



State of Washington
DRAFT
 REPORT OF EXAMINATION
 FOR WATER RIGHT CHANGE

File NR CG1-*01067C
 WR Doc ID 6265704

Added or Changed Point of Withdrawal/Diversion

| | |
|---|---|
| PRIORITY DATE February 11, 1949 | WATER RIGHT NUMBER GWC 616 [G1-*01067C] |
|---|---|

| | |
|--|------------------------------------|
| MAILING ADDRESS STANWOOD CITY 10220 270TH ST NW STANWOOD 98292 | SITE ADDRESS (IF DIFFERENT) |
|--|------------------------------------|

Total Quantity Authorized for Withdrawal or Diversion

| | | |
|--|---------------------|---------------------------------------|
| WITHDRAWAL OR DIVERSION RATE 150 | UNITS GPM | ANNUAL QUANTITY (AF/YR) 121 |
|--|---------------------|---------------------------------------|

Purpose

| PURPOSE | WITHDRAWAL OR DIVERSION RATE | | | ANNUAL QUANTITY (AF/YR) | | PERIOD OF USE (mm/dd) |
|-----------|------------------------------|--------------|-------|-------------------------|--------------|-----------------------|
| | ADDITIVE | NON-ADDITIVE | UNITS | ADDITIVE | NON-ADDITIVE | |
| Municipal | 150 | | | 121 | | 01/01 - 12/31 |

| IRRIGATED ACRES | | PUBLIC WATER SYSTEM INFORMATION | |
|-----------------|--------------|---------------------------------|-------------|
| ADDITIVE | NON-ADDITIVE | WATER SYSTEM ID | CONNECTIONS |
| | | 83650H | 3,046 |

Source Location

| COUNTY | WATERBODY | TRIBUTARY TO | WATER RESOURCE INVENTORY AREA |
|-----------|-------------|--------------|-------------------------------|
| SNOHOMISH | GROUNDWATER | | 5-STILLAGUAMISH |

| SOURCE FACILITY/DEVICE | PARCEL | WELL TAG | TWP | RNG | SEC | QQ Q | LATITUDE | LONGITUDE |
|-------------------------|----------------|----------|-----|-----|-----|-------|----------|-----------|
| Fure Well (S04) | 32042000400400 | AGB785 | 32N | 04E | 20 | NW SE | 48.2453 | -122.3248 |
| Bryant No. 1 Well (S02) | 32042900100600 | AGB783 | 32N | 04E | 29 | NW NE | 48.2389 | -122.3245 |
| Bryant No. 3 Well (NA) | 32042900103200 | APF990 | 32N | 04E | 29 | NW NE | 48.2389 | -122.3235 |
| Cedarhome Well (S07) | 32042000101800 | ABV299 | 32N | 04E | 20 | SW NE | 48.2489 | -122.3200 |

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 for the City of Stanwood 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

Three primary production wells, including two wells providing water to the Bryant Treatment Facility and the Cedarhome Well, as well as the Fure Well as an emergency source of supply. All water is distributed through the City system to serve customers within the City's service area.

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? | Annual Peak Rate of Withdrawal (gpm) |

Provisions

Seawater Intrusion Monitoring

Chloride and conductivity measurements as well as depth to static water level (pump off), measured from the top of the well casing, shall be made on each production well in April and again in August of each year. The chloride and conductivity analysis shall be performed by a state-accredited laboratory. A copy of the laboratory results for all sampling events shall be submitted by October 15 of each year, to the Department of Ecology, Northwest Regional Office, Bellevue, Washington.

Water Level Monitoring

Depth to water measurements shall be taken in all points of withdrawal once a month. The depth to water should be measured from a datum, such as the top of the access port or well casing. This should be measure from the top of the well casing. Ecology shall be provided with the data upon request.

Wells, Well Logs and Well Construction Standards

All wells constructed in the state must 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 must be decommissioned.

All wells must 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 must 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 must 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, which 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.

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 and Issuance of Superseding Certificate

When a change requires significant expense and time to complete, the applicant or Ecology may request a development schedule to ensure diligence in pursuance of the change. Development schedules can also provide a transition from one source to another, or place of use to another over time.

In the present case, the needed infrastructure is entirely in place to affect an immediate change. A transition is not needed and neither is a development schedule. Therefore, upon final approval of the Report of Examination and after the 30-day appeal period has expired, the Superseding Certificate shall be issued assuming no successful appeal has been filed.

Schedule and Inspections

Department of Ecology personnel, upon presentation of proper credentials, will 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.

Real Estate Excise Tax

This decision may indicate a Real Estate Excise Tax liability for the seller of water rights. The Department of Revenue has requested notification of potentially taxable water right related actions, and therefore will be given notice of this decision, including document copies. Please contact the state Department of Revenue to obtain specific requirements for your project. Phone: (360) 570-3265. The mailing address is: Department of Revenue, Real Estate Excise Tax, PO Box 47477, Olympia WA 98504-7477 Internet: <http://dor.wa.gov/>. E-mail: REETSP@DOR.WA.GOV.

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. CG1-*01067C, 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 |
|---|--|
| <p>Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503</p> | <p>Department of Ecology Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608</p> |
| <p>Pollution Control Hearings Board 1111 Israel RD SW Ste 301 Tumwater, WA 98501</p> | <p>Pollution Control Hearings Board PO Box 40903 Olympia, WA 98504-0903</p> |

Signed at Bellevue, Washington, this ____ day of _____ 2014.

Jerry L. Liszak, LHG, Acting 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

Andrew B. Dunn, RH2 Engineering, Inc.

Water Right Control Number CG1-*01067C

City of Stanwood

BACKGROUND

This report serves as the written findings of fact concerning Water Right Application Number CG1-*01067C.

On February 11, 1949, the Department of Conservation and Development (predecessor to the Department of Ecology) received a ground water application (1067) from the Stanwood Water Company to appropriate 150 gallons per minute (gpm) for domestic and industrial supply.

On May 6, 1949, the Department of Conservation and Development issued the Stanwood Water Company Ground Water Permit (GWP) 976. GWP 976 authorized 150 gpm and 121 acre-feet per year for municipal supply and industrial uses for the Town of East Stanwood and Community of Cedarhome.

On May 4, 1951, C.M. Olsen, president of the Stanwood Water Company signed a proof of appropriation form, attesting to the continuous use of the water right.

On May, 14, 1951, the predecessor to the Department of Ecology issued Ground Water Certificate (GWC) 616 to the Stanwood Water Company. GWC 616 authorized 150 gpm and 121 acre-feet per year for municipal supply and industrial uses.

In 1986, the City of Stanwood purchased the water system from the Stanwood Water Company and became the water purveyor for the City's service area.

On June 6, 2014, the City submitted a Water Right Pre-Application Consultation form to the Department of Ecology describing the requested change to add additional points of withdrawal to GWC 616.

On June 16, 2014, representatives from the City and RH2 Engineering, Inc. (RH2) participated in a pre-application consultation with Department of Ecology representative, Mr. Tom Buroker. During this meeting it was decided that the City would be able to proceed down a pilot cost reimbursement processing pathway in which the City's consultant, RH2, which is also an Ecology cost reimbursement contractor, would prepare the report of examination for change for Ecology review. The cost reimbursement agreement between the City and Department of Ecology to reimburse Ecology for time spent reviewing the report of examination and managing the project was also discussed.

On July 1, 2014, the Department of Ecology received a change application (CG1-*01067C) from the City of Stanwood to add additional points of withdrawal to GWC 616 to include the City's Bryant Wells and Cedarhome Well, which are located in Section 29 and Section 20 of Township 32 North, Range 4 East W.M., respectively.

EXISTING Water Right Attributes

| | |
|---------------------------|--|
| Water Right Owner: | Stanwood Water Co |
| Priority Date: | 2/11/1949 |
| Place of Use | Town of East Stanwood and Community of Cedarhome, Snohomish County, State of Washington. |

| County | Waterbody | Tributary To | WRIA |
|-----------|-------------|--------------|-----------------|
| Snohomish | Groundwater | | 5-Stillaguamish |

| Purpose | Rate | Unit | Af/yr | Begin Season | End Season |
|--------------------------|------|------|-------|--------------|------------|
| Municipal and Industrial | 150 | GPM | 121 | 01/01 | 12/31 |

| Source Name | Parcel | Well Tag | Twp | Rng | Sec | QQ Q | Latitude | Longitude |
|-----------------|----------------|----------|-----|-----|-----|-------|----------|-----------|
| Fure Well (S04) | 32042000400400 | AGB785 | 32N | 04E | 20 | NW SE | 48.2453 | -122.3248 |

GPM = Gallons per minute; Af/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 in NAD83/WGS84.

REQUESTED Water Right Attributes

| | |
|-----------------------------|--|
| Applicant Name: | Stanwood City |
| Date of Application: | 7/1/2014 |
| 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. |

| County | Waterbody | Tributary To | WRIA |
|-----------|-------------|--------------|-----------------|
| Snohomish | Groundwater | | 5-Stillaguamish |

| Purpose | Rate | Unit | Af/yr | Begin Season | End Season |
|-----------|------|------|-------|--------------|------------|
| Municipal | 150 | GPM | 121 | 01/01 | 12/31 |

| Source Name | Parcel | Well Tag | Twp | Rng | Sec | QQ Q | Latitude | Longitude |
|-------------------------|----------------|----------|-----|-----|-----|-------|----------|-----------|
| Fure Well (S04) | 32042000400400 | AGB785 | 32N | 04E | 20 | NW SE | 48.2453 | -122.3248 |
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GPM = Gallons per minute; Af/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 in NAD83/WGS84.

Legal Requirements for Requested Change

The following is a list of requirements that must be met prior to authorizing the proposed change to add additional points of withdrawal.

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 *Stanwood Camano News* on August 5, 2014, and August 12, 2014. Notice of this application was also published in *The Herald (Everett)* on August 4, 2014, and August 11, 2014. No protests were received.

Consultation with the Department of Fish and Wildlife

The Department must give notice to the Department of Fish and Wildlife of applications to divert, withdraw or store water. On October 1, 2014, a summary of the proposed decision was provided to Mr. Steve Boessow, Water Rights Biologist with WDFW, and on October 2, 2014, he provided a letter stating that WDFW does not oppose the approval of this change application. The letter emphasizes that adding deeper and downstream wells to the existing water supply should reduce the potential for adverse impacts to flows in Church Creek.

Consultation with the Stillaguamish Tribe

On June 2, 2014, the City and RH2 met with Mr. Pat Stevenson (Environmental Manager) and Mr. Jody Brown (Fisheries Biologist) from the Stillaguamish Tribe Natural Resources Department (Tribe) to discuss the proposed water right change and the pilot cost reimbursement process. Email correspondence from Mr. Brown after the meeting indicated that the Tribe did not have any initial concerns with the proposed water right change, but wanted to be kept in the loop as processing proceeded. A copy of the completed water right change application was emailed to the Tribe, by RH2, on June 30, 2014. A summary of the proposed decision was shared with the Tribe on October 1, 2014, and comments were solicited. On October 14, 2014, Mr. Brown provided a comment letter that stated, "The Stillaguamish Tribe is not opposed to this change 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 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.

Water Resources Statutes and Case Law

RCW 90.03.380(1) states that a water right that has been put to beneficial use may be changed. The point of diversion, place of use, and purpose of use may be changed if it would not result in harm or injury to other water rights.

The Washington Supreme Court has held that Ecology, when processing an application for change to a water right, is required to make a tentative determination of extent and validity of the claim or right. This is necessary to establish whether the claim or right is eligible for change. *R.D. Merrill v. PCHB* and *Okanogan Wilderness League v. Town of Twisp*.

RCW 90.44.100 allows Ecology to amend a ground water permit to (1) allow the user to construct a replacement or additional well at a new location outside of the location of the original well, or to (2) change the manner or place of use of the water, if:

- (a) The additional or replacement well taps the same body of public ground water as the original well. RCW 90.44.100(2)(a),
- (b) Where a replacement well is approved, the user must discontinue use of the original well and properly decommission the original well. RCW 90.44.100(2)(b),
- (c) Where an additional well is constructed, the user may continue to use the original well, but the combined total withdrawal from all wells shall not enlarge the right conveyed by the original permit or certificate. RCW 90.44.100(2)(c),
- (d) Other existing rights shall not be impaired. RCW 90.44.100(2)(d).

When changing or adding points of withdrawal to groundwater rights (RCW 90.44.100), or when consolidating exempt wells with an existing permit or certificate (RCW 90.44.105), the wells must draw from the *same body of public groundwater*. Indicators that wells tap the *same body of public groundwater* include:

- (a) Hydraulic connectivity.
- (b) Common recharge (catchment) area.
- (c) Common flow regime.
- (d) Geologic materials that allow for storage and flow, with recognizable boundaries or effective barriers to flow.

Cost Reimbursement Processing

This application is being processed under a pilot Cost Reimbursement Agreement between the applicant and the Department of Ecology. Through the pilot process, RH2 Engineering, Inc. (RH2), which is a consultant for the City of Stanwood is being allowed to prepare not only supporting documentation, but also to draft this report of examination for change under direct contract with the City. Ecology's contract with the City only involves reimbursement for time Ecology spends reviewing the provided report of examination. The change application is being processed without requiring processing of previously filed water right change applications, as allowed under RCW 90.03.265, since the transfer will not diminish

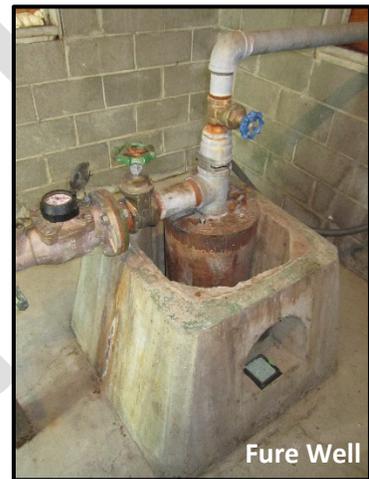
the water available to earlier pending applicants for changes or transfers from the same source of supply.

INVESTIGATION

The City of Stanwood is a municipal water supplier as defined under RCW 90.03.015. The Fure Well is located between the Cedarhome and Bryant well sites and is less than 0.5 miles from either of the proposed additional points of withdrawal. The Fure Well is currently classified as an active emergency source by the Washington State Department of Health.

Site Visits

On May 7, 2014, Andrew Dunn (RH2) visited the Fure Well Site with Ms. Gina Melander (City). The unique well ID tag AGB785 was affixed to the discharge pipe leading to the overboard. The well currently has a submersible pump installed. A 3-inch Badger Recordall Turbo 450 source meter is installed on the discharge and the display read 7,992,520 cubic feet at the time of the site visit. An attempt was made to measure depth to water, but the access port was only 0.5 inches and would not accommodate the e-tape.



In October 2013, Andrew Dunn (RH2) oversaw installation of the Bryant Well No. 3 screen, well development, and aquifer testing. This project was documented in a technical memorandum (RH2, 2013). Unique Well ID tag AFP990 was affixed to the well casing. This well has not been equipped yet as the City pursues source approval from the Washington State Department of Health. Bryant Well No. 1 was observed in operation and Bryant Well No. 2 was used as a monitor well during the testing of Bryant Well No. 3.

In September 2010, Andrew Dunn (RH2) oversaw a 24-hour constant rate pumping test of the Cedarhome Well. Unique Well ID tag ABV299 was affixed to the casing. This well has a submersible pump installed. A source meter is located in a vault near the well. During the testing, depth to water, sand content, and field water quality measurements were made. Results of that testing were documented in a report (RH2, 2010).

All wells are located inside fenced and secured grounds.

History of Water Use

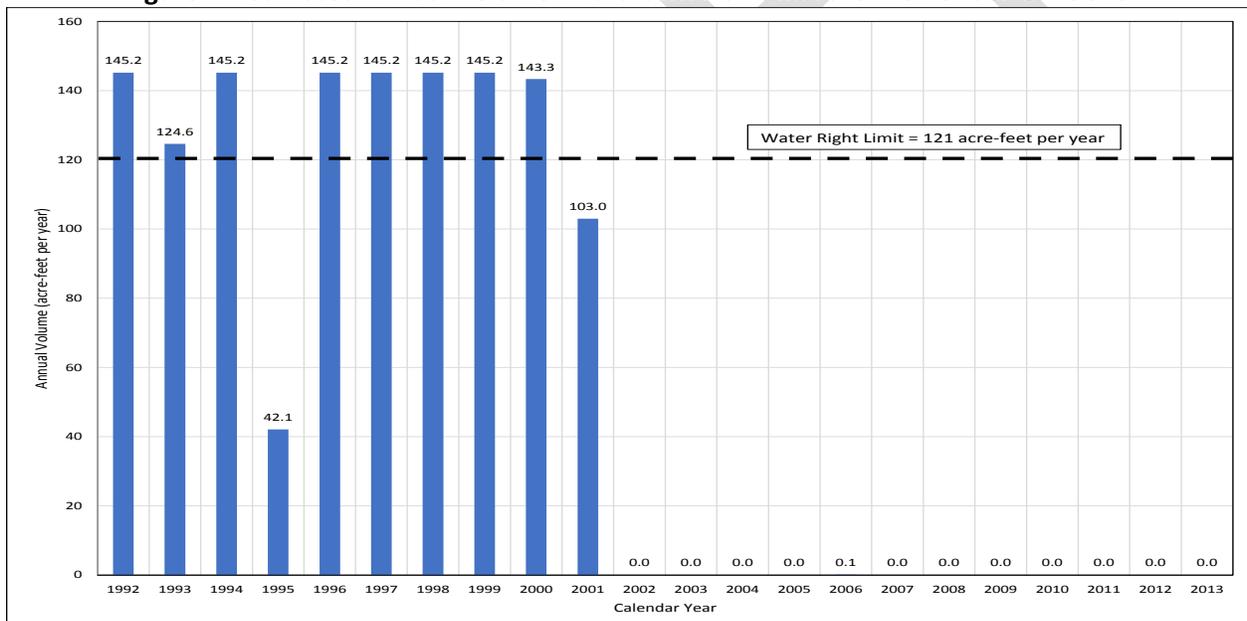
Instantaneous Rate

The instantaneous production rate of the Fure Well has declined over time. When the water right certificate was issued in 1951, it is assumed that the well could pump at 150 gpm. In the late 1990s the pumping rate for the well had declined to approximately 90 gpm (RH2, 2009). The last time the well was operated in 2006 the pumping rate was reportedly down to 46 gpm (email, Ms. Gina Melander, 7/7/2014). This reduction in pumping rate is one of the reasons the City wants to add additional points of withdrawal to this water right.

Annual Volume

Water use estimates were obtained from the City of Stanwood spanning from 1992 through 2013 (**Figure 1**). This data shows that the Fure well was estimated to be pumped at or above the water right limit for the period from 1992 through 2000, with the exception of 1995. This estimate was based on the well pumping at an average rate of 90 gpm for 24 hours a day over these years. Since 2002, the well has been converted to emergency status due to declining yield and high concentration of manganese and hydrogen sulfide in the water. While those constituents do not pose a health risk, the water quality produced by the Fure Well is worse than the water being produced from the Bryant Treatment Facility and the Cedarhome Well. According to City staff, the last time the well delivered water to the distribution system was in 2006 for about a day when the supplies available from Hatt Slough Springs and Bryant Well No. 1 were being exceeded and the reservoir level was dropping. From 2002 through 2006, the well was pumped to overboard once each spring to make sure that it would be functional for the peak summer season, if needed. After being operated in the summer of 2006, the City has not been able to pump water from the well. It is unknown if the failure to pump is related to the electrical system, a mechanical failure with the pump and/or motor, or an issue related to the well and aquifer itself such as clogging of the perforations or decline in the static water level.

Figure 1. Estimated Annual Volume Withdrawn from the Fure Well Under GWC 616



Even though the use of water from the Fure Well has ceased in recent years, the full water right is protected from relinquishment and is able to be carried through the change application process for the following reasons:

1. The purpose of use on the face of the certificate is identified as, “municipal supply and industrial uses.”
2. The water right has been fully perfected historically.
3. The water right is held by a City, which is one of the governmental entities identified under RCW 90.03.015(4)(b).

4. The City is participating in water system planning under WAC 246-290 and has identified the water right as part of its portfolio (RH2, 2010). Ultimately, this water right will be needed to meet demand.

Proposed Use

The purpose of use of this water right will be clarified as being for municipal supply, consistent with the municipal water law (RCW 90.03.015).

Other Rights Appurtenant to the Place of Use

The City of Stanwood currently holds four water rights for municipal water supply purposes (including the right that is the subject of the change application). Those water rights are described in **Table 1**.

Table 1. Summary of City of Stanwood Water Rights

| DOH No. | Source Name | WRTS Record Number | Certificate/Permit Number | Priority Date | Primary or Supplemental Right | Use | Existing Water Rights | | | |
|-------------------|-----------------------------|--------------------|---------------------------|---------------|-------------------------------|------------------------|-----------------------|-------|-----------|-------|
| | | | | | | | Instantaneous | | Annual | |
| | | | | | | | (gpm) | (cfs) | (acre-ft) | (gpm) |
| S01 | Hatt Slough Springs | S1-*02432CWRIS | SWC 1164 | 9/28/1928 | Primary | Permanent | 1,122 | 2.5 | 1,810 | 1,122 |
| S02 | Bryant No. 1 ¹ | G1-*00741CWRIS | GWC 615 | 2/20/1948 | Primary | Permanent | 2,000 | 4.5 | 2,400 | 1,487 |
| S03 | Bryant No. 2 ¹ | G1-*00741CWRIS | GWC 615 | 2/20/1948 | NA ¹ | Emergency | 2,000 | 4.5 | 2,400 | 1,487 |
| NA ² | Bryant No. 3 ¹ | G1-*00741CWRIS | GWC 615 | 2/20/1948 | NA ¹ | Permanent ² | 2,000 | 4.5 | 2,400 | 1,487 |
| S04 | Fure Well | G1-*01067CWRIS | GWC 616 | 2/11/1949 | Primary | Emergency | 150 | 0.3 | 121 | 75 |
| S07 | Cedarhome Well ³ | G1-*04239 | Superseding GWP 4111 | 3/6/1956 | Primary | Permanent | 600 | 1.3 | 960 | 595 |
| Water Right Total | | | | | | | 3,872 | 8.6 | 5,291 | 3,279 |

¹ = Bryant Well Nos. 1, 2, and 3 are authorized under the same water right. Quantities shown are for the entire right, not each individual well.
² = Source approval not yet obtained
³ = Transferred from the Sill Well
 DOH No. = Source Number
 WRTS = Water Right Tracking System (Department of Ecology)
 SWC = Surface Water Certificate
 GWC = Groundwater Certificate
 GWP = Groundwater Permit
 gpm = gallons per minute
 cfs = cubic feet per second
 acre-ft = acre-feet per year

Water used by others, within the City’s retail and future service area, are not included in **Table 1** since they are neither held by the City, nor are they used for general municipal supply.

Hydrologic/Hydrogeologic Evaluation

The original and proposed points of withdrawal are located near the western extent of WRIA 5, in Snohomish County, on the upland located to the north of the Lower Stillaguamish River Valley. This upland has been referred to as the East Stanwood Plateau (Thomas and others, 1997). In general, the area is comprised of several hundred feet of layered unconsolidated glacial and non-glacial deposits. The coarser-grained portions of these deposits that contain groundwater form the area’s aquifers that are

tapped by wells. Finer-grained portions of these deposits form aquitards that can impede the vertical flow of groundwater.

Background research for this change application involved looking at existing regional and site specific hydrogeology and well drilling and testing reports. The report writer has been personally involved in the testing of the Cedarhome Well and the drilling and testing of Bryant Well No. 3.

Well Construction

Table 2 summarizes the construction details for each of the wells involved in this change application.

| Well | Casing Diam. (in) | Approx. Ground Surface Elevation (ft) | Total Depth (ft) | Depth to Open Interval (ft) | Elevation of Screened Interval (ft) | Static depth to water from Ground Surface (ft) | Elevation of Ground Water (ft) |
|--|--------------------------|--|-------------------------|------------------------------------|--|---|---------------------------------------|
| Fure | 12 | 122 | 150 | 50 to 150 | 72 to -28 | 50 (1/1949) | 72 |
| Bryant No. 1 | 12 | 67 | 250 | 50 to 245 | 17 to -178 | 40 (1/1948) | 27 |
| Bryant No. 3 | 16 | 93 | 234 | 198 to 228 | -105 to -135 | 114 (10/2013) | -21 |
| Cedarhome | 12 | 142 | 490 | 381 to 411 446 to 476 | -239 to -269 -304 to -334 | 127 (5/1995) | 15 |
| Elevations are approximate (NAVD88). Groundwater levels are at the time of well construction. Declining water levels will be discussed later in this section. | | | | | | | |

Geology and Stratigraphy

Many investigators have attempted to define the stratigraphy in the vicinity of the City. **Table 3** provides a correlation between the different geologic units used in the various studies referenced.

| Unit Names | GeoEngineers (1995) | Anchor (2008) | Thomas, Wilkinson, and Embery (1997) | Unit Type |
|---|----------------------------|------------------------|---|----------------------|
| Alluvium | | Qal | Qal | Aquifer |
| Vashon Recessional Outwash and Everson Glaciomarine Drift | | Qvr (includes Qgmd) | Qvr | Aquifer and Aquitard |

| | | | | |
|--|------|-----|-----|----------------------|
| Vashon Till | Qvt | Qvt | Qvt | Aquitard |
| Vashon Advance Outwash | Qva | Qva | Qva | Aquifer |
| Pre-Fraser fine-grained or transitional beds | Qpfg | Qtb | Qtb | Aquitard |
| Pre-Fraser or Undifferentiated sediments | Qpf | Qu | Qu | Aquifer and Aquitard |
| Tertiary Bedrock | | Tb | Tb | Aquitard |

The units of most interest in the project area are the following:

Everson Glaciomarine Drift (Qgmd) – This unit consists of clay, silt and clay, clay with scattered gravel, and occasional lenses of sand and gravel that were deposited beneath marine water while the remnant of the continental glacier melted back to the north.

Vashon Till (Qvt) – A dense deposit consisting of an unsorted mixture of silt, sand, gravel, cobbles, and boulders deposited at the base of the Vashon continental glacier. This unit is an aquitard.

Vashon Advance Outwash (Qva) – A dense deposit consisting of sand and sand and gravel deposited by rivers flowing off of the front of the advancing Vashon continental glacier. This unit has been overridden by the glacier, which is why the sediments are so dense. This unit is an aquifer.

Undifferentiated Sediments (Qu) – A dense deposit consisting of layers of silt, clay, fine sand, and occasional gravel. The fine-grained layers are aquitards while the coarse-grained layers form aquifers. Not enough deep wells exist to further refine this unit.

GeoEngineers (1995) indicated that the Fure Well and Bryant Wells had open intervals that were adjacent to both the Qva and Qpf (Qu) aquifers. The Cedarhome Well is screened only in the Qpf (Qu) aquifer.

Anchor (2008) contains a cross section that shows the Fure Well tapping the Qvd (Qgmd) and Qva aquifers, while the Bryant Wells tap the Qva aquifer. However, this same report and also Thomas and others (1997) contains a map that shows the aerial extent of various geologic units and does not identify the Qva aquifer as occurring in the vicinity of the Bryant Wells.

So, the stratigraphy and lateral extent of the different units in the vicinity of these wells is not yet fully understood. **Figure 2** contains two cross sections that show two possible interpretations of the subsurface hydrogeology in the vicinity of the points of withdrawal based on the available information.

Table 4 contains information on the well capabilities when drilled/tested and the calculated aquifer properties.

| Table 4. Well and Aquifer Property Information | | | | | | |
|---|----------------|--------------------|---------------|----------------------------|------------------------------------|--------------------------|
| Well | Unique Well ID | Pumping Rate (gpm) | Drawdown (ft) | Specific Capacity (gpm/ft) | Calculated Transmissivity (gpd/ft) | Interpreted Aquifer Unit |
| Fure | AGB785 | 100 | 48 | 2.08 | 4,160 ¹ | Qva |
| Bryant No. 1 | AGB783 | 1,200 | 15 | 80 | 160,000 ¹ | Qva |
| Bryant No. 3 | APF990 | 1,000 | 7.45 | 134 | 660,000 ² | Qva |
| Cedarhome | ABV299 | 600 | 145 | 4.14 | 20,000 ³ | Qu |
| ¹ Estimated by multiplying 2,000 times the specific capacity. Calculation from Driscoll (1995) | | | | | | |
| ² RH2 Engineering (November 2013) | | | | | | |
| ³ RH2 Engineering (December 2010) | | | | | | |

As can be seen from **Table 4**, the ability of a well to pump at a high rate is dependent on tapping a productive portion of the ground water body.

Groundwater Flow Direction

All regional studies (Anchor, 2008; Thomas and others, 1997) show groundwater flow in the Vashon Advance Outwash aquifer generally radiating out from the middle of the East Stanwood Plateau toward the Stillaguamish Valley and Puget Sound, which in this location is to the southwest. Thomas and others (1997) indicate that the regional groundwater flow in deeper aquifer units is generally to the west toward Puget Sound. The location of the original and proposed points of withdrawal appear to all capture southwest or westward discharging groundwater. Groundwater elevation is generally lower in deeper aquifer units and higher in shallower aquifer units (Thomas and others, 1997). This suggests that leakage between the aquifer units is downward from shallower aquifers to deeper aquifers beneath the plateau.

Due to the leakage between different aquifer units, proximity of the wells, and the similarity in groundwater flow direction on the southern side of the East Stanwood Plateau, all of the wells are considered to be tapping the same body of public groundwater (**Figure 2**).

Historic Groundwater Withdrawals

Table 5 shows that the City has withdrawn from 536 to 928 af/yr of groundwater from the wells completed on the East Stanwood Plateau. This volume does not include water diverted from Hatt Slough Springs, which is located on the northern edge of the Tulalip Plateau, which is south of the Stillaguamish River Valley. The annual water right limit of GWC 615, GWC 616, and GWP 4111 is a total of 3,481 af/yr. From **Table 5** it can be seen that the City is currently only withdrawing approximately 27 percent of the authorized volume.

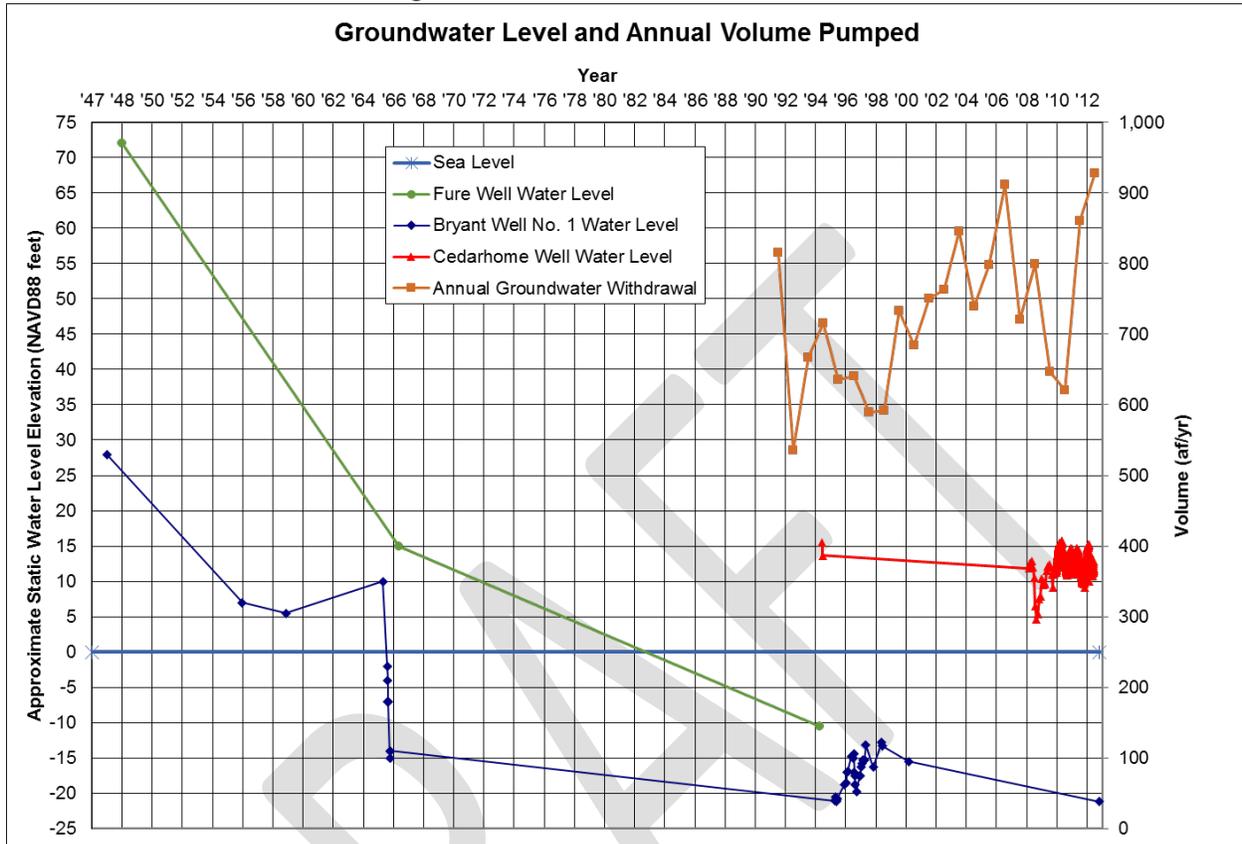
Table 5. Groundwater Withdrawal from the East Stanwood Plateau by the City of Stanwood

| Year | Bryant Wells (af/yr) | Fure Well (af/yr) | Cedarhome Well (af/yr) | Total (af/yr) |
|---------|----------------------|-------------------|------------------------|---------------|
| 1992 | 670.5 | 145.2 | 0.0 | 815.7 |
| 1993 | 411.5 | 124.6 | 0.0 | 536.1 |
| 1994 | 522.2 | 145.2 | 0.0 | 667.4 |
| 1995 | 673.5 | 42.1 | 0.0 | 715.6 |
| 1996 | 490.8 | 145.2 | 0.0 | 636.0 |
| 1997 | 495.9 | 145.2 | 0.0 | 641.1 |
| 1998 | 444.2 | 145.2 | 0.0 | 589.3 |
| 1999 | 446.6 | 145.2 | 0.0 | 591.8 |
| 2000 | 589.6 | 143.3 | 0.0 | 732.9 |
| 2001 | 581.4 | 103.0 | 0.0 | 684.4 |
| 2002 | 750.9 | 0.0 | 0.0 | 750.9 |
| 2003 | 762.9 | 0.0 | 0.0 | 762.9 |
| 2004 | 846.0 | 0.0 | 0.0 | 846.0 |
| 2005 | 739.1 | 0.0 | 0.0 | 739.1 |
| 2006 | 798.5 | 0.1 | 0.0 | 798.6 |
| 2007 | 911.3 | 0.0 | 0.0 | 911.3 |
| 2008 | 426.0 | 0.0 | 294.3 | 720.3 |
| 2009 | 475.4 | 0.0 | 323.6 | 799.0 |
| 2010 | 517.5 | 0.0 | 129.7 | 647.2 |
| 2011 | 549.1 | 0.0 | 71.1 | 620.1 |
| 2012 | 703.7 | 0.0 | 157.2 | 860.9 |
| 2013 | 779.3 | 0.0 | 148.9 | 928.2 |
| | | | | |
| Minimum | 411.5 | 0.0 | 0.0 | 536.1 |
| Average | 617.5 | 58.4 | 51.1 | 727.0 |
| Maximum | 911.3 | 145.2 | 323.6 | 928.2 |

Groundwater Level over Time

Historic data shows that water levels in the vicinity of the Fure and Bryant Wells have declined over time (**Figure 3**). The similarity of the decline suggests that the Fure and Bryant wells are tapping the same aquifer, or at least two aquifers that are hydraulically connected, as is shown in the cross sections in **Figure 2**. It should be noted that the water level data for the Fure Well shown on **Figure 3** was during the period of time when the well was in full production. Since no depth to water measurement could be taken during the site visit due to the size of the access port, it is unknown if and how much the static water level has recovered in the well since it delegated to emergency use only. The high transmissivity of the aquifer tapped by the Bryant wells, the static water level decline over time, and the lack of identification of a barrier to groundwater flow during aquifer testing of Bryant Well No. 3 suggests that recharge to this aquifer and discharge from the aquifer is restricted, possibly by adjacent fine-grained sediments, even though water can be transmitted easily once in the aquifer. **Figure 3** shows the extent of the groundwater level decline over the past 66 years.

Figure 3. Groundwater Level Over Time



Water Quality

Table 6 present water quality data collected over time from the City’s wells for analysis of the potential for seawater intrusion, which is a concern given the proximity to marine water, the completion of all of the wells at least partially below sea level, and the water level decline observed in the Bryant and Fure Wells. The data suggest that the groundwater quality at each well site has been fairly consistent over time and does not indicate that any of the wells are being impacted by seawater intrusion.

Table 6. Conductivity and Chloride Concentration over Time

| Date | Fure Well | | Bryant Well No. 1 | | Bryant Well No. 2 | | Bryant Well No. 3 | | Cedarhome Well | |
|------------|-----------|------|-------------------|------|-------------------|------|-------------------|------|----------------|------|
| | Cl | Cond | Cl | Cond | Cl | Cond | Cl | Cond | Cl | Cond |
| 7/16/1986 | 10 | 310 | | | | | | | | |
| 2/9/1988 | | | 5 | NM | | | | | | |
| 7/27/1989 | | | | | 5 | 320 | | | | |
| 10/13/1992 | < 20 | 270 | < 20 | 330 | | | | | | |
| 6/7/1995 | | | | | | | | | 5 | 243 |
| 12/21/1995 | < 20 | 344 | < 20 | 417 | < 20 | 342 | | | | |

| | | | | | | | | | | |
|--|------|-----|------|-----|------|-----|-----|-----|------|-----|
| 9/8/1999 | < 20 | 304 | < 20 | 344 | < 20 | 344 | | | | |
| 1/27/2000 | < 20 | 329 | < 20 | 362 | < 20 | 362 | | | | |
| 2/12/2003 | < 20 | 416 | < 20 | 390 | < 20 | 390 | | | | |
| 8/10/2005 | | | | | | | | | < 20 | 255 |
| 7/18/2006 | < 20 | 406 | | | | | | | | |
| 8/8/2006 | | | | | < 20 | 334 | | | | |
| 3/27/2007 | | | < 20 | 391 | | | | | | |
| 6/9/2009 | | | | | | | | | 17 | 288 |
| 6/7/2010 | | | 15 | 397 | | | | | | |
| 9/14/2010 | | | | | | | | | 5.4 | 253 |
| 9/15/2010 | | | | | | | | | 5.3 | 254 |
| 5/3/2011 | | | | | | | | | 5.3 | 242 |
| 8/25/2011 | | | | | | | | | 5.4 | 250 |
| 5/1/2012 | | | | | | | | | 5.3 | 248 |
| 9/27/2012 | | | | | | | | | 5.5 | 245 |
| 4/16/2013 | | | | | | | | | 5.3 | 246 |
| 8/12/2013 | | | | | | | | | 5.2 | 245 |
| 10/16/2013 | | | 7.1 | 367 | | | 9.5 | 339 | | |
| 6/2/2014 | | | | | | | | | 5.33 | 244 |
| Cl = Chloride concentration measured in mg/L | | | | | | | | | | |
| Cond = Electrical conductivity measured in µmhos/cm | | | | | | | | | | |
| Blank cells indicate that samples were not collected on that particular day. | | | | | | | | | | |

Ability of Additional Points of withdrawal to pump 150 gpm from this Water Right

The specific capacity of Bryant Well No. 3 as measured during the 2013 pumping test (RH2, 2013) was 134 gpm/ft (**Table 4**). Pumping an additional 150 gpm from this well will cause an additional drawdown of approximately 1.1 feet in the pumping well. During the pumping test of Bryant Well No. 3, Bryant Well No. 1 was being pumped at 1,300 gpm to meet system demands. The combined pumping rate of the two wells at one time was up to 2,500 gpm for a short duration. The results from that testing show that the Bryant Wells are capable of pumping up to 2,150 gpm, which is the combined instantaneous rates under GWC 615 and GWC 616.

The Cedarhome Well recorded a specific capacity of 4.14 gpm/ft after pumping at 600 gpm for 24 hours. At this specific capacity, pumping an additional 150 gpm would cause just over 36 feet of additional drawdown in the pumping well. At the conclusion of the pumping test, there was still 77 feet of available drawdown above the pump intake. So, the aquifer and Cedarhome Well are both able to produce the maximum additional instantaneous rate that would be authorized from this change.

Impairment Considerations

Any change made to a water right cannot impair existing water rights.

Impairment of Minimum Instream Flow Water Rights

The term "instream flow" is used to identify a specific stream flow (typically measured in cubic feet per second, or cfs) at a specific location for a defined time, and typically following seasonal variations. Instream flows are usually defined as the stream flows needed to protect and preserve instream resources and values, such as fish, wildlife and recreation. Instream flows are most often described and established in a formal legal document, typically an adopted state rule.

Once established, a minimum flow constitutes an appropriation with a priority date as of the effective date of the rule establishing the minimum flow (RCW 90.03.345). Thus, a minimum flow set by rule is an existing right which may not be impaired (RCW 90.03.345; RCW 90.44.030).

The Fure Well has a perforated casing from a depth of 50 feet to 250 feet. This perforation configuration is more likely to have a greater impact on Church Creek than pumping from either the substantially deeper Cedarhome Well or the downstream and deeper Bryant Wells. Therefore, there will be no greater or worse impact on Church Creek due to the proposed change.

Well Interference

There are no wells completed to the same depth as the Cedarhome Well in the vicinity. For neighboring wells that are completed in the upper portion of the Qu aquifer, the interlayered coarse and fine-grained material will help to buffer any interference drawdown caused by increasing the pumping rate by up to 150 gpm.

Bryant Well No. 1 and 3 are located approximately 240 feet apart. During the pumping test for Bryant Well No. 3, Bryant Well No. 1 cycled on and off to meet system demand. Bryant Well No. 1 pumped at an average rate of 1,300 gpm during this period. The operation of Bryant Well No. 1 caused approximately 1 foot of drawdown interference in Bryant Well No. 3 while it was pumping. If one of the Bryant Wells is pumped at 150 gpm, representing the proposed instantaneous rate to be transferred, the anticipated interference drawdown at a distance of 240 feet would be approximately 0.12 feet ($150 \text{ gpm} * 1 \text{ ft} / 1,300 \text{ gpm} = 0.12 \text{ ft}$). The nearest potential well would be located just to the north of the City's Bryant property which would be at a similar distance and is anticipated to have similar interference drawdown. This minimal increased drawdown, due to the change, will not impair any existing water rights.

Pumping either the Cedarhome or Bryant Wells at a rate that is 150 gpm higher than their respective water rights allow will not cause impairment of any other well or water right.

Public Interest Considerations

It is important for municipal water suppliers to maintain the ability to be able to utilize their existing water rights to meet current and future demands. Requesting to move water from outdated facilities to newer facilities is common practice.

Consideration of Protests and Comments

No protests were filed against this application. WDFW and the Stillaguamish Tribe did not oppose the water right change.

CONCLUSIONS

Based on this investigation, and on the laws and rules affecting water rights permitting, it is apparent that water is available for the proposed change, that there is no probable likelihood of impairment, that the additional wells tap the same body of public groundwater as the original point of withdrawal, that the proposed change will not prove detrimental to the public interest, and that there is no potential for enlargement of the water right beyond the limitations of the existing right.

RECOMMENDATIONS

Based on the above investigation and conclusions in this report of examination, I recommend that this request for a water right change 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:

150 gpm
121 acre-feet per year
Municipal water supply purposes
Year Round

Points of Withdrawal

Fure Well – NW $\frac{1}{4}$, SE $\frac{1}{4}$, Section 20, Township 32 North, Range 4 E.W.M.
Cedarhome Well – SW $\frac{1}{4}$, NE $\frac{1}{4}$, Section 20, Township 32 North, Range 4 E.W.M.
Bryant Well No. 1 – NW $\frac{1}{4}$, NE $\frac{1}{4}$, Section 29, Township 32 North, Range 4 E.W.M.
Bryant Well No. 3 – NW $\frac{1}{4}$, NE $\frac{1}{4}$, Section 29, Township 32 North, Range 4 E.W.M.

Place of Use

The place of use (POU) of this water right is the service area for the City of Stanwood 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.

Report Writer (Andrew B. Dunn – RH2)

Date

Stamp

WA State Licensed Hydrogeologist No. 822

DRAFT CHANGE REPORT OF EXAMINATION

20

CG1-*01067C GWC 616

Ecology Reviewer (Douglas H. Wood)

Date

Stamp

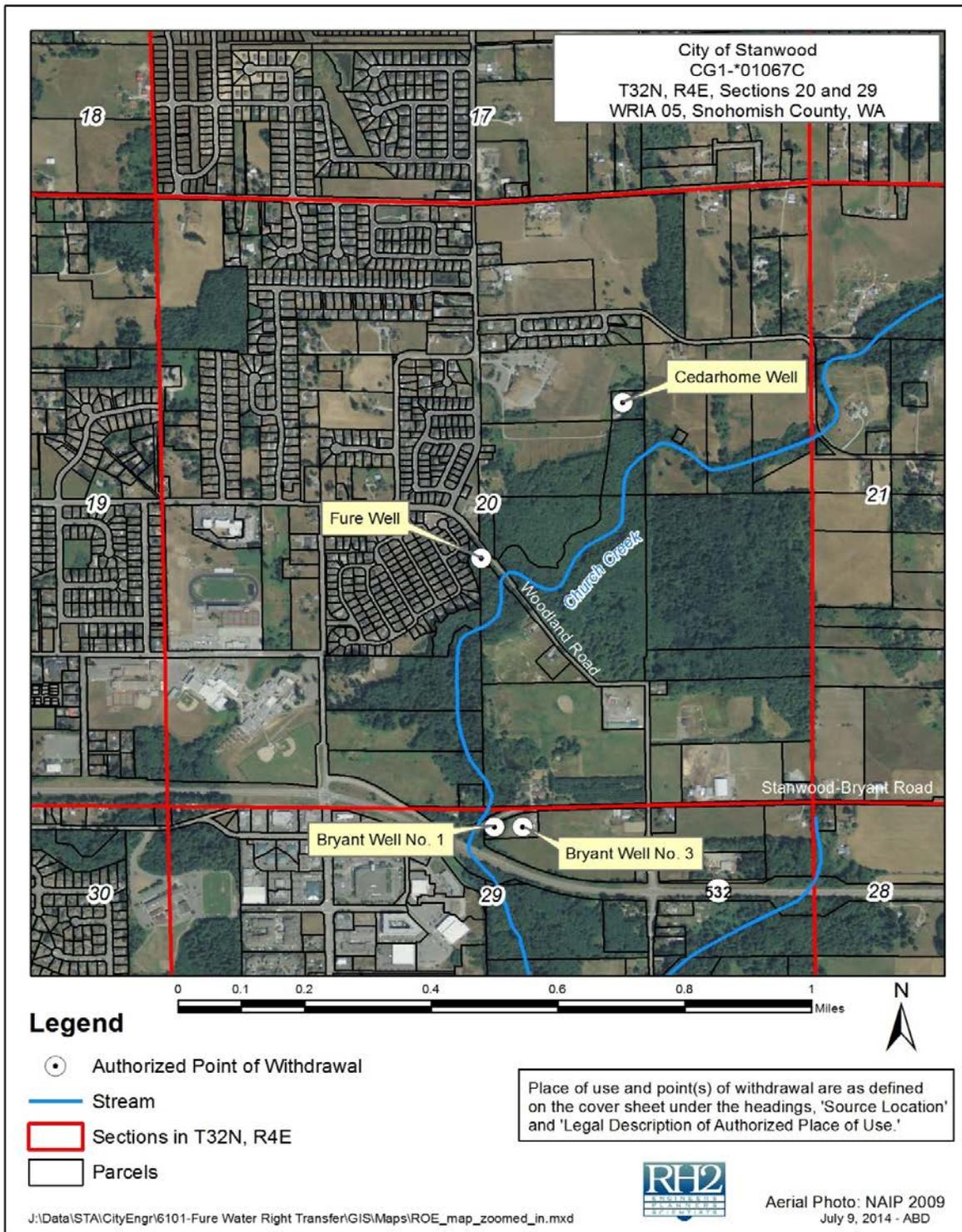
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- Anchor Environmental, LLC, September 2008, *Church Creek Hydrogeologic Assessment*, prepared for Stillaguamish Tribe of Indians.
- GeoEngineers, Inc., August 17, 1995, *Report, Hydrogeologic Services, Installation and Testing of Production Well No. 4, Stanwood, Washington*. Prepared for the City of Stanwood.
- RH2 Engineering, Inc., December 23, 2013, *Bryant Well No. 3 Construction and Testing Summary*. Technical Memorandum. Prepared for the City of Stanwood.
- RH2 Engineering, Inc., November 2010, *Hydrogeologic Report, City of Stanwood Cedarhome Well Testing*. Prepared for the City of Stanwood.
- RH2 Engineering, Inc., December 2009 - Revised June 2010, *City of Stanwood Comprehensive Water System Plan*.
- Thomas, B.E., Wilkinson, J.M., and Embrey, S.S., 1997, *The Ground-Water System and Ground-Water Quality in Western Snohomish County, Washington*. United States Geological Survey Water-Resources Investigations Report 96-4312.

ATTACHMENT 1 - Authorized Points of Withdrawal



ATTACHMENT 2 - Authorized Place of Use

