File NR G1-28301
WR Doc ID 4249414

DEPARTMENT OF ECOLOGY
State of Washington

State of Washington

REPORT OF EXAMINATION FOR WATER RIGHT APPLICATION

PRIORITY DATE	WATER RIGHT NUMBER
10/24/2005	G1-28301

MAILING ADDRESS	SITE ADDRESS (IF DIFFERENT)
SAN JUAN ISLAND SCHOOL DIST 149 PO BOX 458 FRIDAY HARBOR WA 98250	565 CARTER AVE FRIDAY HARBOR WA 98250

Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
40	GPM	6.9

Total withdrawals or diversions from all sources must not exceed the total quantity authorized for withdrawal or diversion listed above.

Purpose

	WITHDRAWAL OR DIVERSION RATE			ANNUAL QUANTITY (AF/YR)		
PURPOSE	ADDITIVE	NON-ADDITIVE	UNITS	ADDITIVE	NON-ADDITIVE	PERIOD OF USE (mm/dd)
Irrigation	40		GPM	6.9		5/15 - 9/30

IRRIGATED ACRES		PUBLIC WATER SYSTEM INFORMATION	
ADDITIVE	NON-ADDITIVE	WATER SYSTEM ID	CONNECTIONS
10	0		

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 2 (upper well)	351192304000	ALS076	35N	03W	11	NE ¼ SW ¼	48.540697	-123.028872
Well 1 (lower well)	351161001000	AHH952	35N	03W	11	NW ¼ SE ¼	48.541356	-123.025593
							Datum: NAD83/WGS84	

Place of Use (See Attached Map)

PARCELS (NOT LISTED FOR SERVICE AREAS)

351192304000, 351161001000

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

Parcel 351192304000
Beginning at the center of Section 11, Township 35N Range 03W, which is the true point of beginning for this property, thence N87° 42′ 40"W 786.9 ft, thence S 26° 55′ 24"W 164.3 ft thence a curve to the right having a radius of 235 ft a cord direction of S45° 42′ 10"E and a cord length of 109 ft thence S33° 33′ 18"E 70.5 ft thence on a curve to the left having a radius of 177.9 ft an angle of 63° 41′ 29" and a cord direction of S 60° 42′ 16"E thence S87° 35′ 57"E 100.2 ft thence on a curve to the left a radius of 47.8 ft an angle of 25° 47′ 25" and a cord direction N79° 30′ 20"E. thence on a curve to the right with a radius of 63.1 ft and angle of 149° 50′ 24" and a cord direction of S 38° 49′ 50"E thence on a straight line S 1° 56′ 17"W 622 ft to a curve to the left with a radius of 36.5 ft and angle of 28° 07′ and a cord direction of S12° 07′ 13"E thence on a curve to the right with a radius of 57.3 ft and angle of 107° 09′ 18" and a cord direction of S27° 23′ 56"W thence S 1° 42′ 19"W 118.2 ft thence S 87° 43′ 07"E 406.9 ft thence N1° 51′ 21"E 1,293.7 ft to the point of beginning.

Parcel 351161001000
Beginning at the center of Section 11, Township 35N Range 03W, which is the true point of beginning for this property thence S 87° 55′ 40"E 644.8 ft thence S 2° 11′ 09"W 114.7 ft thence a curve to left with a radius of 40 ft an angle 282° 24′ 41" and a cord direction S 5° 29′ 56"W thence S 3° 17′ 26"W 169.5 ft thence S 86° 19′ 46"E 48.8 ft thence S 38° 11′ 07"E 50.5 ft thence S 26° 27′ 44"E 286.8 ft thence S 3° 28′ 57"W 65.3 ft thence S 82° 32′ 12"E 40.7 ft thence S 2° 43′ 02"W 70.1 ft thence S 87° 15′ 57"E 10 ft thence S 2° 42′ 50"W 129.4 ft thence N88° 11′ 01"W 900.1 ft thence N1° 52′ 43"E 898.7 ft to the true point of beginning.

Proposed Works

Two wells, one 425 ft deep, the other 360 ft deep and 6 inches in diameter to provide irrigation to a pop-up sprinkler type system.

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Started	August 22, 2023	August 22, 2028

Measurement of Water Use

How often must water use be measured?	Monthly
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?	Annual Peak Rate of Withdrawal (gpm)

Provisions

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.

Flowing wells shall be constructed and equipped with valves to ensure that the flow of water can be completely stopped when not in use. Likewise, the well shall be continuously maintained to prevent the waste of water through leaky casings, pipes, fittings, valves, or pumps -- either above or below land surface.

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.

Ecology is requiring the recording and reporting of meter data as described above to collect seasonal information for water resource planning and compliance.

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 and ensure that your water source is not impaired by future withdrawals, static water levels should be measured and recorded monthly using a consistent methodology. 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 level data should include the following elements:

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. G1-28301, 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 21 day of October 2013.

Jacqueline Klug, Section Manager
Water Resources Program
Northwest Regional Office

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 -- San Juan Island School District #149
Water Right Control Number G1-28301
John Rose LG, Department of Ecology

BACKGROUND

Description and Purpose of Proposed Application

Table 1 Application Summary

Attributes	Summary
Name	San Juan Island School District #149
Priority Date	October 24, 2005
Instantaneous Quantity	40 gpm
Annual Quantity	6.9 **af/y during irrigation season**
Purpose of Use	Irrigation of 10 acres
Period of Use	Irrigation season (May 15th to September 30th)
Place of Use	NE ¼ SW ¼ and NW ¼ SE ¼ Sect. 11 T 35N R03W (See last page for more detailed description)

Table 2 Proposed Sources of Withdrawal or Diversion

Source Name	Parcel	WellTag	Twn Rng	Sec	QQ Q	Latitude	Longitude
Well 2 (upper well)	351192304000	ALS076	T35N R03W	11	NE ¼ SW ¼	48.540697	-123.028872
Well 1 (lower well)	351161001000	AHH952	T35N R03W	11	NW ¼ SE ¼	48.541356	-123.025593

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

This report serves as the written findings of fact concerning all things investigated regarding Water Right Application Number G1-28301.

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 area where the water is to be stored, diverted and used. Notice of this application was published in *The Journal of the San Juan Islands* during the weeks of May 2, and May 9, 2012.

Consultation with the Department of Fish and Wildlife

The Department must give notice to the Washington Department of Fish and Wildlife (WDFW) of applications to divert, withdraw or store water (RCW 77.57.020). Ecology contacted Steve Boessow of WDFW on June 10th 2013 via email to ask if WDFW had any concerns that would prevent the approval of this water right application and requested a response within 30 days. The 30 day deadline has expired without any comments from WDFW, so Ecology assumes there are no objections to approval of this water right application.

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 feet 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 G1-28301 has been submitted to Ecology to secure future water for the purpose of irrigation of 10 acres of athletic fields in the town of Friday Harbor. Friday Harbor water system's primary source is Trout Lake, which is limited by the amount of direct recharge to 168 million gallons per year of sustainable yield. Because of this, the town of Friday Harbor is vulnerable to the effects of cyclical droughts and is reluctant to provide additional water for outdoor recreational use. In addition, San Juan Island School District (SJISD) is looking for a less expensive alternative for their purposes. The approval of a county Conditional Use Permit is necessary to move this project forward and is based on approval of an adequate source of water.

Site Description

SJISD's athletic fields are located close to the northern boundary of the town of Friday Harbor on San Juan Island in the San Juan Archipelago within the Straits of Juan de Fuca. San Juan Island is the second largest of the 175 islands within San Juan County, Washington. The southeastern portion of the island, covering roughly ½ the total area, consists of a broad plain with low relief and elevations mostly below 200 ft. above mean sea level (MSL). The northwestern portion consists of a hilly and mountainous terrain which tapers off to a lower and gentler area around Roche Harbor. The highest peaks on the island are Mt. Dallas at 1,080 ft. and Cady Mountain at 894 ft. Surface waters in the area of SJISD drain from the highlands to the northwest in a southeasterly direction before discharging into Friday Harbor and San Juan Channel. The two wells are situated near the eastern terminus of two valleys that merge together, Beaverton Valley to the west and an unnamed valley to the northwest. (See Topographic Map 1)

Well 1 is situated approximately 1,500 ft. west-north-west of the shoreline of Friday Harbor, and just north of Larson Street, and Well 2 is approximately 2,200 ft west-by-north of the shoreline at the northern terminus of Carter Ave. Both are on two partially developed lots totaling about 30 acres in area. The wells lie at the base of a series of low surrounding hills to the north, northwest and northeast each of which are less than 200 ft. in elevation (See Topographic Map 2). Table 2 provides data on the SJISD wells.

Table 2: Well data

	Well 1 Lower Well	Well 2 Upper Well
Completion depth	425 ft.	360 ft.
Top of casing elevation	82 ft. as per topographic map	93 ft. as per GPS
Height of casing above ground	1 ft.	1 ft.
Diameter	6 in.	6 in.
Depth of seal	74 ft.	39 ft.
Screened interval	none	none
Static water level at time of well completion	4 psi shut-in head or 9 ft above ground surface.	1 ft above top of well casing
Completion date	11/02/04	1/16/06

Hydrologic/Hydrogeologic Evaluation

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)

Geology within the vicinity of SJISD Athletic Field

The two principal terranes that comprise San Juan Island consist of the lowermost, Permian to Jurassic Deadman Bay Terrane which is only exposed at the northern and extreme western edge of the island and consists of a lower unit of pillow basalts with minor interbeds of limestone and ribbon chert informally referred to as either the Permian Volcanics or Deadman Bay Volcanics. 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. Overlying this group of rock units and encompassing the south east three quarters of the island is the Late Jurassic - Early Cretaceous, fault bounded Constitution Formation, a sequence of massive to poorly bedded, angular grained volcaniclastic silt and 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 deep water deposits laid down in a homoclinal continental margin environment independent of any mass wasting events. Overlying these layers are Quaternary glacial deposits of mixed clay, sand, and gravel. These deposits are generally quite thin with average thickness being 20-30 ft and are mostly unsaturated (Russell).

Review of the geologic maps available for this region show that there is a syncline within the bedrock formations whose southeast plunging fold axis is approximately a mile to the west of the SJISD wells (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.

Because there is no definite information on true thickness of the relevant formations or dip angles, it is difficult to determine which formation the two wells are completed in. Stratigraphic descriptions in the well logs do not provide enough information either. Based on a review of all the available information, the report writer's best estimate is that the wells were completed in the Constitution formation, possibly within a portion that contains minor ribbon chert.

Aquifer Recharge and Groundwater Flow Directions

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 as much as 40 inches. The highest rainfall zone on San Juan Island occurs near Mt. Dallas and extends north in a narrow band from Trout Lake north to Roche Harbor Lake. This area receives about

36 to 38 inches of rain per year and falls upon the upper highlands in the central part of the island. This area provides recharge to the southeastern portion of the island through the highly fractured portion of the uppermost bedrock and to a lesser extent through direct runoff. Precipitation in the immediate area of the SJISD athletic fields is between 30-32 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 groundwater 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 area to be 3-4 inches per year for the bedrock, with higher values further upslope to the northwest. Because of the thinness of the glacial deposits on San Juan Island, virtually all wells that are able to provide sufficient quantities of water penetrate into the bedrock formations of the Constitution or Deadman Bay terranes. 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. Usually wells drilled into bedrock of this sort are poor producers of water and are often only sufficient for single domestic use. Russell reports that the average yield from the non-glacial formations on San Juan Island is 7 gpm. The exception to this is when the bedrock is highly fractured and secondary permeability provides adequate transmissivity and storage in the bedrock. Field visits plus review of multiple articles indicate that the Constitution Formation is highly fractured. If we can assume that most of the fractures contributing to secondary permeability are due to the solution mass transfer cleavage of the synclinal folding, then the orientation of the cleavage surfaces will be parallel to the axial fold and be northwest –southeast and would contribute to groundwater flowing from the upland recharge zone to the SJISD wells and hence to Friday Harbor.

Infrastructure of the San Juan Island School District Athletic Fields

The designated place of use consists of approximately 30 acres consisting of one multiuse field, one soccer field, and 3 softball fields. Site plans indicate an additional soccer field and future school site, but construction of this is not planned in the forseeable future. At this time only the multiuse field has been constructed. Additionally there is approximately 2.5 acres of parking lot on site plus a small building for restrooms, storage and a concession stand. This building's water source is the Friday Harbor water system. The rest of the area consists of designated open space that will not be irrigated. The total estimated irrigated acreage will be 10 acres. A 2 inch main line will connect the pump houses and water storage facilities to each 1 inch feeder line that will be connected to the sprinklers. Sprinklers will be of two types, Rainbird 8005 Rotor pop-up sprinklers with 80 ft. radius and Rainbird 6504 Rotor pop-up with 65ft. radius. The total number of sprinkler heads will be 123. Well #2 currently has a Badger model 25 Recordall meter connected to it, the current plan to have well #1 also metered with the same make and model. Well #1 will have two 5,000 gallon storage tanks placed adjacent to the well and will be hooked up to the mainline and Well #2 will have four 5,000 gallon storage tanks also adjacent to and hooked up to the mainline for a total of 30,000 gallon storage capacity. Based on the pumping rates achieved during testing, it would take about 12 ½ hours to completely fill the storage tanks.

Aquifer Tests

Aquifer tests were performed by Mauldin's Well Services on the two wells in August 2012 with a hydrostatic pressure/temperature data logger placed in the well not being pumped in order to observe

groundwater level changes and determine aquifer characteristics. The pump test for well 2 was performed at a constant rate of 11 gpm for 32 hours with manual measurements taken every hour. Stabilization of dynamic water levels was achieved after 16 hours and two manual measurements were taken during water level recovery. Data for well 1 indicates that the pumping rate during the test began with 32.5 gpm but declined to 28.4 gpm over 40.5 hours of pumping with manual measurements taken every 1.5 hours. The dynamic water levels for this well never stabilized. A total of 3 manual measurements were taken during recovery. Table 3 summarizes the results of these two tests.

Table 3: Summary of Well Pump Tests

Pumping Well	Observation Well	Pump Test start date	Beginning discharge rate	Ending discharge rate	Elapsed time	Static Water level	Drawdown	Specific capacity
Well 1	Well 2	8/17/2012	32.5 gpm	28.4 gpm	40.5 hrs	-4.0 ft	-79.35 ft.	N/A
Well 2	Well 1	8/7/2012	11 gpm	11 gpm	32 hrs	-17.1	-27.89 ft.	1.02 gpm/ft.

A site visit was carried out by the report writer and Ms. Ria Berns of Ecology on May 21, 2013 to collect data on well location, actual and proposed infrastructure, and well attributes. During the site visit, Ecology staff noted that neither well was in operation and flowing artesian conditions were observed at both wells, with water flowing from under the well cap onto the ground. The applicant should take note of the following provision that is included in the well construction standards which states: "Flowing wells shall be constructed and equipped with valves to ensure that the flow of water can be completely stopped when not in use. Likewise, the well shall be continuously maintained to prevent the waste of water through leaky casings, pipes, fittings, valves, or pumps -- either above or below land surface."

An analysis of the aquifer tests results show that there was no measurable drawdown in either observation wells during pumping, indicating that the wells' radius of influence was less than the distance between wells (821ft). Because no drawdown was observed in the monitoring wells it is not possible to calculate the aquifer's transmissivity or storage coefficient. Therefore conclusions for determining if there is sufficient water must be drawn from the well performance data.

For well #2, the dynamic water level stabilized after 16 hours, (where drawdown stabilizes at less than 0.1 ft/hour for at least 4 hours) and the drawdown was only 10-11ft over a total available drawdown interval of 340 ft. When the pumping rate of a well is low enough that the drawdown is not particularly large, calculations of theoretical maximum yield based on the well's specific capacity tend to have large errors. However, stabilization does indicate that well# 2 is capable of the 11 gpm set for the constant rate pump test with a significant amount of potential storage in the well. Water levels for this well recovered after the pumping ceased to 76% of static water level (measured before pumping began) after the first hour and had recovered to 80% after the second hour. The well test data does not indicate how much water was pumped during this time, but it is calculated to be 21,120 gallons. It should be further noted that both wells have a significant amount of storage independent of recharge. At maximum drawdown well#2 still had a calculated residual storage of 1,830 gallons available and at static water level a total of 1,996 gallons maximum well storage.

For Well #1 drawdown stabilization was never reached during this test, indicating that the minimum pumping rate was greater than the aquifer's recharge rate for the pumping interval. Due to lack of stabilization of drawdown, specific capacity of the well cannot be reliably calculated. However, based on the graph of the datalogger data provided by the applicant and the rate of drawdown it is clear that

stabilization would occur before the water level reached the bottom of the well, probably no greater then 100ft below ground surface, leaving about 300ft of water still in the well. Water levels for this well recovered after the pumping ceased to 51% of static water level in 1 ½ hours and 62% in 4 ½ hours. . The well test data does not indicate how much water was pumped during this time, but it is calculated to be 72,320 gallons. The total available water storage in the well is 2,350 gallons.

To determine water duty, or annual volume needed for the project, Ecology uses the Washington Irrigation Guide (WAIG) produced by Washington State University. The WAIG estimates pop-up sprinklers have an estimated average efficiency of 75% and using the 1992 crop irrigation requirement for pasture/turf, to irrigate 10 acres to include 3 baseball fields, one soccer field, one multi-use field plus a one acre in case SJISD wants to irrigate a family playground area equals 18.5 AFY assuming full year round use. For irrigation season May 15 to Sept 30 is 18 weeks so this equates to 6.9 acre-feet required during irrigation season. A calculation was done to confirm that the combined pumping rate for the two wells would be adequate to meet this seasonal volume.

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. In the case of the SJISD wells, because the area is underlain by bedrock, the possibility of upconing is remote. Field observations and static water level measurements show that these wells are seasonably flowing artesian and have large head pressures year round. This fact plus the distance of the wells from the shoreline and the inferred groundwater flow directions indicate that the potential for seawater intrusion is minimal.

Impairment Considerations

Impairment is an adverse impact on the physical availability of water for a beneficial use that is entitled to protection. The subject application cannot 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.
- 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).

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 SJISD well No. 2 is used to define "close proximity," as this was the well furthest inland. 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 4 shows the water rights and claims within a ½ mile radius of well No. 2. See map entitled "Water Rights in the vicinity of G1-28301" for more detail.

Table 4 Water Rights and Claims within the vicinity of Water Right Application G1-28301

Water Right No.	Doc. Type	Priority Date	Qi (gpm)	Qa (AF/Y)	Purpose	Water right holder name
G1-23548P	SuperPmt	01/25/1980	20	6	DM	North Forty Owners Association
G1-22396CWRIS	Cert	01/15/1975	3	3	CI DM	BREUNINGER RONALD B
R1-00089CWRIS	Cert	01/15/1970		8.68	ST	SCHUMAN JOHN T
G1-028631CL	Claim L		10		DG ST	ADKINS GEORGE B.
G1-132331CL	Claim L		10	1	DG	MARBLE ELMER R.

[1]Cert = water right certificate, SuperPmt = Superseding Permit Claim L = long form claim,
[2]For Purpose of use: DM = multiple domestic, IR = irrigation, DG = group domestic, ST = Stockwatering CI = Commercial use.

There are 2 ground water claims within the ½ mile radius of the SJISD wells. 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 the Washington State Superior Court. Many of the claims represent use under the ground water exemption (RCW 90.44.050) for single or group domestic use.

All water rights and claims that are within the ½ mile radius from the SJISD wells are greater than 1,100 ft away. Since the two SJISD wells are 800 ft away and there were no measurable impacts or water level declines during the pump tests, using each other as monitoring wells, the conclusion is that there will be no impairment to existing water rights.

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 ground or surface water 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.

Based on the analysis of the geology of the region, local recharge, aquifer characteristics, and well performance data, there appears to be sufficient water available for SJISD's needs.

Legal availability

To determine whether water to 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 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.

A review of the potential legal restrictions for approving this water right indicate that there is no water management plans, Instream flow rules, potential impairment or well interference from existing water rights in the area that would preclude Ecology from approving this water right application.

Beneficial Use

The use of water for irrigation purposes is defined in statute as a beneficial use (RCW 90.54.020(1)).

Public Interest Considerations

No detriment to the public interest could be identified during the subject investigation.

Consideration of Protests and Comments

No protests were filed against this application.

Conclusions

The SJISD wells appear to be able to pump the requested amounts of water while meeting the requirements of physical and legal availability, no impairment of existing water rights, beneficial use, and no detriment to the public interest.

RECOMMENDATIONS

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

40 gpm
6.9 acre-feet per year
For Irrigation

Points of Withdrawal:

Well #1 Ecology Well Tag #AHH-952
NW¼, SE¼, Section 11, Township 35 North, Range 03W W.M.

Well #2 Ecology Well Tag #ALS-076
NE¼, SW¼, Section 11, Township 35 North, Range 03W W.M.

Place of Use Legal Description

Parcel 351192304000
Beginning at the center of Section 11, Township 35N Range 03W, which is the true point of beginning for this property, thence N87° 42′ 40"W 786.9 ft, thence S 26° 55′ 24"W 164.3 ft thence a curve to the right having a radius of 235 ft a cord direction of S45° 42′ 10"E and a cord length of 109 ft thence S33° 33′ 18"E 70.5 ft thence on a curve to the left having a radius of 177.9 ft an angle of 63° 41′ 29" and a cord direction of S 60° 42′ 16"E thence S87° 35′ 57"E 100.2 ft thence on a curve to the left a radius of 47.8 ft an angle of 25° 47′ 25" and a cord direction N79° 30′ 20"E. thence on a curve to the right with a radius of 63.1 ft and angle of 149° 50′ 24" and a cord direction of S 38° 49′ 50"E thence on a straight line S 1° 56′ 17"W 622 ft to a curve to the left with a radius of 36.5 ft and angle of 28° 07′ and a cord direction of S12° 07′ 13"E thence on a curve to the right with a radius of 57.3 ft and angle of 107° 09′ 18" and a cord direction of S27° 23′ 56"W thence S 1° 42′ 19"W 118.2 ft thence S 87° 43′ 07"E 406.9 ft thence N1° 51′ 21"E 1,293.7 ft to the point of beginning.

Parcel 351161001000
Beginning at the center of Section 11, Township 35N Range 03W, which is the true point of beginning for this property thence S 87° 55′ 40"E 644.8 ft thence S 2° 11′ 09"W 114.7 ft thence a curve to left with a radius of 40 ft an angle 282° 24′ 41" and a cord direction S 5° 29′ 56"W thence S 3° 17′ 26"W 169.5 ft thence S 86° 19′ 46"E 48.8 ft thence S 38° 11′ 07"E 50.5 ft thence S 26° 27′ 44"E 286.8 ft thence S 3° 28′ 57"W 65.3 ft thence S 82° 32′ 12"E 40.7 ft thence S 2° 43′ 02"W 70.1 ft thence S 87° 15′ 57"E 10 ft

thence S 2° 42′ 50"W 129.4 ft thence N88° 11′ 01"W 900.1 ft thence N1° 52′ 43"E 898.7 ft to the true point of beginning.

John M Rose 10/17/13

JOHN M. ROSE

Written by John Rose, Licensed Geologist No. 2827 *Date*

Jerry Liszak JERRY LEE LISZAK 10/18/13

Reviewed by Jerry Liszak, Licensed Hydrogeologist No. 834 *Date*

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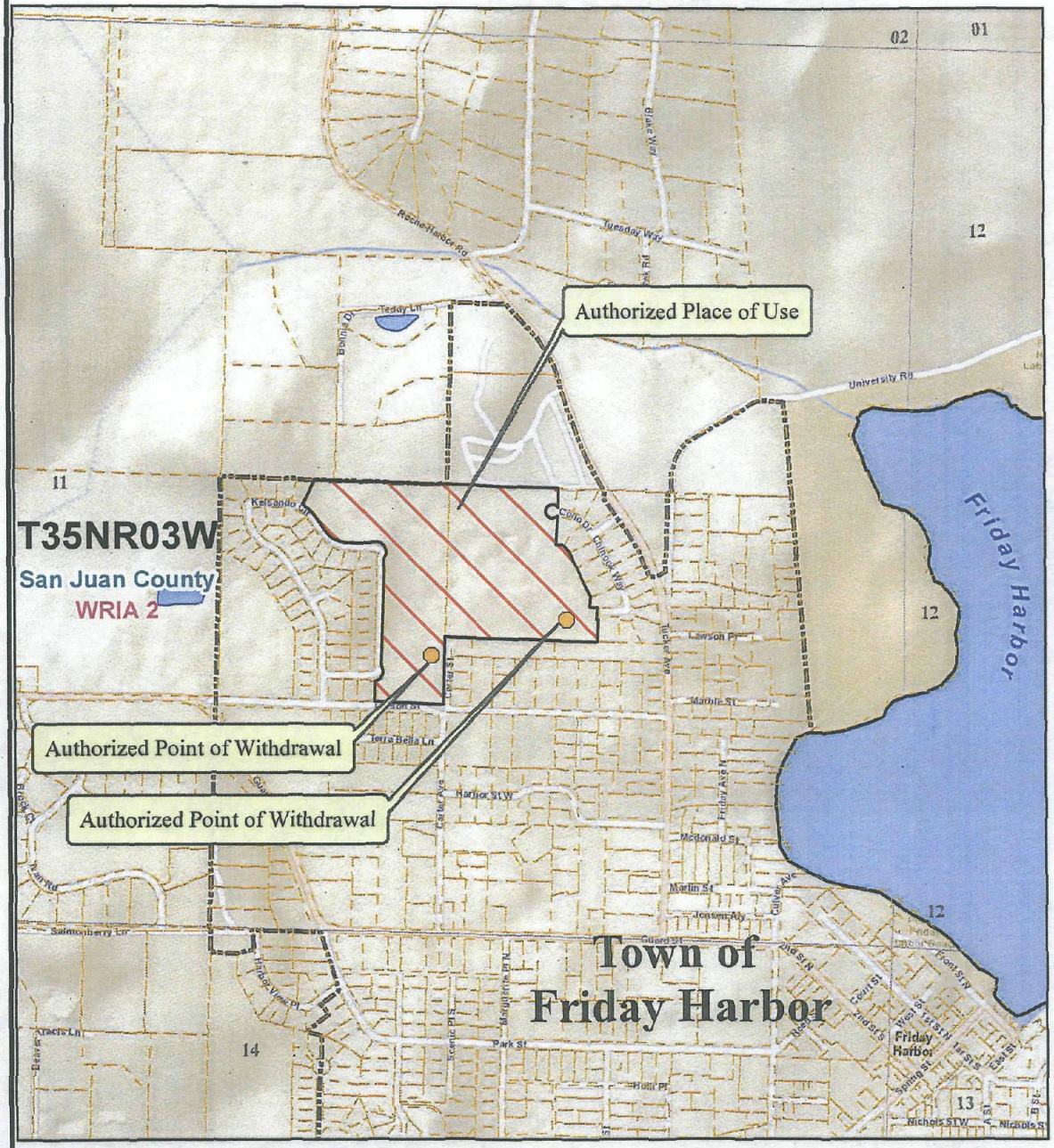
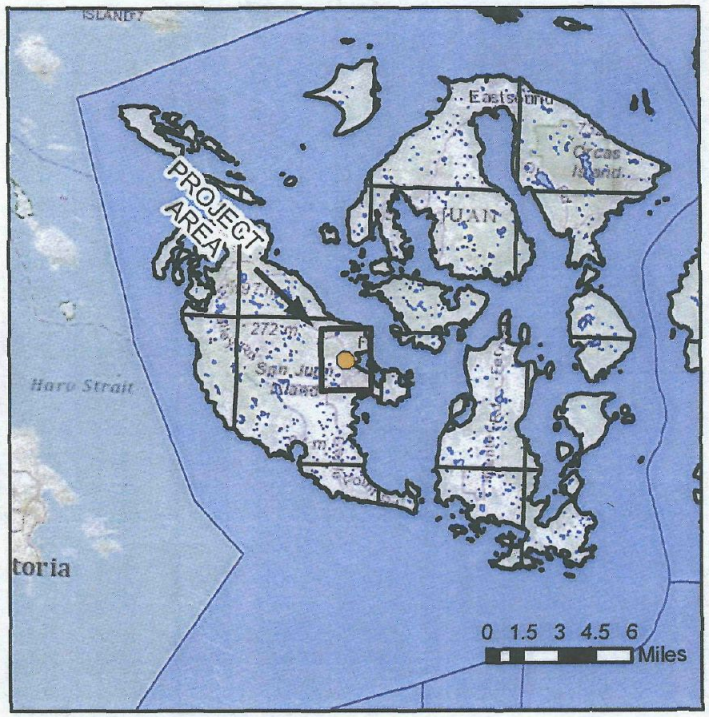
San Juan Island School District #149
Water Right G1-28301
Section11 T35N R03W W.M.
WRIA2 - San Juan County





Legend

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

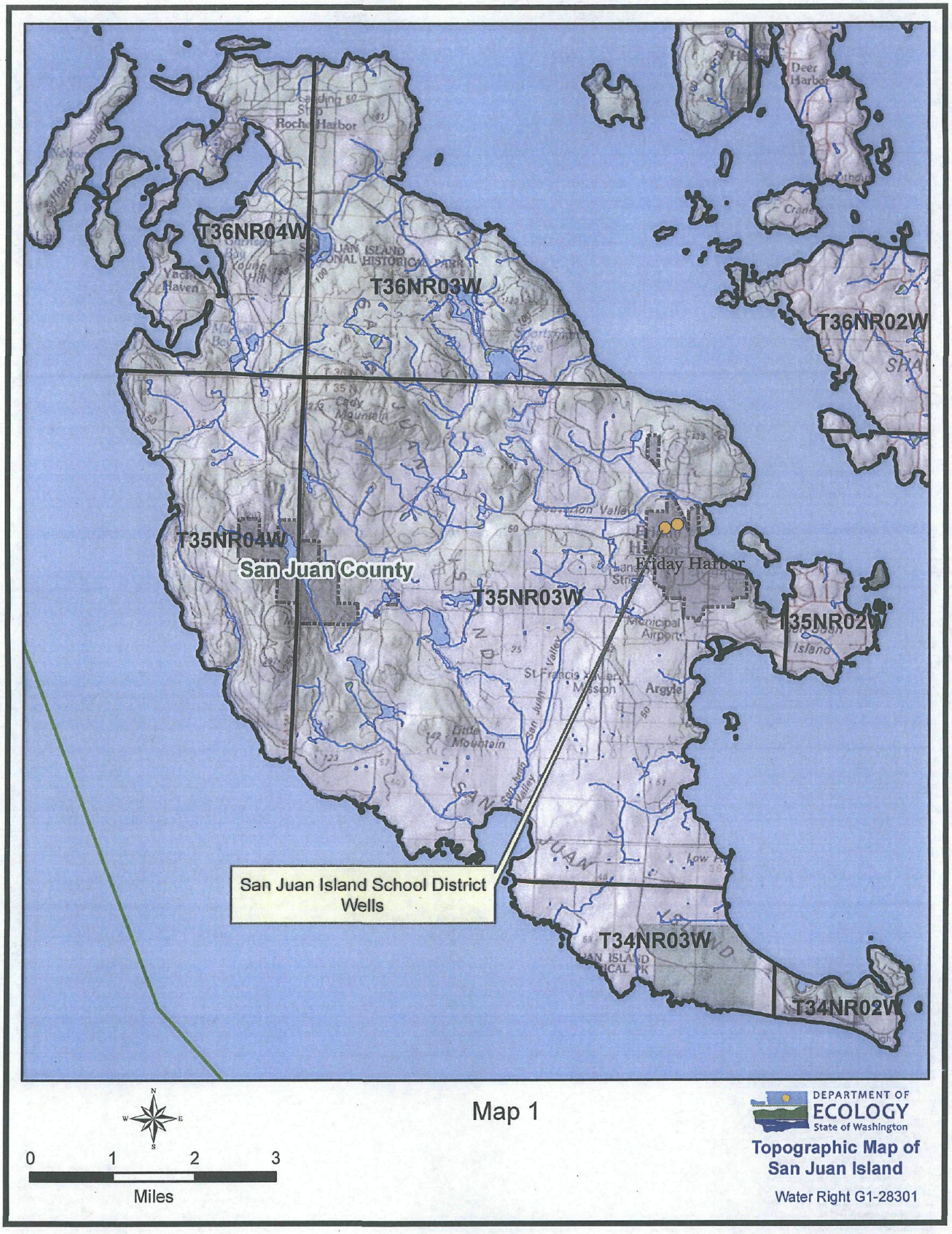
0 250 500 1,000 1,500 2,000 Feet

DEPARTMENT OF ECOLOGY State of Washington

Map Date: 8/20/2013

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

ATTACHMENT 1

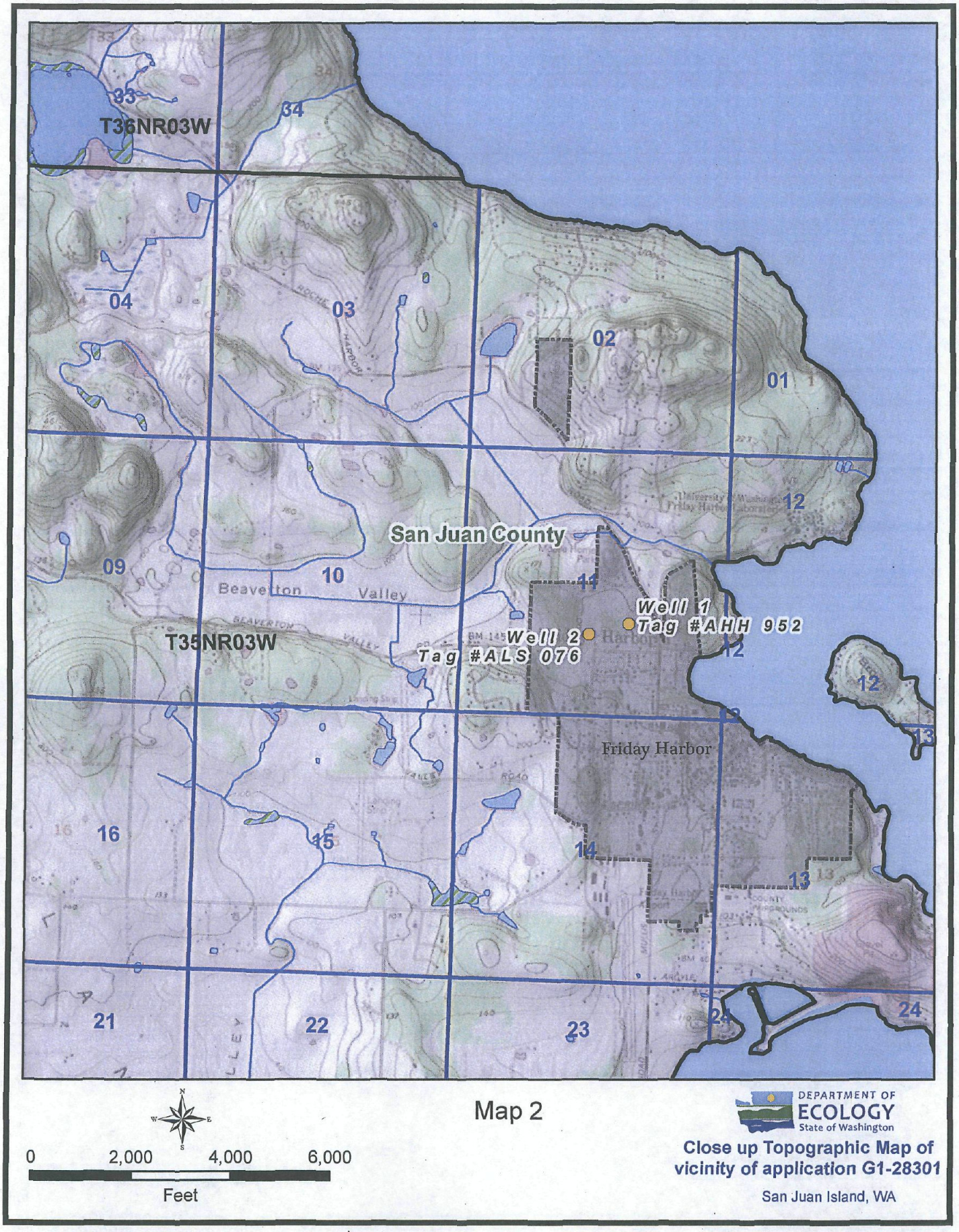


Map 1

DEPARTMENT OF ECOLOGY
State of Washington

Topographic Map of San Juan Island

Water Right G1-28301

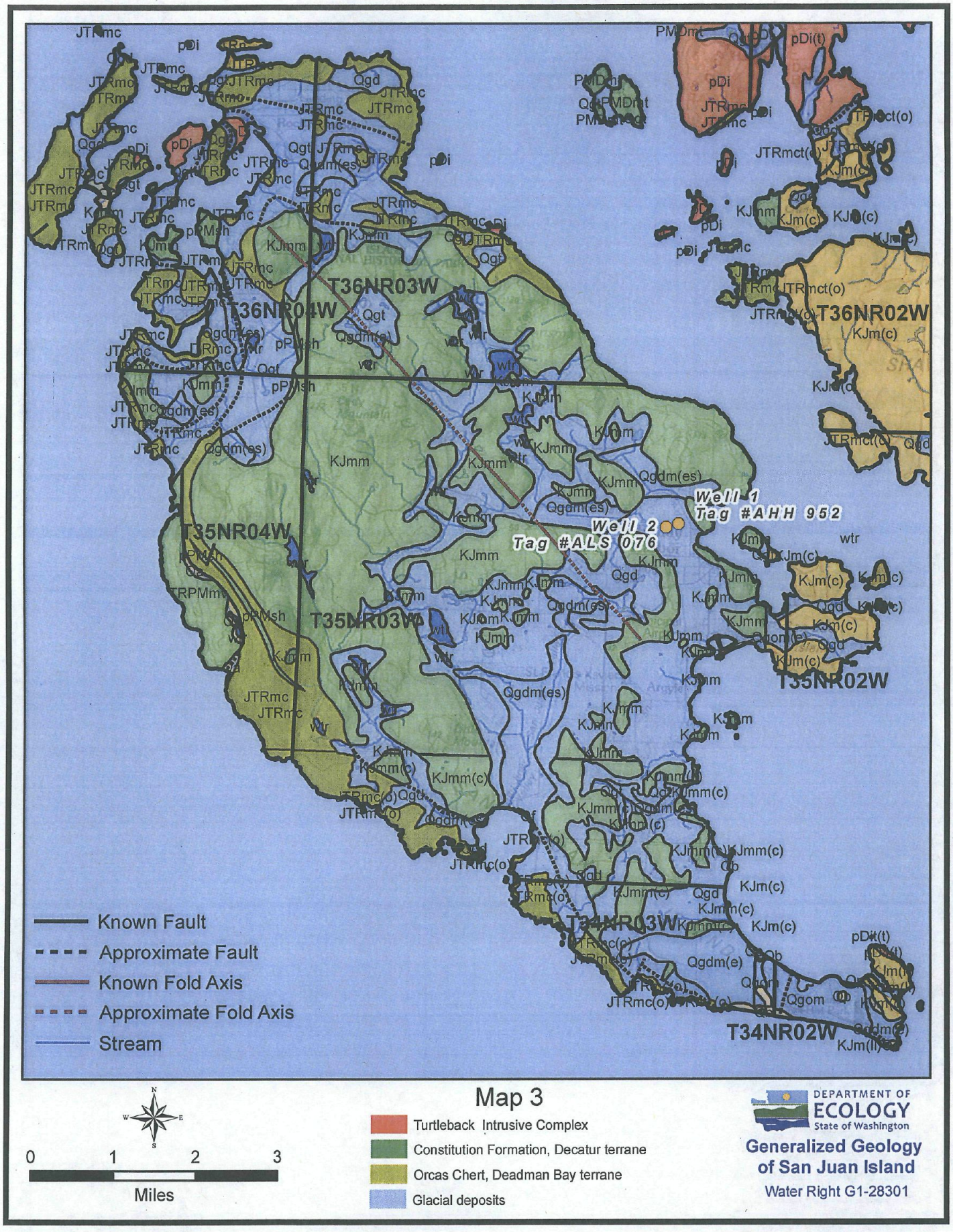


Map 2

DEPARTMENT OF ECOLOGY
State of Washington

Close up Topographic Map of vicinity of application G1-28301

San Juan Island, WA



Map 3

- Turtleback Intrusive Complex
- Constitution Formation, Decatur terrane
- Orcas Chert, Deadman Bay terrane
- Glacial deposits

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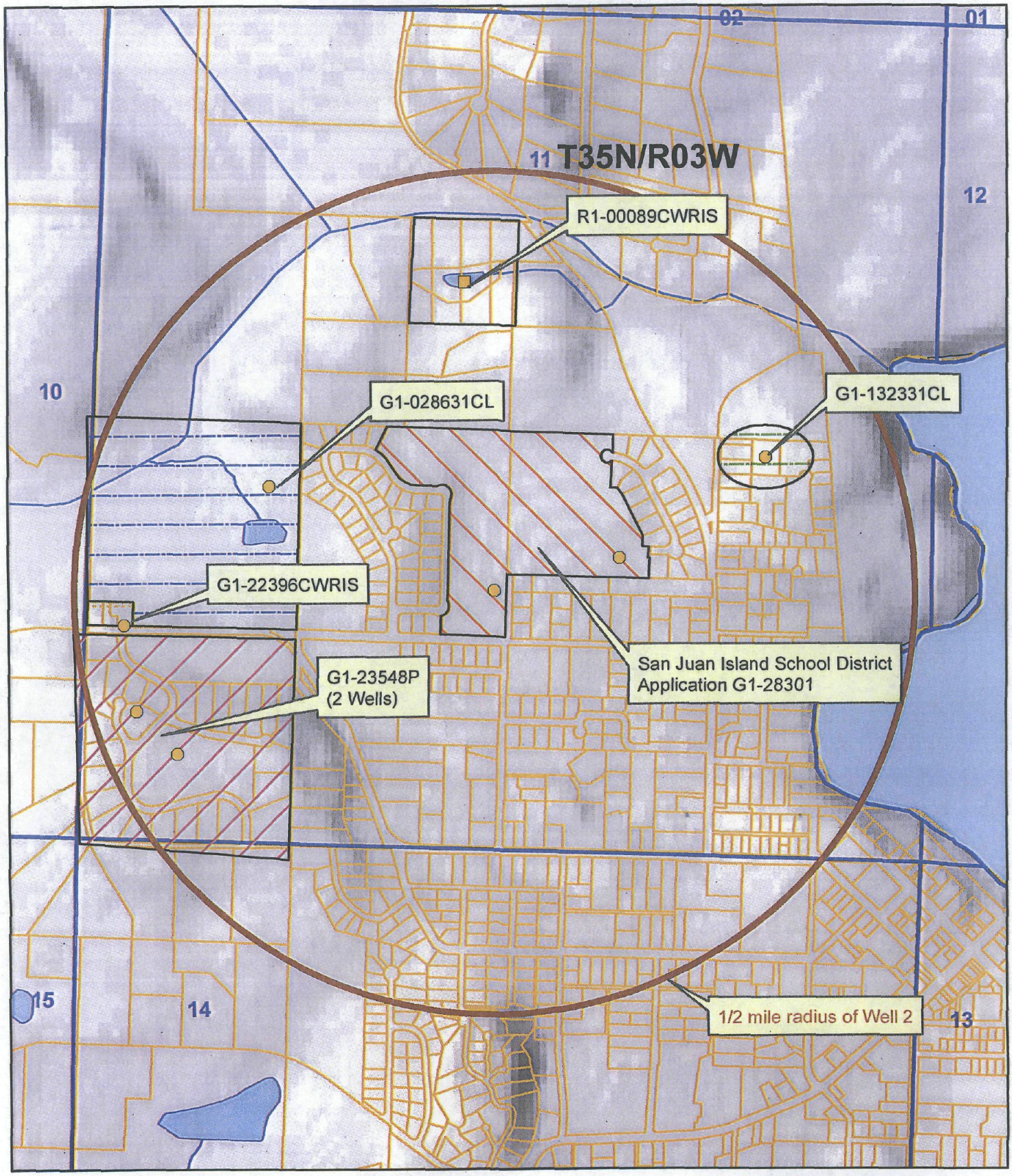
State of Washington

Generalized Geology of San Juan Island

Water Right G1-28301



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State of Washington

Water Rights in the vicinity of Application G1-28301

San Juan County