DEPARTMENT OF ECOLOGY State of Washington

State of Washington
AMENDED REPORT OF EXAMINATION FOR WATER RIGHT APPLICATION

PRIORITY DATE	WATER RIGHT NUMBER
3/18/2011	G4-35465

MAILING ADDRESS	SITE ADDRESS (IF DIFFERENT)
DARRALD & JACKIE CAREY 19622 HWY 9 SNOHOMISH WA 98296	

Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
4.48	GPM	0.414

Purpose

PURPOSE	WITHDRAWAL OR DIVERSION RATE ADDITIVE	WITHDRAWAL OR DIVERSION RATE NON-ADDITIVE	UNITS	ANNUAL QUANTITY (AF/YR) ADDITIVE	ANNUAL QUANTITY (AF/YR) NON-ADDITIVE	PERIOD OF USE (mm/dd)
Domestic single	4.48		GPM	0.392		01/01 - 12/31
Irrigation		4.48	GPM	0.022		06/01 - 09/30

REMARKS

A maximum of 4.48 gallons per minute (gpm), 0.414 acre-feet per year (af/yr) for 1 residence (0.392 af/yr for year-round continuous single domestic supply and 0.022 af/yr for irrigation of lawn and garden up to 0.011 acre between June 1 and September 30 annually). The combined instantaneous quantity from the well identified by Ecology's unique well tag # AGM-643 shall not exceed 25 gpm between 8 total connections. Final beneficial use calculations for each connection either independently or combined shall be determined during the investigation at the Proof of Appropriation stage.

IRRIGATED ACRES ADDITIVE	IRRIGATED ACRES NON-ADDITIVE	PUBLIC WATER SYSTEM INFORMATION WATER SYSTEM ID	PUBLIC WATER SYSTEM INFORMATION CONNECTIONS
0.011		Crest at Lake Cle Elum (Pending)	8

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
Kittitas	1 Well		39-Upper Yakima

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWN	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
1 Well	20558	AGM643	21N	14E	34	NENE	N/A	N/A

Approximately 1068 feet south and 1056 feet west from the northeast corner of Section 34 within the NE¼NE¼ of Section 34, Township 21 North, Range 14 E .W.M. (per documentation provided by the applicant's representative).

Place of Use (See Attached Map)

PARCELS (NOT LISTED FOR SERVICE AREAS)

20481

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

Lot 5D of TANEUM CREEK SHORT PLAT, Kittitas County Short Plat No. 02-22, as recorded January 7, 2005, in book G of Short Plats, pages 231 and 232, under Auditor's File No. 200501070059, records of Kittitas County, State of Washington; being a portion of the North Half of the Northeast Quarter of Section 34, Township 21 North, Range 14 East, W. M., in the county of Kittitas, State of Washington.

Proposed Works

An existing well was drilled in 2002 (Ecology unique well ID AGM643) to a depth of 215 feet with a 6-inch casing. Water from this well will be used for this project for indoor domestic and outdoor supply for the one proposed residence in addition to another 7 residences beyond the residence proposed in this application (Parcel Nos. 16619, 20556, 20557, 20558, 20560, 20561, and 20563), each with up to approximately 500 square feet of lawn/garden. Domestic wastewater will be discharged to an individual on-site septic system, pursuant to the *Declaration of Covenant* signed March 14, 2011 by the subject applicant.

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
December 31, 2012	December 31, 2021	December 31, 2026

Measurement of Water Use

How often must water use be measured?	Monthly
How often must water use data be reported to Ecology?	Annually (Jan 31)
What volume should be reported?	Total Annual Volume (af/yr)
What rate should be reported?	Annual Peak Rate of Withdrawal (gpm)

Provisions

Wells, Well Logs and Well Construction Standards

The aquifer authorized for this water supply well is within the Lower Roslyn (LRF).

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

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

In accordance with WAC 173-160, wells shall not be located within certain minimum distances of potential sorces of contamination. These minimum distances shall comply with local health regulations as appropriate. In general, wells shall be located at least 100 feet from sources of contamination. Wells shall not be located within 1,000 feet of the boundary of a solid waste landfill.

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.

Water use date shall be recorded monthly and maintained by the property owner for a minimum of five years. The maximum rate of diversion/withdrawal and the annual total volume shall be submitted to the Department of Ecology by January 31st of each calendar year.

Recorded water use data shall be submitted via the Internet. To set up an Internet reporting account, contact the Central Regional Office. If you do not have Internet access, you can still submit hard copies by contacting the Central Regional Office for forms to submit your water use data.

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
Quarterly groundwater level monitoring is strongly recommended for purposes of better understanding local recharge area characteristics. Ecology may provide technical assistance. Contact Central Regional Office, Water Resources Program, Technical Unit supervisor or hydrogeologist staff via reception at: 509-575-2491 for further details.

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 (airline, 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 prior to beginning (or modifying) your project at DOH/Division of Environmental Health, 16201 E. Indiana Avenue, Suite 1500, Spokane Valley, WA 99216, (509) 329-2100.

Easement and Right-of-Way
The water source and/or water transmission facilities are not wholly located upon land owned by the applicant. Issuance of a water right authorization by this department does not convey a right of access to, or other right to use, land which the applicant does not legally possess. Obtaining such a right is a private matter between applicant and owner of that land.

Water Use Efficiency
Use of water under this authorization shall be contingent upon the water right holder's maintenance of efficient water delivery systems and use of up-to-date water conservation practices consistent with established regulation requirements and facility capabilities.

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.

General Conditions
Per WAC 173-539A, consumptive use authorized under this permit is water budget neutral. Consumptive use quantities (total withdrawal minus return flow) must be fully offset by debit of an equal consumptive use quantity of seasonal irrigation water right placed into permanent trust in the Washington State Trust Water Right Program (TWRP) by Suncadia, Trust Water Right No. S4-05259CTCL@2sb7

Ecology assigns 0.072 acre-feet of Trust Water Right Certificate S4-05259CTCL@2sb7 to the United States Bureau of Reclamation—Ecology Exchange Contract No. 09XX101700[1], dated January 29, 2009, (Contract) for historic out-of-irrigation season (October 1-March 31) impacts associated with the withdrawals under this permit. You shall pay to the Department of Ecology the sum of $60.19, which represents a proportionate amount of the payment due and owing to the United States for storage and delivery of water under paragraph 15(a) of the Contract. The consumptive use of 0.072 acre feet from Sept. 1 to March 31 is subject to the terms and conditions of the Contract.

Water use under this authorization is contingent upon the conveyance of an equal (0.137 acre-feet per year (af/yr)) or greater amount of consumptive use from a suitable instream flow right (see Trust Water Right Agreement) to the TWRP. Consumptive use totaling 0.137 af/yr is proposed to be offset with Trust Water Right No. S4-05259CTCL@2sb7.

During periods of shortages, valid priority calls against the source Trust Water Right No. S4-05259CTCL@2sb7, based on local limitations in water availability, will result in temporary curtailment of the use of water under the permit until the priority call for water ends.

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[1]" Water Storage and Exchange Contract No. 09XX101700, Between the Bureau of Reclamation and the State of Washington Department of Ecology, Yakima Project, Washington," http://www.ecy.wa.gov/programs/wr/cro/yakimabasin.html/exchangecontract_012909[1].pdf, accessed on July 19, 2011.

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. G4-35465, subject to existing rights and the provisions specified above.

Your Right To Appeal

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.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey WA 98503	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia WA 98504-7608
Pollution Control Hearings Board 1111 Israel Rd SW Ste 301 Tumwater WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia WA 98504-0903

Please send a copy of your appeal to:

Robert F. Barwin, Acting Section Manager
Department of Ecology/CRO
15 W Yakima Ave., Ste 200
Yakima WA 98902-3452

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://www.leg.wa.gov/CodeReviser

Signed at Yakima, Washington, this 1ST day of SEPTEMBER 2011.

Robert F. Barwin, 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.

BACKGROUND

Project Description

On March 18, 2011, Darrald and Jackie Carey of Snohomish, Washington, (the applicants) filed an application with the Washington State Department of Ecology (Ecology) for a water right permit to appropriate public groundwater. The application was assigned Application No. G4-35465. The applicant requested authorization for an instantaneous withdrawal (Qi) of 75 gallons per minute (gpm) and an annual withdrawal volume (Qa) of 0.392 acre-feet per year (af/yr) for one residence and 0.022 af/yr for 0.011 acre of incidental lawn and garden irrigation. While this application requests appropriation from the propose well for 1 residence, it is anticipated the same well will also be used to service other parcels (Parcel Nos. 16619, 20556, 20557, 20558, 20560, 20561, and 20563) for domestic supply and for an additional 0.080 acre (3,500 square feet).

The applicant intends to mitigate for consumptive use under the requested appropriation through the purchase of mitigation certificates from the Suncadia Water Exchange. The Suncadia Water Exchange was established by transferring Court Claim Nos. 05259 and 00626 into the Trust Water Right Program (TWRP). Consumptive loss resulting from the applicant's proposed use will be offset with Trust Water Right No. S4-05259CTCL@2sb7.

Priority Processing

This application is being priority processed because it qualified under the criteria under which an application may be processed prior to competing applications (WAC 173-152).

Description and Purpose of Proposed Application

Table 1: Application Summary

Attributes	Summary
Name	Carey
Priority Date	March 18, 2011
Instantaneous Quantity	75 gpm
Annual Quantity	0.414 af/yr
Purpose of Use	Domestic Single (DS), Irrigation (IR)
Period of Use	Year-round/Seasonal
Place of Use	Parcel No. 20481, T. 21 N., R. 14 E., Sec. 34, Kittitas County

Table 2: Proposed Source of Withdrawal

Source Name	Parcel	WellTag	Twn	Rng	Sec	QQ Q	Latitude	Longitude
1 Well	20558	AGM643	21N	14E	34	NENE	N/A	N/A

Legal Requirements for Approval of Appropriation of Water

RCWs 90.03 and 90.44 authorize the appropriation of public water for beneficial use and describes the process for obtaining water rights. Laws governing the water right permitting process are contained in RCW 90.03.250 through 90.03.340 and RCW 90.44.050. In accordance with RCW 90.03.290, determinations must be made on the following four criteria in order for an application for water rights to be approved:

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

Public Notice

RCW 90.03.280 requires that notice of a water right application by published one 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 *Daily Record* during the weeks of April 16 and April 23, 2011.

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 (RCW 77.57.020). Notice was provided on May 2, 2011 during a Yakima Water Transfer Workgroup (WTWG) meeting.

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 exceeds 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

Proposed Domestic Water Use and Basis of Water Demand

The December 2009 Water System Design Manual[2] (WSDM) by the Washington State Department of Health (DOH) contains guidance for establishing water demands. The suggested methods, in order of preference, include:

1. Metered water production and use records.
2. Comparable metered water-production and use data from analogous water systems. See WAC 246-290-221(3)(a) and Section 5.2.3.
3. The criteria presented in Chapter 5.

According to the WSDM, "For new water systems with no source meter records, the design engineer can use information from analogous water systems or the information in Appendix D to estimate ADD and MDD for residential connections (WAC 246-290-221(3).[3] Analogous water systems are defined in Section 5.2.3 of the WSDM as systems with similar characteristics, such as but not limited to: demographics, housing size, lot sizes, climate, conservation practices, use restrictions, soils and landscaping, and maintenance practices. As such, a reasonable level for a Maximum Daily Demand (MDD) for internal uses can be established at 350 gpd/ERU.

The proposed "Crest at Lake Cle Elum" development does not currently have a Department of Health-approved Group B Water System Plan; however, 8 total connections are planned according to the applicant, one of which is the subject of this application.

Since there are no water use records for the proposed development to review and records for qualifying analogous systems are not available, the MDD values are set a 350 gpd/equivalent residential unit, which is consistent with the WSDM. Under WAC 173-539A, 30% of domestic in-house use on a septic system is assumed to be consumptively use and 90% of outdoor domestic use is assumed to be consumptive.

Monthly and annual use at full build-out of the project were calculated based on the proposed 1 ERU, DOH's MDD, Ecology's Guidance Document 1210, Determining Irrigation Efficiency and Consumptive Use, the Washington Irrigation Guide (WIG) for outdoor water use, and the assumptions found in WAC 173-539A. A crop irrigation requirement (CIR) for grass in the Cle Elum area of 18.11 inches was estimated using the WIG. Assuming the outdoor use is 90% consumptive, consistent with the assumptions in WAC 173-539A, and applying the WIG's CIR, it was assumed outdoor use is sufficient to irrigate approximately 500 square feet (0.011 acre) of grass per resident. The calculated consumptive use and total calculation considered factors specified in WAC 173-539A and are summarized in **Table 4**.

Table 3: Estimated Domestic Indoor and Outdoor Water Use

	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
Indoor (gpd)	350	350	350	350	350	350	350	350	350	350	350	350
Outdoor (gpd)	0	0	0	0	0	43	82	60	45	0	0	0
Total (gpd)	350	350	350	350	350	393	432	410	395	350	350	350

[2] Department of Health, "*Water System Design Manual*", Olympia, Wa., 2009, pp. 27-32, www.doh.wa.gov/chp/dw/Publications/331-123, accessed on January 4, 2011.
[3] Ibid. p. 28.

Table 4: *Estimated Total (Indoor and Outdoor)and Consumptive Use

	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Annual*
Total (acre-feet)	.033	.030	.033	.032	.033	.036	.040	.038	.036	.033	.032	.033	**.414**
Consumptive (acre-feet)	.010	.009	.010	.010	.010	.013	.017	.015	.013	.010	.010	.010	**.137**

*Quantities are rounded.

Hydrologic/Hydrogeologic Evaluation

The following hydrologic/hydrogeologic excerpts were prepared in a technical memorandum dated February 15, 2011 and modified on April 19, 2011, by licensed hydrogeologist, Anna Hoselton and reviewed by Thomas Mackie, supervisor and licensed hydrogeologist, and seeks to address, by way of discussion, analysis, and evaluation, potential for impairment to existing water users.

Hydrogeologic Discussion

The primary hydrogeologic unit underlying Section 34, T. 21 N., R. 14 E.W.M. and general vicinity is the lowermost of the three (upper, middle, lower) members that compose the Eocene Rosyln Formation. The lower half of the LRF is composed of interbedded rhyolite flows and tuffs, tuffaceous to arkosic sandstones, conglomerates, siltstones, claystones and carbonaceous shales consisting of "thin dirty coal beds" (Walker, 1980). The upper portion of the LRF, however, lacks the rhyolite flows and carbonaceous shale interbeds, is finer grained and contains fewer conglomeratic sandstones (Wilson, 2008). Tabor, et al. (2000) noted that the LRF contains discernable crossbedding, pebble stringers, and cut and fill structures giving evidence that deposition occurred in a fluvial environment. The LRF conformably overlies the Teanaway Formation basalts and has a basal unit that is often found to be darker in color, red to red-brown, than the more commonly white to yellow to pale orange colored beds higher up in the section (Tabor et al., 2000). The LRF constitutes about 3,000 ft of the otherwise approximately 8,500 ft total thickness of the entire Roslyn Formation (Walker, 1980; Tabor, et al., 1984 and 2000). The LRF, unlike the upper Roslyn Formation (URF), has not been impacted by coal mining extraction.

Within the boundaries described above, the LRF generally dips south-southeast and strikes east-northeast reflecting an eastward bending of the southern half of the synclinal structure that forms the Roslyn Basin. Locally, mapped dip angles for the LRF range from between 15 and 30 degrees (Tabor, et al., 2000). In this area, thin alluvial sediments blanket the upper slopes of the LRF and gradually thicken in a down slope direction to where they come in contact with and interfinger with glacial drift sediments that dominate the lower slopes along the Lake's edge. Beyond the Lake's edge, the Lake bottom is composed of fine-grained lacustrine clays that overlie bedrock, including the LRF, and impede leakage from the Lake bottom (Link, 1989). Upstream of the Cle Elum Lake dam, the Lake bottom sediments were found to be approximately 25 to 45 feet thick during construction; however, thickness of the fine-grained lacustrine sediments was not determined in the vicinity of the dam itself. Link also noted that in some places erosional "windows" in the lake bottom clays had cut down into the underlying more permeable sediments and, as a result, required plugging or sealing to prevent seepage downstream of the dam.

The LRF, in the subject area, is recharged by local precipitation where the Formation outcrops at or near the land surface (diffuse infiltration) and where precipitation may enter the Formation by means of fracture systems (focused infiltration). Recharge is also assumed to enter the lower elevations of the western edge of the Formation by leakage of groundwater stored in the overlying alluvial and glacial sediments. Some small amount of recharge may enter down dipping LRF bedding along the reaches of Bear and Spring Creeks where they may flow over exposed units.

Groundwater flow within and discharge from the LRF will be influenced, in part, by the Formation's structural attitude. Additionally, secondary permeabilities will encourage preferential flow through units that have been fractured during faulting and folding. In the subject area, groundwater flow within the LRF is interpreted to generally follow a south-southeast or down dip direction. While variations in structural orientation may direct some groundwater eastward from the subject area into the Sandstone Creek basin, there are no springs identified in water right documents or on USGS topographic quads suggesting that is happening. Groundwater discharge from the LRF in the subject area is interpreted to be to area wells and to the overlying middle Roslyn Formation. It may be that Bear Creek, as suggested by its perennial characteristics, receives a small but sustaining volume of groundwater discharge from the LRF on its up-dip (north) side of the drainage, while Spring Creek with its intermittent characteristics may not receive enough groundwater discharge to sustain flows from the up-dip side of its drainage. The difference may be Bear Creek's proximity to the up dip LRF contact with the Teanaway Formation where recharge from the basalt unit may be entering the LRF.

The LRF's recharge/discharge relationship with Cle Elum Lake is, however, largely uncertain. The uncertainty occurs, in part, because while the LRF outcrops east of Cle Elum Lake as described above, LRF outcrops are missing west of the Lake. West of the Lake, however, the underlying Teanaway Formation and a small wedge of the overlying middle member of the Roslyn Formation are present (Tabor, 2000). As a result, it can be reasonably concluded that the LRF's west most boundary terminates somewhere under the lake offshore of Section 28, 33, and 34 of T20N, R14E. Consequently, the LRF may derive recharge from Lake bottom leakage depending on head relationships. The LRF may possibly, however, discharge to the lake bottom clays in a small area around the southeast end of Cle Elum Lake depending on the actual area exposure, structural attitude and head relationships. Additional study is needed to determine which may be occurring and what significance it may pose.

The stratigraphy of the LRF is extremely complex, so no attempt to identify and correlate every change in lithology as recorded by well drillers, on area logs, was made. However, depths to water bearing units recorded on the driller's logs of four wells (Well ID # AGM635, **AGM643**, AGM644, and AGM645) [emphasis added] whose approximate locations were known and recognized to be approximately parallel to dip were given further consideration. Depths to the well's water bearing units were converted to elevations and compared. The comparison suggested the water bearing units correlate reasonably with the Formation's local dip angles and direction. Additionally, the four wells' static water levels (swls) appear to suggest a general trend of deeper groundwater levels as well depth increases, a hydrogeologic characteristic consistent with the behavior of a recharge area. Aquifer properties are expected to be anisotropic and heterogenous because of the LRF's depositional, erosional and deformational history. Transmissivities reflecting primary porosities, within the LRF, are expected to be in the low to moderate range for sandstone/shale units, while transmissivities reflecting secondary porosities are likely to be higher.

Logs for wells located within the LRF/LRF_{ext} boundaries as depicted in Figure 2 and held in Ecology's well database number about 74. Of those wells, 36 appear to withdraw groundwater from the alluvial/glacial (ALV) sediment aquifer and were not considered further for purposes of this report. The remaining 38 logs appear to be for wells that withdraw water from the LRF with a few of the wells appearing to be doubly completed into both the LRF and ALV. Of the 38 LRF and LRF/ALV wells, air test method yield estimates range from less than 1 gallon per minute (gpm) to a high of 75 gpm at well AGM634. However, the majority of the LRF wells are estimated to yield in the range of 25 gpm or less and estimated yields above 25 gpm are suspected to be optimistic at best. In general, it is not expected that higher pumping rates would be sustainable under long duration pumping demands and as distance between a LRF well and the lake increases, sustainability of high pumping rate is less likely.

Some possible exceptions are the 8 and 10 inch wells operated by the Driftwood Acres Public Water System and a 6 inch 'Webber' well, estimated by the driller, to yield in the 45 to 50 gpm range. These wells are located approximately 1,200 to 2,500 feet from the Lake in the NE ¼ NW ¼ of Section 34, T21N, R14E, and while they appeared to be developed into LRF units that extend below the Lake surface, the well's casings are perforated into the overlying alluvial/glacial (ALF) sediments. As a result, the yield derived solely from the LRF by these wells is uncertain.

The only example of an LRF well with test data collected by pump test methods within the LRF/LRF_{ext} boundaries was drilled for the US Forest Service. The 10 inch, 220 foot well is located in the NW ¼ SE ¼ of Section 28, T21N, R14E, and approximately 1,230 feet from the lake. The log for this well contains a very limited record of an 8 hr pump test conducted at a rate of 50 gpm with a resulting 132 feet of drawdown and may represent some pumping inducement of groundwater recharge from the Lake bottom clays or through erosional features in the lake bottom clays.

Impairment Considerations

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

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

Impairment, Qualifying Ground Water Withdrawal Facilities, and Well Interference
Qualifying ground water withdrawal facilities are defined as those wells which in the opinion of the Department are adequately constructed. An adequately constructed will is one that (a) is constructed in compliance with well construction requirements; (b) fully penetrates the saturated thickness of an aquifer or withdraws water from a reasonable and feasible pumping lift (WAC 173-150); (c) the withdrawal facilities must be able to accommodate a reasonable variation in seasonal pumping water levels; and (d) the withdrawal facilities including pumping facilities must be properly sized to the ability of the aquifer to produce water.

Well interference may occur when several wells penetrate and withdraw ground water from the same aquifer. Each pumping well creates a drawdown cone. When several wells pump from the same aquifer, well density, aquifer characteristics, and pumping demand may result in individual drawdown cones that intersect and form a composite drawdown cone. At any point in an aquifer, the composite drawdown caused by pumping wells will be greatly influenced by the transmissivity (T) of the aquifer. In aquifers with high Ts, composite drawdown will generally be much less than in aquifers with similar properties but with low Ts. Transmissivity is related to hydraulic conductivity (K) and the saturated thickness (b) of an aquifer by the relationship T=Kb.

An aquifer's hydraulic conductivity (K) is derived from the physical properties of both the fluid and geologic materials that form an aquifer. Once formed, an aquifer's saturated thickness (b) becomes important in evaluating its transmissivity. For regions of similar K in an aquifer, a large saturated thickness will result in a much higher T than a small saturated thickness. As a result, regions of similar K in an aquifer with a large saturated thickness will experience less composite drawdown or well interference than with a small saturated thickness.

Some conditions, however, will increase or steepen composite drawdown in an aquifer. For instance, where characteristics (such as very fine, clay-rich, or poorly sorted sediments) of an unconfined aquifer cause significant drawdown relative to the saturated thickness, the composite drawdown will increase as saturated thickness is reduced and T becomes smaller. Additionally, in regions where negative or no-flow boundaries occur, such as near the edges of a valley fill aquifer where it is bounded by bedrock, composite drawdown will be steeper than in the central part (generally the greatest thickness region) of the aquifer. Consequently, it is commonly understood that the greatest composite drawdown or well interference is more likely to occur in regions of low transmissivities, thin saturated thicknesses and near negative or no-flow boundaries than in regions of high transmissivities, large saturated thicknesses, and away from negative or no-flow boundaries.

The concepts discussed above come together when potential for impairment is being considered. For example, to claim impairment, a groundwater right holder must have a qualifying groundwater withdrawal facility and be able to demonstrate that withdrawals by another groundwater user is causing an impairing effect along with showing there is a right to protect and other factors. (Please refer to WAC 173-150.) Consequently when a proposed withdrawal is evaluated, consideration is given to how the withdrawal may affect other existing groundwater users.

The subject well is expected to behave as described above in the Hydrogeologic Discussion section and is not expected to create impairing conditions for existing users.

Spring Creek Discussion

Spring Creek is noted on the USGS Topographic Quad as being an intermittent stream. Anecdotal conversation with Mr. Dennis Andes (personal communication, Dec., 2010), a local area resident and well owner, across whose properties Spring Creek flows, further suggest the Creek's flow should be characterized as intermittent (Kittitas County Parcel ID # 947035 and #607035). The intermittent character of Spring Creek suggests it may have little groundwater discharge supporting baseflow. As discussed earlier, because of structural attitude of the LRF, if Spring Creek receives any contribution of groundwater discharge from the LRF it is likely to be derived primarily from the up dip or north side of the drainage. Some Creek flow, however, may be lost to infiltration into down dip LRF units over which the Creek may flow.

If the subject wells are authorized, their pumping will primarily and preferentially capture groundwater from the zones of secondary permeabilities, generally along bedding planes and within fractured shale members, which the well's boreholes have intersected. As pumping continues, vertical leakage across the LRF's bedding planes and via vertical fracture pathways may occur. Either condition will result in the capture of additional recharge or discharge as the groundwater system responds to the new consumptive withdrawal of groundwater.

Well AGM643 is located approximately 500 feet northwest of Spring Creek at its closest point, and if the applicants' request is granted, would pump a maximum of 0.414 af annually from the LRF. The well head is at an approximate elevation of 2,430 feet msl and on June 20, 2002, had a driller reported swl of 49 feet bg. Converting the swl to elevation places it at an approximate elevation of 2,381 feet msl. By comparison, at its closest point from this well, Spring Creek is at an approximate elevation of 2,400 feet msl. Consequently, if the swl of AGM643 were drawn down more than approximately 19 feet due to pumping, then Spring Creek, at its closest point, would be at a higher elevation than the dynamic water level in the well. Should this happen, pumping could result in capture of creek water via secondary vertical infiltration.

In any case, whether primarily by the capture of additional recharge, capture of additional discharge, or to a lesser degree by increased infiltration, both wells appear to have potential to capture groundwater that might otherwise support the intermittent flow of Spring Creek. As a result, should these small groundwater withdrawal effects or cumulative effects on the flows of Spring Creek be an issue of concern, then additional mitigation for Spring Creek may be necessary.

Note: Perhaps in error, all requests have individually requested a maximum withdrawal rate of 75 gallons per minute (gpm) per request. This would equate to a maximum rate of 225 gpm at AGM634 and 75 gpm at AGM643. However, if withdrawn at the maximum requested rates, would exhaust the maximum annual acre feet requested from AGM634 in approximately 2 days and from AGM643 in approximately 1 day. Clearly, operating the water systems in this manner is not likely intended. Further, it is unlikely that the LRF can yield 75 gpm for any sustained period of time. While reliable yield data for the LRF is largely lacking, given the general characteristics of the LR and these ells, it is thought that even a demand of 25 gpm may be greater than an optimum for sustained pumping and system operation.

Water Availability, Planned Mitigation, and Water Duty

Water availability includes legal availability (for example, closure of basins to further appropriations) and physical availability (for example, productivity of the aquifer).

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.
- 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.

Therefore, as discussed above, groundwater appears to be physically available. Legal availability, however, is ultimately a permitting/management decision that is, in part, based on the above information.

Under WAC 173-539A all groundwater in upper Kittitas County, including the project site discussed in this proposal, was withdrawn from further appropriation, except where the new appropriation is water budget neutral. The rule defines water budget neutral as ". . . an appropriation or project where withdrawals of ground water of the state are proposed in exchange for discharge of water from the other water rights that are placed into the trust water right program where such discharge is at least equivalent to the amount of consumptive use."

The appropriation proposed under the subject application will be water budget neutral by dedicating 0.037 af/yr of consumptive use available from the Suncadia Exchange to mitigation purposes. Month-by-month mitigation is offered to account for the project's indoor and outdoor uses during the trust water right's irrigation season (April 1-October 31). Out of irrigation season (November 1-March 31) use will be mitigated through an acceptable storage and release program to address out-of-season impacts. Table 4 above represents the estimated monthly consumptive use for the project.

In planning water demand for either single domestic or multiple domestic, source pumping yields must be recognized. The total daily source capacity, in conjunction with storage designed to accommodate peak use periods, must be able to reliably provide sufficient water to meet the MDD for the system. Reliability and sustainability must also be considered when planning for a sustainable yield. Lacking metered water use records, Ecology referred to the *Yakima River Basin Water Rights Adjudication: Report of Referee, Subbasin No. 1* to obtain water duty that was relied upon by the Referee. The maximum duty of water calculated in Subbasin No. 1 for the purpose of a single domestic use with a small lawn and garden was set at 0.01 cfs or 4.48 gpm.

Neighboring well AGM634 was air tested at 75 gpm at the time of drilling, which in comparison with the majority of wells within the Lower Roslyn formation, are estimated to yield 25 gpm at the time of drilling, depending upon the well's distance from Lake Cle Elum. Based upon no well test data for the subject well, other well log information, and the allocation set by the Referee, the proposed instantaneous estimate may prove both optimistic and potentially unsustainable. If withdrawn at the maximum requested rate of 75 gpm, AGM643 would exhaust the maximum annual acre-feet requested in 1 day.

DOH's WSDM[4] contains guidance for determining peak hourly demand in units of gallons per minute. No well test has been conducted for the proposed source. Based upon other well log information and the allocation set by the Referee, Ecology used the Referee's proven, conservative approach of 4.48 gpm.

Other Rights Appurtenant to the Place of Use

No existing water rights were found appurtenant to the proposed place of use (POU). Water rights in the vicinity are summarized in **Attachment 2**.

Beneficial Use

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

Public Interest Considerations

When investigating a water right application, Ecology is required to consider whether the proposal is detrimental to the public interest. Ecology must consider how the proposal will affect an array of factors such as wildlife habitat, recreation, water quality, and human health. The environmental resources and other natural values associated with the area were taken into account during the consideration of this application.

Consideration of Protests and Comments

No protests were filed against this application.

Conclusions

In conclusion,

- Water is physically available at the quantities sufficient to meet project demand. When combined with the proposed mitigation measures, water is legally available under the provisions of WAC 173-539A.
- According to RCW 90.54.020, domestic use is considered a beneficial use.
- Approval of the proposed appropriation will not result in impairment of existing water right holders as provisioned, when combined with the proposed mitigation measures.
- Approval of the proposed appropriation is not detrimental to the public interest as provisioned, once combined with the proposed mitigation measures.

[4] Department of Health "*Water System Design Manual*," Olympia, Wa., 2009, p. 55, www.doh.wa.gov/ehp/dw/Publications/331-123.pdf, accessed on February 3, 2011.

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 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:

- 4.48 gallons per minute.
- 0.414 acre-feet per year (0.392 acre-feet for domestic and 0.022 acre-feet for irrigation).
- Continuous indoor single domestic for 1 residence.
- Seasonal irrigation of up to 0.011 acre of lawn and garden from June 1 through September 30.

Point of Withdrawal
One well (AGM-643) Approximately 1068 feet south and 1056 feet west from the northeast corner of Section 34 within the NE¼NE¼ of Section 34, Township 21 North, Range 14 E.W.M.

Place of Use
As described on Page 2 of this Report of Examination.

Candis L. Graff, Water Resources Report Writer — Date: 9-1-11

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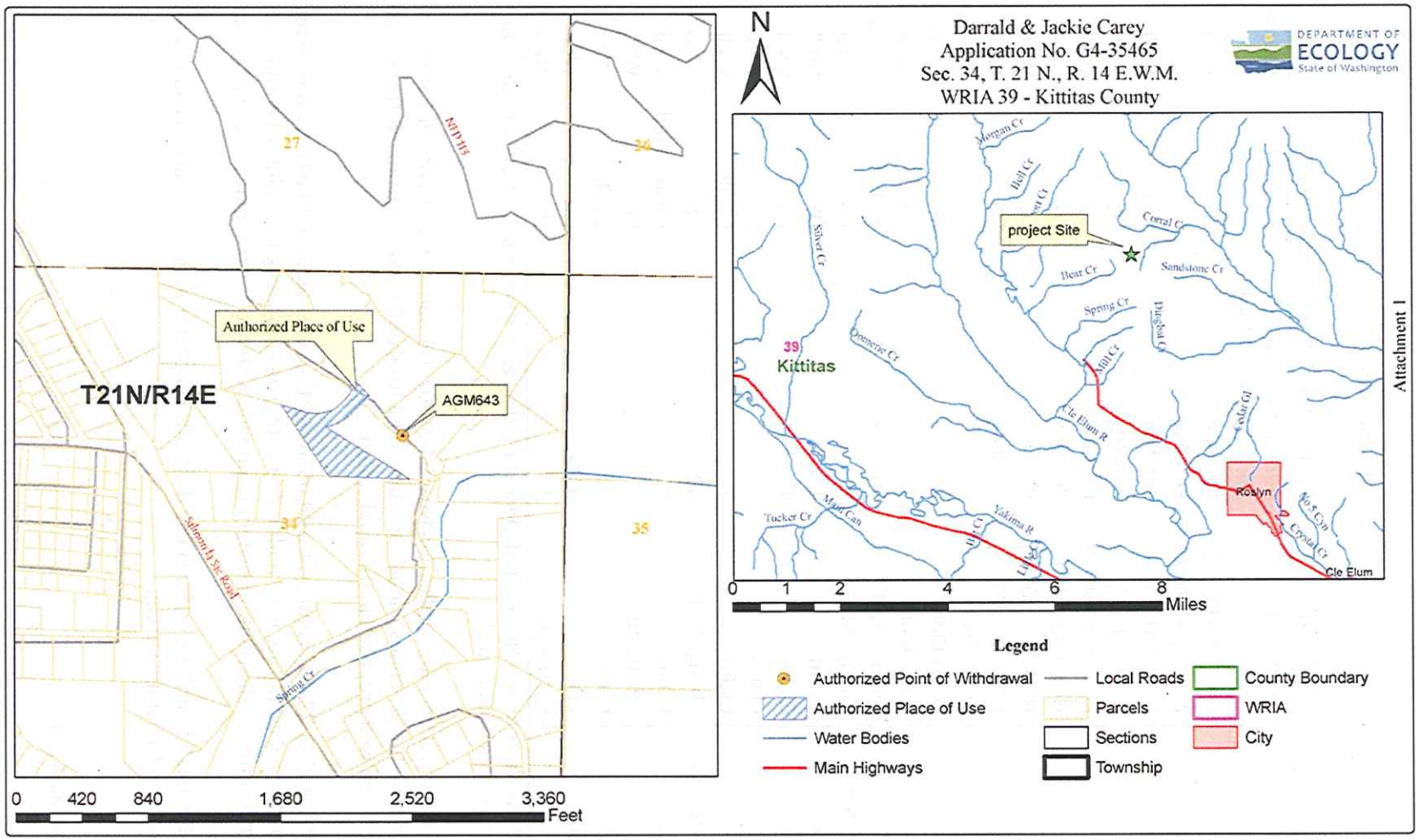
Darrald & Jackie Carey
Application No. G4-35465
Sec. 34, T. 21 N., R. 14 E.W.M.
WRIA 39 - Kittitas County
DEPARTMENT OF ECOLOGY State of Washington
N
T21N/R14E
Authorized Place of Use
AGM643
27
36
34
35
NFD 113
Salmon Ia Sac Road
Spring Cr
0 420 840 1,680 2,520 3,360 Feet
project Site
Kittitas
39
Morgan Cr
Bell Cr
Corral Cr
Sandstone Cr
Bear Cr
Spring Cr
Silver Cr
Domerie Cr
Mill Cr
Cle Elum R
Cedar Gl
Roslyn
No 5 Cyn
Crystal Cr
Cle Elum
Tucker Cr
Main Can
Yakima R
0 1 2 4 6 8 Miles
Legend
Authorized Point of Withdrawal
Authorized Place of Use
Water Bodies
Main Highways
Local Roads
Parcels
Sections
Township
County Boundary
WRIA
City
Attachment I

Attachment 2

Table 5: Other Water Rights within 0.5-Mile Radius of POW

Court Claim/ Control Number	*Document Type*	*Authorized/Claimed Annual Quantity(Qa)*	*Purpose*	*Source*
G4-35307	New App.(WBN)	Pending	DM	Well
G4-35414	New App. (WBN)	Pending		
G4-35418	New App. (WBN)	Pending	DM	Well
G4-35419	New App. (WBN)	Pending	DS	Well
G4-35420	New App. (WBN)	Pending	DS	Well
G4-35460	New App. (WBN)	Pending	DS	Well
G4-35459	New App. (WBN)	Pending	DS	Well
G4-35462	New App. (WBN)	Pending	DS	Well
0415	Court Claim	0.5	DS	Unnamed Spring
1289	Court Claim	1	IR	Spring Creek
1291	Court Claim	2	DS	Spring Creek
CG3-22462C	Change/ROE	30	MU	3 Wells
CG4-GWC4396-A	Change/ROE	2	DS	Well
G4-059811CL	Claim	1	DS	Well
G4-059812CL	Claim	1	DS	Well
G4-059813CL	Claim	1	DS	Well
G4-072947CL	Claim	2	DS/IR	Well
CG4-GWC6536-A@1	Change/ROE	60	MU	3 Wells
G4-000079CL	Claim	40	Unspecified	Well
G4-22756C	Certificate	4	CI	Well
G4-001518CL	Claim	1.5	DG/IR	Well
G4-033805CL	Claim	0.75	DG	Well
G4-27075C	Certificate	2	DS	Trench

Definitions: WBN=Water Budget Neutral, DM=Domestic Multiple, DS=Domestic Single, IR=Irrigation, MU=Domestic Municipal, CI=Commercial/Industrial.

Water Budget Neutral pending application Nos. G4-35307, G4-35414, G4-35418, G4-35419, G4-35420, G4-35459, and G4-35462 request similar amounts for a total of 6 residents from existing 4 existing wells, including the same well proposed in this application.

CG4-GWC4396-A, CG3-22462C, and CG4-GWC6536-A@1 provide water to the Driftwood Acres water system. Each original certificate was modified to authorize combining the points of withdrawal of 3 wells through a common distribution system to provide water to the combined entire development.

Court Claim No. 0415 is authorized for single domestic supply for a recreational cabin and is used seasonally from an Unnamed Spring.

Court Claim No. 1289 is authorized for no more that ½ acre of lawn of irrigation, amounting to 1 af/yr from Spring Creek.

Court Claim No. 1291 is authorized for single domestic supply, including lawn and garden from Spring Creek.

The validity of G4-059811CL, G4-059812CL, G4-059813CL, G4-07294CL, G4-001518CL, G4-033805CL, and G4-000079CL is suspect since the reported dates of first use fall after the adoption of RCW 90.44: Regulation of Public Ground Water of 1945.

G4-22756C is owned by Boulder Creek Enterprises and attests to the withdrawal of 4 af/yr for commercial use.

G4-27075C authorizes 2 af/yr for domestic supply within Sunshine Estates.