File NR G2-30250

DEPARTMENT OF ECOLOGY State of Washington

State of Washington

REPORT OF EXAMINATION FOR WATER RIGHT APPLICATION

APPLICATION PRIORITY DATE
May 3, 2005

WATER RIGHT NUMBER
G2-30250

MAILING ADDRESS
City of Lacey
420 College Street SE
Lacey, Washington 98503

SITE ADDRESS (IF DIFFERENT)
8855 Campus Glen Dr Northeast
Lacey, Washington 98516

Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
800	GPM	1,000

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)
Municipal Supply	800		GPM	1,000		Year round

IRRIGATED ACRES ADDITIVE	IRRIGATED ACRES NON-ADDITIVE	PUBLIC WATER SYSTEM INFORMATION WATER SYSTEM ID	PUBLIC WATER SYSTEM INFORMATION CONNECTIONS
		43500	

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
Thurston	TQu Aquifer		13 – Deschutes

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWN	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
Meridian Campus Well	11801210000	BAM407	18N	01W	1	NENW	645688.5 N	80072.4 E

Place of Use

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

The place of use (POU) of this water right is the service area described in the most recent Water System Plan approved by the Washington State Department of Health, so long as the water system is and remains in compliance with the criteria in RCW 90.03.386(2). RCW 90.03.386 may have the effect of revising the place of use of this water right.

Proposed Works

The Meridian Campus test well was advanced to a depth of 667 feet below ground surface (bgs) with an 8-inch diameter casing and a well screen assembly from 497 to 657 feet bgs. Three TQu aquifer zones (1, 2, and 3) are screened with 10- to 50-slot well screen for a total open interval of approximately 66 feet. Design and installation of the production well is pending.

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Begun	June 2028	June 1, 2051

Measurement of Water Use

How often must water use be measured?	Weekly
How often must water use data be reported to Ecology?	Annually (by January 31)
What volume should be reported?	Total Annual Volume & Report-Volume
What rate should be reported?	Weekly Peak Rate of Withdrawal (gpm)

Provisions

Mitigation

The use of water under this permit is subject to the fulfillment of the Comprehensive Water Rights Mitigation Plan, presented in Lacey (2010) and as amended below, and continued agreement between the cities of Olympia, Lacey, and Yelm through the supporting Amended Interlocal Agreement (presented in Appendix D of City of Lacey (2010)).

A single joint Mitigation Summary Report shall be prepared by the three cities and submitted to Ecology annually. At a minimum, the report shall include:

- Development and performance of the previous year's basin-specific (Woodland Creek, McAllister Creek, Nisqually River, and Deschutes River) out-of-kind mitigation actions. The section on the Deschutes River and Woodland Creek shall be jointly developed with the cities of Olympia and Yelm consistent with interlocal agreements between the cities;
- Development and performance of the previous year's basin-specific in-kind mitigation actions. The summary of performance shall be supported by available data (e.g. estimates of monthly infiltration rates at the Woodland Creek infiltration facility);
- Completed city-specific mitigation actions by basin;
- Applicable water right permit development, by phase (1, 2, and 3);
- Comparison between permit development and corresponding completed mitigation actions; and
- Identification of mitigation actions not completed, if any, including a revised schedule and proposed limitations on permit development until completed.

For brevity, the summary report may include appendices of construction and/or monitoring reports. The annual Mitigation Summary Report for the previous year is due to Ecology on January 31. The first summary report is due on January 31, 2013. The third unnamed water right referenced under the Mitigation Plan in the Deschutes Basin is not a required mitigation element under this water right approval.

Saltwater Intrusion Monitoring
Prior to placing Meridian Campus well into production, Lacey must implement the TQu aquifer groundwater monitoring strategy presented in Northwest Land and Water (2011). Critical elements of the monitoring strategy include:

1. Beachcrest Well No. 3 shall be completed as a monitoring well in TQu aquifer zone 1, 2, and 3;
2. A sentinel monitoring well shall be installed in the TQu aquifer as close to the shoreline of Puget Sound as siting reasonably allows. The monitoring well shall be completed in TQu aquifer zones 1, 2, 3, 4, and 5. The monitoring well must be installed within one year of issuance of the Marvin Road and/or Meridian Campus water right permit;
3. Groundwater elevations shall be continuously monitored (via dedicated downhole pressure transducer) at all City-owned TQu wellheads, including Hawks Prairie well Nos. 1 and 2, Marvin Road, Meridian Campus, Beachcrest Well No. 3, and within each of the five zones discretely screened in the newly installed monitoring well;
4. Groundwater quality (temperature and specific conductance) shall be continuously monitored (via downhole pressure transducer) at Beachcrest Well No. 3 and the sentinel monitoring well. Quarterly groundwater quality samples shall be collected from all TQu aquifer pumping wells and submitted for chloride analysis;
5. Baseline groundwater elevation and water quality monitoring shall be completed for a minimum of two years prior to placing Meridian Campus well into production.
6. Prior to placing the Meridian Campus well into service, a Technical Memorandum must be prepared summarizing observed groundwater elevation and water quality trends in comparison with baseline conditions. In addition, the analysis shall use updated aquifer parameters and information regarding lateral and/or vertical TQu aquifer hydraulic continuity. The memorandum must conclude with recommendations on the development approach (e.g. pumping schedule, duration, etc) of the subject production well; and
7. Long-term groundwater elevation and water quality monitoring must continue for the life of the permit, analyzed, and reported to Ecology annually.

If at any time, the data and/or analysis indicate saltwater intrusion or impairment of existing wells, mitigating measures will be implemented. Mitigating measures may include reduction or cessation of pumping from one or more wells completed in the TQu aquifer.

Measurements, Monitoring, Metering and Reporting
An approved measuring device shall be installed and maintained for the source identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173, which describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

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

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times to the project location, and will be allowed to inspect, at reasonable times, records of

water use, wells, diversions, measuring devices and associated distribution systems to ensure there is compliance with the law.

Water Level Measurements
Static water levels shall be measured and recorded monthly, using a consistent methodology. Data for the previous year shall be submitted by January 31 to the Department of Ecology.

Proof of Appropriation
The water right holder shall file the notice of Proof of Appropriation of water 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.

Findings of Facts
Upon reviewing the investigator's report, I find all facts, relevant and material to the subject application, have been thoroughly investigated.

Therefore, I ORDER approval of Application No. G2-30250, subject to existing rights and the provisions specified above.

Signed at Olympia, Washington, this 19th day of December 2011.

Michael J. Gallagher

Michael J. Gallagher, Section Manager

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.

Mailing Addresses	Street Addresses

Pollution Control Hearings Board PO Box 40903 Olympia, WA 98504-0903 **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 **Department of Ecology** Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503

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

On May 3, 2005, the City of Lacey (Lacey) filed an Application for a Water Right (G2-30250) with the Washington State Department of Ecology (Ecology) for a permit to appropriate public groundwater. The applicant requested authorization for an instantaneous withdrawal rate (Qi) of 800 gallons per minute (gpm) and a total annual withdrawal volume (Qa) of 1,000 acre-feet per year (afy) from one well.

Planned use of the appropriation is for general municipal supply. Lacey's water system currently serves approximately 65,000 residents, and is anticipated to serve 135,000 residents plus commercial at full buildout of the Urban Growth Area (UGA). Lacey's water system consists of water withdrawal, conveyance, and treatment facilities. The place of use is consistent with the City of Lacey 2003 Water Comprehensive Plan (Gray and Osborne) which is within the designated city water service area.

A preliminary permit was issued on July 30, 2008 to Lacey by Ecology. The preliminary permit authorized Lacey to complete drilling and testing of its well and required Lacey to present the testing results in a well construction and testing report. Lacey's final report was submitted to Ecology, dated December 31, 2008 (NLW 2008b).

Table 1 – Application Summary

Attributes	Summary
Name	City of Lacey – Meridian Campus Well
Date	May 3, 2005
Instantaneous Quantity	800 gpm (additive)
Annual Quantity	1,000 afy (additive)
Purpose of Use	Municipal Supply
Period of Use	Year round, as needed
Place of Use	City of Lacey approved water service area

Legal Requirements for Approval of Appropriation of Water

The following requirements must be met prior to authorizing the proposed water right:

- **Public Notice**
  Notice of the proposed appropriation was published in *The Olympian* of Olympia, Washington, on August 30 and September 6, 2005. No protests were received by Ecology.

- **State Environmental Policy Act (SEPA)**
  The subject application is categorically exempt under SEPA (WAC 197-11-305 and WAC 197-11-800(4)) because the instantaneous quantity is less than the 2,250 gpm threshold.

However, the Mitigation Plan submitted by the City of Lacey addresses impacts from six applications for groundwater right that, in sum, exceed the threshold for environmental review. The city, as the lead agency, completed an environmental review for all six water rights and determined on April 8, 2011 that these water rights will not have a significant adverse impact upon the environment and that an Environmental Impact Statement was not required under Chapter 43.21C.030(2)(c). This decision was made after review of:

- Completed Environmental Checklist - dated March 31, 2011,
- Letter from Department of Ecology dated March 18, 2011, and
- City of Lacey Comprehensive Water Rights Mitigation Plan, dated December 3, 2010.

- **Water Resources Statutes and Case Law**
  Chapters 90.03 and 90.44 RCW authorize the appropriation of public water for beneficial use and describe the process for obtaining a water right. Laws governing the water right permitting process are contained in RCW 90.03.250 through 90.03.340. Based on the provisions of RCW 43.21A.690 and RCW 90.03.265, this application has been processed by Aspect Consulting, LLC (Aspect Consulting) under Ecology Cost Reimbursement Agreement No. ASP001 (master contract No. C1000185).

INVESTIGATION

In consideration of this application, Ecology reviewed available documents pertaining to the application's site conditions, projected water demand, the potential effects on surface water bodies, and the potential effect on existing water right holders and established minimum instream flows. This review included information submitted by the applicant, including well construction and testing reports, leakage and surface water depletion analysis, and proposed mitigation strategies, along with pertinent Ecology records, including well logs and water rights records. The review also included reports from multiple investigations characterizing the hydrogeology and water quality of the area, as well as the documents resulting from the watershed planning processes.

A site visit was performed on August 16, 2006. Tyson Carlson of Aspect Consulting, lead by Julie Rector and Peter Brooks representing Lacey, visited several of Lacey's proposed and existing well sites. Since the site visit, extensive coordination between the Lacey, Ecology, and other project stakeholders has occurred in development of a Comprehensive Water Rights Mitigation Plan, which was prepared by Lacey (updated draft submitted in December 2010).

Regional project stakeholders include the cities of Yelm and Olympia, along with local Indian Tribes, Washington Department of Fish and Wildlife, and residents near Long, Hicks, and Pattison lakes. Coordination between the cities of Olympia, Lacey, and Yelm included joint refinement of a regional groundwater model. The model was used to identify potentially impacted surface waters, and to predict individual and cumulative impacts from additional groundwater pumping. Results of the modeling are the basis for development of the mitigation actions, including those that are jointly proposed for Woodland Creek, Deschutes River, and McAllister Creek basins. In addition, individual mitigation measures are proposed by each city to offset well-specific impacts.

Using this information, we evaluated water availability and potential effects of the proposed appropriation upon existing groundwater and surface water rights, including instream flows, and water quality. Each of the four requirements specified in RCW 90.03.290 were individually examined and findings presented below. Ecology has evaluated this application individually, and in connection with other applications filed by Lacey that are being processed at this time. In addition, Ecology has

evaluated this application in the context of other applications filed by the cities of Olympia and Yelm that are being processed at this time. Accordingly, the following investigation focuses on this individual application, but also as appropriate considers and references Lacey's other applications and the Olympia and Yelm applications.

Project Description

The Application for a Water Right submitted by Lacey seeks authorization to withdraw groundwater from one well, known as the Meridian Campus Well. The subject application is one of 6 applications addressed in the Mitigation Plan.

The water authorized under the new permits will service the long-term needs of the Lacey and the surrounding Urban Growth Area (UGA). Lacey's current water right portfolio includes 9,406.5 acre-feet (af) in primary (additive) water rights from over 44 permits and certificates (see Table 2), of which 8,645.3 af are currently available on system. Table 2 is a summary of Lacey's existing water rights portfolio. Previous demand projections predicted a supply deficit would occur by 2006; however, through water right acquisitions, efficiency measures, and administrative restrictions on growth (i.e. Resolution 917), current water supply is projected to meet demand through 2012. In total, the six new permits will provide an additional 7,392 afy. This quantity is expected to fulfill the current estimate for full build out of the UGA and infill within city limits – an approximate 30 to 40 year supply. The Meridian Campus well is projected to be in service by 2028.

Table 2 – City of Lacey's Water Right Portfolio

Source	Water Right Number	Priority Date	Qi in gpm	Qa in afy Additive	Qa in afy Non-Additive
Well No. 1	4578-A	4/26/1962	215	344	-
	G2-20880C	3/20/1973	450	-	240
Well No. 2	5655-A	8/19/1965	600	960	-
Well No. 3	7450-A	3/3/1969	206	330	-
Well No. 4	55-A (B)	9/19/1946	1800	623	-
	G2-23191C	4/19/1974	600	-	320
Well No. 6	G2-27373P(A)	8/13/1986	600	918	49.4
Well No. 7	G2-24351C	11/22/1976	2,150	-	2,775
Well No. 9	G2-25779C	2/10/1981	1,300	21	1027
Well No. 10	G2-25778A	2/10/1981	1,200	22	1649.75
Evergreen Estates	G2-20883C	3/20/1973	700	-	374
McAllister Well	G2-23743C	3/3/1975	500	-	400
	G2-26685	4/18/1985	300	157	-
Madrona Nos. 1	1288-A	2/2/1951	55	30	-
and 2 and 3	1777-A	6/6/1953	300	432	-
	3718A	4/4/1956	350	112	-
	3654-A	3/30/1959	283	452.8	-
	3823-A	7/13/1960	300	480	-
	6320-A	3/19/1968	150	108	-
	G2-20879	3/20/1973	300	-	160
	G2-25778(B)	2/10/1981	500	-	403.25

	G2-25778(C)	2/10/1981	550	-	855
	G2-20878C	3/20/1973	200	-	107
	G2-26623B	11/29/1984	440	132	-
	7450(B)	3/3/1969	920	1320	-
	G2-27373(B)	8/13/1986	200	-	322.6
	G2-25802C	2/24/1981	250	130	-
Pleasant Glade	G2-27372P	8/13/1986	800	-	1290
Hawks Prairie	G2-27371P	8/13/1986	800	1026	264
Beachcrest No. 1	G2-23963C	9/19/1975	250	211.7	-
Beachcrest No. 2	G2-24547C	5/12/1977	250	90	211.7
Beachcrest wellfield	G2-00767C	2/22/1971	20	7.5	-
Nisqually No. 19A	G2-20104C	4/6/1972	350	270	-
Nisqually No. 19C	G2-20882C	3/20/1973	250	-	270
Betti well	G2-27007	8/13/1987	1,000	468.3	-
Brewery Wellfield	(numerous)	1937 to 1982	2,172*	761.2*	-
Total			**21,311.0**	**9,406.5**	

* The brewery water rights total 6,515 gpm, 2283.53 AFY and are jointly owned by the cities of Lacey, Olympia, and Tumwater. The amounts shown represent Lacey's share of the rights.

The place of use for all six applications is consistent with the current City of Lacey Water System Comprehensive Plan which is the designated city water service area. The current water system plan was approved by the Department of Health in September 2003 (Gray and Osborne). An update to the water system plan, including updated demand projections, is pending following processing of the above mentioned application(s).

Site and New Source Description

The proposed point of withdrawal is located approximately 7,900 feet east of the existing Hawks Prairie Well No. 1, in the northeast quarter of the northwest quarter of Section 1 in Township 18 North, Range 1 West Willamette Meridian (WM).

The Meridian Campus test well was advanced in June 2008 to a depth of 667 feet below ground surface (bgs). Hydraulic testing was completed in three TQu aquifer zones (1 through 3) encountered at pumping rates from 151 to 448 gpm. The test well is currently completed with an 8-inch diameter casing and a well screen assembly from 497 to 657 feet bgs (TQu aquifer zones 1, 2, and 3). Static water level is 206.5 feet bgs (approximately 33 feet above sea level). Based on the hydraulic parameters observed during testing of the test well, NLW (2008b) estimated the maximum instantaneous pumping rate of a large (e.g. 20-inch) production well completed in zone 1, 2, and 3 to be at least 1,000 gpm with an estimated 125 feet of drawdown. Note the estimate does not include possible interference drawdown effects from other nearby wells completed in the same aquifer.

The well is located approximately 1.7 miles from the shoreline of Puget Sound on the Hawks Prairie peninsula, an area located between Henderson Inlet, the Nisqually Reach of Puget Sound, and the Nisqually River valley. The area is located within the greater Deschutes River basin (Water Resource Inventory Area [WRIA] 13) and the delineated Woodland Creek watershed boundary. The Hawks Prairie upland is located directly west of the Nisqually River system which is within WRIA 11.

Hydrogeologic/Hydrologic Assessment

The hydrogeology of the Hawks Prairie upland is defined by four major water bearing stratigraphic units. These units are described in the Hawks Prairie Area Hydrogeologic Characterization Report prepared for Lacey (NLW 2008a). The Vashon Drift, with its characteristic large thicknesses of stratified sand and gravel, gives rise to the uppermost aquifer in the *recessional outwash (Qvr)* deposits. The Qvr aquifer supports numerous shallow water table lakes and wetlands, and contributes to perennial base flow to creeks and rivers. Below, low permeable Vashon *till* (Qvt) often separates the upper recessional and the underlying advance outwash aquifers. The *advance outwash (Qva)* serves as a significant source of potable water for some smaller municipal and exempt water supply wells. The Qva is often hydraulically confined by the overlying low-permeability Qvt. Few water supply wells are completed in the Qvr due to its limited thickness; however, it is estimated that one half of the potable water in Thurston County is derived from the Qva, where present (Drost et al. 1999).

Below the Vashon Drift sequence is the clay and silts of the interglacial Kitsap formation. This unit typically acts as a regional aquitard, separating the shallow aquifers from the more regionally extensive deeper aquifers.

Underlying the Kitsap formation are deposits from the *"penultimate" glaciation (Qc)*, or more regionally identified as the Double Bluff Drift, which is present throughout most of the WRIA. The Qc aquifer is typically 15 to 70 feet thick, but has been observed to be in excess of 200 feet thick. The coarse grained layers within the Qc are a heavily utilized water bearing unit.

The deepest known major water bearing unit is the *undifferentiated and unconsolidated Quaternary and Tertiary sedimentary units (Qu/TQu)*. Although highly heterogeneous, several different water bearing layers have been identified and developed as water supplies, including several of the wells currently being evaluated. Few wells penetrate the entire thickness of the unconsolidated deposits, so information on thickness or extent of deeper regional water bearing zones is limited.

Groundwater Flow

In the shallow Vashon aquifers (Qvr and Qva), groundwater flow directions generally correspond to surface topography – with groundwater divides located near ridgelines, and flow tending toward marine (Henderson Inlet and Puget Sound) and local fresh water (Woodland Creek) discharge points. Groundwater flow is also locally affected by increased leakage through discontinuities in the till. The hydraulic effects of these discontinuities and of Woodland Creek are apparent, both in observed groundwater elevation contours (EES 1995) and in regional (Drost et al. 1999) and local groundwater modeling conducted to examine the effects of increased infiltration from LOTT's (the alliance of Lacey, Olympia, Tumwater, and Thurston County) Hawk Prairie Reclaimed Water Satellite Facility (Brown and Caldwell 2004) and the Woodland Creek Reclaimed Water Infiltration Facility (PGG 2010).

Groundwater flow in the intermediate Qc aquifer exhibits similar flow patterns as the overlying Vashon aquifers, but the effect of local surface water drainages is muted. Drost et al. (1999) concluded that deeper groundwater discharges principally to regional discharge features like the Nisqually and/or McAllister River system and Puget Sound. However, similar to the Vashon aquifers, groundwater divides in the Qc aquifer are near topographic ridgelines, with flow directions toward the regional discharge features described above. An analogous flow pattern is observed in the deeper TQu aquifer. In addition, TQu aquifer water levels in the Hawks Prairie area are heavily influenced by tidal variations several miles inland (NLW 2008a).

The Meridian Campus test well is completed in the TQu aquifer. Testing of the well following completion indicate a transmissivity of TQu aquifer zones 1, 2, and 3 of approximately 19,000 to 30,000

gpd/ft (2,540 to 4,011 ft^2/d). Transmissivity of TQu aquifer zone 3 (and subunit 3.5) were lower, ranging from 2,100 to 7,000 gpd/ft (281 to 936 ft^2/d).

Water Quality

Deep groundwater in the Hawks Prairie areas has characteristically elevated concentration of naturally occurring iron and manganese, which exceed their respective secondary Maximum Concentration Limits (MCL) based on aesthetics. All primary MCLs are met.

Lacey has constructed the Hawks Prairie treatment facility to remove elevated concentration of iron and manganese from Hawks Prairie well No. 1, and this facility has capacity to also provide treatment for additional TQu aquifer wells.

Saltwater Intrusion

The Hawks Prairie Area Hydrogeologic Characterization Report (NLW 2008a) evaluates the risk of saltwater intrusion from four TQu aquifer wells proposed by Lacey in the Hawks Prairie area. In addition to evaluating the cumulative effect of progressively increasing groundwater withdrawals from the TQu aquifer in the Hawks Prairie area, the modeling evaluated impacts from average high and average low hydraulic conductivity values determined from field pumping test wells.

Based on this analysis, NLW has made a series of recommendations (2008a) regarding the need for background and continuous groundwater level monitoring in the TQu aquifer during development and production of the Meridian Campus well. NLW has also recommended that the Beachcrest test well be used as a sentinel monitoring well and, in addition to groundwater level elevation, be monitored for specific conductance as an indicator of chlorides in groundwater.

At Ecology's request, Lacey completed additional analysis (NLW 2011) specifically examining the risk of saltwater intrusion in the TQu aquifer from pumping of the Marvin Road and Meridian Campus wells. The analysis evaluated the conservative assumptions used in the characterization report (2008a) and provided additional qualitative evidence to support the proposed TQu withdrawals. The report concluded that, although saltwater intrusion in the TQu aquifer is unlikely to occur, groundwater levels will likely be drawndown from current conditions. To ensure that the drawdown does not induce saltwater intrusion, the report presents a monitoring strategy for the phased development of the three (Hawks Prairie No. 2, Marvin Road, and Meridian Campus) TQu aquifer wells. The monitoring strategy includes the following components:

- Install a near-shore monitoring well in the TQu aquifer;
- Monitor groundwater levels and water quality in all City-owned TQu wells on the Hawks Prairie Peninsula to establish baseline aquifer conditions;
- Evaluate groundwater level and water quality data prior to the Marvin Road and Meridian Campus wells being placed into production; and
- Continued monitoring in TQu aquifer wells for the life of the water right permit(s) to ensure saltwater intrusion does not occur.

Detailed analysis of the data will be completed at critical milestones and submitted to Ecology for review. If the data and/or analysis indicate a possibility of saltwater intrusion, mitigating measures will be implemented. The mitigating measures may include reduction or cessation of pumping from one or more wells completed in the TQu aquifer. Details regarding implementation of the monitoring strategy and reporting to Ecology is summarized in Table 3 (NLW 2011).

Water Resource Inventory Area 13

WRIA 13 includes the Deschutes River watershed and several other smaller watersheds, including the Eld, Budd, and Henderson Inlets. The Henderson Inlet watershed contains two major streams – Woodard and Woodland Creek – in addition to a half dozen smaller drainages that emanate from coastal valleys sloping toward Puget Sound. The headwaters of Woodland Creek begin on the Hawks Prairie upland, with a chain of lakes (Hicks, Pattison, and Longs Lakes) and interconnected wetlands. Below the headwaters, Woodland Creek is typically ephemeral, but a large spring below Martin Way provides perennial baseflow to the creek. In addition, several tributaries joining Woodland Creek below the springs also contribute to summer baseflow. Approximately 90% of the Woodland Creek basin falls within Lacey's Urban Growth Area. The four Lacey water right applications for the Hawks Prairie area that are currently under consideration are located in or directly adjacent to the delineated Woodland Creek watershed.

Due to the nature of the shallow soils and the generally flat topography of the upper Woodland Creek basin, it is estimated that a majority (80 to 90 percent) of the infiltrated precipitation either discharges directly to Puget Sound or across the WRIA 11 boundary to McAllister Creek and the Nisqually River system (Clingman 2001).

The WRIA 13 watershed planning process was to *"create a long-range water resource management framework to protect aquatic habitat and provide water for vital community needs."* The key challenge for the watershed planning group, consisting of governmental, tribal, and private entities, was to balance the water needs of a growing region with the imperative to preserve adequate stream flows (WRIA 13 2004b).

Although the draft WRIA 13 Watershed Plan was not finalized or officially adopted by the Planning Unit several recommendations were made, based on the additional data collected during the planning process, regarding how to best implement the three major planning elements – Water Quantity, Water Quality, and Instream Habitat. The availability and appropriation of public water was a central theme to all elements considered.

Minimum Instream Flows – WRIA 13

Chapter 173-513 WAC outlines an instream resources protection program and specifies minimum instream flows for the Deschutes River Basin and WRIA 13. The program effectively limits, and in some cases prohibits, the further issuance of consumptive water rights that could affect flows. The Chapter 173-513 WAC also stipulates that lakes and ponds in WRIA 13 are to be "retained substantially in their natural condition while considering future allocations."

The Chapter 173-513 WAC specifies the Deschutes River, from river mile 41 to the confluence with Capitol Lake, is subject to instream flows and seasonally closed April 15 to November 1. In addition, Woodland Creek and all its tributaries, including Long, Pattison, and Hicks Lake, are closed to further consumptive appropriations, year round. This implies that no consumptive water is available following adoption of Chapter 173-513 WAC (June 24, 1980), unless it is verified that such appropriation would not adversely impact the neighboring closed water body.

Water Resource Inventory Area 11

WRIA 11 is divided into seven subbasins. The subbasins represent surface drainage areas of significant tributaries to the Nisqually River. However, subbasin delineation, similar to the boundaries of the WRIA, often do not correspond with groundwater divides or aquifer boundaries – such as the administrative

delineation between the Hawks Prairie upland of WRIA 13 and the McAllister Creek subbasin of WRIA 11.

The Nisqually Tribe and the WRIA 11 Planning Unit completed a Watershed Management Plan in October 2003. The main objective of the plan is to *"develop a comprehensive strategy for balancing competing demands for water, while at the same time preserving and enhancing the future integrity of the watershed."* The scope of the plan was focused on examining and presenting recommendations on five key issues: growth and land use, groundwater resources and supply, water rights, instream flow and surface/groundwater continuity, and water quality.

The WRIA 11 Plan presented several recommendations for processing water rights within WRIA 11. The recommendations include batch processing of water right applications by subbasin, along with filling identified data gaps prior to processing. The Plan also offers 16 possible mitigation strategies for consideration in processing water rights.

Minimum Instream Flows – WRIA 11

Similar to the WRIA 13 instream flow rule described above, Chapter 173-511 WAC outlines an instream resources protection program and specifies minimum instream flows for the Nisqually River Basin and WRIA 11.

Most applicable to Lacey's applications are the year-round closure of McAllister Creek and all its tributaries (except Medicine Creek) and Lake Saint Clair. In addition, Chapter 173-511 WAC divides the mainstem Nisqually River into four stream management units (SMU): lower, bypass, middle, and upper reaches. Chapter 173-511 WAC specifies control points (stream gages) for each of the four mainstem SMUs, and specifies minimum instream flows for all months of the year at each control point. The control point for the Lower Reach is located at river mile 4.3, which represents the reach between the influence of the mean annual high tide (at low flow conditions) and the outlet of the Centralia City Light Power Plant (river mile 12.6). In addition, the bypass and middle reaches of the mainstem Nisqually River are closed to further consumptive appropriation from June 1 to October 15.

Flows in the Nisqually River are controlled by the Tacoma Power operated LaGrande Dam and the Centralia City Light operated river diversion near Yelm. These projects are regulated by the Federal Energy Regulatory Commission (FERC) and are required to be operated at a level that ensures sufficient instream flow for fish in the Nisqually River.

In 2001, Ecology completed a study examining instream flows in the lower reach of the Nisqually River. As a surrogate for the control point at RM 4.3, a numerical relationship was developed predicting flows in the lower reach from two upstream USGS gages and the study-specific discharge measurements collected at RM 4.6. Comparison of the numerical relationship to historical data indicate that minimum instream flows in the lower reach have been met much of the time, except for only a couple known failures.

Predicted Impacts to Instream Flows and Closures

Hydrogeologic impacts associated with this application were evaluated through joint-development of a regional groundwater model with all project stakeholders. Based on the original Thurston County groundwater model developed by the United States Geologic Survey (Drost et al. 1999), the groundwater model was originally developed for Olympia for evaluating impacts to surface water bodies

near McAllister Springs and Olympia's proposed McAllister Wellfield (Golder 2008). The model was subsequently updated and improved by the cities of Lacey, Olympia, and Yelm to include additional surface water features and refinements in hydrostratigraphy. The cities of Olympia and Yelm also used the updated model to conduct evaluations of their proposed water right applications.

Modeled impacts due to increased pumping in the Hawks Prairie area are presented in Golder (2008) and in City of Lacey (2010). Aggregated groundwater discharge changes to main hydrologic features due to pumping of Meridian Campus well are summarized in Table 3 below.

Table 3 – Modeled Impacts from Meridian Campus Well (Golder 2008; City of Lacey 2010)

Basin	Maximum Annual Depletion cfs	Month	Average Annual Depletion afy
Woodland Creek at Henderson Inlet	0.05	Mar	29
McAllister Creek at Medicine Creek	0.14	Aug-Sept	86
Nisqually River at RM 4.3	0.09	July-Oct	55
Deschutes River at Tumwater Falls	0.02	Jan-Dec	13

Cumulative impacts of all six applications under consideration for the City of Lacey, including maximum instantaneous predicted depletions (in cfs) and cumulative annual impacts (in afy) are summarized in Table 4.

Table 4 – City of Lacey's Cumulative Modeled Impacts (City of Lacey 2010)

Basin	Maximum Annual Depletion cfs	Average Annual Depletion afy
Woodland Creek at Henderson Inlet	0.83	486
McAllister Creek at Medicine Creek	1.91	1,232
Nisqually River at RM 4.3	0.82	531
Deschutes River at Tumwater Falls	0.34	179

Cumulative regional impacts, including the proposed withdrawals for the City of Olympia and/or Yelm are presented in Table 5. Positive sign indicate a net gain in discharge.

Table 5 – Cumulative Regional Impacts by Cities of Lacey, Olympia, and Yelm

Basin	Maximum Annual Depletion cfs	Average Annual Depletion afy
Woodland Creek at Henderson Inlet	1.06	631
McAllister Creek at Medicine Creek	+6.72 to 18.72	+7,260
Nisqually River at RM 4.3	6.47	4625
Deschutes River at Tumwater Falls	0.95	258.23

To address the impacts to instream flows, a Comprehensive Water Right Mitigation Plan (Lacey 2010) was developed in conjunction with project stakeholders and submitted to Ecology for review. The Mitigation Plan is designed to mitigate for all six subject water right applications. Several of the elements included in the plan are shared amongst the cities of Olympia, Lacey and Yelm, and in the development of the Mitigation Plan Lacey developed collaborative mitigation strategies with the cities of Olympia and Yelm for the Deschutes and Woodland Creek Basins through Interlocal Agreements.

The plan utilizes the benefit of both in-kind (direct replenishment of flow) and out-of-kind (riparian protection and habitat improvements) elements. This is consistent with recommendations for mitigation outlined in the Nisqually Watershed Management Plan (WRIA 11).

Mitigation is proposed in a three phase approach as new water supplies are developed to meet increasing demand. Phase 1 of the mitigation program includes two applications (G2-30248 and G2-30249) necessary to meet Growth Management Act obligations in the near-term. Phase 2 applications (G2-29304 and G2-30251) are projected to meet demand from 2018 - 2026. Phase 3 applications (G2-29165 and G2-30250) will be developed by year 2020 and are anticipated to meet future demand through the next 30 to 40 years.

A summary of mitigation actions proposed by Lacey (2010) by river basin is included in the sections below. Mitigation of regional and application specific impacts for the cities of Olympia and Yelm are summarized in the ROEs for those applications.

Woodland Creek

Offset of impacts to Woodland Creek will include both in-kind and out-of-kind mitigation. Regional In-kind mitigation with the city of Olympia will include groundwater recharge via infiltration of Class A reclaimed water produced at LOTT's Martin Way Reclaimed Water Plant. Location of the infiltration facility is in the Woodland Creek basin, between Goose Pond and Goose Lake at the Woodland Creek Community Park. Infiltration will be phased in to coincide with development of Lacey's and Olympia's permits. Reclaimed water will be infiltrated at a seasonal rate between 0.3 (winter) to 0.8 (summer) million gallons per day (mgd).

The modeled feasibility and effectiveness of infiltration of reclaimed water are presented in PGG (2010). The study indicates that seasonal infiltration of 0.3 to 0.8 mgd would provide an increase in Woodland Creek flow by 0.39 to 0.72 cfs, winter and summer, respectively. However, final infiltration rates will be determined by water quality permitting, and verified through performance monitoring. The cities have proposed to take an adaptive management approach for phasing in mitigation for Phases 1 and 2, and then Phase 3. Data collected during implementation of Phases 1 and 2 of mitigation will be used to further optimize design of the facility by the time Phase 3 water rights will be developed. However, the efficacy of mitigation is not anticipated to be sufficient to offset the Phase 3 summer impacts and Phase 2 and 3 winter impacts.

Specific to predicted impacts to the tri-lakes (Hicks, Pattison, and Long), no in-kind mitigation directly benefiting the surface water bodies is proposed.

Out-of-kind mitigation includes the acquisition of property and/or conservation easements along Woodland Creek to increase the amount of undeveloped protected land along the creek. As part of the regional mitigation package, the three cities will jointly purchase approximately 30-acres of undeveloped property in the basin. Separate from the regional out-of-kind mitigation, Lacey will

provide additional mitigation in the basin, consisting of a $500,000 commitment for additional restoration projects and/or property acquisition over a ten year period.

McAllister Creek Basin

Regional mitigation in McAllister Creek will be provided by Olympia when it transfers its water rights and current surface water withdrawal of up to 21,969 afy from McAllister Springs to the McAllister Wellfield. The McAllister Wellfield is located about one mile south-southeast of McAllister Springs.

When Olympia ceases diverting water from McAllister Springs and starts withdrawing water from the McAllister Wellfield, the flow in McAllister Creek is predicted to increase by up to 6.72 to 18.72 cfs, which will offset the predicted impacts from all three cities, including Lacey's predicted impact of 1.91 cfs.

Nisqually River Basin

Lacey's predicted depletion to the Nisqually River system is limited to the lower reach. The lower reach of the Nisqually River is open year round to appropriation, subject to seasonal instream flows at river mile (RM) 4.3.

As stated in the Mitigation Plan, Lacey will discontinue use of its two wells located in the Nisqually Valley. The two wells have associated water rights (G2-20882 and G2-20104C) totaling 600 gpm (Qi) and 270 afy (Qa).

Deschutes River Basin

Impacts to the Deschutes River Basin will be offset through joint regional mitigation measures, which will include both in-kind and out-of-kind elements. During the closed period (April 15 to November 1), impacts will be partially mitigated through the acquisition and retirement of consumptive irrigation water rights. Together, the three cities have purchased 270 af of certificated water rights from two separate irrigation rights which they intent to retire:

1. S2- 00972C (Dillard and Juanita Jenson): 100 afy and 0.50 cfs; and
2. G2-26862G (Ron Smith): 170 afy and 0.67 cfs.

Out-of-kind mitigation is proposed to offset impacts during the non-irrigation season, including land acquisition and habitat restoration. The cities have jointly purchased approximately 200 acres of the Smith Farm located on the upper reach of the Deschutes River. The cities have also identified several riparian and habitat projects that will be completed, including: channel improvements, reestablishment of wetlands, installation of a cribwall to prevent erosion, and planting of several low- and high-density riparian buffers. The restoration and rehabilitation will take several years and is expected to be completed by year 2016.

APPLICATION EVALUATION

This Report of Examination (ROE) evaluates the application based on the conceptual model presented above. To approve the application, Ecology must determine that each of the following four requirements of has been satisfied:

(1) Beneficial Use – the proposed appropriation would be put to a beneficial use;
(2) Availability – water is available for appropriation;
(3) Impairment – the proposed appropriation would not impair existing water rights; and
(4) Public Interest – the proposed appropriation would not be detrimental to the public interest.

Source of Water Proposed for Appropriation

The applicant seeks to withdraw water from one well located in the northeast quarter of the northwest quarter of Section 1 in Township 18 North, Range 1 West Willamette Meridian (WM). The well is located approximately 7,900 feet east of the existing Hawks Prairie Well No. 1. The application requests an appropriation from the deep TQu aquifer.

Although the TQu aquifer may not be in direct geologic contact with nearby surface water, widespread drawdown effects from pumping of the well may induce increased vertical leakage from shallower aquifers which, in turn, may reduce baseflow contribution to regulated surface water bodies. Consequently, Lacey's application is considered to be in hydraulic continuity and competing for water within the Nisqually and Deschutes River basins, which are limited to further appropriation under Chapters 173-511 WAC and 173-513 WAC, respectively.

Water Availability and Impairment of Flows

Both Chapters 173-511 WAC (Nisqually Basin) and 173-513 WAC (Deschutes Basin) state the purpose of the rules is to retain perennial rivers and streams with instream flows and levels necessary to provide protection for wildlife, fish, scenic-aesthetic, environmental values, recreation, navigation, and water quality.

The rules close portions of the Nisqually and Deschutes Rivers and some other water bodies to further consumptive appropriations and establish specific instream flows on the rivers. Lacey has proposed to use water for municipal supply purposes in a manner that is predicted to deplete flows in both the Deschutes River and Nisqually River basins in periods when the rivers are closed or when they may not meet adopted instream flows.

Stream "closures" are determinations by Ecology under RCW 90.54.020 that water is not *available* for further appropriations. *See Postema v. PCHB*, 142 Wn.2d 68, 95, 11 P.2d 726 (2000). However, a stream closure may, in certain circumstances, be overridden under an exception that authorizes a new appropriation from a closed stream "in those situations where it is clear that overriding considerations of the public interest will be served." (RCW 90.54.020(3)(a). Similarly, under this statute an instream flow can be overridden if "overriding considerations of the public interests are served."

In making a statutory determination of overriding considerations of public interest under RCW 90.54.020(3)(a), the analysis applies three steps:

1. Determine whether and to what extent important public interests would be served by the proposed appropriation. The public interests served may include benefits to the community at large as well as benefits to the river or other environmental resources;
2. Determine whether and to what extent the proposed appropriation would harm any of the public interests (fish, wildlife, scenic, aesthetic, and other environmental and navigational values) protected by the closure and/or any other public interests; and
3. Determine whether the public interests served (as determined in Step 1) clearly override any harm (as determined in Step 2).

The following sections of this report present this three-step OCPI analysis.

Analysis of Public Interests Benefitted by the Water Supply Proposal

Public Water Supply Benefits. When the total package of mitigation measures is considered, the Mitigation Plan proposed by Lacey results in a net ecological benefit for water resources specifically and natural resources generally. The substantial water quantity mitigation provided by joint acquisition of two water rights (Smith and Jensen) benefits the key reaches of the Deschutes River at critical times of the year. For example, water quantity mitigation benefits target the upper and middle reaches of the Deschutes River, whereas the majority of the impacts occur in the lower reach of the river. The few water depletions predicted by modeling occur in less critical areas and in the winter and shoulder

seasons that are less critical to the ecological values protected by regulations. In addition, timing of mitigation measures are phased to match development of the water right such that mitigation will occur at the same time or before the corresponding impacts take place.

Lacey's water rights would provide a significant source of public water supply addressing future needs of customers and business served by Lacey. Providing reliable public water supplies that meet the needs of population and economic growth is an important state policy recognized in RCW 90.54.010 and RCW 90.54.020. Lacey's forecast predicts that without the new appropriation Lacey would have an unmet need in excess of 7,200 afy by 2030. The new water supply would provide a measure of water security to Lacey.

McAllister Creek Benefits. While Lacey's water right proposal will result in impacts to McAllister Creek, the overall effect of the combined actions of the three cities will result in greater flows to McAllister Creek. This will provide substantial benefit to the continued restoration of the McAllister Creek Basin.

Deschutes River Benefits. Lacey, in collaboration with the cities of Olympia and Yelm, are offsetting predicted flow depletions in the Deschutes River and significantly enhancing fish and wildlife habitat in the basin using two methods:

- Flow mitigation (in-kind) through acquisition and retirement of irrigation water rights, and;
- Land acquisition and habitat restoration (out-of-kind).

As part of a shared mitigation strategy, the cities of Olympia, Lacey and Yelm have purchased a farm (Smith Farm) along with its water right, and the water right from another farm (Jensen Farm), both of which are located in the Deschutes watershed. The cities would retire the water rights and conduct habitat improvement projects on the Smith Farm. The cities have acquired consumptive irrigation water rights that will mitigate predicted impacts by returning water to the river during most of the low-flow closure period. Both water rights total 270 acre feet of water during the irrigation season (May through September). The cities gave higher priority to the acquisition of surface water rights in the upper and middle reaches of the Deschutes River, to ensure that mitigation was in the same reach as, or upstream of, predicted impacts. For Lacey, this approach provides a considerable amount of additional benefit to the upper and middle reaches of the river, since the majority of Lacey's predicted impacts are in the lower reach.

In addition, the three cities have proposed an out-of-kind mitigation package for the non-irrigation period (October through April) impacts on the Deschutes. The proposed out-of-kind mitigation will result in numerous habitat improvements on the Smith Farm including habitat enhancements to over one mile of mainstem riparian habitat on the Deschutes River, as well as side channel and wetlands enhancements. The Cities propose land acquisition and habitat restoration as the most appropriate strategy for "winter" impacts. These actions can have greater biological benefits during the winter than flow mitigation. For example, in the Deschutes, one of the primary limiting factors for fish in the winter is the availability of off channel rearing habitat and/or large woody debris that provide protection from high main stem flows. In addition, these restoration actions will have year-round benefits and basin wide improvements in water quality.

The Cities have jointly purchased over 200 acres of farmland which is located in the upper reach of the Deschutes River. This property is currently a sheep ranch and has been altered considerably from a natural condition. The property includes Deschutes River frontage, most of the frontage of the outlet

channel from Lake Lawrence, and springs that flow via the outlet channel to the Deschutes River. To evaluate the Smith Ranch's potential for water rights mitigation, the cities contracted with Anchor QEA to conduct an acquisition and restoration assessment of the site. Anchor QEA concluded that this site is uniquely situated to provide habitat restoration benefits.

Ecology's October 2008 Draft TMDL report for the Deschutes River recommends riparian plantings, stream channel restoration, reduction of fine sediments, and elimination of animal wastes to reduce temperatures, improve dissolved oxygen levels, and reduce fecal coliform bacteria.

Woodland Creek Benefits. The predicted impacts to Woodland Creek will be addressed with a combination of in-kind and out-of-kind mitigation. In-kind mitigation will include infiltration of Class A reclaimed water produced at LOTT's Martin Way Reclaimed Water Plant. The location of the infiltration facility is in the Woodland Creek Basin, near the Woodland Creek Community Center in Lacey. Reclaimed water will be infiltrated at a seasonal rate between 0.3 (winter) to 0.8 (summer) million gallons per day (mgd). Out-of-kind mitigation will be provided through property acquisition resulting in habitat preservation.

Benefits to the Woodland Creek system include in-kind mitigation through the infiltration of Class A reclaimed water. Flow-related mitigation for all predicted impacts in the Woodland Creek basin (excluding Phase 2 and 3 during winter months) will occur through a regional reclaimed water infiltration facility to be located near the headwaters of Woodland Creek in Lacey. The facility will infiltrate reclaimed water year-round, with the purpose of recharging groundwater that provides base flows to Woodland Creek. The proposed infiltration facility will increase flows in Woodland Creek.

For out-of-kind mitigation, the cities of Lacey and Olympia have purchased approximately 30 acres of undeveloped property in the basin that includes 2,200 feet of Woodland Creek frontage and 650 feet of Fox Creek frontage. Riparian land protection will supplement the available flow mitigation for winter months, and since the benefits will be year-round, this will further increase summer mitigation

Analysis of Public Interests Potentially Harmed by the Proposal

Nisqually River Impacts. Lacey's withdrawal of water under all six permits will deplete flows in the Nisqually River by up to 0.82 cfs (531 afy annually). The flow of the Nisqually River is controlled by releases at Alder Dam, and the releases are intended to ensure flows on the river are met and exceeded. Ecology's (2001) analysis indicates that on rare occurrences flows are not being met on the lower reach at RM 4.3. On these rare occasions, up to 0.82 cfs modeled depletion could occur when flows are not met on the river.

Deschutes River Impacts. Lacey's withdrawal of water under all six permits will deplete flows in the Deschutes River during the non-irrigation period (October 1 through April) by up to 0.34 cfs. Flows are not met approximately 25 to 30 percent of days during this period. In addition to the instream flows, the Deschutes River is closed to further appropriation in October. Therefore some depletion will occur when flows are not met or the river is closed to further appropriation. The impacts to the Deschutes River basin in the fall and winter are not being fully mitigated in-kind.

Woodland Creek Impacts. Lacey's withdrawal of water under all six permits will have impacts to Woodland Creek that will largely be mitigated through the discharge and infiltration of reclaimed water in Woodland Park as described above. Modeling has shown that in the dry season, the cities can infiltrate up to 0.8 MGD of reclaimed water to the shallow aquifer compensating for decreased flows in

Woodland Creek. In the wet season, only about 0.3 mgd can be infiltrated without causing adverse affects. The reduced amount of infiltration will occur during the wet season when flows in Woodland Creek are not at critical low flow. Woodland Creek is closed year-round and the winter impacts to the creek will not be fully mitigated in-kind.

Tri-Lakes Impacts. Lacey's wells will have impacts on the Tri-Lakes (Hicks, Pattison, and Long Lakes) with a potential maximum decrease of less than one inch in lake levels. The lakes have a natural yearly variation of 0.5 to 4 feet. Whereas the impacts are small, the lakes are closed to further appropriation, and are not being fully mitigated in-kind.

Summary of OCPI Analysis

The conclusion of the OCPI analysis can only be reached by weighing the potential benefits and harms to the public interest. When all of the public interest benefits and harmed are compared, it becomes evident that the potential benefits clearly outweigh the potential harms. Although the Mitigation Plan provides in-kind mitigation in the form of purchased existing water rights, there are small depletions of the Deschutes River, Nisqually River, Tri-Lakes, and Woodland Creek that cannot be mitigated in-kind. These small depletions are the only public interest potential harms that have been identified in this evaluation. The package of in-kind and out-of-kind mitigation offered by the three cities and the Nisqually Indian Tribe will result in net ecological benefit and provide significant public health, safety and welfare benefits.

Lacey (together with Olympia and Yelm) proposes in-kind mitigation that addresses the majority of surface water depletions. The water quantity mitigation provided by acquisition of water rights (Smith and Jensen), along with reclaimed water infiltration, benefits the key reaches of water bodies at critical times of the year. In addition, water quantity mitigation benefits target the upper and middle reaches of the Deschutes River, whereas the impacts are centered in the lower reach of the river.

Impacts to McAllister Creek will be mitigated in-kind by Olympia moving their surface water diversion to a wellfield which will increase flows to McAllister Creek.

Although there will be impacts to the flows in the lower reach of the Nisqually River, the river flows are controlled by the city of Tacoma as required under its FERC license. Therefore, these mandated flows result in the Nisqually River rarely falling below the established instream flows.

The out-of-kind mitigation will improve environmental conditions in both the Woodland Creek and Deschutes watersheds. This includes mainstem, side channel, and wetland habitat enhancements in the Deschutes to benefit fishery and water quality and habitat protections in Woodland Creek to benefit fishery and water quality. The few unmitigated impacts to flow on the Deschutes River are during the closure period and are minor relative to the habitat, water quality, and flow enhancement benefits of the out-of-kind habitat restoration.

Impacts to the Tri-Lakes are small. Unmitigated impacts to Woodland Creek occur during the wetter season and will be compensated through out-of-kind mitigation by the purchase of land and riparian habitat in the watershed.

In summary, the public interest benefits of the subject application requested by Lacey and the five additional applications requested by Lacey, along with the water right applications requested by

Olympia and Yelm, override any public interest detriments associated with the subject application and with the three cities' new water supply and change of source projects.

Saltwater Intrusion

A common concern along the Puget Sound coastline is intrusion of saltwater induced by pumping of nearshore wells. Saltwater intrusion occurs when head near the submarine outcropping of an aquifer is sufficiently reduced so that it can no longer counter the opposing head of denser saline water; thus, allowing saline water to laterally migrate into the aquifer. Saltwater may also intrude into the aquifer vertically in response to pumping, a phenomena known as upconing.

Based on the analysis presented in NLW (2008a, 2011), we conclude that although the likelihood of saltwater intrusion is low, the water right permit will be provisioned for baseline and long-term monitoring to ensure that pumping will not induce saltwater intrusion. The monitoring strategy is summarized in Table 3 in NLW (2011).

Impairment Considerations

NLW (2008a) modeled drawdown impacts to senior water rights in the TQu aquifer at the nearby Glacier Park and Silver Hawk wells. Both wells are known to be in continuity with several of Lacey's test wells completed in the TQu aquifer. The drawdown analysis indicates the average annual drawdown from the cumulative pumping at Lacey's Hawks Prairie Well No. 2, Marvin Road, and Meridian Campus wells would be approximately 15 to 32 feet on the Silver Hawk and Glacier Park wells. These drawdown estimates represent about 10 percent of the total available drawdown in senior TQu wells.

In addition to the wells evaluated above, the Ecology database was queried for additional well logs within a 1.0-mile radius of the subject application for water supply wells completed in the TQu aquifer. Results of the search indicated there were no wells completed to a depth greater than 400 feet below ground surface (inferred TQu contact elevation). We therefore conclude that although pumping interference effects are likely, no impairment of existing rights in the TQu aquifer is anticipated with full use of the requested quantity.

Additional analysis was presented in NLW (2008a) indicates that pumping of the TQu aquifer (zone 1, 2, and 3) has no discernible impact on water levels in the Qc aquifer. Wells completed in the Qc are separated from the TQu aquifer by a thick (100 to 300 feet) aquitard. This unit greatly limits the hydraulic connection between the Qc and TQu aquifers. Therefore, impairment of wells completed in shallower aquifers is also not expected to occur.

Beneficial Use

In accordance with RCW 90.54.020(1), the proposed appropriation for municipal use represents a beneficial use of water.

Detailed planning on how to deliver and manage water in Lacey's water service area will be presented in the update to the Comprehensive Water System Plan. The water will be used at rates consistent with established municipal demand in Western Washington, including all standards required in the Department of Health's Water Use Efficiency Program.

Public Interest Considerations

The final test pertaining to the granting of a water right is the requirement that the appropriation not be detrimental to the public interest. The effects of the appropriation on the public interest are analyzed in

the availability section above, where it was concluded that overriding consideration of public interest clearly support approving the application.

RECOMMENDATIONS

Based on the above investigation, 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:

800 gpm
1,000 acre-feet per year
Municipal Supply

Point of Withdrawal
NE¼, NW¼, Section 1, Township 18 North, Range 1 West WM

Place of Use
As described on Page 1 of this Report of Examination.

Report by Tyson D. Carlson, LHG, Aspect Consulting, LLC *Date*

Phil Crane 12/19/2011

Reviewed by Philip Crane, Water Resources, SWRO *Date*

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