File NR G4-35495
WR Doc ID 4734035

DEPARTMENT OF ECOLOGY
State of Washington

State of Washington

REPORT OF EXAMINATION FOR WATER RIGHT APPLICATION

PRIORITY DATE
05/10/2011

WATER RIGHT NUMBER
G4-35495

MAILING ADDRESS
Eli Shoval
8444 SE 63RD ST
MERCER ISLAND WA 98040

SITE ADDRESS (IF DIFFERENT)

Quantity Authorized for Withdrawal

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AC-FT/YR)
4.48	GPM	0.414

Purpose

PURPOSE	WITHDRAWAL OR DIVERSION RATE ADDITIVE	WITHDRAWAL OR DIVERSION RATE NON-ADDITIVE	UNITS	ANNUAL QUANTITY (AC-FT/YR) ADDITIVE	ANNUAL QUANTITY (AC-FT/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

Combined instantaneous quantity from the well identified by Ecology's unique well tag # APG-193 shall not exceed 33 gpm between 7 total connections.

IRRIGATED ACRES ADDITIVE	IRRIGATED ACRES NON-ADDITIVE	PUBLIC WATER SYSTEM INFORMATION WATER SYSTEM ID	PUBLIC WATER SYSTEM INFORMATION CONNECTIONS
0.011		AC434 (Wedgwood Estates)	7

Source Location

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

SOURCE FACILITY/DEVICE	PARCELS	WELL TAG	TWN	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
1 Well	957004	APG193	19N	15E	07	SWNE	47.15609	-121.01257

Place of Use (See Attached Map)

PARCELS (NOT LISTED FOR SERVICE AREAS)
957006

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

Lot 3 of WEDGWOOD ESTATES, according to the Plat recorded in volume 12 of Plats at page(s) 12-14, records of Kittitas County, Washington.

Proposed Works

The subject well was drilled in 2006 (Ecology unique well ID # APG193) to a depth of 123 feet. A 6-inch casing and a 5 horsepower submersible pump are installed in the well. The delivery system includes an 87 gallon pressure tank and uses 2-inch PVC for the 1900 lineal feet of mainline outgoing pipes. Water from this well will be used for this project for indoor domestic and outdoor supply. With the addition of this proposal, water from this well will be used for multiple domestic and incidental irrigation supplies totaling 7 connections. Wedgwood Estates is a Department of Health-(DOH) approved Group B community, private water system and will be regulated by DOH. Domestic wastewater will be discharged to an individual on-site septic system, pursuant to the *Declaration of Covenant* signed May 4, 2011, by subject applicant.

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Started	December 31, 2016	December 31, 2021

Measurement of Water Use

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

Provisions

Wells, Well Logs and Well Construction Standards

The subject well and the right to use water from it is restricted to and authorized for the Spex Arth Creek alluvial sediment aquifer.

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 sources of contamination. L 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 and WAC 173-539A-070.

Water use data shall be recorded bi-weekly 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 Ecology 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
In order to maintain a sustainable supply of water and ensure that your water source is not impaired by future withdrawals, static water levels **should** be measured and recorded monthly using a consistent methodology. Static water level is defined as the water level in a well when no pumping is occurring and the water level has fully recovered from previous pumping. Static water level data should include the following elements:

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

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
Final beneficial use calculations for each connection to the Wedgwood Estates water system, either independently or combined, shall be determined during the investigation at the Proof of Appropriation stage.

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
You will pay to Ecology the sum of $60.19, which represents a proportionate amount of the payment due and owing to the united States for storage and deliver of water under Paragraph 15(a) of Water Storage and Exchange Contract No. 09XX101700, between the Bureau of Reclamation and the State of Washington Department of Ecology, Yakima Project, Washington, dated January 29, 2009.[1] The consumptive use of 0.072 acre-feet from September 1 through March 31 is subject to the terms and conditions in the Water Storage and Exchange Contract No. 09XX101700.

You will record with the Kittitas County Auditor a property covenant as required under WAC 173-539A-050 that restricts or prohibits trees or shrubs over a septic drain field on Parcel No. 957006.

You will record with the Kittitas County Auditor an appropriate conveyance instrument under which the applicant obtains an interest in Trust Water Right No. S4-05259CTCL@2sb7 to offset consumptive use.

Any 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.

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. G4-35495, 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 Hearing 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.

[1] "Long-Term Water Storage and Exchange Agreement between the U.S. and the State of Washington, Department of Ecology" (Contract No. 09XX101700), http://www.ecy.wa.gov/programs/wr/cro/images/pdfs/exchangecontract_012909.pdf, accessed on August 22, 2011.

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

Signed at Yakima, Washington, this 6 day of October 2011.

Melissa Downes

Melissa Downes, Acting Section Manager
Water Resources Program, CRO

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 May 10, 2011, Eli Shoval of Mercer Island, Washington, (the applicant) 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. G4-35495. The applicant requested authorization for an instantaneous withdrawal (Qi) of 33 gallons per minute (gpm) and an annual withdrawal volume (Qa) of 0.0392 acre-feet per year (ac-ft/yr) for one residence and 0.022 ac-ft/yr for 0.011 acre (500 square feet) of incidental lawn and garden irrigation. While this application requests appropriation from the proposed well for one residence, it is anticipated the same well will also be used to service 6 additional parcels (Parcel Nos. 957004, 957005, 957007, 957008, 957009, 957010) for domestic supply and for an additional 0.069 acre (3,000 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	**Eli Shoval**
Priority Date	May 10, 2011
Instantaneous Quantity	33 gpm
Annual Quantity	0.414 ac-ft/yr
Purpose of Use	Domestic Single (DS), Irrigation (IR)
Period of Use	Year-round/Seasonal, June 1-Sept 30
Place of Use	Parcel No. 957006, Sec. 7, T. 19 N., R. 15 E., Kittitas County

Table 2: Proposed Source of Withdrawal

Source Name	Parcel	Well Tag	Twn	Rng	Sec	QQ Q	Latitude	Longitude
1 well	957004	APG193	19N	15E	07	SWNE	47.15609	-121.01257

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* of Ellensburg, Washington during the weeks of July 2nd and July 9, 2011. No comments or protests were received by Ecology during the 30-day comment period.

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 "unofficially" provided on June 27, 2011 during a Yakima Water Transfer Workgroup (WTWG) meeting and again officially on August 1, 2011. A positive response was communicated in response to this proposal.

State Environmental Policy Act (SEPA)

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

(a) It is a surface water right application for more than 1 cubic feet per second, unless that project is for agricultural irrigation, in which case the threshold is increased to 50 cubic feet per second, so long as that irrigation project will not receive public subsidies.
(b) It is a groundwater right application for more than 2,250 gallons per minute.
(c) It is an application that, in combination with other water right applications for the same project, collectively exceed the amounts above.
(d) It is a part of a larger proposal that is subject to SEPA for other reasons (e.g., the need to obtain other permits that are not exempt from SEPA).
(e) It is part of a series of exempt actions that, together, trigger the need to do a threshold determination, as defined under WAC 197-11-305.

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

INVESTIGATION

Site Visit

A site visit was performed on June 7, 2011, by Candis Graff and Anna Hoselton from Ecology.

Other Rights Appurtenant to the Place of Use

No other water rights are appurtenant to the proposed place-of-use. No surface water rights from Spex Arth Creek within a .5-mile radius were confirmed by the adjudication court. Other ground water rights in the vicinity are summarized in Table 3.

Table 3: Ground Water Rights within .5-Mile Radius of POW

Control Number	*Document Type*	*Authorized/Claimed Annual Quantity(Qa)*	*Purpose*	*Source*
G4-108735CL	Claim	Not Specified	DG, IR, ST	1 Well
G4-053368CL	Claim	Not Specified	DG	1 Well
G4-35435	WBN/Application Pending	0.609 ac-ft/yr	DS, IR	1 Well
G4-35250P	Permit	21.9 ac-ft/yr	DM, IR	4 Wells
G4-28206CWRIS	Certificate	1.0 ac-ft/yr	DS	1 Well

Definitions: WBN=Water Budget Neutral, DM=Domestic Multiple, DS=Domestic Single, IR=Irrigation, DG=Domestic General, and ST=Stockwater.

G4-108735CL and G4-053368CL are short-form claims and represent permit-exempt groundwater uses.

Water Budget Neutral Pending Application No. G4-35435 requests withdrawal from an undrilled well for domestic supply to serve one residence and incidental irrigation.

G4-35250P represents a permit authorizing a multiple domestic supply for up to 65 housing units and 4.4 acres of irrigation.

G4-28206CWRIS authorizes single domestic supply from March 1 through October 31.

Proposed Use and Basis of Water Demand

The DOH-approved Group B system, Wedgwood Estates, became effective on February 20, 2010, and is approved for 7 connections. The source is currently metered.

The December 2009 *Water System Design Manual*[2] (WSDM) by 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 246-290-2321(3)(a) and Section 5.2.3.
3. The criteria presented in Chapter 5.

According to the WSDM, new systems or water systems that have no source meter records, information can be obtained from analogous water systems or from information presented in Appendix D in order to estimate Average Daily Demand (ADD) and Maximum Daily Demand (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 MDD for internal uses can be established at 350 gpd/ERU.

The MDD values are set at 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 WAC 173-539A, and applying the WIG's CIR, the outdoor water requirement for 500 square feet (0.011 acre) of grass is 0.019 acre-feet per year. The calculated consumptive use and total calculation considered factors specified in WAC 173-539A and are summarized in **Table 4.**

Table 4: *Estimated Total and Consumptive Use

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

*Quantities are rounded.

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

Hydrologic/Hydrogeologic Evaluation

The following hydrologic/hydrogeologic excerpts were prepared in a technical memorandum dated June 21, 2011 and modified on July 5, 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, physical availability and potential for impairment to existing water users.

Hydrogeologic Discussion

The subject well is located within the Spex Arth Creek Basin. The Basin is defined on the south by a segment of the South Cle Elum Ridge, which at the head of the Basin rises to approximately 5,000 ft mean sea level (msl). To the west and east, the Basin boundaries are defined by gently expressed topographic divides that separate the Spex Arth drainage from that of Fowler/Peterson Creek on the west and Tillman Creek on the east. To the north, Spex Arth drainage opens to and merges with the Yakima River valley.

The Spex Arth Basin, is underlain predominately with a Jurassic-Cretaceous age low permeability foliated metamorphic rock identified as the Darrington Phyllite/Easton Schist of the Easton Metamorphic Suite (Hauregud & Tabor, 2009). The resistant grey-black graphitic phyllite/schist, in which quartz layers and veins are common, forms the basin's upland slopes, ridges, and knobs. In between the bedrock highs, alluvial sediments composed of clays, silts, sands and gravels, blanket and fill in lower relief topography between the basin's east and west boundaries and between the bedrock uplands to the south and ridge and knobs to the north. South of the north ridge and knobs, sediments transition from alluvial to glacially derived deposits until dropping down onto alluvial sediments of the main stem Yakima River valley floor.

The subject well withdraws groundwater from the alluvial sediments that span the central region of the basin. Sediment composition, as recorded on area well logs, show the alluvial deposits are composed largely of fine sediments such as silt and clay that is mixed with coarser sediments, such as sand and gravels, and strongly indicate the deposit's overall poor sorting. A few logs record sand, sandy gravel, or gravel-only layers; however, it is uncertain if these coarser materials are extensive, or more likely, exist as limited extent lenses.

While only one well completed into the alluvial sediments fully penetrates the aquifer's entire saturated thickness of 31 ft at its specific location, the remaining alluvial sediment wells, which only partially penetrate the aquifer's saturated thickness, suggest saturated thicknesses range from around 20 to possibly more than 50 ft. At area bedrock wells that have been perforated into the alluvial sediments, saturated thickness of the alluvial sediments may be as little as two feet and as much as 31 ft. Yield estimates done by air-test methods roughly suggest wells developed into the alluvial aquifer can produce from less than 10 gpm to approximately 40 gpm. A four hour pump test was performed at well, APG192, located approximately 500 ft to the northeast, recorded a yield of 33 gpm with a maximum of 3 ft of drawdown. A second four hour pump test was performed at well, APG192 (as noted above) and yielded 37.5 gpm with a maximum of 3 ft of drawdown. The two tests roughly suggest an aquifer transmissivity in

the range of 24,000 to 36,000 gpd/ft (3208 to 4813 sq ft/day) reflecting the 28 to 33 ft saturated thickness composed of poorly sorted sandy clay gravel and sandy gravel. Alluvial aquifer storativity is expected to be in the unconfined to semiconfined range.

Recharge to the alluvial aquifer is by direct precipitation and by runoff of rejected recharge from the highland bedrock areas, especially during storm and snow melt events. Discharge from the alluvial aquifer is to the down slope glacial sediments, and to the east and west forks of Spex Arth Creek where groundwater heads are higher than creek bed elevations. Recharge/discharge relationships between the bedrock unit and the alluvial sediments are presently uncertain due to data limitations.

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 associated with 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 Works and Well Interference

There are three concepts that are important when considering whether a withdrawal of water from a well would impair another existing water right. The concepts are defined as follows:

<u>Impairment</u> is an adverse impact on the physical availability of water for a beneficial use that is entitled to protection.

<u>Qualifying ground water withdrawal facilities</u> are defined as those wells which in the opinion of the Department are adequately constructed. An adequately constructed well 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) has withdrawal facilities capable of accommodating a reasonable variation in seasonal pumping water levels; and (d) the withdrawal facilities and pumping facilities are properly sized to match the ability of the aquifer to produce water.

Well interference is the overlap of the cones of depression for two or more wells. Well interference reduces the water available to the individual wells and may occur when several wells penetrate and withdraw groundwater 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.

General Impairment Discussion

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. Consequently when a proposed withdrawal is evaluated, consideration is given to how the withdrawal may affect other existing groundwater users.

In the case of the subject well (APG192), the closest area well appears to be Oren Development LLC well, APG193, located approximately 500 feet to the southwest. The construction of both wells was finished on September 14, 2006, with both wells being completed to a depth of 124 ft. The static water level (swl) was measured at 91 ft swl at APG193 and at 96 ft swl at APG192 on September 14, 2006. Both wells are developed into what appears to be the same water-bearing brown sandy gravel layer occurring between 72 and 124 ft at APG193 and between 98 and 124 ft at APG192.

Effects due to pumping at the subject well were considered using a Cooper-Jacob approximation of the Theis equation (Driscoll, 1987) for both an unconfined and confined setting. An aquifer transmissivity of 24,000 gpd/ft (3208 sqft/day) to 36,000 (4813 sq ft/day) based on the pump test discussed above was applied and storativity/specific yield was varied from an unconfined to a semiconfined (0.15 to .005) value. Effects were evaluated for a one year period (365 days) of continuous pumping at the requested rate of 33 gpm. Results suggest if the system trends semi-confined the effect spreads out further than it might if the system trends unconfined. However, in either case, drawdown predicted at 500 ft from the subject well calculated to be no greater than 1 foot. Given aquifer characteristics, the 28 ft or more saturated thickness at APG192, and a relatively low density of neighboring wells, impairment between area wells due to pumping at the subject well is not anticipated.

Pumping Effects and Spex Arth Creek Discussion

The subject well is located approximately 1,050 feet east of the intermittent Spex Arth Creek at its closest point. The land surface elevation in the vicinity of the well is approximately 2,280 ft msl while the well's static water level (minus 2 ft of casing above the land surface) when converted to elevation is approximately 2,186 ft msl (Tumwater, 2006). The point at which the creek's elevation is approximately equal to that of the well's swl's elevation occurs downstream at a distance of approximately 2,900 ft northwest of the well within the region where the creek flows over phyllite bedrock. Consequently, the geology and head elevations suggest that groundwater, if not captured by the subject well, may otherwise take one of three paths: (1) discharge to the east fork of Spex Arth Creek near the alluvial sediment/phyllite boundary, (2)

discharge in part to the east fork of Spex Arth Creek near the alluvial sediment/phyllite boundary and in part follow the boundary southeast and discharge from the alluvial sediments to the glacial sediments, or (3) discharge in whole from the alluvial sediments to the glacial sediments in between the phyllite bedrock outcrops east and west of Wood and Steel Road.

If scenario 1 were the case, then relatively constant groundwater discharge to Spex Arth Creek would be expected rather than the intermittent flow that is indicated. Additionally, assuming the unconsolidated alluvial aquifer is unconfined to semi-confined, groundwater flow can be expected to generally conform to local topographic patterns. Further, an attempt to accurately locate a minimum of three wells was made for purposes of completing a flow-direction analysis. With the field location and identification of well APG193, it was possible to compare water level elevations at APG193, at the subject well, APG192, and at well BAF761. The resulting calculated flow direction suggests that groundwater flow from the area of the subject well would be approximately due north.

Evaluating the subject well's location and topographic patterns and calculated direction of groundwater flow suggests that perhaps scenario 2 and certainly scenario 3 above are more likely. Additionally, assuming that scenarios 2 or 3 are representative of the groundwater flow pattern from the area of the subject well, it can be further extrapolated that pumping effects from the subject well, such as a reduction of groundwater discharge to surface water would, in case 3, occur in the "green" or suitable area of the Lamb/Anderson suitability map (Figure 4) along the lower reaches of Spex Arth and/or to the mainstem Yakima River.

In scenario 2, only a portion of pumping effects would be expected to reduce groundwater discharge that may occur at the alluvial sediment/phyllite boundary in the vicinity of the east fork of Spex Arth Creek, while the rest would discharge in the manner described for case 3 above. Interestingly, given head elevations between the creek and the groundwater level at the subject well, pumping effects on the east fork of Spex Arth Creek due to the subject well would be expected during times of higher groundwater levels and low use. Pumping effects due to the subject well would be less so, to not at all, when groundwater levels are lower, such as can be expected during average to below average precipitation and during or following draught conditions such as was seen with the 2006 groundwater level or lower.

Available data supports scenario 3 as the most likely groundwater conditions in the area of the subject well. However, during periods of increased precipitation and low groundwater use, scenario 2 may occur. **As a result, impacts to the east fork Spex Arth as a result of pumping at the subject well during depressed groundwater levels and low stream flow conditions are not anticipated.**

Water Availability, Planned Mitigation, and Water Duty

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

Physical Availability

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

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

Water Availability Discussion

The subject request has been mitigated to offset the consumptive loss that would have otherwise supported baseflow discharge to the mainstem Yakima River. However, local water availability from groundwater and local surface water features near the point of the requested groundwater withdrawal is less clear. This report addresses the local physical availability component of the water availability question while recognizing that water availability also includes legal availability and associated policy and management considerations. Attempting to resolve the local physical water availability question, a simplified water balance describing the inflows and outflows of water for the Spex Arth Alluvial Aquifer (Figure 2) was constructed and considered.

Recognizing the phyllite bedrock highlands contribute a volume of recharge in the form of runoff to the alluvial aquifer the following basic balance equation was used to approximate runoff for the phyllite bedrock unit for average annual conditions (steady-state):

$$\text{Precipitation (P)} - \text{Infiltration (I)} - \text{Evapotranspiration (ET)} - \text{Runoff (RO)} = 0$$
$$P - I - ET - RO = 0$$

The PRISM (Parameter-elevation Regressions on Independent Slopes Model) average annual precipitation 1971-2000 data set was used to evaluate the average annual precipitation (aap) distribution over the alluvial aquifer and the bedrock highlands to the south. Based on field observations, it was assumed that only a small percentage (approximately 3%) of the aap distributed over the highlands infiltrated (I) into the phyllite bedrock and that the remaining aap became rejected recharge (RR). Evapotranspiration (ET) was conservatively assumed to consume approximately 50% of the aap (McKenzi, 2003) and was subtracted from the rejected recharge (97% of the aap) to result in a remainder of 47%. This remaining 47% of the aap was then assumed to leave the bedrock unit in the form of runoff (RO) to the creeks, discharge from springs, as storm event overland flow, and as infiltration, to enter the alluvial sediment unit.

The phyllite runoff (RO) volume was then converted to acre feet per year and added to the aap volume calculated for the alluvial sediments outcrop area as an input. Estimated outputs from the alluvial sediment unit include evapotranspiration (ET), surface water runoff (SRO), intermittent base flow (BF) to the east and west forks of Spex Arth Creeks, groundwater discharge (SSRO) to downslope glacial sediments, and existing permitted surface water and groundwater withdrawals (EWR). Outputs were subtracted from the total alluvial sediment unit input and adjusted slightly to achieve a mass balance for average annual (steady-state) conditions using the following equation:

(Precipitation (P) + Phyllite Runoff (ROp)) - Evapotranspiration (ET) - Surface Runoff (SRO) - Groundwater baseflow (BF) to surface water - Subsurface flow leaving the alluvial unit (SSRO) - Existing Water Rights and domestic wells (EWR) = 0

$$(P + ROp) - ET - SRO - BF - SSRO - EWR = 0$$

Based on area topography, groundwater levels and flow direction calculations, groundwater captured by the subject well is most likely to reduce the SSRO component of the above balance. Based on the hydrogeologic setting, well data, and the simplified water balance, groundwater is physically available for the project. Water availability, however, also includes policy, management and legal considerations and is ultimately a permitting/management decision that is, in part, based on the above information.

Based on the hydrogeologic setting, well data, and the simplified water balance, **groundwater is physically available for the project**.

Legal availability, however, is ultimately a permitting/management decision that is, in part, based on the above information.

WAC 173-539A withdrew from appropriation all groundwater within upper Kittitas County, Only new withdrawals of groundwater where the new appropriation is determined water budget neutral are allowed. 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 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 0.137 ac-ft/yr of consumptive use available from the Suncadia Exchange to mitigation purposes. Table 4 above represents the estimated monthly consumptive use for the project.

Beneficial Use

The use of water for single domestic and irrigation purposes is defined in statute as a beneficial use (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.
- RCW 90.54.020 recognizes domestic and irrigation uses as beneficial uses of water.
- Approval of the proposed appropriation will not result in impairment of existing water rights.
- Approval of the proposed appropriation is not detrimental to the public interest.

RECOMMENDATIONS

Based on the above investigation and conclusions, I recommend that this request for a water right be approved in the amounts and within the limitations listed below and subject to 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 ac-ft/yr for single domestic and 0.022 ac-ft/yr for irrigation).
- Continuous indoor single domestic for 1 residence.
- Seasonal irrigation of up to 0.011 acre of lawn and garden from Jun 1 through September 30 annually.

Point of Withdrawal
One well (APG-193) approximately 1520 feet west and 1860 feet south from the northeast corner of Section 7, within the SW¼NE¼, Section 7, Township 19 North, Range 15 E .W.M.

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

Candis L. Graff, Water Resources Program Date 10-6-11

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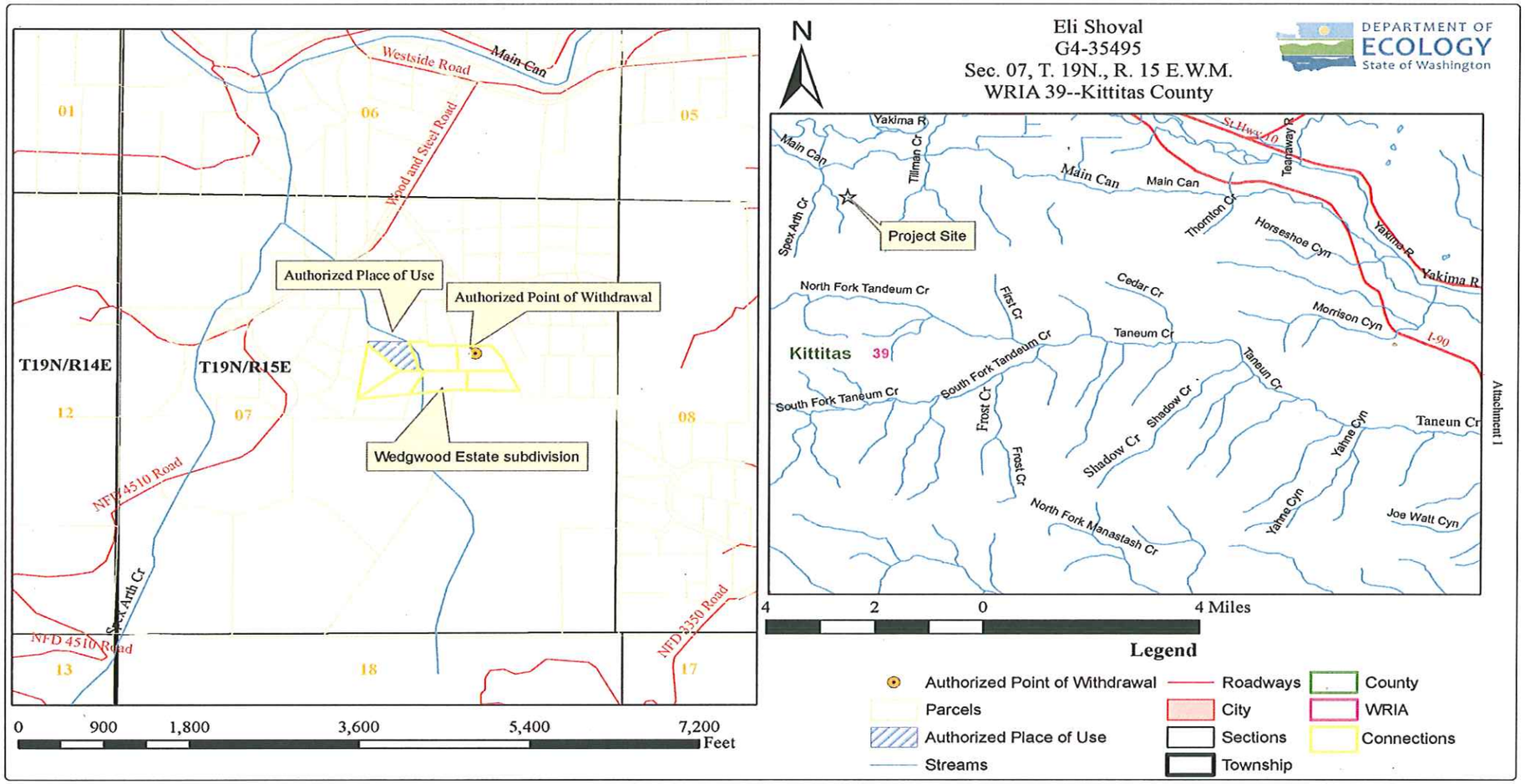

Attachment 1