSION RATE			ANNUAL QUANTITY (AF/YR)		
PURPOSE	ADDITIVE	NON-ADDITIVE	UNITS	ADDITIVE	NON-ADDITIVE	PERIOD OF USE (mm/dd)
Municipal	75		GPM	50		01/01 - 12/31

IRRIGATED ACRES		PUBLIC WATER SYSTEM INFORMATION	
ADDITIVE	NON-ADDITIVE	WATER SYSTEM ID	CONNECTIONS
		74270	14

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
SAN JUAN	GROUNDWATER		2-SAN JUAN

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWP	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
Well	173157015	ACW154	37N	01W	31	SW NE	48.65422	-122.8653
							Datum: NAD83/WGS84	

Place of Use (See Attached Map)

PARCELS (NOT LISTED FOR SERVICE AREAS)

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

The place of use (POU) of this water right is the service area described in the most recent Water System Plan/Small Water System Management Program approved by the Washington State Department of Health, so long as the water system is and remains in compliance with the criteria in RCW 90.03.386(2). RCW 90.03.386 may have the effect of revising the place of use of this water right.

Proposed Works

Well completed, integration with existing WWSC Cascade Lake water system is planned.

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Begun	March 15, 2026	March 15, 2031

Measurement of Water Use

How often must water use be measured?	Weekly
How often must water use data be reported to Ecology?	Upon Request by Ecology
What volume should be reported?	Total Annual Volume
What rate should be reported?	Peak Rate of Withdrawal (gpm)

Provisions

WWSC will be required to run a pump test at the requested 75 gpm and submit the results including all manual and transducer measurements to Ecology's Northwest Regional Office for analysis. This pump test data must be submitted prior to Ecology issuing the final water right certificate.

Wells, Well Logs and Well Construction Standards

All wells constructed in the state shall meet the construction requirements of WAC 173-160 titled "Minimum Standards for the Construction and Maintenance of Wells" and RCW 18.104 titled "Water Well Construction". Any well which is unusable, abandoned, or whose use has been permanently discontinued, or which is in such disrepair that its continued use is impractical or is an environmental, safety or public health hazard shall be decommissioned.

All wells shall be tagged with a Department of Ecology unique well identification number. If you have an existing well and it does not have a tag, please contact the well-drilling coordinator at the regional Department of Ecology office issuing this decision. This tag shall remain attached to the well. If you are required to submit water measuring reports, reference this tag number.

Installation and maintenance of an access port as described in WAC 173-160- 291(3) is required.

Measurements, Monitoring, Metering and Reporting

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

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.

WAC 173-173 describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

Water Level Measurements

In order to maintain a sustainable supply of water, pumping must be managed so that static water levels do not progressively decline from year to year. Static water level is defined as the water level in a well when no pumping is occurring and the water level has fully recovered from previous pumping. Static water levels shall be measured and recorded monthly, using a consistent methodology. Data for the previous year shall be submitted by January 31 to the Department of Ecology.

Static water level data shall be submitted in digital format and shall include the following elements:

Water Right Number
Unique Well ID Number
Measurement date and time
Measurement method (air line, electric tape, pressure transducer, etc.)
Measurement accuracy (to nearest foot, tenth of foot, etc.)
Description of the measuring point (top of casing, sounding tube, etc.)
Measuring point elevation above or below land surface to the nearest 0.1 foot
Land surface elevation at the well head to the nearest foot.
Static water level below measuring point to the nearest 0.1 foot.

Department of Health Requirements

Prior to any new construction or alterations of a public water supply system, the State Board of Health rules require public water supply owners to obtain written approval from the Office of Drinking Water of the Washington State Department of Health. Please contact the Office of Drinking Water at Northwest Drinking Water Operations, 20435 72nd Avenue S, Suite 200, K17-12, Kent, WA 98032-2358, (253) 396-6750.

Water Use Efficiency

The water right holder is required to maintain efficient water delivery systems and use of up-to-date water conservation practices consistent with RCW 90.03.005.

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 permit. 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.

Schedule and Inspections

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the project location, and to inspect at reasonable times, records of water use, wells, diversions, measuring devices and associated distribution systems for compliance with water law.

Findings of Facts

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; that there will be no impairment of existing rights; that the purpose(s) of use are beneficial; and that there will be no detriment to the public interest.

Therefore, I ORDER approval of Application No. G1-28540, subject to existing rights and the provisions specified above.

Your Right To Appeal

You have a right to appeal this Order to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt of this Order. 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 the Order.

File your appeal and a copy of this Order 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 Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail 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 **Pollution Control Hearings Board** 1111 Israel RD SW Ste 301 Tumwater, WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Signed at Bellevue, Washington, this 24th day of February, 2016.

Tom Buroker, Section Manager

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.

INVESTIGATOR'S REPORT
Application for Water Right -- Washington Water Service Company
Water Right Control Number G1-28540
John Rose LG, Department of Ecology

BACKGROUND

This report serves as the written findings of fact concerning Water Right Application Number G1-28540.

Table 1 Summary of Requested Water Right

Applicant Name:	Washington Water Service Company
Date of Application:	3/27/2008
Place of Use	The place of use (POU) of this water right is the service area described in the most recent Washington Water Service Company Rosario Water System Plan approved by the Washington State Department of Health, so long as the water system is and remains in compliance with the criteria in RCW 90.03.386(2). RCW 90.03.386 may have the effect of revising the place of use of this water right.

County	Waterbody	Tributary To	WRIA
San Juan	Groundwater		2-San Juan

Purpose	Rate	Unit	Ac-ft/yr	Begin Season	End Season
Municipal	75	GPM	50	01/01	12/31

Source Name	Parcel	Well Tag	Twp	Rng	Sec	QQ Q	Latitude	Longitude
Well	173157015	ACW154	37N	01W	31	SW NE	48.656275	-122.867498

CFS = Cubic Feet per Second; Ac-ft/yr = Acre-feet per year; Sec. = Section; QQ Q = Quarter-quarter of a section; WRIA = Water Resource Inventory Area; E.W.M. = East of the Willamette Meridian; Datum: NAD83/WGS84.

Legal Requirements for Approval of Appropriation of Water

RCWs 90.03 and 90.44 authorize the appropriation of public water for beneficial use and describes 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 90.44.050. In accordance with RCW 90.03.290, determinations must be made on the following four criteria in order for an application for water rights 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

Public Notice

RCW 90.03.280 requires that notice of a water right application be published once a week, for two consecutive weeks, in a newspaper of general circulation in the county or counties where the water is to be stored, diverted and used. Notice of this application was published in *The Islands' Sounder* on June 4, 2008 and June 11, 2008.

Consultation with the Department of Fish and Wildlife

The Department must give notice to the Department of Fish and Wildlife (WDFW) of applications to divert, withdraw or store water. The permit writer contacted Mr. Steve Boessow, Water Rights Biologist of WDFW on December 7, 2015, via email with the particulars of this application and a request for comments or concerns. The WDFW has 60 days to respond. The expiration date for comments is Feb 5, 2015.

State Environmental Policy Act (SEPA)

A water right application is subject to a SEPA threshold determination (i.e., an evaluation whether there are likely to be significant adverse environmental impacts) if any one of the following conditions are met.

(a) It is a surface water right application for more than 1 cubic foot per second, unless that project is for agricultural irrigation, in which case the threshold is increased to 50 cubic feet per second, so long as that irrigation project will not receive public subsidies;

(b) It is a groundwater right application for more than 2,250 gallons per minute;

(c) It is an application that, in combination with other water right applications for the same project, collectively exceed the amounts above;

(d) It is a part of a larger proposal that is subject to SEPA for other reasons (e.g., the need to obtain other permits that are not exempt from SEPA);

(e) It is part of a series of exempt actions that, together, trigger the need to do a threshold determination, as defined under WAC 197-11-305.

Because this application does not meet any of these conditions, it is categorically exempt from SEPA and a threshold determination is not required.

INVESTIGATION

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

- Information supplied by the applicant
- Washington Department of Health Sentry Database
- Ecology water rights database and records of existing water rights in the vicinity
- San Juan County online zoning map

- 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.
- Brown, E. H., and Ellis, R. C. 1977.*The Stratigraphy and Structure of Orcas Island, San Juan Islands.* Geological Society of America Annual Meeting, Western Washington University, 34 pages.
- Davis, George H. 1984. *Structural Geology of Rocks and Regions*. John Wiley and Sons, 492 pages.
- Kelly, D. November 29, 2005. *Sea Water Intrusion Protection, San Juan County Washington* PowerPoint Presentation Notes.
- 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.
- Russell, Robert H, 1975. *Geology and Water Resources of the San Juan Islands.* Department of Ecology, 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.
- Various Geographic Information System data layers, available from the Washington Department of Natural Resources and the Department of Ecology (Ecology).

Proposed Use and Basis of Water Demand

Water right application G1-28540 has been submitted to Ecology by the Washington Water Service Company (WWSC) to secure future water for the purpose of municipal (domestic and commercial) use initially for the small Woodlands Water System (Group B) in the vicinity of Rosario Resort on Orcas Island. WWSC already provides water to the adjacent Rosario Water System and has created a one-way intertie between the two systems for reliability and redundancy for the Woodlands system. The Washington Department of Health Office of Drinking Water has approved this system for 14 connections.

WWSC intends to complete a full integration of the Woodlands Water System with the larger Rosario System at some time in the future as outlined in the Woodlands Water System Plan executive summary (January 5, 2015, email communication with Roy Stanton, Local Manager, WWSC). Rosario currently has 223 connections according to the WA Department of Health Sentry database. Hence the request that this water right's place of use correspond to the service area of the Rosario Water System and the quantities of 75 gpm/50 Ac-ft/yr which are far in excess of what the Woodlands Water System would normally require.

Site Description

Woodlands Water System is located approximately ½ mile northeast of Cascade Bay, a part of the Eastsound area of Orcas Island in the San Juan Island archipelago. Orcas Island is the largest of the 175 islands within San Juan County, Washington.

The Rosario neighborhood is an unincorporated community centered on the historic Rosario Resort and Spa located in the southeastern part of Orcas Island. Woodlands Water System is approximately ¼ mile from the northwestern edge of Cascade Lake in a small valley formed by the southwestern edge of Mount Constitution which has an elevation of 2,407 ft. above mean sea level (MSL) and Rosario Hill to the west that rises to an elevation of 800 ft. above MSL. The valley contains a marshland/pond complex named Flaherty's Pond that drains into Cascade Lake. The topography consists of numerous bluffs and asymmetrical hills that slope steeply into the marine waters of Eastsound. (See Map 1. Topography of the Rosario Area.)

The Woodlands well is situated on the northernmost property of the Woodland Water System on an undeveloped parcel. The well is approximately equidistant (1400 ft.) from both Flaherty's Pond and Cascade Lake. Table 2 provides data on the Woodlands well.

Table 2: Woodlands Well data	
Total depth	160 ft.
Completion depth	160 ft.
Top of casing elevation	467 ft.
Height of casing above ground	+1 ft.
Diameter	6 in.
Depth of seal	19 ft.
Screened interval	N/A, open hole to bottom
Static water level at time of well completion	22 ft.
Completion date	6-13-98

System Infrastructure

The Woodlands Water System was originally developed by John Miller of "Homes of Islanders". The well began operation in May 1999 as the development progressed. At this time only 6 houses have been built due to a downturn in the island housing industry. In 2007, management of the system passed to WWSC who constructed a one-way intertie with the Rosario Water System so that Rosario could provide water to the Woodlands Water System. Currently the well is equipped with a 2hp model 75S20-3 Grundfoss submersible pump capable of providing up to 75 gpm. Water from the well is pumped into a 3,000 gallon above ground plastic storage tank. This storage tank is connected to 3 booster tanks and a Flint and Walling 3hp C22231 booster pump that provide the pressure to distribute the water via 2 inch PVC pipes to the individual homes. The elevation of the wellhead is 467 ft. above MSL and the elevation of the highest parcel is 495 ft. above MSL. One meter is installed between the well and the storage tank, an additional meter is installed between the booster tank and the distribution system and there are meters at each individual home. At this time, the well is not being operated due to iron bacteria contamination and water is being provided by Rosario Water System. WWSC plans to use a chlorination disinfectant process to address the iron bacteria. If the contamination proves to be chronic, then WWSC intends to use a filtration system for iron/magnesium removal.

Geology of the San Juan Islands

The geology of the San Juan Islands is very complex. It consists of a series of gently folded allochthonous terranes mostly of island arc and marine origin of early Paleozoic to middle Cretaceous age which were accreted onto the North American continent probably 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 fault contacts. These units were then tilted to the southeast, and compressed into a series of broad folds with northwest trending axes, 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) (See Map 2. Geology in the Vicinity of Water Right Application G1-28540.)

Geology within the vicinity of Woodland Water System

The two principal terranes that comprise the portion of Orcas Island in the vicinity of the Woodlands Water System consist of the lowermost, Permian to Jurassic Deadman Bay Terrane. The uppermost unit of this terrane is the Orcas Chert comprised of thick (average of 500 m) very hard, grayish ribbon chert with minor amounts of basaltic tuff, pillow basalt and limestone. The predominate chert is commonly folded and contorted (Brandon 1988) and made up of layers about 1 inch thick with secondary permeability often consisting of pinch and swell structures separating the various layers which frequently terminate laterally. This layer originated in a pelagic marine environment. Overlying this group of rock units and encompassing the southeast three quarters of the island is the Late Jurassic - Early Cretaceous, fault bounded Constitution Formation, a sequence of altered massive to poorly bedded, angular grained volcaniclastic siltstone, mudstone, sandstone, minor conglomerate, minor ribbon chert, and minor pillow basalt plus small amounts of fault sliced Garrison Schist stratigraphically above the Rosario Thrust Fault which separates the two terranes. True thickness of this layer is difficult to determine but Brown and Ellis report a relative thickness of 2,500 meters. Originally thought of as a turbidite deposit, this formation was later re-interpreted by Brandon as marine deep water deposits laid down in a homoclinal continental margin environment independent of any mass wasting events.

The area in the immediate vicinity of Woodland Water System is tectonically very complex, the well lies within an area of multiple splays of the Rosario Thrust fault with boundaries both to the northwest and southeast of the Woodlands Water System well. These splays contain thin slices of both formations that lie outside of their main structural units.

The soil consists of thin (20-40 inches) volcanic ash and glacial drift over bedrock with a very gravelly silt loamy texture that is well drained and has low water capacity.

Review of the geologic maps provided with Brandon's report show that there is a anticline within the bedrock formations whose southeast plunging fold axis parallels the axis of Eastsound (See Geologic

Map 3). Compressional folding can increase the permeability of existing rocks by creating or enlarging existing fractures or bedding planes within the host rock. For rocks that are poorly bedded secondary permeability is often achieved by the pressure solution loss of material along cleavage planes created during compression. (Davis 1984) Brandon confirms this phenomenon on San Juan Island in several papers in which he proves that solution mass transfer occurred concurrently with the creation of cleavage surfaces during Tertiary northeast-southwest compression. Given the regional nature of the folding that occurred across the entirety of the Islands, it is logical to assume that such secondary fracture processes occurred in other areas in close vicinity to fold axes such as the Rosario area.

Because there is no definite information on true thickness of the relevant formations or dip angles, it is difficult to determine which formation the well is completed in. Stratigraphic descriptions in the well log do not provide enough information either. Because of this uncertainty this report will examine the permeability of both the Constitution Formation and the Orcas Chert to help determine if sufficient water is physically available to meet the requested amounts for this application.

Aquifer Recharge and Characteristics

Russell (1975) reports that the source of groundwater in the San Juans is exclusively from precipitation. Due to the rain shadow of the Olympic Mountains, precipitation is not evenly distributed throughout the Islands. Much of the southern portions of the islands, such as Lopez Island and parts of Shaw Island and San Juan Island receive less than 28 inches per year, whereas the upland northern parts of the islands can receive more than 48 inches of rainfall during the year. The highest rainfall in the vicinity of Woodlands Water System occurs on Mt. Constitution where average rainfall near its peak can be greater than 48 inches per year. Precipitation in the immediate area of the Woodlands Water System is 36 to 38 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). In the USGS recharge study by Orr et al., the primary method for estimating recharge was a daily near surface water balance method called the Deep Percolation Model. This method estimates recharge in the Woodland Water System well area to be 0.5 to 1 inches per year for bedrock.

The Orcas Chert of the Deadman Bay terrane, being composed of microcrystalline quartz with minor inter-bedded limestone has no primary porosity or permeability. Any ability for the formation to transmit water is controlled by secondary fracturing and faulting. Russell (1975) reports that in addition to the pervasive pinch and swell structures associated with the regional compressional folding that resulted in the southeast plunging folds across the San Juans, the formation also has extensive minor faults. The minor limestone component of this terrane is extensively altered to aragonite marble and therefore also has virtually no primary permeability. Although the literature available is somewhat vague regarding the porosity and permeability of the Constitution Formation, its high pressure-low grade metamorphism and high percentage of fine-grained sediments probably mean that the Constitution Formation has little inherent permeability and is a poor aquifer material. However, field visits plus review of multiple articles indicate that the Constitution Formation is highly fractured. Usually wells drilled into bedrock are poor producers of water and are often only sufficient for single domestic use. Russell reports that while the yield of bedrock wells on the island vary a great deal, the average yield from the non-glacial formations on Orcas is 8 gpm. The exception to this is when the bedrock is highly fractured and secondary permeability provides adequate transmissivity and storage in the bedrock. Based on this review and the results of the pump yield and pumping rate, the only conclusion is

that the Woodlands Water System well is tapping into an extensive fracture zone which is probably closely linked to the Rosario Thrust Fault system and which provides moderate amounts of water above what is to be expected in most bedrock wells in the region.

Woodlands Water System Pump Test

A well pump test was performed between July 20 and July 28, 1999, by Coldsprings Pumps. A pressure transducer was lowered into the well and the static water level reading recorded as a reference point. The well was monitored for 25 hours before starting a sustained yield test. The pump was turned on and the flow set for 35 gpm. The instantaneous rate was periodically recorded manually using a calibrated bucket and stopwatch. The dynamic water level and recovery levels were also tested manually to support the transducer data. After 48 hours, the pump was shut off and the recovery of water levels was monitored for another 4 days (Coldsprings well pump test report). The pumping water level did not reach equilibrium during this test. A summary of the well pump test data is provided in Table 4.

Table 4: Summary of Woodlands Well Pump Test

Well Test Start Time	07/21/99, 13:34
Discharge Rate	35 gpm
Elapsed Time	48 hours
Static Water Level	22.52 ft.
Drawdown	15.77 ft.
Specific Capacity	2.18 gpm/ft.
Yield	50,400 gallons/day
Chloride Concentration	15 mg/L
pH	6.5

It should be noted that the specific capacity of the well was incorrectly reported by Coldsprings pumps as 0.4583 ft./gpm.

The pump test was performed without observations of drawdown of water levels in nearby wells. A pump test of this sort cannot test the full aquifer characteristics. Only transmissivity can be determined using this approach. Transmissivity reflects the amount of water that can be transmitted horizontally through a unit width by the full saturated thickness of the aquifer under a hydraulic gradient of 1. Approximating transmissivity in bedrock aquifers can be problematic but due to the uncertainty of which formation the well was drawing water from, and the possibility of the well being completed in a relic sedimentary environment of the Constitution formation, a time-drawdown graph was created using the data provided by the applicant to determine if this function could be calculated. However, the data plotted on a semi-logarithmic graph resulted in a curve with a constantly changing slope. Therefore calculating transmissivity from the slope of such a curve isn't reliable.

An inspection of the pumping data shows there is an adequate yield to meet the needs of the 14 homes initially envisioned by Mr. Miller when he began development of Woodlands Water System. The Pump Suspension Summary diagram provided by WWSC shows the current submersible pump provides suction at a depth of 140 ft. below top of casing or 139 ft. below surface. The pump test data shows that the pump suction depth at the time of the test was set at 128 ft. below top of casing. With a maximum drawdown depth of 38.29 ft. below top of casing achieved during the test, this means that at the tested pumping rate, an additional 90 ft. of drawdown was available after 48 hours of pumping. Recovery of water levels over the 4 days of monitoring show that 50% recovery of water level occurred

after 18.6 hours and 75% recovery occurred after 74.1 hours. At the end of the test, 83.6% of full recovery of water level had occurred over 116.6 hours. These figures represent a very slow aquifer recharge rate.

Potential for seawater intrusion

Wells drilled to depths near sea level and located near the shoreline have a tendency to be subject to seawater intrusion because of their proximity to the freshwater-seawater interface (Whiteman et al. 1983). Seawater intrusion can be caused by two different phenomena. Lateral intrusion is the migration inland of the seawater/freshwater interface due to the pumping of wells and loss of head, or if a saltwater zone exists in the aquifer beneath the well, the saltwater will rise up toward the well screen in a process known as upconing. The Woodlands Water System well lies 3,300 ft. from Cascade Bay, the nearest source of saltwater that could be a source of seawater intrusion. The lack of porosity within the bedrock serves to strongly inhibit lateral intrusion although it is possible for this to occur under certain circumstances if the well is tapping into a fracture zone that is directly connected to saltwater. However, data from the pump test indicates that chloride levels were constant and well below the maximum contamination level (250 mg/L) during the entirety of the test. Therefore there is little chance of any lateral intrusion. The well driller reported the elevation of the wellhead was +478 ft. MSL, and WWSC reports the wellhead at an elevation of approximately +467 ft. MSL. Using the more conservative estimate of +467 ft, this still means that the bottom of the well is approximately 300 ft. above MSL. Therefore the chance of upconing is negligible.

Other Rights Appurtenant to the Place of Use

There are no other water rights appurtenant to the place of use. All the water rights in the vicinity of Woodlands Water System are owned by WWSC for the operation of the Rosario Water System. See Impairment Considerations for more information.

Impairment Considerations

Impairment is an adverse impact on the physical availability of water for a beneficial use that is entitled to protection. A water right application may not be approved if it would:

- Interrupt or interfere with the availability of water to an adequately constructed groundwater withdrawal facility of an existing right. An adequately constructed groundwater withdrawal facility is one that (a) is constructed in compliance with well construction requirements and (b) fully penetrates the saturated zone of an aquifer or withdraws water from a reasonable and feasible pumping lift.
- Interrupt or interfere with the availability of water at the authorized point of diversion of a surface water right. A surface water right conditioned with instream flows may be impaired if a proposed use or change would cause the flow of the stream to fall to or below the instream flow more frequently or for a longer duration than was previously the case.
- Interrupt or interfere with the flow of water allocated by rule, water rights, or court decree to instream flows.

- Degrade the water quality of the source to the point that the water is unsuitable for beneficial use by existing users (e.g., via sea water intrusion).

There are no instream flow rules set on Orcas Island. Therefore no regulated low flows will be impaired by this proposed withdrawal. Groundwater wells that are at greatest risk of impairment are those which are completed in the same aquifer zone as the subject well, located in close proximity to the subject well, and also located hydrogeologically down-gradient from the subject well. As water in the aquifer travels toward wells that are located down-gradient from the subject well, the subject well may potentially capture this water and impair the production of down-gradient wells. An arbitrarily, yet conservatively chosen area of one-half mile (1/2-mile) from the Woodlands well 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 induced by groundwater withdrawal at distances of 1,000 feet in most cases. Table 3 shows the water rights and claims within a ½ mile radius of the well. (See map 3. Water Rights in the vicinity of G1-28540.)

Table 3. Water Rights in the vicinity of G1-28540

Water Right Number	Document Type	Priority Date	Qi (CFS)	Qa (Ac-ft/yr)	Irrigated Acres	Purpose	Water Right Holder Name
R1-71001JWRIS	Adjudicated Certificate	01/01/1910		1879	5	DM FR IR PO	Geiser Land Co
S1-71002J	Adjudicated Certificate	01/01/1910	2.694	709	5	DM FR IR PO	Rosario Utilities
CS1-71002J@1	Change Report of Examination	01/01/1910	2.31	499		FR IR MU	Olga Water Users Inc
S1-092368CL	Long Form Claim		0.07	48.26		DG	Geiser, Gilbert H
S1-115821CL	Long Form Claim					DG	Geiser, Gilbert H
S1-111558CL	Long Form Claim					DG	Geiser, Gilbert H
CR1-71001J@1	Temporary Donation	01/01/1910	0.007	1		IF	Moran State Park

All the water rights and claims listed in table 3 are now currently owned or operated by WWSC on behalf of Rosario Water System. Therefore any impairment of existing rights is not considered to be an issue.

Water Availability

For water to be available for appropriation, it must be both physically and legally available.

Physical availability

For water to be physically available for appropriation there must be groundwater present in quantities and quality and on a sufficiently frequent basis to provide a reasonably reliable source for the requested beneficial use or uses. In addition, the following factors are considered:

- Volume of water represented by senior water rights, including federal or tribal reserved rights or claims;
- Water right claims registered under Chapter 90.14 RCW;
- Ground water uses established in accordance with Chapter 90.44 RCW, including those that are exempt from the requirement to obtain a permit; and
- Potential riparian water rights, including non-diversionary stock water.

- Lack of data indicating water usage can also be a consideration in determining water availability, if the department cannot ascertain the extent to which existing rights are consistently utilized and cannot affirmatively find that water is available for further appropriation.

Legal availability
To determine whether water will be legally available for appropriation, the following factors are considered:

- Regional water management plans – which may specifically close certain water bodies to further appropriation.
- Existing rights – which may already appropriate physically available water.
- Fisheries and other instream uses (e.g., recreation and navigation). Instream needs, including instream and base flows set by regulation. Water is not available for out of stream uses where further reducing the flow level of surface water would be detrimental to existing fishery resources.
- The Department may deny an application for a new appropriation in a drainage where adjudicated rights exceed the average low flow supply, even if the prior rights are not presently being exercised. Water would not become available for appropriation until existing rights are relinquished for non-use by state proceedings.

In terms of the water being physically available for allocation, the pump test was conducted for a pumping rate approximately ½ the amount that WWSC is requesting. Since at this time, the well is only directly connected to the Woodlands Water System and this development isn't currently utilizing the well and has not achieved full build out, then the well's yield and tested pumping rate is currently adequate. However, because the test did not reach equilibrium, and due to the known limitations of bedrock aquifers, low recharge, and unknown transmissivity, prior to WWSC completing integration of the Woodlands well with Rosario Water System and submittal of Proof of Appropriation, WWSC will be required to run a pump test at the requested 75 gpm and submit the results to Ecology's Northwest Regional Office for analysis. This pump test data must be submitted prior to Ecology issuing the final water right certificate.

Beneficial Use

The proposed use of water (Municipal Supply) is defined in statute as a beneficial use (RCW 90.54.020(1)). As mentioned earlier in this report, Rosario Water System currently serves 223 connections. Based on Ecology's estimate that an individual domestic property in the San Juans requires approximately 0.25 Ac-ft/yr, the requested 50 Ac-ft/yr would serve 200 individual properties. This is a reasonable annual quantity for ensuring that the final consolidated system has an adequate alternative water source.

Public Interest Considerations

Consideration of Protests and Comments
No protests were filed against this application.

There was no legal restrictions, impairment or public interest considerations identified during the investigation of this application that would preclude approving this water right.

Conclusions

Based on my investigation, I conclude water is available from the source in question, there will be no impairment of existing rights, the purpose of use is beneficial, and there will be no detriment to the public interest.

WWSC has requested a 10 year development schedule to complete construction after approval of the water right permit. This appears to be a realistic time period given the desire to integrate the two systems.

RECOMMENDATIONS

Based on the above investigation and conclusions, I recommend this request for a water right be approved in the amounts and within the limitations listed below and subject to the provisions listed above.

Purpose of Use and Authorized Quantities

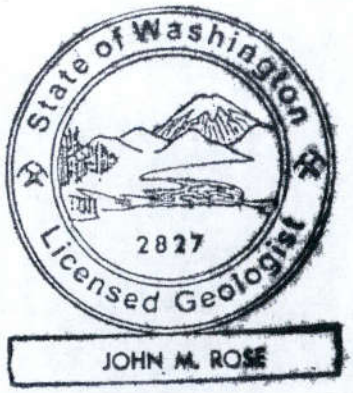
The amount of water recommended is a maximum limit and the water user may only use that amount of water within the specified limit that is reasonable and beneficial:

75 gpm
50 acre-feet per year
For Municipal Supply

Point of Withdrawal:
NW¼ NE¼, Section 31, Township 37 North, Range 01 West. W.M.

Place of Use

The place of use (POU) of this water right is the service area described in the most recent Washington Water Service Company Rosario Water System Plan approved by the Washington State Department of Health, so long as the water system is and remains in compliance with the criteria in RCW 90.03.386(2). RCW 90.03.386 may have the effect of revising the place of use of this water right.



2/18/16

Report by: John Rose, LG *Date*

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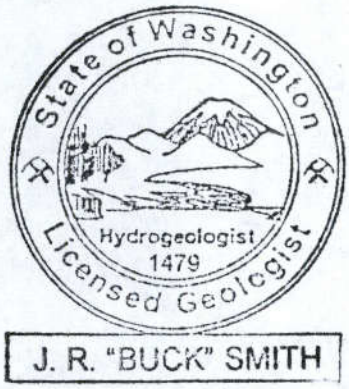
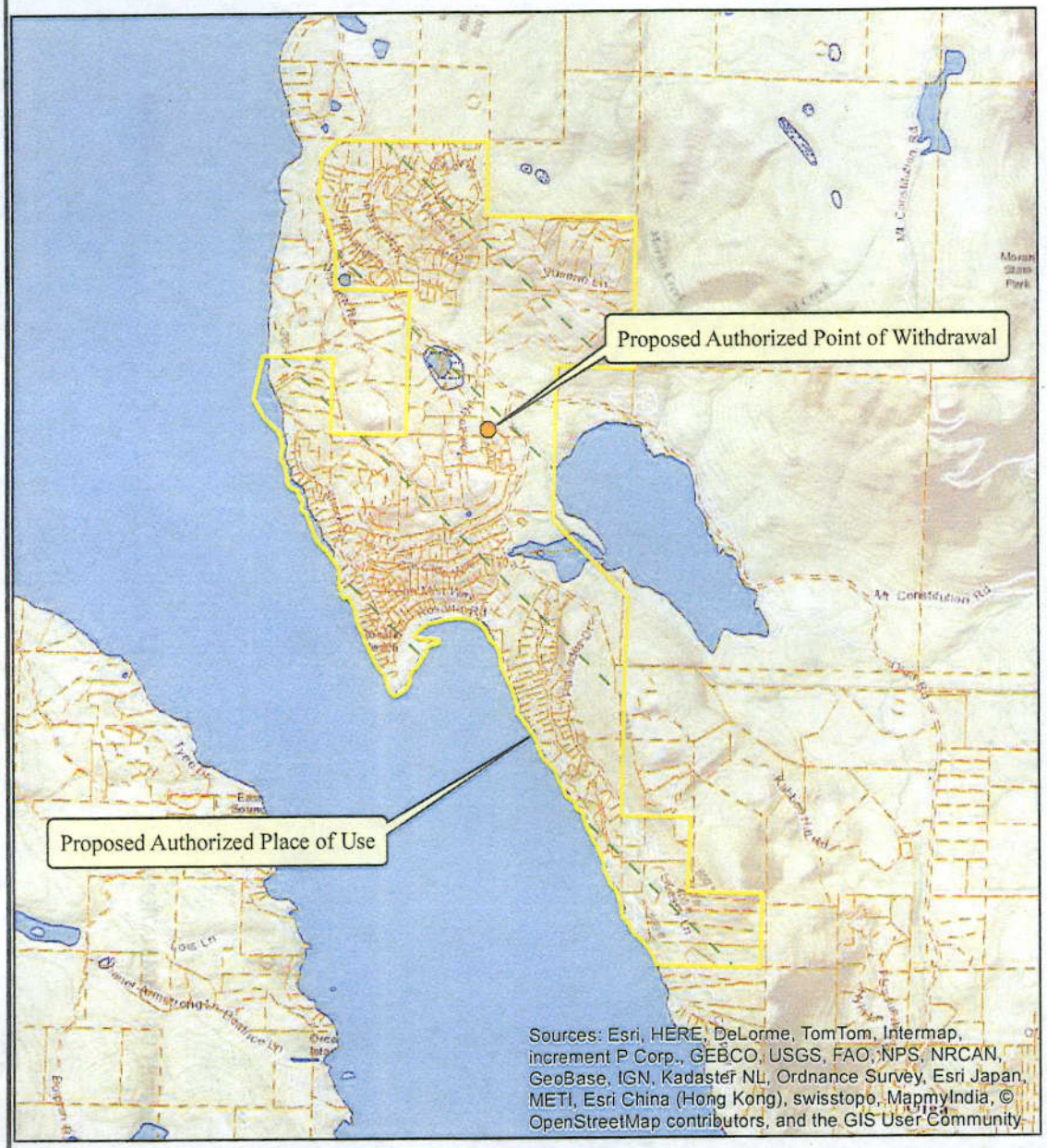
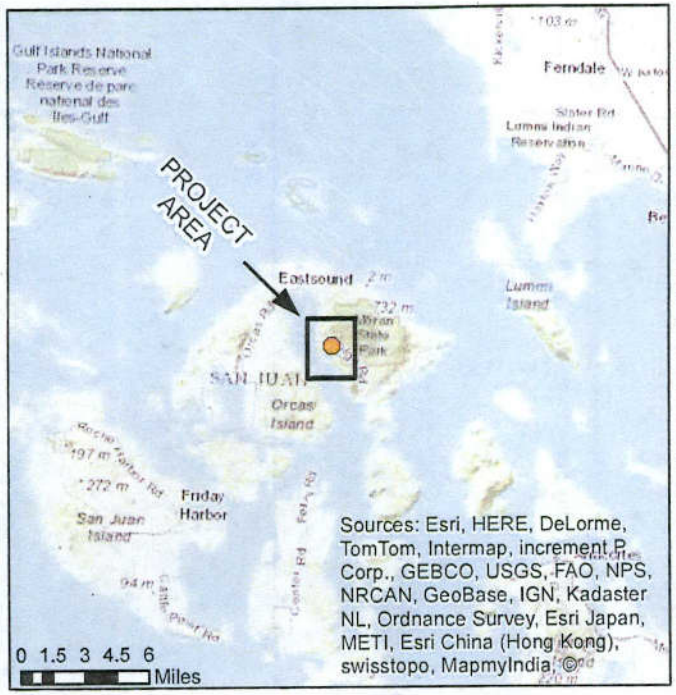


2/18/16

Reviewed by: Buck Smith, LG, LHG *Date*

Washington Water Service Co.
Water Right Application G1-28540
Section 31 T37N R01W, W.M.
WRIA 2 -San Juan County





Legend

- Authorized Place of Use
- Authorized Point of Withdrawal
- County Boundary
- Water Body
- Parcels
- Townships
- Sections

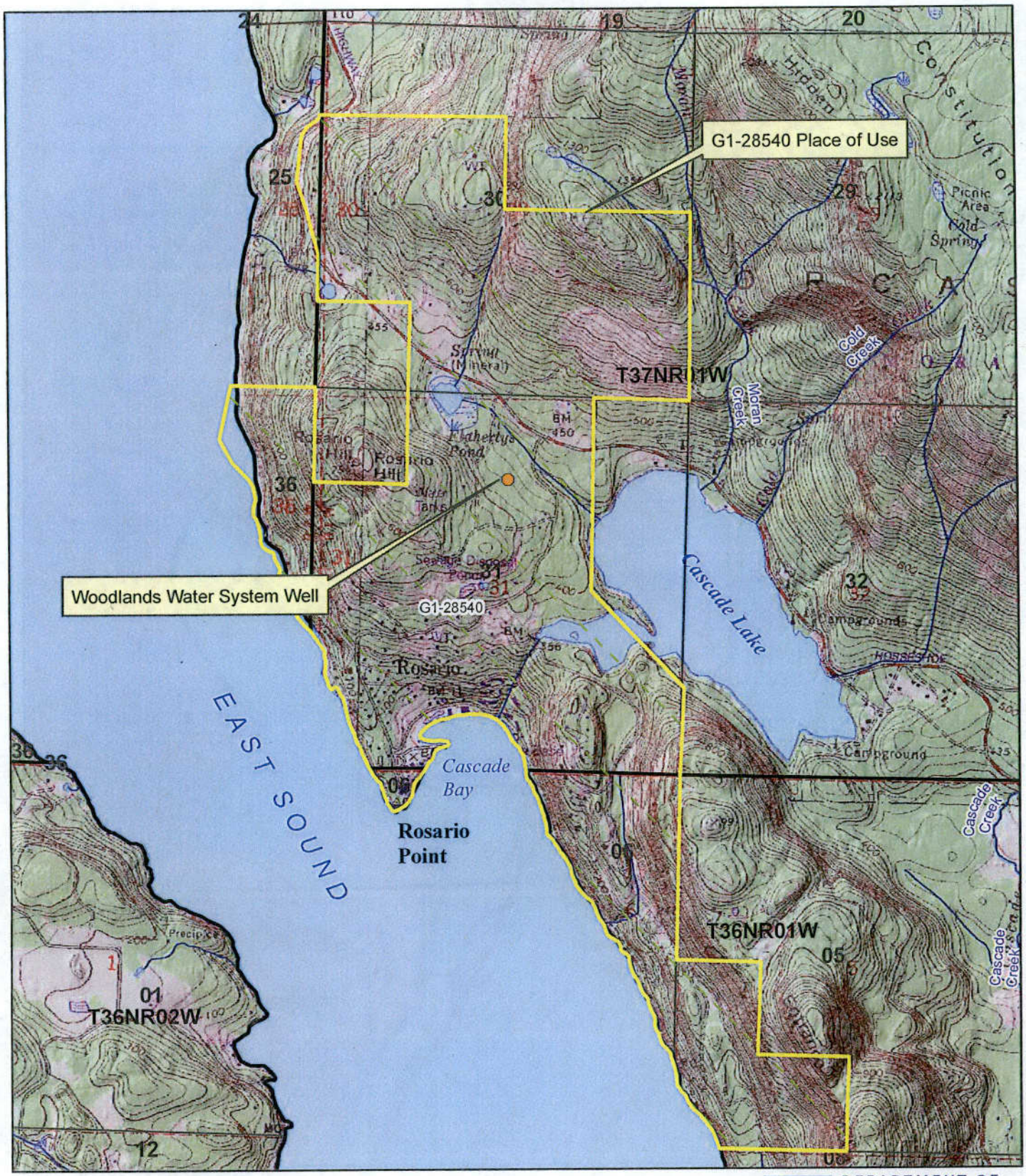
0 0.25 0.5 1 1.5 2 Miles

DEPARTMENT OF ECOLOGY State of Washington

Map Date: 1/6/2016

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 1



N
W E
S

0 1,000 2,000 3,000 4,000

Feet

1/4/2016

Map 1

Well

Township Boundaries

Section Boundaries

Water Bodies

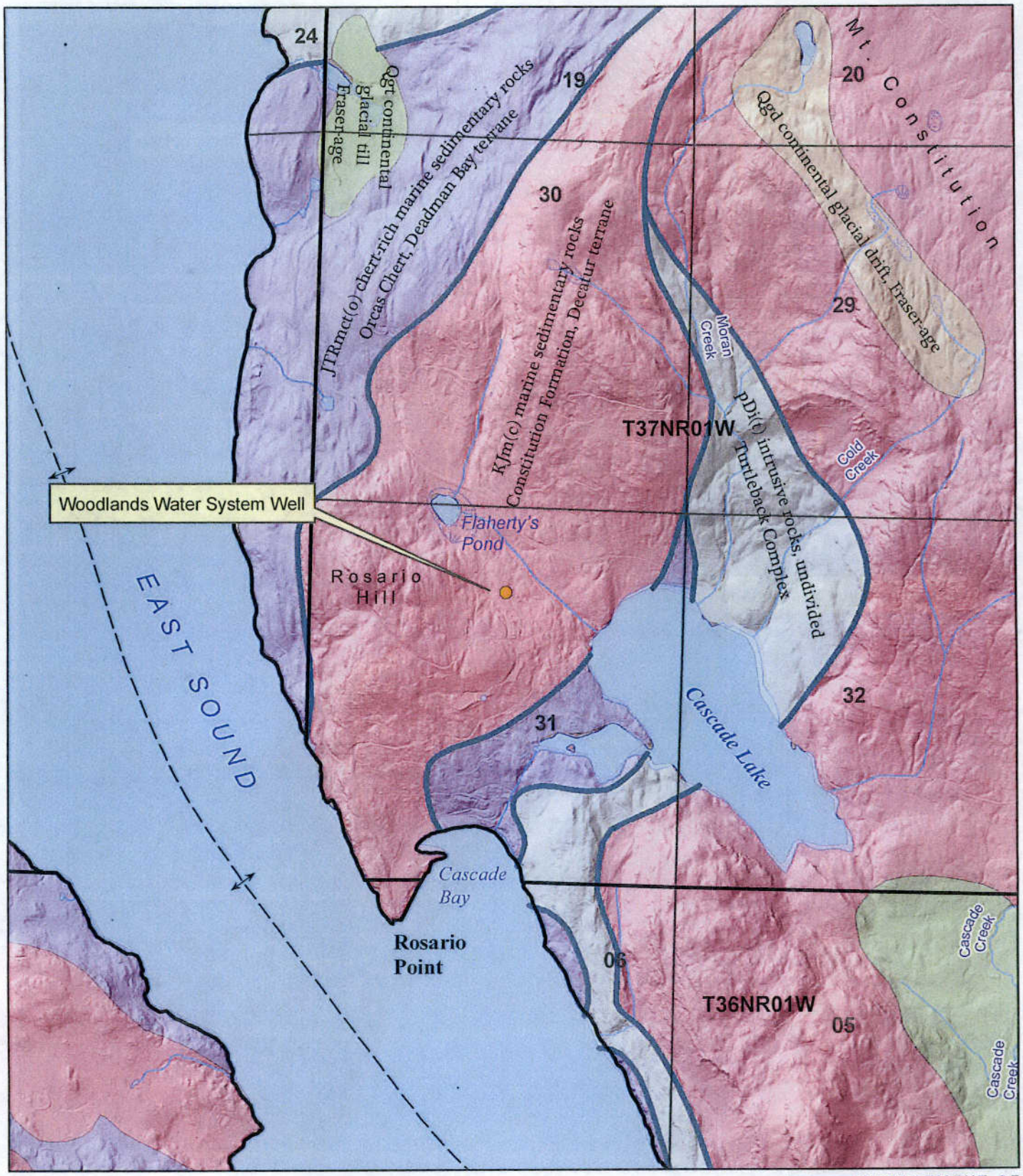
Wetland

Water Courses

DEPARTMENT OF ECOLOGY
State of Washington

Topography of the Rosario Area

San Juan County WA


24
19
20
30
29
31
32
06
05
Qgt continental glacial till Fraser-age
JTRmct(o) chert-rich marine sedimentary rocks Orcas Chert, Deadman Bay terrane
KJm(c) marine sedimentary rocks Constitution Formation, Decatur terrane
Qgd continental glacial drift, Fraser-age
pDi(t) intrusive rocks, undivided Turtleback Complex
Mt. Constitution
Moran Creek
Cold Creek
Cascade Creek
Cascade Creek
T37NR01W
T36NR01W
Woodlands Water System Well
Flaherty's Pond
Rosario Hill
EAST SOUND
Cascade Lake
Cascade Bay
Rosario Point
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E
S
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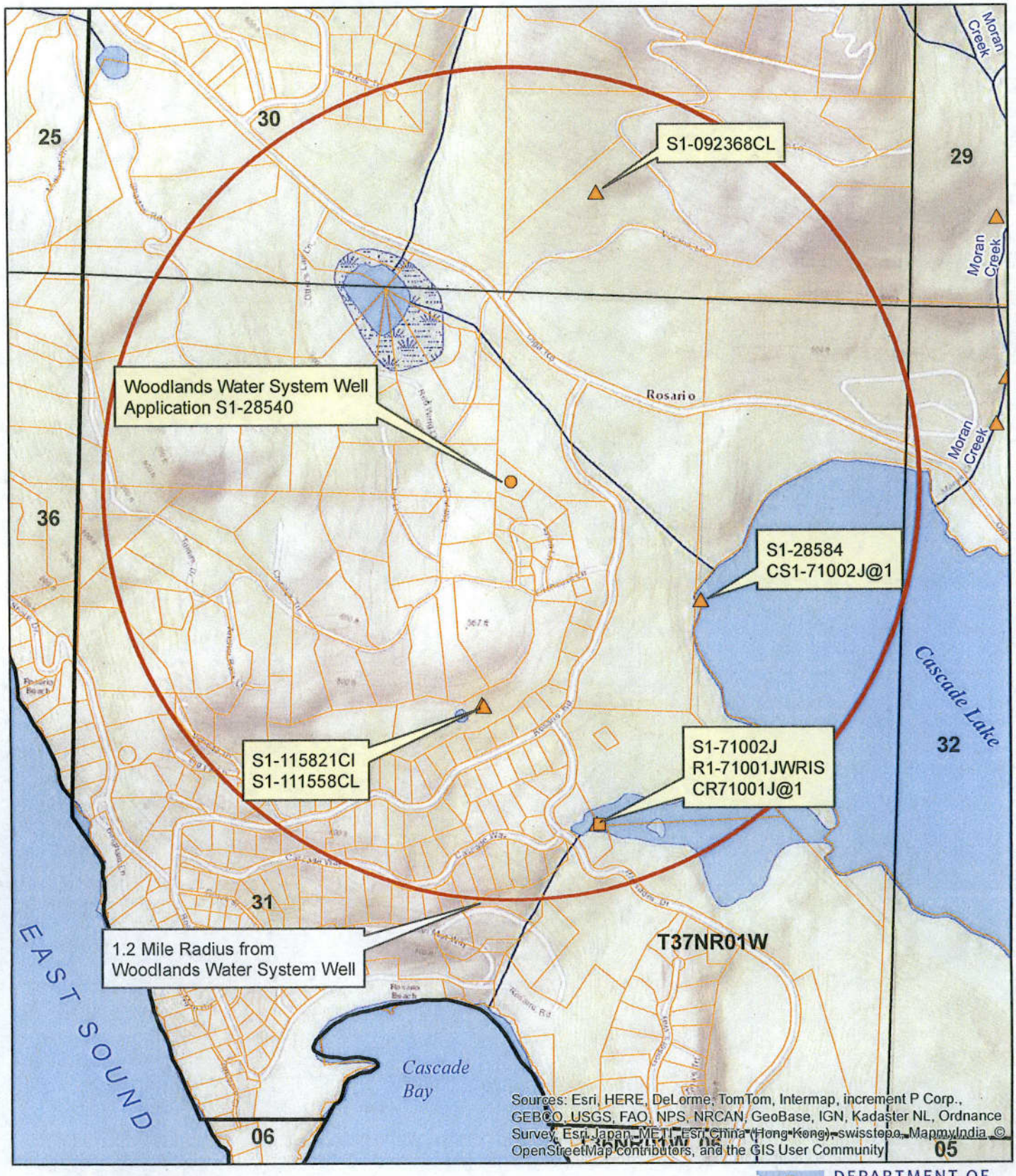
1,000
2,000
3,000
4,000
Feet
1/4/2016
Well
Township Boundaries
Section Boundaries
Geologic Fault Boundaries
Water Bodies
Wetland
Water Courses
Axis of anticline approximate
Map 2
DEPARTMENT OF ECOLOGY
State of Washington
Geology in the Vicinity of Water Right Application G1-28540
San Juan County WA



N W E S

0 500 1,000 1,500 2,000

Feet

1/4/2016

Well
Township Boundaries
Section Boundaries
Water Bodies
Wetland
Water Courses

DEPARTMENT OF ECOLOGY
State of Washington

Water Rights in the vicinity of G1-28540

San Juan County WA

Map 3