STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
*Change Application CG1-*02115C*
To Groundwater Certificate 1488

PRIORITY DATE	CLAIM NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
September 4, 1951			*1488-A*

NAME
City of Arlington

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
154 Cox Avenue	Arlington	WA	98223

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Three wells in the City of Arlington Haller Wellfield

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	90	34.15

QUANTITY, TYPE OF USE, PERIOD OF USE

Municipal Water Supply

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL

Haller Wellfield: 2,900 feet north and 2,770 feet west from the SE Corner of Section 2, T.31N., R.5E., W.M.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE 1/4 NW 1/4	2	31N.	5E.	5	Snohomish
PARCEL NUMBER	LATITUDE		LONGITUDE	DATUM	
31050300101000	48.2029 N		122.1284 W	NAD83	

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

[Attachment 1 shows location of the authorized place of use and point(s) of diversion or withdrawal]

Area served by the City of Arlington as described within the most recently approved Water System Plan

DESCRIPTION OF PROPOSED WORKS

The City of Arlington's water system consists of three wells in the Haller Wellfield (Wells 1, 2, and 3), the Airport Well, water treatment and disinfection facilities, distribution system piping, pumps, and meters. The system has been constructed and is in use.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Completed (infrastructure in place)	*Completed*	*Completed*

PROVISIONS

This authorization for change is issued subject to all applicable State laws and regulations and to the following provisions:

1. All wells constructed in the state shall meet the "Minimum Standards for the Construction and Maintenance of Wells" (WAC 173-160) and "Water Well Construction" (RCW 18.104). In general, wells shall be located at least 100 feet from sources of contamination and at least 1,000 feet of the boundary of a solid waste landfill. Any well which is unusable, abandoned, or is an environmental, safety, or public health hazard shall be decommissioned.

2. 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.

3. Required installation and maintenance of an access port as described in WAC 173-160- 291(3).

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

   Water use data shall be recorded weekly. The maximum monthly instantaneous rate of diversion/withdrawal and the monthly total volume shall be submitted to Ecology by January 31st of the following year. Ecology is requiring submittal of monthly meter readings to collect seasonal information for water resource planning, management and compliance.

   The following information shall be included with each submittal of water use data: owner, contact name if different, mailing address, daytime phone number, Permit/Certificate/Claim No., source name, volume including units, Department of Health WFI water system number and source number(s) (for public drinking water systems), and well tag number (for ground water withdrawals). In the future, Ecology may require additional parameters to be reported or more frequent reporting. Ecology prefers web based data entry, but does accept hard copies. Ecology will provide forms and electronic data entry information.

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

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

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

5. 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.

6. If the criteria in RCW 90.03.386(2) are not met and a Water System Plan/Small Water System Management Program was approved after September 9, 2003, the place of use of this water right reverts to the service area described in that document. If the criteria in RCW 90.03.386(2) are not met and no Water System Plan/Small Water System Management Program has been approved after September 9, 2003, the place of use reverts to the last place of use described by The Department of Ecology in a water right authorization.

7. 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, prior to beginning (or modifying) your project.

8. 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.

9. A superseding certificate shall be issued upon a showing that sufficient infrastructure is in place at the new point of withdrawal to accommodate the additional Qi and Qa that results from this decision.

FINDINGS OF FACT AND DECISION

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

Therefore, I ORDER the requested change under Ground Water Change Application No. CG1-*02115C be approved, subject to existing rights and the provisions specified above.

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

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

- File your appeal and a copy of this decision 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 decision 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 Road SW Suite 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

For additional information visit the Environmental Hearings Office Website: http://www.eho.wa.gov . To find laws and agency rules visit the Washington State Legislature Website: http://www1.leg.wa.gov/CodeReviser .

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

_____

Jerry L. Liszak, Acting Section Manager
Water Resources Program
Northwest Regional Office

BACKGROUND

The City of Arlington (City) submitted change application CG1-*02115C on March 23, 2010. The City entered into a cost reimbursement agreement with the Department of Ecology to process this application for change along with two other applications for change. This report of examination was prepared by Golder Associates Inc. through Ecology's Cost-Reimbursement Program.

Description and Purpose of Requested Change

The City purchased an irrigation water right and proposes to transfer the water to the City's existing points of withdrawal at the Haller Wellfield for the purpose of year round municipal water supply within the City's water service area.

Attributes of the Certificate and Proposed Change

Attributes of the Original Certificate

Owner name	Linda Neunzig
Name on Certificate:	P.V. Robertson
Priority Date:	September 4, 1951
Instantaneous Quantity:	90 gallons per minute (gpm)
Annual Quantity:	40 acre-feet per year (af-yr)
Point of Withdrawal:	T31N R5E Sec 3, SE ¼ NE ¼
Purpose of Use:	Irrigation of 30 acres
Period of Use:	Not Specified
Place of Use:	Beginning at a point on east and West Quarter line 15 feet west of East of section; thence North 968 feet; thence West to Easterly bank of Stillaguamish River; thence Southerly along said Easterly bank to an intersection with said East and West quarter line; thence East to point of beginning, Sec. 3, Twp. 31 N., Rge. 5 E.W.M.

Proposed Change

Name of Applicant:	City of Arlington
Date of Application for Change:	March 23, 2010
Points of Withdrawal:	NE¼NE¼ of Section 32, and SW¼ of Section 29, all in Township 24 North, Range 7 East (Haller Wellfield)
Purpose of Use:	Municipal Water Supply
Period of Use:	Continuously
Place of Use:	Area served by the City of Arlington as described within the most recently approved Water System Plan
Notice of Publication:	The Everett Herald, July 21, 2010 and July 28, 2010
Protests:	None

Legal Requirements for Proposed Change

- **Water Resources Statues and Case Law**

This application is subject to legal requirements in statute, administrative rules, and relevant case law which must be considered prior to issuance of the requested change(s). Among these legal requirements:

- The Washington State Supreme County has held that Ecology, when processing an application for a 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 90.03.380(1) allows for a water right that has been put to beneficial use to be changed. The point of diversion, place of use, and purpose of use may be changed if the change would not result in harm or injury to existing water rights.
- RCW 90.14.160 states that any person entitled to divert water through an appropriation authorized through a general adjudication, who abandons or voluntarily fails, without sufficient cause, to divert all or any part of said right for a period of five successive years after July 1, 1967, shall relinquish such right or portion thereof, to the state.
- RCW 90.44.100 allows Ecology to amend a ground water permit or certificate 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).

- **Public Notice**

  Public notice of the proposed application for change was published on July 21, 2010 and July 28, 2010 in the Everett Herald. No protests were received.

- **State Environmental Policy Act (SEPA)**

  This application is exempt from the provisions of the State Environmental Policy Act (SEPA), Chapter 43.21 RCW, due to the fact that the cumulative quantity of water constitutes a withdrawal of less than 2,250 gallons per minute (gpm) of groundwater (WAC 197-11-800(4)).

INVESTIGATION

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

- Ecology's online Water Rights Tracking System (WRTS) database
- Records of water rights in the vicinity
- Ecology's online Well Log Database
- Topographic and local area maps
- Site visit
- LANDSAT photographs of the area for years 2001 through 2008, inclusive
- Available regional geologic and hydrogeological information including:
  - Golder Associates, 2007, Phase I Summary Technical Memorandum: City of Arlington Water Right Application G1-26641. Prepared for the Washington State Department of Ecology.
  - Golder Associates, 2011, Phase I Summary Technical Memorandum: City of Arlington Water Right Applications CS1-10681C, CS1-18929C, and CG1-02115C. Prepared for the Washington State Department of Ecology. February 1.
  - Pacific Groundwater Group, January 2007. City of Arlington Hydrogeologic Conceptual Model Summary Report, prepared for the City of Arlington.
  - Pacific Groundwater Group, February 2007. Hydrogeologic Analysis for Klein Water Right Transfer.
  - Newcomb, R.C., 1952, Ground-Water Resources of Snohomish County, Washington, U.S. Geological Survey Water-Supply Paper 1135.
  - RH2 Engineering Inc., 2010, City of Arlington Comprehensive Water System Plan, November.
  - Thomas, B.E., J.M. Wilkinson and S.S. Embrey, 1997. The Ground-Water System and Ground-Water Quality in Western Snohomish County, Washington. USGS Water Resources Investigations Report 96-4312.
  - USDA-ARS Washington Irrigation Guide, Appendix B. 1992. Available online at http://www.wa.nrcs.usda.gov/technical/ENG/irrigation_guide/index.html.
  - WestWater Research LLC, 2010, Water Right Summary and Proof of Beneficial Use for Ninety Farms and Water Right Certificate No. 1488, prepared for the City of Arlington, February 24.

Tentative Evaluation of the Extent and Validity of the Water Right Proposed for Change

The original water right was issued to P.V. Robertson in 1951 for irrigation of 30 acres. A series of property ownership transfers occurred over the years since the original water right was issued. Linda Neunzig purchased the property December 2002 from Gerald Klein.

WestWater Research LLC (2010) completed a beneficial use evaluation for the existing water right. As part of their research, they undertook the following:

- Review of the property ownership and water right history
- Review of historic color and black and white aerial photographs over the period 1941 to 2006
- Site visit
- Estimates of water use
- Source assessment and impairment analysis
- Affidavit from Linda Neunzig, current owner of the property, concerning water use

The WestWater evaluation concluded that water had been put to beneficial use for irrigation of 30 acres from 1951 through 2008 based on the aerial photos and the affidavit of the current owner. They also concluded that of the 40 af/yr allowable under the original certificate, 34.67 af were available for transfer.

Review of the WestWater report and information from the site visit and discussions with the applicant indicate:

- The irrigation right was not used for a period starting in January 2009 because of damage to the pump and irrigation equipment from flooding in January 2009. According to the City of Arlington, the owner irrigated the property again in 2011.

- The pump used to supply water for the irrigation system after 2002 was gasoline powered. The flood-damaged pump was observed during the site visit. Because the pump was gasoline powered, there are no electrical records to confirm water use.
- WestWater used color and black and white aerial photographs to evaluate water use. The photos are from 1941, 1965, 1976 (color), 1980, 1987, 1996, 2001 (color), 2004 (color), 2005 (color), and 2006 (color). The month of the photos is not indicated but it is likely that they were taken during later spring, summer or early fall. Some of the photos appear to show evidence of irrigation use in the form of green vegetation (2004 and 2005) while others (2001 and 2006) appear to have patches of dry vegetation suggesting no irrigation. (An evaluation of water use was conducted by Golder Associates for the period 2001 through 2008 using Landsat photos and is discussed later in this report.)
- WestWater estimated water use using information on the pump and the distribution system and estimated the instantaneous pumping rate was about 114 gpm. This appears to be reasonable given the rated pump capacity of 116 gpm and the distribution system characteristics, and is higher than the instantaneous quantity for the certificate of 90 gpm, suggesting the system was capable of producing at least 90 gpm.
- The crop irrigation requirement for pasture is given as 11.12 inches/year for the Sedro Woolley area by WestWater; however, Everett is considered more representative of the Arlington area. The total crop irrigation requirement for pasture based is 12.89 inches/year for the Everett area, based on the Washington Irrigation Guide, Appendix B (1992) and the typical irrigation period noted by WestWater of May 15 to October 1. The estimated crop irrigation requirements are summarized in the following table:

Month	Monthly Net Crop Irrigation Requirement (in)	Net Irrigation per Acre (AF)	Irrigation requirements for 30 Acres (AF)	Estimated Withdrawal Quantity*
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	0	0	0
May	1.09	0.09	2.7	3.6
June	2.88	0.24	7.2	9.6
July	4.36	0.36	10.8	14.4
August	3.12	0.26	7.8	10.4
September	1.44	0.12	3.6	4.8
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
TOTAL	12.89	1.07	32.1	42.8

*assumes 75% efficiency

The estimated irrigation use may actually underestimate the annual consumption because a relatively high efficiency of 75% was assumed for the irrigation gun, which has a typical efficiency of 55 to 75% based on Table 1 in Water Resources Program Guidance Document GUID-1210 *Determining Irrigation Efficiency and Consumptive Use.*

- WestWater estimated an annual consumption of 34.67 AF based on the period of use of 138 days between May 15 and October 1, pump operation over 12 hours per day, and the estimated pumping rate of 114 gpm, and this value was requested by the change application . Although the instantaneous pumping rate is limited to 90 gpm by the certificate, the annual consumption estimated by WestWater appears low based on the estimated withdrawal requirement of 42.8 AF yr using the crop irrigation requirements, irrigated acres, system efficiency, and period of use. Estimated beneficial use associated with irrigation certificate is limited to the actual irrigation requirement of 32.1 AF. Consideration to the 94% efficiency of the Arlington's water distribution system, as noted in the Appendix F of the Water System Plan (2010) results in a withdrawal amount of 34.15 AF for this change to provide equivalent consumptive use for the transfer.

Landsat Evaluation

Review of aerial photographs between 2001 and 2008 suggested that there may have been a period of non-use of the water right. Landsat imagery was evaluated In order to identify if there was a five-year period of non-use between 2002 when the property was purchased through 2008 when the water right was reported to be last used by the owner.

Landsat satellites used for gathering data on land surface reflectance have been in place since 1972. The satellites are equipped with an array of sensors that scans the ground as the satellite passes over a point and records the amount of reflected energy in certain wavelength bands. These bands are then combined to make a color image. For example, one sensor only sees in the red wavelength, one sees only green, and another sees only blue. These are combined to make a color image that we interpret as "true color." The benefit is that the sensors can record both visible and infrared components of the spectrum. Each pixel in the Landsat imagery is a 30 by 30 meter square (approximately 100 by 100 feet). The Landsat bands are summarized in the following table:

Band	Wavelength (μm)	Portion of spectrum	Use
1	0.45-0.52	Blue	blue, suspended sediments
2	0.52-0.60	Green	green, vegetation
3	0.63-0.69	Red	red, chlorophyll absorption
4	0.76-0.90	Near Infrared	water/land interface, vegetation
5	1.55-1.75	Mid Infrared	vegetation, soil moisture
6^	10.40-12.50	Thermal Infrared	surface temperature, geology
7*	2.08-2.35	Mid infrared	vegetation moisture, soils, geology, burns

^ Band six is not included in the 6 layer .img Landsat file
*This is layer 6 is the .img Landsat files

Varying combinations of the bands provide information on photosynthesizing vegetation, variations in vegetation types and moisture content, and plant health.

Review of Landsat images over the period 2002 through 2008 suggests that irrigation use may have been limited in certain years (e.g. 2002 through 2004 and 2006) but there was good evidence of water use in 2005, 2007, and 2008, demonstrating recent use of the water right.

Proposed Use

The proposed use is municipal water supply for the City of Arlington.

- ***Beneficial Use***

  According to RCW 43.27A.020, RCW 90.14.031, and RCW 90.54.020, municipal water supply is considered a beneficial use.

- ***Water Demand***

  The City's average and peak day demands are forecast to increase (RH2 2010). The 2010 Water System Plan (RH2 2010) identified source capacity deficiencies at the Haller Wellfield. Transfer of this water right to the Haller Wellfield will help the City meet current and projected future demands and increase the reliability of their water supply.

- ***Development Schedule***

  The City's water system is fully developed and undergoes periodic upgrades and maintenance as needed to maintain a safe, reliable supply of water.

Other Rights Appurtenant to the Place of Use

The City of Arlington holds four water right certificates and one water right claim for its sources of municipal supply. The City's existing rights are summarized in the following table:

Water Right Tracking #	Certificate #	Priority Date	Qi (cert)	Qi Additive	Qi Non-Additive	Qa (cert)	Qa Additive	Qa Non-Additive	Source
G1-*07495C	GWC 5170	2/12/1965	200	200		320	320		Airport Well
G1-*07494C	GWC 5169	2/12/1965	1,700		1,700	1,344		1,344	Haller Wellfield
S1-*01194C	SWC 194	10/10/1924	2,244.15	2,244.15		3,619.84	3,619.84		Haller Wellfield
G1-24900C		9/17/1986	380	380		386		376	Airport Well
G1-300889CLA		1931	135	135		72.18	72.18		Haller Wellfield
Totals			**4,659.15**	**2,959.15**	**1,700**	**5,742.02**	**4,012.02**	**1,720**	

Note: provided by Doug Wood, Ecology NWRO.

The Haller Wellfield includes three wells (Wells 1, 2, and 3). The instantaneous pumping capacity of each well is 570 gpm, for an instantaneous wellfield capacity of 1,710 gpm. The instantaneous capacity of the water treatment plant is also 1,710 gpm.

The City also submitted two applications for change along with this application for change:

- Application for change CS1-18929C seeks to transfer 269 gpm (0.60 cfs) and 125 af/year from an irrigation and stockwatering right to the City for the purpose of municipal water supply

- Application for change CS1-10680C seeks to transfer 112 gpm (0.25 cfs) and 50 af/year from an irrigation right to the City for the purpose of municipal water supply

These two change applications are being processed concurrently with this application.

Site Visit

A site visit was made on January 11, 2011, to the existing points of withdrawal and diversion and the proposed points of withdrawal. The site visit was made by Michael Klisch (Golder), Doug Wood (Ecology), and Mike Wolanek (City of Arlington). The existing point of withdrawal for CG1-*02115C is a 36-inch diameter concrete-cased well. Based on information on the well log, the well was drilled in 1952 and is 25 feet deep. At the time of drilling (October 1952) the depth to water was 11 feet below top of casing. The well log noted a pumping rate of 94 gpm with two feet of drawdown using a 5 hp electric motor. The depth to water at the time of the site visit was estimated to be about 10 feet below the top of the casing.

At the time of the site visit, there was no electrical service to the well, and there was no pump installed. Evidence of irrigation equipment was observed near the well, including irrigation pipe, a cannon-type sprinkler, and couplings and connectors. Similar equipment was documented in the West Water Report (West Water Research 2010). The gasoline-powered centrifugal pump used for irrigation was located in another portion of the farm. The pump was damaged during flooding in January 2009. The pump information indicates the pump was a 5-hp centrifugal pump with a capacity of 6,960 gallons per hour (116 gpm). The pump was rated for a total head of 187 feet and a maximum suction head of 26 feet.

Hydrologic/Hydrogeologic Evaluation

The hydrogeology of the Arlington area has been described in Newcomb (1953), Thomas and others (1997), and Pacific Groundwater Group (2007). The City of Arlington is located at the confluence of the North and South Forks of the Stillaguamish River (WRIA 5). Thomas and others (2007) delineated the hydrogeologic units in the vicinity of Arlington. The geologic units are summarized in the following table:

Epoch	Hydrogeologic Unit	Typical Thickness (feet)	Maximum Thickness (feet)	Lithology	Hydrogeology
Holocene	Bog/Peat/Marsh Deposits	3	10	Peat, organic-rich mud	Thin and discontinuous, not an aquifer or aquitard
	Alluvium	40	120	Fluvial and beach deposits of fine to coarse sand with lenses of silt and gravel	Unconfined aquifer
Pleistocene	Recessional Outwash	40	250	Sand and gravel, grades to silt	Unconfined aquifer or perched groundwater
	Till	70	250	Compact unsorted sand and gravel in silt and clay matrix	Aquitard with occasional thin confined aquifers
	Advance Outwash	120	350	Fine sand, grades to gravel or silt	Unconfined to confined aquifer
	Transitional Beds	100	400	Sand to silty clay	Aquitard with occasional thin confined aquifers
	Undifferentiated Sediments	500	1,000	Glacial drift and interglacial deposits of sand and gravel with some silt	Confined aquifer and aquitards
Eocene	Bedrock	Unknown	Unknown	Varying sedimentary and volcanic lithologies	Small amounts of confined water in fractures, with some potential for porous flow in sandstone units

Note:
Modified from Thomas and others (2007), Table 3.

The City's Haller Wellfield is located immediately downstream of the confluence of the North and South Forks of the Stillaguamish River, about 50 feet south of the main stem Stillaguamish River. The Haller Well Field includes three shallow wells completed in the unconfined alluvial aquifer adjacent to the main stem Stillaguamish River at depths ranging from 34 to 36 feet below ground surface. The unconfined alluvial aquifer is present in the valleys of the North and South Forks of the Stillaguamish and the main stem Stillaguamish River. The existing point of withdrawal well is also a shallow well completed to a depth of 25 feet below ground in unconfined alluvial materials adjacent to the main stem Stillaguamish River.

The Haller Well Field area is underlain by unconsolidated alluvial sand and gravel. The depth to the underlying Tertiary bedrock is uncertain. Bedrock was interpreted by Pacific Groundwater Group (2007) to be at a depth of about 40 feet below ground in the wellfield area. However, it is possible that alluvial materials include large boulders, such as glacial erratics, that due to the difficult drilling conditions, may have been misinterpreted as "bedrock" at the time of drilling as the wells were not advanced beyond the "bedrock" (Mike Wolanek, City of Arlington, personal communication 2011). The alluvial aquifer is moderately to highly permeable, with hydraulic conductivities ranging from about 3.6 to 3,200 ft/d, and a median hydraulic conductivity of 88 ft/d (Thomas and others 2007).

Pumping tests in the Haller Well Field show that the alluvial aquifer is in direct hydraulic continuity with the main stem and South Fork Stillaguamish River (WWR 2010), and the wellfield is considered to be groundwater under the direct influence of surface water by the Washington Department of Health.

Minimum instream flows for WRIA 5 were established in 2005 under WAC 173-505-050 for the main stem Stillaguamish River and tributaries. The following table summarizes instream flow requirements for the main stem Stillaguamish River from the mouth at Port Susan to the confluence of the North and South Forks. The control point for this reach of the river is Ecology gaging station #05A070 at River Mile 11.2 (near Silvana).

Month	Day	Instream flow (cfs)
January	1-31	2,200
February	1-29	2,000
March	1-15	2,000
	16-31	2,000
April	1-30	2,000
May	1-31	2,000
June	1-15	2,000
	15-30	2,000
July	1-15	2,000
	15-31	2,000
August	1-15	1,700
	15-31	1,700
September	1-15	1,700
	15-30	1,700
October	1-15	1,700
	15-31	1,700
November	1-15	2,200
	15-30	2,200

Month	Day	Instream flow (cfs)
December	1-31	2,200

Under WAC 173-505-070, the main stem Stillaguamish River from the mouth to the confluence of the North and South Forks at River Mile 17.8 has water available above instream flow requirements over the period October 16 to June 30. Because the water right proposed for transfer has a priority date of September 4, 1951, it is senior to the instream flow regulations and is therefore not subject to interruption.

Impairment Considerations

The existing point of withdrawal and the wells in the Haller Wellfield are completed in a highly-permeable alluvial aquifer that is in direct hydraulic communication with the main stem Stillaguamish River. There will be no impairment to the main stem Stillaguamish River minimum instream flow by moving the point of withdrawal of a water right utilizing the same source that is senior to the minimum flow established in WAC 173-505-070. The Haller Wellfield wells have been in operation for many years indicting water is physically available. There have been no reports of interference to other wells or water right holders since the wells have been in operation. Testing completed by Pacific Groundwater Group in 2002 in Well 1R (referenced in the Report of Examination for CG1-300889CL(A)@1) showed there was about 6.5 feet of drawdown in Well 1R when the well was pumped at 570 gpm over a 4-hour period, with rapid recovery to pre-test levels following pump shutdown. Approximately 9 inches of drawdown were observed in Well 1, located about 25 feet from Well 1R, confirming little drawdown is expected outside the immediate wellfield area.

A search of the well log database indicted that there were 11 wells on file within about 0.5 miles of the Haller Wellfield. Other wells may be present that do not have logs filed with Ecology. With the exception of one well which is completed in bedrock (McMahan) all of the wells are completed in the alluvial aquifer. No impairment to these wells is expected based on the observed drawdown during the 2002 testing, the high aquifer transmissivity, and the good hydraulic connection to the river.

Well Owner	Well Depth (feet bgs)	Date Completed	Completion Aquifer	Location
ASSOCIATED SAND & GRAVEL	64		Alluvial	T31/R5E-2NWNE
ASSOCIATED SAND AND GRAVEL	26	03/10/69	Alluvial	T31/R5E-2NWNE
C D HAMMER	19		Alluvial	T31/R5E-2NESW
CITY OF ARLINGTON	38	05/08/02	Alluvial	T31/R5E-2SENW
CITY OF ARLINGTON	36		Alluvial	T31/R5E-2SENW
CITY OF ARLINGTON	36		Alluvial	T31/R5E-2SENW
DENNIS DEARINGER	74	08/12/98	Alluvial	T31/R5E-2NENW
HENRY MILLER	40	04/10/99	Alluvial	T31/R5E-2SENW
LEE FLATO	37	08/09/91	Alluvial	T31/R5E-2SWSW
LYNN GRANSTROM	50	09/16/02	Alluvial	T31/R5E-2NESE
MIKE HANLOCK	30	04/03/81	Alluvial	T31/R5E-2SWNE
PETE VECHL	38	07/12/00	Alluvial	T31/R5E-2SENW
TOM MC MAHAN	211	06/25/92	Bedrock	T31/R5E-2NWSE

The Water Rights Application Tracking System database was queried to located water rights and claims within a 0.5 mile radius of the Haller Wellfield. Twelve water right claims for groundwater, one surface water certificate, and two groundwater certificates are within 0.5 miles of the subject application for change (excluding rights held by the City of Arlington). At least one groundwater certificate and one groundwater claim can be tied to available well logs. Some of the well logs may be associated with water rights or claims filed under a different name or are exempt from the application process. No impairment to these rights is expected based on the observed drawdown during the 2002 testing, the high aquifer transmissivity, and the good hydraulic connection to the river.

File Number	Certificate Number	Person	Document Type	Priority Date	Purpose of Use	Qi	Unit of Measure	Qa	Location	Source
G1-153724CL		MILLER HENRY C	Claim S		NR		GPM		T31N/R5E-	
G1-135771CL		VAN SLAGEREN TOM	Claim L		ST,DG		GPM		T31N/R5E-	WELL
G1-124942CL		LEWIS ORWILL P	Claim S		IR,DG		GPM		T31N/R5E-	
G1-123457CL		WILSON MARVIN W	Claim L		ST,IR		GPM		T31N/R5E-	WELL
G1-119434CL		VALLEY GEM FARMS	Claim L		ST,DG		GPM		T31N/R5E-	WELL
G1-111124CL		HAMMER CURTIS D	Claim S		ST,DG		GPM		T31N/R5E-	
G1-093046CL		GROENDYK JOHN	Claim S		IR,DG		GPM		T31N/R5E-	
G1-091257CL		RICKARD JOHN C	Claim S		IR,DG		GPM		T31N/R5E-	
G1-050157CL		KROEZE JOHN	Claim S		DG		GPM		T31N/R5E-	WELL
G1-035541CL		DESPRES CLARA M	Claim L		DG		GPM		T31N/R5E-	WELL
G1-035723CL		BREEKVELDT BERT	Claim S		DG		GPM		T31N/R5E-	
G1-025841CL		KLEIN PAUL	Claim L		DG		GPM		T31N/R5E-	
S1-008945CL		SOPER FRANCES	Claim L		DG		CFS		T31N/R5E-	

File Number	Certificate Number	Person	Document Type	Priority Date	Purpose of Use	Qi	Unit of Measure	Qa	Location	Source
		M. M.								
S1-*11473AWC	06447A	KROEZE J	Cert	6/23/1952	IR	0.32	CFS		T31N/R5E-	UNNAMED SLOUGH
S1-*01194C	194	Puget Sound Power & Light Co	Cert	10/10/1924	DM	5	CFS		T31N/R5E-SE/NW	STILLAGUAMISH RIVER
G1-*09495C	6379	Associated Sand & Gravel Co Inc	Cert	6/4/1968	CI	150	GPM	36	T31N/R5E-	WELL
G1-*07494C	5169	Arlington City	Cert	2/12/1965	MU	1700	GPM	1344	T31N/R5E-	WELL
G1-*02442C	2968	HAMMER C D	Cert	4/9/1952	IR	156	GPM	30	T31N/R5E-	WELL
CG1-*02115C	1488	Arlington City	ChgApp	3/23/2010	MU	90	GPM	34.67	T31N/R5E-SE/NW	WELL 1
CS1-*18929C	10024	Arlington City	ChgApp	4/7/2010	MU	0.6	GPM		T31N/R5E-SE/NW	Haller well field
CS1-*10680C	5983	Arlington City	ChgApp	4/7/2010	MU	0.25	GPM		T31N/R5E-SE/NW	Haller well field

Enlargement

No enlargement will result from approval of this change. The City of Arlington is receiving a transferred quantity based on a tentative determination of extent and validity. Only water that was previously put to beneficial use is transferred, and only that amount is authorized to be withdrawn (by this authorization) from the wells in the Haller Wellfield. Estimated beneficial use associated with irrigation certificate is 32.1 AF. Consideration to the 94% efficiency of the Arlington's water distribution system, as noted in the Appendix F of the Water System Plan (2010) results in a withdrawal amount of 34.15 AF for this change to provide equivalent consumptive use for the transfer.

Public Interest Considerations

Factors considered for evaluating whether the proposed change is in the public interest included but were not limited to: potential impacts to exempt wells, existing water rights, permits, and claims holders, other water right change applications, potential impact to groundwater and surface water resources, and beneficial use of the resource. No detriment to the public interest was identified during the investigation of the subject application. The available information shows other wells in the area are not expected to be impaired by the anticipated

CONCLUSIONS

In accordance with state law, the following considerations were addressed as part of the process of evaluating this change request:

- The potential for enlargement of the original right,
- The potential for impairment of other rights,
- Consideration of the public interest and welfare,
- Physical availability of water,
- Whether the new point of withdrawal would tap the same body of public groundwater as the original well, and
- Protests or Letters of Concern

Potential for Enlargement

The annual quantity and maximum instantaneous quantity will not be enlarged by this change.

Impairment of Other Rights

No impairment of other rights is expected because the alluvial aquifer is highly permeable with a direct hydraulic connection with the main stem and South Fork of the Stillaguamish River. Interference drawdown from pumping the Haller Wellfield in areas outside the immediate wellfield is expected to be negligible. There are no reports of impairment by other groundwater or surface water users since the wellfield has been in operation. The existing point of withdrawal and the Haller Wellfield are in the same body of groundwater in direct communication with the main stem Stillaguamish River. Because the water right proposed for transfer has a priority date of September 4, 1951, it is senior to the instream flow regulations and is therefore not subject to interruption when flows are not met. No impairment to instream flows is expected from approval of this water right.

Public Interest

No detriment to the public interest was identified during the investigation of this application for change. Municipal water supply is a beneficial use under RCW 43.27A.020, RCW 90.14.031, and RCW 90.54.020.

Availability of Water

Availability of water from the source was determined when the original permit was issued. Physical availability of water from the Haller Wellfield has been established through operation of the field for more than 100 years with no reports during that time of decreased water availability.

Same Body of Groundwater

The existing and proposed points of withdrawals are both in the alluvial aquifer which is in direct continuity with the main stem of the Stillaguamish River.

Protests or Letters of Concern

Public notice of the proposed application for change was published on July 21, 2010 and July 28, 2010 in the Everett Herald. No protests were received.

RECOMMENDATIONS

Based on the above investigation and conclusions, I recommend that the request for change to Certificate 1488-A (G1-02115C) be authorized, in the amounts and within the limitations listed below and subject to the provisions beginning on Page 2, et seq.

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.

90 gpm, 34.15 acre-ft/yr for municipal water supply.

Point of Withdrawal

SE¼, NW¼, Section 2, Township 31 North, Range 5 East W.M.

Place of Use

As described on Page 1 of this Report of Examination.

REPORT BY_____ DATE_____

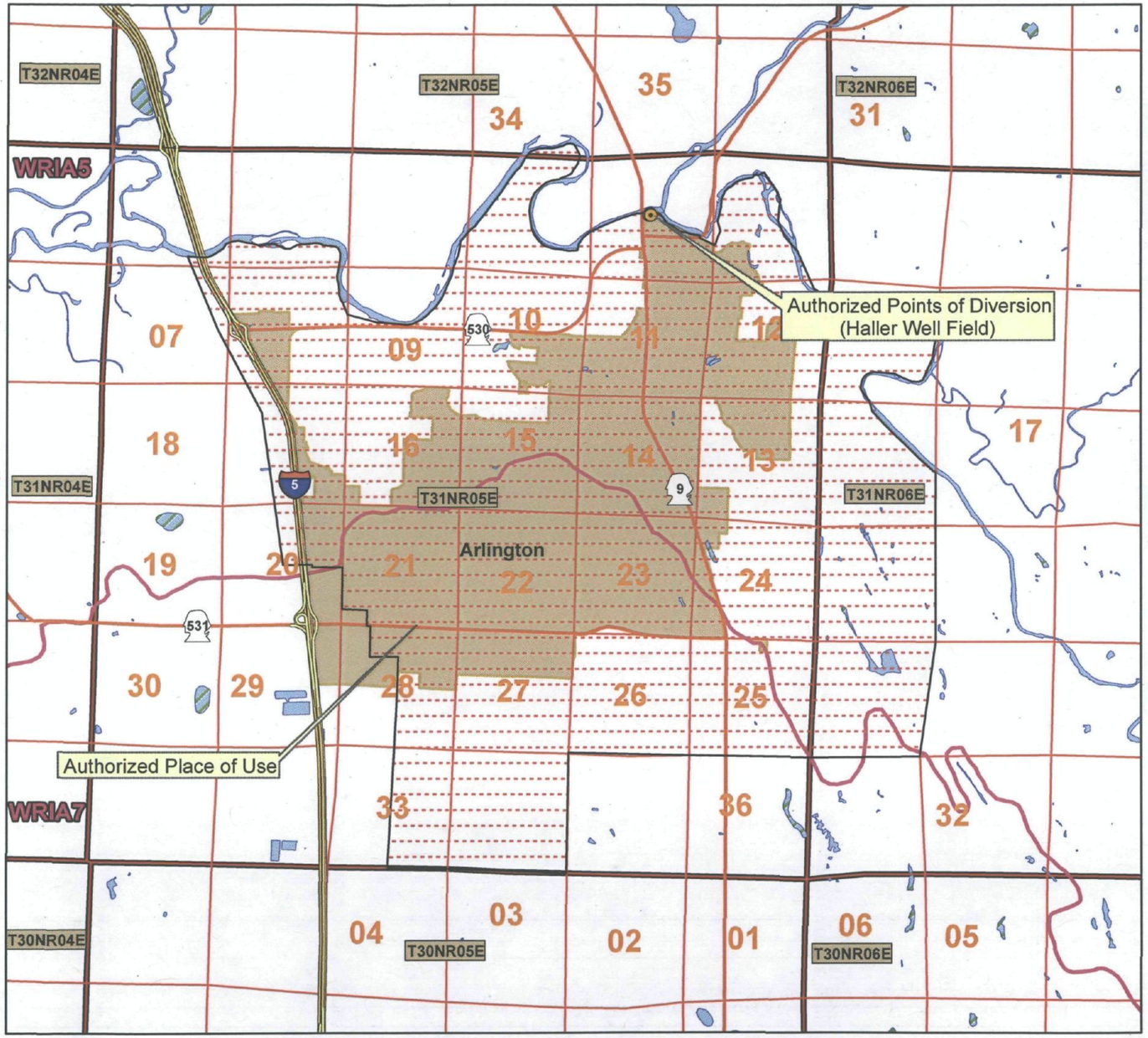
Carl Einberger, L.Hg.
Senior Consultant, Water Resources
Golder Associates Inc.

REVIEWED BY_____ DATE_____

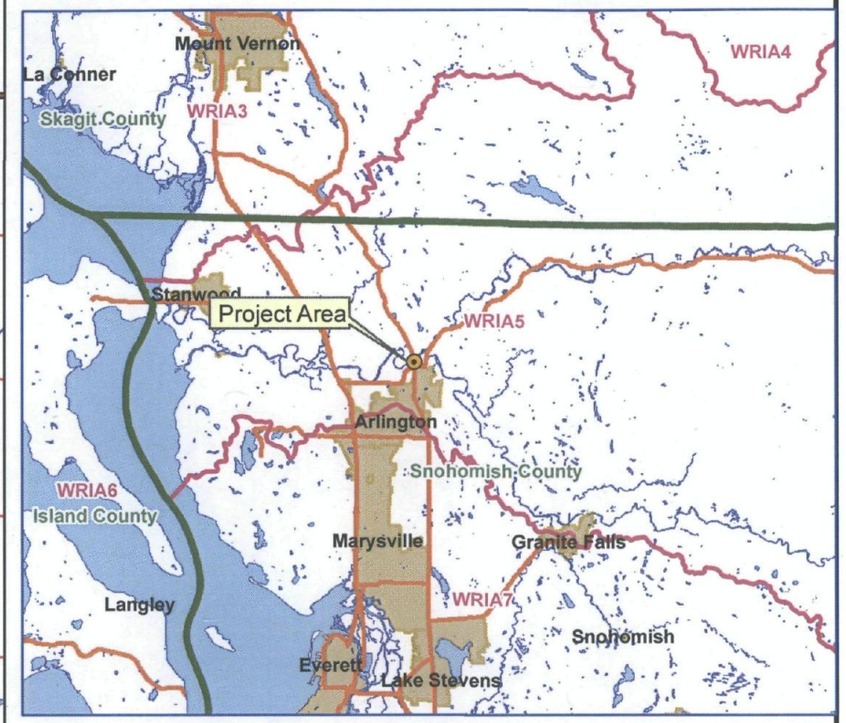
Douglas H. Wood, LHG
Water Resources
Department of Ecology

City of Arlington
Water Right Number CG1-*02115C
Sec.02, T 31N, R 05E W.M.
WRIA 5 - Snohomish County

DEPARTMENT OF ECOLOGY
State of Washington



1 0.5 0 1 2 3 Miles



5 2.5 0 5 10 Miles

Legend

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

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

Attachment 1